PROCEEDINGS OF THE FIFTH WESTERN BLACK BEAR WORKSHOP

HUMAN– BLACK BEAR INTERACTIONS

22-25 February 1994
Provo, Utah

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Sponsored by

Brigham Young University, Department of Zoology
Brigham Young University, Monte L. Bean Museum
Utah Division of Wildlife Resources
Bureau of Land Management
USDA, Forest Service

Brigham Young University Press
Provo 1995

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Julie Jensen, USDA, Forest Service Heber District

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PREFACE

The Fifth Western Black Bear Workshop was held in Provo, Utah on February 22–25, 1994. Wildlife biologists, students, hunters, houndsmen, animal activists, state and federal management and control personnel, private how-to-protect-bears-from-human-food-and-garbage technicians/engineers, and private citizens attended. Included were papers reporting on bear activity and management in various states, how to and where to educate the public about black bears, how to avoid bear problems on public lands and private property, problems of bear management in fragmented habitats, and the plight of young bears orphaned prematurely, and also included lively discussions of the purposes and methodologies of bear hunting.

The diversity of individuals led to lively and frank presentations and discussion of what role(s) bears play in the lives of humans and the role(s) humans play in the lives of bears. This publication hopefully reflects the tenor of the workshop and provides answers and questions that will help all concerned better understand the difficulties and problems associated with the obligate management of black bears by man.

To introduce this volume it seemed only fitting to us to present here one of the few written accounts of a human–black bear interaction in Utah. The incident occured some years ago in our current black bear study area.

> Although excrement and tracks of these animals are frequently discerned in the aspen and fir thickets, only one bear was actually observed in the present study. This animal entered the campsite at Tablerock Spring shortly following dusk and approached to within 30 feet of the position of my sleeping bag. Application of a flashlight revealed a very large bear in coarse, dark brown pelage. The bear did not immediately flee, but appeared instead to be highly agitated by the light that was being cast upon him. He (the bear) swerved convincingly back and forth and at the same time violently "pawed" the earth as if disposed to fight. These antics persisted for perhaps a minute and then a resonant, airy snort heralded his departure. This same resounding noise was heard again several minutes later and was presumably made by the same bear, but at a greater distance from camp.
>
> Ranck, G.L. 1961. *Mammals of the East Tavaputs Plateau.* M.S. Thesis. University of Utah, Salt Lake City. 230 pp.

ACKNOWLEDGMENTS

We thank the owners, operators, and employees of the East Bay Inn and Joe Vera's Restaurant for warm beds, cozy conference rooms, and salsa and chips that fueled the fires of dialogue throughout the workshop. To the following we offer sincere thanks: Brigham Young University's Department of Zoology and the Monte L. Bean Museum of Natural History provided technical support and funding. The Utah Division of Wildlife Resources (DWR), the Bureau of Land Management (BLM), and the USDA, Forest Service (FS) also contributed funds for the workshop and for publication costs. Especially supportive of the workshop were Boyde Blackwell, Jordan Pederson, and Steve Cranney of the DWR and Bill Stroh, Harry Barber (yes, that *is* his real name), and Steve Madsen of the BLM. Brigham Young University (BYU) students Lori Tenney, April Young, Kevin Young, Wade Paskett, Marc Seid, Dana Shurtleff, and Scot Westwood gave logistic and technical help. Dr. Jerran T. Flinders and Dr. H. Duane Smith of BYU helped organize the workshop and the panel discussion about dogs and bears. Bob Ellis (DWR) and Julie Jensen (FS) supplied an impressive array of materials on public education and awareness. Dianna M. Black of the English Department at BYU provided layout and formatting advice and spent many hours with the especially difficult task of editing discussion transcriptions. We acknowledge Dr. Susan E. Meyer of the USDA–FS Intermountain Shrub Sciences Laboratory who generously shared office space and computer facilities and provided encouragement throughout the entire editing process. Marlae Rindisbacher of BYU Media Services is responsible for the delightful cartoons, and Josh Jenkins of the same department designed the cover layout.

I (Black) thank my co-editor (Auger) for her skills at editing and designing this volume and for staying doggedly at the word processing chores. Surprisingly enough, at this job's completion we are still friends.

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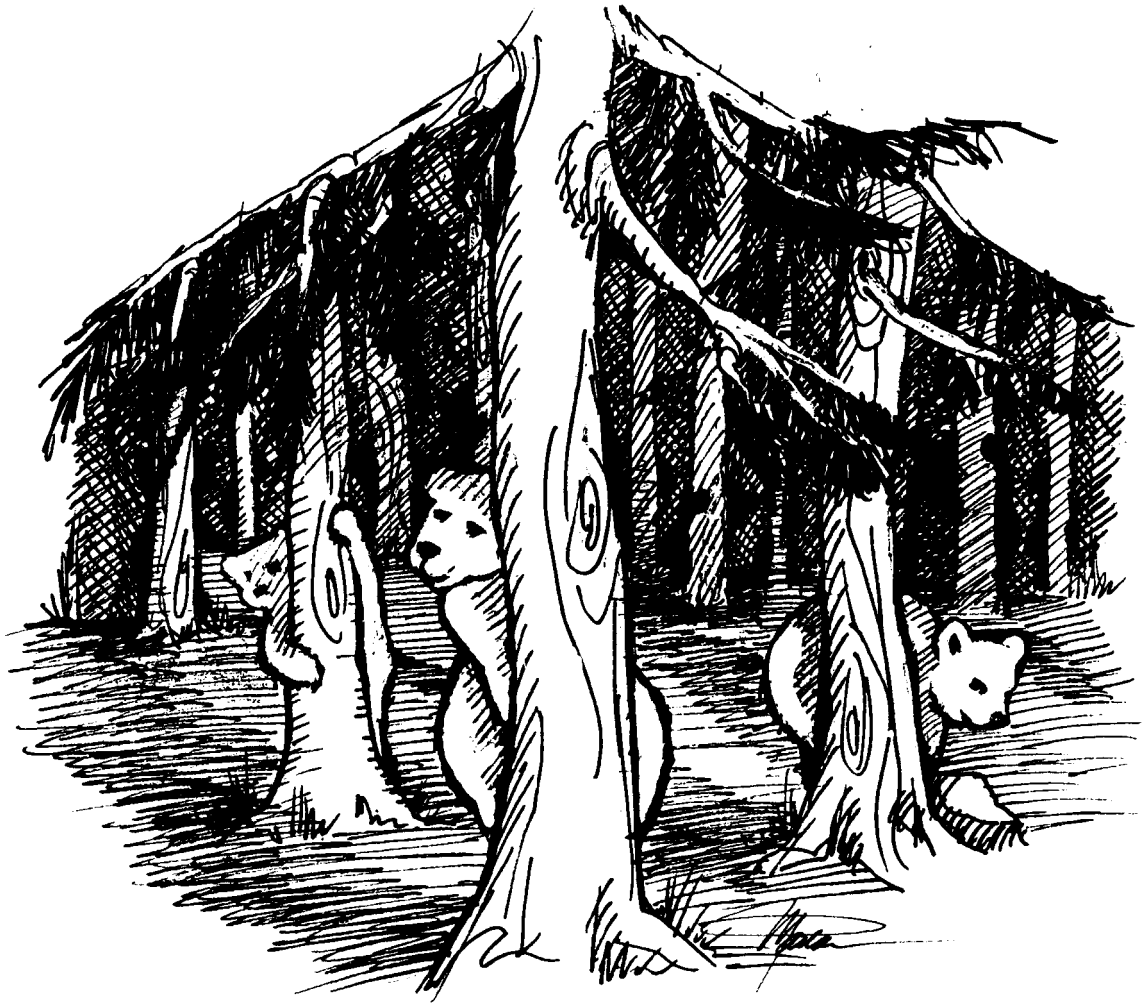
STATE STATUS REPORTS



ARIZONA STATUS REPORT

DAVID CAGLE and SUZANNE TRACHY, Arizona Game and Fish Department
Pinetop Region, HC 66 Box 57201, Pinetop, Arizona 85935

INTRODUCTION

Black bear management in Arizona has recently adopted or is in the process of adopting new hunt, depredation harvest, and nuisance bear handling strategies. These new approaches are designed to minimize the take of female black bears in certain areas, eliminate indiscriminate take of bears by the livestock industry, and use public information and assistance from other public agencies to reduce department manpower needs when addressing nuisance urban and campground bears.

DISTRIBUTION AND ABUNDANCE

Black bears are found primarily in central and southeastern Arizona. The estimated statewide population is 2,500–3,000 individuals. Bears occupy suitable habitat at elevations ranging from below 3,500 ft. to above 10,000 ft. Habitat type varies from upper Sonoran Desert scrub, dense chaparral, oak woodlands, up to mixed conifer forests.

HUNT MANAGEMENT GOAL

The department's Strategic Plan Bear Management Goal is to maintain bear populations at habitat capacity while still providing hunting opportunity. Management objectives are listed below:

- Make hunt recommendations on a Game Management Unit basis.
- Implement hunt structures (season dates, season length, females harvest quotas, etc.) which direct harvest toward the male segment of the bear population. The goal of hunt recommendations is to allow as much bear hunting opportunity as possible, while minimizing the harvest of adult females.
- Evaluate data on a unit basis to determine population status and effect of harvest. Age and sex data from previous harvests should help evaluate the status of a unit's bear population.
- In units with vulnerable bear populations, allow "no hunting" to be an acceptable recommendation.

SPECIFIC STRATEGIES

Depredation harvest of black bears and mountain lions has been further regulated with adoption of a relatively new Arizona law which (1) identifies circumstances when chase can commence, (2) requires livestock growers or agents to contact the department soon after chase, (3) allows for confirmation of loss by a qualified department employee, (4) limits time of chase, (5) limits method of take, (6) requires release of non-target animals, and (7) requires reporting of destroyed bears and lions.

To limit the harvest of female bears, a sow harvest quota has been established for some fall hunts and all spring hunts. This quota hunt will be expanded into some additional units for fall 1994. During the general fall hunts any bear is legal. To further discourage the take of adult sows, a legal bear in the quota hunts is any bear except sows with cubs. Baiting was eliminated as a means of take approximately five years ago.

The department continues to identify critical habitats for bear populations and ensure protection, and improvement where possible, through cooperation with land management agencies and appropriate landowners.

HUMAN–BEAR INTERACTIONS

Arizona has its share of human–bear interactions in urban settings within bear habitat, as well as in campgrounds on national forest lands. Human–bear encounters are a growing problem due to Arizona's expanding human population and increased recreation and visitation within bear habitats. Within the Pinetop Region of east-central Arizona, the incidence of human–bear conflict has risen 93% over the past three years, and the number of bears handled increased 100% in the same time period. The potential for increased conflict is substantial. The Arizona Game and Fish Department developed a nuisance bear response procedure tied to the level of threat a bear poses to humans or private property. This procedure has greatly facilitated our handling of bear complaints. We are currently evaluating other strategies for addressing human–bear interactions including increased education, local ordinances, and determent of bears from urban settings.

RECENT RESEARCH AND PUBLICATIONS

There is no current in-depth research on black bears and no publications since the Fourth Western Black Bear Workshop.

Albert LeCount, recently retired from Arizona Game and Fish, has submitted a proposal to evaluate nuisance black bears in urban settings in east-central Arizona.

HUNTING LAWS AND REGULATIONS

Two units in southeastern Arizona have limited-entry spring hunts. Both units have a sow harvest quota, and the use of dogs is prohibited. The fall hunts are open with units open for various lengths. Some units have a sow harvest quota. These normally have the longest posted season length, but the season is closed the Friday following attainment of the female quota. The use of bait is prohibited on all hunts. Females with cubs are protected on all quota hunts.

HARVEST SUMMARY

For the last three years the fall sport harvest has averaged around 125 animals, and the spring harvest has averaged two bears for the 153 issued tags. The reported depredation harvest for the past three years has averaged around five bears. Between 55% and 59% of the reported harvest are male bears, which is below the objective of 70%.

QUESTIONS AND ANSWERS

Ken McDonald, Utah Division of Wildlife: You referred to new approaches to depredation. May a livestock owner hire or select anybody to chase a depredating bear within the allowed 14-day period? And what happens to the carcass?

David Cagle: The livestock owner or his agent may select anyone, including ADC. The carcass must stay in the field.

McDonald: Do you have pursuit-only seasons?

Cagle: No, we don't. We have a pursuit season only for raccoons in the summer.

D.J. Schubert, The Fund for Animals: Do you try to estimate your black bear population size, and what method do you use?

Cagle: We use several tools and information sources to help us estimate population sizes: GIS maps of vegetation, topography and road maps, along with harvest data and information on food availability. In Arizona there are probably 2,500 to 3,000 bears.

Gary Olsen, Montana Dept. of Fish, Wildlife and Parks: You mentioned that you are striving for 70% of your harvest to be males. We're trying to do similar things in Montana and are interested in your rationale for that management approach. Also, in your spring hunt, what percentage of the harvest is male?

Cagle: Right now about half of the spring harvest is male. We treat the females as the vulnerable segment of the population, as they do not generally disperse from natal areas. Males are essentially in excess and we would like to direct the harvest more towards that excess.

CALIFORNIA STATUS REPORT

ROBERT W. STAFFORD, California Department of Fish and Game
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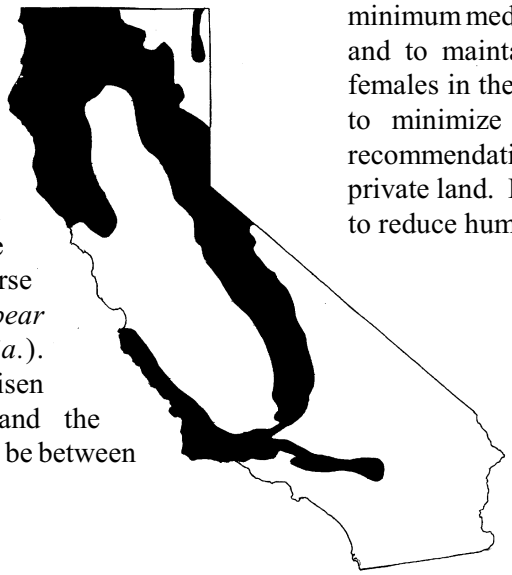
DISTRIBUTION AND ABUNDANCE

Black bears inhabit over 120,000 km^2 of California and occur at highest densities in the North Coast, Cascade, Klamath, and Sierra Nevada mountains. Population densities are lower in the Central Coast and Transverse ranges (*Figure 1. Black bear distribution in California.*). Population estimates have risen over the past ten years and the population is now estimated to be between 18,000 and 24,000 (Fig. 2).



POPULATION MONITORING SYSTEM

California uses a number of monitoring techniques to determine the status of the population. These methods include age and sex composition of hunter-killed bears, hunter success, and hunter effort. Populations are modeled to assess the effects of various hunting strategies on the age structure, sex ratio, and population size. Radiotelemetry studies have been initiated to document survival rates, food habits, and den site characteristics.

MANAGEMENT OBJECTIVES AND STRATEGIES

The primary goal of the black bear management program is to maintain a healthy, viable, and widely distributed black bear population. One element of the program is to provide regulated hunting of bears. Specific objectives of the program are to maintain a minimum median age of 4.5 years for harvested females and to maintain a higher percentage of males than females in the annual harvest. The department strives to minimize impacts to bear habitat by making recommendations to managers of both public and private land. Public education is emphasized in efforts to reduce human–bear conflicts.

SPECIES MANAGEMENT PLAN

A statewide strategic black bear management plan is being updated and is scheduled for release in 1995. The previous plan for black bears in California was prepared in 1985 and reprinted in 1987. Specific elements in the updated plan include habitat management, hunting and viewing recreation, depredation, law enforcement, research, and public education.

HUNTING LAWS AND REGULATIONS

In contrast to the previous 10 years, bear hunting regulations remained unchanged between 1991 and 1994. The California Fish and Game Commission has the authority to regulate bear hunting and to adopt regulations for killing bears that cause property damage. Current bear hunting regulations provide for a 23-day archery-only season beginning on the third Saturday in August and a 79-day general bear season extending from the second Saturday in October until late December. All successful hunters are required to present their bear skull to a department employee so

that a tooth can be removed. Both successful and unsuccessful bear hunters are required to return their bear tags. The season is closed when 1,250 bears are reported killed. There is no spring season and baiting is not permitted. Dogs may only be used as a method to pursue and take bears during the general bear season, and the use of dogs for the pursuit or take of any mammal is prohibited in bear habitat between April and early fall. Cubs, bears weighing less than 50 pounds, and females with cubs may not be killed. Tag sales are limited to 15,000.

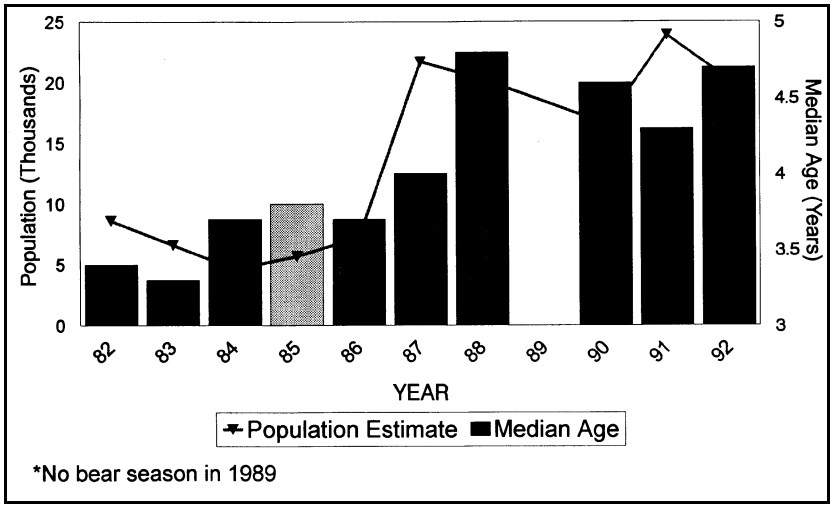


Figure 2. Population estimates and median age for harvested black bear (1982–1992).

RECENT RESEARCH AND PUBLICATIONS

In the summer of 1992, the department initiated a study in the Klamath Mountains to obtain additional information on subadult survival and dispersal, and age specific reproductive rates of sows. The goal of this study was to monitor 20 adult females and 10 subadults for a minimum of 10 years. Thus far, 24 sows and subadults have been radio collared. Bear density in the Klamath study area was found to be high with 40 individual bears being captured in a 40 km^2 area in 1992. Similar studies will be initiated in other geographic regions in upcoming years.

In addition to this study, the following publications on black bears in California have been completed.

Braden, G. 1991. Home Ranges, Habitat Use, and Den Characteristics of Black Bears in the San Gabriel Mountains of Southern California. M.S. Thesis. Calif. State Polytech. Univ., Pomona. 80 pp.

Keay, J. 1990. Black Bear Population Dynamics in Yosemite National Park. Ph.D. Dissertation. Univ. of Idaho. 140 pp.

Stubblefield, C. 1992. Characteristics of Black Bear Ecology in the San Gabriel Mountains of Southern California. M.S. Thesis. Calif. State Polytechnic Univ., Pomona. 105 pp.

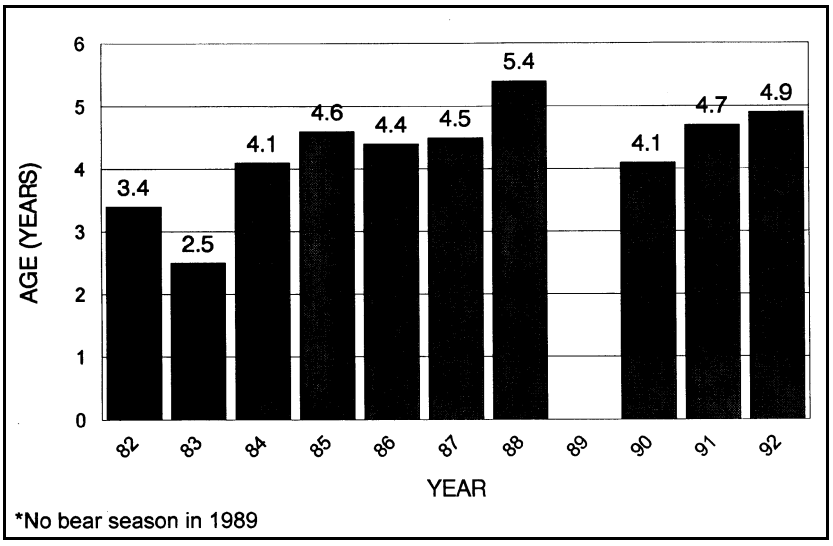


Figure 3. Median ages for harvested female black bears (1982–1992).

HARVEST SUMMARY

The average reported kill during the years 1990 to 1992 was 1,315 bears with 10,680 bear tags being sold annually. Males comprised 61% of the harvest during this period and the median age of all hunter-killed bears has increased over the past 10 years (Fig. 2). The median age of harvested female bears has almost doubled since 1983 (Fig. 3).

While the bear harvest remained relatively stable since 1987 (partly due to the in-season closure mechanism), hunter success (number of bears killed per number of days hunted) increased until

1992, when a sharp decline was observed (Fig. 4). These data were derived from an annual hunter take survey of 4% of license buyers who stated that they hunted almost 12 days for every bear killed in 1992. While a decline in hunter effort may indicate a decline in the overall population, other data gathered in 1992 contradict this conclusion. Increases in the median ages of harvested bears, the lack of changes in overall hunter success, and proportion of successful hunters both suggest a stable population. All bear hunters were required to submit their tags to the department at the end of bear season, and hunters were requested to indicate the number of days that they hunted on these tags. Information from these tags indicated that successful bear hunters hunted an average of 3.5 days in 1993. The most likely cause for the perceived decline in hunter success was survey error or response bias by survey participants. This was supported by other data in the 1992 Hunter Take Survey which indicated that almost 200 bears were killed in a county where only one bear had been taken over the previous 10 years.

Mandatory tag return continued to be beneficial in determining the methods used to hunt bears in California. Over the past three years, approximately two-thirds of the bears reported killed in California were taken with the aid of trailing hounds. Regardless of the method used to take the bear (hounds, archery, opportunism while deer hunting), the number of days spent hunting did not vary by method with hunters spending between three and four days to get a bear.

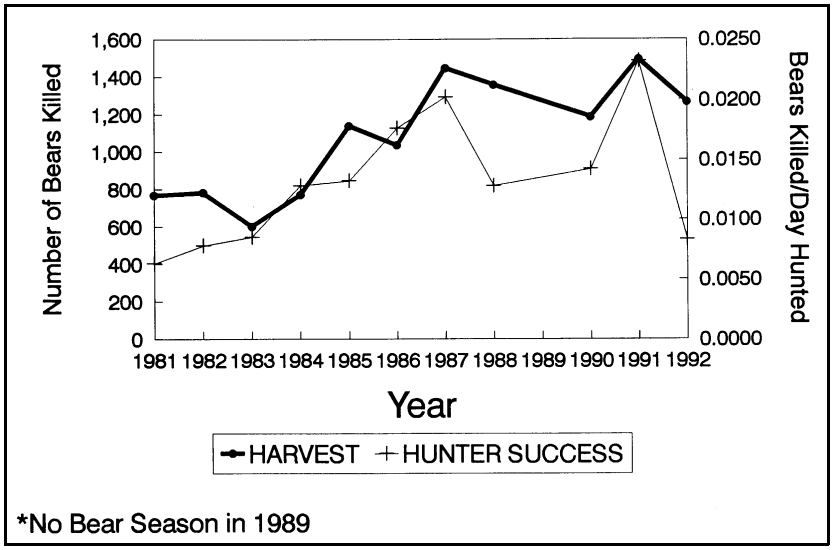


Figure 4. Black bear take and hunter effort (1981–1992).

PROPERTY DAMAGE/DEPREDATION TRENDS AND POLICIES

California's bear depredation policy strongly discourages relocating problem bears. Property owners are given the responsibility for killing depredating bears after the department has verified that damage was caused by a black bear. Black bear depredation continues to increase and a record number of depredation permits (215) were issued in 1993. In contrast to the previous five-year period, bear damage to structures was the most commonly cited reason for requesting a depredation permit. Over the past six years, an average of 191 permits per year were issued and 69 bears were killed annually. Male bears accounted for approximately 80% of the bears killed for depredation.

PUBLIC ATTITUDES TOWARDS BEAR MANAGEMENT AND HUNTING

Black bear hunting, particularly with the use of dogs, continues to be controversial in California. There are two major points of controversy. The first is the perception that the use of dogs for bear hunting is unsporting. In both 1993 and 1994, legislation was introduced in the state senate to ban the use of dogs for bear hunting. In both cases, the legislation failed. Concurrently, the Fish and Game Commission has considered, and is continuing to consider, limitations on the use of dogs to take bears. Intensive lobbying efforts have been undertaken by proponents on both sides of this issue.

Another point of dispute between political entities is the effects of poaching and the black market on the statewide bear population. There is no data indicating that the number of bears killed by poachers is limiting the population. In contrast, data gathered from hunters and field studies suggest that bear populations are robust and healthy. Computer modeling suggests that fewer than 340 bears are killed each year by poachers. However, highly publicized poaching rings are commonly referred to as examples of a major threat to California's bear population. Public education

regarding this matter is one of the department's greatest challenges.

In an effort to alleviate public concerns, the department and the Fish and Game Commission provide numerous opportunities for public comment. Each year the department holds annual scoping sessions to discuss bear hunting regulations including a wide range of alternatives. Separate scoping sessions are held to obtain input on Environmental Documents concerning mammal hunting regulations. The Environmental Document regarding bear hunting is produced annually and is open to a 45-day public comment period. Finally, the Fish and Game Commission accepts written recommendations throughout the year and accepts oral recommendations at three meetings.

CONCLUSION

In spite of California's expanding human population, data indicate that black bear populations are thriving. The reasons for this include public land ownership patterns which maintain quality bear habitat, conservative hunting regulations, and strict enforcement and penalties for illegal activities. In the future, bear population monitoring programs will remain in place and will be refined to increase effectiveness. Current field studies will continue and be expanded to obtain more information on black bear ecology in California. Public education will continue to be emphasized to reduce human–bear conflicts.

COLORADO STATUS REPORT

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R. BRUCE GILL, Colorado Division of Wildlife
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DISTRIBUTION AND ABUNDANCE

Black bears are found throughout all suitable habitats in the western two-thirds of Colorado. They are also found in the timbered canyon complexes incised in the shortgrass prairie areas in the southeast corner of the state. Area of suitable habitat is approximately 75,000 km^2. There is no reliable estimate of the statewide population. The range of densities are currently unknown but two studies in what is subjectively considered some of the better Colorado black bear habitat resulted in density estimates of 18 and 37 bears per 100 km^2.

BLACK BEAR MANAGEMENT DATABASE

Hunter kill statistics comprise the largest data set for monitoring black bear status in Colorado. A mandatory check of all hunter killed bears has been in effect since 1979. The insensitivity and constraints of kill data alone are recognized. Beginning in 1991 all black bears killed by landowners, division personnel, ADC personnel, and road kills were also included in the data base. A statewide database to record bear–human conflict incidents will be initiated in 1994. A standardized protocol for capture, marking, moving, and documenting of nuisance bears will also begin in 1994.

MANAGEMENT OBJECTIVES AND STRATEGIES

Colorado black bear management has followed two general objectives: (1) maintain populations to sustain hunting and (2) minimize damage to livestock, crops, and private property. These dual objectives led to liberal season lengths and method of take until 1992. A new policy to address black bear–human conflicts was adopted in 1993, with implementation beginning in 1994. This policy focuses more attention to the root cause of the conflict rather than just acting against the offending bear. Bears will not be captured and translocated unless landowners or managers take corrective action to address the source of conflict. If the corrective actions alone do not end the problem, bears will be moved only one time. All translocated black bears are ear-tagged. Should a tagged bear ever be captured a second time in a human conflict situation the bear will be killed. Education and information efforts have been dramatically increased in chronic problem areas. This effort is a fundamental shift in our historic approach to dealing with bear–human conflicts.

SPECIES MANAGEMENT PLAN

Colorado adopted a statewide black bear management plan in 1990. However, only limited portions of this comprehensive plan have been implemented through annual operation plans. The eight policy-level objectives of the plan were as follows:

1. Monitor black bear numbers to maintain stable, healthy black bear populations while providing a sustainable annual harvest.
2. Schedule the timing of black bear hunting seasons to protect females with nursing cubs. (This objective is

no longer applicable as there has been no spring season since 1992).

3. Focus problem bear management on individual problem bears and stress nonlethal management methods, while effectively reducing the level of bear-caused property and livestock damage.
4. Work together with federal public land managers and private landowners to identify and protect critical black bear habitats throughout the state.
5. Implement law enforcement activities that effectively deter black bear poaching.
6. Develop a prototype black bear watching program to test the feasibility of providing structured watching experiences.
7. Periodically inform the public of our progress towards producing these management outcomes.
8. Educate the public to increase awareness of black bear conservation issues and what must be done to manage bears effectively for the benefit of people.

RECENT RESEARCH AND PUBLICATIONS

The Colorado Division of Wildlife (CDOW) began a census technique development research program in 1993. The program is evaluating the use of an extensive marking program in one year followed by remote camera resightings the subsequent year. An early highlight of the research was the development of a new cage-type bear trap in order to reduce snare-caused injuries. The study will evaluate the procedure in two or three distinct vegetation communities, which will also allow the comparison of densities for typical Colorado bear habitat.

The CDOW will also begin a joint management-research program to evaluate the utility of translocation for nuisance bears. This is an outgrowth of the new directives for handling bear–human conflicts. This work will be concentrated in the south-central portion of the state between Trinidad and Colorado Springs, with field work beginning April 1995.

In cooperation with Dr. Henry Harlow, University of Wyoming, the CDOW is examining muscle disuse atrophy, muscle metabolism, and changes in body fat composition in denning black bears.

Beck, T.D.I. 1991. Black bears of west-central Colorado. Colorado Division of Wildlife Technical Publication No. 39, 86 pp.

Decker, D.J., C.A. Loker, and J.M. Baas. 1993. Colorado Black Bear Hunting Controversy: Amendment #10 Post-Election Voter Analysis. Human Dimensions in Natural Resources Unit Report No. 8, Colorado State University, Ft. Collins. 54 pp.

Loker, C.A., D.J. Decker, R.B. Gill, T.D.I. Beck, and L.H. Carpenter. 1994. The Colorado Black Bear Hunting Controversy: A Case Study of Human Dimensions in Contemporary Wildlife Management. HDRU Series No. 94-4, Cornell University. 56 pp.

HUNTING LAWS AND REGULATIONS

Black bear hunting regulations in 1991 were identical to those in 1990. There was a limited license hunt that ran from 1 April to 15 May and again from 1 September to 30 September. License numbers were limited to 2,000. There was an unlimited entry bear season concurrent with archery, muzzleloader, and regular rifle deer and elk seasons in the fall. Use of bait and hounds were permitted in the spring season and bait was permitted during the September season.

Black bear hunting regulations underwent great public scrutiny during 1991. The continuation of hunting black bears during the spring was the primary issue of contention. Colorado Division of Wildlife staff recommended ending the spring season beginning in 1992. However, the Colorado Wildlife Commission (CWC) decided to continue all current hunting methodologies. They attempted to move hunting pressure away from the spring season by allocating 50% of the 2,000 limited licenses in 1992 to the spring period. This allocation would have decreased to 30% for spring in 1993 and 10% for spring in 1994. Additionally, the CWC extended the spring season through 31 May and eliminated the unlimited entry black bear hunts during the fall deer and elk seasons.

In response to this action by the commission, a citizen ballot initiative was drafted which would, if voted in, eliminate black bear hunting during spring and summer seasons as well as the use of bait and hounds for bear hunting. Organizers needed 50,000 signatures on their petitions and obtained 76,360. The item was

placed on the November 1992 ballot as a legislative amendment. Amendment #10 was voted into law with nearly 70% of voters favoring it. The amendment, although last in a long series, received the third highest number of total voters. Detailed analyses of this event are provided in the publications listed in the previous section.

Black bear seasons for the years 1993 and 1994 were established as follows. There would be an unlimited entry season during the regular rifle deer and elk seasons. There would also be a limited entry season from 2–30 September. For the September season number of licenses was limited to 1,000. This was based on the concern of bowhunters that having rifle bear hunters out during archery deer and elk seasons (also in September) was a serious safety problem. The CDOW will closely monitor reports of safety conflicts between bowhunters and bear hunters before increasing permit numbers. Baiting and the use of hounds are prohibited.

Intentional feeding of wildlife had become an increasing problem in Colorado during the previous two decades. The Colorado Wildlife Commission passed regulations prohibiting the intentional feeding of all big game species, with the exception of black bears and puma (*Felis concolor*). This exclusion was provided because it was then legal to bait both of these species for hunting. With the passage of Amendment #10 the CWC quickly added black bear to the list of species which could not be intentionally fed. This action was in response to growing concerns with bear-human conflicts.

The mandatory check of all hunter-killed black bears remains in effect. Hunters have five days to bring the carcass to a CDOW officer for sealing.

Cubs of the year and black bears accompanied by one or more cubs of the year may not be legally killed.

It is unlawful to sell, trade, barter or offer to sell, trade, or barter bear gall bladders.

HARVEST SUMMARY

In 1991, 475 black bear were killed: 297 during the limited-entry spring/fall hunt and 178 during the unlimited fall hunt. Total hunter participation was 3,852.

In 1992, 483 black bear were killed: 315 during the limited entry spring hunt and 168 during the limited-entry September hunt. With no unlimited black bear hunting, total hunter numbers were only 1,450.

In 1993, 278 black bear were killed: 167 during the limited September hunt and 111 during the unlimited entry fall hunts from October through November. Hunter numbers totaled 4,060.

During the years 1986–1992, black bear hunters using bait in the spring season had an average kill rate of 31%. There was substantial public rhetoric in 1992 about the necessity of bait in order to kill bears in Colorado. September season bear hunters in 1993, without bait or hounds, had a kill rate of 21%. While it is clear that baiting increased hunter success, it is equally clear that baiting is not necessary. Hunter interest for the 1,000 limited September licenses doubled from 1993 to 1994 (984 vs 1,970 applicants).

PROPERTY DAMAGE/DEPREDATION TRENDS AND POLICIES

Colorado law provides that the Colorado Division of Wildlife will reimburse property owners for losses of real and personal property caused by bear and puma. The Colorado Wildlife Commission has added a regulatory caveat requiring that property owners take reasonable precautions to protect their property.

Detailed analyses of black bear damage claims have been compiled for the period 1979–1992. During this 14-year period the Consumer Price Index doubled; therefore, all analyses of expenditures were standardized to 1987 dollars. Damage claims ranged from $14,931 to $79,336. The three years ranked highest in dollar damage were 1989 ($79,336), 1992 ($74,299), and 1990 ($38,107).

Over 70% of the reimbursements are for domestic sheep. Whether the recent increases in claims are indicative of a real increase in depredation is unknown. The number of range sheep in Colorado declined by nearly 60% during this analysis period. It has been suggested that during times of economic hardship livestock owners are more prone to file damage claims. Lamb prices have been lower during 1990–1992 than during any period since 1979. Average adjusted dollar value of lambs in 1990–1992 was $48.46/cwt as compared to $72.78/cwt for 1979–1989.

Apiary damage is the second most expensive type of damage and has been increasing since 1988. It is also the easiest type of damage to prevent. The CDOW is providing electric fencing materials to all apiarists

and the proper use of said fencing, once provided, will be a prerequisite for all future beehive damage claims.

Comparisons of areas of high black bear damage and high black bear hunter kill were enlightening. The region which accounts for 50% of all bear damage claims accounts for about 15% of the bear kill by hunters. It appears that the presence of large numbers of domestic sheep is a more important variable than the number of bears. It clarifies the limited utility of sport hunting seasons for solving black bear depredation situations.

Of growing concern in Colorado is the presence of high-value exotic animals, i.e. alpaca, llama, domestic elk. We have paid claims of $10,000 for a single animal. While such individual claims receive a lot of public attention, they are of much less importance than the claims for domestic sheep. About 45% of all bear damage events occur between 1 July and 15 August.

PUBLIC ATTITUDES TOWARD BEAR MANAGEMENT AND HUNTING

The analysis of the Amendment #10 vote was enlightening. The three hunting practices in question (spring season, baiting, and hounds) were overwhelmingly disapproved of. Yet 90% of nonhunters polled support hunting in general. Their opposition was to the specific practices of bear hunting. The primary issue for hunters was the maintenance of black bear populations, whereas killing female bears with cubs was the primary issue for nonhunters. Both groups strongly believe such issues should be resolved by CDOW rather than voters (hunters 72%, nonhunters 63%). And even among hunters, there was not majority support for the use of bait and hounds.

The long-held, and seldom challenged, paradigm of wildlife management that we manage for population welfare, not individual animal welfare, was shown to be inadequate for current society. The public retains a strong trust in the CDOW to manage black bears.

CONCLUSIONS

Much of the focus of black bear management during the last decade has centered on hunting seasons and methodology. The issues were not dealt with adequately through traditional channels, thus leading to an elected solution via a ballot initiative. Current black bear hunting seasons should provide both protection to the bear population and reasonable opportunity for hunting. The issue of human–bear conflicts has received increased attention. New directions in management of this issue will rely less on general sport hunting and more on changing the behavior of people. The utility of translocation of nuisance bears has received critical attention and will be the focus of research/management evaluations.

QUESTIONS AND ANSWERS

Helen Davis, Simon Fraser University: Did you find a sex bias in your catch with your trap? We've had a lot of problems with only catching males in culvert traps.

Tom Beck: No, we didn't see a sex bias at all. We had 37 subadult males, 23 subadult females, 18 adult males, 18 adult females, and 17 cubs. Most of the captures came in the first 37 days. I think 75 of the 89 bears we tagged were caught in that first 37 days of trapping.

Steve Herrero, University of Calgary: Given the attitudes towards hunting in Colorado, does Colorado have a non-game program related to black bear?

Beck: No, we do not. We have some interest by some in-house people, but they look at very traditional approaches—for instance, putting up bait sites so people can watch bears in artificial environments. Fortunately, we have passed regulations that prohibit people from feeding bears, so we have stopped that.

IDAHO STATUS REPORT

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DISTRIBUTION AND ABUNDANCE

Black bear distribution in Idaho closely corresponds to the distribution of coniferous forests. Bears are found throughout the forested mountains and foothills north of the Snake River plain. Few black bears occur south of the Snake River, except in southeastern Idaho. Most bear habitat is publicly owned (FS and state lands).

No reliable black bear population estimators are available; however, research by the Idaho Department of Fish and Game reports bear densities of 1.0 bears per 1.3 km^2 in the best habitats.

Bear management in several areas depends on a continual supply of bears dispersing from reservoir areas. This concept must be validated and a management philosophy developed.

POPULATION MONITORING SYSTEM

The department relies primarily on two methods to collect black bear harvest data: the mandatory check and report program and the annual telephone harvest survey. The mandatory check and report program, implemented in 1983, requires the hunter to bring the skull of the harvested black bear to an official check point within 10 days of the kill date and to fill out a report form. In most cases, a tooth is extracted from the skull for aging. Pertinent data including the kill date, location, and method of take are recorded on the report form. These data are used to monitor the harvest by comparison with criteria developed from research data. Compliance with the mandatory report program is unknown.

The telephone harvest survey provides a second estimate of the black bear harvest. This survey contacts approximately 10% of bear tag holders and collects information from both successful and unsuccessful hunters. Statewide harvest, recreation days, and hunter success are estimated. To collect data valid at the data analysis unit (DAU) level, sampling intensity should be increased to about 30% of bear tag holders.

To refine our bear management program, a means of estimating population size and trend is needed. Techniques are not currently available to estimate population size; however, a method to monitor population trend is being developed. Preliminary validation work was conducted at Priest Lake and Council in 1988 and 1989. The results were promising, and efforts to expand this program will occur (Figs. 1 and 2).

BLACK BEAR MANAGEMENT CRITERIA

We made the following refinements to the criteria developed for our 1986–1990 black bear management plan (Table 1).

- Separate median age criteria were established for male and female bears. Because young male bears

Table 1. Criteria used to monitor black bear harvest in Idaho.

Criteria	Overharvest[a]	Desired Level[b]
Percent Female	≥ 40%	≤ 35%
Median Age	≤ 3 yrs.	≥ 5 yrs.
Males	≤ 2 yrs.	≥ 4 yrs.
Females	≤ 4 yrs.	≥ 6 yrs.
Bait Station Survey	Declining	Stable/Increasing

[a] Reflects an overharvested population.

[b] Reflects a viable population with a diverse age structure.

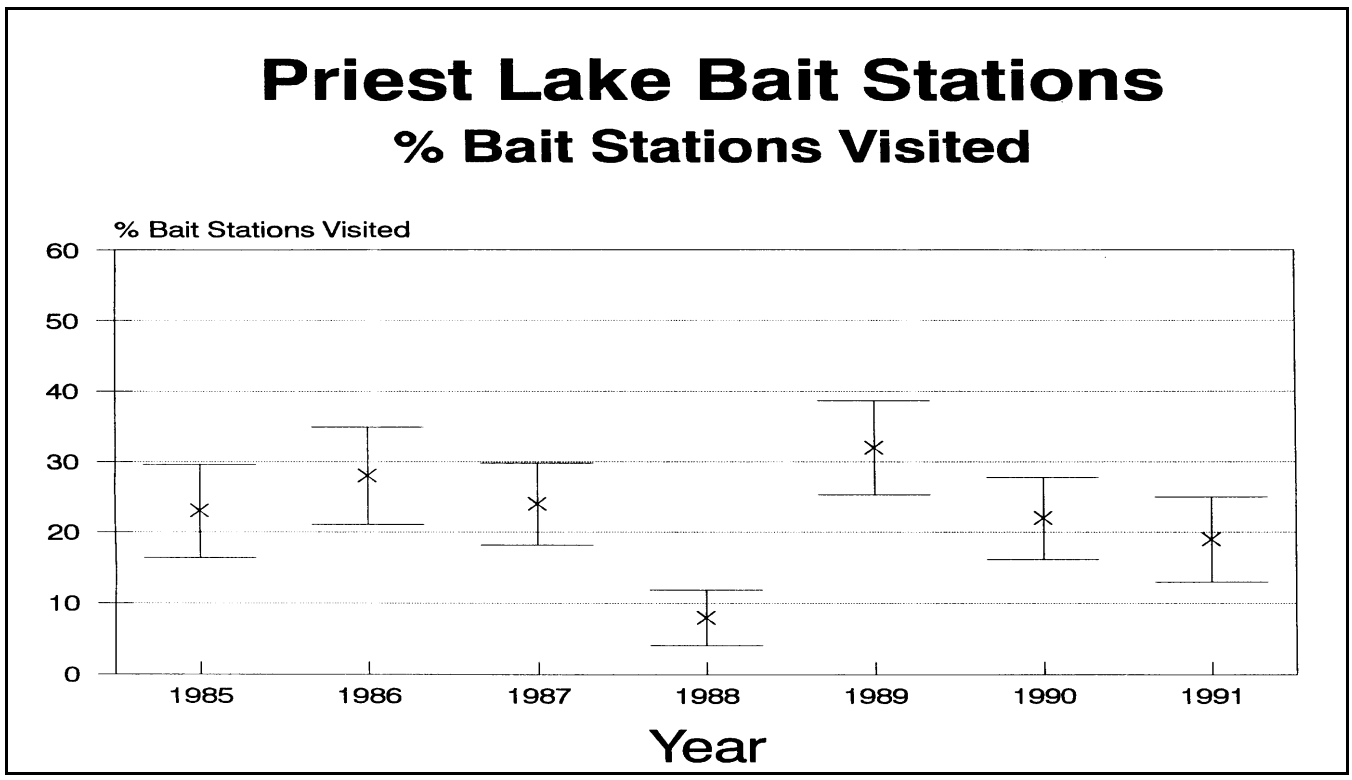

Figure 1. Percent of bait stations visited each year at Priest Lake (1985–1991).

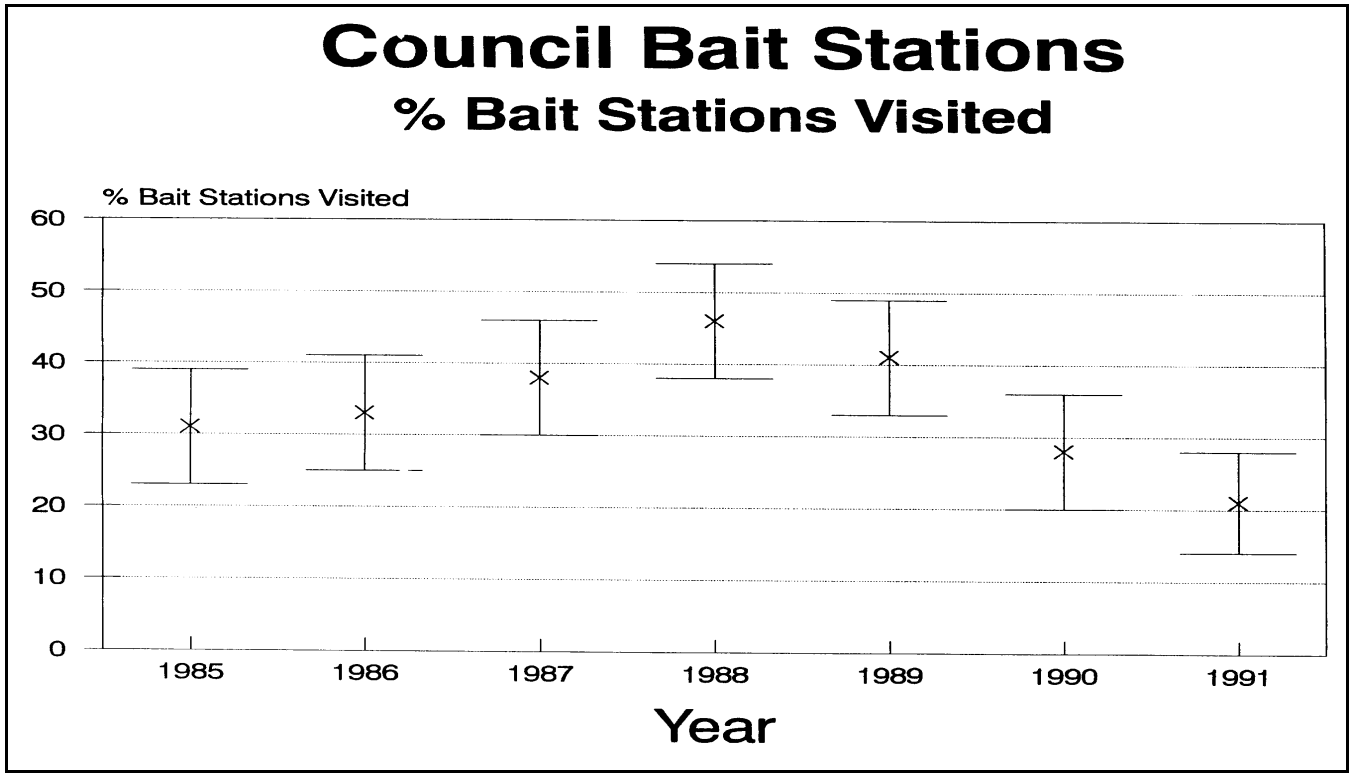

Figure 2. Percent of bait stations visited each year at Council (1985–1991).

are dispersing, they tend to be vulnerable. They are over-represented in the harvest and depress the overall median age, often below criteria levels. From a population standpoint, it is more important to maintain a median age of at least six years among females than a median of at least five years in the overall harvest.

- The criteria for percent adults and percent adult males have been eliminated because they are redundant in light of other criteria.
- Criteria developed for the 1986–1990 Bear Plan were designed to indicate overharvest, but were interpreted as population goals. The new 1992–2000 plan establishes a two-tiered system that includes a second set of values more accurately reflecting target levels for a viable, self-sustaining population. Changes in management direction will take place (1) when bear populations are shown to be at or below the "overharvest" median age standards, (2) when the population is declining, or (3) when the percent of females in the harvest is 40% or more. A decline should be evident for three or more years and the severity of the decline should also be evaluated. The season structure of adjacent DAUs will also be considered to avoid significant changes in hunter distribution. When population parameters fall between overharvest and desired population standards, management actions may be implemented to increase or stabilize the population.
- We also recognize that certain areas in Idaho provide extensive secure habitat (reservoirs) for bears. Roadless and/or wilderness areas are prime examples. Hunting pressure is light in these core areas, resulting in relatively high median ages and low percent females in the harvest. Because population turnover is low, there is little vacant habitat and young bears, especially males, are forced to disperse into surrounding, less-secure habitats where harvest rates are often high. These young dispersing males will dominate the harvest statistics in the surrounding areas. Median age criteria for the DAU may be violated, even though the core or reservoir population is secure and will continue to supply a surplus of dispersing bears. Current harvest criteria may not apply in these situations. The key is to ensure that the harvest remains focused on the dispersing bears and does not compromise the reservoir population. In such cases, management direction will be based on the department's discretion and interpretation of a variety of factors including perceived bear population status, social considerations, and other nonhunting factors (e.g., weather patterns).
- In some DAUs bear harvest is consistently low, resulting in small samples from which to monitor harvest parameters. This may lead to inaccurate conclusions. Hence, harvest criteria will be applied only to DAUs in which average annual harvest is at least 30 bears. When harvest is less than 30 bears, the criteria do not apply, and management decisions will be based on professional judgement.
- Black bear are difficult to observe because they are shy and often occupy forested areas. They are also difficult to census; therefore, we are developing scent station surveys to monitor population trends. Testing of the scent station survey technique in 1988 showed that it can detect large (>20%) declines in bear populations. Though it may not detect small population changes, it is a useful technique when used in conjunction with harvest criteria. The scent station methodology will be considered for all appropriate DAUs.

MANAGEMENT OBJECTIVES AND STRATEGIES: 1992–2000 GOALS AND OBJECTIVES

1. Maintain or improve black bear populations and distribution in Idaho.
2. Distribute recreational opportunity throughout black bear habitat in a manner that is consistent with population objectives and provides a variety of hunting opportunities.
3. Improve harvest information by improving compliance with the mandatory check and report program and by requiring that hides be checked in addition to skulls.
4. Increase the sample of bear tag holders contacted during the annual telephone harvest survey to derive a harvest estimate within ±10% for select Area 1 DAUs and ±20% for other DAUs and statewide.
5. Continue to monitor management criteria with goals reflecting a viable population and guidelines indicating overharvest according to the 2-tiered system presented in Table 1.

6. Monitor the bear population response to changes in season framework using the biological criteria and take steps to reduce harvest when data indicate the need.
7. Obtain better data on the economic and social value of black bear.
8. Manage bears to reduce conflicts among competing user groups.
9. Consider initiating research to accomplish the objectives listed below.
    a. Establish the link between harvest criteria and characteristics of the standing population.
    b. Determine age- and sex-specific vulnerability to different harvest techniques.
    c. Test and refine the reservoir concept as a management philosophy.
10. Work with the Outfitters and Guide Board to set quotas in DAUs where a harvest reduction is needed. This will include evaluating new license and renewal applications.
11. Develop a set of habitat management guidelines for black bear.

SPECIES MANAGEMENT PLAN

Idaho is divided into five areas for purposes of managing black bear populations (Fig. 3). Area 1 includes habitats that vary from dense, semi-coastal forests to patchy forest habitats along dry river breaks. Abundant road access and proximity to human population centers characterize Area 1 DAUs. Area 2 includes habitats similar to Area 1, but is not as accessible by road and not as close to major population centers. Area 3 has limited access and much of it is officially designated as Wilderness. Area 4 includes a variety of habitats that are generally dry shrub and grass types with few berry-producing plants. The livestock industry is a major resource user of public lands in Area 4. Area 5 includes most of the irrigated lands in southern Idaho and the drier, desert portions of the state. Habitat quality in Area 5 is marginal for black bear and few bears occur there. Based on similarities in habitat, road access, and proximity to urban population centers, three of the five black bear management areas (Areas 1, 2, and 4) are divided into smaller groups—data analysis units (DAUs)—to facilitate analysis of harvest information (Fig. 3).

The 1992–2000 Black Bear Plan refines our management program for black bear by incorporating data collected from the department's mandatory check program. There are several significant differences between the 1986–1990 and the 1992–2000 Black Bear Management Plans. The 1992–2000 plan does the following:

1. Prioritizes the management alternatives the department will consider when harvest adjustments are deemed necessary.
2. Refines the management criteria developed for the 1986–1990 Bear Plan by evaluating male and female bear ages separately, putting more emphasis on the proportion of females in the harvest, and providing a 2-tiered system of guidelines. These guidelines are comprised of one set of values indicating an overharvested population and a second set reflecting a viable, self-sustaining population (Table 1).
3. Modifies department philosophy to recognize the value of harvest criteria to indicate the need for harvest reductions. When criteria for a DAU are violated, steps will be taken to reduce harvest.
4. Assumes the presence of bear populations in "reservoir" areas that receive little hunting pressure because of road access and habitat condition. The only significant hunting in these areas occurs along river corridors and other major access routes. Under these circumstances, harvest is focused on the young, dispersing animals; consequently, the harvest criteria will rarely meet management objectives, though a majority of the population is largely unhunted and possesses a satisfactory age structure.
5. Provides that black bear tags are not valid until the fourth day after purchase.
6. Recommends actions to achieve better compliance in the mandatory check program. This will improve the database considerably and provide better insight into population dynamics, status, and trend.
7. Implements a tagging system for bear hides similar to that for mountain lion. This requirement will improve the quality of harvest data and compliance with the mandatory check.
8. Opens the spring harvest season on 15 April. Biologically, this date is more reasonable than the

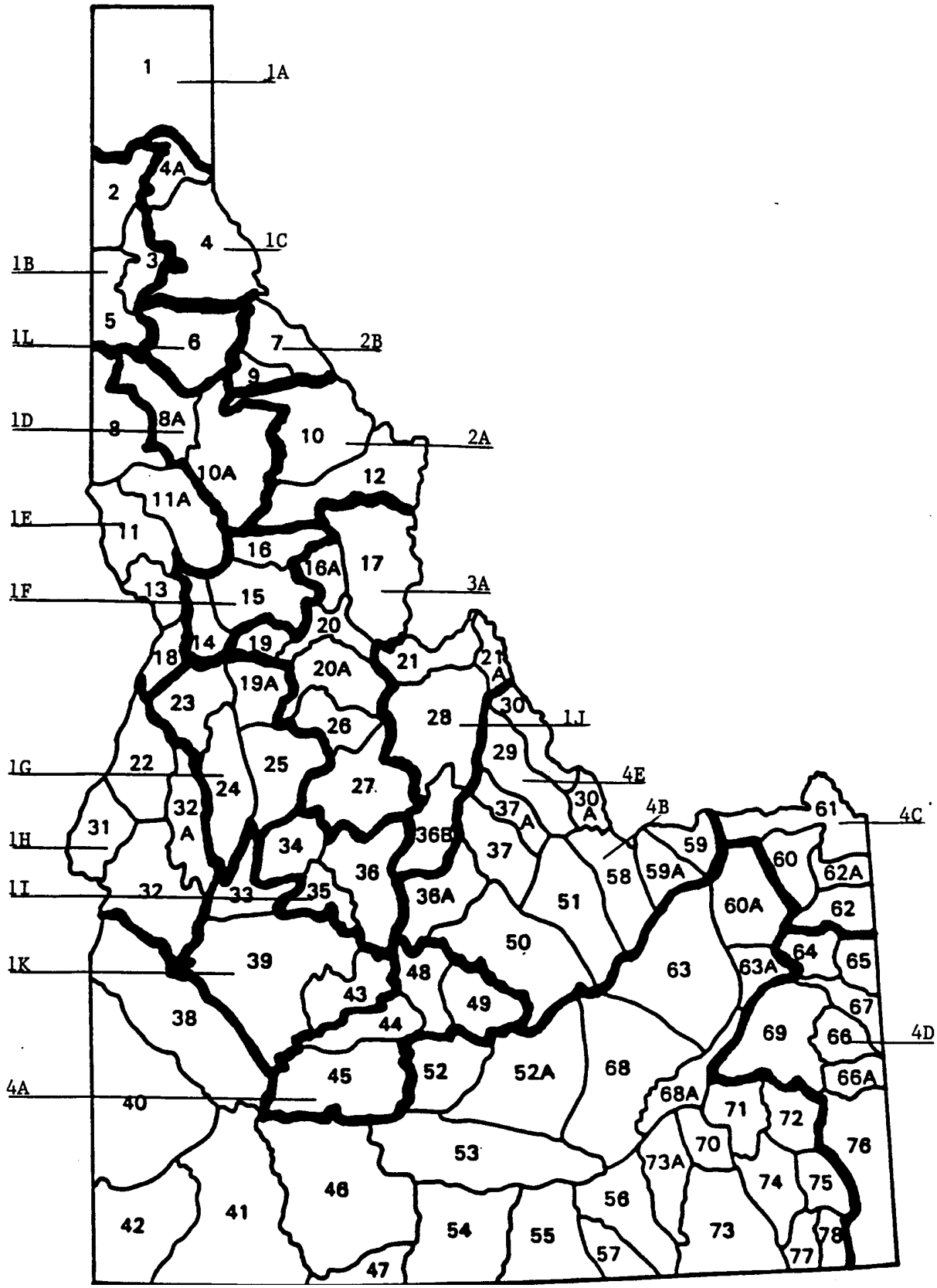

Figure 3. Twenty (20) data analysis units (DAUs) for black bear management in Idaho.

1 April opener because few bears emerge from hibernation before mid-April, and the plan should improve relations with landowners concerned about damage to road systems while they are wet.

9. Opens the fall harvest season 15 September.
10. Offers a dog training season that opens the day after the harvest season closes—in all units that offer such a season—and closes on 31 July.
11. Specifies a set of regulations regarding baiting that will be uniformly enforced on state, federal, and private lands.
12. Realigns some game management units into different DAUs to facilitate better management of black bears in those units.
13. Identifies research and other data needs.

RECENT RESEARCH AND PUBLICATIONS

Unsworth, J.W., J.J. Beecham, and L.R. Irby. 1989. Female black bear habitat use in west-central Idaho. *J. Wildl. Manage.* 53(3): 668–673.

Beecham, J.J. and J. Rohlman. 1994. A shadow in the forest—Idaho's black bear. The Univ. of Idaho Press. Moscow, Id.

Although the Idaho Department of Fish and Game is not conducting any research on black bear at this time, Jeff Rohlman and I are continuing to investigate new methods for releasing captive-raised orphan cubs back into the wild. Gary Alt and I published a short paper (Wild. Soc. Bull. 12: 169–174) in 1984 describing our initial efforts in this area. More recently, Jeff and I have been placing orphans in vacant dens in late November or early December. Our sample sizes are limited (n=15) at this time, but we both believe this technique shows promise. Future releases will concentrate on evaluating the effectiveness of artificial dens and using telemetry equipment to document the survival rates of cubs that abandon their den shortly after release.

HUNTING LAWS AND REGULATIONS

Idaho offers five controlled hunts for black bear; all other seasons are general hunts. The spring season opens 15 April and closes in May or June, depending on the specific management unit. The fall season opens on 15 September and closes on 31 October; some management units have a two-week closure from 1 October through 14 October to provide additional protection to female bears. Hunting with dogs or bait is prohibited in management units within grizzly bear recovery zones. Listed below are some specific hunting regulations:

1. Either sex may be taken, except females accompanied by young.
2. Dogs may be used in management units with a hound season to take or pursue black bears, but only if the following conditions are met:
   a. A firearm season (excluding muzzleloader) for deer or elk is not open in the area to be hunted.
   b. The owner or person having control of the dogs in the field has a valid hound hunter's permit in possession.
   c. During pursuit seasons, bears may be pursued and treed but not captured, killed, or possessed.
3. All successful bear hunters must comply with the department's Mandatory Check and Report Program within 10 days after the kill date.
4. Black bears may not be trapped, snared, or otherwise captured or held without a permit issued by the Director.

Conflicts With Grizzly Bears

The grizzly bear is classified as a "threatened" species by the U.S. Fish and Wildlife Service. The department currently restricts use of dogs and bait to hunt black bears in grizzly bear recovery areas (Units 1, 62, 62A, and part of 61). This tactic, in conjunction with intensive public relations work and selected road closures, seems to be effectively reducing grizzly bear mortality. This strategy will be continued and its effectiveness monitored to minimize or eliminate human–bear conflicts.

Baiting Recommendations

The following standards were adopted to regulate bear baiting in Idaho:

1. Timing of the baiting season:
   a. No baits may be placed for the purposes of attracting or taking black bear prior to the opening of the black bear season.
   b. All structures, bait containers, and materials must be removed and excavations refilled when

the site is abandoned or within seven days of the close of the black bear season.

2. Location of bait sites:
   a. No bait site may be located within 200 yd of any free water (e.g., lake, pond, reservoir, spring, or stream), maintained trail, or any road.
   b. No bait site may be located within 0.5 mi of any designated campground or picnic area, administrative site, or dwelling.
3. Types of bait:
   a. No whole game animals (including birds and fish) or parts thereof may be used to attract black bear.
   b. The skin must be removed from any mammal parts or carcasses used as bait.
4. Bait containers:
   a. No bait may be contained within paper, plastic, metal, wood, or other nonbiodegradable materials, except that a single, metal container with a maximum size of 55 gal. may be used if securely attached at the bait site.
   b. Baits may be contained in excavated holes if the diameter of the hole does not exceed 4 ft.
5. Establishment of bait sites:
   a. Any structures constructed at bait sites using nails, spikes, ropes, screws, or other materials must be removed when the site is abandoned by the permit holder or within seven days of the close of the black bear season.
   b. All bait sites must be visibly marked at the nearest tree or on the bait container using a tag supplied by the department.
6. Baiting permit administration:
   a. All persons placing or hunting over bait must possess a baiting permit issued by the Idaho Department of Fish and Game.
   b. Each hunter may possess only one Idaho Department of Fish and Game baiting permit each year and may maintain up to three bait sites.
   c. No person may hunt over an unlawful bait site.
   d. Limits on the number of bait sites that can be established by outfitters should be specified in their operating plans.
   e. Guides and clients of outfitters are not required to obtain a baiting permit, but they must have a copy of the outfitter's permit in their possession while hunting over a bait site.
   f. Baiting permits will be issued by mail or in person at Idaho Department of Fish and Game regional and subregional offices beginning 1 March each year.
   g. Permits will be valid for the calendar year in which they were issued.
   h. Possession of an Idaho Department of Fish and Game baiting permit does not exempt the permit holder from any restrictions placed on users of federal, state, or private lands.

PROPERTY DAMAGE\DEPREDATION TRENDS AND POLICES

By Memorandum of Understanding, the department and ADC agreed that the following procedures will be used to handle depredation bears:

- ADC has the responsibility for control of black bears committing livestock depredations and other agriculture-related depredation problems.
- The department has the responsibility for controlling black bear in nuisance and human-safety situations. ADC may handle such complaints at the request of the department if mutually agreed by both parties.
- In areas where public safety is of concern and in nonlivestock agricultural complaints, ADC shall use culvert traps whenever practical, and shall use culvert traps in classified grizzly bear habitat unless determined to be impractical.
- Snares used in classified grizzly bear habitat must be sufficient to hold any grizzly bear that may be inadvertently trapped.
- Any black bear taken must be reported on the department's Big Game Mortality Report form. The report and the bear skull or jaw shall be submitted to the affected region within thirty days of the date of the kill. All salvageable bear parts (pelts, claws, and teeth) remain the property of the department and must be submitted to the affected region or disposed of according to instructions.

QUESTIONS AND ANSWERS

D.J. Schubert, Fund for Animals: What percent of your hunters use dogs, and what percent of the kill are they responsible for?

John Beecham: We allow dogs in both our spring and fall hunts. They make up about 5–6% of the hunters and are responsible for about 21% of the kill.

Mike Pelton, University of Tennessee: Have you considered altering your spring and/or fall hunts to coincide with denning strategies of adult females?

Beecham: That's basically the approach we took in this last planning process, Mike. What we found was progressively more females in the harvest the later into the spring that you hunted them. So we shortened the spring season a little on the front end and fairly dramatically on the tail end. The fall hunt is where I think we made the big contribution toward protecting females. We had a fairly significant spike in female harvest in the first two weeks of September. We now cut out that time period and start the season on 15 September. We also saw a significant peak in the first two weeks of October. In some of the areas where we have concerns about bear populations we also have a gap in the hunt during that period. In those areas you can hunt bears from 15 September through 1 October. Then the season closes for two weeks and opens again in mid-October. Those cuts were designed specifically to protect females.

Question: John, what time of year are you running your bait stations? The question is this: are you measuring fruit availability or bear distribution?

Beecham: That was a major consideration. We try to eliminate that variable by running bait stations the last week of June and the first week of July. Basically bears are making the transition from a grass and forb diet to a berry diet at that time. It's a time frame when food conditions are consistent from year to year, and also road access is fairly consistent.

Question: It sounds like you have about 900 bait permits. Do you have any problems from the public land management agencies like the Forest Service about allowing baiting on those public lands?

Beecham: Quite the contrary. They were more than happy to give that responsibility to us. We have kind of a unique situation in the West. We have three forest regions within the state and about 21 national forests. It's just a mix-mash, and every forest was handling the baiting situation differently. The Boise National Forest was requiring and charging for permits. Some forests were allocating the permits out geographically. Some in the northern part of the state were not requiring permits at all; hunters in those areas didn't have to contact the Forest Service, and the [FS] had no idea what was going on in terms of baiting. Some required you to just check-in and get a free permit. The advantage now is that we're getting a better database on what's happening with baiting. It's not the best system in the world, and we had to meet extensively with the Forest Service to work out difficulties, but it seems to be working in this first year.

MONTANA STATUS REPORT

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ABSTRACT. Over the past two decades Montana black bears have risen in status from varmints and pests to a valued wildlife species (Aderhold 1984). For example, it wasn't until 1971 that resident sportsmen were required to have a black bear license, even though black bears were classified as big game animals in Montana late in the 1930s (Weckworth, 1971).

To date there have been only two long-term black bear research efforts in Montana. Jonkel and Cowan's (1971) work in the late 1960s heightened hunter interest in black bears and increased harvest. However, these increases during the mid-1970s was interpreted as overharvest in some areas. Consequently, lack of adequate long-term population information resulted in more restrictive seasons in some parts of the state by the early 1980s. Little other research activity was evident until the mid-1980s, when Kasworm et al. (1983; 1988; 1991) and Thier (1990) began work on black bears in northwestern Montana.

In 1985 a mandatory tooth turn-in for collecting age and sex information on harvested bears was established. A set of management criteria was suggested which helped to better manage black bears. These standards were based upon the best information available on black bear management from Montana as well as from surrounding states and provinces. Management information began to accumulate after 1985 with the initiation of short-term studies in various parts of Montana and with age information from tooth returns. These projects involved live-capture, tagging, and telemetry to determine home range sizes, seasonal movements, food habits, denning ecology, reproduction, and mortality.

Montana black bears are the subject of increasing interest from the public. Given the vast array of philosophies about black bears, and their biological complexity, the Montana Department of Fish, Wildlife, and Parks (FWP) determined early in 1991 that it was necessary to bring together all available information into a comprehensive document that summarized the status of the black bear and its management potential. A draft black bear management plan was prepared in early 1993 (Olson 1993) and subsequently was used as the basis for an environmental impact statement, finalized in January 1994 (Montana Dept. Fish, Wildlife and Parks 1994).

DISTRIBUTION AND ABUNDANCE

The range of black bears in Montana probably has changed very little over the past several decades. Bears are distributed over dry to wet forested habitats and in isolated mountain ranges east of the Continental Divide (Fig. 1). Approximately 45% of the state is considered occupied habitat. In general, habitat quality and quantity are best in the northwestern corner of the state, becoming less desirable (drier) toward the southeastern portion. Bear habitat and numbers appear to follow precipitation gradients in Montana.

Little is known about densities of black bears in Montana, and no population estimates exist. For purposes of comparison, however, density estimates on various study areas in northwestern Montana indicate a range of 0.06–0.56 bears per km^2 (Jonkel and Cowan 1971; Thier 1990; Mace 1992).

Home range sizes for black bears in Montana range from 53–225 km^2 for males and 14–137 km^2 for females (Aune and Brannon 1987; Greer 1987; Thier 1990; Kasworm and Thier 1991).

HARVEST INFORMATION

Since 1985 Montana black bear hunters have been required to return the skull of each harvested bear so that a tooth may be extracted and aged. In addition, sex, date, and location of kill are recorded. When available, hides are also checked for evidence of gender and possible lactation.

Montana's annual black bear harvest has averaged 1,474 bears per year for the period 1971–1991. For the fourteen years since 1978, harvest of bears appears to have decreased (Fig. 2). Harvest has varied from 928 bears in 1972 to 1,870 bears in 1980. One thousand three hundred and fifty-seven bears were reported in 1992. By season, 50.1% of the harvest occurs during the fall and 49.9% during the spring. The fall hunting season begins the first week in September and runs through the Thanksgiving weekend. The spring season begins 15 April and generally ends by 31 May. Currently, spring ending dates vary from 15 May to 15 June.

During the spring black bear hunting season, 34.1% of harvested animals are female, compared to 32.1% reported during the fall season (data from hunter questionnaire). Overall, 32.8% of harvested bears are reported female, which is lower than the 38.5% indicated by mandatory tooth turn-in information.

From 1985 to 1991, no significant changes in median ages were noted. Female median ages ranged from 3.5 to 8.5 years, while males are generally harvested at a younger age, with a range of 3.5–6.0 years. Generally, harvested female median ages are highest for the spring period. Statewide, median ages drop during the fall season due to high numbers of yearling bears that are harvested during September.

More older males are being harvested during the spring season than the fall season, possibly because of increased vulnerability during the breeding season.

Based upon tooth return data from 1985 to1991, adult males (5+ yr.) comprised 25% of the harvest, with adult females 21%, subadult males 37%, and subadult females 17%.

Success rates for black bear hunters have ranged from 27% between 1972 and 1974 to 8% in 1987. A general trend of declining success has occurred since 1971; however, this decline has moderated since 1978. The average success rate for the period 1971–91 was 15%. For the period 1978–90, hunters averaged 11.2% success. By season, Montana black bear hunters have varying rates of success, but do the best during the spring season. Since 1978, spring bear hunters averaged 14.5% success and fall hunters 9.1%.

Montana black bear management units presently consist of 138 hunting districts designated for deer, elk, mountain lion, and black bear. These hunting districts are generally associated with coniferous forests, which make up about 25% (23 million acres) of Montana's land base. Black bear hunting is not allowed in portions of eastern Montana, and, although bears are occasionally observed, no breeding populations have been identified. Roads, rivers, and watershed divides are frequently used to identify district boundaries.

BLACK BEAR RESEARCH IN MONTANA

There have been few intensive, long-term black bear studies in Montana. Jonkel and Cowan's (1971) 1959–66 work in the North Fork of the Flathead River remains the most heavily cited Montana reference. More recently, black bear research has been initiated in the Cabinet-Yaak region of northwestern Montana (Kasworm and Brown 1983; Kasworm and Manley 1988; Thier 1990; Kasworm and Thier 1991). Other short-term projects were initiated in the 1980s, some in conjunction with grizzly research. These include the Absaroka-Beartooth area of south-central Montana (Greer 1986; Mack 1987; Simmons and Stewart 1989;

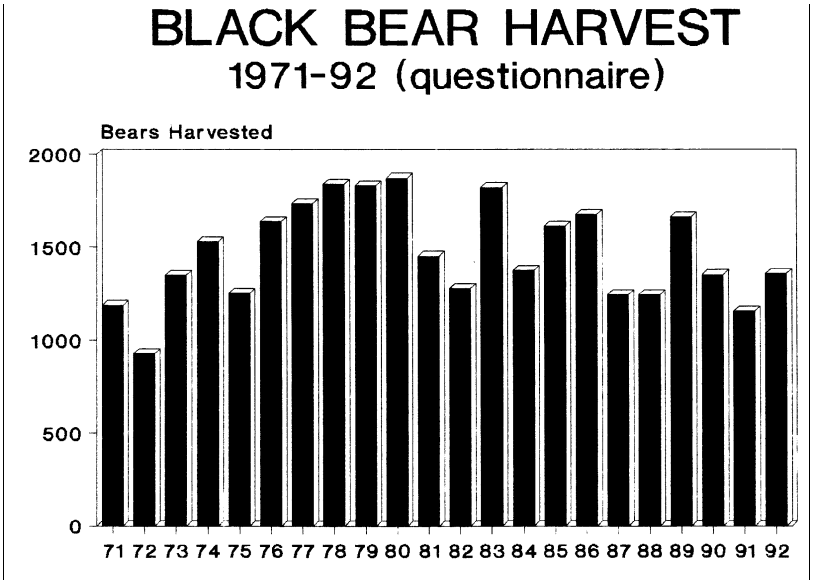

Figure 2. Black bear harvest for the period 1971–1992.

Mack 1990) and the Rocky Mountain Front in north-central Montana (Aune and Brannon 1987; Aune and Kasworm 1989). Both department researchers and graduate students have participated in these projects.

MANAGEMENT PLAN AND EIS

A draft Montana black bear management plan was finished in early 1993 (Olson 1993). Because the management plan outlined major changes, an EIS has since been completed in compliance with the Montana Environmental Policy Act.

The main objective of the management plan is to provide more protection to female black bears. Additional objectives include the following:

- Improve monitoring data on population status, composition, and trend.
- Improve the quality and quantity of biological data.
- Improve the flexibility of the annual harvest so as to be responsive to population trend data.
- Enhance public understanding of black bear biology, habitat requirements, and management.

Five alternatives were considered in the EIS, ranging from no hunting to the status quo. The proposed action includes 30 elements which are designed to assure maintenance of desirable sex and age composition of Montana black bear populations through conservative harvest of females (Appendix 1). Selected elements are discussed below.

FWP's preferred alternative maintains a spring hunt from 15 April through 31 May. (Some areas currently allow hunting until 15 June.) The fall season would begin 15 September rather than 1 September. The shortened spring season allows for protection of female bears, especially those with cubs (existing statute protects cubs and sows with cubs). The 15 September opening allows time for subadult males and females, as well as adult females and cubs to disperse from berry patches where bears tend to concentrate in early fall.

Successful hunters would be required to turn in hides and skulls for tagging. This may help determine the number of lactating females that are harvested annually. Currently, hunters need only turn in the skull for removal of a tooth, so very little data exists on orphaning of cubs. The hunter has five days to report a harvested bear.

At present, Montana maintains 138 black bear hunting districts, based upon deer and elk distribution. The management plan reduces the number of units to 26, based upon bear habitat types, accessibility, vulnerability, and harvest history.

Management criteria are established that limit harvest of female black bears to 40% of the annual harvest, while maintaining a median age of 6.5 years in females and 4.5 in males. Failure to meet the criteria for three consecutive years in any of the 26 management units would prompt re-evaluation of management strategies in that unit.

Montana will continue to prohibit the use of baits and hounds as a harvest method. Pursuit seasons are also not allowed.

Both resident and non-resident black bear licenses will be sold separately from combination packages to better assess hunter effort.

Long-term research is recommended to help estimate basic population parameters such as black bear densities, natality and mortality, effects of various hunting strategies, habitat needs, and usefulness of various monitoring techniques.

Hunters will be required to utilize bear meat. This element stresses the importance of the black bear as a big game animal rather than merely a trophy.

FWP will expand its information and education efforts through various media. Emphasis will be placed on biological and habitat needs, effects of human development on black bears, minimization of problems with garbage and pet foods in bear country, effective ways to identify grizzly and black bears, and hunter ethics.

FWP will work with other federal and state land management agencies to develop black bear habitat criteria for use in evaluating and planning such projects as timber sales, subdivisions, and livestock grazing systems.

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APPENDIX 1. Element description of the proposed action regarding black bears in Montana.

EXISTING ELEMENTS

- Hunting season format that includes both spring and fall hunting
- Use of harvest quotas in some hunting districts
- Use of ADC bear mortality data in population monitoring
- Mandatory inspection of skulls of all harvested black bears
- Prohibition on baits and hounds to pursue or harvest black bears
- Assistance to beekeepers in implementing preventative measures
- Distribution of information on bear biology and habitat requirements

ADJUSTMENTS

- Delineate new black bear management units.
- Adopt 15 September as the earliest opening date for fall hunting.
- Adopt 15 April as the earliest opening date for spring hunting, and 31 May as the latest closing date.
- Inform the public about consequences of living in black bear habitat and how to prevent human–black bear conflicts.
- Expand emphasis on hunter ethics for both adults and youth.

NEW INITIATIVES

- Develop management targets intended to maintain conservative harvest
- Mandatorily inspect and tag hides of harvested bears
- Remove black bear license from the resident sportsman's package
- Upgrade FWP shelter in Helena to better accommodate orphaned cubs
- Improve documentation/reporting system for illegal activities
- Improve documentation of nuisance bear complaints and follow-up
- Curtail chronic bear–human conflicts caused by human negligence
- Improve handling of ADC data on depredation complaints and control actions
- Require hunters to use meat of harvested black bears
- Revise statute addressing waste of fish or game (87-3-102 MCA)
- Revise statute addressing baiting (87-3-101 MCA)
- Clarify statute addressing use of hounds by FWP, ADC or agricultural operators to control depredating bears (87-3-127 MCA)
- Work with other entities to develop black bear habitat criteria
- Produce an annual, standardized statewide black bear report

PUBLIC INITIATIVES

- Encourage ADC to assist only those bee keepers who use preventative measures to protect their hives.
- Maintain bear-proof garbage containers at FWP facilities and actively encourage other agencies and private interests to do the same.
- Explore the potential to initiate a research effort to evaluate management targets and refine them if necessary.
- Explore the potential to initiate a research effort to provide needed information for use in developing habitat criteria.

NEW MEXICO STATUS REPORT

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DISTRIBUTION AND ABUNDANCE

Black bear occur throughout the mountainous areas of the state. These areas are located primarily in the north-central, central and southwest parts of New Mexico and encompass approximately 40,000 square miles of the state's 121,412 square miles of land area. Habitat types and bear densities vary greatly throughout these mountain ranges. Bear densities are generally greater in the spruce-fir forests of the north-central mountains and lower in the pinyon-juniper and ponderosa pine forests of the south. The black bear population in New Mexico is estimated at 3,000 individuals.

POPULATION MONITORING SYSTEM

Population status is monitored primarily through hunter harvest data. Successful hunters are required to present the hide and skull of their bear to a game department representative for inspection and tagging within five days of taking the animal. A premolar tooth for aging is collected and the sex of the bear, date of kill, location of kill, number of days hunted, and use of guides and/or dogs is documented. Also, a survey of all licensed hunters is attempted through an annual mail questionnaire.

MANAGEMENT OBJECTIVE AND STRATEGIES

Black bear are classified as game animals in New Mexico and their management of the responsibility of the New Mexico Department of Game and Fish. The management objective is to maintain viable and huntable populations of black bears throughout their present range. Historically, research and habitat management for the black bear have received little emphasis, and most management strategies have been related to harvest regulations and reduction of human–bear problems. Recently, the department initiated a black bear research project that will assist in development of better management strategies for the future.

SPECIES MANAGEMENT PLAN

The current black bear management plan was prepared in 1987 and is in effect until 1995. The objectives of the plan are summarized as follows:

- Implement a research project to address management needs.
- Prohibit baiting of bear as a legal harvest method.
- Determine hunter harvest through mail questionnaire surveys, hunter field checks, and a mandatory pelt tagging requirement.
- Continue to collect and evaluate information on age and sex of harvested bears, kill locations, kill dates, and use of guides and/or dogs.
- Evaluate impact of spring bear hunting on bear populations and recommend spring seasons to protect females and young.
- Manage habitat to provide sufficient cover and to protect or provide mast and other forage-producing vegetation.
- Maintain open roads at a level of no more than one mile of road per square mile of land.
- Implement resource management programs to maintain or enhance bear habitat.

RECENT RESEARCH AND PUBLICATIONS

In 1992 the department initiated a black bear research project that will assist tremendously with the future management of the bear in New Mexico. This project was contracted with the Hornocker Wildlife Research Institute and is planned to be a 10-year project to be completed in two 5-year segments. The main objectives of the project are (1) to document the population characteristics and dynamics of black bear on two study areas in New Mexico; (2) to validate the premolar cementum age analysis technique with known-aged black bear from this study and the statewide hunter harvest pelt tag program; and (3) to identify habitat quality (cover, food availability, and phenology) and weather parameters which may influence bear population characteristics and design or adapt methodologies to collect adequate data for quantifying the relationship between bear populations and their environment.

The project will be conducted on two study areas, one in the north part of the state near Cimarron and the other in the south near Reserve.

Prior to this project, the only recent bear research was a joint effort between the department and the Philmont Boy Scout Ranch. This project began in 1987 and ended in 1991. The project was geared toward solving nuisance bear problems and evaluating the success of relocating nuisance bears. Incidental to this project, some data on home range, sex and age ratios, mortality, and habitat preference was collected. The results of this project are in an interdepartment final report (Jones, D. 1991. Philmont Bear Project—Final Report, New Mexico Department of Game and Fish).

HUNTING LAWS AND REGULATIONS

Two thousand nine hundred and thirty-five residents and 339 non-residents purchased licenses in 1993 to hunt bear in New Mexico. Bear hunting licenses are available on an unlimited basis and may be purchased from any vendor in the state.

New Mexico is divided into 58 game management units and 28 of these are open to bear hunting. Following is a summary of the 1993 bear hunting regulations.

1993 HUNTING REGULATIONS

Hunting Season. September 1 through October 31, except bear season closed in any unit in which a firearms elk season is open.

Bag Limit. One bear, except any cub less than a year old or any female accompanied by a cub or cubs.

Legal Manner and Methods. Dogs may be used in hunting bear. When dogs are used in pursuit of bear, the licensed hunter intending to harvest the bear must be present continuously once any dog is released. Baiting and trapping are not legal methods of taking bear. Legal weapons are center-fire rifles or handguns, shotguns, muzzle-loading rifles or bow. There are various caliber, weight, and ammunition restrictions that these weapons must meet.

Tagging Requirements. Bear must be tagged with the tag from the hunting license and a hide tag furnished by the department. A successful hunter must make arrangements to have the hide tagged by a Game and Fish Department representative within five days of taking the animal or before taking the hide and skull out of New Mexico, whichever comes first.

HARVEST SUMMARY

New Mexico has had a mandatory pelt tag requirement and has collected age, sex, kill location, and hunter information since 1985. Tables 1, 2, 3, and 4 summarize age and sex of harvested bears and total harvest data for the years 1985 to 1993.

The department conducts a hunter harvest mail questionnaire survey each year. Questionnaire survey cards are mailed to all licensed hunters, and the response rate is usually 38–40%. Table 5 contains a summary of this information.

PROPERTY DAMAGE/DEPREDATION TRENDS AND POLICIES

Depredation problems have remained low over the years with an average of eight bears being taken per year to alleviate these problems. Nuisance bear problems continue to increase, especially around resort areas as more homes are located in bear habitat. The trend in the department is more toward educating people about bear and attractive nuisances rather than using

bear relocations to solve these problems.

PUBLIC ATTITUDES TOWARDS BEAR MANAGEMENT AND HUNTING

Generally, public attitudes have not adversely affected our bear management program. We have small segments of the public whose attitudes are at opposite extremes. One group feels that all bear should be destroyed, and the other believes that bear should be left totally unmanaged. Fortunately, the majority of the public view the bear as a valuable member of our wildlife community and understand that hunting is an important management tool.

CONCLUSION

Although some areas in the state were probably overharvested in the past, viewed as a whole, the statewide bear population is healthy, With the knowledge gained from the current research project, we will be better equipped to make management decisions concerning black bear. This knowledge, combined with more public education about the black bear, should ensure a bright future for our bear.

Table 1. Statewide spring hunter harvest, New Mexico, 1985–1991. No spring hunts were held in 1992 and 1993.

Year	Male	Female	Total	% Male	% Female
1991	37	11	48	77	23
1990	59	19	78	76	24
1989	64	14	78	82	18
1988	42	13	55	76	24
1987	46	10	56	82	18
1986	47	22	69	68	30
1985	56	31	87	64	36

Table 2. Statewide fall hunter harvest, New Mexico, 1985–1993.

Year	Male	Female	Unknown	Total	% Male	% Female	% Unknown
1993	174	139	–	313	56	44	–
1992	133	84	1	218	61	39	–
1991	138	89	–	227	61	39	–
1990	172	132	1	305	57	43	–
1989	189	89	1	279	68	32	–
1988	147	88	1	236	63	37	–
1987	146	94	1	241	61	39	–
1986	99	62	–	161	61	39	–
1985	104	63	4	171	61	37	2

Table 3. Total statewide hunter harvest (spring and fall), New Mexico, 1985–1993.

Year	Male	Female	Unknown	Total	% Male	% Female	% Unknown
1993	174	139	–	313	56	44	–
1992	133	84	1	218	61	39	–
1991	175	100	–	275	64	36	–
1990	231	151	1	383	60	40	–
1989	253	103	1	357	71	29	–
1988	189	101	1	291	65	35	–
1987	192	104	1	297	65	35	–
1986	146	84	–	230	63	37	–
1985	160	94	4	258	62	36	2

Table 4. Age structure of total harvest (percent of each age class in total harvest), New Mexico, 1985–1993.

	Year							
Age	1985	1986	1987	1988	1989	1990	1991	1992
1	19	20	14	21	7	6	7	23
2	22	17	19	14	21	9	13	13
3	13	17	15	5	13	17	16	6
4	4	11	10	15	13	13	10	13
5	8	8	8	10	11	11	9	9
6	6	6	7	5	9	13	11	6
7	6	5	5	5	5	10	5	10
8	3	4	4	5	4	5	6	5
9	4	2	3	3	4	3	6	4
10	3	3	2	3	2	3	6	4
11+	5	6	8	7	10	9	11	13

Table 5. Results of mailed hunter survey, New Mexico, 1990–1992.

						Pressure		Harvest		Hunter Days		
Year	Hunt	No. Licenses	No. Responses	% Response	% Hunted	No. Reported	No. Projected	No. Reported	No. Projected	No. Reported	No. Projected	% Hunter Success
1990	Spring	1241	531	42.8	60.5	414	968	52	122	1936	4525	12.6
1990	Fall	4829	1904	39.4	73.1	1731	4390	176	446	9631	24427	10.2
1991	Spring	1200	473	39.4	55.0	295	748	26	66	1366	3466	8.8
1991	Fall	4811	1846	38.4	72.0	1639	4272	123	321	9195	23964	7.5
1992	Fall	2438	936	38.4	74.8	824	2146	118	307	4232	11023	14.3

OREGON STATUS REPORT

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ABSTRACT. Black bears in Oregon are currently found throughout their historic ranges. Recent trends in damage complaints and harvest indicate that populations are increasing statewide. The department has initiated two separate bear studies in order to evaluate harvest and to determine densities, denning sites, home ranges, sex ratios, birth rates, habitat preferences, and recruitment rates. Public perceptions and attitudes have continued to change.

DISTRIBUTION AND ABUNDANCE

Bears are found throughout their historical ranges. Recent changes in land management practices have produced excellent forage conditions which have been conducive to increasing populations. Sighting and harvest reports indicate that bears are repopulating portions of eastern Oregon. Current population estimates, based on 40,000 square miles of habitat, indicate a stable to increasing population of 25,000 bears. These estimates are based on 0.9 bears per square mile in western Oregon and 0.3 bears per square mile in eastern Oregon.

POPULATION MONITORING SYSTEM

Population status is determined through analyzing hunter harvest and damage trends. Oregon's 1992 Black Bear Management Plan lists two criteria for monitoring harvest and population trends.

- A population will be considered over-harvested if the median age of all bears harvested is 3-years-old or less, or that of males is 2-years-old or less, or that of females is 4-years-old or less.
- The desired overall median age is 5 years or older. By gender, the desired median ages are 4 years or older for males and 6 years or older for females.

The department has instituted two separate bear studies in eastern and western Oregon. Bears have been captured through the use of snares or dogs and fitted with radio transmitters. These studies were designed to gather information on densities, home range, age structure, sex composition, mortality (all causes), general habitat preferences (M.S. project), denning sites, and hunter compliance with new special regulations. Information collected from these studies will be used to validate monitoring criteria and to develop a population model.

Oregon does not require mandatory check-in of

Table 1. Number of bear tooth samples received 1983–1991 (Trainer and Golly 1991).

Year	West Oregon	East Oregon	Total	Percent Bear Harvest (a)
1983	56	22	78	05
1984	85	68	123	09
1985	103	60	163	13
1986	114	37	151	11
1987	255	76	331	31 (b)
1988	237	135	372	40
1989	291	159	450	58
1990	322	131	453	43
1991	310	135	445	33

(a) Percentage of bears harvested (determined from hunter survey estimates for spring and fall seasons) for which tooth samples were received.

(b) First year that tooth collection envelopes were issued with purchase of bear tag.

harvested bears; however, hunters are requested to voluntarily return premolars for age analysis. In order for age data to be significant the department needs to receive teeth from at least 30% of harvested bears. Only 33% of hunters returned teeth during the 1991 season (Table 1).

MANAGEMENT OBJECTIVES AND STRATEGIES

State law directs the department to manage bears at levels providing optimum recreational value to both consumptive and nonconsumptive users. In some areas, hunting is used as a management tool to alleviate damage problems on private lands.

SPECIES MANAGEMENT PLAN

Oregon's Black Bear Management Plan was adopted in 1987 and will be revised every five years. The first revision was adopted in 1992 and is available through the department headquarters.

RECENT RESEARCH AND PUBLICATIONS

Anonymous. 1987. Oregon black bear management plan. Typescript. 26 pp.

Anonymous. 1993. Oregon's black bear management plan, 1993–1998. Oregon Department of Fish and Wildlife. Portland, 38 pp.

Hostick, G.A. 1990. Live-trap removal and release as a solution to bear damage complaints. Oregon Department of Fish and Wildlife. Informational Report. 6 pp.

Noble, W.O., E.C. Meslow, and M.D. Pope. 1990. Denning habits of black bears in the central coast range of Oregon. Oregon State University, Corvallis. 28 pp.

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Trainer, C.E., and N.E. Golly. 1992. Age and reproductive status of selected mammals: black bear age structure. Pittman-Robertson Federal Aid Report W-87-R, Study No 1, Job 5. 33 pp.

HUNTING LAWS AND REGULATIONS

Season structure has remained the same over the last several years. The general fall season runs from the end of August through the end of November. Controlled spring hunts occur in April, May, and June and are designed to alleviate damage and provide limited recreational opportunities.

Using bait and hounds is permitted, but bears cannot be trapped or snared. The bag limit remains one bear, except that cubs and sows with cubs are protected. Starting in 1991 hunters must have purchased a general season tag by midnight prior to the start of the season. Hunters who receive a spring-controlled bear tag may also participate in the general fall hunt, which allows the hunter the opportunity to harvest two bears. Hunting license and tag fees are found in Table 2.

Table 2. License and tag fees for 1992 hunting season.

	Resident	Nonresident
License	$12.50	$125.50
General tag	$10.50	$75.50
Controlled spring tag	$13.50	$75.50

HARVEST SUMMARY

Harvest is still determined by phone surveys which reach 5–15% of bear tag holders. Questions are designed to provide the department with the following information:

- Did you hunt?
- Where did you hunt?

- Were you successful?
- If successful, what sex of bear did you harvest?
- In what management unit did you harvest your bear?
- How many days did you hunt?
- What type of weapon did you use?
- By what method did you hunt (i.e., dogs, bait, stalk, incidental, call)?

This information is then extrapolated to help the department formulate a statewide perspective.

Weather conditions and more restrictive big game seasons have reduced some hunting opportunities. Harvest continues to fluctuate on a yearly basis; however, overall hunter success has been fairly stable. General season harvest is summarized in Table 3, and spring harvest in Table 4.

Table 4. Controlled spring bear hunt history, 1985–1993.

Year	Total Hunts	Total Permits	Total Hunters	Harvest	Percent Success
1985	3	290	N/A	27	N/A
1986	2	190	144	30	21
1987	3	1100	777	125	16
1988	4	700	532	123	23
1989	5	726	544	115	21
1990	6	1142	862	165	19
1991	8	1219	958	191	20
1992	9	1265	999	155	16
1993	9	1165	874	167	19

PROPERTY DAMAGE/DEPREDATION TRENDS AND POLICIES

No new statutory changes have been instituted. Interactions between bears and humans have continued to rise and appear to be related to human dispersal into rural areas and habitat changes resulting from land management practices. Significant tree damage is still being documented in western Oregon on young tree plantations. Efforts to control the damage center around trapping and killing, limited spring hunting seasons, and feed stations maintained by the forest industry. The department has had limited success in relocating damage bears. Relocated bears often returned to the original damage site, and landowners were unable or unwilling to remove bear attractants.

PUBLIC ATTITUDES TOWARDS BEAR MANAGEMENT AND HUNTING

The public has taken a more vocal position in bear management. Organized letter campaigns have been initiated in response to bear control and removal measures conducted on private timber lands. Many of these letters were from outside Oregon.

Opposition to spring bear seasons, hound hunting, and baiting were all expressed at the spring 1993 adoption of Oregon's Black Bear Management Plan. Those opposed to hounds and bait promised to place a petition before the voters of Oregon to let the public determine methods of hunting bears. The Oregon Bear and Cougar Coalition has been gathering signatures to place a measure on the November 1994 ballet that would ban the use of bait and hounds for the taking of bear and cougar. Concerns over these two methods center around sportsmanship and true hunting issues. Many people still feel that illegal take by hound hunters exceeds legal harvest and that these illegal bears are destined for the foreign parts market. Media coverage of the initiative has focused on images of bears being shot out of trees, hounds chewing on bears, and litter at bait stations.

CONCLUSIONS

Bear populations appear to be healthy, and are stable to increasing. Two studies have been instituted to provide better information for modeling and population dynamics. Public attitudes have continued to change and the department has been called upon to justify seasons and methods of take.

QUESTIONS AND ANSWERS

Question: Regarding the initiative drive in Oregon to put restrictions on harvest methods—is your agency doing anything to counter that, or does the agency agree with this movement?

Ron Anglin: Sigh!!!

Boyde Blackwell, Moderator: Is there another question? (Laughter.)

Anglin: By state law, our agency cannot take a position for or against the petition, and we have conformed to that law exactly.

Blackwell: Any harder questions?

Steve Cranney, Utah Division of Wildlife: Are there other organizations, not state agencies, that are in on this fight with the petition initiative?

Anglin: There are groups on both sides of the issue that are taking an active role in collecting signatures for the petition. There is an Oregon Sportsman's Coalition, representative of 25 different sports groups, that is taking a very active role in opposition to the petition. Both sides have come to us for biological information, and that's the role that we as a state agency are serving.

Gary Olsen, Montana Dept. of Fish, Wildlife & Parks: Are hounding and baiting heavily outfitted in Oregon?

Anglin: No, we don't see that. If you look at Oregon's demographics, a lot of the people came from the South in the 1930s and 1940s and they brought a lot of their southern traditions along. The hound hunting community is a small, closely-knit group, and a lot of them are loners. We have had, however, quite a bit of outfitting and guiding going on since California was shut down, because people started coming over the boarder. I suspect that we see some outfitting in northeastern Oregon where baiting is allowed, but overall outfitting is not a major issue in the state.

Table 3. Oregon general bear season and harvest summary.

YEAR	SEASON DATES	AREA	TAGS SOLD		HUNTERS	HARVEST MALE	FEM	UNK	TOTAL		HUNTER SUCCESS	HUNTER DAYS	DAYS/ HUNTER	DAYS/ BEAR
1975	JULY 01-DEC. 31/ AUG. 01-NOV. 30	ENTIRE STATE	17,924		16,247	–	–	–	1,841		11%	148,092	9	80
1976	AUG. 01-DEC 31/ AUG. 01-NOV. 30	ENTIRE STATE	14,660		11,043	–	–	–	1,074		10%	102,557	9	96
1977	AUG. 01-DEC. 31/ AUG.01-NOV. 30	ENTIRE STATE	15,847		12,833	–	–	–	920		7%	133,570	10	145
1978	AUG. 01-DEC.31	3/4 OF STATE	8,770		NO SURVEY	–	–	–	506		–	–	–	–
1979	SEP. 01-NOV 30	3/4 OF STATE	15,705	*	11,324	–	–	–	812		7%	118,338	10	146
1980	AUG.23-NOV.30	ENTIRE STATE	14,762	*	11,072	–	–	–	958		9%	–	–	–
1981	AUG.29-NOV.30	ENTIRE STATE	15,503	*	10,124	–	–	–	783		8%	113,722	11	145
1982	SEP.04-NOV.30	ENTIRE STATE	21,586	*	16,756	–	–	–	1,313		8%	196,713	12	150
1983	AUG.27-NOV.30	ENTIRE STATE	25,474	*	20,500	–	–	–	1,420		7%	314,325	15	221
1984	AUG.25-NOV.30	ENTIRE STATE	26,753	*	NO SURVEY	–	–	–	1,350	**	–	–	–	–
1985	AUG 24-NOV.30	ENTIRE STATE	25,863	*	NO SURVEY	–	–	–	1,250	**	–	–	–	–
1986	AUG.23-NOV.30	ENTIRE STATE	25,928	*	20,748	800	476	100	1,376		7%	239,346	12	174
1987	AUG.22-NOV.30	ENTIRE STATE	25,496	*	17,666	600	277	77	954		5%	202,879	11	213
1988	AUG.20-NOV.30	ENTIRE STATE	20,771	*	15,920	501	236	66	803		5%	169,335	11	211
1989	AUG.26-NOV.30	ENTIRE STATE	19,467	*	16,781	417	216	31	334		4%	202,125	12	304
1990	AUG.25-NOV.30	ENTIRE STATE	20,375	*	17,080	596	274	18	888		5%	217,459	13	245
1991	AUG.24-NOV30	ENTIRE STATE	12,020	***	9,569	733	388	51	1,172		12%	117,616	12	100
1992	AUG.29-NOV.30	ENTIRE STATE	16,573	*	11,882	555	237	13	805		7%	160,004	13	199
1993	AUG.27-NOV.30	ENTIRE STATE	17,160	*	13,734	840	323	15	1,178		9%	N/A	N/A	N/A

* Tag sale deadline
** Based on report card returns
*** Tag sale deadline changed to 23 August in 1991 from 28 September in 1990

Bag limit: one bear. Cubs less than 1-year-old and sows with cubs are protected.

TEXAS STATUS REPORT

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INTRODUCTION

Prior to European colonization, black bears (*Ursus americanus*) inhabited all of Texas except the extreme southern portion. The original four subspecies included the Louisiana black bear (*U. a. luteolus*), American black bear (*U. a. americanus*), New Mexico black bear (*U. a. amblyceps*), and Mexican black bear (*U. a. eremicus*) (Hall 1981). As human populations increased, the black bear population subsequently began to decrease. The decline of the native bear population in Texas was primarily attributed to subsistence and sport hunting and predator control. Human encroachment on bear habitat and domestic livestock grazing also contributed to this decline (Taylor 1993a).

By the mid-1900s the resident bear population had been totally extirpated from Texas. From 1960 to 1987, there were occasional sightings and reports in the forests of east Texas and rugged mountain ranges of west Texas. These bears were believed to be transients from Louisiana, New Mexico, or Mexico. Since 1988 black bear sightings have increased substantially in west Texas. Recolonization of bears into the Chisos mountains of Big Bend National Park is occurring. The black bear is classified as an endangered species in Texas.

DISTRIBUTION AND ABUNDANCE

The current statewide bear population in Texas is estimated to be fewer than 50 animals. In 1993, two small resident breeding populations were reported in the Guadalupe Mountains National Park (GMNP) and the Big Bend National Park (BBNP) in west Texas.

The Guadalupe mountains are located in Culberson and Hudspeth counties the northern Trans-Pecos region on the Texas-New Mexico state line. Little information is known about this bear population; however, previous estimates by GMNP personnel suggest that this area has a resident, breeding population of 6–8 individuals. Additionally, the extent of bear movement across the New Mexico state line is unknown. Due to limited bear habitat south of the Guadalupe mountains and the unknown effects of bear hunting in southeastern New Mexico, this population will probably remain stable at a relatively low density.

Big Bend National Park is located in the big bend area of the Trans-Pecos region on the Texas-Mexico border. The Chisos mountains are an isolated range found within BBNP and currently has a growing, viable bear population estimated at approximately 12–15 individuals. In 1988 there were 26 reported bear sightings which rapidly increased to 502 sightings in 1993 (Skiles, unpublished data). With this increasing bear population, human–bear interactions have also increased. Bears have entered campsites, occasionally destroying camping equipment in search of food. BBNP personnel are currently addressing the situation by bear-proofing garbage containers, providing bear-proof boxes, and increasing information and educational programs (Skiles, unpublished data). Bear numbers outside the high visitor use areas of the Chisos mountains is unknown; however, sightings from these areas are not uncommon. The recolonization of bear to their native habitat within the big bend area of Texas is an exciting development. This population may provide the necessary resource for further expansion and recolonization of bears within other historic mountain ranges of west Texas. According to Taylor (1993a), the Davis mountains located in Jeff Davis county in the central Trans-Pecos region has excellent bear habitat and has historically held healthy populations of black bears.

Bear activity has also been reported more frequently outside National Park boundaries in the

Chinati mountains and Davis mountains of west Texas and scattered reports come from central and south Texas. While some of these reports may indeed represent resident individuals, most are believed to be migrants from Mexico. In 1993 the first documentation of two accidental bear mortalities within the same year were investigated which included a roadkill and a transformer electrocution (Taylor 1993).

There are several factors accounting for the increasing bear population in west Texas including good reproductive success in Mexico and BBNP, and the ban on bear hunting in Mexico. Improving attitudes in Texas and Mexico as well as improved agricultural and livestock practices have enhanced the habitat and contributed to this population increase (Taylor 1993b).

While no resident breeding population is believed to exist in east Texas, a habitat suitability study was initiated in 1993 to determine if suitable habitat exists in this region where potential black bear restoration and management can be directed. The current management strategy in Texas includes total protection, information transfer, public education, research, and preparation of a black bear management plan.

LITERATURE CITED

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Taylor, R. B. 1993a. Black Bear Status. Performance Report, Texas Parks and Wildlife Department, Austin, Tex. Fed. Aid Proj. W-125-R-4, Job 68. 7 pp.

Taylor, R. B. 1993b. Texas Status Report. Pp. 73–76 *in* Proceedings of the Fourth Western Black Bear Workshop (J. Keay, ed.). Yosemite National Park, California, 144 pp.

QUESTIONS AND ANSWERS

Hal Black, Brigham Young University: Do you have any evidence that bears eat armadillos? Are they ever on the same turf?

Raymond Skiles: Armadillos may well be a very valid food source for bears, although armadillos do not extend into the western portion of the state; we don't expect them to be an influence there.

Tom Beck, Colorado Division of Wildlife: Are there any plans for the re-establishment of black bears in other areas of the state.

Skiles: Only now are we beginning to have an opportunity because of changing attitudes. With so much of the northwestern Texas land being privately owned, working with private ranchers is the only avenue. A number of ranchers have shown interest during preliminary contacts from the state. If plans can be organized regarding freedom of property, then it appears that reintroductions are very possible. One potential action in the state which might be controversial is the downlisting of black bears before we actually have viable populations. That option is only considered because it may take something like that to assure land owners that they will not lose autonomy on their property. Frankly, it's a source of a great deal of fear and consternation that any endangered species found on private property might mean all kinds of changes for the way owners do business. Those few cases of federal interference after the location of endangered species on private property have caused an immense schism and a great barrier to working together on many issues.

David Cagle, Arizona Game and Fish Dept.: You said that Texas Parks is looking at habitat suitability in east Texas. Is that in Big Thicket? And are you considering a down-road reintroduction of the Louisiana subspecies?

Skiles: It *is* the Big Thicket and the region around there. Reintroduction as an objective is not the case yet, because it appears as though there may be a natural reintroduction occurring like the one we had in Big Bend National Park. In fact, last year several bears were seen in east Texas and were creating a great deal of excitement where ever they went. Then they vanished. It was thought that they were migrants from Louisiana.

UTAH STATUS REPORT

BOYDE H. BLACKWELL, Wildlife Program Coordinator
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DISTRIBUTION AND ABUNDANCE

Utah has approximately 8,712,266 acres of available black bear habitat. Black bear habitat includes most areas along the Wasatch mountain range, the high Uinta Mountains, the Book Cliffs, and other isolated regions in southeastern areas of the state (Fig. 1). The estimated population size of black bears in Utah is 800 to 1,000 individuals and the population appears to be stable.

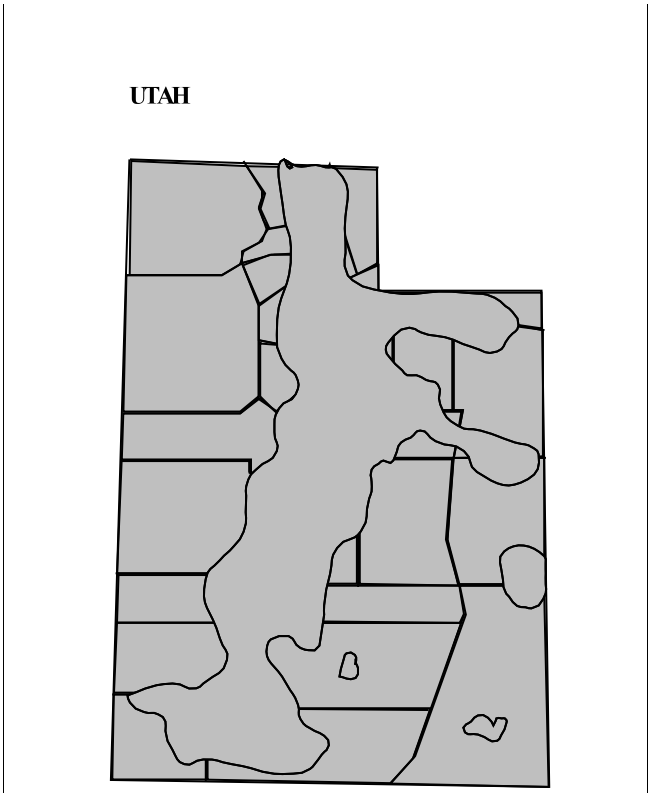

Figure 1. Black bear habitat in Utah (8,712,266 Acres).

POPULATION MONITORING

Utah has a 48-hour mandatory check-in for all bears taken during the sport hunt season. A premolar is taken, sectioned, and aged. These data as well as sex, number of hunter days, and hunters afield are used in building indices to estimate the health of the state's bear population on a unit basis. A population study conducted by Dr. Hal L. Black of Brigham Young University is currently underway in Utah. He is determining whether population trends can be measured from information obtained from yearly track surveys.

HUNTING LAWS AND REGULATIONS

For the 1993 season the Utah Wildlife Board elected to discontinue the spring bear hunt in Utah. This regulation was continued for the 1994 season as well and may continue into the future of bear hunting in Utah. There are 169 permits available for the 1994 season in a limited entry system for 23 units in various areas of the state. The 1994 season dates are 27 August–4 October and 5–30 November.

Bait may be used only after the hunter receives a valid bear permit and registers a bait station with the Division of Wildlife Resources. Bears may be taken by archery tackle only when hunted over bait. Each bait hunter may only operate one station and do so within the season dates (i.e., no pre-baiting). Hounds may be used to hunt bear during the regular season, but hounds may not be run off of bait stations. Successful applicants must wait two years before applying again.

Table 1. Summary of Utah black bear harvest data, 1967–1993.

YEAR	NUMBER PERMITS SOLD	TOTAL HUNTERS AFIELD	TOTAL SPORT HARVEST	PERCENT MALES	PERCENT FEMALES	BEAR/ PERMIT HOLDER	DEP. HARVEST	TOTAL DAYS FOR SUCCESSFUL HUNTERS	AVERAGE DAYS/SUC HUNTER	PURSUIT PERMITS SOLD
67			15				12			
68			12				9			
69	43	31	25			0.81	27			
70	155	119	9			0.08	18			
71	59	48	17			0.35	16			
72	96	77	19			0.25	7			
73	125	114	25			0.22	0			
74	134	117	29			0.25	9			
75	161	144	22	59%	41%	0.15	2			161
76	107	96	10	58%	42%	0.10	7			48
77	149	127	26	67%	33%	0.20	6			77
78	222	185	40	67%	33%	0.22	10			114
79	240	196	26	81%	19%	0.13	5			91
80	217	177	26	72%	28%	0.15	6			95
81	263	227	39	70%	30%	0.17	4			95
82	229	188	38	61%	39%	0.20	6			93
83	219	176	18	56%	44%	0.10	9			98
84	217	184	26	69%	31%	0.13	6			33
85	269	230	29	73%	27%	0.13	10			86
86	332	302	72	55%	45%	0.23	6			90
87	326	262	44	65%	35%	0.17	25			156
88	491	394	69	65%	35%	0.17	28			173
89	687	556	97	70%	30%	0.17	10			187
90	142	119	22	82%	18%	0.18	16			355
91	142	119	35	77%	23%	0.29	15	220	6.2	364
92	142	124	32	81%	19%	0.26	25	227	7.1	524
93	162	136	35	49%	51%	0.22	12	161	4.6	570
AVERAGE	248	228	37	67%	33%	0.18	11	203	6	179

Any bear is legal in Utah excepting cubs and females accompanied by young. The season limit is one bear. All black bear pursuit and harvest permittees are sent a questionnaire to collect information on pursuit and hunting efforts. Since the start of a limited entry system, all available black bear harvest permits have been sold. An average of 12 bait permits are issued per year.

LIVESTOCK DEPREDATION

If a bear is harassing, chasing, disturbing, harming, attacking, or killing livestock, or has committed such an act within the past 72 hours: the livestock owner, an immediate family member, or an employee of the owner on a regular payroll, and not hired specifically to take bear, may kill the bear; The livestock owner may notify the Division of the depredation who shall authorize a local hunter to take the depredating bear or notify an animal damage control specialist. Depredating bear may be taken at any time by an animal damage control specialist, supervised by the animal damage control program, while acting in the performance of the person's assigned duties and in accordance with procedures approved by the Division. A depredating bear may be taken with any weapon authorized for hunting bear. Since 1967, an average of 11 bears per year are taken due to depredation of livestock—a maximum of 28 in 1988 and a minimum of 0 in 1973.

CONCLUSIONS

Based on the data collected since 1967, the overall black bear population in Utah is classified by the Division as "stable to increasing" in most areas of the state. The number of females compared to males taken in the harvest for 1993 is cause for some concern and will be monitored closely to see if a continued trend becomes apparent (Tables 1 and 2).

Public attitudes towards bears and bear hunting continue to change in Utah as well as in other states. There is increased conflict between various interest groups concerning bear management. These attitudes must be addressed, and in many cases alternative uses of the resource must be investigated. The Division is currently planning a survey of Utah residents to poll opinions on bear hunting and hunting methods in Utah. Results will be available and reported at the next Western Black Bear Workshop.

Table 2. Black bear harvest, 1993.

BLACK BEAR PERMIT SALES	
Resident bear permits	147
Nonresident bear permits	15
Total bear permits	162
Archery-Bait Registration Certificates	29
Cougar-Bear Pursuit Permits Sold	570
Number Pursuing Bear*	104
SPORT HARVEST	
Hunters afield	162
Number of bears taken	35
Total days/successful hunter	161
Average days/successful hunter	5
Percent hunter success	22%
Adult males harvested	14
Subadult males harvested	3
Adult females harvested	17
Subadult females harvested	1
Percent males harvested	49%
Percent females harvested	51%
DEPREDATION HARVEST	
Government trappers (ADC)	11
Livestockmen	1
Total	12
Known Illegal Kills and Accidents	2
TOTAL KNOWN MORTALITY	49

QUESTIONS AND ANSWERS

Unidentified: Could you elaborate on the 1993 harvest? You said there was an increase in the bait stations, but only two bear were harvested using that method. Was the bulk of the harvest with hounds?

Boyde Blackwell: Yes, only two bear were taken over bait stations last year. Additionally, one bear was taken in a chokecherry patch and another by stalking after a rainy day. All of the rest were taken using hounds. We obtain this information from the mandatory check-in process.

Unidentified: To what do you attribute the reduced success even though there were more bait stations?

Blackwell: According to hunters who used bait, bear were just not coming into the stations. Utah experienced wet conditions the year prior and the mast crop was very good, so there was a lot of natural food available. A lot of hunters came in wanting to change their permits for that reason.

Gary Olsen, Montana Dept. of Fish, Wildlife and Parks: Boyde, what effect does your end-of-August opener have on the percentage of females in the fall harvest. Do you feel that date is strategic? And when are those bear harvested?

Blackwell: In 1993 most of the female bears in the harvest were taken in August and early September. We had a lot of people who were very concerned that they were never going to see a bear. When we went to the fall hunt, a lot of people said, "Well there goes Utah's bear hunt. They're never going to kill another bear in Utah." We had always taken bear in the spring. As you can see from the data, that notion was wrong. We actually harvested two more bear in the fall than we did last spring or the spring before.

Unidentified: Boyde, it looks like your depredation harvest is relatively high compared to your sport harvest—15 bear to depredation and 30 to sport. What is the definition of depredation and when can ranchers or land owners contact ADC to come out and take an animal? Does a loss have to be reported or is recent harassment justification for contacting ADC? Does simply seeing a bear constitute harassment?

Blackwell: Harassment is chasing, hazing, and causing damage, but to some ranchers simply seeing a bear would be depredation. If we're going to issue a depredation permit, we need to verify the damage and determine that it was done by a bear. Once again, depredating bears are not moved; they are destroyed. Also, under a state program sheep or cattle ranchers who do experience depredation can be paid half of their market value up to 50,000 dollars.

Scott Davis, Utah Division of Wildlife Resources: As I recall, Utah law says that the property owner and his full time employee have the right to shoot a depredating animal provided they immediately report it to the Division of Wildlife. Is that correct?

Blackwell: Yes, we were talking about ADC before. If ADC is going to take the bear, damage must be verified.

Question: ADC took 11 and you gave one depredation permit—does that mean other ranchers took them also? Did he give that permit before he took it or after he took it? I'm confused between state law and the permit system I guess

Question: I thought Scott just said that state law says he could have taken that bear without a permit.

Blackwell: He could have.

Question: Is that happening more than we know or do they have to report that after they take it

Blackwell: If a bear is taken they still have to report it and that bear becomes the property of the state. Or he can pay the money and he can keep the bear.

Unidentified: Do you have statewide population estimate for black bears?

Blackwell: The estimate for the Utah bear population is between 800 and 1000 individuals. That is using available habitat as compared to other studies that we have done. It is not something that we like to use as a hard-fast figure. We try to manage using indices, whether it's harvest data or whether it's percentage of success per unit. We also pay attention to the number of females that are taken. If we can see that our percentage of success is very low and the number of females in the harvest is also very very low, then we may be able to increase that unit.

WASHINGTON STATUS REPORT

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INTRODUCTION

Washington's black bear management program is changing, and will continue to change, over the course of the next several years. Black bear, cougar, and furbearer management responsibilities were combined in May 1993, and as a result we now have a full-time program manager dedicated to these species. The Department of Wildlife is also changing. In July of this year we will officially be merged with the former Department of Fisheries, creating a "new" Department of Fish and Wildlife. Current and projected black bear management strategies are highlighted in the sections below.

DISTRIBUTION AND ABUNDANCE

Black bear reside in 31 of Washington's 37 counties, with bears occupying all forested habitats within western Washington, the Cascade Mountain Range, the Okanogan Region, and the Selkirk and Blue Mountain ranges. Only two island counties within the north Puget Sound area and the arid, shrub-steppe habitat of the Columbia Basin do not support resident black bear populations.

No current black bear population estimate is available. A 5-year black bear research investigation, set to begin this summer, will examine bear densities by habitat type and annual mortality rates for selected sex and age cohorts. This information should allow for future population estimation and population modeling.

CURRENT MANAGEMENT AND REPORTING

Black bear management in Washington is currently based on manipulations of the harvest through hunting season length and hunting technique. Washington has no general spring bear season, and the limit is one bear per hunter per season. Generally, both bait hunting for black bear and the use of hounds are legal harvest methods. (There are some local area closures to baiting and hounding).

Information on our black bear harvest is obtained from a combination of mandatory hunter report card and bear tooth submittals (successful hunters only), and from post season questionnaires that sample 10% of our bear tag buyers. Information generated allows us to determine the total bear kill, including the sex and age composition of the harvest, the method of take, and the geographic distribution of the kill. Information is collected and analyzed at the Game Management Unit (GMU) and regional levels. Regions are administrative groupings of Game Management Units that allow efficient biologist and officer deployment.

FUTURE MANAGEMENT AND REPORTING

The Washington Department of Wildlife will begin drafting the state's first black bear management plan later this year. Based on Washington's State Environmental Policy Act (SEPA), an Environmental Impact Statement (EIS) may also be prepared prior to or as a complimentary document to the management plan.

The management plan will emphasize a need to refine and enhance the way in which bear harvest data are collected and analyzed. The creation of (1) habitat-based Bear Management Units (BMUs); (2) guidelines for implementing harvest season changes based on sex, age, and kill information; and (3) bear population estimation surveys will be included as future activities.

Changes to hunter reporting and collection of harvest information will center around the initiation of mandatory bear hunter checking stations, where hunters will be required to bring bear carcasses. It is believed

that this is the best way to improve the quality of harvest data. Increasing the hunter questionnaire sample from 10% to at least 30% may also be done to enhance data on hunter success and methods.

DAMAGE AND NUISANCE ACTIVITY

The bulk of black bear–caused property damage occurs on private industrial timber lands in western Washington. Black bear peel the bark from conifers—primarily Douglas fir—in order to expose and consume the inner sapwood (phloem). Generally, peeling activity occurs in the spring of the year in stands 15 to 30 years of age. The trees, particularly those 8" to 12" DBH, become attractive to bear usually following precommercial thinning activity. The thinning stimulates photosynthetic rates and sugar production making the trees especially palatable to bear during a time of year when natural foods are not readily available. Historically, the Department of Wildlife has cooperated with the Washington Forest Protection Association (WFPA) in allowing localized, "hot-spot" hunts on timber lands that are experiencing black bear timber damage. In 1985, WFPA began a black bear supplemental feeding program. The program, designed to alleviate peeling damage, has effectively reduced the number of black bear hot-spot hunts that occur each year.

Other black bear damage activity includes livestock, orchard, and apiary depredations. Human population growth and development has also led to increases in black bear urban nuisance complaints. The Department of Wildlife is currently completing a statewide policy on the handling of nuisance black bear and cougar. The policy specifies circumstances in which animals will be (1) monitored, (2) captured and relocated, or (3) captured and destroyed. Later this year efforts will be made to increase the reporting rate and the consistency with which field information on nuisance black bear activity is received.

POPULATION MONITORING SURVEYS

Currently, the Department of Wildlife has no surveys specifically designed to monitor populations or population trends for black bear. This is a priority for the program, and plans are currently being made for a statewide tetracycline marking project to occur in 1996. The tetracycline effort will provide a statewide population estimate. Long-term population trend monitoring will then begin in 1997 with the initiation of black bear bait station index routes.

REGULATION CHANGES

Statewide general hunting seasons are established for all species in three year increments. In June 1993, we began the public review process that will ultimately lead to adoption of the 1994–1996 hunting seasons by the Wildlife Commission. Recommendations currently being finalized include regulations on the use of bait to hunt black bear. Currently there are no regulations governing this activity, and concerns for the practice of unregulated bait hunting are shared by the agency, hunters, non-hunters, and anti-hunters alike. Restrictions on the type, timing, and placement of baits will allow us to address issues of sanitation, habituation, aesthetics, and grizzly bear recovery.

HARVEST SUMMARY

Black bear harvest information since the Fourth Western Black Bear Workshop is presented in Table 1. Our harvest over the last three years has increased slightly, with the percentage of females in the harvest and hunter success rates remaining stable. In 1993, still hunters ("boot" hunters) took 28% of the total harvest; bait hunters took 46%; and hound hunters accounted for 23% of the total bear kill.

Table 1. Washington bear harvest and hunter information, 1991–1993.

	Hunters		Harvest	
Year	Total #	Success	Total	% Female
1991	10,839	13%	1,379	37.0%
1992	11,648	12%	1,442	36.5%
1993	12,179	12%	1,507	35.0%

QUESTIONS AND ANSWERS

Teresa DeLorenzo, International Bear News: I know that the timber industry has been doing a lot of work with feeding stations. Can you give us an update on how that is working?

Stephen Pozzanghera: Stations to me has a different connotation. What you are referring to is a supplemental feeding program run by the Washington Forest Protection Association [WFPA]. They are actually feeding bears in and around vulnerable 18 to 30-year-old Douglas fir stands. Bears will concentrate on these stands especially, after they have been thinned, get that growth spurt, and produce high sugar cambium. Trees are vulnerable in the spring of the year before other foods are available to bears; so, the feeding program usually starts 1 April and concludes at the end of June. Last year WFPA put out 260 thousand pounds of bear pellets.

Boyde Blackwell, Utah Division of Wildlife Resources: Have you found an increased number of bears gathered around those areas waiting to be fed? And then do they disperse?

Pozzanghera: The one thing I do want to make clear is that while the department does view the feeding program positively, remember it is not a department program. It *has* been effective in reducing timber damage, as several analyses have shown. I guess the question is about concentration of bears. We've heard from the WFPA that they've produced some excellent video footage [documenting the feeding stations], and it is not a situation in which these sites are acting like magnets. What you are actually doing is feeding the resident bear population in and around these adjacent stands of trees.

D.J. Schubert, Fund for Animals: Regarding the North Cascades Grizzly Bear Recovery Zone, I'm confused about where baiting will and will not be permitted. I think you said that hunters will be allowed to bait within the recovery zone that is out of wilderness areas. Is baiting already restricted in wilderness areas?

Pozzanghera: Remember, the zone is not yet designated. There are basically going to be three situation management areas. Situation one's are undesignated areas—primarily Forest Service lands. [Situation two's were not discussed.] And then there are situation three's, which for our purposes are urban areas where you don't want grizzly anyway. Baiting will be allowed within the undesignated areas.

Schubert: Has there been any consideration of limiting hound hunting within the recovery area?

Pozzanghera: At this point the draft chapter identifies hound hunting as an issue that will be investigated.

WYOMING STATUS REPORT

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DISTRIBUTION AND ABUNDANCE

Black bears are found primarily in the mountainous areas of Wyoming. These areas include the Bighorn, Medicine Bow, Shoshone, Bridger-Teton and Targhee national forests. Bear populations that occupy the Bighorn and Laramie Peak mountains are isolated from other suitable habitat by either high elevation grasslands or sagebrush dominated deserts. While the Snowy Range and Sierra Madres are extensions of suitable habitats from northern Colorado, the occupied habitats within Wyoming are also geographically isolated from other black bear populations. The western and northwestern portions of the state offer the largest amount of suitable habitat for black bears, some of which is also occupied by grizzly bears (*Ursus arctos horribilis*). Little is known about the status of black bear populations in most of Wyoming's suitable habitat.

POPULATION MONITORING SYSTEM

Harvest data is the only source of information available for assessing the status of bear populations. A mandatory harvest reporting system exists for all black bears harvested in the state. This system has been in place since 1979. Hunters who harvest a bear must present the skull and carcass to a Wyoming Game and Fish (WGFD) employee who then collects two teeth for aging and records location of the kill, sex, number of days hunted, and use of bait. A survey conducted in 1992 indicated that 96% of licensed bear hunters complied with the reporting requirement.

MANAGEMENT OBJECTIVES AND STRATEGIES

Historically, Wyoming has had both a spring and a fall hunting season. Spring seasons typically began on May 1 and closed on June 30. In 1992, all but two hunt areas shortened the length of the spring season to reduce harvest rates on females. Currently, most hunt areas close on or before June 7. The fall season usually runs from September 1 until November 15.

Baiting has been permitted in most of the state except in Hunt Areas 25 and 26, near Cody, and within the recovery zone and food storage restriction zone for grizzly bears. Baiting appears to be a very successful technique for harvesting bears during the spring season. In fact, most of the bears killed are shot over baits. Conversely, most of the bear harvest during the fall season is opportunistic, usually occurring in conjunction with big game hunting. In the fall of 1993, the U.S. Forest Service closed all of its lands in Wyoming to bear baiting. They intended to prepare an Environmental Analysis on this issue, but to date nothing has been completed. It is not known if the moratorium will be in effect for the 1994 spring seasons.

SPECIES MANAGEMENT PLAN

A black bear management plan was developed during 1993. Significant recommendations in this plan are as follows:

- Increase public involvement and conduct a statewide survey of Wyoming residents relative to black bear management issues.
- Establish management criteria to assess impacts of hunting on black bears.
- Develop Black Bear Management Units (BMU) that represent "populations" of black bears and correspond to known black bear distributions. Adjust all hunt area boundaries to coincide with BMU boundaries. All management data will then be analyzed by BMU.

- Establish annual female mortality quotas to control harvest rates of females.
- Continue to allow baiting but limit the amount, type, and density of baits.
- Pursue legislation to stop the sale of bear parts and increase the penalties associated with the illegal take of black bears.
- Change current damage statutes to allow private interests to take bears only after consultation with WGFD employees and only when necessary to prevent personal injury and loss of private property, emphasizing non-lethal control.

RECENT RESEARCH AND PUBLICATIONS

The Wyoming Cooperative Studies Research Unit at University of Wyoming, Laramie is initiating research on black bears within the Medicine Bow National Forest near Laramie.

Initial research is being conducted to test the feasibility of using bait station surveys to assess population trends in the Snowy Range and Greys River BMUs.

Moody, D. (ed). 1993. Wyoming Game and Fish Department, Black Bear Management Plan. 40 pp.

University of Wyoming, Survey Research Center. 1992. Bear Hunter Survey. 10 pp.

University of Wyoming, Survey Research Center. 1994. Public Attitude Survey on Black Bear Management in Wyoming. 8 pp.

HUNTING LAWS AND REGULATIONS

1. Bag and possession limit: One black bear may be taken during any one calendar year.
2. Baiting
   a. Using baits for black bear hunting is permitted in all hunt areas except where Forest Service regulations prohibit and areas within the grizzly bear recovery area.
   b. Bait station locations must be registered with the Forest Service or WGFD.
   c. Baits are limited to one per sq. mi.
   d. Baits must be a nontoxic biodegradable substance, not to exceed 200 lb. enclosed in a rigid container

Table 1. Wyoming harvest statistics, 1984–1993.

	Spring			Fall			Totals		
Year	Male	Female	Total	Male	Female	Total	Male	Female	Total
1984	77	33	110	56	37	93	133	70	203
1985	89	43	132	70	27	114	127	70	198
1986	87	37	124	70	44	114	157	81	238
1987	89	38	127	41	23	64	130	61	191
1988	86	58	144	56	25	81	142	83	225
1989	90	59	149	44	23	67	134	82	216
1990	91	47	138	52	32	84	143	79	222
1991	111	57	168	48	22	70	159	79	238
1992	98	60	158	40	22	62	138	82	220
1993	91	49	140	67	31	98	158	80	238
Mean	91	48	139	54	29	85	145	77	222
Percent	66	34	63	64	36	37	65	35	

of wood, metal, or plastic no larger than 8 cu. ft.
   e. No baits may be placed more than seven days before the opening of the spring or fall season.
   f. The hunter's name must be visibly attached to the container.
   g. All baits must be at least 200 yd. from water.
   h. All baits must be at least 200 yd. from roads or pack trails.
   i. All baits must be at least 0.5 mi. from any developed campground, picnic grounds, or buildings.
   j. All bait must be removed no later than seven days after close of the season.
3. Reporting kills: Hunters taking black bears must retain the pelt and skull from each black bear taken. Within 10 days after harvesting a black bear, the pelt and skull must be presented to department personnel for examination and reporting.
4. Limitations: Any black bear, except cubs or females with cubs at side, may be taken in open areas during season dates and open shooting hours (sunrise to one hour after sunset). Season dates are generally from 1 May to 15 June during the spring season and 1 September to 15 November during the fall season.
5. Dogs: Dogs may not be used to hunt, run, or harass black bears.

HARVEST SUMMARY

Since 1979 black bear harvest has increased by 77%. However, total harvest from 1984 to 1993 has not varied considerably, ranging from a low of 192 in 1987 to a high of 238 in 1993 (Table 1). Total harvest has averaged 222 bears for the last ten years. Males comprised 65% of the total harvest, averaging 145 per year. Annual statewide harvest of females has increased approximately 50% from 61 in 1987 to 82 in 1992. Harvest rate of females has increased a dramatic 100% since 1979.

Approximately 63% of the total bear harvest occurs during spring seasons. Spring seasons also account for 63% and 62% of the total male and female harvest, respectively (Table 1).

In Wyoming, estimates of the number of sportsmen who exclusively hunt black bears have only been collected since 1988. Prior to this, all general elk licenses contained a bear tag enabling thousands of elk hunters to opportunistically hunt bears during the fall season. Hunter estimates prior to 1988 were obtained from random sampling of elk hunters. From 1984 to 1992, number of hunters has increased from 2837 to 4094. Number of spring hunters has increased over 100% in the last ten years, while number of fall hunters has only increased by approximately 17% (Table 2).

It would appear that spring hunters are more successful at harvesting black bears than fall hunters. This is probably due to the influence of baiting. While spring hunters account for only 32% of the total hunters, they harvest 63% of the total bears annually. While days per hunter are relatively constant between seasons, days per harvested animal are markedly lower for the spring season (Table 2).

Wyoming has developed criteria for monitoring harvest rates on black bears. These criteria are based on research from Idaho and Colorado and include percent females in the harvest, percent subadult females of total female harvest, and median ages of harvest animals for both sexes (Table 3).

We have analyzed data for the recently completed Bear Management Units for the last five years. These data indicate possible problems with current harvest

Table 2. Number of hunters and recreation days, 1984–1993.

	Spring		Fall		Total	
Year	Hunts	R. Days	Hunts	R. Days	Hunts	R. Days
1984	699	4,107	2,138	13,010	2,837	17,117
1985	1,229	7,761	1,997	11,947	3,226	19,708
1986	1,230	8,951	2,274	14,141	3,504	23,092
1987	1,204	8,479	2,363	14,702	3,567	23,181
1988	1,172	8,601	2,729	19,148	3,901	27,749
1989	759	5,441	2,934	19,700	3,693	25,141
1990	1,446	10,269	2,508	15,677	3,954	25,946
1991	1,366	9,194	2,618	17,502	3,984	26,696
1992	1,531	10,474	2,563	16,337	4,094	26,811
1993*						
Mean	1,182	8,142	2,458	15,796	3,640	23,938
Percent	32	34	68	66		
Days/Hunt		6.8		6.4		
Days/Kill		58.2		214.0		

* 1993 data not available.

rates on females. To address these concerns, Wyoming is proposing to implement female mortality quotas for all BMUs either in the spring or fall of 1994.

PROPERTY DAMAGE/DEPREDATION

Table 3. Wyoming Game and Fish harvest criteria for black bears.

Criteria	Desired	Overharvest
% Female Harvest	≤ 35%	≥ 40%
% Male Harvest	–	≥ 60%
% Subadult female to Total Female Harvest	–	≥ 35%
Median Age		
Female	≥ 6 Yrs.	≤ 4 Yrs.
Male	≥ 4 Yrs.	≤ 2 Yrs.
Total	≤ 5 Yrs.	≤ 3 Yrs.

TRENDS AND POLICIES

Wyoming statute allows for any black bear damaging private property to be killed by the owner, employee, or lessee of the property. Damage generally occurs in high elevations where domestic stock, particularly sheep, are grazing in bear habitat. Damage payments often reflect recurring localized problems. Concerned livestock caretakers who destroy visible bears may explain why bear numbers in some quality bear habitats appear lower than expected. Proposed changes in depredation regulations were discussed above (see Species Management Plan).

PUBLIC ATTITUDES TOWARDS BEAR MANAGEMENT AND HUNTING

Public Attitude Surveys

Public attitude surveys were conducted to assess the attitudes towards black bear management and hunting from bear hunters and the general public. Three key findings are highlighted below.

- The majority of respondents do not presently hunt, while only half have ever hunted. This is not surprising since slightly over half of the respondents were females.
- Roughly half the respondents have little or no knowledge of black bear management or harvest in Wyoming, nor are they aware of the controversy surrounding bear baiting and spring hunting.
- Slightly over half, 52.3% agreed that bear hunting in Wyoming should continue. Approximately one-third (31.9%) felt that spring hunting should continue while only 16% agreed that the use of baits should continue.

Comparison Of The Public Attitude And Black Bear Hunter Survey (1992)

Only 20.3% of the black bear hunter respondents favored elimination of the use of bait for hunting black bear, while 65.5% of the general public respondents were in favor of eliminating it.

Of the black bear hunter respondents, 52.4% supported shortening the spring season to reduce female harvest, while 76% of the public respondents supported a shorter season.

CONCLUSIONS

Black bear management within Wyoming is beginning to change from traditional methodologies used in the past. It is likely that future harvest regimes will focus on female mortality quotas established for individual bear management units. We also hope to improve our knowledge of black bears through increased research efforts.

QUESTIONS AND ANSWERS

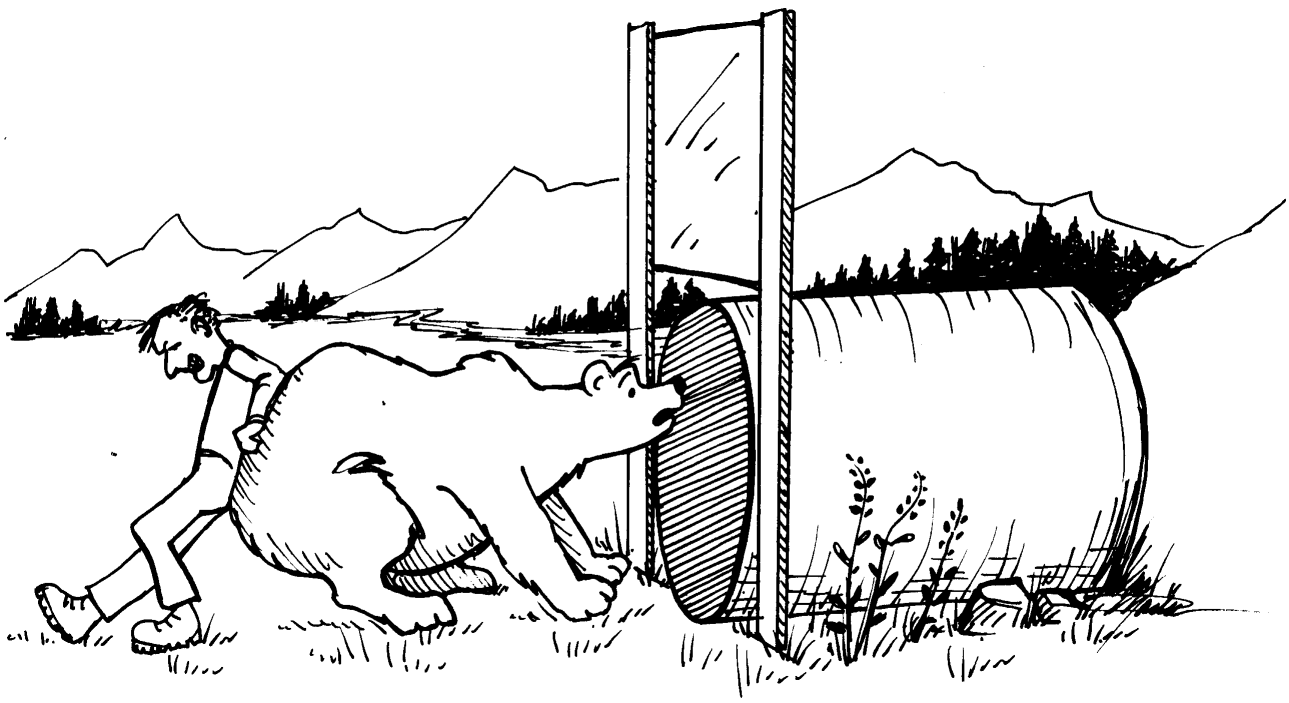
John Beecham: I have an observation on the geographic distribution of bait sites that you are proposing. At one station per square mile, hunting pressure will be distributed evenly across your black bear habitat. I suspect that arrangement will have a greater potential for [negatively impacting] the bear population than if you let hunters group stations leaving reservoir areas in between. The proximity of bait sites is a social issue. If you want to put in a stand in the tree right next to me, maybe we have to duke it out to see who gets to shoot the bear. As far as I'm concerned, that is the baiter's problem.

Tom Beck My concern is this—assuming the Forest Service vacillates and puts another moratorium on baiting, you're still going to have baiting open which

forces everybody to the private land [20% of total]. I suspect private lands contain some of those island populations that you are already concerned about. So, you are going to force all of your hunters to one bait, and those guys love their bait and are very mobile into small places. I can see the potential for massive overharvest occurring even in one year. It is not so much Joe from the drugstore, but if Joe happens to be an outfitter that books 15 or 20 hunters. . . Do you have a plan for that contingency?

David Moody: I agree with you, and no, we don't have a plan. We could not get our administration off of dead center to even deal with this issue until a month ago. And here we are in the process of trying to set spring seasons. The recommendation of the black bear committee was to eliminate baiting, yet I see our administration falling into the same traps that your administrations fell into years ago. We don't seem to want to learn from our mistakes. I'm not sure how to deal with the potential overharvest. You're right—the emphasis is going to shift. I envision that the BLM, which has basically taken a backdoor to this whole issue, may follow suit with the Forest Service and eliminate baiting on the remaining portions of the public land excepting state lands.

POSTER ABSTRACTS



VIABILITY AND GERMINABILITY OF SEEDS FROM SEVEN FLESHY-FRUITED SHRUBS AFTER PASSAGE THROUGH THE BLACK BEAR

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ABSTRACT. Throughout their range American black bears consume diverse fruits in copious quantities as they increase fat reserves prior to denning. Given their mobility, large gut capacities, and long retention time relative to birds, it is surprising that the role of bears in seed dispersal is so poorly known. A logical first step is to determine the effect of bear digestive processes on seed vigor. The two papers on this topic (Krefting and Roe 1949; Rogers and Applegate 1983) are preliminary in nature, but both conclude that passage through a bear's gut does not kill seeds. This work compares the viability, germinability, and germination rate of control seeds, seeds passed through free-ranging bears, and seeds passed through captive bears (housed at Washington State University under care of C. Robbins).

Fleshy-fruited species examined are found in the diets of black bears from Utah and represent a variety of color, size, fleshiness, nutritional content, and seed characteristics. They are serviceberry (*Amelanchier alnifolia*), squawapple (*Peraphyllum ramosissimum*), chokecherry (*Prunus virginiana*), Oregon grape (*Mahonia repens*), Skunkbush sumac (*Rhus trilobata*), Snowberry (*Symphoricarpos oreophilous*), and blue elderberry (*Sambucus cerulea*).

Fruit and scat collection was done in late summer 1992. Seeds were air-dried and stored at room temperature until germination experiments began in April 1993. Tetrazolium viability tests on 100 seeds from each species and treatment were performed, and results were analyzed using Chi square tests. The generalized design for germination experiments included eight replications (petri dishes) of 25 seeds in each of five chill durations at 1°C (no chill, 5 wks., 10 wks., 15 wks., and 20 wks.). Post-chill incubation consisted of five weeks at 10/20 °C (12h:12h). Seeds in chill and incubation were checked every week. Due to limited seed availability, some treatment combinations were not available. Total germination was defined as the percent of viable seed that germinated. Percentages were arcsin transformed and subjected to two-way ANOVA analysis using ingestion treatment and chill regime as main effects. For serviceberry, squawapple, and Oregon grape, germination rate was analyzed using a similar ANOVA, with weeks to 50% germination (W50) as the dependent variable.

Filled control seeds were highly viable (>74%). Excepting serviceberry, where viability fell 14% for seeds passed through captive bears, digestion had no significant effect on initial viability ($p<0.05$). Once imbibed in germination chambers, however, rosaceous seeds passed through captive bears were highly susceptible to fungal attack.

Germination of control seeds summed over five cold stratification regimes (1 °C) was significantly different from that of at least one bear ingestion treatment for four of the seven species. For Oregon grape and skunkbush sumac, ingestion by wild black bears enhanced germination, but for snowberry control seeds germinated better. All viable serviceberry seeds germinated after sufficient chill, but germination of controls was higher than ingested seeds after shorter chill durations. No significant differences were detected between ingestion

treatments for squawapple. Finally, chokecherry germinated too poorly to obtain reliable comparisons, and blue elderberry did not germinate under any ingestion treatment or chill regime.

A 5-week prewarming before cold stratification resulted in significantly increased overall germination of Oregon grape, skunkbush sumac, and snowberry. Prewarming lengthened the minimum chill requirement of serviceberry from 7 to 14 weeks. Trends seen in rate graphs support the notion that effective prewarming of seeds may result from passage through a bear. Implications include increased germinability over a broader range of weather conditions or prevention of premature winter germination depending on the species.

Scarification, as shown in scanning electron micrographs for skunkbush sumac and serviceberry, may be responsible for increased germination in hard-seeded species and for decreased vigor in soft-seeded species passed through captive bears.

Taken alone these data do not fully legitimize bears as seed dispersers. Future work involves characterization of scat deposition sites, exposure of seeds in scats to predators and secondary dispersers, and the relative importance of bears in communities containing other dispersal agents.

RESPONSES OF BLACK BEARS TO MANIPULATED LEVELS OF HUMAN DISTURBANCE AT ANAN CREEK, TONGASS NATIONAL FOREST, ALASKA

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ABSTRACT. Wildlife viewing programs that provide opportunities to observe large mammals have gained wide acceptance and have increased in popularity and demand. The FS Anan Creek Bear Observatory, located on the Cleveland Peninsula, is becoming increasingly popular among those who wish to observe black bears (*Ursus americanus*) at close range. This study is designed to provide information on tolerance thresholds of bears for human activity for the USDA Forest Service, as well as gain a better understanding of the behavior and ecology of these animals.

Primary objectives are to document individual variation in black bear responses to human activity, to investigate effects of different levels of visitor use on bear behavior, and to determine whether responses of bears to human activity vary depending on food abundance and availability. From 17 July–4 September 1993, 308 hours of observations of bear and human activity were logged at the upper falls (no visitor use) and lower falls (high visitor use) of Anan Creek. Human use was monitored over the summer months of 1993. A qualitative estimate of fish availability was devised based on the observed density of salmon across the mainstream and sidepools of Anan Creek. Preliminary results showed that black bear activity was significantly higher at the upper falls (no visitor use) than the lower falls (high visitor use). For both tagged and untagged bears, males exhibited a preference for the upper falls while females with cubs were observed more frequently at the lower falls. Hypotheses explaining disproportionate use of the lower and upper falls by different sex classes include differences in fish capture success, amount of cover present, and human disturbance between the two sites as potential causal factors. Large individual variation in activity level, bout lengths, and other behaviors was evident within the group of tagged black bears, highlighting the importance of detailed examination of the differences in behavior between and within individual subjects. As this was the first year of the study, analyses and interpretation remain limited. Data will continue to be collected over the summers of 1994 and 1995.

BLACK BEAR DENNING BEHAVIOUR AND SITE SELECTION IN COASTAL B.C. FORESTS

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ABSTRACT. Black bear (*Ursus americanus*) winter denning habitat requirements are being studied in coastal British Columbia as part of a larger three-year black bear study in the Nimpkish Valley on northern Vancouver Island. The study was initiated in 1992 to examine the effects of logging old growth forests on black bear denning behaviour and habitat needs. Data from the first winter indicates that bears den in large diameter trees, stumps and logs (mean = 148 cm DBH, N=17) in both old growth and second growth stands. All dens in second growth stands are associated with residual attributes of old growth (N=4). These structural elements (large stumps and logs) will eventually decay and be absent from third and successive rotations. Forests are currently managed primarily for timber and fibre production on short rotations (<100 yrs.). This time-scale will not allow trees to reach sizes suitable for creating new dens. Habitat manipulations will be attempted to observe the response of bears to loss of previously used dens. The attributes of typical dens and their surrounding habitats will be determined in order to test hypotheses about den selection and assist in developing guidelines for managing black bear denning habitat in coastal forests.

BEAR-PROOF FOOD STORAGE AND SOLID WASTE COLLECTION SYSTEMS

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INTRODUCTION

The problem of food conditioning and human habituation in bears has led to the development of several innovative designs for bear-proof food storage lockers and bear-proof solid waste collection systems. Among the most widely used designs are those developed by Haul-All Equipment Systems in Lethbridge, Alberta, and their American licensee McClintock Metal Fabricators in Woodland, California.

Recognizing that bears will forage not only in trash cans, but in cars, dumpsters and landfills as well, Haul-All Equipment Systems and McClintock Metal Fabricators advocate a systematic, comprehensive approach to bear-proof food storage lockers, refuse/recycling receptacles, dumping containers, and regional transfer stations. The following is a brief description of the various elements of the Bear Management System.

HYD-A-MEAL™ BEAR-PROOF FOOD STORAGE LOCKERS

These 23-cubic-foot-capacity food lockers are designed for installation in campgrounds, picnic areas, and remote back-country campsites. Their proven effectiveness in keeping hungry bears away from food is attributable to several key design features which are common to all other products in the Bear Management product line. Among these features are special recessed latches which are built into narrow door handles that are inaccessible to bear claws. Other key features include rugged 12-gauge galvannealed steel construction, and close manufacturing tolerances which eliminate exposed edges where bears can pry with their claws.

For reliable performance and long life, latches and hinges are stainless steel, and all units are painted with an industrial polyurethane coating.

Hyd-A-Meal Food Storage Lockers are equipped with doors on each end for user convenience and easy cleaning. The doors are easily opened from the inside to prevent children from getting trapped inside. The large size of the Hyd-A-Meal ensures ample room for the biggest coolers, with space left over for additional items. Legs can be ordered in various lengths according to customer requirements.

HYD-A-BAG® RECEPTACLES

Hid-A-Bag Bear-Proof Refuse/Recycling Receptacles have been used for years in parks throughout North America. Recessed bear-proof latches are installed on both the user lid as well as on the rear loading door. A front edge riser at the base of the covered latch on the user lid provides added protection against bear access. Also, the standard user access lid is self-closing to prevent users from leaving the unit open. (Optional lids for disabled persons are not self-closing.) The rear loading door is also protected: the two covered latches must be disengaged simultaneously in order to open the door.

As with all products in the Bear Management System, Hid-A-Bags are constructed of sturdy, rust-resistant 12-gauge galvannealed steel and finished with an industrial-grade polyurethane coating. They are shipped with mounting skids for bolt-down installation. Available in 32, 60, 70, and 130-gallon models, Hid-A-Bags use a unique tilt-out bag rack to minimize lifting and protect operators from back injury during unloading.

HYD-A-WAY® SELF-DUMPING HYDRAULIC CONTAINERS

These stationary, hydraulically powered self-dumping bins are designed for high-use areas where conventional dumpsters are commonly used. Available in 2, 4, and 6 cubic-yard models, Hyd-A-Way containers are anchored in position so they can't be tipped over or rolled around by foraging bears. They also are fully enclosed, and have bear-proof latches. This prevents bears from climbing inside the container, which is a common problem with conventional dumpsters.

Hyd-A-Way containers are designed for use with Haul-All's side-loading collection vehicles, which are available in 12, 14, 15, 18, and 30 cubic-yard models. The self-dumping process is accomplished by a single driver by quick-connecting a hydraulic line from the truck to the container to execute the dumping cycle. Other types of trucks can be outfitted with power take-off units to operate the Hyd-A-Way containers. The hydraulics can also be powered with a stand-alone power pack.

Haul-All trucks can be outfitted with an optional pressure washer to keep containers clean and free of odors that attract bears.

TRANSTOR® REGIONAL COLLECTION SYSTEMS

These 42-cubic yard self-dumping transfer stations are designed to replace those small landfills where bears love to congregate for supper. A typical transfer site is developed by establishing a grade separation, and pouring concrete footings for mounting the bin. A backhoe and pole auger are also required. The Transtor can be shipped to the site in sections to be assembled at the time of installation.

As with the Hyd-A-Way dumping container, the Transtor's hopper is rotated to the dumping position with the use of hydraulic quick couplers mounted on the transfer trailer. The unit can be dumped by a single driver. After a number of sites have been dumped, the transfer trailer goes to the regional landfill and empties the load.

FOR FURTHER INFORMATION, PLEASE CONTACT:

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AN ANALYSIS OF MULTIPLE PATERNITY IN THE AMERICAN BLACK BEAR USING *RAPD* DNA FINGERPRINTING

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ABSTRACT. We examined the possibility of multiple paternity in black bear litters (*Ursus americanus*) from eastern Utah. The Randomly Amplified Polymorphic DNA Polymerase Chain Reaction (RAPD-PCR) was employed to generate "fingerprints" for eight families (17 cubs) and 20 potential fathers. A similarity index of band sharing coefficients was calculated. The population had a high overall average similarity (0.786), which is not unexpected when using RAPD markers. This made assigning specific paternity based on band sharing difficult, as many of the fathers were closely related. Instead, we looked at relatedness between cub pairs, and for some, similarity fell below the known first degree relative similarity value of 0.869. Among all three families with three cubs, two cubs were always more closely related than either were to the other cub. Relatedness within these families was lower than the overall within family relatedness suggesting that all three families had at least two fathers. Relatedness in families of two cubs was not as conclusive, but at least two families showed evidence of multiple paternity (lower than average cub similarity). A computer generated phylogenetic tree using the program PAUP was constructed. Some families did not cluster together indicating multiple paternity, and these results correlated with five of eight conclusions based on band sharing. RAPDs produce dominant marker's; therefore, heterozygotes are not detectible. Paternity evaluations would be more straightforward if techniques that do allow heterozygote detection and\or amplify more polymorphic regions of the DNA were employed.

GENETIC EVIDENCE OF HISTORICAL EVENTS IN A BLACK BEAR POPULATION

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ABSTRACT. To assess the amount of genetic variation in a population of black bears from the North Fork of the Flathead River, in Montana, a 317 base pair segment of the D-loop of the mitochondrial DNA (mtDNA) of 40 individuals was sequenced. Sequences were then analyzed to reveal both the amount of genetic variation and the distribution of variation found within the population. Analysis revealed that on average, sequences from the population differ at 1.65% of their nucleotides, with the most divergent sequences differing at 4.75%. However, the distribution of pairwise differences between sequences revealed that the mtDNA types fall into two distinctly different evolutionary lineages. Within each lineage, sequences differ at less than 0.13% of their bases, while between lineages, the difference is approximately 4.2%. This peculiar distribution of variation is best explained by a migratory event. The results of analyses using methods summarized by Crandall and Templeton (1993) support this hypothesis. The data of Slatkin and Hudson (1991), however, suggest that alternatives to a migratory event may explain the distribution of variation as well.

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PRELIMINARY ROAD TRACK SURVEYS OF BLACK BEARS IN UTAH

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ABSTRACT. Track surveys were conducted as an ancillary project during the third summer of a five-year study of black bear ecology and biology in the Book Cliffs of east-central Utah. Initial observations indicate that road tracking may be a valid technique for measuring population trends. From June to early August 1993, two 16-kilometer road transects along the Book Cliffs Divide Road were monitored on a regular basis for frequency of bear tracks. A total of 24 surveys yielded 97 sets of tracks (52 sets on the east transect, 45 sets on the west). When compared to front pad width (FPW) measurements of captured bears, front track widths (FTW) measured from track surveys were consistently smaller ($p < 0.05$). Among captured bears, FPWs larger than 11.5 cm corresponded to males 86% of the time; thus, FTWs wider than 11.5 cm most likely belong to males.

INVITED PAPERS

BLACK BEARS IN BIG BEND NATIONAL PARK - THE TEX-MEX CONNECTION

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ABSTRACT. Black bears (Ursus americanus) historically inhabited the area now included in Big Bend National Park (Bailey 1905), located on the United States (U.S.)–Mexico border in southwest Texas (Fig. 1). Extirpated as a resident breeding population by the time of park establishment in 1944, bears occurred only temporarily or as transients until recent years. Strong evidence exists that bears migrating from existing populations in Mexico have become breeding residents of the park. National Park Service (NPS) managers and staff are implementing a bear management program designed to ensure continued success of the population and minimize bear–human conflict.

INTRODUCTION

The national park system of the United States provides sanctuaries for protection of native species. Many NPS units were established only after some species had been extirpated from the respective park area. *NPS Management Policies* (1988) encourage restoration of extirpated species through management action. Restoration of animals having the potential to prey upon livestock adjacent to parks have often been delayed, or have not occurred, due to expense, controversy, and legal challenges.

Native species restoration which occurs through natural processes, however, puts the species in a position equal to other native species. Management then must emphasize perpetuation of native animal life as part of the natural ecosystem of the park, and minimize human impacts on natural animal population dynamics (NPS Policies 1988).

HISTORY

Black bears (*Ursus americanus*) now inhabit approximately 10% of their former range in the U.S. (M. Pelton, University of Tennessee, pers. comm.). Once ranging widely throughout Texas, black bears were by the 1940s reduced to remnant populations in the mountains of the Trans-Pecos and in the east Texas Pineywoods. By the late 1950s, native black bears had been extirpated from east Texas (Fleming 1980). Schmidly (1977) reported that occasional sightings of transient bears had occurred during the 1960s, but by 1977 there was no evidence of resident bear populations remaining anywhere in the Trans-Pecos.

Vernon Bailey (1905) reported black bears were abundant in the Chisos Mountains during his 1901 survey. Borrell and Bryant (1942) described black bears in 1936 and 1937 as "fairly common in the higher parts of the Chisos Mountains, particularly in Pine Canyon," and documented reports by local persons having seen bears on the Mesa de Anguila, Dead Horse Mountains, and lower slopes of the Chisos Mountains. Black bears in search of food visited Civilian Conservation Corps camps during 1940, (Moore 1994) as visitor facilities were being constructed in anticipation of the area becoming a national park.

Evidence for the decline of black bears in the Big Bend include Borrell and Bryant's (1942) report of ranchers killing bears. Professional trappers assisted in removal of potential predators from the area. One trapper, Mitt Smith, employed by private ranchers, then by the government, reported trapping three bears between 1932 and 1945 (Maxwell 1948). Recreational hunting also contributed to the decline of black bear populations in the Big Bend. Area residents made

hunting trips to the Chisos Mountains, often successfully taking black bears (B.P. McKinney, Texas Parks and Wildlife Department, pers. comm.).

Big Bend National Park was established in 1944, and now consists of 801,000 acres (324,291 ha) of mountain, desert, and river terrain (Fig. 1). Since 1944, native park wildlife have been protected from consumptive uses, and livestock grazing has occurred only upon several private inholdings within the park boundary.

Historic and current black bear observation records from all available sources have been compiled into a computer database maintained by NPS staff at Big Bend. NPS reports indicate bears continued using the park for several years following park establishment. In 1944, bear observations were recorded at several locations in the Chisos Mountains, and on the Mesa de Anguila, a lower, more arid range west of the Chisos (Senter 1944). One bear observation was reported the following year (Anon. 1945).

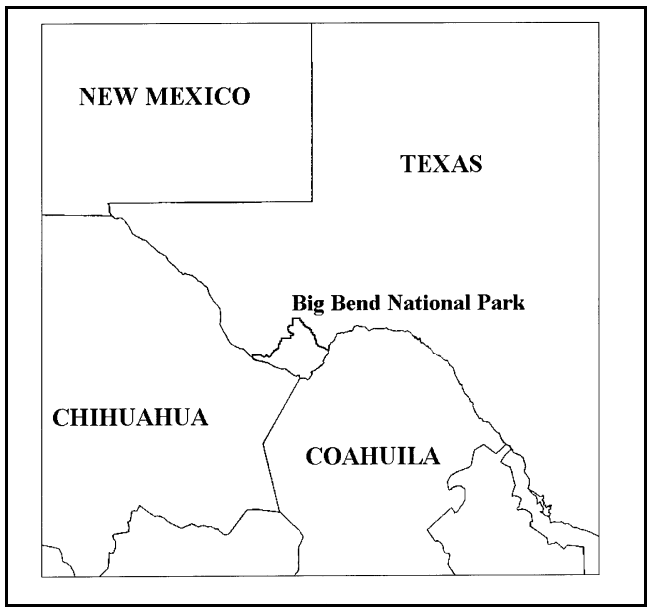

Figure 1. Location of Big Bend National Park.

It wasn't until 1949 that more bear observations were recorded, when two bears were reported in Brushy Canyon, just east of the park (Maxwell 1950). In 1950, two reports were recorded of bears in the Chisos Mountains; a brown-phase bear near the Basin service station, and a black bear climbing a century-plant stalk near the Window (Maxwell 1950).

From 1950 through 1955, sporadic bear observations were recorded by park staff. Several bears used the park during 1951 and 1952 (Maxwell 1951, Sholly 1952). Still, no records indicated production of young. The Chief Ranger estimated 8 to 10 bears were using the park in 1953 (Sholly 1953), and he wrote that "one raided trail camp at Laguna Meadow during spring," possibly representing the first conflict between park visitors and bears. Three bear observations were recorded in the 1954–1955 biennial animal census report (Steele 1955), including one at Panther Junction, location of park headquarters and employee housing. In 1957, bear sign was reported in Brushy Canyon (Miller 1958).

During the following decade, observations were limited to several in the northern Deadhorse Mountains prior to and during 1962 (Evans, 1962).

By the time further bear observations occurred in 1969, wildlife sightings of importance were being recorded and filed at park headquarters on Natural History Field Observation cards. That year park naturalist William Rabenstein made the first photographic documentation of a bear in the park. The lone animal was traversing sparse desert near the south end of the Old Ore Road, which skirts the Dead Horse Mountains. The only other report of 1969 included an adult and two cubs, but did not describe cub size. No previous cub documentation had occurred since the park was established.

Occasional bear observations continued from 1976 through 1980, including a female with two cubs using the Chisos Mountains during 1978.

Black bears have been reported in the Chisos Mountains and other parts of the park each year since 1984. Only individual adults were observed until 1988, when observations, including photographs by park visitor David Lloyd, documented a female with three small cubs. During the same period, other adult individuals and a female with two large, possibly yearling, cubs were also seen in the Chisos Mountains.

During 1988, 27 bear observations and the presence of females with small cubs indicated that a resident black bear population was becoming re-established in Texas' Big Bend country.

The Mexican Connection

No permanent bear populations are known to have persisted on the U.S. side of the border any closer to Big Bend than the Guadalupe Mountains, 200 mi (322 km) away. The majority of transient bears reported in the park prior to 1985 were observed either in the

Chisos mountains or between there and the Sierra del Carmen range, in Mexico adjacent to the Big Bend.

The Sierra del Carmen is contiguous with Big Bend's Dead Horse Mountains, extending south into the Mexican state of Coahuila. Geologically, these mountains constitute a single range (Maxwell 1967), and are separated only by the Rio Grande–carved Boquillas Canyon. Boquillas Canyon probably does not pose a significant barrier to travel, since tributary drainages provide passageways to river level on both sides of the Rio Grande.

The Sierra del Carmen is a rugged mountain range several times the size of Big Bend's Chisos, rising to an elevation of 8,960 ft (2,731 m). The higher portion of the range, referred to locally as the Maderas del Carmen, is characterized by a diverse habitat of pine/oak/juniper woodlands. Shrub habitat dominates lower slopes and foothills. Small but permanent streams exist in many of the higher drainages.

Land use practices in Mexico contributed significantly to bear survival south of the border. Much land adjacent to Big Bend is occupied by collectively operated agricultural tracts known as *ejidos*. These tracts occupy lower, more arid regions, and their human inhabitants have placed heavy demands upon local natural resources, resulting in generally poor wildlife habitat (Carrera 1994).

Black bears are primarily forest dwellers, even when adequate food and cover is available in unforested habitat (Herrero 1979). Montane forest habitat in Mexico south of the Big Bend region occurs in isolated mountain ranges. Land use is primarily for livestock production on privately owned ranches. These ranches are often quite large, remote, have difficult road access, and receive little human influence. Owners tend to be well educated, and generally practice sustainable resource stewardship. Positive conditions provided on these private ranches, along with protection afforded the Black Bear as an endangered species in Mexico since 1986, appear to have provided suitable conditions for dispersal into the adjacent Big Bend region of Texas (Doan-Crider 1995).

MANAGEMENT

Following the increase in bear activity observed during 1988, and a record 41 observations in 1989, Big Bend National Park staff began encouraging park managers to support programs required for successful co-existence of humans and bears.

In 1990, after several near-collisions between automobiles and bears on the Green Gulch road to the Chisos Basin, the Big Bend Natural History Association provided highway signs to increase motorist caution. These signs were the first park facility changes intended to prevent human influences upon bears. That year, 77 bear observations occurred in the park.

The National Park Service has a long history of managing bears in parks, including mistakes and corrections which have led to common agreement regarding several concepts. Paramount among these is the importance of preventing bears from obtaining their first taste of foods of human origin. This frequently begins a lengthy, difficult, and expensive process of managing bears that typically become more aggressive toward humans, damage property, and often must be destroyed (H. Werner, Sequoia National Park, pers. comm.). Additionally, any bear engaged in such activity is likely to teach similar practices to other bears, particularly its offspring.

From the time bears returned as residents of the park, it was clear that a rare opportunity existed. Few if any other parks have had the opportunity to implement effective and proven bear management techniques from the beginning of a bear population's existence. If Big Bend could be successful, it would avoid the fate of other parks with significant bear populations, where financially and ecologically costly consequences of past mistakes continue being experienced today (S. Thompson, Yosemite National Park, pers. comm.).

Big Bend bear observations in 1991 indicated the trend was being sustained; 68 observations were recorded during the year. Although no bears had yet been observed obtaining food from human sources, it was clear that garbage receptacles in the Chisos Basin development and along the Green gulch road were highly vulnerable. In 1991 the park began purchasing and installing bear-resistant trash containers, replacing traditional barrels and cans. Acting upon recommendations from bear management specialists in a variety of western national parks, Hid-a-Bag containers (McClintock Metal Fabricators, Inc., 455 Harter Ave., Woodland, California 95776), were selected.

During 1992, 51 bear sightings were reported, but little additional progress was made to modify park

institutions as required to ensure a successful future for Big Bend bears.

A YEAR OF CHALLENGES

By late June 1993, over 90 bear observations had occurred. It became clear that a variety of slowly progressing bear program actions would require rapid implementation. The Park Assistant Superintendent set the park's first bear management action planning meeting for 7 June (Cheri 1993). The timeliness of the memorandum was emphasized when, on June 4, the first bear "raid" upon a campsite in Big Bend National Park since 1953 occurred. The bear damaged a backpack and obtained human food in Boot Canyon of the Chisos Mountains.

Already under construction by the Trails Maintenance Supervisor and crew were bear-resistant camper food storage boxes, installed during late summer in each of the 43 Chisos backcountry campsites. To prevent further habituation of bears to non-natural foods, campsites in the area were closed until the boxes were installed.

In response to the call for action, an interim action plan was developed to make facilities bear-resistant, provide necessary visitor and resident information, institute a bear information management system, and prepare for bear manipulation requirements (Koepp 1993).

Without additional funds, Park Superintendent Robert L. Arnberger committed operating funds from existing park programs to implement actions called for in the action plan. The plan incorporated newly identified actions with those already begun.

Facility changes included replacement of unprotected waste and recycling containers with bear-resistant containers; modification of vulnerable structures containing bear attractants; and installation of bear-resistant food containers in backcountry and developed-area campsites. National Park Concessions, Inc. (NPCI), the concessionaire operating a store, restaurant, and lodge in the Chisos Basin, agreed to provide necessary changes to their facilities as well.

An education campaign included increases in backcountry and campground ranger patrols; inclusion of bear-related messages in interpretive programs, radio announcements, park literature, and visitor center displays; bear education programs geared toward NPS staff, concession employees, and resident families; and development of signs for installation at campsites, trailheads, bulletin boards, and roadsides.

To prepare for future bear management actions, programs were initiated to institute a bear information reporting and automated data management system, and to obtain training and equipment for trapping, immobilization, aversive conditioning, tagging and monitoring of bears. Finally, the need for long-term planning and research was recognized.

During early fall, bears congregated in the upper Chisos Mountains, apparently drawn to an unusually large crop of pinyon pine (*Pinus cembroides*) nuts. On numerous occasions, bears continued to feed in pinyon pine trees despite motorists and hikers passing or watching only yards away. The convergence of people, bears, and natural foods inevitably led to bears taking interest in human foods. On the day-use-only Lost Mine Trail, a bear obtained and consumed food from an unattended knapsack, and visitors reported a young bear attempting to open a wooden food box in the bed of a pickup truck at the trailhead. The Lost Mine Trail was closed to visitor use for several weeks to prevent bear–human interaction as the nut crop dwindled.

Other incidents occurred, bringing park managers' fears to reality. Bears were seen eight times in the drive-in Chisos Basin Campground, with a bear obtaining camper food on one occasion. A large bear followed Chisos Remuda horse rides on several occasions, once blocking the trail and requiring the wrangler to return to the remuda with the day's customers. Bears came onto porches of NPCI rental cabins, and were reported peering into a room, scratching at a door, and attempting to open a soft drink vending machine. A bear followed an NPCI employee until he took refuge in an occupied cabin.

As the park's first year of significant bear-related challenges came to a close, its most intense period to date of bear–human interactions occurred. As during previous years, all Chisos Mountains backcountry campsites filled during the Christmas/New Year holiday. On the night of 29 December 1993 at least 10 of the campsites were visited by bears in search of food. Tents were ripped, backpacks destroyed, and fuel and water containers crushed. Daytime forays into unattended campsites also resulted in destruction of camping equipment. At some sites, parties posted watches to prevent lingering or returning bears from again entering camp. Similar activity occurred the following nights, and by 4 January 1994, over 30

incidents of bears attempting to obtain food from campers had occurred.

To prevent further habituation of bears to human foods, and to avoid subjecting visitors to further property damage and disturbance, the park superintendent closed 22 campsites along the Pinnacles, Boot Canyon, and Colima Trails for an indefinite period of time.

As holiday visitors departed, bear incidents and observations also declined. After the first week in January, few bear observations were recorded until late April, in spite of heavy backcountry visitor use through the spring break and Easter holidays.

Research in the nearby Serranias del Burro mountain range of Mexico revealed a period of denning and reduced activity beginning in early January and continuing until early April (Doan-Crider 1995). Similar behavior may account for the apparent reduction in bear activity at Big Bend National Park during the same period.

PLANNING FOR THE FUTURE

Following the Christmas 1993/New Year 1994 holiday events, park managers recognized the need for professional consultation in devising long-term programs to achieve successful co-existence of park visitors, residents, and black bears. Consultants with experience in varied aspects of bear management were recruited to work with park managers and staff to identify program weaknesses and outline requirements for successful bear management.

During the three day period, 25–27 January 1994, consultants and NPS staff worked together designing bear-related programs to fit specific park needs.

Steve Thompson, Yosemite National Park wildlife biologist, contributed extensive expertise in managing bears in the context of high visitor use park settings. Carrie Hunt, Hornocker Wildlife Research Institute biologist and research associate, was asked to make recommendations based upon her lengthy experience addressing bear–human conflicts in backcountry and developed areas for public, commercial, and private interests. Richard Taylor, Texas Parks and Wildlife Department biologist and principle investigator of black bear activity in western Texas, represented the need for coordinated bear management on public and private lands of the Big Bend region beyond park boundaries.

To provide the NPS with an implementation guide to short and long-term required actions, a document of *Recommendations for Bear Management at Big Bend National Park* was submitted to the Park Superintendent (Skiles 1994). Recommendations include details for (1) a multi-faceted information and education campaign for park residents, staff, and visitors; (2) prevention efforts focusing upon food, waste, and stock feed management; (3) law enforcement to provide penalties for inappropriate human activities; (4) contingencies for trapping, marking, relocating, aversive conditioning, and possible destruction of bears; (5) planning to successfully manage bears across private, state, federal, and international boundaries; and (6) research goals to provide information for predicting and preventing bear–human conflict and identifying threats to the bear population.

While a variety of essential programs have been put in place to address the most critical bear management needs at Big Bend National Park, long-term success is dependent upon completion of identified actions. The National Park Service, however, has on numerous occasions produced plans which were only partially implemented or were not implemented at all due to factors such as budget constraints, priority changes, management and staff turnover, and reduced commitment.

The steps required to make Big Bend a model of successful national park bear–human coexistence have been identified. The goals are clear, and are among the primary purposes of a national park: to provide for full reestablishment of a native species into its historic range, and to conduct human activities in a manner that minimizes conflict with native animals.

Big Bend National Park is located in a state and region of the country where little protected land and habitat exists, and where large carnivores and omnivores have largely been removed from the wild. Not only has an important component of the Big Bend National Park ecosystem been restored, but the return of black bears to Big Bend represents an opportunity for area residents and park visitors to derive the benefits of sharing common habitat with another intelligent and influential life forms.

Many reasons for encouragement but few guarantees exist that bears will thrive in the Big Bend region over the long term. Only time and commitment will tell whether we have seized the opportunity.

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FATAL INJURIES INFLICTED TO PEOPLE BY BLACK BEAR

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ABSTRACT. We analyzed reports dated between 1907 and 1993 of 37 fatal black bear attacks on human beings. Approximately two-thirds (N=25) of these fatalities occurred since 1969. We interpret this as being primarily due to increasing human activity in black bear habitat, especially in less-developed/remote areas, where fatalities appear to be more common (N=24) than in more developed areas (N=9). Geographically, fatalities can be interpreted as clustering in three epicenters: Alaska (N=5), Alberta and British Columbia (N=12), and Ontario and Michigan (N=12). Most fatalities occurred during the month of May (N=9), and the summer months of July and August (N=16). Fatal attacks during May could have been partly due to the normal unavailability of calorically concentrated foods. We interpret incidents that occurred during July and August as reflecting high exposure rates. Many people are then active in black bear habitat. In 29 out of 34 incidents where the attacking bear's motivation could be inferred based on its behaviour after the attack (eat, drag, or both to person), we concluded that the bear was acting as a predator. Anyone involved in a potentially predaceous attack should fight back using any available means. In all 18 fatal predaceous attacks where the gender of the attacking bear was positively determined, male bears were involved. This is consistent with male black bears being the more aggressive gender. Subadult male bears were responsible for 5 out of 8 predaceous fatalities in developed areas. Female bears were responsible for two non-predaceous fatalities. For incidents where the age class of the bear was known, adult bears were responsible for 12 out of 13 of the predaceous fatalities in less-developed/remote areas. In only three fatal attacks was the bear involved known to have a history of feeding on people's food or garbage. Habituation and food conditioning do not appear to be major explanatory factors for fatal incidents. Only two fatalities occurred in a national park. The overall low rate of fatal attacks by black bear on people confirms that the black bear is normally tolerant of people, but that they have lethal potential.

INTRODUCTION

Black bear (*Ursus americanus*) are correctly viewed as a species that seldom injures human beings (Herrero 1985). Herrero (1985) has referred to the typical black bear as "tolerant." The word was carefully chosen since black bear can normally exist in close proximity to people and yet not injure anyone. This is despite having the strength to do so, at least when facing an unarmed person.

In most parts of North America a person is more likely to be killed by a lightning strike than by a black or even a grizzly bear (*U. arctos*) (Herrero 1985). However, since serious injuries and fatalities do occur, studying the circumstances associated with them should give researchers clues regarding avoidance. Despite this there has been little scientific study of the nature of bear attacks on human beings. The first black bear-inflicted fatality reported in scientific literature was in 1950 (Whitlock). Since then there have been two major documentations and interpretations of black and grizzly bear-inflicted fatalities and injuries (Herrero 1985; Middaugh 1987). These studies have documented the

rarity of fatal attacks by black bear. They also offer suggestion regarding how to avoid injury.

Data reported by Herrero (1985) were North America–wide in scope but were primarily for the period up to 1980. Middaugh's (l987) data are somewhat more recent but are restricted to the state of Alaska. Published data also exist for Alberta (Tough and Butt 1993) and British Columbia (Thommasen et al. 1994). Data which we present in this paper are based on reports of black bear-inflicted fatalities throughout North America, up to and including 1993. We compare the nature of recent fatalities with those reported before to assess any trends and to further document the circumstances associated with fatalities.

METHODS

Research which culminated in publication of Herrero's book, *Bear Attacks: Their Causes and Avoidance*, was based on collection of a systematic database on aggressive encounters between black or grizzly/brown bears and people (Herrero l985). Details of database generation are found in the book. For this paper, a new North America–wide database on this topic was created by contacting all management agencies in North America with jurisdiction over bears. In the case of British Columbia, this was supplemented with data from the Division of Vital Statistics. While a substantial effort has gone into collecting this data, we cannot guarantee that it contains all incidents of black bear–inflicted fatalities for the period covered.

The database was originally managed using UNIX with a custom-written program. This was recently transformed into File Maker Pro for Macintosh by the Environmental Design Faculty's computer manager, Mark Zawalykut.

RESULTS AND DISCUSSION

A listing of the 37 fatalities analyzed in this paper is presented in Table 1. There is one fatality from British Columbia (in 1985) for which we have not yet obtained information. This incident is therefore not included in this analysis. Our data for British Columbia are consistent with those of Thommasen et al. (1994), but not with those presented by Sharpe (1994).

Twenty-five of the 37 black bear–inflicted fatalities we have recorded occurred since 1969 (Fig. 1). The decade, 1980–1989, had the highest number of fatalities, eleven. The increase in fatalities in the decades post 1969 might be due to increased amounts of human activity, such as timber cruising or hiking, in black bear habitat. The existence of better records for this period may also in part explain the increase.

Given that there are at least half a million black bear in North America there are relatively few fatal attacks on people (Herrero 1985). However, because such incidents do occur, an understanding of the circumstances might help to prevent some additional deaths.

Examination of the age of individuals killed by black bear showed that when the analysis for *Bear Attacks: Their Causes and Avoidance* was completed in l980, half of the victims were 18 years old or younger (Herrero l985). To Herrero (1985) this suggested that children were particularly vulnerable to black bear attacks as they also seem to be to attacks by cougar. However, if we look at the age of people who were killed since l980, we see that only three out of thirteen victims were of age 18 or younger. Children may still be more vulnerable than adults; however, adults we believe are now more active in the areas where fatalities are currently occurring.

Twenty-five out of 37 victims were male. We interpret this to suggest little more than males spent more time outdoors than did females.

Other variables are also acting. Geographically, fatal incidents can be interpreted as clustering in three epicenters: one in Alaska, another in Alberta and British Columbia, and the other in Ontario and Michigan (Figs. 2 and 3). Each of these areas have large numbers of black bears and this alone could be sufficient explanation for the number of fatal incidents. However, the states of California, Idaho, Maine, and Oregon also each have large numbers of black bear but no reported fatalities. Therefore, large numbers of black bear is not by itself sufficient explanation for fatalities.

However, as Herrero (1985) previously concluded, another common circumstance present in these geographical areas is the presence of black bear populations that have had relatively little exposure to people. Fatal attacks by black bear concentrate in what we have termed less-developed/remote areas. Of 33 fatalities for which we could ascertain the nature of the location, 24 occurred in less-developed/remote areas, and nine in developed areas. Only one of the nine fatalities that occurred in a developed area was inside of

Table 1. Summary of black bear–inflicted fatalities including sex and age of the person killed.

Date	Sex	Age	Country	Province/State and Location
Unknown, prior to 1980	F	<10	Canada	AB, The Calgary District
Unknown, prior to 1980	M	Adult	US	MI, Cheboygan County
17 May 1907	M	Adult	Canada	AB, Along the Red Deer River
13? Nov 1924	M	30–39	Canada	ON, The Port Arthur District
30 Aug 1929	F	<10	Canada	MB, About 5 km SW of Brightstone
7 Jul 1948	F	<10	US	MI, West of Sault Sainte Marie
– – 1953	M	50–59	US	AK, 100 miles NW of Anchorage
8 Aug 1958	F	<10	Canada	AB, Jasper National Park, Sunwapta Bungalows
– – 1961	M	Adult	Canada	ON, The Sudbury District
19 Aug 1963	M	50–59	US	AK, 10 miles NW of Manley Hot Springs
7 Aug 1967	F	10–19	Canada	BC, NW side of Okanagan Lake
1 Oct 1968	M	50–59	Canada	ON, Near the Neguageon Lake Reserve
25 Jul 1971	M	30–39	US	CO, Holzwarth Ranch, 37 miles SSW of Estes Park
16 May 1974	F	<10	US	WA, Near Glenwood
22 Jul 1976	M	Adult	US	AK, Slate Creek, 37 miles SW of Eagle
28 Aug 1976	F	Adult	Canada	AB, Hines Creek area
13 May 1978	M	Youth	Canada	ON, Algonquin Park, Along Lone Creek
13 May 1978	M	Youth	Canada	ON, Algonquin Park, Along Lone Creek
13 May 1978	M	Youth	Canada	ON, Algonquin Park, Along Lone Creek
19 Jun 1978	M	Unk.	US	MI, Porcupine Mountains Wilderness State Park
18 Jul 1980	M	10–19	Canada	BC, Leo Creek, about 240 km NW of Prince George
1 Aug 1980	M	20–29	US	AK, Glacier Bay National Monument, Sandy Cove
14 Aug 1980	M	40–49	Canada	AB, Near Zama Lake
14 Aug 1980	F	20–29	Canada	AB, Near Zama Lake
21? May 1983	M	Adult	Canada	SK, Canwood Provincial Forest
25 May 1983	M	50–59	Canada	SK, Nipawin Provincial Park
6 Jul 1983	M	10–19	Canada	PQ, La Verendrye Wildlife Reserve, Lake Canimina
29 May 1985	M	20–29	Canada	BC, 85 miles S of Fort Nelson
14 Aug 1985	F	Adult	US	WY, Grand Teton National Park, Stewart Draw
24 Jun 1987	M	Adult	Canada	BC, 100 miles E of Stewart
11 Nov 1987	F	10–19	Canada	AB, Crooked Creek, 60 km SE of Grande Prairie
26 May 1991	M	10–19	Canada	AB, Slave Lake, Martin River Campground
11 Oct 1991	M	30–39	Canada	ON, Algonquin Park, Bates Island in Opeongo Lake
11 Oct 1991	F	40–49	Canada	ON, Algonquin Park, Bates Island in Opeongo Lake
14 Jun 1992	M	20–29	Canada	ON, Kenning Township, 90 km ENE of Cochrane
8 Jul 1992	F	30–39	US	AK, West of Glennallen
10 Aug 1993	M	20–29	US	CO, Waugh Mountain

a national park and this occurred quite a while ago, in l958, in Jasper National Park.

Adequate explanation does not exist regarding why fatal black bear attacks on people appear to occur primarily in less-developed/remote areas. We doubt that this is due simply to exposure rates, because, with visitation being high in many national parks, the opportunities for black bears to interact with people are many. The hypothesis first offered by Herrero (1985), still seems to us to best explain the data. In the national parks and the more developed states, because of the high interaction potential between people and black bears, individual bears with particularly aggressive tendencies have been killed. However, in less-developed/remote areas a black bear may have little

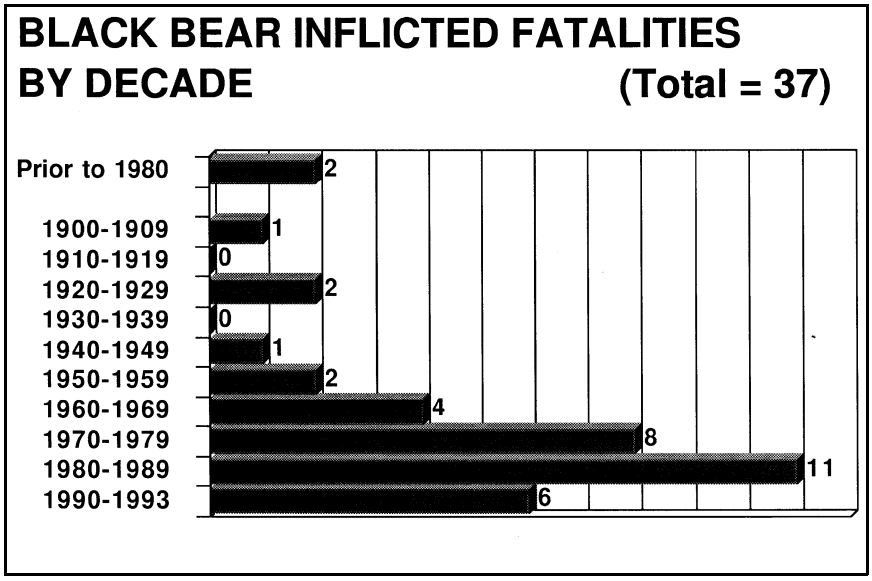

Figure 1. Black bear inflicted fatalities by decade (N=37).

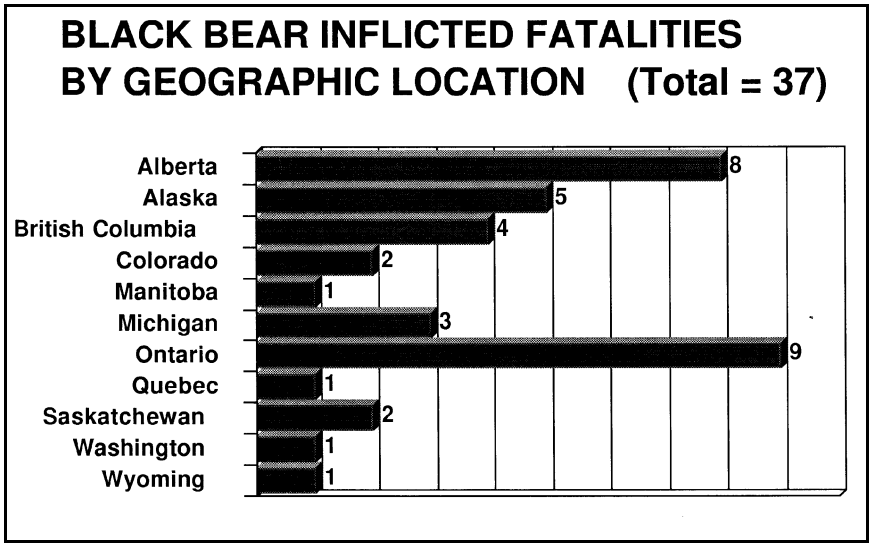

Figure 2. Black bear inflicted fatalities by geographic location (N=37).

experience with people and may be encountering a person for the first time. We suggest that some small fraction of black bear living in less-developed/remote areas somehow decide to treat a person as prey.

The inferred motivation of bears that inflict fatal injury to people thus becomes an important element in commenting on this hypothesis. Of course inferring a bear's motivation is conjectural. We have assumed that when a person is killed by a bear, and then is either dragged off, or eaten, or both, that the bear's motivation is predation. Based on this criterion, in 29 out of 34 fatal incidents where the bear's motivation could be inferred, we concluded that the bear acted as a predator with a person as the prey. There was one incident in exception to this. Based on the circumstances of the incident, we believe the bear killed the victim in response to being wounded by the victim. Although the bear fed on the victim's body, we interpret this to be a scavenging response rather than an attack motivated by predation. The inferred motivations of the five non-predaceous incidents were varied with no clear pattern emerging.

We believe the data provide solid evidence that the main reason black bear have killed people is as prey. Other researchers working with the same database could however interpret the same facts differently.

If predation is the primary motivation associated with fatal black bear attacks on people, then one might find a correlation with food stress for bears. While data are very poor in this regard, available data do not suggest that individual bears involved in fatal attacks on people were below body weights common for their cohort during the time of year that the fatal attack occurred.

If black bear–inflicted fatalities are examined according to the month in which they took place we see a fairly even distribution May through August (Fig. 4). There may, however, be proportionally more fatal incidents in May (N=9) because fewer people are out hiking or working in the woods in May than during the months of June, July, and August when more people are active outside. This means that chances of a bear encountering a person would be less in May than during the summer months. There is little food of significant caloric value for most black bear to eat during May in the areas where the fatalities occurred.

This suggests that lack of availability of caloricallly dense natural foods may be a contributing factor in some fatal attacks.

One might also hypothesize that during years of natural food crop failure for black bear, fatal attacks might increase. Four fatalities, including one discussed previously (Hatler 1967; Herrero 1985: p. 121), fit this pattern. Certainly black bear populations experience periodic stress due to food crop failure. There is no question that depredation rates may increase as black bears try to find something to eat (Herrero l985). Very rarely do people appear to become food during food crop failure years.

To further understand the circumstances associated with fatal black bear attacks on people we looked at the activities of victims preceding attack and the time of day during which fatal attacks occurred. Seven of the victims were in a tent (3), or cabin (3), or trailer (1) prior to attack. Four were cooking (2), or picking berries (2). Thirteen of the victims were walking or hiking (2), doing forestry survey work (1), doing geological exploration (3), fishing (3), or playing (4) prior to being attacked. For the remainder of the victims their previous activity was either unknown or not easily classified. Most of the fatal attacks occurred during daytime. This was true for 21 incidents where the time of attack was known. Five of the daytime incidents occurred in the evening between 1730 and 1900. Only three fatal incidents are known to have occurred at night. In two of these cases the victim was dragged out of a tent and killed. The bear involved in one of these two incidents had a previous history of feeding on people's garbage.

Black bear which become habituated to people and conditioned

Figure 3. Geographic locations with highest incidence of black bear inflicted fatalities.

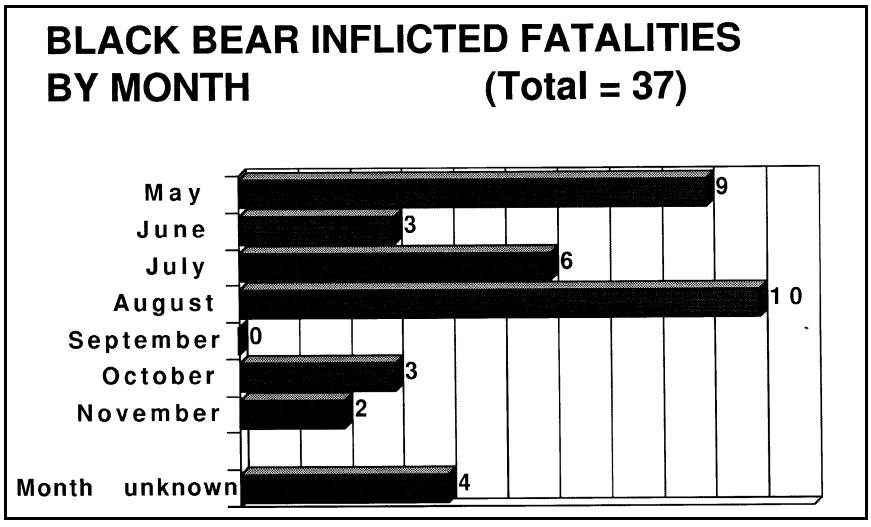

Figure 4. Black bear inflicted fatalities by month (N=37).

to feeding on people's food and garbage are likely to inflict minor injury to people when trying to get at our edibles. Herrero (1985) reported over 500 such incidents leading to minor injury (no, or less than 24 hours of hospitalization). However, since only three known fatalities have been inflicted by a black bear with a known history of feeding on people's food or garbage, this does not appear to be a major contributor to fatal incidents. This contrasts with the situation for grizzly bear that have become habituated to people and conditioned to feeding on our food or garbage (Herrero l985, Herrero l989). Grizzly bear with this sort of experience have killed at least ten people in or very nearby national parks (Herrero 1989).

We know very little regarding the characteristics of individual black bear involved in fatal attacks on people. In all cases a single bear seems to have been involved. For one fatality there is a possibility that a female accompanied by cubs that were not biologically hers was responsible. Injury, infirmity, or disease such as rabies or trichinosis were often tested for during recent decades, but to our knowledge these variables have not been found to even be a contributing factor. Data regarding the gender and age of black bear involved in fatal attacks show that for 21 fatalities where the gender was known, in 19 cases a male bear was involved. In all the cases where the motivation of the bear was inferred to be predation and the gender of the bear was known (N=18), the bear was male. In neither of the two fatalities where the gender was determined to be female was the motive inferred to be predation. A possible interpretation is that adult male black bear are more aggressive than females, and therefore are more likely to take on potentially dangerous prey such as people. The absence of any predaceous fatalities clearly attributable to a female black bear with or without cubs is further evidence regarding the reluctance of this cohort to actually attack people (Herrero 1985).

An interesting relationship emerges when the incidents are grouped by the age class of the bear and the attack location (less-developed/remote versus developed). Of the eight incidents in the developed areas where the bear's motivation was inferred to be predation, five of the bears were subadult, two were adults, and the age class of the eighth was unknown. Of the 18 incidents in remote areas where the bear's motivation was inferred to be predation, only one fatality was due to a subadult, compared to 12 due to adults. Age was unknown in the five remaining incidents.

Competition with adult bears may force some subadult bears into more developed areas. The tendency of subadults to be bold and adventuresome, combined with the right set of circumstances, may contribute to very rare cases of predation in developed areas.

CONCLUSIONS AND SPECULATIONS

The last systematic data collection regarding black bear–inflicted injury incident rates in the national parks of North America (a jurisdiction where records are particularly accurate) was 1980–1985 (Herrero and Fleck 1990). Injury rates were low to non-existent for all national parks that had black bear. This was true when rates were calculated according to mean number of visitors per year, or mean number of backcountry user nights per year. While these data are not particularly recent there is no reason to suspect significant changes within the national parks since then. These data confirm the conclusion that black bear are normally extremely tolerant of people (Herrero 1985). There also is no reason to suspect that overall injury incidence rates are higher outside versus inside of national parks. This is true even though almost all black bear–inflicted fatalities have occurred outside of national parks. We therefore conclude that black bear attacks on people are rare.

This paper and other research documents the extent and nature of known black bear–inflicted fatalities (Whitlock l950, Kaniut 1983, Herrero l985, Middaugh 1987, Tough and Butt 1993, and Thommasen et al. 1994). Such incidents are extremely rare since we have only been able to find records of 37 fatalities despite an extensive search.

Black bear–inflicted fatalities do not appear to be random events. The circumstances associated with them have already been detailed and we will only repeat a few. By examining what the bear did with the victim after death (feeding on, or dragging, or both) we concluded that a large majority of the incidents could be classified as predaceous. This is the same pattern proposed by Herrero (l985). The nature of bear behaviour during fatal incidents does not seem to have changed since. While our current paper does not present data regarding how to recognize possibly predaceous attacks, or what to do if one is involved in

such an incident, reference should be made to Herrero (1985) on this topic. We want to stress that one never offers passive resistance in such an incident, rather one fights back using every weapon available including determination, rocks, sticks, shouting, commanding position, guns, and even knives. The objective is to deter a potential predator. This conclusion was based on examining incidents that might have been fatal, as well as ones that were.

The potential for possibly predaceous attacks should not be exaggerated to condone people's abuse of black bear. The normal image of the black bear as being extremely tolerant of humankind is clearly correct.

The low human fatality rates suggest that black bear do not normally include people in their prey search image. Yet clearly they are capable of killing people, and a person if fed upon represents a lot of calories and nutrients. Why aren't more people killed by black bear? We suspect the answer has to do with millennia of coevolution during which black bears that attempted to, or actually did, prey on people usually were killed or seriously injured either by potential victims, or other people. Our belief is that black bear have encountered a superior competitor.

If people are superior competitors then perhaps this helps to explain why fatal incidents appear to cluster in what we describe as less-developed/remote areas. Because bears in such areas would have had little experience with people they might be more inclined to include our species in their prey search image. Those that do are probably quickly eliminated as people's presence in an area becomes established.

In this paper we found new evidence regarding the gender and age class of black bear involved in fatal predaceous incidents. In all cases where gender was positively determined, male bears were involved. This finding is consistent with the idea that male bears are more aggressive than are female bears. For predaceous fatalities in remote areas, the bear was an adult in all cases but one. We also developed a hypothesis for those predaceous incidents that occur in developed areas. In a majority of these cases, the bear was a subadult male. When forced into the dangerous habitats that developed areas often represent, the proximity of these bears to people, combined with the adventurous nature of subadult bears, can in very rare instances lead to predation in developed areas.

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FOLLOW-UP DISCUSSION WITH STEPHEN HERRERO: FATAL INJURIES INFLICTED TO PEOPLE BY BLACK BEAR

As part of his presentation on black bear attacks Dr. Stephen Herrero showed a video made by Tom Walters. While filming wildlife in Ontario, Tom encountered a black bear which pursued him as though he were potential prey. The bear repeatedly approached and at one point forced Tom to back into a nearby lake. This entire incident lasted the better part of an hour and portion of it was inadvertently filmed as Tom held the camera to his side while slowing backing away and attempting to discourage the bear vocally. The discussion begins with questions referring to this incident.

Raymond Skiles, Big Bend Nat'l. Park: Steve, you suggested that Tom did everything right. But at the same time, obviously, we say do everything you can to fight. Didn't he *not* use some tools; that is, picking things up, throwing sticks or rocks, or anything like that.

Steve Herrero: Yes, he probably could have done things a little *more* right. And sticks and stones would have probably worked to his advantage. He could have been even more aggressive. But I suppose I contrast Tom's behavior with those of people who have been badly injured in what I call potentially predaceous black bear incidents—when they've been really passive, and they've literally just lain there and allowed the bears to start working them over. So Tom was certainly headed in the right direction. And indeed, he did manage to keep the bear off. So he was successful. Yes, he could have done more.

Passivity

Skiles: How much does offense on the part of the human help? Had Tom thrown something early do you think he could have deterred the bear the first time?

Effectiveness of human offense

Herrero: I think that is the time to establish the dominance relationship if possible, and there has been some experimental work done in Yosemite that will be of interest along the following lines. It was found there that in instances where black bears came into campgrounds foraging for food—if the people acted in concert and aggressively before the bear really got into the campsite—they could almost always chase them off. But the farther the bear was into the campsite or if the bear was actually on the food, the harder and harder it became to deter it. So there is a place for concerted human aggressive action to deter even that type of incident which is fairly different [from Tom's experience]. Now don't mistake [an encounter with a campground bear] with a predaceous incident. But it is a matter of establishing dominance early on in both of those types of situations.

Early establishment of human dominance

Question: You have documented 33 human fatalities. [Herrero's revised paper documents 37 fatalities.] Is there any idea of the number of significant injuries? You probably encountered that [information] with all your research as you went along. That would be very interesting also.

What about injury rate?

Herrero: That, up to 1980, is in my book. And [compiling more information] is what I am in the process of doing right now for the revision of the book. I have just sent out several hundred letters to various management agencies in North America in order to update those data on serious injuries and minor injuries that have occurred. The reason I was able to report on fatalities today, and I couldn't report on injuries, is because fatalities are something I feel I have automatically been informed of, because of the book. But with run of the mill injuries, I need the systematic database again. What I can say is that these instances of attempted predation oftentimes are not successful. Tom's is a good example. In the database, in rural areas, especially in B.C. and Alberta, I do have quite a few incidents that I would classify as attempted predation. At the same time you have to be very careful in interpreting those, because now that the word is out that black bear can act as predators on human beings, everyone who is confronted by a black bear is starting to see it as a potential predator. I think certainly in the case of most of the incidents—almost all the incidents that occur in the United States—that's a totally incorrect interpretation. There are endless confrontations with black bear in which the last thing in the world the bear would ever do is become a predator on a human being.

Present status of Herrero's database

Question: I'm reminded of the cartoon where the two bears are standing over the remains of a fisherman and one bear says to the other, "I love it when they lay down and play dead." Are you saying that the best approach is to be aggressive towards the bear rather than the old thing about lying down?

Playing dead vs. fighting back

Herrero: Yes, in the case of black bear. With regard to grizzly bear, it is a more complicated situation. It depends on the motivation of the bear in the specific incident. If the incident occurs during the middle of the night and the bear tries to pull you out of your tent, you clearly must fight back because this is a potentially predaceous incident. Fortunately, these have decreased in frequency in Yellowstone and Glacier. In the case of a sudden confrontation with a grizzly bear female with cubs during the day, I think the data are clear that fighting back normally increases the extent of injury, but may in some cases intimidate the bear and cause it to go away. There is sort of a bimodal distribution, but the greatest probability is that you are going to get more severely injured. In the case of black bear confrontations, if the bear is in your campground and getting into your food and you haven't been able to deter it up to that point, you may end up with minor scratches or bites if you try to deter it; so maybe the best thing at that point is to leave it alone. If the bear is attacking in the manner of the bear that attacked Tom—that persistent bearing in, and in one of these remote areas—there is no question in my mind that aggressive fighting back is called for in every instance. There is one instance related in my book that I think really captures the spirit of what people can do. It involved a 10-year-old girl near Prince George. She was walking home one evening with a pail of water to take back to the cabin. A black bear took a run at her, knocked her down, bit her. She got up, grabbed an axe and hit the bear over the head, which temporarily stunned it. Remember, she was a 10-year-old girl. She ran to the cabin door. The bear ran right after her. She slammed the door in the bear's face. The bear started to tear the door off the cabin. She ran into the house, grabbed a pot of boiling water, and threw it on the bear's head at which point it ran off. There's not any doubt in my mind that the girl saved her own life; and that people have the capability to survive, if they run on the right instincts.

Proper procedure in case of attack

10-Year-old girl fights and successfully deters bear

Scott Richardson, Utah Division of Wildlife Resources: I had an experience where I encountered a black bear on a carcass of a cow, and it exhibited aggressive behavior. Have you any evidence from your database of bears defending a natural food source?

Black bears aggressively defending food resources

Herrero: Thank you for the question. It is a very good one; one that I personally have been very interested in. In Alberta I've got about a dozen instances in the database where hunters were injured by grizzly bear [defending carcasses]. It's serious business in Alberta. It's serious business in Alaska. And so I thought, do black bear defend carcasses in the same manner and occasionally injure people? I have no instances at all in my database of black bear on carcasses injuring people who have come too close. If any of you know of such instances I would very much appreciate a record. [No instances were volunteered.]

Note from Stephen Herrero, 19 May 1995

I have since become aware of an incident that happened in Maine in 1990. A hunting guide was returning to check his bait pile and found a bear on the bait. He yelled and the bear charged him and attacked him. I infer the motivation of the attack to be a combination of being startled and defending a food source.

Fatal attacks often occurred during daylight hours

Jordan Pederson, Utah Division of Wildlife Resources: You said that most of the attacks by black bears have occurred during daylight hours?

Herrero: That's correct.

Pederson: I'm aware of five attacks here in Utah. All have been at night; all the bears were females. One [attacked a person] lying on the ground in a sleeping bag. Of the other four, two entered cabins, one went in a camper shell, and one went into a wickiup thing made out of poles and attempted to drag the people outside.

More injury incidents at night as bears forage around human activities in campgrounds, etc.

Herrero: Yeah, I wasn't saying that there hadn't been incidents that occurred at night. I was saying that for these 33 fatal incidents the data indicate that they have occurred primarily in the daytime. In the database there are three incidents that occurred at night. But by far the majority occur during the daytime. If we look at serious injury, it helps to round out the picture a little more. In a sense it gives you a restrictive view to only look at fatalities. But in terms of adding something new to my book, it was all I was able to do. There are more incidents [resulting in injury] that occur at night, especially in developed areas where black bear tend to become more nocturnal than diurnal. They learn to work around human activities. These are displaced bears, bears that are not living as natural bears. They have had to alter their normally chosen time budgets—generally diurnal and crepuscular, except where it's exceedingly hot—and become active primarily at night in order to forage around the activities of human beings. And of course under those circumstances, the incidents related to human beings are more likely to occur. So it's a complex picture indeed. I don't question the data or the incidents you present whatsoever. It's just that you have to see this whole thing in a very big picture and realize that the data I presented here were just on mortalities, and I have faith in those data. And I don't think they represent a biased subsample either, because the areas where the mortalities actually occurred were areas where people were out primarily in the day doing things like timber cruising, mineral exploration, et cetera and they just came upon the wrong bear at the wrong time.

Pederson: Now that you mention it, these were areas of campgrounds, summer homes, and lakes where there is a lot of daytime activity. And the bears have become accustomed to working at night around those activities.

Herrero: Right, thanks for adding this.

Al LeCount, Independent Wildlife Consultant: Steve, I don't know if you have any information on this or not. Coming back to the question about if we were to stop hunting black bears would we see more aggression return. Do you have any information on European brown bears that we could apply to the couple of existing hypotheses? The first is that they are just not as aggressive as our grizzlies are. The second is that since they coexisted with man for so long with weapons, the aggressive animals have been removed. But now in a lot of European countries we've gone through quite a long period of time where the weaponry has not been available to eliminate those animals. Do you know if we are seeing any rise in fatalities caused by European brown bears?

Would aggression return if hunting stopped?

Herrero: This is a great question Al. I'm one of the ones who generated some of the ideas on it, partly because, I think you remember, I worked with Italian brown bears in 1971. And through personal exposure, I realized that not only did they not attack, but you couldn't even see them. The only time that you could see an Italian brown bear—and I worked in the main area of concentration in central Italy—was at the absolute crack of dawn. They were out between 4:30 and 5:00, just crack-of-dawn stuff, and then they were gone. You would never see them again. And they were active primarily at night. There hasn't been a known bear attack in decades in Italy or in any of these areas in western Europe, so we've got to differentiate between eastern and western Europe. In western Europe, brown bear—*Ursus arctos*, the same species as our grizzly bear—exist as micropockets, remnant populations. There are a few hundred individuals in large populations in Norway. In Italy there were perhaps a hundred individuals in the population I was working in. In other places such as the border between Spain and France, perhaps fewer than 30 or 40 individuals exist. These bears are hanging on by the skin of their teeth. But as Al says, they've now been protected from hunting since around 1940, 1950 at the latest. They're still poached, and they're still killed in livestock depredation incidents in Norway. We haven't seen an increase in human injury, but the circumstance in my opinion isn't there because we really don't have recovered populations. And when you go further east in Europe, you get bears really that are quite like ours. They're still pretty wild, and you get very aggressive confrontations, especially with females with young. You also get substantial populations of bears. But it's a very interesting situation to watch. I don't think that we have yet any really telling data from it.

Evidence from European brown bears

Steve Cranney, Utah Division of Wildlife Resources: Just a question on researcher activity, particularly in denning bears in the spring. I'm just a rookie at it, but I've been out a year or two with folks doing that. I've seen quite a bit of aggressive behavior on the part of the bears. I've never seen any injuries occur from it yet, but I'm curious to know if there are a number of injuries out there that have occurred to researchers in denning situations. These guys, I see their heartbeats go up or breathing rates go up when they have to crawl in, some distance sometimes, to inject one of these animals.

Injuries to researchers.

Herrero: You bet—and in other circumstances, when you have a cub in a trap or something and you know the mother is around—those are heartbeat sorts of situations. Let me answer by saying that in this room we have black bear researchers who have accumulated tens of thousands of direct contact hours with black bears in trapping situations in a great variety of contexts, and let me just ask: Do any of you know of any bear researchers who have been injured during a trapping situation or in situation where you have caught cubs with attending females or anything like that? Any incidents to volunteer?

Tom Beck, Colorado Division of Wildlife: I know of one in California Redwood National Park. A bear lunged and broke away from a snare. It bit a researcher and then took off.

Incident involving researcher

Note from Stephen Herrero, 19 May 1995

The research-related injury in Redwood National Park in California happened on 24 August 1982. While the researchers were trying to jab the bear, the bear charged one of them and when the bear reached the end of its cable, the cable snapped. The bear knocked the researcher down, bit his stomach and ran off. The break occurred somewhere along the length of the cable (not at a junction), and the researchers believed this to be due to a manufacturing defect.

I have records of a total of seven bear-inflicted injuries sustained while conducting black bear research. The cover the period from 1976 to 1993. I wouldn't want to claim that this number represents all of the research-related injuries that occurred in this period.

Herrero: Thank you very much. Any others?

Classic female black bear behavior at close range

Jordan Pederson, Utah Division of Wildlife Resources: We had a female with two cubs in aspen and three or four foot high snowberry. We got to her and she got separated from those cubs. She bluffed us out and we went up the tree. I don't know whether she was confused, or we were, or all of us were. But anyway, she was. We had worked her, and she was a very good mother all through the nine years that we had her radioed. But she was in there with those cubs and she couldn't find them.

Herrero: Jaws popping, blowing, running?

Pederson: Yes, just running round and round and then she would stand up and look for them, and of course we thought she was looking for us.

Herrero: And you were right there. I mean this is a classic incident. This was a classic female black bear. If there ever was a circumstance in which a female might have attacked a person, this is it. She didn't know where the cubs were; things were confused at close range; and nobody is up a tree except the researchers ultimately. And yet injury didn't occur.

Pederson: She finally located those cubs, picked them up, and took them; and everything quieted down.

Herrero: Thank you very much for volunteering that one.

Mike Pelton, University of Tennessee: I know of a few close calls, but they were instances where bears ran over the researchers getting out of the way. We've handled probably 3000. We've only had one instance where a bear actually injured one of the researchers. He can tell you about that; but it was a very minor incident, I might add.

Herrero: I think it's worth getting the incident out, because we are realizing that these are very rare situations.

Incident involving researcher

Steve Pozzanghera, Washington Dept. of Wildlife: I think there are two reasons why I was not going to mention it. Number one was my wishing to remain anonymous. Number two was because the bear was just going under sedation, so to me, it was a situation where she wasn't in full faculties anyway. It was a deal where we had gone in to give a subsequent hand injection from behind. The animal was just a little bit jittery yet. We had a metal scale with us, and somebody set down that metal scale and it hit a rock with a nice loud [crash]. And the female, in one motion, picked up her head, turned around, and grabbed my leg. Then she was out: I mean

cold. So we proceeded to pry her jaws off my leg and finished the workup. To me that wasn't a real attack situation. But in one case where we had captured a cub—we had a cub in a snare. And the female came in to the trap site and stayed in the area the entire time blowing, popping, huffing. We were only trying to get the cub out, and she made periodic runs and stops and runs and stops. We were able to free-range dart her because she stayed within 10 or 15 feet the entire time.

Herrero: Thank you very much. This is great testimony to the nature of black bear behavior.

Question: As long as we are telling bear stories—an incident two years ago during archery season involved an archer approaching a female black bear with two cubs. She was up above him a little bit, standing on a rock and the cubs were behind her. This guy apparently didn't know body language very well, but his description of what went on was pretty classic as far as her moving her head back and forth trying to explain to him that we don't need to continue with this. Apparently he thought they should. The upshot was that he took photos of her, probably within about 25 feet. Well, she charged. He turned and ran 125 feet and she nailed him and worked him over pretty good. Then he curled up in a ball, and she walked away. He moved again and she came back and inflicted some additional injuries. And I was wondering, would not running have probably been the best thing he could have done?

Herrero: Yes, and this was in northern California, if we are talking about the same incident. That's the only one of its kind. And like I said, there are nine instances in the database where females with young have injured a person and that's one of them. But definitely do not run. In the database there are a slew of instances where black bears have injured people, where they have gone up a tree after [people] or nailed people who ran. These are usually very minor injuries. And in the nine females-with-young instances, in five of them or so the female went up the tree after the person and pulled them out by the foot.

Importance of *not* running from bear

Flinders: It seems like in your book that there was a real question as to whether a pet dog along with a hiker could precipitate an attack from a grizzly or maybe deter an attack from a black bear. Is that true?

Possibility of dog provoking an attack

Herrero: There's not a lot that I say in the book, except that there are not a lot of incidents in which grizzly bear have been provoked by dogs to attack. From this small handful of incidents, I reached a general conclusion. There are a couple of black bear females that were provoked by dogs, so there's no question that dogs can provoke attack. And these are, in particular, untrained dogs, you know, the little yappers that go out there and get the bear excited and come right back. But despite that, if you look at it statistically, there are not a lot of incidents like that which have occurred. It [a dog] is provocation to the bear. If the dog comes back to the person, I certainly wouldn't blame the bear so to speak. But it's not a big deal. On the other hand a lot of people do get comfort from a dog. And a well-trained bear dog, which are few and far between in North America, is trained to keep a bear at bay. And there have been a handful of those situations that I've been made aware of; so again it's a complex situation but not one that should be blown out of proportion in my opinion.

Training of dog essential—good bear dogs keep bears at bay.

Question: On the island of Vancouver mountain lions tend to be more aggressive than in other populations. Have you found anything like that with black bears, where in one geographic region they are more aggressive?

Bears more aggressive in some regions

Herrero: Yes, those geographic regions where the fatal incidents cluster are the same ones where we have more instances of attempted predation as well. There are also a lot more bears

in those areas. I point that out in the paper that accompanies this presentation. And there is also relatively less human usage. So we probably are dealing with slightly different variants in behavior on these frontiers.

Management issues—risk to humans or dogs in spring

Question: Since you are so well versed in this and know the data so well, I'll put you on the spot. Do you think that there is any recommendation or any advice you would give bear managers about eliminating a spring hunt of black bears because it puts the bear at risk and because [the bear] is more vulnerable or defensive of its cubs at that time or because of the injury it may do to the hunter or the hunter's dogs? And also in that question would you recommend perhaps closing some areas to hiking in the spring when the bear is emerging from her den because of threats hikers or hiker's dogs would pose to the bear?

Herrero: Yes and no and thank you! I don't think I can easily jump into the whole question of seasons of bear hunts and their relationship to the data. I don't mean to be disrespectful to your question. I really can't give it a good answer, nor do I think my data bear tremendously on the issue of spring versus fall hunting, because in general we are dealing with rare injury incidents. One thing that's very clear is that in park populations that have not been hunted for quite a while, we do not see a significant increase in mortalities or in instances of attempted predation. It may be that once that genotype is out, it's out. It may also be that it reoccurs in other situations. We just don't know. We have some data both from hunted areas and non-hunted areas and right now the serious injuries are clustered in rural and remote areas.

Helen Davis, Simon Fraser University: What do you think of these bearproof suits?

Herrero: Oh, the bionic suits? Troy Hurtubise, the Canadian bionic man. Troy wrote to me recently and said that he has now perfected the bionic bear suit and is about to test it. Keep posted.

REHABILITATING ORPHANED BEAR CUBS

SALLY A. MAUGHAN, Wildlife Rehabilitator
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ABSTRACT. Finding solutions for orphaned cubs continues to be a problem. Killing the cubs is often the only apparent solution. If we rehab and release, will the cubs become nuisance bears? Are we simply trading one problem for another? As caretakers of our wildlife, we have a responsibility to look at all the options. We should educate the public on the problems of orphaned cubs and offer solutions. They need to be aware and share in the responsibility, whatever solution we choose.

INTRODUCTION

This year (1994) marks the start of my sixteenth year as a licensed wildlife rehabilitator for Idaho Fish and Game. For the last five years I have worked exclusively with black bears and coyotes. Between 1 January 1989 and 31 December 1993, we placed 12 black bear cubs in our rehabilitation program. Six males and six females ranged in age from seven weeks to five months. They arrived as early as the end of March and as late as the end of June. Before release, three cubs died of illness or injury. We placed the remaining nine cubs in dens. Only one female became a nuisance bear. We captured her and placed her in another study program. We consider the remaining eight successful releases.

Opinions vary widely on the success of cub rehab. Some individuals don't believe in wildlife rehab. Some think rehabilitated cubs become nuisance bears or that they starve to death. Finding a rehabilitator with facilities to handle cubs also can be a concern. Let's look at reasons for placing orphaned cubs in a rehab program.

1. Wildlife *rehabilitators* focus on individual animals. Wildlife *managers* focus on populations. That makes us a perfect team. We all recognize that saving a few cubs will not affect the population; however, a rehab program provides knowledge which can make a difference when individuals really count as in the case of a low bear population or a threatened/endangered species. To start learning techniques of rehab when populations are already low or threatened is a real disadvantage.
2. The public doesn't know or care that the individual won't make a difference. They aren't aware of the logistics of care and placement of the cubs back into the population. The negative publicity of euthanizing can easily create the picture of an uncaring and unfeeling wildlife department. On the other hand, the favorable publicity from rescue and rehab generates good will and public support.
3. The goal is a successful release. For a wildlife manager or biologist, that means a bear that survives and does not become a nuisance. For a wildlife rehabilitator, that means an animal in good health, with wild instincts developing normally, such that it can survive on its own. After 15 years as a wildlife rehabilitator and five years of work with cubs, I believe that goal is attainable. What we have learned in the past and continue to learn will help others develop a rehab program for orphaned cubs.

FACILITIES

We put newly arrived cubs in an 8' × 8' room first. This helps us to set up a feeding routine. Once the cubs feel secure (depending on the age) we allow them access to the attached outside cage. Moving the cubs to the main facility takes place gradually. The timing

depends on the individual animal, its age and behavior. Initially, the openness and size of the main cage (35' × 45' × 8') frightens the cubs, increasing the chance of injury. For several days we allow the cubs to spend a few hours each day in the cage, and initially we stay with them. Once we feel they are secure in their new surroundings, they stay in the facility until denning.

FORMULA AND WEANING

We have used the formula recipe below for the last four years with excellent results. When cubs are on the formula, growth rate increased and coat condition improved, even with less frequent feedings.

FORMULA FOR BLACK BEAR CUBS

Esbilac Powder
Multi-Milk Powder
Water
Gerber Strained Fruit Cereal
Gerber Rice Cereal

Mix 1 part Esbilac Powder with 3 parts Multi-Milk Powder.

Blend 1 part powder mixture with 2 parts water.

Add 1 jar of Gerber strained fruit cereal per 5 cups of liquid. (Or substitute blended fresh fruit.)

Add 1 cup Gerber baby rice cereal (dry) per 5 cups of liquid

Solid foods are always available. We start with a mixture of ground Puppy Chow and formula mixed with baby cereal and fruit. We alternate with oatmeal and formula. As the cubs get older, we switch from the mush to dry dog food mixed with formula. We also provide fruits and vegetables. Vegetables are seldom eaten by any of the bears regardless of age (Table 1).

Cubs wean themselves at about five months. By late October, one cub will consume 5 lbs. of dry dog food per day and one five-gallon bucket of fruit. Cubs will consume seemingly unlimited amounts of acorns when they are available. They will not eat beef or wild meat unless it is on a carcass. Fish is an individual preference.

Table 1. Preferred foods of black bears in rehabilitation.

Food	Always	Frequently	Seldom
Acorns	✓		
Apples	✓		
Apricots	✓		
Asparagus	✓		
Avocado		✓	
Bananas			✓
Beef			✓
Blackberries	✓		
Blueberries	✓		
Boysenberries	✓		
Cabbage		✓	
Cantaloupe			✓
Carrots	✓		
Cauliflower			✓
Celery			✓
Cherries	✓		
Corn on Cob	✓		
Cranberries		✓	
Cucumbers			✓
Dandelions	✓		
Deer Carcass	✓		
Dry Dog Food	✓		
Grapes	✓		
Green Beans			✓
Insects	✓		
Leaf Lettuce	✓		
Mice/Birds		✓	
Oranges		✓	
Parsley		✓	
Peas			✓
Plums		✓	
Peaches	✓		
Pears	✓		
Potatoes			✓
Radishes		✓	
Raisins	✓		
Raspberries	✓		
Rhubarb			✓
Salmon/Trout		✓	
Spinach		✓	
Strawberries			✓
Tangerines		✓	
Tomatoes			✓
Turnips			✓
Watermelons		✓	
Willows/Grass	✓		
Zucchini			✓

IMPRINTING

It is our experience that imprinting does not happen simply from handling. If domestication is your goal, excessive handling will result in some imprinting. In rehab, imprinting is a concern, not a goal.

Several conditions can increase the chance of imprinting, and those can be considered by asking the following questions:

- What were the animal's circumstances before it came to rehab? Did someone have it for an extended period during which they handled or treated it like a domestic pet?
- What were the circumstances that brought the animal to you? Was it orphaned, abandoned, hurt, or confiscated by Fish and Game?
- How old is the animal? Age determines the degree of development of the wild instinct.
- Was the animal injured, and if so, how severely? Was handling required to treat the injuries? How much and how long? How long will treatment last?
- What is the individual personality of the animal?

Handling alone is not the sole cause of imprinting. Any of the above situations can combine to make imprinting a concern.

In working with cubs, be aware that nurturing is important. An infant does not develop as well if fed and left in the crib without nurturing. The same applies to all youngsters, including bear cubs. You can provide a nurturing atmosphere without imprinting.

We restrict handling of cubs to playtime after feeding. If you have two or more bears, they will play with each other. As their foster mother, your presence offers a security that allows them to go about the business of being bear cubs. Your involvement will be an occasional play attack or hit-and-run behavior.

We use this playtime to watch and learn about behavioral interactions between cubs. We can then imitate when dealing with single bears. You can provide single orphans the opportunity to wrestle and play as cubs do with their mother or siblings. Just be alert for warning signs and limit the time to that period between feeding and napping.

DEVELOPMENT OF THE WILD INSTINCT

In rehab, we often release cubs before full development the wild instinct. On occasion when we over-winter a wild animal, we see the instincts develop and the behavior change accordingly. We first noticed this behavior in bears two years ago when we completed the main facility.

Around mid-September, bears become very destructive. Logs are torn down and dens moved around. During the first part of October, their behavior changes dramatically. They spook at anything and everything, despite our consistent routine. As we approach, they run wildly to the other end of the cage clapping lips and woofing, often climbing to the top of the wire. They settle down only when they visually recognize us. Auditory and visual stimulation can send them running, or climbing the side of the cage. The most normal sounds and sights of their everyday surroundings now pose a threat. This behavior lasts just over a month, during which the bears remain nervous and restless much of the time. As the weather changes, such behavior begins to taper off, and they become more lethargic in preparation for hibernation.

Their behavior is typical of other wild orphans held longer than usual. We did not see this behavior in previous years because we kept the cubs in a more isolated, less open facility. We believe this to be the development of their wild instincts. Their behavior when coming out of the den will be much the same.

DENNING

Denning takes place between mid-November and late December. In November, the bears are not as lethargic and ready for hibernation as they are in December. Therefore, weather permitting, we try to schedule releases for December. Once we know if we are going to have an early or late winter, we start preparing the bears for hibernation.

The first step is to decrease food gradually. Starting in November, we feed just once a day in the morning. We continue cleaning twice a day, but minimize all other activities. As the weather gets colder, the bears first become more active, then start to slow down and become sluggish. They sleep later each morning and retire earlier each evening.

After decreasing the feedings to once a day, we gradually cut back on the amount of food. When we have an estimated date for denning the bears, we stop feeding entirely. Water is still available after we stop

feeding, but we seldom see the bears drink. During the final feeding, we clean, make one last check for any weak areas, and repair damage to the dens. This is the last time we enter the cage. From that time on, all activity ceases around the bears, and we keep stimulation to a minimum.

Restricting the food supply creates the same situation bears face in the wild before hibernation. Lack of food and changing weather trigger the instinct to hibernate. Bears then become lethargic and eventually hibernate. Rehab cubs follow a similar pattern when we stop feeding. The first week, the bears remain active during the day and much of the night. They display some low key signs of hunger that usually last only a few days. If we stop feeding two weeks before denning, the bears may go into normal hibernation in the facility. If we shorten the time, they become lethargic and inactive for longer periods, but do not go into full hibernation.

Two or three days before we transport the bears, wildlife biologist Jeff Rohlman goes in search of dens. Most of wild bears are in dens by the time we take the rehab cubs; however, we often locate an extra site in case a wild bear uses one of our den sites. During 1994 we will build artificial dens. When ready to transport the bears, we move them into a metal carrier without having to tranquilize.

At the den site, Assistant Wildlife Bureau Chief, John Beecham tranquilizes the cubs using Ketamine and Rompun. We check the teeth, take measurements of the neck and chest, and tag the bears. John crawls into the den to clean and prepare it. Sometimes we add hay brought from the den in the facility. Pine boughs and snow cover the den entrance.

Several days later, Jeff Rohlman checks the dens again. In most cases the cubs have left to investigate their new world. They may wander a bit and find another den or return later to the same den. Considering their weight, they should come out of hibernation with enough fat reserve to last until berries are available. This helps offset the fact they don't have the adult female to help them after hibernation. Results of den reintroductions are shown in Table 2.

Table 2. Results of den reintroductions.

Year	Tag #	Sex	Date Denned	Stayed in Den
1989	SF362	M	15 Nov 89	No
1991	EF181	F	15 Dec 90	Yes
1991	EF182	–	–	–
1992	SF340	M	19 Dec 92	Unk.
1992	SF341	F	19 Dec 92	Unk.*
1992	SF342	M	19 Dec 92	Unk.
1993	U1334	M	27 Nov 93	No
1993	U1335	F	27 Nov 93	No
1993	U1336	F	27 Nov 93	No
1993	U1337	M	27 Nov 93	No

*Captured in study area 26 June 1993.

NUISANCE BEARS

Of the nine cubs released, only one female became a problem bear. She was a single cub, orphaned during hunting season. We know that she excavated her den, enlarged it, and remained there until spring. After emergence, she ran into people who fed her. Consequently, she began to pester humans for food. Jeff Rohlman trapped and moved her several times, but when her problematic behavior persisted, we transported her to Charlie Robbins' facility at Washington State University. We work hard to insure successful releases. When something goes wrong, we need to determine the cause in case those same circumstances come together again.

After comparing notes on the problem female and the other cubs, we determined the circumstances we felt contributed to the situation: (1) she was a single cub; (2) people gave her food shortly after she left the den; and (3) her personality was different from any bear's that we've worked with before or since. She was hyperactive and seldom still for more than a few minutes. She was very outgoing and aggressively interested in everything going on around her. She was content in her surroundings, wanted to be the center of attention, and liked people. Five years and 12 bears later, she remains the only nuisance bear.

Having a single cub is a disadvantage. That alone does not cause a nuisance bear, but it doesn't help when combined with one or both of the other circumstances. We feel the outcome would have been different had either of the other two conditions been different. The fact that eight of the nine rehab cubs did not become problem bears supports that hypothesis.

CONCLUSION

The question is, can we successfully rehab orphaned bear cubs? The answer is yes. We know the criteria which predict a successful release: health, instincts, survival capabilities, overall condition, mental and physical development, growth, fat reserves, behavior, weight, and imprinting. Then we look at past releases to determine how many became nuisance bears or how many were known to have died. The rest are considered successful releases.

Can the rehabilitated cubs survive until food is plentiful? Yes, they can. Their pre-release fat reserves are plenty sufficient to get through hibernation, and it is doubtful they will succumb to starvation in the spring. Their weight exceeds that of wild cubs. If starvation were a threat, other cubs would be more at risk. Hunting and poaching by man, and predation by other bears are concerns, but do not negate a successful release. These are threats all cubs face, even with an adult female present.

From a wildlife manager's viewpoint, a successful release is a bear that survives and does not become a nuisance. Factors such as human population and attitude, bear density, bear–human encounters, and food supply all affect the outcome. Those factors and the bears themselves, determine if rehab of orphaned cubs will be successful in your area. In Idaho, the program works, and we will continue to rehabilitate orphaned cubs.

QUESTIONS AND ANSWERS

Janene Auger, Brigham Young University: How much does it cost to rehabilitate a cub from spring through denning?

Sally Maughan: Cost is a factor, and most departments probably don't have the funds. I average around $3,000 a year for bear rehabilitation alone, and my job with a travel agency basically supports that work. I've never broken it down by bear, and I don't think I want to know as it would probably shock me out of business. Total cost depends on outside help that you can get. Local grocery stores donate their daily produce or sell us fruit at a discount. Personnel from the Fish and Game bring roadkill deer when they get them.

Teresa DeLorenzo, International Bear News: Just a comment in support of Sally—If you are going to do rehab, please use a professional rehaber. Be aware, I am a professional rehaber who does turtles, and I get really proprietary about people who don't know what they are doing. A couple of rehaber organizations run good classes and good licensing. If your state doesn't actually license rehabers, at least make sure that the people you use have some national certification, and check their experience and facilities. That is part of doing the job right.

Maughan: Prior to becoming a rehabilitator, I would have been the first one knocking on your door if I heard you were going to kill a cub saying, "I'll take it, I'll take it." It would have been the biggest mistake of your life and my life to have given me the cub. So please, don't turn [wild animals] over to unlicensed people.

Steve Cranney, Utah Division of Wildlife Resources: Has there been any follow-up radio tracking of rehabilitated cubs, and what time in the spring do you turn them loose from the den?

Maughan: We always put cubs in dens in December, because that gives them a period of time to hibernate and to be out of contact with people. If they want to get up and leave, they can. From your standpoint that may be a negative, but from a rehab standpoint—if the cubs want to wander around and figure out what this new place is about, winter is a nice time to do it. Other bears are usually in their own dens, and there are hopefully no people around. I think that the cubs go back into dens, either the den we've prepared or another den. We have not radio-collared this year, but we will in the future. We'll find out when they come out of the den, how long they stay out, where they go, and what they do.

Danielle Chi, Utah State University: How do you try to reduce the likelihood of habituation in these cubs, and how do you assure that they will be able to utilize natural foods?

Maughan: First, we minimize handling by people. Myself and only two or three other people handle the cubs. As rehabers we don't believe that imprinting is caused strictly by handling. Usually orphaned cubs are unafraid and secure in their environment. But about the middle of September they start becoming very destructive—tearing, demolishing, ripping apart anything they can. And about the second week of October they begin to spook at everything. The most common, ordinary sights and sounds suddenly seem to

pose a threat. When we come out in the morning to feed, they're ninety miles an hour to the other end of the facility and up the wire, sometimes popping their jaws and woofing, sometimes just on full alert. Often our knocking over a bucket in the cage will cause them to run. We feel that it is a development of a wild instinct. So, in answer to your question, once you take cubs out of a secure facility and stick them in a totally strange place, I think they're nervous and a bit leery of what's going on. Everything now is strange and suddenly seems to be fearful, so they're not necessarily habituated to people. I think that if they come out of the den and run into people and get fed, that poses a possible threat. Regarding the food—I listed a food chart [in the manuscript] of what we tried. We basically keep the cubs on dog food, fruit, and vegetables, although they don't care for vegetables. We have people who occasionally bring in some of the wild food for us. Once we release it's a matter of them going out and finding natural foods. And from what I've seen, they'll try almost anything.

Helen Davis, Simon Fraser University: How do you decide what dens to put cubs in? Do you use dens previously used by other bears?

Maughan: We pick on Jeff Rohlman, a wildlife biologist. He finds the dens for us. This year we have plans to construct den sites to make it easier for us. Our rapport with the bears enables us to get them in the carriers without tranquilizing. We tranquilize them at the den site, check their teeth, and get chest and neck measurements. Then John usually is the lucky one who crawls in the den with all the creepy crawly things and gets it ready. It is quite interesting to watch him get in there and somehow manage to get two or three very big bears in. It's a great time to consider bribery, because he needs assistance to get out!

Davis: I'm curious how other people here feel about the decision to kill cubs, and how do you explain your view to the public? I think most people would rather see them sent to a zoo than be killed. What do you do about that attitude?

Maughan: In most cases I'd rather see them euthanized than sent to a zoo. We were lucky enough to send our problem bear to Charlie Robbins in Pullman, [Washington]. Had it not been for that, I would have had her euthanized. I would not have allowed her to go to a zoo.

Jordan Pederson, Utah Division of Wildlife: Just a comment from someone who tried to relocate cougar and bear. Don't waste your time on zoos. You'll spend all your budget on phone calls and get a lot of no's. In fact, I could have *gathered* bears and cougars both.

Tom Beck, Colorado Division of Wildlife: I think that if the public finds out that there are [orphaned] cubs in the wild, our first response as a state agency should be to find a rehabilitator and make a good faith effort to catch the cubs. If the public isn't aware of the situation, then it's quite different. It depends on how far you are from a rehabilitator and your staff, but you do need to make a good faith effort to find them and either euthanize them or rehabilitate them instead of just leaving them be. Leaving them just gets us into a lot of public relations trouble. One thing I encourage you to do—if you must euthanize cubs, there are museums, universities, and information/education displays that are always looking for good educational samples of different age and sex classes of animals. Oftentimes the public takes it a little easier if you can say that the animal has been put to use.

Maughan: I agree. I think if you have to put a cub down, just do it. Don't leave it to starve to death and suffer long-term. That will really create havoc.

Question: Just a comment—having seen what trouble bears can get into in human areas, you might want to consider [the implications of] feeding dog food and using feeders and buckets in your facility. Bears remember these kinds of things, and there are a lot of porches out there that have these same dog feeders on them.

Maughan: We try to scatter the food around to make the cubs look for it, but that is not ideal because we don't have a complete cover on the facility and the dogfood becomes a real mess when it rains. We also have what we call a dry dogfood dispenser. It is set up a little differently than a regular cat or dogfood dispenser. It holds 140 lbs. of food and the food comes out as the bears want it. We have to use the buckets to get the food into the facility. I wish there were another solution, but in confinement like that there are few options.

Bert Frost, University of Maine: Regarding release success, I haven't seen much data on [bears], but I did release six fishers from a three month period of captivity. Of those six, five died. Only one successfully made it. Well, she didn't even make it. She survived for 8 months and then was caught in a trapper's trap. When they were released they were in excellent shape—heavier than when they came in—and weren't habituated to humans at all. As far as we could tell they were still wild animals. They had learned to hunt before, because they were making it on their own and were in good shape when we brought them in. They were in better shape when we took them out. We even let them go in the spring of the year after the trapping season so that a lot of the resident fishers had already been removed. I recovered three carcasses, and they were all in very poor shape and looked like the fishers had starved to death. So just a caution—don't get your hopes up that all of your bears are surviving out there.

Maughan: I think we'll find out when we start radio-collaring whether they are surviving or not.

John Beecham, Idaho Dept. of Fish and Game: We don't have a lot of information, because we haven't gone to the expense of radio-tracking these animals, but over my career I've hand-raised somewhere between forty and fifty cubs. I'd say the majority went out in the late summer or fall when food resources were good. Since 1986 we've been putting them in natural dens and again haven't really followed up on them that much. I can tell you that in 1982 I went in and trapped 10 females for a graduate student, and two of the bears I caught were marked bears. When I went back to my records, these adult females turned out to be orphans that I had released in the past. We monitored those bears for another five years, and they kicked out young just fine. Two of the nine bears that we released in a denning situation were killed by hunters two years after the release. So we see some success there. I believe we've captured three others in trapping operations as much as two years after release. Certainly, I don't think that we can expect that all of those individuals will survive. Some have, and you can expect some will. But I think that's probably not different than what you would see with wild bears when they're kicked off from their moms. Some will make it, some will not. I think that rehab is a worthwhile thing for us to do as professionals. We don't get many cubs, so it's not that big of a problem. It's not like trying to rehab robins.

Maughan: I don’t do robins!

SEQUOIA AND KINGS CANYON NATIONAL PARKS—BLACK BEAR MANAGEMENT TECHNIQUES AND PROGRAM UPDATE

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INTRODUCTION

Sequoia and Kings Canyon National Parks are located in the southern Sierra Nevada Mountains that run roughly north to south along the eastern edge of the state of California. Sequoia National Park was established in 1890, Kings Canyon in 1940. The two parks have adjacent boundaries and are managed as one unit. The parks cover approximately 860,000 acres, about 90% of which is wilderness.

Sequoia and Kings Canyon National Parks have a long history of human–bear problems, starting with the first record of a nuisance bear killed in 1912 for causing food and property damage. A more familiar story is Bear Hill, the location of an historic garbage dump in Sequoia. The dump was used to provide the public with bear viewing opportunities from the early 1920s through the 1930s. Managers eventually made the connection between human garbage and bear problems and closed the dump in 1940 for the welfare of the bears and because it was unnatural (SEKI 1989). Even though managers at Sequoia-Kings seemed to realize the cause of bear problems, bear control continued to be the primary effort used to solve problems until the early 1970s with the development of a proactive management plan (Fig. 1; Zardus and Parsons 1980).

CURRENT BLACK BEAR MANAGEMENT PROGRAM—AN OVERVIEW

The goal of the current black bear management plan for Sequoia and Kings Canyon National Parks is to restore and perpetuate the natural distribution, ecology, and behavior of black bears free of human influences. This is accomplished by (1) eliminating human food availability and human activities that may influence bear populations, (2) minimizing human–bear interactions that result in a learned orientation of bears

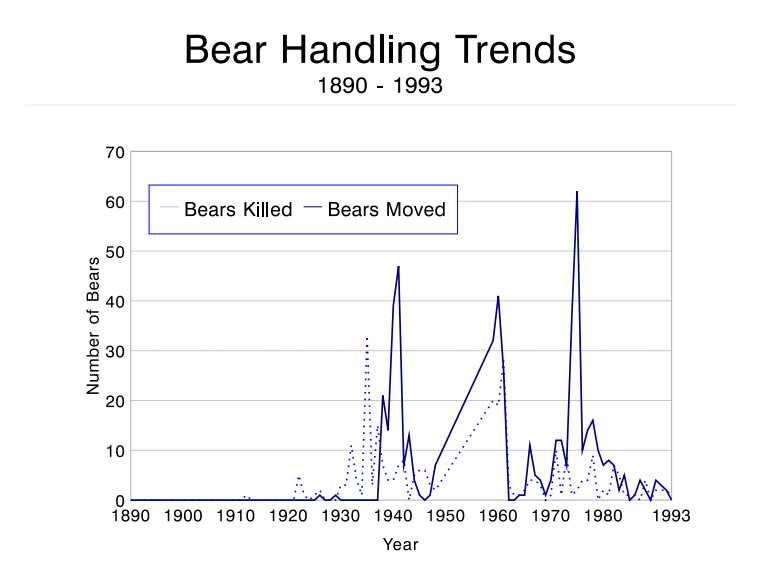

Figure 1. Bear handling trends in Sequoia and Kings Canyon National Parks 1890–1993.

toward people, and (3) providing visitors the opportunity to appreciate black bears in their natural environment (SEKI 1992). To achieve this goal, the current bear program emphasizes proactive management techniques such as bear-proof garbage and food storage facilities, public education, law enforcement, and a detailed incident reporting system. However, once a bear discovers human food, it may become destructive or potentially dangerous, and a management action may be needed. Reactive management techniques such as limiting human access to an area; aversive conditioning; and capture, identification, and possible destruction of nuisance bears are used in these parks to address an existing or imminent problem. Managers also utilize many sources of information on bear management to ensure that effective strategies and safe handling procedures are followed. (See Goldsmith *et. al.* 1980 for other bear management recommendations.)

PROACTIVE TECHNIQUES

Bear-Proof Garbage Facilities

Many park bears continue to get their first taste of human food through access to garbage. Yet the parks have come a long way towards reducing the amount of garbage available to bears. In all developed areas of the parks various types of bear-proof garbage facilities are in place: 32-gallon cans with mailbox style lids, Hid-a-bag® cans in 70-gallon volume, and several styles of bear-proof dumpsters in 2–4 cubic yard capacities.

It is important to realize that each of these facilities is sometimes better described as bear-resistant, but with planning, each will work in certain situations. The small mailbox style cans in high-use areas are easily overstuffed, leaving food available to bears. They are fine for roadsides or other minimal human use areas. The Hid-a-bag® cans have self-latching lids and are my recommendation for campgrounds. But these can also be overstuffed, are expensive, and the heavy bags can split when being removed. Each of the dumpster styles used requires the visitor to latch the lid after use, a task not always done. Dumpsters with reinforced lids and an easy latching system are needed in very high-use areas. Instead of purchasing the costly Hid-a-bag® cans, Sequoia-Kings has now switched to "dumpsters only" in a few campgrounds. Our dumpsters, however, tend to be bear-resistant, not bear-proof, a compromise also with a price.

The timing and frequency of garbage pick-up is also a consideration. During high visitation in the summer months, garbage collection is done daily by contractors. An evening pick-up is ideal, leaving less intense garbage smells to attract bears to human-use areas (Zardus and Parsons 1980). There are four different garbage contractors who collect the garbage in Sequoia-Kings; efforts to establish and maintain a garbage contract with specific bear-proof parameters are important.

Bear-Proof Food-Storage Facilities

By 1985 bear-proof food-storage boxes, measuring approximately 18"×18"×51", were installed in every campsite in all developed areas of Sequoia-Kings except for one (SEKI 1989). That area had historically low reports of bear incidents until recently. Data collected from 1989–90 showed that park visitors were bringing nearly three times more food than would fit in the current-size bear boxes. A larger box was developed, measures approximately 24"×35"×51", and costs $425. Sequoia-Kings is now annually purchasing and installing very small quantities of these larger boxes, and eventually each of 1,300 campsites will have one. For backcountry users, bear cables and poles were tried in the late 1970s, but most were eventually replaced by bear boxes. Food boxes continue to be installed in the backcountry where needed on sections of trail receiving high visitor use. Criteria for box placement were developed to ensure that boxes are placed in response to existing or potential bear problems on durable sites along maintained trails and in locations compatible with other backcountry management objectives (SEKI 1992).

Bear canisters for bear-proof food storage for backcountry users are also available in Sequoia-Kings. The parks' concessioner and natural history association are facilitating the rental and sale of canisters in three areas of these parks. The canisters weigh less than three pounds and have been tested successfully for strength on brown, black, and polar bears in zoos. The canister works best for people on 1–5 day backcountry trips who want to get off heavy-use trails and not be constrained to bear box locations.

The counter-balance method of backcountry food storage is still used in these parks; however, the previous two methods are better and encouraged more strongly. Most backcountry users never really master the art of balancing two equally weighted food sacks over a carefully chosen, live, downsloping limb. While

the counter-balance method of backcountry food storage is least preferred by the parks, users are required to store their food using one of the methods.

Law Enforcement And Education

Several federal regulations protect bears from human influences. Of the two most often invoked, one prohibits feeding or poaching wildlife and the other requires people to store food and garbage properly. Each carries a fine of up to $500 and/or imprisonment. Compliance with the food-storage regulation varies among campgrounds, but compliance monitoring consistently shows that people obey regulations much more when each campsite is personally contacted by a ranger each night.

Public education continues to be the most effective method in reaching our bear management goal, yet is the most challenging. The public gets information about bears from many sources: personal contact by a ranger (the most effective), a new bear brochure, a wilderness brochure, campground entrance and visitor centers, roadside signs, interpretive programs, films, and bulletin board displays. New employees also get bear information. Sequoia-Kings and Yosemite National Park's public information staffs have been working together on joint bear management issues since 1993. One of their projects produced the new bear brochure and logo, and they are currently working on other elements of an intensive bear management public education campaign for this spring. The parks' main concessioner developed its own way to educate the public with a "Save a Bear" button campaign. Visitors receive a bear button and hand-out for a small donation of fifty cents. These donations go to the Sequoia and Kings Canyon National Parks Foundation for the bear management program.

Seasonal bear management staff, varying from one to three employees, are hired each summer to assist in implementing the bear management program. Each is responsible for nightly public contact, enforcement of the bear management regulations with citations or impoundment of food, coordination of the bear incident reporting, and the monitoring of problem bears. These responsibilities are also shared to a somewhat lesser degree with all park employees—mainly law enforcement, interpretive, and campground staff—who come in contact with many visitors.

Reporting Bear Incidents And Observations

The Bear Information Management System (BIMS), a computerized reporting system, was established in 1978 for better record keeping of bear incidents and observations. An event is considered a bear incident if a bear causes property damage or threatens the safety or causes injury to a person. BIMS records are still a valuable tool used to identify a problem area or bear that may require a management action.

PROBLEMS CONTINUE

Bear incidents (Fig. 2) and dollar damage (Fig. 3) trends from 1980–1993 show the decrease in reported incidents and dollar damage after bear boxes were installed. Dollar damage trends also show that front country incidents make up most of the damage. Park managers, employees, and visitors alike must take responsibility for bear problems. These parks encourage overnight stays and provide food service restaurants and grocery stores for the public. Park

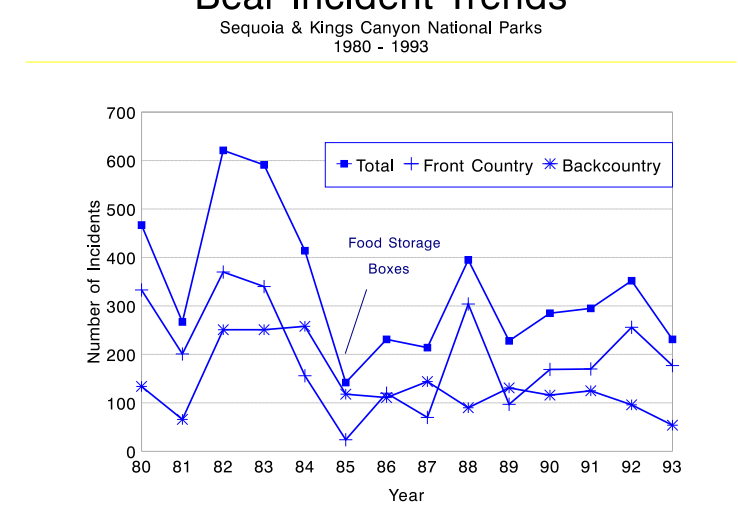

Figure 2. Bear incident trends in Sequoia and Kings Canyon National Parks 1980–1993.

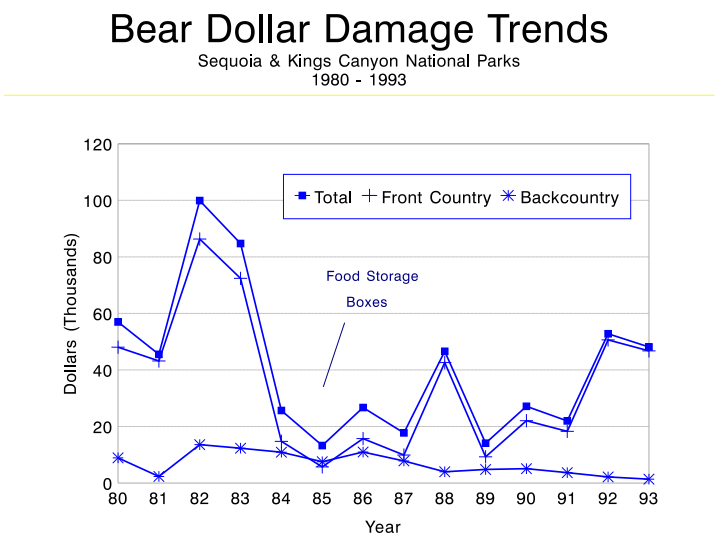

Figure 3. Bear dollar damage trends in Sequoia and Kings Canyon National Parks 1980–1993. Dollar damage amounts corrected for inflation.

managers have yet to fund adequate bear-proof facilities. Visitors continue to disregard regulations and to bring much more food than will fit in the small bear boxes. This requires that they store food in their cars where it is still vulnerable to persistent bears. In the end, bears continue to have some access to human food.

REACTIVE MANAGEMENT

Reacting to bears that have learned to obtain human food is a necessary element of our program. Reactive management techniques used in Sequoia-Kings are aversive conditioning, capture and marking, and toleration or destruction of individual nuisance bears. Aversive conditioning techniques used in Sequoia-Kings are minimal. Visitors and employees are encouraged to shout at and throw objects toward nuisance bears. Rock salt and emetic chemicals that cause bears to retch and find human food distasteful are occasionally used to deter a persistent campground or panhandler bear. I believe more energy should be put into implementing preventive techniques that potentially protect many bears rather than very time-consuming aversive conditioning of an individual bear.

Attempts are made to capture all problem bears and to mark them with ear tags, streamers, and radio collars. These marking techniques are used to later identify the culprit bear in property damage or safety incidents in each area.

Over the past five years, an average of two problem bears were destroyed annually in accordance with the parks' bear management plan in Sequoia-Kings (Fig. 1). The bear management committee, made up of biologists and area rangers, reviews the data and recommends to destroy a bear or not. The superintendent makes the final approval or disapproval for destruction. The behavior of many problem bears is tolerated by park management, depending on the severity of incidents. Bears that bluff charge or injure people without provocation, or persistently break into structures where food has been properly stored are not tolerated and are considered for destruction.

Some problem bears in Sequoia-Kings are tolerated; a few are destroyed. Translocation as a solution to bear problems is not used. Translocation studies in these parks repeatedly showed that relocated bears returned to the capture site or were killed outside the parks, regardless of the distance they were taken before release. (Goldsmith 1979; Chin 1979). Translocation is used on rare occasions to move particularly troublesome bears out of developed areas on busy weekends. It is a measure intended to buy time, not to permanently remove the bear.

BEAR MANAGEMENT TECHNIQUES IN YOSEMITE NATIONAL PARK AND SEQUOIA AND KINGS CANYON NATIONAL PARKS

The overall goals and objectives of bear management in Yosemite and Sequoia and Kings Canyon National Parks are essentially the same. However, two management techniques are tangible evidence of philosophical differences among park managers. (1) Sequoia-Kings uses bear boxes in backcountry areas to protect backcountry bears from human influences, realizing most users cannot or will not utilize proper food storage. Yosemite uses limited bear boxes in backcountry areas supporting the freedom of backcountry users to be entirely responsible for proper bear-proof food storage. (2) Sequoia-Kings either tolerates or destroys problem bears believing translocation of problem bears just prolongs the

decision to destroy a bear. Yosemite utilizes translocation as an additional technique in giving a problem bear another chance before deciding to destroy it. And in a practical difference, Sequoia-Kings traditionally has fewer annual visitors (1.7 million in 1993) than Yosemite, therefore freeing up campground and law enforcement staff to assist with bear management objectives. With nearly 4 million annual visitors, Yosemite's staff is overwhelmed with other people-control issues, limiting its availability to enforce food-storage regulations.

CONCLUSIONS

Sequoia and Kings Canyon National Parks utilize proactive and reactive management techniques to implement the black bear management program. Emphasis on working with people instead of bears works to control the causes of human–bear problems, not the symptoms. Public education efforts, providing bear-proof food-storage and garbage facilities, and enforcing wildlife regulations allow these parks to work towards perpetuating a natural bear population free from human influences.

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QUESTIONS AND ANSWERS

Question: Do you have problems with bears learning bad behaviors on the surrounding Forest Service land and then coming into the park and getting into trouble?

Dianne Ingram: No, I think it's the other way around.

Harry Barber, Bureau of Land Management: Did you say that you put radios on your problem bears? Do all of your problem bears get radios, and what kind of telemetry program do you have?

Ingram: Most of them get a radio collar. Telemetry helps us to find a bear immediately if we decide that we have to destroy it. Telemetry also helps us monitor known problem bears at night. If a bear is moving into a campground you can meet it halfway there and maybe keep it out.

Barber: How many radios do you have out at any one time?

Ingram: Less than ten.

Question: I'm just curious if any of the vehicles that are broken into *don't* have food in them.

Ingram: Sometimes—and that's a key element in reporting. If a bear breaks into cars with food in them, we tend to give them the benefit of the doubt. But if a bear starts breaking into cars that do not have food in them, that is almost justification to destroy it.

Tom Beck, Colorado Division of Wildlife: It seems like we keep focusing on structural or engineering solutions, but bears get smarter each generation or each iteration and maybe we need some totally wild, weird, or creative ideas to look at. One idea I've wondered about but don't have the facilities or expertise to address is aversive sound. Is there some range of hearing, some frequency, some decible level, some intensity that might be extremely painful to a bear in the short-term? Perhaps you could put an automated system in these high concentration areas—campgrounds or picnic areas—if not for the bear maybe for the people.

Ingram: Sometimes a visitor will bring a boat horn to the campground. That doesn't really work, but I think you're referring to sounds too high for us to hear.

Beck: And a sound that's there all the time. It would be just like a shock collar. I'll guarantee that if you've got somebody pounding that problem bear with a shock collar, you are going to teach it. But you have to do it every single time. If you had an automated system, the bear wouldn't be able to get away from it.

Teresa DeLorenzo, International Bear News: I'm wondering how responsive and receptive the public would be to some really aggressive visitor management measures—things like limiting numbers of visitors or indeed charging the $500 fines. Do you have any sense of this?

Ingram: I think they would respond to expensive fines and to closing parts of parks or limiting the number of people. The hard part is getting superintendents to agree.

DeLorenzo: And there would be implications for your budget. If you had fewer people, you'd have to charge more.

Ingram: I've also thought of showing visitors the dollar damage figures and number of bear incidents as they come into the campground. But basically, if a bear hasn't been in the campground the night before, people aren't expecting it to come in. The most common question is, "Well, when was a bear last seen?" They always think they are going to get away with it whether or not you show them the dollar damage or how many you kill.

Tom Beck: I know the superintendent will hate it, but why don't you leave some of the most severe cases of damage right where they occur? We found in trying to reduce vehicle–deer accidents that the only way we could get cars to slow down was to leave dead deer bodies. When we left the bodies stacked up, we measured significant reductions in the average speed and number of collisions. So take some of these vehicles that are really just mangled to pieces and leave them right there with an informative sign. It's a lot more stunning than a picture.

Ingram: The pictures work, but I think that your idea would work even better.

Question: [No microphone. The question concerned liability when human injury occurs inside a national park. Does the "three strikes, you're out" management strategy for problem bears hold up in court?]

Steve Herrero, University of Calgary: I've spent a fair amount of time in court as an expert witness in cases that went wrong, and a suggestion is that the Glacier Park policy with regard to grizzly bear seems to stand up in court. That is, they differentiate between offensive and defensive aggression on the part of bears. Bears that have acted offensively in terms of their aggression are axed. Those that have acted defensively are regarded as responding to provocation of some sort and may be moved. The kind of approach that tries to draw a fairly clear line seems to stand up in lawsuits.

BLACK BEAR MANAGEMENT IN YOSEMITE NATIONAL PARK: MORE A PEOPLE MANAGEMENT PROBLEM

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ABSTRACT. The long history of human–black bear interactions in Yosemite National Park has compelled the Park Service to pursue a variety of management strategies to mitigate conflicts. A comprehensive human–bear management plan was enacted in 1975, but prior management, or lack thereof, often resulted in an abundance of human food available to bear and numerous bears killed in an effort to prevent damage and injuries. Present focus on proactive management strives to keep the many sources of food (garbage, campgrounds, backpackers, etc.) unavailable to bears through public education, facilities, and law enforcement. Reactive management in the form of capturing and relocating or killing aggressive bears is not recognized as a solution to the problem and has diminished in recent years. Recent high levels of bear incidents and damage, however, indicate that bears are still able to find much human food in developed areas despite extensive management efforts. Increased damage may also be the result of a reduction in the number of bears relocated or killed, but management efforts will continue to focus on closing "gaps" that allow bears access to human food. Needed management actions are listed.

INTRODUCTION

Yosemite National Park, established just over 100 years ago, has been the site of intense interactions between black bears (*Ursus americanus*) and humans for much of its history. Bears have caused many thousands of dollars in property damage and have injured hundreds of people over the park's history (Harms 1977; Harms 1980; Hastings and Gilbert 1981; Keay and van Wagtendonk 1983; Hastings and Gilbert 1987; Keay and Webb 1989). The abundant presence of human foods has led to changes in behavior, foraging habits, distribution, and population dynamics of bears in the park (Harms 1977; Harms 1980; Graber 1982; Graber and White 1983; Hastings and Gilbert 1987). Over the years, management by the National Park Service (NPS) to mitigate conflicts through relocation and killing of bears may have also caused the bear population to change from a natural sex and age composition (Keay 1991). The National Park Service, as a result, has been faced with the dilemma of protecting the bears as a significant species both ecologically and aesthetically while also providing for the safety of humans and their property. The persistently high level of undesirable interactions between humans and bears in Yosemite has resulted in an evolution of management strategies that have often been ground-breaking for management in other Park Service units. In retrospect, however, many of the early stages of management seem slow in coming and neglectful of National Park Service mandates.

What follows is an overview of past and present management of black bears in Yosemite National Park. Such an account will give some idea of the complexities involved in a large and intensive management program, how present management strategies have evolved, and will show how mistakes and delay can lead to an accumulation of problems that are difficult to reverse.

MANAGEMENT AREA

Yosemite National Park covers 308,000 ha in the central Sierra Nevada of California and ranges in

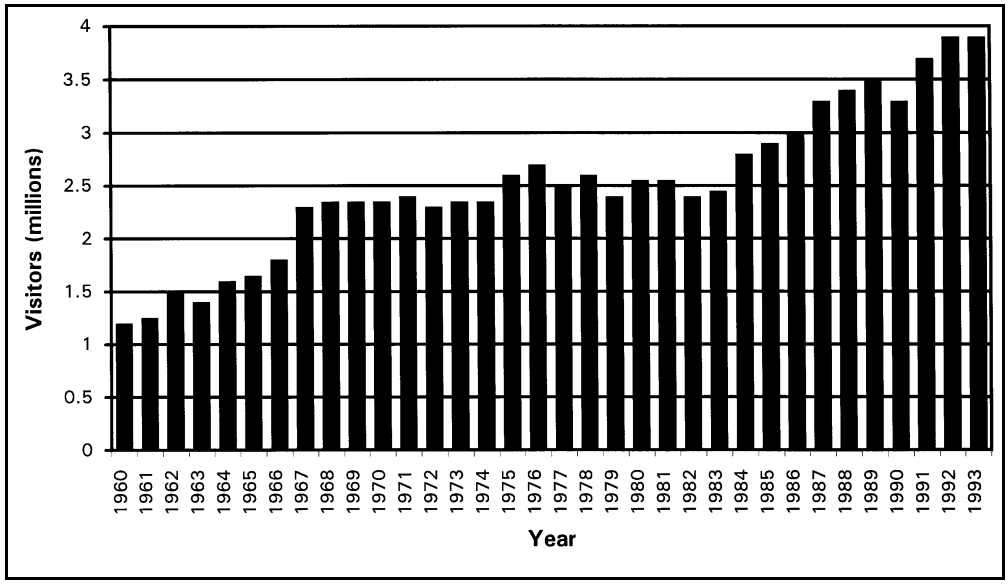

Figure 1. Annual visitation to Yosemite National Park, California, 1960–1993.

elevation from 400 m to 4,000 m. Dominant vegetation communities include (roughly in order of elevation) canyon live oak (*Quercus chrysolepis*), montane chaparral, montane meadow, black oak (*Q. kelloggii*), mixed conifer, red fir (*Abies magnifica*), lodgepole pine (*Pinus contorta*), plus large areas of treeless alpine. The highest quality black bear habitat in the park is found below 1,800 m where important forage plant species such as oaks (acorns) and manzanita (berries) (*Arctostaphylos sp.*) are most common (Graber and White 1983). Human foods, however, comprise at least 15% of the black bear diet in Yosemite (Graber and White 1983).

Grizzly bears (*Ursus arctos*) were formerly found in Yosemite, but were extirpated by the turn of the century (Storer and Tevis 1955). Removal of this predator and competitor may have resulted in a higher black bear population.

Yosemite has a long history of heavy human use. Before establishment of the park, Yosemite Valley was used for agriculture with many of the meadows plowed or grazed. Many alpine meadows outside of Yosemite Valley were also heavily grazed by sheep. Tourism to view the high waterfalls and granite cliffs in Yosemite Valley grew steadily after the park was officially designated with "improvements" such as roads, hotels, restaurants, and recreational facilities built to accommodate park visitors. Annual park visitation in recent years has approached 4 million people (Fig. 1).

Currently, the park contains a total of 1,948 campsites, with approximately 45% of those sites concentrated in Yosemite Valley. In addition, the park contains 1,600 lodging units, 11 restaurants, 3 bars, and 12 stores. Again, most of these facilities are located in Yosemite Valley. At peak season in summer, approximately 1,500 employees are housed in Yosemite Valley (89% concession, 8% NPS, 2% other). A total of about 10,000 visitors and residents spend the night in the east end of Yosemite Valley, an area of approximately 520 ha, throughout most of the summer.

The extremely high number of visitors to Yosemite coupled with the numerous developed facilities to serve them have provided a multitude of ways for black bears to be exposed to human foods. This exposure has inevitably led to the uniquely high number of conflicts between humans and bears over the history of the park.

INCIDENTS, INJURIES, AND DAMAGE

Figures 2, 3, and 4 show the record of human–bear interactions in Yosemite over the last 34 years. Human injuries have generally declined (Fig. 2), but the total number of incidents has remained high, especially over the last 6 years (Fig. 3). Property damage has also shown a marked increase in that period (Fig. 4), with an average of $137,500 per year. It must be noted, however, that data shown in Figures 3 and 4 may be subject to variables related to reporting accuracy and frequency. Not all incidents are reported, and efforts by park staff to collect reports may have varied among years as staff size varied. Also, estimates of property damage made in the field for each incident are of unknown accuracy. This is especially true for vehicle damage which has become the largest category of damage in recent years.

MANAGEMENT STRATEGIES

Management of bears in Yosemite, both historical and current, can be divided into two primary categories: proactive and reactive. Proactive management is aimed at preventing human–bear conflicts by anticipating or detecting the sources of these conflicts and mitigating them by providing long-term solutions. Reactive management responds to ongoing conflicts and attempts to mitigate them through immediate action; i.e., capture and removal of bears suspected of being involved in property damage or aggressive acts.

Until relatively recently, bear management in Yosemite National Park has relied heavily on reactive management. As injuries and property damage mounted, however, it became obvious that long-term solutions to problems were not being achieved by capturing and relocating or killing large numbers of bears. Finally, public outcry over the destruction of bears compelled the National Park Service in 1975 to develop a bear management plan for Yosemite. The plan, which is still in effect, is titled "Human–Black Bear Management Plan" because, when properly implemented, it relies more heavily on management of humans and their activities than bears. The plan identifies three main objectives:

- To restore and maintain the natural "integrity," distribution, abundance, and behavior of the endemic black bear population.
- To provide for the safety of park visitors by planning the development and use of the park so as to prevent conflicts and unpleasant or dangerous incidents with bears.
- To provide the opportunity for visitors to understand, observe, and appreciate the black bear in its natural habitat with a minimum of interference by humans.

In order to achieve these objectives, the plan further identifies five basic elements:

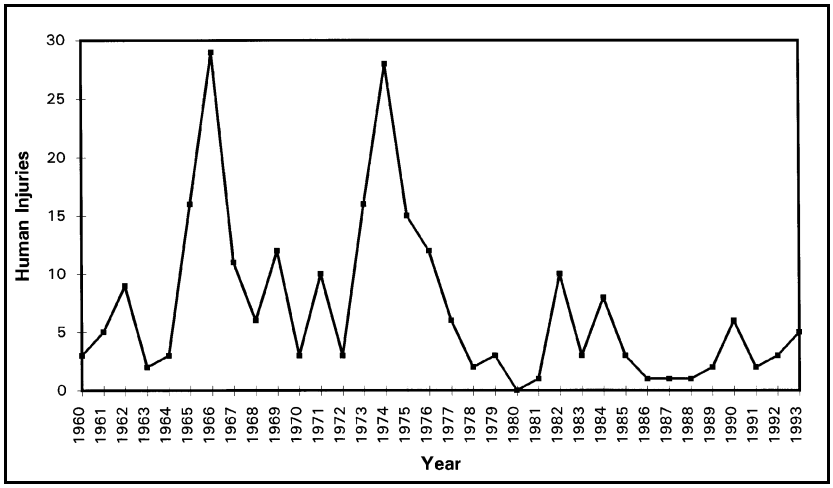

Figure 2. Black bear caused human injuries, Yosemite National Park, California, 1960–1993.

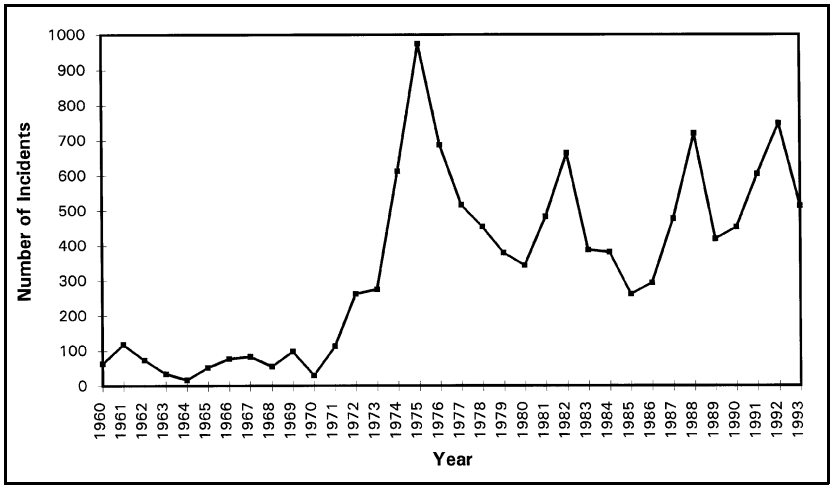

Figure 3. Black bear incidents, Yosemite National Park, California 1960–1993.

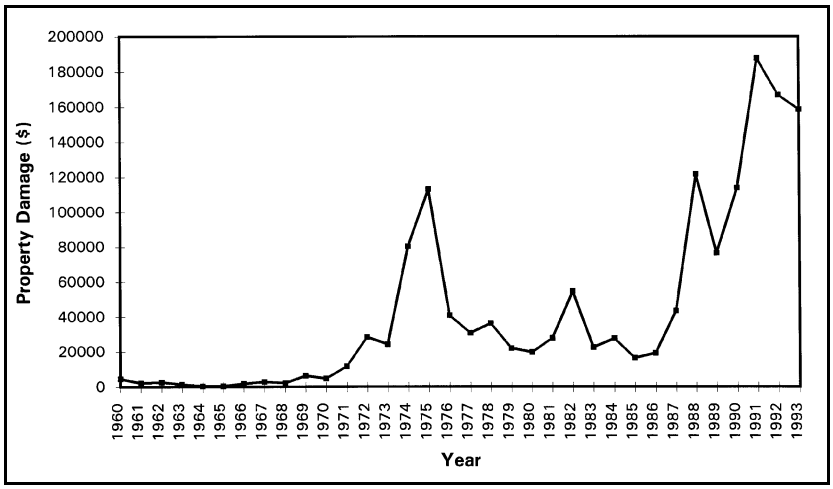

Figure 4. Black bear caused property damage, Yosemite National Park, California, 1960–1993.

(1) public information and education; (2) removal of unnatural food sources; (3) enforcement of regulations regarding food storage and feeding of animals; (4) control of conditioned bears; (5) continuation of a research program on black bear population dynamics and ecology, and monitoring of human–bear interactions.

Implementation of these elements and, therefore, achievement of management objectives, relies upon cooperation among the park's various operational divisions. For example, most of the responsibility for public information and education falls to the Interpretation Division to develop displays, campfire programs, and literature. The Maintenance Division provides a system of garbage storage and transportation that denies access by bears, and the Visitor Protection Division enforces regulations. In all elements, the Wildlife Management Section provides coordination and oversight that responds to new "gaps" in the system and changing patterns of bear activity. Divisions throughout the park are often the sources of this information.

Proactive Management

Public Information and Education. The role of public education in Yosemite has changed dramatically over time. Through the 1930s, visitation to the park was actively promoted by the Park Service to build a constituency for the preservation of such areas and to ensure the profitability of concession operations. Information and education provided in the park emphasized public entertainment and access to natural attractions, including black bears. Around 1925, the Park Service established feeding pits where visitors in bleacher seats could watch large numbers of black bears feeding on food scraps collected from the hotel and restaurant operations. The pits were originally established in an attempt to keep bears out of campgrounds and hotel areas. These "shows" were highly popular with the public, but created a dangerous situation. By 1937, approximately 60 black bears were in Yosemite Valley in the summer, as estimated from the number of different bears using the feeding pits, where 60 tons of scraps were dumped that year. The same year, 55 incidents of bears injuring humans were reported. Visitors followed the example provided by the bear pits and commonly fed bears by hand, an activity that often resulted in injury. Visitors also enjoyed mingling with the feeding bears in the pits. Property damage also increased with the number of bears attracted to developed areas of the park. Records are sketchy and probably incomplete, but indicate that many bears were relocated or killed during this period to protect visitors and their property. At least 95 were killed in the five years from 1937–1942 (Yosemite N.P. Archives).

With increasing damage and injuries, the Park Service finally realized that the feeding of bears for public entertainment was an ill-advised activity. The feeding pits in Yosemite Valley were phased out between 1940 and 1944, but more pits were established on the rim of the valley in an attempt to keep bears from returning once they were relocated. These pits remained in operation until the mid 1950s.

As visitation to Yosemite has swelled, the function of public information and education has become a crucial component of minimizing the impact of humans on park resources, including black bears. Visitors staying at campgrounds and lodging facilities receive a

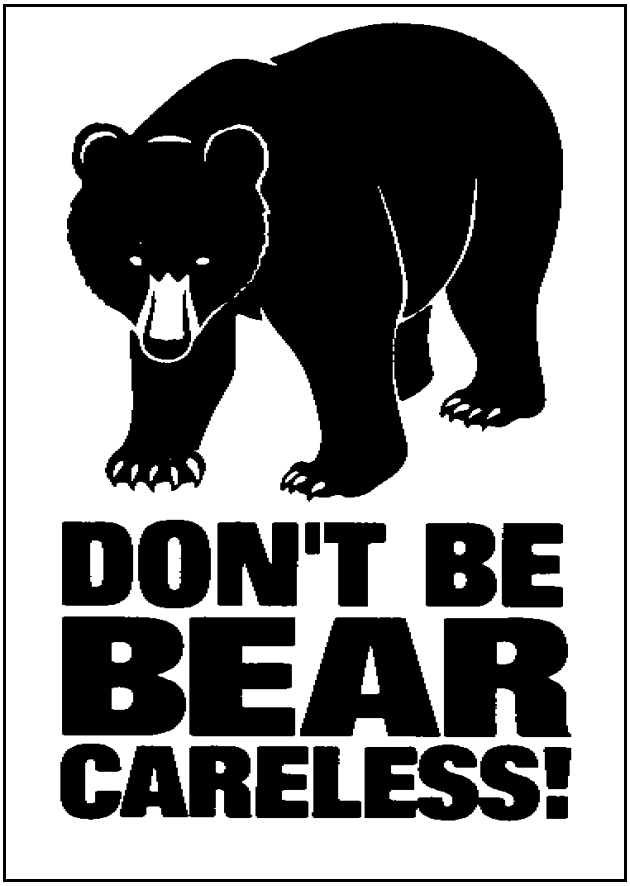

Figure 5. Logo developed for black bear information campaign, Yosemite, Sequoia, and Kings Canyon National Parks, California, 1994.

multi-color pamphlet that describes the human–bear problem in the park and advises them of food storage regulations and procedures for reducing the chance of conflict. Each quarterly issue of the *Yosemite Guide*, a newspaper-format information source given to every visitor, has an article on bears that communicates regulations and precautions. Visitor centers have bear displays and show a movie about bears almost daily during the summer which illustrates the problem in Yosemite. Live programs on bears are given in amphitheaters and at campfires. Signs at trailheads, campground entrances, in restrooms, and numerous other locations warn visitors of the legal and bear damage consequences of improper food storage. In total, the effort to warn visitors of human–bear conflicts is the most intensive public information program in Yosemite. Currently, the park, in cooperation with Sequoia and Kings Canyon National Parks, has developed a campaign with the slogan "Don't Be Bear Careless" (Fig. 5). This campaign uses new signs, buttons pamphlets, and events to publicize the importance of visitor compliance.

Removal of Unnatural Food Sources—Garbage. Certainly, the cessation of operating feeding pits in Yosemite was the easiest and most obvious removal of unnatural food achieved by the Park Service. Many other sources, however, remained; some of which the park still faces today.

Throughout the park's history, the heavy visitation to Yosemite has resulted in a problem of garbage accumulation and disposal that have had a detrimental effect on bears. Wherever hotels, restaurants, and campgrounds were located, open garbage dumps were not far away. Large numbers of bears foraged in the dumps which inevitably led to property damage and human injuries. Viewing bears amid smoldering piles of garbage became a popular visitor activity in the absence of the feeding pits and injuries resulted. Despite the conflicts and the obvious impact on bears, the last of the open garbage dumps in Yosemite were not closed until the early 1970s. Presently, all garbage generated in the park must be hauled to county landfills outside.

Bears also had access to garbage from numerous trash cans and dumpsters throughout the park. These receptacles attracted bears into the middle of campgrounds, parking lots, lodging facilities, and restaurants where damage and injuries occurred. All trash cans were finally fitted with bear-resistant mailbox-style lids in the 1960s, but the many dumpsters in the park did not receive the same treatment until 1975.

Currently, the park's Maintenance Division services 325 trash cans and 227 dumpsters, and they hauled 1,633,000 kilograms (1,800 tons) of garbage to county landfills in 1993. With this number of receptacles and this volume of refuse, the challenge is to plan a pickup schedule that prevents overflow of receptacles; otherwise, bears are still able to obtain garbage. Overflows often occur during peak visitor use periods of the summer, which require either an increased pickup frequency or an increased number of receptacles in certain locations to correct the problem.

The Park Service, in cooperation with the park concessionaire, operates a large recycling program in Yosemite. Glass, aluminum, and plastic containers are collected in 300 trash can size receptacles located in developed areas of the park. Because these materials often contain food residues, their receptacles and storage facilities must also be bear-resistant.

Bears continue to obtain small amounts of garbage from a limited number of open-top dumpsters in the park. These dumpsters, located in housing and maintenance areas, are meant to receive only yard refuse, scrap lumber or metal, or other materials without food value. They often, however, contain lunch scraps or kitchen garbage thrown there by careless residents, employees, or visitors. In an attempt to mitigate this food source, stickers printed with "No Food or Garbage" and symbols have been affixed to all four sides of all open-top dumpsters, but food continues to be found in them.

The fitting of bear-resistant lids on dumpsters in the park has greatly curtailed access by bears. Recently, however, some bears have learned to extract garbage from these dumpsters. Bears have been observed hanging head-first into the dumpsters through the mailbox-style door by hooking their hind feet on the chute's edge. All but the bear's feet disappear into the dumpster and it is able to reach and remove garbage. This technique, however, is not without risk to the bear. In the last five years, two bears have been accidentally killed after they fell into dumpsters and were subsequently emptied into compacting garbage trucks.

Removal of Unnatural Food Sources—Food Storage. The large number of people coming to Yosemite National Park bring a large amount of food with them. Until recently, regulations required that all

food be kept in vehicles to be properly stored away from bears: *Store all food in your vehicle trunk. If your vehicle has no trunk, all food must be stored in the passenger compartment covered with a blanket or tarp, and with all windows and vents closed.* This tactic, although it reduced the access of bears to human food, caused some bears to break into vehicles to obtain food. Such incidents are costly when door window frames are bent down and back seat upholstery is shredded as bears attempt to obtain food stored in trunks.

In an attempt to reduce this problem in campgrounds, steel bear-proof food boxes were installed in many campsites. In 1977, 85 boxes were installed in the White Wolf Campground north of Yosemite Valley. Between 1984 and 1988, approximately 1,500 more were installed, which equipped every campsite outside of Yosemite Valley with a box, but left over half of the 832 sites within the valley unequipped. Incidents of bear damage were highest in those campgrounds that lacked boxes.

Although the boxes have greatly reduced incidents in campgrounds equipped with them, some incidents have persisted because people often bring more food than the box can hold and, therefore, must store some of it in their vehicles. All boxes purchased before 1989 measure approximately 46 cm × 46 cm × 130 cm for a total volume of about 0.275 m^3. Because these boxes apparently have inadequate volume for many visitors, all boxes purchased more recently have about 2.5 times the volume and measure approximately 60 cm × 89 cm × 130 cm. This project culminated in 1994 with the installation of 500 boxes that completed all Yosemite Valley sites and replaced some of the older, smaller lockers in other campgrounds.

Replacement of old food boxes has become increasingly important due not only to their small volume, but also because many are becoming irreparable every year. The oldest boxes are over 15 years old and are beginning to show the wear of heavy use and winter-long burial in snow. However, replacement of all 1,500 old-style lockers, including installation, would cost nearly $900,000 ($500 per box + $100 per installation).

Visitors who park their cars and stay in lodging units or head into the backcountry are also vulnerable to bear damage if they leave food in their vehicles. Over the last three years, nearly 50% of all vehicle damage in Yosemite occurred in parking lots. Visitors who stay in hard-sided structures are now required to remove all food from their vehicles and keep it in their lodging. Visitors staying in tent cabins, however, face a dilemma. These people are not allowed to keep food in their tents because bears and other animals can easily enter the units. Visitors who stay in tent cabins must, therefore, either eat or discard all of their food, or leave it in their vehicles (in trunk or covered) and risk bear damage. Backcountry users are urged to bring no extra food or to discard it in a bear-resistant receptacle before they leave the trailhead. Proposals have been submitted for the installation of bear-proof boxes or structures at tent cabins and trailheads, but both projects will require a total of approximately $300,000 to complete.

About 94% of the park is wilderness and, although this area is used less heavily than the frontcountry, it is among the most heavily used wilderness in California, if not the nation. In 1993, overnight use of Yosemite's backcountry was approximately 80,000 people for a total of 145,000 user-nights. Such heavy use has, over the years, apparently led to a change in black bear distribution in the park. Early in this century, bears were rarely encountered above 2500 m elevation (Grinnell and Storer 1924), which includes a majority of Yosemite's backcountry. Bears are now commonly seen at elevations up to 3000 m in the park, apparently because of the presence of humans and their food. This has led to many bears that are heavily conditioned to backpackers food and that have developed highly sophisticated techniques for obtaining it.

In most other areas of black bear habitat, it is adequate to suspend food by a rope over a branch and tie off the rope to another tree. The bears in Yosemite, however, have learned that chewing or pulling on the rope will bring down the food. As a result, a new technique was developed in the park for hanging food more safely—the counterbalance method.

Until recently, this method was the only recognized method of properly storing food in Yosemite's backcountry, and its use was required. The complexity of this method, however, has led to low compliance and widespread improper use (Yosemite National Park, unpublished data). Heavily-conditioned bears have also devised strategies to obtain even properly-hung food; e.g., chewing off the limb, sows sending cubs out onto small branches to throw off the bags, and plunging from higher branches and grabbing the food sacks on the way down.

THE COUNTERBALANCE METHOD

Select a high, live, downsloping tree branch that is at least 5" in diameter where it connects to the trunk and no more than 1" in diameter at the point where the food is to be hung. Divide your food equally in weight between two sacks. Tie a cord to a rock and toss it over the branch. Tie one of the sacks to the end of the cord and hoist it all the way to the branch. Tie the second sack high on cord and stuff the excess cord into the sack, but leave a loop of it exposed. Heave the second sack up so that it hangs with the first sack no less than 12' from the ground and 10' out from the trunk. To retrieve the food, use a long stick to pull the excess cord out of the sack and down to the ground.

Devices have been installed in some of Yosemite's more heavily-used backcountry areas to allow better food storage. This includes cables (34), poles (14), and, to a limited extent, boxes (19). These devices have improved food storage, but have offered additional maintenance problems, with cables becoming snarled with abandoned ropes and lockers being used as garbage receptacles. In Yosemite's sister Sierra Nevada parks, Sequoia and Kings Canyon National Parks, boxes are used widely in the backcountry as the primary method of food storage. The managers of Yosemite, however, have so far been reluctant to expand the use of boxes in the wilderness, objecting to the aesthetic disruption of man-made devices, the possible environmental damage of concentrated human use attracted by the boxes, and increased maintenance responsibility in remote areas.

An alternate strategy being pursued in Yosemite is the use of bear-resistant food canisters. These plastic cylinders, approximately 30 cm long × 21 cm wide and weighing 1.3 kg, are manufactured by Garcia Machine in Visalia, California. The canisters can hold a 3 to 5 day food supply and have proven to be highly effective against bears. The park concessionaire currently offers the canisters for sale or rental at four locations in the park, and several merchants outside of the park are offering canisters.

The Park Service officially recognizes the canisters as a proper method of food storage and encourages their use. In 1993, a plan was written to expand distribution of canisters and perhaps require their use in some park areas where bear problems are heavy. If implemented, the program would be evaluated for success and possible expansion to reduce human–bear conflicts in other areas of the park.

Apple Trees. Yosemite contains nearly 500 fruit trees, mostly apple, that are remnants of the park's agricultural past. Most of these trees are located in developed areas of the park and attract large numbers of bears in the fall when fruit ripens. The largest parking lot in Yosemite Valley is set within a 143-tree orchard at Curry Village, a situation that results in numerous vehicle break-ins. In 1989, a year of high apple yield, 12 different bears were seen in this parking lot in one fall night.

Removal of the fruit trees as exotic species would be in order if bear management were the only concern. The trees, however, are recognized as a cultural resource that should be preserved as part of Yosemite's history. This poses a dilemma to park managers; whether a cultural resource should be protected even if it adversely affects a natural resource. Mitigation was attempted in 1992 when fire hoses were used to knock blossoms from the apple trees in Curry Village. This treatment, however, appeared to be ineffective and probably resulted in higher apple yield from inadvertent irrigation of the trees.

Enforcement of Regulations. This component of management is necessary to reinforce compliance with food storage regulations. Commissioned law enforcement rangers issue citations that carry a $25 fine for improper food storage, or can issue verbal or written warnings to violators. Adequate enforcement coverage of a problem as large as Yosemite's, however, requires a significant investment of ranger staff time, which has not been possible in recent years. This inadequacy has placed increased importance on education and facilities to mitigate human–bear conflicts, but a greater enforcement presence is definitely needed to achieve management goals.

Authority for the NPS to enforce certain food storage regulations comes from Title 36 Code of Federal Regulations (CFR), and the park's Compendium. The latter document provides detailed regulations that apply specifically to Yosemite National Park and that are subject to annual review and revision based upon changes in facilities, bear activity, and management strategies.

Enforcement of these regulations in Yosemite, however, has not been vigorously pursued in recent years. The staff of law enforcement rangers in Yosemite Valley has been reduced by 49% over the last 10 years, even though park visitation has grown by 65%

over the same period. As a result, demands such as medical emergencies, search-and-rescue, road patrol, and miscellaneous crimes have relegated enforcement of food storage regulations to a lower priority. In 1993, 45% of all bear incidents in the park (n = 513) were attributed to human error (e.g., improper food storage), but citations were issued in only 8% of those cases. Improperly stored food was impounded only 43 times from campgrounds and parking lots during that year.

Increased enforcement of food storage regulations would undoubtedly result in further reductions in human–bear conflicts by providing incentive for compliance by visitors for whom protection of bears and their property is not reason enough. Further improvement in food storage facilities, however, would be a more effective means of reducing violations.

Reactive Management

Although reactive management has been de-emphasized in Yosemite, it continues to be a significant component of bear management in the park. Great strides have been made in recent years to reduce human–bear conflicts, but the high level of continuing problems demands that certain bears be dealt with directly in an attempt to mitigate immediate situations of damage and/or aggression. Reactive management, however, will continue to diminish in importance with further advances in education, facilities, and enforcement, and as park managers can accept that capturing, relocating, and killing bears is only a "bandage" approach to a serious problem.

Yosemite National Park has captured and killed or relocated bears for over 50 years (Harwell 1937, Beatty 1938). Until relatively recently, this type of management was heavily relied upon to mitigate human–bear conflicts. Records of bear management prior to 1975 are fragmentary, contradictory, and probably incomplete, but it is clear that many bears were killed. The best records of management between 1960 and 1974 show that at least 200 bears were killed in Yosemite during that period (Fig. 6). Implementation of the Human–Bear Management Plan in 1975 resulted in a reduction in the number of bears killed, but large numbers of bears continued to be captured and relocated. More recently, however, there has been a general decline in the number of bears captured. This was the result of a shift in emphasis from reactive to proactive management in which efforts to capture bears were reduced. Decreases in the park's Wildlife Management staff have also reduced capture operations.

Under present policy, bears are killed only when there is overwhelming evidence that their behavior is escalating in aggression and property damage, and repeated relocation efforts have failed. Some bears have been captured and moved up to four times in a year because there was no evidence of them being highly aggressive or destructive. Efforts are directed at mitigating the food sources discovered by the bears. Radio collars are now used to track the return of some relocated bears and associate their movements with locations of property damage.

Relocation of bears suspected of being involved in property damage continues to be the primary management action taken with bears captured in Yosemite. A total of 124 relocations were made in the 5 years of 1989–1993. All relocation sites are within park boundaries, which limits the distance that bears can be moved; the greatest distance of a relocation site from Yosemite Valley is only 36 km. As a result, approximately 80% of relocations fail, with the bears eventually being recaptured in developed areas in the years following their release.

Relocation is not a viable, long-term solution to human–bear conflicts. The park strives to maintain natural populations of wildlife, but relocation likely affects the survival of captured bears (Graber 1982). In addition, capture and relocation operations can consume

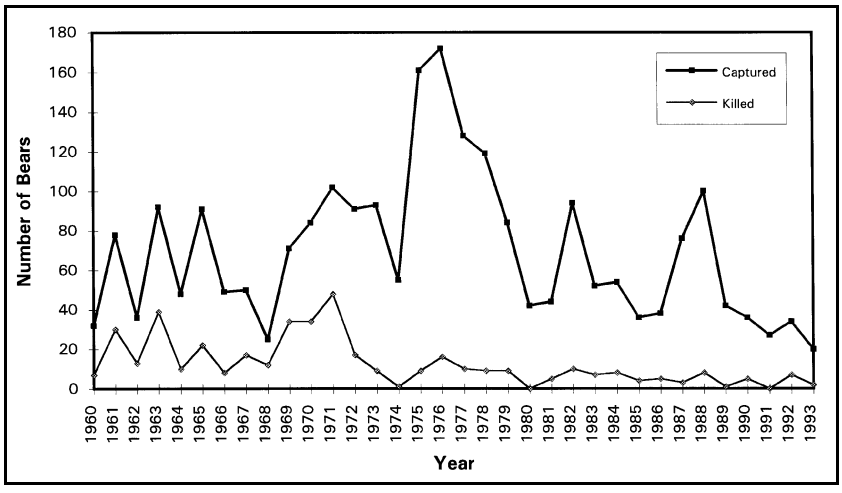

Figure 6. Numbers of bears captured and killed, Yosemite National Park, California, 1960–1993.

large amounts of time and money, which detrimentally affect other wildlife programs. Other Sierra Nevada national parks, Sequoia and Kings Canyon, have abandoned relocation as a bear management option, in recognition of its monetary and ecological costs, and its ineffectiveness. Reductions in capture efforts in Yosemite have allowed personnel to dedicate more time to designing and procuring food boxes, developing educational materials, and working toward other proactive, long-term solutions.

Given the extraordinarily high number of human–bear incidents in Yosemite, however, relocation is continued as a preferable alternative to killing large numbers of bears to provide short-term relief. Park administrators and biologists are reluctant to kill many bears when gaps in proactive management (as shown to us by the bears) remain unclosed. The death of a bear would alleviate a problem only until another bear discovers the food source, thus becoming another candidate for killing. Management programs that rely heavily on killing and relocating bears, such as earlier in Yosemite's history, effectively obscure proactive management gaps and delay solving them. Killing can have a detrimental effect on a bear population even more profoundly than relocation (Bunnell and Tait 1980). Keay (1991) found that the sex and age composition of Yosemite's black bear population in some ways resembled that of a hunted population, and surmised it was the result the park's long history of killing and relocating bears.

CURRENT PATTERNS OF INCIDENTS

Despite the extensive bear management program described above, human–bear incidents in Yosemite continue at unacceptably high levels, as revealed by data from 1993. Total reported incidents that year were 513, resulting in $158,663 in property damage. Of these incidents, 47% occurred in the backcountry, but they accounted for only 7% of the property damage. This discrepancy is a reflection of the high amount of vehicle damage that occurred in frontcountry areas. Damage to vehicles accounted for 38% of reported incidents and 87% of total property damage. This is a pattern that has become prevalent over the last 5 years with vehicle damage making up 44% of all incidents and 87% of all property damage in that period ($703,351). In comparison, vehicle damage comprised only 14% of incidents and 44% of total damage for the 5 year period of 1979–1983 ($146,385).

This increase in vehicle damage is not easy to understand. The largest number of bear-proof boxes (1,500) were installed in campgrounds in 1984–1988 with the intent of reducing damage to vehicles. Bear incidents and damage dropped off the following year (Figs. 3 and 4), but increased thereafter. In 1992 and 1993, 88% and 53%, respectively, of all Yosemite Valley incidents occurred in campgrounds in which a majority of campsites had no bear-proof boxes. We expect that data to be collected in 1994 and 1995 will reveal that completion of box installations will reduce incidents in these campgrounds.

Incidents in parking lots, however, accounted for a significant amount of vehicle damage in recent years, with 50% and 66% of all vehicle damage occurring in these areas in 1992 and 1993, respectively. Obviously, facilities, information, and enforcement must be provided in these areas to encourage visitors to remove food from their vehicles.

The high recent levels of incidents and property damage may also be related to a reduction of emphasis on reactive management (e.g., relocation and killing). This may have allowed some bears to become heavily conditioned and cause property damage over longer periods. For example, approximately $15,000 in damage occurred in Tuolumne Meadows parking areas over a period of 4 weeks in 1993. After a bear identified as being involved in several of these incidents was killed, incidents in Tuolumne Meadows declined greatly. Such mitigation, however, is increasingly difficult as bears appear to become more elusive. We have noted a marked decrease over the last five years in the success of culvert traps and the ability to approach free-ranging bears for darting.

Nonetheless, failure of park visitors to take adequate precautions to avoid bear incidents continues to be a significant factor. Human error was identified as the cause of 45% of all incidents in 1993. This rate of noncompliance, coupled with the ever-escalating numbers of visitors (Fig. 1), and ever-declining numbers of park staff to educate the public and enforce regulations produce conditions that inevitably lead to increased bear incidents.

Currently, the park's Wildlife Management staff consists of two permanently-employed biologists, augmented by one two-month seasonal employee and two volunteers hired to assist with bear management activities. Permanent staff members have the

responsibility of overseeing all wildlife management programs in the park, but bear management occupies greater than 80% of their time over the year. As a result, important programs such as Threatened and Endangered Species get minimal coverage, and implementation of needed programs is delayed.

CONCLUSION

The continuing high levels of human–black bear conflict in Yosemite National Park demand immediate and decisive action. Otherwise property damage will continue to mount and the black bear population will continue to be altered from the natural condition. Our choice in this action is whether to treat the "symptom" or the "disease." It would be possible to reduce incidents and property damage by returning to the intensive reactive management of capturing many bears for relocation or killing. Such management, however, would need to continue indefinitely, would adversely affect the bear population, and could (and should) be unacceptable to the public in a National Park setting.

On the other hand, improvement in proactive management would identify gaps that are allowing bears access to human food and take steps to correct them. Recommended actions include the following:

Bear-Proof Food Boxes. Install larger boxes in all campsites and provide bear-proof food storage for all tent cabin units and at trailhead parking areas. The goal must be to have no cars in the park with food left in them overnight.

Increased Enforcement. Increase the number of park personnel involved in patrolling campgrounds, parking lots, and other areas where human–bear incidents are occurring. This presence could take the form of either commissioned rangers able to write citations or patrols designed to give information, and find and correct food storage problems.

Garbage Disposal. Provide increased frequency of garbage pick-up or provide additional bear-resistant receptacles at those places and times that high visitor use results in overflow. Take steps to further discourage the improper use of open-top dumpsters, and remove such dumpsters if improper use continues.

Bear-resistant Canisters. Enlarge the distribution system of bear-resistant food canisters and more strongly encourage their use by backpackers. Consider mandatory use of canisters in some heavily-used backcountry areas.

Information and Education. Evaluate and improve current materials and programs for effectiveness, and develop new campaigns to address emerging problems (i.e., car damage in parking lots), and where visitor compliance needs to be improved.

Increased Staff. Add at least one permanent biologist and two seasonal employees to the park's Wildlife Management staff. At its present level, the staff is inadequate to pursue and implement many of the above measures, respond to the frequent human–bear crises, and adequately manage the other wildlife programs that yearly grow in size and number.

Implementation of these proactive measures is a daunting task, especially when considered on top of the extensive efforts already undertaken. Critical funding limitations now being endured further restrict action. The issue of bear management in Yosemite, however, involves both protection of natural resources and protection of visitor safety: two very high Park Service priorities. As such, the problem may be a serious and expensive one to solve, but, as history has proven, it would be a more serious and more expensive problem to ignore.

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QUESTIONS AND ANSWERS

Hal Black, Brigham Young University: Would there be any good reason to think that when you have a female bear with cubs who is genetically predesposed or has learned to be aggressive, we ought to intentionally dispose of the cubs along with the mother?

Steve Thompson: This is something I grappled with in the case you are referring to. This is anthropomorphism, but I was thinking about whether the cubs would suffer as a result of being orphaned. It was in August and they were fairly large. And we've had cubs in the past that survived on their own after being orphaned at that stage. So, when we euthanized the mother, we decided to give them a chance. We may end up having problems with them in the future, and actually thought that they would stay in the campground where we had euthanized their mother, but they never came back. It was mostly that I had trouble killing four bears at once. That's all there is to it. I couldn't do it.

Dianne Ingram: I think the only thing that we needed to discuss was whether we were going to see those bears down the road again displaying the same behavior that their mother did. Even if it's not genetic, we all know how easily bears learn. And they did watch their mother attack three or four different people. They've got to take that in somehow.

Kate McCurdy, Yosemite Nat'l. Park: I think in a park situation where you have a lot of visitors it's definitely a concern. I don't know that you would ever be able to rehab and release. We've had two follow-ups on orphaned cubs. One did become a problem bear, but last year we trapped one of the bears released in 1992 within a mile of where we originally captured her. She was in great shape, had gained 10 pounds, and seemed to be doing just fine.

WORKSHOPS AND PANEL DISCUSSIONS

SOCIOLOGICAL AND ETHICAL CONSIDERATIONS OF BLACK BEAR HUNTING

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The following manuscript is a summary of an open round-table discussion session. This session was prompted by two recent developments: (1) an increase in the criticism of current black bear hunting techniques before state wildlife commissions and (2) the use of ballot initiatives as a method to advance regulatory change. Each of the participants was asked by the panel moderator (TDIB) to summarize the arguments for or against a particular hunting methodology. The fact that a participant presented a specific side of the argument was not necessarily a reflection of that person's own position. All attendees of the session were free to voice opinions throughout the session; many of these were recorded by audio tape and/or notes and are included. In fairness to participants, specific comments or ideas will not be attributed to any individual.

The intent of the session was to stimulate debate, not to arrive at definitive answers. The questions of bear hunting methodology are primarily social, yet each have biological ramifications. For those seeking biological, scientific support either for or against a particular practice, you will likely be disappointed. We attempted to present all arguments and critically examine some. The ultimate decisions regarding hunting techniques will be resolved in a sociological environment, not a biological one. We do believe this manuscript will serve as a useful primer for all who choose to concern themselves with the issue of black bear hunting. This manuscript does not represent an exhaustive academic approach but rather a summation of thought which was promoted by the group interaction.

SHOULD BLACK BEARS BE HUNTED?

Role and focus of agencies.

The role of state wildlife management agencies has historically been to **protect** and to **provide.** Most western agencies were established in response to overexploitation of wildlife populations and habitats. The primary focus of these agencies was to protect wildlife populations from further overexploitation and to allow for the reestablishment of depleted populations. The primary supporters of these activities, both financially and politically, were hunters and fishermen.

Why protect wildlife?

But why do we choose to protect wildlife populations? We protect them in order to provide for some human benefits. The range of benefits goes from the abstract (I want to know they exist somewhere) to the utilitarian (I derive income from them). And with black bears, a benefit has often been the prevention of depredation.

Black bear management: historical perspective

Until quite recently anyone questioning whether we should hunt black bears would have been considered a heretic in any agency. We in the wildlife management profession are learning that social mores are dynamic; what was mainstream 30 years ago may now be fringe behavior. The black bear serves as an excellent case history of this dynamic situation.

Relative to other big game species in the West, black bears received protection as a game species quite late. Much of our historic attitude toward black bears revolved around the real and perceived depredations upon livestock and domestic crops. The ease with which black bears adapted to human activity led to further conflict of the nuisance variety.

These historic conflicts, and the lack of a vested-interest constituent group for black bears, resulted in both liberal hunting seasons and methodologies. A less obvious, but perhaps more important, outgrowth of these attitudes was the development of the agency philosophy that we needed to hunt black bears in order to manage them. This supposed need was easily transformed into a rationalization in support of various hunting methodologies. To argue that sport hunting is needed for black bear management implies the following:

The link between sport hunting and management goals

1. We understand the impact of hunting on population dynamics and bear behavior.
2. We can effectively regulate harvest to manipulate age, sex, and level of kill.
3. We can predictably define and influence the target population.

In reality, we cannot do any of the above consistently. There are clearly situations where control of depredating black bears is an appropriate management activity. What is less clear is how effective sport hunting can be in achieving those management objectives. We do know that black bears can be overhunted in localized areas, often quite easily. Some managers believe that such localized hunting can be an effective deterrent to human–bear conflicts, especially in areas with high density of human dwellings. The utility of this approach tends to be scale related, so that it may work for summer home congregations but not for range livestock.

The wildlife management profession has evolved into a period where we speak of hunting as a management tool rather than as an end product of our activities. While there are situations with some species where sport hunting can be an effective procedure to reach management goals, rarely is hunting the only tool available. If one bases an entire argument in support of hunting upon management need, one will find himself vulnerable to reasoned criticism. However, there are three strong economic arguments in support of hunting as a management tool. First, it is often the cheapest method to obtain desired objectives. Second, the license fees paid by hunters supports the management agency infrastructure. And third, the hunting license fee and associated hunting expenditures places an economic value on the bear beyond the aesthetic value. This economic value encourages preservation of habitat and bear populations. Whereas 20 years ago, bears were often killed in retaliation for the depredation of a single lamb, we now often see guidelines where domestic loss must exceed a specified level prior to lethal bear control. This is a direct result of the consideration of the economic value of black bears.

Hunting as a management tool—economic arguments

Hunting of black bear is a product of wildlife management which clearly provides benefit to a great many people. Because it is a product, we should be concerned not only with the quantity but with the quality of the product. While agencies routinely collect kill data for management monitoring, the number of dead bears is a poor measure of the hunting product. This difference in measured output is critical to the future of black bear hunting. If one only measures performance by the number of bears killed, how those bears were killed easily becomes irrelevant. However, if one measures the hunting activity, then how one hunts becomes a critical factor. To the non-hunting public, how we hunt appears to be a powerful factor in their acceptance of hunting. The non-hunting public appears to be concerned with two major issues:

How to hunt vs. how many to hunt.

(1) do we have a credible management program in place and (2) are hunters behaving in an ethical/responsible way.

Population vs. individual management

The debates currently being waged in nearly all Western states have to do with how we hunt black bears, not whether we hunt them. Rarely is the level of hunting called into question. Generally the public trusts state agencies to protect the black bears from overexploitation. The public also supports the hunting of black bear as a valid wildlife benefit. A long-held paradigm in wildlife management is that we direct our concern to the population level, not the individual animal level. We have used this paradigm as an excuse not to consider criticism of hunting methodologies. If we are to preserve hunting as a product of wildlife management we must modify the current paradigms. All hunting must operate within two sets of concordant rules, one biological and the other sociological. Neither set can be ignored. While the biological rules set the limits for exploitation (what we can kill), the sociological rules impact modes of human behavior (how we kill).

Biological and sociological considerations

The principal biological consideration is protection of a black bear population from overexploitation. It is clear that unrestricted hunting can lead to catastrophic reduction in bear numbers, even extirpation. The primary methods to prevent excessive kill are (1) limited number of licenses, (2) restriction on season timing and duration, and (3) restrictions on hunting methodology. As long as the total annual kill of black bears is less than the recruitment rate, there are no **right** or **wrong** methods pertinent to the question of population survival. This concept has general validity for all wildlife. Biologically speaking, there is no compelling reason to not hunt geese in January, elk in July, or bighorn sheep in February. The fact that we do not highlights the sociological nature of most of our hunting rules.

The current environment of change

Change is rarely comfortable, either for agencies or vested interest groups. The history of natural resource management in America clearly indicates that change occurs in non-incremental steps rather than gradually. This makes resistance to change stronger and acceptance more difficult. The Colorado black bear hunting debates were a vivid example. There appeared to be many opportunities for small concessions to satisfy most of the critics. Clearly there was a small minority who would not be silenced short of banning all bear hunting. But the preoccupation with this minority prevented reasonable compromise. The result was a large change in how black bears will be hunted. Wildlife management agencies and hunters alike must share some of the blame for the criticism of the status quo. Too often agencies are preoccupied with responding to complaints from traditional vested interests while the hunters focus on maximizing their hunting opportunities with minimal regulation. Neither devotes much time to examining the role of the hunting culture within the larger mosaic of American society. This insularity, while once our strength, may now be our greatest weakness. It is in this environment that we must now confront the issues of black bear hunting methods.

SPRING SEASONS FOR BLACK BEAR

Rationale For Spring Seasons

Proponents of spring black bear hunting generally offer one or more of the five following lines of reasoning:

1. Concentration and predictability of habitat use by black bears enable hunters to be successful.
2. Sex selectivity is possible based on differential den emergence times.
3. The spring bear season provides recreational opportunity during a different time of year than most other hunting seasons.

4. Spring hunts are part of our hunting tradition.
5. Hunters are fearful of the domino-theory; i.e., if we lose this season to the ANTI'S they will come back for other seasons.

Spring habitat use

Black bears do concentrate in areas which provide suitable green forage soon after den emergence. Knowledgeable hunters can utilize this trait to improve chances of seeing and killing bears. This is more noticeable in the northern Rocky Mountains than in the Southern Rockies. In areas where baiting and hounds are not allowed (e.g., Montana) this seasonal concentration is probably critical to hunter success. In areas of dense conifer vegetation, this spring period may be the only time when black bears actively forage in more open environments.

Den emergence and sex selectivity in the harvest

A majority of studies clearly indicates the earlier den emergence and greater early activity of male black bears. Summaries of male and female harvests at weekly intervals show a strong male bias during the earlier weeks of spring seasons. This bias wanes as spring progresses; the strong male bias generally lasts for two to three weeks. Hunters usually want long spring seasons as access to mountainous areas improves with snow melt. However, the utility of spring hunting for biasing the kill to males deteriorates rapidly with time. Data from Colorado clearly demonstrate that most bears are killed in the last two weeks of the spring season, regardless of ending date. To take advantage of differential activity to bias the sex ratio of the kill, the season needed to end by 15 May. Other states, where den emergence precedes Colorado by three to four weeks, would likely need to close earlier. Most bear managers prefer to see hunter kill directed to males, and spring seasons do clearly provide the opportunity for directing hunter kill to the male segment of the population.

Hunter crowding in the fall

With the exception of spring turkey and varmint hunting, there are few hunting opportunities from January through August. While spring bear hunting is probably a hold-over from earlier years when most Western states allowed year-round hunting of bears, hunters have increasingly been taking advantage of this opportunity, especially since the mid-1970s. As long as the spring kill does not negatively impact the health of the black bear population, why reduce or eliminate this opportunity? Hunter crowding is an issue in many states during the fall big- game seasons. For hunters seeking a big game experience with lower hunter density, the spring bear season has been a wonderful opportunity. Spring is also a great time to be out and about in the mountains, and many hunters comment on the spiritual refreshment this provides after a long winter. For these hunters, hunting bears is much more than just killing bears.

Tradition and the public

Tradition is an important part of American culture. It often serves as the source of heterogeneity in our human population, and, as a society, we usually revere tradition-based activities. The loss of a traditional activity often angers people far more than would seem reasonable from the subject lost. As hunters become a smaller minority each year the fear, and at times paranoia, about loss of hunting privileges weighs heavy on their minds. Many traditions in America continue because of the societal tolerance of minority opinion. There are also instances where minority traditions have created great strife in our society; i.e., slavery and women's suffrage. Tradition appears to be a strong argument within state agencies but not within the non-hunting public.

Domino theory

The domino theory is widely accepted among hunters. This theory proposes that we should defend all hunting practices against attacks, for if we ever let the anti-hunters defeat us on any hunting issue, then the entire network of sport hunting will eventually fall. The belief in this theory is pervasive and strong. In November 1992 Colorado citizens voted on a citizen-initiated ballot initiative (Amendment 10) which would prohibit spring seasons for bears and use of hounds and bait for bear hunting. Numerous citizen polls during the previous four years indicated a strong opposition to these techniques by non-hunters and also many hunters. The measure passed overwhelmingly (70% YES, 30% NO). Post-election analyses showed that most

YES voters acted out of concern for bear population health and a sense of fair chase while a sizeable portion of the NO voters did so, not because they supported the methodologies, but out of fear of subsequent attacks on hunting. Interestingly, large majorities of both groups of voters preferred that such decisions be made by appropriate state agencies rather than by ballot questions.

Committed anti-hunters will continue to oppose all hunting practices. However, they are quite candid in saying they will openly attack those behaviors which they think are most out of line with general societal norms. They will not attack white-tail deer hunting. The real power lies with the non-hunting public. Nearly all public opinion surveys show that the non-hunting public (about 70% of Americans) is tolerant and/or supportive of regulated hunting. When this group is exposed to hunting behaviors which they find inappropriate, they are not hesitant to side with anti-hunting advocates; i.e., the Colorado Amendment 10 vote. The hook-and-bullet press, along with hunting advocacy groups, reinforce the fear in hunters of losing their privileges to the vocal, well-financed anti-hunting lobby. While many wildlife professionals believe the strength of belief in the domino theory is much greater than the strength of the evidence, the concern among hunters is real.

The nature of the non-hunting public contrasted with the anti-hunting public

Rationale Against Spring Seasons

Opponents of spring black bear seasons also have an array of reasons:

1. It is ethically wrong to hunt during a time when females are nursing young because of orphaning and subsequent death of cubs.
2. It is wrong to harass bears during a critical period for them physiologically.
3. Bears are too vulnerable in the spring because of their concentration in limited habitat and declining physical condition.
4. Spring seasons contribute to harming other natural resources. Road damage and stream siltation are two examples.
5. Agencies lose credibility for supporting spring seasons.

Nursing females

The biggest issue is the killing of nursing female black bears. There is no way to prevent this from happening in a spring bear season, either through hunter education or timing of season. Nursing female black bears often forage at great distances from their cubs. When pursued by hounds, the female bear usually leaves the cubs in a tree and continues eluding the hounds. When she trees, she is seldom with her cubs. Many nursing females do not bring cubs to bait sites initially but will as they grow older and as she becomes less wary at the site. There remains great contention between hunters and bear biologists/managers as to the ability of hunters to accurately assess nursing status of bears. The conclusion of most biologists is that it is quite difficult to accurately determine nursing status on free-ranging black bears, even when a bear is in a tree or at a bait. The appearance of nursing females in the kill each spring supports this notion. During the last year of spring bear hunting in Colorado, the number of nursing female black bears checked was within three of the number predicted based on breeding rate of females and total female kill. In other words, there was no selection even with regulations prohibiting the taking of nursing females. Proponents of spring hunting usually point out that most states protect females with cubs by regulation. The regulation looks good on paper but is very difficult to implement in the field because of bear behavior.

Difficulty of discrimination between females w/ or w/o cubs

The crux of the nursing female argument is the difference in the paradigms of managing for total population fitness without concern for individual animal welfare and one where individual animal welfare is important. The number of nursing females killed is irrelevant from the animal

welfare position. They do not accept the population dynamics arguments, especially since there are alternative hunting seasons where cub death because of family group break-up is not an issue. Wildlife professionals are concerned with both individual and population welfare but perhaps have not done a good job of expressing such concerns to the non-hunters.

Physiological stress during spring

In most western states the spring season is a period of significant physiological stress to black bears. Available food is usually insufficient to maintain body weight, much less replenish stores of nutrients used during the long hibernation period. Because of these conditions black bears may be forced to forage in areas which provide minimal security. Of great concern at this time is the impact of long and/or repeated pursuits by hound packs. Our treatment of black bears is inconsistent with our treatment of ungulates. By regulation and education we encourage people to avoid activities which stress ungulates in the months following the winter period, primarily because of the lowered physiological condition of the animals. Natural mortality among young bears does occur during spring, especially in cold or dry periods. Added stress during these times would likely increase mortality. Such mortality may not be readily observable to hunters; e.g. leaving a young bear in a tree after a hound chase appears to be saving the bear when the chase itself may contribute to subsequent starvation.

Vulnerability of bears concentrated in spring habitats

Some argue that the limited habitat available during the spring season and subsequent concentration of black bears creates a situation where the bears are too vulnerable. The same behavior trait thus is used in arguments for and against spring hunting! Clearly agencies agree with this position partially, as evidenced by the trend in limiting hunting licenses during spring seasons in particular units. Limiting licenses controls the potential for over-kill although it may not address the ethical concern of hunting during a time of maximum vulnerability.

Road damage

An issue relative to other natural resources is road damage and harassment of other wildlife. In order to bias the kill to males, agencies encourage hunters to hunt as early as possible. This often results in severely rutted access roads. The road condition is a valid concern to land management agencies and private landowners as bad conditions increase maintenance costs. Rutted roads also contribute to increased erosion and silting of streams. This can have a negative effect on stream fisheries, especially in highly erosive soils. Many wildlife agency personnel have grave concerns regarding impact of spring black bear hunters on ungulate populations. The fact that they appear more worried about incidental impact to other wildlife rather than the target species further agitates the critics of spring bear hunting.

Credibility problem of double standard

While deer and elk management finance western state wildlife agencies, smaller programs often dictate how that agency is perceived by the non-hunting, and sometimes the hunting, public. There seems to be a general perception that agencies treat black bears differently than other big game, or even wildlife in general. The perception is that there are two different ethical standards. Many in the profession agree. The perception that we hold hunters to one standard with popular game animals (deer, elk, bighorn sheep) but not with bears creates a big credibility problem for the agencies. Try suggesting a spring hunt for elk some year! As public agencies, credibility is our main currency for keeping public support.

BAITING FOR BLACK BEAR

Rationale For Baiting

Proponents for baiting offer the following justifications:

1. Baiting is effective in increasing hunter success and/or implementing population control.
2. Baiting provides opportunities to watch black bears.
3. Baiting allows for hunter selectivity for specific age and sex groups.

4. Without baiting or hounds, hunters would not be able to kill bears in many areas.
5. Baiting as a form of supplemental feeding may improve physical condition and cub production.

Improvement of hunter success

Baiting of black bears surely increases hunter opportunity to observe and kill a bear. As baiters are prompt to point out, baiting is not a sure thing. Placement of bait in areas naturally traveled by bears improves success. A major detriment to baiting success is when black bears avoid the bait during daylight hours. Hunters using bait in Colorado enjoyed average success rates about 50% better than hunters not using bait (30 vs. 20). If a management objective is to significantly reduce black bear density, then baiting is an effective tool. As density decreases, incidental encounters decline and baiting becomes a more effective procedure.

Anyone having the opportunity to watch bears receives some benefit. At bait sites used by individual hunters, the number of bears killed is proportionally small to the number at the site most of the time. This may not hold true for baits maintained by outfitters. While novice black bear hunters often shoot the first bear seen, more experienced hunters often wait to fill a tag, either in search of a larger bear or to prolong the hunting season. Baiting provides the opportunity for a hunter to observe more bears than other hunting techniques. This is beneficial in training hunters to recognize size and possibly age and sex of black bears. Although the situation may be artificial, the enjoyment to the hunters of watching these animals is very real. Where black bears are unusually wary, baiting provides the only successful means for non-hunters to observe bears. Some hunters continue maintenance of bait sites after seasons to provide for general observation, while many more incorporate non-consumptive watching during the hunting season.

Identification of age class and sex of bear

Because of the potential for close-range observation and prolonged observation at baits, many hunters contend that the size, sex, and age (size-related) of target bears can be determined. They contend this enables them to identify nursing females and other females. Most experienced black bear biologists believe that a small percentage of bear hunters can do this. At the least, experienced hunters can accurately identify large, adult males. Smaller bears of either sex are much more difficult. Several factors make accurate determination difficult. First, the overlap of sizes among age and sex groups of black bears is large. More subtle differences like shape of face are difficult to see and not unambiguous. Most bear researchers have stories of inaccurately classifying sex of a bear at a distance of 10 ft. Second, most hunters using bait hunt with rifles and thus do not set up at close range to the bait, as do archers. Greater distance reduces the accuracy of any identification. Third, at long-maintained bait sites, most bear activity occurs just prior to dusk at low-light conditions and with the constraint of ensuing darkness to force a decision by the hunter. An examination of hunter kill data does not support a general relationship of bait hunters being selective for males. Besides the real problems of observation, the turnover among bear hunters contributes to a lot of inexperienced bear hunters. This does not negate that individual hunters can utilize bait to be very selective. Rather, the consensus is that such hunters make up a small proportion of the bear hunter population.

Stalking vs. baiting success

Black bears are animals of the forest and shrublands and only under unusual conditions do they venture far into openings. They also possess excellent senses of sight, hearing, and smell. This makes them difficult to seek out and stalk as one might an ungulate. Hunting success can vary widely based on time of year as well as method. In Colorado, black bear hunters average 3–5% success when hunting during deer and elk seasons (Oct.–Nov). Hunters in September, without bait, average 21% success. When legal, hunters using bait averaged 28% success during spring or September. While baiting clearly improves hunter success, it is not necessary to permit one a reasonable chance of killing a black bear. Hunts in Montana and Pennsylvania routinely

result in hunter kills in excess of 1,000—all without bait or hounds. Baiting to improve hunter success is most likely a significant factor where dealing with large proportions of novice hunters.

Nutritional and habitat improvements of baits

Baiting creates habitat. It provides a concentrated source of high quality food. It has been suggested that this supplemental feeding serves a positive effect both on individuals and the population. A bear with steady access to bait undoubtedly benefits nutritionally. The cost of this food source would vary by season. Agonistic encounters among bears is greatest in spring and negligible in fall, so the stress impacts of concentrating bears at a site would likely vary. In years of fall food failures, abundant bait may keep black bears from foraging in areas of human habitation; thus, reducing management actions against nuisance bears. Baiting in the fall may also increase cub production the following year in those years when fall foods are scarce. In food-poor years, supplemental food may also increase survival of yearling bears. The short-term impact upon population productivity may be significant. Because of the varying proportion of breeding females each year, the long-term impact may be much less. These relationships are researchable and it is unfortunate they have not been investigated. Baiting to reduce bear depredation on trees, rather than for hunting, has been shown to be both cost-effective and publicly acceptable. This type of baiting has been restricted to commercial timber forests in the Coast Range of Washington. It appears to offer a viable alternative to more traditional bear depredation approaches.

Supplemental feedings

RATIONALE AGAINST BAITING

Opponents to baiting offer the following rationales:

1. Baiting tends to congregate bears in unnatural situations; this can lead to increase in intraspecific strife and increase in vulnerability to hunting.
2. Baiting is an unfair method of killing an animal.
3. Baiting is inconsistent with the concept of fair chase as applied to nearly every other hunted species.
4. Baiting predisposes bears to become nuisance bears by teaching them to feed on anthropogenic foods.
5. Baiting may increase the susceptibility of non-target species to illegal kill.
6. Baiting increases management costs to regulate and enforce baiting requirements.

Localized overexploitation of bears due to baiting

Black bears are highly mobile animals. Once they discover a bait site they may continue to visit it regularly. This can lead to an unnatural concentration of bears in a small area. Baiting can lead to a situation where intense hunting pressure can be exerted on a population. Whereas a bait site maintained by an individual hunter usually results in one or fewer dead bears, baits maintained by outfitters or groups of hunters can result in most of the bears visiting a bait being killed. This leads to localized overexploitation and is counter to any educational efforts to bias kill toward males. In low density habitats, baiting can be effective at extirpating bears, especially where management monitoring is minimal. Black bears are a highly social but solitary animal. The concentration of animals at one site where there is competition for food could lead to severe agonistic encounters, possibly death to young bears. This would be especially true during spring seasons when mating activity peaks.

Agonistic behavior due to competition for food or mates

Where's the sport and skill?

The perception among much of the public is that people are shooting black bears from blinds while the bear has its head in a barrel of food scraps. A selection of bear hunting videos from the local video rental store will support this perception. Many people simply view this as unfair. Where are the outdoor skills that we often tout as a benefit of hunting? Hooking an animal on

an artificial food source, then blasting it from 200 yds, is analogous to worm fishing at a fish hatchery raceway. Where is the sport?

Inconsistency of baiting regulations

The question of consistency in our regulatory approach is often cited. Several western states have passed regulations prohibiting the feeding of big game, primarily because of increasing conflicts between humans and wildlife. The intent is to keep the animals wild and not habituated to man. However, many of the same agencies condone baiting of black bear. While it is often believed that this is a hold-over from earlier anti-predator attitudes, agencies are reluctant to explain the discrepancy. Why is it acceptable to shoot a bear feeding on doughnuts while the person who shoots an elk coming to rock salt or alfalfa is not only ticketed, but ostracized as something less than a real hunter? Among non-hunters, the notion of fair chase is paramount to their tolerance of hunting. While the anti-hunter may hold a spotlight on hunter behavior, the hunters have control over what is seen.

Does baiting create habituated and nuisance bears?

Where the baiting of bears is conducted, what do the bears do at the end of hunting season? Do they go back to natural forage? We know that black bears learn much of their early habitat use from their mothers. What about bears that have been using bait every year of their life? Do they even know areas of high natural food abundance? Or do bears go seeking food from familiar sources; i.e., 55-gallon barrels. The process of luring a bear to bait involves habituating that bear to human odors and presence at the bait site. What role does that habituation have in reducing the wildness of the bear and possibly predisposing it to a human–bear conflict situation? Some states (Arizona, Colorado, New Mexico, California) aggressively promote the idea that a fed bear is a dead bear. The once-common practice of trapping and moving nuisance bears is receiving critical attention. California does not move nuisance bears. If the source of conflict cannot be resolved, the bear is killed. Colorado only moves bears once, and then only after actions are taken to alleviate the source of conflict. What are the fates of translocated nuisance bears? Moving the bear does little to resolve the problem. Once the bear is habituated to human food, it will eventually wind up as a nuisance bear and ultimately will have to be killed. Does this habituation encourage bears to enter campgrounds? Will baiting contribute to a greater number of aggressive actions between humans and bears? All are valid questions which agencies have been reluctant to address.

Impact on non-target species

Baiting may contribute to the illegal or unwanted kill of other species. This is of particular importance where grizzly bears and black bears are sympatric. The presence of otherwise unavailable animals will tempt some hunters. Also of concern is the difference in behavior of the two species of bears. How will a grizzly bear react at a bait when it discovers the hunter in the stand? If the bear becomes aggressive, the hunter may have little option in defense of life. Why create a situation where the hunter has limited options?

As public criticism of baiting increases, a first response of management agencies is to begin regulating the activity, rather than to ban it. Such regulations often require registering of site and post-season clean-up, or restrictions on what items are allowable and on non-containerized baiting. Regulations require enforcement. One of the more common complaints is the placement of baits. Most hunters prefer bait sites with vehicle access. This often puts them in conflict with other public land users who dislike the sight and/or smell of a bait site. There are bona fide public health concerns depending on what type of bait items are used and their proximity to water supplies. Enforcement of regulations and resolution of user conflicts requires agency manpower. As agency budgets shrink or remain static and prioritization of activity is required, other agency constituents dislike the allocation of manpower to bear baiting enforcement.

Conflict with other users of public lands

USE OF HOUNDS IN HUNTING BLACK BEAR

Rationale Supporting Use Of Hounds

Justification for the use of hounds for hunting black bear include the following:

1. Use of hounds is a traditional method of hunting with a long history.
2. The interaction of hounds and houndsman is a rewarding hunting experience.
3. Hunting with hounds does not guarantee a kill; the bear frequently gets away.
4. Using hounds allows hunters to select for the size, sex, and possibly age of the bear, as well as its nursing status.
5. These hunts can be strictly for sport (catch-and-release) without the death of a bear.
6. Use of hounds is the most effective way to target depredating or nuisance bears.

Bear hunting with hounds has a long history in American hunting lore. The literature of American hunting is liberally seasoned with bear hunting stories, nearly all with hounds. It is a tradition that tends to localize within families and regions. Those who participate do so with a fervor not often seen among other groups of hunters. Part of this dates to the era when we were actively pursuing bears as predators and the best hunters utilized hound packs. The lore grew around this group.

Bond between the houndsman and dogs

The interaction of man and dog can be spiritually strong. Few would argue with the waterman's allegiance to his retriever; the feeling of houndsmen for their dogs is no less strong. There is a symbiosis between a good handler and the dog pack. Packs often get confused on hard, bare ground; or take a back-track on a fresh scent, and it is usually the houndsman who works this out for the dogs. There is a danger to the dogs in pursuing large carnivores. Bears can easily kill dogs by drowning, biting, and swatting. There is a risk in turning dogs out on a bear and the houndsman does not take such risk lightly. The specific animal being chased is often secondary in importance to the chase. The chase is where the recreation and the reward lie.

No guarantees in using dogs

A common misperception is that once the dogs get on the track, the bear will be treed. Unfortunately a few outfitters bent on touting their prowess contribute to such falsehoods. In truth, a great many chases end with the hunter never seeing the bear. If a treed bear was guaranteed, much of the challenge would be gone from the hunt. Thus, hounding is indeed sporting. It is not uncommon for houndsmen to oppose the use of bait for bear hunting on the grounds of sportsmanship.

Selection for sex and size of bear

Houndsmen contend they can be very selective for sex and size of bear in a tree, as well as nursing status. However, in research done in Maine, it was found that houndsmen were not accurate in assessing whether the bear had cubs. In that research all cubs were left in trees other than where the female treed. Undoubtedly, if the hunter takes time and uses optics, the sex of the bear can usually be determined. However, data from California, Idaho, and Colorado all suggest that hunters using hounds are not strongly selecting for males. There does appear to be selection for older bears in Idaho. It is unlikely that houndsmen are better than any other group of hunters at estimating size of a bear; most fare poorly, as do bear biologists! The potential for selection exists but apparently other factors mitigate against more widespread use.

Pursuit-only seasons

Houndsmen are usually strong advocates for pursuit-only seasons. They usually want these in summer months as a training and conditioning period for their dogs. Even during open seasons, many hunters leave bears in trees. Considering the sizeable investment it takes to maintain a hound pack, it is understandable that a hunter may not want to end his season on the first day. Such behaviors result in a lot of recreational activity for each bear killed.

The focus of animal damage control work in recent years has been to target effort on the depredating individual rather than the population. With black bears, prompt arrival of hounds

to the depredation scene is the most specific technique available. While it is not totally discriminating, as bears will cross tracks, it is far superior in selectivity than traps. It is critical that the hunter arrives soon after the depredation—at worst within 24 hr. Few management agencies will financially support hound packs for their employees; thus, when hounds are needed they must go to private hunters for help. If hounding were banned, there would be no source for this preferred technique. Hounds have been used as a possible deterrent for nuisance bears. Rather than trap and transplant nuisance bears, which is costly and of unknown effectiveness, several agencies have tried hound chases as a negative reinforcement. This provides recreation for the houndsman and hopefully is enough of a deterrent to the bear to keep it away from where it was a nuisance.

Hounds and depredating bears

Rationale Against Use Of Hounds

Opponents to the use of hounds usually cite one of the following arguments:

1. The bear does not have a chance; this is not fair chase.
2. The use of electronic collars on dogs is unfair and contributes to abuses of fair chase.
3. Harassment during either spring or fall seasons can have detrimental impacts on bears.
4. Cubs are caught on the ground and killed by the hounds.
5. Hounds often trespass on private property and houndsmen cannot control this.
6. The behavior of houndsmen does not deserve our support. They are unwilling to address the abuses among their ranks, or even acknowledge them.

Many opponents of this hunting technique believe that once the dogs strike on the bear the fate of the bear is sealed. Perhaps this perception is the result of biased reporting combined with overzealous statements by some houndsmen. Any hunting technique that results in a 100% kill is not viewed as fair chase, but rather as control. This is a situation where unbiased educational efforts could defuse some of the acrimony. There are some opponents who simply think the pursuit is wrong, regardless of outcome. They point to harassment laws which most states have that make it unlawful to harass wildlife. They question the consistency of allowing bears to be pursued by hounds in light of such statutes or regulations. This is an especially germane point relative to pursuit-only seasons since there is no attempt to kill the animal.

Fair chase

The intent of radio-telemetry collars on hounds is good. It enables hunters to retrieve dogs in a timely manner, thus minimizing harassment to other wildlife. In mountainous terrain with limited vehicle access, there is limited opportunity to abuse their use. However, in more moderate terrain with high road density, hunters do use the radio-collars in what is perceived to be an unfair manner. The most common complaint is that hunters do not even accompany the hounds during the chase but merely track the dogs from the road networks until the bear is treed. The hunters then track to the bear and shoot it. Few would agree that the positive rewards of hunter–hound interaction are being achieved here. The prevalence of such behavior is unknown. But, like the number of nursing females killed, it is not the total number that is important. The fact that some hunters behave this way taints all houndsmen, and houndsmen have been unwilling to acknowledge the problem or address it.

Radio-telemetry and dogs

Hounds chasing black bears during the spring season may have a direct impact on mortality of young bears during food-poor years. Most individual bears are losing weight during the spring period, and the expenditure of energy during one, or several, hound chases may be more than the bear can afford. Nursing females are separated from cubs and killed, leaving the cubs to starve to death or be killed by predators. Chasing of black bears in fall seasons can have negative effects in several ways. The first is in physiological stress from the extended pursuit. At this

Mortality and physiological stress

time bears have their winter pelt insulating them as well as a thick fat layer. Running generates substantial heat and bears have limited ways to dissipate heat (panting). Overheating could seriously stress bears, possibly leading to death or abortion of fetuses. In food-poor years, bears will use substantial energy escaping dogs that should be used to produce fat for the pending hibernation. Finally, bears evolved to have a short period of frenzied feeding in the fall in order to store fat. Continued chasing by dogs disrupts the feeding patterns not only of the chased bear but of nearby bears as well.

Hounds and cubs

During spring seasons cubs can be caught on the ground by the hounds. When this happens the cubs are usually killed by the dogs. This occasionally does happen, but the more common instance is that the cubs go to tree and their mother continues to run. Probably more cubs die from the female being killed than from hound packs; however, the emotional power of the image of cubs being killed by dogs is a force. Ignoring the issue because of the small number of incidents and minimal impact to the population is not a prudent decision.

Trespass on private property

Once the hounds begin the chase there is no way to control where they go. Advocates of radio-telemetry collars on dogs suggest these collars help them to catch dogs before trespass. In reality, the only way to prevent hound trespass on posted, private land is not to hunt in the area. Responsible hunters acknowledge this and behave accordingly. But not all do, and this becomes an issue of great concern to many landowners.

Hunter behavior—the real problem

The more we talk to opponents of hound hunting, the more obvious it becomes that the major problem is hunter behavior. There is a strong perception that houndsmen abuse the rules of fair chase routinely. The issue of radio-collars on dogs, sequential packs of dogs to keep fresh hounds on the bear, keeping bears treed for days while getting a hunter to the site, willful trespass—all of these result in a tarnished image. The perception is the reality. Houndsmen must address the abuses and the over-statements. Undercover law enforcement work that suggests heavy involvement of hunters with illegal traffic in bear parts must be addressed. Houndsmen have a credibility problem with both wildlife professionals and the public, both hunting and non-hunting. Until they, as a group, work to address these problems they will not receive support.

MISCELLANEOUS ISSUES

Two other issues came up repeatedly during the discussions that were pertinent to all the hunting methodologies: (1) the truthfulness of messages by advocacy groups and (2) the failure of state agencies to direct research efforts toward hunting methodologies.

LACK OF RESEARCH

Lack of ecological research

Many of the claims by advocates on either side of an issue are amenable to research. For example, how does baiting affect movement patterns and habitat use? Is there a relationship between bear use of bait and subsequent history as a nuisance bear? What are the impacts of fall hound seasons on bear feeding behavior? There are many similar questions which should have been researched. Currently we operate in an arena dominated by opinion, often stridently offered. Amidst the call to base the decisions on biology, we find there is too little biological knowledge. Our profession has been reluctant to implement research to assess impacts of hunting. This has become more pronounced as criticism of hunting has received more attention. In the dialogues which we will all participate in soon, most of us would be more comfortable with unbiased research findings than just expert opinion.

As glaring as the omission of ecological research on hunting method is the omission of sociological research. We do not live in a homogenous society; there are regional and sub-regional cultures which are changing at varying rates. If we are to manage wildlife for human benefit we must first understand how the human society feels about wildlife and its uses. We can

no longer afford to only listen to our traditional constituent group or to base decisions on societal norms of 50 years past. This is not to imply an abandonment of traditional support groups who have supported wildlife management financially and politically for so long. Rather it is a call to broaden the scope of dialogue in hopes of having a better feel for our current societal norms. To ignore such a process is to invite management by ballot.

Lack of sociological research

Truth In Advertising

A number of examples of untrue or misleading statements were discussed. All appeared to have one thing in common—they cast a positive light on the advocates while denigrating the opposition. Perhaps it is unavoidable given the state of our society's political system. But it does serve to both elevate emotions and destroy credibility. Once a person or group espouses a statement which is patently untrue, their credibility on all statements becomes suspect. Only those ignorant of the true nature of the situation accept future statements. Unfortunately, this often means the majority of citizens—at least on wildlife issues. Perhaps we are naive to hope for unbiased, objective statements on emotionally contentious issues. But if we have any hope of solving the issues of black bear hunting, that hope lies in all participants being truthful and forthright.

Public ability to discern truth in advertising

SUMMATION

In the near-term, the primary black bear management issues will continue to be over hunting methodologies. Agencies are generally ill-prepared to effectively resolve these issues because the issues are sociological in nature. However, if agencies do not resolve the issues in a timely manner then they can expect to see resolution via ballot initiatives and/or legislation. Agencies need to rapidly develop a philosophy for decision-making that includes constituents which have historically been left out of the process. The failure to do so will result in loss of agency credibility. The ballot initiative in Colorado was not over the welfare of the black bear population. There was general agreement among constituents that the agency was committed to protect the black bear population. The greatest loss in the ballot process was in agency credibility because the agency failed to listen to all constituents. Loss of public trust will make the balancing of contentious natural resource issues much more difficult.

In the long-term, black bear management will focus more on resolution of human-bear conflicts, depredation to private property, and the impacts of hunting. Encroachment of human dwellings and activities into previously secure bear habitat will continue as the gravest threat to black bear populations. While it is apparent that most management agencies were ill-prepared to deal with the issue of black bear hunting techniques, it is prudent to examine current research to ensure that it is directed toward resolution of pending problems rather than documenting general life history traits.

QUESTIONS AND TOPICS FOR THE PANEL DISCUSSION ON HOUNDS AND BLACK BEARS

The following questions were prepared by Dr. Jerran T. Flinders, Dr. H. Duane Smith, and Dr. Hal L. Black. They were given to the panel of experienced houndsmen prior to the workshop for their consideration.

- Have you found evidence that black bears take over kills (deer or elk for example) made by mountain lion or do you think they only scavenge these carcasses after the lion has lost interest?
- What proportion of bears stay and fight dogs on the ground rather than climb a tree? Do adult males fight more than females?
- Do you need "fighting" dogs (e.g., Airedales, pit bulls) in your pack in order to successfully stop or tree bears? Are bears injured by these dogs or by hounds?
- How many chases must you have per year to train or maintain a trained pack of hounds?
- Do some bears seem to seek out and prey on domestic livestock such as sheep, goats, and/or cattle? Do you find carcasses of domestic livestock in good bear habitat that have not even been subject to scavenging by bear?
- How interested are you in responding to requests from ranchers to kill a particular bear causing depredation on livestock? Would you use your "bear permit" to take the offending bear? How could "sporting hounds men" be encouraged to do more of this kind of work?
- Do bears eat much bone?
- Do females usually put their cubs up a tree when being chased by hounds?
- Have you ever seen two or more adult bears sharing a kill or carcass?
- What is the greatest number of different bears you have seen or treed in or near a good patch of food (acorns, chokecherries, pinenuts)?
- Have you ever had a dog killed by a bear?
- Do bears hang out on elk calving grounds?
- What is the most extensive rock-turning (ant-eating) activity you have observed?
- Have you ever observed a bear kill an adult deer or elk?
- Have you ever heard of dogs killing a bear?
- Do bears quickly return to the area from which they were initially chased?
- How many good dogs are needed to adequately tree most bears?
- Does age of the bear influence success of the chase?
- What are the most important factors that influence your decision as to where to initiate a chase?
- Is there an optimal time of day to initiate the chase?

PANEL DISCUSSION: HOUNDS AND BLACK BEARS

What do houndsmen know about bear behavior? Probably more than they have formally been given credit for by the scientific bear community. In an attempt to bridge the gap between these two groups we assembled a collection of active, successful houndsmen to share their insights into bear behavior in the presence of dogs. A houndsman with an academic degree in wildlife, a working cattle rancher, a retired blue-collar worker, a professional guide, and a small business man comprised the guild of houndsmen. Three wildlife biologists from Brigham Young University, Jerran T. Flinders, H. Duane Smith and Hal L. Black posed questions and directed the panel discussion. What resulted was an hour and a half of fun and education. It seemed the consensus of the panel that greater cooperation between houndsmen and agency biologists could result in better understanding of black bear behavior. There was general consensus as well that much of what houndsmen know about bear behavior needs to be recorded and published and that professional biologists would do well to regularly interact with experienced houndsmen as they seek to understand and regulate bear harvest and management.

Panel members: Mike Bodenchuk, John Childs, Bud Hutchings, Shawn Labrum, and Earl Sutherland

Flinders: I worked with Earl, Jordan, and Boyde on a bear project in the mountains to the east of us [Wasatch Front, UT]. We found that bears seem to be taking a lot of meat. About half their diet was composed of meat of some sort. Ungulates were part of that as well as rodents and porcupine. We have a good density of mountain lion in this area, and we were wondering if bears were doing all this killing themselves. We know this to be so in some instances, but we also wondered if they scavenge the kills of lions and if they go a step farther and take kills from lions. We have wanted to investigate the relationship. It seems like we have a lot of information in other countries about the relationships between carnivores, but very little about the North American ones. We wonder if you who do a lot of trailing have come upon instances where a lion kill was taken over by a bear or the reverse. Or, perhaps, do the bear just scavenge those kills. Would anyone respond to that?

Do bears take kills from cougars?

Hutchings: I've found throughout the years that for bear I've come across in the spring, very seldom have I ever seen any sign where they've eaten any meat or any carcasses. It seemed like they were more strictly on grass. It might seem funny, but if I see any droppings or anything, I'm always stirring in them. I want to find out everything that they've been eating. But in the middle of summer, or the fall especially, I've seen where black bears have come upon carcasses. And a lot of times it's deer after the deer hunt and elk after the elk hunt. I've started bear with my dogs off of these carcasses. I don't think in Utah bears kill very much wildlife. I've never seen where a bear has actually attacked a wild animal and killed it. Now I'm not saying that it isn't possible, because they're a pretty strong animal and pretty fast. But I have seen where they've killed livestock. And mostly why they've killed the livestock is because the food source that they are usually on is down at that particular time. Here in Utah some years have a good acorn crop or a good chokecherry crop, and bears don't have near as much problem at that time. But if that food is down, I think that's when we have more trouble with livestock losses. I was up on the mountain one time talking to a sheep man. He said that he was just up on the hill and a big boar came feeding through his sheep herd and the sheep were grazing in this valley there. The sheep

The relation between natural food availability and livestock losses

didn't hardly pay no attention. They'd just move from side to side, and the bear just wandered up through them and went on his merry way. But there was a lot of feed at that particular time. So I think that determines a lot whether they kill much livestock. But they will eat a lot of carrion, especially towards the later part of the fall when they're going into hibernation. They'll eat anything that's edible to put that weight on. They've got to get that fat build-up to carry them throughout the winter. But anyway that's my observation.

Lion–bear encounter—bear killed by lion

Labrum: One of the most interesting things that I've heard of and have actually seen the pictures of was from a friend of mine in Nevada. He was trailing about a three-year-old female lion and came into where she had killed a yearling deer. He said you could see where there was a bunch of commotion and there was about a two-year-old black bear boar that came in to the kill and they had a big fight. The lion killed the bear, drug it about 50 yards from where the deer was, ate a little bit, and then buried it. My friend jumped the lion and treed her, and she didn't have a mark on her.

Lion–bear interaction at calf carcass

Childs: I have seen where bear have run lion off of kills. One was a deer. I don't know if the bear killed the deer or the lion did, but I assume the lion did because of the sign around there. But it was a big bear. I didn't see the lion, but I caught the bear. On my own livestock operation we sometimes have a problem with calves getting pneumonia in the summer when it gets hot and dusty. And a year ago we lost 10 or 12 in just a matter of a week. I was right there trying to save a 450 pound calf that was sick. I vaccinated it with the antibiotics and came back the next morning to check, and it had died during the night. A lion had come in, and in typical manner, had covered it up with sticks and leaves and fed on it. I went back to camp where I had my 18-year-old daughter helping me, and we got the dogs and went back out. In the meantime a bear had come in and torn the calf all to pieces and stirred it up. Needless to say, I didn't catch either one of them. But I know that bear ran that lion off, because it had happened within a 12-hour period.

Lion–bear interaction at artificial baits

Bodenchuk: I guess I have to preface by saying that my experience with bears and lions is mostly out of New Mexico. We don't have near the lion density down there that I've seen in southern Utah. But we've got probably more bear in a higher density in northern New Mexico. I've found where bears have taken over kills from lions. The trappers that I've talked to have said that they have seen it here also. We baited bears one year right before deer fawning on an Indian reservation in New Mexico and had lions working the same baits as the bears. The bears usually established first and then the lions came in. What some of the fellows have told me is that they think the bears are taking the lion kills as soon as they can find them and not necessarily after the lion has lost interest, as the question asked. But generally they stay on the carcass long enough that there is nothing left for the lion to come back to afterwards.

Sutherland: When I was doing the study up here above Mapleton [UT], I found where a bear had been working a patch of tall brush and grass. It had taken down about a year-and-a-half-old doe and fed on it. You could see the struggle and the fight and could tell that the bear had taken the deer by itself. But as far as seeing them take over each other's kills—I've seen where bear have taken lion's, but I don't know whether they have actually fought off the lion or just came in after the lion had left.

What factors determine where and when to start dogs on chase?

Smith: Bud you introduced a couple of items that might be of interest to us. You talked about identifying areas where you might start your dogs onto a bear. What are some of the important factors that influence your decision as to where and when to initiate a chase?

Hutchings: Well, the best thing I can say is that I know what feed they're on at particular times of the year. I also know the area that I'm hunting in and the best places to strike up a track. Now we haven't got a lot of bear in Utah. In some areas we have more than others, but I'll pick one place like on the north Manti where I do a lot of hunting. If you don't know where to look for a bear, you might ride a few days before your dogs will ever pick up any sign. After a number of years hunting an area, you just automatically know which places to go. In the fall you'll be hunting maybe some of your lower areas where you've got your oakbrush with the acorns. Spring food is kind of light. Where the bear come down in the spring to get the early grass, that's where they come back in the fall to get the fall feed. With experience you just know more or less where to go. As far as starting a track—whenever you are bear hunting, always try to get out as early as possible. Every hour counts. If you get the dogs in there early, the scent hadn't left, and you can be more successful. Something else about the scent conditions—I've seen a track that was made the afternoon before and the track sat all night and your dog scents that track first thing in the morning and you can move along pretty good. This is in the hot summer months. On the other hand, I've had reports of somebody seeing a bear an hour before, and when I took the dogs out there right in the middle of the hot day, they couldn't hardly move that track. I mean, they were tracking it like it was a week old. And then on the age of tracks in the summertime—a good bear dog can take a track three days old. In the spring you can be pretty successful. In the summertime the track usually burns out as the day drags on.

Importance of knowing seasonal food availability

Benefits of early-morning tracking

Sutherland: Like you were saying, in the spring you go around the springs in the bottoms of the canyons where the grass is just starting to grow lush and green. What you want to do is follow the snow line. In the late summer or fall the different kinds of berries, fruits and acorns are really the number one food items when you've got a good crop. You can find the bears in them quite heavy.

Black: Thanks, gentlemen. Sometimes it has been said that the reason baiting works so well is that the bears are starving after the long period of hibernation. Is there anything wrong with that notion? I mean, what do spring bears look like? Tell me which ones look hungry and which ones don't.

What is the physical condition of bears in spring?

Bodenchuk: Well I've baited bears and run them with hounds, but I've never shot bears over bait. In spring they are kind of lean. That doesn't necessarily mean that they are any easier to catch. Well, I think they're harder to catch because they'll run farther. Part of what we were doing was trying to catch big boars. With baiting and running dogs in combination, we could find the bear that we wanted instead of running whatever track we started. If you bait late enough into the spring that you are getting close to the mating season, I think the big boars are checking the baits for sows. They are just going from one to the next. If you're any earlier than that, baiting is not that successful. Early in the spring they're eating grass, and then if they find a carcass they start on it. One of your questions is about elk calving ranges, and I think that just a little time after they get off that grass, they'll go to those calving ranges. If you bait in those calving ranges, you'll have good success, because nearly all the bears will be there. I don't particularly think that bait and hounds are any more successful than just going and hunting bears. I could run a lot of bears just by going through the country; but by having the bait and the hounds in combination, we could pick what bear we want. We'd start him right there and know that we are on the bear rather than running a two-day-old track.

Success of baiting in the spring

Bears and calving areas

Black: Earl, you said something to me once—just follow up about the calving areas out on the Book Cliffs.

Sutherland: Yeah, I've hunted out there a lot. I go around and find where the elk are calving, and in the scats you can see that bears are eating calf elk. It's quite obvious. That's one of the first places that time of the year where I'd look.

How much chasing is needed to maintain a pack?

Flinders: Part of why we're here is to talk about hounding in general. There are times when bear *need* to be pursued if they are doing damage, or for sport. But the whole issue comes down to this: if you are going to maintain any kind of pack of hounds you have got to train them on bear. How long does it take to train a hound to be a good bear dog? How many chases do you need a year to maintain the training of an individual or a pack? And does training need to be done in the spring as well as in the fall?

Hutchings: I've raised hound dogs for 40 some-odd years, and I've hunted bear with them for 35 years. I hear a lot of controversy over the pursuit of bear with dogs, but I don't believe pursuit is a damaging thing for bear. I've never seen a bear killed by hounds, and I've been lucky that I haven't had any cubs killed by them as far as I know. But anyway, a bear dog is just a little bit different than a lion dog. All hounds don't make good bear dogs. There are some hounds which, when faced with a bear track, want nothing to do with it. It just takes a special breed of dog to be successful on bear and to be worth training. It does take a lot of time to train a bear pack, and I believe that if you just had a short season in the fall, you might have dogs die of old age before you train them to be good bear dogs. The dogs that I've been used to raising—you have to hunt them a lot and that means in the spring and in the fall. You've got to have a pursuit in order to train those dogs. Otherwise, you just as well not fool with [training new dogs] because unless you could buy them out of state from somebody who has hunted them more or longer . . . but it does take some time to train a good bear dog.

Importance of chasing bear in spring and fall

Childs: We've got kind of a joke around our outfit. We say, leave the kids and the young dogs and the young horses at home until they're trained and then take them and put them to work. It doesn't matter whether you're hunting bear or lion, if you don't hunt those dogs—give them some experience—you're never going to make bear dogs out of them. Bud is right: all hounds are not bear dogs. It takes a special breed; but the more you hunt them, the better they're going to be.

Labrum: I think that as long as you have the feet under the dog—the more you hunt, him the better he'll get. It's just like they said: you need [pursuit seasons] spring and fall instead of just once every year. You at least need to hunt them once a week, and the more the better. As far as I'm concerned the more that dog learns, the better dog he's going to be.

Finding problem bears with dogs

Black: Earl, that incident we had up here a year or two ago where the young woman was drug out—did you try to find the offending bear with dogs, traps, or snares?

Sutherland: Yeah, we used dogs, traps, and snares. The problem was that the bear ran the reservoir. So we were kicked back too many hours to really hit it hard. You can imagine a bear swimming that far across the reservoir. The dogs kept hitting the water and going out into the water, but we kept telling them, "No, it's got to be on this side. It's got to be over here." They knew a lot more than we did. The access to the other side was so bad that it took us quite a while to get around.

Black: So, if you had a bear that's a nuisance and is going to be caught and destroyed or hauled away, your first choice, if you can get on it fast enough, is to go after it with good dogs.

Sutherland: Yeah, for sure.

Flinders: As a follow-up question to your response, Bud said that the bear population in Utah isn't dense. And we have a number of houndsmen who are trying to keep their dogs in condition. From the other standpoint, how often can you chase a single bear until the stress of that begins to affect its survival. Should that be considered or regulated somehow? It's talked about in regards to lions as well, but it would be especially important with a female bear with cubs. Have you had any experience with that?

How does chasing stress bears, esp. in low density areas?

Hutchings: I'd like to talk all night about bear. I don't really believe that it puts too much stress on the bear. I'll guarantee you that the stress is on the dogs and the one who is chasing them—the hunter. The bear usually gets by in pretty good shape. And as far as a sow and cubs—most generally they are pretty easy to tree. And 90% of the time the cubs tree with the sows—not always, but most of the time they do. They [the sows] put them up the tree at the first sign of danger or the first noises that don't sound right. I really don't think it puts that much strain on them. It might give them a little running exercise. A bear is a pretty durable animal. In June in the breeding season I've seen where boars traveled for long distances, like 28 miles in one night. You put your dogs on them, and you know the track was made that night, yet that bear ends up 28 miles away. Pretty good jaunt all throughout the night. Anyway, I just wanted to stress that I didn't think that the pursuit really puts that much stress on them.

Behavior of females with cubs

Distances males can travel

Bodenchuk: I'd like to be sure that we're talking about the same thing. A sow with cubs is a sow with this year's offspring, not last year's offspring. If you've got your spring season timed right, those sows with two or three-month-old cubs are in some pretty rough country. They don't come out where boars can kill their cubs, and they don't come to a bait. A sow in the spring with yearlings which are still by her side will come out to a bait, and those yearlings are old enough that they're self sustaining. They'll run with the sow and be caught. Now, a sow in the fall with this year's cubs—you'll catch them in the tree with the sow. They'll tree a little quicker or else the sow will bump them up a tree, and you'll run the sow. In my experience we've never caught those sows that shoved their cubs up a tree and left. The sows won't go up a tree. They'll stay on the ground and just run in big circles. When you talk about sows with cubs and running them, you've got to be sure that you're talking the same thing. To my knowledge, I've never run a sow with this year's cubs in the spring season, but I've done it in the fall. I've run the same boar off the same bait three days in a row, and we'll go seven or ten miles before the dogs give out. It gets too hot and everybody quits. And we'll come back and run him off the same bait the next day. It doesn't seem to bother the bear nearly as much as it seems to bother the dogs.

Behavior of females with cubs

Distances males can travel

Black: Some people have said that, if you think about the history of bears in North America, black bears are used to running or at least going up trees when they are chased by wolf packs, or grizzlies, or some of the other large carnivores that were here in the past. So, Mike, are you saying that having to run from something isn't a new experience in the history of black bears?

Evolutionary nature of running and treeing behaviors

Bodenchuk: No, in my experience the more you run a bear, the less likely he is to tree. If he has ever figured out that he can stay on the ground and trick those dogs and bring them to bay, the less likely he is to go up a tree; they figure it out pretty quickly. I've seen bears literally just walking in front of a pack of hounds, and those dogs are barking in their ear and running around in front of them. They don't seem to be bothered too much at all. I think it takes a hard dog pack to catch bears consistently. The older bears that have been chased before are not as likely to go up a tree, unless they're just rolling fat from late fall acorns or something.

Behavior of "chase-wise" bears

Smith: Some of you have already hinted at the fact that the same boar will return to the same bait night after night. Is it your experience that the animal will quickly return to the area from

which you initiated the chase or do some of them stay away for a period of time? Do you have any information on that, and does that differ by sex or the animal that you are running?

What is the return rate of bears to bait sites?

Hutchings: I've run a boar and had a pretty tough chase in one day, and then I went back to the tree the next morning where we had left him and let the dogs start again. And the boar a lot of times will be eight miles maybe even ten away from that point when the dogs jump him. But I really do believe I can tell a little more within the area that I am used to hunting, because, like I said, we haven't got a big population of bears. I can pretty well name the ones that I have been treeing. But it seems like that if you hassle them a little bit, they're going to change territories. They're going to move over a little bit and get away from that harassment, and it might even be a little harder to find any sign in this one particular area. But the bear gets wise. If they've heard dogs before a couple of three times, it doesn't take them long. They're a pretty smart animal. If you start a track in one canyon or a bear is laid up on a ridge somewhere or off on a side in a thicket and that bear hears those hound voices, they'll pick up right there and start leaving tracks. It seems a chase like that will just go on all day long. Maybe your dogs will peter out because a bear can travel. I've watched them, and they can cover a lot of country just on a walk. They don't have to run. Anyway they can be a long ways off and the dogs will never get the surprise of the jump like that, because a bear is smart. He has heard the hound voices, and he'll move on. A lot of times you never get to a tree.

Behavior of "chase-wise" bears

Childs: I've had limited experience actually chasing bears off of baits, but on kills in the summertime I think it depends more on the time of the year whether they come back to the same area or move on—you know, with the different feeds they're on at the time. Sows with cubs seem to hang around more than a boar. Just one comment on chasing bear and putting stress on them—I've always felt if they get tired they're going to go up a tree. I've never had any experience with catching a cub on the ground. I've treed a lot of young ones, but the female is usually with them. The yearlings will stay on the ground, but the young cubs won't; they'll always tree.

Stress from the chase

Labrum: In my experience, each bear has a mind of its own. It just depends on how rough the country is or what they decide to do that day. You might go into a drainage and run a bear 500 yards, and it might be a big boar and up a tree he goes. Then you go back the next day, and that very same bear will run for fifteen miles and be laughing at the dogs over the last ridge, and the dogs are shaded up on the ridge two miles behind him. I haven't ever seen a bear that I can even say was bothered at all. They'll either climb or they'll take you for miles.

Stress from the chase

Black: Let's open it up a bit to the audience. Do you have any follow-ups on these questions or any observations?

Question: You referred to needing spring and fall pursuit seasons or hunting seasons for bears. Based on what I heard today, most of the states don't have a pursuit season. I guess this question is more for the state people. How does this sit with the houndsmen in your states? Do they complain about no pursuit season?

How do houndsmen react to elimination of pursuit seasons?

Black: Anyone from outside Utah?

Ron Anglin, Oregon Dept. of Fish and Wildlife: Oregon did away with pursuit seasons several years ago. We do have a very long three-month fall [hunting] season. We have some limited controlled spring hunts. But it has been our experience that the houndsmen work their dogs when they want to work their dogs.

Labrum: As far as I know, other states either have quota systems or a different type of system for permits. Utah is on a program with a draw basis, and if hunters have a valid permit and they run dogs during season, then they should be able to run their dogs until they catch whatever bear they want. I can't speak for other houndsmen, but I pretty well stick to my hunting dates and respect lion and bear both.

Black: Any other questions?

Al LeCount, Independent Wildlife Consultant: I just wanted to ask a question of the panel members, because I think it comes up quite often. It is about the efficiency of hunting with hounds; and I know that varies with time of year, the terrain you're in, and the habitat. But I think we have a group of panel members here who have reasonably good dogs and quite a bit of experience. Could each of you tell us—if you were to go out on ten hunts and on each of those ten hunts start a bear, how many of those would you end up getting to the tree?

What is the efficiency of hunting with hounds?

Bodenchuk: Across the board, spring and fall, to a tree and not bayed on the ground, two or three.

Childs: I think the terrain you're in makes a lot of difference. If you're in big canyons and there are not many ledges, your success rate will be a lot higher. I'd agree with him [Bodenchuk] overall.

Hunting efficiency and terrain

Hutchings: I will too. I don't like to brag, and I usually don't too much, but here in 1982 and '83 I knew a fellow who was just starting out bear hunting, and he had gone out all through the season, and he couldn't tree no bear. He'd run them for three or four hours and couldn't stop anything. And he asked—he is the kind of a guy that likes everything in minutes and hours and really documents things—What percent of the time do you tree bear that you start with your dogs? That kind of put me on the spot for a minute and I was thinking back [for a time] when I didn't tree one that I'd jumped. I mean, you start a lot of tracks that the dogs might cold-trail all day long and never get the bear jumped. And that day's gone and you have to try again. But I got thinking, and I'd guess I'd have to say 100%. In these particular years, 1982 and '83, every bear that I started and the dogs jumped treed. I treed 27 bear through that summer. I had to travel around a bit in the state, but every bear that I had running the dogs put in a tree—not on the ground bayed when I got to them, but treed. I can't say that now. I've got dogs and they are fair dogs. I tree some, but the biggest share of them you don't tree. I've still got the same bloodlines, but something slipped a little bit, you know. Anyway, in '82 and '83 I had five dogs that would just flat work a bear.

Hunting efficiency and individual dogs

Black: Do you know where you buried those dogs? We could probably get some DNA and clone those suckers.

Hutchings: I'd sure like too.

Sutherland: In my experience, just two or three out of 10 is probably doing good, because you don't get all of them, because a lot of them you never do jump what with the heat and the terrain.

Hunting efficiency and heat/terrain

Labrum: In my experience north of where I live, you can probably tree four or five out of 10 bears that you start. When I go south I'm lucky to get one out of 20 in a tree. It just depends on the education of the bear and the country you're hunting them in.

Smith: You have talked about prime time for hunting, and food patches, and knowing where to go. Can you help us understand, a little bit, the number of different bears that might be working a food patch during one of those prime times, and maybe ages or sexes of bears that might be working a given food patch?

Do bears concentrate in food patches?

Sutherland: As they say, we don't have enough bear to really get very many numbers in a food patch. They're off by themselves a lot of times and have almost a whole canyon to themselves.

Hutchings: In this particular area we don't have the density. If you see where one was feeding in a food patch, you feel lucky. I hunted the Book Cliffs back in the 1960s, and we had a real good bear population. In some of those canyons you could see maybe two or three sizes of bear tracks that were panning out into good meadows where the grass was coming in early in the spring. Also, by Blanding where they have a few more bear, I've seen where more bears have been feeding in the same area. But I've never actually *seen* more than one different bear in any food patch.

Childs: I think I mentioned earlier about losing calves to pneumonia in the summer. One summer we lost about 35 calves in probably two weeks time. It was back in the early 1980s when we had quite a few bear in this area. I think I caught six different bear in that area but it was over a month's time.

Bodenchuk: I don't know if I count, because I come from where there are a lot of bears. In southern New Mexico particularly, and to a lesser extent northern New Mexico where it's drier, occasionally you'll have conditions just right where it will rain on one mountain and not anywhere else. You'll get the timing of water just right, and that will be the only place where you have acorns for 40 miles; every bear in the world will be right there. And I've gone into canyons and had, with a big pack of dogs, three different bears running in front of the dogs at the same time. You'll have adults of all ages and sexes. I think that's unlikely to happen in the spring because food is more widely distributed, and they are a little more territorial before breeding. Right before hibernation I think some of those territories might break down.

Labrum: I've hunted the Book Cliffs for the last 7–8 years fairly steady, mostly in the spring. In the last 3–4 years, I've been spending time out there in the fall. I've seen a steady increase of bear in the last 7–8 years in that country. If you find the right berry patch in the fall at the right time—I've seen where there's fresh bear scat everywhere. I don't know if I've counted the tracks, but I'd say I've seen at least 5 or 6 bear tracks; that is, sign of different bears in the same berry patch.

Boyde Blackwell, Utah Division of Wildlife Resources: I was wondering, when you put out on a bear and your dogs cross a cougar track on the pursuit, what percentage of the time will your dogs switch? And if they do, is this a concern you have as a handler? Can you keep your dogs from doing that?

Do dogs switch from bear to lion tracks?

Sutherland: To me it's no big concern, because you've trained your dogs with cougar, too; so it's part of the thrill of turning them loose and finding out what's at the other end when you get there. And it doesn't happen often, but 2 or 3 times a year you'll catch a lion rather than a bear.

Frequency of switching

Hutchings: Like Earl says, the dogs don't have any switches on them, so you can't go out and say well I'm going to hunt bear today and put the switch on for bear, or for lion the next day. They're trained on lion *and* bear. When I hunt with dogs, I have strike dogs out ahead of me. I usually hunt on horseback, and I've got my strike dogs, maybe one or two, hunting ahead of me.

So they're searching for the track, and if it's a lion track, they'll usually voice on it and then start off. I always ride up and try to catch my dogs before they go on. I check them out to see if they're on bear or lion. I like to run bear period, but I hunt lion throughout the winter. I don't care to run lion through the summer, although I tree a few. If I can, I stop them off the lion track and go on hunting until I strike a bear. But usually if my dogs get on a bear and they're working a bear, very seldom do they ever cross off onto a lion.

Need for houndsman to check track

Childs: I think the same. If they're cold-tracking a two or three-day-old bear track and they hit a night-old lion, they'll switch. But normally, the bear scent is stronger, and they'll stick with it.

Strength of bear scent

Flinders: Maybe we could talk a little bit about bear and domestic livestock. Earl will remember our #6 male. We caught him up here as a 7-year-old and followed him for another four years, the last three of which were drought years. He really never took livestock [sheep] until the last year and was then killed by ADC. I think the interesting question is the difference between bears who are predisposed to prey on livestock and others that seem to avoid this [behavior]. Earl can attest: we had some females that just never got in trouble—just never did—so certainly food sources and how bad the year is may have something to do with this. Sometimes on the range you'll find dead cattle that have died from poisonous plants or something else, and you know there are bear around, yet they haven't even scavenged the carcass. So there seem to be some major differences here. What do you think?

Are some bears predisposed to prey on livestock?

Hutchings: That's right. I've always said that bear take a lot of bum raps [for killing livestock]. They're a scavenger animal. If there's a carcass lying out there, not all of them eat the carcass. I've seen where a bear has come across a livestock carcass and investigated but never touched it. The sign is right there in the dirt. You can see just what they've done, and they've never touched it. On the other hand, I've seen where they've come in and promptly eaten everything except the skull and the big leg bones. I think each bear has got its own disposition. They're a lot like humans in that way. We've got some bad characters. There are bear that, if they start killing livestock, I think they might make a habit of it. I've seen where a bear went through a canyon and maybe killed 20 or 25 sheep in one night. It might have eaten one. And then maybe on some kills they might not eat any; they just kill. But I think they get playing and roughhousing [the sheep] and kill them just for the sport of it—just like the human race. We've got some of them that are just bad apples. That's why we have the ADC to take care of these problems. But not all bears are killers, so I've always stuck up for the bear. I'm kind of conservative with my hunting, but I'm not against hunting bear. I would like to see the bear population come to where anybody who wanted could get a bear. I think a lot of times coyotes kill an animal or maybe a sheep will just die. And then a bear comes in a day or two later, runs into that carcass, and eats it. Then the bear track is right there in the dirt; [ADC] sees it, and the bear takes the blame. It takes a pretty good eye to determine just what happened or what took place in that instance.

Individual variation in disposition

Bears blamed for coyote kills

Childs: Probably 25 years ago when there weren't a lot of bear around here, we had one area where we had a herd of sheep; and there was a bear in there for several years—never bothered the sheep. We were tracking sign all the time. They all have their own personalities. Some are killers; some aren't. But I agree with Bud; many times bears get blamed for killing stock that the coyotes do. I've been in the sheep and cattle business all my life, and I can't say that I care about coyotes, but they're far more worse [predisposed] to kill than bear. It's pretty hard to see a coyote track in the summer. And those sheep herders can see a bear track pretty easy.

Coyote behavior

Bodenchuk: I think all bears are individuals, and you have got to take that into consideration. But I think there are also trends that predispose bears towards killing livestock: dry weather, dry summers when there's no additional forage, a year when you had a late frost and there are no

acorns on the trees. Bears have to get something in them in order to go into hibernation. That's going to predispose bears to killing. In terms of calf killing, I've noticed that some bears, primarily boars when they get big enough and old enough that they're the dominant bear on the mountain, become more predisposed towards being a predator than just a scavenger. I think chronic killers have all been big adult boars. The opportunistic bear killing out there could be just about anything. I think [bear] density also has something to do with it. A subadult in an area that's just packed full of bears doesn't have as many feeding opportunities as a bear that is all by himself in a canyon where he can pick and choose. I think that there are a lot of things that contribute to whether a bear kills or not. I don't know if this is the right place to mention it, but we've been talking with the Utah DWR [Division of Wildlife Resources] about maybe trying to supplementally feed bears in areas where we've had historic problems during a small period of the summer to try to keep them from killing. But there are also bad things that we don't want to do with supplementally feeding bears, so we've got to temper that with what we're doing.

Food availability and depredation

Behavior of dominant bears vs. subadults

Supplemental feeding programs

Boyde Blackwell: This last year in Utah we had one of our better years in a long time for moisture. And we also ended up with a relatively small number of ADC kills for a year. Previously, we've had a lot of dry years where the mast crops have failed. There was less food out there for them to forage on, and we had increases in numbers of bears that had to be taken by ADC. I believe the same thing that some of these gentlemen have indicated. If the food is not there, then they will turn to an alternative source.

Food availability and depredation

Black: Let's come back to one of the earlier questions. Helen has a good observation of a lion-bear interaction, and she needs to share it with us.

Helen Davis, Simon Fraser University: I work on a study on Vancouver Island up in British Columbia where we just have black-tailed deer and big cougars. We have a lot of clear-cuts as well, so it's quite good for bear viewing. We've observed our bears encountering deer at 10 meters away and then running in the other direction scared. It's a little embarrassing. I observed this summer one of our small females. She is an adult, but she is only about 100 pounds. I viewed her up close feeding on a deer carcass. I wanted to see if she had actually killed this deer herself. We'd only had one other instance of a bear eating deer other than fawns. When I went back four hours later I was confronted with a really nice big cougar over the kill. So I believe that it was the cougar kill and that the bear had scavenged from it. She was stripping flesh from the bones, so it hadn't been fully eaten by the cougar by any means. When I went back the cougar was crunching up the last bones. There was basically nothing remaining when it left.

Lion–bear interaction

Steve Cranney, Utah Division of Wildlife Resources: We've had one comment about females with cubs of the year in spring and the likelihood of *not* encountering them very often when you're pursuing. I guess I'd like to hear from the other four about the encounters they've had in the spring with running cubs and females. And I would like to know if they've had any experience with any mortality—dogs catching any of those cubs.

Do dogs ever catch cubs?

Labrum: I haven't had any bad experiences with cubs whatsoever. As far as early spring cubs, I've never seen them in the tree with the mom, but I have once in the late fall. I don't see any problems with cubs and hounds.

Sutherland: In the early spring, the only bears I've ever caught with cubs—that I knew had cubs anyway—always had them above them in the tree. I've never have had dogs catch them on the ground or had any problems that way.

Childs: I've never had any problem with dogs catching cubs on the ground. When we used to be able to hunt all summer, it didn't seem like you caught any young cubs until later on. I don't remember catching any early in the spring.

Hutchings: Our spring hunt starts in April when a lot of our mountain roads are closed up with snow drifts. There's no way in, and the sows that come out with their cubs are back in these areas. We very seldom ever get to the newborn cubs as they are coming out of hibernation, because most of them are coming out around May when the weather straightens up. Our season closes the first part of June, so that only gives a guy a couple of weekends to get to these sows and cubs. I hunted a lot before there were any restrictions on hunting, licenses, or seasons, and I have treed cubs early when I've got into them you know, but I've never had any problems with the dogs injuring cubs.

Timing of pursuit season

Smith: How interested are you guys in responding to requests from ranchers to kill a particular bear that's causing depredation? Would you be interested in using your bear permit that way? How could we encourage sporting houndsmen to get more involved in that type of thing, or is it an issue?

Sportsmen and depredation hunting

Sutherland: I think my own feelings are that there ought to be a separate tag or separate list just for depredation hunting so the person knows that it might be a yearling bear or it might be a 7-year-old bear. It might have slipped hair or it might be perfect. And when they leave they know they've got to kill the bear whether it looks like what they want or not. The biggest problem I see is the guy who says, "Yeah I've got a permit I'll go out and do it." Then when he gets there and the bear has slipped half the hair on its back, he says, "No, I don't want him" and turns around and walks off.

Childs: If I understand correctly, there's a provision that as a livestock owner I could get a depredation permit. I haven't ever put in for a kill permit on a bear, but if I had a kill permit and one of my neighbors were having trouble, I'd be willing to help him out.

Bodenchuk: I want to address this from the other side. While the bear is a limited resource in this state and others, and we want to make the maximum use of that resource, I think we have to think really hard about making a sporting proposition out of wildlife damage management. If you're talking about sport hunting an area to reduce the localized population to maybe reduce the incidence of depredation, that's one thing. But if you're talking about going after a particular stock killer, one way we do that efficiently is with a snare. It's unrealistic to expect livestockmen to continue suffering depredations while waiting for a houndsman or while waiting for somebody who is on the top of the depredation list to get there from another part of the state. Additionally, I have a fundamental problem with having someone take a sporting opportunity at what might be somebody's livestock losses. I think there's a bill in the legislature right now to allow a family member or outfitter to come in and take a depredating animal. Quite frankly, if I wanted to run my dogs and the season was closed, I could buy a sheep and put it on the forest. A bear would kill it, and I could go hunt for fun. That's not the intention behind depredation, and I don't think we want to goad a bear into depredating so we can go chase it. I think we need to look at those as separate issues. I may not be the most popular guy on the panel now but. . .

Labrum: I'm basically speaking for myself as a full-time outfitter. I think it could correlate real well, and I think the main issue is timing. If you get a problem animal and you can get somebody right away that has dogs to catch the lion or the bear, I think it would work out real good if there was a simple way of coordinating a full-time outfitter with the government hunters. If you get sportsmen involved and they have a tag and they're working 5 days a week, and you try to get a-

hold of them and they say well I've got to go to work tomorrow, you're just doing a phone circle. And the animal goes to waste rather than goes to use. If you work with licensed, legal full-time outfitters—somebody who's hunting clients everyday—I think it would work real well. Timingwise I think the program could work if there's a simple process [that was set up].

Black: A couple more quick questions. Do you think a bear eating a two-year-old deer will eat as much of the bone as a lion would? Do bears eat much bone?

Do bears eat bone?

Sutherland: I've scavenged through the scat, and there's no doubt in my mind that bears will eat a little more bone [than lion] just by the scat you come across. It always has a lot of bone and hair in it.

Black: Is that seasonal at all? In theory, females that have been nursing for three or four months in the den ought to be really down on their calcium-phosphorus levels, and I wonder if they wouldn't chew on bone a lot in the spring to replace that.

Hutchings: It depends on the bear. I've seen where bears come in over a period of three or four days and just take the maggots off [the carcass]. And then I've seen where a bear has come into a carcass and slicked it right up, to where the only thing left was the leg bones, the big bones, the skull, and a little bit of hide. But thinking back on this, it's mostly a pretty good-sized track, you know, a boar that has come in and done this.

Childs: Maybe Bud can remember: we had a big boar get in our sheep about 25 years ago. It was in middle of August and the lambs were weighing probably 75 pounds. We found 34 that he'd killed, but none of these had been fed upon. When we killed the bear later, we looked in his paunch, and he had chunks of leg bone in there 2–3 inches long. They were the big bones down on the lower part of the leg towards the hock. A lot of bone was in there.

Bodenchuk: I can't ever remember looking in a bear's stomach and finding bone. But most of the bears I was looking at were boars. I've seen where they gnaw on bones like the ends of the rib bones. I've seen where they crunch the long bones of the body, and I think they're getting the marrow out, but most of those bone shards are right there on the ground.

Black: Any questions from the audience?

Question: I was wondering if you use telemetry around here on your dogs? Do you find that it helps in this kind of terrain?

Telemetry and lost dogs

Labrum: Mainly to pick up lost dogs, not in the aid of the hunt.

Helen Davis: You talked about possibly using your hounds for depredation, but would you be willing to use your hounds for free for research purposes, if somebody were trying to collar bears or cougars?

Hounds and research

Sutherland: Most of us do it to a certain extent—until you start going day after day. It gets to be quite expensive for us. I'd be glad to do it one day a week or something, but after that it would have to be subsidized.

Hutchings: That's the way I feel, too. I'm getting up in years and my old body won't take this hard hunting every day, day in and day out. But I'm always glad to help in any way I can.

Childs: I feel the same way. If you're neglecting your work or your expense is getting too much—but I've done it both ways. I've been paid for doing it and donated it both.

Flinders: Let's get back to the dogs themselves. It's still a controversial issue, hounds and the use of them. Mike, you indicated earlier that you had watched a bear just walking with the dogs yammering alongside. That brings up the question then: do you get a fighting dog—Airedales or pit bulls? It takes a particular kind of dog to successfully run bear, and people are interested in how much damage the bear sustains in this as well. I know those who have been out and have seen dogs beat up. Let's talk about that a bit. I don't' know anyone who runs anything but hounds, but maybe you guys do.

Fighting dogs in the pack

Bodenchuk: I've worked with a lot of different outfitters and have had packs of dogs probably for the last 15 years or better. I've done it both ways. I tried to get some pit bull crosses and personally I don't think they're an advantage. If a bear is inclined to go up a tree, hounds will eventually put him up a tree. The downside to having these fighting dogs is that they'll fight each other at the tree. You know, it's just as big a wreck if you've got dogs fighting dogs as if you got bears fighting dogs. But it'll make you madder if it's your own dogs. And I'd rather have a bunch of loud-mouthed hounds that I can keep in touch with and one bow-legged hound dog that won't get to the tree until everything is over with. I don't like the fighting dogs in my pack.

Dogs fight at tree—no advantage

Childs: My limited experience with fighting dogs is that usually they won't go with the hounds. If they follow you to the tree, they fight the other dogs. I don't see any practical use to them. When some of my neighbors find out I've got hounds, they say, "What do you need them for? Sheep dogs can tree bears all the time." It depends on the bear and the situation. I don't think fighting dogs could hurt a bear, even a little bear. Bears are too strong too smart. They get out of the way.

Hutchings: I never was a believer of breeding pit bulls or Airedales or any fighting dogs in with the hounds. I believe if you've got the right line of hounds—I'm not talking about any particular breed because there are good hounds in any breed—you don't need any pit bull in them. They'll work a bear good. Now, you can get some hounds that aren't so good. They get walking a bear that's on the ground and tag it 20 ft. back, and the bear will just go throughout the country. Those hounds don't tree very many bear. The bear might even start feeding and not pay any attention to them. You've got to have dogs that get in close enough to stop the bear and, when the bear turns to go a certain way, a dog's got to cut that path off; and if the bear turns another way there's got to be a dog there. That's how they stalk the bear, and then they come in and nip. A good bear dog will get in and nip, but they know when to grab and turn loose. And a lot of these fighting dogs like a pit bull—they're glad to go in a take a-hold. We'll, anything that goes in, takes a-hold of a bear, and stays there—that's the last time he's ever going to bite one. I've lost a lot of good dogs to bear in the past years. It really hurts when you put three or four years into a dog and get it just where you want it, and then a bear just clamps right down over its back and crushes it. If the dogs get a bear backed up into the brush, the bear, if it has a choice, will head for the thickest and the roughest places it can find. I've had them back into real thick brush where the dogs have to take that bear head on. They'll stand their distance, but if the bear gets an eye on one particular dog, he'll rush that dog. He'll come out and about a good half the time he's going to nail that dog. That's how fast bears are. And I've had them come out and smother one particular dog. I've treed bear with one dog—quite a few times in the past years. But hunting four to six dogs is handy because if a bear smothers one dog the other dogs'll come in and they'll nip and turn loose. That turns the bear and gets his attention off the dog he has got down. And no way, I've never had dogs hurt a bear. One time I had a two-year-old that came down the tree and I saw it come down

Behavior of effective hounds

Optimal size of pack

just before I got there and it hit the ground and my five dogs got a-hold of that bear. Some of those dogs took a pretty good whipping. I know they were glad to get away from it.

Labrum: I've heard a lot of stories about pit bulls and Airedales. I wonder how many of the stories change from one guy to the next. Before long you have a big battle going on and it goes on for 20 days. I wonder how much truth there is to the stories. Personally, I have never owned a hound with anything in it but just hound.

Black: I met John, oh, ten or twelve years ago, and he has one of the ugliest cattle dogs. In fact, John is looking for a home for it right now because it needs to retire. Its name is Rattler, and he is the most pathetic looking animal. And so I showed my stupidity by turning to John—I didn't know him well at that time—and I said, "Is that dog any good?" John just looked at me and said, "If it wasn't any good it wouldn't be here." Anyway, I guess the same goes for his other dogs. We probably could go on all night. I'm sure Bud could. I want to ask one more question. Tom Beck told me once he saw a bear in ponderosa pine country turning rocks for maybe a quarter of a mile. Have any of you seen those kinds of rock- turning events or something similar?

Ants and rock-turning

Hutchings: Yeah. It comes rock-turning time after the grass starts getting a little dry and older. They're looking for grubs and ants. A lot of times you can actually follow a bear's path just by looking at the rocks that are turned over. I've run along ridges for half a mile or so where a bear has turned every major rock. And then I've noticed in particular that if a sow is training new cubs in a summer it seems like there's all the more rocks turned over. I think that sow is teaching her cubs you know how to look for food. But they do turn rocks and tear open stumps. They're doing that all the time.

Childs: I'm probably not telling anyone anything that they don't know, but at the right season bear scat is strictly hulls of ants.

Labrum: I've seen it with rocks for quite a ways. I've never measured how long. One spring I went down Railroad Canyon [Book Cliffs, UT] and there were cow patties all the way down the road. I think from the time I got off the dugway, I followed a bear track all the way down the road, and the bear had rolled over about every cow patty. It's one of the most interesting things I've seen.

Black: Any other remarks?

Jody Williams, UDWR Wildlife Board: We as an animal species have kind of unusual ways of letting people know that we're stressed. I believe that it was Bud who said that you didn't feel that the bears were under any stress as you chase them. I just want to know what you would expect the bears to be doing and what kind of behavior you think that they would exhibit should they be experiencing the stress that some people figure that they have when they are being chased by hounds? What would you expect them to be doing?

How do we tell if bears are under stress?

Black: Taking Valium.

Hutchings: Well, if they were under stress, they might be real disturbed and mad for one thing. They might be there with their legs drooping over a limb huffing and puffing like they were about ready to fall out. But most of the ones I've seen go up a tree, can go up with so much power that they'll tear limbs off two and three inches in diameter. But if they see you coming, sometimes they're more scared of you than they are of the dogs. I've had a lot of bears stay in a tree for hours with the dogs; but when they see you coming, they'll come down and run again. Anyway, most

of the bear I've seen up a tree are pretty relaxed, and some of them act like they would probably even go to sleep right there. That doesn't show any stress that I can see.

Bodenchuk: Some bears pop their jaws when they get stressed or cornered. When you have a bear in the tree, most of them won't be popping their jaws. They'll be sitting there catching their breath. Certainly those bears that were walking with the dogs behind them were pretty much unconcerned about the dogs. I've had bears bay on the ground and just look around like they were looking for something to eat. But like Bud said—when you get where they can smell you or see you, then they leave. The dogs by themselves don't seem to disturb them, particularly those that have been run before. I think they get used to it real quick.

Jody Williams: Then would you assume that when they are running, they are under a certain amount of stress?

Bodenchuk: Oh no. I think they run from each other. Just because they are running doesn't mean that they are stressed. But the fact that they are *not* running is a pretty good indication that they are *not* stressed.

Jody Williams: Some of you also indicated that there aren't very many bears in Utah. Could you elaborate on that somewhat?

Hutchings: I think I'm the one who said that. As far as states that have got a lot of bear, Utah isn't classified as one of them; but we do have a healthy bear population in a lot of the areas. We haven't got a big population, but we've got a huntable population with limited permits. But it couldn't be opened up to a lot of permits. We've got a lot of terrain that would make good bear habitat.

Black: Anyone else?

Optimal pack size

Linda Wiggins: I heard one of you say that you've treed a bear with one dog. What is the optimal size of the pack of dogs, and how many is too many? How many can you train?

Childs: If you asked my wife, she could tell you all kinds of stories about too many dogs. Speaking for myself, I like to train dogs and I like to work with dogs and animals. That's what I do for a living. I've treed a bear with one dog before, and I've not treed bear with 5 or 6 good dogs, too. For me, five or six dogs in a pack is about right to track bear with because of the limited time and ability to train a pack of dogs. Of course, if you get too many dogs, you get into trouble. It depends upon how your dogs handle and how much time you spend with them. I've seen guys that have had dogs all of their lives and the dogs won't even go and jump in the truck. It depends a lot on the individual and how he handles the dogs.

Black: [Acknowledgments and closing remarks]