List of Appendices

Appendix E -- Habitat Baseline 1998 and Monitoring Protocol

Appendix E. Habitat Baseline 1998 and Monitoring Protocol

Introduction

The 1998 baseline reflects the best available habitat measures representing ground conditions inside the Primary Conservation Area (PCA) as of 1998. Habitat standards identified in the Conservation Strategy pertain to secure habitat, developed sites, and livestock grazing allotments. The standards demand that all three of these habitat parameters are to be maintained at or improved upon conditions that existed in 1998. The 1998 baseline represents the best estimate of what was known to be on the ground at the time and establishes a benchmark against which future improvements and/or impacts can be assessed. It also provides a clear standard for agency managers to follow when considering project effect analysis. This appendix documents estimates for baseline values so that current and future habitat conditions throughout the PCA can be evaluated for compliance with habitat standards as formalized in the Conservation Strategy. In theory, the 1998 baseline should be a static measurement bound to a single point in time. In reality, this baseline continues to evolve as more reliable information is acquired; errors in the baseline are identified and corrected; and as new geoprocessing tools are developed to more accurately model secure habitat and estimate road densities. Since the release of the 2007 Conservation Strategy, new information has become available and some errors in the 1998 baseline have been identified. Consequently, baseline values have been adjusted where necessary to more accurately reflect 1998 ground conditions. The 1998 baseline database will continue to be improved upon when and if legitimate errors are identified. Features found to be erroneously excluded from the 1998 baseline will be reviewed as to their actual status in 1998. If reliable information is made available to substantiate the existence of these features in 1998 then corrections to the baseline will be made. All corrections made to the baseline will be documented, tracked, and reported in the Interagency Grizzly Bear Study Team (IGBST) annual reports. Baseline values presented in this appendix represent the best available information at this time and will serve as a basis for monitoring and evaluating improvements in habitat conditions and identifying any need for mitigation measures in the future.

Secure Habitat and Motorized Access Route Density

Maintaining or improving secure habitat at or above 1998 levels inside the PCA is a required habitat standard. To monitor compliance with this standard, secure habitat is annually measured and compared against 1998 levels for each bear management subunit. The best estimates of secure habitat levels that existed in 1998, per subunit, constitute the 1998 secure habitat baseline (Table 1). Measurement of secure habitat is based on configuration of motorized routes. Routes that are open to the public at any time during the non-denning season (March 1–November 30) detract from secure habitat. Likewise, gated routes that are closed to the public but remain accessible to administrative personnel also detract from secure habitat. Decommissioned routes that effectively prohibit motorized use by the public and administrative personnel do not detract from secure habitat.

The density of motorized routes on the landscape is monitored inside the PCA; however, there are no mandatory standards for motorized route density. Monitoring protocol requires that open motorized access route density (OMARD) and total motorized access route density (TMARD) inside the PCA be monitored and reported against 1998 levels annually.

Secure habitat is any contiguous area greater than 10 acres in size and more than 500 meters (m) from an open or gated motorized route. OMARD is a measure of the density of motorized routes (roads and trails) that are open to the public for one or more days during the non-denning portion of the year when grizzly bears are active (March 1 – November 30). TMARD measures the density of motorized routes open to the public and/or administrative personnel for one or more days during the non-denning season. Hence, routes that are gated to the public year-round and accessible only to administrative staff contribute to TMARD but do not count toward OMARD. OMARD is reported at levels > 1.6 kilometer (km) per 2.6 square kilometer (sq km) (> 1 mile (mi) per square mile (sq mi)) while TMARD is reported at levels > 3.2 km per 2.6 sq km (> 2 mi per sq mi). State, county, and private roads occurring on federal lands are included in these calculations; however, roads occurring on private inholdings reflect 1998 conditions and are not updated in the motorized access database through time.

Calculations for percentage of secure habitat, OMARD, and TMARD are generated using the Motorized Access Model, a suite of customized geoprocessing tools compatible with ArcGIS software. Algorithms built into the model generate a 500 meter buffer around all relevant motorized features. Areas larger than 10 acres in size that fall outside this buffer are designated secure habitat. Methods for measuring route density have greatly improved with advancements in geoprocessing tools since earlier versions of the Conservation Strategy were released. Starting in 2009 a more accurate method for measuring line density was implemented into the ArcGIS software, which led to improved estimates for the 1998 baseline values of motorized route density. The new baseline measurements provide a more accurate and realistic estimate of road densities and do not reflect changes in the configuration of 1998 motorized routes. Instead, only the method from which road density is calculated has changed. Route density values are stored in a 30 m raster format and cell values correspond to densities within a 2.6 sq km (1 sq mi) moving window. In previous methods, the total length of motorized routes within the moving window was based on a simple absence or presence of motorized routes within a given cell. Cells containing one or more route segments were summed and then multiplied by 30 m (length of single cell) to get the total length of motorized routes within the moving window. This method tended to under-estimate route density in some cases, and over-estimate in others. The current algorithm instead accounts for all route segments within a cell and accurately measures the total length of routes intersecting the 2.6 sq km (1 sq mi) moving window based on actual line geometry (Figure 1).

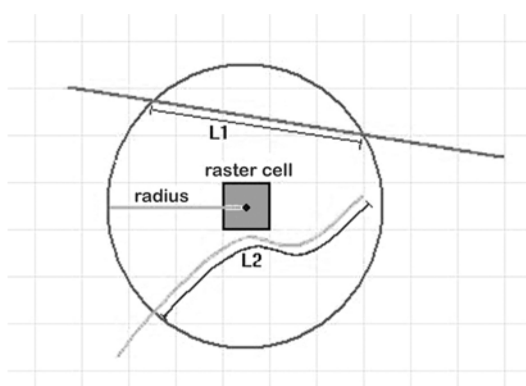

Figure 1 Measurement of route density based on total length of routes within 2.6 sq km (1 sq mi) moving window.

The most current values for 1998 baseline levels of secure habitat, OMARD, and TMARD are presented in Table 1. These values, which are based on the best methods available, supersede those presented in the 2007 Conservation Strategy and comprise the benchmark against which all future change is to be measured.

Exceptions to the 1998 Baseline for Secure Habitat

Three subunits, Gallatin #3, Henrys Lake #2, and Madison #2, were targeted in previous versions of the Conservation Strategy as needing improvement in secure habitat with respect to 1998 levels. The specific areas with potential for improvement identified in these three subunits fall within the Custer Gallatin National Forest boundary and hence, the quantity and timing of improvements was to be determined by the Gallatin National Forest Travel Management Plan (TMP; USDA Forest Service 2006*c*). A primary factor contributing to impoverished secure habitat levels in these three subunits was motorized access on private land inholdings. Since 1998, the Gallatin National Forest conducted several land exchanges under the *Gallatin Range Consolidation and Protection Act* in areas inside and outside the PCA. These land exchanges resulted in the acquisition of formerly private parcels which are now administered as part of the Gallatin National Forest. With implementation of the 2006 Gallatin TMP, many roads inherited from these exchanges have been permanently decommissioned. Non-system routes that are not maintained by the Forest Service have subsequently been closed, with a high priority given to road decommissions in the three subunits identified as in need of improvement. With full implementation of the Gallatin TMP very near completion, measurable increases in secure habitat with respect to 1998 baseline levels have been realized in the three targeted subunits. Consequently, the Custer Gallatin National Forest has proposed via a Travel Plan Amendment that the improved levels of secure habitat resulting from full implementation of the TMP constitute new baseline levels for these 3 subunits. This amendment effectively raises the bar for baseline conditions in the 3 identified subunits. These enhanced levels of secure habitat for the 3 targeted subunits will constitute new measures against which future change will be made (Table 1).

Cumulative Effects Model

With previous versions of the Conservation Strategy, the Cumulative Effects Model (CEM) was the requisite tool for estimating effectiveness and quality of habitat when evaluating project impacts. With this version of the Conservation Strategy the CEM will no longer serve as the requisite tool for evaluating impacts of competing project scenarios. Instead, the current tool for conducting project impact analyses is the Motorized Access Model which was established concurrent with the CEM.

The CEM was a computerized model designed in stages during the 1980s and 1990s as a tool for evaluating relative change in grizzly bear habitat quality due to human activities. The model led to construction of useful spatial data layers reflecting various habitat components and delineating management boundaries relevant for monitoring secure habitat. Some of these layers were subsequently incorporated into the Motorized Access Model. The CEM was considered the best available science at the time; however, the utility of the CEM has since been questioned and is no longer the endorsed protocol for reporting habitat metrics. The rationale for this change in protocol is many-fold, least not is the inability to verify or ground truth in a statistically defendable manner the validity of numerous numerical coefficients residing at the core of the model (Boyce *et al*. 2001, Borkowski 2006). Furthermore, the process for developing vegetation coefficients described by Mattson *et al*. (2004) proves to be highly technical and complex, making it difficult to interpret and implement. Therefore, updating the vast array of coefficients with any reasonable degree of reliability poses a daunting challenge as the grizzly bear population expands, broad landscape changes occur, or new information becomes available. In addition, many of the CEM geospatial datasets are approaching three decades in age and there is no operative mechanism in place to systematically update all existing data layers to reflect current conditions. Collectively, neither the vegetation spatial data nor the multitude of coefficients have proven accurate enough for site-specific project analyses, as past modeling efforts have shown (Dixon 1997). Finally, the format of GIS datasets designed to interface with the CEM are now obsolete and the program code would need to be completely re-vamped to accommodate current geospatial data formats. This is especially problematic since few members of the CEM technical modeling team remain employed in the GYE and there is no technical documentation of the underlying source code for the CEM algorithms (Dixon 1997). In short, the CEM is a high maintenance operation that is difficult to execute and interpret. The Motorized Access Model will instead continue to be used to calculate and monitor secure habitat and motorized route density inside and outside the PCA.

Developed Sites on Public Lands

Developed sites include all sites on public land developed or improved for human use or resource development. Examples of developed sites include, but are not limited to, campgrounds, trailheads, lodges, administrative sites, service stations, summer homes, restaurants, visitor's centers, and permitted resource development sites such as oil and gas exploratory wells, production wells, plans of operation for minerals activities, work camps, etc. Developed sites on public lands inside the PCA are currently inventoried and tracked in existing GIS databases. Table 2 displays the number of developed sites for each administrative unit by bear management unit (BMU) subunit as of 1998.

Activities based in statutory rights, such as oil and gas leases and mining plans of operation under the 1872 General Mining Law are also tracked as part of the developed site monitoring effort. Mining claims and or oil and gas leases do not in and of themselves constitute a site development, but have the potential to be developed sometime in the future. It is important to note that one mining claim does not necessarily mean a potential for one operating plan. In 1998, approximately 1,354 mining claims associated with 28 plans of operation had been filed throughout nine BMU subunits; however, no oil and gas leases existed inside the PCA. Claims are often staked around known mineral deposits to protect the original claim and a single operating plan can sometimes encompass hundreds of claims. Furthermore, a number of filed claims, upon detailed exploration, do not have enough mineralization to be economically developed and consequently are never acted upon. Approved operating plans associated with mining claims or claim groups are included as a separate category in the developed site baseline (Table 2). A detailed itemized list of all developed sites (names and types) compromising the 1998 baseline is documented in Table 3.

Livestock Grazing

The livestock allotment standard established in the Conservation Strategy requires that there be no net increase in the number or acreage of active commercial livestock grazing allotments or in permitted sheep animal months (AMs) inside the PCA from that which existed in 1998. Existing sheep allotments will be monitored, evaluated, and phased out as the opportunity arises with willing permittees. Sheep animal months (AMs) are calculated by multiplying the permitted number of sheep times the months of permitted use.

In 1998 there were 101 active or vacant commercial livestock grazing allotments and 23,900 permitted sheep animal months (AMs) inside the PCA (Table 4). Of these, 83 were cattle and/or horse allotments and the remaining 18 were for sheep. Operational status of allotments is categorized as active, vacant, or closed. An active allotment is one with a current grazing permit, although a "no-use" permit can be granted on a year-by-year basis when a permittee chooses not to graze livestock. Vacant allotments are those without an active permit but may be used periodically by other permittees at the discretion of the land management agency to resolve resource issues or other concerns. Reissuance of permits for vacant cattle allotments may result in an increase in the number of permitted cattle but the number and acreage of active allotments inside the PCA must remain at or below 1998 baseline levels. Combining or dividing existing allotments is allowed as long as net acreage in active allotments does not increase above 1998 levels. Any such use of vacant cattle allotments resulting in an increase in cattle numbers will only be allowed after an analysis to evaluate impacts on grizzly bears. Where chronic conflicts occur on cattle allotments inside the PCA, and an opportunity exists with a willing permittee, one alternative for resolving the conflict may be to phase out cattle grazing or to move the cattle to a currently vacant allotment where there is less likelihood of conflict.

Table 1. 1998 Baseline values (and exceptions) for percentage of open motorized access route density (OMARD), total motorized access route density (TMARD), and secure habitat for all 40 bear management unit (BMU) subunits in the Primary Conservation Area.

BMU subunit name	**1998 % OMARD (> 1 mi / mi^2)**	**1998 % TMARD (> 2 mi / mi^2)**	**% 1998 Secure Habitat**	**Subunit area (mi^2) (excluding lakes)**
Bechler/Teton	17.0	5.8	78.1	534.3
Boulder/Slough #1	3.2	0.3	96.6	281.9
Boulder/Slough #2	2.1	0.0	97.7	232.4
Buffalo/Spread Creek #1	11.5	5.3	88.3	219.9
Buffalo/Spread Creek #2	15.6	12.7	74.3	507.6
Crandall/Sunlight #1	19.3	7.2	81.1	129.8
Crandall/Sunlight #2	16.6	11.7	82.3	316.2
Crandall/Sunlight #3	19.2	10.6	80.4	221.8
Firehole/Hayden #1	10.4	1.7	88.3	339.2
Firehole/Hayden #2	9.0	1.5	88.4	172.2
Gallatin #1	3.6	0.5	96.3	127.7
Gallatin #2	9.5	4.5	90.2	155.2
Gallatin #3*	46.0*	22.9*	55.3*	217.6
Hellroaring/Bear #1	23.1	15.8	77.0	184.7
Hellroaring/Bear #2	0.1	0.0	99.5	228.9
Henry’s Lake #1	49.0	31.2	45.4	191.2
Henry’s Lake #2*	49.9*	35.2*	45.7*	140.2
Hilgard #1	29.0	15.3	69.8	201.2
Hilgard #2	21.0	13.6	71.4	140.5
Lamar #1	9.9	3.8	89.4	299.9
Lamar #2	0.0	0.0	100.0	180.8
Madison #1	29.5	12.5	71.5	227.9
Madison #2*	33.7*	24.0*	66.5*	149.4
Pelican/Clear #1	2.0	0.5	97.8	108.4
Pelican/Clear #2	5.4	0.4	94.1	251.6
Plateau #1	22.2	12.9	68.8	286.3
Plateau #2	8.5	3.5	88.7	419.9
Shoshone #1	1.5	1.1	98.5	122.2
Shoshone #2	1.3	0.7	98.8	132.4
Shoshone #3	3.9	2.1	97.0	140.7
Shoshone #4	5.3	2.9	94.9	188.8
South Absaroka #1	0.6	0.1	99.2	163.2
South Absaroka #2	0.0	0.0	99.9	190.6
South Absaroka #3	2.4	2.7	96.8	348.3
Thorofare #1	0.0	0.0	100.0	273.4
Thorofare #2	0.0	0.0	100.0	180.1
Two Ocean/Lake #1	3.5	0.3	96.3	371.9

BMU subunit name	1998 % OMARD (> 1 mi / mi^2)	1998 % TMARD (> 2 mi / mi^2)	% 1998 Secure Habitat	Subunit area (mi^2) (excluding lakes)
Two Ocean/Lake #2	0.0	0.0	100.0	124.9
Washburn #1	16.1	4.2	83.0	178.3
Washburn #2	7.4	1.1	92.0	144.1
Mean for PCA/Total sq. miles	**12.7**	**6.7**	**85.6**	**9025.4**
***** *Baseline values for the three subunits identified as in need of improvement (Gallatin #3, Henrys Lake #2, and Madison #2) will no longer be based on 1998 levels, but rather on improved levels based on full implementation of 2006 Travel Management Plan. See appended table below.*				
Exceptions to 1998 Baseline (baseline values based on 2006 Gallatin National Forest Travel Management Plan levels)				
BMU subunit name	**% OMARD (> 1 mi / mi^2)**	**% TMARD (> 2 mi / mi^2)**	**% Secure Habitat**	**Subunit area (mi^2) (excluding lakes)**
Gallatin #3	28.6	12.7	70.7	217.6
Henrys Lake #2	41.5	30.6	51.7	140.2
Madison #2	32.0	21.6	67.5	149.4

Table 2. The 1998 baseline for numbers of developed sites on public lands in each bear management subunit in the GYE.

Subunit	Administrative units[1]	Summer home complexes[2]	Developed campgrounds[3]	Trailheads	Major developed sites and lodges	Administrative or maintenance	Other[4]	Plans of operation[5]	Total sites per subunit
Bechler/Teton	CTNF YNP GTNP	0 0 0	1 0 8	5 2 3	2 0 1	4 2 3	16 2 9	0 0 0	58
Boulder/Slough #1	CGNF	0	1	7	0	1	3	8	20
Boulder/Slough #2	CGNF YNP	0 0	0 1	0 3	0 0	2 2	0 1	0 0	9
Buffalo/Spread Creek #1	BTNF GTNP	0 0	1 1	1 7	0 2	0 1	2 3	0 0	18
Buffalo/Spread Creek #2	BTNF	1	4	3	3	5	5	1	22
Crandall/Sunlight #1	SNF CGNF	0 0	2 2	5 2	1 0	1 0	5 5	0 0	23
Crandall/Sunlight #2	SNF CGNF	0 0	5 0	4 0	1 0	2 0	5 0	1 0	18
Crandall/Sunlight #3	SNF WG&F	0 0	2 2	3 0	0 0	1 1	2 0	0 0	11
Firehole/Hayden #1	YNP	0	1	5	1	6	13	0	26
Firehole/Hayden #2	YNP	0	1	3	1	2	8	0	15
Gallatin #1	YNP	0	0	3	0	1	0	0	4
Gallatin #2	YNP	0	2	5	1	12	1	0	21
Gallatin #3	CGNF YNP	0 0	2 0	9 0	0 0	1 0	6 0	0 0	18
Hellroaring/Bear #1	CGNF YNP	0 0	4 0	11 1	0 0	3 0	8 1	8 0	36
Hellroaring/Bear #2	CGNF YNP	0 0	0 0	1 0	0 0	1 2	0 0	0 0	4
Henrys Lake #1	CTNF	2	3	1	0	3	10	1	20
Henrys Lake #2	CTNF CGNF	0 5	0 3	1 4	0 0	1 0	1 2	1 0	18
Hilgard #1	BDNF CGNF	0 0	0 0	0 6	0 1	3 2	0 2	0 0	14

Subunit	Administrative units[1]	Summer home complexes[2]	Developed campgrounds[3]	Trailheads	Major developed sites and lodges	Administrative or maintenance	Other[4]	Plans of operation[5]	Total sites per subunit
Hilgard #2	CGNF YNP	0 0	0 0	4 3	0 0	1 0	1 0	0 0	9
Lamar #1	YNP CGNF SNF	0 0 0	1 2 0	5 7 0	0 0 0	3 6 0	2 3 0	0 8 0	37
Lamar #2	YNP	0	0	0	0	4	0	0	4
Madison #1	CGNF YNP	0 0	1 0	11 0	0 0	1 0	8 0	0 0	21
Madison #2	CGNF YNP	8 0	2 0	1 1	1 0	4 2	5 1	0 0	25
Pelican/Clear #1	YNP	0	0	2	0	0	0	0	2
Pelican/Clear #2	YNP	0	1	4	1	4	3	0	13
Plateau #1	CTNF CGNF YNP	1 0 0	0 0 0	0 0 0	0 0 0	0 0 1	1 0 0	0 0 0	3
Plateau #2	CTNF YNP	0 0	0 0	1 0	0 0	1 4	1 0	0 0	7
Shoshone #1	SNF	1	2	0	0	0	6	0	9
Shoshone #2	SNF	0	0	1	1	0	0	0	2
Shoshone #3	SNF	2	0	1	1	0	0	0	4
Shoshone #4	SNF	3	3	3	6	0	8	0	23
South Absaroka #1	SNF	0	0	0	0	0	0	0	0
South Absaroka #2	SNF	0	0	0	0	2	0	0	2
South Absaroka #3	SNF	1	3	4	1	1	5	0	15
Thorofare #1	BTNF YNP	0 0	0 0	0 0	0 0	0 4	0 0	0 0	4
Thorofare #2	BTNF YNP	0 0	0 0	0 0	0 0	2 0	0 0	0 0	2
Two Ocean/Lake #1	YNP BTNF GTNP	0 0 0	2 1 0	3 0 0	1 0 0	3 0 1	2 0 1	0 0 0	14

Subunit	Administrative units[1]	Summer home complexes[2]	Developed campgrounds[3]	Trailheads	Major developed sites and lodges	Administrative or maintenance	Other[4]	Plans of operation[5]	Total sites per subunit
Two Ocean/Lake #2	YNP BTNF	0 0	0 0	0 0	0 0	2 1	0 1	0 0	4
Washburn #1	YNP	0	2	8	2	7	6	0	25
Washburn #2	YNP	0	1	6	0	1	4	0	12
Primary Conservation Area	**All**	**24**	**68**	**161**	**28**	**118**	**168**	**28**	**595**

[1] Abbreviations for administrative units: BDNF = Beaverhead-Deerlodge National Forest, BTNF = Bridger-Teton National Forest, CTNF = Caribou-Targhee National Forest, CGNF = Custer- Gallatin National Forest, GTNP = Grand Teton National Park, SNF = Shoshone National Forest, WG&F = Wyoming Game and Fish, YNP = Yellowstone National Park.

[2] Single permitted recreation residences are classified as other developed sites in this table.

[3] Campgrounds with trailheads are sometimes combined and treated as single developed sites.

[4] Includes developed recreation sites, as well as community infrastructure sites, dams, and other miscellaneous facilities.

[5] Includes mining claims with plans of operation. Not all sites have active projects.

Table 3. Developed sites (type and name) comprising the 1998 baseline per Bear Management Subunit inside the Primary Conservation Area.

Bear Management subunit	Admin Unit [i]	Name and type of developed sites
Bechler/Teton #1	CTNF	**Campgrounds (1):** Cave Falls. **Trailheads (5)*:*** Coyote Meadows, Hominy Peak, South Boone Creek, Fish Lake, and Cascade Creek. **Major Developed Sites (2):** Loll Scout Camp and Idaho Youth Services Camp. **Administrative (4):** Squirrel Meadows guard station/cabin, Porcupine guard station, Badger Creek seismograph site, and Squirrel Meadows guard station/WGF cabin. **Other (16):** Grassy Lake dam, Tillery Lake dam, Indian Lake dam, Bergman Res. dam, Loon Lake dispersed sites, Horseshoe Lake dispersed sites, Porcupine Creek dispersed sites, gravel pit/target range, Boone Creek dispersed sites, Tillery Lake oil & gas camp, Calf Creek oil & gas camp, Bergman oil & gas camp, Granite Creek cow camp, Poacher's trailhead, Indian Meadows trailhead, and McRenolds Res. trailhead/wildlife viewing area/dam.
	GTNP	**Campgrounds (8):** Grassy Lake Road campsites (8 individual car camping sites). **Trailheads (3)**: Glade Creek, Lower Berry Creek, and Flagg Canyon. **Major Developed Sites (1):** Flagg Ranch complex. **Administrative (3):** Flagg Ranch Ranger Station, Flagg Ranch employee housing, and Flagg Ranch maintenance yard. **Other (9):** Upper Berry, Lower Berry, and Moose Basin patrol cabins; Hechtman Horse Camp, Warm Springs group campsite, Wilcox Point campsite #1, Warm Springs individual campsite, Flagg Ranch boat launch, and Yellowstone South Entrance boat launch.
	YNP	**Trailheads (2)**: 9K1 and Cave Falls. **Administrative or Maintenance Sites (2):** South Entrance and Bechler Ranger Stations. **Other (2):** Union Falls and Snake River picnic areas.
Boulder/Slough #1	CGNF	**Campgrounds (1):** Hicks Park. **Trailheads (7)**: Goose Lake, Upsidedown Creek, Independence, Sheep Creek, Copper Creek, Bridge Creek, and Box Canyon. **Administrative (1):** Box Canyon administrative cabin. **Other (3):** 2 recreation residences (Rasnick and Mandeville), Independence mine site (no plan of operations). **Plans of Operation (8):** Carolyn Sluice Box, Cray Sluice, East Iron Mountain Beartooth Plateau 1, East Iron Mountain Beartooth Plateau 2, Iron Mountain Idaho Construction Metal, Crescent Creek Pan Palladium, Crescent Creek Chromium Corp America, and Crescent Creek Beartooth Platinum.
Boulder/Slough #2	CGNF	**Administrative (2):** Slough Creek cabin and Buffalo Fork cabin.
	YNP	**Campgrounds (1):** Slough Creek. **Trailheads (3):** Specimen ridge, Slough Creek, and Lamar Ford. **Administrative (2):** Elk Tongue and Lower Slough patrol cabins. **Other (1):** Yellowstone River picnic area.
Buffalo/Spread Creek #1	BTNF	**Campgrounds (1):** Pacific Creek CG/TH**.** **Trailheads (1):** Colter Dump. **Other (2):** Teton Horseback Adventures, Shoal Creek Outfitters Base Camp
	GTNP	**Campgrounds (1)**: Lizard Creek. **Trailheads (7):** Grand View Point, Two Ocean Lake, Christian Pond, Arizona Lake, Arizona Creek #1, Arizona Creek #2, and Pilgrim Creek. **Major Developed Sites (2):** Moran Entrance Station housing and Jackson Lake employee housing. **Administrative (1):** Buffalo Fork Ranger Station. **Other (3):** Moran Post Office, Moran school, and Colter Bay storage/staging area.

Bear Management subunit	Admin Unit [i]	Name and type of developed sites
Buffalo/Spread Creek #2	BTNF	**Summer Home Complex (1):** Turpin Meadows. **Campgrounds (4):** Hatchet, Turpin Meadows, Angles CG/TH and Box Creek CG/TH. **Trailheads (3):** Turpin Meadows, Lava Creek, and Clear Creek. **Major Developed Sites (3):** Heart Six Ranch, Turpin Meadows Ranch, and Togwotee Lodge. **Administrative (5):** Buffalo Ranger District Office, Buffalo Ranger District compound (Includes a gravel pit), Enos Lake patrol cabin, Nowlin Meadows patrol cabin; Hatchet administrative site**.** **Other (5):** UW Forestry Walk VIS, Four Mile Picnic Area, Lost Lake information station, Togwotee Overlook, and Historic ranger station. **Plans of Operation (1):** gravel pit
Crandall/Sunlight #1	CGNF	**Campgrounds (2):** Chief Joseph and Ovis Lake Road Camp. **Trailheads (2):** Broadwater and Clarks Fork Foot. **Other (5):** Arbor Day watchable wildlife site, Kersey Lake rental cabin/boat dock, Round Lake rental cabin/warming hut, Clarks Fork fishing platform/interpretive exhibit, and 1 recreation residence (summer home).
	SNF	**Campgrounds (2):** Beartooth and Island Lake. **Trailheads (5):** Beartooth Lake, Island Lake, Clay Butte, Muddy Creek, and Morrison Jeep. **Major Developed Sites (1):** Top of the World store complex. **Administrative (1):** YNP highway maintenance site (includes 2 summer residences). **Other (5):** Island Lake Boat Ramp, Beartooth Lake Boat Ramp, Clay Butte Lookout, Pilot/Index Overlook, and Beartooth Lake picnic area.
Crandall/Sunlight #2	CGNF	**No Developed Sites**
	SNF	**Campgrounds (5):** Fox Creek, Lake Creek, Hunter Peak, Crazy Creek and Lily Lake. **Trailheads (4):** Pilot Creek, Clarks Fork, North Crandall, and Crazy Creek. **Major Developed Sites (1):** K-Z Lodge complex. **Administrative (2):** Crandall work center (2 residences, office, shop and bunkhouse), and Crandall WGF cabin. **Other (5):** Crandall waste transfer site, Clarks Fork overlook, Lily Lake boat ramp, Swamp Lake boat ramp, and Reef Creek picnic area. **Plan of Operations (1)**: Ghost Creek commercial sale gravel pit.
Crandall/Sunlight #3	SNF	**Campgrounds (2):** Dead Indian and Little Sunlight. **Trailheads (3):** Little Sunlight trailhead/corrals, Dead Indian, and Hoodoo Basin/Lamar. **Administrative (1):** Sunlight Ranger Station. **Other (2):** Sunlight picnic area, and Sunlight Bridge overlook.
	WGF	**Campgrounds (2):** WGF Sunlight Unit #1 and WGF Sunlight Unit #2. **Administrative (1):** WGF Sunlight Management complex.
Firehole/Hayden #1	YNP	**Campground (1):** Madison Junction. **Trailheads (5):** Nez Perce Creek, 7-Mile Bridge, Fountain freight Road, Lone Star, and OK5. **Major Developed Sites (1):** Old Faithful complex. **Administrative (6):** Norris employee housing /government area, Norris hot mix plant, Madison employee housing /government site, Mesa gravel pit; Mary Lake patrol cabin, and Nez Perce patrol cabin. **Other (13):** 12 picnic areas (Norris, Gibbon Meadows, Tuft Cliffs, Gibbon Falls, Madison, Buffalo Ford, Cascade, Firehole Canyon, Nez Perce, Feather Lake, Goose Lake, and Excelsior); and Norris Geyser Basin Museum.
Firehole/Hayden #2	YNP	**Campgrounds (1):** Bridge Bay. **Trailheads (3):** Divide, Beach Lake, and De Lacy Creek. **Major Developed Sites (1):** Lake complex. **Administrative (2):** Lake government area and Bridge Bay Marina. **Other (8):** Gull Point, Sand Point, and 6 additional lakeshore picnic areas.

Bear Management subunit	Admin Unit [i]	Name and type of developed sites
Gallatin #1	YNP	**Trailheads (3):** Black Butte (WK2), Specimen Creek (WK3), and Bighorn Pass (WK6). **Administrative (1):** Daly Creek patrol cabin.
Gallatin #2	YNP	**Campgrounds (2):** Mammoth and Indian Creek**.** **Trailheads (5):** Rescue Creek, Lava Creek, Golden Gate, Bunsen Peak, and Fawn Pass. **Major Developed Sites (1):** Mammoth complex. **Administrative (12):** Stephens Creek employee residence, Gardiner gravel crusher/asphalt site, Lower Mammoth employee housing area, YCC employee housing area, Indian Creek gravel pit, Deaf Jim patrol cabin, North Entrance Ranger Station, Fawn Pass patrol cabin, Winter Creek patrol cabin, Bunsen Peak radio repeater site, and Mt Holmes fire lookout. **Other (1):** Sheepeater picnic area.
Gallatin #3	CGNF	**Campgrounds (2):** Tom Miner and Red Cliff. **Trailheads (9):** Buffalo Horn, Sphinx Creek, Elkhorn, Wilson Draw, Tom Miner, Tom Miner Horse Facilities, Sunlight, Twin Cabin, and Tepee Creek. **Administrative or Maintenance (1):** Buffalo Horn cabin. **Other (6):** Corwin Spring fishing /boat access, Yankee Jim fishing access/boat ramp, Elkhorn River Ford horse access, Windy Pass rental cabin, Yankee Jim picnic area, and Porcupine Creek recreation residence.
	YNP	**No Developed Sites**
Hellroaring/Bear #1	CGNF	**Campgrounds (4):** Eagle Creek, Bear Creek, Timber Camp, and Canyon. **Trailheads (11):** Cedar Creek, La Duke, Little Trail Creek, Pine Creek, Palmer Mt. (3 trailheads), North Fork Bear Creek, Joe Brown, Bear Creek, and Sixmile. **Administrative (3):** OTO Ranch, Blanding Station house/barn/horse facility, and Hayes/McPherson property. **Other (8):** Eagle Creek horse facility, La Duke picnic area, La Duke bighorn sheep watchable wildlife site, 1 recreation cabin, Lonesome Pond camping area, McConnell fishing and boat access, watchable wildlife/big game winter range site, and watchable wildlife/fish site. **Plans of Operation (8):** Counts, Mineral Hill Mine (5 distinct plans), Independence, and Livingston.
	YNP	**Trailheads (1):** Crevice. **Other (1):** Crevice cabin
Hellroaring/Bear #2	CGNF	**Trailheads (1):** West Fork Mill Creek. **Administrative (1):** Hellroaring cabin/tack shed.
	YNP	**Administrative (2):** Buffalo Plateau and Hellroaring patrol cabins.
Henrys Lake #1	CTNF	**Summer Home Complexes (2):** Big Springs North, Big Springs South. **Campgrounds (3):** Big Springs, Flat Rock, and Upper Coffee Pot. **Trailheads (1):** Howard Creek. **Administrative (3):** Sawtelle Peak Electronics Site, Keg Springs Seismograph Site, Big Springs Fire Tower. **Other (10):** Big Springs Interpretive Trail, Big Springs Bridge Fish Viewing, Johnny Sack Cabin, Big Springs Boat Ramp, Big Springs Snow Park/Warming Hut, Macks Inn Water Treatment Plant, Macks Inn Substation, County/State Sheds Complex, FAA Maintenance Sheds, Cold Springs Substation. **Plans of Operation (1):** Willow Creek Mining Site.
Henrys Lake #2	CGNF	**Summer Home Complexes (5):** Clark Springs (8 lots), Rumbaugh Ridge (5), Romsett (9), Lonesomehurst A, Lonesomehurst B. **Campgrounds (3):** Lonesomehurst, Cherry Creek, Spring Creek. **Trailheads (4):** Basin, Watkins Creek, Targhee Pass, West Denny Creek. **Other (2):** Basin rental cabin, and Lonesomehurst boat ramp.
	CTNF	**Trailheads (1):** Targhee Creek. **Administrative (1):** Defosses Cabin. **Other (1):** Howard Springs Family Picnic/Wayside Area. **Plans of Operation (1):** Turquoise Mountain Mine
Hilgard #1	BDNF	**Administrative (3):** McAtee Cabin, Indian Creek Cow Camp and Shedhorn Cow Camps.
	CGNF	**Trailheads (6):** Upper Buck Ridge, Cinnamon, Meadow Creek Cutoff, Cache Creek, Lower Buck Ridge, and Taylor Falls/Lightning Creek. **Major Developed Sites (1):** Covered Wagon Ranch complex. **Administrative (2):** Cinnamon cabin and Cinnamon Mountain lookout. **Other (2):** Yellow Mule rental cabin and Buck Creek recreation residence.

Bear Management subunit	Admin Unit [i]	Name and type of developed sites
Hilgard #2	CGNF	**Trailheads (4):** Eldridge, Wapiti, Lower Wapiti/Albino Lake, and Sage/Elkhorn. **Administrative (1):** Eldridge Cabin. **Other (1):** Wapiti rental cabin.
	YNP	**Trailheads (3):** WK1, WK5, and WK4.
Lamar #1	CGNF	**Campgrounds (2):** Soda Butte and Colter. **Trailheads (7)**: Abundance Lake/Upper Stillwater, Republic Creek;, Lower Lady of Lake, Lady of Lake #1, Woody Pass, Daisy Pass and Wolverine Pass. **Administrative (6):** Cooke City guard station/warehouse, 2nd Forest Service warehouse, highway borrow pit, mine tailings repository, old mine buildings, and mine reclamation pond. **Other (3):** Cooke City dump (SUP), Beartooth Highway interpretive site, and Cooke City burn pile. **Plans of Operation (8)**: Cray Placer and 7 distinct New World mines.
	SNF	**No Developed Sites**
	YNP	**Campgrounds (1):** Pebble Creek. **Trailheads (5):** 3K1, 3K3, 3K4, Trout Lake, and Lamar Ford**.** **Administrative (3):** Northeast Entrance Ranger Station (and supporting government operation), Lamar Buffalo Ranch Ranger Station/Institute, and the Cache Creek patrol cabin**.** **Other (2):** Warm Creek picnic area and Buffalo Ranch/Lamar River picnic area.
Lamar #2	YNP	**Administrative (4):** Calfee Creek, Upper Miller Creek, Cold Creek, and Lamar Mountain patrol cabins.
Madison #1	CGNF	**Campgrounds (1):** Cabin Creek. **Trailheads (11)**: Potamogeton, West Fork Beaver Creek, Whits Lake, Johnson Lake, Tepee Creek, Red Canyon, Kirkwood, Cub Creek, Fir Ridge, Hebgen Mountain and Cabin Creek. **Administrative (1):** Building destruction site. **Other (8):** gravel pit, Tepee Creek snowmobile parking area, Beaver Creek watchable wildlife site, Beaver Creek rental cabin, Cabin Creek rental cabin, Hebgen Dam fishing access and administrative site, Yellowstone Holiday picnic area, and North Shore picnic area.
	YNP	**No Developed Sites**
Madison #2	CGNF	**Summer Home Complexes (8):** California (2 lots), Lakeshore A (6 lots), Lakeshore B (8 lots), Lakeshore C (3 lots), Lakeshore E (19 lots), Baker's Hole (3 lots), Railroad (3 lots), and Horse Butte (2 lots). **Campgrounds (2):** Rainbow Point and Bakers Hole (includes watchable wildlife site). **Trailheads (1):** Rendezvous Ski Trail complex. **Major Developed Sites (1):** Madison Arm Resort. **Administrative (4):** West Yellowstone Ranger Station, WY Interagency Fire Center (Includes crew quarters IAFCC, fire control center and mixing site), Bison capture facility (SUP), and Game Warden Residence. **Other (5):** Solid Waste Transfer Station (SUP), Madison picnic area/boat ramp, Rainbow Point picnic area/boat ramp, Horse Butte lookout/picnic site, and South Plateau shooting range.
	YNP	**Trailhead (1):** Cable Car. **Administrative (2):** West Entrance Ranger Station/housing complex and Cougar Creek patrol cabin. **Other (1):** Madison River picnic area.
Pelican/Clear #1	YNP	**Trailheads:** Lower Falls and Sour Creek.
Pelican/Clear #2	YNP	**Campgrounds (1):** Fishing Bridge RV Park. **Trailheads (4):** Pelican Valley, 9-mile, Clear Creek, and Avalanche Peak. **Major Developed Sites (1):** Fishing Bridge store/gas station/employee housing/museum. **Administrative (4):** East Gate Ranger Station/housing complex; Fern Lake, Pelican Cone, and Pelican Springs patrol cabins. **Other (3):** Steamboat Point, Lake Butte, and Sylvan Lake picnic areas.
Plateau #1	CGNF	**No Developed Sites.**
	CTN	**Summer Home Complexes (1):** Moose Creek**.** **Other (1):** Lucky Dog Lodge/TNC/SUP
	YNP	**Administrative (1):** South Riverside patrol cabin.

Bear Management subunit	Admin Unit [i]	Name and type of developed sites
Plateau #2	CTNF	**Trailheads (1):** Moose Creek/Trail Canyon. **Administrative (1):** Warm River Springs GS/Cabin. **Other (1):** Snow Creek Pond disperse sites
	YNP	**Administrative (4):** Cove, Outlet, Buffalo Lake, and 3 Rivers patrol cabins**.**
Shoshone #1	SNF	**Summer Home Complexes (1):** Moss Creek (7 lots). **Campgrounds (2):** Newton Creek and Rex Hale. **Other (6):** Summer lot E, Fire Memorial, Robbers Roost cabin/cow camp, and Newton Springs picnic area, Blackwater Pond Picnic/Fishing Area, and Palisades interpretive site**.**
Shoshone #2	SNF	**Trailheads (1):** Blackwater. **Major Developed Sites (1):** Blackwater Lodge Complex.
Shoshone #3	SNF	**Summer Home Complexes (2):** Eagle Creek (8 lots) and Kitty Creek (14 lots). **Trailheads (1):** Kitty Creek**. Major Developed Sites (1):** Buffalo Bill Boy Scout Camp Complex.
Shoshone #4	SNF	**Summer Home Complexes (3):** Grinnell Creek (2 lots), Pahaska (2 lots), and Mormon Creek (13 lots). **Campgrounds (3):** Eagle Creek, Three Mile, and Sleeping Giant. **Trailheads (3):** Fishhawk North, Eagle Creek, and Pahaska. **Major Developed Sites (6):** Elephant Head Lodge, Absaroka Mountain Lodge, Shoshone Lodge, Crossed Sabres Lodge, Goff Creek Lodge, and Pahaska Tepee. **Other (8):** Sleeping Giant ski area, WY Game and Fish cabin, Wayfarers Chapel, summer home isolated lot C, summer lot A, summer home lot B, West Gateway Interpretive Site, and Cody Peak Interpretive Site.
South Absaroka #1	SNF	**No Developed Sites.**
South Absaroka #2	SNF	**Administrative (2):** Venus Creek Cabin and Needle Creek Administrative site (2 cabins).
South Absaroka #3	SNF	**Summer Home Complexes (1):** Pinnacles (20). **Campgrounds (3):** Brooks Lake, Pinnacles (23) and dispersed campground (23 sites) near Brooks Lake. **Trailheads (4):** Long Creek/Dunoir, Brooks Lake, Pinnacles Trailhead, and Bonneville. **Major Developed Sites (1):** Brooks Lake Lodge. **Administrative (1):** Wolf Creek. **Other (5):** Brooks Lake boat ramp, transfer corral/Bud Betts, Transfer Corral/Paul Gilroy, Pinnacles Transfer Corral/Bridger Teton Outfitter on Brooks Lake Creek, and Winter Cabin/warming hut.
Thorofare #1	BTNF	**No Developed Sites.**
	YNP	**Administrative (4):** Cabin Creek, Howell Creek, Trail Creek, and Thorofare patrol cabins.
Thorofare #2	BTNF	**Administrative (2):** Hawk's Rest patrol cabin (USFS) and **WGF patrol cabin.**
	YNP	**No Developed Sites.**
Two Ocean/Lake #1	BTNF	**Campgrounds (1):** Sheffield Creek Campground/Trailhead.
	GTNP	**Administrative (1):** Snake River gravel pit. **Other (1):** Snake River Picnic Area.
	YNP	**Campgrounds (2):** Lewis Lake and Grant Village. **Trailheads (3):** Shoshone Lake, Heart Lake, and Riddle Lake. **Major Developed Sites (1):** Grant Village. **Administrative (3):** Heart Lake patrol cabin, Harebell patrol cabins, and Mt Sheridan fire lookout. **Other (2):** West Thumb warming hut and Frank Island picnic area.
Two Ocean/Lake #2	BTNF	**Administrative (1):** Fox Park Patrol Cabin. **Other (1):** Huckleberry Lookout Historic Site.
	YNP	**Administrative (2):** Peale Island patrol cabin and Fox Creek patrol cabin.

Bear Management subunit	Admin Unit [i]	Name and type of developed sites
Washburn #1	YNP	**Campgrounds (2):** Tower (includes store, parking and overlook) and Canyon Village. **Trailheads (8):** Lower Blacktail, Upper Blacktail, Blacktail Plateau Rd/ski trail, Hellroaring, Wraith Falls, Mount Washburn, Dunraven Pass, and Howard Eaton trail. **Major Developed Sites (2):** Canyon Village and Roosevelt Lodge complex. **Administrative (7):** Frog Rock gravel pit, Grebe Lake gravel pit, Tower Ranger Station, Mount Washburn fire lookout; and Upper Blacktail, Lower Blacktail, and Observation Peak patrol cabins. **Other (6):** Lava Creek, Antelope Creek, Dunraven Pass, Dunraven, and Howard Eaton picnic areas; and Yanceys Hole cookout site.
Washburn #2	YNP	**Campgrounds (1):** Norris (and Ranger Station). **Trailheads (6):** Bighorn Pass, Winter Creek, Solfatara Creek, Grizzly Lake, Grebe Lake, and Washburn Ice Lakes. **Administrative (1):** Ice Lake gravel pit. **Other (4):** Apollinaris Springs, Beaver Lake, Norris Junction, and Virginia Meadows picnic areas.

[i] Administrative unit abbreviations: BDNF = Beaverhead-Deerlodge National Forest, CGNF = Custer Gallatin National Forest, CTNF = Caribou-Targhee National Forest, GTNP = Grand Teton National Park, SNF = Shoshone National Forest, WGF = Wyoming Game and Fish, YNP = Yellowstone National Park.

Table 5. Number and acreage of commercial livestock grazing allotments and number of sheep animal months inside the Yellowstone Primary Conservation Area (PCA) in 1998.

Administrative unit	Cattle Allotments		Sheep Allotments		Sheep AMs
	Active	Vacant	Active	Vacant	
Beaverhead-Deerlodge NF	3	2	0	0	0
Bridger-Teton NF	9	0	0	0	0
Caribou-Targhee NF	11	1	7	4	14,163
Custer-Gallatin NF	23	10	2	4	3,540
Shoshone NF	25	0	2	2	5,387
Grand Teton NP	1	0	0	0	0
Total number in PCA	72	13	11	10	23,090
Total area in PCA (acres)	**660,845**	**67,893**	**148,368**	**77,665**	**NA**
Total area in PCA (km^2)	**2,674**	**275**	**600**	**312**	**NA**

Note: Tables in this appendix represent the most current baseline information available and supersede comparable tables in the appendices of the 2007 Conservation Strategy for the Grizzly Bear in the Greater Yellowstone Area (USFWS 2007); Forest Plan Amendment for Grizzly Bear Habitat Conservation for the Greater Yellowstone Area National Forests, Final Environmental Impact Statement (USDA Forest Service 2006a); and the 2006 Forest Plan Amendment Record of Decision (USDA Forest Service 2006b).

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Appendix F. Lead Agencies for Actions under this Conservation Strategy

AGENCY LEADS AND PARTICIPANT AGENCIES HABITAT AND POPULATION MONITORING				
TASK	**LEAD AGENCY**	**PARTICIPANT AGENCIES**	**TASK LEADER**	**ANNUAL REPORT LEADER**
Secure Habitat/OMARD and TMARD (GIS runs and database updates)	USFS	YNP, GTNP	USFS	USFS
Cutthroat trout spawners	YNP	IGBST	YNP	YNP
Ungulate numbers	NPS, WY, MT, ID	NPS, WY, MT, ID	NPS, WY, MT, ID	NPS, WY, MT, ID
Whitebark cone transects	IGBST	YNP, USFS	IGBST	IGBST
Moth presence	WY	IGBST/WY	IGBST/WY	IGBST/WY
Mortality reduction	WY, MT, ID, NPS, USFS, FWS/LE	WY, MT, ID, NPS, USFS, FWS/LE	Cooperative	Cooperative
Developed Sites and Livestock Grazing	USFS	NPS	USFS	IGBST
TASK	**LEAD AGENCY**	**PARTICIPANT AGENCIES**	**TASK LEADER**	**ANNUAL REPORT LEADER**
Unduplicated females w/cubs	IGBST	WY, YNP, MT, ID, GTNP	IGBST	IGBST
Mortality	IGBST	MT, WY, ID, YNP, GTNP, FWS/LE	IGBST	IGBST
Distribution	IGBST	WY, YNP, MT, ID, GTNP	IGBST	IGBST

AGENCY LEADS AND PARTICIPANT AGENCIES HABITAT AND POPULATION MONITORING				
Maintaining 25 adult females with collars	IGBST	WY, YNP, MT, ID, GTNP	IGBST	IGBST
Monitoring genetic diversity	IGBST	IGBST, USFWS	IGBST	IGBST
Control action and conflict reporting	YNP	WY, YNP, MT, ID, GTNP	YNP	YNP/IGBST
Public outreach and information	All	WY, YNP, MT, ID, GTNP, USFS, FWS/LE	To be selected	To be selected

Appendix G. The Relationship between the Five Factors in Section 4(a)(1) of the ESA and the Existing Laws and Authorities (2016)

See Appendix O, Attachment B for 2024 state regulatory mechanisms

The relationship between the five factors in Section 4(a)(1) of the Endangered Species Act and the existing State and Federal laws and regulations is important to assure that the existing laws and authorities can address all the factors necessary to assure recovery under the Endangered Species Act. This table presents the State and Federal laws and authorities and which of the five factors are addressed by that law or authority.

Sec. 4. (A) General. - (1) The Secretary shall by regulation promulgated in accordance with subsection (b) determine whether any species is an endangered species or a threatened species because of any of the following factors:

A. the present or threatened destruction, modification, or curtailment of its habitat or range;
B. overutilization for commercial, recreational, scientific, or educational purposes;
C. disease or predation;
D. the inadequacy of existing regulatory mechanisms;
E. other natural or manmade factors affecting its continued existence.

FEDERAL AND STATE LAWS AND REGULATIONS	Five Factors				
	A	**B**	**C**	**D**	**E**
The Act of Congress March 1, 1872 - Set Yellowstone National Park as a Public Park	X	X		X	X
National Park Service Organic Act of 1916, 16 U.S.C. 1, 39 Stat. 535	X	X		X	X
Lacey Act of 1900, as amended, 16 U.S.C. 701, 702; 31 Stat. 187, 32 Stat. 285; Criminal Code Provisions, as amended, 18 U.S.C. 42-44, 62 Stat. 87				X	
Fish & Wildlife Coordination Act of 1934, as amended, 16 U.S.C. 661-666c; 48 Stat.401	X	X		X	X
Federal Aid in Wildlife Restoration Act 1937, 16 U.S.C. 669-669i, 50 Stat. 917	X	X			X
The Act of Congress September 14, 1950 - Expansion of Grand Teton National Park to include Jackson Hole National Monument	X			X	
Sikes Act, 1960, as amended, 16U.S.C. 670a-670o; 74 Stat. 1052, Pub. L. 86-797	X	X			X
Multiple-Use Sustained-Yield Act of 1960, 16 U.S.C. 528-531, 74 Stat. 215, P.L. 86-517	X	X			X
National Environmental Policy Act of 1969, as amended, 42 U.S.C. 4321, 83 Stat. 852, Pub. L. 91-190	X	X			X
The Act of Congress August 25, 1972 - Establish John D. Rockefeller, Jr. Memorial Parkway	X	X			
Endangered Species Act of 1973, as amended, 16 U.S.C. 1531-1543; 87 Stat. 884	X	X	X	X	X
Forest and Rangeland Renewable Resources Planning Act, 1974, Pub. L. 93-378	X	X		X	X
National Forest Management Act of 1976, U.S.C. 1600 et. seq., Pub. L. 94-588	X	X			X
Federal Land Policy and Management Act of 1976, as amended,43 U.S.C. 1701 et. seq., Pub. L. 94-579, 90 Stat. 2744		X			X
Fish & Wildlife Improvement Act of 1978, 16 U.S.C. 742 l, 92 Stat. 3110				X	
Fish and Wildlife Conservation Act of 1980, 16 U.S.C. 2901-2904; 2905-2911; 94 Stat. 1322, Pub. L. 96-366	X	X		X	X
National Wildlife Refuge System Improvement Act of 1997 Publ. L. 105-57	X	X		X	X
36 CFR 1.5 (a)(1) – authority to establish use limits within national parks		X		X	
36 CFR 1.7(b) – compilation of public use restrictions; and 2.10(d) – camping & food storage restrictions				X	X
36 CFR 1.7(b) – compilation of public use restrictions; and 7.13 (l) – commercial vehicle restrictions in Yellowstone National Park		X		X	X

FEDERAL AND STATE LAWS AND REGULATIONS	Five Factors				
	A	**B**	**C**	**D**	**E**
36 CFR 2.2 – wildlife protection in national parks		X		X	X
36 CFR 2.10 – camping and food storage restrictions				X	X
36 CFR 219 – national forest system land management planning		X			X
36 CFR 219.19 – definitions related to the ESA	X			X	
36 CFR 219.27 (a)(6) – special designations	X			X	X
36 CFR 261.50 (a), (b) and (c) – authority to issue area closure orders on national forests				X	X
36 CFR 261.53 (a) and (e) – authority to issue "special" closures to protect threatened and endangered species, other sensitive resources				X	X
36 CFR 261.58 (e), (s) and (cc) – prohibition of activities that are contrary to an order				X	X
WYOMING STATE STATUTES					
23-1-101 (a)(xii) – definition of "Trophy Game" includes grizzly bear				X	
23-1-103 – ownership of wildlife		X		X	
23-1-302 (a)(ii) – powers and duties, trophy game zones		X		X	
23-1-302 (p) – competitive raffle license issuance, includes trophy game licenses				X	
23-1-502 (d) – commission to submit annual budget request for general funds to maintain grizzly bear management program	X	X	X	X	X
23-1-703 – limitation on no. trophy game licenses issued; 75% of available licenses reserved for residents; once-in-a-lifetime restriction on grizzly bear license				X	
23-1-705 (k) – reissuance of license to veteran with disabilities, waiver of once-in-a-lifetime limitation				X	
23-1-901 – damage claims				X	X
23-1-1001 – grizzly bear relocation		X		X	
23-2-101 (e) & (j) – application fees set aside to compensate for damage & grizzly bear license fees				X	X
23-2-102 – age restriction to hunt big or trophy game				X	
23-2-104 – commission authority to set archery seasons, archery equipment specifications for big or trophy game				X	
23-2-303 (d) – trapping rules & specifications				X	X
23-3-102 – prohibition against take without a license, penalties		X		X	X
23-2-401 – nonresidents must be accompanied by a licensed guide to hunt big or trophy game in designated wilderness areas				X	X

FEDERAL AND STATE LAWS AND REGULATIONS	Five Factors				
	A	**B**	**C**	**D**	**E**
23-2-407 – persons providing guiding or outfitting services for the purpose of taking big or trophy game must be licensed				X	X
23-3-106 – transportation of big or trophy game animal				X	X
23-3-107 – wanton destruction of big or trophy game animal		X		X	X
23-3-109 – dogs injuring big or trophy game animal		X		X	X
23-3-111 – commission authority to establish firearm and ammunition specifications for taking big & trophy game		X		X	X
23-3-112 – firearm prohibition & restriction		X		X	X
23-3-301 – importation, sale of wildlife prohibited				X	X
WYOMING GAME AND FISH COMMISSION REGULATIONS					
Chapter I – Access to Records				X	
Chapter II – General Hunting Regulations				X	
Chapter III – Black Bear Hunting Seasons Section 6 – Areas Closed to Black Bear Baiting; Section 7 – Reporting Use of a Bait by a Grizzly Bear	X	X		X	X
Chapter XXVIII – Big or Trophy Game Damage Claims		X		X	X
Chapter XXXIII – Issuance of Scientific Research Permits		X		X	
Chapter XXXII – Regulation Governing Legal Firearm Cartridges and Archery Equipment				X	
Chapter XLIII – Areas Closed to the Taking of Specified Wildlife		X		X	X
Chapter XLIV – Issuance of Licenses Section 5(f) – Trophy Game, Grizzly Bear Licenses		X		X	
Chapter LIV – Wildlife Violator Compact		X		X	
Chapter LVI – Regulation Governing Lethal Take of Wildlife		X		X	
Chapter LVIII – Notification of Grizzly Bear Relocation				X	
Chapter LXVII – Grizzly Bear Management Regulation		X		X	
Big and Trophy Game Hunting Regulation Brochures – Precautions When Hunting in Areas Occupied by Grizzly Bears		X		X	X
IDAHO STATE STATUTES					
I.C. 36-103 (a) – State Wildlife Policy		X		X	X
I.C. 36-103 (b) – Commission authority to administrator 36-101 (a)				X	X

FEDERAL AND STATE LAWS AND REGULATIONS	Five Factors				
	A	**B**	**C**	**D**	**E**
I.C. 36-104 (b) – Commission authority to restrict season, location, boundaries, limits, gender, age, method of take; includes automatic closure, mandatory check/report, and tag limits		X		X	
I.C. 36-105 (3) – Public notice and publication requirements for season setting				X	
I.C. 36-106 (e)(6) – Directory authority for emergency season closure upon written order		X		X	X
I.C. 36-201 – Commission authority to classify wildlife		X		X	X
I.C. 36-401 – Requirement for license and tag		X		X	
I.C. 36-408 (1)(2) – Commission authority to restrict hunter effort (e.g., controlled hunts, tag limits)		X		X	
I.C. 36-409 (c) – Requirement for license and tag		X		X	
I.C. 36-412 (a) – Hunter education mandatory for those born after 1/1/1975		X		X	
I.C. 36-501 – Sale and purchase of wildlife restrictions		X		X	
I.C. 36-502 – Possession, transportation, sale and use of wildlife restrictions		X		X	
I.C. 36-701 (a), (d), 703, 704, 706, 707, 709, 710 – Captive wildlife restrictions		X	X	X	
I.C. 36-1101 (a) – non take without statutory/Commission/Director authorization		X		X	
I.C. 36-1107 – Permit required for response to depredation unless self-defense/defense of others/defense of property under threat to human life or domestic animals		X		X	X
I.C. 36-1404 (a), (c), (d), (e), (g) – Penalties including license revocation in states participating in Wildlife Violator Compact		X		X	X
Title 67 Chapter 52 – Requirements for public notice, comments, and legislative review				X	
Title 74 – Open meeting requirements				X	
IDAHO FISH AND GAME COMMISSION RULES AND SEASON PROCLAMATIONS					
IDAPA 13.01.02.100 – Additional bear identification materials and exam are recommended and available on-line		X		X	
IDAPA 13.01.06.100.01 (e) – Grizzly bear classified as big game animal		X		X	
IDAPA 13.01.06.300.01 (e) – Game species may be taken only in accordance with Idaho law and rules established by the Idaho Fish and Game Commission		X		X	

FEDERAL AND STATE LAWS AND REGULATIONS	Five Factors				
	A	**B**	**C**	**D**	**E**
IDAPA 13.01.08.260.04 – Take of grizzly bear restricted to once-in-a-lifetime				X	
IDAPA 13.01.08.300.01 (e) – Prohibition against take of adult grizzly bear accompanied by young, or young grizzly bear accompanied by an adult grizzly bear		X		X	
IDAPA 13.01.08.320.01 – Tag requirement		X		X	
IDAPA 13.01.08.350.01 – Evidence of sex requirement		X		X	
IDAPA 13.01.08.410 – Unlawful methods of take (e.g., no use of electronic calls, bait, dogs, snares, traps, radio telemetry tracking)		X		X	
IDAPA 13.01.08.420-422 – Five-day mandatory check and 24-hour mandatory report of kill requirements for grizzly bear hunters		X		X	
IDAPA 13.01.10.100, 101, 200, 400, 700.01 – Permits, requirements for import, export, transport, release and sale of living wildlife		X	X	X	
IDAPA 13.01.10.300 – Recovery, possession and sale of wildlife parts		X		X	
Idaho Fish and Game Season Proclamations issued pursuant to Idaho Code 36-104(b)		X		X	X
MONTANA STATE STATUTES					
87-1-201 (1) – Powers and duties of Montana Fish, Wildlife and Parks – The department shall supervise all the wildlife, fish, game, game and nongame birds, waterfowl, and the game and fur-bearing animals of the state. The department possesses all powers necessary to fulfill the duties prescribed by law and to bring actions in the proper courts of this state for the enforcement of the fish and game laws and the rules adopted by the department.		X	X	X	X
87-2-201 (2) – The department shall enforce all the laws of the state regarding the protection, preservation, management, and propagation of fish, game, fur-bearing animals, and game and nongame birds within the state.	X	X	X	X	X
87-2-201 (8) MCA – The department is authorized to promulgate rules relative to tagging, possession, or transportation of bear within or outside the state.		X		X	X
87-1-201 (9)(a) – The department shall implement programs that: (i) manage wildlife, fish, game, and nongame animals in a manner that prevents the need for listing under 87-5-107 or under the federal Endangered Species Act, 16 U.S.C. 1531, et seq.	X	X	X	X	X

FEDERAL AND STATE LAWS AND REGULATIONS	Five Factors				
	A	**B**	**C**	**D**	**E**
87-1-301. – Powers of commission. (1) the commission: (a) shall set the policies for the protection, preservation, management, and propagation of the wildlife, fish, game, fur-bearers, waterfowl, nongame species, and endangered species of the state and for the fulfillment of all other responsibilities of the department related to fish and wildlife as provided by law; (b) shall establish the hunting, fishing, and trapping rules of the department.	X	X	X	X	X
87-1-301 (3) – The commission may divide the state into fish and game districts and create fish, game, or fur-bearing animal districts throughout the state. The commission may declare a closed season for hunting, fishing, or trapping in any of those districts and later may open those districts to hunting, fishing, or trapping.		X		X	X
87-1-301 (4) – The commission may declare a closed season on any species of game, fish, game birds, or fur-bearing animals threatened with undue depletion from any cause.		X		X	X
87-1-301 (5) – The commission may authorize the director to open or close any special season upon 12 hours' notice to the public.		X		X	X
87-1-304. – Fixing of seasons and bag and possession limits. The commission may: (a) fix seasons, bag limits, possession limits, and season limits; (b) open or close or shorten or lengthen seasons on any species of game, bird, fish, or fur-bearing animal as defined by 87-2-101; (c) declare areas open to the hunting of deer, antelope, elk, moose, sheep, goat, mountain lion, bear, wild buffalo or bison, and wolf by persons holding an archery stamp and the required license, permit, or tag and designate times when only bows and arrows may be used to hunt deer, antelope, elk, moose, sheep, goat, mountain lion, bear, wild buffalo or bison, and wolf in those areas; (d) restrict areas and species to hunting with only specified hunting arms, including bow and arrow, for the reasons of safety or of providing diverse hunting opportunities and experiences; and (e) declare areas open to special license holders only and issue special licenses in a limited number when the commission determines, after proper investigation, that a special season is necessary to ensure the maintenance of an adequate supply of game birds, fish, or animals or fur-bearing animals.		X		X	X
87-2-101. – Definitions. (4) "Game animals" means deer, elk, moose, antelope, caribou, mountain sheep, mountain goat, mountain lion, bear, and wild buffalo.		X		X	X
87-2-701. – Special licenses. (1)(2) grizzly bear—resident, $150 ; nonresident, $1,000.		X		X	X

FEDERAL AND STATE LAWS AND REGULATIONS	Five Factors				
	A	**B**	**C**	**D**	**E**
87-2-701 (2) – If a holder of a valid special grizzly bear license who is 12 years of age or older kills a grizzly bear, the person shall purchase a trophy license for a fee of $50 within 10 days after the date of the kill. The trophy license authorizes the holder to possess and transport the trophy.		X		X	X
87-2-702. – Restrictions on special licenses – availability of bear and mountain lion licenses. (3) Except as provided in 87-2-815, a person may take only one grizzly bear in Montana with a license authorized by 87-2-701.		X		X	X
87-5-103. – Legislative intent, findings, and policy. (2) The legislature finds and declares all of the following: (a) that it is the policy of this state to manage certain nongame wildlife for human enjoyment, for scientific purposes, and to ensure their perpetuation as members of ecosystems; (b) that species or subspecies of wildlife indigenous to this state that may be found to be endangered within the state should be protected in order to maintain and, to the extent possible, enhance their numbers.		X		X	X
87-5-301. – Grizzly bear – findings – policy. (1) The legislature finds that: (a) grizzly bears are a recovered population and thrive under responsive cooperative agreement; (b) grizzly bear conservation is best served under state management and the local, state, tribal, and federal partnerships that fostered recovery; and (c) successful conflict management is key to maintaining public support for conservation of the grizzly bear. (2) It is the policy of the state to : (a) manage the grizzly bear as a species in need of management to avoid conflicts with humans and livestock; and (b) use proactive management to control grizzly bear distribution and prevent conflicts, including trapping and lethal measures.		X	X	X	X
87-5-302. – Commission regulations on grizzly bears. (1) The commission may regulate the hunting of grizzly bears, including the establishment of tagging requirements for carcasses, skulls, and hides; and (b) establish requirements for the transportation, exportation, and importation of grizzly bears.		X	X	X	X
87-5-3-2. – Commission regulations on grizzly bears. (2) When special grizzly bear licenses are to be issued pursuant to 87-2-701, the commission shall establish hunting season quotas for grizzly bears that will prevent the population of grizzly bears from decreasing below sustainable levels.		X		X	X

FEDERAL AND STATE LAWS AND REGULATIONS	Five Factors				
	A	**B**	**C**	**D**	**E**
87-6-413. – Hunting or killing over limit. (1) A person may not attempt to kill, take, shoot, or capture or kill, take, hunt, shoot, or capture more than one game animal of any one species in any license year unless the killing of more than one game animal of that species has been authorized by regulations of the department. (2) If a person is convicted or forfeits bond or bail after being charged with hunting or killing over the limit of: (a) mountain sheep, moose, wild buffalo, caribou, mountain goat, black bear, or grizzly bear, the person shall be fined not less than $500 or more than $2,000 or be imprisoned in the county detention center for not more than 6 months, or both. In addition, the person shall forfeit any current hunting, fishing, recreational use, or trapping license issued by this state and the privilege to hunt, fish, or trap in this state for 30 months from the date of conviction or forfeiture unless the court imposes a longer period.		X		X	X
87-6-404. – Unlawful use of dog while hunting. (1) A person may not chase any game animal or fur-bearing animal with a dog.		X		X	X
ADMINISTRATIVE RULES OF MONTANA					
ARM 12.9.103. Grizzly Bear Policy – Now, therefore, in order to promote the preservation of the grizzly bear in its native habitat, the commission establishes the following policy guidelines for the Montana Department of Fish, Wildlife, and Parks action when dealing with grizzly bears.	X	X	X	X	X
Grizzly Bear Hunting Regulations (2016) – Commission Rule		X		X	X
MONTANA DEPARTMENT OF STATE LANDS					
Title 75, Chapter 1 MCA - Montana Environmental Policy Act	X				
Title 76, Chapter 14, MCA - Montana Rangeland Resource Act	X				
Title 77, Chapter 1 MCA - Administration of State Lands	X				X
Title 87, Chapter 5, MCA - Nongame and Endangered Species Conservation Act	X			X	X
Montana Constitution. Article IX - Environment and Natural Resources. Section 1 - Protection and Improvement	X				
Montana Constitution. Article X - Education and Public Lands. Section 4 - Board of Land Commissioners.	X				
FEDERAL PLANS AND GUIDELINES - NATIONAL PARK SERVICE					
NPS-77, Natural Resource Management Guidelines, May 16, 1991		X			X
Final Environmental Impact Statement, Grizzly Bear Management Program, Yellowstone National Park, July, 1983	X	X	X	X	X

FEDERAL AND STATE LAWS AND REGULATIONS	Five Factors				
	A	**B**	**C**	**D**	**E**
Yellowstone National Park Annual Bear Management Plan		X			X
Grand Teton National Park Human/bear Management Plan, 1989	X	X	X	X	X
U.S. FOREST SERVICE (Regions 1,2, and 4)				X	
Beaverhead-Deerlodge NF Land and Resource Management Plan (2009)	X			X	X
Bridger-Teton NF Land and Resource Management Plan with Amendments and Corrections (2015)	X		X	X	X
Custer NF and Grasslands Land Resource Management Plan (1987)	X		X		
Gallatin NF Plan (1987) as amended through November 2014	X		X	X	X
Shoshone NF Land Management Plan (2015)	X		X	X	
1997 Revised Forest Plan - Targhee National Forest	X		X	X	X
OTHER DOCUMENTS					
Grizzly Bear Compendium. National Wildlife Federation, Washington, D.C. 1987					X
Interagency Grizzly Bear Committee Taskforce Report, Grizzly Bear/Motorized Access Management. 1994. Revised 1998.				X	
Yellowstone Grizzly Bear Investigations				X	X
Public Information and Involvement Strategy for IGBC.				X	X
Tri-State MOA – Allocation of Discretionary Mortality of Grizzly Bears in the Greater Yellowstone Ecosystem among WY, MT, & ID (2016)		X		X	X
Grizzly Bear Recovery Plan Supplement: Revised Demographic Recovery Criteria for the Yellowstone Ecosystem (2016)		X			X
1993 Grizzly Bear Recovery Plan	X	X	X	X	X
Wyoming Grizzly Bear Management Plan (2016)	X	X	X	X	X
Wyoming Grizzly Bear Annual Job Completion (Monitoring) Reports		X	X	X	X
Wyoming Bear Wise Program	X	X		X	X
Grizzly Bear Management for SW Montana (2013)	X	X	X	X	X
Grizzly Bear Final Management Plan for Western Montana (2006)	X	X	X	X	X
Idaho Yellowstone Grizzly Bear Management Plan to Accompany HCR 62	X	X		X	X

Appendix H. Montana State Grizzly Bear Management Plan (excluding plan appendices)

MONTANA GRIZZLY BEAR MANAGEMENT PLAN 2024

MONTANA FISH, WILDLIFE & PARKS

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Figures and Tables

Executive Summary

Montana Fish, Wildlife and Parks (FWP) proposes to manage grizzly bears (*Ursus arctos*) within the state of Montana under the direction of a new, programmatic plan. This plan, analyzed through the Montana Environmental Policy Act (MEPA) process and accompanied by an Environmental Impact Statement (EIS), will be fully compliant with the Endangered Species Act (ESA) and will maintain commitments in existing agreements with federal, state, and tribal agencies. The plan will supplant two previous plans under which FWP has operated: one for Western Montana, and one for Southwest Montana.

Recognizing that grizzly bears have expanded their area of occupancy to include many areas beyond the federally designated Recovery Zones (RZs)—as well as the buffer areas surrounding two of these zones, called Demographic Monitoring Areas (DMAs)—this plan will guide management statewide, focusing on the 30 counties where grizzly bear presence has been documented in recent years or may be documented in the near future. Since grizzly bears currently are listed as threatened under the ESA, the plan is designed to guide state management while this species remains so listed—and also to guide and articulate FWP's future vision for management should any grizzly bear populations in Montana be delisted and full management authority for them be returned to the state.

FWP envisions a future in which grizzly bears will continue to be an important symbol of the State of Montana and part of its cultural heritage. The overwhelming success of grizzly bear recovery, to date, speaks to its importance and central role in the culture of Montana. FWP would continue to ensure their long-term presence in Montana, recognizing that they are among the most difficult species to have in our midst. FWP views grizzly bears as both "conservation-reliant" (meaning the threats grizzly bears face can never be eliminated, only managed; Goble et al. 2012) and "conflict-prone" and embraces the challenges of ensuring the species' healthy future, while ensuring the safety of people and their property. As it supports a thriving grizzly bear population, FWP expects to continue its internationally recognized conflict prevention and response program, and fully expects that removal of some animals will be necessary in the implementation of this plan.

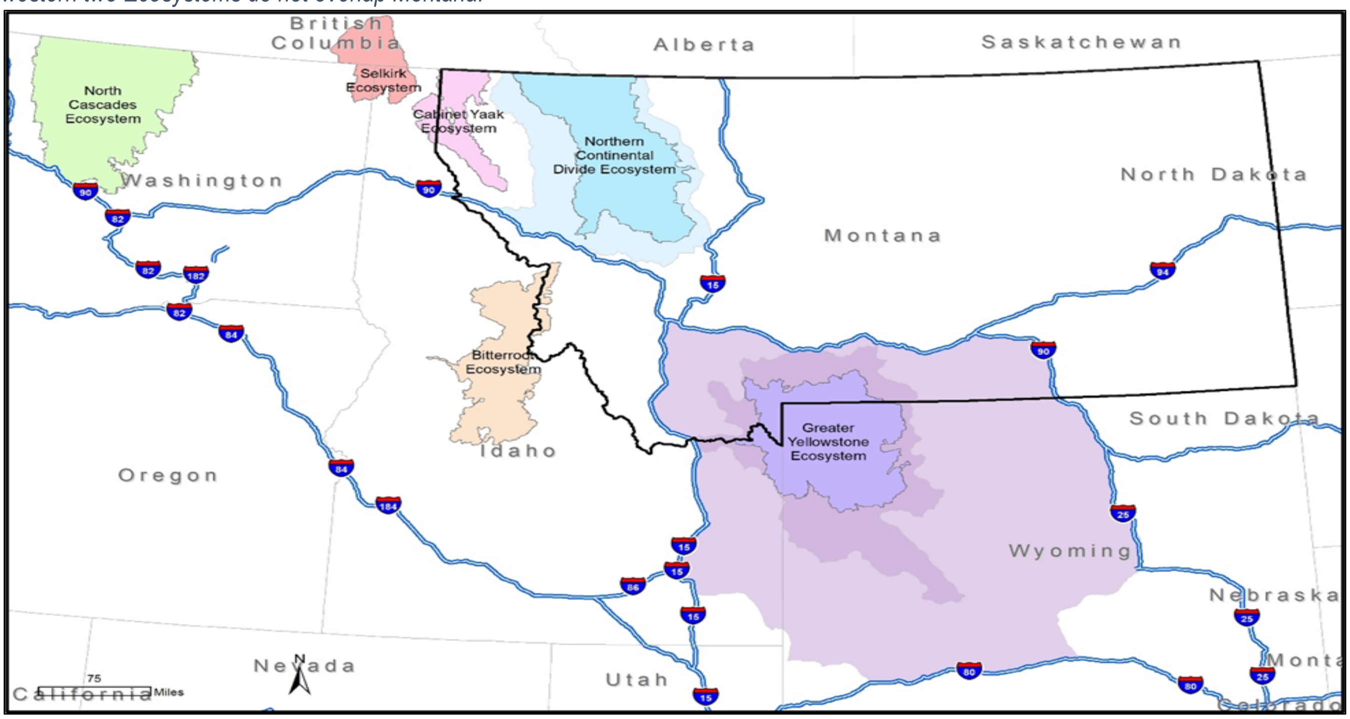
As shown in Figure 1, FWP's Preferred Alternative considers the cornerstone populations occupying the Northern Continental Divide Ecosystem (NCDE) and the Greater Yellowstone Ecosystem (GYE) as having met recovery targets and supports their delisting. As this plan documents, populations in these two secure areas are abundant and appropriately distributed across the landscape. FWP supports federal policies for meeting recovery goals in the Cabinet-Yaak Ecosystem (CYE) and for attaining natural recovery of a population in the Bitterroot Ecosystem (BE); the latter being comprised largely of wilderness. FWP also takes the position—and this plan documents the case—that populations occupying the NCDE and GYE are abundant enough to provide dispersal opportunities for establishing connectivity among recovery ecosystems. Therefore, FWP's Preferred Alternative does not identify specific statewide population targets beyond those already referenced in the Recovery Plan or Conservation Strategies. Related details are covered in the remainder of this document.

In recent years, grizzly bear populations in the various recovery zones have expanded to the point where they are close to connecting (e.g., NCDE and CYE, NCDE and GYE, NCDE and BE, GYE and BE). A remaining challenge is ensuring long-term connectivity between those zones, across human-populated areas—a challenge that will require effort and patience from FWP and from Montanans. Fortunately, connectivity does not require that grizzly bears occupy the entire state, nor does it require that the density of bears in between recovery zones match the density of bears within those zones.

FWP believes connectivity can be achieved by securing attractants (to help grizzly bears rely on natural, not anthropogenic, foods and avoid human contact) and in the case of the GYE, by occasional, thoughtful translocations for genetic exchange. Translocation for genetic exchange is not a standalone strategy for connectivity as the conservation of habitat and the prevention of conflicts in between recovery zones are important components to ensure long-term connectivity. Measures described in the current GYE Conservation Strategy are and will continue to be used to promote connectivity through natural movements. These measures include habitat protections, population standards, mortality control, outreach efforts, and adaptive management. It is believed these strategies together can bring connectivity between core populations to fruition.

Figure 1. All six grizzly bear Ecosystems, as mapped by USFWS

USFWS-identified grizzly bear Recovery Zones: North Cascades Ecosystem (NCE); Selkirk Ecosystem (SE); Cabinet-Yaak Ecosystem (CYE); Northern Continental Divide Ecosystem (NCDE); Bitterroot Ecosystem (BE); Greater Yellowstone Ecosystem (GYE). The lighter blue surrounding the NCDE, and the darker purple immediately surrounding the GYE, show those zones' Demographic Monitoring Areas (DMAs). The medium purple surrounding the GYE and its darker-purple DMA is a Distinct Population Segment (DPS) boundary. To date, the USFWS has not officially designated any of the remaining populations as DPSs or established DPS boundaries for them. Note the western two Ecosystems do not overlap Montana.



In this document, FWP uses the term "core" or "population core" or "cornerstone population" to refer to the four focal areas entirely or partially in Montana that have been termed "grizzly bear ecosystems" since the early 1980s. FWP's Preferred Alternative does not actively manage for grizzly bear presence outside of core areas, where the likelihood of conflict is elevated and legitimate concerns about human safety are the single highest priority. Core areas refer to the four focal areas entirely or partially in Montana that have been termed "grizzly bear ecosystems," and include the recovery zones and associated demographic monitoring areas. Management decisions for any bears found outside of core areas will be guided by the likelihood that the bear will contribute to the long-term persistence and connectivity of populations. Where that likelihood is low, FWP will be quick to recommend (or implement, if appropriate) control when conflicts arise. Because there are no cornerstone populations of grizzly bears in Central or Eastern Montana (nor does FWP envision a future in which there will be any), there is nothing with which to connect bears from the West. While grizzly bear presence would not be an objective in areas far from largely mountain habitats and in prairie habitats where agricultural development predominates, individual animals in these areas would be accepted to the degree they remain conflict-free. This is not meant to eliminate the potential for hunter harvest of non-conflict bears in these areas during seasons established by the commission. Hunters could target bears in these areas however only if the Commission approved seasons that allowed hunting there.

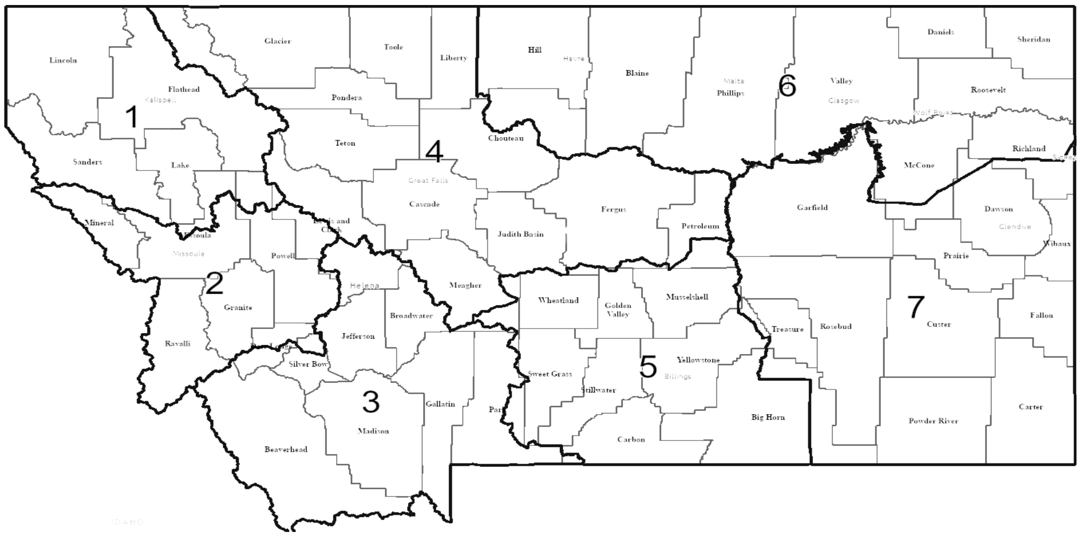
In contrast, where the likelihood is high that grizzly bear presence can contribute to long-term persistence and connectivity with low potential for conflict, FWP would make all reasonable efforts to recommend (or implement, if appropriate) actions that minimize bear removal.

FWP emphasizes that i) human safety would not be compromised under any scenario, and ii) decisions in any given case may deviate from these fundamental principles, as no programmatic plan can anticipate all variables in a situation.

In addition to the years of working with state, federal, and tribal partners, and commitments made under various agreements, FWP's Preferred Alternative has benefitted from the work of the Grizzly Bear Advisory Council (2019-2020), a group of 18 citizens empaneled to draft recommendations related to grizzly bear management. FWP also notes the rigorously implemented public opinion survey of Montanans, finalized in 2020 (survey questions and results are available online at: https://www.cfc.umt.edu/research/humandimensions/news/human-dimensions-grizzly-bear.php). This plan builds upon the experience and interactions of many, both within and outside of FWP, in identifying and successfully "threading the needle" between the difficulties of managing this particular species.

Figure 2. FWP regions in Montana

Below are Montana's seven FWP regions, each with its headquarters city (in parentheses) and approximate counties served. However, note that regional boundary lines do not always correspond to county lines.



Region 1 (Kalispell)	*Region 2 (Missoula)*	*Region 3 (Bozeman)*	*Region 4 (Great Falls)*	*Region 5 (Billings)*	*Region 6 (Glasgow)*	*Region 7 (Miles City)*
Lake	*Granite*	*Beaverhead*	*Cascade*	*Golden Valley*	*Blaine*	*Carter*
Lincoln	*Mineral*	*Broadwater*	*Glacier*	*Musselshell*	*Daniels*	*Custer*
Sanders	*Ravalli*	*Gallatin*	*Judith Basin*	*Stillwater*	*Hill*	*Fallon*
…and parts of…	*…and parts of…*	*Jefferson*	*Liberty*	*Sweet Grass*	*Phillips*	*Garfield*
Flathead	*Deer Lodge*	*Madison*	*Pondera*	*Wheatland*	*Richland*	*Prairie*
Lewis & Clark	*Lewis & Clark*	*…and parts of…*	*Teton*	*Yellowstone*	*Roosevelt*	*Rosebud*
Missoula	*Missoula*	*Carbon*	*Toole*	*…and parts of…*	*Sheridan*	*Treasure*
Powell	*Powell*	*Deer Lodge*	*…and parts of…*	*Big Horn*	*Valley*	*Wibaux*
Lewis & Clark	*Silver Bow*	*Lewis & Clark*	*Chouteau*	*Carbon*	*…and parts of…*	*…and parts of…*
		Meagher	*Fergus*	*Fergus*	*Chouteau*	*Big Horn*
		Park	*Flathead*	*Meagher*	*Dawson*	*Dawson*
		Silver Bow	*Lewis & Clark*	*Park*	*McCone*	*McCone*
			Meagher	*Petroleum*	*Richland*	*Richland*
			Petroleum			

Table 1 compares, side by side, the no-action alternative vs. FWP's Preferred Alternative, with each row corresponding to an identified issue. Background and details are provided in the main body of the document. (Note: For definitions of the abbreviations, acronyms, and other terms used throughout this document, see the Definitions section following this table.)

Table 1. Alternative A vs. Alternative B: Comparison of two plans and their outcomes

Issue	A. No action (status quo)	B. FWP Preferred Alternative
Role of grizzly bears in Montana	Grizzly bears would continue to be the "official state animal of Montana," recognizing the importance that Montana plays nationally in conservation of the species. However, contention and uncertainty would continue to surround appropriate policy for bears outside of RZs or DMAs, especially in light of growing population dispersal and increasing conflict.	Grizzly bears would be seen as a valued part of Montana's fauna, a species that is both "conservation-reliant" and "conflict-prone." Under this Alternative, clarity would be provided about where grizzly bear presence is a management objective. Core populations associated with existing RZs and DMAs would be maintained near recovery levels. FWP would not actively manage for grizzly bear presence between core areas, where the likelihood of conflict is high but would promote low density populations in between core areas for connectivity purposes. The Preferred Alternative recognizes that human–bear conflicts and bear mortalities would be greater in areas between population cores. Management decisions for any bears found outside of core areas will be guided by the likelihood that the bear will contribute to the long-term persistence and connectivity of populations. Where that likelihood is low, FWP will be quick to recommend (or implement, if appropriate) control when conflicts arise. FWP would use available discretion to remove or relocate grizzly bears involved in conflicts with humans, particularly in areas where connectivity among population cores is unlikely.
Numerical objectives	There would be no numerical statewide objectives. FWP has committed to population and habitat objectives in the GYE CS, and in the NCDE CS.	FWP would renew its commitment to recovery and long-term demographic and genetic health of grizzly bears, statewide. FWP is committed to specific numeric goals in the GYE and NCDE as articulated in the two Conservation Strategies (CSs) and supports the recovery goal in the CYE. FWP commits to working with the USFWS in developing a goal for the BE when appropriate. However, this Alternative finds that establishing a statewide numeric minimum, optimum, or maximum population objective would not be useful.

Issue	A. No action (status quo)	B. FWP Preferred Alternative
Distributional objective	No explicit distributional objective would be identified. FWP would manage for core populations in the NCDE, GYE, and CYE. Current FWP plans envision future biological connections among these cores as well as to the BE. A goal of the NCDE CS is to provide opportunity for connectivity with other Ecosystems in Montana, but no explicit objective is articulated. FWP would continue to struggle with the meaning of "biologically suitable and socially acceptable."	Sustaining grizzly bear recovery would continue to be an objective where recovery objectives have been met. Achieving recovery would continue to be an objective where objectives have not yet been met. Connectivity does not require that grizzly bears occupy the entire state nor does the density of bears in between recovery zones need to match the density of bears within those zones. FWP believes connectivity can be achieved by securing attractants (to help grizzly bears rely on natural, not anthropogenic, foods and avoid human contact) and in the case of the GYE, by occasional, thoughtful translocations for genetic exchange. Translocation for genetic exchange is not a standalone strategy for connectivity as the conservation of habitat and the prevention of conflicts in between recovery zones are important components to ensure long-term connectivity by free-ranging bears. Because there are no cornerstone populations of grizzly bears in Central or Eastern Montana (nor does FWP envision a future in which there will be any), there is nothing with which to connect bears from the West. While grizzly bear presence would not be an objective in areas far from largely mountain habitats and in prairie habitats where agricultural development predominates, individual animals in these areas would be accepted to the degree they remain conflict-free. This is not meant to eliminate the potential for hunter harvest of non-conflict bears in these areas during seasons established by the commission.
Human safety	FWP would maintain a focus on human safety and conflict prevention.	FWP would maintain a focus on human safety and conflict prevention. Outside of core areas, conflict-free grizzly bears will not be proactively removed on public or private lands. This is not meant to eliminate the potential for hunter harvest of non-conflict bears in these areas during seasons established by the Commission. FWP would use available discretion to remove or relocate grizzly bears involved in conflicts with humans, particularly in areas where connectivity among population cores is unlikely.
Role of private lands in grizzly bear conservation and management	No explicit direction would be articulated for private lands, but FWP would recognize the pivotal role of private-landowner support in recovery and the significant contribution of private lands in the recovery effort.	FWP would acknowledge the contribution of private lands in providing habitat for grizzly bears beyond secure[1] and would prioritize aid to landowners to minimize conflicts wherever they might occur. Where grizzly bear expansion does not contribute to connectivity, FWP would have lower tolerance for grizzly bears involved in conflicts. Management decisions for any bears found outside of core areas will be guided by the likelihood that the bear will contribute to the long-term persistence and connectivity of populations. FWP would use available discretion to remove or relocate grizzly bears involved in conflicts with humans, particularly in areas where connectivity among population cores is unlikely.

[1] See ARM 12.9.1401. "Secure" is a general term meaning wild places where humans visit but do not live, where extractive activities are limited spatially and temporally, where roads are primitive and do not dominate the landscape, and where wildlife generally lives with minimal interaction with people. No specific standards are implied.

Issue	A. No action (status quo)	B. FWP Preferred Alternative
Conflict prevention	Focus would be on the NCDE, GYE, CYE and surrounding areas, including Sapphire, Flint, Highwoods and nearby ranges and, beginning in 2022, the Bitterroot area.	FWP would continue its active conflict prevention program, focusing on the same core areas as at present and areas important to connectivity. FWP would continue to research emerging technologies to minimize human–bear conflict, and provide funding and in-kind support to independent research programs
Conflict response	Conflict bears would be controlled as recommended by IGBC (1986), attempting to minimize number of bears removed. FWP would consider conservation as well as human safety and tolerance in addressing conflicts outside fundamental recovery areas. Responses to conflicts would be generally more aggressive when they occur on or near private lands. FWP would not participate in moving federally listed bears involved in conflicts if captured outside of RZs.	FWP would continue its emphasis on reducing attractants that often precipitate conflicts. When necessary, bears involved in conflicts would be controlled consistent with state and federal guidelines throughout Western Montana. Where discretion is possible, FWP would attempt to minimize removal (moving bears or euthanizing them) where connectivity between core populations is likely but would be quicker to recommend and/or implement removal where connectivity is unlikely. Under 87-5-301, MCA, FWP would not participate in moving federally listed bears involved in conflicts if captured outside of RZs. Under 87-5-301, MCA, a livestock owner or other authorized person may lethally take a delisted grizzly at any time without a permit or license from FWP when a grizzly bear is attacking or killing livestock. Under 87-5-301, MCA, FWP may issue a permit to a livestock owner or authorized person to kill a delisted grizzly bear that is threatening livestock. Such take under 87-5-301, MCA, would be constrained by a quota set by the commission and would count against established mortality limits where applicable (e.g., GYE and NCDE demographic monitoring areas). Under 87-6-106, MCA, FWP may issue a permit to the livestock owner or authorized person to kill the delisted grizzly bear. In no case would this quota compromise recovered populations.
Public certainty vs. agency flexibility in conflict response	FWP would anticipate less predictability for the public about agency management actions since there will be no management direction in the different management areas (e.g., RZs, DMAs, outside of the DMAs, connectivity areas).	FWP would anticipate more predictability than the status quo due to adoption of different management direction in different management areas because of the additional guidance provided in the preferred alternative regarding the biological importance of bears in certain locations. However, FWP would retain some discretion to respond to conflict bears on a case-by-case basis.
Destinations of a bear captured in a conflict setting when moving it away from the site is recommended and FWP is allowed to move it under state law (i.e., captured inside RZ).	Bears involved in conflicts would be moved to areas where the probability of causing additional conflict is low (and only to sites previously approved by the Commission). Since 2009, 84% of destinations have been in FWP Region 1 (72% in Flathead County). Under MCA 87-5-301, only bears captured within RZs could be moved by FWP under listed status.	Bears involved in conflicts with people would be moved to areas with a lower probability of conflict. However, if a non-conflict (non-target or preemptively trapped) animal is captured, FWP would consider moving it to an area outside of the Ecosystem of origin, in which connectivity is an objective, if a Commission-approved release site exists. As the known range of grizzly bears changes, FWP would continue to engage with the Commission to gain pre-approval of new sites within "estimated occupied range of grizzly bears" (Appendix G) to which grizzly bears could be moved. If delisted, bears involved in conflict outside RZs also could be handled in this way.

Issue	A. No action (status quo)	B. FWP Preferred Alternative
Moving non-conflict bears (captured outside RZs) whose origin is uncertain	FWP would have no overall policy; decisions would be made on a case-by-case basis.	If the situation allows, these bears would be left in place. If moving the bear is required, it would be moved to a Commission-approved release site which provides the best chance for the bear to find life requisites while minimizing conflict. The site selected for release need not be located within the Ecosystem of origin, particularly if releasing the bear at the selected site would advance the interests of connectivity. As the known range of grizzly bears changes, FWP would continue to engage with the Commission to gain pre-approval of new sites within "estimated occupied range of grizzly bears" to which grizzly bears could be moved but would not seek approval of new release sites beyond the most recently updated "estimated occupied range of grizzly bears" without first going through and extensive environmental analysis.
Moving non-conflict bears to areas outside of "estimated occupied range of grizzly bears"	Movement of grizzly bears outside "estimated occupied range of grizzly bears" would require a separate environmental analysis and decision notice, as well as approval from the Commission.	If FWP proposes to move a bear into unoccupied habitat for purposes of recovery or connectivity, it will first complete an environmental review and seek approval from the Commission. New FTE positions as approved by the legislature may be established for transfer of bears between ecosystems and does not focus on unoccupied habitat.
Orphaned cubs	Cubs orphaned after September 1 generally would be left in the wild. Bringing younger orphans to Montana Wildlife Rehabilitation Center (MWRC) is discouraged and must follow the MWRC intake policy because i) acceptable permanent captive situations are very difficult to find, and ii) re-release into the wild is only permitted with pre-approved plan and release area.	Cubs orphaned after September 1 would be generally left in the wild. Bringing younger orphans to MWRC is discouraged and must follow the MWRC intake policy because i) acceptable permanent captive situations are very difficult to find, and ii) re-release into the wild is only permitted with pre-approved plan and release area.
Conflict management operational structure	FWP would continue supporting bear managers in or near Anaconda, Bozeman, Chouteau, Conrad, Hamilton, Kalispell, Libby, Missoula, and Red Lodge.	Building on current structure, FWP would prioritize bear manager FTE where expanding population presents the need for conflict management and also opportunities for connectivity while maintaining efforts in occupied core areas.
Prioritizing information, outreach, and communication efforts	FWP would maintain efforts aimed at people living, working, and recreating in grizzly bear habitat, targeting both new and long-term residents.	FWP would prioritize efforts where expanding population presents the need for conflict management and also opportunities for connectivity while maintaining efforts in occupied core areas.
Population research and monitoring	Population monitoring and research would continue as described in the NCDE and GYE CSs and in any future CYE or BE CS.	FWP would continue monitoring, as committed to in CSs, but also would prioritize finding ways to increase its understanding of bear status in areas of potential connectivity.
Resources required	No change from present.	Slightly more than current baseline.
Hunting of grizzly bears: Values and beliefs	Goal would be to allow for limited regulated harvest upon delisting of bears, but no specific plans are in place. MCA and ARM identify the potential of grizzly bear hunting if not federally listed.	FWP would prepare for a conservative grizzly bear hunting season if not federally listed, but the decision on whether to establish a hunting season would rest with the Commission. FWP recognizes the strongly held views held by many members of the public. FWP will not recommend a hunting season for at least 5 years after an ecosystem is delisted.

Issue	A. No action (status quo)	B. FWP Preferred Alternative
A potential grizzly bear hunt: Functions, expectations, regulations.	If delisted, hunting would be implemented within a scientifically sound framework that maintains a viable and self-sustaining population, and to garner additional public support.	Grizzly bears are statutorily classified as a game animal (87-2-101, MCA). As such, they are protected/regulated by Commission rules. If delisted and a hunting season is adopted by the Commission, it could be used to limit expansion where core connectivity is unlikely (particularly in Central and Eastern Montana), but it would be consistent with maintaining an appropriate density of grizzly bears where connectivity is prioritized. Hunter-killed bears within the DMA would be counted against DMA mortality limits as outlined in the GYE CS and NCDE CS. In no case would hunting compromise recovered populations.
Law enforcement	FWP would continue to work cooperatively with federal (where listed) and tribal authorities to deter unlawful take, and to apprehend violators.	FWP would continue to work cooperatively with federal (where listed) and tribal authorities to deter unlawful take, and to apprehend violators.
Recreational use	FWP would consider grizzly bear presence in all recreation planning and decisions on FWP lands. FWP also would consider grizzly bear presence when providing input on other public land management decisions. FWP would continue or expand its program of educating recreationalists, including hunters, about recreating safely in grizzly bear country.	FWP would consider grizzly bear presence in all recreation planning and decisions on FWP lands. FWP would also consider grizzly bear presence when providing input on other public land management decisions. FWP would continue or expand its program of educating recreationalists, including hunters, about recreating safely in grizzly bear country. Efforts targeted for black bear hunters and wolf trappers will be emphasized.
Motorized access management	FWP would support land management agencies' policies previously agreed to as part of the CSs. Elsewhere, FWP would continue existing policy of avoiding open road densities exceeding 1 mi/mi^2 on lands it owns or manages. FWP would take the view that, outside of areas with specific road density standards, grizzly bears can coexist with humans in areas with moderate amounts of motorized access if attractants are well managed, conflicts are minimized, and mortality of grizzly bears is sufficiently low.	FWP would support land management agencies' policies previously agreed to as part of the CSs. Elsewhere, FWP would continue existing policy of avoiding open road densities exceeding 1 mi/mi^2 on lands it owns or manages. FWP would take the view that, outside of areas with specific road density standards, grizzly bears can coexist with humans in areas with moderate amounts of motorized access if attractants are well managed, conflicts are minimized, and mortality of grizzly bears is sufficiently low.
Engagement with community groups	FWP would continue informal communication and cooperation with community groups.	FWP would stand ready to adopt the leading role in grizzly bear management but would also acknowledge that success will depend on actions taken by citizens working collaboratively. While exercising its authority and leadership role, FWP would actively encourage bottom-up, community-based efforts to resolve management challenges. FWP expects this approach to yield solutions which are tailored to local communities, bolstered by local buy-in, but which also respect the values and mandates expressed in national and/or state laws and regulations.

Issue	A. No action (status quo)	B. FWP Preferred Alternative
Climate change	FWP would not explicitly consider climate change as part of its grizzly bear management.	In allocating resources or suggesting regulations, FWP would consider habitat variations, including those manifest in climate—e.g., lengthening of non-denning seasons may increase chances of human–bear conflict, particularly in autumn. FWP would continue to monitor populations as they respond to these variations and would adjust management responses accordingly.

Definitions

Below are some acronyms, abbreviations, and other terms used in this document.

Acronyms and abbreviations

Term	Meaning
ARM	Administrative Rules of Montana.
BE	Bitterroot Ecosystem, as commonly used and understood by the IGBC.
BIR	Blackfeet Indian Reservation.
BLM	[United States Department of the Interior] Bureau of Land Management.
Commission	Montana Fish and Wildlife Commission—the body appointed to make policy and regulations for FWP.
CS	Conservation Strategy. In this document, "CS" and "Conservation Strategy" refer to two specific documents: the GYE CS (GYE Subcommittee 2016) and the NCDE CS (NCDE Subcommittee 2019) or the most recent version of the Conservation Strategies.
CSKT	Confederated Salish and Kootenai Tribes.
CYE	Cabinet-Yaak Ecosystem, a geographic area defined by the 1993 USFWS Grizzly Bear Recovery Plan as the recovery zone plus the larger area surrounding it in which grizzly bears may be anticipated to occur as part of the same population (USFWS 2022, Species Status Assessment).
DCA	Demographic Connectivity Area. Defined in the NCDE CS as "an area in zone 1 intended to allow grizzly bear occupancy and potential dispersal beyond the NCDE to other recovery areas."
DMA	Demographic Monitoring Area—a geographic area specifically mapped as part of the GYE CS or the NCDE CS. A DMA is an area surrounding an RZ, within which recovered grizzly bear populations will be maintained, population monitoring will be conducted, and demographic objectives will be applied.
DNRC	Montana Department of Natural Resources and Conservation.
DPS	Distinct Population Segment—a designation used by the USFWS to identify a vertebrate population that is distinct and significant relative to the entire species, for the purposes of listing, delisting, or reclassifying under the Endangered Species Act (ESA). In the previous, but vacated delisting proposals, the USFWS designated the grizzly bear population in the GYE as a DPS and delineated a geographic boundary within which this designation applies.
ESA	Endangered Species Act.
FIR	Flathead Indian Reservation.
FTE	Full-time equivalent (staff position).
FWP	Montana Fish, Wildlife, and Parks.
GBAC	Grizzly Bear [Conservation and Management] Advisory Council—a group of 18 citizens selected and empaneled, by then-governor Steve Bullock of Montana, via Executive Order 9-2019. Their final report was issued in 2020.
GBRP	1993 USFWS Grizzly Bear Recovery Plan.
GNP	Glacier National Park.
GYE	Greater Yellowstone Ecosystem, a geographic area defined by the 1993 USFWS GBRP as the recovery zone plus the larger area surrounding it in which grizzly bears may be anticipated to occur as part of the same population (USFWS 2022, Species Status Assessment). This is different than the definition in the Tri-state MOA which uses the geography as the distinct population segment delisting in the 2007 and 2017 USFWS rules.
IGBC	Inter-agency Grizzly Bear Committee.
IGBST	Inter-agency Grizzly Bear Study Team, an inter-agency team tasked with monitoring and researching the GYE population (led by the Northern Rocky Mountain Science Center, under the USGS).
MCA	Montana Code Annotated.
MEPA	Montana Environmental Policy Act.
MOA	Memorandum of Agreement.
MOU	Memorandum of Understanding.
MWRC	Montana Wildlife Rehabilitation Center
NCDE	Northern Continental Divide Ecosystem, a geographic area defined by the USFWS GBRP as the recovery zone plus the larger area surrounding it in which grizzly bears may be anticipated to occur as part of the same population (USFWS 2022, Species Status Assessment).
PCA	Primary Conservation Area. As used in the GYE and NCDE CSs, these are the geographic RZs, renamed as PCAs in the event that delisting occurs, intended "to be managed as a source area for the grizzly bear population."

Term	Meaning
RZ	Federally defined grizzly bear Recovery Zone (as articulated in the Federal Recovery Plan). RZs are predominantly public lands, where habitat protections are in place to support stable-to-increasing grizzly bear populations.
SDM	Structured Decision Making. A formal process to help identify issues and make decisions, especially in uncertainty.
USDA	United States Department of Agriculture.
USDA WS	USDA Wildlife Services.
USFS	United States Forest Service.
USFWS	United States Fish and Wildlife Service.
USGS	United States Geological Survey (under which the Northern Rocky Mountain Science Center operates).

Other terms—specific to bears and bear management

Generally, this document adopts the definitions of terms suggested by Hopkins et al. (2010), as listed below. A single asterisk (*) denotes an exception, while a double asterisk (**) denotes terminology not addressed by Hopkins.

Aggressive behavior: Bear behavior (defensive or offensive) that is threatening to people. Defensive behaviors can be associated with a bear's defense of itself, its young, or its food—often during surprise encounters. Offensive behaviors can be related to a bear's overt attempts to obtain anthropogenic foods in the presence of people or active predation on people.

Aggressive bear: A bear that has displayed aggressive behavior and is a public safety concern.

Anthropogenic attractant: Any food or other attractant having a human origin.

** Augmentation: Deliberate movement of a grizzly bear into a population, with the intent of increasing that population's abundance, genetic diversity, or both.

** Attractant: Anything that attracts a bear to a site [from NCDE Subcommittee 2019].

Aversive conditioning: A learning process in which deterrents are continually and consistently administered to a bear to reduce the frequency of an undesirable behavior.

Bear attack: Intentional contact by a bear resulting in human injury.

** Bear deterrent: An agent administered to bears to cause pain, avoidance, or irritation [from Lackey et al. 2018].

** Boneyard: A site used for disposing of multiple animal carcasses [from NCDE Subcommittee 2019].

Conditioning: Learning triggered by receiving a reward or punishment for a given response to a given stimulus. Rewards of unsecured anthropogenic foods can lead to food conditioning in bears, whereby they learn to associate humans or their infrastructure with food. Although usually used in a binary sense (i.e., either conditioned or not) because we typically lack sufficient knowledge of a bear's behavior and intentions, and also because we lack a nuanced vocabulary for describing both, this trait almost surely exists along a continuum (from mild to severe).

Conflict bear: A bear involved in human–bear conflict (see below).

** Conflict prevention: Strategies and actions that aim to deter or prevent bears from obtaining anthropogenic foods, killing or injuring livestock, damaging property, or injuring people.

** Connectivity: The ability for animals from one population to interact physically with those from a different population. May also be referred to as "linkage." In this document, the term "connectivity" is synonymous with the term "linkage" and a "connectivity zone" is synonymous with a "linkage zone." "Genetic connectivity" refers to situations in which neighboring populations exchange individuals and gene flow is achieved through reproduction of immigrants (and their descendants). In grizzly bears, genetic connectivity is often achieved through dispersal movement by males, which typically involve longer distances than females, who can mate with females in the target population, in essence, moving genetic material between populations. “Demographic connectivity” refers to situations in which neighboring populations exchange individuals and immigrants (and their descendants) contribute significantly to population dynamics. In grizzly bears, demographic connectivity may be achieved through the residency of females and males in the areas between sub-populations because female bears typically disperse shorter distances than males. Demographic connectivity can often be achieved by moving females. By default, demographic connectivity also achieves genetic connectivity (Costello 2020).

Control: In this context, hazing, moving, or euthanizing a grizzly bear.

** Core: In this document, FWP uses the term “core” (or “population core” or “cornerstone population”) to refer to the four focal areas entirely or partially in Montana that have been termed “grizzly bear ecosystems” since the early 1980s. Core includes the recovery zones and associated demographic monitoring areas. These are populations that are either biologically recovered (in the case of NCDE and GYE) or identified by the USFWS as requiring recovery (in the case of CYE and BE). Note that this usage of “core” is different from its meaning in some USFS Forest Plans that use it to mean large, contiguous blocks of landscape devoid of motorized human use. FWP notes, however, that large, remote landscapes have allowed these populations to persist, and we expect that importance to continue in the future.

** Corridor: The term “corridor” is sometimes used when referring to connectivity among core portions of a population’s geographic range. In this document we do not use the term “corridor,” preferring to use the term “connectivity” (which we also synonymize with “linkage”). The term “corridor” can be misleading because i) it suggests the animals using such areas do so out of specific intention to move from one core area to another (which may not be the reason they are present within the “corridor”); and ii) it suggests that animals within the corridor are present only temporarily while moving through, and that these areas provide only what is needed for such movement rather than for normal requirements of obtaining food, shelter, or mates. We prefer the more general and expansive term “connectivity” because, while individual grizzly bears may use connectivity areas briefly while dispersing or finding a new home range, they may also use them during their entire lives. Connectivity areas may, by definition, contain breeding aggregations of grizzly bears, although they are likely to be at lower densities than within areas we call “population cores” or “population cornerstones.”

** Denning season: The typical time period during winter months in which most grizzly bears are hibernating in dens [from NCDE Subcommittee 2019S].

** Depredation: An action generally associated with the killing of domestic livestock animals.

Ecosystem: A term used to define the six recovery areas designated in the Recovery Plan [USFWS 1993]. Use of this technical term recognizes the complex and sometimes unique interactions of many living and non-living components within each of these large landscapes. In this document, reference to an Ecosystem refers to the general area occupied by the resident grizzly bear population and not specifically to the RZ or DMA. Ecosystems are generally considered to be the larger area surrounding the recovery zones in which grizzly bears may be anticipated to occur as part of the same population” (USFWS 2022, Species Status Assessment).

“Estimated occupied range of grizzly bears.” This is the area within a boundary produced using standardized, objective algorithms to differentiate the area where grizzly bear populations are verified to have colonized, from the area where only scattered observations (perhaps of dispersing individuals) are known. The outermost boundaries of “estimated occupied range of grizzly bears” are revised biennially, using newly obtained data and the standardized algorithms. This term may be referred to as “occupied grizzly bear range,” “occupied range,” “occupied habitat,” or “occupied grizzly bear habitat.”

Extirpate: In population biology, this term typically means to eliminate locally. An entire species could be said to be “extinct” (e.g., the passenger pigeon, *Ectopistes migratorius*); in contrast, we’d characterize grizzly bears in California has having been “extirpated.”

Food-conditioned bear: A bear that has learned to associate people, human activities, human-use areas, or food storage receptacles with food. Although usually used in a binary sense (i.e., either food-conditioned or not), the learning process usually means that an individual falls within a continuum from mildly to severely food-conditioned. (See definitions for Conditioning and Habituation.)

Habituation: The waning of an innate response to a stimulus after repeated or prolonged presentations of that stimulus. Bears that are continually exposed to humans, with no negative consequences, can lose their innate avoidance behavior and become habituated—or, more precisely, human-habituated. Although usually used in a binary sense (i.e., either habituated or not) because we typically lack sufficient knowledge of a bear's behavior and intentions and we also lack a nuanced vocabulary for describing both, this trait almost surely exists along a continuum (from mild to severe).

Hazing: A technique in which deterrents are administered to a bear to immediately modify the bear's undesirable behavior.

* Human–bear conflict: An interaction between a grizzly bear and human in which a bear either does, or attempts to, damage property, kill or injure livestock, damage beehives, injure people, or obtain anthropogenic foods, attractants, or agricultural crops [adapted from NCDE Subcommittee 2019]. In the field, the specifics of each situation are reviewed by an inter-agency team, bears are not necessarily "branded" as being "conflict" or "non-conflict" animals based solely on this definition and chosen responses can vary in their aggressiveness based on a comprehensive review.

** Hyperphagia: An increase in bears' appetite and food consumption during the fall, associated with the need to gain adequate fat reserves for hibernation [from NCDE CS].

Management removal: Lethal or non-lethal removal of a bear from the population by or at the direction of management personnel.

Nuisance bear: FWP follows Hopkins et al. (2010) in considering this term poorly defined and susceptible to multiple interpretations, so its usage is avoided in this document. We note, however, that it was still in common usage in the mid-1980s when IGBC (1986) was finalized, so it appears in that guidance as well as some older technical literature.

Onsite release: A management method that consists of releasing a captured bear back to its original site of capture.

Preemptive capture: Capturing a bear deemed to be at significant risk of future conflict (often due to nearness to human infrastructure), even though no conflict has yet occurred.

Relocation: The terms "relocation" and "translocation" are often used interchangeably. In this document, FWP uses relocation to describe the capture and subsequent transport of a bear from the site of capture to another location in association with attempts to mitigate human–bear conflicts.

** Removal: Capture and removal of a bear, either lethally or by placement in an authorized zoological or research facility.

Translocation: The terms "relocation" and "translocation" are often used interchangeably. In this document, FWP uses translocation to describe the capture and subsequent transport of a bear for purposes unrelated to human–bear conflict, such as demographic or genetic augmentation of another population.

** Transplant/Transplantation: Transplantation is defined in MCA 87-5-702(11) as "the release of or attempt to release, intentional or otherwise, wildlife from one place within the state into another part of the state." For purposes of this plan, to "transplant" means to move a bear outside of its home range into an area generally understood as different from the area of its origin. The word "transplant" generally is used in reference to a new population becoming resident in the new area as a result of human-assisted movements (e.g., in the case of a transplanted population).

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Part I: Introduction to This Plan

Scope of this document and of decisions to be made

This document provides the foundation for Montana Fish, Wildlife, and Parks' (FWP) decisions regarding conservation and management of grizzly bears at the state level. It is not intended as a compendium of all aspects of grizzly bear conservation or management in Montana, because some decisions and commitments are incorporated in existing plans or agreements. These other documents are referenced and briefly reviewed herein, but for the sake of brevity, are not repeated in their entirety. That said, adoption of this plan will serve to recommit FWP to the existing plans and strategies to which it is a party.

Purpose and need

Grizzly bears are listed under the Endangered Species Act (ESA) of 1975 as a threatened species throughout the entire lower 48 states. Management authority rests with the U.S. Fish and Wildlife Service (USFWS) for recovering the species. That said, federal, state, and tribal authorities typically work cooperatively and very few day-to-day management activities are conducted by field staff of the USFWS. Rather, states, tribes, and other agencies conduct most work "on the ground" under authority permitted by the USFWS.

States, tribes, and other federal agencies are expected to produce, and have in the past produced, management plans that explain and guide their priorities and resource allocations. Potential changes in status of grizzly bear populations within Montana also must be considered in this statewide plan.

In 1993, the USFWS recognized six areas, four of which are partly or wholly within Montana, with recovering grizzly bear populations. The 1993 USFWS Grizzly Bear Recovery Plan (GBRP) identifies a recovery objective of delisting each of the populations sequentially as they achieve the recovery targets, along with continued ESA protection of each population until its specific recovery targets are met.

At present, in two of the recovery areas that are partly or entirely located within Montana (NCDE and GYE), USFWS has found that grizzly bears have met existing recovery criteria. In 2007 and again in 2017, the USFWS designated the GYE population as a Distinct Population Segment (DPS) for the purpose of delisting, and also delineated a geographic boundary within which this designation applies and within which delisting would occur. Because the delisting rule was vacated in 2007 and 2017, the DPS designation was also vacated. To delist the NCDE population, the USFWS may similarly designate it as a DPS and delineate a DPS boundary.

Delisting of the GYE and NCDE populations could occur within the time frame typically considered for FWP management plans (generally not less than 10 years), in which case federal oversight of state activities would cease within each of those designated DPS boundaries after a five-year mandatory post-delisting monitoring period during which the USFWS will have an oversight role. Federal oversight would continue outside the DPS boundaries for these populations until targets outlined in the Recovery Plan (1993) are met and those recovered populations are delisted. This potential multi-jurisdictional future provides an additional rationale for a comprehensive, statewide plan for Montana.

Grizzly bears have expanded in abundance and distribution in Montana in recent years (see Figures 3 and 4), enhancing long-term prospects for population sustainability by increasing the likelihood of biological connectivity. However, because grizzly bears can damage property and injure or kill people, their closer proximity to human habitation poses new challenges for Montanans beyond those anticipated by existing plans and agreements.

Figure 3. Main areas of Montana with estimated occupied range of grizzly bears (2022)

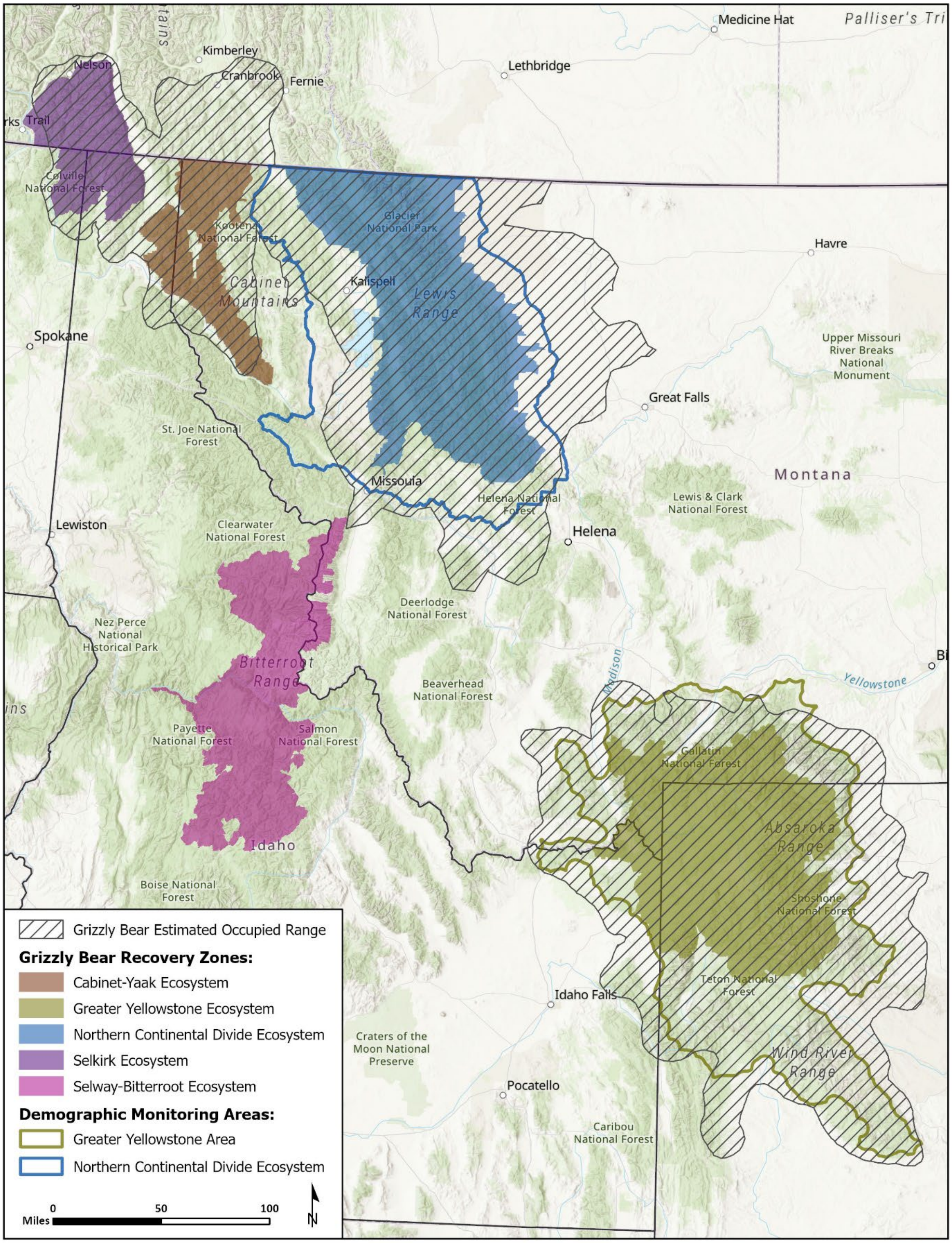


Figure 4. Other areas where grizzly bears “may be present” (2023)

According to USFWS (July 2022), blue shading is where grizzly bears "may be present.” This term includes individuals that may be scattered or dispersing, and does not necessarily indicate a meaningful assemblage of bears in all outlying areas.

Species List Areas (or "may be present" map) help federal agencies determine where effects to listed species should be considered for consultation from actions they carry out, fund, or permit to meet requirements under Section7(a) of the Endangered Species Act (ESA). As grizzly bears expand their range, the SLA is intended to be spatially inclusive of all areas that meet the "may be present" methodology for grizzly bears. The "may be present" methodology is derived from current estimated occupied range and verified location data outside of current distributions; not all areas that are designated as "may be present" meet the criteria to be included in estimated occupied range. Local evaluation is needed by federal Level 1 ESA Streamlining Teams to determine potential effects of agency actions where grizzly bears "may be present." Identifying locations where grizzly bears "may be present" will facilitate project planning activities that promote grizzly bear conservation and recovery. The grizzly bear SLA is updated with any new verified sightings every 90 days. Although we receive sighting information throughout the year, there can be a lag between receipt of the information, verification of grizzly bear, and updating the map. To provide the most up-to-date information for Section 7 consultation pending those updates, we will notify the relevant federal agency personnel when any new HUCs are added. We will continue to supply an updated verified map to all partners through PAC.Last updated July 19, 2023 with data from 2013 to July 19, 2023.

This draft plan reflects these updated biological and social conditions, and updates and incorporates two existing plans. It takes advantage of recommendations and perspectives previously provided by the Governor’s Grizzly Bear Advisory Council (GBAC), as well as a recently completed survey of Montanans’ knowledge, beliefs, and attitudes toward grizzly bears (survey questions and results are available online at: https://www.cfc.umt.edu/research/humandimensions/news/human-dimensions-grizzly-bear.php). The plan also reflects existing laws, regulations, and policies, as well as intergovernmental commitments made by FWP and by the Commission. It will guide FWP activities consistent with ESA listed status, but also will guide management should delisting of recovered populations occur in the future.

Sidebar 1. FWP process and ESA delisting

FWP recognizes that many citizens have great interest in the listing status of the grizzly bear under the Endangered Species Act (ESA). ESA listing and delisting are federal processes. Petitions from the states of Montana and Wyoming to remove grizzly bears from the list of threatened and endangered species in the NCDE and GYE areas (and from Idaho to delist all populations south of Alaska) were submitted in 2022.

This FWP process recognizes the current federal status of the grizzly bear and anticipates policy under a possible future change in that status. However, this document is not a delisting plan. Removing a species from the list of threatened and endangered species requires not only documentation that recovery criteria have been met, but also documentation that the state has in place adequate regulatory mechanisms to ensure that listing will not be necessary in the future.

Montana's grizzly bear management plan illustrates Montana's aptitude and commitment to successfully manage the species, both now and in the future. In doing so, FWP demonstrates the adequacy of its regulatory and management mechanisms, in accordance with the listing and delisting criteria set forth in Section 4 of the ESA.

Context and background of this document

This draft plan, presented here as the Preferred Alternative, is written in the context of two existing FWP plans (cited above) and public processes that are considered to have fulfilled the scoping requirements of MEPA. Each is briefly summarized here.

Recognizing that grizzly bears are expanding in geographic range, that conflicts with humans appear to be increasing, and that populations of both grizzly bears and humans are likely to keep increasing in the immediate future, FWP realized new planning guidance may be necessary for grizzlies. A structured decision-making (SDM) process resulted in decisions to work with the Governor to empanel an independent citizens' council to examine these issues and, following that, to replace existing management plans with one statewide plan. The SDM process also developed a problem statement, strategic objectives, fundamental objectives, and constraints/sideboards; these are reiterated in the Sidebar 2.

Sidebar 2. FWP problem statement, resulting from 2019 structured decision-making process

"Grizzly bears in Montana are native, iconic carnivores that have high value to people and cultures across the state and the world and play important roles in Montana ecosystems. At the same time, they can and do injure or kill people and livestock, and cause property damage and economic loss, which may disproportionately affect certain individuals. Their potential presence is both valued and feared. While the benefits of grizzly bear population recovery are accrued broadly across society, the costs associated with increasing grizzly bear populations tend to be focused on communities and the public that directly live with grizzly bears.

After 40 years of hard work by all Montanans, grizzly bear populations have reached and surpassed federal recovery goals in the GYE and NCDE. Densities of grizzly bears are increasing, and they are now expanding into areas where they haven't been for decades, including connectivity areas between recovery zones. These areas include a greater percentage of working private lands and places where the human population is expanding, creating a greater potential for conflicts. Existing management plans and agency communications plans built public expectations on where bears would occur and do not reflect recent changes to bear distribution.

Montana remains committed to maintaining the long-term viability of grizzly bears, consistent with our long history of wildlife conservation. The challenge is balancing conflicting values and addressing diverse needs, especially in newly recolonized areas. Federal protected status currently governs Montana's ability to address distribution and abundance. However, many challenges would remain even if delisted. These are likely to intensify with time, including the likely establishment of more bears in more areas, adding to the complexity. Currently, FWP lacks adequate resources and public support to meet this challenge where bears currently exist, much less in areas where they may recolonize.

The time is right for Montana to address its statewide strategy and approach to grizzly bear conservation. Timely and continued engagement with Montanans is essential for success.

Strategic objectives

1. Ensure grizzly bear population viability over the long term.
2. Maximize human safety.
3. Maximize effective response to conflicts involving grizzly bears.
4. Maximize effective grizzly-related outreach and conflict prevention.
5. Maximize intergovernmental, interagency, and tribal coordination.

Fundamental objectives

1. Maximize engagement among people with diverse and competing values.
2. Maximize public confidence and ownership in grizzly bear management.
3. Maximize transparency of grizzly bear planning processes.

4. Maximize clarity of grizzly bear management objectives in all parts of the state.
5. Maximize clarity of guidance for making time-sensitive management decisions.
6. Minimize financial costs of grizzly bear management.
7. Maximize public agreement on the role of hunting at appropriate locations, levels, and times.
8. Maximize management flexibility within the confines of the ESA.

Constraints / sideboards
Maximize considerations of existing grizzly bear management objectives and existing commitments. Honor intra and interagency commitments already in place."

On July 24, 2019, then-governor Steve Bullock signed Executive Order 9-2019 (see Appendix D), creating a Grizzly Bear Conservation and Management Advisory Council (GBAC) consisting of 18 Montana citizens[2]. In setting up the need and rationale for this council, the Executive Order included a preface which is worth repeating here (note: the "Whereas" preceding each line has been deleted).

> Grizzly bears are valued by people and cultures across Montana and around the world, yet are also feared and can affect people's livelihoods and safety. Their numbers in Montana continue to increase and have expanded into areas where they have not been for decades, including places key to connecting their populations. Despite this success, long-term coexistence of people and grizzly bears across the landscape will remain a challenge.
>
> Existing management plans did not fully anticipate grizzly bear distribution across the landscape and as Montana's human population continues to grow, we can expect conflicts between bears and people to increase in frequency and complexity.
>
> As "threatened" under the federal Endangered Species Act (ESA), grizzly bears are currently managed by the U.S. Fish and Wildlife Service—in cooperation with the Montana Department of Fish, Wildlife and Parks (FWP), the U.S. Forest Service, the National Park Service, the Bureau of Land Management, the Blackfeet Tribe, and the Confederated Salish and Kootenai Tribes. In the Grizzly Bear Recovery Plan, the U.S. Fish and Wildlife Service identifies six recovery areas, and four of those exist wholly or partly within Montana. Recent litigation has created uncertainty about the delisting of grizzly bears from the ESA's "threatened" list.
>
> It is timely that Montanans work together to determine how the state and its partners will collectively manage and conserve grizzly bears. It is important to recognize existing grizzly bear management objectives and existing intra-agency and inter-agency commitments already in place, including conservation strategies, monitoring protocols, recovery plan criteria, and forest plans. The future of grizzly bear management in Montana must maintain scientific integrity, and balance diverse interests and values.
>
> Montana remains committed to maintaining the long-term viability of grizzly bears and balancing their needs with those of people. It is important for the public to have ownership and confidence in grizzly bear management in Montana. To ensure its citizens have a voice in the future of grizzly bears, Montana must provide meaningful opportunities for people to engage in a public discussion around grizzly bear management, recovery, and conservation. It is in the best interests of all Montanans to bring stakeholders and experts together to recommend statewide strategies for conserving and managing grizzly bears for today and for the future.

Citizens' recommendations from Governor's Grizzly Bear Advisory Council (GBAC)

In August 2020, the GBAC[2] submitted to Governor Bullock its final report —which contained a vision statement, guiding principles, and specific recommendations—along with advice about resources required to implement them. The GBAC

[2] Alphabetically, members of the GBAC (and their locations) were: Brett Barney (Wyola), Chad Bauer (Missoula), Darrin Boss (Havre), Jonathan Bowler (Condon), Trina Jo Bradley (Valier), Caroline Byrd (Bozeman), Michele Dieterich (Hamilton), Erin Edge (Missoula), Nick

report provides an indispensable foundation for considerations made in this draft document and plan, as well as for final decisions on policy and strategy. Additional public input, received as part of the GBAC process, also has been incorporated. The complete GBAC report, posted online at https://fwp.mt.gov/gbac, is included in this document as Appendix E.

Summary of GBAC report (2020) – including its Guiding Principles and Council Recommendations

The vision statement of the GBAC is as follows: "We envision fully recovered grizzly bear populations in the four identified recovery areas in Montana and landscapes in-between that accommodate grizzly bear presence and connectivity while maintaining the safety and quality of life of those that live, work, and play in Montana."

In Guiding Principle 1, the GBAC advised that "all those living in or visiting Montana should expect the potential presence of grizzly bears on the landscape…." In Guiding Principle 2, the GBAC advised that "the identification of areas between established recovery zones that best contribute to genetic and demographic connectivity is necessary to prioritize resource allocation, focus outreach and education efforts, build social tolerance, and proactively engage local communities and landowners." In Guiding Principle 3, the GBAC advised that "as expansion occurs outside the four recovery Ecosystems and the landscapes in-between them in Montana, FWP and relevant agencies will have to balance this expansion with the need to prioritize resources that support both public and private lands." In Guiding Principle 13, the GBAC advised that "both genetic and demographic connectivity are important to the long-term sustainability, persistence, and resiliency of grizzly bears. Connectivity areas will exist in diverse social and environmental settings. Not all these settings are conducive to permanent habitation but should be managed to promote genetic and demographic connectivity in biologically suitable habitat, being mindful that biologically suitable does not always mean acceptable."

After "Guiding Principles" came "Council Recommendations," with subheadings.

Under the subheading of "Grizzly bear distribution, relocation, and connectivity," the GBAC stated that "genetic and demographic connectivity among Montana's four recovery zones is important to the long-term viability of grizzly bear populations in the continental United States" and added that the intent of their recommendations was to "balance the continued importance of public lands with the need for the involvement of private lands to support our vision for an interconnected metapopulation of grizzly bears in Montana."

Under that same subheading, a few of the Recommendations were as follows. In Recommendation 19 the GBAC advised that "FWP should continue to allow natural movement to new areas between all four identified recovery zones in Montana." In Recommendation 20, the GBAC advised that "FWP and all relevant agencies should clearly define the 'landscapes in-between' the four recovery zones in Montana that are important for genetic and demographic connectivity and the long-term sustainability of the grizzly bear." Finally, in Recommendation 21, the GBAC advised that "FWP, in coordination with relevant agencies and through a public process, should evaluate and identify those landscapes that can reasonably be considered important for grizzly bear recovery and connectivity from those that cannot, and clearly distinguish these in its management plan. Such a distinction is necessary for determining appropriate relocation sites between the four recovery zones, as well as for prioritizing resources for outreach and education, transportation upgrades, and conflict prevention, reduction, and response efforts. These decisions should be in accordance with current Conservation Strategies."

Gevock (Helena), Lorents Grosfield (Big Timber), Kameron Kelsey (Gallatin Gateway), Robyn King (Troy), Kristin Kipp (Browning), Cole Mannix (Helena), Heath Martinell (Dell), Chuck Roady (Columbia Falls), Greg Shock (St. Ignatius), and Anne Schuschke (East Glacier). Facilitators were Shawn Johnson and Heather Stokes Center for Natural Resources and Environmental Policy, University of Montana.

In Guiding Principle 5, the GBAC offered that "strategies and tools aimed at proactively preventing or reducing conflicts are often effective and can be less expensive than compensating for conflict after the fact." In Guiding Principle 10, the GBAC advised FWP to "strive to cultivate social tolerance through sound management decisions and conflict prevention measures."

Also in Council Recommendations, under the subheading of "Conflict prevention and reduction," the GBAC stated the following: "Preventing conflicts with grizzly bears is essential to the development of social acceptance and the continued conservation of grizzly bears. Proactive, inclusive efforts to mitigate conflict can engage communities, protect private property, maintain human safety, and be an efficient use of limited resources, while minimizing associated bear mortality."

Under that same subheading, the Recommendations included the following points.

In Recommendation 11, about human–bear conflicts in and around developed areas, the GBAC advised FWP to:

- provide guidance for "land use planning to prevent human/grizzly conflicts;"
- recommend actions to "governing bodies on how to minimize grizzly bear conflicts;"
- help local communities "identify and use available local grants for conflict prevention;" and
- prioritize the "research, development, and funding of new and innovative tools and techniques for conflict prevention and aversive conditioning…."

In Recommendation 12, about conflicts related to agriculture, the GBAC advised FWP to:

- "research and make recommendations on best management practices that help reduce depredations on livestock and non-livestock commercial losses;"
- "integrate technology to allow for timely reporting of agricultural conflicts to neighboring farms and ranches;" and
- "increase and diversify partnerships, funding, and support for community-based groups and other organizations" working on preventing or reducing human–bear conflicts.

Additionally, under the subheading of "Education and outreach," in Recommendation 3 the GBAC advised FWP to "provide residents and landowners with accurate information on the effective use of non-lethal methods to haze grizzly bears."

Under the subheading of "Conflict response and protocols," the GBAC stated that "timely and consistent conflict response is necessary to build and maintain relationships between FWP and the communities where grizzly bears exist. Building these relationships prior to conflict will help to promote open communication and sharing of information if the need for response should occur."

Under that same subheading, in Recommendation 15, the GBAC advised FWP to:

- "make bear management specialists Full Time Equivalent (FTE) positions included in permanent base funding, provide each specialist with a year-round technician, and create more of these fully funded positions as needed;"
- "clarify management protocols for conflict bears and continue to share them with landowners, livestock producers, and communities to maximize transparency;" and
- "periodically review inter-agency Memorandums of Understanding (MOUs) for opportunities to improve efficiency and capacity for conflict response."

And under the subheading of "Grizzly bear distribution, relocation, and connectivity," in Recommendation 23 the GBAC advised FWP to "expedite work with landowners, agricultural producers, and communities to prioritize the creation of new suitable relocation areas inside and between recovery Ecosystems which further the conservation, connection, and recovery of grizzly bears in Montana while ensuring existing land uses are supported."

In Guiding Principle 1, the GBAC advised that "All those living in or visiting Montana… should have access to education, assistance, and resources involved with coexisting with grizzly bears."

Returning to Council Recommendations, under the subheading of "Education and Outreach," the GBAC stated that "Education and outreach should engage all Montanans and visitors in the shared responsibility of grizzly bear conservation."

More specifically, under that same subheading, the GBAC advised FWP as follows:

- in Recommendation 2, to "provide easy access to education about hunting safely in grizzly bear country for resident and non-resident hunters in Montana;"
- in Recommendation 3, to "provide residents and landowners with accurate information on the effective use of non-lethal methods to haze grizzly bears;"
- in Recommendation 5, to "create open and accessible communication channels between bear managers and the public to encourage communal efforts around bear awareness and conflict prevention;"
- in Recommendation 6, to work with other agencies to "create consistency and timeliness around public access to grizzly bear mortality data across recovery Ecosystems;"
- in Recommendation 7, to "explore ways to inform, promote, and incentivize Bear Aware programs in communities;"
- in Recommendation 8, to "support educational efforts to build a common understanding of perspectives between agricultural producers and urban communities;" and
- in Recommendation 9, to "create and use consistent messaging around the use and effectiveness of bear spray."

Finally, in Recommendation 10, the GBAC supported the creation of "a full time and permanent Grizzly Bear Information, Education, and Outreach Coordinator to support and contribute to the broader efforts of FWP's Wildlife Stewardship Outreach Specialist."

The GBAC reported to the Governor that "substantial deliberation was given to the role of hunting; however, because of the diversity of interpretations of available science, backgrounds, values, and opinions individually held by Council members, we cannot reach consensus that hunting has a role in grizzly bear management." Further considerations were contained in a non-consensus section of the GBAC document.

Statewide survey of Montanans' attitudes toward grizzly bears

FWP and human dimension researchers Holly Nesbitt, Alex Metcalf, and Elizabeth Metcalf (of the University of Montana) designed and administered a survey of Montanans' general views about grizzly bears and attitudes toward their management. Questionnaires were sent to 5,350 randomly selected adults (aged 18+) within Montana in early November 2019, with follow-up mailings in late November 2019 and early January 2020. A total of 1,758 responses were received. To account for possible non-response bias, responses were weighted to account for differences between the sample and the adult population of Montana in terms of age, gender, educational level, and geographic location (rural vs. urban, within or outside grizzly bear range). See https://www.cfc.umt.edu/research/humandimensions/news/human-dimensions-grizzly-bear.php for the full questionnaire and results (Nesbitt et al. 2020).

Below is a summary of key survey results relevant to FWP developing a statewide grizzly bear management plan.

- Most Montanans (92%) agree that grizzly bears have a right to exist in Montana, and 86% find it acceptable for bears to live in primarily forested areas that are publicly owned. When asked if grizzly bears do not belong where people live, the responses were more evenly divided: 35% agreed or strongly agreed, and 43% disagreed or strongly disagreed with this statement.
- Most Montanans (57%) disagree that their recreational opportunities are limited by grizzly bears; however, 23% agree or strongly agree.
- When asked about their emotional response to seeing a grizzly bear from a distance while walking, more Montanans reported they would be nervous, scared, or upset than those that reported they would be relaxed, not scared, or pleased.
- A minority of Montanans agree that their personal safety is threatened by grizzly bears (19%) or that grizzly bears pose a safety risk to people they care about (28%).
- About 60% of Montanans agree that people should learn to live with grizzly bears near their homes, while 20% disagree. When asked about taking actions to reduce human–bear conflict on their own property, respondents' willingness was high for securing attractants, but lower for actions related to livestock.
- Almost all Montanans (94%) report they have or would be willing to carry bear spray while recreating or hunting.
- About 49% of Montanans support enough hunting to manage grizzly bear population size; 30% support a very limited season that would not affect the population size; and 4% support as much grizzly bear hunting as possible. About 17% believe grizzly bears should never be hunted in Montana.

Nesbitt et al. (2023) found that residents with positive attitudes and emotional dispositions toward grizzlies or who trusted the agency were more likely to believe populations were low. Residents who believed hunting should be used to manage conflict, were themselves hunters, had vicarious wildlife experience with property damage, believed grizzly populations were expanding, or were older were more likely to believe populations were too high. Satisfaction with grizzly bear management peaked when people perceived that the wildlife population levels were neither too high nor too low (Nesbitt et al. 2023).

Existing statutes, regulations, plans, and agreements

The grizzly bear is currently listed under the ESA as threatened throughout its range in the contiguous United States. As such, the ESA and its implementing regulations provide direction and, in some cases, restrict actions that can be taken. The Recovery Plan (USFWS 1993) and its supplements (USFWS 1997, 2007, 2017, and 2018) outline recovery goals and methods pursuant to populations in Montana. Where not superseded by federal law or regulation, the Montana Code Annotated (MCA, Table 2) provides direction to FWP and the Commission regarding the management of grizzly bears. Under the authority of the MCA, the Commission develops more detailed regulations governing grizzly bear management in the Administrative Rules of Montana (ARM).

Two existing FWP management plans currently guide discretionary activities regarding grizzly bears: 1) the Grizzly Bear Management Plan for Western Montana: Final Programmatic Environmental Impact Statement 2006-2016 (cited hereafter as Dood et al. 2006); and 2) the Grizzly Bear Management Plan for Southwestern Montana 2013: Final Programmatic Environmental Impact Statement (cited hereafter as FWP 2013). Upon its adoption, this current document will supersede those two prior plans.

Additionally, the State of Montana, represented by FWP, is a signatory to two separate documents called Conservation Strategies (CS): the 2016 Conservation Strategy for the Grizzly Bear in the Greater Yellowstone Ecosystem [Yellowstone Ecosystem Subcommittee 2016]—hereafter called the GYE CS; and the 2019 Conservation Strategy for the Grizzly Bear in the Northern Continental Divide Ecosystem [NCDE Subcommittee 2019]—hereafter called the NCDE CS. The NCDE CS is currently being reviewed and updated. The GYE CS is pending revision and will incorporate the use of the IPM as the population estimator, other related population, habitat, and management information, and revised Tri-state MOA. The revision of the GYE CS is expected to be finalized in 2024 and will be reviewed periodically thereafter. These two CS documents do several things for their respective Ecosystems (GYE and NCDE, Sidebar 3):

- Both CSs provide comprehensive, inter-jurisdictional guidance on how grizzly bears would continue to be conserved and managed if they were to be delisted in the two respective Ecosystems (GYE and NCDE).
- Both CSs summarize and describe strategies, standards, and guidelines to be coordinated among state, federal, and tribal entities for managing grizzly bear populations, conflicts, and habitats in the event that federal protection (under the ESA) is removed in each Ecosystem.
- Both CSs simultaneously prefigure management after delisting, and support delisting by documenting regulatory mechanisms that assure species conservation and avoid future relisting.

However, neither CS provides explicit guidance to FWP for managing and conserving grizzly bears between the ecosystems they define.

The majority of the NCDE grizzly population is expected to occupy the Recovery Zone (RZ)—which, should delisting occur, would be renamed the Primary Conservation Area (PCA)—as well as a buffer surrounding it called Management Zone 1; the two of these together form the Demographic Monitoring Area (DMA). Two Demographic Connectivity Areas (DCAs) are intended to provide sufficient security for female grizzly bear occupancy, potentially providing a demographic “stepping stone” from the NCDE to the CYE (via the Salish DCA) and to the Bitterroot Ecosystem (via the Ninemile DCA). The NCDE CS also identifies a Management Zone 2, which is intended to provide sufficient habitat protection to allow for occasional occupancy and movement of male bears toward the GYE.

The NCDE CS provides documentation and cross-referencing of FWP’s Grizzly Bear Management Plan for Western Montana (Dood et al. 2006), while the GYE CS provides documentation and cross-referencing of FWP’s Grizzly Bear Management Plan for Southwest Montana (FWP 2013). Both CS documents include Memoranda of Understanding (MOUs), in which each agency agrees to use its authority to implement the measures for conservation, monitoring, and cooperation, while respecting statutory responsibilities that differ among signatories.

The demographic objectives of the NCDE CS were formally adopted by the Commission in ARM 12.9.1403. At the time of this writing, FWP anticipates similar ARM commitments for the GYE.

For a map and a summary of these two Ecosystems and their related conservation strategies, see Figures 3, 4 and 5 and Sidebar 3.

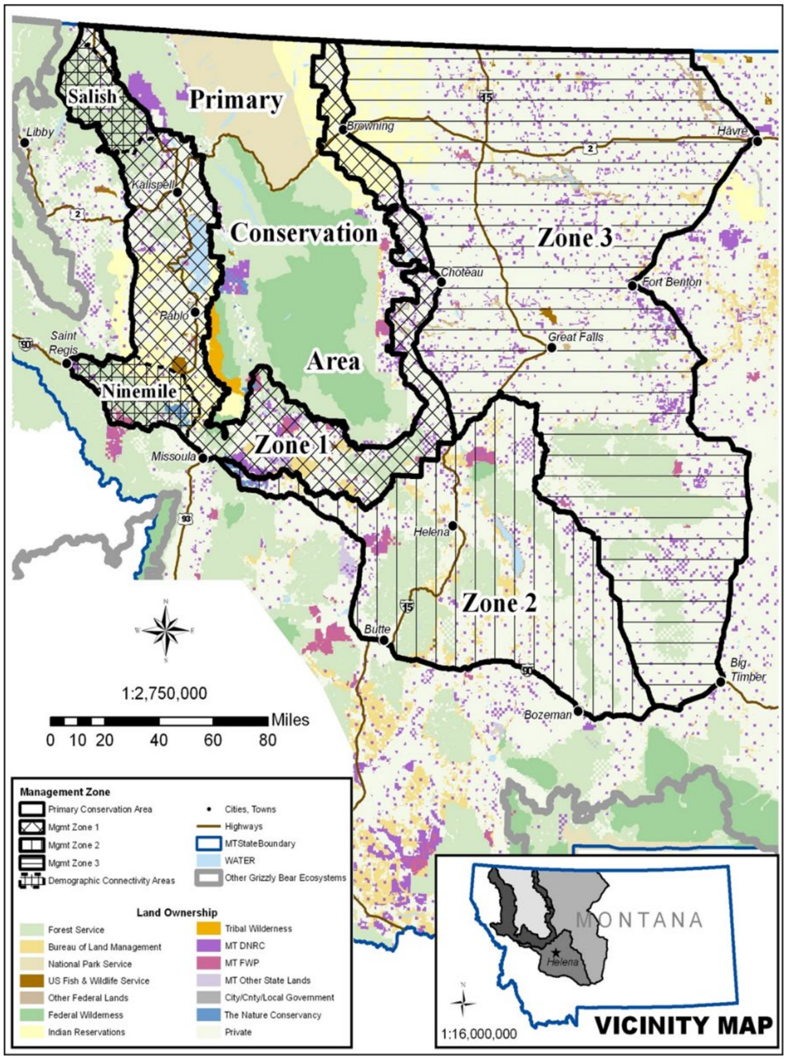
Sidebar 3. Summaries of both (NCDE and GYE) existing Conservation Strategies

The NCDE Conservation Strategy (NCDE 2020)—and by reference its signatory agencies—stated that its goal is to "maintain a recovered, genetically diverse grizzly bear population throughout the Demographic Monitoring Area (DMA: the Primary Conservation Area (PCA) and Zone 1) while maintaining demographic and genetic connections with Canadian populations and providing the opportunity for demographic and/or genetic connectivity with other ecosystems (Cabinet-Yaak, Bitterroot, Greater Yellowstone)."

The GYE Conservation Strategy—and by reference its signatory agencies—stated that it was "developed to be the document guiding management and monitoring of the GYE grizzly bear population and its habitat upon recovery and delisting." Its vision is that the Primary Conservation Areas (PCAs, called Recovery Zones under listed status) would be a "secure area for grizzly bears, with population and habitat conditions maintained to ensure a recovered population is maintained for the foreseeable future and to allow bears to continue to expand outside the PCA. Outside of the PCA, grizzly bears will be allowed to expand into biologically suitable and socially acceptable areas… [but the objective outside the PCA] is to maintain existing resource management and recreational uses and to allow agencies to respond to demonstrated problems with appropriate management actions."

Figure 5. Map of NCDE existing Conservation Strategy zones

Management zones and Demographic Connectivity Areas (DCAs) identified by the NCDE Conservation Strategy. Management Zone 1 surrounds the Recovery Zone (RZ), which after delisting would be called the Primary Conservation Area (PCA). The two DCAs have less restrictive habitat standards but are meant to allow for occupancy of adult female grizzly bears. Management Zone 2 is meant to allow for movement of male grizzly bears toward the southeast for genetic exchange. No specific habitat protections are developed for Management Zone 3, where occupancy may be incompatible with human presence and management is expected to focus on conflict prevention and response.


Salish
Primary
Conservation
Area
Zone 3
Ninemile
Zone 1
Zone 2
Libby
Kalispell
Pablo
Saint Regis
Missoula
Browning
Havre
Choteau
Fort Benton
Great Falls
Helena
Butte
Bozeman
Big Timber
1:2,750,000
0 10 20 40 60 80 Miles
Management Zone
Primary Conservation Area
Mgmt Zone 1
Mgmt Zone 2
Mgmt Zone 3
Demographic Connectivity Areas
Cities, Towns
Highways
MTStateBoundary
WATER
Other Grizzly Bear Ecosystems
Land Ownership
Forest Service
Bureau of Land Management
National Park Service
US Fish & Wildlife Service
Other Federal Lands
Federal Wilderness
Indian Reservations
Tribal Wilderness
MT DNRC
MT FWP
MT Other State Lands
City/Cnty/Local Government
The Nature Conservancy
Private
MONTANA
Helena
1:16,000,000
VICINITY MAP

Part II: Issues and Alternatives

Issues identified and considered

Regarding grizzly bear management, FWP has identified a list of broad themes in which FWP decisions and input will have substantial effects on the species' status and on the lives of Montanans. These themes, which provide structure for FWP's decision-making, have emerged from years of inter-agency collaboration on grizzly bear conservation, previous state and inter-agency plans, routine interactions with the public during FWP's day-to-day management and research, the GBAC process and associated public input, and the University of Montana Attitudes Survey. The themes are listed below.

- **Status and role of grizzly bears in Montana.**

  What do FWP and Montanans see as the status and role of grizzly bears in Montana? How does FWP view the future of the state when thinking about the advantages and disadvantages of sharing it with these animals?

- **How many grizzly bears should live in Montana?**

  Should FWP identify statewide numeric objectives for the species, and if so, what should those be?

- **Distributional objective and population connectivity.**

  Over the long term, where in Montana will grizzly bears live, and what is their biological role in species conservation and management within their U.S. Northern Rocky Mountain distribution? Although inherent topographic and biological characteristics dictate much of the answer to this question (and commitments under the ESA and associated Conservation Strategies constrain its decision space), FWP—through its own management activities as well as those of federal, state, tribal, and non-governmental partners—influences where grizzly bears will live in Montana and, very roughly, at what densities.

- **Human safety.**

  Grizzly bears are large, powerful animals that can sometimes act aggressively in defending cubs, food resources, or their sense of personal space. Although many potential interactions are resolved by bears moving away (often well before any human is even aware of their proximity), they can and do injure people. Although FWP cannot control the behaviors of individual bears, actions taken by FWP (in conjunction with partners) can often reduce the risk to human safety.

- **The role of private lands in the future of grizzly bear conservation and management.**

  Grizzly bears are increasingly found on private lands. While this discovery creates increased opportunities for biological connectivity between population cores, it increases the potential for conflict with humans as grizzly bears compete for resources, damage property, and threaten human safety.

- **Conflict prevention.**

  Humans have limited ability to alter grizzly bear behaviors, which result from natural selection and encoded genetic instructions. However, FWP can greatly reduce the chances that bears' biological drives to obtain food and shelter will lead to conflicts with humans. In recent decades an entire sub-field of conflict prevention has emerged and a variety of technical approaches can be attempted to reduce or prevent conflicts—especially concerning the securing of attractants. If human-related food supplies (garbage, pet foot, bird feeders, beehives, fruit trees, spilled grain, livestock, etc.) are more easily obtainable than natural ones, bears tend to overcome their wariness of people to access those supplies. Such attractants set the stage for property damage and for habituation or conditioning of bears. However, when attractants are secured so that there is no nutritive reward for the bears' natural curiosity, the probability of conflict is reduced substantially.

- **Conflict response.**

Human–bear conflicts can be reduced but cannot be eliminated entirely. There will always be a need to respond to circumstances in which an individual bear has damaged property or threatened human safety or is very likely to do so. For any threatened species under the ESA, federal guidance and approval is required if any action more intrusive than hazing is considered. That said, even under listed status there remains considerable flexibility for how any given situation is handled.

FWP's initial response to most conflict situations is to reduce or eliminate the conflict source (e.g., attractants). In some cases, however, FWP recommends to USFWS the capture of a bear. Captured bears, in turn, can be i) released onsite for further monitoring, ii) relocated a short distance from the site, iii) relocated a long distance from the site, or iv) euthanized.

As of March 2022, FWP can no longer move federally listed grizzly bears that are involved in conflict and captured outside RZs; however, FWP can move federally listed bears not involved in conflict outside RZs to sites previously approved for that purpose by the Commission. This restriction does not preclude FWP from providing conflict response and working toward conflict resolution, but it does significantly limit FWP's ability to address especially persistent conflicts involving federally listed grizzly bears outside RZs. Legislation passed during the 2023 Montana legislation session provides livestock owners with limited flexibility to lethally remove a grizzly bear attacking or killing livestock following federal delisting (§§87-5-301 and 87-6-106, MCA).

- **Public certainty vs. agency flexibility in responding to human–bear conflict.**

In conflict responses, two goals are in tension: i) flexibility for state (and federal) managers to balance conservation objectives while ensuring safety for humans and property; and ii) the public benefit of consistent, predictable conflict response. FWP sees no option for simultaneously optimizing both goals. Increasing agency flexibility to tailor conflict responses does unavoidably reduce the ability to predict (in a programmatic plan, or on a finer spatiotemporal scale) what that response will be. Similarly, providing increased certainty to the public does unavoidably constrain managers in ways that could force them to make sub-optimal decisions. This plan attempts to partially address this tension by outlining different management strategies in different management areas—such as in RZs, areas that connect RZs, and areas that do not connect populations or RZs.

- **Destinations of bears captured in conflict situations.**

An option often considered by managers when dealing with a human–bear conflict is to capture the bear in question and move it to another location with the intention of providing it an alternative, conflict-free habitat while working to reduce the attractiveness of its original conflict location. Sometimes a grizzly bear is captured in anticipation of conflict (i.e., a preemptive capture), while at other times a bear that is not the presumed offender is captured incidentally (i.e., a non-target capture). In all cases, the decision of where to release the captured bear is complex and reflects both short-term contingencies and longer-term strategic objectives. As of March 2022, FWP can only move federally listed bears involved in conflicts if captured within RZs (although federal authorities can move them if captured outside RZs). At its February 4, 2022, meeting the Commission approved a list of sites to which grizzly bears (including non-conflict bears) could be moved by FWP over the next five years (Appendix G). The list of approved sites will be updated in 2027.

- **Moving bears to initiate new or to support existing populations.**

The action of moving grizzly bears from one population to another to increase the latter's abundance, genetic diversity, or both is known as augmentation.

Since 2005, FWP and USFWS have cooperatively augmented the CYE by moving in an average of 1.2 bears per year from the NCDE, a program many credit with saving the CYE population. The idea of similarly augmenting the GYE has been discussed for almost 40 years. Some citizens view animals that are brought into new areas by people very differently than they would view the same animals who arrived on their own. Also, agencies typically have been reluctant to move an animal that has the potential to cause conflicts in its new home.

At their meeting of December 14, 2021, the Commission approved an augmentation program to move several grizzly bears from the NCDE to the GYE. A more detailed protocol document has been drafted (Appendix I) to articulate the purpose and need of the augmentation program and to provide guidance to field staff regarding the type of bear, circumstances of its capture, time of year, and likely release areas. This protocol document has been finalized by both the GYE and NCDE subcommittees of the Inter-agency Grizzly Bear Committee (IGBC).

In June, 2024, the USFWS updated it's ESA Section 7 Biological Opinion on the Issuance of Recovery Permits for actions involving grizzly bears in the NCDE and the GYE. Recovery permits would be issued pursuant to section 10(a)(1)(A) and section 6(d) of the ESA. While such authorized take for purposes of enhancing the conservation of listed species and carrying out recovery action may adversely affect individual grizzly bears, it is not likely to jeopardize the continued existence of the grizzly bear as a species. FWP has applied for and received a recovery permit to translocate grizzly bears from the NCDE to areas within the GYE for the purposes of genetic augmentation to address future threats associated with isolation of the GYE grizzly bear population. With an estimated population of more than 1,100 grizzly bears, the NCDE grizzly bear population has achieved biological recovery. Any bears captured within the DMA in the NCDE for translocation to the GYE would count against the NCDE mortality threshold. Decisions to capture bears for this purpose would consider the current status of mortality and if the total NCDE mortalities are high and approaching the threshold, FWP could decide not to do the translocation that year. For these reasons, the capture and removal of 2 to 4 bears every ten years will have no significant environmental impacts. The northern range of the GYE is 60 miles from the southern end of the NCDE. The GYE contains more than 1,000 grizzly bears and has also achieved biological recovery. Releasing 2 to 4 grizzly bears into the GYE ecosystem will have no significant environmental impacts (Appendix J) .

The USFWS has formally proposed reintroduction to move bears from other areas into the two established Recovery Zones lacking populations (the Bitterroot, and the North Cascades in Washington State), but neither proposal has been implemented.

- **Orphaned cubs.**

Occasionally an adult female grizzly bear is killed and her offspring come into FWP possession. Offspring older than one year of age can be treated similarly to other bears, but orphaned cubs under that age pose a particular challenge because they face much lower odds of survival if left to fend for themselves. The question of how to address such situations deserves considerable thought and planning before they occur.

- **Conflict management operational structure.**

Minimizing and responding to human–bear conflicts requires considerable resource commitments, including specialized staff, equipment, materials, and the funding necessary to acquire and maintain these operational components.

- **Prioritizing information, outreach, and communication efforts.**

For Montanans to live their lives with minimal human–bear conflicts, certain steps are required. However, living safely around grizzly bears is not something Montanans know intuitively. Targeted and well-planned educational programs are required to enhance the public's level of knowledge before people can effectively avoid conflict. As with decisions on how, when, and where to deploy staff, FWP must decide how to prioritize information, outreach, and communication efforts.

- **Population research and monitoring.**

In cooperation with federal and tribal partners, FWP conducts ongoing monitoring of grizzly bear populations to understand trends in abundance, distribution, and habitat use, as well as ancillary information that helps direct management. Most such efforts are guided by inter-agency agreements currently in place. In brief, inter-agency biologists focus their ongoing monitoring efforts on four areas: Greater Yellowstone, Northern Continental Divide, Cabinet-Yaak, and Selkirk (the last of which does not overlap Montana). FWP is committed to continuing its participation in these monitoring efforts. To date, very few resources have been expended to better understand the status of bears outside of these four core areas.

- **Resources required.**

Because this plan is programmatic and FWP budgets are ultimately controlled by the Montana legislature, only a rough estimate of resources required is provided here. FWP would anticipate expending resources similarly to those currently expended to further conservation, management, and educational efforts related to grizzly bears. In fiscal year 2024, there were 20.61 full-time equivalent (FTE) FWP personnel working on grizzly bears. The total funds estimated to support the grizzly bear program was approximately $2.32 million. Of that amount, about 70% went toward personal services (e.g., salaries and benefits), 28% toward operating costs, and 2% toward equipment.

- **Values and beliefs associated with hunting grizzly bears.**

State laws and regulations in Montana consider the grizzly bear a species for which hunting seasons may be authorized by the Commission, should the species be delisted under the ESA. However, the issue of hunting grizzly bears elicits strong reactions from many members of the public.

Many proponents of hunting feel that if a population is considered to be "recovered," that means it should have animals available for hunting. Some proponents feel that hunting may increase social tolerance for bears by people or that hunting may help bears become warier of humans; others feel that hunting is a preferred population management tool for regulating the population and potentially addressing bears involved in conflicts. Many opponents, on the other hand, consider grizzly bear hunting to be trophy hunting. Other opponents are concerned that the populations will be overharvested; they would rather see "excess" animals used for expanding distribution into other areas. Many opponents simply do not support harvesting an iconic and, for some, spiritually significant animal. The potential for hunting is a key reason some grizzly bear advocates oppose delisting. Additional background is provided in Part III.

- **A potential grizzly bear hunt: functions, expectations, and regulations.**

If delisting occurs during this plan's implementation and a decision is made that recreational hunting has a role to play, there remains significant discretion to consider the magnitude, objectives, geographic scope, and other constraints that would direct such a hunt. The Commission would ultimately make such decisions in a separate public process that would respect the conservation objectives in this plan. FWP has committed in ARM that it will not propose a hunt for at least five years after a population is delisted.

Sidebar 4. Geography and specialized terminology

As formalized in statute and rule, the State of Montana is committed to managing and conserving grizzly bears so that they are "recovered"—i.e., they no longer require ESA protection. Thus, FWP recognizes a particular responsibility toward bears in the four identified areas (USFWS 1993): Northern Continental Divide, Greater Yellowstone, Cabinet-Yaak, and Bitterroot (all termed "Ecosystems" by USFWS 1993). However, this document does not always reference the USFWS designations "NCDE," "GYE," "CYE," and "BE" and avoids excessive focus on these terms, for the following reasons:

1) This is not a "delisting plan" per se. ESA listing decisions are made by federal agencies, not by FWP.

2) In recent years, grizzly bears have increasingly used areas beyond the boundaries that USFWS identified for these four Ecosystems and this document acknowledges that fact.

3) This usage of the term "ecosystem" itself, though widely adopted after the 1982 Recovery Plan, is a shorthand term that is inconsistent with the term's usage in ecology (for details, see the above Definitions section). Ecosystems are generally considered to be the larger area surrounding the recovery zones in which grizzly bears may be anticipated to occur as part of the same population" (USFWS 2022, Species Status Assessment).

4) If and when delisting occurs, conservation strategies for the NCDE and GYE call for these areas to transition from "Recovery Zones" (RZs) to "Primary Conservation Areas" (PCAs) over a period of years. In the future, the PCA designations themselves may become less and less useful.

5) In the future, FWP expects the boundaries around these areas to be seen as increasingly artificial and arbitrary, yet acknowledges that: a) the current NCDE and GYE will, for the foreseeable future, function as population cornerstones; b) the BE has the potential to sustain the next largest contiguous grizzly bear population; and c) the current CYE will, for the foreseeable future, be a focus for grizzly bears in Northwestern Montana.

Table 2. Relevant statutes and administrative rules

Montana Statutes – (MCA) Title 87 Fish and Wildlife	**Description**
87-1-201	Powers and duties of the Department
87-1-214	Disclosure of information -- legislative finding -- large predators
87-1-217	Policy for management of large predators -- legislative intent
87-1-233	Compensation for damage caused by animal held in captivity
87-1-301	Powers of the Commission
87-1-303	Rules for use of lands and waters
87-1-304	Fixing of seasons and bag and possession limits
87-1-511	Sale of confiscated birds and animals – disposition of seized grizzly bears
87-1-601	Use of fish and game money
87-2-101	Definitions – “Game animals”
87-2-701	Special Licenses
87-2-702	Restrictions on special licenses – availability of bear and mountain lion licenses
87-2-814	Auction or lottery of grizzly bear license (Effective on concurrence of contingency)
87-3-131	Regulation of grizzly bear parts
87-4-702	Possession of game by merchants, hotelkeepers, or restaurant keepers
87-4-801	Definitions – “Wild Zoo menagerie”
87-5-102; 87-5-103; 87-5-107; 87-5-108; 87-5-109; 87-5-110; 87-5-111; 87-5-112	Endangered Species Statutes
87-5-301	Grizzly bear – findings – policy
87-5-302	Commission regulations on grizzly bears
87-5-716	Consultation with departments of Agriculture, Public Health and Human Services, and Livestock
87-5-725	Notification of transplantation or introduction of wildlife
87-6-106	Lawful taking to protect livestock or person
87-6-202	Unlawful possession, shipping, or transportation of game fish, bird, game animal, or fur-bearing animal
87-6-205	Waste of game animal, game bird, or game fish
87-6-206	Unlawful sale of game fish, bird, game animal, or fur-bearing animal
87-6-207	Unlawful use of a boat
87-6-216	Unlawful supplemental feeding
87-6-401	Unlawful use of equipment while hunting
87-6-413	Hunting or killing over limit
87-6-701	Failure to report or tattoo
87-6-906	Restitution for illegal killing, possession, or waste of certain wildlife
Montana Statutes – Non FWP	
1-1-508	State Animal
2-15-3110	Livestock loss board – purpose, membership, and qualifications
2-15-3111	Livestock loss reduction program
2-15-3112	Livestock loss mitigation program – definitions
2-15-3113	Additional powers and duties of livestock loss board
81-1-110	Livestock loss reduction and mitigation accounts
81-1-111	Livestock loss reduction and mitigation trust fund
Montana Administrative Rules – Title 12 Fish, Wildlife and Parks	
12.3.514	Animals Unfit for Human Consumption
12.6.1901	Definitions - “Bear”
12.8.806	Food Storage
12.9.1401[2]	Grizzly Bear Policy
12.9.1403	Grizzly Bear Demographic Objectives for the Northern Continental Divide Ecosystem

12.9.1404	Definitions
12.9.1405	Grizzly Bear Management Objective
12.9.1406	The Quota and Establishing and Adjusting the Quota
12.9.1407	The Mortality Threshold
12.9.1408	Grizzly Bear Mortalities That Apply to the Quota and the Mortality Threshold
12.9.1409	If a Delisted Grizzly Bear Population Overlaps Two or More States
12.9.1410	Allowable Lethal Management of the Grizzly Bear
12.9.1411	Allowable Non-Lethal and Preventative Measures of the Grizzly Bear
12.9.1412	Baiting Grizzly Bears and Normal Livestock and Agricultural Operations
12.9.1413	Requirement to Manage and Delisted Grizzly Bear Population for Five Years Prior to a Hunting Season
12.9.1414	Grizzly Bear Annual Report
12.9.1415	Genetic and Population Augmentation
12.9.1416	Date of Effect and Applicability
Montana Administrative Rules – Title 36 Department of Natural Resources and Conservation	
36.11.403	Definitions
36.11.421	Road Management
36.11.432	Grizzly Bear Management and Programmatic Rules

[2] ARM 12.9.1401 and 12.9.1403 address the Fish and Wildlife Commission's (Commission) policy guidelines and the State's management of grizzly bears in the NCDE. Senate Bill (SB) 295, passed during the 2023 Legislative Session, further clarifies how Montana will manage delisted grizzly bears relative to human safety, conflict with livestock, and genetic exchange. SB295 also requires the Commission to adopt rules prior to delisting. The Montana Secretary of State (SOS) defines and implements the ARM development and amendment process, including process steps and timeline. This includes opportunities for public participation. At the Commission's June 8, 2023, meeting, they approved the initiation of ARM rulemaking, and at the Aug. 17, 2023, meeting, they edited the draft rule language proposed by FWP. This edit indicates that, following delisting, a livestock producer may remove a threatening grizzly bear on public land when the livestock producer demonstrated an effort to utilize one or more nonlethal and preventative measures. After including the edit, the Commission approved the proposed rules and initiated the formal Montana Administrative Procedure Act process with the SOS. On October 20, 2023, the Commission published MAR Notice No. 12-614 pertaining to the public hearing on the proposed adoption of new rules and amendment of ARM 12.9.1401 pertaining to grizzly bears. Public comment was received through November 20, 2023, and there was an opportunity to make oral comments on November 17, 2023, via Zoom. On December 14, 2023, the Commission approved New Rules I through XIII (ARM 12.9.1404-1416) and the amendment to 12.9.1401. The SOS approved New Rules I through XIII (ARM 12.9.1404-1416) and the amendment to 12.9.1401 with no edits on January 12, 2024.

Alternatives considered in detail

Below is an expansion of the two Alternatives, issue by issue, that were tabulated above under Executive Summary.

Alternative A: No action (status quo)

- **Role of grizzly bears in Montana.**

Grizzly bears would continue to be the "official state animal of Montana" (§ 1-1-508, MCA; a depiction of a grizzly bear head is part of the FWP logo and adorns FWP staff uniforms). The grizzly bear would continue to be categorized as a game animal (§ 87-2-101, MCA) but also as a large predator (§ 87-1-217, MCA). As a species listed as threatened under the ESA, hunting is precluded. However, state laws and regulations provide authority for a hunting season (subject to Commission authorization) should delisting occur. Other laws and regulations address discrete issues with grizzly bear conservation (e.g., prohibiting commerce in grizzly bear parts, providing for increased penalties for illegal killing). State regulations (ARM 12.9.1401) recognize the importance Montana plays nationally in grizzly bear management, as well as management challenges posed by the species. As such, grizzly bears have increased in both numeric abundance and geographic distribution over the past two decades. However, as articulated in the FWP "problem statement" from the 2019 SDM process, the Governor's Executive Order establishing the GBAC, and the GBAC's final recommendations, the way to manage this increasing number of bears, particularly in areas other than identified RZs, has remained a topic of contention. Although people would likely continue to vary in how they view grizzly bears and their role in Montana, the lack of an integrated and accepted approach has caused difficulty both for agency managers and for the public, particularly in geographic areas outside of established RZs and DMAs.

- **Numerical objectives.**

As a signatory to both the Greater Yellowstone CS and the Northern Continental Divide CS, FWP has committed to the population objectives contained therein, as both a criterion for delisting and as a long-term, post-delisting objective. For both the GYE and NCDE, a population threshold is identified which ensures those populations remain above recovery levels. In the NCDE, FWP has committed to manage mortalities from all sources to support an estimated probability of at least 90% that the grizzly bear population within the [NCDE] DMA remains above 800 bears. Achieving this level of probability translates to about 1,000 bears, at least, in the NCDE DMA. In the GYE, an integrated population model (IPM) was recently adopted and recalibrated to incorporate the latest best available science to estimate and monitor the population. With the adoption of the IPM, the IGBST has recalibrated prior year population estimates so they are comparable over time. Additionally, vital rates and demographics for the GYE population may now be reviewed annually so that managers are able to make appropriate adjustments to mortality rates. In conjunction with the IGBST, the signatory parties of the Tri-sate MOA (Appendix H) agree to apply annual mortality rates to maintain the population in the DMA within or above a range of 800-950 grizzly bears ($0.98 \leq \lambda \leq 1.02$). Should the population exceed 950 individuals, signatory parties will manage to maintain or reduce the population and use the IPM to determine mortality limits for population stability or decrease ($0.95 \leq \lambda \leq 1.00$). The revised Tri-state MOA uses the IPM to identify limits for discretionary mortality and allocation among the three states. The premise of the demographic criteria will remain in that FWP and signatory parties will agree to maintain the population above recovery thresholds and above 800 individuals, and will agree to mortality limits to ensure that.

These objectives are sufficient to assure the demographic sustainability of the two areas but leave uncertainty regarding how bears elsewhere are to be managed. Numerical objectives in the two other USFWS-designated ecosystems partly within Montana are more general. In the CYE, demographic recovery criteria are i) maintaining 6 females with cubs over a running 6–year average both within the recovery zone and within a 10–mile area immediately surrounding it (excluding areas within Canada), ii) 18 of the 22 bear management units occupied by females with young from a running 6–year sum of verified evidence, and that iii) known, human-caused mortality not exceed 4% of the population estimate based on the most recent 3–year sum of females with cubs, of which no more than 30% shall be females. In the BE, demographic recovery criteria are 14 females with cubs over a running 6–year average, and ii) after at least 90 grizzly bears are established, a mortality limit (known, human-based deaths) of no more than 4% of a minimum population size estimate, with no more than 30% of that being females.

At present, FWP is not attempting to estimate numbers of bears between recovery areas, but continues to collect data on observations, which contribute to estimation of the “estimated occupied range of grizzly bears” and understanding of general trends. FWP has hired several grizzly bear specialist and technicians to work in areas outside of recovery areas to proactively work on conflict prevention and to respond to conflicts if and when they occur.

- **Grizzly bear distributional objective.**

The NCDE and GYE CSs and the Recovery Plan outline objectives for occupancy of females with offspring to ensure that grizzly bears are well distributed within core ecosystems. Throughout Montana, no explicit distributional objective has been identified. Existing FWP planning documents focus on maintaining populations in the CYE, NCDE, and GYE, but articulate the desirability of long-term connectivity among them (as well as toward the BE), acknowledging that human–bear conflicts would likely be more common in these relatively less-wild areas. A goal of the NCDE CS is to provide opportunity for connectivity with other ecosystems in Montana, but no explicit objective is articulated. In the GYE, FWP has committed under the GYE CS to allow for populations outside of the federally designated DMA “where biologically suitable and socially acceptable” but no further guidance is provided either internally to FWP staff or externally to other agencies or the general public. The existing augmentation program in which grizzly bears are occasionally moved from the NCDE to the CYE would continue until USFWS and FWP biologists should deem it no longer necessary.

- **Human safety.**

FWP would continue efforts to maintain and enhance public safety. It does so primarily through prevention and response to human–bear conflicts (see below), as well as through educational efforts.

- **Role of private lands in grizzly bear conservation and management.**

FWP would not articulate an explicit direction regarding grizzly bears on private lands but would acknowledge the pivotal role of private landowner support in broader recovery—and the significant contribution private lands already have made in providing habitat for grizzly bears.

- **Conflict prevention.**

FWP would continue to expend considerable resources working with the local citizenry to prevent and minimize human–bear conflicts and to respond to conflicts that do occur. Bear specialists would continue to be focused on the CYE, NCDE, and GYE. At least one bear manager would continue to focus on the geography east of the NCDE, north of the GYE, and in the BE.

FWP staff would continue to prioritize conflict prevention (as detailed in Part III). Specific actions would depend on the nature of potential human–bear conflicts. Typically, “site conflicts” (e.g., access to garbage or pet / livestock feed, depredation on chickens) predominate west of the Continental Divide, whereas livestock conflicts predominate east of the Continental Divide. Boneyards and/or livestock carcasses near human residences or animal pastures can be attractants for grizzly bears. FWP would continue programs that encourage landowners to phase out boneyards. Over the past few decades, FWP has adopted and/or supported both livestock carcass removal and livestock carcass redistribution as alternative means ways to dispose of these attractants.

- **Conflict response.**

FWP staff would continue to respond to human–bear conflicts, both within and outside of RZs. Additional detail on current practice is provided in Part III.

FWP bear managers would continue to record bear conflicts in a standardized, inter-agency database, with data entry typically completed no later than the end of each calendar year. The database will be a valuable resource moving forward, to better understand human–bear conflicts, as well as the agency’s success in minimizing them. It may allow for future detailed analyses of human–bear conflicts and agency responses. However, because the number of conflicts each year is subject to many variables (e.g., number of human residences and potential attractants near grizzly bears, size of grizzly bear population, abundance of naturally occurring foods), FWP would not necessarily consider changes or trends in the number of conflicts as a measure of the success or failure of prevention efforts.

- **Public certainty vs. agency flexibility on conflict response.**

Because no additional statewide guidance would be provided, considerable discretion (within the parameters of IGBC 1986) would continue to characterize conflict responses. Case-by-case flexibility in decision making increases the likelihood that the response will match the individual situation—but also makes it more difficult to predict, for the public, what will occur.

- **Destinations of bears involved in conflicts (captured inside RZs) when moving them is planned.**

When a decision is reached with USFWS regarding grizzly bear relocation, the animal would be moved to an area where the probability of additional conflict is low (see Appendix G). Since 2009, 84% of destinations have been in FWP Region 1 and 72% have been in Flathead County.

- **Moving non-conflict bears (captured outside RZs) whose origin is uncertain.**

Sometimes, in a conflict setting, a bear is captured that was not itself involved in the conflict. At times a decision is made to capture a bear proactively (i.e., preemptively) because its presence in the area predisposes the animal to future conflict. In such cases, generally it is not possible to know how long the animal has been present near the site, nor from which core population it may have originated. Lacking additional direction that would be provided by FWP’s Preferred Alternative, considerable uncertainty would continue to characterize decisions on where to move such animals. Typically, they would be moved to the presumptive (albeit not definitively known) population core of origin.

- **Moving non-conflict bears outside of “estimated occupied range of grizzly bears.”**

There may be situations where it is desirable to move a non-conflict bear into an area that is not currently designated as “estimated occupied range of grizzly bears” habitat, such as in a connectivity area or an unoccupied portion of a recovery zone. If a situation arises and there is a desire to move a bear into unoccupied habitat to facilitate recovery or connectivity, FWP would first complete an environmental analysis of the impacts of such a transplant and would require approval by the Commission before such movement could occur. This situation would require advanced planning and public input and would not be applicable to decisions needing an immediate resolution.

- **Orphaned cubs.**

Generally, cubs orphaned after September 1 of each year would be left in the wild. Taking younger orphans to Montana Wildlife Rehabilitation Center (MWRC) is discouraged by existing policy and must follow MWRC intake guidelines because i) acceptable permanent captive situations are very difficult to find however FWP has sent young cubs to captive facilities in the past, and ii) re-release into the wild is only permitted with a pre-approved plan and release area, none of which exist currently.

- **Conflict management organizational structure.**

As currently, bear managers would continue to be based in or near Anaconda, Bozeman, Chouteau, Conrad, Hamilton, Kalispell, Missoula, and Red Lodge.

- **Prioritizing information, outreach, and communication efforts.**

FWP would continue its current efforts aimed at people living, working, and recreating in grizzly bear habitat, targeting both new and long-term residents. As currently, a communication specialist in FWP's Communication and Education Division would plan, disseminate, and coordinate information, outreach, and education programs regarding grizzly bear biology, management, conflict prevention, and safety. Regionally based communication officers would, as now, vary in how they communicated to the public regarding human–bear conflicts, the resolution of those conflicts, recommendations regarding human safety, unlawful take incidents, and other newsworthy events regarding grizzly bears.

- **Population research and monitoring.**

As stated within the "Issues identified and considered" section: In cooperation with federal and tribal partners, FWP conducts ongoing monitoring of grizzly bear populations to understand trends in abundance, distribution, and habitat use, as well as ancillary information that helps direct management. Most such efforts are guided by inter-agency agreements currently in place. In brief, inter-agency biologists focus their ongoing monitoring efforts on five areas: Greater Yellowstone, Northern Continental Divide, Cabinet-Yaak, Bitterroot, and Selkirk (the last of which does not overlap Montana). FWP is committed to continuing its participation in these monitoring efforts.

FWP would continue its existing research and monitoring efforts, as articulated by the GYE and NCDE CS documents. The GYE monitoring effort would continue to be conducted by the Inter-agency Grizzly Bear Study Team (led by USGS), which includes FWP as a member (see Van Manen et al. 2022 for the most recent report [available online at: https://igbconline.org/grizzly-bear-study-team/], as well as IGBST 2021 for an update on improved population estimators). The NCDE monitoring effort would continue to be led by FWP and would incorporate efforts made by the biological staff of Glacier National Park and the CSKT and Blackfeet Tribe (see Costello and Roberts 2021 for the most recent report and Costello et al. 2016b for details on methods).

- **Resources required.**

In order to further conservation, management, and educational efforts related to grizzly bears, FWP would anticipate expending resources similar to those currently expended. In fiscal year 2024, there were 20.61 full-time equivalent (FTE) FWP personnel working on grizzly bears. The total funding estimated to support the grizzly bear program was approximately $2.32 million, of which about 70% went toward personal services (e.g., salaries and benefits), 28% toward operating costs, and 2% toward equipment. These funds came from the federal Pittman-Robertson tax on arms and ammunition (54%), hunting license revenue (19%), federal agency sources (19%, primarily USFWS), and various private sources (8%).

- **Hunting of grizzly bears: values and beliefs.**

Grizzly bears would continue to be classified by the State of Montana as a game animal, i.e., one that potentially could be subject to a regulated, recreational hunt should the Commission authorize one through its season setting process that includes public engagement. However, hunting would be an available option only for grizzly bears in a population that previously had been federally delisted (i.e., reverted to authority of the State of Montana from current status as threatened under the ESA). Neither of the two existing state grizzly bear plans includes details of how such a hunt might occur in future, but both indicate that a long-term goal would include limited, regulated hunting. No existing plans discuss with any depth the systems of human values that would be presupposed by such a hunt, nor do any plans detail Montanans' diversity of values regarding grizzly bear hunting.

- **A potential grizzly bear hunt: Functions, expectations, and regulations.**

If delisting occurs, hunting would be implemented within a scientifically sound framework that would maintain a viable and self-sustaining population to garner additional public support and to maintain positive and effective working relationships with stakeholders. Existing plans provide no additional details regarding how FWP might propose to the Commission that a hunt be managed and regulated. However, in 2017, as a requirement for delisting of the Greater Yellowstone DPS, the USFWS required the states of Montana, Wyoming, and Idaho to adopt hunting regulations they could point to as adequate regulatory mechanisms to ensure hunting would not jeopardize the delisted population. These are detailed in Part III.

- **Expected consequences if this Alternative is adopted.**

If this Alternative is adopted, little would change compared with the current situation. FWP expects grizzly bears to slowly continue expanding their geographic distribution and increasingly moving through both public and private lands, including areas far from people and areas closer to residences, farms, ranches, and businesses than in previous years. It is increasingly probable that grizzly bears originating in one core area will mate with grizzly bears in other core areas—but whether, or when, such interactions might occur cannot be known for certain. Similarly, grizzly bears may gradually become more common in and around the Bitterroot Mountains, but whether they will become established as a population is unknown.

Under this Alternative, FWP would expect a gradual increase in human–bear conflicts, and in the need for conflict reduction and response. Uncertainty and inconsistency would continue in how FWP views, and ultimately responds to, grizzly bears in newly colonized areas. We expect public discourse on grizzly bears to become increasingly contested.

Additionally, FWP staff will only relocate conflict-involved grizzly bears within RZs to areas pre-approved by the Commission. The restriction on where such grizzly bears can be released would not apply to federal authorities as long as grizzly bears are federally listed under the ESA, should they become involved in such relocations. Thus, we expect additional uncertainty about where these animals may be released.

FWP would expect continued uncertainly, both internally and externally, regarding our approach and responses to grizzly bears located in areas not mapped by either of the existing CS documents (Figure 6).

Figure 6. Occupied range—with recovery zones and NCDE management zones

Dark brown outlines are FWP- and USFWS-verified "estimated occupied range of grizzly bears" (2020); orange shading is the four RZs that fall partly or wholly in Montana; and blue outlines are NCDE zones 1, 2, and 3, as identified in NCDE CS document.

Alternative B: FWP preferred

In contrast to the above Alternative A, which would preserve the status quo and take no action, Alternative B is the one preferred and recommended by FWP.

- **Role of grizzly bears in Montana.**

Grizzly bears would continue to occupy a primary role in Montana's cultural heritage as the "official state animal of Montana" (§ 1-1-508, MCA). The grizzly bear would continue to be categorized a game animal, but also as a large predator. As a species listed as threatened under the ESA, hunting is currently precluded. If delisting occurs, Montana state law provides some authority to the Commission to implement a hunting season. ARM 12.9.1413, as adopted, would require a minimum of five years of state management of any delisted grizzly bears prior to proposing any hunting season. Other laws and regulations address discrete issues with grizzly bear conservation (e.g., prohibiting commerce in grizzly bear parts, providing for increased penalties for illegal killing, see below). State regulations (ARM 12.9.1401) recognize Montana's importance nationally in the management of grizzly bears, as well as management challenges posed by the species.

Grizzly bears would be seen as a valued part of Montana's fauna, a species that is both "conservation-reliant" and "conflict-prone." Conservation-reliant means the threats grizzly bears face can never be eliminated, only managed (Goble et al. 2012). Due to their need for large areas and limited interaction with humans, FWP expects the core portions of their distribution to coincide with the four Ecosystems identified by the USFWS. However, grizzly bears at low density in some areas between these cores will facilitate connectivity. As those bears will live closer to people they will likely have a higher probability of human-caused mortality. There must be efforts in place to reduce human-bear conflicts and human-caused bear mortality. Where connectivity with a population core is not likely, grizzly bear presence would not be an objective, and individual bears would be tolerated only to the extent that they do not conflict with human safety or human uses of the landscape.

- **Numerical objectives.**

As a signatory to the GYE and NCDE Conservation Strategies, FWP has committed to population objectives contained therein, which function both as a criterion for delisting and as a long-term, post-delisting objective. In brief, the GYE CS standard is to maintain the population in the DMA within or above a range of 800-950 grizzly bears ($0.98 \leq \lambda \leq 1.02$) as estimated by the revised and recalibrated Integrated Population Model (IPM). The adoption of the IPM was adopted by the Interagency Grizzly Bear Study Team (IGBST) as the population estimator for the GYE. With the adoption of the IPM, the IGBST has recalibrated prior year population estimates so they are comparable over time. Additionally, vital rates and demographics for the GYE population may now be reviewed annually so that managers are able to make appropriate adjustments to mortality rates. Should the estimated population within the DMA decline to 800 bears, any recreational hunting that had been authorized by any of the states after delisting would be closed. In the NCDE, FWP would continue to manage mortalities from all sources to support an estimated probability of at least 90% that the grizzly bear population within the NCDE DMA remains above 800 bears. Achieving this level of probability translates to about 1,000 bears, at least, in the NCDE DMA. There would be no additional and/or explicit population objectives. However, when compared to the No Action Alternative, FWP would anticipate a higher statewide population of bears because of the objective to maintain a low density of bears in connectivity areas. Grizzly bear monitoring and reporting systems are central to managing healthy grizzly populations. This should include estimating population size and trends, as well as monitoring and reporting vital rates such as adult female survival in core populations. Monitoring range expansion, dispersal events, and grizzly bear presence in connectivity areas may also occur.

At present, FWP is not attempting to estimate numbers of bears between recovery areas, but continues to collect data on observations, which contribute to estimation of the “estimated occupied range of grizzly bears” and understanding of general trends. FWP has hired several grizzly bear specialist and technicians to work in areas outside of recovery areas to proactively work on conflict prevention and to respond to conflicts if and when they occur.

- **Grizzly bear distribution and connectivity.**

Grizzly bear presence would be an objective in RZs and DMAs, and management objectives in the NCDE and GYE would follow existing Conservation Strategies. The NCDE and GYE CSs and the Recovery Plan outline objectives for occupancy of females with offspring to ensure that grizzly bears are well distributed within core ecosystems. Throughout Montana, no explicit distributional objective has been identified. Grizzly bear density in these cornerstone areas would be high enough to provide occasional dispersers. In areas between core populations (i.e., between RZs) and where natural bear movement is likely or is already occurring, an objective would be to manage for connectivity. FWP expects that connectivity will be accomplished over time by a low density of bears that are able to live with minimal conflict in these areas. When evaluating a specific response to an individual bear, FWP would consider the importance of the individual bear to the distribution and connectivity objectives in this management plan. But the importance of a single bear to the distribution and connectivity of the species does not obviate the duty of FWP to work with the local community and partners to craft appropriate solutions in each circumstance.

The Preferred Alternative recognizes that human–bear conflicts and bear mortalities would be greater in areas between population cores. Management decisions for any bears found outside of core areas will be guided by the likelihood that the bear will contribute to the long-term persistence and connectivity of populations. Where that likelihood is low, FWP will be quick to recommend (or implement, if appropriate) control when conflicts arise. FWP would use available discretion to remove or relocate grizzly bears involved in conflicts with humans.

The existing augmentation program, in which grizzly bears are occasionally moved from the NCDE to the CYE, would continue until USFWS and FWP biologists should deem it no longer necessary. In addition, FWP would translocate bears with no history of conflict from the NCDE core area to pre-selected and pre-approved areas within the GYE for genetic exchange. Areas chosen for release in the GYE would be areas where habitat is suitable, where conflict potential is low, and where the translocated bear is most likely to breed. Depending on cooperation from other jurisdictions, release areas may or may not be in Montana. Trapping would be conducted to capture and move bears as resources allow. The frequency of such actions would be unpredictable and would vary annually. The expectation is that approximately 2 to 4 candidate bears would become available and be moved every ten years. There would be no additional expectations or requirements for the timing beyond that. For example, depending upon circumstances, there could be no bears moved for a few years, or there could be more than 1 bear moved in a single year.

This magnitude of capturing and moving bears would result in approximately 3 to 6 bears being moved to GYE per grizzly bear generation. If one-half of translocated bears moved stayed in the GYE, survived long enough to reproduce, and generated a cub that survived to adulthood, approximately 1.5 to 3 effective migrants per generation would gradually be added to that population. New FTE positions as approved by the legislature may be established for transfer of bears between ecosystems and does not focus on unoccupied habitat. The 2023 Montana Legislature approved two additional FTE to focus on capturing and moving non-conflict grizzly bears from the NCDE to the GYE for genetic exchange.

As a cooperative effort of the IGBST, the parties of the Tri-State Memorandum of Agreement will continue to conduct genetic sampling of GYE grizzly bears (i.e., biological samples will be acquired from grizzly bear captures, mortality investigations, or other methods), and will analyze these samples to evaluate genetic diversity and connectivity with other grizzly bear populations. Samples will be collected from captured and dead bears in areas outside the GYE as possible for genetic fitness monitoring. The NCDE Conservation Strategy (2019) articulates an objective to "monitor demographic and genetic connectivity among populations," including estimating the spatial distribution of the NCDE population biennially, and identifying the population of origin for individuals sampled inside and outside of the DMA to detect movements of individuals to and from other populations or recovery areas. In the CYE and SE, the monitoring team continues to estimate population of origin and document movements using population genetics and pedigree analyses. To date, movements of individuals among the NCDE, CYE, and SE populations have been documented, but no interbreeding of grizzly bears from different ecosystems has been observed (except for individuals moved for Cabinet Mountain augmentation). The Department will continue to conduct genetic sampling, as necessary, when handling bears, will analyze those samples to evaluate genetic diversity and connectivity between populations and the need for continued efforts.

- **Human safety.**

FWP would continue efforts to maintain and enhance public safety. It would do so primarily through prevention of, and response to, human–bear conflicts (see below), as well as through educational efforts. FWP would use available discretion to remove or relocate grizzly bears involved in conflicts with humans, particularly in areas where connectivity among population cores is unlikely.

- **Role of private lands in grizzly bear conservation and management.**

The importance of private lands in providing connectivity (where biologically likely) would be acknowledged, with commensurate aid to landowners to minimize or prevent conflicts.

- **Conflict prevention.**

FWP would continue to spend considerable resources working with the local citizenry to prevent and minimize human–bear conflicts, and to respond to conflicts that occur. Bear specialists would continue to be focused on the CYE, NCDE, and GYE. One bear manager would continue to focus on the geography east of the NCDE and west of the GYE. Additionally, one bear manager would continue to work on bear-involved conflicts in/around the BE.

FWP staff would continue to prioritize conflict prevention (as detailed in Part III), with specific actions depending upon the type of conflict. To the west of the Continental Divide, most such conflicts of concern are “site conflicts” (e.g., access to such anthropogenic food sources as garbage, pet food, livestock food, or chickens)—while to the east of it, one of the greatest conflict concerns is livestock depredation. FWP would prioritize conflict prevention activities in the four cores areas and also the in-between areas where low-density populations for improved connectivity may appear feasible.

Moving forward, FWP will continue to encourage, support, and administer (where appropriate) livestock carcass removal programs as a generally recognized best practice. For long-term disposition of carcasses, composting programs are recognized as the best solution; however, where composting is impractical, secured landfills may suffice. Such programs reduce the risk of bear-involved conflicts, while supporting the general goal of minimizing the bears’ option to obtain food from human-related sources.

The FWP livestock carcass redistribution program in Region 4 has been gradually phasing out in recent years. FWP would continue to reduce and ultimately end this program and would discourage activities that facilitate grizzly bears accessing livestock carcasses, even far from people. FWP would work with individual livestock producers to craft site-specific programs for reducing the likelihood of conflicts over livestock carcasses. FWP’s operating principle would be that, ideally, grizzly bears should consume natural foods only (acknowledging that it is impossible to totally eliminate the possibility of a grizzly bear finding and consuming a livestock carcass somewhere). Where livestock producers operate their own carcass redistribution sites, FWP would encourage an adaptive management approach, facilitating learning about the effectiveness (or lack thereof) of individual operations in reducing conflicts, as well as how phasing them out would alter the dynamics of human–bear conflict. Given the complexity of possible objectives and consequences of carcass redistribution, Kubasiewicz et al. (2016) suggested that an SDM approach would be useful in assessing whether these sites ameliorate, exacerbate, or have no effect (Steyaert et al. 2014) on human–bear conflicts.

- **Conflict response.**

FWP staff would continue to respond to human–bear conflicts, both inside and outside of RZs. Additional detail on current practices is provided in Part III. FWP would continue to document bear conflicts in a standardized, inter-agency database, with data entry completed as promptly as possible. Moving forward, the database will be a valuable resource to better understand human–bear conflicts, as well as all agencies' success in minimizing them. It may allow for future detailed analyses of human–bear conflicts and agency responses. However, because the number of conflicts each year is subject to many variables (e.g., number of human residences and potential attractants near grizzly bears, size of grizzly bear population, abundance of naturally occurring foods), FWP would not necessarily consider changes or trends in the number of conflicts as a measure of the success or failure of prevention efforts.

Generally, when conflicts occur on or near private lands rather than in remote settings, the responses would be more aggressive. In situations allowing discretion, FWP would discourage removal in areas where connectivity between core populations is likely and would encourage removal in areas where it is unlikely. Under §§ 87-5-301 and 87-6-106, MCA, a livestock owner or other authorized person may lethally take a delisted grizzly at any time without a permit or license from FWP when a grizzly bear is attacking or killing livestock. Under §§ 87-5-301 and 87-6-106, MCA, FWP may issue a permit to the livestock owner or authorized person to kill the delisted grizzly bear.

- **Public certainty vs. agency flexibility on conflict response.**

Compared to the present, under this Alternative the public would have more certainty about how human–bear conflicts would be resolved, as the interests of bears would be given slightly more weight within population core areas, some weight (albeit a bit less) where connectivity among population cores is likely, and less weight elsewhere.

- **Destinations of bears involved in conflicts (captured inside RZs) when moving them is planned.**

Conflict-involved bears would be moved to sites where the probability of additional conflict is low (Appendix G). Since 2009, 84% of destinations have been in FWP Region 1 (72% have been in Flathead County). However, if a non-conflict bear (non-target or preemptively trapped) animal is captured, FWP would consider moving it to an area outside of that RZ where connectivity is an objective and a Commission-approved release site[3] exists. As the known range of grizzly bears changes, FWP would continue to engage with the Commission to gain pre-approval of new sites within the "estimated occupied range of grizzly bears" to which grizzly bears could be moved. If delisting occurs, bears involved in conflict outside RZs could potentially be handled in this way.

- **Moving non-conflict bears (captured outside RZs) whose origin is uncertain.**

Sometimes, in a conflict setting, a bear is captured that was not, itself, involved in the conflict. At times a decision is made to capture a bear proactively (or preemptively) because its presence in the area predisposes the animal to future conflict. In such cases, generally, it is not possible to know how long the animal has been present near the site, nor from which

[3] As required by legislation signed into law in 2021, the Commission approved a list of sites to which grizzly bears may be released. Maps of these sites are included as Appendix G. Considerations for site selection include; 1) site is not a designated trailhead, 2) site is not a designated or known dispersed camping site, 3) site is not immediately adjacent to private land, unless that private landowner has given explicit permission, 4) site is not an active grazing allotment with livestock present, 5), site is not currently occupied by humans conducting work such as timber harvest nor is the site serving as a human encampment for such activities, 6) site is far enough from capture site as to make it less likely for the bear to return to the conflict site. Ideally, release sites are some distance behind locked gates and remote enough to prevent recurring conflict. Some designated release sites may never be used or used very infrequently.

core population it may have originated. If the situation allows, such bears would be left in place. If moving a bear is required, it would be moved to a Commission-approved release[4] site which provides the best chance for the bear to find life requisites and the least likelihood of conflict with humans. The site selected for release need not be located within the presumptive Ecosystem of origin, particularly if releasing the bear at the selected site would advance the interests of connectivity. Moving bears to such sites would not constitute artificial expansion of grizzly bear distribution in Montana because these sites are within areas that bears have already colonized. FWP would continue to engage with the Commission to gain pre-approval of new sites within the "estimated occupied range of grizzly bears" (as documented by FWP and/or US Geological Survey—see Appendix G) to which grizzly bears could be moved but would not seek approval of release sites beyond the most recently updated "estimated occupied range of grizzly bears."

- **Moving non-conflict bears outside of the "estimated occupied range of grizzly bears."**

There may be situations in which it is desirable to move a non-conflict bear into an area that is not currently designated as the "estimated occupied range of grizzly bears," such as in a connectivity area or an unoccupied portion of a recovery zone. If the situation arises and there is a desire to move a bear into unoccupied habitat to facilitate recovery or connectivity, FWP would first complete an environmental analysis of the impacts of such a transplant and Commission approval would be required before such movement could occur. This situation would require advance planning and public input and would not be applicable to decisions needing immediate resolution.

- **Orphaned cubs.**

Cubs orphaned after September 1 of each year generally would be left in the wild. Taking younger orphans to MWRC is discouraged by existing policy and would be required to follow MWRC intake guidelines because i) acceptable permanent captive situations are very difficult to find however FWP has sent young cubs to captive facilities in the past, and ii) re-release into the wild is permitted only with a pre-approved plan and release area (neither of which exists currently). However, if an orphan cub was captured after August 1, FWP would consider moving it to another RZ, DMA, or pre-approved site where connectivity is an objective. If separate plans were approved to use some other location (not MWRC) for overwintering a cub and re-releasing it in the wild as a yearling, such an action could be considered on an experimental basis. However, again, currently there is no facility that can accommodate such an experiment.

- **Conflict management organizational structure.**

As is currently the case, bear managers would be based in or near Anaconda, Bozeman, Choteau, Conrad, Hamilton, Kalispell, Libby, Missoula, and Red Lodge.

- **Prioritizing information, outreach, and communication efforts.**

Under this heading, the response is the same for this Alternative as it was for the No Action Alternative, except that FWP will increase efforts to reach recreationists including black bear hunters and wolf trappers with appropriate messages.

- **Population research and monitoring.**

Under this item, the response is the same for this Alternative as it was for the No Action Alternative. In addition, if it becomes feasible and necessary to estimate grizzly bear abundance or trends in between any occupied core areas, FWP would prioritize attempts to do that. FWP would also increase efforts to understand grizzly abundance and population trends in areas outside of established RZs and DMAs, particularly where biological connectivity is likely. This could be accomplished through live-captures and radio-marking, noninvasive surveys, or hunter observation surveys.

- **Resources required.**

FWP anticipates requiring somewhat more resources than the current baseline to stay ahead of human–bear conflicts that may arise as bears expand in their geographic distribution (see this section under the No Action Alternative).

- **Hunting of grizzly bears: values and beliefs.**

Grizzly bears would continue to be classified by the State of Montana as a game animal (§ 87-2-101, MCA) —i.e., one that potentially could be subject to a regulated, recreational hunt should the Commission authorize one. However, hunting would be an available option only in a grizzly bear population that had been federally delisted and was under state management. Because this Alternative prioritizes biological connectivity among population cores, hunting of any delisted grizzly bears would most likely be focused on (although not necessarily restricted to) areas where connectivity is unlikely. In these areas, the values of those who are and those who are not comfortable with a sustainable harvest of grizzly bears would be variously represented.

- **A potential grizzly bear hunt: Functions, expectations, and regulations.**

Ultimately, the Commission would make any decisions on a grizzly bear hunt through a separate public process. FWP believes it useful to take advantage of this current planning effort to consider, with the public, various alternative ideas of how hunting might occur. As outlined in Part III, hunting approach 1, 2, or 3 would be considered for any delisted grizzly bears, while hunting approach 4 would be considered for areas with little chance of providing connectivity between population cores. No hunting will occur for at least five years after the bears to be hunted are delisted. *See* ARM 12.9.1413.

- **Expected consequences if this Alternative is adopted.**

A long-term operational plan of moving bears from the genetically diverse and well connected NCDE to isolated and/or smaller populations (along with some track record of those bears surviving and successfully breeding with resident bears), superimposed on an objective of connectivity fostered by a low density of bears between population cores, should facilitate the case that adequate regulatory mechanisms were in place other than those implemented by the USFWS.

Although FWP can reasonably expect members of the public to disagree with portions of any plan ultimately adopted, we would expect greater acceptance of the FWP Preferred Alternative than of the No Action Alternative, because the Preferred Alternative offers two advantages: i) it would update our knowledge and intentions; and ii) it would reduce uncertainty regarding how to address conflict situations.

Alternatives considered but not carried forward

The following alternatives were considered but were not carried forward for various reasons, as explained below.

1) FWP could consider an alternative approach in which grizzly bears would not be welcome in the state or were considered an undesirable pest species (such as, for example, feral swine, Sus scrofa). This approach would run contrary not only to such federal laws as the ESA, but also to state law and to FWP's vision. Thus, this plan does not carry forward such an alternative for further analysis.

2) FWP could consider an alternative approach under which grizzly bear recovery within USFWS-designated RZs would be an objective, but outside of those zones grizzly bears would not be tolerated (i.e., would be removed when possible) regardless of their behavior or conflict status. Similarly, there would be no attempt to provide for connectivity among RZs through movement or low-density occupancy of areas between them. Should delisting occur, hunting could be used as a tool

to discourage grizzly bear distribution from expanding beyond the RZs. Although such an approach could arguably be viewed as strictly consistent with numeric standards under the ESA and the two existing Conservation Strategies to which FWP is a signatory, it would be contrary to the clear intent of the USFWS Recovery Plan, to the intent of those two Conservation Strategies, and to FWP's interpretation of its responsibilities under its various mandates. It would also tend to hinder, rather than to facilitate, eventual transfer of management from federal to state authority through delisting. Thus, this plan does not carry forward such an alternative for further analysis.

3) FWP could consider an alternative approach under which grizzly bears' presence would be an objective wherever they are found in Montana. Under such an approach, individual bears involved in conflicts with humans would still be controlled (i.e., hazed, moved, or euthanized, depending on circumstances), but the larger geographic context would not constitute an important part of the decision-making. Rather, the bears themselves would be considered to have indicated, by their presence, where they chose to live. FWP would not emphasize population stability within existing cores, nor would it explicitly prioritize connectivity among those cores (although, if successful, connectivity could occur indirectly). Rather, this approach would view all grizzly bears in Montana as members of an undifferentiated statewide population. Under this alternative, the safety and security of humans and their property would continue to be a high priority for FWP. However, since grizzly bears would be controlled only when conflicts arose, they would likely become more common in areas close to homes, farms, ranches, and other human infrastructure, including parts of the state (especially east of the main Rocky Mountain chain) that grizzly bears historically occupied but have not occupied for over a century. The risk to human safety and security would be higher than in other Alternatives.

Although this alternative would theoretically create the most certainty that grizzly bears would thrive indefinitely in Montana, FWP considers this approach naïve, costly, biologically unnecessary, and irresponsibly dangerous to humans and livestock. The existing grizzly bear population cornerstones are large enough that, with the appropriate level of long-term connectivity, there is no biologically based justification for the larger population that such an alternative would envision. A critical element of FWP's responsibility is to prioritize human safety, and a growing grizzly bear population in increasingly close association with homes and businesses fails that test. Thus, this plan does not carry forward such an alternative for further analysis.

4) FWP could consider an alternative approach in which human–bear conflicts are always resolved in the most favorable way for the individual bear involved, regardless of the cost to human livelihood or safety. Although such an approach could result in increased grizzly bear population, expanded geographic distribution, and quicker and more certain biological connectivity between cores, it would go against Montana law indicating that FWP's first priority in managing large predators (a classification that includes grizzly bears) is to protect humans and livestock. Thus, this plan does not carry forward such an alternative for further analysis.

Issues considered but not differentiated by alternatives

The following issues were considered but were not differentiated by alternatives, as explained below.

- **Motorized access.**

As detailed in Part III, high road density is associated with lower usage of those areas by grizzly bears, and lower survival of bears that do use them. For this reason, public land managers have committed, via Forest Plans, Conservation

Strategies, and Habitat Conservation Plans to various limitations on motorized access, primarily within core population areas. FWP holds a small proportion of the public lands that provide grizzly bear habitat, and many roads in or around its land do not fall under FWP jurisdiction. Previous FWP grizzly bear plans (Dood et al. 2006, FWP 2013) have recommended that land management agencies (including FWP) manage for open-road densities of 1 mi/mi^2 or less where grizzly bears might use the habitat and that this matches FWP's statewide approach to managing motorized access for multiple species (e.g., elk). FWP would anticipate maintaining this approach regardless of which Alternative is chosen here.

- **Transportation accommodation.**

As in existing plans (Dood et al. 2006, FWP 2013), FWP remains interested in minimizing the disruptive and demographic effects that highways create for grizzly bears. Because we know that grizzly bears are likely to use only the largest and most open types of crossing structures (Ford et al. 2017) and these are generally the most expensive, careful planning will be required to avoid making a large investment in a structure that provides little benefit to grizzly bears. FWP staff will assist and inform the development of proposals for highway crossing structures or other wildlife accommodations, and may ultimately lead the development of proposals. FWP staff are actively partnering with the Montana Department of Transportation (MDOT), local community organizations, and NGOs on priorities and placement. FWP is increasingly engaged in transportation projects to improve the chances that grizzly bears and other wildlife can cross roads safely (Costello et al. 2020).

In March 2020, a Memorandum of Agreement (MOA) between FWP and MDOT on coordination of wildlife and transportation issues was finalized and signed. This high-level MOA provides an umbrella structure under which work groups can share information and coordinate efforts related to reducing the negative effects of Montana's highway system on wildlife. The MOA specifically names one organization, Montanans for Safe Wildlife Passage, as an additional cooperating partner in this effort.

- **Climate change.**

FWP's understanding of how grizzly bears are likely to be affected by climate change is summarized in Part III of this document. The effects would be similar regardless of the management direction under consideration in this document.

- **Approach to public information on grizzly bear conflicts, relocations, and mortalities.**

What happens when there is a grizzly bear conflict, relocation, or mortality? Should FWP regions make individual decisions regarding the public dissemination of information about such events? Or should FWP adopt more consistency across the state regarding whether, when, or how such information is disseminated? The same approach would be applied regardless of management direction under consideration in this document.

Required goals, objectives, and strategies

Below are goals, objectives, and strategies that are viewed as required, and thus not subject to additional planning consideration.

Legal requirements for ESA-listed threatened species

By law, FWP is required to operate as permitted by USFWS when dealing with federally listed grizzly bears. More detailed guidance is provided in the two Conservation Strategies to which FWP is a signatory (see below Sidebar 3), as well as in regulations promulgated by the USFWS regarding mortality of grizzly bears (see Appendix A).

Commitments made under the two Conservation Strategies

FWP is a signatory to the inter-agency MOU implementing the NCDE CS (NCDE Subcommittee 2019), which serves as an inter-agency management plan for the NCDE and surrounding lands. This CS is not a regulatory or statutory document, but rather is a summary of commitments and regulatory mechanisms made by each government entity that would take formal effect upon delisting of grizzly bears within the NCDE DPS and is considered a requirement for eventual delisting by the USFWS. If delisting occurs, the ESA requires the USFWS, in cooperation with the State of Montana, to monitor grizzly bears for at least five years afterwards to assure that recovery is sustainable (a separate post-delisting monitoring strategy would be developed by the USFWS). The CS, unlike USFWS post-delisting monitoring, is not considered to be time-limited, but rather to be in effect indefinitely—although reviewed and potentially revised by participants at five-year intervals.

The NCDE CS categorizes the commitments made by each signatory towards Demographic Monitoring and Management (i.e., population management), Habitat Management and Monitoring, and Conflict Prevention and Response. FWP is primarily involved with the first and third of these and tangentially involved with the second. FWP commitments that relate to Demographic Monitoring and Management (which apply within the NCDE DMA) are formalized by a public process and written into rule by the Commission in ARM 12.9.1403. Additional detail on the NCDE CS is provided in Part IV of this document.

Because the Montana legislature has previously made the finding (§ 87-5-301, MCA) that grizzly bears are a recovered population that is best served under state management and the local, state, tribal, and federal partnerships that fostered recovery, and because both Conservation Strategies are considered components of any future delisting rule for the populations, FWP policy should continue to support the commitments made in both the GYE CS and the NCDE CS. Thus, in brief, FWP is committed (including through the Commission-adopted ARM 12.9.1403) to the grizzly bear population objectives contained in the two Conservation Strategies and both of the Alternatives articulated herein reflect that commitment.

In the NCDE, this means FWP, working with partners, will:

a) Maintain a well-distributed grizzly population within the NCDE DMA; specifically, that females with dependent offspring will be documented as present in at least 21 of the 23 bear management units (BMUs) and six of the seven occupancy units will be documented at least every six years. Adherence to this objective will be evaluated by monitoring the presence of females with offspring (cubs, yearlings, or two-year-olds) within defined geographic units of the NCDE.

b) Manage mortalities from all sources, including but not limited to hunting and the loss of grizzly bears by translocation out of the NCDE, to support an estimated probability of at least 90% that the grizzly bear population within the demographic monitoring area remains above 800 bears, considering the uncertainty associated with all of the demographic parameters and further manage mortality against a 6-year running average within the following threshold objectives.

c) Monitor demographic and genetic connectivity among populations.

Additionally, should the NCDE population be delisted, and a hunting season be authorized by the Commission:

d) If the probability of that population remaining over 800 (within the DMA) falls below 90%, hunting would cease and would not resume until the probability is 90% or greater.

e) If mortality thresholds—as outlined in https://rules.mt.gov/gateway/ruleno.asp?RN=12%2E9%2E1403 for ARM 12.9.1403 (b)(ii) or (b)(iii)—should be exceeded in any given year, then hunting would not be allowed the next year.

In the GYE, this means FWP, working with partners, will:

a) Maintain the population in the DMA within or above a range of 800-950 grizzly bears ($0.98 \leq \lambda \leq 1.02$) as estimated by the recently adopted and recalibrated IPM. Should the estimated population within the DMA decline to 800 bears, any recreational hunting that had been authorized by any of the states after delisting would be closed.

b) Maintain a well-distributed grizzly population within the GYE DMA; specifically with a target of at least 16 of 18 BMUs within the PCA occupied at least one year in every six, and no two adjacent BMUs can be unoccupied over any six-year period.

c) Monitor all sources of mortality for independent females and males (>2 years old) and dependent young (<2 years old) within the GYE DMA and limiting mortality to annual mortality limits based on an annual population size estimate using an integrated population model and in coordination with Idaho and Wyoming per the Tri-State MOA.

Additionally, should the GYE population be delisted, and a hunting season be authorized by the Commission:

d) Limit mortality to agreed-upon thresholds to maintain the population above recovery levels and 800 individuals. Should the estimated population within the DMA decline below established thresholds, any recreational hunting that had been authorized by any of the states post de-listing would be closed.

Irreversible and irretrievable resource commitments

A resource commitment is considered irreversible when impacts from its use create limitations to future use options. Irreversible commitments apply primarily to nonrenewable resources, such as fossil fuels or minerals, and to those resources that are renewable only over long timespans, such as soil productivity. A resource commitment is considered irretrievable when the use or consumption of the resource is neither renewable nor recoverable for use by future generations. In essence, irretrievable resource commitments involve the loss in value of an affected resource that cannot be restored as a result of the proposed action or preferred alternative. Such commitments include expenditure of funds, loss of production, or restrictions on resource use.

The programs considered under FWP's Preferred Alternative do not result in any irretrievable commitment of resources. If expansion of bears proves untenable in some areas, FWP has demonstrated the ability to remove bears. Similarly, habitat programs, hunting seasons, and access management can be reversed or revised if needed. Because removal of individual grizzly bears can be regulated or eliminated on an annual basis, or even on a short-term basis (if data indicates such action is prudent), the management program poses no threat to the species.

Conversely, because grizzly bears and other wildlife are a major factor in Montanans' quality of life, contributing to the attraction of new residents and an expanding human population, western Montana's human population has increased rapidly. Subdivisions, energy development, and other developments are slowly but steadily altering grizzly habitat. While FWP can moderate this loss somewhat by allowing grizzly bears to expand into currently unoccupied habitats to meet their needs, it cannot control human population growth.

Finally, grizzly bears are large and potentially dangerous animals. By their presence, they pose some risk to Montana's human inhabitants and visitors. Considering all of the people and activities that currently occur in grizzly habitat, and the comparatively few injuries or deaths, the risk level is low. In addition, the programs outlined in this plan should allow for management and further minimization of the risks of living with grizzlies. Through education, understanding, and science-based wildlife management, we expect to be able to minimize risks of injury and/or death from grizzlies.

Part III: Context and Background

Geographic setting: Thirty counties in Western Montana

The geographic setting of this plan consists of the thirty counties of Western Montana (Figure). Although possible, it is unlikely that counties further east would be affected, so they are not discussed here. Together, these counties constitute 74,158 mi^2 (192,068 km^2), about 51% of Montana's total area.

Figure 7. Western Montana counties covered by this plan

Montana, highlighting the 30 western counties that are the focus of this plan.

Most counties in this area are characterized by one or more river valleys divided by rugged mountain ranges. Elevations range from 1,820 ft. (555 m) where the Kootenai River enters Idaho near Troy, Montana, to 12,799 ft (3,904 m) on top of Granite Peak in the Beartooth Mountains. Major river drainages in Montana west of the Continental Divide include the Kootenai (which flows into the Columbia River in British Columbia), and the Bitterroot, Blackfoot, and Flathead (all of which flow into the Clark Fork, which itself flows into Lake Pend Oreille in Idaho, and from there into the Columbia River near the Washington/British Columbia boundary). East of the Continental Divide, major drainages in Montana include the Bighorn, Clark's Fork, and Tongue Rivers (all of which flow into the Yellowstone River), and the Beaverhead/Bighole (Jefferson), Gallatin, Judith, Madison, Marias, Musselshell, Sun, and Teton Rivers (all of which flow into the Missouri River). Additionally, the Belly, St. Mary, and Waterton Rivers, which originate in Glacier National Park, are tributaries of the Saskatchewan River system, ultimately flowing into Hudson Bay.

Lower elevation habitats below 6,000 ft. (1,829 m) vary greatly and include large areas of shortgrass/sagebrush prairie, mountain foothills, intensively cultivated areas (grain and hay field agriculture), natural wetlands/lakes, riparian plant communities ranging from narrow streambank zones to extensive cottonwood river bottoms, manmade reservoirs, small communities, and sizeable towns and cities.

In these thirty counties, the mountainous portion above 6,000 ft. (1,829 m) contains all, or portions of, forty-four mountain ranges, including the Absaroka, Anaconda-Pintler, Beartooth, Beaverhead, Big Belt, Bitterroot, Blacktail, Boulder, Bridger, Cabinet, Castle, Centennial, Coeur d'Alene, Crazy, East Pioneer, Elkhorn, Flathead, Flint Creek, Gallatin, Garnet, Gravelly, Henry Lake, Highland, John Long, Lewis, Lewis and Clark, Little Belt, Livingston, Madison, Mission, Nevada, Ninemile-Reservation Divide, Purcell, Rattlesnake, Ruby, Sapphire, Salish, Sawtooth, Snowcrest, Spanish Peaks, Swan, Tendoy, Tobacco Root, and West Pioneer ranges. Mountainous habitats are dominated by coniferous forest (Douglas fir, lodgepole pine, Engelman spruce, western cedar, hemlock, whitebark pine, limber pine, ponderosa pine, juniper), and rocky subalpine/alpine communities found above timberline.

Human population

As of 2021, an estimated 950,071 people lived in the 30-county area of Montana; despite having only slightly more than half Montana's area, these counties comprised almost 89% of Montana's population. The 2021 estimate also reflected a population increase of nearly 24% since the year 2000. During the years 2000–2019, population growth was highest in Gallatin, Broadwater, and Flathead counties; population declined modestly in seven counties (Figure 8 and Table 3).

Figure 8. Western Montana counties: Annual population growth

From 2000-2019.

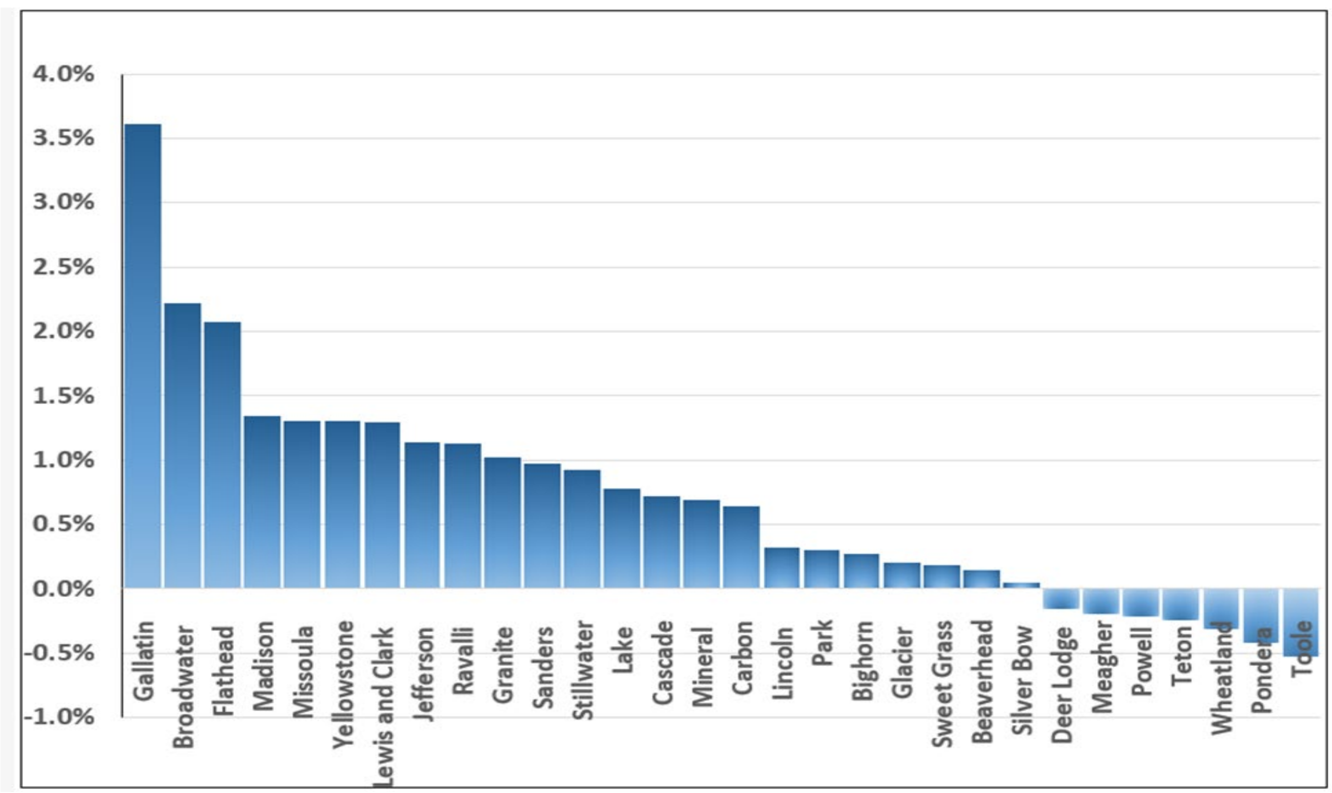


Table 3. Western Montana counties: Population, area, and population density

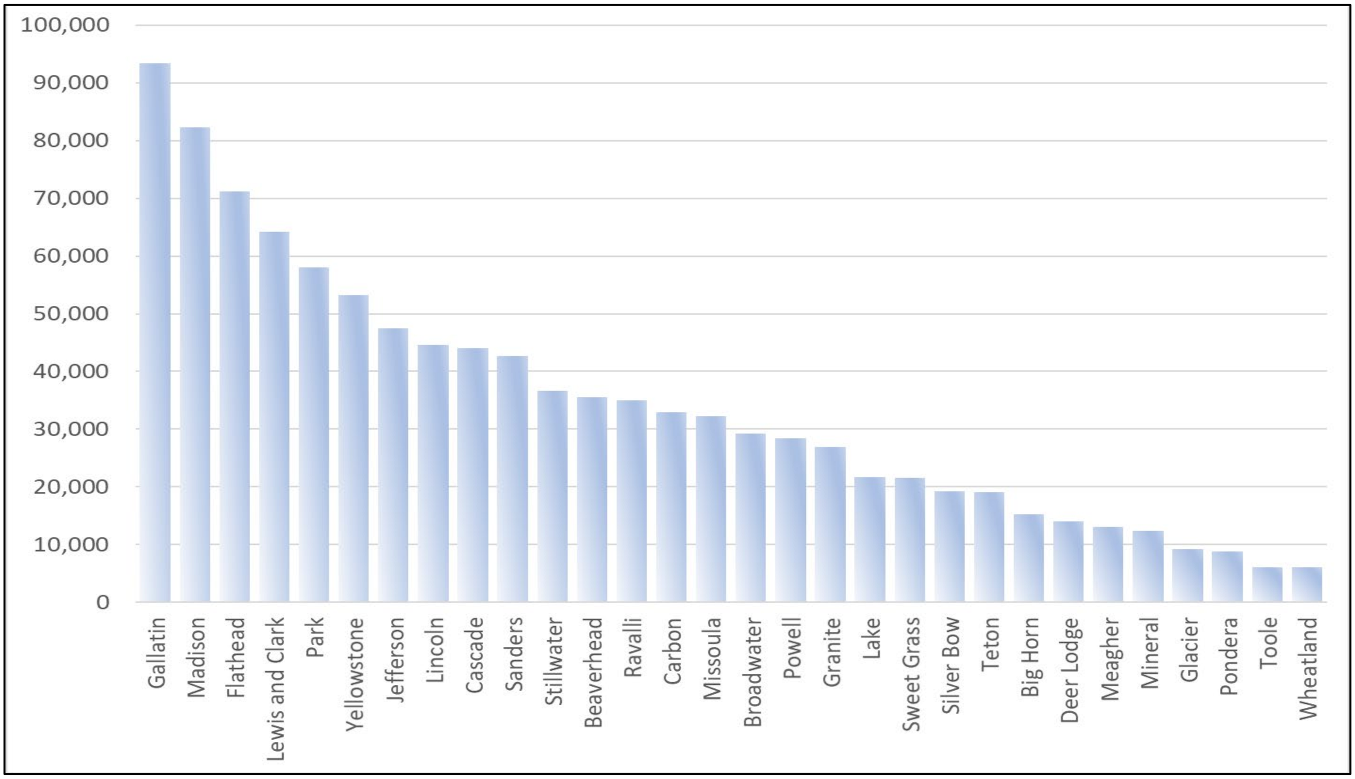
From Montana.gov (2021 January 25). Counties are listed in descending order by 2021 population.

County	Population, 2000	Population, 2021	Annual growth rate, 2000–2019	Area in miles (excluding large water bodies)	Population density
Yellowstone	129,352	161,300	1.30%	2,635	61.21
Missoula	95,802	119,600	1.31%	2,598	46.04
Gallatin	67,831	114,434	3.62%	2,608	43.88
Flathead	74,471	103,806	2.07%	5,099	20.36
Cascade	80,357	91,366	0.72%	2,688	33.99
Lewis and Clark	55,716	69,432	1.30%	3,459	20.07
Ravalli	36,070	43,806	1.13%	2,394	18.30
Silver Bow	34,606	34,915	0.05%	718	48.63
Lake	26,507	30,438	0.78%	1,493	20.39
Lincoln	18,837	19,980	0.32%	3,619	5.52
Park	15,694	16,606	0.31%	2,802	5.93
Glacier	13,237	13,753	0.21%	2,991	4.60
Bighorn	12,671	13,319	0.27%	4,995	2.67
Jefferson	10,049	12,221	1.14%	1,657	7.38
Sanders	10,227	12,113	0.97%	2,761	4.39
Carbon	9,552	10,725	0.65%	2,047	5.24
Stillwater	8,195	9,642	0.93%	1,790	5.39
Beaverhead	9,202	9,453	0.14%	5,542	1.71
Deer Lodge	9,417	9,140	-0.15%	731	12.50
Madison	6,851	8,600	1.34%	3,587	2.40
Powell	7,180	6,890	-0.21%	2,326	2.96
Broadwater	4,385	6,237	2.22%	1,189	5.25
Teton	6,445	6,147	-0.24%	2,271	2.71
Pondera	6,424	5,911	-0.42%	1,626	3.64
Toole	5,267	4,736	-0.53%	1,916	2.47
Mineral	3,884	4,397	0.70%	1,220	3.60
Sweet Grass	3,609	3,737	0.19%	1,855	2.01
Granite	2,830	3,379	1.02%	1,727	1.96
Wheatland	2,259	2,126	-0.31%	1,422	1.50
Meagher	1,932	1,862	-0.19%	2,392	0.78

Although still sparsely populated by national standards, the human population of Western and Central Montana and its associated developmental footprint has expanded greatly in recent decades. In 2016 the 30-county area contained an estimated 292,548 single family homes, with approximately 109,206 (over 37%) built since 1990. Almost 1,025,000 acres (414,803 hectares) of previously open space—slightly more area than Glacier National Park—was estimated to have been converted to residences during this quarter-century. Counties with the largest acreage of open space converted included Gallatin, Madison, Flathead, and Lewis and Clark (see Figure 9 open space to housing), though all counties contributed.

Figure 9. Western Montana counties: Acres of open space converted to housing

For 1990–2016. From 2020, https://headwaterseconomics.org/economic-development/montana-home-construction/.



Economics

In 2010, the median per capita income in the United States was $27,334, and the median household income was $51,914. In Montana, median per capita income was somewhat lower, at $23,836, with median household income of $43,872. All but one of the 30 counties in Western Montana ranked below the U.S. median per capita income in 2010, and all but two ranked below the U.S. median household income. Twenty of the 30 counties in Western Montana ranked below the Montana-wide median for per capita income, and 22 of 30 ranked below the Montana-wide median for household income (Table 4).

Table 4. Western Montana counties: Income – per-capita, median, below poverty line

Data from 2021. Counties are listed in descending order of median household income[4]

County	Median household income	Poverty rate (%)
Gallatin	$78,910	9
Stillwater	$75,820	8
Yellowstone	$69,182	11
Jefferson	$68,128	7
Lewis and Clark	$67,702	9
Broadwater	$66,307	9
Flathead	$65,835	10
Missoula	$65,682	13
Carbon	$62,841	9
Madison	$62,516	9
Sweet Grass	$61,454	10
Ravalli	$60,030	10
Teton	$59,787	13
Park	$59,113	10
Cascade	$57,085	13
Beaverhead	$53,776	13
Granite	$52,984	12
Silver Bow	$52,495	13
Lake	$50,978	17
Mineral	$50,327	14
Sanders	$50,270	15
Toole	$49,297	15
Lincoln	$48,156	17
Pondera	$47,900	17
Powell	$47,687	17
Big Horn	$47,179	26
Deer Lodge	$45,725	15
Meagher	$45,391	15
Glacier	$44,777	25
Wheatland	$42,431	17

[4] "Montana Income and Poverty: Small Area Income and Poverty Estimates (SAIPE). U.S. Census Bureau 2021.

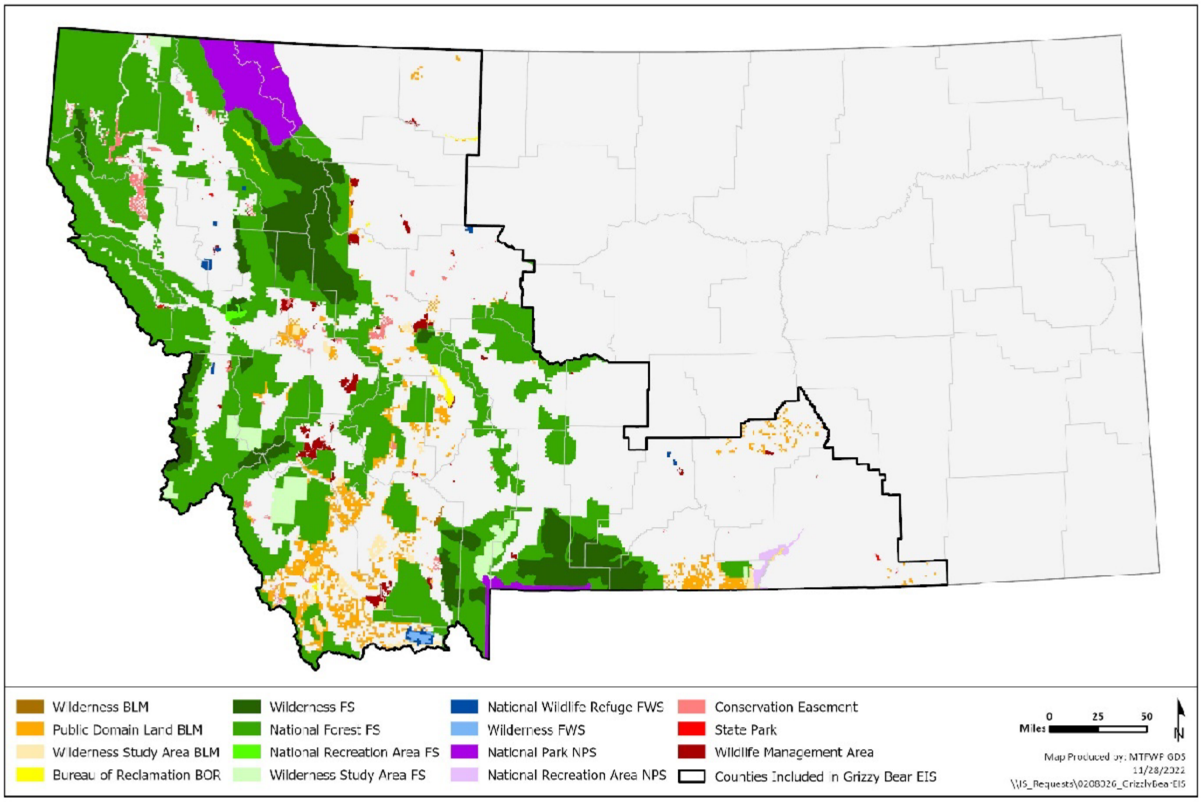
Land ownership

The majority of mountainous habitat (above 6,000 ft., 1,829 m) is located within publicly owned National Forests, corporate timber lands and Glacier and (the Montana portion of) Yellowstone National Parks. Approximately 36% of the 30-county area is managed by USFS, and just over 2% by NPS. All, or portions of, the Bitterroot, Custer-Gallatin, Deer Lodge-Beaverhead, Flathead, Helena-Lewis and Clark, Kootenai, Kaniksu (part of the Idaho Panhandle National Forest complex), and Lolo National Forests lie within this 30-county area. The Bureau of Land Management (BLM) manages just under 3% of lands in the area (Table 5, Figure 10). A small portion (just over 1%) of mountainous habitat is in state ownership (Montana Department of Natural Resources and Conservation [DNRC]). The Blackfeet Indian Reservation constitutes over 3% of total lands, and the Flathead Indian Reservation constitutes an additional 2.6%. Smaller amounts are managed specifically for wildlife by USFWS and FWP. Other lands are in private ownership, including private subdivisions, ranches, land trusts, ski resorts and timber company lands. Communities of various sizes also occupy several thousand acres of low-elevation river-valley habitat.

Table 5. State and federal protected land acreage within the 30-county project area.

State or Federal Protected Lands	Acres
Bureau of Reclamation (BOR)	84,480
National Forest (USFS)	14,018,560
National Park (NPS)	1,173,920
National Recreation Area (USFS and NPS)	115,200
National Wildlife Refuge (USFWS)	76,804
Bureau of Land Management (BLM)	1,376,640
Wilderness (BLM, USFS, and USFWS)	3,300,480
Wilderness Study Area (BLM and USFS)	807,040
State Parks (FWP)	29,440
State Wildlife Management Areas (FWP)	413,440

Figure 10. State and federal protected land acreage within the 30-county project area.



Land Use

Agriculture

The 30-county area supports a large agricultural economy. In 2017, there were an estimated 16,993 farms and ranches in the 30-county area (Table 6). By far the most common activities of these farms and ranches were raising beef cattle, growing forage (hay) for cattle, and growing grain crops (wheat, oats, barley).

Table 6. Western Montana counties: Agricultural characteristics

Data from 2017, https://www.nass.usda.gov/Publications/AgCensus/2017/Online_Resources/County_Profiles/Montana/cp30001.pdf.

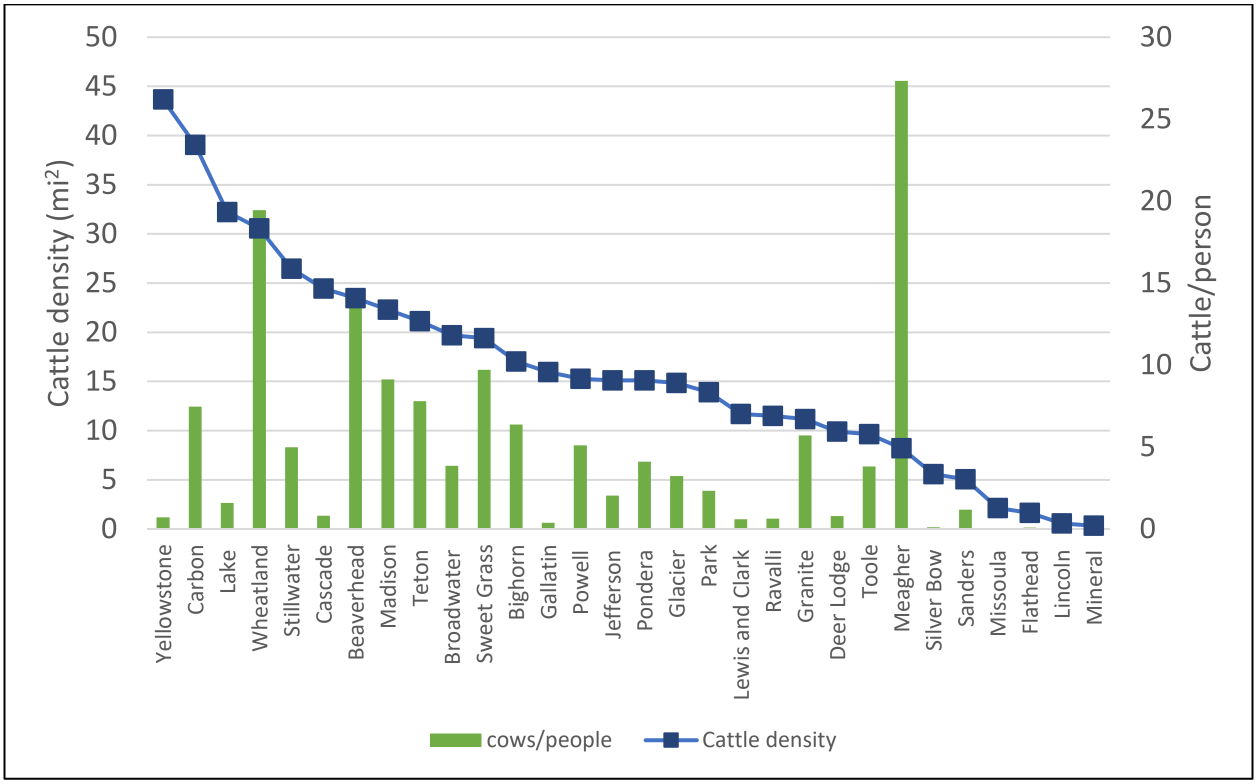
County	# of ranches / farms (2017)	Average # of acres	Total # of acres in agriculture	% of land in crops	% of land in pasture
Bighorn	353	9,032	3,188,296	7	82
Yellowstone	1,314	1,220	1,603,080	19	76
Cascade	1,027	1,237	1,270,399	33	61
Beaverhead	494	2,498	1,234,012	13	86
Glacier	637	1,862	1,186,094	42	56
Toole	362	3,025	1,095,050	67	31
Madison	605	1,526	923,230	16	80
Teton	686	1,294	887,684	52	46
Meagher	145	6,084	882,180	10	83
Wheatland	174	4,944	860,256	16	80
Sweet Grass	301	2,745	826,245	7	90
Carbon	725	1,125	815,625	17	78

Pondera	486	1,656	804,816	69	30
Lewis and Clark	707	1,132	800,324	10	81
Stillwater	562	1,357	762,634	23	72
Park	575	1,238	711,850	16	76
Gallatin	1,123	624	700,752	30	63
Sanders	521	1,233	642,393	7	29
Lake	1,170	548	641,160	15	39
Powell	254	2,253	572,262	10	62
Broadwater	296	1,577	466,792	24	69
Jefferson	370	952	352,240	16	78
Granite	151	1,892	285,692	10	71
Missoula	576	452	260,352	8	16
Ravalli	1,576	153	241,128	22	53
Flathead	1,146	159	182,214	51	24
Deer Lodge	77	962	74,074	16	73
Silver Bow	142	425	60,350	6	74
Lincoln	345	139	47,955	26	27
Mineral	93	198	18,414	30	13

Sheep, hogs, and dairy cattle were also being raised in smaller numbers. Sheep and beef cattle were grazed on privately owned grassland and on publicly owned (USFS, BLM, DNRC) grazing allotments. Some of these allotments occurred in high elevation habitats occupied by grizzly bears. In 2020, an estimated 1,211,000 cattle (including calves) grazed in the 30-county area, as well as some 92,200 sheep (including lambs). The largest populations of cattle were in Beaverhead (~ 130,000) and Yellowstone (~ 115,000) counties, and the largest number of sheep were in Silver Bow (~ 12,000), Beaverhead (~ 12,000), and Wheatland (~ 11,500) counties. Cattle density was highest in Yellowstone and Carbon Counties; cattle outnumbered people by the greatest proportion in Meagher, Wheatland, and Beaverhead counties (Figure 11).

Figure 11. Western Montana counties: Density of cattle and ratio of cows to people

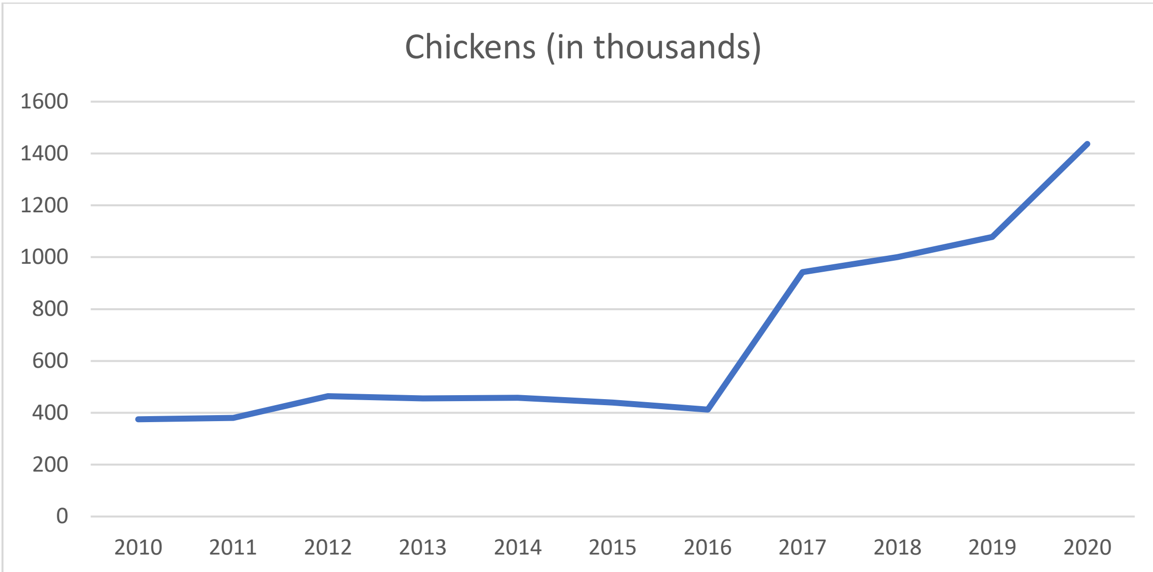
Density of cattle (blue squares) and ratio of cows to people (green bars) in the 30 counties considered in this document.



Although Montana is not known particularly for producing poultry, the number of chickens reported as being raised in Montana has increased in recent years, with a notable increase beginning in 2017 (Figure 12). Most chicken producers are small scale, but even a few chickens can attract grizzly bears, resulting in conflicts.

Figure 12. Chickens raised in Montana

From USDA 2020. Chickens reported as raised in Montana during 2010–2020.



Mining

Large mineral deposits, ranging from talc to gold, are located throughout Western Montana. Of these, metallic minerals provide the largest share of Montana's non-fuel mining income, with copper, palladium, and platinum leading the list of important metals (these 2 being mined nowhere else in the United States). In 2012, there were a total of 53 mines in production, development, standby permitting, or reclamation status, all but 7 of which were located within the 30-county area (these 7 were predominantly coal mines; http://www.mbmg.mtech.edu/pdf/2012ActiveMines.pdf).

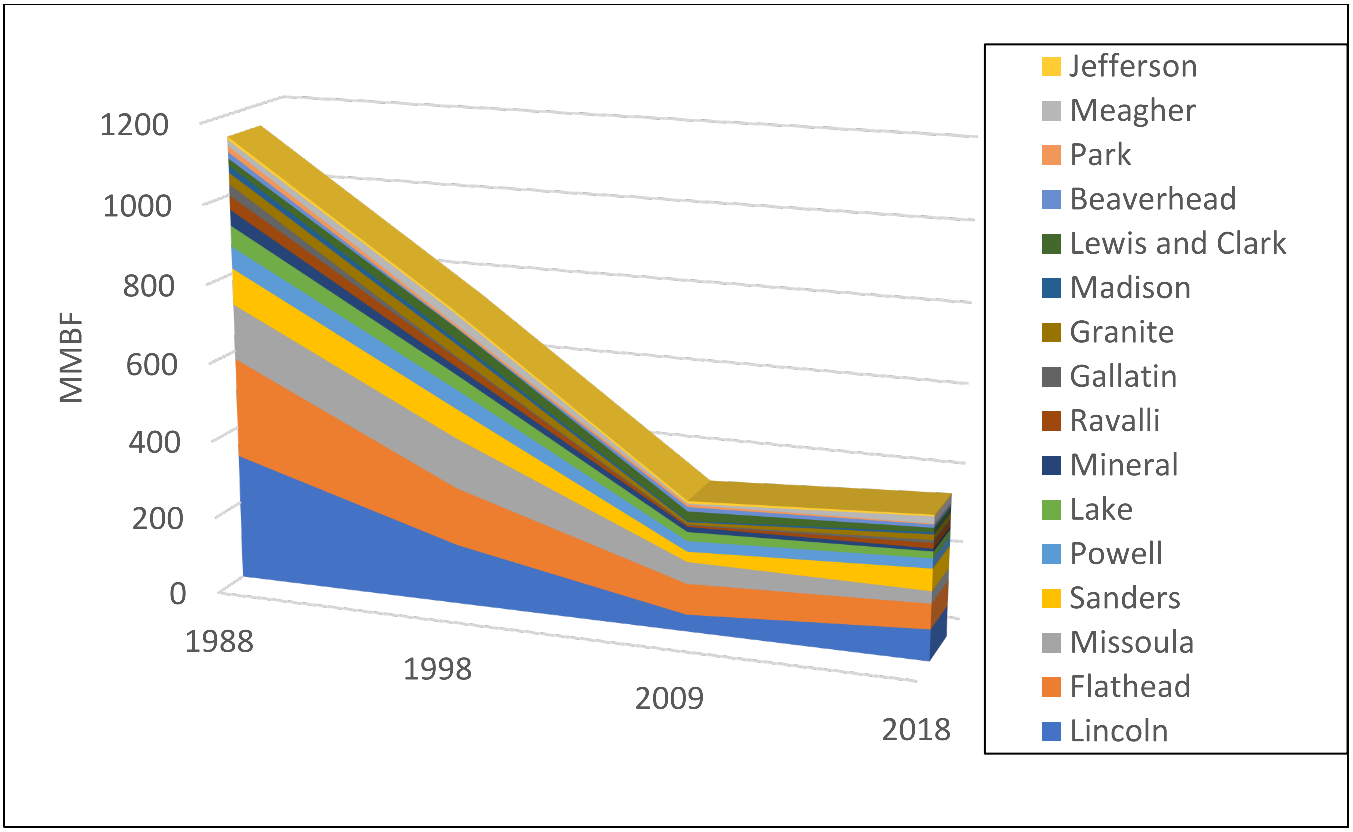
Wood products

The majority of Montana's forested lands (23 million acres) are located within the western part of the state. Nearly 4 million acres of these forest lands are permanently reserved as either wilderness areas or National Parks. Eleven million acres of the remaining forested land is administered by the USFS, with 5.2 million acres of this public estate designated by current forest plans as suitable for timber production. Private forest lands occupy approximately 6 million acres, with 2 million owned and managed by large timber companies. Another four million acres of private forest lands are owned by some 11,000-plus private individuals.

Timber production in the 30-county area has declined since the late 1980s (http://www.bber.umt.edu/fir/s_mt.asp). In 1988, an estimated 1,163 million board feet (MMBF) were produced; this declined to approximately 352 MMBF in 2009, before recovering slightly to 367 MMBF in 2018 (Figure 13).

Figure 13. Wood products – gross output from primary producing counties, all in Western Montana

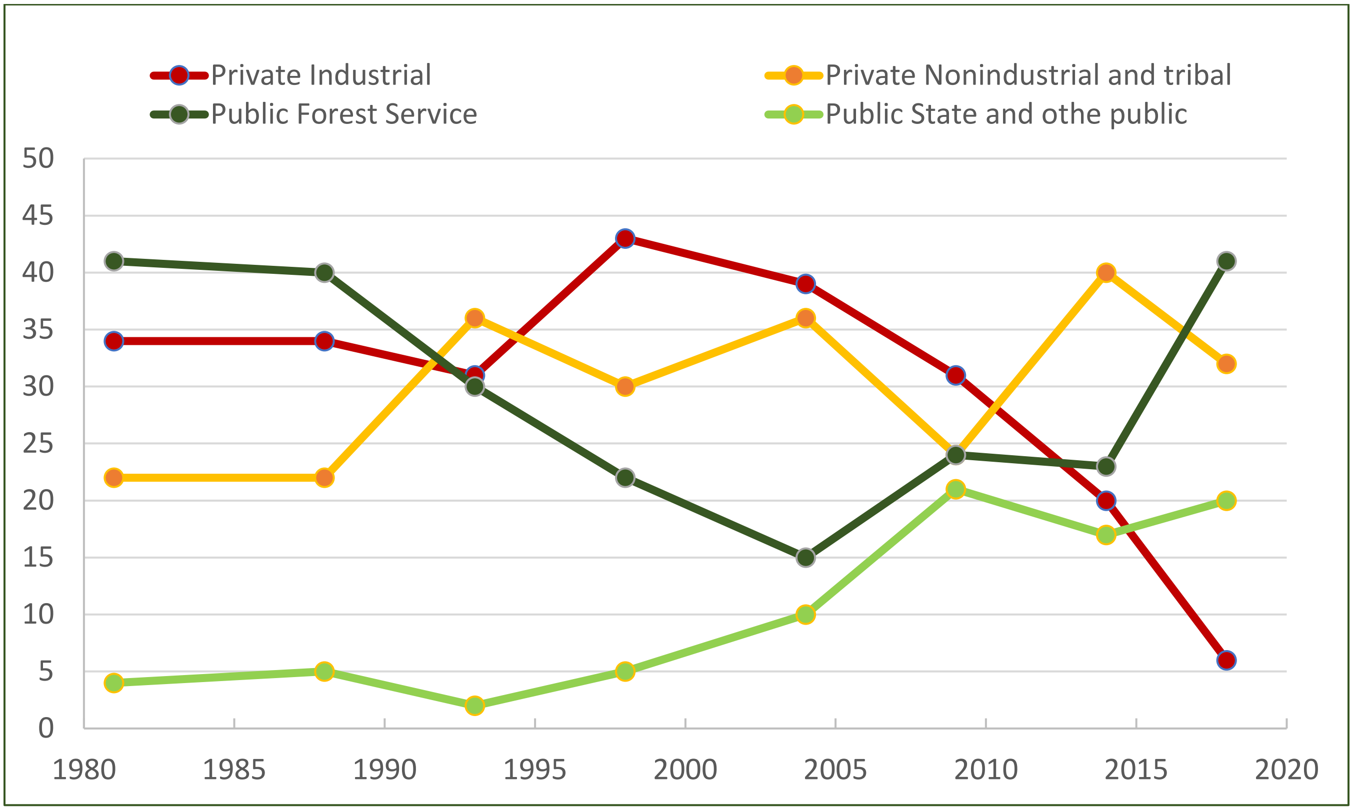
From 1988-2018. Gross output from top sixteen wood-producing counties in Western Montana, in million board feet (MMBF) per year.



Sources for wood products, categorized broadly into public (USFS; state and other public), and private (corporate industrial timber lands; private, non-industrial and tribal) forestlands, has varied over time (Figure 14). During the 1980s, most production came from U.S. Forest Service lands, being almost matched by private industrial forests, with very little coming from state lands. As production on USFS lands declined in the 1990s, the proportion coming from non-industrial and tribal lands increased (briefly becoming dominant in 1994). The relative contribution from private industrial lands peaks in about 1998 as USFS lands continued to decline, but other public lands made up some of that. However, the proportion contributed by private industrial lands has declined markedly in the past 20 years, with the other sources increasing in importance.

Figure 14. Percentage of wood products from four categories of forest producing lands

Data (1985–2020) from University of Montana Bureau of Business and Economic Research (BBER) 2020, http://www.bber.umt.edu/pubs/forest/fidacs/MT2018%20Tables.pdf.



In 2018, the University of Montana Bureau of Business and Economic Research (BBER) estimated that Montana's forest industry accounted for just under 8,000 jobs in direct employment, and an additional 13,300 jobs indirectly associated with wood products. This was up somewhat from employment ca. 2010, but lower than the late 1990s (Morgan et al. 2018).

Recreation

Outdoor recreation and tourism are major components of the economy in the 30-county area. Western Montana is nationally renowned for its high-quality fishing, hunting, camping, hiking, river floating, skiing, snowmobiling, wildlife viewing and sightseeing opportunities. Glacier and Yellowstone National Parks, Flathead Lake, and other public lands attract large numbers of people to the area every year. Many of these outdoor activities are made possible by public ownership of large tracts of mountainous habitat and additional access provided by many private landowners.

Recreationists have largely unhindered access to millions of acres of undeveloped land. Some of this land is currently, or based on documented trends of increasing distribution will be, occupied by grizzly bears. As bear numbers and distribution increase and the number of outdoor enthusiasts grow, contact and interaction with people engaged in outdoor activities is likely to increase. As part of FWPs conflict prevention efforts there are targeted messaging campaigns for hikers, cyclists, campers and hunters. Messages have been designed to reach black bear hunters and wolf trappers. Maps of grizzly bear distribution will be routinely updated.

Value orientations of Montanans relevant to grizzly bear management

Although largely rural (only the Billings and Missoula areas are considered "metropolitan" by the U.S. Census Bureau), and ethnically more homogenous than most states (88.6% white, 6.4% Native American), and older than most (23.2% 62 years or older) Montana's 1,062,300 people in 2021 contained a populace with diversity of values and attitudes toward wildlife. Based on a large-scale public opinion survey in 19 western states conducted in 2004, Teel and Manfredo (2009) developed a typology of value orientations they termed "traditionalists," "mutualists," "pluralists," and "distanced." Those with a "traditionalist" orientation tended to score high on such measures as valuing use of animals and hunting, tending to emphasize the wildlife should be used and managed for the benefit of people. Those with a "mutualist" orientation scored higher on measures such as social affiliation and caring, tending to view wildlife as part of their extended social network. Those categorized as "pluralists" scored high on both sets of measures, with context and situations controlling which might dominate in any given issue. Those categorized as "distanced" scored low on both sets of measures, i.e., were more apathetic generally about wildlife.

Based on a nationwide follow-up survey conducted during 2016-18, 28% of U.S. respondents were categorized as "traditionalists," 35% as "mutualists," 21% as "pluralists," and 15% as "distanced" (Manfredo et al. 2018). Montana had a greater percentage of respondents categorized as "traditionalists" than the national average (38.5%), but this was down considerably from the 47% estimated in 2004. Montana had a lower percentage of respondents categorized as "mutualists" than the national average (26.5%) but this was up considerably from the 19% estimated in 2004. Montana had among the highest percentage among the 19 western states categorized as "pluralists" (27.5%), almost unchanged from 2004. Of note is that Montana had among the lowest percentage of respondents among western states categorized as "distanced" (7.5%). In short, Montanans don't all share the same value orientation toward wildlife, but very few are apathetic.

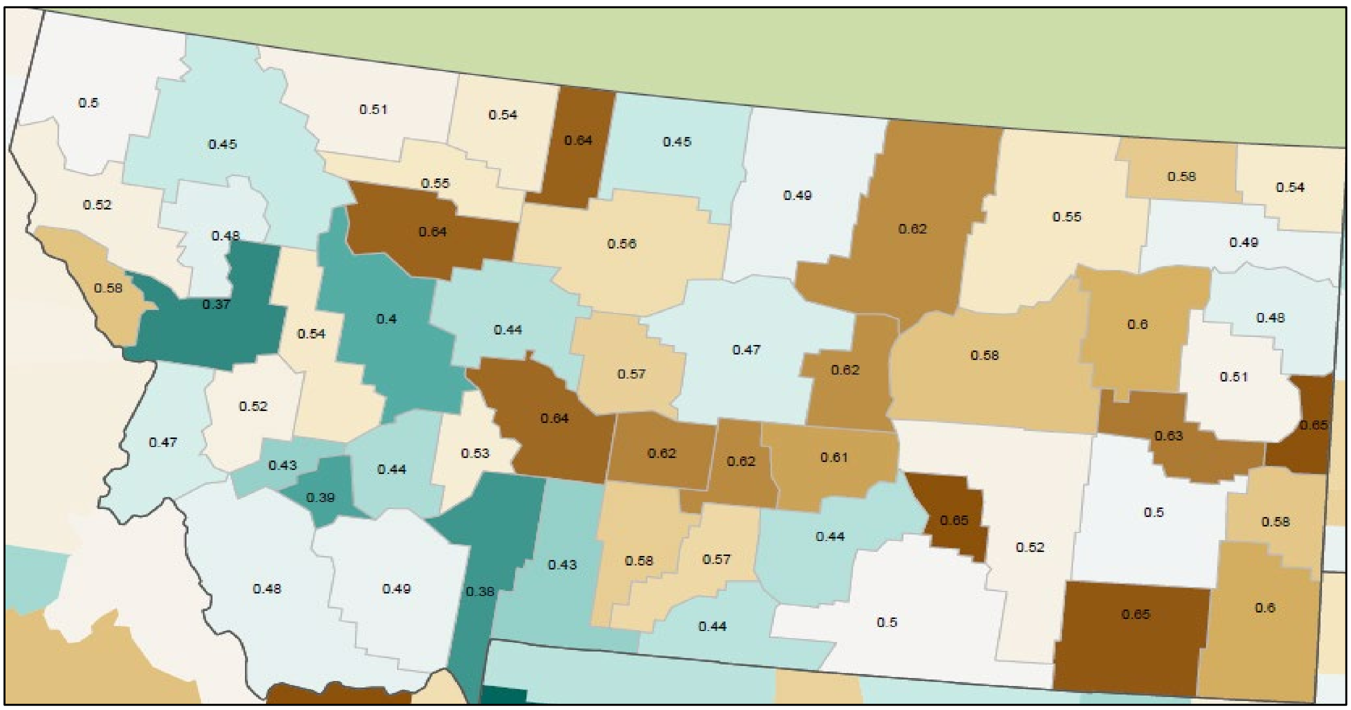
Manfredo et al. (2018) also found that, among all 50 states, only Alaska (62.9%) and Wyoming (62.1%) exceeded Montana's 60.8% of respondents agreeing that local communities should have more control than they currently do over management of fish and wildlife by the state. Montana was among 6 states with the highest percentage of respondents agreeing that wolves that kill livestock should be lethally removed by state managers (Manfredo et al. 2018). In contrast, Montana clustered close to the mean of all states in percentage of respondents agreeing that a black bear attacking a person should be lethally removed by the state. (The questionnaire did not address grizzly bears specifically, probably because they are present in only 5 of the 50 states). In a somewhat surprising finding, given that FWP's funding is largely provided by hunters and anglers, and that "traditionalists" outnumber "mutualists," Montana ranked highly among states in percentage of respondents who prefer a funding model which includes public state taxes (albeit not a funding model that prioritizes public state taxes). Just under 75% of Montana respondents preferred including some public taxes in wildlife funding, similar to percentages in Washington, Arizona, and Michigan, but higher than percentages in Wyoming, the Dakotas, Colorado, or Utah. Almost 14% of Montana respondents reported being active hunters, the 11th highest among the 50 states. Thirty-seven percent of Montana respondents reported being active wildlife viewers, a percentage exceeded only by the 40.7% in Alaska. Montana, Alaska, and Wyoming stood apart as states with high percentages of active wildlife viewers while also having high percentages of "traditionalists" (who might otherwise be assumed to hunt wildlife but not watch it; Manfredo et al. 2018). However, Montana also had the largest decrease in the proportion of self-identified active hunters from 2004 to 2018.

Nationwide, Manfredo et al. (2018) found that trust in state wildlife agencies in 2018 (64%) far exceeded trust in state government generally (41%) or the federal government (25%).[5] "Traditionalists" tended to trust state wildlife agencies more (65%) than "mutualists" (54%), although pluralists were the most trusting of state wildlife agencies (72%). In Montana, trust in the state wildlife agency was higher than the national average among both "traditionalists" (71.5%) and "mutualists" (62.3%), and was 69% among all respondents in 2018. In contrast, trust in the federal government among Montana respondents declined from 41% in 2004 to just 22% in 2018.

At FWP's request, Dr. Michael Manfredo (Colorado State University, Ft. Collins, CO) examined county-level attitudes of Montanans toward lethal control of black bears that attack humans, regardless of circumstances, as well as county-level indices of support for "traditionalist" vs "mutualistic" values. Respondents in Gallatin, Missoula, Lewis and Clark, and Butte-Silver Bow Counties were predicted to be negatively disposed toward lethal control of black bears (Figure 15).

Figure 15. County-level support for lethal control of black bears that attack humans

Predicted by a statistical model using data from a nationwide survey. See also Manfredo et al. (2021).

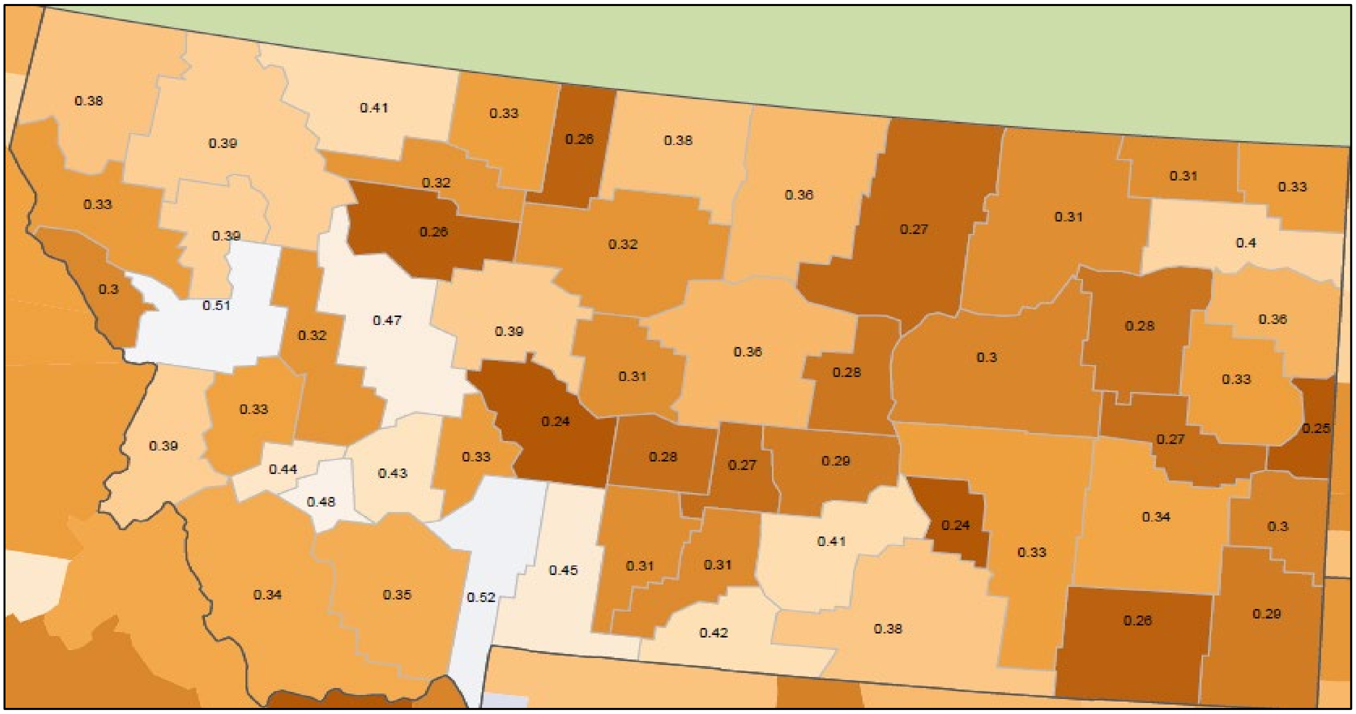


Respondents in Yellowstone, Carbon, Park, Cascade, Flathead, Deer Lodge, and Jefferson counties were predicted to be neutral. Among Western and West-central Montana counties, the most support for lethal control of black bears was found in Meagher, Teton, and Liberty counties, with support also being seen in Mineral, Powell, Toole, Pondera, Sweet Grass, and Stillwater Counties.

[5] Nesbitt et al. (2020) did not use the orientation typology of Manfredo et al. (2018), nor were they able to contrast public attitudes toward FWP with attitudes toward other government entities. However, they obtained data specific to Montanans' trust regarding FWP grizzly bear management. Over 70% either agreed or strongly agreed they trust FWP "knows how to effectively manage grizzly bear populations," over 76% either agreed or strongly agreed they trust FWP "knows how to respond to grizzly bear-human conflict," 80% either agreed or strongly agreed they trust FWP to "provide the public with the best available information on how to reduce grizzly bear-human conflict," and over 67% either agreed or strongly agreed that FWP "tells the truth about grizzly bears and their population status."

Figure 16. County-level social-habitat index

Predicted by a statistical model using data from a nationwide survey. Values exceeding 0.5 indicate a higher percentage of mutualists than traditionalists; values under 0.5 indicate a higher percentage of traditionalists than mutualists. See also Manfredo et al. (2021).



At the county level, support for lethal control of dangerous bears appeared to be highly correlated with ($r = -0.95$) the "social-habitat index" (i.e., whether values tended more toward mutualistic or traditionalistic; see Figure 16). Mutualistic values were greater than traditionalistic only in Missoula and Gallatin counties. Among western Montana counties scoring as most traditionalistic were Meagher, Teton, Mineral, Powell, Granite, Sanders, Broadwater, Beaverhead, and Madison.

Manfredo et al. (2017) argued that values, such as summarized above, are resistant to rapid change, at least in the absence of large-scale shifts in people's life circumstances, but that congruence of values is not necessarily a prerequisite to facilitating adaptive behavioral changes that can support long-term conservation. Pointedly (given Montanan's generally high regard for FWP's ability to manage human-grizzly bear conflict), Hughes et al. (2020) argued that "the challenges to grizzly bear conservation success are more about decision-making processes and issues of legitimacy, power, trust, and respect rather than people's attitudes toward bears."

Summary of grizzly bear biology

This summary of grizzly bear biology is not intended to be exhaustive; focus is primarily on aspects influencing their conservation and management status in Montana, as well as current and possible future management responses by FWP and other management entities. Other aspects of grizzly bear biology are not considered in depth here; readers interested in learning more can consult references cited herein, and in Part IV under the summary of science used.

Species and evolutionary history

The Eurasian brown bear and the North American grizzly are considered the same species (Ursus arctos). A number of sub-species are typically recognized within Eurasia (Garshelis 2009), and in earlier days, a number of North American subspecies were also recognized Pasitschniak-Arts (1993). More modern practice has been to accept only 2 subspecies in North America (based on skull analyses by Rausch 1963): the Kodiak subspecies (*U. a. middendorffi*) and all others in North America (*U. a. horribilis*). For purposes of this plan, we simply refer to grizzly bears, Ursus arctos, recognizing that adaptive differences with a genetic component may exist within grizzly bears in the Northern Rockies.

Current theory holds that this species developed its large size, aggressive temperament, flexible feeding habits, and adaptive nature in response to habitats created by intermittent glaciations (Herrero 1972). It is believed that early grizzly bears migrated to North America from Siberia across a land bridge at the Bering Strait at least 50,000 years ago (Schwartz et al. 2003, Miller et al. 2006). As the continental ice sheet receded about 10,000 years ago, the species began to work its way south over post glacial North America.

In North America, grizzly bears originally inhabited a variety of habitats from the Great Plains to mountainous areas, from central Mexico to the Arctic Ocean. European explorers encountered grizzly bears throughout most of the American West. It is not known exactly how many grizzly bears lived in the U.S. before 1700, but based on historical sightings and modern-day densities, it is estimated that around 50,000-100,000 bears lived in parts of 17 states.

Physical characteristics

Grizzly bears are generally larger than black bears and can be distinguished by longer, curved front claws, humped shoulders, and a face that appears concave (Schwartz et al. 2003, Garshelis 2009). A wide range of coloration from light brown to nearly black is common. Guard hairs are often paled at the tips; hence the name “grizzly” (Sidebar 5). Spring shedding, new growth, nutrition, and climate all affect coloration.

Sidebar 5. On what we call this animal

The term “grizzly bear” may be an unfortunate choice, because the word “grizzly” is often confused with the word “grisly.” The bear’s name, based on the word “grizzled” (from Middle English “grisel,” meaning “gray-colored"), refers to its “grizzled” appearance—an appearance caused by its outer fur typically being dark with light-colored tips. The similar-sounding but unrelated word “grisly” (from Old English “grislic,” meaning “to fear”), is a close synonym for gruesome, ghastly, frightful, hideous, horrifying, macabre, repulsive, or monstrous; it is most often used when describing a bloody scene or a murder. In many minds, the two words have become confused and the “grizzly bear” has come to be seen as a “grisly” animal. (In Eurasia and coastal Alaska, the most common name for Ursus arctos is simply “brown bear,” although not all are brown in color.)

Grizzly bears are certainly powerful and sometimes aggressive animals that can and do injure or kill people, yet typically they shy away from humans. Remembering that grizzly bears are named for their distinctive grizzled appearance, not for being monstrous, might help people maintain perspective on how to live near them.

In the lower 48 states where few grizzly bears have extensive access to salmon, mean weights of adult grizzly bears are 150-250 kg (330-550 lbs.) for males and 110-150 kg (240-330 lbs.) for females (Schwartz et al. 2003). Variation in body mass is affected by age at sexual maturity, samples from within the population, season of sampling, and reproductive status.

Grizzly bears are relatively long-lived; animals in captivity and in the wild have been documented as living as long as 34 years (Schwartz et al. 2003) or even longer. In general, the oldest age classes are listed at 28 years for males and 23 years for females, although individuals can live longer. More pertinent to conservation and management than maximum longevity are estimates of survival rates among sex/age classes of grizzly bears (see below).

Social organization and behavior

Except when caring for young or breeding, grizzly bears are generally solitary. Strict territoriality is unknown, with intraspecific defense limited to specific food concentrations, defense of young, and surprise encounters (Schwartz et al. 2003, Garshelis 2009).

In contrast to their generally solitary nature, grizzly bears of all ages will congregate readily at plentiful food sources and form a social hierarchy unique to that grouping of bears. Except at concentrated food sources, mating season is the only time that adult males and females tolerate one another, and then it is only during the estrous period. Other social affiliations are generally restricted to family groups of mother and offspring, siblings that may stay together for several years after becoming independent, and an occasional alliance of sub-adults or several females and their offspring (Schwartz et al. 2003, Garshelis 2009).

Individual grizzly bears evidently differ in their tolerance to close approaches by other bears or by people. Surprise is an important factor in many confrontations involving grizzly bears and humans. A female with young exhibits an almost reflexive response to any surprise intrusion or perceived threat to her “individual distance” or that of her cubs. Defense of a food supply is another cause of confrontation between humans and bears. Grizzly bears may defend a kill or carrion out of perceived need.

Predaceous attacks on humans by grizzly bears are exceedingly rare (although they have been documented). Although grizzly bears are the more aggressive species and more likely to cause injury to people, predaceous attacks on people, although still rare, are more common among black than grizzly bears (Herrero 2002). Importantly, grizzly bears are much more likely to become aggressive toward people (with attendant risk of serious injury) if they have first become habituated (Albert and Bowyer 1991, Gunther and Wyman 2008, Gunther et al. 2018), or worse, become conditioned to seek out human food sources or other attractants of human environments (Mattson et al. 1992b, Herrero 2002, Herrero et al. 2005).

Habitats: biophysical characteristics

Grizzly bears do not use forested stands highly for foraging (Mace and Waller 1996, Mattson 1997b, Apps et al. 2004, Milakovic et al. 2012), finding most of their preferred forage in relatively open areas. They will use forested cover for resting (particularly in otherwise open areas, Blanchard 1983), and typically avoid open areas that are far from shrub, forest, or topographic cover. At a finer scale, some studies have shown grizzly bears to use edges between forested and open areas preferentially (Mattson 1997c, Stewart et al. 2013). Numerous studies have shown that grizzly bears tend to use burned areas and areas of high vegetation diversity, including avalanche chutes and areas characterized from remote sensing platform by what has been termed “greenness” (Waller and Mace 1997, Ramcharita 2000, Serrouya et al. 2011). Apps et al. (2004) documented preference for relatively high elevation, steep slope, rugged terrain, and low human access and linear disturbance densities. These landscapes also were comprised of more avalanche chutes, alpine tundra, barren surfaces, burned forests, and less young and logged forests. Riparian zones are often used both for foraging and travel (Servheen 1983, McLellan and Hovey 2001), particularly in otherwise open habitats (Aune 1994, Phoebus et al. 2017), a habitat relationship that has implications for human–bear conflict (Wilson et al. 2005, 2006; Eneas 2020). Relationships with forest productivity and some overstory species were positive at broader scales, while associations with forest overstory and productivity were negative at the finest scale.

Although grizzly bears may avoid intensively burned areas for few years after a fire, (Blanchard and Knight 1996, Podruzny et al. 1999), most studies have shown that they use burned areas preferentially, taking advantage of improved foraging substrate (Hamer 1999, Hamer and Herrero 1987, McLellan and Hovey 2001), and availability of preferred forbs (i.e., pink hedysarum roots; Pengelly and Hamer 2006) and shrubs (i.e., globe huckleberry; Martin 1983). Other forest disturbances (e.g., logging) can also set back succession in ways that are advantageous to plants important to grizzly bears (Nielsen et al. 2004, Kearney et al. 2019, Souliere et al. 2020), but the bears’ tendency to avoid humans, whose presence is typically greater where industrial timber harvest has occurred (or to suffer higher mortality if they do not) can compromise much of this advantage (Zager et al. 1983, Mace et al. 1999, Ciarniello et al. 2007, Berland et al. 2008, Nielsen et al. 2008, Apps et al. 2016, Proctor et al. 2019). Working lands where there are cleared patches of forest allow for early successional vegetation to flourish, such as shrubs, berries and grasses, thereby providing increased forage opportunities.

Habitats: human influences

Motorized access: Displacement and mortality risk

Historically, grizzly bear populations have done poorly when in close proximity to humans and have recovered in the most remote habitats (Ciarniello et al. 2007; Lamb et al. 2017, 2018). Although recent work has suggested that human infrastructure is an imperfect surrogate for actual disturbance (Corradini et al. 2020, Goodbody et al. 2021), most research has focused on the effects of motorized access on displacement of bears (Mattson et al. 1987, McLellan and Shackleton 1988, Kasworm and Manly 1990, Mace et al. 1996, 1999; Proctor et al. 2019). That said, not all grizzly bears respond to roads in the same way. High-use roads are avoided more strongly than low-use roads (Chruszcz et al. 2003, Mace et al. 1996); roads open to unlimited use are avoided more strongly than roads open to only occasional or administrative use (Wielgus et al. 2002). Since female bears, especially those with young cubs, tend to avoid male bears and most bears (notably including males) avoid using areas near roads, some females relax their avoidance of roads in order to lessen their chance of encountering males (Mattson et al. 1987, Chruszcz et al. 2003, Graham et al. 2010, Stewart et al. 2013, Boulanger and Stenhouse 2014). Thus, they may trade one dangerous risk (meeting male bears) for another (meeting people).

Apps et al. (2004) examined detection of bears at hair traps, Upper Columbia River Basin, B.C., as a function of human presence, along with other biophysical characteristics. They found a strong association of grizzly bear detection with terrain conditions that would inhibit human access and habitation: high elevations, steep slopes, and complex topography. Later analyses at a larger scale generally confirmed these associations (Apps et al. 2016).

Studies have shown that grizzly bear survival (Mace et al. 1996, Nielsen et al. 2008, Schwartz et al. 2010, Boulanger et al. 2013, Boulanger and Stenhouse 2014, McLellan 2015, Parsons et al. 2021) or density of bears (Linke et al. 2013, Lamb et al. 2018) is negatively correlated with density of motorized access routes. A nuance more recently documented is that many grizzly bears become more nocturnal (particularly in areas that are agricultural, rural, or both) where road density is high but actual road usage is low (Northrup et al. 2012, Lamb et al. 2020). Work by Chruszcz et al. 2003, and by Roever et al. 2008a,b showed that, in some cases grizzly bears actually appeared to prefer being near low-use roads—not because they were attracted to people or traffic, but because roads were themselves associated with habitat characteristics likely to yield better foraging (e.g., early seral communities created by logging).

Ecological traps can occur if attractants near roads bring grizzly bears from secure habitats to places where their survival rate is too low to overcome the advantages those attractants provide (Lamb et al. 2017).

Highways and crossing structures

Grizzly bears, particularly males (Chruszcz et al. 2003), are hesitant to cross high-volume highways (Gibeau et al. 2002, Waller and Servheen 2005), and highways generally are known to be a source of considerable mortality for them (Benn and Herrero 2002, Kaczensky et al. 2003). In the past 30 years, within the NCDE area of Montana, grizzly bear fatalities caused by vehicles have been clustered around US Highway 93 in the Mission Valley, US Highway 2 along the southern boundary of Glacier National Park, Highway 83 in the Swan Valley near Condon, Highway 200 between Potomac and Lincoln, and to a lesser extent, along the East Front north of the Teton River (Costello et al. 2020). Sawaya et al. (2013) and Ford et al. (2017) showed that grizzly bears preferred large overpasses to under- highway structures and their use patterns took some time to develop. Females with cubs appear particularly reluctant to use highway crossings, yet solitary grizzly bears and family groups are three and five times, respectively, more likely to use overpasses compared to underpasses when correctly designed (Ford et al. 2017). Adequate fencing is crucial for effectiveness of crossings structures. Rytwinski et al. (2016) found that crossing structures are ineffective at reducing large mammal road mortalities if fences are absent or are too short in length. The Wildlife Crossing Structure Handbook (Federal Highway Administration 2011) recommends that underpasses are a minimum of 40 feet wide and 15 feet high for grizzly bears.

Diet

The wide historic and current distribution of grizzly bears in North America, Europe, and Asia (from the Canadian Arctic to Mexico, from Scandinavia to Greece, and from Spain to Siberia) provides a preview of the dietary flexibility of the species. Although bears do have essentially the digestive system of carnivores and they do kill or scavenge animals to eat (Mattson 1997a, Hilderbrand et al. 1999a,b; Zager and Beecham 2006), with carnivory being more pronounced among male than female grizzly bears (Jacoby et al. 1999, Milakovic and Parker 2013), grizzly bears are successful omnivores, consuming a wide variety of plants and animals (Fortin et al. 2013, Gunther et al. 2014). In some areas they are largely herbivorous (McLellan 2011). Forbs (i.e., dicotyledons, or dicots) generally provide more protein and are more digestible than graminoids (Rode et al. 2001). Small-bodied grizzly bears can subsist on a more herbivorous diet better than large-bodied bears (Welch et al. 1997, Rode et al. 2001). Grizzly bears are opportunistic feeders and will prey or scavenge on almost any available food source, including ground squirrels, ungulates, carrion, and garbage. In areas where animal matter is less available, they may eat roots, bulbs, tubers, fungi, and tree cambium to meet protein requirements. High quality foods such as berries, nuts, and fish are important in some geographic areas. But grizzly bears diets are not random assemblages of whatever items are available; animals make judicious foraging choices that vary by sex and by age-class, as well as by item availability, and these choices affect reproductive success (Mattson 2000).

Upon emergence from their dens, most grizzly bears seek lower elevations, drainage bottoms, avalanche chutes (Serrouya et al. 2011), and ungulate winter ranges. Herbaceous plants are eaten as they emerge, when crude protein levels are highest. Throughout late spring and early summer, most grizzly bears living in mountainous areas follow plant phenology back to higher elevations. Bears inhabiting prairie environments will concentrate along riparian areas, eating fruits and berries on shrubby vegetation. In late summer and fall, there is a transition to fruit and pine nut sources, as well as herbaceous materials. During late summer and fall, a period termed “hyperphagia,” grizzly bears rapidly gain weight, attaining peak body mass just prior to hibernation. Conflicts with humans can increase during this period, particularly as grizzly bears are attracted to (and some may make temporary movements to access) carcasses and/or gut-piles from hunter-harvested ungulates (Green et al. 1997, Ruth et al., 2003, Haroldson et al. 2004, Ebinger et al. 2016, Van Manen et al. 2019). Because bears rely solely on their stored energy reserves during hibernation, this pre-denning weight gain is essential for reproduction and survival. Bears metabolize fat and muscle during the denning period.

Grizzly bears must not only maximize energy intake while minimizing the costs of acquiring that energy, but must also balance the macronutrients—protein, lipids, and carbohydrates—contained in their diets (Felicetti et al. 2003, Robbins et al. 2007, Coogan et al. 2014, Costello et al. 2016a). Due to their carnivoran digestive system, one might expect grizzly bears to maximize protein sources whenever possible (Rode and Robbins 2000, Robbins et al. 2007), and it is well established that bears with more access to high protein sources—e.g., salmon and ungulate calves—do grow larger and produce larger litter sizes than those with less access to such sources (Hilderbrand et al. 1999a,b; Robbins et al. 2004, López-Alfaro et al. 2015; Costello et al. 2016a; Matsubayashi et al. 2016); although McLellan (2011) provided evidence that the proportion of meat in diets was not correlated with population density in a study area lacking salmon. However, Erlenbach et al. (2014) found that when captive grizzly bears were offered salmon, beef, and other food options, they did not maximize meat consumption but consumed diets that averaged 17% protein by total metabolizable energy (22% by dry matter intake). That is, even given a chance to consume more protein, these bears allocated their intake of the three macronutrients more similarly to humans and mice than to other carnivores such as domestic dogs, cats, or mink. However, grizzly bears did consume lipids in higher proportions than other omnivores, and some of their preferred foods with high lipid content—e.g., whitebark (*Pinus albicaulis*) pine nuts, army cutworm moths (*Euxoa auxiliaris*)—are in decline throughout the Northern Rockies. Among wild bears in the GYE, Costello et al. (2016) found that diets tended to be higher in protein than the optimal levels suggested by Erlenbach et al. (2014), particularly in spring and particularly among males. That said, diets of female grizzly bears averaged about 20–25% protein during summer and fall periods (Costello et al. 2016a).

Erlenbach et al. (2014) also showed that bears with less access to lipid-rich diets used carbohydrate-rich diets with similar efficiency, although the time and energy required to process such small fruits as huckleberries may limit grizzly bears' body growth (Welch et al. 1997). In summary, Erlenbach et al. (2014) suggested that whenever possible, grizzly bears' food selection process tends to follow three broad rules: i) maximize energy intake while optimizing dietary protein content; ii) prefer lipids over carbohydrates in order to limit protein intake and increase energy density (lipids typically contain more calories per unit weight than carbohydrates); and iii) use digestible carbohydrates if lipids are unavailable or difficult to exploit.

Denning

Denning is the period during which a bear hibernates in its den. Generally, among grizzly bears in Montana, den entry can be from late September to early December, while den emergence can be from February to May (Haroldson et al. 2002, Graham and Stenhouse 2014). However, patterns underlying this generality have implications for conservation and management. The duration of denning is longer (starting earlier and ending later) in higher elevations and more northerly latitudes (Pigeon et al. 2016b).

Typically, the sequence of den entry and den emergence is as follows. The first to den are pregnant females, with about half having entered dens by the end of October and almost all having done so by the end of November (Haroldson et al. 2002). Other females (alone or with cubs or yearlings) follow, entering dens from mid-November to mid-December (Graham and Stenhouse 2014). Males enter dens slightly later than non-pregnant females. In spring, den emergence typically is in reverse order: Males (particularly sub-adult males) begin emerging as early as February in the Yellowstone area (Haroldson et al. 2002) and in late March farther north in Alberta (Graham and Stenhouse 2014), with almost all having emerged by late April. Females follow, with a few emerging in late March but most doing so in April. Females with newborn cubs tend to be last to emerge (Pigeon et al. 2016b), most in late April but some not until early May.

Den entry is also affected by food availability in autumn; Pigeon et al. (2016b) showed that in Alberta, grizzly bears entered dens later when berry production was high than when it was low. Den emergence in Alberta was also weakly related to spring temperatures, occurring earlier in colder springs than in warmer ones (Pigeon et al. 2016b). European brown bears subsidized by human food (in the form of feeding stations) spent considerably less time in dens than predicted given the latitude of denning (Krofel et al. 2016). The duration of hibernation in black bears is also shown to be decreasing—likely due to the lengthening growing season associated with climate change, as well as increasing provision of anthropogenic foods (Johnson et al. 2017). Combined, these studies suggest that we can expect somewhat shorter denning seasons among Montana grizzly bears in the future as the climate warms (Cross and Servheen 2010, Servheen and Cross 2010), particularly those bears with access to high-quality anthropogenic foods. That said, we expect grizzly bears in Montana to den for substantial periods annually because of the short growing season and related scarcity of foods during winter.

Population dynamics

Reproduction

Grizzly bears in Montana typically mate between May and July, and cubs are born in the den the following winter. Most litters are 1 to 4 cubs, with the average being 2. Male grizzly bears are sexually mature around 4.5 years of age, but larger, dominant males may preclude young adult males from siring many offspring. Reproductive intervals for females average 3 years (but can be longer or shorter), and animals that lose young before or during the breeding season may come into estrus and breed again that same year. The mean age when females produce their first cubs varies from as young as 4 to as old as 10 years, depending on population; in Montana, the mean has been reported as age 5.8—both in Yellowstone 1983–2001 (Schwartz et al. 2006b) and in the NCDE (Costello et al. 2016b). The mean age of when females produce their first cubs in the CYE is 6.3 years of age (Kasworm et al. 2021). Offspring typically remain with their mothers for 1 to 3 years before weaning in Montana (most typically at age 2 years), again depending on various factors. Grizzly bears are promiscuous: a male can impregnate multiple females within the same breeding season, while a female can bear offspring from multiple males within the same litter.

Survival

In the great majority of populations where survival rates and mortality causes have been studied, independent bears are most often killed by people (McLellan et al. 1999, Schwartz et al. 2003, McLellan 2015), whether by regulated hunting (where legal), by management removals, by vehicles, by self-defense, or by illegal killing. Only in the most remote populations are deaths more often natural rather than human-caused. Thus, except for these very remote areas, the probability of death is a function of proximity to humans and their infrastructure (Johnson et al. 2004; Schwartz et al. 2010; Boulanger and Stenhouse 2014; Lamb et al. 2017, 2020). However, from the perspective of population dynamics, the important question is not what kills individual grizzly bears (all die eventually), but rather how long they live before dying.

Most natural mortality occurs outside of the denning season. Among the primary sources of natural mortality among grizzly bears are other grizzly bears (McLellan 1994, Swenson et al. 1997b, 2001a,b; Schwartz et al. 2003). Adult males sometimes kill juveniles and adults are also known to occasionally kill other adults (McLellan 2005). Several authors believe some bears die during denning, especially following periods of food shortages associated with pollinator abundances and food resource availability.

Parasites and disease do not appear to be significant causes of natural mortality, but they may hasten the demise of weakened bears. Three cases of Montana grizzly bears infected with highly pathogenic avian influenza (HPAI) in the fall of 2022 have raised awareness of this potential source of mortality, but little is known about transmission routes. FWP will continue to test wild mammals that demonstrate symptoms consistent with HPAI infection. It is difficult to comment at this time on the significance of this disease to grizzly bear survival. Natural mortality during the denning period is not well documented.

Density dependence

Documenting density dependence in a long-lived, low-density species is very difficult, so it not surprising that only long-term studies have done so. That said, it is clear that reproduction and survival in grizzly bears, as in most well studied vertebrates, are negatively associated with population density. Where detailed information is available, relationships with density are indirect, being modulated by nutrition and intra-specific competition and aggression. Litter size has been shown to increase with the mother's access to high quality foods (Hilderbrand et al. 1999b, McLellan 2015), age (Gonzalez et a. 2012), and body condition (Keay et al. 2018); and to decrease with population size or density (Miller et al. 2003, Schwartz et al. 2006b, McLellan 2015. Increasing resource competition and/or population size is associated with older ages of first reproduction (Stoen et al. 2006, McLellan 2015, Keay et al. 2018) and longer intervals between successive litters (McLellan 2015, van Manen et al. 2016). Conversely, increasing access to high quality foods is associated with younger ages of first reproduction and shorter intervals between successive litters (McLellan 2015). Growth rate of cubs was shown to be related to body fat of their mothers when initiating hibernation (Robbins et al. 2012); offspring body weight, in turn, was shown to be a predictor of lifetime reproductive success (Zedrosser et al. 2013). Dependent offspring survival has been documented as being negatively related to population density (Miller et al. 2003, Schwartz et al. 2006c, Van Manen et al. 2014, Keay et al. 2018). Adult survival has not been documented as related to population density, but general pattens among long-lived mammals would not lead to an expectation that such a relationship would be found (Eberhardt 1977, Fowler 1987, Gaillard et al. 1998).

Regarding conflicts between humans and bears (of any species), numerous studies have shown an increase in such conflicts when natural bear foods are scarce, and a decrease when natural bear foods are plentiful (Johnson et al. 2015, 2018; Garshelis et al. 2017; evidence that bears near human settlements are not necessarily food-limited, or using these areas specifically to access human foods even if they do end up accessing such foods; Elfström et al. 2014a, b; Eneas 2020).

Climate change and grizzly bears

USFWS (2021) includes a summary of expected consequences of climate change on hydrology, vegetation, and fire in the U.S. Northern Rockies, as well as anticipated effects on grizzly bears. Here we will reference but will not reiterate that work. Documented and expected effects of climate change on grizzly bear denning are summarized in the above section on denning. A discussion of effects of whitebark pine decline in the Yellowstone area on grizzly bears is included in Part IV, under the summary of science used.

The direct effects of warmer temperatures on grizzly bear behavior, movements, and habitat use are still being researched. Pigeon et al. (2016a) demonstrated that ambient temperatures affected grizzly bear habitat selection, with the bears exhibiting some use of open habitats at night but avoiding those habitats during warm summer days. Rickbeil et al. (2020) found that, post-denning, grizzly bears in Alberta tended to become active sooner in years with early snowmelt. They also found, however, that the phenology of important food plants had advanced in tandem, lessening a concern that grizzly bears active so early in the spring would lack these food resources. Climate change is expected to alter the distribution and abundance of vegetation formations that provide grizzly bear habitat for resting or foraging (Butler 2012). Climate change, directly or indirectly, will also alter the geographic distribution of many plant species used by grizzly bears (Holden et al. 2012, IGBST 2013, Roberts et al. 2014). The best studied example is the decline of whitebark pine caused by blister rust (*Cronartium ribicola*) and mountain pine beetle (*Dendroctonus ponderosae*) which has been ongoing for decades, and which is expected to be exacerbated by continued climate change-induced effects (Fortin et al. 2013, Hansen and Phillips 2015, Buotte et al. 2016, Shanahan et al. 2016).

The relevant questions here are i) what effects, if any, such changes in plant distribution and abundance will have on the nutritive state of individual grizzly bears (Lopez-Alfaro et al. 2015) and, by extension, on the ability of their populations to remain stable; and ii) whether summer drought conditions, projected to become increasingly common, will cause grizzly bears to seek succulent forage closer to humans, thus increasing the likelihood of human–bear conflicts. Roberts et al. (2014) projected that most plant species used by grizzly bears in the Canadian Rocky Mountains will remain relatively stable or will increase in areal coverage under likely future climate change. Elevations of most species are projected to increase, but only two species known to be used by grizzly bears would "run out of room" from this elevational increase, and neither of these—grouse whortleberry (*Vaccinium scoparium*) and black crowberry (*Empetrum nigrum*)—is a preferred food for grizzly bears.

Ransom et al. (2018) studied potential grizzly bear food items in the North Cascades and projected the following effects in the event of future climate change: While some plant species—e.g., glacier lily (Erythronium grandiflorum) and horsetails (*Equisetum species*), which prefer mesic soils—would decline, such other key food items as huckleberry (*Vaccinium species*) and sweet vetch (*Hedysarum species*) would either increase in abundance, move upward in elevation (potentially drawing grizzly bears away from conflict with people), or both.

In contrast, Prevéy et al. (2020) projected a decline in habitat suitability for mountain huckleberry (Vaccinium membranaceum) within its North American distribution, although most of the decline seems to be situated on the periphery of current or prospective grizzly bear distribution in Montana.

Currently, a consensus among biologists is that, although climate change is real and its effects are uncertain, grizzly bears have the advantage of being omnivorous and adaptive, and thus well equipped for change (Cross and Servheen 2009, Servheen and Cross 2010). The primary concerns associated with climate change are whether the adaptations the animals can make will put them at greater risk of conflict with humans, a possibility that management has some ability to mitigate.

History of grizzly bears in Montana

Before 1800, grizzly bears were undoubtedly common in Western Montana. With newly acquired access to firearms by indigenous people and westward expansion of settlers, bears began to be impacted. With no mechanisms to provide protection or management, almost without exception the bears' numbers declined where humans and bears came together for any length of time. The decline of the grizzly bear took less than 60 years, from the end of the trapping era in 1840 to the turn of the century. The decline was due to a number of factors, including: a reduction of prey because of market hunting associated with gold exploration and mining; subsistence hunting associated with gold exploration and mining; construction of railroads, homesteading, and predator control; and loss of habitat related to ranching, farming, and human settlement. Much of the killing was based on the feeling, and in some cases fact, that the grizzly bear posed a threat to people and livestock.

By the 1870s, grizzly bears had disappeared from western states and by the 1880s they had been extirpated from prairie river bottoms. In fact, by the turn of the century, they had disappeared from most broad, open mountain valleys. Fifteen years later, most foothill country lacked grizzly bears.

Grizzly bears were never extirpated from Montana, but their numbers probably reached their lowest levels in the 1920s. At that time, changes were made out of concern for the future of the species including designating grizzly bears a "game animal" in 1923, the first such designation of the species in the lower 48 states. This change, together with early prohibitions on the use of dogs to hunt bears, outlawing baiting (both in 1921) and closing seasons, allowed grizzly bears to survive in portions of Western Montana.

Sidebar 6. Part A of "How many animals are enough?" Simulation models

Though we wish we could, none of us can accurately predict whether a given wildlife population will still exist at some point in the future. We can only say that, for instance, a bigger population is more likely to persist indefinitely than a smaller one. But exactly how big is big enough to attain such persistence? Answering this question would require accurate documentation of animal population sizes over at least several centuries—in other words, data that we have not yet accumulated—and since we lack such data, biologists must substitute models instead.

These models may be either computer simulations, or theoretical calculations (generally to examine the genetic consequences of small population size). In the former, populations are represented numerically and projected over long spans of time, under varying conditions, to see how long it takes before some of the simulated populations go extinct. We'd like to manage for a population large enough that these simulated extinctions are quite rare. Mark Shaffer, a pioneer of this approach, used the analogy of an industrial stress test, in which the modeled population is deliberately exposed to various conditions to see how it responds, much like an industrial product is exposed to extreme environments to see how well it lasts.

Such an approach is informative, but limited when applied to real-world wildlife management. The industrial stress-test analogy says, in effect, "Let's take this population in its current state, put it in a dark room where nobody can intercede, lock the door, run time forward for a few hundred years, and then return, open the door, and see how it did." Thinking of it this way, some characteristics of simulation modeling may become clearer.

First, the simulation results are a projection, not a prediction. In a projection, we take known current conditions, assume they will remain true for years far into the future that we cannot yet see, and—based on those assumed conditions—imagine what we believe will be some likely outcomes. However, projecting current conditions forward in time is like projecting a small bit of celluloid film onto a big movie screen: every detail is exactly what was on the original celluloid, except bigger. The screen merely enlarges the film; it cannot create any new information. By contrast, true prediction is based not on known current conditions but on unknown future ones; and since those are unknown, true prediction actually cannot be done.

Second and relatedly, a simulation procedure doesn't allow people to monitor and, if needed and feasible, adjust conditions as the population under stress varies in size or resilience. Most populations that "go extinct" in such simulations do so only after a few years in which they have been quite small. In these models, there are no simulated managers or concerned citizens who could take remedial action to save the situation before it's too late. Instead, we remain ignorant of the increased danger that (some of) the populations are exposed to until we return to the locked room years later to examine the wreckage. This is not quite the situation facing a society invested in conserving the species.

Third, there is rarely enough data about a population to be confident that the simulated version reflects reality. In particular, most models assume that, on balance, births and deaths stay in long-term equilibrium. (If births outnumbered deaths continually, even a small population would quickly increase toward infinity; while if deaths outnumbered births continually, even a large population would quickly decline to extinction. In neither case would the model address the question we're asking.) The only two ways to accomplish this equilibrium are i) to use unvarying (i.e., density-independent) birth rates that exactly balance unvarying (density-independent) death rates, such that any deviation from this finely tuned, knife-edge balance will tilt the population upwards or downwards; or ii) to devise a set of (density-dependent) birth and death rates that respond to the population's position compared with its carrying capacity. But we almost never know a population's true carrying capacity, nor exactly how its birth and death rates may change as it moves toward, or away from, abundance (it turns out both of those factors matter quite a lot).

Finally, it is sometimes claimed that such modeling, though imperfect, is at least objective and "scientific"—i.e., independent of, say, human hopes or fears regarding the population's survival. But upon close inspection, this claim also fails. This kind of simulation modelling can only tell us a probability of persistence (or, its mirror image, extinction) over some given time period, and is typically expressed by the quantitative objective "x% chance of extinction within y years." But science cannot tell us what numbers to choose for x and y. Rather, this objective attempts to articulate and quantify a value assumed by the modeler. What probability of extinction are we willing to accept? And how many years do we consider sufficient for a "stress test" type? (It is a mathematical fact that the more simulation years to which one exposes a modeled population, the more likely extinction becomes; that is, given enough simulated years, almost any population would eventually go extinct.) These are values questions that science alone can't answer.

Modelers, like the general public, are free to propose for study any given set of acceptable risks and timeframes except one: They cannot mathematically estimate the population conditions needed to render the chance of extinction zero, forever.

If we try to ignore the fact that someone's values are always an integral part of the modeling process (not necessarily a bad thing), then we don't fully understand modeling.

Sidebar 7. Part B of "How many animals are enough?" Two rules of thumb

Here we'll use genetics to revisit the question of "How many animals are enough to ensure long-term persistence?"

One approach is modeling, which we explored earlier. A second approach is to focus on minimizing the erosion of genetic diversity within a small, isolated population, since such erosion could render the population unable to evolve, if needed, to future conditions. We know that in general, larger populations have more genetic diversity — i.e., more options available from which to develop adaptations to differing conditions — than smaller ones. But how large is large enough to maintain the needed evolutionary potential? We don't have the luxury of observing a variety of wild populations, subjected to changing conditions over time, to see which ones successfully coped and which did not. Instead, we must depend on theory, augmented by well-considered simulation models. Accordingly, below we will explore what might be called "the two rules of thumb."

The first rule of thumb is the long-term rule of "500 animal effective population size." It comes from geneticist Ian Franklin, who postulated in 1980 that a population of 500 animals would be large enough to allow beneficial mutations to indefinitely balance genetic erosion (in particular, "genetic drift"), and thus was a useful response to the question of "How many are enough to retain [long-term] evolutionary potential to cope with future change?" This theory has since met some scientific dispute (Jamieson and Allendorf 2012, 2013 and Frankham et al. 2013), but FWP agrees with Jamieson and Allendorf (2013) that it can be useful in considering long-term needs for population size. Importantly, however, the 500 number refers to the "effective" population size (or "Ne" for "Number, effective"), not to the exact number of animals (or "Nc" for "Number, census"). The Ne size is defined as that which will lose genetic variability at the same rate as an "ideal" population. An "ideal" population, in turn, is defined as one which has discrete, non-overlapping generations and virtually no annual variations in size, and in which there is random distribution of each animal's genetic contribution(s) to the next generation (i.e., by what is called a Poisson distribution). In nearly all wild populations, the Ne is smaller than the Nc; thus, to satisfy Franklin's rule of thumb, more than 500 animals would be needed.

What is the relationship between Ne and Nc in grizzly bears? Harris and Allendorf (1989) reviewed various equations relating these 2 quantities and created simulations of grizzly bear populations. They concluded that—based on demographics and breeding structure—Ne was likely to be in the range of 0.24–0.32Nc, depending on assumptions used, and suggested that a population of about 1,560–2,080 was needed to meet Franklin's criterion. Since then, advances in genetics and theory have allowed better, more data-driven estimates of Ne for the greater Yellowstone grizzly bear population. Kamath et al (2015) estimated that the Ne/Nc ratio had, in recent years, been between 0.42 and 0.66 (suggesting that from 760 to 1,190 bears would be needed to satisfy Franklin's rule of thumb). Regardless, the long-term need for occasional genetic interchange between geographically discrete grizzly populations has not seriously been questioned by biologists (and is not questioned by FWP).

The second rule of thumb, "one migrant per generation" (OMPG), addresses a related question: If an isolated population is reachable by occasional migrants from another (presumably larger and more genetically diverse) population, then how many migrants are needed, and how often, for the entire assemblage to remain genetically secure and to retain any adaptive divergence.

Decades earlier, Sewell Wright (1931), one of the founders of modern conservation genetics, had proposed that under a number of simplifying assumptions, just one migrant per generation (OMPG) would be sufficient to prevent loss of heterozygosity and allelic diversity within a vulnerable subpopulation while still allowing it to respond adaptively to local conditions—and that this single migrant per generation could do the trick for a population of any size. The reason for this counter-intuitive postulation derives from fact that in a small population, one migrant would provide a relatively large infusion of genetic material, while a large population would have less need of the immigration because of its already larger gene pool. A number of simulation studies later confirmed that this OMPG rule of thumb maintained its validity under a variety of assumption violations typical of real-world populations (Mills and Allendorf 1996, Wang 2004), and thus that one migrant per generation, or maybe just over one, remained a useful long-term goal. A genetic metric to reflect the balancing between assuring that the target population would maintain its evolutionary potential while still maintaining necessary local adaptations is called FST--which under OMPG would, after a sufficient number of years, equilibrate at 0.2.

Of course, in the OMPG theory, each migrant must be "effective"—i.e., after entering the vulnerable population, it must contribute to the gene pool by breeding with a resident.

What about the 'G' in OMPG? How long is a generation for grizzly bears? Using methods similar to those used to estimate Ne for Yellowstone grizzly bears, Kamath et al. (2015) estimated a generation to be at about 14 years. The generation interval in the NCDE and CYE population is believed to be 14 years. To date, we have no evidence that any migrants, effective or otherwise, have made it from the NCDE to GYE area populations. Haroldson et al. (2010) estimated that, at the time, FST was just under 0.1; however, given the lack of migrants, it is likely that this level of similarity is the legacy of historic connectivity.

Current status of identified grizzly bear populations in Montana

Yellowstone area – including parts of Wyoming and Idaho

Abundance and trend

In the GYE, counts of females-with-cubs from systematic and opportunistic sightings are used to monitor population trend and these data are combined with demographic data to estimate total population size. Females-with-cubs are an easily identifiable segment of the population, and are assumed to track total population numbers, given that they represent the reproductive segment. A distance rule and individual characteristics are used to differentiate sightings into a minimum count of unique females-with-cubs and then the Chao 2 estimator is applied to observation frequencies to estimate the total number of females-with-cubs, including unobserved mothers. Total population size is extrapolated by applying ratios of females-with cubs to other sex and age categories (as estimated from population modeling with observed vital rates). Under this original "Knight-Chao" method, generous distance criteria were used to differentiate unique females, resulting in conservative estimates known to be increasingly biased low (Schwartz et al. 2008). An unbiased mark-resight approach, using marked females-with-cubs and systematic observation flights to estimate total numbers of females-with-cubs, was also used, but as it suffered from poor precision, it failed to provide good information about population trend. In 2019, the Knight-Chao method yielded an estimate of 66 total females-with-cubs, corresponding to a total population size of approximately 737 bears within the Yellowstone DMA. The mark-resight method yielded 75 females-with-cubs, corresponding to roughly 840 bears. Importantly, the mark-resight method excluded highly visible females-with-cubs feeding on aggregations of army cutworm moths, which in 2014 and 2015 numbered roughly 20% the estimate of those observed beyond moth areas. Thus, this unbiased method suggested total population size of perhaps >1,000 bears within the DMA.

In a thorough re-assessment of protocols used to estimate population sizes from observed females-with-cubs, IGBST (2021) considered both the distance rule used to differentiate "unique" females, and the statistical approaches used to obtain each years' best estimate and to infer population trends from a time series of such counts. An objective of this work was to move from an algorithm that prioritized minimizing false positive identifications of females-with-cubs (ensuring under-estimates rather than over-estimates of true abundance, but at the cost of decreasing sensitivity to changes in abundance with true population increase) to one that balanced the objectives of accuracy (thus increasing sensitivity to true population change) with minimizing the probability of over-estimation. IGBST (2021) recommended that this balancing was best achieved by revising the distance rule (by which females-with-cubs were considered unique) from 30 to 16 km. This revision reduced under-estimation bias considerably, while limiting to probability of any given year's estimate being biased substantially high to between 3% and 12%.

Additionally, the IGBST, working with University of Montana collaborators, has developed an integrated population model (IPM) to further enhance the estimation of total population size in the GYE. The IPM will replace the refined Chao2 (IGBST 2021) as the best available science for estimating the GYE population. An integrated population model mathematically integrates annual count data with a traditional population projection model that estimates the change in population size from one year to the next using sex- and age-specific survival and reproductive rates. With adoption of the IPM, the IGBST has recalibrated prior year population estimates so they are comparable over time, and vital rates and demographics for the GYE population may now be reviewed annually so that managers are able to make appropriate adjustments to mortality rates. This approach is well suited to the GYE grizzly bear monitoring program because, since 1983, the IGBST has not only obtained annual estimates of females-with-cubs (i.e., count data), but has also obtained data on survival and reproduction rates by monitoring a sizable sample of radio-marked bears. By utilizing all of these historic and ongoing data sources simultaneously, the IPM approach is expected to lead to better total population estimation and better insight into population trend. Additionally, by examining model output with and without certain data inputs, the IPM can be used to evaluate which data sources are most important for estimation of population size and trend and will allow for additional data sources or modules in the future. In 2022, the Chao2 estimate based on implementation of the 16-km distance criterion was 60 females with cubs within the DMA, from which a total population size of 965 bears was estimated using the IPM (95% credible interval: 819 - 1,112). Using the IPM, the median population growth rate from 2021 to 2022 was $\lambda = 1.03$. Decadal annual growth rates were 1.03 during the 1980s, 1.058 during the 1990s, 1.023 during the 2000s, and 1.009 during the 2010s (Gould et al. 2023).

We have less information about abundance of grizzly bears in the Yellowstone area beyond the DMA boundary because the systematic surveys for females with cubs are not conducted beyond the DMA. During the years 2012–2019, the number of females-with-cubs estimated outside the DMA averaged about 7% of the number estimated within the DMA and other information suggests that males are disproportionately represented among bears outside the DMA.

Ecological status

The preponderance of evidence is that grizzly bears are in approximate equilibrium with the ability of natural habitats to sustain them within Yellowstone National Park and most of the largely wild areas in Wyoming, Idaho, and Montana surrounding it (for references, see Part IV under the summary of science used). Population growth within the 49,931 km^2 (19,278 mi^2) GYE DMA defined by the USFWS has evidently slowed from the rate estimated during the 1980s, 1990s, and early 2000s. Within the DMA, the survival rates of adult grizzly bears have approximated those during the earlier period of rapid increase. However, cub production and juvenile survival during 2002–2012 were lower than during 1983–2001. These latter vital estimates were shown to be negatively associated with estimated grizzly bear density, as was female home range size. These factors, in addition to the slowing of population growth within the DMA, have led to the consensus conclusion that proximity to long-term carrying capacity have led to density-dependent effects being observed on the population scale.

In the Yellowstone area, some of the grizzly bear's historic food resources (particularly whitebark pine seeds and cut-throat trout) have declined and may continue to decline in the future. This may, in time, reduce the long-term capacity of the area to support grizzly bears. However, to date, grizzly bears have been able to adjust their diet and continue to reproduce successfully, producing offspring that can survive to adulthood and reproduce in turn.

Habitat and range expansion

As of 2019, grizzly bears had expanded their area of occupancy to include almost all of the suitable habitats within the boundaries of the DMA. As of 2015, about 27% of the total area of "estimated occupied range of grizzly bears" was beyond the DMA boundary. By definition, we know less about the abundance of bears beyond the area where monitoring of females with cubs occurs, but it is likely that density is lower than closer to the more strictly protected core area (at least in part due to lower survival resulting from greater proclivity to conflict with humans), and that the gender balance disproportionately favors males. Within the area designated by the USFWS as the RZ, human access, availability of attractants, and other industrial or commercial activities that tend to displace bears are limited to the point where they are unlikely to cause negative population-level effects. Human access and incompatible activities are less strictly controlled beyond the RZ and ultimately will limit grizzly bear density but—we believe—will not preclude occupancy that is sufficient to provide a population buffer, as well as connectivity to other grizzly bear populations.

Mortalities

In the Yellowstone area, the vast majority of deaths among grizzly bears over age 1 have been caused, directly or indirectly, by humans, more than half by agency staff following human-bear conflicts.

FWP's view is that human-caused grizzly bear deaths are an unfortunate but inevitable result of an expanding bear population that is increasingly closer to agriculture, livestock, residences, and suburban areas. Only the most sparsely populated portions of North America have enough space between humans and bears to keep conflicts to a minimum. Thus, even the relatively large, secure areas of the U.S. Northern Rockies are too small to fully immunize grizzly bears against the risks associated with human populations.

This does not, however, mean that these secure areas are too small to provide the cores needed for grizzly bear populations to slowly increase, and thus to add dispersers to connectivity areas that eventually allow for an interconnected metapopulation. From the perspective of population dynamics, the question is not how grizzly bears die, but rather how long they live before dying. To date, mortality rates have not been so high as to produce a long-term population reduction or to deter continued geographic expansion. Still, each human conflict-related grizzly bear death is unfortunate and FWP, along with other government agencies and non-governmental organizations (NGOs), have made and will keep making strong efforts to prevent, reduce, and mitigate human–bear conflicts. These efforts are the most effective way to reduce human-caused bear mortalities.

Genetics, isolation, connectivity

Grizzly bears living in the Yellowstone area have been isolated from other grizzly bear populations for over 100 years, raising concerns over the genetic effects of small population size. No immigrants into the Yellowstone area population have been documented and both heterozygosity and allelic diversity are among the lowest of North American grizzly bear populations for which data are available. However, these two metrics of genetic diversity declined only very slowly, if at all, from 1985 to 2010. Based on direct estimates from genetic data, the rate of inbreeding has been very low since 1985, and no physiological, behavioral, or demographic effects associated with, or indicative of, inbreeding have been detected. Importantly, compared to estimates from 1910–1960, estimates from 1985–2007 indicate that effective population size (the summary metric best suited to consider genetic effects) has continued to increase, and is well above the level where the short-term effects of reduced genetic diversity would be expected. Currently, all indications are that Yellowstone grizzly bears are genetically well adapted to their existing environment and facing no immediate threat related to population genetics.

However, from a genetic perspective, the Yellowstone population is sufficiently small that isolation from other populations poses risks for long-term viability exceeding 100 years. Although no genetic issues currently limit the ability of grizzly bears in Yellowstone to survive and reproduce normally, their ability to respond evolutionarily to unknown future challenges, including environmental ones, may be limited by low allelic diversity combined with isolation. Thus, introduction of genetic material from other grizzly bears is ultimately required to reduce long-term risks associated with the loss of allelic diversity in the Yellowstone grizzly bear population.

Best estimates are that this long-term genetic risk can be ameliorated by the effective migration into Yellowstone of as few as 1–2 animals per generation (with a generation considered to be about 10–15 years) if continued indefinitely into the future. Thus, genetic connectivity is required over the long-term, but such connectivity can be thought of as a slow and continuous trickle of bears rather than a sudden and dramatic increase of gene flow.

Recent geographic expansions of Yellowstone-area grizzly bears in a northwesterly direction and of NCDE-area grizzly bears in a southeasterly direction, have increased the probability of natural genetic connectivity in the future. A major impediment to achieving connectivity is the rapidly increasing human development associated with Interstate Highway 90 and with other major transportation arteries (see the beginning of Part III, on the geographic setting of the thirty focus counties in Western Montana). Thus, increasing the ability of humans and bears to safely share the Montana landscape is the great challenge that FWP intends to meet.

Northern Continental Divide area

Abundance and trend

Using mark-recapture analyses—with marks being DNA recovered from hair—Kendall et al. (2009) estimated the 2004 population of grizzly bears within their 33,480 km^2 survey area as 765 (95% CI = 715–831). Mace et al. (2012) used vital rates (e.g., birth, death, and migration rates) from bears monitored during 2004–2009 to estimate λ, the annual rate of growth, as approximately 3% per year (1.031; 95% CI = 0.928–1.102). Projecting this rate of growth to the estimated abundance in 2004, they estimated population size (including some areas adjacent to the NCDE area) at greater than 1,000 in 2009. Costello et al. (2016) used similar methods in updating the rate of growth during the 2004–2014 period. Depending on how the analysis handled independent females whose fates were undetermined, λ was estimated as 1.020 or 1.027 (with a mean of 1.023). Stochastic simulations yielded a similar mean, with 95% confidence limits of 1.015–1.029. These analyses suggested a 2014 population size of 960 bears (95% CI = 946–1,089). Independently, and using mark-recapture and DNA approaches similar to those of Kendall et al. (2009) but in a spatially-explicit framework, Kendall et al. (2019) estimated λ during 2004–2012 within their 33,300 km^2 study area as 1.043 (95% 1.017–1.069), although it was slightly higher for females than for males. In 2018, a predicted population projection, assuming 2004-2014 vital rates within the DMA, estimated that the population would increase from 1,068 bears in 2019 to 1,163 bears in 2023.

Habitat and range expansion

Using methods similar to those developed by Bjornlie et al. (2014a), the “estimated occupied range of grizzly bears” in the NCDE area increased from 1994 to 2018, when it was estimated to be over 60,000 km^2. The percentage of the “estimated occupied range of grizzly bears” beyond the DMA boundary increased from about 15% in 2004 to over 35% in 2018. Most of this spatial expansion occurred in an easterly direction and a substantial portion also occurred along the eastern frontier of the NCDE population's core. Although grizzly bears far east of the mountains in agricultural areas can avoid conflicts with humans by restricting their movements to riparian areas, they are likely to conflict with human use beyond those linear areas, either by foraging on growing or spilled grain or by seeking shelterbelts or shady areas for daybeds (Skuban et al. 2018) which are typically situated near houses and other structures used by people. By 2018, more of the NCDE population's "estimated occupied range of grizzly bears" was on private land than was on public land.

Genetics, isolation, connectivity

Unlike in the Yellowstone, Cabinet-Yaak, and Bitterroot areas, we have very little short- or long-term concern about the genetic health of the Northern Continental Divide area bear population, not only because the metrics of genetic diversity provide no reason for concern but also because this population is connected to, and fortified by, Canadian populations to the north. Expected heterozygosity among selected genetic microsatellites in NCDE bears (Kendall et al. 2009, Mikle et al. 2016) was above the mean expected for that latitude (Proctor et al. 2012: 16) and was similar to that observed in large, connected populations in northern British Columbia. Kendall et al. (2009: 10), in noting genetic discontinuities among sections of the NCDE population, pointed out that these differences were similar to those observed between NCDE bears and those in the Prophet population of northern British Columbia, some 1,150 km distant. With population growth and expansion, genetic diversity within the NCDE has increased (Mikle et al. 2016).

Proctor et al. (2012: 25) considered NCDE grizzly bears north of US Highway 2 to be within the same genetic grouping as those in Alberta and British Columbia south of Canada Highway 3—which Proctor and Morehouse (2021) estimated as numbering approximately 210 bears. Although it would be naïve to view grizzly bear populations on the Canadian side of the border (or those north of Highway 3) as a reliably unending and problem-free connection all the way to the Yukon, there does appear to be sufficient connectivity to provide for occasional genetic exchange. On the British Columbia side, density of grizzly bears in the upper Flathead drainage (studied for over 40 years) has varied, largely in response to huckleberry abundance (McLellan 2015); yet it was among the highest recorded among southern interior grizzly bear densities during the late 1990s, and even at its lowest ebb it was comparable to densities estimated in the NCDE area. In the Castle Bear Management Area (between Alberta's southern border and Canada Highway 3), which faces issues similar to those on Montana's East Front, density was estimated as approximately 20 bears per km^2 in the "core" conservation area and 17 per km^2 in the adjacent Support Zone (Morehouse and Boyce 2016c), similar to recent estimates in the NCDE area, and was probably growing slowly.

Although Proctor et al. (2012) showed that Canadian Highway 3 reduced demographic connectivity among bears on either side of it, their Fig. 9c also showed considerable genetic overlap among genetic signatures of bears north and south of the highway (with most such overlap produced by male migration, but some caused by relocation of conflict bears north across Highway 3). Efforts are currently underway to reduce the limitations placed on grizzly bear movement by Highway 3 (Proctor and Morehouse 2021). In turn, these southern Canadian populations, while affected by highways and development that constrict connectivity and facing conservation challenges of their own, are not entirely isolated genetically from populations further north.

Cabinet-Yaak area

Abundance and trend

The population of grizzly bears in the CYE, although slowly increasing, remains small. As of the end of 2021, approximately 60–65 grizzly bears were estimated to inhabit the CYE (including 4 translocated as part of the augmentation program), with slightly more than half of these in the Yaak portion of the area. Fourteen of the 22 bear management units within the USFWS recovery area were occupied by females with young for at least one year during 2016–21 (10 in 2021). The population was estimated to have grown at a rate of approximately 1.9% annually between 2012 and 2021, albeit with considerable uncertainty (Kasworm et al. 2022). While reproductive rates have been comparable to other grizzly bear populations in Montana and elsewhere in the Rocky Mountains, adult female survival rates have only risen to a level supporting population growth in the years since 2007.

Beginning in 1990, concerns about low population size led to a program called "augmentation"—meaning the augmenting of a bear population by adding a new bear from outside it. Under this program, grizzly bears occasionally were moved from other areas into the Cabinet portion of the CYE. From 1990 to 1994, the USFWS augmented the CYE with an initial 4 bears (3 of which remained for over 1 year) from British Columbia and from 2005 to 2019—after FWP began cooperating with USFWS on this program in 2005—another 18 (10 females, 8 males) from the Flathead River drainage. Of these 22 total bears, 16 stayed at least 1 year, while 5 (3 females, 2 males) are known to have produced offspring in the area and 7 are known to have died. The 3 females have produced at least 15 cubs, who in turn are responsible for at least 23 2nd–generation offspring. The augmentation program is considered to have saved the Cabinet segment of the CYE population from extirpation (Kasworm et. al 2022).

Genetics, isolation, connectivity

Concerns about genetic diversity for grizzly bears inhabiting the Cabinet-Yaak area differ qualitatively from those for Yellowstone grizzly bears. Grizzly bears in the CYE are known to be susceptible to deleterious effects of inbreeding because i) the population size is small, and ii) most animals are descended from only a few males. Thus, the short-term effects associated with having an Ne of under 50 are relevant for this population. CYE bears have similar population genetics as those in the NCDE because of historic connectivity, as well as the recent augmentation of NCDE bears to the Cabinet Mountains. Thus, if the risk of inbreeding can be overcome, there is, unlike in Yellowstone, no particular concern for loss of alleles, putting the CYE population at risk of inability to respond adaptively to future environmental stresses.

In recent years, some male—and fewer female—grizzly bears from British Columbia population units called Yahk, South Purcell, and South Selkirk, as well as from the U.S. Selkirk and NCDE areas, have been documented as immigrating naturally into the CYE (Proctor 2018, Proctor and Morehouse 2021). Relatively little gene flow into the CYE has been documented (and, as of this writing, none from the NCDE or Selkirk areas). Four bears are known to have immigrated from the Purcell Mountains into the Yaak portion of the CYE, producing 14 offspring (Kasworm et al. 2022). Although contiguous with the Yaak portion of the CYE on the U.S. side, the Yahk grizzly bear population unit in British Columbia is small (estimated in 2005 to be about 20 bears, with a density of approximately 6.5 bears per 1,000 km^2), and little movement of females has occurred between it and the adjacent South Purcell unit north of Highway 3 (Proctor and Morehouse 2021). Efforts to increase the permeability of Highway 3 to grizzly bears (particularly females) could bolster the conservation prospects of the Yahk area (and, in time, the Yaak and potentially the Cabinet sections of the CYE), because the Purcell area is less affected by constraints to connectivity with larger populations to the north than is the Yahk area (Proctor and Morehouse 2021). However, home ranges that overlap different recovery areas (Cabinet-Yaak, Selkirk) and adjacent Canada (Purcell) have been documented, and the "estimated occupied range of grizzly bears" is uninterrupted between NCDE, Cabinet-Yaak, Selkirk, and adjacent Canada.

Bitterroot area

Due largely to its many miles of remote and protected habitat, the Bitterroot area (primarily in Idaho, but also extending east to the foothills of the Bitterroot Mountains in Montana) has long been identified as a priority area for grizzly bear recovery (Mattson and Merrill 2002, Roy et al., 2001, USFWS 2000). Merrill et al. (1999) identified the Idaho portion of the Bitterroot area as potentially suitable for grizzly bears. Extrapolating from Resource Selection Function models developed in Yellowstone and the Swan Mountain Range, Boyce and Waller (2003) projected that the Bitterroot Recovery Zone could potentially support over 300 grizzly bears. Using a more general predictive model, Mowat et al. (2013) predicted that the Bitterroot Recovery Zone could support over 400. Boyce et al. (2002) used theory and estimates of the potential population size in the Bitterroot to bolster the case that even a small population in the greater Bitterroot area would substantially buffer grizzly bears against complete extirpation in the U.S. Rocky Mountains, assuming low levels of dispersal among the NCDE, Cabinet-Yaak, and Bitterroot populations.

As of autumn 2022, there is not a population of grizzly bears in the Bitterroot system. However, individual animals have been documented within, or very close to, the Bitterroot system, including from the Cabinet-Yaak, NCDE, and Selkirk Ecosystem (Missoulian 2019, USFWS 2019, Kasworm et al. 2020, Nadeau 2020). Thus far, apparently these animals have left the area in one of three ways: they have naturally returned to their place of origin; they have been moved by management agencies; or they have been killed by humans. For example, a bear originally captured near Whitefish and placed in the Cabinet-Yaak area moved back and forth across Interstate 90 in two successive years, spending a few months during summer 2019 in the Bitterroot mountain range, before ultimately losing its tracking collar in the Whitefish range. Recent verified observations continue to suggest that a few individuals are present between occupied areas and the Bitterroot area each year. Evidence from GPS collars and genetic parentage of outlier bears suggests that male bears traveled distances greater than those required to move among grizzly bear core areas (Costello and Roberts 2022). However, in order for grizzly bear recovery to occur in the Bitterroot area, additional demographic connectivity from other populations, particularly for female bears who are unlikely to travel as widely as males, will be required.

The USFWS has embarked on a new EIS to address grizzly bears in the Bitterroot. Assessments conducted by Idaho Department of Fish and Game suggest low productivity and quality for potential grizzly bear habitat in the Lolo-Selway and Salmon River Regions (pers. comm.).

Additional background on issues and alternatives

Numerical objectives

FWP has developed numerical objectives, often specific to regions or hunting districts, for some species (e.g., elk) but not for others (e.g., mountain lions, mountain goats). Indices of grizzly bear abundance in the GYE and NCDE have been developed by the USFWS as part of assessing progress toward recovery and these form part of FWP's planning efforts. At recovered levels, the number of grizzly bears in Montana would be sufficient to assure long-term persistence, assuming continued habitat security and continued work to minimize human–bear conflicts. However, independent of requirements under the ESA and commitments to the two Conservation Strategies and understanding that some Montanans believe there are too many grizzly bears in the state and others believe there are too few, FWP views the grizzly bear as a species for which detailed numerical objectives would not be useful.

Distributional objectives and population connectivity

As mentioned elsewhere, FWP is a signatory to the two completed Conservation Strategies and is a member of the IGBC subcommittees for Montana's four Ecosystems (GYE, NCDE, SCE, BE). As such, Montana FWP has committed to do its part to achieve and sustain recovered grizzly bear populations in the 4 RZs. (FWP takes the position that grizzly bears in and around the GYE and NCDE areas have reached federal recovery goals).

However, a fundamental tenet of responsible wildlife management is to avoid managing for isolated populations that number as few as Montana grizzly bear populations currently do (and would into the foreseeable future). Thus, even if federal delisting rules were to eschew such considerations, FWP recognizes the value of providing functional connectivity between population cores. Connectivity in this sense should not be interpreted as requiring one seamless group of animals stretched across the various population cores; instead, occasional migrants among the cores will suffice and these can be provided by a long-term average density of bears that is lower than the density in the population cores. In grizzly bears, demographic connectivity may be achieved through the residency of females and males in the areas between sub-populations because female bears typically disperse shorter distances than males. Demographic connectivity can often be achieved by moving females. By default, demographic connectivity also achieves genetic connectivity (Costello 2020). Modeled pathways that harbor connectivity are primarily associated with mountainous areas and secondarily associated with rivers and streams in open valleys (Figures 17 and 18; Sells et al. 2023).

Figure 17. Prediction of female grizzly bear connectivity pathways in western Montana, summarized from 5 sets of directed (randomized shortest path) movement simulations using start and end nodes associated with routes of NCDE-CYE, NCDE-BE, NCDE-GYE, CYE-BE, and GYE-BE (Fig. 1). Class 1 = lowest relative predicted use, whereas class 10 = highest relative predicted use. Simulations were based on 46 individual iSSFs for NCDE females (Sells et al. 2023).

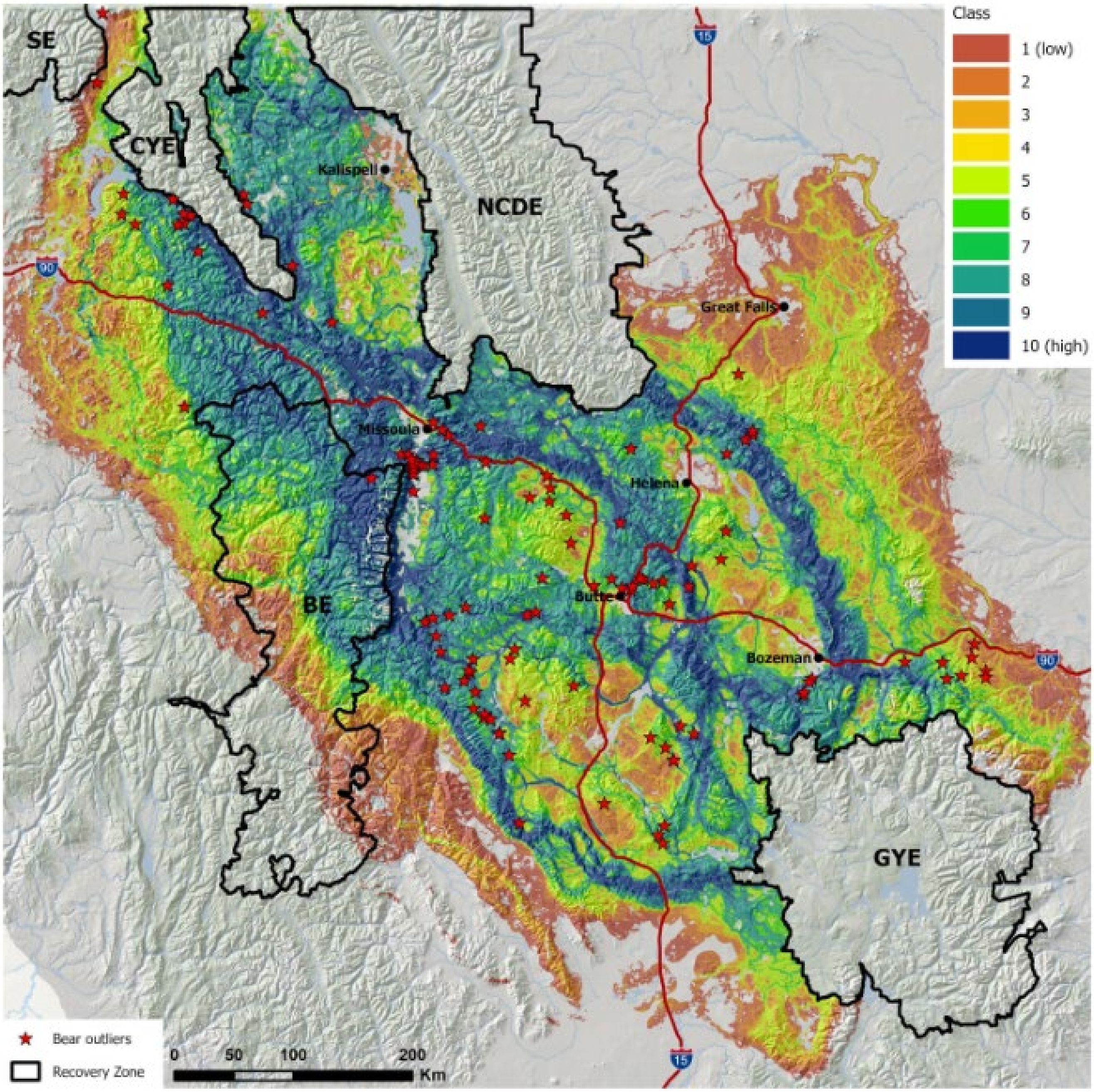
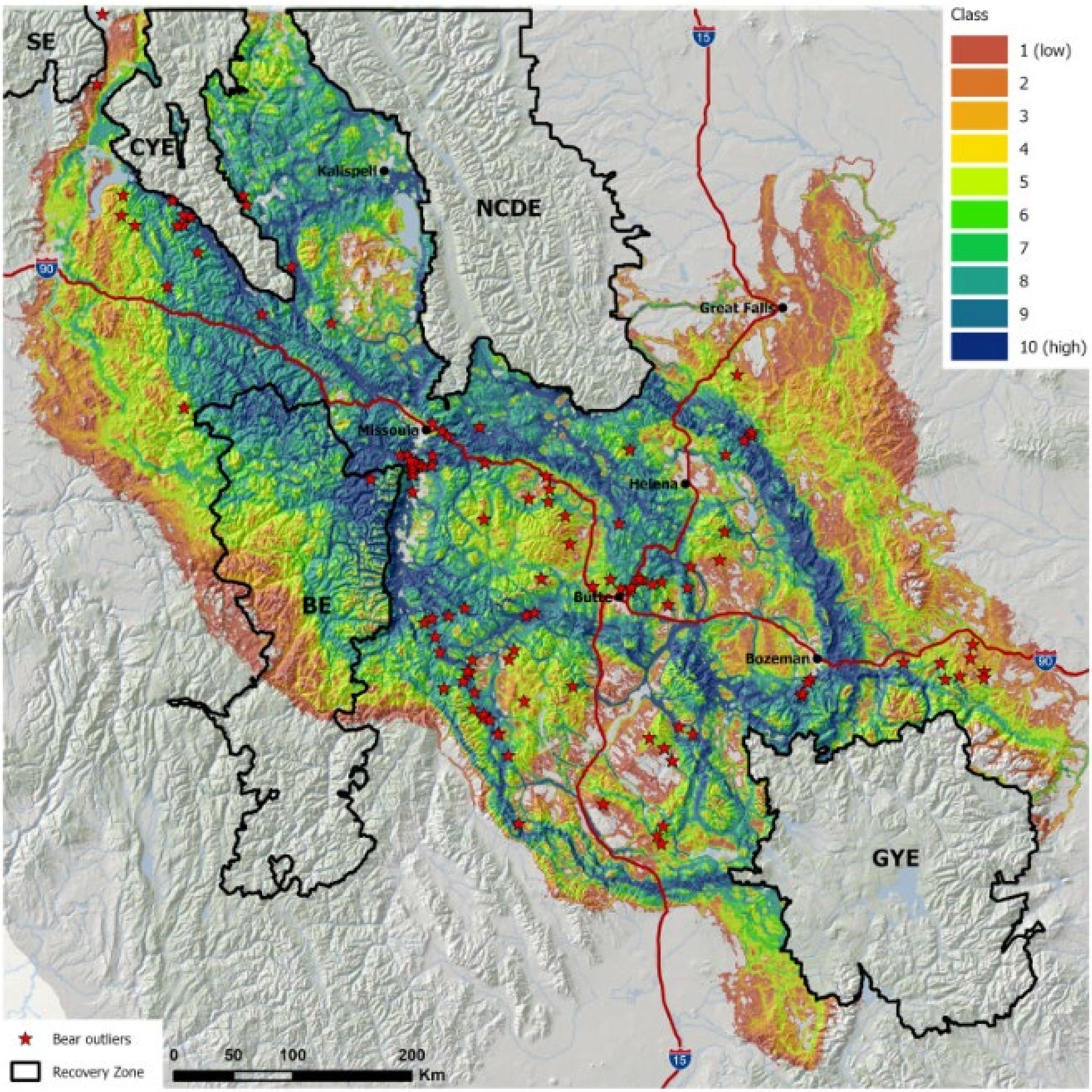


Figure 18. Prediction of male grizzly bear connectivity pathways in western Montana, summarized from 5 sets of directed (randomized shortest path) movement simulations using start and end nodes associated with routes of NCDE-CYE, NCDE-BE, NCDE-GYE, CYE-BE, and GYE-BE (Fig. 1). Class 1 = lowest relative predicted use, whereas class 10 = highest relative predicted use. Simulations were based on 19 individual iSSFs for NCDE males (Sells et al. 2023).



FWP recognizes that lands on which this connectivity would occur are not managed with grizzly bears as a recognized priority; public lands are more heavily roaded and used than are areas identified as “secure” by inter-agency plans, and human–bear conflicts on private lands must be avoided. FWP favors working with partners to gradually increase the capacity for coexistence (recognizing that this will require efforts from people and entail some suffering for bears), and remains optimistic that, long-term, the level of coexistence will provide for the needed connectivity. However, if connectivity cannot be achieved in this way, artificial connectivity (occasionally moving bears among cores) can be used to achieve the goal of increased genetic diversity.

Considering that the landscapes between secure areas are more heavily populated, developed, and traveled than are the cores that have supplied the engines of grizzly bear recovery, and that deaths of grizzly bears older than cubs are overwhelmingly caused by people, a reasonable question is whether this vision can work biologically. We can expect that, even with effective conflict prevention and public education about coexistence, grizzly bears will encounter a higher risk of dying (directly or indirectly) due to interactions with people, particularly in the areas between cores that are not subject to restrictions on human use (other than restrictions designed to reduce attractants). Will this higher mortality doom the efforts to allow for long-term connectivity? Or alternatively, is there a feasible future that acknowledges the inevitably higher risks for animals that are between core areas, while still providing the desired connectivity between those cores?

Population biologists use the term “source-sink dynamics” to describe populations overlaying some habitats that create conditions in which reproduction exceeds mortality and other habitats in which mortality exceeds reproduction (Pulliam 1988). A number of studies linking grizzly bear population dynamics to habitat conditions (particularly those highly influenced by human activity) have shown or postulated the existence of such source-sink dynamics (e.g., Schwartz et al. 2006d, 2012; Ciarniello et al. 2007). Although the presence of habitats in which additions fail to balance subtractions raises legitimate concerns about overall sustainability, readers should keep in mind that the source-sink concept was developed to explore conditions under which populations could persist in their presence. It would be erroneous, if understandable, to equate a population “sink” with an unstopped “drain” through which all the animals disappeared. Whether a population can persist in the presence of “sinks” depends on the strength and proximity of sources, the “depth” of the sinks, the proportions of the population using sources and sinks, and the details of movements and dispersal of individuals among them.

A related concept, sometimes conflated with source-sink dynamics, is that of an “ecological trap” (also termed an “attractive sink”). In this concept, habitats exist that not only provide insufficient safety or resources for animals’ recruitment to balance mortality but are also attractive to those animals (Battin 2004). That is, the evolutionarily developed cues that animals use to tell them where they’ll do well are no longer a good match for the existing conditions in these habitats; animals are “lured” in (perhaps from better habitats), as it were, despite these habitats not actually providing for their life requisites. For grizzly bears, human attractants in populated areas have the potential to create such ecological traps, at least at a local level. (For North American grizzly bear populations, see Northrup et al. 2012 and Lamb et al. 2017; for European contexts, see Steyaert et al. 2016, Penteriani et al. 2018.)

The distinction between the two concepts (source-sink vs. ecological trap) is important: grizzly bears in the U.S. Rocky Mountains can plausibly persist within a source-sink system but would likely be on a downhill trajectory if too many of the sinks became ecological traps. The primary way to prevent this would be to reduce or secure attractants to grizzly bears that are likely to ultimately result in their deaths. In contrast, the presence of a population sink doesn’t necessarily doom the overall population as long as the population trajectory within it isn’t too strongly negative, and the sink is close enough to sources that are, in turn, strong enough to maintain occupancy. That is, a patch of land may be a “sink” but may also, at the same time, serve to provide or enhance connectivity. Currently, FWP is not aware of ecological traps that are attracting grizzly bears from core habitats in recovery areas in a way that would pose a threat to population viability or other status.

An empirically based model of grizzly bear persistence in Western Montana

The most applicable examination of how source-sink dynamics appear to be operating for grizzly bears in Western Montana is that of Lamb et al. (2020). These authors used a large data set of grizzly bear studies in British Columbia (with almost 2,700 individual bears followed, either genetically or through telemetry, in 41 different studies) to understand how survival and reproduction varied by the magnitude of human influence on each individual landscape. In addition to finding (as other studies have) that grizzly bears tend to become more nocturnal when in closer proximity to humans and their infrastructure, Lamb et al. (2020) found that a freely available database called the "Human Influence Index" was a good predictor for the rate at which grizzly bears would die. This resource allowed them to develop a map that predicted the growth or decline of a given grizzly bear population in any given part of British Columbia. Lamb et al. (2020) summarized their findings as "a striking paradox of coexistence: The mobility of [grizzly] bears averts extirpation through demographic rescue, yet these same animals face considerable risk once they arrive near people…connectivity to wilderness is a critical mechanism of coexistence…bear density in human dominated landscapes often remains an order-of-magnitude lower than in wilderness areas…and would rapidly be extirpated without continual immigration… [and without] social tolerance for [grizzly bears], and creative solutions for coexistence." Note: "Wilderness" as used above is a general term referencing areas of minimal human influence, not necessarily equated with federally-designated wilderness under the U.S. Wilderness Act of 1964.

In the figures, we applied the model developed by Lamb et al. (2020) to Montana west of the Continental Divide (see Sidebar 8. for methods). These maps can be interpreted as providing insight into two important questions: i) If the "seed" of a population of grizzly bears has been initiated outside of a Recovery Zone, then according to the Lamb model, what would be that population's expected trajectory (λ)? and ii) If the expected trajectory is negative, how far away is that population from a putative source that could supply immigrants?

We caution readers against focusing on the exact λ values; those values are derived from studies in British Columbia, and thus may be higher or lower than values observed in Montana. Instead, readers should focus on the fact that the relative differences in growth rates most likely reflect what we can expect, given current levels of human influence. It would be incorrect to interpret the λ in a given area as indicating the rate at which the grizzly bear population is changing now (the map includes areas with no extant grizzly bear population). The λ values are conditional; they illuminate the underlying long-term trend we would expect to see, should there be enough animals to constitute a population considered capable of having a trend. Similarly, areas other than those shaded in dark blue should not be considered as areas where grizzly bears cannot possibly be found at any time, but instead as areas where persistence requires immigration. (Of course, FWP cannot directly increase immigration—but it can take steps to facilitate coexistence, increasing the probability that immigrants will survive.) Finally, we caution that these maps do not predict where grizzly bears will find connectivity, but instead depict the likely source-sink dynamics underlying, and informing, the management approaches available to FWP. The maps can help FWP prioritize conflict reduction resources by suggesting: i) where survival rates are consistent with sustainability; ii) where the mortality of bears must be reduced if connectivity is a goal; and iii) where it makes little sense to prioritize connectivity (because human influence is already so high as to make connectivity infeasible).

FWP interprets these maps as providing optimism that, assuming the continuation of conflict prevention and response programs and the continuation of approximately current levels of human infrastructure, grizzly bear connectivity (at least west of the Continental Divide) can gradually be accomplished—even in the presence of human–bear conflicts, and some resultant deaths of bears.

Sidebar 8. Development and interpretation of figures 19 and 20.

Development

To develop Figures 19 and 20, FWP downloaded from https://doi.org/10.7927/H4BP00QC the raster format GIS Human Influence Index (HII) and, with one exception (explained below) applied from Lamb et al. (2020a) the summary relationships between HII and asymptotic population growth (λ) that ignore minor differences in grizzly bear reproduction associated with vegetative productivity. (In the Lamb models, this vegetative productivity was indexed by the Normalized Difference Vegetation Index, abbreviated as NDVI, which accounted for a small proportion of variance.)

In consultation with Dr. Lamb, we began by comparing Montana's grizzly bear habitats that lie west of the Continental Divide (which are characterized by human-dominated valleys with roads, homesites, small communities, and small-scale agriculture) to those that lie east of the Divide (which are characterized by livestock-dominated areas) and decided to focus on the former, which are more similar than the latter with the British Columbia study areas that informed Lamb's model.

The HII values in turn reflect human population density, infrastructure, and access, and vary from 0 (no human impact) to 64; in the areas of study, generally the HII values were below 40. HII does not model grizzly bear mortality directly, but the model does account for the relationship between HII and mortality.

We altered the mapping protocol used by Lamb et al. (2020) in one respect: Rather than apply the predicted λ at the smallest possible (i.e., 1 km^2 pixel) scale, we used a moving-window protocol to assign to each pixel the λ resulting from the mean HII at the scale of the average home range, reasoning that these were more meaningful spatial scales on which to envision population growth rates. (Note: As shown respectively in Figures 19 and 20, the mean home range for a female is 358 km^2, and for a male is 1,364 km^2.

We lack an analogous model to illustrate how, and indeed whether, such source-sink dynamics might play out on Montana lands east of the principal mountain chains, where human attractants and ultimate causes of grizzly bear mortality differ somewhat from those further west.

Interpretation

Potential grizzly bear population growth rates, as estimated by applying the Lamb et al. (2020) model to western Montana at the scale of mean female (Figure 19) and male (Figure 20) home range sizes, suggest that some areas (shown in dark blue on both maps) would be capable of sustaining grizzly bears, once colonized, even without additional immigrants. However, other areas (shown in~~;~~ other colors) would likely act as sinks where population persistence would require continuing immigration from source populations such as the NCDE and CYE. White isopleths indicate distances from the presumed source.

Figure 19. Estimated potential population growth rate at the spatial scale of the mean female home range size (358 km²), as extrapolated from the Lamb et al. (2020) model.

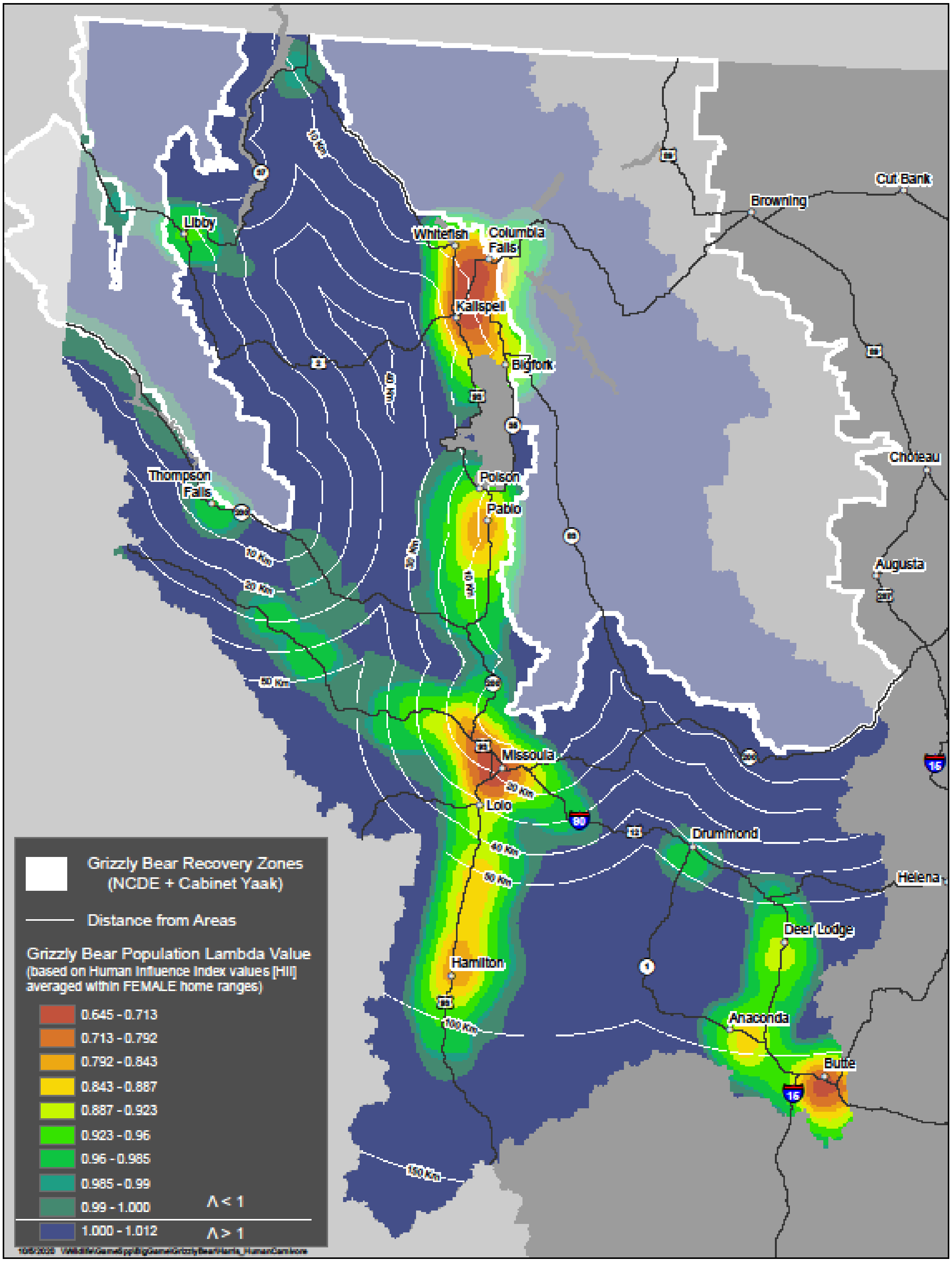
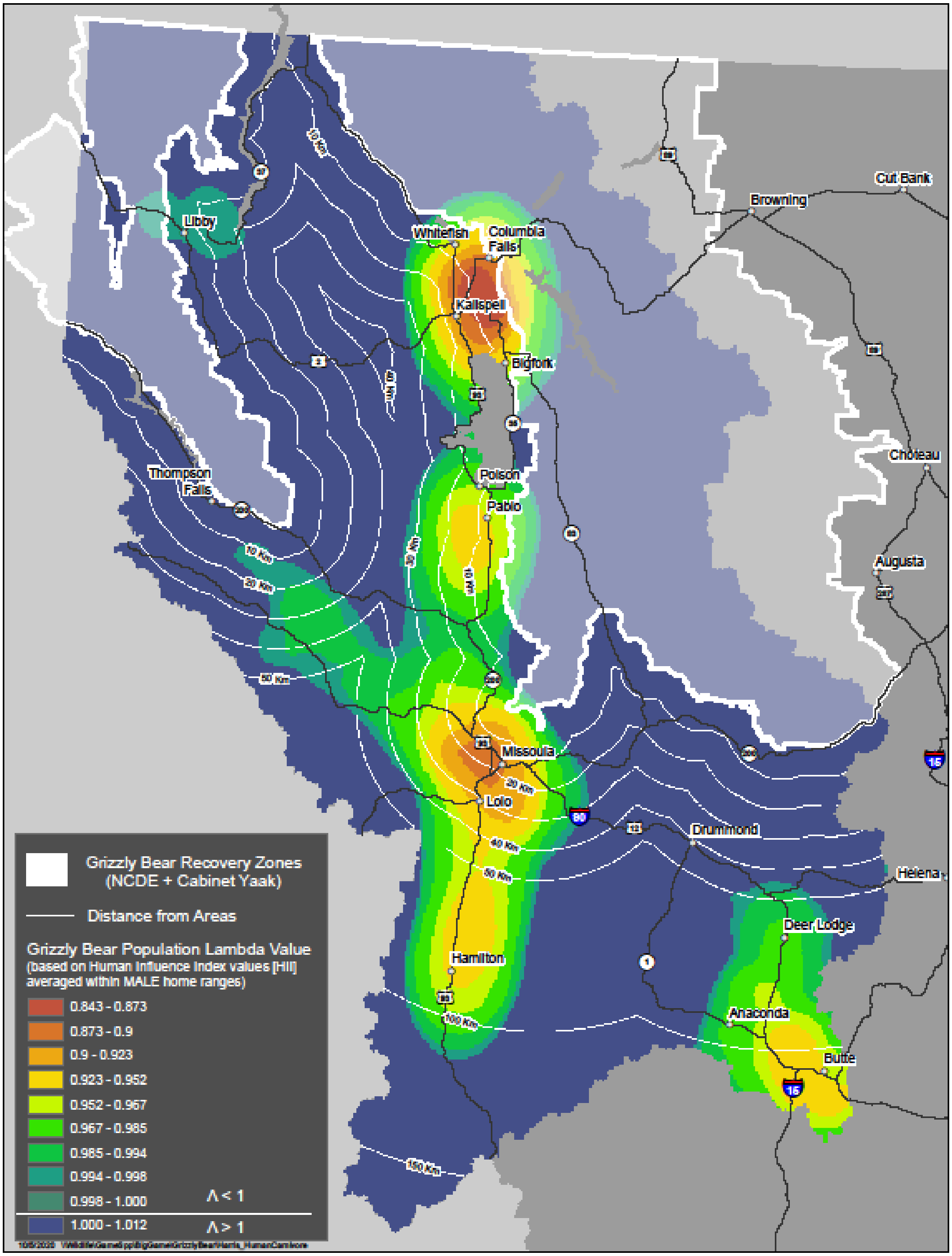


Figure 20. Estimated potential population growth rate at the spatial scale of the mean male home range size (1,364 km²), as extrapolated from the Lamb et al. (2020) model.



Human safety

It hardly requires restating that grizzly bears are potentially dangerous animals. According to draft and incomplete statistics compiled by the USFWS for the decade 2011–2020, there were 32 incidents in Montana that were categorized as "attacks." The locations of these incidents were as follows: 17 were in the GYE; 13 were in the NCDE (of which 4 were within Glacier National Park); and 2 were in the CYE. The severity of human injury from these incidents was as follows: in 15, severity was minor (i.e., less than 24 hours in hospital); in 12, severity was major (i.e., more than 24 hours in hospital); in 1, severity was fatal; and in 4, severity of injury was not recorded. The human activities just before these incidents were as follows: In 17 (53%), hunting (or related activities); in 10, hiking; in 2, bicycling; and in other cases, gathering, working, or involved in unknown activities. Bear spray was carried, either by the victim or by someone in the victim's party, in 12 of the incidents and was used in 8. In 2021 there were 15 incidents and 1 human fatality in the Montana portion of the GYE; and 18 incidents and 1 human fatality in the NCDE.

Bear spray, which has an active ingredient of some form of capsaicin pepper, is generally considered highly effective in deterring a grizzly bear attack (Herrero and Higgins 1998, Smith et al. 2008). Although not difficult to use, some people do not understand that it is a deterrent rather than a repellent or that it is only useful within a short range (typically 10–12 m). Most practitioners recommend practicing using bear spray (particularly becoming adept at removing the safety device), keeping it from extreme temperatures, and acquiring fresh bear spray after about four years of storage. Although windy or extremely cold conditions can compromise the effectiveness of bear spray, Smith et al. (2021) concluded that it would still have utility under most adverse conditions.

Conflict prevention

Regarding conflicts with grizzly bears (and sometimes with black bears or mountain lions as well), FWP has been a leader in both prevention and response efforts. The term "human–bear conflict" (or "conflict" for short) is rarely defined rigorously, if at all, when invoked in everyday speech or even in reports and technical papers. This plan provides a definition (see Definitions) but acknowledges that the word is often used generally, without rigorous definition, in common parlance. Thus, readers should keep in mind the looser, less precise usage often adopted.

As of summer 2023, FWP supported a total of 10 bear managers in or near Anaconda, Bozeman, Choteau, Conrad, Hamilton, Kalispell (2), Libby, Missoula, and Red Lodge. Despite uncertain funding, FWP has also supported assistants (some only seasonally) for many of those locations. Bear specialists are constantly innovating to add and evaluate new tools for prevention. This includes development of outreach activities and educational materials. They also conduct research on bear behavior around attractants to gain a better understanding of how to prevent conflict. Resources and needs for these efforts depends on and vary in scope and scale. In Region 2, FWP also provided in-kind support and close technical assistance through a bear management specialist and range-rider employed by the landowner-led Blackfoot Challenge group. Thus, during the non-denning season, a team of 14 staff have actively worked with landowners to address conflict issues and to respond to individual grizzly bears involved in conflicts.

These FWP staff, in turn, coordinated closely with similarly trained and tasked staff on the Flathead and Blackfeet Reservations (both of which employ fully trained, full-time bear managers), and at Glacier and Yellowstone National Parks.

They also coordinated closely with a statewide conflict prevention specialist employed by USDA-Wildlife Services (based in Missoula). Where large livestock were involved in potential or actual conflicts with grizzly bears, they also coordinated closely with USDA-Wildlife Service conflict response staff.

The contributions of non-governmental organizations (NGOs) in helping to minimize human–bear conflicts cannot be overstated: FWP staff routinely coordinates with many NGOs who conduct their own activities to educate and support landowners, recreationists, and citizens to prevent conflicts. In addition to the internationally recognized work of the Blackfoot Challenge (noted just above), indispensable contributors in their various regions have included (in alphabetical order):

- Big Hole Watershed Committee, which employs a range rider and operates a livestock carcass collection program;
- Bitterroot Bear Aware Collaborative, which helps subsidize bear-resistant sanitation receptacles for communities and provides education about bears;
- Blackfeet Nation Stock Growers Association, which has provided education about electric fencing and ranching near grizzly bears generally along the East Front;
- Clearwater Resource Council, which works in the Seeley Lake area to install electric fencing and bear-resistant sanitation tools, thus helping to prevent future food rewards and habituation there;
- Conservation Science Collaborative, which helped to facilitate a range rider and information about livestock guard dogs on the East Front;
- Defenders of Wildlife, which helps provide electric fencing by cost-sharing and by assisting in installation;
- Great Bear Foundation, which has organized volunteer-drive fruit pickups, to discourage bears from congregating around feral apples and other fruit trees;
- Greater Yellowstone Coalition, which has helped fund a range rider in the Gravelly Mountains and also helped to facilitate bear-resistant sanitation receptacles on public lands;
- Madison Valley Ranchlands Group, which supports construction of a livestock composting facility in Madison Valley;
- Missoula Bear Smart Working Group, which has written a Missoula Bear Hazard Assessment and a Human-Bear Conflict Management Plan for the city and surrounding areas. The conflict plan was unanimously adopted by Missoula County Commissioners and the Missoula City Council.
- People and Carnivores, which provides education, works with selected landowners to implement conflict prevention, and has pioneered new approaches to secure attractants from grizzly bears;
- Swan Valley Bear Resources, which helps landowners to prevent conflicts by providing fruit gleaning, bear-resistant sanitation receptacles, electric fencing, education, and more;
- Tom Miner Basin Association, which works to secure attractants in the area northeast of Yellowstone National Park;
- Watershed Restoration Coalition, which supports construction of a livestock composting facility near Deer Lodge;
- Western Landowners Alliance, which has provided support programs to help ranchers living with difficult predators.

Many of these organizations have received financial support from the Vital Ground Foundation or the Montana Outdoor Legacy Foundation. The latter is also a major funder and supporter of FWP's own conflict prevention work, which continues to incorporate new technologies and new lessons learned from experience. Although there is statewide consistency in the overarching goal (conflict-free coexistence of people and bears) and in many of its supporting strategies, the focus and activities toward that end are somewhat variable among FWP regions and individual bear managers, largely due to different sources of human–bear conflicts.

FWP bear managers' conflict objectives and recent related activities are summarized below.

The below objectives have been articulated:

- work with landowners to identify and secure attractants;
- work with government agencies to promote food storage on public lands;
- work with city, county, state, and federal governments to minimize conflicts;
- provide information and outreach about conflict prevention to the media;
- educate the public about how to live and recreate safely in grizzly bear country;
- respond to conflicts on private and public land; and
- build relationships of trust with and among landowners, NGOs, agency staff, and the public.

The below activities have been pursued as well by bear managers, who have worked with landowners to erect over 400 temporary or permanent electric fences to separate bears from potential attractants. In 2020 alone, managers responsible for the northwest section of the NCDE (and surrounding lands) performed the following activities:

- worked with waste management staff from the counties of Flathead, Lake, Lincoln, and Missoula, as well as from the municipality of Whitefish, to improve resistance to bears in various waste transfer stations;
- installed permanent electric fencing to protect small livestock for 10 landowners;
- loaned temporary electric fencing to 8 additional landowners;
- worked on developing electric screens and mats, to fortify electric fences and to prevent access to grain bins;
- loaned motion-activated noise makers ("Critter Gitters") to landowners on 24 occasions;
- loaned 10 bear-resistant sanitation containers;
- continued to lead and facilitate a locally based group to pick excess fruit (which otherwise would attract bears),
- helped lead public "bear fairs" in 4 small communities and made presentations at twelve public meetings.

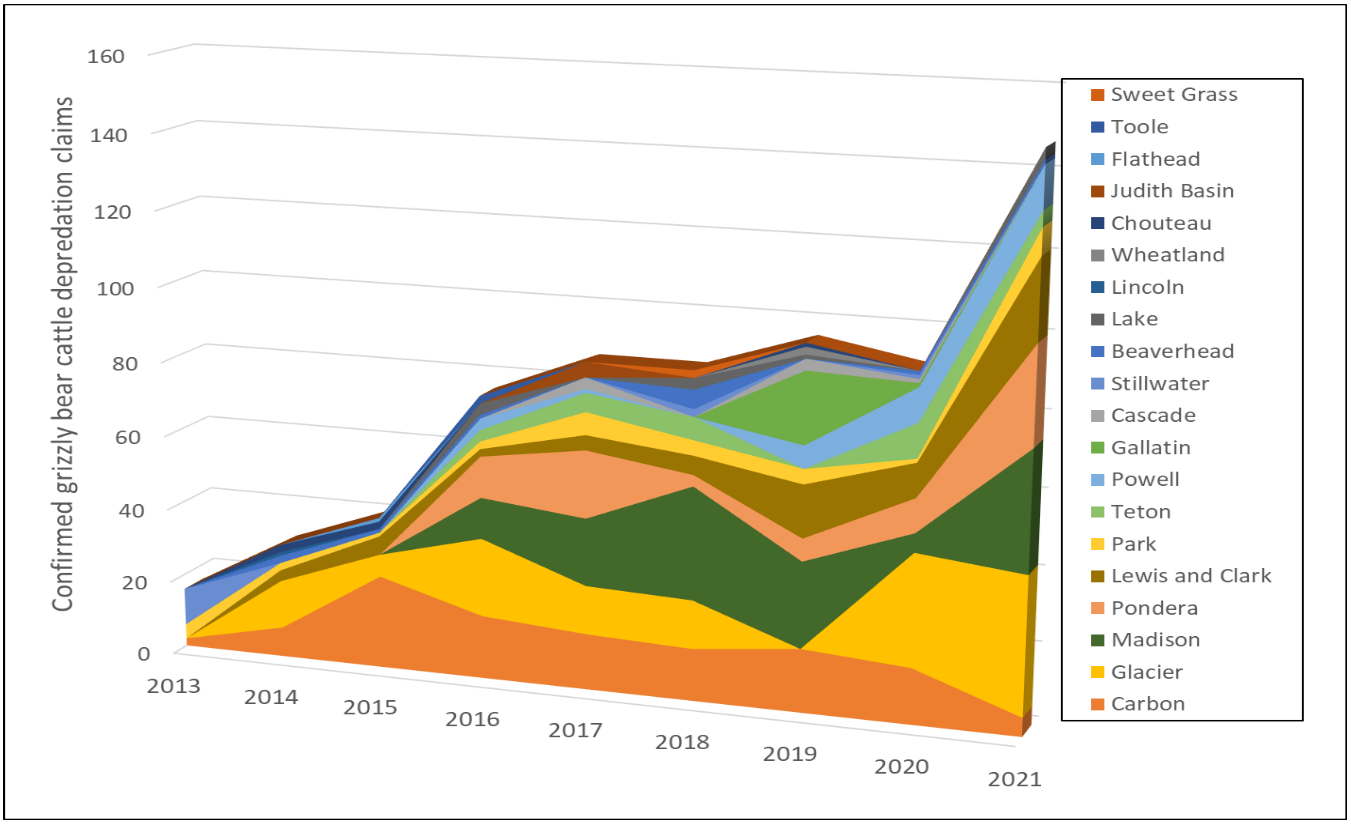
In 2019, FWP bear managers responsible for the CYE provided education or training in minimizing conflicts at 32 events or meetings.

Because not all depredation by grizzly bears on livestock is discovered, reported, or confirmed, we lack a complete census of livestock lost (Harris 2020). The most rigorously vetted data set is that compiled by the Livestock Loss Board (LLB, Montana Department of Agriculture, https://liv.mt.gov/Attached-Agency-Boards/Livestock-Loss-Board. Since 2013, LLB has reported claims of livestock losses to wolves, grizzly bears, and mountain lions. To determine eligibility for compensation, each claim must be verified by USDA-WS.

From 2013 to 2021, LLB statistics show 676 claims of individual cattle (mostly calves, although these are not distinguished in the data set) killed by grizzly bears. During this period, the number of individual cattle losses claimed by county were: Glacier, 133; Madison, 119; Carbon, 118; Pondera, 73; Lewis and Clark, 63; and the rest scattered throughout the remainder of the 30 counties. Claims by county varied annually, probably reflecting the idiosyncratic nature of human–bear conflict generally, but clearly increased almost linearly during the nine-year period (increasing, on average, by about 14 cattle claims annually—see Figure 21). Harris (2020) reviewed the literature on predator-induced losses of livestock, concluding that verified losses almost certainly understated true losses.

Figure 21. Confirmed Montana cattle (including calves) lost to grizzly bears

From 2013–2021—verified by USDA-US. Montana Livestock Loss Board, https://liv.mt.gov/Attached-Agency-Boards/Livestock-Loss-Board/Livestock-Loss-Statistics-2022.



Also during 2013–2021, a total of 250 sheep were verified and claimed as lost to grizzly bears—mostly from the counties of Pondera (66), Teton (54), and Toole (53). Temporal and spatial patterns of depredation are more variable for sheep than for cattle, likely due to wide variations in the number of animals involved: most sheep depredations involved fewer than six animals, but some involved dozens.

Livestock carcasses

Especially in early spring, when bear hibernation ends and livestock are most likely to die, grizzly bears will feed on available livestock carcasses—bringing the bears closer to livestock and humans (Newsome et al. 2015) and increasing the likelihood of conflicts. Bear managers have used one of three responses: i) move the carcasses to remote locations, thus diverting bears from coming near people; ii) remove carcasses and deposit them in secured locations where bears cannot gain access; or iii) electric fencing for private boneyards to prevent bear access and aggregation.

There is little doubt that it is undesirable to leave such attractants as livestock carcasses and boneyards near human infrastructure (Wilson et al. 2005, 2006). Some ranchers have, either on their own initiative or as a result of agency recommendation, moved carcasses from lands they control to areas that are somewhat more remote. FWP and NGO programmatic approaches have included either preventing bears from accessing these resources entirely (either by moving them to protected dumps or compost piles) or redistributing them to remote areas where it is expected they serve to detain bears from moving closer to people while also providing a supplemental source of food (Madel 1996). Electric fencing of private boneyards has also been effective at reducing bear use of ranches (Wilson et al. 2005). Livestock carcass removal programs have been initiated by the Blackfoot Challenge (with indirect support from FWP) in the Blackfoot River drainage (Wilson et al. 2014, 2017), on the Rocky Mountain Front by FWP, and in the Big Hole areas (by the Big Hole Watershed Committee).

The only organized program of livestock carcass redistribution known to us is that begun by FWP Region 4 in 1987 and continuing through at least 2017 (Madel 2017). Aune and Kasworm (1989:262) suggested such a program could serve to detain grizzly bears in the East Front foothills during spring, thus reducing bears' use of private lands further east. They envisioned this program as a transition step toward altogether removing livestock carcasses as a source of bear food, adding that the program should not be a general "feeding program" and should not redistribute more than 10–20 carcasses per year.

Madel (1991, 1996) considered that livestock carcass redistribution reduced conflict compared with private boneyards near residences (although evidence of success was anecdotal) and that it also functioned as a substitute protein source for grizzly bears who historically would have had greater access to spring carcasses from ungulates (bison and elk). The livestock redistribution program implemented by FWP along the East Front of the Rockies gradually has been reduced in recent years. The number of carcasses involved per year was 222 in 1989–1990, 139 in 1991–1994, and only 22 in 2017 (Madel 1991, 1996, 2017), as privately-operated boneyards providing carcasses for redistribution were phased out. It is unknown, however, to what extent private boneyards have been replaced by smaller-scale, privately-operated analogues of FWP's carcass redistribution program.

There are no reports of rigorous, controlled studies comparing the effects on human–bear conflict of diversionary use of carcasses versus carcass removal (Garshelis et al. 2017). Feeding of bears is a common practice in Europe (typically using both maize and livestock carrion), often conducted in association with hunting but also with the objective of diverting bears from settled areas and reducing depredation on sheep. After the European Union banned the use of carrion in feeding stations in 2004, Kavĉiĉ et al. (2013) found that bears in Slovenia continued to use feeding sites (now supplied only with maize) at similar rates as before the ban, and that depredation rates on sheep did not change. Kavĉiĉ et al. (2015) used this finding—along with concerns that supplemental feeding could increase reproductive rates and thus could indirectly increase bear-human conflicts—to urge caution when considering continued supplemental feeding in the European context. Jerina et al. (2015, cited in Garshelis et al. 2017) found an inverse correlation between time Slovenian bears spent near feeding sites and time spent near settlements during autumn, although not at other times of year. See also Robbins et al. 2004:168.

In spring 1998, the provincial government of Alberta began moving road-killed ungulate carcasses to remote sites (1,430–2,013 lbs., or 650–915 kg, per site per year) in a quest to reduce springtime livestock depredation. After this program ended in 2014, Morehouse and Boyce (2017b) examined its effectiveness. During the program's last two years of operation, they found that 12 monitored sites were used by 22 uniquely DNA-identified grizzly bears (roughly one-quarter of resident grizzly bears and about 13% of all detected grizzly bears). During the first year after the program's end in 2014, none of those 22 bears was identified from available hair samples obtained opportunistically at spring conflict sites, suggesting that there was no immediate rush by the bears to replace the suddenly unavailable carcasses with living livestock at the conflict sites.

Throughout the study period, livestock depredations had been increasing in areas further east from the mountains in Alberta (as in Montana), but this trend did not change with cessation of the carcass intercept program (Morehouse and Boyce 2017a). Spring livestock depredation incidents were fewer in the 2 years post-program than in the program's final year, although more than in other years of the program's existence. Assessing the possible effects of the program on conflict incidence, always a difficult proposition, was further complicated in this case by the increasing effectiveness of community-based conflict prevention efforts (Morehouse et al. 2020).

Conflict response

Many calls received by FWP bear managers do not require a conflict response. These calls may involve requests for information, observations of a bear that the reporting party does not consider threatening, or other issues that can be handled by telephone. Among incidents that are appropriately considered conflicts, most are addressed with site visits and efforts (such as securing attractants) to prevent bears from returning. If the bear in question is still nearby during the site visit, sometimes an attempt is made to use hazing (informal aversive conditioning) to discourage it from returning. However, in many cases these measures alone do not resolve the issue, and the possibility of capturing the bear is considered.

At this point, FWP staff members generally begin communication with the USFWS grizzly bear recovery coordinator to discuss options. If there is a failure of conflict resolution efforts that do not involve handling bears, then it often occurs that the joint decision is made to set traps and attempt to secure physical control of the bear(s) in question. When depredation upon livestock is suspected, USDA-WS is involved in the investigation and makes the determination as to whether depredation by grizzly bears is confirmed. If a bear is successfully captured, further discussions ensue regarding which of the four options (listed below) is most appropriate.

Release onsite

In this option the bear is released back to the original site, typically with a radio collar to facilitate tracking. This option may be appropriate for several reasons: i) sometimes the captured bear was not the one understood to be involved in the conflict; ii) sometimes the mere act of capture and release will deter the bear from further conflict behavior; iii) sometimes only some members of a bear's family group were captured.

Short-distance relocation

In this option the bear is relocated to a new site that is far enough away from the original site to eliminate (at least temporarily) the conflict potential, but not so far away that the bear is unlikely to know how to procure resources and avoid aggressive conspecifics. The relocation sites are selected—based on safety, accessibility, and capacity to absorb additional bears—from a list of sites previously approved by the land manager. Even if the bear returns to the conflict site, this option may buy time for FWP staff to work with people on such steps as removing or securing attractants.

Long-distance relocation

In this option the bear is relocated to a more distant site, where it is less likely to return to the conflict site (Milligan et al. 2018). Sometimes these relocated bears settle into their new home; other times they wander widely, eventually establishing new home ranges or settling in areas that cannot be predicted in advance. Other times they eventually return to the previous home range. As with short-distance relocation sites, the relocation site is selected—based on safety, accessibility, and capacity to absorb additional bears—from a list of sites previously approved by the land manager.

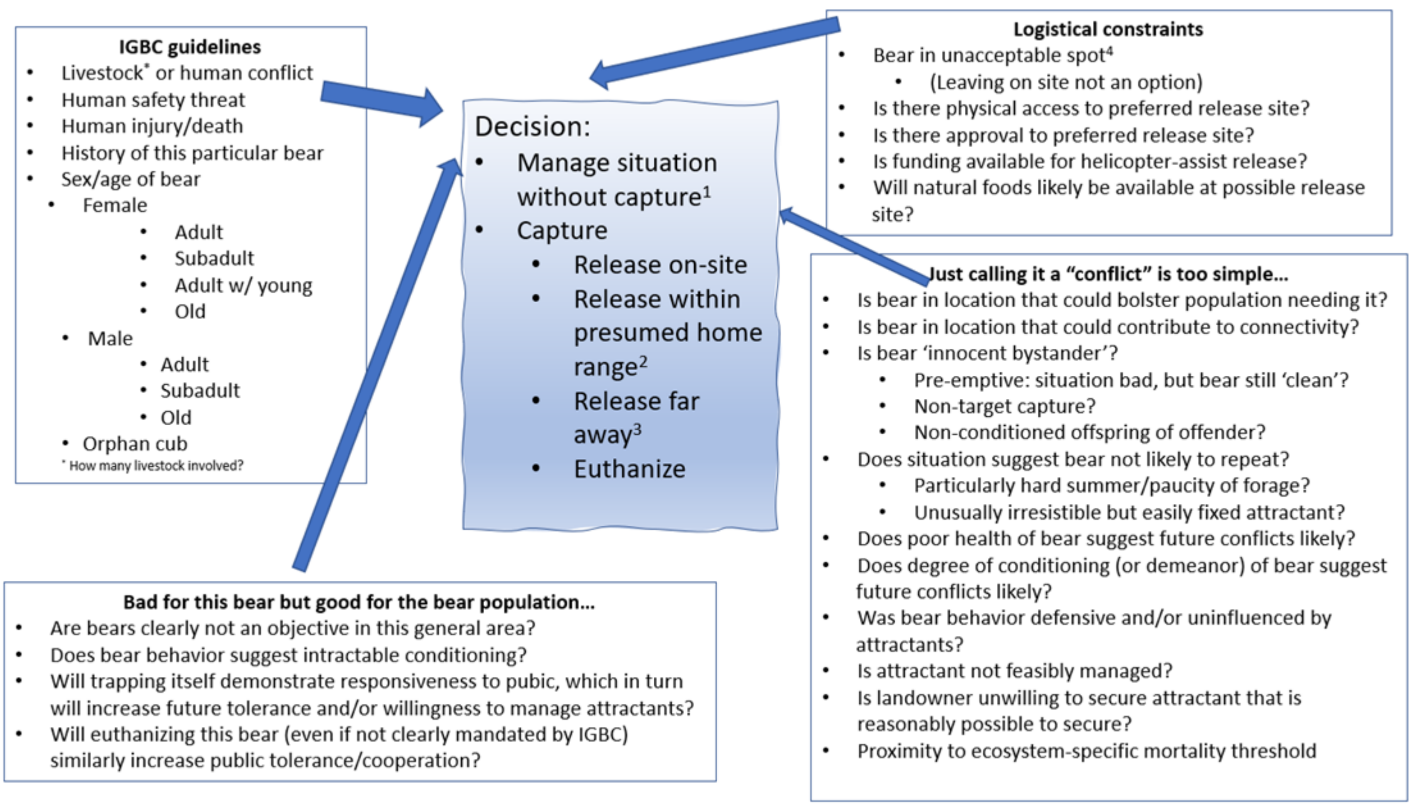
Euthanization

In this option the bear is euthanized. Typically, hides, skulls, or other parts are retained by the agency and donated for educational purposes.

Figure 22 shows the factors considered once a decision has been reached that a bear requires hands-on attention.

Figure 22. When human–bear conflict is verified: Flow of considerations and responses

1 includes attractant management and, often, also hazing or aversive conditioning.
2 is short-distance relocation—releasing the bear a short distance away and encouraging it to return to natural foods in the area.
3 is long-distance relocation—releasing the bear farther away, allowing time to manage attractants and otherwise reduce conflict potential even if the bear returns later; alternatively, some bears will settle in the relocation area.
4 is when a bear cannot be released on site due to attractants that cannot be removed, human presence, or some other situation making it an unacceptable spot for a grizzly bear at the time.
Note: Relocation could be unsafe for people (if near human infrastructure like a golf course) or bears (if near a hazard like a cliff).



Sometimes traps are set before a conflict is documented, in situations where a decision is made that a bear is in a risky place (even if it never causes damage). These are typically termed "preemptive captures." At other times, a bear other than the targeted one is captured. On rare occasions, orphaned cubs are captured and transferred to a temporary holding facility, and a permanent facility is found for them.

During the four non-denning seasons from 2017 to 2020, FWP staff led or were heavily involved with 176 "management" or conflict captures. Of these, 145 (82%) were inside of, or closest to, the NCDE recovery zone (and of these, 84 (58%) were in the northwest (FWP Region 1), 12 (8%) in the southwest (FWP Region 2), and 49 (34%) east of the mountains (FWP Region 4). Twenty-seven captures (15%) were within or associated with the GYE, and only 4 (2%) were within or associated with the CYE. These 176 capture events resulted in bears being transferred to captivity on two occasions (1%), released onsite on 11 occasions (6%), relocated on 104 occasions (59%), and euthanized on 59 occasions (34%).

Because the reasons for initiating a capture were varied and often complex, quantification of those reasons is imprecise and sometimes unclear. Of the documented primary reasons for deciding to capture and handle the bear, the most common were: depredation on livestock (42); killing of poultry, usually chickens (21); exhibiting bold or extremely habituated behavior or being near residence (20); damaging property (15); accessing garbage (12); and accessing fruit or fruit trees (8). There were also 14 cases of preemptive capture—i.e., the bear was considered to be in a situation that risked a future conflict, although no conflict had yet occurred. Additionally, there were 37 cases of incidental capture—e.g., the bear captured was one not implicated in the conflict, in some cases a juvenile.

During this period from 2017 to 2020, for the 173 incidents in which a primary reason for capture was clearly documented, in 42 incidents (24%) the primary reason was depredation of large livestock (cattle or sheep). Of those 42 incidents, in 33 (79%) the offending bear was euthanized when captured. Two additional bears involved in livestock depredations were euthanized after one attempt at relocation.

In early 2021, the 67th session of the Montana legislature passed Senate Bill 337, which amended § 87-5-301, MCA, in two ways that affect the relocation options available to FWP bear managers for federally listed grizzly bears. Newly enacted subsection (3)(a) limits FWP bear managers to moving a grizzly bear only to sites previously approved by the Commission. Newly enacted subsection (3)(b) prohibits FWP bear managers from relocating a grizzly bear involved in conflict outside of a Recovery Zone. The legislation does not preclude USFWS, or other entities permitted by USFWS, from relocating or translocating bears (see Appendix C). The new legislation does not speak to restrictions on relocating grizzly bears that are not under ESA protection.

During the 4 non-denning seasons 2017-2020, 129 of the 173 captures for which specific geographic locations were available (75%) that FWP personnel led or were heavily involved with occurred outside of recovery zones. These 129 capture events resulted in bears being released onsite on 5 occasions (4%), relocated on 84 occasions (65%), and euthanized on 40 occasions (31%).

Among the most common documented primary reasons for deciding to capture and handle bears outside of recovery zones were livestock depredation (29), killing poultry (most often chickens, (20)), exhibiting bold or extremely habituated behavior or near residence (14), property damage (9), accessing garbage (8), and accessing fruit or fruit trees (8). In 11 instances, bears were captured preemptively—i.e., they were considered to be in a situation that risked a future conflict, although no conflict had yet occurred. Additionally, in 26 captures the bear captured was categorized as incidental—e.g., a bear other than the captured one had been the capture target or the captured bear was a juvenile that was not implicated in the conflict.

Among the 29 captures in which depredation of large livestock (cattle or sheep) was cited as a primary reason for capture outside of a recovery zones, the bear was euthanized in 21 (73%) cases.

Moving non-conflict grizzly bears (captured outside RZs) whose origin is uncertain

FWP's Preferred Alternative would allow managers to relocate such bears to release sites considered to provide the best chance for the bear to avoid future conflict, even if that site were not within the animal's presumed or known population core of origin, as long as the site had previously been approved by the Commission and was included within the "estimated occupied range of grizzly bears." Thus, the Preferred Alternative envisions increased application of the "estimated occupied range of grizzly bears" boundaries to management decisions. Whereas estimated occupied range maps are now analyzed primarily to document changes in occupied range over time, the resulting maps would also be used to determine whether or not specific release sites could be used in situations such as envisioned here.

It is thus appropriate to clarify how the "estimated occupied range of grizzly bears" maps are (and would continue to be) produced. Following Bjornlie et al (2014a:183), Costello et al. (2023), Dellinger et al. (2023), and Kasworm et al. (2023), the "estimated occupied range of grizzly bears" maps are produced by applying zonal analysis and ordinary kriging to 3 km^2 cells with verified grizzly bear locations documented during a 15-year window (20-years for CYE) up to the current year. Verified locations used to determine occupancy of cells are collected from GPS transmitters; VHF telemetry flights; capture and mortality locations; human-grizzly bear conflict sites; verified observations (sightings or tracks) or remote camera photos confirmed by agency personnel; and opportunistic samples of grizzly bear hair, blood, scat, or tissue confirmed by DNA analysis. GPS data are screened to exclude all but one randomly selected location per bear per day. This ensures that GPS data are not overrepresented in the data set and are appropriately scaled to the daily activity radius used to determine grid cell size. Data involving unusual single-track temporary excursions, made by relocated or other collared bears, may also be screened if they unduly distort the extent of occupied range. The method is unaffected by the intensity of location points within cells but is influenced instead by the number of neighboring cells with locations points.

The algorithm developed by Bjornlie et al. (2014a) was designed to provide the "most parsimonious balance of inclusion and exclusion of low-density peripheral locations …. [while allowing]…for annual updates of grizzly bear distribution…." FWP finds it a good choice when the objective is to identify a boundary that distinguishes where grizzly bears have established residency, as opposed to areas where bears have made occasional forays or areas with low-density peripheral locations. Note that the "estimated occupied range of grizzly bears" map is deliberately not as inclusive as USFWS's "may be present" concept (Figure 4), which is an estimate of the larger area over which grizzly bears have been observed to occur.

Costello, CM, LL Roberts, and MA Vinks. 2023. Northern Continental Divide Ecosystem Grizzly Bear Monitoring Team Annual Report, 2022. Montana Fish, Wildlife & Parks, 490 N. Meridian Road, Kalispell, Montana, USA.

Dellinger, JA, BE Karabensh, and MA Haroldson. 2023. Grizzly bear occupied range in the Greater Yellowstone Ecosystem, 2008-2022 in FT van Manen, MA Haroldson, and BE Karabensh, editors. Yellowstone grizzly bear investigations: annual report of the Interagency grizzly Bear Study Team, 2022. U.S. Geological Survey, Bozeman, Montana, USA.

Kasworm, WF, TG Radandt, JE Teisberg, T Vent, M Proctor, H Cooley and JK Fortin- Noreus. 2023. Cabinet-Yaak grizzly bear recovery area 2022 research and monitoring progress report. U.S. Fish and Wildlife Service, Missoula, Montana.

Protocols for moving grizzly bears when needed

As a listed species, decisions about capturing and moving grizzly bears are ultimately made by the USFWS. In practice, this occurs following a consultative meeting (typically by telephone) involving FWP staff and USFWS staff (as well as staff from USDA-WS and tribal biologists, if relevant). Release locations are typically on public lands to sites previously approved by land management agencies (typically in multi-year agreements). Before a relocation or translocation occurs, land managers are consulted, and bears are moved only to selected sites that are deemed appropriate by the land management officials at that time.

The Commission has authorized, for use by FWP staff, a suite of potential release sites in Montana (Appendix G). The occasional translocation of individual non-conflict grizzly bears from the NCDE to the GYE for purposes of genetic augmentation is included in the currently operative Tri-State Agreement (between Montana, Idaho, and Wyoming, see Appendix H). Guidance provided by an inter-agency team of biologists and managers regarding the best candidate bears, opportune timing, and most appropriate release settings has been documented in a briefing paper (see Appendix I). The recovery permit to translocate grizzly bears from the NCDE to areas within the GYE for the purposes of genetic augmentation to address future threats associated with isolation of the GYE grizzly bear population was approved by the USFWS in June, 2024 (see Appendix J). Translocation for connectivity purposes is not a standalone strategy as the conservation of habitat and the prevention of conflicts in between recovery zones are necessary components to ensure long-term connectivity. Measures described in the 2016 GYE Conservation Strategy are and will continue to be used to promote genetic connectivity through natural movements. These measures include habitat protections, population standards, mortality control, outreach efforts, and adaptive management.

Destinations of bears captured in conflict settings

Each FWP region works with their federal and state land management partners to maintain a list of suitable release sites for grizzly bears needing to be relocated. FWP bear managers always obtain specific permission from these partners prior to releasing animals. FWP Region 1 operates under a relocation plan jointly developed with the Flathead, Kootenai, and Lolo National Forests. FWP Region 2 operates under a “Relocation protocol and interim decision-making process for grizzly bear occurrences in outlying area,” jointly developed with USFWS, BLM, DNRC, CSKT, Blackfoot Challenge, and the Lolo, Helena-Lewis and Clark, Bitterroot, and Beaverhead-Deerlodge National Forests. FWP Regions 3 and 5 operate under a relocation plan developed jointly with the Custer Gallatin and Beaverhead-Deerlodge National Forests. FWP Region 4 operates under a relocation plan developed jointly with the Lewis and Clark National Forest.

As required by legislation signed into law in 2021, the Commission approved a list of sites where grizzly bears may be released. Maps of these sites are included as Appendix G. Ideal sites would meet the following criteria; 1) site is not a designated trailhead, 2) site is not a designated or known dispersed camping site, 3) site is not immediately adjacent to private land, unless that private landowner has given explicit permission, 4) site is not an active grazing allotment with livestock present, 5), site is not currently occupied by humans conducting work such as timber harvest nor is the site serving as a human encampment for such activities, 6) site is far enough from capture site as to make it less likely for the bear to return to the conflict site. Ideally, release sites are some distance behind locked gates and remote enough to prevent recurring conflict. Some designated release sites may never be used or used very infrequently. As of March 2022, FWP can only translocate federally listed conflict bears if captured within federally identified recovery zones.

Moving bears to initiate new or support existing populations

FWP has not moved any grizzly bears with the intent of starting a new population. Beginning in 2005, FWP, in close coordination with USFWS, has taken the lead in capturing and moving occasional bears from NCDE to CYE (see above section, Current status of grizzly bear populations in Montana, CYE subsection).

FWP has not, as of this writing, moved any grizzly bears into the GYE from other populations. However, the Commission approved, in concept, moving a few grizzly bears from the NCDE to GYE populations at their meeting on December 14, 2021. A more detailed protocol document articulating the purpose and need for the augmentation program as well as providing guidance to field staff regarding the type of bear, circumstances around its capture, time of year, and likely release areas, has been drafted and approved by both the GYE and NCDE subcommittees of the Inter-agency Grizzly Bear Committee (IGBC). The protocol calls for:

- Translocating 'non-conflict' bears from other populations in Montana to pre-selected and pre-approved areas within the Greater Yellowstone Ecosystem. Areas chosen for release would be those judged most likely to allow the individual to meet its biological needs without conflicts with humans, and also most likely to breed.
- Trapping would be conducted to capture and move bears as resources allow. "Conflict" bears would encompass not merely bears known to have history of conflict, but also non-target animals captured at or near the site of a conflict. Thus, animals available for this program (i.e., "non-conflict") bears would be those captured in remote settings, typically resulting from specific efforts to identify appropriate candidates for the genetic augmentation program.
- The frequency with which such animals would become available would vary annually, and not be predictable. The expectation is that approximately 2 to 4 candidate bears would become available and be moved every 10 years. There would be no additional expectations or requirements for the timing beyond that. For example, if opportunities arose, more than 1 bear might be moved in any given year; conversely, a few years might pass with no good opportunities.
- This magnitude of capturing and moving bears would result in approximately 3 to 6 bears being moved to the Yellowstone area per grizzly bear generation. If one-half of the bears moved stayed in the Yellowstone, survived long enough to reproduce, and produced (or sired) a cub that survived to adulthood, approximately 1.5-3 effective migrants per generation would gradually be added to the Yellowstone population.
- Translocated individuals would be considered experimental[6] animals, and either moved or euthanized should they cause conflicts with humans [similar to how any other grizzly bear will be managed].
- For any translocated individuals that survive and remain in the Yellowstone area at least 1 year, the allowable mortality limit for that gender for the GYE (per the Conservation Strategy) would be increased by one (to account

[6] Not to be confused with the legal definition of an "experimental population" in ESA 10(j).

for the unanticipated addition of that individual, reinforcing that the augmentation is for genetic, not demographic purposes).

The 2023 legislature identified additional staff capacity for bear captures and translocations for genetic exchange.

Orphaned cubs

FWP policy on orphaned grizzly bear cubs is provided in Appendix F, which is a part of the larger policy on accepting wildlife for rehabilitation at the MWRC. Although MWRC has accepted orphaned grizzly bear cubs in the past and may do so in future, placing these animals in appropriate captive facilities is difficult and time-consuming. The policy appended here clarifies field protocols as well as the rare circumstances that FWP anticipates accepting orphaned grizzly bear cubs to its captive facility under either Alternative.

Conflict management operational structure

FWP would continue supporting bear managers in or near Anaconda, Bozeman, Chouteau, Conrad, Hamilton, Kalispell, Libby, Missoula, and Red Lodge. Building on current structure, FWP would prioritize bear manager FTE where expanding population presents the need for conflict management and also opportunities for connectivity while maintaining efforts in occupied core areas. FWP's bear technician position and associated operations in Libby is funded by the Hecla Mining Company.

Prioritizing information, outreach, and communication

It seems clear that rural residents, recreationists, ranchers, farmers, and all others with the potential to interact with grizzly bears would benefit from more knowledge about bears and how to minimize adverse interactions with them. Thus, educational efforts will be an important component of FWP efforts moving forward. That said, it would be risky to assume that education is invariably successful in changing behaviors that lead to human–bear conflicts (Gore et al. 2008, Baruch-Mordo et al. 2011, Dietsch et al. 2017). Without well designed research to monitor actions (rather than merely attitudes) of the intended education recipients, we should not assume that education by itself will yield the desired results (Gore et al. 2006, Baruch-Mordo et al. 2009). Work with reducing black bear-human conflict has shown, however, that educational programs can augment the effectiveness of proactive enforcement (Baruch-Mordo et al. 2011) or direct provision of bear-proofing materials (Johnson et al. 2018).

Resources required

See an explanation of this issue in Part II, under the No Action Alternative under the same title name.

Hunting of grizzly bears: Values and beliefs

FWP acknowledges that, to some Montana citizens (as well as to many outside the state), any hunting of grizzly bears is offensive to their deeply held values. While rarely articulated clearly, FWP understands at least some of these values to hold that the grizzly bear is different from other species of wildlife in Montana (and different even from the closely related black bear) and should not be considered a game species (which are legally protected but subject to recreational hunting when specifically authorized by the Commission). For people holding these sets of values, details regarding the type of hunt considered, the number of animals killed, potential negative or positive effects on conservation prospects of grizzly bears, on the safety of people, and on security from property damage are unlikely to be important influences on their views toward future FWP recommendations. These values are legitimate, need to be taken seriously, and will be part of any consideration of possible hunting in the future.

Sidebar 9. Would a grizzly bear hunt be a "trophy" hunt?

Montana statutes and rules do not define "trophy" hunting. Similarly, this document does not use the term. Section 87-2-701, MCA, however states that grizzly bear hunters must purchase a "trophy" license to possess and transport a harvested animal. The harvest is cited as an undefined trophy in the law, ostensibly to deter poaching and establish accurate harvest data. Because the grizzly bear is classified as a game animal, any hunter who harvests a grizzly bear would be prohibited from wasting edible meat.

For other Montana citizens (and others outside the state), a more nuanced description of various alternative ways hunting might take place and how FWP would view hunting if it occurred could inform their support or opposition. Still others support hunting grizzly bears unreservedly, such that a nuanced description of how it might take place would not be important. Some of these people would feel disenfranchised by a FWP that did not take advantage of a future legal structure that allowed for hunting, considering it to have become an agency they no longer recognize or feel speaks to them.

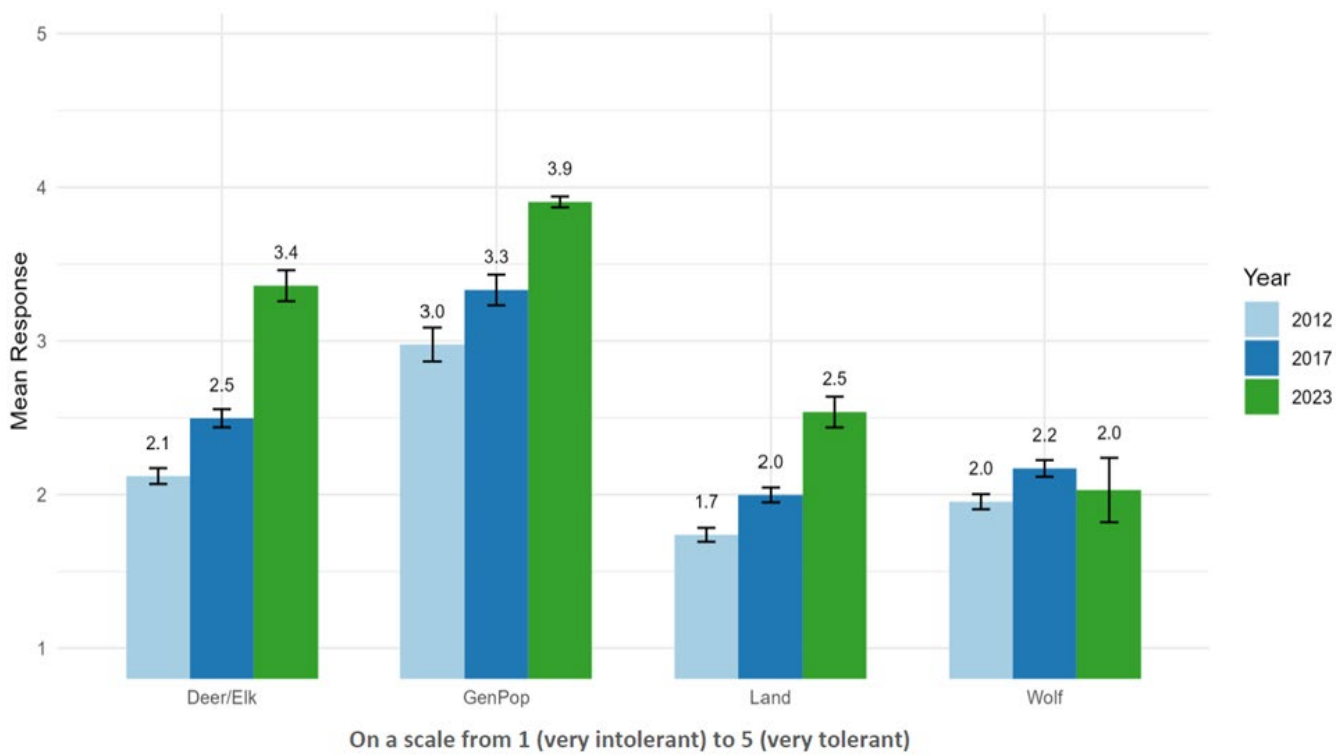
Results from a 2020 survey of Montanans regarding the topic of grizzly bear management in Montana (Nebitt et al. 2020) found a sizable majority of Montanans supported some form of potential grizzly bear hunting: 49 percent supported enough hunting to manage grizzly bear population size; 30 percent supported a very limited season that does not affect their population size; and, four percent supported as much grizzly bear hunting as possible. Seventeen percent responded that grizzly bears should never be hunted in Montana. A majority (61 percent) agreed or strongly agreed that people should have the opportunity to hunt grizzly bears as long as populations can withstand the pressure, whereas 24 percent disagreed or strongly disagreed with this notion. Views were more mixed for other questions related to hunting grizzly bears. When asked if hunting should be used as a tool to reduce conflict, 46 percent agreed or strongly agreed, and 36 percent disagreed or strongly disagreed. When asked if hunting would make grizzly bears more wary of humans, 39 percent agreed or strongly agreed, while 32 percent disagreed or strongly disagreed.

Previous FWP plans have indicated that grizzly bear hunting may promote acceptance and tolerance. This may still be true, but FWP has no expectation that enhanced acceptance or tolerance would occur among all segments of Montana's citizenry. Acceptance and tolerance are embedded in attitudes, and attitudes in turn are embedded in fundamental values and cultural identities. These change slowly, and typically not as a result of a single management decision or activity.

However, FWP does find evidence that providing a place for hunting within the overall management and conservation scheme may, for those whom hunting forms an important part of their identity, foster a sense that the agency is empathetic with those values (Manfredo et al. 2017). FWP believes this sense of inclusion, particularly among rural landowners who would be asked by Montanans generally to allow grizzly bears to travel through, and sometimes live on their lands, can serve to improve their cooperation with programs to reduce conflicts even if their attitudes toward grizzly bears have not changed. Reducing conflicts, in turn, benefits all Montanans for whom managing for an interconnected grizzly bear population is a value.

Some indirect evidence for this comes from Lewis et al (2012) in regards to wolves. They reported that tolerance for having wolves on Montana's landscape remained low as of 2012. Among a cross-section of Montana residents, 37% reported being "very intolerant" whereas 23% reported being "very tolerant". Percentages reporting being "very intolerant" increased to 45% among deer/elk license holder, 48% to wolf license holders, and 63% to rural landowners (defined as owning at least 160 acres). Notably however, Lewis et al. (2012) reported increased satisfaction (and decreased dis-satisfaction) among all 4 groups following the 2011 wolf hunt (although it is possible that these attitudes may have changed for other reasons). Dissatisfaction among Montanans generally decreased from 39% to 22%; among deer/elk license holder from 51% to 21%; among wolf license holders from 67% to 25%, and tellingly, among rural landowners from 64% to 34%. In addition to the wolf survey data from 2012, data from Metcalf et al. (2024) showed that intolerance with wolves being on the Montana landscape has decreased over time (Figure 23). These findings cannot tie hunting and trapping directly to increased tolerance but the activities are likely an important factor. A more recent perspective supporting the potential for harvests supporting tolerance for a species was provided by Richardson (2023). A variety of actions and activities may result in increased support depending on individual perceptions.

Figure 23. Wolf tolerance in Montana



Admittedly, the tolerance of wolves does not directly translate to the tolerance of grizzly bears under a hunting scenario. However, from the 2020 Survey of Montanans regarding the topic of grizzly bear management in Montana, we find generally positive attitudes towards grizzly bears (Costello et. al., 2020). That said, a sizable majority of Montanans support some form of potential grizzly bear hunting: 49 percent support enough hunting to manage grizzly bear population size; 30 percent support a very limited season that does not affect their population size; and, four percent support as much grizzly bear hunting as possible (Costello, 2020). Only seventeen percent responded that grizzly bears should never be hunted in Montana

(Costello et. al., 2020). Residents who believed hunting should be used to manage conflict, were themselves hunters, had vicarious wildlife experience with property damage, believed grizzly populations were expanding, were older, or were more likely to believe populations were too high (Nesbitt et. al., 2023).

Thus, there is an argument to be made that a feeling of inclusion, control, engagement, and agency – which hunting may engender even if the vast majority of landowners never draw a permit or if hunting never occurs on or near their land -- is particularly important for landowners because they have outsized influence to affect grizzly bear conservation. Their cooperation in grizzly bear conflict prevention is critical. Grizzly bears obtaining human rewards on their land are much more likely to continue that behavior elsewhere, and repeat offenders almost always die years before they otherwise would. Thus, increasing the level of trust between landowners and an agency or organization working toward grizzly bear conservation carries much greater conservation impact than would a similarly scaled increase in trust between a randomly selected citizen and the same agency or organization.

Considering the values of those who prize hunting, and/or of rural landowners whose cooperation in reducing human–bear conflict is key to success (but impossible to mandate) does not mean that those values are the only ones considered by FWP. FWP expects that various aspects of its ultimate strategy will be supported more by some members of the public than others and has no illusions that any plan will unify the attitudes and values of all Montanans. The fundamental goals of the plan must be broadly acceptable to most Montanans, but it is unlikely every aspect will find favor among all Montana's citizens.

A potential grizzly bear hunt: functions, expectations, and regulations

Under any realistic scenario including a future hunting season, the following general principles would apply to FWP and any citizens affected by hunting: (i) The hunting program would be small in scope; (ii) The general approach of FWP toward grizzly bears would remain very similar to its current approach to the species. Grizzly bear hunting would be added to the scope of what FWP considers and does but would not dominate that scope. FWP anticipates that, as now, the overwhelming majority of attention and resources would be spent on conflict reduction and, under the Preferred Alternative, in furtherance the objectives of interconnected populations that are consistent with prioritizing human safety and minimizing disruptions to Montana citizens' ways of life and livelihood; (iii) If hunting occurred, it would be embedded within and consistent with FWP's overarching goal of maintaining thriving grizzly bear populations within their core areas, under the Preferred Alternative in encouraging connectivity among those areas where doing so is most likely to result in biological benefit and where bear-human conflicts can mostly likely be kept to manageable levels, and maintaining public support for both of those goals. Specific details to any hunting season will need approval by the Commission following required public process. As part of the season-setting process, FWP routinely conducts public scoping to gain insight into the public's concerns about any Montana hunting and trapping season. FWP uses these scoping comments, other communications, and survey and harvest data to craft proposals for season recommendations. Once proposals are presented to the Commission, the Commission may reject, modify, or approve the recommendations. Once approved, the final proposal becomes regulation.

History of grizzly bear hunting in Montana

Montana recognized grizzly bears as a game animal in 1923, initiating the regulation of harvest by requiring a hunting license to harvest a bear and by designating hunting seasons and units. Additional regulations were enacted over time (Table 7). Wildlife managers began estimating the total annual kill of grizzly bears (including hunting) in 1947. Assuming hunting accounted for 60% of annual kill, the approximate numbers of bears harvested statewide by hunters during 1947 and 1966 ranged from to 6 to 36 and averaged 22 (Greer 1972). Until 1967, a general big game license allowed a hunter to harvest either a black bear or a grizzly bear.

In 1967, when grizzly bears were recognized under the Endangered Species Preservation Act, Montana introduced a special grizzly bear hunting license. A mandatory check was also established to monitor annual harvest more closely. During the years 1967–1974, hunters' annual harvest in the GYE was 0–9 bears with an average of 3, and in the NCDE was 9–28 bears with an average of 19 (Figures 24 and 25).

In 1975, when grizzly bears were listed as threatened under the Endangered Species Act (ESA), hunting seasons were closed outside of the NCDE. The NCDE hunt was permitted to continue as long as human-caused mortalities from all causes, including hunting, did not exceed a quota, which was set at 25 at that time.

In 1983, a subquota of 9 human-caused mortalities was established for females. In 1986, this subquota was reduced to 6 and the overall quota of human-caused mortalities was reduced to 21. Concurrently, costs of grizzly bear hunting licenses were increased, and more restrictions on the date of license purchase were enacted.

During the years 1975–1990, the number of grizzly bear licenses sold, and the number of grizzly bears harvested, gradually decreased (Figures 24 and 25), and 60% of bears harvested were males. Hunters' success rates (i.e., bears harvested per license issued) showed a range of 0–3.4%, and an average of 1.6%.

In 1991, a limited-entry spring grizzly bear hunt was implemented on the Rocky Mountain Front, designed to target conflict bears. This special hunt resulted in the harvest of 3 males with a hunter success rate of 5.9%. Responding to a lawsuit, a court injunction closed the fall hunting season in 1991. Subsequently, authority for Montana to establish a grizzly bear hunting season in the NCDE was removed by USFWS in a federal rule.

Table 7. Timeline of changes to grizzly bear hunting in Montana

- Items in regular type represent changes enacted by Montana law or by Commission regulation or rule.
- Items in bold type represent changes enacted by federal law or rule.

Year	Management event or regulation change
1923	Bears (grizzly and black) are declared game animals.
	Anyone with a general big game license may harvest one grizzly or black bear within defined seasons and areas.
	Spring grizzly bear hunting season is closed statewide.
1942	Grizzly bear hunting season is modified to coincide with fall big game hunting season.
1947	Harvest of cubs or females with cubs is prohibited.
	Managers begin estimating annual harvest number.
1948	Baiting of bears is prohibited.
1967	**Grizzly bear is listed as endangered under Endangered Species Preservation Act of 1967.**
	Managers begin maintaining grizzly bear mortality records in one central location.
	A requirement is established for a special grizzly bear hunting license, obtainable before or during the season; license fee is set at $1 for residents and $25 for non-residents.
	A requirement is established for hunters to purchase a $25 trophy license within 10 days of harvesting a grizzly bear.
	A harvest limit is established of 1 grizzly bear per license, per person, per year.

1969	Mandatory reporting of grizzly bear kills, with presentation of hide and head, is implemented.
1970	Last date of license purchase is set at September 15 (one day before first general big game hunting season).
1971	Grizzly bear license fee is raised to $5 for residents and $35 for non-residents; the $25 trophy license remains. Waiting period of 7 years established for next purchase of a grizzly bear license by successful grizzly bear hunters.
1972	Last date for grizzly bear license purchase is set at July 1. Baiting with livestock, using trapping devices, and pursuing with dogs are prohibited in the harvest of grizzly bears.
1975	**Grizzly bears are listed as threatened in the lower 48 states under Endangered Species Act (ESA).** **Grizzly bear hunting is closed in all areas except NCDE; in NCDE, 10 hunting districts and an annual quota of 25 human-caused grizzly bear deaths, including from hunting, are established.**
1976	Grizzly bear hunting license fee is raised to $25 for residents and $125 for non-residents. Regulation is enacted: hunting season closes within 48 hours of notice after the number of human-killed bears reaches 25.
1978	Last date of license purchase is set at June 15.
1980	Grizzly bear hunting license fee is raised to $150 for non-residents.
1982	Grizzly bear hunting license fee is raised to $175 for non-residents. Last date of grizzly bear license purchase is set at August 31.
1983	Annual subquota is set at 9 human-caused deaths (including by hunting) of female grizzly bears in NCDE.
1984	Grizzly bear hunting license fee is raised to $50 for residents and $300 for non-residents.
1986	**USFWS special rule adjusts annual quotas related to grizzly bear hunting along Rocky Mountain Front. Quota for all human-caused grizzly bear deaths is adjusted to 21; subquota for NCDE females is adjusted to 6.** Three bear management units are established in the NCDE, each with an additional female subquota.
1987	State law is passed, limiting harvest to one grizzly bear per person per lifetime.
1991	Limited-entry, spring (April 1– May 4) grizzly bear hunting season is implemented on the Rocky Mountain Front; the harvest limit is 3 grizzly bears total, after which the season closes. Fifty permits are issued (46 used by hunters) with approximately two-thirds of hunting effort occurring on private lands. Harvested are 3 males, aged 4, 5, and 21; the older two previously had been captured and marked, and had a history of human–bear conflicts. A few days before being harvested, the 21-year-old is believed to have depredated calves nearby. **Fall hunting season for grizzlies is canceled, due to federal court preliminary injunction on hunting them.**
1992	Commission omits grizzly bear hunting season from biennial regulations for 1992–1993. **State's authority to establish grizzly bear hunting season in NCDE is removed by USFWS in federal rule.**

Figure 24. Grizzly bears harvested in Montana.

Numbers are estimated for 1947–1966, and observed for 1967–1991.

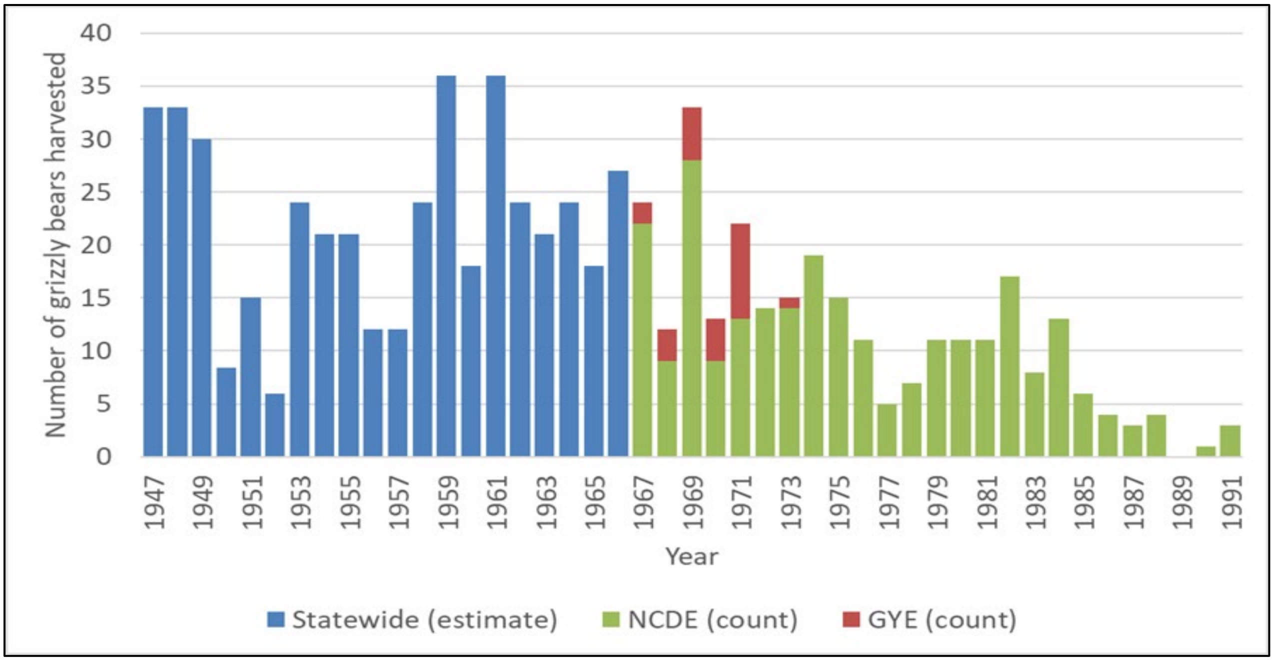
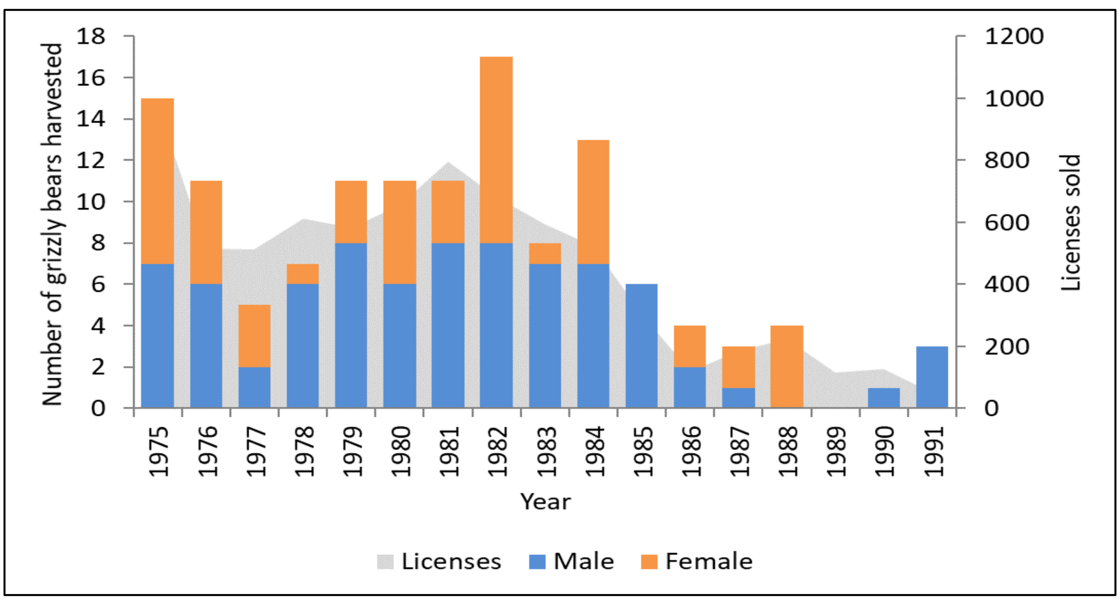


Figure 25. Observed numbers of grizzly bears harvested and licenses sold in Montana.

From 1975–1991.



The 2017 draft proposed hunting season

Any hunting of grizzly bears in Montana would occur under regulations adopted by the Commission through a public process. In 2017, as a requirement of delisting the GYE DPS, the USFWS required Montana, Wyoming, and Idaho to propose hunting regulations they could point to as adequate regulatory mechanisms to ensure that hunting would not jeopardize a (future) delisted population. Montana adopted regulations that provided a structure for a future hunting season and were viewed both by FWP and the Commission as conservative. Montana, Wyoming, and Idaho entered into an MOA (since updated, see Appendix H) whereby the three states agreed to annual maximum mortality limits applies within the GYE DMA based on the estimated population size and sex/age structure. These mortality limits would include all sources of mortality (including estimated unreported mortality) and would be applied separately to females and males that are independent of their mothers (i.e., over 2 years old). If, after all other sources of mortality were accounted for, there were bears that could be killed without exceeding these limits, they could be allocated among the states and available for hunting. This system would ensure that no one state could cause the mortality limit overall to be exceeded. In Montana, hunts could occur inside or outside of the DMA, but the applicable mortality limits were those within the DMA (that is, even hunts outside the DMA were subject to the mortality limits applying in the DMA, there were no permits allocated specifically for bears outside the DMA). The guiding principles of Montana's hunting season structure that was adopted by the Commission in May 2017 included:

- Maintain a viable grizzly bear population in the Montana portion of the GYE under state management;
- Increase broad public acceptance of sustainable harvest and hunter opportunity as an effective part of successful, long-term grizzly bear conservation; and
- Maintain positive and effective working relationships with stakeholders.

Upon FWP's recommendation, the Commission ultimately decided to delay the adoption of the proposed hunt, a decision that was rendered moot by litigation that suspended the USFWS delisting rule. See Sidebar 10 for FWP's 2017 hypothetical hunting structure for GYE, should delisting occur.

Sidebar 10. Hypothetical GYE hunting structure (FWP, 2017) in case of delisting. Note: This is the structure designed in 2017. It does not reflect improvements in population estimation techniques since that time.

Seasons and overall structure

- Spring (Mar. 15 – Apr. 20) and fall (Nov. 10 – Dec. 15), designed to limit exposure of female grizzly bears to hunting
- Mandatory hunter reporting within 12 hours of harvest
- Quotas by hunting district, with district to close upon 24-hour notice when quota reached
- When female quota is reached, all hunting districts close (regardless of whether the male subquota had been reached)
- Maximum harvest equal to the number of permits (i.e., hunter success assumed to be 100%)
- Mandatory orientation for all permit holders; taking a bear in a den prohibited
- Taking of females with young prohibited, as would be use of dogs, baits, or scents

Geographic limitations

- Seven possible hunting districts in the GYE, with two (the western-most and eastern-most) closed to harvest to minimize probability of removing a genetic migrant and facilitate genetic exchange between the NCDE and GYE.

Estimation of number of permits

1. Use estimate of population size for year t (using the revised methodology)
2. Calculate total sex-specific mortality limits (from GYE CS table) for population size in year t
3. Calculate "discretionary" mortality allowable in year (t+1) by subtracting the total estimated actual sex-specific mortality in year t (which includes an estimate of unknown deaths) from sex-specific mortality limits
4. Allocate 34% of resultant discretionary mortality to Montana (proportion of GYE DMA)
5. For example, in 2017, Chao2 estimated population size was 718. Montana would have proposed offering 6 permits, with subquotas of 5 males and 1 female (i.e., hunt would have closed within 24 hours of a female being harvested). The Chao2 method was revised since this process was developed in 2017, therefore, in the future, the population size for year t will be derived from the revised Chao2 estimate (less biased) and observed vital rates within an Integrated Population Model.

Would hunting grizzly bears reduce human–bear conflict?

The GBAC stated that while hunting can be a useful tool in managing grizzly bear populations, it will not replace the need for conflict prevention. As reflected in ARM 12.9.1401 from 1977, a reasonable thought is that hunting of grizzly bears could be useful in reducing bear-human conflicts, and that hunting could modify the behavior of bears so as to reduce their danger to humans. FWP is not aware of definitive research that could support or refute either assumption for grizzly bears in Montana. Hunting is not likely to be an effective tool for conflict prevention or reduction. Human-bear conflict was not correlated with prior harvest, providing no evidence that larger harvests reduced subsequent human-bear conflicts. Given that variation in natural foods, harvest is unlikely to prevent elevated levels of human-bear conflicts in years of food shortage unless it maintains bears at low densities – an objective that might conflict with maintaining viable populations and providing opportunities for sport harvest (Obbard et al. 2014). However, work on black bears in a number of North American jurisdictions can be instructive for considering the possible effects on conflict complaints generally. The below quote on the topic comes from a committee of the International Association for Bear Research and Management (IBA), in their March 2017 position paper entitled "Hunting as a tool in management of American black bear populations" (IBA 2017):

> The efficacy of hunting as a means of reducing nuisance complaints is subject to considerable scientific debate and is situation-dependent. Some studies have linked hunting and trapping to reduced human–wildlife conflict, suggesting that they reduce populations from biological carrying capacity, remove some problem individuals from the population before they would ordinarily die, and alter the behavior of wildlife (Conover 2001). In New Jersey, the occurrence of a hunting season was linked to decreases in human–bear conflicts the following year (Raithel et al. 2016), and in one Ontario study area, nuisance complaints increased substantially during the 5 years following the closure of a spring hunting season (Hamr et al. 2015), though neither study considered the likely confounding effects of local food conditions on complaint numbers. Conversely, studies in Wisconsin and across Ontario as a whole found no evidence that increasing harvest reduced subsequent human–bear conflict; instead, conflict levels were tied to underlying population growth in Wisconsin (Treves et al. 2010), and in Ontario, to annual variation in natural foods, with complaints increasing in years of poor food supply (Obbard et al. 2014).

The position paper concludes that "[w]here the primary management objective is to slow population growth or limit population size or distribution, then increasing human-caused mortality is the only option. A regulated and monitored hunt can do this effectively…Conversely, if the primary management goal is to reduce human–bear conflict, the crucial and, arguably, only efficient and long-term way to do so is through education, outreach, and implementation of practices and regulatory policies that remove bear attractants…."

The papers cited by IBA (2017) provide reason to doubt that hunting per se would reduce conflicts generally. Hunting itself is very unlikely to solve all bear/human conflicts and thus reduce the need for our active bear conflict reduction program. However, there are four aspects of the situation in Montana deserving consideration for the possibility that they could plausibly provide some reduction in bear/human conflicts. We note here that only the fourth of these has been supported by empirical data, so we urge that these be viewed as hypotheses, to be examined later if hunting were to occur:

1) It is true that a dead bear cannot behave in any way once killed and that — not being herd animals — animals other than the one removed cannot "learn" from the death of the hunted animal. However, it is not necessarily the case that every instance of hunting results in the death of the targeted bear. Hunting may, in some cases, serve a similar function as does purposeful hazing, if the animal is pursued by humans but not killed and if the animal senses that it is being harassed. This would seem particularly true if shots are fired close enough to provide negative stimulus, but the animal not hit.

2) Although it is probably true that “conflict” animals per se would rarely if ever be specifically and deliberately targeted by hunters, it is nonetheless possible that subtle behavioral attributes with a genetic component may make some animals more vulnerable to hunters than others. We routinely accept this concept when hunting other animals (e.g., mule deer more vulnerable on a per capita basis to an “either deer species” hunt than white-tailed deer, due in part to their less wary nature). If some bears are genetically wired to be less wary than others – or have been taught by their mothers that the reward of being near people outweighs the risks – they may indeed be more vulnerable to hunting. Thus, it is conceivable that hunting bears that are exposed to human attractants could disproportionately remove some of those most apt to respond to those attractants.

3) If hunting removes primarily dominant males (as a guided hunt might do), this could reduce the imperative felt by females with cubs to get out of their way. If, as has been shown with some data in Scandinavia, males appropriate the most secure and best food patches, relegating females with cubs to refuges near people where adult males are less willing to venture, a reduction of dominant males could allow some of these females with cubs to spend longer in these secure areas.

4) Some hypothetical hunts could have the effect of reducing population density at a local geographic scale. Garshelis et al. (2020) have shown that among Minnesota black bears (often hunted over bait), population size – largely dictated by hunting pressure - added to the effects of annual variation in food abundance and efforts to secure attractants in explaining variation in conflict reports. Reductions in population size caused by hunting reduced conflicts; thus, on a local scale, it is plausible that this could occur with grizzly bears as well – although Garshelis et al. (2020) caution that this could be difficult if attractants remain unsecured. These authors concluded that “A recommendation stemming from experiences in Minnesota is to mitigate local conflicts through targeted measures aimed at changing human behavior, reducing availability of attractants, and increasing tolerance of people, while at the same time managing and monitoring the population on a larger scale at a socially-acceptable level.” (Garshelis et al. 2020: 16). Thus, although hunting itself would be unlikely to sufficiently reduce conflicts to tolerable levels, it could be of minor assistance in that cause.

Hypothetical hunting structures approaches and their rationales

- **Issues and attributes common to all.**
  - Any such hunts would be structured so as to bias off-take in favor of males.
  - Under delisted status, any grizzly bear hunt would only be authorized by the Commission after thorough public process.
  - FWP does not envision offering hunts within the planning horizon in hunting units in, or near, the Cabinet-Yaak or Bitterroot grizzly bear areas.
  - FWP envisions recommending little or no hunting in connectivity areas if bear presence is unknown, density is believed to be very low, and evidence of desired connectivity is lacking.
  - FWP envisions that hunting may be used as a tool to limit grizzly bear population density in areas where potential for connectivity is low and potential for human-grizzly bear conflict is high.
  - Under the Preferred Alternative, hunts would be sustainable (i.e., not intended to reduce population abundance) where providing for connectivity between the current NCDE, GYE, CYE and/or BE populations is a high priority.
  - Grizzly bear hunts would be once-in-a-lifetime opportunities for successful applicants (§ 87-2-702, MCA).

- As with all hunts of animals classified as a game animal, no edible portion of the carcass could be left in the field or wasted (§ 87-6-205(4), MCA).
- Sale or purchase of the head, hide, or mounts of a grizzly bear legally taken by a hunter would be prohibited (§ 87-6-206, MCA).
- Any successful applicant for a grizzly bear hunting license would pay the applicable license fee; in addition, any successful hunter over 12-years of age would be required to purchase a trophy license within 10 days after the date of kill (§ 87-2-701, MCA).
- A mandatory orientation session would be required of all hunters licensed to kill grizzly bears.

- **Approach 1: No hunting.**

  Description:
  - No recreational hunting. Bears that die from the deliberate activities of humans would be those that required removal when conflicts could not be resolved by non-lethal means.

  Characteristics:
  - Although allowable by statute and regulation, no hunting season would be proposed by FWP or approved by the Commission.

  Projected benefits:
  - No additional mortality to any grizzly bear population over and above natural mortality, and mortality made necessary by management actions.

  Projected challenges:
  - Defending the lack of hunting to Legislators, Commission members, and/or members of the public who would expect it if delisted, given existing policies.

  Projected downsides:
  - Loss of opportunity to provide additional source of funding for bear management and conservation.
  - Loss of a sense of involvement and engagement among landowners living near the bears subject to this kind of hunt. FWP anticipates that a sense of disengagement among landowners affected by grizzly bear presence ultimately makes communication and cooperation with FWP bear managers and NGO staff working to minimize human/bear conflicts more difficult and may make grizzly bear conservation more difficult in general.

- **Approach 2: Limited draw, sustainable off-take hunt.**

  Description:
  - A limited number of tags would be available via random lottery for licenses to take a single grizzly bear during short spring- and fall-seasons in specified areas where populations from the Greater Yellowstone cornerstone and/or the Northern Divide cornerstone (depending on listing status) have shown evidence of density-dependence. (This would be very similar to the (never-implemented) model used in 2017 for the GYE at the request of USFWS).

  Characteristics:
  - The number of permits would be limited to the maximum discretionary mortality allowable under a multi-agency conservation strategy.

- The maximum discretionary mortality under multi-agency conservation strategies would be determined after accounting for all known and estimated mortality from other sources and based on a population estimate considered to be conservative. Thus, best available models project that this hunt would not reduce the underlying growth rate of the population affected.
- For any hunt in or near the GYE, the number of permits would be limited by the 3-state MOA allocating discretionary mortality among Wyoming, Idaho, and Montana.
- Hunting units would not be geographically confined to a DMA, but any animals taken would count against the maximum prescribed within that DMA.
- Hunts would end within any given hunt unit when the limit for females harvested in that unit is reached. For hunts involving multiple hunting units, the entire hunt (i.e., among all hunt units) would end when the limit for females harvested is reached in any hunt unit. Hunters would be required to report harvest within 12-hours and closures would occur upon 24-hour notice when a limit is reached.
- Season dates would be designed to limit female mortality by targeting periods when most females are denning and primarily males are out of dens.
- Taking of any bear in a group would be prohibited.
- Taking of a bear in a den would be prohibited.

Projected benefits:

- The primary anticipated benefit would be an enhanced sense of involvement and engagement among landowners living near the bears subject to this kind of hunt. FWP anticipates that an enhanced sense of landowner engagement that would accompany this type of hunting would help foster communication and cooperation with FWP bear managers and NGO staff working to minimize human/bear conflicts.
- A secondary anticipated benefit would be the generation of revenue from the sale of a limited number of licenses and potentially from non-refundable application fees; these revenues would be ear-marked for supporting regionally placed grizzly bear managers.
- A tertiary anticipated benefit would be providing a modest amount of hunting opportunity for those interested in legally taking a grizzly bear.

Projected challenges:

- Complex rule-structure.
- The need to adjust allowable mortality and, in the case of the GYE, coordinate with 2 other states annually.
- Workload involved with FWP staff checking harvested bears, and publicizing hunting season closures (if needed) rapidly.

Projected downsides:

- Frustration and disagreement from those opposed to such a hunt.
- The potential that a harvested animal might have been one that would have contributed to connectivity later had it lived longer. (FWP believes this probability is small because of the geographic restrictions in this type of hunt, as well as the limited number of animals hunted).

- The potential that the social benefits anticipated above (i.e., fostering a sense of engagement and cooperation among landowners and others who feel burdened by co-existing with grizzly bears) would not be realized, in part because of the modest number of bears removed.

- **Approach 3: Auction hunt.**

  Description:

  - Either in conjunction with hunts described above or as a stand-alone program, a single statewide permit would be offered at auction (as authorized under § 87-2-814, MCA), with the highest bidder obtaining authorization to take a single grizzly bear from within a number of potential locations. It is likely, albeit not mandated, that the permittee would prioritize taking a large male bear and would hire an outfitter/guide to assist. The auction could either be conducted directly by FWP or outsourced to a qualified organization which would be allowed to retain up to 10% for administrative costs.

  Characteristics:

  - One grizzly bear, statewide, annually.
  - Hunting units would not be geographically confined to a DMA, but any animals taken would count against the maximum prescribed within that DMA. Hunters would be required to report harvest within twelve hours. If occurring in conjunction with a hunt under Approach 2 (as described above), the limit would be reduced by 1 to account for this mortality.
  - Subject to the geographic constraints above, hunting units available to the permittee would allow for considerable choice (but not include areas within, or near, the CYE or BE).
  - Season dates would be designed to limit female mortality by targeting periods when most females are denning and primarily males are out of dens.
  - Taking of any bear in a group would be prohibited.
  - Taking of a bear in a den would be prohibited.

  Projected benefits:

  - The primary anticipated benefit would be the generation of revenue from the sale of a single, high-priced permit; these revenues would be ear-marked for supporting regionally placed grizzly bear managers.
  - A secondary anticipated benefit would be providing a very small amount of hunting opportunity for those interested in legally taking a grizzly bear and willing to spend a great deal of money for this rare opportunity.

  Projected challenges:

  - FWP workload associated with administering the auction (or managing the contract of an outside organization if outsourced).
  - FWP workload associated with staff checking harvested bears, and publicizing hunting season closures (if needed) rapidly.

  Projected downsides:

  - Many people object to a hunt that is available only to the highest bidder, a person typically with financial means to bid well above what most can afford. This type of hunt is likely to be considered by most of the public as a "trophy hunt," which are held in lower regard by many members of the public than hunts available to those of lesser financial means.

- **Approach 4: Population growth reduction hunt.**

  Description:

  - Either in conjunction with hunts described above or as a stand-alone program, a limited number of tags would be available via random lottery for licenses to take a single grizzly bear during short spring- and fall-seasons in specified areas where the geographic distribution of bears has expanded into areas that are outside of DMAs, and that provide no connectivity with other population cores. Permits would be limited numerically to produce, at maximum, a slow and modest reduction in the underlying rate of growth but would be constrained by the maximum allowable mortality limits codified in any multi-agency conservation plans.

  Characteristics:

  - These hunts would occur where reducing the number of bears, short-term, and the growth-rate longer-term of the bear population, are considered social benefits.
  - Hunt permits would be valid only on private land and require advance permission of the landowner.
  - Hunting would not occur where connectivity between population cores can occur.
  - Taking of any bear in a group would be prohibited.
  - Taking of a bear in a den would be prohibited.

  Projected benefits:

  - The primary anticipated benefit would be an enhanced sense of involvement and engagement among landowners living near the bears subject to this kind of hunt. FWP anticipates that an enhanced sense of landowner engagement that would accompany this type of hunting would help foster communication and cooperation with FWP bear managers and NGO staff working to minimize human/bear conflicts. FWP anticipates that increased communication and cooperation, in turn, would benefit grizzly bear conservation in areas where connectivity and population growth is an articulated objective.
  - A secondary anticipated benefit would be enhanced acceptance among local residents of remaining bears because of the removal of some bears from these landscapes (i.e., areas where bears are not expected to contribute measurably to connectivity or to establish new populations). Bear-human conflicts would be anticipated to decline slightly simply from fewer bears being on the landscape.
  - A tertiary anticipated benefit would be providing a modest amount of hunting opportunity for those interested in legally taking a grizzly bear.
  - An additional anticipated benefit would be the generation of revenue from the sale of a limited number of licenses and potentially from non-refundable application fees; these revenues would be ear-marked for supporting regionally placed grizzly bear managers.
  - Finally, while not identified as an objective, it is possible that because of the geographic restrictions of this hunt, animals harvested would be those likely to become involved in conflict situations, thus further reducing bear-human conflict.

Projected challenges:

- Delineation of hunting areas that meet the criteria.

Projected downsides:

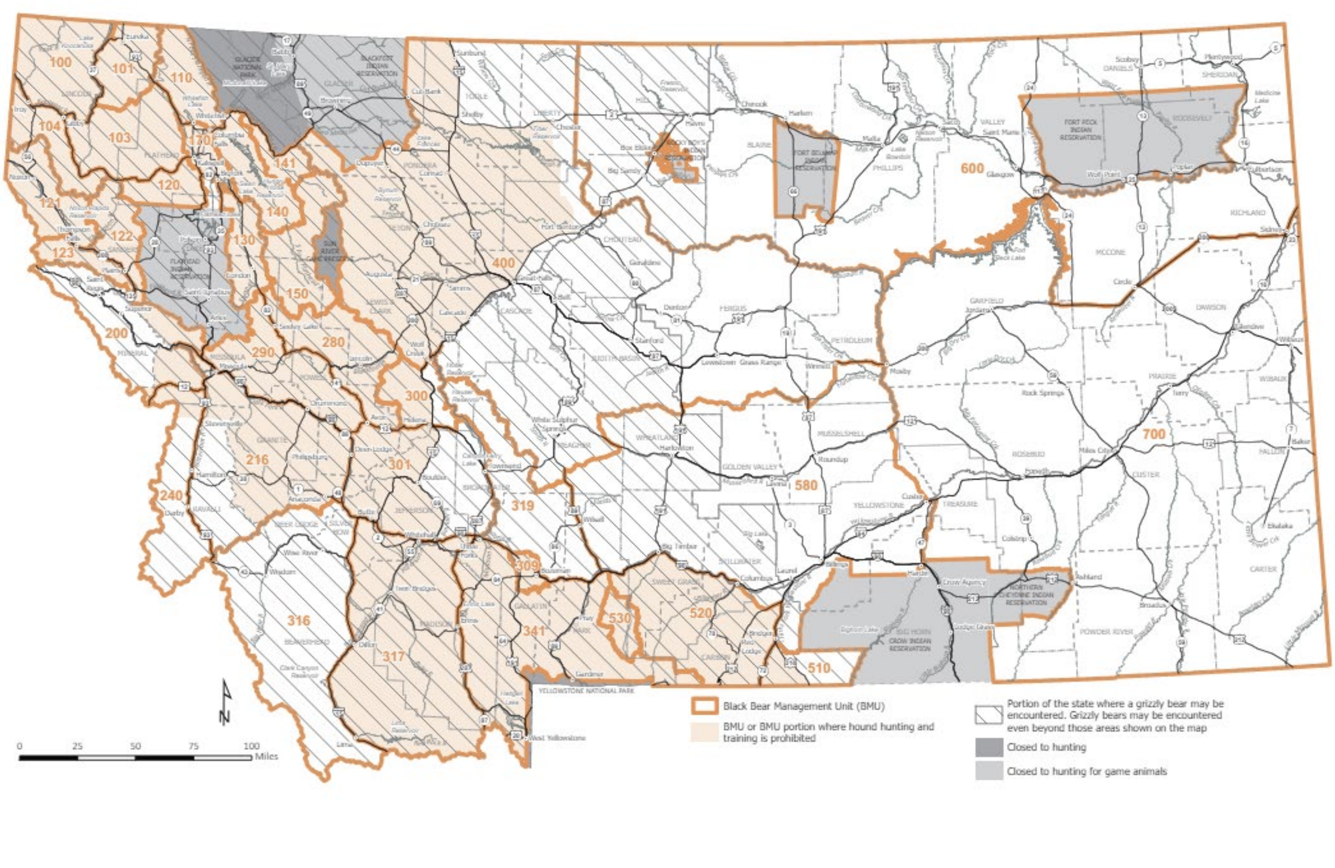
- The potential that the social benefits anticipated above (i.e., fostering a sense of involvement and cooperation among local residents who feel burdened by co-existing with grizzly bears) would not be realized, in part because of the modest number of bears removed (i.e., bears would remain on the landscape, and bear-human conflicts would likely continue, albeit perhaps both at lower levels than were this type of hunt not implemented).

Recreational activities in potentially occupied grizzly bear habitat

Black bear hunting with hounds

The 2021 Montana legislature passed a law allowing licensed hunters to chase black bears with hounds during the spring hound season in any valid hunting district or management unit during the period that unit is open to hound hunting or chasing. Hound hunting and training is prohibited in occupied grizzly bear habitat in the areas shown in Figure 26. The Commission has the authority to close areas to avoid conflicts between hunters and grizzly bears.

Figure 26. FWP Bear Management Units.



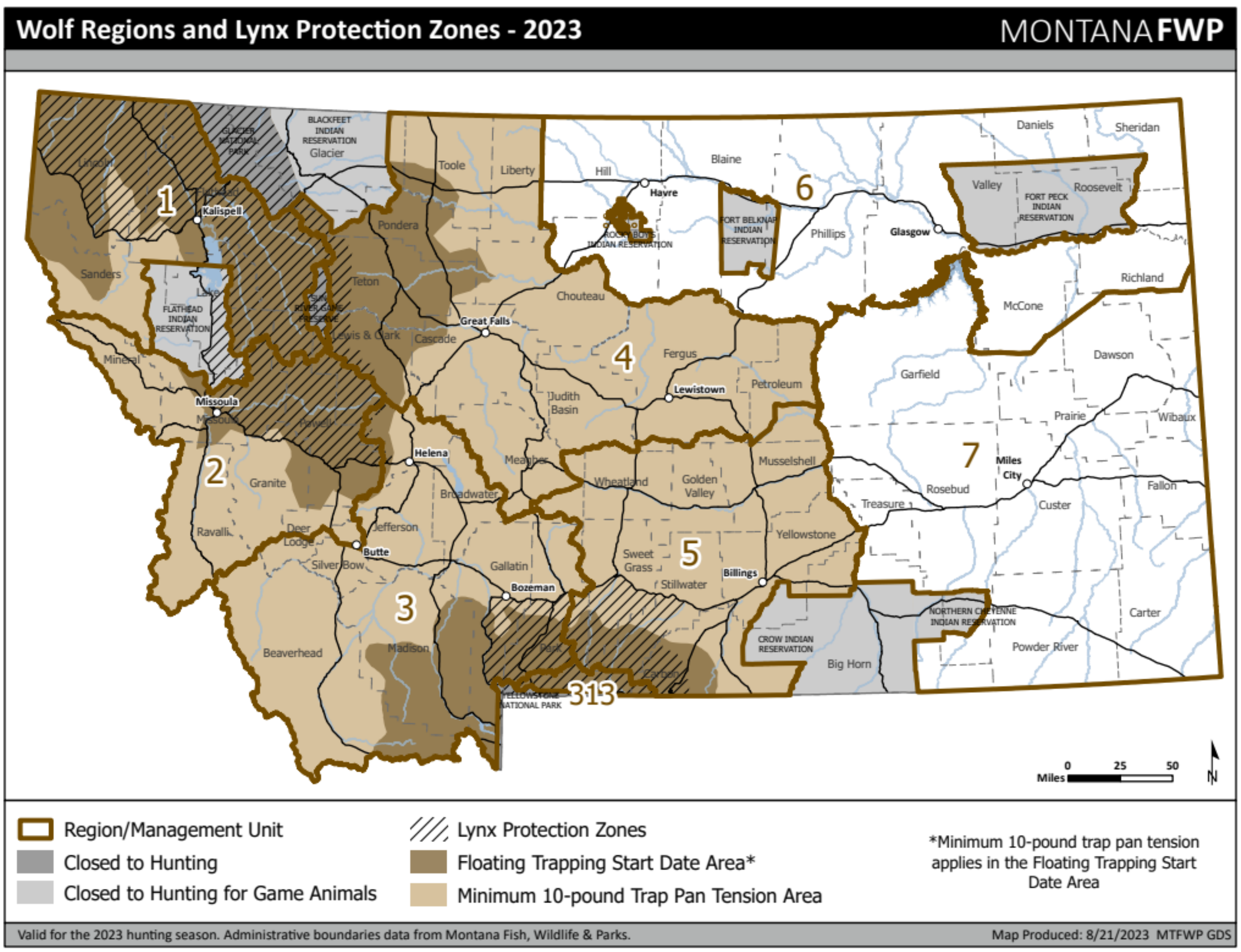
Wolf trapping

Wolf trapping with footholds became legal again in Montana in 2012. For many years, trapping was limited to footholds but in 2021 the Commission approved the use of snares in addition to footholds. Trapping regulations include a floating start date for wolf trapping in the "estimated occupied range of grizzly bears." The intent of the floating start date is to avoid grizzly bears that have yet to den for the winter. FWP decides whether to open the trapping season in the "estimated occupied range of grizzly bears" each Monday in December with input from field staff based on bear activity. The Commission can adjust seasons annually, regionally, and on short notice to address harvest rate and population trajectory or concerns to species like lynx or grizzly bears. As a result, wolf regulations should not impact other federally listed species or the ability to delist or keep delisted those species.

Trappers are urged to exercise caution when out in the field throughout the trapping season as bears can be active at any time to include grizzly bears that leave dens at some point during winter. Trappers are encouraged to avoid trapping in areas where grizzly sign is detected.

It is in the best interest of the department and within statutory direction to protect and conserve species to limit human-grizzly bear conflicts and incidental take resultant from activities such as black bear hunting with dogs and wolf trapping.

Figure 27. FWP Wolf Regions.



Part IV: Supplementary Information

Summary of science used in this document

This section covers references on science used by FWP to develop this document, organized by relevant topic with brief notes about the main takeaway.

Grizzly bear biology

FWP generally has depended on the following sources for basic biological information on grizzly bear biology in North America: Pasitschniak-Arts (1993), Schwartz et al. (2003) and Garshelis (2009). With specific reference to denning, FWP has consulted Haroldson et al. (2002), Graham and Stenhouse (2014), Krofel et al. (2016), Pigeon et al. (2016b), and Johnson et al. (2017).

Augmentation

Servheen et al. (1987) provided an early discussion paper of how augmentation into the Cabinet-Yaak area might occur. Maguire and Servheen (1992) discussed the decision analysis used to decide on the age/sex class of bears to use in the pilot augmentation project and estimated the probabilities that augmented bears would remain in the target area, as well as that they would be involved in subsequent human–bear conflicts. Servheen et al. (1995) reported on early efforts to augment four bears into the CYE during 1990-92. They used the word "transplant," but we prefer "augmentation." Kasworm et al. (1998) updated this report. Proctor et al. (2004) used simulations to show that augmenting the CYE population was more effective than other alternatives in reducing extinction probability in the short-term. Kasworm et al. (2007) used genetic evidence to show that three of the four grizzly bears augmented in the early 1990s had remained resident for at least a year and that at least one had successfully reproduced. Kendall et al. (2015) concluded, based on a large-scale mark-recapture experiment depending on genetic signatures for the marks, that augmentation had succeeded in preventing the CYE population from becoming functionally extirpated.

Density dependence

Our general understanding of population regulation in grizzly bears was informed by Brockman et al. (2020), Keay et al. (2018), McLellan (1994, 2015), Miller et al. (2003), and Schwartz et al. (2006a) (Gardner et al, 2014).

Genetics, minimum population size, conservation biology

For background on conservation genetics as it relates to grizzly bear conservation and management generally, FWP has referred to Wright (1931), Franklin (1980), Frankham et al. (2013), Jameison and Allendorf (2012, 2013), Mills and Allendorf (1996), and Wang (2004). On the genetics effects of small and isolated populations for grizzly bears specifically in the Northern Rockies, FWP has referred to Harris and Allendorf (1989), Miller and Waits (2003), Haroldson et al. (2010), Kamath et al. (2015), Kendall et al. (2009), Kasworm et al., 2007, Laikre et al. (1996), Kendall et al. (2015), Proctor et al. (2004), and Proctor et al. (2012).

Infanticide

It has long been known that grizzly bears sometimes kill each other, and that cubs are the most frequent victims of such intraspecific killing (Craighead et al. 1976, Mattson et al. 1992, Olson 1993, Mörner et al. 2005). Adult males are the most frequent perpetrators, but other sex/age classes of bears, including adult females, are known to occasionally kill cubs (Hessing and Aumiller 1994, McLellan 1994.)

Based on observations of spatial distributions of females and males in two disparate study areas, Wielgus and Bunnell (1994) suggested that adult females avoided adult males (in one but not the other study area) in order to reduce the probability that their cubs would be subjected to intraspecific predation. Because grizzly bear females are induced ovulators, Wielgus and Bunnell (1995) suggested that sexually selected infanticide (SSI)—in which a male enhances his reproductive success by killing cubs and mating with the mother who shortly after comes into estrus—might operate in bears and that the avoidance documented was a counterstrategy by females.

Swenson et al. (1997b) found evidence consistent with the hypothesis that hunting had affected the social structure of bears in Sweden in a way that exacerbated SSI and lowered the population's rate of increase from what it would have been without infanticide. Following on this, Wielgus and Bunnell (2000) added this element to their earlier interpretation of their data. A number of subsequent studies from Europe supported some, albeit not all, of the original implications of Swenson et al.'s (1997b) work (Swenson et al. 2001a,b Dahle and Swenson 2003; Bellemain et al. 2006a,b; Zedrosser et al. 2009; Steyaert et al. 2013; Gosselin et al. 2015).

FWP finds the most well researched, thorough, and geographically applicable reviews of SSI to be that of Miller et al. (2003) and McLellan (2005). In a review of four cub survival and litter size data Alaskan populations, Miller et al. (2003) found no evidence consistent with the expectations had SSI been common. Instead, he found that litter sizes and cub survival were lower in national parks, where densities were probably close to carrying capacity, than in nearby, similar hunted areas where densities had been lowered by hunting. In his study area, where one might expect to find the kind of hunting-related effects of SSI postulated by Wielgus and Bunnell (1995) and Swenson et al (1997b), McClellan (2005) found no evidence consistent with expectations of the hypothesis. Additional data and analyses in the same study area later led to a similar conclusion (McLellan 2015).

McLellan (2005) also provided a useful simulation model that further explored expectations under explicitly articulated versions of the SSI hypothesis for bears, finding that it should typically be rare, and when present, the most likely perpetrators would be older rather than younger males. Finally, McLellan (2005) pointed out some particularities of the study area in which Wielgus and Bunnell (1995) claimed to have found their counterstrategy, but also pointed out some design and analysis flaws from their study that left it open to alternative explanations.

Grizzly bears and people

In addition to the sources cited elsewhere, FWP has referenced the following:

- For grizzly-bear livestock conflicts, Anderson et al. 2002.
- For details on compensation programs (particularly for lost livestock), Morehouse et al. 2018, Harris 2020.
- For conflicts in domestic settings (and reasons grizzly bears might be attracted to such settings), Elfström et al. 2013, 2014a,b; Fernández-Gill et al. 2016; Gunther et al. 2004, Howe et al. 2010, and Morehouse 2016a,b.

Relocation

Brannon (1987) provided an early report on success of relocations of GYE grizzly bears involved in conflict (the author used the term translocation, but we replace it with relocation for consistency). He found that between 1968 and 1984, 57% of individual moved were not later involved in human–bear conflicts and that 41% did not return to their capture site (77% of those moved more than 75 km). Riley et al. (1994) defined success of relocations of Northwestern Montana bears slightly differently: no resumption of conflict activities within 2 years, and mortality only from legal hunting or natural causes. Under this definition, success rate for bears over 1.5 years old was 44% for 1st-time relocations and 15% for bears moved more than once. Females were twice as likely than males to be successfully relocated, although no statistical difference between sexes was observed for animals originating east of the mountains where livestock depredation predominated as the conflict cause. Campbell (1999) reported that 6 of 13 grizzly bears relocated from the Cooper River Delta in Alaska whose movements could be adequately monitored returned to their original home range compared with 3 that did not.

Linnell et al. (1997) reviewed relocations of large carnivores worldwide, concluding that relocated animals typically roam widely after release and are prone to the same types of conflict that justified the initial capture and relocation. Finally, Milligan et al. (2018) evaluated 110 relocations of grizzly bears in Alberta, characterizing 33 of these as “successes” (defined as the bear surviving at least one year with no evidence of homing and not requiring additional management action). Increasing success in relocation was associated with implementation earlier during the non-denning season than later, and the release location having a low mortality risk (fewer roads, more water bodies). Bears released further from their release site were less likely to exhibit homing behavior than those released closer, but also had home ranges over three times as large for the first year following release.

Population status and potential for each population core

Bitterroot area

For insight into the potential for the Bitterroot area to support grizzly bears long-term, FWP used Boyce and Waller (2003) as well as the more general assessment of Mowat et al. (2013). For additional insight into attitudes toward grizzly bears and their possible recovery in the Bitterroot area, we referenced the qualitative study conducted by Velado (2005). Boyce et al. (2002) modeled metapopulation dynamics with and without the addition of a population in the Bitterroots. For more recent status of grizzly bears in the Bitterroot area, we used USFWS (2020).

That the BE retains appropriate habitat for grizzly bears is supported by the work of Merrill et al. (1999); Boyce and Waller (2003) used habitat and population size information from earlier studies of grizzly bears in the Swan Mountains and Yellowstone to estimate that the BE might ultimately support approximately 321 grizzly bears.

Cabinet-Yaak area

For context and background on grizzly bear conservation efforts in the Cabinet-Yaak area, we used Kasworm et al. (1998). For more recent information on status, trends, and prospects, we relied on Kasworm et al. (2019, 2020), Kendall et al. 2015), Proctor et al. (2018), and USFWS (2020). On augmenting bears to the area’s population, we used Maguire and

Servheen (1992), Servheen et al. (1987, 1995), and Kasworm et al. (2007). For recent management efforts, we used Annis (2017, 2018), Annis and Trimbo (2019).

Northern Continental Divide area

Principle references informing FWP's understanding of the status of grizzly bears in the Northern Continental Divide area comes from Kendall et al. (2009, 2019), Mace et al. (2012), Costello et al. (2016), Mikle et al. (2016), Costello and Roberts (2019, 2020), and USFWS (2020). We referenced Teisberg et al. (in review) for information on body condition of grizzly bears in this area.

Greater Yellowstone area

FWP has generally depended on annual reports produced by the IGBST for its understanding of the status and trend of grizzly bears in the Greater Yellowstone area. Other important sources on which we base our understanding of the status of grizzly bears in the Greater Yellowstone area include Miller and Waits (2003), Schwartz et al. (2006a), Harris et al. (2007), Cherry et al. (2007), Schwartz et al. (2006a,b, 2008, 2010, 2012), Haroldson et al. (2010), Fortin et al. (2013), Van Manen et al. (2014, 2016, 2020, 2021), Costello et al. (2014), Bjornlie et al. (2014a,b), Kamath et al. (2015), Wells et al. (2019), and IGBST (2006, 2012, 2013, 2021). The USFWS species status review (USFWS 2020) provides a useful summary.

Critiques of science used

FWP is aware of, and has thoroughly considered, critiques of science produced by the IGBST that have been published online or in various non–peer-reviewed venues. Here, we briefly explain our rationale for accepting the quantitative analyses conducted by IGBST and thus IGBST's interpretations.

- **Overview: Areas of concurrence and differences of interpretation re: Yellowstone grizzly bears.**

Issue 1. Critics and IGBST agree that from the 1980s until about 2001, grizzly bear abundance in the Yellowstone area increased at a modest pace and more slowly since then. They disagree about the magnitude of the increase.

Issue 2. Critics and IGBST disagree about how many bears most likely have been present in the past decade or so.

Issue 3. IGBST has concluded that mortalities of grizzly bears (including all documented and estimates mortalities never detected) have remained at levels consistent with a stable population; critics have claimed that mortalities have increased, possibly to the point of causing a population decline.

Issue 4. Critics and IGBST concur that all available approaches to estimating abundance and trend of grizzly bears are imperfect. They disagree regarding the most likely consequences of these imperfections.

Issue 5. Critics and IGBST concur that grizzly bear spatial distribution has increased considerably and has continued to do so at least through 2018. They disagree about the causes and implications of the increase.

Issue 6. Critics and IGBST concur that important dietary items for grizzly bears (notably whitebark pine and cut-throat trout) have declined in abundance, as well as that these declines have made life more challenging for grizzly bears. They disagree about evidence for population level consequences of these declines.

Issue 7. Critics and IGBST concur that increasing human population and development poses challenges for continued grizzly bear conservation, and that reducing human–bear conflicts as much as possible is the highest priority.

- **Detailed explanations.**

Issue 1: Trend.

The IGBST has used data from four independent sources to estimate the trend of GYE grizzly bears since 1983 (IGBST 2006, 2012, 2021): 1) asymptotic growth rates (i.e., λ), estimated from multi-year estimates of survival and fecundity rates (Harris et al. 2006, Harris 2007), 2) tallies of unique females with cubs observed within the GYE, filtered to reduce to inconsequential the probability of incorrectly considering as separate animals multiple observations of the same one (Knight et al. 1995) and expanded to estimate the number of undetected females with cubs (via Chao et al., IGBST 2021), 3) mark-resight estimates using data from fixed-wing aerial surveys of marked and unmarked females with cubs (starting in 1998), and 4) a partial reconstruction minimum number of bears known alive at various years in the past (which is unavoidably characterized by a long time-lag as many animals are only enumerated and added to estimates of presence in years past when they die and their carcasses become available for inspection).

FWP is aware of only a single criticism of the first method. Doak and Cutler (2014) argued that Harris et al. (2007) over-estimated asymptotic population trajectories by ignoring reproductive senescence among older-aged females. However, Harris et al. (2006) had earlier showed that incorporating reproductive senescence as estimated by Schwartz et al. (2003) had negligible influence on estimated trends using this approach.

More common have been criticisms that numbers of unique females with cubs generated by the Knight et al. rule set are sensitive to the observer effort and because observer effort has generally increased through time, that apparent increases are spurious. However, while it's true that very low levels of effort would return a lower number of females-with-cubs than were actually present, it is not necessarily the case that observation effort past a certain level would continue to return even more females-with-cubs, both because the Knight et al. rule precludes increases without limit, and because the Chao estimator explicitly handles the condition under which all animals are observed multiple times. Figure 4 in Van Manen et al. (2014) shows that grizzly bear seen/hour during flights went up and hours flown actually declined somewhat from 1997 to 2012 – so at best, the relationship between effort and total number of sightings is complex, not necessarily (certainly not entirely) controlled by effort. Van Manen et al. (2014) also presented evidence that although the number of bears captured increased during 1998-2012, the proportion representing bears previously captured did not change during the same period, a pattern consistent with an increasing population during this time period. More recently, improvements to the original Knight et al. (1995) ruleset have resulted in estimates of population trend largely similar to those in use in recent years (IGBST 2021).

The refined Chao2 (IGBST 2021) is a component of the integrated population model (IPM) and is the best available science for estimating the GYE population. An IPM mathematically integrates annual count data with a traditional population projection model that estimates the change in population size from one year to the next using sex- and age-specific survival and reproductive rates. With adoption of the IPM, the IGBST has recalibrated prior year population estimates so they are comparable over time, and vital rates and demographics for the GYE population may now be reviewed annually so that managers are able to make appropriate adjustments to mortality rates. The newly adopted IPM will better estimate trends in the foreseeable future.

Issue 2: Abundance.

Acknowledging that even the best conceivable approach to estimating the abundance of grizzly bears in the GYE would be subject to some uncertainty, we find the estimates produced by the IGBST (2021) to be well grounded in empirical data and reasonable models, thoroughly considered and vetted, and in any case, the best available. The IGBST (2021) estimated that in 2019, total abundance within the DMA was over 1,000 bears. Using the improved approach outlined in the IGBST (2021), the study team reported an abundance estimate in 2022 of 965 bears (95% confidence interval 819 – 1,121). With the adoption of the IPM, abundance estimates will be more precisely and accurately estimated in the foreseeable future.

Issue 3: Trends in mortalities.

The IGBST has reported that documented and estimated mortalities (including, but not limited to, radio-marked bears) has been lower than estimated 'limits' for all years since monitoring began. Critics contend that mortalities have increased markedly in recent years and infer that the population could be in decline as a result. FWP is unable to confirm some of the numbers used in reports that take issue with the IGBST results. FWP's analysis shows that the number of "TRU" (total reported and unreported, i.e., an estimate of mortalities taking into account those never documented) deaths of male grizzly bears during the 19-year period 2002-2020 increased (at a rate of approximately 1.13 male bears/year, $z = 5.18$, $P < 0.01$), as did the number of mortalities as a proportion of estimates of adult male abundance (at a rate of approximately 0.004 mortality rate/year; $z = 3.76$, $P < 0.01$). However, FWP's analysis shows that the number of "TRU" mortalities of females has shown no significant change during the 2002-2020 period ($z = 0.77$, $P = 0.44$). Thus, it is not logically inconsistent for mortalities aggregated among both genders to have increased, while density of females has either not changed or increased. It is also consistent with the IGBST's conclusion that male bears have increasingly occupied areas with greater risk while population trajectory (controlled by the female segment of the population) has increased slowly or remained approximately stable. Critics claim the number of mortalities have increased, possibly to the point of population decline. The IGBST does not dispute that the number of mortalities has increased over time but attribute it to increasing population size. Their vital rate monitoring has shown that survival rates of independent bears have remained stable over time.

Issue 4: Uncertainty in trends and abundance estimates.

FWP understands, as the IGBST has acknowledged, that the Knight-Chao estimator is imperfect. In particular, because of the limitations of the original Knight et al. (1995) rule set to differentiate individual females (Schwartz et al. 2008), it becomes increasingly conservative as the number of true females increases. Past some density of females, this index would be expected to remain flat even if true density continued to increase. However, most of these issues were recently resolved by the IGBST (2021). Likewise, the IGBST has provided additional analyses leading to its conclusion that the preponderance of evidence supports the conclusion that Yellowstone area bears increased relatively rapidly during 1983-2002, more slowly during 2002-2014 and very slowly if at all since 2014. There is no evidence of a population decline since 1983. With the adoption of the IPM, uncertainty in trends and abundance estimates will be better accounted for.

Issue 5: Increase in minimum area occupied.

There appears to be consensus among the IGBST and some critics that the minimum area of grizzly bear occupancy in the GYE area has increased considerably since 1980. The method the IGBST has used to quantify this was reported by Bjornlie et al. (2014a) and interprets this expansion as resulting from bears being near, or at carrying capacity within the inner portion of the area of occupancy (not necessarily in all portions of it), noting that males are disproportionately represented among the pioneering bears. Critics make two points about this to counter this assessment: a) the rate of occupancy expansion has exceeded estimates that the IGBST has made of the rate of increase in abundance, and b) that density overall must have declined, not increased, because relatively constant trend indices over the period of geographic expansion suggests the same number of bears occupied an increasing area.

a) Implicit in the first theme of criticism is that the rates of increase in abundance and occupied area should bear an approximately 1:1 relationship to one another. FWP knows of no accepted biological theory dictating that rates of increase in abundance and areal extent of a free-ranging wildlife population must be similar. That said, if one had to choose a simple mathematical expectation for the relationship of abundance (λ) to expansion (A), it would more likely be A = λ2 than to be A = λ. This is because if appropriate habitat surrounds the core of an expanding population, animal home ranges would gradually build on each other in two dimensions (longitude and latitude) rather than the single dimension available to an increase in numbers. FWP would not contend that a simplistic quadratic relationship between abundance and area is necessarily correct or empirically supported for GYE grizzly bears but offers it as context within which to interpret the discrepancy in the two rates of increase.

Additionally, there are biological reasons to expect grizzly bears of both sexes to begin exploring new habitats (and, by such exploration, increase the "estimated occupied range of grizzly bears"), particularly when situated at the frontier of the existing geographic distribution (e.g., Swenson et al. 1997a, Kojola and Laitala (2000), Jerina and Adamiĉ (2008). Animals who can find good habitat not already occupied by conspecifics can enjoy a fitness advantage (i.e., better survival and reproduction) over those who stay put.

b) Van Manen et al. (2016) considered the grizzly bear density had approached or reached its capacity within the central portions of the study area (with its outer-most boundary approximated by the DMA) but did not necessarily imply that density was similarly high along the expanding front of grizzly bear distribution.

Issue 6: Food declines vs. density.

FWP is unaware of disagreement in the scientific literature that important dietary items for grizzly bears (notably whitebark pine and cut-throat trout) have declined in abundance. A reasonable hypothesis to examine (and one that some critics have favored) is that these declines have contributed to the reduction in reproductive rate and juvenile survival that resulted in reduction of population growth from the roughly 4–7% estimated during 1983–2001 (Harris et al. 2006, Harris 2007), to the roughly 0–2% estimated during 2002–2012 (Van Manen et al. 2016). Another reasonable hypothesis is that these declines in reproductive rates and juvenile survival resulted from increased resource competition (and consequences thereof) that in turn was associated with higher grizzly bear density. These two plausible events (reduced food availability vs. more bears competing for those foods) occurred at about the same time, and both would be expected to reduce or halt population growth. How do we know which one was more important?

In situations such as this, it is generally seen as weak science to simply document a correlation between one plausible explanation and the observed consequences and, from this, conclude causation. Instead, scientists attempt to elucidate specific responses that would logically flow from one, but not the other plausible cause. Then, quantitative empirical data is gathered and used to examine which of the two hypotheses is most consistent with the empirical evidence. This is the approach taken by IGBST:

a) Bjornlie et al. (2014b) wondered if trends in home range sizes of males and female grizzly bears in the Yellowstone area could provide some insight into the relative roles played by the whitebark pine (WBP) decline and the increase in grizzly bear density. They found that female home ranges were smaller during 2007-2012 than during 1989-1999, whereas those of males did not change significantly between the two time periods. They hypothesized, based on previous published research on bears, that home range size of female bears would increase if declines in WPB required bears to search further for foraging, but would decrease if intra-specific competition resulted from increased density. To test the competing hypotheses, Bjornlie et al. (2014b) developed indices of grizzly bear density in the Yellowstone area from a long history of marked animals and also used fine-scaled maps of WBP to quantify the proportion of grizzly bear home ranges affected by its decline. They then used model selection procedures to assess the strength of the evidence for the two competing hypotheses. Bjornlie et al. (2014b) found that data supported an association between density and female home range size (smaller home ranges associated with higher density) but did not support an association with availability of WBP. Signals were slightly more nuanced for male home range sizes: the associations with both WBP and density were similar when home ranges were quantified using one method; associations were somewhat stronger with density than WBP when home ranges were quantified using an alternative method. However, only the density relationship using the alternative home range metric was significant. These analyses provided justification for Bjornlie et al. (2014b) to conclude that the smaller home range sizes of females seen during the latter period were more likely a result of high density than reductions of WBP.

b) Van Manen et al. (2016) used a similar competing-hypotheses design to examine influences directly on the vital rates that drive population growth (survival and cub production), with particular focus on the time period 2001-2011 when WBP mortality increased markedly. They used the same index to grizzly bear density developed by Bjornlie et al. (2014b) and developed a spatially- and temporally explicit index of WBP mortality using remote-sensing databases. These spatial covariates were applied to each individual grizzly bear sampled. Van Manen et al. (2016) found no evidence that independent (i.e., no longer under mothers' care) female survival had changed during 2002-2011 compared with 1983-2001, and modest evidence that independent male survival had increased. However, there was no evidence that either independent female or male survival was associated with either density or WBP. In contrast, Van Manen et al. (2016) found support for models that included density as associated with both cub and yearling survival, but not for models that included WBP. Similarly, cub production (quantified by the transition rate from not having cubs in one year to having a litter the next year) was found to be associated with density but not WBP mortality.

Those two studies provided empirical evidence to support the relative importance of grizzly bear density (as opposed to declining WBP) in explaining differences observed since the earlier study period. FWP is unaware of any similarly rigorous analyses, published or unpublished, that would question or refute either of those studies.

Issue 7: Increasing human population and development.

In recent decades, although still sparsely populated by national standards, Montana has seen great increases in its human population and, in turn, of areas where humans live, work, and play. The results for grizzly bears include more fragmented habitat, more exposure to humans, and more potential for conflict. Additionally, recreationists have largely unhindered access to millions of acres of undeveloped land which, based on documentation of current and expected trends, either is or will be occupied by grizzly bears. As bear numbers and distribution increase and the number of outdoor enthusiasts grow, contact and interaction with people engaged in outdoor activities is likely to increase.

Biological effects of hunting

FWP is aware of, and has thoroughly considered, written critiques suggesting that hunting grizzly bears in Montana would almost certainly result in more strongly negative biological consequences than indicated in this document's section on hunting (e.g., Gosselin et al. 2015, Bischof et al. 2018, Mattson 2020). Below is a brief review of those writings.

1) Mattson (2020) uses an overly simplistic dichotomy of whether hunting mortality would be compensatory or additive. It ignores the literature showing density-dependent responses, not in adult survival where theory and empirical evidence in most large-mammal studies suggests it should not occur, but in juvenile survival and recruitment where one would expect to find it. See the section on density dependence. Mattson (2020) ignores the data on grizzly bears in Alaska (Miller et al. 2003, Keay et al. 2018, Brockman et al. 2020,) and misinterprets McLellan (2005).

2) Critics contend that sexually selected infanticide (SSI) would occur in Montana bear populations subject to a recreational hunt, reducing cub and possibly yearling survival (or litter sizes prior to mortality, if females increase counterstrategies to avoid infanticide and in so doing sacrifice foraging opportunities at the expense of their own reproductive output). A number of studies are cited, primarily from European bear populations, supporting these arguments.

FWP does not dispute or take issue with the potential for infanticide or SSI among bears in Montana, nor with research showing the importance of SSI in many populations of bears in Europe. However, as articulated earlier in the section on infanticide in bears, FWP finds the most cogent, well researched, and applicable works relating to SSI among North American bears to be those of Miller et al. (2003) and McLellan (2005) and is unaware of newer or more applicable research that would cast doubt on the value of those studies.

Conclusions from both Miller et al. (2003) and McLellan (2005) are persuasive that litter size and juvenile survival among bear population subjected to low offtake via recreational hunts would increase if hunting reduced density of populations near carrying capacity and would be unchanged if hunting had no effect on—or reduced density of—a population below carrying capacity. Neither study supported the hypothesis that hunting (and particularly, reducing the abundance of adult males) would reduce litter size or juvenile survival.

Also relevant is Swenson (2003), which states that the presence of SSI among Scandinavian bear populations "does not mean that SSI is important in every population… North American and Scandinavian brown bears have very different histories. Humans tried to exterminate bears in Scandinavia with all available technology for hundreds of years and almost succeeded.... This long history of persecution may have been an important selective force in shaping life history strategies…lowered aggressiveness and increased productivity… may make European brown bear females less able than North American females to defend their cubs from infanticidal males.... In contrast to Europe, brown bears in North America were exterminated rapidly after European immigrants arrived; they survived only in inaccessible areas."

3) A number of publications have implicated hunting as having deleterious effects on grizzly bear social dynamics, foraging tactics, life-history strategies, or other biological attributes (Zedrosser et al. 2013; Frank et al. 2017, 2018, 2021; Bischof et al. 2018), and thus that biological effects of hunting would extend beyond the loss of hunting individuals. These studies have focused on the hunting population of brown bears in Sweden, where harvest rates have been high, regulations are lax, and most hunting occurs with the help of dogs. Such research is helpful for context, but FWP's view is that extrapolating effects to such a different system would not constitute good science.

4) FWP's understanding of the likely effects of hunting on human–bear conflicts is summarized in the above section on hunting.

Human dimensions

For attitudes and concerns regarding the presence, management, and conservation of grizzly bears, FWP relied on Frost (1985), Velado (2005), Sage (2019, 2022), and Nesbitt et al. (2020, 2023). A study not addressed in this plan is Canepa et al. (2008).

Relationship of this plan to federal laws and regulations

U.S. Endangered Species Act

As of this writing, all grizzly bears in the lower 48 states are classified by the USFWS as threatened under the ESA. All actions FWP takes must be consistent with protocols and procedures outlined by the USFWS under the ESA and its implementing regulations. As a threatened species, ultimate management authority is with the USFWS. That said, day-to-day management occurs in a cooperative setting, whereby land management agencies act according to plans that have been developed in consultation with and approved by the USFWS, and in which states and tribes conduct conflict prevention and response activities (in conjunction with USDA WS when livestock depredation in involved). The USFWS must approve of actions that affect individual grizzly bears, i.e., relocation, translocation, euthanasia. The USFWS does not typically require notification or involvement with day-to-day- conflict prevention, conflict response (except when capture of individual grizzly bears is contemplated), education and information efforts on the part of states and tribes.

USFWS "4d" rule

Under the protection of the ESA, "taking" of grizzly bears is prohibited. To "take" is defined by the ESA as to "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." However, Section (4)(d) of the ESA "Protective Regulations" provides the authority for the Secretary of the Interior to issue regulations for a threatened species that modify the strict interpretation of "take" for states that have entered into a cooperative agreement with the USFWS. Montana has entered into such an agreement. Federal Regulation 50 CFR 17.40(b) lays out the exceptions to strict federal prohibition on "take" that are applicable to grizzly bears in Montana (see Appendix A for the full text of 50 CFR 17.40(b)). These have become known colloquially as the "4d rule."

First, the rule allows grizzly bears to be taken "in self-defense or in defense of others," subject to the requirement that the individual taking the bear must report the event to the USFWS within five days and cannot transport, sell, or retain any parts of a grizzly bear killed in such a situation. Second, it allows authorized federal, state, or tribal authorities to remove (i.e., euthanize) a grizzly bear "constituting a demonstrable but non immediate threat to human safety or committing significant depredations to lawfully present livestock, crops, or beehives" if such taking is done humanely and in accordance with inter-agency guidelines (for more on the Inter-agency Guidelines, see below) and only when "it has not been reasonably possible to eliminate such threat or depredation by live-capturing and releasing unharmed in a remote area the grizzly bear involved." Third, federal, state, and tribal authorities may engage in taking other than killing or permanently injuring a grizzly bear (e.g., harassing, trapping) for scientific or research purposes, again with the requirement of appropriate reporting to the USFWS.

Relationship of this plan to state laws, regulations, and resolutions

MEPA, Montana Code Annotated (MCA), and Administrative Rules of Montana (ARM)

This plan is written to be consistent and in compliance with the:

- Montana Environmental Policy Act (MCA, Title 75), following guidelines produced by Stockwell (2013).
- Elements of the Montana Code that refer to big game, predators, and grizzly bears specifically (Section1-1-508, MCA; Sections §§ 87-1-201; 87-1-217; 87-1-304; 87-2-101; 87-2-701; 87-2-702; 87-3-131; 87-5-103; 87-5-301; 87-5-302; 87-5-725; 87-6-106; 87-6-202; 87-6-205; 87-6-206; 87-6-907; 87-7-413, MCA).
- Elements of the Administrative Rules of Montana (ARM) with relevance to grizzly bears, specifically ARM 12.3.514; 12.9.1401; 12.9.1403; 12.9.1404; 12.9.1405; 12.9.1406; 12.9.1407; 12.9.1408; 12.9.1409; 12.9.1410; 12.9.1411; 12.9.1412; 12.9.1413; 12.9.1414; 12.9.1415; 12.9.1416; 36.11.403; 36.11.421; 36.11.432.

Legislative resolutions

In 2021, the 67th Montana legislature passed Senate Joint Resolution 18. The full text appears below.

A JOINT RESOLUTION OF THE SENATE AND THE HOUSE OF REPRESENTATIVES OF THE STATE OF MONTANA REQUESTING THAT MONTANA'S CONGRESSIONAL DELEGATION WORK TO RETURN MANAGEMENT OF MONTANA'S RECOVERED GRIZZLY BEAR POPULATIONS TO THE STATE OF MONTANA AND INITIATE FURTHER REVIEW OF MONTANA'S GRIZZLY BEAR POPULATIONS.

WHEREAS, the United States Congress authorized the Endangered Species Act of 1973; and

WHEREAS, the Endangered Species Act defined "endangered species" to mean "any species which is in danger of extinction throughout all or a significant portion of its range"; and

WHEREAS, the Endangered Species Act defined "threatened species" to mean "any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range"; and

WHEREAS, the grizzly bear was designated as a "threatened species" in the conterminous United States under the Endangered Species Act on July 28, 1975; and

WHEREAS, the Endangered Species Act was amended by the United States Congress in 1978 so that the new definition of "species" included a "distinct population segment" that interbreeds; and

WHEREAS, in Senate Report 151 of the 96th United States Congress, the Congress instructed that the authority to designate distinct population segments be exercised "sparingly and only when the biological evidence indicates that such action is warranted"; and

WHEREAS, in 1993, the United States Fish and Wildlife Service revised the Grizzly Bear Recovery Plan, establishing six grizzly bear recovery zones, including the Greater Yellowstone Grizzly Bear Recovery Zone, the Northern Continental Divide Grizzly Bear Recovery Zone, the Cabinet-Yaak Grizzly Bear Recovery Zone, the Selkirk Grizzly Bear Recovery Zone, the Bitterroot (Mountains of Idaho and Montana) Recovery Zone, and the North Cascades (Mountains of Washington) Recovery Zone; and 67th Legislature SJ 18

WHEREAS, in 1996, the United States Fish and Wildlife Service and the National Marine Fisheries Service developed a policy to clarify the meaning of "distinct population segment," and the clarification required a distinct population segment to exhibit "discreteness" relative to the remainder of the species and "significance" to the species to which it belongs; and

WHEREAS, for the purpose of the discrete population segment policy, the United States Fish and Wildlife Service and the National Marine Fisheries Service define "discreteness" as being separated from other populations of the same species by physical, physiological, ecological, or behavioral factors, or as being delimited by international governmental boundaries with significant differences in habitat management, conservation regulations, exploitation control, or regulatory mechanisms; and

WHEREAS, because of the genetic interchange between the Northern Continental Divide, Cabinet-Yaak, and Selkirk grizzly bear recovery zones, and because of the genetic interchange that occurs between grizzly bears crossing the border between the United States and Canada, these three recovery zones should be considered one large interbreeding distinct population segment; and

WHEREAS, delisting efforts for the Greater Yellowstone Grizzly Bear Recovery Zone have been ongoing for 13 years, and the grizzly bear population in the Northern Continental Divide Grizzly Bear Recovery Zone has reached recovery goals and should also be in an ongoing delisting process; and

WHEREAS, delays in the United States Fish and Wildlife Service delisting process create a significant loss of social tolerance among Montanans who are adversely impacted by the continued expansion of grizzly bears.

NOW, THEREFORE, BE IT RESOLVED BY THE SENATE AND THE HOUSE OF REPRESENTATIVES OF THE STATE OF MONTANA:

That the Legislature supports the delisting of Montana's grizzly bear populations from the Endangered Species Act and the return of Montana grizzly bears to state management.

BE IT FURTHER RESOLVED, that the Legislature call on the United States Fish and Wildlife Service to revise the 1993 Grizzly Bear Recovery Plan and reevaluate the Grizzly Bear Recovery Zone efficacy across all ranges.

BE IT FURTHER RESOLVED, that the Legislature requests that the United States Fish and Wildlife Service create a statewide distinct population segment that includes all of Montana's grizzly bear recovery zones for the purpose of delisting the bear and returning its management to state control.

BE IT FURTHER RESOLVED, that the United States Fish and Wildlife Service develop a new management plan pursuant to section 4(d) of the Endangered Species Act that would aim to resolve conflicts between bears and humans within the Northern Continental Divide Grizzly Bear Recovery Zone and other grizzly bear recovery zones.

BE IT FURTHER RESOLVED, that the Legislature call on Montana's Congressional Delegation, as part of its efforts to return management of Montana's grizzly bears to the state, to exempt the delisting of grizzly bear populations from judicial review.

BE IT FURTHER RESOLVED, that the Secretary of State send a copy of this resolution to the Secretary of the United States Department of the Interior, the Governor of the State of Montana, the Department of Fish, Wildlife, and Parks, the Secretaries of State for the States of Washington, Wyoming, and Idaho, and to each member of the Montana Congressional Delegation.

Relationship of this plan to inter-agency cooperative plans

Below is a summary of other inter-agency cooperative plans in relationship to this current plan.

1993 Recovery Plan

Grizzly bear populations listed under the ESA are broadly managed under the auspices of the Grizzly Bear Recovery Plan, initially published on January 29, 1982, and revised and approved by the USFWS on September 10, 1993. The 1993 Recovery Plan identified “Ecosystems” in which grizzly bears were present but in need or recovery. Recovery zones were specifically established in the Recovery Plan for the Yellowstone Ecosystem (termed the YGBE in the 1993 Recovery Plan, but subsequently referred to at the Greater Yellowstone Ecosystem, GYE); the Northern Continental Divide Ecosystem (NCDE), the Cabinet-Yaak Ecosystem (CYE), and the Selkirk Ecosystem (SE). Additionally, the 1993 Recovery Plan identified two “evaluation areas” for which further planning would be conducted. These were the Bitterroot Ecosystem (BE), and the North Cascades Ecosystem (NCE). In March 2000, the USFWS published a final EIS detailing its plan to recovery grizzly bears in the Bitterroot Ecosystem, at which point, the BE “evaluation area” became recognized as a 6th recovery zone. The SE and NCE are located entirely outside of Montana, and thus enter consideration in this plan only tangentially. The other 4 “Ecosystems” are located entirely (in the case of the NCDE), primarily (CYE), or partly (GYE, BE) within Montana.

The 1993 Recovery Plan outlines general approaches the USFWS identified as fulfilling the ESA's requirement that delisting only occur once the conditions that necessitated listing were resolved. However, detailed strategies and tactics for each Ecosystem have evolved over time, and been superseded by various subsequent documents and agreements that have updated our understanding of the species' status, monitoring protocols, and specific actions needed to achieve recovery. Thus, while the 1993 Recovery Plan remains the foundational document from which most others flow, its importance for day-to-day management has receded as newer, more relevant documents have been produced by federal, state, and tribal authorities.

Inter-agency Grizzly Bear Committee (IGBC)

In 1983 the Secretaries of the Interior and Agriculture and the Governors of Idaho, Montana, Wyoming, and Washington signed a Memorandum of Agreement to establish the Inter-agency Grizzly Bear Committee (IGBC). Their purpose for creating the IGBC was to "coordinate [federal and state] management and research actions to the greatest extent possible to insure the best utilization of available resources and prevent duplication of effort." The mission of the IGBC is "…to achieve recovery and delisting, and to support ongoing conservation of grizzly bear populations and their habitats after delisting in areas of the western United States through inter-agency coordination of policy, planning, management, research and communication: (IGBC 2019). Sub-committees for each of the six identified grizzly bear Ecosystems were subsequently created. The IGBC consists of "…representatives from the U.S. Forest Service, the National Park Service, the U.S. Fish and Wildlife Service, the Bureau of Land Management, the U.S. Geological Survey, and representatives of the state wildlife agencies of Idaho, Montana, Washington and Wyoming. In the interest of international coordination and cooperation, the Canadian Wildlife Service is also represented. At the Ecosystem level, Native American tribes possessing grizzly habitat within the recovery areas have also been involved" (http://igbconline.org/story-of-the-igbc/). FWP has been a full member of both the IGBC Executive Committee and of the GYE, NCDE, CYE, and BE sub-committees from the outset.

The IGBC is not a governing body or legal entity (IGBC member agencies retain their individual authority and autonomy); rather it exists to provide and coordinate policy-level oversight and direction among its various members. Various documents produced or sanctioned by the IGBC have relevance to this plan and are referenced as appropriate. The intention is that the plan be fully consistent with, and build upon, documents produced by the IGBC.

IGBC Guidelines

An early, important, and still-used document is called the Inter-agency Grizzly Bear Guidelines (1986). In its Section III, this document put forth general goals of NPS and USFS lands.

GYE Conservation Strategy (CS)

FWP is a signatory to the inter-agency Memorandum of Understanding (MOU) regarding the GYE CS (GYE Subcommittee 2016), which serves as an inter-agency management plan for the GYE and surrounding lands. The GYE CS is not a regulatory document, but rather a summary of commitments and regulatory mechanisms made by each government entity. The GYE CS would formally take effect upon delisting of bears within the proposed GYE DPS. If delisting occurs, the ESA requires the USFWS, in cooperation with the state of Montana, to monitor the species for at least five years afterwards to assure that recovery is sustainable). The CS, however, is not considered to be time-limited, but rather to be in effect indefinitely and (although reviewed by participants at 5-year intervals). The GYE CS is pending revision to incorporate the revised Tri-state MOA, the use of the IPM as the population estimator, and other related population, habitat, and management information.

The GYE CS summarizes strategies and actions that federal, state, and tribal authorities have pledged to undertake within the Demographic Monitoring Areas (DMA) that includes and surrounds the GYE Recovery Zone (which would be renamed the Primary Conservation Area after delisting). The CS categorizes these commitments as Demographic Monitoring and Management (i.e., population management), Habitat Management and Monitoring, and Conflict Prevention and Response. FWP is primarily involved with the first and third of these, and tangentially involved with the second.

NCDE Conservation Strategy (CS)

FWP is a signatory to the inter-agency MOU implanting the NCDE CS (NCDE Subcommittee 2019), which serves as an inter-agency management plan for the NCDE and surrounding lands. The NCDE CS (NCDE Subcommittee 2019) is not a regulatory or statutory document, but rather a summary of commitments and regulatory mechanisms made by each government entity. The NCDE CS is currently being reviewed and updated, and would take formal effect upon delisting of bears within the proposed NCDE DPS. If delisting occurs, the ESA requires the USFWS, in cooperation with the state of Montana, to monitor the species for at least five years afterwards to assure that recovery is sustainable (a separate monitoring strategy would be developed by the USFWS). The CS, however, is not considered to be time-limited, but rather to in effect indefinitely and (although reviewed by participants at 5-year intervals).

The NCDE CS summarizes strategies and actions that federal, state, and tribal authorities have pledged to undertake within the Demographic Monitoring Areas (DMA) that includes and surrounds the NCDE Recovery Zones (which would be renamed the Primary Conservation Area after delisting). The CS categorizes these commitments as Demographic Monitoring and Management (i.e., population management), Habitat Management and Monitoring, and Conflict Prevention and Response. FWP is primarily involved with the 1st and 3rd of these, tangentially involved with the 2nd. Commitments made by FWP related to Demographic Monitoring and Management were formalized by a public process and written into regulation by the Commission in ARM 12.9.1403.

CYE Conservation Strategy (CS)

Recovery criteria for delisting has not been met in the CYE, however, initial preparation of a CS for this ecosystem has begun.

BE Conservation Strategy (CS)

With no known bears established in the BE, a CS for the BE has yet to be developed. In the 2000 Record of Decision (ROD; 65 FR 69644), the USFWS stated they were going to translocate 25 grizzly bears in the BE but never did. Failure to adhere to the 2000 ROD or publish a supplemental EIS resulted in the recent ruling of CV 21-136-M-DWM. Judge Molloy ordered the USFWS to prepare a supplemental EIS associated with the 2000 EIS on grizzly bear recovery in the BE, a new ROD, and a Final Rule. Instead, the USFWS decided to initiate an entirely new NEPA process including a draft and final EIS as well as a new ROD, to which the plaintiffs and Judge Molloy agreed. Alternatives in this EIS may describe the translocation of bears into the BE or natural recolonization from GYE and NCDE populations. The USFWS have committed to a timeline to complete this EIS and ROD by 2026. Implementation of this EIS and ROD would likely require development of a CS for the BE. While Montana populations of grizzly bears will be a source for the BE population, recovery will be dependent mostly on

Idaho Department of Fish and Game due to the geography of this ecosystem. FWP will be involved to ensure connectivity with the GYE and NCDE, and to mitigate conflict in the Bitterroot Valley.

Tri-State Memorandum of Agreement (MOA)

In August 2016, the Commission entered into a MOA with the wildlife commissions of Wyoming and Idaho regarding the management, genetic health, and allocation of discretionary mortality of grizzly bears in the Greater Yellowstone Ecosystem. That document was revised and approved by the Commission in December 2021, to incorporate the refined Chao2 population estimate (IGBST 2021), and was revised again to incorporate the IPM methodology (see Appendix H). The revised Tri-State MOA describes the adoption of the Integrated Population Model (IPM) by the Interagency Grizzly Bear Study Team (IGBST) as the population estimator for the Greater Yellowstone Ecosystem. With the adoption of the IPM, the IGBST has recalibrated prior year population estimates so they are comparable over time. Additionally, vital rates and demographics for the GYE population may now be reviewed annually so that managers are able to make appropriate adjustments to mortality rates. The revised Tri-State MOA sets a population management objective within or above a range of 800-950 within the Demographic Monitoring Area of the GYE. The revised Tri-State MOA also uses the IPM to identify limits for discretionary mortality and allocation among the three states.

The purpose of the MOA was to define a process to coordinate management of grizzly bears across state lines, largely anticipating a possible future delisting of these animals. This plan and the accompanying EIS are fully consistent with that MOA. This MOA will become effective upon the date of signature of all Parties. It will remain in effect until it is terminated by the Parties. Any Party may terminate its participation in the MOA by providing one hundred-eighty (180) days' written notice to the other Parties, which notice shall be transmitted by hand or other means of delivery confirmation. Parties meet annually to review implementation of the MOA and to recommend any appropriate modifications to the MOA based on changes to the Strategy, state management plans or other pertinent regulatory documents. Any modification to the MOA will only become effective upon the written consent of all Parties.

FWP-USDA-WS Memorandum of Understanding (MOU)

In October 2022, FWP renewed a Memorandum of Understanding (MOU) with U.S.D.A. Wildlife Services (WS) outlining a cooperative program for management of wildlife damage from grizzly bears, wolves, black bears, and mountain lions in Montana. For grizzly bears, the importance of this MOU is largely to clarify that investigations of possible livestock depredations will be the responsibility of WS (in cooperation with FWP when possible). This MOU is renewed every 5 years, but could be done sooner if circumstances change (e.g., if grizzly bears are delisted) or amendments are requested.

U.S. Forest Service Plans

Decisions made by the U.S. Forest Service, which manages the largest single land-ownership category in Western Montana, have great influence on grizzly bear management and conservation. Forests with lands in the NCDE and GYE areas are incorporated by reference in the two respective Conservation Strategies.

Relationship of this plan to existing plans

Western Montana Plan (2006) and Southwest Montana Plan (2013)

This plan, when formally adopted, would supplant both of the following grizzly bear management plans:

- the Western Montana plan (Dood et al. 2006); and
- the Southwestern Montana plan (FWP 2013).

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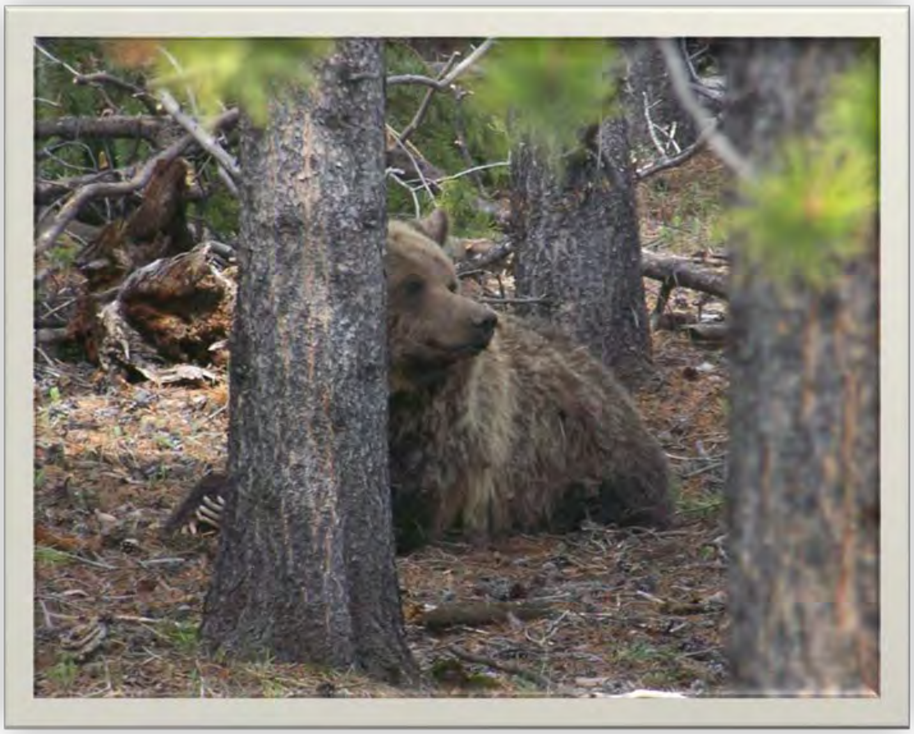
Appendix I. Wyoming Grizzly Bear Management Plan (excluding plan appendices)

Wyoming Grizzly Bear Management Plan



Prepared by
Wyoming Game and Fish Department

Approved by
Wyoming Game and Fish Commission
May 11, 2016

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TABLES

FIGURES

LIST OF ACRONYMS AND ABBREVIATIONS

APA	Wyoming Administrative Procedures Act
BMU	Grizzly Bear Management Unit
BOA	Grizzly Bear Observation Area
CFR	Code of Federal Regulations
Commission	Wyoming Game and Fish Commission
COY	Cubs of the Year
Department	Wyoming Game and Fish Department
DMA	Demographic Monitoring Area
DPS	District Population Segment
ESA	Endangered Species Act
FR	Federal Register
GTNP	Grand Teton National Park
GYA	Greater Yellowstone Area
GYE	Greater Yellowstone Ecosystem
ICST	Interagency Conservation Strategy Team
IGBC	Interagency Grizzly Bear Committee
IGBST	Interagency Grizzly Bear Study Team
LCS	Large Carnivore Section
MOA	Memorandum of Agreement
PCA	Primary Conservation Area
Study Team	Interagency Grizzly Bear Study Team
The ACT	Endangered Species Act of 1973
USFS	United States Forest Service
USFWS	U.S. Fish and Wildlife Service
WGFC	Wyoming Game and Fish Commission
WGFD	Wyoming Game and Fish Department
WRR	Wind River Reservation
YES	Yellowstone Ecosystem Subcommittee
YGCC	Yellowstone Grizzly Coordinating Committee
YNP	Yellowstone National Park

FOREWORD

The Yellowstone Ecosystem Subcommittee (YES) of the Interagency Grizzly Bear Committee (IGBC) produced the original *Draft Conservation Strategy* for the grizzly bear (*Ursus arctos*) population in the Greater Yellowstone Area (IGBST 2000). That document outlined a cooperative management strategy state and federal agencies would implement for post-delisting management of the Greater Yellowstone Area (GYA) Distinct Population Segment (DPS) of grizzly bear. The U.S. Fish and Wildlife Service (USFWS) determined completion of such a plan, and a commitment to implement it, were necessary to delist the GYA DPS of grizzly bear.

During the spring of 2000, at the request of the state members of the IGBC, the governors of Idaho, Montana, and Wyoming appointed a 15-member citizen roundtable to review the *Draft Conservation Strategy* (IGBC 2000). The roundtable reached consensus on 26 recommendations provided for the governors' consideration in response to the *Draft Conservation Strategy*. The group also recommended the 3 states develop state plans addressing management in areas outside the Primary Conservation Area (PCA; Fig. 1) to:

a. Ensure the long-term viability of grizzly bears and preclude the need for re-listing;
b. Support expansion of grizzly bears beyond the PCA, in areas that are biologically suitable and socially acceptable for grizzly bear occupancy; and
c. Manage grizzly bears as a game animal – including allowing regulated hunting when and where appropriate.

Public comments on the *Draft Conservation Strategy* were reviewed and analyzed in 2000. YES ultimately developed a *Final Conservation Strategy* (ICST 2007), approved and released by the USFWS in 2007 (USFWS 2007a).

The Wyoming Game and Fish Department (WGFD or Department) developed and released a draft state management plan for public review during the summer of 2001. Over 8,000 written comments were received. In addition, the Department contracted an independent research firm to conduct a survey of Wyoming residents' attitudes related to grizzly bear management and conflict issues (WGFD 2001). Public input and survey results were considered in developing a final Wyoming Grizzly Bear Management Plan approved by the Wyoming Game and Fish Commission (WGFC or Commission) in 2002, and amended in 2005 (WGFD 2005). The Wyoming Grizzly Bear Management Plan is available online (https://wgfd.wyo.gov/WGFD/media/content/PDF/Wildlife/WYGRIZBEAR_MANAGEMENTPLAN.pdf) and the survey report can be requested from the Department's Office of the Director, 5400 Bishop Blvd., Cheyenne, WY 82009.

The 2016 update to the Wyoming Grizzly Bear Management Plan (this plan) is based on current U.S. Fish and Wildlife Service grizzly bear demographic monitoring and recovery criteria (Appendix I), and covers all areas under state management jurisdiction: the entire state of Wyoming excluding Yellowstone National Park (YNP), Grand Teton National Park (GTNP), and Tribal lands within the Wind River Reservation (WRR).

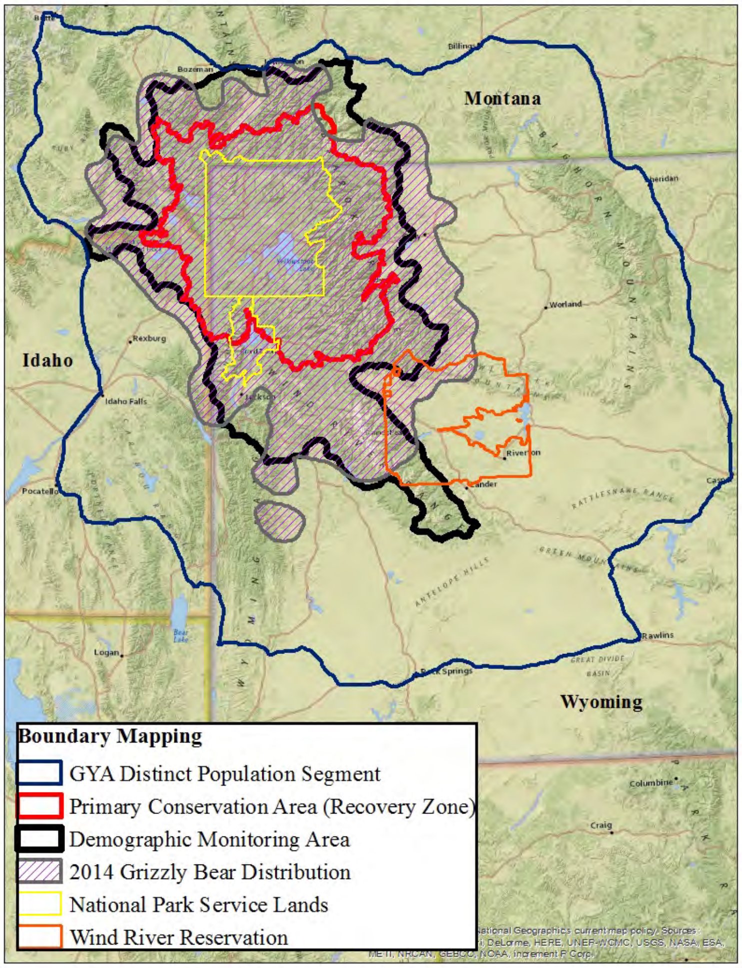

Fig. 1. Management and jurisdictional boundaries referenced throughout this plan.

The GYA DPS of grizzly bear was first delisted in 2007. Litigation immediately ensued and in 2009, threatened species status was restored under the Endangered Species Act (ESA). This reversal was due primarily to a Montana District Court's opinion that "the Service failed to articulate a rational connection between the scientific data and its conclusion that changes in whitebark pine production are not likely to impact the Yellowstone grizzly to the point where it is likely to become endangered within the foreseeable future . . ." [D.C. No. 9:07-cv-00134-DWM OPINION]. In light of this ruling, the Interagency Grizzly Bear Study Team (IGBST or Study Team) completed a comprehensive analysis demonstrating that reductions in whitebark pine have not negatively impacted grizzly bears on a population scale, and any reduction of the population growth rate is a response to density dependent factors indicative of a wildlife population approaching its environmental carrying capacity (Bjornlie et al. 2014a, van Manen et al. 2014, and van Manen et al. 2015). Updated demographic information from these studies has also been incorporated into a *Draft Revised Supplement to the Grizzly Bear Recovery Plan* (USFWS 2013) as well as the corresponding state management plans. The most current science and technical information pertaining to grizzly bear recovery and management are incorporated into this plan. The management plan is adaptive in nature and additional knowledge on GYA DPS grizzly bears gained through research, management experience, and/or public input (e.g. improved population estimation methodologies and conflict management techniques) may warrant future updates.

After the grizzly bear is removed from its listed status under the ESA, state wildlife agencies and tribes will assume management authority and lead roles for managing the species. This plan, in conjunction with applicable Wyoming statutes and Commission regulations, shall serve as the State's regulatory mechanisms (Appendix II) assuring a recovered population of grizzly bears is sustained into the foreseeable future.

It is the objective and policy of the Department and the Commission to maintain traditional land uses and public recreation throughout the Demographic Monitoring Area (DMA – Fig. 1) while assuring those uses are compatible with, and do not threaten the GYA DPS of grizzly bear. This approach enables traditional land uses to continue, which builds local public support for a State-managed grizzly bear population. Public support is key to the long-term welfare and sustainability of the grizzly bear population. This plan will accomplish the goal of maintaining a recovered population and public support by employing the best available science to implement the management strategies described herein, in an adaptive framework.

INTRODUCTION AND HISTORY

Many consider the grizzly bear an iconic symbol of wilderness and wild places. In the Wyoming portion of the Greater Yellowstone Ecosystem (GYE), balancing grizzly bear recovery and management with other uses of the land presents many unique challenges. The Department acknowledges grizzly bears have unique social and ecological values. The species is an important attribute of a landscape rich in wildlife viewing opportunities that contribute to a regional tourism-based economy; conversely, grizzly bears also come into conflict with humans and can impact their livelihood. The Department developed this plan in recognition that diverse opinions and viewpoints exist with respect to grizzly bear management. The plan will serve as the guiding document for sustaining a recovered grizzly bear population that fulfills a range of social and ecological values in the GYE.

The purpose of this plan is to outline the adaptive framework that will be used to manage and sustain a recovered population of grizzly bears in Wyoming. The plan, along with enabling state statutes and regulations, shall constitute Wyoming's core regulatory mechanism for post-delisting management of grizzly bears. The grizzly bear was originally listed as "threatened" under the Endangered Species Act in 1975 (Fed. Reg. 40:145,31734-31736). Since then, recovery goals, management criteria, and monitoring protocols have been largely defined by the USFWS through the original *Grizzly Bear Recovery Plan* (USFWS 1993), *Interagency Grizzly Bear Guidelines* (Mealey 1986), *Final Conservation Strategy* (ICST 2007, USFWS 2007a), and *Draft Revised Supplement to the Grizzly Bear Recovery Plan* (USFWS 2013).

Section 4.(f)(1)(B)(ii) of the Endangered Species Act of 1973 (the ACT) states:

"*The Secretary shall develop and implement plans (hereafter in this subsection referred to as recovery plans) for the conservation and survival of endangered species and threatened species listed pursuant to this section, unless he finds that such a plan will not promote the conservation of the species. The Secretary, in developing and implementing recovery plans, shall, to the maximum extent practicable …incorporate in each plan …objective, measurable criteria which, when met, would result in a determination, in accordance with the provisions of this section, that the species be removed from the list.*"

The 1993 *Recovery Plan* identified specific criteria which when met would result in delisting the GYA DPS of grizzly bears. As additional data and technical information warranted, recovery criteria were updated in the 2000 *Draft Conservation Strategy* (USFWS 2003); the 2007 *Final Conservation* Strategy (ICST 2007, USFWS 2007a); and again in the 2013 *Draft Revised Recovery Plan Supplement* (USFWS 2013). Updated recovery and post-delisting management criteria are now incorporated into the *Final Revised Recovery Plan Supplement* (USFWS 2016a) and *Revised Conservation Strategy* (USFWS 2016b) based on the accumulated knowledge and experience gained from more than 40 years of grizzly bear monitoring, research and management.

The original and current demographic and habitat-based recovery criteria have been met for multiple years. After recovery criteria are met, a prerequisite for delisting requires that the USFWS demonstrate the 5 factors listed in Section 4(a)(1) of the ACT no longer threaten the GYA DPS of grizzly bear. The 5 factors are: "(A) the present or threatened destruction, modification, or curtailment of [the species'] habitat or range; (B) overutilization for commercial, recreational, scientific, or educational purposes; (C) disease or predation; (D) the inadequacy of existing regulatory mechanisms; or (E) other natural or manmade factors affecting [the species'] continued existence." In order to demonstrate existing regulatory mechanisms will not threaten GYA DPS grizzly bears (referred to as factor D in the ESA), the states must prepare post-delisting management plans. This plan provides the framework for post-delisting management of grizzly bears in Wyoming and a mechanism for public input to State management in accordance with the Wyoming Administrative Procedures Act (APA) [W.S. 16-3-107 through 112]. After the GYA DPS of grizzly bear is delisted, the Department will assume primary authority for grizzly bear management throughout Wyoming, except on National Park Service lands within YNP and GTNP, and on Tribal lands of the WRR.

The original Wyoming Grizzly Bear Management Plan (WGFD 2002) was based on criteria outlined in the first *Draft Conservation Strategy* released two years prior (USFWS 2000). That earlier management plan was developed in preparation for delisting as the grizzly bear population originally neared recovery goals set forth in the Service's *Draft Recovery Plan*. In 2005, the Department updated the management plan (WGFD 2005) prior to release of the *Final Conservation Strategy* in 2007 (USFWS 2007a). However, the 2005 plan did not incorporate some of the updated demographic criteria and monitoring protocols ultimately adopted in 2007. The 2016 plan incorporates the *Final Recovery Plan* (USFWS 2016a), *Conservation Strategy* (USFWS 2016b) criteria, and post-delisting adaptive management framework agreed upon by the USFWS and the states of Idaho, Montana, and Wyoming. In addition, the states have entered into a Memorandum of Agreement (MOA; Appendix I) committing to manage the GYA grizzly bear population in accordance with the adaptive framework outlined in Table 1 and Appendix I of this plan. The adaptive framework includes an annual process for reviewing and allocating allowable mortality. The states fully understand and accept that coordination must continue after delisting to assure pertinent information and data are shared and effectively utilized to sustainably manage the GYA DPS of grizzly bear.

Scientists and managers have delineated a Demographic Monitoring Area (DMA) based on suitable grizzly bear habitat to replace the outdated "Conservation Management Area" in the GYA (Fig. 1). In order to assure population trajectory and mortality data are reported consistently, YES and IGBC unanimously voted to incorporate the DMA concept. The PCA or "Recovery Zone" is encompassed within the exterior boundary of the DMA, but the larger DMA is the geographic area where state wildlife agencies will actively monitor the grizzly bear population and manage for its long term viability (for further information, see Population Monitoring and Management subsection, page 12). The DMA boundaries are based on biological criteria whereas the former "Conservation Management Area" was based predominantly on easily identifiable infrastructure and administrative boundaries such as roads/highways, county lines, etc. area (USFWS 2016b).

ADAPTIVE MANAGEMENT CRITERIA

The adaptive framework for post-delisting management (Appendix I) is designed to ensure the GYA DPS of grizzly bears is maintained at or above current demographic recovery criteria. Three basic grizzly bear life history parameters are monitored as recovery criteria: (1) sufficient reproduction to offset mortality to ensure population viability; (2) adequate distribution of breeding females throughout the area; and (3) an annual evaluation of total human-caused mortality that will ensure a recovered population (*Final Recovery Plan* 2016, *Draft Final Conservation Strategy* 2016). Specific management objectives for the Wyoming grizzly bear population will be established by the Commission. Management objectives will ensure the population is managed within the range stipulated in Demographic Recovery Criterion 3 and will ensure Demographic Recovery Criterion 1 and 2 continue to be met or exceeded. It is important to note that multiple layers of protection are afforded by the demographic criteria. While the Commission may set a specific population objective within the range specified by Crierion 3, the other criteria will also determine the objective that is ultimately adopted. Objectives will be adjusted as necessary to assure all three criteria are met. The combination of a conservative population estimate, highly regulated discretionary mortality, the intensive collection and analysis of grizzly bear demographic information and the conservative mortality limits outlined in the demographic recovery criteria ensure there are multiple and layered checks and balances that serve to ensure the maintenance of a recovered grizzly bear population.

In March of 2016, the USFWS proposed updated Demographic Recovery Criteria as listed below:

- <u>Demographic Recovery Criterion 1</u>: Maintain a population size of at least 500 bears and at least 48 females with cubs in the demographic monitoring area (DMA) as indicated by methods established in published, peer-reviewed scientific literature and calculated by the IGBST using the most updated protocol as posted on their website. The current method (2016) used to estimate population size is the model-averaged Chao2 method. If the estimate of total population size drops below 500 in any one year, or counts of females with cubs go below 48 unduplicated females with cubs in 3 consecutive years, this criterion will not be met. The population estimate and counts of unduplicated females with cubs will be calculated by the IGBST using data obtained within the DMA.
- <u>Demographic Recovery Criterion 2</u>: Sixteen of 18 grizzly bear management units (BMUs; Fig. 2) within the Recovery Zone must be occupied by females with young, with no 2 adjacent bear management units unoccupied, during a 6-year sum of observations. A 6-year sum of observations means a BMU is considered occupied if it has a female with young in at least 1 year of each 6-year period. The GYA DPS of grizzly bears will be managed to meet this criterion. Should this criterion not be met for 3 consecutive years, the IGBST will initiate a Biology and Monitoring Review to inform an appropriate management response. This criterion is important as it ensures that reproductive females occupy the majority of the Recovery Zone and are not concentrated in one portion of the ecosystem.

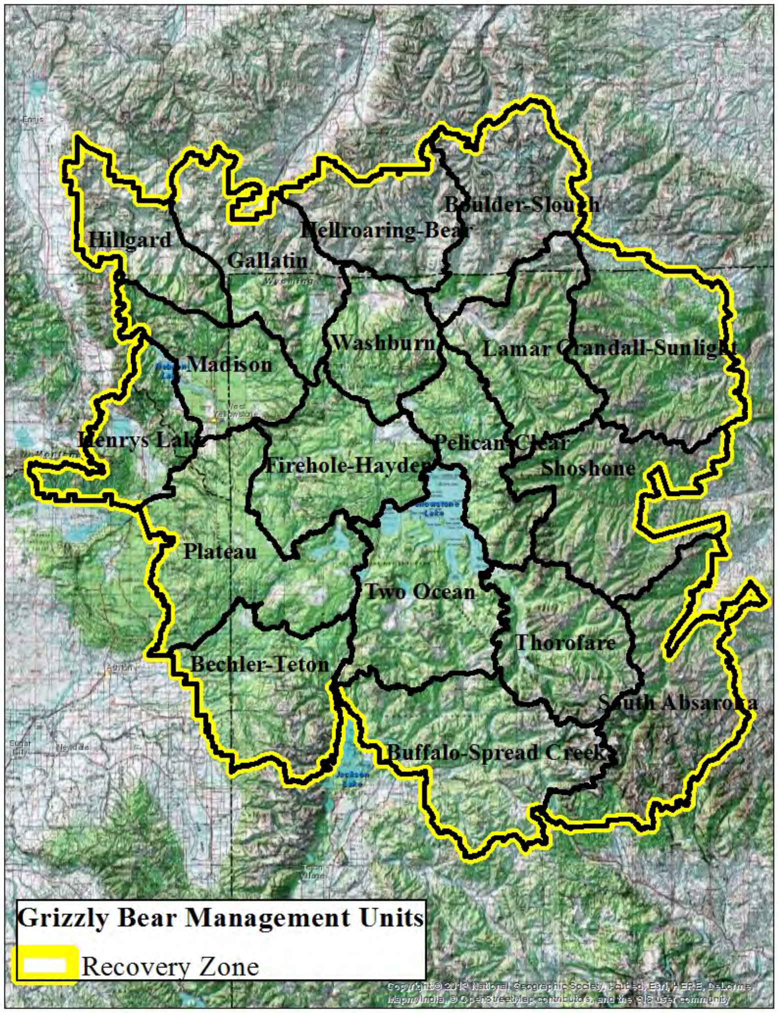

Fig. 2. Current grizzly bear management units (BMUs; *n* = 18) within the primary conservation area (PCA).

- Demographic Recovery Criterion 3: Maintain the population around the 2002-2014 Chao 2 modeled average ($\overline{X}$= 674; 95% CI = 600-747; 90% CI = 612-735) by maintaining annual mortality limits for independent females, independent males, and dependent young as shown in Table 1. If mortality limits are exceeded for any sex/age class for three consecutive years and any annual population estimate falls below 612 (the lower bound of the 90% confidence interval), the IGBST Study Team will produce a Biology and Monitoring Review to inform the appropriate management response. If any annual population estimate falls below 600 (the lower bound of the 95% confidence interval), this criterion will not be met and there will be no discretionary mortality, except as necessary for human safety.

Table 1. Total mortality rates used to establish annual mortality limits for independent females, independent males, and dependent young grizzly bears inside the DMA (from USFWS proposed 2016 Demographic Recovery Criteria).

	Annual Grizzly Bear Population Estimate		
	≤674	675-747	>747
Total mortality rate for independent <u>FEMALES</u>.	≤7.6%	9%	10%
Total mortality rate for independent <u>MALES</u>.	15%	20%	22%
Total mortality rate for dependent young.	≤7.6%	9%	10%

POPULATION STATUS

The GYA DPS of grizzly bears exceeded the demographic recovery criteria many years ago. Summaries of the GYA DPS recovery progress and its current status follow.

<u>Demographic Recovery Criterion 1</u> is met with a minimum population of at least 500 grizzly bears within the DMA. Fig. 3 depicts annual population estimates with an overall increasing population since 2000. The GYA DPS of grizzly bear has exceeded this criterion since at least 2002. The Commission will establish management objectives that ensure this recovery criterion continues to be exceeded. The annual documentation of independent female grizzly bears with cubs is a primary driver of the current Chao2 population estimation technique. This criterion has been achieved since at least 2004; however it should be noted that using females with cubs as a specific recovery criterion is problematic in that is merely a portion of the data used to derive a population estimate and also does not account for the future potential of incorporating new methodologies to estimate population size. It should be noted that currently with the most updated best available science, 48 females with cubs equates to approximately 600 grizzly bears. In addition, achievement of Recovery Criterion #3 ensures the population remains above 500 grizzly bears within the DMA.

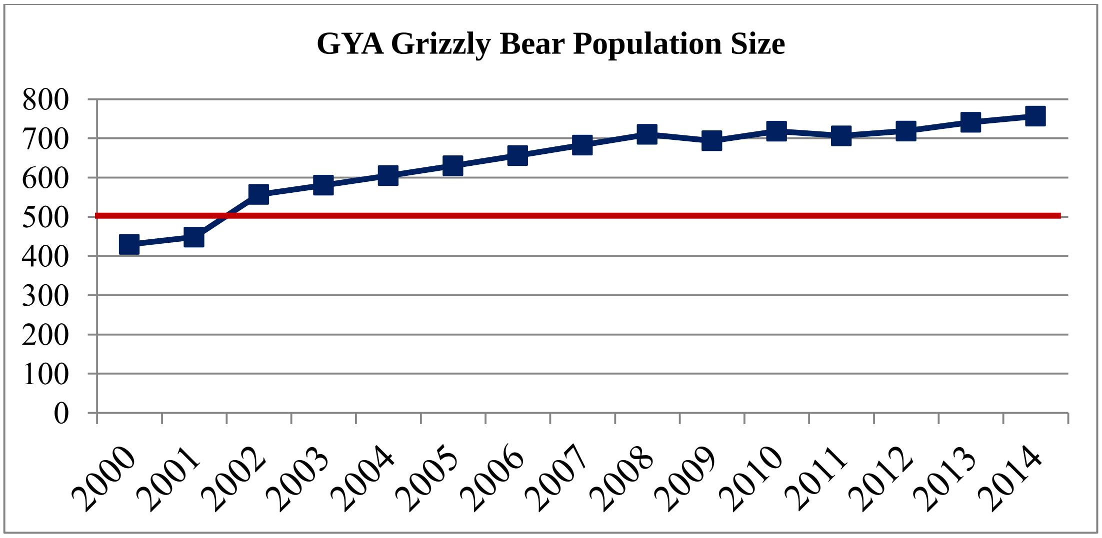

Fig. 3. Annual estimates of the GYA DPS based on the Chao2 estimator (with updated vital rates and ratios). Solid red line represents the minimum population size of 500 grizzly bears required to meet demographic Recovery Criterion 1.

Demographic Recovery Criterion 2 is a distributional criterion that requires 16 of 18 BMUs within the PCA must be occupied by females with young, with no 2 adjacent BMUs unoccupied, during a 6-year sum of observations. Fig. 4 illustrates BMU occupancy by females with young within the PCA since 1996. Fig. 5 demonstrates the increase in occupancy between two 5-year periods (2001-2006 and 2007-2012), and also depicts the expansion outside the PCA since 2006. This recovery criterion has been met or exceeded since 1999.

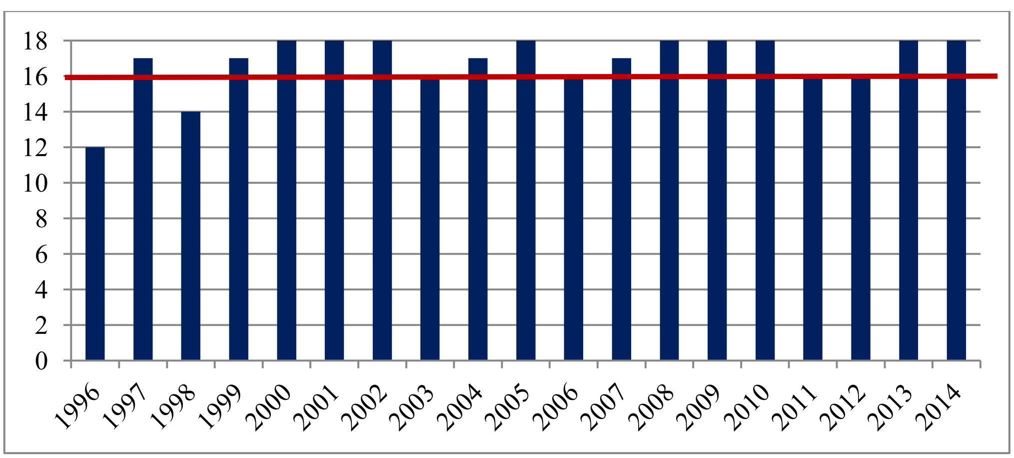

Fig. 4. Annual numbers of BMUs occupied by females with young in the PCA.

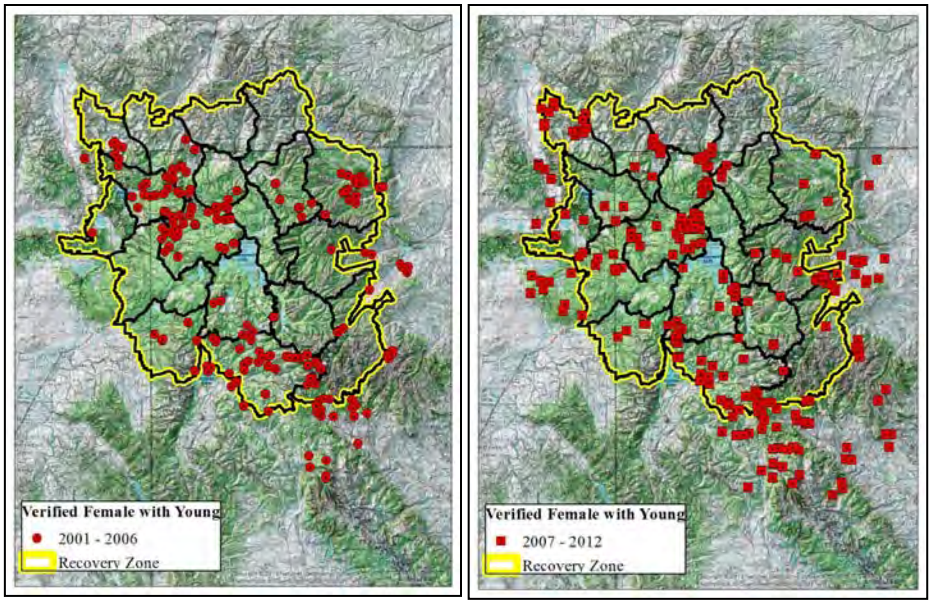

Fig. 5. Observations of radio-marked female grizzly bears with young during two 5-year intervals (18 BMUs are outlined in black).

Demographic Recovery Criterion 3 establishes that grizzly bear mortalities within the DMA should not exceed population-based thresholds established for identified age and sex cohorts of grizzly bears. The mortality limits in the adaptive framework (Table 1) are calibrated to maintain the GYA grizzly bear population at least within a range of 600-747. Figs. 6 and 7 depict annual mortality rates of independent-aged male and female grizzly bears in relation to annual mortality thresholds.

Conservative mortality limits allow for population growth if the population declines below 674 and even more conservative limits would be applied should the population decline below 600. The Commission will establish mortality limits based on their population management objectives to at least within the limits established in Appendix I and the Recovery Criteria. Mortalities will be counted and reported annually based on data obtained from within the DMA. Total mortality estimates of independent males and females will include unreported/undocumented mortalities based on the method described by Cherry et al. (2002). Natural mortalities are estimated based on survival data obtained from representative samples of radio-collared grizzly bears. If the grizzly bear population within the DMA is less than 674 and any one of the mortality limits specified at that level (7.6% for independent females or dependent young, 15% for independent males) is exceeded for 3 consecutive years and the population falls below 612, the IGBST will initiate a Biology and Monitoring Review to inform an appropriate management response.

Federal law allows the take of any grizzly bear that is an immediate threat to human safety. Authorized state or federal agencies continue to take grizzly bears chronically involved in livestock depredations, property damage, or threatening public safety. These are classified as management removals. From 1990-2000, management removals and illegal take averaged 1.0 grizzly bear per year. An annual average of 2.6 grizzly bears was taken by the public in self-defense situations during the same time period (Fig. 8). As the grizzly bear population has grown and expanded into areas outside the Recovery Zone, and in some instances outside the DMA, the Department has documented an increase in aggressive encounters, self defense mortalities, and management removals. From 2001-2014, the Department documented annual averages of 5.1 grizzly bears taken in self defense, and 7.1 grizzly bears removed for management reasons in Wyoming (Fig. 8).

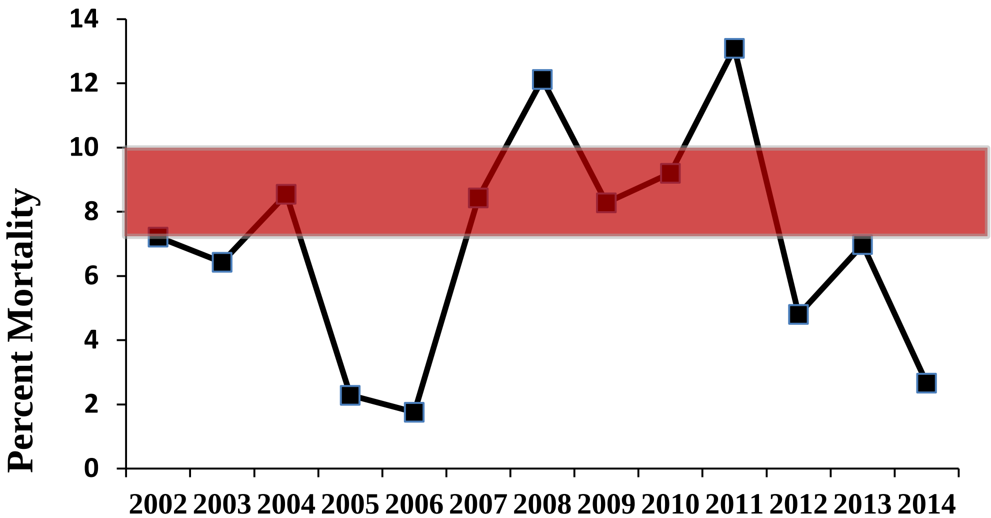

Fig. 6. Estimated annual mortalities of independent aged (≥ 2 years old) female grizzly bears in the GYA DPS. Shaded portion of chart depicts the allowable mortality range (Table 1). Refer to IGBST (2012) for description of methods used to estimate total mortality and numbers of independent females.

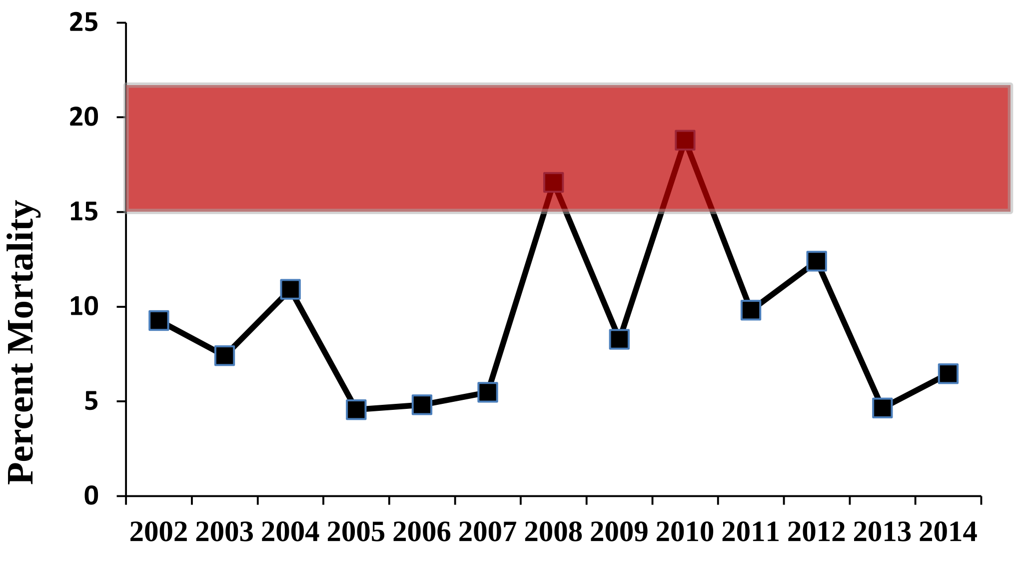

Fig. 7. Estimated annual mortalities of independent aged (≥ 2 years old) male grizzly bears in the GYA DPS. Shaded portion of chart depicts the allowable mortality range (Table 1). Refer to IGBC (2012) for description of methods used to estimate total mortality and numbers of independent males.

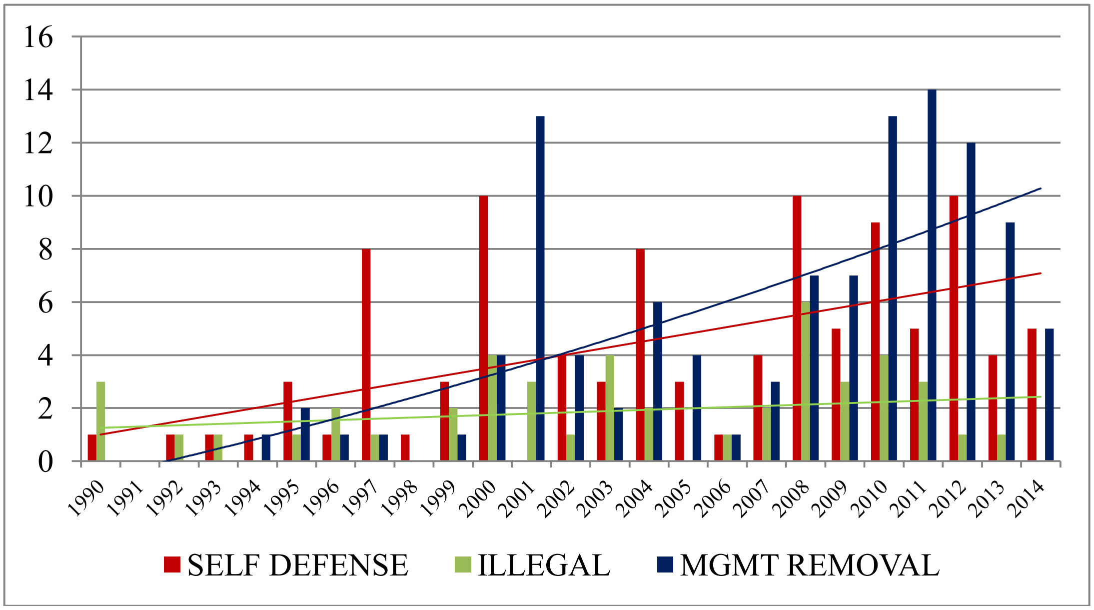

Fig. 8. Annual grizzly bear mortalities attributed to human causes in Wyoming. Linear trend lines illustrate changes in mortality sources through time.

REGULATIONS

History

The state did not devote much attention to grizzly bear management during the early part of the 20th century. The 1899 *Game and Fish Laws of Wyoming* made no mention of grizzly bears. The 1903 *State Game Warden Report* simply stated it was a misdemeanor to hunt, kill, or trap grizzly bears upon any of the National Forest Reserves in the state, except during the open game (ungulate) seasons. In 1937, black bears and grizzly bears were classified as game animals on most national forests and in the Black Hills; however they remained classified as predatory animals throughout the remainder of the state. Wildlife classified as "game animals" could not be trapped or hunted with dogs without approval of the Chief Game Warden or local game warden. Hunting seasons for black and grizzly bears generally corresponded with elk or deer hunting seasons. Any person holding an elk and/or deer license could kill one bear of either species.

Current Wyoming Statutes and Wyoming Game and Fish Commission Regulations

Wyoming Statute (W.S.) 23-1-101 (a) (xii) (A) classifies the grizzly bear as a "trophy game animal." This classification empowers the Commission to regulate take of grizzly bears. State regulatory mechanisms authorizing the Commission to manage grizzly bears are summarized in Appendix II.

MANAGEMENT STRATEGIES

Large Carnivore Section

The Department established the Large Carnivore Section (LCS) to effectively manage grizzly bears and other large carnivores in Wyoming. The LCS works with regional wildlife managers, information /education personnel and agency leadership to ensure the strategies and directives in this plan are executed. With respect to grizzly bears, LCS's primary responsibilities include monitoring and management of a recovered grizzly bear population, promptly addressing human-grizzly bear conflicts, participation in research that informs management, and conducting appropriate planning based on the best available science. Additionally, the LCS conducts public education and outreach through a variety of forums including the Bear Wise Wyoming Program. Outreach and education efforts are designed to proactively prevent conflicts, address public safety issues, and provide general education about grizzly bear ecology and management. The LCS works closely with all Department personnel to ensure agency efforts are coordinated and consistent with this plan.

The following sections address six key components of the Department's grizzly bear management program.

Occupancy

The distribution of grizzly bears in Wyoming currently encompasses all of YNP and GTNP, and extends east of the Absaroka and Owl Creek Mountains, and south into the Wind River Range and the Wyoming Range (Fig. 9).

Habitats that are biologically and socially suitable for grizzly bear occupancy are the portions of northwestern Wyoming within the DMA that contain large tracts of undisturbed habitat, minimal road densities, and minimal human presence (Fig. 9). Suitable habitat is the area capable of sustaining a viable grizzly bear population now and into the future, based on findings of the IGBST. The DMA is based on the United States Fish and Wildlife Service (USFWS) biological suitability model (USFWS 2007b) with additional consideration given to data on grizzly bear occupancy, mortality, and social tolerance (IGBST 2012). The USFWS provides a comprehensive discussion of how suitable habitat is delimited at: http://www.fws.gov/mountain-prairie/es/species/mammals/grizzly/BackgroundOnUSFWS_SuitableHabitatMarch2013.pdf.

The suitable habitat areas are within the geographic area commonly known as the Greater Yellowstone Area (GYA). For purposes of this plan, GYA and GYE are geographically synonymous. The Wyoming portion of the GYA includes parts of Park, Hot Springs, Fremont, Teton, Sublette and Lincoln counties. The GYA includes all lands within the Shoshone, Bridger-Teton, and Caribou-Targhee National Forests, YNP, GTNP, the National Elk Refuge, and the western portion of the WRR. It also incorporates private, state and BLM lands within and adjacent to the above mentioned national forests (Fig. 9).

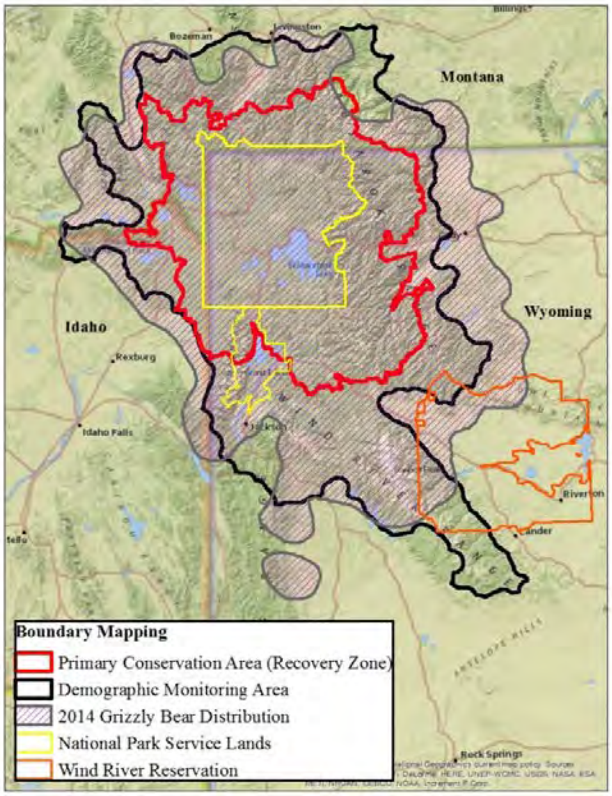

Fig. 9. Grizzly bear distribution in Wyoming as of 2014 (adapted from Bjornlie et al 2014b).

Areas outside the DMA, including isolated mountain ranges such as the Bighorns, Sierra Madres, Snowy Range, Laramie Range, and the Black Hills, do not contain sufficient amounts of suitable habitat (as defined by the IGBST) needed to meet essential requirements for occupancy by grizzly bears. The potential for conflicts is extraordinarily high and resulting mortality levels would be too great to sustain a grizzly bear population in those locations.

A recovered grizzly bear population will be maintained within the DMA. The State will apply more conservative management policies within portions of the PCA outside the national parks to assure the demographic distribution criterion (at least 16 of 18 BMUs occupied by females with young over a 6-year sum of observations) is met. Management flexibility will be greater outside the PCA boundary. However overall mortality within the DMA should not exceed the mortality limits prescribed in the adaptive management framework (Table 1, Appendix I) and the updated *Conservation Strategy* (USFWS 2016b).

Human activities and traditional land uses outside the DMA would contribute to a higher frequency of human-grizzly bear conflicts potentially resulting in a lower public tolerance for grizzly bears. Accordingly, those areas identified outside the DMA where the potential for conflict is high will generally be managed to proactively discourage these occurrences from happening (see Conflict Management page 20). Public hunting seasons may also be used to limit grizzly bear occupancy outside the DMA, but will be regulated to assure overall population and distribution goals continue to be met within the DMA.

Grizzly bears will inevitably continue to disperse outside the DMA due to success of the grizzly bear recovery program, and associated increase in abundance and distribution. However, this does not imply that the Department will manage for grizzly bear occupancy in these areas. The DMA identifies the areas containing biologically suitable and socially acceptable habitats where we are committed to maintain a recovered grizzly bear population. Grizzly bears occupying areas outside the DMA contribute little to population maintenance due to high frequency of conflicts and lower reproduction compared to grizzlies within the DMA. Although grizzly bears will not be actively discouraged from occupying all areas outside the DMA, management decisions will focus on minimizing conflicts and may proactively limit occupancy where potential for conflicts or public safety issues are very high. It should also be noted that the areas lying beyond the DPS boundary are within the area where grizzly bears will remain listed as a threatened species under the Endangered Species Act.

Population Monitoring and Management

Reliable status and trend data are essential to effectively manage the GYA DPS of grizzly bear. Investigations are continually underway to refine population estimators and improve monitoring efficacy. The current population estimator is the model averaged Chao2 (Keating et al. 2002, IGBST 2005, Cherry et al. 2007) with updated vital rates (IGBST 2012, USFWS 2013). Because it is conservative and sensitive to changes in trend, the model averaged Chao2 estimator will continue to be used until a more accurate estimator is available. Improved data collection protocols and population analysis techniques may be implemented if they are demonstrated to be reliable, approved by the IGBST and the Yellowstone Grizzly Coordinating Committee YGCC, and reasonably cost-effective. All monitoring data will be compiled, analyzed and reported annually in grizzly bear job completion reports.

Population Monitoring

The Department has invested enormous fiscal and personnel resources to monitor and manage the GYA DPS of grizzly bears over a period of decades. Those efforts have included capturing many individual bears and fitting them with radio collars, collecting and analyzing biological samples, monitoring physiological condition, conducting radio telemetry and observation flights, monitoring food sources, and other aspects of grizzly bear ecology and general management activities of the Department. In recent years, annual costs of the Department's grizzly bear program have approached and exceeded the $2 million mark. After the GYA DPS of grizzly bears is delisted, the Department will continue to annually assess population trends, mortality, reproduction, distribution, and other factors to be considered in management decisions. Every bear captured by the Department represents an opportunity to gain additional insight into the overall health of the grizzly bear population. The Department will continue to collect biological samples (i.e., hair, tissue, and blood as applicable) for monitoring purposes. Cataloging biological samples will enable the Department to monitor the genetic diversity of the population, as well as provide valuable information related to condition, diet, and potential for disease prevalence.

Recent research evaluating genetic viability of GYE grizzly bears (Kamath et al. 2015) has demonstrated the effective population size (N_e) of the GYE grizzly bear population increased from 102 in 1982 to 469 in 2010, which is greater than four times the minimum effective population size needed to maintain genetic health (Miller and Waits 2003). According to the authors, the observed heterozygosity and current effective population size are sufficient to avoid inbreeding depression, and to reduce concerns regarding genetic viability of GYE grizzly bears (Kamath et al 2015). The Department will continue to collect genetic samples from grizzly bears (i.e., captures, reported mortalities, hair collected from rub trees) on an annual basis in order to evaluate potential changes in heterozygosity and overall genetic diversity of the population. Should genetic issues become a concern in the future, translocation of genetic material into the GYE DPS will be considered.

Data from radio-collared grizzly bears will continue to provide crucial information about distribution, movements, reproduction, mortality, habitat use, and home range size of grizzly bears. Movements of marked grizzly bears have been analyzed to map seasonal, annual, and lifetime home ranges, and to identify important seasonal habitats and foods, potential travel or linkage corridors, activity patterns, and den sites. Information obtained from a representative subset of the population has enabled managers to estimate survival rates for various demographic classes, age at first reproduction, rate of reproduction, and life expectancy. Over time these metrics can change as a function of habitat quality and population density, and must be continually monitored and calibrated to accurately estimate rate of change in the population. Information on causes of grizzly bear mortalities also informs management and assists with efforts to identify potential areas where additional attention may be needed.

Regular observation flights have been conducted in the GYA since the 1980s. Originally, the Recovery Zone was divided into 18 BMUs that served as the geographic basis for monitoring. As the grizzly bear population expanded, it was necessary to increase the area and number of units flown to effectively monitor the entire population. Grizzly Bear Observation Areas (BOAs) (Fig. 10) were established for this purpose (IGBST 2015). BOAs will be the geographic reference areas used for observation flights and other population monitoring efforts as well as for recording mortalities. In order to report data consistently and provide a basis for long-term trend evaluation, BOA boundaries are intended to remain fixed. However, some limited modifications may be considered to improve monitoring efficacy and accuracy. Female distributional data will continue to be reported based on the original 18 BMUs to address requirements of the demographic recovery criteria (USFWS 2013, 2016a, 2016b).

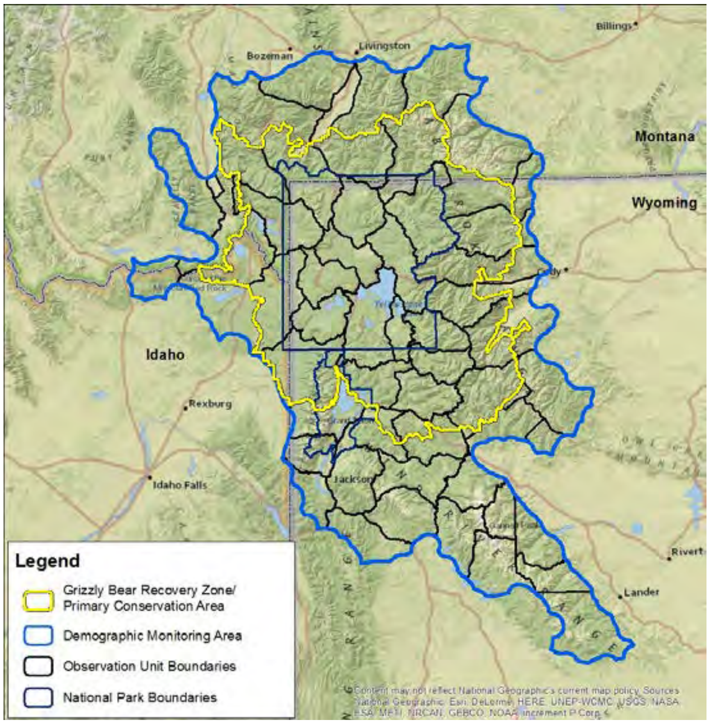

Fig. 10. Grizzly bear flight observation units (also called Bear Observation Areas – IGBST 2015) used to systematically monitor grizzly bears throughout the DMA.

All forms of mortality will be monitored for Wyoming grizzly bears. The Department will manage human-caused mortality to assure overall mortality limits for the DMA are not exceeded. Allowable discretionary mortality within the Wyoming segment of the GYA grizzly population will be determined annually based on demographic and monitoring information provided by the Department and the IGBST and the allocation process outlined in the tri-state MOA (Appendix I). The Commission will determine where to apply discretionary mortality within the state based on Commission established management objectives and recommendations from the Department and considering public comments. The Commission will ensure that distributional recovery criteria are met within the PCA. The Department will manage non-hunting sources of mortality through education, enforcement, and implementation of the conflict management guidelines (Appendix IV). Consultation with the appropriate state and federal agencies will continue to ensure management objectives for Montana, Idaho and the National Parks are not compromised.

Portions of the WRR are known to be occupied by grizzly bears. The WRR is located entirely outside the PCA and represents less than 5 percent of the DMA. The Department lacks management jurisdiction on Tribal lands, but will continue coordination with the Eastern Shoshone and Northern Arapaho Tribes to ensure our collective management actions sustain a recovered grizzly bear population. The Tribes are members of the YES (YGCC) and management of WRR grizzly bears is fully coordinated with the other agencies in the context of ecosystem-scale management. Upon delisting, Tribes will assume full authority to manage grizzly bears on Tribal lands.

Grizzly Bear Foods Monitoring

Grizzly bears are opportunistic omnivores capable of surviving in a variety of habitats (Craighead 1998) by utilizing a broad range of food items (Craighead and Mitchell 1982, IGBST 2013, Gunther et al. 2014). Changes in climate may affect regional vegetation, hydrology, fire regimes, and pathogen prevalence, which may in turn influence the abundance, range, and elevational distribution of foods consumed by GYA grizzly bears (Gunther et al. 2014). However changes in abundance of various food sources are not likely to negatively impact grizzly bears at the population scale due to their dietary plasticity (IGBST 2013, van Manen et al. 2014, van Manen et al. 2015). An in-depth dietary analysis revealed 266 different species from 200 genera and 4 kingdoms are consumed by grizzly bears in the ecosystem (Gunther et al. 2014), indicative of the grizzly bear's broad dietary flexibility (Gunther et al. 2014). Moreover, past changes in key food abundance resulting from the Yellowstone fires, cutthroat trout declines, and whitebark pine die-off were not associated with population-level responses by grizzly bears.

The Department will continue to participate in coordinated monitoring of grizzly bear food sources and will consult with land management agencies and private landowners regarding issues related to grizzly bear habitat protection, disturbance, enhancement and mitigation. The Department will continue to work closely with the USFS to assist in the monitoring of selected whitebark pine stands and army cutworm moth aggregation sites based on methodology implemented by the IGBST (IGBC 2000). Whitebark pine stands will be inventoried and monitored for seed production, tree health (i.e. tree mortality, evidence of blister rust, *Cornartium ribicola* and mountain pine beetle, *Dendroctonus ponderosae* infestation), and evidence of grizzly bear use. Grizzly bear use at existing and newly identified moth aggregation sites will also be monitored. The Department will continue to identify areas of interest related to grizzly bear diet in order to better understand and manage the population.

Hunting

Since the early 20th century, regulated hunting has played an instrumental role in the recovery and health of wildlife populations. Regulated hunting is not only a pragmatic and cost effective tool for managing populations at desired levels; it also generates public support, ownership of the resource, and funding for conservation as well as greater tolerance for some species such as large predators that may cause safety concerns and come in conflict with certain human uses.

Regulated hunting may be a component of the Department's grizzly bear management program. Hunting, along with other management tools, may be utilized to ensure the long-term conservation of grizzly bears in Wyoming by maintaining the population within a healthy, sustainable range and by potentially limiting occupancy of unsuitable habitats. Public take may also be directed, when appropriate, to areas with high frequencies of human-grizzly bear conflicts. If implemented, this strategy will evaluate the use of hunter harvest to replace some of the mortality that might otherwise result from agency take in conflict situations. Any proposed grizzly bear hunting seasons will be promulgated in a manner similar to that used for other trophy game species in Wyoming. Wildlife managers will consider population objectives, annual population data and trends, grizzly bear distribution information, species specific characteristics (i.e. reproductive rates and behavior) and habitat data to develop hunting season proposals.

Regulations governing grizzly bear management will be promulgated in conformance with the Wyoming Administrative Procedures Act (APA) and presented for Commission action each year. The APA mandates public review of all agency rulemaking. Initial proposals will be thoroughly reviewed and approved by the Department. The Commission will ultimately take formal action on the proposed seasons, either adopting as presented, or making modifications based on biological data and social concerns expressed by the public. Hunting regulations must also be promulgated in conformance with Wyoming Statutes governing legal methods of take. W.S. 23-3-109(a) prohibits use of dogs to take trophy game animals. (This statute directs the Commission to regulate the use of dogs to take mountain lions).

Female grizzly bears with dependent young as well as dependent young will be protected from hunter harvest. Hunting seasons may also be timed to reduce exposure of females to harvest. Early spring and late fall hunts tend to focus hunting pressure on males because females with young are more likely to be in dens at those times. Persons who draw a grizzly bear license will be required to participate in training on grizzly bear ecology, identification, and safety. In general, males are more exposed to harvest because they range more widely and are more likely to be encountered by hunters. At any given time, approximately 67 percent of independent females are accompanied by dependent young (WGFD 2014, IGBST Annual Report 2015). A regulation that prohibits take of females with young will functionally extend protection to approximately two-thirds of the adult females in the population. Protecting females will serve to focus regulated harvest on the male segment of the population.

If hunting seasons are promulgated, license allocation and mortality limits will be developed annually within geographically-defined hunt areas to attain an appropriate distribution of harvest, both within and outside the DMA. A great deal of interstate and interagency collaboration and communication will be incorporated into season planning processes. Hunting season structures will be evaluated and adaptively managed to achieve desired harvest results, thereby ensuring recovery criteria continue to be met.

Research and Monitoring

Applied research to develop more accurate and efficient population and/or density estimation techniques will continue to be a priority. The Department also has interest in research addressing how an intact large carnivore guild may directly and indirectly impact ungulate populations in northwest Wyoming. This research question has management, social and ecological implications. The Department will continue to evaluate interactions among grizzly bears, ungulates, and other large carnivores. There are also multiple questions related to efficacy of management strategies for population stabilization and conflict resolution. The GYA grizzly bear population affords unique research opportunities to address these types of questions from the perspective of a long-term dataset.

Increased abundance and expansion of grizzly bears within areas with differing land use patterns will afford unique opportunities to look at potential changes to survivorship and birth rate as well as habitat selection patterns outside the core recovery zone. In addition, managers will have the opportunity to evaluate how changes in the population may relate to anthropogenic influences on the landscape (e.g., human-grizzly bear conflicts, habituation) as well as how the population responds to management and changing habitat conditions (Bjornlie et al. 2014a, van Manen et al. 2015). It will be particularly important to evaluate how harvest management influences population demographics should hunting occur. Questions may arise regarding survivorship, recruitment, movements, genetic diversity, and behavioral adaptations in response to hunting and other anthropogenic influences.

Much of the PCA is designated wilderness and national parks, whereas lands outside of the PCA, while still containing wilderness and roadless areas, are predominantly multiple-use. Given the diverse land use patterns, differences in grizzly bear demographic characteristics and habitat utilization may emerge. Understanding these differences may have implications for management of grizzly bears outside the PCA.

The Department will continue to identify questions that have specific management implications, and will develop hypotheses to test through relevant research projects. The Department will continue to serve on the IGBST and will play a key role in furthering the body of information available for managers to adaptively manage this and other grizzly bear populations.

Habitat and Land Management

Effective grizzly bear habitat consists of areas where biological needs of grizzly bears are met and mortality risk is low – in other words, large contiguous areas that are remote from human activities [USFWS 2007, Schwartz et al. 2010]. The majority of secure habitat inside the PCA is within national parks and designated wilderness. Outside the PCA, most habitat occupied by grizzly bears is on USFS lands. The Department is responsible for managing grizzly bears on all lands in Wyoming, excluding national parks and Tribal lands; however the Department has no direct authority to manage habitat except on Commission-owned lands.

The six national forests within the GYA, in their capacity as members of YES, have committed to maintain secure grizzly bear habitat at 1998 levels (ICST 2007, FR 72:14925, USFWS 2016b). All six forest plan revisions include standards ensuring habitat will be conserved at levels needed to sustain the recovered GYA DPS grizzly bear population [FR 72:14923]. Once the grizzly bear is delisted, the YES will continue as the YGCC. The Department will provide data and input to all appropriate land management decisions in our capacity as a member of YGCC, and when providing agency comments on proposed planning and permitting actions on federal lands. Coordination among state and federal agencies and private landowners will be essential to assure adequate grizzly bear habitat is maintained.

The central reason why grizzly bear populations declined in North America was the settlement of vast tracts of land and conversion of those lands to more intensive anthropogenic uses, leading to increasing frequencies of encounters and conflicts with grizzly bears, and consequently increased grizzly bear mortality. The result of these combined factors was fewer tracts of suitable habitat where grizzlies could survive. The following factors contribute to loss of suitable habitat: conversions of native vegetation, depletion of food resources, disturbance, displacement from human activities and developments such as roads and subdivisions, and fragmentation of habitat into increasingly smaller blocks that are inadequate to maintain viable grizzly bear populations.

Roads contribute significantly to degradation of suitable grizzly bear habitat. Grizzly bears living near roads also have a higher probability of mortality (Schwartz et al. 2010). Road development has displaced adult females from approximately 16 percent of the total available habitat in YNP (Mattson et al. 1987). Female displacement is higher in areas having higher road densities. The distances at which grizzly bears appear to be displaced from roads vary in different habitats and seasons. The impact of roads is greatest in spring. During the fall, grizzly bears tend to move to higher elevations where they forage in locations that are typically more isolated from existing roads. Consequently, roads are a less important source of disturbance during the fall season. The amount of traffic also appears to influence the degree of road avoidance.

The Department supports maintaining roadless areas where they currently exist within occupied grizzly bear habitat (primarily within the PCA). This is consistent with forest management plan commitments to maintain secure grizzly bear habitat at 1998 levels. Grizzly bears rely on security cover to insulate themselves from threats and disturbances. Overall habitat suitability can be impacted by loss of security cover as a direct or indirect consequence of various human activities. Such activities may include: land management practices, recreational developments and primary roads (Mattson et al. 1987), restricted roads and motorized trails (Mace et al. 1996); human use (Knight et al. 1988, Mattson 1989, McLellan and Shackleton 1989); oil and gas development (Schallenberger 1977, Reynolds et al. 1983, McLellan and Mace 1985); logging practices (Zager et al. 1983, Archibald et al. 1987, Bratkovich 1986, Hillis 1986, Skinner 1986); and forest fires (Zager et al. 1983, Blanchard and Knight 1990). The Department will continue to provide technical advice, including data and expertise regarding grizzly bear ecology, to inform decisions of land management agencies. We will encourage jurisdictional agencies to address the impact of human activities in their land management plans and permitting actions.

The majority of suitable habitat occupied by the GYA DPS of grizzly bears is a contiguous region of northwest Wyoming that, for the most part, remains intact. A comparatively limited number of two-lane highways bisect portions of the GYA. The Department will work with appropriate land management agencies and the Wyoming Department of Transportation to minimize impacts if additional highway projects should be proposed in the future.

Human activities, including recreation in occupied grizzly bear habitat, are also linked to disturbance, human-grizzly bear conflicts and grizzly bear mortalities. The Department promotes the use of bear pepper spray in areas occupied or likely to be occupied by grizzly bears. The Department also recommends that land management agencies require proper food/waste handling practices (i.e. food storage orders) that reduce the potential for conflicts.

Habitat Recommendations

The following general guidelines will be considered in formulating Department comments on land use plans and permitted actions in occupied grizzly bear habitat:

- Work with land management agencies to monitor habitat conditions and trends potentially affecting all sensitive and priority wildlife species.

- As mandated by Sections 1502.16, 1508.7, and 1508.8 of the Council on Environmental Quality Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act [40 CFR Parts 1500-1508], identify and evaluate the cumulative effects of all past, present, and reasonably foreseeable actions potentially affecting sensitive and priority wildlife or their habitats. The potential significance of impacts created by the project being analyzed must be evaluated in the context of an overall cumulative effects analysis covering an appropriate unit of land or the ecosystem as a whole.

- Monitor human activities that may reduce habitat effectiveness on seasonally important wildlife habitats and recommend changes in management of human uses if warranted.

- Base road construction proposals on completed transportation plans that take into consideration important wildlife habitats and seasonal-use areas.

- Use minimum road design and construction specifications based on projected transportation needs. Schedule construction to avoid important seasonal use periods as identified in species-specific guidelines.

- Recommend site-specific design and mitigation standards to locate roads, drill sites, landing zones, etc. in a manner that avoids adversely impacting important wildlife habitat.

- Stabilize and reclaim disturbed areas with native plant species whenever possible to provide proper watershed protection. Species that provide wildlife forage and/or cover should be used in rehabilitation projects where deemed appropriate. However, to reduce potential for traffic collisions and mortalities, plant species that attract wildlife should not be planted within road rights-of-way.

- As general guidance, the Department recommends the average density of open roads should not exceed one mile of road per square mile. This is consistent with the Department's elk management guidelines.

- When necessary, recommend seasonal road closures and/or vehicle restrictions during important seasonal use periods. Road closures may also be recommended in specific situations where there is concern about potential conflicts due to increased bear activity.

- Encourage the USFS and Bureau of Land Management to enforce regulations banning motorized travel off established roads as well as food storage orders within USFS lands.

- Focus efforts to improve habitat quality in areas of recurring grizzly bear mortalities related to human causes. Such efforts may include improved sanitation, seasonal road closures, and enhanced educational efforts.

The Department recognizes large tracts of roadless areas are crucial for successful conservation of grizzly bears. The Department will work with local groups and land managers to develop compatible travel management plans. In general, the density of open roads has remained the same or decreased in most bear management subunits since 1998 (IGBST 2015).

Conflict Management

The guidelines outlined in the final *Conservation Strategy* (USFWS 2016) along with the guidelines below will be used to manage human conflict both inside and outside of the DMA. Human welfare will receive priority consideration when grizzly bears and people come into conflict. Management actions will be based on a risk assessment that considers the impact to humans as well as the grizzly bear population and mortality status. Department responses to conflict include no action, aversive conditioning, deterrence, exclusion, relocation, and/or removal. Situations involving grizzly bears occupying locations where the potential for conflicts is high (e.g. subdivisions) will be managed proactively to prevent damage and address human safety concerns. All management actions will be documented in the annual grizzly bear job completion report. As the grizzly bear population has increased in abundance and distribution, the Department has documented a corresponding increase in abundance and distribution of conflicts (Fig. 11). The Department will continue to stress the importance of conflict resolution and maintain vigilance in response to grizzly bear/human conflicts.

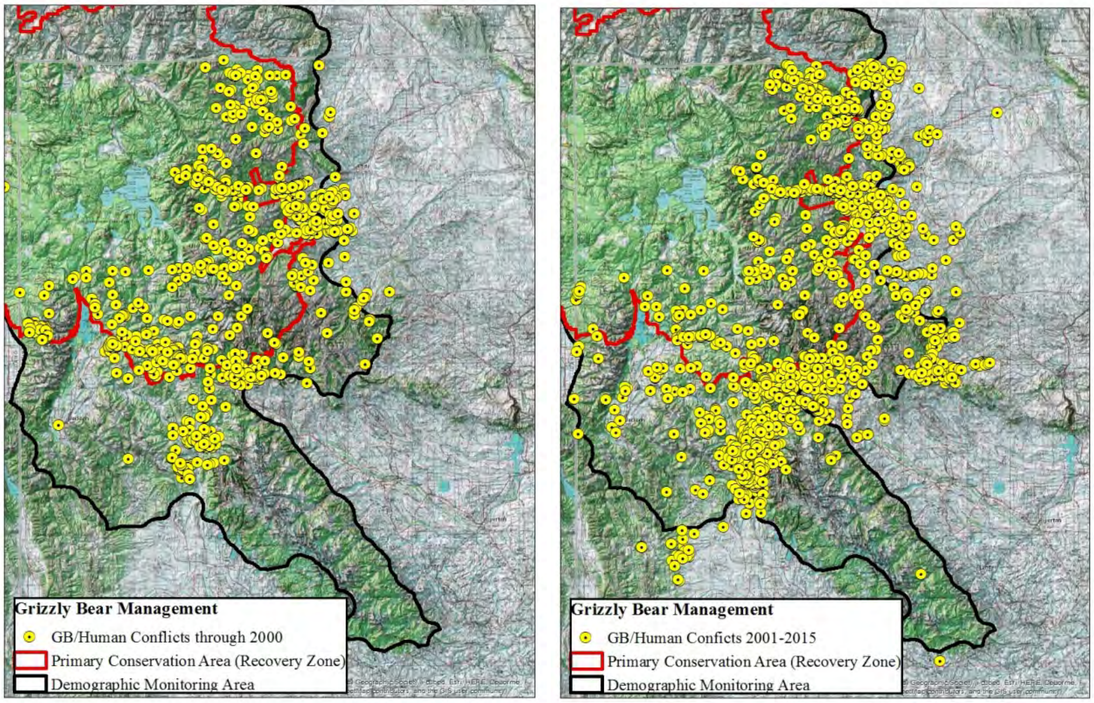

Fig. 11. Verified grizzly bear-human conflicts illustrating the increased distribution of conflicts beyond the Primary Conservation Area and Demographic Monitoring Area in Wyoming.

The Department's conflict management program will focus on education and preemptive management strategies. Public safety will remain the paramount consideration in all Department management decisions related to grizzly bear conflicts. To the extent possible given logistical and manpower constraints, situations involving grizzly bear conflicts will be handled in a timely and effective manner. Non-lethal control measures will be exercised whenever appropriate and practical. Location, cause of incident, severity of incident, history of the offending grizzly bear(s), and bear's health, age, and sex will be considered in any decisions to identify appropriate management actions. Additionally, the Department will include the prevention of future conflict as a consideration when developing strategies to deal with individual situations. Appropriate circumstances in which response actions may be taken are described below:

No Action

The Department may elect to take no action after the initial investigation if the circumstances do not warrant control or if the opportunity for effective control of the situation is low.

Many human-grizzly bear conflicts are one-time events. The activities and circumstances leading to the conflict may not be repeated, thus a management response becomes unnecessary. In other situations, the location of the grizzly bear involved is unknown, or the location where the next conflict may occur cannot be reliably anticipated.

Aversive Conditioning, Deterrence, and Exclusion

The Department may employ various options to prevent or reduce the potential for conflicts and/or depredations (e.g. electric fencing, bear proof structures or containers, scare devices). As circumstances warrant, the Department will employ nonlethal methods such as removing the source of the conflict or altering the behavior of the bear(s) that may be contributing to a conflict.

Often the most effective action is to manage the root cause(s) of the conflict. Implementing property protection (bear exclusion) measures or eliminating attractants will often result in grizzly bears abandoning the area and discontinuing undesirable behaviors. Aversive conditioning by actively deterring grizzly bears from a specific site or area will sometimes have the same effect depending on the situation.

Relocation

The Department may capture grizzly bears and relocate them away from conflict situations when other options are likely to be ineffective, or where human safety is a concern. Capture and relocation efforts will be initiated in a timely manner when practical. The Department will attempt to relocate conflict grizzly bears to locations where the probability of causing additional problems is low. Grizzly bears captured to manage conflicts will not be relocated into unoccupied habitat. Grizzly bears not suitable for release will be removed from the population. All sub-adult and adult grizzly bears to be relocated or released on site will be permanently marked and may be radio-collared when applicable.

Removal

Lethal control may be employed when other options are not practical or feasible, in particular when bears become food-conditioned, human-habituated, or aggressive toward humans. Grizzly bears displaying these behaviors are a public safety threat and often continue to be involved in property damage incidents. In other circumstances, some grizzly bears may not be suitable for release due to injuries, illness or their physical condition. When the option to lethally remove a bear is exercised, the source of the conflict should also be managed as appropriate. As with other known human-caused mortalities, Department removals will be reported annually.

Conflict Management Procedures

General

The following conflict management procedures shall be implemented in accordance with the guidelines above:

- The Department will ensure that appropriate LCS and regional personnel are trained to manage conflicts involving grizzly bears. Conflict management is a high priority for the Department.

- Conflict reporting procedures will be made available to the public.

- Appropriate personnel within other state and federal agencies may be trained, authorized, and equipped to manage conflicts in appropriate circumstances as determined and approved by the Department.

- Livestock depredation information and training may be made available to livestock producers and their employees. It shall remain essential, however, for Department personnel to respond to and verify instances of livestock depredation in a timely manner.

- The Department will provide a timely response to reports of human-grizzly bear conflicts. Appropriate actions to address human-grizzly bear conflicts will be identified and implemented in accordance with Department guidelines and protocols.

- The Department will evaluate reports of human-grizzly bear interactions and will promptly conduct an investigation when warranted. The Department will inform the affected parties or their representatives of the findings as soon as feasible.

- The Department will provide information and technical assistance to prevent, manage, and mitigate human-grizzly bear interactions.

- The Department may provide deterrent or aversive conditioning devices or supplies for use in preventing or managing interactions and conflicts.

- The Department may preemptively capture and relocate grizzly bears to prevent interactions and conflicts with humans in cases where this is deemed necessary.

- Grizzly bears involved in conflicts may be captured and relocated to prevent additional conflicts.

- When action is necessary to prevent additional conflicts or to address public safety, grizzly bears may be removed from the population in cases where relocation is not possible or practicable, or where prior relocation attempts have proven ineffective.

- Grizzly bears displaying aggression or considered to present a continued threat to human safety will be removed from the population as the situation warrants.

- Grizzly bears displaying food-conditioned or habituated behaviors may be relocated, aversively conditioned, or removed from the population dependent on the specific details of the incident.

Property Damage Management

Grizzly bears are attracted to processed human foods, gardens, garbage, bird feeders, livestock and pet feed, livestock carcasses, improperly stored big game carcasses, and septic treatment systems near camps and residential areas. These types of attractants often lead to property damage by grizzly bears.

The Department has developed a statewide proactive outreach program called "Bear Wise Wyoming Program" to improve public awareness of conditions or circumstances that may lead to conflicts, how to avoid conflicts, and how to respond appropriately in a bear encounter. The Department will continue to identify potential sources of attractants and work with private property owners and land management/local government agencies to reduce sources of attractants throughout areas potentially occupied by grizzly bears. When an attractant cannot be eliminated, the Department will provide technical advice to protect property and reduce the potential for human-grizzly bear conflicts. Techniques to prevent damage may include aversive conditioning, physical exclusions such as electric fencing, relocation or removal of offending animals, and use of deterrent devices. The Department will encourage further development of effective, non-lethal damage management techniques and equipment. The Department will implement the following actions as warranted to manage property damage caused by grizzly bears:

- The Department will evaluate reports of property damage and will promptly investigate when warranted. The Department will inform the affected parties or their representatives of the findings as soon as feasible.

- The Department will provide information and technical assistance to prevent, manage, and mitigate property damage caused by grizzly bears.

- The Department may provide deterrent or aversive conditioning devices or supplies for use in preventing damage.

- The Department may preemptively capture and relocate grizzly bears to prevent damage in cases where this is deemed necessary.

- Grizzly bears causing property damage may be captured and relocated to prevent additional damage.

- When relocation is not possible or practical, or when it is unlikely to resolve the problem because of food conditioning, habituation, or other behavioral traits, grizzly bears may be removed from the population.

Agriculture Damage Management

Grizzly bears can cause extensive damage to unprotected agricultural commodities including livestock, livestock feeds, and apiaries. The Department will cooperate with livestock producers and land management agencies to promote livestock management techniques that reduce depredations. Grizzly bear management actions will emphasize long-term, non-lethal solutions, however, it will be necessary to relocate or remove offending animals to resolve specific conflicts. The Department will continue to promote development and improvement of techniques and devices to protect agricultural products from damage. Responsible Department personnel maintain awareness and knowledge of current literature on depredation management techniques. The Department will implement the following actions as warranted to manage and mitigate agricultural damage caused by grizzly bears:

- The Department will evaluate reports of damage to livestock or agricultural products caused by grizzly bears and will promptly investigate when warranted. The Department will inform the affected parties or their representatives of the findings as soon as feasible.

- The Department will provide information and technical assistance to prevent, manage, and mitigate agricultural damage caused by grizzly bears.

- The Department may provide protective, deterrent, or aversive conditioning devices or supplies to prevent damage.

- The Department may preemptively capture and relocate grizzly bears to prevent agricultural damage in cases where this is deemed necessary.

- Grizzly bears causing agricultural damage may be captured and relocated to prevent additional damage.

- Grizzly bears that are involved in livestock depredations may be removed from the population.

- Grizzly bears involved in livestock depredation often times create human safety risks and may be handled as such if the circumstances warrant.

- The Department will reimburse landowners for compensable damage to agricultural products as directed by Wyoming Statutes and Commission regulation (Appendix II).

- The Department will develop and update outreach materials that explain the damage claim process. Some related papers, agreements, and brochures include: Demaree (1985), Iverson (1989), WADMB et al. (2002), Bruscino and Cleveland (2004), and WGFD and WADMB (undated).

Outdoor Recreation-Grizzly Bear Conflict Management

Encounters between grizzly bears and humans that live, work, and recreate in grizzly bear occupied habitats may increase the potential for grizzly bear mortalities to occur due to self-defense actions, and may also result in injuries or death of humans engaged in activities such as hunting, fishing, hiking, camping, recreating or working in grizzly bear country. The Department will implement the following actions to manage human grizzly bear conflicts.

- The Department will encourage the reporting all instances of conflicts with grizzly bears.

- The Department will encourage the carrying of bear pepper spray when recreating and working in locations potentially occupied by grizzly bears.

- The Department will encourage the development of additional products and techniques outdoor resource users can utilize to avoid or manage interactions with grizzly bears in a non-lethal manner.

- The Department will annually publicize news releases with safety tips for recreating and working in grizzly bear occupied habitat [e.g., https://wgfd.wyo.gov/News/Hunters-urged-to-use-caution-when-hunting-in-grizz]

- The Department will utilize a multi-faceted information and education program to assist in managing outdoor resource user-grizzly bear conflicts [e.g., the "Bear Wise Wyoming Program" https://wgfd.wyo.gov/Wildlife-in-Wyoming/More-Wildlife/Large-Carnivore/Grizzly-Bear-Management/Bear-Wise-Wyoming]. Also see next section.

- The Department will investigate all reported human-grizzly bear conflicts that result in death or injury to a person or grizzly bear.

Grizzly bears identified for removal may be captured and donated alive to public research institutions or public zoological parks for appropriate educational or scientific purposes in accordance with Wyoming statutes and Wyoming Game and Fish Commission regulations. Grizzly bears not suitable for release, research, or educational purposes will be lethally removed. The Department will direct the disposition of all grizzly bears that are lethally removed by other than a licensed hunter. Grizzly bears lethally removed in authorized management actions shall be retained by the Department or donated to scientific or educational institutions in accordance with Wyoming Statutes and Wyoming Game and Fish Commission regulations.

Information and Education

In 1991, the Department launched an education outreach effort that emphasizes learning to co-exist with grizzly bears by reducing human-grizzly bear conflicts. Its focus was to increase public understanding and awareness of grizzly bears, their behavior and physical characteristics, and how to avoid conflicts.

Three target audiences were originally identified and continue to be highest priorities. They include:

- Persons hunting in occupied grizzly bear habitat.

- Schools, teachers and youth organizations with particular emphasis on grades 3-12 in the GYA.

- Persons residing in and visiting the GYA.

In 2004, a subcommittee of the IGBST analyzed causes and spatial distribution of grizzly bear mortalities and conflicts occurring from 1994-2003 throughout the GYA DPS. The majority of known, human-caused grizzly bear mortalities resulted from agency management actions in response to conflicts (34%), self-defense killings, primarily by big game hunters (20%), and illegal (vandal) killings (11%). The report contained 33 recommendations to reduce human-grizzly bear conflicts and identified the following 3 sources of grizzly bear mortality that Department programs could effectively influence: 1) conflicts at developed sites; 2) self-defense killings; and 3) illegal killings (IGBST 2006).

To address the first mortality source, the committee recommended implementing enhanced management strategies in a "demonstration area" where developed site conflicts and Department management actions had been historically high. The North Fork of the Shoshone River, comprised primarily of private lands west of Cody, was selected to implement a multi-agency/public approach to reduce bear conflicts at developed sites.

In 2005, the Department also began implementation of the Wyoming Bear Wise Community Program [https://wgfd.wyo.gov/Wildlife-in-Wyoming/More-Wildlife/Large-Carnivore/Grizzly-Bear-Management/Bear-Wise-Wyoming]. Although efforts were focused primarily in the initial demonstration area, the Department also initiated a smaller scale project in the Jackson, Wyoming area to address the increased frequency of black and grizzly bear conflicts. For the past 10 years, the Wyoming Bear Wise Community programs in Cody and Jackson areas have been effective at educating the public, minimizing human-grizzly bear conflicts and promoting proper attractant management. Although challenges remain and vary among communities, progress is expected to continue as the Wyoming Bear Wise Community Program effort reaches more people. In an effort to broaden the program, the Department branded this work as the "Bear Wise Wyoming Program" beginning in 2013. This rebranding was in response to increasing distribution of grizzly bears and the realization that interest in Wyoming's grizzly bears has broadened to statewide, national, and even international scales. Efforts to proactively reduce human-grizzly bear conflicts have been accomplished through the Bear Wise Wyoming Program and are summarized in grizzly bear annual job completion reports (Bjornlie et al. 2012, 2013; Atkinson et al. 2014):

The Department will continue to implement and expand its information and education efforts. Resources will continue to be allocated to the Bear Wise Wyoming Program to maintain current levels of service and for future expansion as recommended by the Department and approved by the Commission. This statewide program focuses on the proactive measures designed to reduce conflicts, and on educational efforts to inform the public about grizzly bear ecology, management and conflict resolution. Presentations will continue throughout the state, as well as on a national and international scale.

Law Enforcement

The Commission will ensure the fair, consistent and effective enforcement of laws and regulations related to grizzly bears. As is the case with all Wyoming wildlife, the Department's law enforcement charge and mission is a high priority. The Department will invest in the protection of the grizzly bear population, the thorough investigation of reported and discovered violations and will work with local prosecutors to adjudicate violations appropriately and in accordance with state law. Additionally, the Department will focus many of its' grizzly related education efforts towards ensuring understanding and compliance with Commission regulations and Wyoming statutes.

Grizzly Bear Management Costs and Funding

As the grizzly bear population size and distribution increase, management costs have continued to rise (Fig. 12) primarily due to the increasing costs of conflict management. From 1990-2015, the Department expended over $40 million to manage grizzly bears. Total future costs are difficult to predict, however costs associated with data collection and conflict management will vastly exceed any revenue generated by the grizzly bear program. The Department will continually seek ways to use new technology, new science and new methodologies to improve efficiency of the grizzly bear management program. The Department has the infrastructure and personnel in place to continue the current management program. Costs associated with managing a delisted grizzly bear population will not increase. The Department is legally bound and committed to maintaining the viability of all Wyoming wildlife.

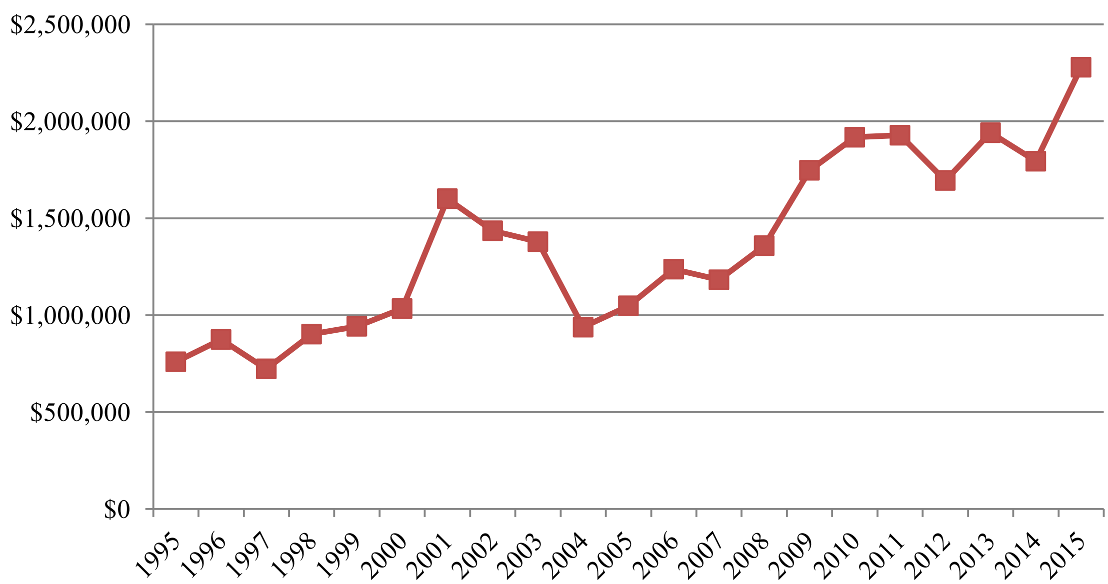

Fig. 12. Annual expenditures by the Department related to grizzly bear recovery and management.

— W G F D —

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Appendix J. Yellowstone Grizzly Bear Management Plan (State of Idaho) (excluding plan appendices)

State of Idaho

Yellowstone Grizzly Bear Management Plan

to accompany HCR 62

Prepared by:

Idaho's Yellowstone Grizzly Bear
Delisting Advisory Team

As Modified by:

House Resource and

Conservation Committee
on March 13, 2002

March 2002

Table of Contents

ACKNOWLEDGMENTS

Idaho's Yellowstone Grizzly Bear Delisting Advisory Team is composed of individuals from Idaho, representing a wide variety of interests. Their primary goal was to develop recommendations for management of grizzly bears in Eastern Idaho that consider all the varied landscapes, people, current land uses, culture, grizzly bear ecology, and legal requirements once the population was removed from protection under the Endangered Species Act. Without dedication of the members and willingness to work together, this project would likely not have succeeded. Members of the Delisting Advisory Team (DAT) include:

Mark Orme, Team Leader, Idaho Falls
Dan Christopherson, Fort Hall
Brent Ferguson, Ririe
Marv Hoyt, Idaho Falls
Gerald Jeppesen, Rexburg
Delane Kritsky, Pocatello
Bruce Mincher, Idaho Falls
Jim Peek, Viola
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Jim Gerber, Alternate, St. Anthony
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Brent Robson, Alternate, Tetonia

The Delisting Advisory Team was provided logistical and technical support by a number of agency personnel representing the Governor's Office of Species Conservation (OSC), Idaho Dept. of Fish and Game (IDFG), and the U.S. Fish and Wildlife Service (USFWS) including:

Jim Caswell, OSC, Boise
Steve Huffaker, IDFG, Boise
Roger Fuhrman, IDFG, Boise
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Gregg Losinski, IDFG, Idaho Falls
Tanya Richardson, IDFG, Idaho Falls
Larry Dickerson, USFWS, Chubbuck

Facilitator Pat Entwistle, Horseshoe Bend, provided the necessary guidance and encouragement for the Delisting Advisory Team to move forward and complete its assignment in a timely fashion.

Disclaimer:

This plan was modified by the 56th Idaho Legislature, Second Regular Session. As a result of these amendments, certain members of the DAT may no longer support the management direction contained in this plan.

INTRODUCTION

The recommendations included within this document are only applicable to the grizzly bear population associated with Yellowstone National Park and surrounding areas. No recommendations are presented for the Selkirk, Cabinet-Yaak, or Selway-Bitterroot recovery areas. Furthermore, it is the policy of this management plan that no grizzly bears from the Yellowstone population be translocated to unoccupied range within Idaho.

Background

In the lower 48 states, grizzly bears were eliminated from 98% of their historic range during a 100-year period (Mattson et al. 1995). The 1920s and 1930s drove grizzlies to extinction throughout much of their range. Of 37 bear populations present in 1922, 31 were eliminated by 1975 (Servheen 1999). Currently there are five recognized grizzly bear populations in portions of Wyoming, Montana, Idaho, and Washington. Three of these populations contain fewer than 35 individuals.

The Yellowstone population, residing in portions of Idaho, Montana, and Wyoming currently contains an estimated 400-600 individuals. The grizzly bear was listed as "Threatened" under the Endangered Species Act in 1975, with primary management under the direction of the US Fish and Wildlife Service (USFWS). After delisting, the states would assume the primary management role within their respective state boundaries.

Currently, Idaho classifies grizzly bears as a Threatened species, making it illegal to take or possess grizzly bears except under certain circumstances, including scientific research, propagation, to stop damage to property and water rights and other specific circumstances outlined in 36-106(e)5 and 36-1107, Idaho Code. (Appendix I). In addition, the following Idaho State Statutes apply to management of all fish and wildlife species, including threatened species:

36-103 (a). Wildlife property of State – Preservation – Wildlife Policy. All wildlife, including all wild animals, wild birds, and fish, within the State of Idaho, is hereby declared to be the property of the State of Idaho. It shall be preserved, protected, perpetuated, and managed. It shall only be captured or taken at such times or places, under such condition, or by such means, or in such manner, as will preserve, protect, and perpetuate such wildlife, and provide for the citizens for the State and, as by law permitted to others, continuous supplies of such wildlife for hunting, fishing and trapping.

(b). Commission to Administer Policy. Authority, power and duty of the Fish and Game Commission to administer and carry out the provisions of the Idaho Fish and Game Code. The commission is not authorized to change the state's wildlife policy but only to administer it.

36-201. Fish and Game Commission authorized to classify wildlife. With the exception of predatory animals, the Idaho Fish and Game Commission is hereby authorized to define by classification or reclassification all wildlife in the State of Idaho. Animals currently classified as 'predatory' include coyote, jackrabbit, skunk, weasel, and starling.

The Grizzly Bear Recovery Plan (USFWS 1993) identifies specific criteria that must be accomplished prior to a change in status for the grizzly bear. Along with specific population criteria that have been met; habitat based recovery criteria, only within the Primary Conservation Area (PCA), would be developed and a Conservation Strategy would be prepared. Amendments to the Recovery Plan and the Draft Conservation Strategy (USFWS 2000) were submitted to the public for review in the spring of 2000. The habitat based recovery criteria will be finalized and appended to the Recovery Plan. The Conservation Strategy will be a cooperative management plan that describes agency interactions, regulatory mechanisms, population management, population monitoring, habitat monitoring, and habitat management that will be in effect after delisting. The Draft Conservation Strategy currently applies to the existing Recovery Zone (named the Primary Conservation Area in the Draft Conservation Strategy) and a 10-mile buffer. The final Conservation Strategy will have two primary roles. First, it will describe and summarize the coordinated efforts to manage the grizzly bear population and its habitat, and the public education/involvement efforts that will be applied to ensure continued conservation of the grizzly bear in the greater Yellowstone area. Secondly, it will document the regulatory mechanisms that exist to maintain the Yellowstone population as recovered through the legal authorities, policy, guidelines, management programs, monitoring programs, and the commitment of participating agencies. While the Conservation Strategy is in effect, there will be goals for population size and habitat status. If these goals are not met, the grizzly bear could be relisted.

Upon delisting, the Idaho Fish & Game Commission will have ultimate authority and obligation for managing grizzly bears within Idaho. Management of the population outside the PCA will be directed by state management plans, as approved by the Idaho Legislature, under the guidance of Idaho Dept. of Fish and Game, while management of the grizzly bear population within the PCA will be guided by the Conservation Strategy.

The Yellowstone Ecosystem Subcommittee (YES) of the Interagency Grizzly Bear Committee (IGBC) produced the “Draft Conservation Strategy for the Grizzly Bear in the Yellowstone Area.” The governors of Idaho, Wyoming, and Montana appointed a 15-member citizen roundtable to review the strategy. This Governors’ Roundtable identified and reached consensus on a number of issues and provided a series of recommendations. The Governors ultimately endorsed the following recommendations:

1. A Primary Conservation Area (PCA) should be designated and managed conservatively to protect a core of secure habitat and grizzly bear numbers. They endorsed the current size and management guidelines for the PCA.
2. Agencies should establish a joint agency-citizen education committee to promote better understanding and awareness of grizzly bear conservation needs. Key messages should include realistic information on grizzly bear management, living with grizzly bears, and hunting in grizzly bear country without encountering problems.
3. The Yellowstone Grizzly Management Committee (currently YES) should be expanded to include three (3) non-voting members from each state, appointed by the governors, to add citizen perspectives to management.
4. In the short term, states should continue funding essential grizzly bear recovery efforts. In the long term, better funding mechanisms are needed to distribute the cost equitably among interests that support grizzly bear conservation. The governors and congressional delegations from Idaho, Montana, and Wyoming should pursue additional federal funding.
5. State management plans for areas outside the PCA should be developed concurrently with the revision of the Draft Conservation Strategy and should seek to:
    a. Ensure the long-term viability of grizzly bears and preclude relisting.

b. Support expansion of grizzly bears beyond the PCA, into areas that are biologically suitable and socially acceptable.
c. Manage grizzly bears as a game animal, including allowing regulated hunting when and where appropriate.

Recommendation #5 initiated the development of a state plan. The section of Idaho Code that created the Office of Species Conservation authorizes a procedure to be followed in development of state management plans for Threatened and Endangered species (Appendix II).

Based on the procedure, Delisting Advisory Team members were selected in July 2001. Eight management planning meetings were held and attended by Delisting Advisory Team members, representatives of IDFG, U.S. Fish and Wildlife Service, Office of Species Conservation, regional experts on grizzly bear biology, and members of the public. Public comment was accepted throughout the plan's development. Public opinions and ideas were considered by the team and included in the plan where appropriate.

Plan Development & Scope

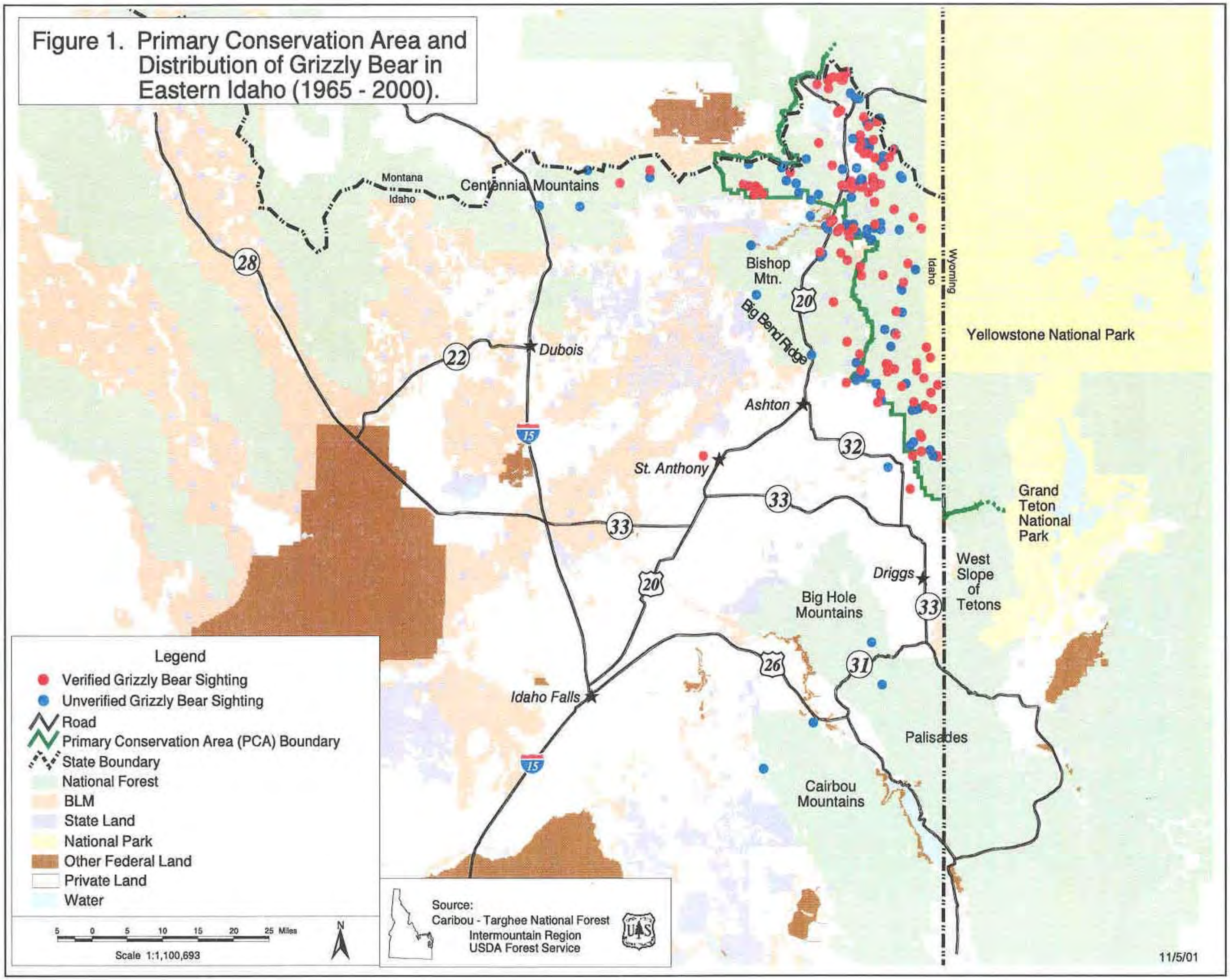
This document provides the recommended components of grizzly bear management in Eastern Idaho, as developed by the Delisting Advisory Team. Upon review by the Director of the Idaho Dept. Fish and Game, Fish and Game Commission, and the Idaho legislature, these recommendations will be approved and adopted as the management plan for grizzly bears in Eastern Idaho. The primary reason for most management efforts is to ensure long-term annual benefits from the wildlife resource to the human population. Such management efforts also benefit wildlife populations. A variety of "products" are provided by healthy wildlife populations, including tangibles such as harvest, watchable wildlife, scientific values, and recreational economic benefits, and intangibles such as social and cultural values. Wildlife is held in public trust for the people of Idaho, who ultimately decide which mix of products is most desirable.

Throughout this document the team has attempted to consider the interests of all Idahoans, as well as the needs of the grizzly bear, within biological, economic, social, and staffing constraints. If problems exist which are impossible to correct, it is important for the Department, in consultation with affected stakeholders, to re-evaluate and adjust management direction.

Upon review, final approval, and implementation of the recommendations contained within this document, it is recommended that a termination date not be established. Future management must be adaptive and responsive over time. As new data and knowledge of various biological and sociological factors are attained, management programs and frameworks will be adjusted and monitored as to their effect. An integral component to adaptive management is input and involvement by all affected stakeholders. The Department will work diligently toward informing and involving all publics interested in management of the grizzly bear.

Overall, the goal of the recommendations is to allow for the compatible co-existence of grizzly bears and humans in Eastern Idaho grizzly bear habitat. Management programs and frameworks must be adaptive and responsive in order to serve Idaho's citizens as well as grizzly bears.

Figure 1. Primary Conservation Area and Distribution of Grizzly Bear in Eastern Idaho (1965 - 2000).



Grizzly Bear Ecology

The grizzly bear is an opportunistic omnivore that readily adapts to a wide range of habitats. Historically, suitable bear habitat existed throughout North America, but current distribution is restricted to Alaska, Canada, and four (4) western states (Miller and Schoen 1999, McLellan and Banci 1999, Servheen 1999). In Idaho, grizzly bears currently occupy the Greater Yellowstone Ecosystem (GYE, Fig. 1), Selkirk Ecosystem, and Cabinet/Yaak Ecosystem. Grizzly bears historically occupied the Bitterroot Mountains of central Idaho, but no evidence supports current occupation of the area (Melquist 1985, Groves 1987, Servheen et al. 1990, Kunkel et al. 1991). Servheen (1999) completed a review of grizzly bear distribution in the lower 48 states.

Grizzly bear home ranges within the GYE are larger than those reported for other grizzly bear populations. Larger home ranges can indicate low environmental productivity and increased foraging requirements to meet bear nutritional needs. From 1975-1987, the Interagency Grizzly Bear Study Team reported mean home range sizes of 874 km^2 for adult males and 281 km^2 for adult females in the GYE. Females with new cubs used slightly less area, and those with yearlings used more. Subadult males disperse from their natal ranges to establish new home ranges, and these spatial requirements probably limit ultimate population density.

Within the GYE, a variety of foods are available to the grizzly bear; however, seasonal variation, weather, and human disturbance can influence the bear diet. To a large degree, abundance of high-quality foods dictates body size, reproductive rates, and population density. Animal matter is arguably one of the most valuable bear foods (Welch et al. 1997, Hilderbrand et al. 1999). Bears are most successful feeding on animals that are abundant and vulnerable to their predatory skills. For some interior populations, trout may provide a high-quality seasonal food. In the GYE, it is estimated that 30-50 grizzly bears forage annually on spawning cutthroat trout (*Oncorhynchus clarki*) in tributary streams of Yellowstone Lake (Reinhard and Mattson 1990). During the spring, grizzly bear use of ungulates, both scavenged and as neonate prey, is extensive (Gunther and Renkin 1990, French and French 1990, Green 1994). The annual percentage of energy obtained from ungulate meat is considerably higher in GYE than for other interior populations (Hilderbrand et al. 1999).

Use of ungulates abates during summer as bears use habitats that supply a variety of graminoids, forbs, and root crops (Mattson et al. 1991a). Yellowstone lacks significant berry-producing habitats. Consequently, bears use high-elevation sites to feed on whitebark pine (*Pinus albicaulis*) nuts (Blanchard and Knight 1991, Mattson et al. 1991a). Pine nuts are high in fat and one of the most energy-rich foods consumed by bears. When abundant, bears use pine nuts to the exclusion of most other foods. Throughout much of its range, however, whitebark pine has been severely impacted by an exotic fungus, white pine blister rust (*Cronartium ribicola*). The rust is present and spreading in the Yellowstone area (Smith and Hoffman 1998).

Army cutworm moths (*Euxoa auxiliaris*) are also valuable seasonal foods (Klaver et al. 1986, Mattson et al. 1991b, White 1996), as they are high in lipid and calorie content (Kevan and Kendall 1997, White et al. 1999). Studies from Glacier National Park (White et al. 1999) indicate that a foraging bear can consume as many as 40,000 moths/day.

During failure of key natural food items, the search for alternative foods often results in an increase in the number of bear-human conflicts and an increase in human-caused bear mortality

(Blanchard 1990, Riley et al. 1994, Blanchard and Knight 1995). Additionally, development (e.g., summer homes, resorts, campgrounds) may result in a loss of habitat, while the attraction to these sites from poor sanitation practices may result in increased human conflict and bear mortality.

Causes of mortality in grizzly bears include natural death, illegal killing, defense of life or property killings, management actions, accidents, and unknown. Human-caused mortality is the primary cause of grizzly bear deaths (Fig. 2, Schwartz et al. in press), with the majority of deaths occurring near human facilities and access routes (Knight et al. 1988). Research has shown that grizzly bears avoid areas with high open road densities (Lloyd and Fleck 1977, Schallenberger and Jonkel 1980, Brannon 1984, Aune and Kasworm 1989). No human-caused bear mortalities have been documented in the past 17 years in Idaho. Recreational developments and various other human concentration areas can increase mortality rates of grizzly bears. Additionally, diverse attractants such as apple orchards, outfitter camps, and locations where people have persistently fed individual bears or unlawfully disposed of garbage have enticed bears into conflict situations, especially during periods of natural food shortage. The primary situations that result in human/grizzly conflict are: 1) food related – improper food storage or sanitation in either a backcountry, rural, or urban setting; 2) surprise encounters (e.g., sow defending cubs, bear defending a kill/carcass, bears surprised in close quarters and acting defensively); 3) human encroaching on a bear's space (e.g., photographer or tourist approaching a bear close enough to precipitate a defensive reaction; and 4) bears responding to a noise attractant (e.g., bear attracted to a hunter attempting to bugle or cow-call an elk, bears associating gunshots with a food source [carcass or gut pile]).

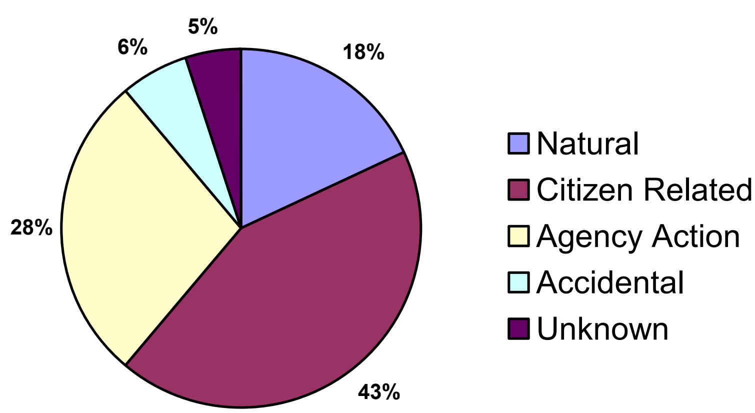


Figure 2. Causes of mortality in grizzly bears from unhunted populations in northwestern Montana and the Greater Yellowstone Ecosystem, 1975 – 1985 (Schwartz et al. in press).

In hunted populations, harvest tends to be greater in areas with access (Miller 1990a). Hunting impacts population composition in different ways, and regulations can impact the composition of harvests (Miller 1990b, Van Daele et al. 1990). Because bears are promiscuous, regulations that direct harvests toward males and away from adult females permit higher hunter quotas (Taylor et al. 1987). Not all bear deaths are detected and recorded. Miller (1990a) indicated that unreported sport or nuisance kills and wounding losses could represent significant sources of mortality that managers should consider.

Sustainable grizzly bear mortality levels are derived from estimates of population size and reproduction data (Miller 1990b). Because grizzly bears can sustain only very low mortality rates (a maximum of 5.7% was estimated by Miller [1990b]), most managers adopt conservative regulations to avoid overharvest.

Grizzly bears have a low reproductive rate relative to other mammals, a trait that critically impacts the species' survival in the presence of humans (Pasitschniak-Arts 1993, Craighead et al. 1995). The age of first litter production is dependent on maturation and body size (Blanchard 1987, Stringham 1990), which is positively related to diet quality (Hilderbrand et al. 1999). Mean age of first litter production from a sample of 15 females observed in Yellowstone National Park was 5.9 years (range = 5 – 9; Craighead et al. 1995). Cub litter size varies among individuals and populations but on average ranges between 1 and 3 young. Mean litter size has been correlated with adult female body mass; intake of dietary meat, primarily salmon and ungulates (Bunnell and Tait 1981, Stringham 1990, McLellan 1994, Hilderbrand et al. 1999); garbage (Stringham 1986); latitude (Bunnell and Tait 1981, Stringham 1984); climate; and a climate-carrion index (Picton 1978, Picton and Knight 1986). Litter size is also related to age, with young and old females producing fewer cubs per litter than prime-age adults (Craighead et al. 1974, 1995; Sellers and Aumiller 1994). The proportion of cubs in any population is a reflection of reproductive performance and early mortality and should be higher for more fecund populations. Although sex ratio at birth can favor males (Craighead et al. 1974; Craighead and Mitchell 1982; Knight and Eberhardt 1985, 1987), males generally have a lower rate of survival. The overall sex ratio in bear populations tends to be skewed towards females.

Agency Responsibilities

Idaho Dept. of Fish and Game (IDFG), under the direction of the Idaho Fish and Game Commission, will be the primary agency responsible for management of Yellowstone grizzly bears in Idaho. The Department, upon approval of the Idaho Legislature, will implement management actions within the financial, staffing, and legal limits that exist. Given that the grizzly bear population within the PCA includes parts of Idaho, Wyoming, Montana, Yellowstone National Park, and Grand Teton National Park jurisdictions, a highly coordinated and cooperative management effort among the management agencies will be necessary.

After delisting of the Yellowstone grizzly bear, the existing Yellowstone Ecosystem Subcommittee of the Interagency Grizzly Bear Committee will be renamed and operate as the management body responsible for coordination, implementation and evaluation of grizzly bear conservation within the Primary Conservation Area as specified in the Conservation Strategy. This group will continue as the 'Yellowstone Grizzly Bear Management Committee' and be responsible for:

1. Implementing the Conservation Strategy.
2. Ensuring that population and habitat data specified in the Conservation Strategy are collected and evaluated annually to monitor the current status of the grizzly bear population.
3. Sharing information and implementing management actions in a coordinated fashion.

4. Proposing management policy changes as necessary.
5. Establishing necessary task forces to implement management reviews and approved actions when necessary.
6. Identifying research needs and financial needs for management.
7. Implementing management and status reviews as necessary to ensure responsiveness of the agencies to changing circumstances of the grizzly or its habitat in Yellowstone.
8. Directing and coordinating information and education efforts.

The Governors of Idaho, Montana, and Wyoming have recommended that the Yellowstone Grizzly Bear Committee be expanded to include nine non-voting, governor-appointed members in order to provide local citizen perspectives to management.

The Idaho Legislature directs the Idaho Fish & Game Commission to coordinate with the IGBC and YES to incorporate citizen members with voting privileges into the Yellowstone Grizzly Bear Committee. Further, the legislature recognizes this would require an agreement by the majority of the Yellowstone Grizzly Bear Committee.

DISTRIBUTION AND OCCUPANCY

Goal: To manage a recovered grizzly bear population within suitable grizzly bear habitat in eastern Idaho and to provide for a population that is in a biologically suitable area and socially acceptable. Social acceptance of grizzly bears will depend on how management issues are approached and how much faith people have in managers.

The management direction established in the Draft Conservation Strategy is designed to maintain grizzly bear distribution and occupancy within the PCA and to keep mortalities at low levels. Management direction in the PCA has met the goals of the grizzly bear recovery plan. This management direction will allow for the grizzly bear population to occupy some limited areas outside of the PCA.

Outside of the PCA, the objective is to maintain existing resource management and recreational use and to develop a process whereby local publics can respond to demonstrated problems with appropriate management actions. By maintaining existing uses, people will feel less threatened both economically and in their lifestyles. The key to successful management of grizzly bears lies in bears utilizing lands that are not managed solely for them but in which their needs are considered along with other uses.

The majority of the biologically suitable habitat occurs on the Caribou-Targhee National Forest. A lesser amount of biologically suitable habitat occurs on public and state lands adjacent to the National Forest land. It is also anticipated that grizzly bears will occasionally occur on private lands.

During the next five to ten years, it is expected that grizzly bears will occur within the PCA and outside of the PCA in the following general areas: west through the Centennial Mountains; through the Island Park Caldera and out through the Bishop Mountain area and Big Bend Ridge areas; south along the Westslope of the Tetons and into the Palisades and Big

Hole Mountain areas (Fig. 1). Primarily roadless, these areas are the most likely to be inhabited by grizzly bears.

Grizzly bears are unique animals in their ability to exist in a wide range of habitats and habitat conditions. It would be premature to identify specific suitable habitats, given the bears flexibility in habitat use. Furthermore, it is anticipated that grizzly bears can successfully occupy a wide range of habitats in eastern Idaho and that compatible co-existence with traditional uses will be a major determining factor for their future. Grizzly bears will not be tolerated in areas with high human activity and/or development.

Bears that are trapped and relocated will only be relocated into the PCA, other grizzly bear occupied areas in Idaho, or acceptable areas outside the state. There will be no relocations into unoccupied areas in Idaho. In areas with high potential for human/grizzly bear conflicts, a variety of management options are available, including management for lower numbers of bears.

Motorized Access and Habitat Management

Inside the PCA, land management agencies will incorporate and maintain the motorized access management direction contained in the Draft Conservation Strategy. Outside of the PCA, IDFG will work with the land management agencies to achieve direction contained in approved federal land management plans, considering the needs of all wildlife species.

While IDFG recognizes the need to minimize negative impacts, it has no direct jurisdiction over land management activities on a majority of the land adjacent to the PCA. Therefore, IDFG will act in an advisory capacity with regard to potential impacts on grizzly bear habitat, and request federal land management agencies to consider the following grizzly bear issues in their land management plans for federal lands:

1. Identify and evaluate for each project proposal the cumulative effects of all activities, including past, current, and future projects.
2. Recommend management of human activities or combinations of activities on seasonally important wildlife habitats that minimize adverse impacts on the species or reduce the habitat effectiveness.
3. Continue to provide input into the planning process for all roads and new construction; recommend minimum road and site construction specifications, and construction times, based on the needs of grizzly bears and other wildlife species.
4. Recommend that roads, trails, drill sites, landing zones, etc., be located to avoid habitat components important to grizzly bears, based on site-specific evaluations.
5. Recommend that new roads that are not compatible with area management objectives and are no longer needed for the purpose for which they were built be restricted or decommissioned.
6. Recommend that native plant species be used whenever possible to provide proper watershed protection on disturbed areas. Wildlife forage and/or cover species will be used in rehabilitation projects where deemed appropriate.
7. For roads and/or trails that remain open, recommend seasonal closures and/or vehicle restrictions based on grizzly bear or other resource needs.

Livestock Conflicts

Inside the PCA, IDFG will support land management agencies in achieving the livestock management direction established in the Draft Conservation Strategy. The Targhee National Forest Land Management Plan recognizes livestock grazing as an important multiple use inside the PCA, and should be respected in the final Conservation Strategy.

On public lands outside of the PCA, while IDFG recognizes the need to coordinate wildlife and livestock management, it has no direct jurisdiction over livestock management activities. Therefore, IDFG will act in an advisory capacity with regard to impacts on grizzly bears and their habitat, encouraging land management agencies to consider the grizzly bear in their livestock management plans.

Habitat Monitoring

Inside the PCA, IDFG will adhere to the habitat monitoring requirements established in the Draft Conservation Strategy.

Outside the PCA:

1. IDFG will continue their normal monitoring programs for elk, deer, moose, kokanee, cutthroat trout, and other identified important food sources for grizzly bears.
2. On public lands, IDFG will encourage and work with land management agencies to monitor wetland and riparian habitats, whitebark pine, and important berry-producing plants.
3. On public lands, IDFG will encourage and work with land management agencies to monitor changes in motorized access. Monitoring efforts will focus on those areas that currently provide security for bears (areas that have no motorized access routes or motorized access route densities less than or equal to 1.0 mile per square mile).
4. In eastern Idaho, private lands are generally at lower elevations than most of the public lands. Undeveloped private lands may provide important spring habitat for some bears because they will provide early green-up. In addition, many of these undeveloped lower elevation lands provide important winter ranges for deer, elk, and moose, and winter-killed animals are an important food source for bears in the spring. On private lands, IDFG will work with citizens, counties, and other agencies to monitor development activities.
5. IDFG will identify important spring habitat for bears, then work with landowners to minimize impacts to bears during their period of use.

Habitat Restoration

Inside the PCA, IDFG will adhere to the habitat restoration measures as called for in the Draft Conservation Strategy.

Outside of the PCA, IDFG will encourage the public land management agencies in implementing existing management direction in land use plans. IDFG will identify site-specific changes that may be needed in existing land use plans, and will work with the public agencies through existing procedures and agreements to modify and amend land management plans. Examples of site-specific changes that may be considered include changes in motorized access, changes in livestock allotments, increasing productive whitebark pine stands, control of noxious weeds, and improvements in riparian and wetland habitats. Through this process the public will be able to have full participation in the decisions.

IDFG will assist private land owners who want to improve habitat conditions for wildlife (including the grizzly bear) on their lands by providing education materials and technical assistance.

POPULATION MONITORING

Goal: To develop and implement a science-based monitoring program that results in the data and tools necessary for IDFG to successfully manage grizzly bears.

The Draft Conservation Strategy states that human caused mortality for grizzly bears in the PCA should be limited to no more than 4% of the calculated population size (USFWS 2000). This means that mortalities in the three states and inside Yellowstone National Park must be recorded. State agencies would record all known mortalities and coordinate with the other jurisdictions to help with this assessment. Also, the Interagency Grizzly Bear Study Team will continue to monitor grizzly populations in accordance with the Draft Conservation Strategy. IDFG efforts will be coordinated with the efforts of the Interagency Grizzly Bear Study Team to ensure that the entire range of grizzly bears is monitored in Idaho and no unnecessary overlap in efforts occur. Outside the PCA, data analysis units will be established to facilitate monitoring distribution, abundance and mortality. This will be done in coordination with Wyoming and Montana.

Monitoring grizzly bears is complicated by their secretive nature and widely dispersed, low-density distribution. However, a number of techniques are available to assess population status and trend. Techniques that attempt to enumerate individuals can provide the most precise estimates of abundance. Mark-recapture estimates and DNA profiling currently provide quantitative estimates of abundance and require the greatest dedication of resources (personnel and operating dollars). These methodologies would be appropriate when finite estimates of the population are required for intensive management purposes. More qualitative assessments of populations can be accomplished by using techniques currently employed by the Interagency Grizzly Bear Study Team. Observations of females with young are documented, including results from organized aerial surveys. Distribution is further monitored by recording verified sightings of sign and/or bears. Additionally, cause-specific mortality is monitored. Although absolute estimates of abundance generally cannot be generated using observational data, relative population status and trend can be ascertained. A monitoring program that primarily uses observational data would require fewer resources to implement than those for generating precise population estimates. Finally, a monitoring program could consist of simply documenting verified sightings to assess distribution, with population trend inferences made from changes in distribution. This framework would cost the least in resources, but the opportunities for intensive management of grizzly bears would be limited due to the lack of quantifiable information.

Preferred Monitoring Framework

Monitoring will be directed at estimating females with young, bear distribution, and mortality. Estimation of population size using observations of sows with young is used in the Yellowstone Ecosystem (Knight et al. 1995) and has been validated (Boyce et al. 2001). Since sows produce approximately two (2) cubs once every three years, a minimum estimate of the adult female breeding population can be obtained with these observations (Eberhardt and Knight 1996). The percentage of adult females in the population is 27.4% (Eberhardt and Knight 1996), so the number of unduplicated females with cubs of the year summed over a three-year period can be divided by the percentage of females in the population to obtain a minimum population estimate. This system could be extended to the known range of the population in Idaho, using the same methodologies in order to make the information-gathering process comparable with ongoing assessments.

The preferred monitoring framework is to collect data on females with young; record other bear observations, including sign, to estimate known distribution; and document cause-specific mortality. It is believed that the density of grizzly bears in Idaho during the next few years will be so low that aerial surveys would provide little if any information. Instead, IDFG shall concentrate on soliciting and recording incidental sightings. This framework is generally consistent with what is currently being collected throughout the Yellowstone Ecosystem and therefore allows for uniformity and comparability with other data collection efforts. More intensive monitoring efforts such as capture and collaring and/or DNA profiling could be used to provide more precise information as needed and when adequate funding is available. Monitoring efforts will be coordinated with the Interagency Grizzly Bear Study Team to minimize overlaps.

As with other managed wildlife species, analysis units will be established. Habitat criteria, although monitored within each analysis unit, will not be established strictly for grizzly bears.

Additional Monitoring Activities

Additional, more intensive population monitoring will depend upon need and will be coordinated with adjacent states and Yellowstone National Park, through the Interagency Grizzly Bear Study Team, since grizzly bears occupying southeastern Idaho may be expected to travel into other jurisdictions.

Trapping and radio-collaring individual bears could be conducted when needed. Radio-collared individuals allow assessment of population size, home range, habitat use, activity patterns, survival, and productivity, depending upon objectives. Census using marked bears involves extensive field effort over several years. Trapping efforts that include previously marked bears and unmarked bears can be used to estimate population, using several mark-recapture procedures (Pollock et al. 1990). A minimum population estimate, plus a sex/age composition of the trapped population, would then be available. This method has been successfully used on both species of bears in Yellowstone National Park (Craighead et al. 1995), southcentral Idaho (Beecham 1983), northwestern Montana (Jonkel 1971), southcentral Alaska (Miller et al. 1997), and many other areas representing a wide variety of habitat conditions and is thus applicable to southeastern Idaho. These efforts will be incorporated into other monitoring efforts on associated species.

A bear census using hair sample collections and DNA analysis to identify individual bears is in the developmental stages (Woods et al. 1999). This technique uses a random sampling procedure stratified according to bear density across the entire occupied bear habitat at intervals throughout the period when bears are active. Strips of barbed wire to collect hair would be placed in areas frequented by bears. Hair would first be identified by species, and if grizzly hair was collected, then a thorough analysis of the DNA would be made to identify the individual bear. Different laboratories may produce different results, so selection of a reliable analytical laboratory is important.

Bears that are captured during management activities may be sexed, aged, and marked and/or radio-collared. While these individuals will not likely provide population characteristics, changes in composition and bear distribution may imply change in population status and suggest more intensive survey effort is needed.

Hunter harvest will be intensively monitored. When hunting opportunity for grizzly bears is established, a mandatory check may be implemented for all harvested bears as is done with black bears, mountain lions, bighorn sheep, mountain goat, and moose. Locations of harvested bears may be compared with distributions obtained by other means, and may help guide hunter harvest to more effectively compensate for and reduce management actions. Reproductive tracts from females may also be collected to assess reproductive status.

PUBLIC INFORMATION AND EDUCATION

Goal: To develop, implement and disseminate a coordinated information and education program that is understandable and useful for the people who live, work, and recreate in bear habitat so as to minimize human/grizzly bear conflicts and to provide for the safety of people.

Management strategies are unlikely to succeed without useful, state-of-the-art public information and education programs. A partnership information and education approach involving IDFG, as well as other agencies, local communities, and private interests, can result in minimizing human/bear conflicts.

Information on human safety should be included in hunter education classes. Human safety is of utmost concern when hunting in grizzly bear country. Hunters and other visitors in bear country should consider carrying pepper spray or other bear-deterrent devices. Outfitters and guides will be encouraged to provide training and certification in human safety in bear country.

It is recommended that Idaho Dept. of Fish and Game:

1. Create or designate a position responsible for providing educational programs through schools, community presentations, workshops, news releases, magazine articles, videos, and radio and television announcements.
2. Continue to cooperate with federal resource management agencies in providing safety literature at trailheads and offices in bear country.
3. Sponsor a program aimed at development of "Bear Smart Communities."
4. Develop a multi-media program based on the "Living in Bear Country" program.
5. Produce and share educational materials and audio/video programs with other bear management agencies and organizations.
6. Coordinate with other agencies to develop bear education programs for specific user groups such as hunters, anglers, wood cutters, scout groups, communities, ranchers, 4-H, etc.
7. Coordinate with other entities involved in the management of Yellowstone grizzly bears to ensure that the development and use of educational materials, signs, brochures, etc., be consistent and similar throughout the tri-state area.

CONFLICT MANAGEMENT

Goal: To minimize the potential for human/grizzly conflicts while maintaining traditional residential, recreational, and commercial uses within Eastern Idaho, and to respond quickly, appropriately, and efficiently when conflict situations arise. Conflict reporting procedures will be made available to the public through personal contacts and a variety of media channels.

As previously stated in the introduction, the Governors' Roundtable recommended and the Governors endorsed that state management plans be developed for areas outside the PCA. Therefore, Idaho Code, Title 36-2404 (Appendix II) becomes applicable and requires that a state management plan provide for the management and conservation of the species once it is delisted. The plan shall contain sufficient safeguards to protect the health, private property, and economic well-being of the citizens of the State of Idaho.

Potential conflicts emerge when managing the needs of the grizzly bear while protecting human health and safety, minimizing private property damage and livestock depredation, allowing timber harvest and recreational and hunting opportunities, and providing for other wildlife species. A goal of the management plan is to provide a management framework that is quick to respond to conflicts when they arise, while providing for the welfare of the grizzly bear.

Land management agencies and local county governments are encouraged to include the grizzly bear and its interaction with other land uses in their land-use plans to avoid creating human/grizzly bear conflicts (e.g. disposal issues). Efforts are encouraged to minimize restrictions on other land uses, while providing for the needs of the grizzly bear. Expanded habitat areas for the grizzly bear are possible when the bears co-exist on land managed for other uses. This also encourages local support for increased habitat and bear populations.

Human/Grizzly Bear Conflicts

Human safety is a high priority, and the risk to human safety must be minimized. As bear numbers and distribution increase, the potential for human/grizzly conflicts will also increase. The increase in human/grizzly encounters may jeopardize the safety of humans as well as the safety of the bears. Adequate response to human safety concerns will increase local support for the grizzly bear.

There will be no prosecution of any individual who injures or kills a grizzly bear while acting in self-defense if the bear is molesting, assaulting, killing, or threatening to kill a person.

IDFG shall provide timely information to the public and land management agencies about current bear distribution, including relocations, food conditions, activity, potential and current conflicts, and behaviors. Land management agencies are encouraged to contact their permittees with information that will help them avoid conflicts.

Proper education of those who live, work, and recreate in bear-occupied areas will help to minimize human/bear conflicts. Grizzly bears are highly attracted to potential food sources. Gardens, orchards, garbage, human and pet foods, game carcasses, and septic treatment systems are attractants to bears. IDFG will work with private property owners and others to reduce the source of attractants and provide technical advice for the protection of property and the reduction of human/grizzly conflicts. Preventative measures must be given priority, as they are more effective than simply responding to problems as they occur. IDFG will encourage the development of preventative management tools and techniques as bears expand into available habitat.

Bear-resistant food storage containers, meat poles, and bear-resistant garbage containers should be provided at campsites and other bear areas. Federal and State agencies should assist in securing grant-funding for local governments to develop bear-proof garbage containers and bear-proof landfills.

The Idaho Fish and Game Commission should consider promulgating a regulation which prohibits the baiting of grizzly bears for any purpose, including hunting, photography, viewing, etc.

Livestock/Grizzly Bear Conflicts

Livestock operations that maintain large blocks of open rangeland can provide many benefits to the long-term conservation of the grizzly bear through maintenance of open space and habitats that sustain a variety of wildlife species. Livestock grazing at long time established historical levels in the PCA and surrounding areas is important to maintain, especially following delisting of the grizzly bears. Livestock operations will continue to have access to their facilities and animals regardless of the other sections of this plan. In all cases, F&G will seek permission from affected landowners and work cooperatively with them and other stakeholders.

Livestock operators can suffer significant losses from bear depredation. Upon delisting, every individual has the right to protect their person and their property, including livestock, on private, state and federal land. If outside funding is available and the landowner is willing, efforts may include preventative programs aimed at minimizing livestock conflicts.

In cases involving livestock depredation, management actions will follow the Memorandum of Understanding (MOU) between the Idaho State Animal Damage Control Board and IDFG which states that "*The Board is responsible for prevention and control of damage caused by predatory animals and other vertebrate pests, including threatened and endangered species within the State of Idaho as described in Section 25-128, Idaho Code, and has delegated such responsibility to Wildlife Services."* The MOU also states that *"Both parties (IDFG and WS) shall consult and cooperate in any trapping efforts. WS will be the lead agency on capture and the Department shall be responsible for immobilization, handling, and release of grizzly bears."*

Programs will be developed to provide private landowners and livestock operators with incentives or benefits if they implement preventative measures and maintain opportunities for wildlife, including bears. Federal and State agencies should assist in securing funding sources to provide for incentives.

Upon federal delisting, the Idaho Fish and Game Commission will reclassify the grizzly bear as a game animal. The grizzly bear will be included in the big game depredation program Idaho Code, 36-1109 (Appendix III). In the future, claims for compensation shall be based on confirmed, suspected or probable losses, decrease in weaning or pregnancy rates, damage to facilities and equipment, and labor or other expenses required to resolve disruption of ranch activities. Currently this program provides for compensation from the secondary depredation account, which does not include license/tag funds, for depredation of livestock and damage to berries and bees from black bears and mountain lions. The program will be administered by the appropriate IDFG Regional Landowner Sportsman Coordinators and Regional Supervisors.

Nuisance Grizzly Bear Management

Successful management of nuisance grizzly bears is paramount to the success of overall grizzly bear conservation. When conflicts occur they must be addressed in a timely, efficient manner. Public acceptance of grizzly bears is dependent on the prevention and alleviation of conflicts with humans, livestock, and private property. The management of nuisance bears must allow flexibility in response to a broad range of conflicts.

Inside the PCA, the nuisance guidelines presented in the Draft Conservation Strategy will be followed (Appendix III).

Outside the PCA, significant consideration will be given to humans when grizzly bears come into contact with people or private property including livestock . The focus and intent of nuisance grizzly bear management, damage management, and hunter/grizzly bear conflicts outside the PCA will be predicated on strategies and actions to prevent human/livestock/grizzly bear conflicts. It is recognized that active management aimed at individual nuisance bears will be required as part of the management program. Nuisance grizzly bears will be controlled in a timely and effective manner. Location, cause of incident, severity of incident, history of bear, and health/age/sex of bear will all be considered in any management action.

Grizzly bears occupying areas where the potential for conflicts are high (e.g., subdivisions) will be actively discouraged and/or removed to prevent damage and provide for human safety.

Criteria for Nuisance Grizzly Bear Determination and Control Outside of the PCA (see Appendix IV for definitions):

1. IDFG will investigate reported human/livestock/grizzly bear conflicts immediately. IDFG will communicate investigation findings to the affected parties or their representatives promptly.
2. Following the verification of property damage and consultation with the property owner or owner's representative and/or land management agency, IDFG will determine what management action will be initiated.
3. Grizzly bears captured during a management action that have a high probability of being chronic depredators will be removed from the population.
4. When relocation is not possible or practicable, or when it is likely it will not solve the problem, the bear will be removed from the population.
5. Grizzly bears displaying unnatural aggression or considered a threat to human safety will be removed from the population.
6. Grizzly bears displaying natural aggression will only be removed from the population when the particular circumstances warrant removal.
7. Grizzly bears displaying food conditioned or habituated behaviors, or damaging property may be relocated, aversively conditioned, or removed based on specific details of the incident. IDFG will inform the affected people and land management agencies of the management decision.
8. Grizzly bears may be preemptively moved when they are in areas where they are likely to come into conflict with humans or their property, including livestock.
9. Grizzly bears relocated because of nuisance activities will be released in a location where the probability to cause additional conflicts is low.
10. All sub-adult and adult grizzly bears that are captured in management actions and are to be relocated/released will be permanently marked and may be radio-collared.

IDFG will have the management flexibility to deviate from these nuisance protocols when extraordinary circumstances dictate a need. IDFG will prepare an annual report of these exceptions for the Commission.

Response Actions :

1. No Action: IDFG may take no action after the initial investigation if the circumstances of the conflict do not warrant immediate control or if the opportunity for control is low.

2. Averse conditioning and deterrence: IDFG may use various options to prevent grizzly bear depredation. Such options should include but are not limited to bear-proof garbage containers, scare devices, electrical fencing, etc.
3. Capture: when other options are ineffective or when human safety is a concern, IDFG will initiate capture and relocate offending animals. IDFG in consultation with appropriate entities will determine the proper relocation areas so as to minimize further conflicts.

4. Removal: lethal control of nuisance grizzly bears will be used when other options are not viable and when human safety and protection of personal property including livestock warrant such action. Kill permits will be issued under the supervision of IDFG to affected property owners or their agents.

Any bear causing a human fatality outside the PCA will be removed from the population. Appendix III outlines the actions for incidences inside the PCA.

All reported grizzly bear conflicts and subsequent IDFG corrective actions must be documented.

HARVEST MANAGEMENT

Goal: To allow for regulated harvest of grizzly bears while maintaining a viable and self-sustaining population.

Although this plan provides general guidance for the management of grizzly bear hunting opportunity, the Idaho Fish & Game Commission has ultimate authority and discretion for establishment of take seasons and methods of take for game animals.

The success of grizzly bear recovery in the Yellowstone Ecosystem justifies a management paradigm shift from one of preservation to one of conservation. The basis of conservation is sustainable use, which for wildlife resources includes regulated hunting. Recognition of the grizzly bear as a game animal will ensure that the proper resources for population and mortality monitoring will be allocated. This will benefit the long-term viability of the bear, as it has for Idaho's other hunted, large mammal species. Classification of the grizzly bear as a game animal can also be expected to improve the level of acceptance of the bear by the public living within grizzly bear range and to increase the number of stakeholders favoring grizzly bear conservation. Hunters have been long-term supporters of conservation, and the presence of legal hunters in the field may minimize the poaching of bears by those opposed to their recovery. Additionally, hunting may act as a form of reverse habituation, thus decreasing the likelihood of human/bear conflicts. The removal of individual bears will open up home ranges for subadults, also minimizing conflicts with bears that might otherwise disperse to human-use areas. Thus, hunting tends to reduce the number of management actions needed. Management actions that involve capturing bears are expensive to conduct and, to the extent that hunter harvest can substitute for this, costs will be reduced.

The hunting of grizzly bears by members of the Shoshone-Bannock Tribes is a traditional and cultural issue, which will be determined by the Governing Body of the Shoshone-Bannock Tribes after delisting of the grizzly bear is finalized. Discussions between the Shoshone-Bannock Tribal Council and the Idaho Fish & Game Commission will be held on the management of the Yellowstone grizzly bear. [1]

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1 For purposes of future litigation, nothing herein shall be construed as recognition or endorsement of off reservation treaty rights of the Shoshone-Bannock Tribes by the State of Idaho.

It is unlikely that grizzly bear hunting seasons will be established immediately upon delisting. Establishment of grizzly bear hunting seasons will be conducted using the same process, including public meetings, as for other game species. There are three situations when hunting should be considered as a management tool for grizzly bears:

A well-conserved population is one that can sustain a harvest. As the bear population expands in accordance with the goals of this plan, a harvestable component may be produced. This situation will be identified through the monitoring protocols established elsewhere in this plan, and a hunting quota will be determined by IDFG, based on criteria outlined below.

Chronic depredation problems may indicate a bear population that is socially unacceptable for a given location. Chronic problems involve repetitive events of property damage or frequent repetitive bear use of areas of high human use, which might reasonably be expected to lead to conflict. The hunting option would be considered in conjunction with other mechanisms, such as sanitation and public education.

Individual bears may become the objects of a lethal control action per the guidelines set forth elsewhere in this plan. Such an animal, under occasional circumstances, may provide an opportunity for a hunt, at the discretion of the local IDFG office. Factors to consider when choosing to use a private hunter would be the urgency of timely action, safety, high probability of harvesting the appropriate individual, and attention to the principles of fair chase. A list of hunters desiring to participate should be maintained by IDFG, to be contacted as an opportunity occurs. It is expected that this option would be used sparingly.

All animals harvested as described above will count toward total allowable mortality quotas for the population. Harvest management will thus be considered as one component of an integrated management program for grizzly bears. It will be highly regulated, directed at individual bears as needed, and considered in annual mortality targets that will be established by IDFG in conjunction with other states and the Interagency Grizzly Bear Study Team.

Grizzly bears may be hunted in any portion of their distribution within Idaho, on any lands typically open to hunting. However, since portions of Idaho fall within the area to be managed under the Conservation Strategy, the number of grizzly bears to be removed from that area by hunting must be consistent with the established goals. That document stipulates that the sum of human-caused mortalities can not exceed 4% of the total estimated minimum population, with no more than 30% of that number being female grizzly bears. Thus, hunting mortality must be coordinated among IDFG and the other agencies that are signatory to the Conservation Strategy. A mechanism for allocation of bear quotas among the states must be negotiated among wildlife agencies of Idaho, Montana, and Wyoming. One such method may allocate tags based on the percentage of the total PCA population estimated to reside within the respective state.

Areas not covered by the Conservation Strategy may be managed less conservatively with regard to grizzly bears, in keeping with their multiple use designations. However, this plan also recognizes that the grizzly bear is a desirable component of Idaho's wildlife heritage. In general, for areas in which it is desirable to have the grizzly bear population remain stable or continue to expand, total human-caused mortality should be maintained at no more than 5.7% (as calculated by a running 6-year average) of the total estimated minimum population, with only 30% of that number being female. Different total allowable harvest, percentage female mortality, and/or population estimate methodologies may be used in the future as new information and technology become available. A higher percentage of the male or female population may be harvested as desirable for management goals in areas where grizzly bears should be maintained at low population densities. Thus, harvest management is one of the tools used for managing the grizzly bear population.

A spring grizzly bear season is recommended to protect the female cohort. Spring bear seasons typically have a lower percentage of female harvest than do fall seasons. Population data from the previous field season may be used to establish the harvest quota. The quota will be the appropriate percentage of the population as described above, less known mortality from other sources, including accidental, natural, and control actions, as well as treaty hunting mortalities. Therefore, the size of the quota will be limited by the reliability of the population monitoring data. Uncertain data will result in conservative population estimates and harvest quotas smaller than the population might otherwise allow. Since legal harvest is one of the sources of grizzly bear mortality that can readily be managed, this plan recognizes that harvest may be suspended in years of excessive mortality from other sources.

Because grizzly bear populations are very sensitive to the level of female mortality, every effort should be made to focus the harvest on male bears in areas where it is desirable to have a stable or increasing population. Methods to ensure a predominantly male harvest may include:

1. There could be a mandatory check requirement similar to that required for mountain lions and black bears.
2. Females with young may not be harvested. Neither may cubs or young accompanying a female be harvested.
3. Early closure of hunting seasons when the allowable female quota has been harvested. The IDFG Director may enforce emergency season closures at his/her discretion.
4. A tag fee structure that would include a refund for hunters harvesting a male bear.
5. Early timing of the spring hunt. Boars typically emerge from the den earlier than sows and sows with cubs.
6. Promotion of the use of hunting methods intended to allow the hunter a better opportunity to determine sex.

The Commission could consider a once per lifetime controlled hunt limitation for grizzly bear hunts similar to the controlled hunt limitation for mountain goat, bighorn sheep, and moose hunts. The Commission could also consider mandatory training for hunters, outfitters, and guides who hunt grizzly bears. The training could include information on methods to distinguish between a grizzly bear and a black bear, clean camp rules, and safety, including the use of pepper spray.

Currently, the use of bait and hounds is not permitted for black bear hunting in Idaho 'Bear Management Units' inside the PCA. To minimize accidental grizzly bear mortality within the PCA, this practice will be continued. There will be no additional restrictions on black bear hunting methods outside of the PCA as a result of grizzly bear distribution and occupancy. It will be illegal for a hunter to take a grizzly bear using bait and/or hounds. Grizzly bear hunters may be guided or unguided.

There will be no additional restrictions on the hunting/trapping of other legally harvested animals inside or outside of the PCA as a result of grizzly bear distribution and occupancy.

Big game, including black bear, hunters desiring to hunt in known grizzly bear range will receive information on methods to distinguish between a grizzly bear and a black bear, clean camp rules, and safety, including the use of pepper spray. Any time the identification of the species of bear is in doubt, the animal should not be harvested. The rate of accidental grizzly bear kills should be monitored and additional training implemented as necessary to keep this rate acceptably low.

PROGRAM COSTS & FUNDING

Grizzly bear management is an Idaho activity that exists because grizzly bear conservation is a national priority. Idaho and a few other western states contain suitable habitat to support grizzly bears. They are managed not just for Idaho citizens, but also for the rest of the nation. It is entirely logical that all those who benefit from the presence of grizzly bears in Idaho should pay for their management. While it is beyond the scope of a state management plan to provide assurances that all agencies involved with grizzly bear management have adequate funding, it is recognized that tasks associated with assisting individuals and/or communities with preventative measures, population enumeration, depredations, and information/education could add significantly to the monetary resources needed. Monitoring population indices, habitat conditions, providing technical assistance, and interagency coordination are currently being conducted with minimal increases in funding requirements anticipated for future management.

We recommend that the Idaho legislature and Governor encourage the Congressional delegation to seek federal appropriations and funds from national business and conservation groups to fund grizzly bear management activities in Idaho. A trust or endowment concept has been developed through the Interagency Grizzly Bear Committee. This proposal is a good starting point from which to seek a stable funding mechanism for grizzly bear management.

The use of hunting license, federal aid to fish and wildlife, and nongame funds should be continued at historic levels, but additional management obligations created when the grizzly bears are returned to state management should be funded with new revenue sources.
The Department will implement approved management actions within the financial, staffing, and legal limits that exist. In the event that funding is insufficient, further direction should be

provided by the legislature in order to prioritize agency efforts in the most efficient and most needed manner. Critical tasks include monitoring mortalities and response to human/livestock/grizzly bear conflicts.

Current annual expenditures for Yellowstone grizzly bear management activities in Idaho amount to approximately $21,000. Recommended management actions outlined in this document are expected to increase those costs to approximately $145,000 per year (Table 1) based on current grizzly bear population levels. With increases in both human and grizzly bear populations and inflation, future management costs will likely increase accordingly and shall be federally funded.

Table 1. Current IDFG estimated costs for management of grizzly bears in eastern Idaho and future estimates for implementation of recommendations presented within this document.

1 TASK		Personnel Costs*	Operating Costs	Capital Outlay Costs	Total Costs
Annual Aerial Observation Flights	Current Costs	1,000	3,000	0	4,000
	Future Costs	1,000	3,000	0	4,000
Monitor Key Food Sources	Current Costs	0	0	0	0
	Future Costs	1,000	250	0	1,250
Radio Telemetry & Monitoring	Current Costs	0	0	0	0
	Future Costs	500	3,500	1,500	5,500
Hair Snaring & DNA Sampling	Current Costs	0	0	0	0
	Future Costs	15,000	10,000	0	25,000
Document Distribution	Current Costs	1,000	100	0	1,100
	Future Costs	4,000	1,000	0	5,000
Monitor Mortalities	Current Costs	250	100	0	350
	Future Costs	500	200	0	700
Respond to Human/Grizzly Bear Conflicts	Current Costs	1,500	500	0	2,000
	Future Costs	3,000	1,000	0	4,000
Respond to Livestock Depredations	Current Costs	250	100	0	350
	Future Costs	500	200	0	700
Livestock Depredation Payments	Current Costs	0	0	0	0
	Future Costs	1,000	5,000	0	6,000
Trapping & Relocation	Current Costs	1,500	250	0	1,750
	Future Costs	2,500	500	1,000	4,000
Provide Materials and/or Technical Advice for Preventative Actions	Current Costs	500	0	500	1,000
	Future Costs	8,000	2,500	25,000+**	35,500+
Seek/Solicit Grants and Other External Funding Sources	Current Costs	0	0	0	0
	Future Costs	8,000	1,000	0	9,000
Provide Education Materials	Current Costs	1,000	250	0	1,250
	Future Costs	9,000	2,500	5,000	16,500
Develop and Present Education Materials	Current Costs	1,000	250	0	1,250
	Future Costs	9,000	2,500	5,000	16,500
Monitor Habitat Conditions	Current Costs	500	0	0	500
	Future Costs	500	0	0	500
Provide Technical Assistance for Habitat Restoration on Private Land	Current Costs	0	0	0	0
	Future Costs	500	100	0	600
Interagency Coordination	Current Costs	6,000	1,000	0	7,000
	Future Costs	8,000	1,500	0	9,500
TOTAL	Current Costs	14,500	5,550	500	20,550
	Future Costs	72,000	34,750	37,500+	144,250+

* Personnel costs based on $25.00/hour including benefits.
** Private, public, and/or corporate funding to be solicited based on future identified needs.

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Appendix N. Grizzly Bear Management Plan for the Wind River Reservation (excluding plan appendices)

Grizzly Bear Management Plan for the Wind River Reservation

Image courtesy of www.firstpeople.us

Eastern Shoshone and Northern Arapaho Tribes
Ft. Washakie and Ethete, WY
&
Shoshone and Arapaho Tribal Fish and Game Department
Ethete, WY

Assisted by the U.S. Fish and Wildlife Service
Fish and Wildlife Conservation Office
Lander, WY

March 3, 2009

3/3/09

Ivan Posey, Chairman Eastern Shoshone Tribe Date

3/3/09

Harvey Spoonhunter, Chairman Northern Arapaho Tribe Date

Summary

- The intent of this plan is to support the co-existence of grizzly bears and people. It looks neutrally upon grizzly bears and considers them as a wildlife species for which management is essential due to tensions that will arise between the needs of grizzly bears and the needs of people. Traditional views of the Eastern Shoshone and Northern Arapaho Tribes (Tribes) recognize grizzly bears as an elder relative, as strong, as great and as deserving of respect and placed here by the Creator for a purpose.
- Tribes have sole authority for managing grizzly bears within the Wind River Reservation (Wind River) boundaries, and will seek assistance from and cooperation with the Yellowstone Grizzly Bear Coordinating Committee (YGBCC, a subcommittee of the Interagency Grizzly Bear Committee), the Interagency Grizzly Bear Study Team (IGBST) and the Wyoming Game and Fish Department (WGFD). Since the Yellowstone Ecosystem grizzly population crosses jurisdictional boundaries, cooperative efforts are necessary.
- Monitoring of the grizzly bear population within Wind River's boundaries will be done by the Tribes working in cooperation with the IGBST. Monitoring protocols and annual reports of monitoring efforts on Wind River will be part of the IGBST's annual reports.
- At this time, the Tribes do not designate a specific number of individual grizzly bears for which it will manage.
- Grizzly bears will likely confine themselves to remote areas in the Owl Creeks and Wind River mountains; however, they may occasionally wander near developed areas.
- Grizzly bears will be managed as a trophy game animal for which a hunting tag is required. Harvest may occur at the discretion of the Tribes' Joint Business Council (JBC) once the grizzly bear population reaches a sustainable size and will manage within the mortality limits as set forth by the Final Conservation Strategy (Conservation Strategy) for the Grizzly Bear in the Greater Yellowstone Area (GYA) 2007.
- Efforts to manage grizzly bears include trapping and radio-collaring, surveying by plane and remote cameras, conducting surveys for cone production on whitebark pine trees, expanding availability of food storage poles and metal containers at trailheads and campsites in the Owl Creek and Wind River mountains, and providing information to the public. Options to handle depredating grizzly bears will be evaluated on a case-by-case basis, and will include but are not limited to: no action, using non-lethal methods, radio-collaring and releasing on-site, relocating or immediate removal by lethal means. Tribes will not reimburse for grizzly bear depredations of livestock.
- This plan applies to all lands within the 1868 exterior boundary of Wind River, as modified by the Lander Agreement of 1872 and Thermopolis Agreement of 1896.

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Introduction

The grizzly bear (*Ursus arctos*) conjures images of power, respect, fear, solitude, and wilderness. Traditional tribal views often hold the grizzly bear in esteem while some contemporary views see them as a serious threat to human safety, competitors, livestock killers and in other negative ways. The intent of this plan is to support the co-existence of grizzly bears and people. Management is essential due to tensions that will arise between the needs of grizzly bears and the needs of people. Grizzlies have the potential to affect resources important to Tribal people such as outdoor recreation, big game populations and livestock. People have the potential to affect grizzly bears by changing habitat and food resources through development, climate change and harvesting of big game. This plan will guide the Tribes in conserving and sustainably managing grizzly bears for this and future generations on all lands within the 1868 exterior boundary of Wind River, as modified by the Lander Agreement of 1872 and Thermopolis Agreement of 1896 (the Lander Agreement removed the South Pass portion of Wind River and the Thermopolis Agreement removed the northeast corner of Wind River in the Thermopolis area).

In 1975, the grizzly bear was designated as threatened under the Endangered Species Act in the lower 48 states. Since then, its population grew and expanded throughout the GYA, including Wind River (Schwartz *et al.* 2006). In 2007, the grizzly bear was delisted and primary management was turned over from the federal government to the states and tribes. The Conservation Strategy requires a minimum of 500 grizzly bears be maintained in the GYA. As of 2007, there was an estimated 571 grizzly bears in the GYA (Schwartz *et al.* 2008).

Coordination between parties involved in grizzly bear conservation is important, especially since bears routinely cross jurisdictional boundaries. With coordination, mutual benefits occur between parties that ultimately lead toward better conservation and management of grizzly bears. The Tribes are members of the YGBCC, which is the local sub-committee of the IGBC that is responsible for overseeing conservation of grizzly bears in the GYA. Tribes are also in the process of establishing a cooperative Memorandum of Understanding with the IGBST. The IGBST is an interdisciplinary group of scientists and biologists responsible for long-term monitoring and research efforts on grizzly bears in the GYA, and works closely with the IGBC. The Memorandum of Understanding will allow assistance and data-sharing to occur.

The Lander Fish and Wildlife Conservation Office (LFWCO) of the FWS has had a long and productive relationship assisting the Tribes in managing their fish and wildlife resources on Wind River since 1941. The JBC and TFG were assisted by the LFWCO in developing this plan.

Tribal Elder Views

Interviews of Shoshone and Arapaho Elders were conducted from August 2005 to February 2007. Visits were made to the Ft. Washakie, Ethete and Arapaho senior centers, Rocky Hall, individuals' homes, the Tribal College, and the Shoshone Cultural Center. During these interviews traditional history, stories, meanings, and memories along with current opinions were obtained and collated into the following:

Traditional views recognize grizzly bears as an elder relative, as strong, as great, as master of the forest and as deserving of respect and placed here by the Creator for a purpose. The Shoshone word for grizzly bear, "Bee-yah-ah-gwy" means "big bear." Grizzlies were like a wise uncle that knew best. When appearing in a vision, one was to follow what the grizzly bear showed you. Both Shoshones and Arapahos have a traditional Pow Wow dance honoring the grizzly bear.

Grizzlies were to be left alone and people were supposed to be careful around them. Bears generally wouldn't bother you; however, sometimes people had to kill them. If they were killed, then all parts were to be used. Bear oil was used to treat arthritis, rugs were used to stay warm and of course the meat was eaten. Claws were used in decorative dress and were worn by men because it was impressive and showed high status. A segment of the Arapahos' are members of a bear clan and see the grizzly bear as sacred. Members of the clan are not supposed to harm the bear.

Grizzlies modeled virtuous things to people such as strength, independence and care for family. One traditional story told of a bear family that stayed in a cave, caring for their young. The bear talked to an old man and told him that they were very much alike - that it had a family just like the man and was trying to care for them and to exist just the same. The grizzly bear, along with other animals, used to talk with people through telepathy.

As for current opinions, some Elders said that grizzly bears should be protected. Some said grizzly bears were dangerous and to stay away from them. Another mentioned that as long as grizzly bears stayed away from her house, she was OK with them. One man wanted the Business Councils to talk with the elders directly and ask the elders themselves for their input.

Biology and Current Status

Biology: Grizzly bears are large omnivores averaging 425 pounds for males and 295 pounds for females in northwest Wyoming (Schwartz *et al*. 2006). However, weight varies greatly during the year due to a bulk-up in fall that sustains them during winter hibernation. Females generally have a litter size of 2, breed every 3 years and have their first litter at age 4 to 6. Females peak reproductively at about 9 years and can produce cubs until 25 years of age. Breeding occurs between mid-May and mid-July. Typical annual survival rates are 0.77 for adult males, 0.94 for adult females, 0.80 for subadult females, and 0.84 for cubs. Home range size for females and males in northwest Wyoming averaged 105 mi^2 and 325 mi^2, respectively (Schwartz *et al*. 2006).

Feeding Habits: Grizzly bears consume a wide variety of vegetation, insects and mammals (Schwartz *et al.* 2003). Foods of major importance include whitebark pine cones (*Pinus albicaulis*), army-cutworm moths (*Euxoa auxiliaries*), elk calves (*Cervus canadensis*) and ungulate carcasses. Whitebark pine cones are an important high-quality food source for grizzly bears, particularly during the late summer and fall (Mattson and Reinhart 1994). Substantial whitebark pine stands occur in both the Owl Creek and Wind River mountains (Figures 1 & 2). Bear-human conflicts are often reduced during years in which cone production is high because bears remain in high elevation areas where whitebark occurs and are thus distant from human developments (Mattson and Reinhart 1994).

Grizzly bears' reproductive success increases during years of abundant cone production (Mattson and Jonkel 1990). Blister rust and pine beetle infestations throughout the west are causing major declines in whitebark (Keane and Arno 1993). This too is apparent on Wind River as large stands of whitebark are succumbing to pine beetle as evidenced by the red-topped trees in Figure 3. Tree mortality appears to be more prominent in the Owl Creek Mountains; however, stands in the Wind River Mountains are showing effects as well.

Army-cutworm moths aggregate in large masses under high alpine talus slopes throughout the Absaroka and Wind River Mountains. These moth aggregation sites are an important high-quality food source for grizzly bears (Mattson *et al.* 1991) and can comprise nearly ½ of their annual caloric intake (White 1996). There are 2 known army-cutworm moth sites in the Absaroka Mountains that have been visited by grizzly bears that were radio-collared on Wind River in 2006. Additional moth sites do occur in the Wind River Mountains, but at this time grizzly bears have not been observed using them (Dave Moody, personal communication 2007).

Elk calves, winter-killed ungulate carcasses and gut piles from harvested big game provide a major source of protein-rich food for grizzly bears. In a 3-year study in Yellowstone National Park, black and grizzly bears accounted for 55 to 60% of mortalities of elk calves that were less than 30 days old (Barber *et al.* 2005). Estimates of wintering ungulates on Wind River are: 6500 to 7500 antelope, 3200 to 4800 deer, 7000 to 9000 elk, 100 to 200 moose, and 350 to 450 bighorn sheep. In 2007, approximately 1,130 Tribal hunters harvested 96 pronghorn antelope, 495

Figure 3. Dying and dead whitebark pine due to pine beetle infestation, Trail Ridge, Owl Creek, 2007.

Stands of whitebark pine in the Owl Creek Mountains

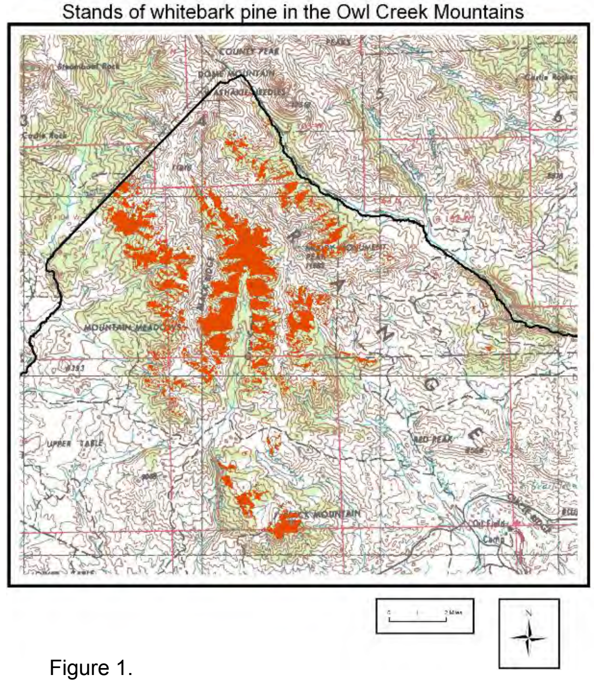

Figure 1.

Stands of whitebark pine in the Wind River Mountains

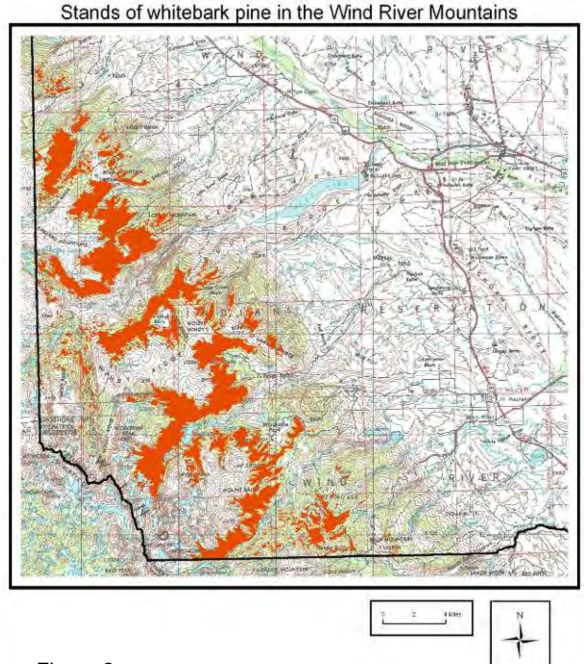

Figure 2.

deer, 527 elk, 3 moose, and 16 bighorn sheep. Gut piles from harvested big game provide an important food source for grizzly bears prior to entering the den (Dave Moody, personal communication 2008).

Available Habitat: The vast majority of Wind River's 2,260,000 acres is remote and sparsely populated. Elevations range from 4,500 to 12,250 feet. Habitat types include desert, grassland, shrubland, agriculture, montane, and alpine. Specifically, 458,000 acres are forests, 1,290,000 acres are shrubland, and 183,000 acres are grassland and alpine meadow. There are at least 734,000 acres of potential grizzly bear habitat with 161,000 acres and 100,000 acres currently occupied by grizzly bears in the Owl Creek and Wind River mountains, respectively (Figure 4).

Current Population Status: As of September 2008, there were 3 grizzly bears with active radio-collars in the Owl Creek Mountains. These included #531 (a 10 to 12 yr-old female), #532 (a 5 to 6 yr-old male) and #537 (a 5 to 6 yr-old female) (Figure 4). Bear #459 (an 11 yr-old male) recently dropped its collar in May 2008 and likely still occurs on Wind River. All of these bears were captured and radio-collared in the Crow Creek Basin and East Fork areas during a joint trapping effort between the TFG, WGFD and LFWCO lasting 2 ½ weeks in July and August 2006 (Figure 5). Two additional grizzly bears were radio-collared, however one died in August 2006 and the other dropped its GPS collar in May 2007 (Figure 6). The number of bears trapped during this short period greatly exceeded all expectations.

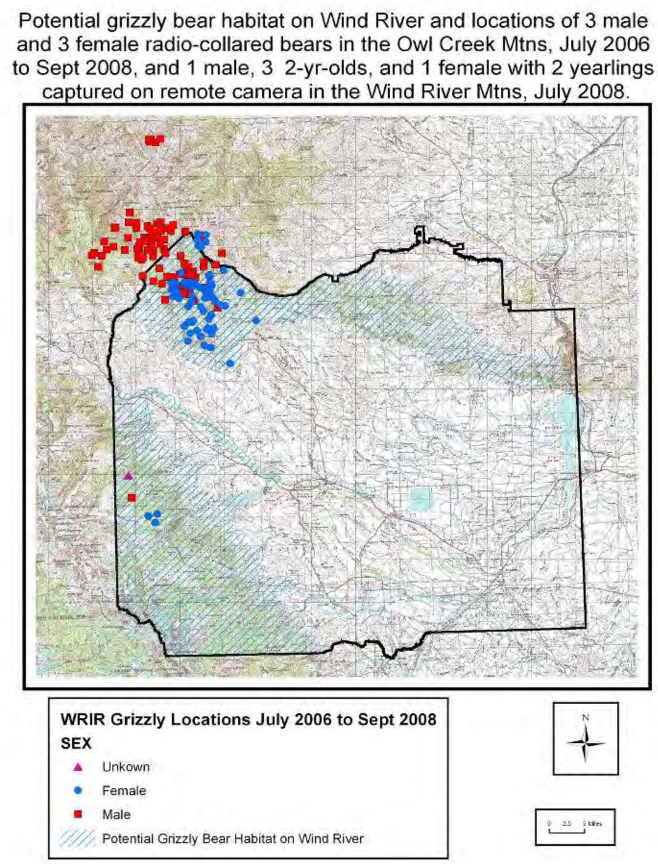

Figure 4.

During July and August 2008, a remote camera study was conducted in the Wind River Mountains between Bob Creek and Bull Lake Creek to document presence and distribution of grizzlies (Lockwood *et al.* 2008). During the 49-day study, there were 8 detections of grizzly bears as follows: an adult female with 2 yearling cubs on 6 occasions in the Kirkland Park area, an adult male on 1 occasion in the Bold Mountain area, and three 2-year-olds in the Bob Creek drainage (Figure 4). Based on the aforementioned data, Wind River has a moderate and expanding population of grizzly bears. Supporting evidence for this observation is that the population in the Greater Yellowstone Ecosystem grew at a 4 to 7 % annual rate between 1983 and 2001 (Conservation Strategy 2007) and has continued to grow since.

Figure 5. TFG wardens Western Thayer, Ben Warren and Herman St. Clair with sedated grizzly bear, Crow Creek, 2006.

Livestock: Though generally not a food source, cattle, primarily calves, can be depredated upon by grizzly bears. In 2 cattle allotments near Blackrock just west of Togwotee Pass, Wyoming, grizzly bears were responsible for 78 of 182 calves that were lost (43%) between 1994 and 1996 (Anderson *et al.* 2002). However, this loss represented only 1 to 2% of the 6,000 calves that ranged on the allotments during that time period. Grizzly bear density was high as there were at least 10 bears on the allotments. Three grizzlies were responsible for 90% of the losses and once removed by management action, calf depredations were reduced dramatically. During this time period fewer than 9 adult cows were depredated by grizzly bears. Cattle are the primary livestock utilizing range on Wind River. There are approximately 135 permittees that ran 23,100 cow/calf pairs utilizing 163,400 Animal Unit Months on Tribal lands in 2001 (Bureau of Indian Affairs 2002). Approximately 140 horses also ranged on these lands. There are no free-ranging domestic sheep or other livestock utilizing Wind River.

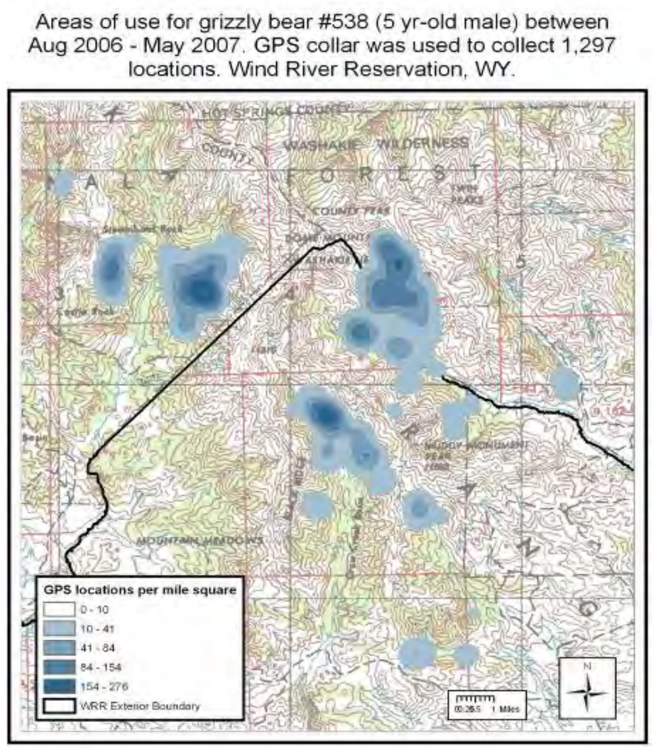

Figure 6.

Management

As mentioned previously, this plan attempts to balance the needs of grizzly bears and the needs of people. In order to do this, adequate knowledge of the distribution and population size of grizzlies is essential. With this knowledge, appropriate management decisions can be made that will ensure Wind River's grizzly bear population will be sustained in perpetuity for the benefit of the bear and the benefit of current and future tribal members, while allowing removal of bears as needed for the protection of human safety and personal property.

Population Monitoring: Methods for monitoring include radio-collaring, remote camera surveys, aerial surveys, and public reports. Trapping and radio-collaring efforts will adhere to approved practices so that grizzly bears are handled humanely and efficiently. Currently, the TFG has one bear trap that was constructed by a TFG warden. A second is planned for construction (Figure 7).

Figure 7. Western Thayer investigating TFG bear trap in Crow Creek Basin, 2006.

As mentioned in the Biology and Current Status section, a cooperative remote camera study was done in the

Wind River Mountains in 2008 (Figure 8). Excellent data were obtained on the distribution of grizzly bears in the northern third of the Wind River Mountains, from Bob Creek to Bull Lake Creek. A similar study will be conducted on the southern two-thirds of the Wind River Mountains between Bull Lake Creek and Trout Creek within the next 2 years. This will further our knowledge of distribution throughout the remaining portion of the Wind River Mountains located on Wind River.

Telemetry flights are an important monitoring tool. Flights for the 3 radio-collared grizzly bears in the Owl Creek Mountains will continue to be contracted by the WGFD. Flights typically occur every 10 days beginning in April and continuing until it's documented that a bear has denned, usually in November or December. Monitoring radio-collared bears provides important information related to distribution, seasonal habitat utilization, dates of denning, den site selection, cause of death, and survival rates by age and sex class.

Figure 8. Grizzly female with yearling cubs captured by digital image during remote camera survey, 2008.

Another important monitoring method are summer observation flights. Members of the IGBST conduct annual survey flights throughout the GYA. In 2007, 74 flights were conducted, each lasting approximately 2.5 hours (IGBST 2007). Aerial monitoring will involve conducting 2 summer surveys of 2 to 2.5 hours in length in each of 3 observation units: West Owl Creek (#46), North Wind River (#48) and South Wind River (#49) (Figure 9). All grizzly bears observed will be plotted with GPS and recorded to age and number in group. Females with cubs-of-the-year (COY) are especially important to document. The number of females with COY are used to estimate population size and the allowable mortality thresholds for the entire ecosystem. Typically, a pilot and one observer conduct the survey. Currently, there is a shortage of flight services that can conduct these surveys. Sky Aviation, the company that performs these flights in this part of Wyoming, may have difficulty conducting addtional flights on Wind River due to limited staff and equipment (Dave Stinson, personal communication 2008). Another flight service may be available in 2009. All data from flights will be provided to the WGFD and the IGBST for inclusion in the Yellowstone ecosystem database maintained by the IGBST.

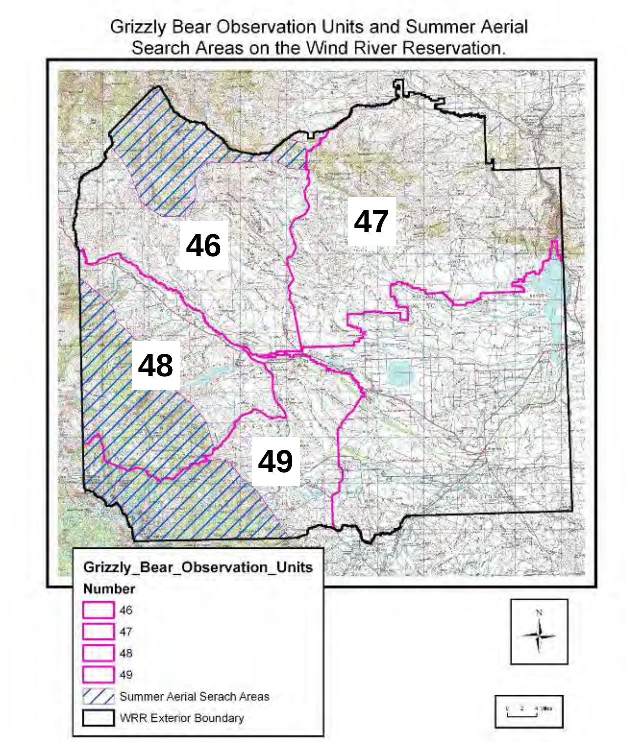

Figure 9.

Population Management: Tribes have the sole responsibility for managing grizzly bears on Wind River, but will seek assistance from and cooperation with the

IGBST and WGFD. At this time, the Tribes do not designate a specific number of grizzly bears for which it will manage, and future strategy will depend on the number of grizzly bears present on Wind River and the direction the Tribes wish to take.

Occasionally, grizzly bears may conflict with people. For example, a hungry bear becomes habituated and spends an inordinate amount of time around human developments, threatening human safety. Or, a grizzly bear becomes a habitual livestock depredator. These are termed "Grizzly Bears of Concern" and will require management action (see Table 1 below for further discussion). Removal of grizzly bears by management action takes precedence over hunter harvest.

Relocating Grizzly Bears of Concern to areas outside Wind River is an option. Prior to relocating, TFG personnel will contact the WGFD to coordinate an appropriate release area and to ensure that bears are radio-collared with the appropriate frequency. Once a grizzly bear is moved off Wind River, it becomes the jurisdiction of the WGFD. Personnel from the Bridger-Teton National Forest (BTNF) and Shoshone National Forest (SNF) indicated that they are willing to accept livestock depredating bears. When relocating is desired, the TFG will contact the North Zone Wildlife Biologist for the BTNF in Jackson or the Wildlife Biologist for the SNF in Cody who will then contact their respective Forest Supervisor for approval. Personnel with Yellowstone National Park stated that it's highly unlikely that they will accept grizzly bears from Wind River since they do not accept bears from anywhere outside the park.

Once the grizzly bear population is of a sustainable size, the Tribes may allow hunter harvest if so desired. Currently, the grizzly bear is designated as a trophy game animal for which the season is closed. Given the limited number of grizzly bears on Wind River and within the GYA, the season may remain closed for a period of time. Because individual grizzly bears each require vast areas of secure habitat and because this habitat is relatively limited on Wind River, the population will remain small. Consequently, when hunter harvest is allowed, take will be very limited to help ensure future sustainability of the population.

Once hunter harvest is allowed, the season timing and length, harvest quota and other specifics will be proposed annually by the TFG and LFWCO for approval by the JBC in accordance with the following requirements:

- The Tribes will attempt to follow mortality limits as laid out in the Conservation Strategy. Mortality from all causes should not exceed 15% for males $\geq$2 yrs-old and 9% for females $\geq$2 yrs-old in order to sustain grizzly populations. Types of mortalities include known natural-caused and all human-caused such as human-related accidents, management action, and hunter harvest.
- Tribal hunters must posses a grizzly bear tag issued by TFG.
- Selection of hunters will be by random drawing.
- Young or females with young may not be harvested.
- Hunters will be required to report harvest to the TFG and the LFWCO within 72 hours. The LFWCO will record all known removal (harvest, management action, illegal, accidents and any other removal) and provide this information to the TFG and IGBST. All mortality information will be provided to the IGBST as soon as possible by phone, preferably within 24 hours of the mortality. This rapid reporting will allow the IGBST to keep track of the annual mortality levels throughout the ecosystem to help assure the mortality limits are not exceeded.

Table 1. Summary of take. Take means removal of a grizzly bear by placing in captivity, relocating to another location, or killing and may occur in the following instances:

Provision	Allowance
Take in self defense.	Any person may take a grizzly bear in self defense or the defense of others.
Protection of human life and safety.	The Tribes may promptly remove any grizzly bear determined by the Tribes to be a threat to human life or safety.
Tribal government take of Grizzly Bear of Concern.	"Grizzly Bear of Concern" is defined as a grizzly bear that attacks humans or any domestic animal including livestock, dogs (excludes hounds that are in pursuit of a bear), and livestock herding and guarding animals, damages personal property, or becomes habituated to human food and/or people and spends an inordinate amount of time around human developments, threatening human safety. Management removal by TFG or other authorized personnel will occur on a case-by-case basis and will consider history of offending bear's behavior, threat to human safety, evidence of the attack, potential for future conflicts, degree of damage, presence of unusual grizzly bear attractants, any previously specified animal husbandry practices that have been implemented, effectiveness of other methods, etc. Non-lethal methods (relocating, hazing, rubber bullets, electric fencing, etc.) will be considered on a case-by-case basis when depredation has occurred. Lethal removal will be used if non-lethal methods are impractical and ineffective.
Additional take provisions for Tribal government employees.	Authorized tribal agents (i.e., employees of the TFG authorized by the JBC to manage grizzly bears), acting in the course of official duties, may take a grizzly bear from the wild, if such action is for: (1) scientific purposes; (2) to avoid conflict with human activities; (3) to relocate a grizzly bear to improve its survival and recovery prospects; (4) to aid or euthanize sick, injured, or orphaned grizzly bears; (5) to salvage a dead specimen which may be used for scientific study; and (6) to aid in law enforcement investigations involving grizzly bears.
Hunter Harvest by enrolled member.	Under authorization of the JBC, the TFG may issue tag(s) that allow for the harvest of grizzly bear(s) by licensed hunters during approved seasons. Hunters must apply for a tag and be entered into a random drawing. At the writing of this plan, the grizzly bear season is closed.

Bear Depredations: Grizzly bears will likely spend the bulk of time in remote areas of the Owl Creeks and Wind River mountains where the majority of suitable habitat resides. Cattle are also present in these areas during the late spring, summer and fall and may be subject to grizzly bear depredation. Grizzly bears may also occasionally occur in lower elevation sagebrush uplands and near agricultural lands. Cattle are present in these areas during winter months and calving season. Consequently, grizzly bears may kill livestock and may need to be relocated or lethally removed. This will be assessed on a case-by-case basis as mentioned above. Compensation for livestock losses will not be provided by the Tribes. The Tribes will cooperate with and utilize assistance offered by the LFWCO, Animal and Plant Health Inspection Service (APHIS) - Wildlife Services and WGFD when capturing or lethally removing grizzly bears. All mortality due to removal of depredating bears will be provided to the IGBST as soon as possible by phone, preferably within 24 hours of the mortality. TFG personnel have received and will continue to receive training in determining grizzly bear kills of livestock, capturing techniques, and appropriate care and handling. Any illegal take will be investigated by the TFG in cooperation with the local Special Agent of the FWS if desired.

A typical depredation scenario is as follows:

- A livestock owner finds a dead calf in his pasture. He covers the carcass with a tarp to protect the scene. He notifies the TFG.
- TFG contacts the local APHIS Wildlife Services personnel and/or the LFWCO for assistance if needed. TFG visits scene and determines whether calf was killed by a grizzly bear.
- TFG will discuss options with owner to determine course of action. Actions could include: no action to see if depredation continues; attempt to trap and radio-collar grizzly bear to assess presence near livestock and identification of grizzly bear if depredation

continues; relocate grizzly bear; remove livestock carcasses or other items that may be acting as an attractant; suggest confining or moving livestock if feasible to deter future depredation; consider using non-lethal methods such as rubber bullets and the like; or lethally remove grizzly bear by shooting or trapping and euthanizing humanely.

Habitat Management: New human developments (wind turbines, oil and gas wells, homesites, and the like) should be avoided or minimized within occupied grizzly habitat. The density of roads, the vehicular use of those roads, and human developments have a major impact on how suitable an area is for grizzly bears (Conservation Strategy 2007). The BIA's Wind River Reservation Forest Management Plan (2004) recognizes the importance of grizzly bears and their habitat by the following guidelines. The plan has a no net increase in roads in the Wind River Roadless Area and in the Monument Peak area of the Owl Creek Mountains. In addition, throughout the remaining portion of grizzly habitat a road density of 1 mile of open road per mile^2 or less will be maintained in order to sustain the integrity and security of grizzly bear habitat.

In order to assess the level of cone production for whitebark pine, transects will be established and surveys conducted each year. A transect was established on Bold Mountain in August 2008. Additional sites will likely be established in Washakie Park and on Trail Ridge. On each transect, 10 trees are marked permanently and all cones attached to the tree from that year are counted. These are recorded and sent to the IGBST annually.

Food Storage: Minimizing contact of bears with non-natural foods is an effective method of reducing bear habituation to people. Habituation can result in a bear becoming a threat to human safety and personal property (IGBST 2008). The TFG has erected food poles at campsites in Crow Creek Basin and will be installing metal storage containers as well. Efforts will be expanded to include the Wind River Mountains. In bear habitat, homeowners will be encouraged to store garbage, grain, etc. in bear-proof buildings or containers. For those with beehives, use of electric fencing will be encouraged. To further minimize human/bear conflicts, the prohibition of baiting bears will continue.

Public Outreach: The TFG and LFWCO will be jointly responsible for the creation and distribution of outreach materials. Pamphlets will be developed for handout to tribal hunters and other interested individuals and will provide information on grizzly bears biology, tribal management, depredation protocols, etc. This will also be incorporated into existing outreach programs (for example, hunter safety). Signage will be installed and maintained in bear habitat and backcountry users will be encouraged to carry pepper spray. Sample signs that encourage good food storage in bear habitat and that help differentiate black bears from grizzly bears are attached in Appendix A.

Disposition of Grizzly Bear Parts: Grizzly bear parts resulting from confiscation of illegal harvest or from management removal will be housed by TFG and disseminated at the discretion of the JBC for religious, cultural, traditional and/or educational purposes. Sale of parts disseminated by the JBC is not permitted. To obtain a grizzly bear part, a tribal member must submit a letter of request to the TFG stating the intended use and purpose. Once received, a minimal delay may occur in order to confirm the legitimacy of the request with the JBC. Surplus parts may be donated for educational purposes to schools on Wind River.

Definitions

APHIS: Animal and Plant Health Inspection Service.

BTNF: Bridger-Teton National Forest.

COY: cubs-of–the-year. These are cubs that are < 1 year old.

Depredation: a grizzly bear attack that resulted in the immediate or recent (< 1 week) death of a domestic animal.

Domestic animal: animals that have been selectively bred over many generations to enhance specific traits for their use by humans, including use as pets. This includes livestock and dogs (excludes hounds that are in pursuit of a bear).

Enrolled Member: a person officially recognized by the Eastern Shoshone or Northern Arapaho as a member of their tribe.

FWS: US Fish and Wildlife Service.

GYA: Great Yellowstone Area – portions of Wyoming, Montana, and Idaho near Yellowstone National Park, including Wind River.

Grizzly Bear of Concern: a grizzly bear that attacks humans or any domestic animal including livestock, dogs (excludes hounds that are in pursuit of a bear), and livestock herding and guarding animals, damages personal property, or becomes habituated to human food and/or people and spends an inordinate amount of time around human developments, threatening human safety.

IGBC: Interagency Grizzly Bear Committee – a multi-agency group created in 1983 to lead the effort to recover the grizzly bear in the lower 48 states.

IGBST: Interagency Grizzly Bear Study Team - an interdisciplinary group of scientists and biologists responsible for long-term monitoring and research efforts on grizzly bears in the Greater Yellowstone Area. Representatives are from the U.S. Geological Survey, National Park Service, U.S. Fish and Wildlife Service, U.S. Forest Service, Montana State University, and the states of Idaho, Montana, and Wyoming. The Tribes are currently working on a cooperative MOU with the IGBST.

JBC: Joint Business Council of the Eastern Shoshone and Northern Arapaho Tribes.

Livestock: cattle, sheep, horses, mules, domestic bison, and herding and guarding animals (llamas, donkeys, and certain breeds of dogs commonly used for herding and guarding livestock).

LFWCO: FWS Lander Fish and Wildlife Conservation Office.

Private land: all land that is not under Federal Government ownership and administration. Tribal land is considered private land.

Remove: place in captivity, relocate to another location, or kill.

SNF: Shoshone National Forest

Take: to remove.

TFG: Shoshone and Arapaho Tribal Fish and Game Department.

Tribal land: Tribal trust, allotted, and fee-title Indian-owned land within the exterior boundaries of Wind River.

Tribes: the Eastern Shoshone and Northern Arapaho Tribes of the Wind River Reservation.

Ungulate: hoofed animal.

WGFD: Wyoming Game and Fish Department

YGBCC: Yellowstone Grizzly Bear Coordinating Committee – the local sub-committee of the IGBC responsible for the Greater Yellowstone Area. Tribes are members.

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Appendix O. Tri-State Memorandum of Agreement Regarding the Management, Genetic Health, and Allocation of Discretionary Mortality of Grizzly Bears in the Greater Yellowstone Ecosystem

Wyoming Game and Fish Commission

Wyoming Game and Fish Department

Montana Fish and Wildlife Commission

Montana Fish, Wildlife and Parks

Idaho Fish and Game Commission

Idaho Department of Fish and Game

Tri-State Memorandum of Agreement
Regarding the Management, Genetic Health, and Allocation of Discretionary Mortality of Grizzly Bears in the Greater Yellowstone Ecosystem
Among
Wyoming Game and Fish Commission, Wyoming Game and Fish Department, Montana Fish and Wildlife Commission, Montana Fish, Wildlife and Parks, Idaho Fish and Game Commission, and Idaho Department of Fish and Game

This Memorandum of Agreement (MOA) is made and entered into by and among the Wyoming Game and Fish Commission and the Wyoming Game and Fish Department (collectively WGFD), the Montana Fish and Wildlife Commission and Montana Fish, Wildlife and Parks (collectively MFWP), and the Idaho Fish and Game Commission and the Idaho Department of Fish and Game (collectively IDFG), collectively referred to as the Parties.

I. Purpose

The purpose of this MOA is to define the process by which the Parties will coordinate management and allocation of discretionary mortality to ensure the long-term genetic health, viability, and sustainability of the grizzly bear population in the Greater Yellowstone Ecosystem (GYE). The Parties enter into this MOA in support of the designation of the Distinct Population Segment (DPS) of GYE grizzly bears and removal of the DPS from the Federal list of endangered and threatened wildlife under the Endangered Species Act (ESA). The Parties intend this MOA to be consistent with the *Conservation Strategy for the Grizzly Bear in the Greater Yellowstone Ecosystem* (Strategy) and individual state management plans, as these documents may be revised in conjunction with the delisting process and future grizzly bear conservation.

The Parties previously committed to adopt and implement appropriate revision to methods for GYE population estimation as new methods are scientifically vetted and accepted (i.e., a commitment to a recalibration process). Consistent with this commitment, the Parties amend our prior MOA to reflect the Interagency Grizzly Bear Study Team (IGBST) implementation of the integrated population model (IPM) as the population estimator for the GYE population.[1]

As detailed below, the Parties agree to manage the GYE population within the Demographic Monitoring Area (DMA) to be within or above a range of 800 – 950 grizzly bears (applying the IPM population size estimate).

The Parties' management objective and related mortality management consider: the U.S. Fish and Wildlife Service (USFWS) recovery criteria for minimum GYE population size (500), occupancy, and survival/mortality rates; levels for population resiliency and genetic fitness; recalibration, using the IPM, for the Chao2 population size estimates for 2002-2014 (consistent with the federal court remand of the 2017 delisting rule); evidence of GYE population density in the DMA reaching levels limiting population growth rates since the early 2000s; and higher conflict levels associated with a population that is more abundant, and has higher densities in a larger extent of occupied range.

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[1] Implementation of the IPM is described in the IGBST 2022 Annual Report (published in 2023 by U.S. Geological Survey, Northern Rocky Mountain Science Center, available at igbconline.org).

The Parties make commitments, to resolve deficiencies that the Ninth Circuit Court (July 2020) identified in the USFWS 2017 final rule designating and delisting the GYE DPS of grizzly bears. The Parties commit: (1) to ensure long-term genetic diversity of the GYE population through translocation if effective immigration does not occur naturally; and (2) to recalibrate GYE population metrics and mortality limits should a new population estimation method be incorporated to estimate size and evaluate survival/mortality of the GYE population.

II. Background

Since 2006, the GYE Interagency Conservation Strategy Team, with participation of the Parties and various federal agencies, has developed and revised the Strategy to identify and implement regulatory mechanisms, interagency cooperation, population and habitat management and monitoring, and other actions to ensure continued recovery and sustainable management of the GYE population post-delisting. The Strategy's key mechanisms for maintaining a recovered GYE population are its population and habitat criteria, which are based on continued achievement of USFWS recovery criteria for the GYE population. The Strategy incorporates the Parties' individual state management plans, which have different, but compatible, management objectives.

For purposes of this MOA, the Parties adopt the Demographic Monitoring Area (DMA), identified in the 2016 Strategy revision and the USFWS 2017 Supplement to the Grizzly Bear Recovery Plan (Supplement), as the geographic area used to monitor continued achievement of population objectives for the GYE population. The IGBST and the Yellowstone Ecosystem Subcommittee (YES) of the Interagency Grizzly Bear Committee (IGBC) recommended the use of the DMA for monitoring GYE population demographics.

The demographics and vital rates of the GYE population have changed over time, and the IGBST has periodically reviewed and adjusted mortality limits to ensure a total GYE population of at least 500 bears and to meet the occupancy criterion for breeding female bears. The GYE population has far surpassed the minimum requirement for genetic diversity represented by 500 bears for more than two decades. By 2006, although the GYE population was still increasing, the GYE population growth rates slowed when compared to the higher levels of growth in the 1980s and 1990s, and the GYE population began exhibiting signs of density dependence (e.g., population growth fluctuations, decreased home-range size, reduced dependent young survival, increased competition, and increased intraspecific mortality as more bears occupied the same suitable habitat).

In 2021, the IGBST adopted the IPM framework, based on Bayesian statistics, as the estimator of population vital rates for the GYE. The IPM continues to use documentation of females with cubs-of-the-year and the Chao2 estimate, which has been used (with refinements) for GYE population estimation since 2007. The IPM also uses other modeled and field-collected data inputs, such as survival, mortality, and reproduction data. The IPM allows the Parties to estimate population vital rates annually by sex- and age-specific cohorts, and to set mortality limits incorporating those rates.[2]

[2]Before the IPM, the IGBST reassessed vital rates on timeframes of 5 years or longer, and the Parties' prior MOA framework identified tiers of mortality limits based on these rates. With the implementation of the IPM, the Parties are able to apply a more responsive approach for limiting mortality on an annual basis.

III. Definitions

1. “Discretionary mortality” is the amount of human-caused grizzly bear mortality over which agencies have discretionary authority, such as management removals, translocations out of the DMA and regulated harvest.

2. “Non-Discretionary mortality” is mortality over which agencies do not have discretionary authority, such as naturally occurring mortality or human-caused mortality, such as illegal shootings, defense-of-human-life shootings, and vehicle collisions. Non-discretionary mortality includes a statistical estimate derived by the IPM of unknown mortalities from non-discretionary sources.

3. “Total mortality” is the combination of discretionary and non-discretionary mortality, as estimated by the IPM.

4. “Greater Yellowstone Ecosystem” (GYE) is defined as that portion of Idaho east of Interstate Highway 15 and north of U.S. Highway 30; that portion of Montana east of Interstate Highway 15 and south of Interstate Highway 90; that portion of Wyoming south of Interstate Highway 90, west of Interstate Highway 25, Wyoming State Highway 220, and U.S. Highway 287 south of Three Forks (at the 220 and 287 intersection), and north of Interstate Highway 80 and U.S. Highway 30. This is the same GYE definition USFWS used in its 2007 and 2017 rules to designate and delist a DPS of grizzly bears under the ESA, both of which rules USFWS vacated in response to court decisions based on grounds other than the DPS designation. The Parties assume USFWS will re-designate a grizzly bear DPS for the GYE using this same defined geographic area.

5. The “Primary Conservation Area” (PCA) is the area whose boundaries are approximately depicted on the map attached hereto as Attachment A; the PCA is divided into 18 Bear Management Units.

6. The “Demographic Monitoring Area” (DMA) is the area that includes the PCA and an additional area surrounding the PCA. The DMA is approximately 19,279 square miles in area, whose boundaries are depicted on the map attached hereto as Attachment A. The IGBST delineated the DMA based on suitable habitat and narrow valley areas bordering suitable habitat that could act as potential mortality sinks. The DMA is the area within which the GYE population is annually surveyed and estimated and within which the total mortality limits will apply.

7. The “Integrated Population Model” (IPM) is the population estimation framework used for the GYE population as best available science. The IPM is based on in-depth analyses and annual field data collections since 1983. The IPM is a synergistic model that incorporates data from a variety of field-collected and modeled sources. The IPM allows the Parties to estimate population size and vital rates annually by sex- and age-specific cohorts and to derive mortality limits incorporating those rates. The IPM population size estimate is reported as a median value.

IV. Responsibilities

1. **Science-based Adaptive Management.** The Parties will continue to use best available science and adaptive management approaches to manage the GYE population collectively and cooperatively.

2. **Tri-State Population Management Objectives.**

a. The Parties agree to monitor and manage the GYE population to ensure achievement of the three USFWS demographic recovery criteria (minimum population size, breeding female occupancy, and mortality limits).

b. As an additional level of protection, the Parties will manage the GYE population in the DMA to maintain a population within or above a range of 800 – 950 grizzly bears (applying the IPM population size estimate).

This range is reflective of the population size when the GYE population began exhibiting traits indicative of density dependence since 2006 (e.g., reduced population growth rates, population growth fluctuations, decreased home range size, reduced dependent young survival, and increased competition).

c. In conjunction with the IGBST, the Parties have reassessed and recalibrated population metrics with the adoption of the IPM to estimate and monitor population size. Following this review, the Parties agree to apply annual mortality rates to maintain the population in the DMA within or above a range of 800-950 grizzly bears, based on the following framework in Table 1 (see Attachment C, Tables C1 and C2, for example of process for establishing limits and allocation by management jurisdiction):

Table 1. Management Framework based on DMA Population Size (IPM Population Size Estimate)

800* – 950	> 950
➢ Manage to maintain population within or above this range. ➢ Use IPM to determine mortality limits for population stability, slight increase, or slight decrease, remaining within or above the population range: $0.98 \leq \lambda \leq 1.02$ ➢ Manage conflict and authorize hunting at individual state discretion, based on allocated mortality limits.	➢ Manage to maintain/reduce population. ➢ Use IPM to determine mortality limits for population stability or decrease. $0.95 \leq \lambda \leq 1.00$ *If mortality limits are determined for a population decrease, the decrease will not exceed* 5% ($\lambda \geq 0.95$). ➢ Manage conflict and authorize hunting at individual state discretion, based on allocated mortality limits.

*See Paragraph 4e below for management strategies if the population falls below 800.
Note: Lambda (λ) denotes the change in population size from one year to the next: $\lambda = 1.0$ represents no change in population size between two years: $\lambda > 1.0$ indicates population increase and $\lambda < 1.0$ indicates population decrease.

d. Should the Parties adopt a new population estimation method to estimate size and evaluate survival/mortality of the GYE population, the Parties renew their commitment to recalibrate population metrics and mortality limits.

3. **Relationship of Tri-State Management Objectives to USFWS Demographic Recovery Criteria.**

a. **USFWS Demographic Recovery Criterion 1 (Minimum Population Size)** is to maintain a minimum population size of at least 500 bears within the DMA (for genetic fitness).

The Parties' agreement in Paragraph IV.2 to manage the GYE population in the DMA within or above a range of 800 to 950 grizzly bears, and to take additional measures described in Paragraph IV.4, provide an additional level of protection above USFWS Demographic Recovery Criterion 1 and will ensure this criterion is met.

b. **USFWS Demographic Recovery Criterion 2 (Breeding Female Occupancy)** is to ensure that 16 of the 18 Bear Management Units within the PCA are occupied by at least one female with offspring over a six-year period, with no two adjacent Bear Management Units unoccupied over a six-year period.

The Parties' agreement in Paragraphs IV.2, IV.4, and IV. 6. to monitor and manage for breeding female occupancy will ensure it is met.

c. **USFWS Demographic Recovery Criterion 3 (Mortality Limits)** is to maintain the population within the DMA around the 2002 2014 model averaged Chao2 estimate ($\overline{X}$= 674; 95% CI = 600–747; 90% CI = 612–735) by maintaining annual mortality limits for independent females, independent males, and dependent young (based on maximum mortality rates ranging from 7.6 to 22% depending on the demographic class and total population size estimate).

With the adoption of the IPM as a population estimator for the GYE population in 2021/2022, this USFWS criterion is outdated. Using the IPM, the "recalibrated" numbers for this criterion approximately correspond to an IPM population size estimate for 2002-2014 of 823 (mean of 821), with 95% credible intervals of 681-960).

The Parties' agreement to determine and apply mortality limits based on our objective of managing the population in the DMA within or above a range of 800-950 bears, using the framework presented in Table 1, is consistent with the foundation for the USFWS Criterion for applying mortality/survival rates on an annual basis.

4. **Additional Mortality Management.** In addition, the Parties' management in the DMA will include, but not be limited to, the following:

a. With the adoption of the IPM, the Parties are able to review vital rates and demographics for the GYE population annually and will make appropriate adjustments to mortality rates (as presented in Paragraph IV.2. above).

b. The Parties will prohibit hunting of females accompanied by young, and young accompanied by females, and discretionary mortality of such animals will only occur for management removals.

c. If total available mortality for a demographic class (independent male or female) is exceeded, the calculation of the next year's available discretionary mortality will reflect the appropriate offset for that class.

d. If a state meets any of its allocated regulated harvest limits at any time of the year (see IV.7 below), the respective state will close that state's portion of the DMA to hunting for the remainder of the year.

e. If the IPM population size estimate for the population within the DMA is less than 800, which the Parties do not expect to occur based on their commitments under this MOA and other interagency commitments, such as those described in the Strategy, the Parties will:
   i. Manage the population for increase above 800 (use IPM to determine mortality limits based on $\lambda > 1.0$), including closure of the DMA to hunting.
   ii. Request IGBST biology and monitoring review, and consider the results of the IGBST review in determining appropriate changes to the management framework.

5. **Genetic Fitness.** The Parties agree to translocate grizzly bears between the GYE and other grizzly bear populations, when necessary for genetic fitness of a distinct grizzly bear population occurring within the three states, and subject to applicable requirements of federal, state, or tribal law and consistent with applicable demographic recovery criteria for a population listed or previously listed under the ESA.

a. As a cooperative effort of the IGBST, the Parties will continue to conduct genetic sampling of GYE grizzly bears (i.e., biological samples will be acquired from grizzly bear captures, mortality investigations, or other methods), and will analyze these samples to evaluate genetic diversity and connectivity with other grizzly bear populations.

b. To further ensure genetic viability of the GYE population, the Parties adopt the following mechanisms to provide for genetic augmentation through translocation:

   By the end of 2025, the Parties will translocate at least two grizzly bears from outside the GYE into the GYE, unless migration from outside the GYE is detected in the interim. Genetic monitoring of the GYE population will continue, and genetic diversity and effective population size (N_e) will be re-assessed at least every 14 years (*i.e.*, one generation). If effective migration is not detected, the Parties will continue to make additional translocations from outside the GYE.

6. **Monitoring.** The Parties will support the IGBST in the annual monitoring of the GYE population to ensure demographic criteria are met.

7. **Coordination and Allocation of Discretionary Mortality.**

a. The Parties will meet to review population data annually (preferably as soon as practical after the annual population data are available).

b. The Parties will use monitoring data supplied by IGBST and collectively derive discretionary mortality limits based on varying management objectives (i.e., maintain, increase, reduce) to calculate regulated harvest available for each jurisdiction (MT, ID, WY) in the DMA, based upon the following allocation protocol (see Tables C1 and C2 for example of process for deriving available harvest mortality and allocation by jurisdiction.):

i. Begin with the estimates for total population size and mortality, and estimates specific to demographic classes[3] (independent males, independent females and dependent young) in the DMA for the previous calendar year, as derived using the IPM (reported by the IGBST).

ii. If an annual mortality limit was exceeded in the prior year for any demographic class (i.e., total mortality was greater than the available mortality for the prior year), the calculation of the mortality available for that demographic class for the current year will reflect the appropriate offset for that class.

iii. Using IPM estimates, determine the total available mortality for the demographic class of independent females and independent males respectively, based on the framework for managing mortality identified in Table 1.

iv. Determine the available harvest mortality by subtracting the prior year non-harvest mortality, as derived using the IPM, from the total available mortality.

v. Allocate discretionary mortality available for regulated harvest of independent males and independent females to each management jurisdiction as provided in Table 2.

Table 2. **Allocation of harvest by management jurisdiction within the DMA.**

Management Jurisdiction*	% of DMA outside NPS Lands
WY inside DMA	58%*
MT inside DMA	34%
ID inside DMA	8%

*Four percent (4%) of the DMA outside of National Park Service lands in Wyoming is under the jurisdiction of the Tribes governing the Wind River Reservation.

c. The Parties may agree to adjust their respective individual allocation of discretionary mortality based on management objectives and spatial and temporal circumstances. Each party has discretion as to how it applies its allocation of discretionary mortality pursuant to its respective regulatory processes and management plan.

[3] Independent males and independent females are 2 years of age or older. Dependent young are younger than 2 years of age.

d. A state may opt to use its allocation for regulated harvest for translocation of grizzly bears out of the DMA for conservation purposes. If, for any reason, a state opts not to implement some or all of its allocation, that allocation is not available to another state for additional harvest unless agreed to by the state with the unused allocation.

e. The Parties will confer with the National Park Service (NPS) and United States Forest Service (USFS) annually. The Parties will invite representatives of both GYE National Parks, the NPS regional office, GYE USFS Forest Supervisors, and the Wind River Reservation to attend the states' annual meeting.

f. The Parties will monitor mortality throughout the year, and will communicate and coordinate with each other, and tribal and federal land management agencies as appropriate, to minimize the likelihood of exceeding mortality limits.

g. Each Party will designate one representative as a respective Point of Contact for purposes of achieving the objectives of this MOA.

V. Authorities and Regulatory Mechanisms

The Parties enter into this MOA pursuant to their respective state authorities as set forth in Title 87, Montana Code Annotated; Title 23, Wyoming Statutes Annotated; and Title 36, Idaho Code.

The Parties have the authority, capability, and biological data to implement appropriate hunting restrictions, management relocations and removals, and population management. The Parties will use their respective individual authorities to regulate discretionary mortality as allocated to their jurisdictions under this MOA. The Parties' respective regulatory mechanisms to manage, monitor, restrict, and adjust mortality include, but are not limited to, those identified in Attachment B.

This MOA in no way restricts the Parties from participating in similar activities with other states, agencies, tribes, local governments, or private entities.

Each Party has discretion to manage grizzly bears within its jurisdiction of the GYE that are outside the DMA pursuant to its respective regulatory processes and state management plan.

VI. No Obligation of Funds

This MOA is neither a fiscal nor a funds obligation document. Any endeavor or transfer of anything of value involving reimbursement or contribution of funds among the Parties will be handled in accordance with applicable laws, regulations, and procedures and such endeavors will be outlined in separate agreements or contracts made in writing by representatives of the Parties. This MOA does not provide such authority.

VII. Term, Termination and Effective Date

This MOA will become effective upon the date of signature of all Parties. It will remain in effect until it is terminated by the Parties. Any Party may terminate its participation in the MOA by providing one hundred-eighty (180) days' written notice to the other Parties, which notice shall be transmitted by hand or other means of delivery confirmation.

VIII. Amendment

Party representatives will meet annually to review implementation of the MOA and recommend any appropriate modifications to the MOA based on changes to the Strategy, state management plans, or other pertinent regulatory documents. Any modification to the MOA will only become effective upon the written consent of all Parties.

IX. No Third-Party Beneficiary

Nothing contained herein shall be construed as granting, vesting, creating, or conferring any right of action or any other right or benefit upon any third party.

X. Severability

Should any portion of this MOA be judicially determined to be illegal or unenforceable, the remainder of the MOA will continue in full force and effect.

XI. Sovereign Immunity

The states of Wyoming, Montana, and Idaho do not waive their sovereign immunity by entering into this MOA, and each fully retains all immunities and defenses provided by law with respect to any action based on or occurring as a result of this MOA.

In Witness Thereof, the Parties hereto have executed this MOA as of the last written date below.

Jan 17-024

President, Wyoming Game and Fish Commission — Date

January 17, 2024

Director, Wyoming Game and Fish Department — Date

In Witness Thereof, the Parties hereto have executed this MOA as of the last written date below.

Lesley Robinson
Chairman, Montana Fish and Wildlife Commission

6/24/24
Date

Director, Montana Fish, Wildlife and Parks

7/9/24
Date

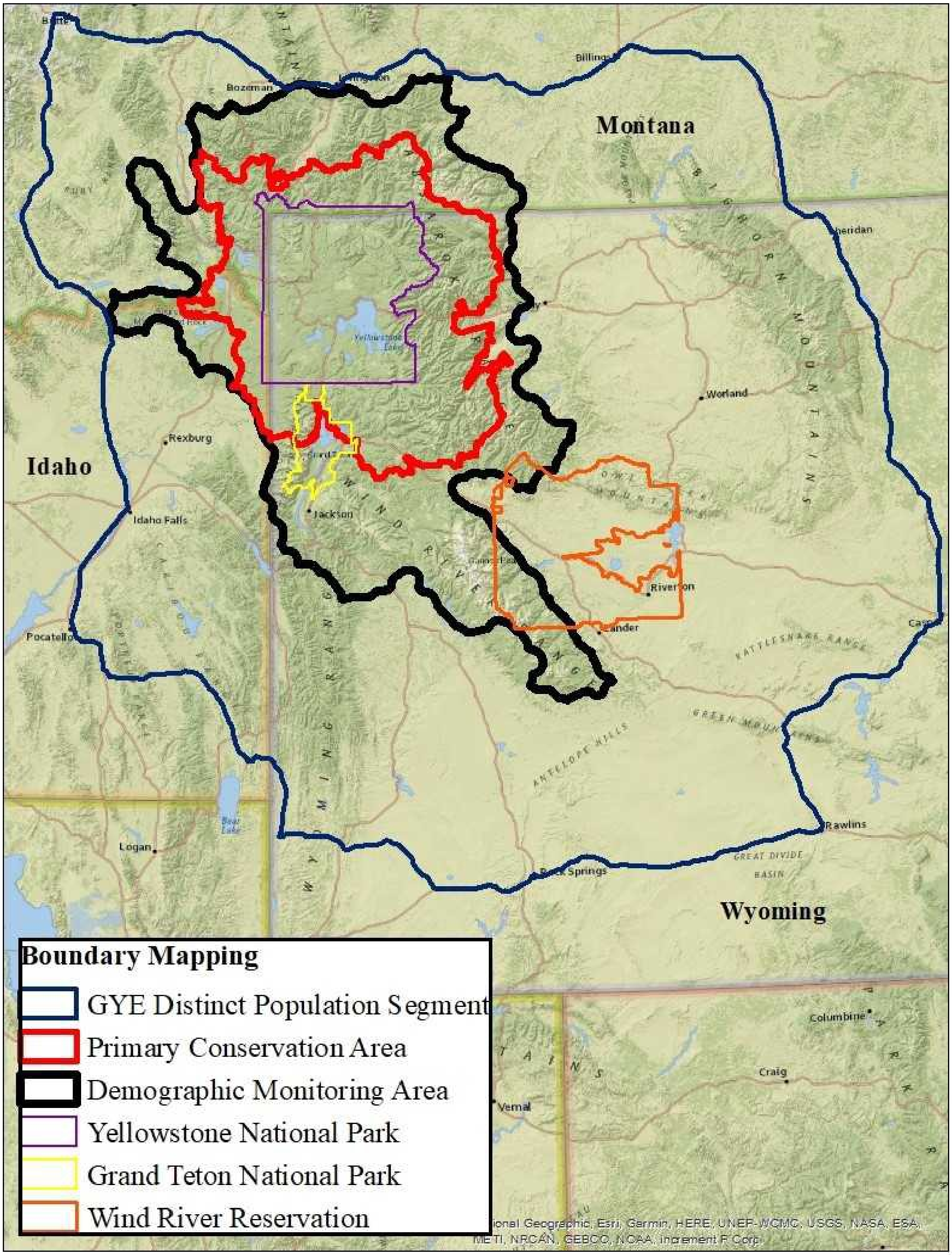
In Witness Thereof, the Parties hereto have executed this MOA as of the last written date below.

Don Ebert — January 25, 2024
Chair, Idaho Fish and Game Commission — Date

Jim Fredericks — January 25, 2024
Director, Idaho Fish and Game Department — Date

ATTACHMENT A

Greater Yellowstone Ecosystem



ATTACHMENT B

State Regulatory Mechanism

	Wyoming WS=Wyoming Statute WGBMP=Wyoming Grizzly Bear Management Plan	**Montana** MCA= Montana Code Annotated ARM=Admin. Rules of Montana MTFWC – Montana Fish and Wildlife Commission Regulation	**Idaho** IC=Idaho Code IDAPA=Idaho Admin. Code ISP=Idaho Season Proclamation
Protected Classification	W.S. 23-1-101 (a)(xii)(A) (classified as trophy game animal)	MCA 87-2-101 (4) (classified as a game animal)	IC 36-201 IDAPA 13.01.06.100.05 (classified as big game animal)
No Take without Statutory/Commission/Director Authorization	W.S.23-3-102(a)	MCA 87-1-301; MCA 87-1-304; MCA 87-5-301 (including quotas for take for livestock protection); MCA 87-5-302	IC 36-1101(a)
Commission restriction of season, location boundaries, limits, gender, age	W.S. 23-1-302(a)(ii), WGBMP	MCA 87-1-304 (1); MCA 87-5-302	IC 36-104(b)(2) seasons, locations, sex, limits, methods of take; ISP
Commission limit of harvest to automatically close season, including gender-based limits	W.S. 23-1-302(a), WGBMP	MCA 87-1-304; MCA 87-5-302	IC 36-104(b)(2); ISP
Commission authority to restrict hunter effort (e.g., controlled hunts, tag limits)	W.S. 23-1-302(a)(i), WGBMP	MCA 87-1-201(8); MCA 87-1-304 (1); MCA 87-2-702; MCA 87-5-302;	IC 36-104(b)(2) IC 36-104(b)(5) authority to designate controlled hunt IC 36-408(1),(2); ISP
Prohibition against take of females with young present	W.S. 23-1-302(a)	MCA 87-1-304; MCA 87-5-302; MCA 87-5-302	IC 36-104(b)(2) (Commission authority to prohibit in conjunction with season setting via proclamation or rulemaking); IDAPA 13.01.08.300.01.d
Requirement for license and tag	W.S. 23-3-102(a)	MCA 87-1-201(8); MCA 87-2-701; MCA 87-2-702; MCA 87 2-814; MCA 87-5-302	IC 36-401 IC 36-409(c)
Mandatory Check/Report to Monitor Harvest	W.S. 23-1-302(a)	MCA 87-1-301; MCA 87-5-302	IC 36-104(b)(3) (Commission authority for rules for mandatory check and report requirements); IDAPA 13.01.08.420, 422

	Wyoming WS=Wyoming Statute WGBMP=Wyoming Grizzly Bear Management Plan	**Montana** MCA= Montana Code Annotated ARM=Admin. Rules of Montana MTFWC – Montana Fish and Wildlife Commission Regulation	**Idaho** IC=Idaho Code IDAPA=Idaho Admin. Code ISP=Idaho Season Proclamation
Authority for Emergency Season Closure based on Change in Conditions affecting mortality/habitat	W.S. 16-3-103(b)	MCA 87-1-304 (5); MCA 87-5-302	IC 36-104(b)(3) Commission emergency closure authority IC 36-106(e)(6) Director authority, closure in emergency effective upon written order
Permit required for response to depredation unless self-defense/defense of others/defense of property under threat to human life or domestic animals	W.S. 23-1-302(a)(viii)	MCA 87-1-201(8); MCA 87-1-304(1)(e); ARM 12.9.103(1)(d)	IC 36-1107 (carcass remains property of state)
Mandatory Education	W.S. 23-1-302(a)(xxii)	MCA 87-1-301; MCA 87-1-304 MFWC Black Bear Regulations	IC 36-412(a) Hunter education mandatory for those born after 1/1/1975 IDAPA 13.01.02.200 Recommended additional materials and exam regarding bear identification available on-line.
Penalties	W.S. 23-3-102(d), W.S. 23-6-202, W.S. 23-6-206, W.S. 23-6-208	MCA 87-6-413. (Hunting or killing over limit)	IC 36-1402(c) Misdemeanor IC 36-1402(d) Felony IC 36-1402(e) Hunting license revocation for certain violations, including take during closed season, exceeding bag/possession limit IC 36-1402(g) License revocation in Idaho revokes hunting privileges in all 44 states participating in the Interstate Wildlife Violator Compact

	Wyoming WS=Wyoming Statute WGBMP=Wyoming Grizzly Bear Management Plan	**Montana** MCA= Montana Code Annotated ARM=Admin. Rules of Montana MTFWC – Montana Fish and Wildlife Commission Regulation	**Idaho** IC=Idaho Code IDAPA=Idaho Admin. Code ISP=Idaho Season Proclamation
Civil Penalty	W.S 23-6-204(e)		IC 36-1404(a)
Procedural Aspects of State Regulatory Mechanisms	W.S. 16-3-101, Wyoming Administrative Procedures Act	MCA 2-4-101, et seq., Montana Administrative Procedures Act	IC 74, Chapter 2, Open Meeting Requirements, including notice for all meetings of Idaho Fish and Game Commission IC Title 67, Chapter 52 (Idaho Administrative Procedure Act), requirements for public notice and comment, legislative review IC 36-105(3) Public Notice & Publication requirements for season setting

Attachment C

Example of Process for Establishing Limits and Allocation by Management Jurisdiction

Table C1. Example of IPM-estimated available harvest mortality ranges based on management scenario. Available harvest mortality is rounded to nearest whole number with values < 0.5 rounded down and values ≥ 0.5 rounded up without exceeding total limit.

	2022 Population Size Estimate **Total Population = 965**	**Available Total Mortality for 2023** Based on Management Scenario (population increase/maintenance/reduction)			**Prior Year Non-harvest Mortality** (using 10-year average from 2013-2022)	**Available Harvest Mortality for 2023** = Available Total Mortality – Non-Harvest Mortality		
		Using $\lambda > 1.0$ (population increase objective)	Using $\lambda = 1.0$ (population maintenance objective)	Using $\lambda = 0.95$ for 5% (population reduction objective)		Using $\lambda > 1.0$	Using $\lambda = 1.0$	Using $\lambda = 0.95$
Independent-aged Females	328	<31	31	45	17	31 – 17 = < 14	31 – 17 = 14	45 – 17 = 28
Independent-aged Males	332	<41	41	59	20	41 – 20 = < 21	41 – 20 = 21	59 – 20 = 39
Dependent Young*	305	N/A	N/A	N/A	*	N/A	N/A	N/A

Notes: Lambda (λ) denotes the change in population size from one year to the next: $\lambda = 1.0$ represents no change in population size between two years: $\lambda > 1.0$ indicates population increase and $\lambda < 1.0$ indicates population decrease.

* All 3 states prohibit harvest of dependent young and accompanying adults, so no harvest mortality is available for dependent young.

For purposes of this example, the prior 10-year average of non-harvest mortality is used to illustrate an “average” harvest mortality scenario. An actual calculation would use the prior calendar year’s mortality.

Table C2. Example allocation of available harvest mortality in DMA (derived per example presented in Table C1) by state management jurisdiction, using $\lambda = 1.0$ (maintain population) and rounding allocation results to nearest whole number without exceeding total limit (with values < 0.5 rounded down and values ≥ 0.5 rounded up.

	Available Harvest Mortality for Allocation (derived per Table A1)	WY Harvest Allocation	MT Harvest Allocation	ID Harvest Allocation
Independent-aged Females*	14	8	5	1
Independent-aged Males	21	12	7	2
Dependent Young	N/A	N/A	N/A	N/A

Note: All 3 states prohibit harvest of dependent young and accompanying adults, so no harvest mortality is available for dependent young.