

**Appendix A. Grizzly and Black Bear Management Project Statement
From Denali National Park and Preserve's Resource Management Plan
August, 1998**

GRIZZLY AND BLACK BEARS

PROJECT CODE: DENA-N-364.2

SERVICEWIDE ISSUES:

N18	Visitor Use Impacts on Backcountry Park Resources
N24	Human Impacts Within and Adjacent to Park
N16	Biological Impacts of Near-Park Development on Populations of Animals
N20	Lack of Basic Data - Insufficient Understanding of Park Ecosystems and Threats to Them

STATEMENT OF PROBLEM

Present Condition

Denali National Park and Preserve currently receives over 600,000 person days of visitor use per year in an area with grizzly bear (*Ursus arctos*) densities as high as 32 bears/1000km² (Dean 1987, Keay unpublished data). As visitation to Denali continues to increase, so will the potential for impacts to bear populations. Grizzly bears and black bears (*U. americanus*) are unpredictable animals that can seriously threaten human safety (Herrero 1985). In Denali National Park, many people have the opportunity to observe grizzly bears in their natural environment. In 1989, 95% of park visitors using the visitor transportation system were able to observe grizzly bears along the park road (Machlis 1990). The park provides a valuable opportunity for the public to foster an appreciation and understanding of bears. This appreciation and public support could enhance efforts to conserve threatened bear populations in other areas.

Despite the legal protection of grizzly and black bears within the wilderness portion of the park, the bear population continues to face impacts from human activities inside park boundaries and throughout surrounding areas. Within and adjacent to the park, bears must adapt their behavior to a variety of widely dispersed human influences. These influences include garbage dumps, garbage incinerators, food caches, human developments, frontcountry hiking and camping, backcountry hiking and camping, existing and proposed road use, development, and legal and illegal harvest. These influences have potential to

impact movements of bears, bear behavior, and population sex and age structure resulting in an unnatural bear population.

Visitor use in Denali continues to rise. Consequently, the potential for conflict between bears and people is a major concern. Bear-human conflicts result in loss of wild and free ranging bears and could threaten human safety. Bear behavior and ecology is strongly influenced by the motivation to obtain high energy sources of food. The availability of human foods increases as visitor numbers increase. Availability of human food and garbage at campsites, campgrounds, and other areas of human use may attract both black and grizzly bears. Habituation of bears to people by food rewards is the primary factor associated with bear-human conflicts in national parks (Herrero 1985, Herrero and Fleck 1989). Food-conditioned bears may behave aggressively toward people in order to obtain food. Although no human fatalities have occurred in the park and injuries are few, the number of bear-human incidents and encounters is high. In 1996, over 240 bear-human interactions were reported. Incidents involving property damage are an annual occurrence. Factors affecting bear-human conflicts must be investigated. The continued experimental development and implementation of a bear-human conflict management program, by professional biologists and highly trained technicians, is essential to visitor safety and resource protection.

The increase in visitor use over the years has resulted in an increase in vehicular traffic on the park's primary artery. In an attempt to reduce the impact to bears from increased vehicle use, the park established the visitor transportation system in the early 1970's. This is a shuttle bus system, designed to minimize disturbance to wildlife and to maximize wildlife viewing opportunities. It is not clear what impact use of the visitor transportation system has had on bear behavior along the road corridor. It is also impossible to establish biologically-sound use limits with our current level of knowledge.

In addition to the consequences associated with increased visitor use, bears are subject to harvest by subsistence and sport hunters within the 1980 new park additions and outside the park. A great deal of this harvest activity occurs on preserve lands and on state lands immediately adjacent to the park on the south side of the Alaska Range. National Park Service presence in this area prior to 1980 was minimal. Subsequently, the bear activities, population status, and extent of impact from this harvest is not well known.

When dealing with harvested populations, the ability to determine trends in population numbers and reproductive status is critical. Numerous efforts have been made to quantify the bear population within Denali National Park. Currently no method exists for management to readily and consistently obtain up-to-date and accurate numbers.

Current Management Actions and Results

Denali park staff have developed a bear-human conflict management program for the park (Stahlnecker 1994). This program has been the result of over a decade of experience, research, and consultation with other bear biologists. The goals of this program are based on management policies of the National Park Service and legislation which applies specifically to Denali. Specific goals are to (1) maintain the natural processes affecting the genetic integrity, distribution, abundance, and behavior of black and brown bear populations; (2) provide visitor safety by minimizing bear-human conflicts and the resulting personal injuries and property damage; (3) provide opportunities for visitors to understand, observe, and appreciate black and brown bears as part of an intact ecosystem; and (4) minimize management actions considered intrusive to bears. Currently bear management policy meets these goals by stressing preventive management as the first step toward problem resolution. Efforts are focused on identifying and resolving the causes of bear-human conflict through appropriate research, management, and public education.

Research, conducted by a U.S. Geological Survey-Biological Resources Division (USGS-BRD) research biologist, is underway to determine the status and trend of grizzly bears in the park and the primary factors affecting grizzly bear population dynamics. The research will also investigate an effective method to monitor populations throughout the park. Results of this research will assist in answering management questions concerning bear densities and population characteristics. Radio collars are used in this research.

Management of bears and people in Denali National Park should be based on sound scientific principles. Seasonal habitat selection, availability of natural foods, and distribution affect population dynamics and patterns of bear-human interactions. Scientific research is necessary to understand the relationship between bears and humans within the park and formulate management strategies to minimize conflicts. Monitoring population dynamics, movements, and density of black and brown bears, and the effects of hunter harvest, will provide information critical to the management of Denali National Park as a functioning ecosystem. Knowledge of population and behavioral change is needed to assist studies in progress on bear ecology, predator prey relationships, and the effects of traffic on wildlife use of the road corridor.

RECOMMENDED ACTIONS

A. Program Administration and Planning

N-364.201: Convert the Seasonal Wildlife Management Technician Positions to Permanent (Subject to Furlough) and Create an Additional Position

Extended seasons, from four months to seven months, for the wildlife technicians would facilitate end of season data entry and analysis, equipment repair and ordering, and report writing. Bear resistant food containers (BRFCs) would be adequately maintained. The extension of these positions would provide time for monitoring bear-human interactions on the south side of the Alaska Range during the spring snowmachine season, maintenance of a wildlife harvest data base for land adjacent to the park, and conducting bear education programs at local schools. Structuring these positions in such a way would provide continuity, facilitate positive relationships with inholders and local government agencies, and decrease the need to continually train new personnel in a highly complex and technical operation.

As visitor use activities continue to increase on the south side of the Alaska Range, one additional wildlife management technician will be needed to deal with the added bear-human conflicts that may occur.

N-364.202: Develop Cooperative Planning Agreement With Local Government Agencies

Contacts and agreements will be developed with the Denali Borough, Department of Transportation, Denali State Park personnel, and state regulatory agencies to implement food and garbage handling regulations and ordinances in areas outside the park and on private lands within the park. All regulations would be established to ensure no impact to the natural behavior of bears residing in the park. Methods would be developed to share information on the location and nature of bear problems and bear human interactions. If biological research indicates that subsistence or sport hunting activities within the 1980 park or preserve additions or on state lands adjacent to the park have an adverse impact on the bear population within the park, the Federal Subsistence Board or Alaska Board of Game would be encouraged to modify bear hunting regulations and bag limits on lands within and surrounding the park.

N-364.203: Maintain Adequate Training for the Wildlife Management Personnel

Bear control actions would be enhanced by the availability of sufficiently trained personnel and properly maintained equipment to safely and efficiently handle problem bears. Wildlife management personnel will be knowledgeable of bear behavior, shotgun qualified, and trained in the use of aversive conditioning techniques. They will be proficient in chemical immobilization and handling of bears. This will be accomplished by sending personnel to training with other parks or agencies as necessary. The park will coordinate with USGS-BRD research to maintain one permanent employee at a fully-trained park practitioner level. Personnel with adequate training and authorization to immobilize bears must be

available at all times to respond to bear incidents. A quick response to problem bear situations is critical to a successful management program.

N-364.204: Update the Bear-Human Conflict Management Plan Annually

The bear-human conflict management plan would be reviewed annually and updated as necessary to reflect areas of concern and current bear management situations. The plan would address evolving issues such as increasing activity and development on the south slope of the Alaska Range. Planning would encompass methods to determine and measure wildlife harassment by snowmachine users. The implementation of closures around critical areas such as den and kill sites would also be addressed on a parkwide basis.

N-364.205: Publish Summary of Bear/Human Conflict Program

Park staff has gained important experience and data on bear-human conflicts. This information should be synthesized and published to assist others with bear management programs.

B. Research

N-364.211: Coordinate Black and Brown Bear Research Program

Ongoing grizzly and black bear research will be supported by the park and encouraged to continue. Research efforts would be expanded to develop a park-wide, comprehensive, problem-oriented research program to provide management with knowledge of black and grizzly bear population characteristics. Emphasis would be placed on studying distribution and movements, behavior, human-bear interrelationships, and the impacts of management programs on the bear population within the park. Specific information will include seasonal habitat selection by bears in areas along the park road, in the backcountry, and south of the Alaska Range and the identification of areas with a high potential for bear-human conflicts. A habitat model would be developed to provide a more detailed picture of bear use and potential habitat. Some specific research problems include:

1. Integrate bear research with ongoing predator-prey studies and incorporate the role of all major predators and major prey species, taking a community approach to studying resource interactions throughout the park.
2. Determine what effect human activity, including garbage management, consumptive use, and backcountry hiking, is having on the bear population and movement patterns.
3. Model predator-prey and predator-predator interactions.

4. Determine the appropriateness, impacts to the bear population, and potential safety hazards associated with proposed in-park and near-park development.

N-364.212: Develop Bear Monitoring Protocols

Develop a monitoring protocol for evaluating bear population status and trend along the road corridor, the Stampede area, the south district, and in the preserve.

N-364.213: Recover Historic Data for Inclusion in Park Data Bases

Historic records from Murie, Dean, other researchers, bus drivers, wildlife observation cards, case incident reports, and interviews would be used to develop a picture of past wildlife population dynamics and distributions, and habitat use, along the road corridor. Whenever possible these data would be incorporated into park data bases and the park geographic information system (GIS). A document would also be prepared compiling the historic records

N-364.214: Investigate Road Use Disturbance to Bear Populations

See Road Use Impacts to Natural Resources DENA-I-670.

N-364.215: Develop Aversive Conditioning Techniques

A technique for delivering a capsicum-based spray, triggered by remote control, would be developed with professional-level oversight and direction by a Wildlife Biologist. Additional techniques will be developed and/or evaluated as opportunities occur.

N-364.216: Investigate Habitat Use and Population Status of Bears Occupying the South Side of Denali

In cooperation with the Alaska Department of Fish and Game and Denali State Park, habitat use and population status of grizzly and black bears on the south side of Denali would be investigated.

N-364.217: Support Independently Funded Bear Research Projects

The service will support independently funded bear research projects in Denali National Park by private and public organizations, agencies, and universities. The park would provide temporary housing and logistical support for field and laboratory work (Research Administration and Management DENA-I-410).

C. Mitigation

N-364.221: Remove Human Foods

The availability of BRFCs would be maintained to insure an adequate supply for all backcountry units. A BRFC program would be developed on the south side of the Alaska Range as the need arises due to increased visitor use. New BRFCs would be purchased each year to maintain a high quality stock. Bear-proof lockers would be maintained in developed campgrounds. Bear-proof food storage would be required at all NPS field camps. A proactive effort would be made to encourage local businesses inside and outside the park to conform with state regulations regarding food and garbage storage. Technical assistance would be provided to inholders and local businesses in developing secure food and garbage handling practices.

N-364.222: Implement Closure Procedure as Required in Bear-Human Conflict Management Plan

Based on procedures outlined in the bear-human conflict management plan and on monitoring results, closures would be implemented around den and kill sites as necessary. Implementation of necessary closures would counter harmful human disturbance of active bear dens and stop human activity from interfering with active kill sites. A commitment to long term, extensive monitoring of bear activity and den sites would be essential to implementing this mitigation action (DENA-N-364.205, DENA-N-364.231, and DENA-N-364.232).

N-364.223: Continue Current Experimental Aversive Conditioning

The wildlife management technicians would continue to aggressively use experimental aversive conditioning techniques under the oversight of a professional Wildlife Biologist. New techniques would be developed with professional-level oversight, evaluation, and direction (DENA-N-364.215). All actions would be carefully documented and evaluated to determine their effectiveness.

N-364.224: Develop Interagency Habitat Linkages

Denali National Park and Preserve biologists would coordinate with ADF&G and other adjacent land management agencies toward developing habitat linkages which would ensure a large, healthy, contiguous population of grizzly bears and black bears into the future.

D. Monitoring

N-364.231: Maintain Adequate Parkwide Monitoring of Human-Bear Encounters and Incidents

All visitors would be encouraged to report any bear incident to a uniformed National Park Service employee. Uniformed employees would interview the witness/victim and complete a bear information management system (BIMS) form used to monitor individual bears, bear activity, and bear management actions. The wildlife management technicians would provide training to NPS staff on the use of these forms. A computerized bear information and management system would be maintained to aid in the analysis and evaluation of the park's bear management program.

A monitoring system would be implemented to begin evaluating the effect of snowmachine use on wildlife during March and April on the south side of the Alaska Range. Efforts would also be made to obtain bear-human interaction data from the south district.

The wildlife technicians would record the locations of bear-human encounters and incidents as universal transverse mercator (UTM) coordinates suitable for entry in the park GIS.

N-364.232: Implement Annual Bear Monitoring Program

A technique would be developed (DENA-N-364.212) and conducted on a regular basis to gain information on bear population status and trends including densities, numbers, distribution, composition, age class, and productivity. Attempts would be made to duplicate previous survey efforts to allow comparability of data. Survey efforts would be coordinated with ADF&G Biologists to ensure complete and accurate reporting of population status within and adjacent to the park.

Data from surveys in the preserve lands would be used by park managers to evaluate sport harvest effects on bear populations. Data may be used to support changes in annual season and bag limit regulations as necessary.

N-364.233: Update Bear Information Management System Data Base

The suitability of data from the late 1970's to 1992 would be evaluated and added to the BIMS data base if appropriate. Where possible, the locations of past bear interactions would be recorded as UTM coordinates suitable for entry in the park GIS.

N-364.234: Track Alaska Dept. of Fish and Game (ADF&G) and US Fish and Wildlife Service Bear Management Decisions and Harvest Data on Adjacent Lands and in the Preserve

All bear management decisions would be monitored and input would be provided as appropriate. A data base would be maintained of wildlife harvest on lands adjacent to the park and in the preserve. An effective dialogue would be established with ADF&G staff and users to ensure data quality and continuity.

N-364.235: Gather Known Bear Data for South District

The wildlife technicians would monitor and gather data on den locations, concentrations of wildlife, and kill sites in the south district. The information sources would include local residents and users, and historic records and reports.

N-364.236: Implement Monitoring Protocol for Predation Events

N-364.237: Implement Berry Production Monitoring Protocol

N-364.238: Monitor Human Use Patterns

Human use activities, particularly backcountry use, would be tracked and analyzed on a regular basis to assist in determining areas with high potential for bear-human interactions.

E. Interpretation

N-364.241: Maintain Adequate Level of Public Information

Information about black and grizzly bears would be distributed throughout the park. All visitors obtaining campground permits or backcountry use permits will be given verbal and written warnings about black and grizzly bears. Adequate staff would be available at the visitor access center backcountry desk to provide information and record reports of bear-human interactions. An informative article about bear behavior and bear-human interactions will be published in the Denali Alpenglow. Interpretive activities will emphasize the potential hazards of bear-human interactions in a uniform fashion. The wildlife management technicians will provide training to the interpreters on disseminating the 'bear warnings'. Signs posted at developed campgrounds will advise campers about proper food and garbage storage. Special training about bear ecology and behavior will be required for all NPS and concession employees. As the wildlife technician function continues to evolve, their ability to assist with these duties will diminish. Funding is needed to provide seasonal interpretive support to accomplish these tasks.

F. Protection

N-364.251: Maintain Adequate Level of Regulation and Closure Enforcement

Protection of bears, their habitat, and public safety would be enhanced by evening campsite and overnight backcountry patrols in areas characteristic of frequent bear-human interactions. Campsites and backcountry areas that experience bear problems would be temporarily closed to protect visitors and minimize the need to manipulate bears. Closure signs would be constructed during the winter so supplies are always available. Protection of bears and their habitat would be enhanced by regulation enforcement throughout the park and preserve. Human disturbances near bear activity sites would be stopped when encountered by park rangers and resource personnel and the violations would be immediately reported to the Ranger Division. The park would utilize the Alaska Department of Public Safety, Division of Fish and Wildlife Protection's Violation Reporting Program to encourage visitors to turn in individuals intentionally harassing or disturbing bears and their prey. Information posters and pamphlets developed by the state for the Turn In Poachers program would be distributed in the park by NPS personnel. As the wildlife technician function continues to evolve, their ability to assist with these duties will diminish. Funding is needed to provide seasonal law enforcement support to accomplish these tasks.

STAFFING & FUNDING (1998)

PROJECT/ACTIVITY	YEAR01 (\$1000/FTE)	YEAR02	YEAR03	YEAR04	SUBTOTAL
PROGRAM ADMINISTRATION					
- Inter-Agency Planning		50.0/0.1	25.0/0.1	25.0/0.1	100.0/0.3
- Training	10.0/0.0	10.0/0.0	10.0/0.0	10.0/0.0	40.0/0.0
RESEARCH					
- Coordinate Research	50.0/0.2	100.0/1.0	100.0/1.0	100.0/1.0	350.0/3.2
- Develop Monitoring Procedures	200.0/0.7	200.0/0.7	200.0/0.7		600.0/2.1
- Recover Historic Data	10.0/0.2				10.0/0.2
- Develop Aversive Conditioning	50.0/0.0	50.0/0.0			100.0/0.0
MITIGATION					
- Remove Artificial Foods	8.0/0.0	8.0/0.0	8.0/0.0	8.0/0.0	32.0/0.0
MONITORING					
- Monitor Bear/Human Interactions	60.0/1.2	60.0/1.2	60.0/1.2	60.0/1.2	240.0/4.8
- Monitor Bear Population		30.0/0.1	30.0/0.1	30.0/0.1	90.0/0.3
- Monitor Predation	10.0/0.2	5.0/0.0	5.0/0.0	5.0/0.0	25.0/0.2
- Monitor Berry Production	15.0/0.2	5.0/0.1	5.0/0.1	5.0/0.1	30.0/0.5
INTERPRETATION					
- Public Information	11.3/0.2	11.3/0.2	11.3/0.2	11.3/0.2	45.2/0.8
PROTECTION					
- Enforcement	14.0/0.3	14.0/0.3	14.0/0.3	14.0/0.3	56.0/1.2
TOTALS	438.3/3.7	543.3/3.7	468.3/3.7	268.3/3.0	1718.2/13.6

COMPLIANCE

All appropriate NEPA, NHPA, and ANILCA compliance documents will be prepared before initiation of any project and will be maintained on file at Denali National Park and Preserve headquarters.

REFERENCES

Bunnell, F. L., and D. E. N. Tait. 1978. Bears in models and in reality-implications to management.

Dean, Frederic C. 1987. Brown bear density in Denali National Park, Alaska, and sighting efficiency adjustment. *Int. Conf. Bear Res. And Manage.* 7:37-43.

Herrero, S. 1985. Bear attacks: their causes and avoidance. N. Lyons Books/ Winchester Press, Piscataway, N.J. 287pp.

Herrero, S. 1989. The role of learning in some fatal grizzly bear attacks on people. Pages 9-14 in M. Bromley, ed. *Bear-People Conflicts: Proceedings of a Symposium on Management Strategies*. Northwest Territory, Department of Renewable Resources, Yellowknife.

Herrero, S., and F. Fleck. 1989. Injury to people inflicted by black, grizzly, and polar bears: recent trends and new insights. *International Conference on Bear Research and Management*, 8:25-35.

Jope, K. L. 1985. Implications of grizzly bear habituation to hikers. *Wildlife Society Bulletin*, 13:32-37.

Machlis. 1990. Denali National Park Visitor survey. Idaho State University, Moscow, ID.

Mattson, D. J. 1989. Human impacts on bear habitat use. *International Conference on Bear Research and Management*, 8:33-56.

Mattson, D. J., R. R. Knight, and B. M. Blanchard. 1987. The effects of developments and primary roads on grizzly bear habitat use in Yellowstone National Park, Wyoming. *International Conference on Bear Research and Management*, 7:259-273.

McLellan, B. N., and D. M. Shackleton. 1989. Immediate reactions of grizzly bears to human activities. *Wildlife Society Bulletin*, 17:269-274.

Meagher, M. and Phillips. 1983. Restoration of natural populations of grizzly and black bears in Yellowstone National Park. *International Conference on Bear Research and Management*, 5:152-158.

Stahlnecker, K.E. 1994. Bear-human conflict management action plan, Denali National Park and Preserve. Unpublished Draft. U.S. Department of the Interior, NPS, Denali National Park and Preserve. Denali Park, Alaska. 45+pp.