

5. ALTERNATIVE APPROACHES FOR FUTURE MANAGEMENT BY AREA

The document to this point has described specific aspects of the Department's grizzly bear management program that are common across the state and relate to day-to-day management of the species. The purpose of this section is to discuss a variety of alternatives for future direction for populations within each recovery zone and the surrounding area and identify and discuss possible changes in program direction as well as to indicate the Department's preferred approach. It also evaluates the significance of any potential impacts associated with implementing this FPEIS and management tools used to mitigate negative impacts.

While there have been significant successes in some recovery zones, notably the Northern Continental Divide, recovery in the Cabinet-Yaak recovery zone has been slow and tenuous. Moreover, recovery programs in the Bitterroot have not been implemented. This section will present various approaches to possible future direction and the benefits and challenges of those approaches. It is FWP's opinion that new and or innovative approaches would be helpful to speed recovery in the Cabinet-Yaak and Bitterroot as well as securing successes in the Northern Continental Divide. Further, FWP believes that by continuing to foster cooperative working relationships with federal and state agencies, provincial and tribal governments as well as local organizations, successful conservation and management of grizzly bears throughout western Montana can be achieved.

Cabinet-Yaak Recovery Zone and Surrounding Areas

The current CY recovery zone encompasses about 2,600 mi² of northwest Montana and northern Idaho (see Figure 2). It is bordered to the north by the Canadian border, to the south by the Clark Fork River and Montana Highway 200, to the west by the towns of Moyie Springs and Clark Fork, and to the east by the town of Libby. The CYE is bisected by the Kootenai River.

The Cabinet Mountains account for approximately 58% of the CY recovery zone and lie south of the Kootenai River, while the Yaak River borders Canadian grizzly populations to the north. Two 7.5 mile wide linkage zones link the Yaak with the Cabinet Mountains. Approximately 90% of the recovery zone is on public land administered by the Kootenai, Lolo, and Panhandle National Forests. Plum Creek Timber Company Inc. is the main corporation holding a significant amount of land in the area. Individual ownership exists primarily along the major rivers, and there are numerous patented mining claims along the Cabinet Mountains. Wilderness encompasses 237 mi² of the higher elevations in the Cabinet Mountains. Libby, Troy, Thompson Falls, Noxon, and Trout Creek are the primary communities adjacent to the East Cabinet Mountains.

The CYE is often described in terms of having two portions. The Cabinet Mountains portion forms the southern half of the CYE and is topographically diverse, with a steep mountain range up to 8,700 feet near the center and more definable seasonal habitats. The Cabinet Mountains Wilderness area is approximately 34 miles long, varies from 0.5 to 7 miles wide and consists of higher elevation habitat. A valley of private land including the towns of Libby and Troy dissects the northern Cabinet Mountains. The southern Cabinet Mountains are therefore connected to the Yaak to the north by 2 relatively narrow corridors of habitat. The Yaak portion of the ecosystem has gentler topography and slightly lower elevations, up to 7,700 feet. Seasonal grizzly bear habitats are not as clearly definable but are connected to British Columbia bear populations.

The 1993 Grizzly Bear Recovery Plan estimates that a recovered population in the CYE would consist of a minimum of 100 individual grizzly bears. Potential isolation from grizzly bears in the Canada portion of the greater CYE has however been identified as a potential threat to grizzly bears in the U.S. portion of the ecosystem. Conditions in Canada and along the international boundary currently allow movement of grizzly bears between Canada and the Yaak portion of the CYE, but grizzly bear habitat is being impacted by highways and associated development in Canada. Additionally, U.S. Highway 2 bisects the ecosystem between the Yaak and Cabinet Mountains portions. To date, there has been no documented movement of grizzly bears across Highway 2 between the Yaak and Cabinet Mountains. Consequently, the combination of highway, river, railroad, associated development, and small population size appears to be a substantive barrier to movement of grizzly bears in the ecosystem.

Alternative 1. Continue Existing Program

FWP evaluated continuing to implement the existing programs and management direction. As with any program, there have been many changes since the FWP 1986 Programmatic EIS for this area. Many of these changes have benefited the grizzly population. Efforts from other agencies have certainly enhanced our understanding of grizzly bears and their use of the area however, they have not resulted in significant recovery to date. Because the initial population was so low and funding limited, progress towards recovery of this portion of the ecosystem has been limited and could be easily reversed.

Benefits

- Recovery programs have been implemented in conjunction with the citizen's group established to assist with the augmentation test and ongoing grizzly augmentation for the ecosystem. Based on changes in land management and public understanding, support for recovery has increased in some circles in the last two decades. There is some evidence of additional bears, notably in the Yaak area, and because recovery occurs slowly, the public may more readily support our efforts.
- Land changes have occurred that benefit grizzlies in the area.

Challenges

- Recovery in this ecosystem has been slow and tenuous. Even slight changes in mortality levels can dramatically impact the success of recovery.
- The initial augmentation was only to test the technique and was not intended to achieve recovery.
- Because the population levels are low in the Cabinet-Yaak and survival of each individual animal is critical, constraints on land use and activities may be higher than necessary if the population was more abundant.
- Low numbers of bears also limits flexibility for dealing with conflict situations between people and bears.
- Because there has been limited success for two or more decades, the public may feel that full recovery is not possible and efforts should cease.
- There will be ongoing pressure for additional habitat and land management constraints to support the existing small population.

Alternative 2. Accelerated Recovery - FWP's preferred alternative

This alternative evaluated accelerated recovery in the Cabinet-Yaak through more rapid augmentation and reduced human-use mortality of the population. Based on data assembled for the 1986 State Grizzly Bear Management Plan, sufficient habitat exists to support at least 90-120 bears in the Cabinet-Yaak area.

By implementing an active community based augmentation program, we believe there is potential to vastly improve the recovery prospects for this recovery zone.

Under this alternative, in cooperation with USFWS and USFS, 10-15 sub-adult male or female, or appropriate adult females, would be relocated from other areas (Yellowstone, NCDE, or Canada) within the next 3-5 years. At the present time, the emphasis for augmentation will be on females because it is believed that there are still sufficient males within the area to support recovery. No conflict or habituated and/or food conditioned bears would be used for augmentation, and released animals would be intensively monitored. After an initial effort, the program would be evaluated for its successes or potential problems and if successful ongoing augmentation of sub-adult females would continue to occur until population objectives, 90-120 bears, had been achieved through a combination of augmentation and natural reproduction.

Modeling suggests that if human-caused mortality is not reduced, successful augmentation will require far more bears. Furthermore, if linkage between the Cabinets and Yaak are not established, augmentation would be required well into the future. As a consequence, this approach also recognizes the need to include programs aimed at reducing human-caused mortality and improving or creating population linkage.

Benefits

- Active involvement of the local community would be higher and public opposition would be lessened.
- The potential for more rapid recovery of this population.
- There are genetic benefits associated with reducing the length of time a population remains demographically small or isolated during recovery.
- While current programs have provided for some connection between the NCDE and the Yaak portion of the ecosystem, this approach would probably speed connection between the Cabinets and the Yaak as well by increasing population size and eventual occupancy of the Highway 2 area between them.
- With a more robust population in the area, we may be able to better determine which areas and management prescriptions are necessary to maintain grizzly bears in this recovery zone. In turn, this could result in more flexible management in other portions of the ecosystem.
- Recovery and delisting of the population could occur in a much shorter timeframe than the no-action alternative.

Challenges

- Local support would be critical to any successful augmentation. Support and tolerance for grizzly bears may be tested with increasing distribution and number of translocated animals.
- There is some uncertainty of the survival level for translocated animals.
- Some people may feel threatened by a recovered population.
- It may be difficult to capture sufficient subadult females to meet the shortened timeframe.
- Higher population levels will result in the need to have conflict management programs in place.
- This approach would require significant funding commitments over existing programs.

Alternative 3. Endangered Status

The decision to change the status under the Endangered Species Act is not ours to make. Rather this decision lies within the authority of the Department of Interior through the USFWS. Under Montana State law, FWP does have authority within state statutes and processes to list the grizzly bear as

endangered, however, the federal Endangered Species Act would supersede this and direct management within Cabinet-Yaak. Alternatively, FWP could seek a change from the USFWS to alter the status of the Cabinet-Yaak population to endangered and pursue recovery in that arena.

While the grizzly bear is currently listed as warranted but precluded for endangered status, there has been litigation to force the change to endangered status. Moreover, there are certain segments of the public that feel that more restrictive habitat and land management constraints need to be in place for this population to survive and endangered status would support those actions.

Benefits

- Endangered status would bring the full force of the statute into the recovery effort.
- Larger land areas could be managed with more focus on the needs of grizzly bears.
- Endangered status would limit resource industry activities harmful to bears.
- Make clear the legal status of the bear to the public.

Challenges

- In our judgment, local support under fully endangered status would be difficult to maintain.
- Resource industries could be further impacted by additional regulations.
- Past experiences with other species shows elevated levels of social conflict with large carnivores being managed under endangered status.
- FWP cannot directly implement this alternative because only the USFWS can revise the status of this population.

Northern Continental Divide Recovery Zone and Surrounding Areas

The NCD recovery zone encompasses approximately 9,600 mi² of northwest Montana (see Figure 2). Extending south from the Canadian border, it continues west into the Flathead and Mission valleys, south to the Blackfoot River basin, and eastward onto the Rocky Mountain Front. It includes a varied landscape encompassing five Wilderness areas (Bob Marshall, Scapegoat, Great Bear, Rattlesnake, and Mission Mountains), portions of five National Forests (Flathead, Kootenai, Lolo, Helena, and Lewis & Clark), Glacier National Park, the Blackfeet and Flathead Indian Reservations, and other federal, state, and private lands.

Because of its proximity to Canadian bear populations, large land area, and high proportion of designated wilderness and national park lands, the NCDE offers some of the best long-term prospects of supporting a viable grizzly bear population among the six areas designated as grizzly bear recovery zones in the US. While final results from the current NCDE DNA project will not be available until early 2007, the Department's previous EIS's have estimated that the NCDE supports a grizzly bear population of approximately 500-700 bears. If results from the NCDE DNA study estimate a substantially different population size, programs may have to be adjusted.

The area is characterized by extremely diverse habitats, much of it being heavily forested, mountainous, and a largely roadless wilderness. Conversely, more than 10% of this ecosystem is private land and the majority of bear-human conflicts and bear deaths occur on these private lands. In 1980, using baseline information collected by the Border Grizzly Project, FWP launched an ecological study of grizzly bears along the Rocky Mountain East Front. This area contains a unique transition between the Rocky Mountain Cordillera and the short-grass prairies of the Great Plains. This study ended in 1987 and provided information on the ecological requirements of grizzly bears along the eastern side of the NCDE,

and their response to oil and gas development and other human activities. FWP has recognized that ecological requirements of grizzly bears differed between the more open and dry Rocky Mountain East Front and the moister habitats to the west of the Continental Divide. These differences and the lack of ecological information on grizzly bears in western habitats suggested a west-side study would be necessary.

Studies of grizzly bears in the lower reaches of the South Fork Flathead River were initiated in 1987. This study, termed the "South Fork Project" was situated in the northern Swan Mountains. The goal was to document factors limiting population size and to test methods for monitoring population trend. Habitat objectives included evaluation of seasonal habitat selection, and the effect of roads on grizzly bear distribution and survival.

Alternative 1. Continue Existing Program – FWP's preferred alternative

Recovery programs to date have resulted in successes in portions of this ecosystem. Basic grizzly bear management programs and activities are in place and current processes allow for periodic updates and changes such as those identified in this plan. Furthermore, evidence from previous reviews indicated a large and healthy population that remains connected to the population in Canada. As many program changes needed to benefit grizzly bears have already occurred and have been or are being implemented, FWP's preferred alternative in the NCDE is to continue these successful efforts. In the formal language of MEPA, this constitutes the "no action" alternative.

Benefits

- Grizzly bears already occupy the majority of the recovery zone and have expanded beyond it in many places.
- Connections may have been, or are close to being, established through natural migration with the Yaak portion of the Cabinet-Yaak recovery zone.
- Programs and commitments are in place to maintain this population at recovered levels.
- Habitat protection is already significant, including large areas in national park and designated wilderness areas. Additional habitat adjacent to these areas is being managed in a way that addresses grizzly bear issues.

Challenges

- A review of existing commitments and agreed upon long-term measures has not been established. A conservation strategy needs to be prepared and approved to document commitments among managing agencies within and beyond the recovery zone.
- Tolerance for bears is being tested in some places at current population levels.
- Mandatory habitat protection is impacting economic viability of important resource industries. Maintaining an adequate balance between resource industries needs and grizzly bear habitat needs is a challenge.
- DNA estimate may indicate the need to adjust and/or modify the current program.

Alternative 2. Accelerated Recovery

FWP believes that an accelerated recovery process is probably not warranted for this recovery zone. There may be small peripheral portions where additional animals could be augmented to bolster densities (example: Rattlesnake Wilderness area), but cost effectiveness is questionable.

Benefits

- Ensures all areas of the ecosystem are occupied, and most areas have good densities of bears.
- Will probably speed the rate of distributional increase in some areas outside the recovery zone.

Challenges

- Many people would question the need for accelerating recovery when in fact evidence indicates recovery has already largely occurred.
- Accelerated efforts to increase the population may reduce existing tolerance for this healthy bear population.
- Results of the DNA population estimate will not be available until early 2007, and the public may be unwilling to change program direction without this information.

Alternative 3. Reduce Recovery Efforts

This alternative acknowledges the status of the NCDE population and changes programs by reducing efforts in some areas. Previous reviews by FWP in 1986, 1991 and 1995 indicated that this area has a significant and healthy bear population. If such estimates are validated by the DNA population estimate project results in early 2007 it could provide the basis for changing program direction. Population estimates in past reviews were similar to levels currently estimated for the Yellowstone area that is being considered for delisting. The population in the NCDE is also connected with that to the north in Canada. With this alternative the department would scale back some programs and/or research on grizzly bears in the NCDE. The benefits and challenges of this approach are as follows:

Benefits

- The money and other resources preserved by scaling back efforts in the NCDE could be used to support recovery in other areas.
- This approach acknowledges the biological status of the population in this area.
- It could potentially enhance public support for recovery in other areas if it is seen that progress in recovery does result in changes in program direction.

Challenges

- Failure to maintain programs on a par with the grizzly bear population could result in escalated conflicts and/or problems, ultimately eroding public support.
- The public will still demand updated information and assurances that the population is healthy. Scaling back on population monitoring will reduce public confidence in the program.
- There is a public expectation that bear programs built around conflict management, public education and community support will continue.
- Difficult to scale back management efforts while the bear is listed as threatened without losing public support.
- The ability to achieve or maintain distribution increases and connections with other ecosystems may be reduced if programs are dramatically reduced.
- Delisting would be delayed with loss of public support.

Bitterroot Recovery Zone and Surrounding Area

The Bitterroot ecosystem is one of the largest continuous blocks of federal land remaining in the lower 48 states. Any recovery effort here will require cooperation with the State of Idaho. The core of the ecosystem contains the Selway-Bitterroot and Frank Church-River of No Return Wilderness Areas.

Together these two wilderness areas make up the largest contiguous block of wilderness habitat in the Rocky Mountains south of Canada. Of all remaining unoccupied grizzly bear habitat in the lower 48 states, this area in the Bitterroot Mountains affords one of the best possibilities for grizzly bear recovery. As such, the region offers excellent potential to recover a healthy population of grizzly bears and to boost long-term survival and recovery prospects for this species in the contiguous U.S. The recovery of the grizzly bear in the Bitterroot would also aid in restoration of Nez Perce Tribe cultural and spiritual values related to the grizzly.

Historically, the grizzly bear was a widespread inhabitant of the Bitterroot Mountains in central Idaho and western Montana. When Lewis and Clark traveled through the Bitterroot country in 1806, grizzly bears were abundant. They killed at least 7 grizzly bears including 1 female and 2 cubs while camped near present-day Kamiah, Idaho. Grizzly bears were common in central Idaho until the early 1900s. One author wrote of killing dozens of grizzly bears over several years in the Bitterroot Mountains. A major influx of hunters, trappers, and settlers at the turn of the century, and later sheepherders, were responsible for direct mortality and elimination of grizzly bears from the Bitterroot area. Conservative estimates indicate trappers and hunters killed 25 to 40 grizzly bears annually in the Bitterroot Mountains during the early 1900s. The last verified death of a grizzly bear in the Bitterroot ecosystem occurred in 1932 and the last tracks were observed in 1946. Although occasional unverified reports of grizzly sightings persist, no verified tracks or sightings have been documented in more than 50 years.

In 1975, the grizzly bear was listed as a threatened species in the 48 contiguous states under the U.S. Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*). At that time the Bitterroot ecosystem, along with the Northern Continental Divide and Yellowstone ecosystems were listed as areas where grizzly bears were known or thought to exist and where recovery should be emphasized.

A Grizzly Bear Recovery Plan, finalized in 1982, called for the evaluation of the Selway-Bitterroot country as a potential recovery area. At that time the Bitterroot ecosystem was classified as an Evaluation Area because it was in need of more research to determine habitat quality and whether grizzly bears still occurred there. The Bitterroot Evaluation Area (BEA) encompassed about 5,500 mi². The boundary ranged from the St. Joe River Watershed divide in the north, to the Salmon River in the south, the transition of roaded and unroaded National Forest land in the west, to the Selway-Bitterroot Wilderness boundary and Fish creek road in Montana in the east.

Attempts to verify presence of grizzly bears continued through the 1980s and are ongoing. Numerous studies have failed to verify the presence of grizzly bears in this region. Three different habitat studies were conducted from 1979 through 1991 to investigate habitat suitability of the BE for grizzly bears. The authors suggested habitat in the BEA was sufficient to support grizzly bears. An interagency group of grizzly bear scientists reviewed the information and concurred, suggesting the BEA could support between 200 and 400 bears. Following these efforts in 1991, the IGBC endorsed the Bitterroot ecosystem as a recovery area and recommended the USFWS pursue grizzly bear recovery in this region. The ecosystem includes about 16,686,596 acres (26,073 mi²) of contiguous national forest lands in central Idaho and western Montana. These include all or parts of the Bitterroot, Boise, Challis, Clearwater, Nez Perce, Payette, Sawtooth, Salmon, and Panhandle National Forests in Idaho, and the Bitterroot and Lolo National Forests in western Montana. A few scattered parcels of private and state land are interspersed throughout this area, but total acreage is minor.

The center of the area is characterized by three large wilderness areas covering a contiguous area of almost 4 million acres (6,250 mi²). These include the Frank Church-River of No Return (2,361,767 acres,

3690 mi²), the Selway-Bitterroot (1,340,681 acres, 2095 mi²) and the Gospel Hump (200,464 acres, 313 mi²) Wilderness Areas. The area contains 3 major mountain ranges, the Salmon River Mountains (south of the Salmon River), the Clearwater Mountains that extend from the Salmon River north to the upper Clearwater River drainage, and the Bitterroot Mountains along the Montana-Idaho state line.

Alternative 1. Preparatory Planning – FWP's preferred alternative

Under this alternative, preparatory planning would be undertaken for the anticipated presence of grizzly bears within the ecosystem whether they arrive through natural migration or through a USFWS decision to reintroduce as per their Record of Decision on the Final EIS for Grizzly Bear Recovery in the Bitterroot Ecosystem. It is important to note, therefore, that this approach does not require an active relocation component and FWP will not unilaterally reintroduce bears under this alternative. Instead, FWP would work with agencies, local citizens, local businesses and other interested parties to ensure that provisions are in place should bears occupy the recovery zone at some time in the future.

This approach would include an intense sanitation and public education campaign. The U.S. Forest Service, Defenders of Wildlife, and the National Wildlife Federation are already implementing a sanitation program. It is envisioned that this would continue and/or be expanded to include additional efforts by FWP, permittees, and private landowners in and around the recovery zone. The Survey of Attractant Sites, Selway-Bitterroot Ecosystem that was conducted by Brown Bear Resources, Inc. would be utilized as a tool in addressing the areas where sanitation problems exist. Public education efforts would include: presentations at schools in and around the area to teach children about grizzly bears and how to recreate safely in grizzly bear country; presentations to all civic clubs and interested organizations about grizzly bears and how to recreate safely in grizzly bear country, and placing of informative signs at all trail heads in and around the recovery area.

Benefits

- Necessary steps to prepare the ecosystem and the public prior to potential bear arrival would be in place.
- Anticipatory approach that includes citizen involvement from the onset.
- Education and public outreach would be initiated prior to potential bear arrival.
- Measures aimed at reducing human-bear conflict would be in place prior to potential bear arrival.
- Public opposition should be lessened with this approach.

Challenges

- Requires significant resource commitments up front.
- Active recovery would not be initiated immediately, if at all.
- May be difficult to source sufficient funding without presence of bears.
- Public opposition to possible reintroduction.

Alternative 2. No Action

Under this alternative, no active recovery efforts would be implemented. It is possible that grizzly bears could make their way to this ecosystem (some have already come close). However, timeframes for recovery would be unreasonable (hundreds of years) to reach the recovery goal of 200+ bears. Further, no preparatory action would be taken.

Benefits

- Segments of the public resistant to the presence of grizzly bears will likely be supportive.
- More public support from certain segments of society for natural recovery than a reintroduction.
- Minimal cost.

Challenges

- Protecting adequate habitat components for a recovered bear population would be difficult. Major valley floors and key spring ranges are becoming heavily populated with humans.
- Public interest in bears would decline or become non-existent.
- Mortality and management issues in the areas between the Bitterroot and other ecosystems may prohibit recovery from occurring.
- More severe habitat and land management constraints would have to be placed on lands between the currently occupied areas and this ecosystem.
- Higher costs involved in purchase and easement programs.
- In the absence of a preparatory planning program, conflicts would become increasingly severe and difficult to resolve should bears make their way into this ecosystem.

Alternative 3. Accelerated Recovery Through Reintroduction.

Under this alternative, should the USFWS grant FWP permission, grizzly bears would be reintroduced into the Montana portion of the Bitterroot ecosystem under the provisions of the ESA (the number of bears would be determined by how fast recovery was to be achieved).

Benefits

- This area would contribute significantly to a viable grizzly population in the lower 48 states.
- Active recovery would begin to occur and grizzly bears may be given deference in land management and human activity decisions.
- Clear protected status of grizzly bears.
- People in the area that support recovery would see some progress.

Challenges

- Segments of the public resistant to the presence of grizzly bears will likely oppose any reintroduction.
- Support for reintroduction from adjoining State of Idaho would strengthen program but may be difficult to achieve.
- Finding sufficient animals to support the reintroduction.
- Process requirements would be very expensive.
- Uncertainty about survival of reintroduced bears from other areas.
- FWP does not have the authority to implement this alternative without prior authorization from USFWS.

Short Term and Long Term Impacts

FWP evaluated the significance of potential impacts associated with implementing this DPEIS. Successful implementation of this grizzly bear program may result in a broad range of short term, long term and cumulative impacts within the 17-county region. In general, most adverse impacts associated with implementing this DPEIS are anticipated to be short-term and/or localized, and would be reduced significantly by implementation of mitigation measures. There are unlikely to be direct environmental consequences (i.e. those caused by an action and occur at the same time and place) because actions and

preferred alternatives are programmatic in nature and apply in many cases to future management activities. In order to comply with requirements for environmental analysis, the DPEIS analyzes all impacts to the human environment that are identifiable. The analysis of those impacts is based primarily on projections of how future activities and areas would change because of the proposed actions. Such projections are however inherently uncertain and difficult to predict.

Under this program, grizzly bear numbers within western Montana are likely to increase over time and it is probable that such increases would result in expanded occupation and use of habitats within and outside the recovery zones. While the significance of impacts resulting from bear expansion beyond the recovery zones would be reduced through mitigation (see Strategies to minimize human-grizzly conflict, page 32), increased human-caused mortality and human-bear conflicts are possible (see Conflict Management, page 30). Furthermore, the human population in the 17-county analysis area is predicted to expand during the timeframe of this plan (see Size and Human Population, page 11). Increasing rural settlement and subdivisions on private lands could impact the bear's use of habitat and movement between habitats. Bear habituation to humans could become more prevalent, increasing risks to both the bear and public safety.

Implementing habitat measures and preventative management programs will likely benefit other species of wildlife in Montana, especially black bears. Black bear issues parallel those surrounding grizzlies, and the programs recommended in this plan should assist FWP in multi-species management. Habitats that are managed in a way that affords opportunities for occupancy and expansion of the grizzly bear population may benefit other species by providing suitable habitat. For example, areas where road accesses are adequately managed benefit species such as elk. Although grizzly bears are omnivores, and predation of ungulates, such as elk, deer and moose, does occur, the overall impact of an expanded grizzly bear population on other populations of wildlife is, however, expected to be limited. As a result, it should not be necessary to adjust hunting seasons to compensate for grizzly bear predation on other wildlife.

While adverse impacts to other wildlife species as a result of this program should be minimal, there is the potential that population levels of black bears could decline due to increased competition for resources as grizzly bears expand into currently unoccupied habitats. Based on the current status of black bears in, and adjacent to, areas currently occupied by grizzlies in Montana, impacts are not anticipated to be significant.

Many factors influence and affect the local social and economic environment. Regardless of this plan, recreational use is likely to increase over the next decade due to human population growth in many western counties and an increase in people seeking outdoor recreational opportunities (see Recreational Opportunities, page 15). Users would be affected to varying degrees by the perceived level of grizzly bear use, grizzly bear-human conflicts, and information and education about recreating in bear country. People uncomfortable recreating in bear occupied areas may shift their use patterns to include areas likely to be unoccupied by bears and/or utilize areas such as developed campsites and heavily utilized day use trails in bear country. For many people, however, recreating in grizzly bear habitat is an attraction. Tourists from surrounding states as well as nationwide may be drawn to western Montana. As a consequence, grizzly bear-human conflicts and human-caused mortalities have the potential to increase with increased contact between bears and humans.

An expanding bear population could result in increased economic benefits to western Montana. Many people travel to or relocate to Montana because of the states diverse and abundant wildlife resources.

Furthermore, the value of many properties in Montana is enhanced by the presence of wildlife and the opportunities for associated recreation and potential harvests.

A variety of agricultural and livestock enterprises also exist across the 17-county region. As bears expand into areas outside the recovery zones, the potential exists for operators to be impacted by their presence. Grizzly depredation on domestic livestock would likely be minimal initially; however, as the bear population increases and expands into areas outside the recovery zones, the incidence of depredation could increase. Likewise, orchard and apiary (including commercial, pollination, landowner and hobbyists) operators, could experience income loss due to bear presence. As the costs of bear damage and depredation fall on the individual rancher or producer, economic losses and increased management costs due to livestock depredation, and damage to apiaries and orchards could be significant to individual producers but are unlikely to affect the overall industry.

Over the long term, agencies that manage lands in western Montana could see increased costs due to regulations regarding expanded attractant storage rules and habitat management changes. Most of these changes are already occurring in the areas that could be occupied by grizzly bears in the near term, and the public has clearly indicated support for these efforts. Also, because grizzly bears have always had and will always have a high public profile, public pressure could result in FWP and other agencies reprioritizing programs to focus additional effort on grizzly bear management. It is FWP's hope that by managing grizzlies as one component of our wildlife program such reprioritization would have minimal affect on other programs.

Cumulative Impacts

The following discussion of cumulative effects is a synopsis of the analysis of effects presented in the previous section. A cumulative effect is generally defined as the impact on the environment, which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions. Such impacts can result from individually minor yet collectively significant actions taking place over a period of time.

Past, present and reasonably foreseeable actions may affect grizzly bear habitat. Of concern are cumulative effects on grizzly bears due to increasing rural settlement and subdivisions on private lands. Irrespective of this plan, such changes would occur, and could affect the bear's use of habitat and movement between habitats. In addition, bears that spend more time at lower elevations have more conflicts with humans and experience a higher level of mortality. It is possible that increased development of lower elevation sites will lead to an increase in such adverse effects.

Rural economies are changing in western Montana and the cumulative impacts resulting from livestock and agricultural losses attributed to grizzly bears and other predators could further decrease the ability of long term operators to persist in this environment. Adverse impacts could result if additional ranch land were sold for conversion into subdivisions and residential developments.

As grizzly bears expand into areas outside the recovery zones, black bear hunting could have indirect cumulative adverse impacts on grizzly bears, particularly in areas with lower grizzly bear population levels. Grizzly bears have the potential to be killed either through mistaken identity or conflicts with hunters. Restrictions on hunting in grizzly bear habitat could result in both beneficial and adverse effects to the bear. Restrictions could result in fewer hunter-related grizzly bear mortalities, but may also reduce the availability of carcasses and gut piles for grizzly bears. In addition, restrictions would antagonize

hunters and others who traditionally utilized such areas, leading to erosion of public trust and support for the grizzly bear program and increased “vandal” killing.

Mitigation

An adaptive management approach affords FWP the opportunity to manage the population of grizzly bears in western Montana with a fair degree of flexibility to meet different needs and expectations. Many of the management tools outlined throughout this plan are designed to mitigate the potential for negative impacts of an expanding bear population while maximizing the benefits to the degree possible in a complex biological, social and economic environment.

While there are many benefits to expanded grizzly bear populations, there is no denying that there will be impacts to livestock producers and property owners due to conflicts with grizzly bears as the population expands. Implementing the programs recommended in this document will minimize those impacts through prevention, where possible, and adequate management if conflicts occur. Moreover, as the cause, severity, and appropriate response to human-bear conflicts often varies considerably from one incident to another, FWP has developed programs that utilize a broad range of management applications to mitigate adverse impacts.

Information and education remains a critical component under any alternative to minimize grizzly bear-human conflicts. Programs have been developed that emphasize providing people with the information they need to reduce the potential for human-grizzly conflicts that could lead to injury or loss of human life, or human-caused grizzly mortality while maintaining traditional residential, recreational and commercial uses of the areas into which the grizzly is or may be expanding. Coordinated management of nuisance bears, food storage orders, and information and education efforts would minimize conflicts and grizzly bear mortalities under all alternatives.

Mitigating bear losses due to hunting activity through education programs is another key component and FWP will continue efforts aimed at evaluating hunter education programs such as its bear identification requirements. Strengthening the program through adjustments such as implementing mandatory annual training courses for black bear hunters statewide, or for specific hunting districts, would reduce losses.

Implementing the road density standards as recommended is already occurring for other management purposes (erosion control, water quality, etc.) and is allowing for some expansion in the bear population. Future adjustments may be necessary.

In summary, as required in Section 12.2.431 of the Administrative Rules of Montana, throughout the process of developing this DPEIS, FWP evaluated the significance of impacts resulting from the proposed implementation of this grizzly bear program for western Montana. The Department has determined that although impacts could occur, our commitment to mitigation should reduce their significance. As a result, FWP does not anticipate any significant impacts that cannot be addressed through mitigation.

Irreversible and Irretrievable Resource Commitment

This section describes irreversible and irretrievable commitments of resources associated with implementation of the proposed grizzly bear management program outlined in this DPEIS. A resource commitment is considered irreversible when impacts from its use limit future use options. Irreversible commitment applies primarily to nonrenewable resources, such as fossil fuels or minerals, and to those

resources that are renewable only over long time spans, 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.

With few exceptions, the programs recommended in this document should 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. Likewise, habitat programs and access management can be reversed or revised if needed. The level of recommended mortality will not result in any irretrievable commitment of the grizzly bear resource and should allow it to flourish. Because these levels of removal can be regulated or eliminated on an annual basis, or even short time basis (should data indicate that to be prudent), the management program poses no threat to the species, and should benefit it.

Conversely, because the grizzly bear and other Montana wildlife serve as a major component of our quality of life in Montana and this is attracting new residents and an expanding human population, the state is seeing some additional commitment of resources. Subdivisions, energy development, and other "land development" programs are slowly but steadily altering grizzly habitat. While Montana officials can moderate this loss to a degree by allowing the bear population to expand into currently unoccupied habitats and by managing occupied habitats to meet their needs, we as a people will ultimately have to forego some things to allow grizzlies to survive at viable levels. These issues will be decided by the citizens of Montana and the nation through the appropriate political and social processes.

Finally, grizzly bears are large and potentially dangerous animals. By their presence, they pose some risk to the human inhabitants of the state and to visitors. Current information shows that this risk is very real, but at a surprisingly low level. Considering all of the people and activities that currently occur in grizzly habitat, and how few injuries or deaths occur, the level of risk is low. In addition, the programs outlined in this plan should allow for management and further minimization of the risks of living with grizzlies.

No environment is totally risk free for people. Through education, understanding, and science-based wildlife management, we the people of Montana and this nation can minimize the risks of injury and/or death from grizzlies.

GLOSSARY

Abbreviations and Acronyms

ARM – Administrative Rules of Montana
ATV – All terrain vehicle
BLM – Bureau of Land Management
CEM – Cumulative Effects Model
COY – Cubs of the Year
CYE – Cabinet-Yaak Ecosystem
DNA – Deoxyribonucleic acid – the molecule that encodes genetic information
DNRC – Department of Natural Resources and Conservation
DPEIS – Draft Programmatic Environmental Impact Statement
EIS – Environmental Impact Statement
FPEIS – Final Programmatic Environmental Impact Statement
FWP – Montana Department of Fish, Wildlife and Parks
GIS – Geographic Information System
GYE – Greater Yellowstone Ecosystem (includes all lands in or adjacent to Yellowstone National Park)
IBA – International Association for Bear Research and Management
IGBC – Interagency Grizzly Bear Committee
MCA – Montana Codes Annotated
MDOT – Montana Department of Transportation
MEPA – Montana Environmental Policy Act
MFGC – Montana Fish and Game Commission
MFWPC – Montana Fish, Wildlife & Parks Commission
MOU – Memorandum of Understanding
NCDE – Northern Continental Divide Ecosystem
NEPA – National Environmental Policy Act
PCA – Primary Conservation Area
PEIS – Programmatic Environmental Impact Statement
USC – United States Congress
USFS – United States Forest Service
USFWS – United States Fish and Wildlife Service

Selected definitions

Adaptive management: a model for grizzly bear conservation and management that uses and incorporates information from ongoing monitoring and research to direct appropriate conservation action. Specifically, it is the integration of program design, management, and monitoring to systematically test assumptions in order to *adapt* and *learn*. The model incorporates resource objectives, monitoring protocols to test assumptions, evaluation of predicted outcomes, a decision-making process, and clear communication of results.

Conflict bear: any grizzly bear involved in bear/human conflicts resulting in agency management activities.

Cumulative effects model: model that evaluates the cumulative effects of human activities on grizzly bears and their habitat; cumulative effects result from individually minor yet collectively significant uses occurring over space and time.

Depredation: damage to any property including agricultural products.

Habitat effectiveness: reflects an area's actual ability to support bears i.e. it is the value of a landscape to bears in the presence of human activities.

Food conditioned: a bear that has received a significant reward of non-natural foods such as garbage, camp food, pet food, grain, corn, or processed livestock food and persistently seeks those foods.

Habituated: when a bear does not display avoidance behavior around humans or in human use areas such as camps, residential areas, or along roads.

Lethal control: management actions that result in the death of a grizzly bear.

Natural aggression: defense of young, food, during a surprise encounter, or self-defense.

Non-lethal control: a variety of management activities intended to avert or resolve a conflict situation without killing the grizzly bear in question.

Primary conservation area: area that contains the minimum seasonal habitat components needed to support a recovered grizzly bear population. Should a population recover, a PCA for this population would be delineated that may differ to the original recovery zone, pending further analysis.

Relocation: the capture and movement of a bear involved in a conflict with humans or their property by management authorities to a remote area away from the conflict site.

Repeat offense: the involvement of a bear that has been previously relocated in a conflict situation or continues to repeat a behavior that constituted a human/bear conflict.

Removal: the capture and placement of a bear in an authorized public zoological or research facility or destruction of the bear. Removal can also involve killing the bear through active measures in the wild when it is not otherwise possible to capture the bear.

Sustainable off-take: maintenance of the bear population at a level where the number of deaths does not exceed the sustainable mortality level.

Unacceptable aggression: grizzly bear behavior that includes human injury or death when unprovoked by surprise, food, etc., approaching humans or human use areas, such as camps, in an aggressive way, or aggressive behavior when the bear is also unprovoked by self-defense, defense of cubs, defense of foods, or in a surprise encounter.

LITERATURE USED TO ASSIST IN PREPARATION OF THIS PLAN

- Administrative Rules of Montana (ARM) 36.11.431 – ARM 36.11.434. 2003. Threatened and endangered species – grizzly bear, grizzly bear Management on blocked lands, grizzly bear management on other western Montana lands, grizzly bear management on eastern Montana lands.
- Albert, D. M., T. R. Bowzer and S. D. Miller. 2001. Effort and success of brown bear hunters in Alaska. *Wildlife Society Bulletin* 28: 501-508.
- Aune, K., Stivers, T. and M. Madel. 1985. Rocky Mountain Front grizzly bear monitoring and investigation. Montana Department of Fish, Wildlife and Parks, Helena. 138 pp.
- Bader, M. 2000. Spatial needs of grizzly bears in the U.S. Northern Rockies. Alliance for the Wild Rockies. Special Report No. 10. Missoula, Montana. 28 pp.
- Bader, M. 2000. Distribution of grizzly bears in the U.S. Northern Rockies. *Northwest Science* 74: 325-334.
- Berger, J., J.E. Swenson and I. Persson. 2001. Recolonizing carnivores and naïve prey: conservation lessons from Pleistocene extinctions. *Science* 291:1036-1039.
- Blackfeet Indian Reservation. 1998. Draft bear management plan and guidelines for bear management on the Blackfeet Indian reservation, Montana.
- Bob Marshall Wilderness Complex Interdisciplinary Team, J. J. Claar, Coordinator. 1993. Grizzly bear sanitation strategy, Northern Continental Divide Ecosystem, draft final report, to NCDE manager's subcommittee.
- Bodurtha, T. 2004. Draft BNSF habitat conservation plan for grizzly bears. U.S. Fish and Wildlife Service, Kalispell, Montana.
- Boyce, M. S. and J. S. Waller. 2003. Grizzly bears for the Bitterroot: predicting potential abundance and distribution. *Wildlife Society Bulletin* 31:670-683.
- Bulte, E. H. and D. Rondeau. 2005. Why compensating wildlife damages may be bad for conservation. *Journal of Wildlife Management* 69:14-19.
- Caughley, G. 1994. Directions in conservation biology. *Journal of Animal Ecology* 63:215-244.
- Clevenger, A. P., B. Chumszyz and K. E. Gunson. 2001. Highway mitigation fencing reduces wildlife-vehicle collisions. *Wildlife Society Bulletin* 29:646-653.
- Confederated Salish and Kootenai Tribes. 1981. Flathead Indian Reservation Grizzly Bear Management Plan, Flathead Indian Reservation, Montana.
- Confederated Salish and Kootenai Tribes. 2000. Flathead Indian Reservation Forest Management Plan, Flathead Indian Reservation, Montana.

- Confederated Salish and Kootenai Tribes. Mission Mountain Tribal Wilderness Management Plan, Flathead Indian Reservation, Montana.
- Confederated Salish and Kootenai Tribes. Mission Mountain Buffer Management Plan, Flathead Indian Reservation, Montana.
- Conover, M. R. 2001. Effect of hunting and trapping on wildlife damage. *Wildlife Society Bulletin* 29:521-532.
- Conover, M.R. and D. V. Conover. 2001. For whom do we manage wildlife: the resource, society, or future generations. *Wildlife Society Bulletin* 29: 675-679.
- Craighead, F.L., M.E. Gilpin and E.R. Vyse. 1999. Genetic considerations for carnivore conservation in the Greater Yellowstone Ecosystem. Pages 285-321 in T.W. Clark, A.P. Curlee, S.C. Minta, and P.M. Kareiva, editors, *Carnivores in Ecosystems: the Yellowstone Experience*. Yale University Press.
- Craighead, L. 2000. Regional corridors. A comparison of the Walker-Craighead reserve model with the Merrill-Mattson CERI reserve model. Craighead Environmental Research Institute. Bozeman, Montana.
- Curtin, C. G. 2002. Integration of science and community-based conservation in the Mexico/U.S. borderlands. *Conservation Biology* 16: 880-886.
- Davradou, M. and G. Namkoong. 2001. Science, ethical arguments, and management in the preservation of land for grizzly bear conservation. *Conservation Biology*, 15: 570-577.
- Dobson, A. et al. 1999. Corridors: reconnecting fragmented landscapes. Pages 129-170 in M.E. Soule and J. Terborgh (eds) *Continental Conservation: Scientific Foundations of Regional Reserve Networks*. Island Press.
- Dood, A. R., R. B. Brannon and R. D. Mace. 1986. Final programmatic environmental impact statement, the grizzly bear in northwestern Montana. Montana Department of Fish, Wildlife and Parks. 287 pp.
- Dood, A. R. and H. I. Pac. 1993. Five year update of the programmatic environmental impact statement, the grizzly bear in northwestern Montana 1986-1990. Montana Department of Fish, Wildlife and Parks. 228 pp.
- Edwards, V. 2003. Northern Continental Divide Ecosystem front country survey of attractant sites, 2002-2003. Brown Bear Resources, Inc., Missoula, Montana.
- Edwards, V. 2003. Let's talk trash: the maintenance and use of bear-resistant dumpsters in Lincoln County, Montana. University of Montana, Missoula, Montana.
- Frye, S. J. and L. F. Marnell. 2004. Bear management plan, Glacier National Park. Glacier National Park, Montana.

- Garsheilis, D. L., M. L. Gibeau and S. Herrero. 2005. Grizzly bear demographics in and around Banff National Park and Kananaskis Country, Alberta. *Journal of Wildlife Management* 69:277-297.
- Graves, T. and Reams, V. 2001. Record of Snowmobile effects on wildlife: monitoring protocols workshop, Denver, Colorado. 110 pp.
- Guide Outfitter Association of British Columbia. Grizzly bears in British Columbia: the real story. 2000. Guide Outfitter Association of British Columbia. 17 pp.
- Gunther, K.A., et al. 1999. Grizzly bear-human conflicts, confrontations, and management actions in the Yellowstone Ecosystem. Interagency Grizzly Bear Committee. 62 pp.
- Harris, R. B., W. A. Wall and F. W. Allendorf. 2002. Genetic consequences of hunting: what do we know and what should we do? *Wildlife Society Bulletin* 30: 634-643.
- Henry, G. V. and Muchash. 2000. Red wolf reintroduction lessons regarding species restoration. Red wolf management series. Technical Report no. 12. 17 pp.
- Herrero, S, T. Smith, T. D. DeBruyn, K. Gunter and C. A. Matt. 2005. From the Field: brown bear habituation to people – safety, risks, and benefits. *Wildlife Society Bulletin* 33:
- Hood, G. A. and K. L. Parker. 2001. Impact of human activities on grizzly bear habitat in Jasper National Park. *Wildlife Society Bulletin* 28: 624-638.
- Horejsi, B. L. 2004. Grizzly bears in southwest Alberta; A vision and plan for population and habitat recovery. Western Wildlife Environments Consulting Ltd. Calgary, Alberta, Canada.
- Horejsi, B.L. 2002. Science and thresholds versus reality: Grizzly bear population and habitat recovery in southwest Alberta. Pgs. 21-225 In. Eds: Taylor, L., Martin, K., Hik., D., A. Ryall. *Proceedings, Ecological and earth sciences in mountain areas conference*, Banff, Alberta. Environment Canada.
- Hunt, C. Date Unknown. Bear shepherding guidelines for safe and effective treatment of human-bear conflicts. Wind River Bear Institute, Heber City, Utah.
- Infield, M. 2001. Cultural Values: a forgotten strategy for building community support for protected areas in Africa. *Conservation Biology* 15: 800-802.
- Interagency Grizzly Bear Committee. 1987. Grizzly bear compendium. Bozeman, Montana.
- Interagency Grizzly Bear Committee. 1986. Interagency grizzly bear guidelines. Missoula, Montana. 100 pp.
- Interagency Grizzly Bear Committee. 1998. Interagency grizzly bear committee taskforce report: grizzly bear motorized/access management. Missoula, Montana. 8 pp.
- Interagency Rocky Mountain Front Wildlife Monitoring and Evaluation Program. 1987. Management guidelines for selected species. Rocky Mountain Front studies.

- Johnson, S. 2000. Building a species recovery program on trust. *Conservation biology in Practice*. Pages 35-37.
- Kasworm, W. and T. Manley. 1988. Grizzly bear and black bear ecology in the Cabinet Mountains of northwest Montana. Montana Department of Fish, Wildlife and Parks, Helena.
- Karworm, W., I. T. and C. Servheen. 1998. Grizzly bear recovery efforts in the Cabinet/Yaak ecosystem. *Ursus* 10: 147-153.
- Kasworm, W. and C. Servheen. 2004. Habitat fragmentation effects on grizzly bear and black bear movement and connectivity in the Kootenai River Valley. U.S. Fish and Wildlife Service, Libby, Montana.
- Kasworm, W., Carriles, H., Radandt, T. and C. Servheen. 2005. Cabinet-Yaak grizzly bear recovery area 2004 research and monitoring progress report. U.S. Fish and Wildlife Service, Missoula, Montana. 69 pp.
- Keegan, C. E. and T.A. Morgan. 2005. Montana's timber and forest products industry situation, 2004. The University of Montana-Missoula, Bureau of Business and Economic Research, Missoula, Montana. 10 pp.
- Lacy, R. C. 1997. Importance of genetic variation to the viability of mammalian populations. *Journal of Mammalogy* 78: 320-335.
- Lande, R. 1993. Risks of population extinction from demographic and environmental stochasticity and random catastrophes. *The American Naturalist* 142: 911-927.
- Lenton, S., E. John and J. Perez Del Val. 2000. A single non-parametric GIS model for predicting species distribution: endemic birds in Bioko Island West Africa. *Biodiversity and Conservation* 9:869-885.
- Lewis, M.S. and R. Paige. 2006. Selected results from a 2006 survey of registered off-highway vehicle (OHV) owners in Montana. Montana Fish, Wildlife and Parks: Responsive Management Unit research Summary No. 21. 4 pp.
- Linnell, J., J. Swenson and R. Andersen. 2000. Conservation of biodiversity in Scandinavian boreal forests: large carnivores as flagships, umbrellas, indicators, or keystones? *Biodiversity and Conservation* 9:857-868.
- Mace, R. D. and J. S. Waller. 1998. Demography and population trend of grizzly bears in the Swan Mountains, Montana. *Conservation Biology* 12: 1005-1016.
- McLellan, B. 2004. Rates and causes of grizzly bear mortality in the United States and Canadian portions of the Flathead drainage, British Columbia. Forest Sciences Research Branch, Revelstoke, British Columbia, Canada.
- McLellan, B. N. 2005. Sexually selected infanticide in grizzly bears: the effects of hunting on cub survival. *Ursus* 16: 141-156.

- McLellan, B. N and F. W. Hovey. 2001. Habitats selected by grizzly bears in a multiple use landscape. *Journal of Wildlife Management* 65: 92-99.
- McLellan, B. N. and F. W. Hovey. 2001. Natal Dispersal of grizzly bears. *Canadian Journal of Zoology* 79: 838-844.
- Meadow, R., R. P. Reading, M. Phillips, M. Mehringer and B. J. Miller. 2005. The influence of persuasive arguments on public attitudes towards a proposed wolf restoration in the southern Rockies. *Wildlife Society Bulletin* 33(1).
- Messmer, T.A., D. Reiter and B.C. West. 2001. Enhancing wildlife sciences' linkage to public policy: lessons from the predator-control pendulum. *Wildlife Society Bulletin* 29: 1253-1259.
- Miller, S. D. 2001. Rates of brown bear, *Ursus arctos*, cub survivorship in hunted and unhunted portions of Alaska (in press).
- Miller, S.D., R. A. Sellers and J. A. Keay. 2003. Effects of hunting on brown bear cub survival and litter size in Alaska. *Ursus* 14: 130-152.
- Miller, S. D., G. C. White, R. A. Sellers, H. V. Reynolds, J. W. Schoen, K. Titus, V. G. Barnes, Jr., R. B. Smith, R. R. Nelson, W. B. Ballard and C. C. Schwartz. 1997. Brown and black bear density estimation in Alaska using radiotelemetry and replicated mark-resight techniques. *Wildlife Monographs*. 133.
- Miller, S. D. 1990. Population management of bears in North America. *International Conference on Bear Research and Management* 8: 357-373.
- Miller, S. D. 1993. Brown bears in Alaska: a statewide management report. Alaska Department of Fish and Game. *Wildlife Technical Bulletin* 11. 40 pp.
- Miller, S. D. Impact of increased bear hunting on survivorship of young bears. *Wildlife Society Bulletin* 18: 462-467.
- Miller, S.D. 1990. Denning ecology of brown bears in south-central Alaska and comparisons with a sympatric black bear population. *International Conference on Bear Research and Management*. 8: 279-298.
- Mincher, B. J. 2000. Issues affecting grizzly bear management in the Greater Yellowstone Ecosystem. Unpublished Report. 17 pp.
- Montage, J. M., M. E. Paterson and B. Sutton (date unknown). Political and social viability of predator compensation programs in the west, final project report. Wildlife Biology Program, School of Forestry, University of Montana, Missoula, Montana.
- "Montana," Microsoft® Encarta® Online Encyclopedia 2005. <http://encarta.msn.com> © 1997-2005 Microsoft Corporation. Accessed March 2 2006..

- Northern Continental Divide Ecosystem Monitoring Team. 2004. Draft Interagency Population and Habitat Monitoring Plan for Grizzly Bears in the Northern Continental Divide Ecosystem. 37 pp.
- Noss, R. F., H. B. Quigley, M. G. Hornocker, T. Merrill and P.C. Paquet. 1996. Conservation biology and carnivore conservation in the Rocky Mountains. *Conservation Biology* 10: 939-963.
- Olson, G. and I. Trowbridge. 1990. Blackleaf wildlife management area management plan. Montana Department of Fish, Wildlife and Parks.
- Pac, H. I., and A. R. Dood. Five-year update of the programmatic environmental impact statement, the grizzly bear in northwestern Montana, 1991-1995. Montana Department of Fish, Wildlife and Parks. 53 pp.
- Peek, J., J. Beecham, D. Garshelis, F. Messier, S. Miller and D. Strickland. 2003. Management of grizzly bears in British Columbia: a review by an independent scientific panel. Minister for Water, Land and Air Protection, Government of British Columbia, Victoria, British Columbia, Canada.
- Pelletier, K. (date unknown). Managing private land in Swan Valley linkage zones for grizzly bears and other wildlife. Swan Valley Linkage Zone Working Group.
- Primm, S. and S. M. Wilson. 2004. Re-connecting grizzly bear populations: prospects for participatory projects. *Ursus* 15 Workshop Supplement: 104-114.
- Proctor, M. F., McLellen, B. N., Strobeck, C. and R. M. R. Barclay. In press. Genetic analysis reveals demographic fragmentation of grizzly bears yielding vulnerably small populations.
- Proctor, M.F., C. Servheen, S. Miller, W. Kaseworm, and W. Wakkinen. 2004. A comparative analysis of management options for grizzly bear conservation in the U.S.-Canadian trans-border areas. *Ursus* 15: 145-160.
- Riley, S. J., D. J. Decker, L. H. Carpenter, J. F. Organ, W. F. Siemer, G. F. Mattfeld and G. Parsons. 2002. The essence of wildlife management. *Wildlife Society Bulletin* 30: 585-593.
- Rubbert, T. 2006. Hiking with Grizzlies. Riverbend Publishing.
- Schwartz, C., S. Miller and M. Haroldson. 2001. Grizzly/brown bear. In: *Wild Mammals of North America* (in prep.)
- Schwartzman, S., A. Moreira and D. Nepstad. 2000. Rethinking tropical forest conservation: perils in parks. *Conservation Biology* 14: 1351-1357.
- Servheen, C, J. S. Waller and P. Sandstrom. 2001. Identification and management of linkage zones for grizzly bears between the large blocks of public land in the Northern Rocky Mountains. U.S. Fish and Wildlife Service. 87 pp.

- Sowka, P. 2005. Living with predators resource guide series – predator behavior modifications for professionals. Second Edition. Produced by the Living with Wildlife Foundation in cooperation with Montana Department of Fish, Wildlife and Parks, living with Predators Project. Swan Valley, Montana.
- Sowka, P. 2005. Living with predators resource guide series – recreating in bear, wolf and mountain lion country. Second Edition. Produced by the Living with Wildlife Foundation in cooperation with Montana Department of Fish, Wildlife and Parks, living with Predators Project. Swan Valley, Montana.
- Sowka, P. 2005. Living with predators resource guide series – techniques and refuse management options for residential areas, campgrounds and group-use facilities. Second Edition. Produced by the Living with Wildlife Foundation in cooperation with Montana Department of Fish, Wildlife and Parks, living with Predators Project. Swan Valley, Montana.
- Spanski, G. T. 2001. Inventory of mines and mining related facilities in Idaho and western Montana active from 1997 through 2000. Preliminary Open File Report 01-129 for U.S. Department of Interior and U.S. Geological Survey. 14 pp.
- State of Montana. Code Annotated 87-3-130. Taking of wildlife to protect persons or livestock.
- State of Montana. Montana Department of Fish, Wildlife and Parks. 2002. Grizzly bear management plan for southwestern Montana 2002-2012. Montana Department of Fish, Wildlife and Parks, Helena, Montana.
- State of Montana. Montana Department of Fish, Wildlife and Parks, Region Four. 1988. Rocky Mountain Front Grizzly Bear Management Program.
- State of Montana. Montana Department of Fish, Wildlife and Parks, Region Two. 2004. Living with Predators Project.
- State of Montana. Administrative Rules of Montana. Section 12.9 103 grizzly bear policy.
- State of Montana. Administrative Rules of Montana. Section 36.11.431 Threatened and endangered species – grizzly bear.
- State of Montana. Administrative Rules of Montana. Section 36.11.432 Grizzly bear management on blocked lands.
- State of Montana. Administrative Rules of Montana. Section 36.11.432 Department of Natural Resources and Conservation.
- State of Montana. Administrative Rules of Montana. Section 36.11.433 grizzly bear management on other western Montana lands.
- State of Montana. Administrative Rules of Montana. Section 36.11.434 grizzly bear management on eastern Montana lands.

- Stritthold, J.R. and D. A. Dellasala. 2001. Importance of roadless areas in biodiversity conservation in forested ecosystems: case study of the Klamath-Siskiyou Ecoregion of the United States. *Conservation Biology* 15: 1742-1754.
- Summerfield, B., W. Johnson and D. Roberts. 2004. Trends in road development and access management in the Cabinet-Yaak and Selkirk grizzly bear recovery zones. *Ursus* 15 Workshop Supplement: 115-122.
- Teddy Roosevelt Conservation Alliance. Square Deal Initiative #1. The Square Dealer Vol. 1, Issue 2.
- Thompson, S, Jonkel, J. and P. Sowka. 2005. Living with predators resource guide series – practical fencing resource guide: controlling predators. Produced by the Living with Wildlife Foundation in cooperation with Montana Department of Fish, Wildlife and Parks, Living with Predators Project. Swan Valley, Montana.
- Treves, A. and K. U. Karanth. 2003. Human-carnivore conflict and perspectives on carnivore management worldwide. *Conservation Biology* 17: 1491-1499.
- U. S. Forest Service. 1994. Food storage special order LC00-18, occupancy and use restrictions, Northern Continental Divide Ecosystem, Flathead, Lewis and Clark, Lolo, and Helena National Forests. USDA Forest Service.
- U. S. Forest Service. 1986. Bitterroot National Forest Land Resource Management Plan. Helena National Forest, Montana.
- U. S. Forest Service. 1986. Flathead National Forest Land Resource Management Plan. Flathead National Forest, Montana.
- U. S. Forest Service. 1986. Helena Forest Land Resource Management Plan. Helena National Forest, Montana.
- U. S. Forest Service. 1986. Lewis and Clark National Forest Land Resource Management Plan. Lewis and Clark National Forest, Montana.
- U. S. Forest Service. 1986. Lolo Forest Land Resource Management Plan. Lolo National Forest, Montana.
- U. S. Forest Service. 1987. Kootenai National Forest Land Resource Management Plan. Kootenai National Forest, Montana.
- U. S. Forest Service. 1995. Forest plan amendment #19, allowable sale quantity and objectives and standards for grizzly bear habitat management, decision notice. U.S. Forest Service, Flathead National Forest, Kalispell, Montana.
- U. S. Forest Service. 1995. Forest plan amendment #19, allowable sale quantity and objectives and standards for grizzly bear habitat management, amended environmental assessment. U. S. Forest Service, Flathead National Forest, Kalispell, Montana.

- U. S. Forest Service. 2002. Biological opinion on the effects of the Spotted Bear River trailheads project on grizzly bears. Helena, Montana.
- U.S. Forest Service. 2002. Final environmental impact statement for access management within the Selkirk and Cabinet-Yaak grizzly bear recovery zones. U.S. Forest Service, Libby Montana.
- U. S. Forest Service. 2004. 2003 LRMP amendment 19 monitoring report. U. S. Forest Service, Flathead National Forest, Kalispell, Montana.
- U. S. Fish and Wildlife Service. 1993. Grizzly bear Recovery Plan. Missoula, Montana. 181pp.
- U. S. Fish and Wildlife Service. 1995. Biological opinion and amendment 19 to the Flathead National Forest plan. Helena, Montana.
- U. S. Fish and Wildlife Service. 2003. Identification and management of linkage zones for grizzly bears between large blocks of public land in the northern Rocky Mountains by C. Servheen, J. S. Waller and P. Sandstrom. Missoula, Montana. 87 pp.
- U. S. Fish and Wildlife Service. 2004. Biological Opinion for the Kootenai, Idaho Panhandle and Lolo National Forest Land and Resource Management Plans Amendment for Motorized Access Management within the Selkirk and Cabinet-Yaak Grizzly Bear Recovery Zones. U.S. Fish and Wildlife Service, Upper Columbia Fish and Wildlife Office, Spokane, Washington and Montana Field Office, Kalispell, Montana. 163 pp.
- U. S. Fish and Wildlife Service. 2005. Montana DNRC Forested Trust Land Habitat Conservation Plan, Draft Grizzly Bear Conservation Strategy. U. S. Fish and Wildlife Service and Montana Department of Natural Resources and Conservation Lands, Montana.
- Wakkinen, W. L. and W. F. Kasworm. 2004. Demographics and population trends of grizzly bears in the Cabinet-Yaak and Selkirk ecosystems of British Columbia, Idaho, Montana, and Washington. *Ursus* 15 Workshop Supplement: 65-75.
- Waller, R. and L. Craighead. 1997. Analyzing wildlife movement corridors in Montana using GIS. Proceedings of the International ESRI Users Conference.
- Wilson, S. M. 2004. What's behind grizzly bear conflicts on Rocky Mountain Front ranges. *Wild Guardian*: winter 2004.
- Wilson, S. M., Primm, S. and A. R. Dood. 2006. Beyond Boundaries: challenges and opportunities for grizzly bear management and conservation in Montana. Draft workshop summary report produced by Northern Rockies Conservation Cooperative in cooperation with Montana Fish, Wildlife and Park. 26 pp.
- Willcox, L. and D. Ellenburger. 2000. The bear essentials for recovery. An alternative strategy for long-term restoration of Yellowstone's great bears. Sierra Club grizzly bear ecosystems project. 25 pp.
- Yaffee, S. L. and J. M. Wondolleck. 2000. Making collaboration work! *Conservation Biologist in Practice* 17-25.