WILDLIFE RESEARCH INSTITUTE

2008 RESEARCH PLAN
AND
PUBLIC SAFETY ASSESSMENT

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Current Research 1996 to Present

The Wildlife Research Institute (WRI) is a 501(c)(3) nonprofit research and education organization funded by donations. Over a hundred publications have resulted from the research (see Publications on page 53). WRI staff, board members, and workers are volunteers except for work-study students and a graduate student.

Current research is the same as in my letter of July 17, 2000, which says, "*The ultimate purpose of the project is to gather detailed behavioral data on movements, habitat use (including use of hibernacula), foraging, social interactions, and communication to test optimal foraging hypotheses and to refine models of home range use. Based on our experience, we hypothesize that home range use depends upon the distribution of resources (food, cover, water) and the perception of danger from other bears, humans, and predators. To obtain detailed behavioral data, we propose to develop the trust of wild study bears to the extent that they will go about their business of making a living while allowing detailed, close range observations (as described by Rogers & Wilker [1990. How to obtain behavioral and ecological information from free-ranging, researcher-habituated black bears. Bear Research and Management 8: 321-328]). Our study area is the territory of a clan, or extended family, of bears that are direct descendants of the matriarch, Shadow" [now 18 years old]*.

The use of diversionary food in this project was one of the topics of greatest interest to DNR Commissioner Allen Garber when he visited in 2000. On June 26, 2000, he wrote, "*Your research especially about feeding bears and reducing the incidences of nuisance bears (bears being where they are not welcome) is important. I would like to know how that research proceeds*."

General goal and purpose

Our goal remains the same as it has been throughout my career—to learn as much about black bear behavior and ecology as we can in whatever time we have left in our lifetimes. Our purpose is to obtain detailed, in-depth information on which to construct future hypotheses and design experimental studies for quantitative research.

Experimental design

One of the goals for the current research is to test optimal foraging hypotheses and to refine models of home range use, as stated above. However, we are still at the stage of identifying foods and other resources and determining their relative values and how those values change from year to year and season to season. We are also determining annual variability in territorial boundaries and extraterritorial travels. The most important bear in all of these studies is June because of the amount of time we have invested in developing a history of her use of space and resources and the potential for comparing past and future data as food supplies and social pressures (from people and bears) change over the years. We are finding that only a portion of home range use is related to food resources. This will complicate analyses with regard to optimal foraging hypotheses. Much of their behavior appears to be based on territorial defense, protecting future resources, exploration, mate seeking (by both males and females), avoidance of other bears, avoidance of predators, etc. We need GPS collars for more detailed data on all of this and wonder if the MN DNR might support the studies by providing those collars. DNR food survey data has been helpful in a general way.

Our research approach incorporates elements of qualitative and quantitative methods to ensure that studies are as accurate and thorough as possible. Our research is more qualitative than experimental. Many of the studies involve ethological descriptions. Qualitative research emphasizes in-depth descriptions of study animals, behaviors, and contexts, looking at variables (including interactions among variables) in natural settings rather than setting up experiments. We are doing longitudinal studies to learn how individuals change over time. In the natural setting, we are passive participants in that researchers are present but do not interact or participate. We assume the role of spectators as the bears ignore us and go about their lives. This produces the most in-depth, comprehensive information possible. Although all observations must be considered subjective, we constantly monitor our observations and records for evidence of personal bias or prejudice. Our 40 years of research experience with bears provides an advantage in that we no longer make observations through a mental filter of fear but interpret bear behavior in terms of their fear rather than our fear. The experience also facilitates comparisons with past observations of other bears.

The bears are revealing rich lives that can only be explored in-depth in a long-term study. To fully understand their lives, it is necessary to know their past experiences and have a thorough knowledge of their ecology, which we learn in greater depth each year we can follow an individual bear like June. A holistic understanding is necessary to make accurate interpretations of behavior and situations. This differs from quantitative or experimental research, in which selected pre-defined variables are studied, often at the expense of variables that may be of greater significance. Qualitative research is needed to set up hypotheses for testing through quantitative research. In conducting qualitative research, we keep detailed records of what occurs, including those things characteristically taken for granted. This differs from experimental studies in which only pre-selected variables are measured. Much of bear biology is still at the basic exploratory stage. Researchers have barely scratched the surface of bear behavior and social organization. The primary need is for a comprehensive, holistic, and expansive body of ethological and ecological observations rather than for experiments that test variables of questionable validity. A problem is that some observations involve annual events that require several years to develop sufficient sample sizes for statistical analyses. We are tackling some of the most difficult areas of bear biology studied to date. Topics are grouped under the following headings, each of which will be discussed in detail beginning on page 6

- Black bear-human relationships
- Travels, land tenure, and social organization
- Communication
- Food and weight
- Reproduction and cub survival
- Hibernation
- Care and development of cubs
- Play
- Morphology, physiology, and abilities
- Parasites
- Sign
- Habitat and other environmental factors

There is an growing need for studies of bear conservation in their increasingly urbanized environment. This is one of the least studied topics in bear biology. As more and more people move into bear habitat, bears become habituated, which is a normal process. This long-term

study of bears within the Eagles Nest Community is replacing unfounded beliefs with facts about basic bear ecology, behavior, and coexistence with people, including details of habituation and bear responses to diversionary feeding. The fact that the community has provided diversionary food and has coexisted with habituated bears for four decades with no documented complaints to the DNR before 2006 is in itself worthy of a case study.

As part of that research, we are monitoring bear-human relations, local bear population levels, sightings by residents, diversionary feeding, natural food abundance, aversive conditioning, bear travels, daily activity patterns, seasonal weight changes, circannual activity patterns, reproductive success, and survival. Data are compared with that from a previous, nearby study using data from that study for bears without access to diversionary food (Rogers 1987).

Throughout my career, I have done open-ended exploratory research, combining qualitative and quantitative methods as appropriate, similar to the long-term studies David Mech, Ph.D. has done on wolves. This approach has led to advances in knowledge I would not have been able to explore had I limited myself to a priori experimental designs. This open-ended approach avoids the pitfalls of setting up experiments to test preconceived notions based on misconceptions. It allows the flexibility to explore new avenues that could not have been predicted. These continuing pioneering studies are providing much of the behavioral information available on black bears today. Early in the research, Harvard Professor E. O. Wilson (1975) recognized the research as one of the four major studies of large mammals in the world, writing, "A new level of resolution has been attained, in which free-ranging individuals are tracked from birth through socialization, parturition, and death, and their idiosyncrasies, personal alliances, and ecological relationships recorded in clinical detail." Publications from the study received the Anna M. Jackson Award from the American Society of Mammalogists (1974) and the Quality Research Award from the U. S. Forest Service (1988). The studies have produced over a hundred bear publications, 35 of them peer-reviewed. Several papers have been cited by over a hundred authors according to Google. Martinka (1994) ranked two of the publications in the top five most "important contributions to the bear literature," according to a 1992 survey of 98 bear biologists around the world. Martinka presented the rankings as an invited paper at the 9th International Conference on Bear Research and Management at Missoula, Montana, in 1994.

Field study methods

Field study methods include radio-tracking, direct observation, video-taping, field computer recording, scat analysis, Baerman sedimentation, GPS mapping, and weight recording to determine movements, habitat use, den use, diet, social organization, communication, growth, reproduction, survival, geneology, and coexistence with people in an increasingly urbanized environment. The research subjects are of known age, known kinship, known movement history, and live in close juxtaposition to each other around a rural community, providing an unprecedented opportunity to understand the above aspects of bear behavior and ecology. Techniques for walking with bears and recording data on a field computer are described by Rogers and Wilker (1990). Part of the study includes mapping annual changes in the travels of individual bears as their territories are platted and developed. A combination of remote radio-tracking, direct observation, GPS mapping, and working with the community on bear-human relationships provides data on many of the unknowns in bear biology today. Nowhere else in the world is there a long-term study with the kinds of detailed background information available in this project. GPS-mapped travels, especially of 7-year-old June, show patterns of territory use and how they vary with natural food abundance.

Data analysis and statistical methods
Data are mapped, entered on excel spread sheets, recorded in journals, or recorded on video tape as appropriate. As data reach sample sizes suitable for statistical analysis, the appropriate tests will be used to analyze results in relation to associated variables. Data will be analyzed with parametric tests whenever the assumptions of normal distribution and equal variances can be met. Otherwise non-parametric versions will be used as appropriate.

Research bears
Research in 2008 will again focus on 18-year-old Shadow's clan. 8-17 members are radio-collared at any one time. All are of known lineage and age and have adjacent territories. Much of the detailed ecological and behavioral data will come from 7-year-old June, a bear that becomes increasingly valuable each year as she provides opportunities to compare current and past responses to territorial neighbors, natural food scarcity, real estate development, etc.

June spends the vast majority of her time foraging for natural foods and defending her territory against radio-collared fellow clan members. Our history of observations of June is unique in the world. When we observe her interacting with other bears, we usually know which bear is in its own territory, the kinship relation, outcomes of previous encounters, and (in the case of males) if it was a former mate.

Each year, the clan provides deeper insights into

- the black bear's intricate social system,
- resource use,
- differences in black bear behavior between years
- differences in black bear behavior between individuals,
- how people and bears coexist in their increasingly urbanized environment.

Study area
The study area between Ely and Tower includes a rural community in Eagles Nest Township. This community typifies much of northern Minnesota in that it is undergoing rapid development. Areas that were forest when the project began are now housing developments. Nearly all the remaining lakeshore on Eagles Nest Lakes Two and Three, Robinson Lake, Clear Lake, Armstrong Lake, and Pickerel Lake are under development, and researchers are documenting how bears respond to the change.

Assistance
Obtaining and analyzing the data require help. Students from Macalester College, Blake School, Vermilion Community College, and possibly University of Minnesota are scheduled to participate in the field in 2008. Data are being shared with a doctoral student at University of Kentucky and an undergraduate student from Queens University in North Carolina. Eagles Nest Community is forming a Bear Helpline to be manned by a half dozen residents.

Timeline
The project had a slow start due to early permit restrictions on sample size, losses of key study bears, and the need to develop a radio-collared cohort of bears of known kinship. The project is now providing unprecedented insights into bear biology. Our current studies include some of the most difficult subjects yet studied and require long-term studies to develop publishable sample sizes. As the research progresses, we are seeing greater variability in bear behavior than has been previously documented. Our intent is to continue gathering data on the topics listed below

as long as possible. There is no reason to set a termination date other than what might be imposed by my health and that of my research associates. The longer we study bears, the better insights we have and the more in-depth results we can achieve as is discussed further under the research topics below.

Publication intentions

We intend to publish in the future as we have in the past. The entire list of 122 publications is included on page 53. Many topics are approaching publishable sample sizes now that we have an adequate sample size of bears of known kinship and known age providing a stream of data. The most recent peer-reviewed publication is Peters, G., Owen, M., and Rogers, L. 2007. "Humming in bears: a peculiar sustained mammalian vocalization." Acta Theriologica 52: 379-389. Also in 2007, Sue Mansfield completed her master's thesis (Antioch University) entitled, "Effects of supplemental food on weights and reproductive success of black bears in northeastern Minnesota," which we intend to publish in a peer-reviewed journal.

We are also sharing results through

- Internet. www.bear.org (nearly 37,000 unique visitors/month)
- Publications. Recent publications include a peer-reviewed journal article, a master's thesis, and two books. The books are "Discovering Black Bears" by Anderson et al (2007) and "Bears for Kids, 2nd edition, by Fair and Rogers (2006).
- Lectures.
- Radio and TV interviews
- Field courses for wildlife professionals and the public
- The North American Bear Center which opened on May 5, 2007, and had about 35,000 visitors the first summer.

On March 10, 2008, the BBC began making a 1-hour Natural World documentary about bear conservation in an increasingly urbanized environment, starring June and the Eagles Nest Community. Filming will continue until June is in her den in October. The documentary will be a major educational project with 150 million viewers worldwide.

Literature Cited

Anderson, M., N. Field, and K. Stephenson. 2007. Discovering Black Bears. Dog-eared Publications LLC. 40pp.

Fair, J. 2006. Bears for Kids, 2nd edition. Wildlife Research Institute. 47pp.

Martinka, C. J., 1994. Reflections on the recent history of bears. Int. Conf. Bear Res. and Manage. 9(1):1-5.

Mansfield, S. A. 2007. Effects of supplemental food on weights and reproductive success of black bears in northeastern Minnesota. Unpublished master's thesis. Antioch University New England, Keene, New Hampshire. 49pp. plus Appendix.

Peters, G., Owen, M. & Rogers, L. 2007. Humming in bears: a peculiar sustained mammalian vocalization. Acta Theriologica 52: 379-389.

Rogers, L. L., and G. W. Wilker. 1990. How to obtain behavioral and ecological information from free-ranging, researcher-habituated black bears. Bear Res. and Manage. 8:321-328.

Wilson, E. O. 1975. Sociobiology: The New Synthesis. Cambridge: Harvard University.

Current Research Topics

Black bear-human relationships

The study area includes a rural community where residents have been providing bears with diversionary food for over 40 years. The surprising thing is that there were no bear complaints before 2006.

Proposed joint project between WRI and the MN DNR

WRI would like to work with the MN DNR in comparing complaints from Eagles Nest Township with complaints from the rest of the state to evaluate a hypothesis that *bear complaints increase in number and severity where regular bear feeding stations are located.* Comparisons would be made in complaints per bear and in severity of complaints. This would mean developing a ranking system for complaints. Severe complaints would include house break-ins and attacks. Other complaints would be ranked as less severe down through mere sightings. Researchers and a network of residents would continue to monitor the behavior of radio-collared research bears in the township to see what percent of their time is spent around houses versus foraging in remote areas. Researchers are already monitoring bear numbers, travels, daily activity patterns, annual activity patterns, reproductive success, survival, and how bears behave in relation to residences, locations of aversive conditioning actions, diversionary food in years of scarce and abundant natural food.

Studies about reducing bear-human conflict

Data from this study area, where bears have access to supplemental food, are compared with data from bears that had no such access in a nearby area where bears were previously studied (Rogers 1987). Additional help will be available in 2008 through the Community Bear Helpline Group and student interns.

Research to find ways of reducing conflict is one of the most needed areas of research today as more and more people move into bear habitat. Spencer et al. 2007 stated, "Managing bear-human conflict is arguably one of the most challenging priorities wildlife managers face today because black bears occur throughout most of North America, have a high tolerance for anthropogenic activities, and readily adapt to artificial food sources. It is critical for wildlife researchers and managers to continue investigating human-bear conflicts to better understand behavioral patterns of bears and people."

Preliminary studies have shown that reducing attractants and using aversive conditioning are effective in reducing conflicts in campgrounds and residential areas when natural foods are abundant but are much less successful when natural foods are scarce. Data from other areas show that in years of extreme scarcity, house break-ins are most common where attractants are most diligently removed and no diversionary food is provided. For example, Whistler, BC, had 92 successful or attempted break-ins by black bears in 2007 (Miller 2008).

Reducing attractants and using aversive conditioning can be effective in reducing conflict when natural foods are available but are much less effective when natural foods are scarce. Both of those methods (reducing attractants and aversive conditioning) appear to be more effective, especially in preventing house break-ins, where diversionary food is used (see 'Break-ins or Diversionary Feeding' on page 41). The successful use of diversionary food runs counter to

common beliefs that fed bears prefer human food over wild food, become too lazy to forage for wild food, and go from house to house seeking food more and more aggressively (see 'To Feed or Not to Feed' on page 44).

WRI's studies of bear-human relationships include

- Studies of effects of diversionary feeding in Eagles Nest Township on bear behavior, including conflict behavior.
- Causes of bear attacks in America and how to avoid attacks
- How dangerous are mother black bears with cubs?
- Factors influencing conflict between humans and black bears in NE Minnesota
- Does habituation and diversionary feeding increase nuisance activity and/or attacks by black bears or grizzly bears?
- To what extent do mothers pass on nuisance behavior to offspring?
- Factors influencing responses by black bears to humans in NE Minnesota
- How does black bear behavior change with habituation and diversionary feeding?
- Does supplemental feeding introduce black bears to nuisance activity or act as a buffer against it?
- What techniques are most effective for minimizing house break-ins by black bears?
- Does supplemental feeding change the travels, daily activity patterns, denning patterns, social organization, land tenure system, reproductive success, and survival of black bears in NE Minnesota?
- Do black bears with access to diversionary food become lazy or do they treat such food as a supplement as they actively forage for a balanced natural diet?
- How effective are bear-proof garbage containers in deterring nuisance activities?
- How do black bears respond to pepper spray and other aversive conditioning techniques?
- To reduce nuisance activity, how effective is it to reduce attractants and practice aversive conditioning in years of scarce or abundant food with and without diversionary food?
- As people become more knowledgeable about black bears, do attitudes toward black bears change and are these attitudes reflected in the number of nuisance complaints about them?
- What does habituation to humans mean in terms of bear responses to humans, human food, nuisance activity, and survival?
- How does June, a habituated bear, avoid people, 4-wheelers, grouse hunters, etc. as observed by researchers accompanying her?
- How do observations in the study area compare with observations by other researchers across America?

Travels, land tenure, and social organization

This long-term study is unique in that the radio-collared bears have adjacent territories and are of known age and lineage. Several allow close-up observation, with the key bear being June (born in 2001). Research methods include radio-tracking, GPS mapping, direct observation, and scat analysis. In combination, these methods provide unprecedented insights into the bears' intricate social systems. When June interacts with other bears, observers usually can identify the bear, know which bear is in its own territory, know their kinship, and know the outcomes of previous encounters. If the other bear is a male, observers often know if it was a former mate. Long-term observations of June are revealing the variability of behavior from year to year and litter to litter. 40 years of research experience enables the researchers to provide context for current

observations. The data are descriptive, augmented by video and maps providing data for comparisons. Quantitative data on territory size, movements, and nuisance problems will be compared with data from a previous, nearby study—selecting bears without diversionary food from that data (Rogers 1987).

Questions and topics include:

- The matriarchal territorial social system. Observations provide descriptive data on how females maintain territories through scent-marking, vocalizations, body language, and aggression. Observations reveal seasonal and annual changes in responses to territorial intrusion.
- Extraterritorial travels—extent and purpose. During mating season, researchers observe daily changes in vulval swelling and other signs of estrus. In all seasons, researchers observe feeding, den explorations, and relative frequency of scent-marking activity inside and outside territories and how it relates to future shifts in territorial boundaries.
- How do long range movements by black bears differ by age, sex, and season in NE Minnesota?
- Family breakup. As yearlings approach 17 months of age and family breakup becomes imminent, researchers can observe changes in the relationship between mothers and young as judged by frequency of nursing, grooming, playing, and sleep proximity, as family breakup approaches. Individual variability in these parameters is explored between individuals and between litters from the same individual. June will be separating from her second litter in 2008. Researchers will observe how family breakup with this litter compares with her previous litter.
- Post family breakup. Radio-tracking and direct observation is revealing the extent to which male and female offspring establish semi-exclusive areas within mothers' territories and how mothers respond to these areas and to the yearlings themselves during encounters. Study is also revealing the variability in relationships among siblings after dispersal.
- Effects of food scarcity or abundance. Radio-tracking and observations compare behavior, travels, and territoriality between years of scarce or abundant natural food. In years of scarce natural food, bears make greater use of supplemental food. Studies are revealing the extent to which food scarcity and reproductive status influence willingness to cross territories of kin, non-kin, aggressive bears, submissive bears, etc.
- What are the foraging patterns of bears within their territories compared with foraging patterns during extraterritorial movements?
- Dispersal behavior of subadult males and females. Radio-tracking and observations are revealing whether dispersal is voluntary or forced, differences in dispersal behavior of males and females, extent of travels, and effects of food supply (both natural and supplemental) on the age at which subadults disperse.
- The extent of grooming and play behavior among kin, non-kin, potential mates, former mates, etc.
- Fighting behavior of black bears in NE Minnesota. Observations of fights between black bears have seldom been observed. Events leading up to them, the vocalizations involved, and outcomes are being recorded.
- Radio-tracking and mapping the movements of radio-collared bears day after day and year after year, together with detailed observations of June provides insights into seasonal and annual changes in travel patterns and daily activity patterns. Travel patterns are

interpreted with knowledge of soil patterns as distributed by glacial movements and with knowledge of wind direction as a trigger of movements to distant locations.

- All of the above are steps toward testing optimal foraging hypotheses and refining models of home range use, which are very difficult to do. Doing so requires knowledge of food abundance, which changes constantly with the annual cycle of plant growth and fruiting. Insect productivity is mostly hidden and difficult to measure. Berry crops vary from year to year and undergo further variability when logging temporarily increases sunlight and productivity. Foraging behavior may also be influenced by the perception of danger from other bears, predators, and people.

Communication

Knowing the meanings of vocalizations and body language can be useful during bear-human encounters and is essential in understanding interactions among bears.

- What are the meanings of vocalizations and body language as determined by observing context and outcome?
- What are the functions of scent-marking behaviors of black bears inside and outside their known territories and how does scent-marking vary by sex, age, and season?
- What are the preferred objects for scent-marking by black bears in NE Minnesota?

Food and weight

Working with habituated study black bears provides us with the unique opportunity to assess food preferences through direct observation, and allows us to record weight changes of individual bears throughout the non-denning seasons.

- What are the food preferences in NE Minnesota?
- How do diets change with season and how do they change in years of scarce or abundant natural foods?
- How much food do bears eat per day in years of scarce or abundant natural food and how does this affect their consumption of diversionary food?
- Do bears eat toxic or medicinal plants in NE Minnesota?
- How do seasonal patterns of weight change vary with age, sex, pregnancy, lactation, etc.?
- How important are spawning fish in diets of black bears near Ely, Minnesota?
- How important are fawns and other prey in diets of black bears near Ely, MN?
- Which ant species do bears prefer in NE Minnesota?
- How do bears find ant colonies in NE Minnesota?
- How does differential digestion of various food types affect results of scat analyses?
- How do bears respond to food shortages in terms of daily activity patterns, use of diversionary foods, extraterritorial travels, strife, weight gain, reproductive success, survival, etc.?

Reproduction and cub survival

An area of black bear biology that has been scarcely described is the whole area of courtship, incest avoidance, mating, post-mating behavior, and multiple paternity within litters using DNA. For the first time, researchers are observing answers to the following and other questions on these topics

- What are the courtship, mating, and post-mating activities of male and female black bears?
- How does natural and diversionary food affect reproduction, including age of first reproduction, litter size, and cub survival?
- Do black bears avoid incest?
- How does female age affect litter size, interval between litters, and cub survival?
- How does cannibalism and infanticide affect cub survival in NE Minnesota?
- How important are the various causes of cub mortality, including cannibalism, infanticide, predation, falls from trees, electrocution on power poles, road kills, drowning, flooding in dens, exposure, early spring rain, starvation, orphaning in spring, shooting, strangulation in dumpsters, etc.?
- Using DNA samples from hair from cubs, mothers, and adult males in the area, determine paternity within litters.

Hibernation

Direct observation, den cams, and radio-tracking are opening the door to a better understanding of hibernation activities, including pre and post hibernation activities.

- What are the pre-hibernation activities of black bears in NE Minnesota?
- How does bedding behavior change with season and how does it differ with age and sex?
- How does denning chronology differ with sex, age, weight, and reproductive status?
- What are preferred den sites and do preferences vary with sex, age, and reproductive status?
- What times of year are potential den sites investigated and when are dens constructed?
- How many dens are constructed and how much time is spent in each phase of den construction?
- How often are dens reused?
- What is the origin in the “anal plug” of hibernating black bears?
- How do heart rates and body temperatures vary through the year with respect to preparation or emergence from hibernation?
- How does body composition affect hibernation behavior and physiology?

Care and development of cubs

Direct observation and den cams are providing new insights into care and development of cubs in and out of dens.

- When are cubs born in NE Minnesota?
- When is teat order established and how consistently is teat order observed among black bear littermates?
- What do mothers do to care for newborn cubs and how does care change as the cubs develop?
- To what age do mothers lick cubs to stimulate defecation and eat the feces?
- Does the food supply of the previous year (natural and supplemental) influence frequency and duration of nursing bouts in the den and after emergence and how does this affect growth and survival of cubs?
- How do mother bears respond to threats to cubs from predators, weather, and people and how do responses to people change with habituation to people?

- How do cubs develop in terms of weight, tooth eruption, eye opening, ear development, hair length, claw development, and ability to walk, run, climb, and play and how do these development aspects vary with maternal condition and availability of natural and supplemental food before and after birth?

Play

Play among wild bears and the factors that affect it have been little described in the literature.

- What types of play do wild black bears do and what triggers play, including play among cubs, play between cubs and mothers, play among older bears, play with certain trees, play with other objects, and water play?
- How does the abundance of natural or supplemental food affect frequency of play?
- How does family breakup affect play relationships among family members?
- How does play behavior change with age and season?

Morphology, physiology, and abilities

- Sexual dimorphism; what are the differences between males and females in dentition and body form?
- What are the hearing abilities of black bears?
- What are the seasonal and age-related changes in heart rate in NE Minnesota?
- How does body temperature vary with season in NE Minnesota and how does it vary with food supply?
- How do black bears regulate body temperature in NE Minnesota?
- What are the frequencies of the various color phases near Ely, Minnesota?
- What are the patterns of molting and hair growth in NE Minnesota and how do these vary with age and lactation?
- What are examples of navigation, orientation, homing behavior, and spatial memory by black bears in NE Minnesota?
- What are the relative weights of organs and other body parts and how does this vary with age and sex?
- How can age be determined from dental characteristics in NE Minnesota?
- How do black bear teeth, claws, tongue, stomach, and other morphology serve as adaptations for survival?
- How fast to black bears walk and run?
- What is the distribution of scent glands on black bears?
- How do black bears demonstrate intelligence and self awareness?
- What differences in personality are observed among black bears?
- What difference in behavior are observed between black and grizzly bears?
- What is the life expectancy of black bears in NE Minnesota and how is this affected by a host of lifestyle factors?
- How fast does food pass through the digestive tract and how is this affected by diet, food abundance, and season?
- Parasites of black bears, their threats to humans, and how bears deal with parasite loads during hibernation.

Parasites

June opened up a new avenue of study with the discovery that she carries *Baylisascaris transfuga*, a parasite that is spread directly with no intermediate host. In October 2007, she produced a scat containing over a dozen *B. transfuga* worms in various stages of decomposition. This is the second record in northeastern Minnesota of a bear defecating adult *B. transfuga* worms prior to hibernation. The observations triggered interest by the University of Minnesota in the life cycle of this parasite in June and her offspring and in the general population.

Methods include collecting scats from June and her offspring and examining them using the Baerman technique and other techniques to determine

- Whether the spring fecal plug contains eggs of *B. transfuga*
- Whether the spring fecal plugs of June's yearlings contain such eggs
- When eggs first turn up in scats in the spring
- How the frequency of positive scats varies through the year from this bear that is known to be infected
- Whether adult worms appear other than during the prehibernation period and if not what triggers expulsion prior to hibernation. This will involve close observation of diet changes in fall.

Scats will be collected from other bears that are not known to be infected. Collections will be made in or near dens and throughout the year to determine

- The percent of scats that test positive in this area where bears congregate at diversionary feeding stations and how the percentage compares with bears from other areas where this parasite has been reported
- The presence of other parasites and how levels compare with other areas where they have been reported
- How infection rates vary with age and sex
- Whether cubs test positive early enough in their lives to implicate transplacental or nursing transmission
- Whether infected bears show any obvious health effects

Sign

Direct observation is revealing how bear sign is made throughout territories, mating ranges, etc. This is opening the door to better interpretation of the meaning of bear sign and how it is distributed throughout a territory. Sign of special interest includes scent-marks, tree bites, and broken tops of sapling conifers. More general sign includes tracks, scats, beds, and signs of foraging. Questions include

- What are the best ways for people to determine if bears live in their area?
- Which objects and species of trees are preferred for scent-marking in NE Minnesota?
- How does sign differ between males and females?

Habitat and other environmental factors

- What habitats do bears use, how do they use them, and how does use differ with sex, age, and season in NE Minnesota?
- How do various forest management practices benefit bears in NE Minnesota?

- How do bears use white pines in NE Minnesota and how does use differ with sex, age, season, and reproductive status?
- How do bears aid seed dispersal in NE Minnesota?
- How do black bears respond to predators, reptiles, biting insects, rain, sun, hail, heat, humidity, cold, and wind in NE Minnesota and how do these factors influence habitat use?

Literature Cited

Miles, M. B., and M. Huberman. 1994. Qualitative data analysis: an expanded sourcebook, 2nd edition. Sage Publ., Inc., 352pp.

Miller, D. 2008. Whistler Bear Response Officer Program 2007 Year End Report. Conservation Officer Service. Ministry of Environment. 52pp.

Rogers, L. L. 1987. Effects of food supply and kinship on social behavior, movements, and population growth of black bears in northeastern Minnesota. Wildl. Monogr. 97, 1-72

Spencer R. D., R. A. Beausoleil, and D. A. Martorello. 2007. How agencies respond to human-black bear conflicts: a survey of wildlife agencies in North America. Ursus. 18(2) 217-229.

Educational Outreach

The purpose of WRI's educational outreach program is to replace misconceptions with facts at levels ranging from the local community to wildlife professionals.

Education 2008

A major opportunity for worldwide public education is currently being filmed by the BBC. On March 10, 2008, WRI and BBC began filming a 1-hour BBC/Animal Planet documentary on bear conservation in the bears' increasingly urbanized environment. The documentary will feature research bears June, Juliet, and Donna. It will also feature the trails, waterways, and wilderness of northeastern Minnesota, using helicopters, dogsleds, and canoes to film the beauty of the area. The documentary will focus on Eagles Nest Township, a rural community that developed a program for coexisting with bears as the community expands with real estate development and new residents unfamiliar with bears. The documentary will include interviews with residents, community leaders, and DNR officials. Filming will continue until the bears are in dens in October. The audience is anticipated to be over 150 million but could exceed 500 million if the program turns into a series or if footage is also used in BBC's new "Life" series, the sequel to "Planet Earth." The Ely City Council and other area leaders are offering any help they can to support this major opportunity to advertise the beauty of northeastern Minnesota to the world. Economic benefits could be substantial statewide.

WRI will continue to help the newly opened North American Bear Center (NABC) by creating exhibits and updating its website www.bear.org. The NABC is projected to have 35,000-50,000 visitors, and its website is projected to have over 440,000 unique visitors per year.

WRI will also help Eagles Nest Township plan educational seminars to teach people how they can coexist with habituated and non-habituated bears as the community expands and bear encounters become more common. As people and bears increasingly coexist, bears become more habituated, which is a normal process to be factored into public knowledge and management decisions.

Ongoing educational outreach

Training professionals

WRI personnel train wildlife professionals at WRI field courses near Ely, Minnesota, and in classes in other cities. Wildlife professionals include conservation officers, wildlife managers, wildlife information specialists, park rangers, wildlife technicians, etc. WRI also publishes scientific peer-reviewed journal articles for professionals (see Publications on page 53).

Consulting for government wildlife agencies

WRI personnel are frequently called upon as consultants for government wildlife agencies on bear behavior and human conflict. This involves conference calls, serving on scientific panels, serving on committees, in various states or provinces.

Training NGO leaders

Leaders and participants of US and Canadian non-governmental organizations participate in courses at the Wildlife Research Institute Field Station near Ely, Minnesota. The most popular

course is “Bear conservation in their increasingly urbanized environment,” which deals with bear behavior, ecology, and bear-human conflict.

Training students
Graduate students and undergraduate interns assist in the research. Biology and Ecology students attend bear field courses to gain insights unavailable to them elsewhere.

Teaching teachers and the public
WRI reaches a variety of professionals and the general public through field courses near Ely, Minnesota. Participants include teachers, professors, authors, artists, students, wildlife rehabilitation specialists, hunters, and the general public. Participants observe bears, attend lectures, and participate in discussions. In the process, they obtain a summary of what has been learned during four decades of research around Ely. Participants leave the course knowing more about black bear behavior, vocalizations, body language, hibernation, ecology and human conflict than many biologists.

Media consultation
WRI personnel work with newspaper reporters, TV reporters, and magazine writers on most major bear issues in the news. Work is “on the record” or behind the scenes as needed to assure that accurate information reaches the public. WRI personnel also frequently advise text writers for TV programs and documentaries about bears. National Geographic, BBC, Animal Planet, and Discovery Channel are frequent clients. WRI personnel also work with authors of books, especially children’s books, to replace misconceptions with facts.

Editing scientific journal articles
WRI personnel provide scientific review for editors of the top professional journals in the wildlife field, including the Journal of Wildlife Management, Wildlife Society Bulletin, Journal of Mammalogy, Canadian Field Naturalist, Ecology, Ursus, Canadian Journal of Zoology, and others.

TV programs and documentaries about WRI research
TV programs about WRI bear research reach large audiences. The documentary “The Man Who Walks With Bears” has aired over 70 times on Animal Planet, Discovery Channel, and PBS since 2001. Each airing is available in over 80 million households. In 2007, TV programs about the research aired on Animal Planet, Discovery Channel, ESPN Outdoors, and other networks around the world. Some of those will re-run in 2008.

Traveling museum exhibit and other exhibits
A museum exhibit on bears that was produced jointly by the WRI and the Bell Museum of Natural History at the University of Minnesota continues to travel the United States and Canada.

The Internet
WRI created the award-winning www.bear.org and www.bearstudy.org. Bear.org is recommended by New York Times, Washington Post, and Readers Digest Magazine as the “go-to” website for authoritative bear information. These websites are the sources of information for many newspapers, magazines, books, brochures, and other sources. The Minnesota DNR used extensive passages from these websites for its Black Bear Handbook for the Minnesota Bear Hunter Education Program. Government agencies and museums across America use sounds, photos, and information from these websites for their nature programs, exhibits, and brochures.

Lectures

WRI personnel conduct lecture tours across the United States and Canada, reaching public, professional, university, and school audiences. Interviews in lecture cities reach the public through local radio and TV programs and in local newspapers.

Research History 1967-1994

The Wildlife Research Institute (WRI) is a 501(c)(3) nonprofit research and education organization funded by donations. Over a hundred publications have resulted from the research (see Publications on page 53).

Michigan Studies 1967-1968

In 1967 and 1968, Lynn Rogers captured, ear-tagged, and moved "nuisance" bears in the Upper Peninsula of Michigan. He obtained information on bear-human relationships, homing success, and the use of cementum annuli to determine ages of live bears.

Minnesota studies between Ely and Isabella 1969-1994

Population
In 1969, Rogers conducted a population study which helped elevate black bears to big game status in Minnesota. Rogers wrote Minnesota's initial bear hunting regulations at the request of the Minnesota DNR. The population study continued into the early 1980's, along with other long-term studies, aiding bear management.

Physiology
During 1969 to 1986, Rogers and coworkers obtained hundreds of blood samples at all times of year, including hibernation. The samples were analyzed at the Veteran's Administration Hospital in Fort Snelling, MN, the University of Illinois in Champaign, Illinois, and the Harvard Medical School in Cambridge, Massachusetts to determine seasonal and annual changes in blood chemistry, including hematology, electrolytes, liver enzymes, nitrogen elements, protein, lipids, ratios, differentials, thyroid, and hormones.

Rogers also studied heat loss patterns with Dr. Aaron Moen of Cornell University.

Behavior and Ecology
Behavior and ecology were major areas of study from late 1969 through March 21, 1994. Captures, radio-tracking, den visits, and scat analysis continued through four generations of bears that held adjacent territories. The study provided insights into the effects of kinship and food supply on social organization, land tenure, movements, and population growth.

The Need for Direct Observation

Moving beyond tranquilized bears and dots on maps
Despite the above advances, the information learned by studying tranquilized bears and putting telemetry dots on maps was limited. The study, like others before it, was nearly devoid of observations of undisturbed bears. Knowledge of behavior and ecology remained very limited through the mid-1980's. Very little was known about parenting, habitat use, courtship, mating, territorial defense, communication, and other day to day activities. Little was known that could help forest managers manage forests for bears. Detailed information on behavior and ecology was needed for a better understanding and management of black bears. The only way to get that information was through direct observations such as were used by Dian Fossey and Jane Goodall in their studies of gorillas and chimpanzees and by Lynn Rogers in his studies of white-tailed deer (Rogers 1980, 1981; Rogers et al 1981).

Questions about researcher safety around bears
The prospect of observing black bears in the dense forests of Minnesota raised questions. Would bears behave naturally with researchers close enough to make observations in the dense underbrush of northern Minnesota? Would 24-hour observations be safe during mating season and with mothers with cubs? We didn't know.

Questions about public safety and nuisance behavior
We also wondered if bears that lost their fear of observers would jeopardize public safety or become nuisances. We looked to the literature for answers. We found opinions, slogans, and warnings, but no scientific studies. Bear-human relationships, including effects of feeding, were among the least studied areas of bear biology, but beliefs about those topics were (and are) so widely and passionately accepted that most people considered research into those topics unnecessary. In the early to mid-1980's, we conducted experiments in diversionary feeding that included habituation and food-conditioning. During the years we continued those experiments, problems were nonexistent at a campground a quarter mile away. The habituated and food-conditioned bears showed none of the nuisance behavior and aggressive behavior the non-scientific literature had predicted.

The beginnings of close-up qualitative observational research
In the mid and late 1980's, WRI researchers worked ever more closely with individual bears to explore possibilities of accompanying them for 24-hour periods. Anxious, crowded bears often showed ferocious-looking bluster but did not attack. Researchers learned to interpret blustery communication in terms of the bears' fears rather than their own fears and accompanied bears for longer and longer periods.

By 1986, several wild free-ranging bears were ignoring researchers 1-20 feet away. Researchers worked in shifts around the clock, recording data as bears foraged, played, nursed, napped, and slept through the night. Codes were developed for each bear activity, habitat, weather condition, and plant eaten, including the number of bites taken of each food (Rogers and Wilker 1990). At each day's end, researchers downloaded complete 24-hour records showing how bears allocated their activities and habitat use through the day. Travels were mapped. Complex behaviors were described in writing. Researchers brought no food other than an initial handful containing scat markers and then collected scats to determine passage rate of the markers. 24-hour accumulations of scats were weighed and analyzed to compare scat contents with the observed diet. Bears were revealing unprecedented information on daily activity patterns, foraging behavior, food preferences, habitat use, sleep (REM and passive), social behavior, play, den exploration, scent-marking, courtship, mating, territorial defense, care of cubs, meanings of vocalizations, meanings of body language, individual differences in disposition, reasons for extraterritorial forays, and responses to predators, people, insects, and weather—in short, the aspects of bear life that could not be obtained from tranquilized bears or mapping travels.

Professional and public interest in results
Direct observation advanced science and provided the public with a better understanding of bears. The International Bear Association held a special session in Victoria, BC in February 1989 for WRI researchers to share new details of bear life. In Minnesota, U. S. Forest Service (USFS) officials walked with the bears to observe habitat use and assess safety. Walking with the bears proved to be so safe that the USFS enlisted nearly 200 volunteers from the general public to record data. The Minnesota DNR protected the study bears and observers by closing the study area (see details on page 25).

Literature Cited

Martinka, C. J., 1994. Reflections on the recent history of bears. Int. Conf. Bear Res. and Manage. 9(1):1-5

Rogers, L. L. 1980. The use of tame, free-ranging deer in studies of food habits. 42nd Midwest Fish and Wildlife Conference, St. Paul, Minnesota. Dec. 7-10, 1980. (Abstract)

Rogers, L. L. 1981. Walking with deer. pp. 29-34. In: W. H. Nesbitt and P. L. Wright (eds.). Records of North American Big Game. Boone and Crockett Club, Publisher. Alexandria, VA.

Rogers, L. L., J. J. Mooty, and D. K. Dawson. 1981. Foods of white-tailed deer in the Upper Great Lakes Region: a review. U.S. Dep. Agric., For. Serv., GTR NC-65. 24 pp.

Rogers, L. L., and G. W. Wilker. 1990. How to obtain behavioral and ecological information from free-ranging, researcher-habituated black bears. Bear Res. and Manage. 8:321-328.

Spencer R. D., R. A. Beausoleil, and D. A. Martorello. 2007. How agencies respond to human-black bear conflicts: a survey of wildlife agencies in North America. Ursus. 18(2) 217-229.

Wilson, E. O., 1975. Sociobiology: The New Synthesis. Harvard University Press. 697pp.

Do WRI methods create nuisance bears and bears that jeopardize public safety?

They do not. We are studying a diversionary feeding situation that has existed in Eagles Nest Township for over 40 years. We didn't create it. We began studying the results of this feeding in 1996 and received a DNR permit to radio-collar bears in 1999. The food we legally provide at the research center allows us to census the local population, identify individuals, record behavior and weights, and to better study what happens when bears have supplemental food available. In any one year, 6-12 residences feed bears. This has led to dozens of bears becoming habituated to people over the four decades. What makes this interesting for research is that the outcome over the years has been the opposite of what most people would predict. Instead of nuisance problems being extra high because of feeding and habituation, nuisance problems are unusually low except in 2007, which is a special case addressed separately in detail for reasons given below.

Nuisance complaints statewide and those from Eagles Nest Township differ in 3 ways

The first difference is the *lower rate* of nuisance complaints from Eagles Nest Township compared with the statewide rate. Table 1 covers 11 years from 1996 (the first year of study) through 2006 (the most recent year with statewide complaint data as listed in Status of Minnesota Black Bears, 2006). Assuming a statewide population of 25,000 bears and an Eagles Nest Township population of 25 bears, there was an average of 0.04 complaints per bear per year statewide and 0.01 complaints per bear per year in Eagles Nest Township. These averages are significantly different (Wilcoxon signed-rank test, $P = 0.042$). If we were to include transients in the Eagles Nest population, the difference would be even more striking. If we were to extend the comparison over the 40 years of feeding, the difference would be more striking yet. For further comparisons, complaints in Ontario, which has similar habitat and is only 22 miles from Eagles Nest Township has 0.1 complaints per bear per year (Spencer et al. 2007), 10 times the rate in the study area. Across North America, there are 43,237 complaints for 747,083 bears (Spencer et al. 2007), or 0.06 complaints per bear. Eagles Nest Township, at 0.01 complaints per bear per year has one of the lowest rates of bear complaints in North America. Forty years of feeding and habituating bears in Eagles Nest Township and 11 years of research did not boost nuisance complaints during 1966 through 2006.

Table 1. Comparison of nuisance black bear complaints statewide to those from Eagles Nest Township, Minnesota (1996-2006).

	# bears	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	mean
Statewide													
Complaints	~25,000	1296	2857	969	1176	723	782	625	505	582	511 [b]	480 [a]	
Complaints/bear		0.05	0.11	0.04	0.05	0.03	0.03	0.03	0.02	0.02	0.02	0.02	0.04
Eagles Nest													
Complaints	~25	0	0	0	0	0	0	0	0	0	0[b]	3	
Complaints/bear		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.12	0.01

[a] Eagles Nest complaints subtracted from Statewide complaint number

[b] one recorded 'non-complaint' was eliminated

The second difference is in the *severity* of complaints. Including 2007 (discussed in detail below), there were 20 complaints from the study area (3 in 2006 and 17 in 2007). These complaints were mainly about bears being human tolerant and getting bird feeders or garbage.

Such complaints pale in comparison with complaints from other areas in the region where 30 percent of the complaints were about break-ins, including repeated break-ins. Break-ins are virtually unheard of in Eagles Nest Township. The remainder of the complaints from the other areas were about human tolerant bears, garbage, and bird feeders, as in Eagles Nest Township.

Two complaints from Eagles Nest Township reported bear 'bites' that were actually simple nips that did not break the skin. In both instances, the person knew the bear and had a history of hand-feeding her. Hand-feeding goes against WRI and MN DNR recommendations. The nips were the result of coaxing the bear close then teasing and/or playing with the bear. At the time the complaints were filed, both complainants were angry with research over issues related to the fall 2006 hunter harassment charge (see below), and one had vowed to teach the researchers "a lesson."

If we consider the 3 break-ins outside the study area and the 2 nips inside the study area as 'severe' complaints, there is no difference in the severity of bear complaints between the study area and the surrounding area (Fisher's exact test, $P = 0.1912$). Feeding and habituating bears in Eagles Nest Township has not increased the severity of complaints.

The third difference is in *bear attacks*. There has never been an attack in Eagles Nest Township. However during 1996-2006, there were 3 attacks in other parts of Minnesota (Miles Becker on 9-15-02, Kim Heil-Smith on 9-16-03, and Mary Munn on 7-29-05). Feeding and habituating bears in Eagles Nest Township did not precipitate attacks.

How can complaints, house break-ins, and attacks be lower in Eagles Nest Township where dozens of bears have lost their fear of people over four decades of feeding?

Two factors are at play: bear hunger and human attitude. In years of natural food failures, bears across North America sometimes make desperate attempts to obtain bird seed and garbage and to break into houses for food. People register complaints because they are not used to seeing bears and because problems are severe. In Eagles Nest Township, the 6-12 feeding stations act as buffers against these problems in years of natural food failures. As a result, the bears obtain food outside houses and are not driven to break in. They are also less likely to seek bird feeders and garbage. However, no method is foolproof. Transient bears may cause problems before they discover the diversionary feeding sites. And even with diversionary food, the occasional bear gets a bird feeder. That is where attitude comes in. Most people in Eagles Nest Township are used to seeing bears. They don't usually report sightings or minor bird feeder incidents. They know enough to remove attractants if they don't want to see bears. Removing attractants is especially effective in solving bear problems where bears can turn to diversionary food or where natural food is abundant. With diversionary food, problems in Eagles Nest Township are typically minor and brief. Consequently, residents have not complained to the DNR until recently, as will be discussed.

Probably the best test of diversionary feeding in Minnesota was in 1985, the scarcest food year ever recorded by the DNR in northeastern Minnesota. Bears were desperate throughout the region. The DNR recorded 2,859 complaints that year, the highest number on record. However, 3 places were quiet, and all had diversionary food. DNR Wildlife Manager Bill Carlson told me there was one area in his district with no problems—a 10-mile radius around the Grand Marais dump. His only complaint within that radius was about a bear sleeping in someone's yard—nothing more. Another quiet area was the Kawishiwi River Campground where I was

conducting an experiment with diversionary feeding. The campground did not have a single problem all summer even though it had perennial problems in previous years. The third problem-free area was Eagles Nest Township. The local newspaper did a story on it (Wognum 1985). The story began "*There have been a lot of problems with bears in and around Ely this year, tipping over garbage cans and getting into gardens, but south of town, on Armstrong Lake the bears just aren't interested in causing problems. The main reason is that the bears are being served at an outdoor restaurant, owned and operated by Ed Orazem.*" A picture showed Ed sitting next to one of the bears that had lost its fear of people. The article went on tell how Ed Orazem began feeding bears in the mid-1960's to divert a bear from his neighbor's garbage. It worked, and he and others continued feeding in Eagles Nest Township ever since.

Over the 40 years that people have provided diversionary food in Eagles Nest Township, dozens of bears have lost their fear of people, but none jeopardized public safety.

Neighbors of feeding stations seldom see bears. The four closest neighbors to the Research Center are good examples. Darnell and Bonnie Stage (218-365-6731) have lived 96 yards from the research center since 1987. They used to see up to 8 bears in their yard in a summer, but since the Research Station began feeding bears, they see 0-4 bears per year and have had no trouble. Similarly, Todd and Lisa Hutchinson (612-919-6430), 152 yards away, have never had a bear in their yard in the two years they lived there, and they freely have barbecues and marshmallow roasts. Bill and Nancy Johnson, 233 yards away, seldom see bears and saw none in their yard in 2007. Judy Carney, 270 yards away, also sees few bears and saw none in her yard in 2007. Peg Dawson (218-365-3643) lives only 76 yards from a major favorite feeding station and saw no bears in her yard in 2007. Neighbors of other feeding stations also see few bears.

Big trouble in 2007

So what happened in 2007 to generate 17 complaints from the study area in sharp contrast to previous years? That was a problem of people and politics much more than a bear problem. Several things worked together to create the flurry of complaints recorded in 2007.

Fall 2005

In a meeting with WRI researchers on 30 Nov 2005, DNR Wildlife Manager Tom Rusch stated his goal was to end feeding in his district. He asked when we would be wrapping up the research project. He disagreed with a statement we had made on a poster (Mansfield and Rogers 2005) presented at the Eastern Black Bear Workshop in Tallahassee, Florida, in April 2005: "In the 16 years Minnesota DNR has kept records of nuisance bear activity, no complaints have been registered from the study area." Mr. Rusch had confirmed that statement when we consulted with him prior to printing the poster. Less than two weeks after the November meeting with Mr. Rusch, he wrote up the first bear complaint from the study area. Darnell Stage, the nearest neighbor to the research center, stopped by the DNR office to talk about a beaver dam. Mr. Rusch asked him about bears and later wrote up a complaint under Mr. Stage's name. Mr. Stage was incensed when he found out two years later that a complaint against the research had been filed in his name (see attached affidavit from Mr. Stage on page 61).

Spring 2006

The Wildlife Manager Tom Rusch indicated he had received a number of nuisance bear calls from the study area but would not share them with us over the phone. He said he would meet

with us. However, despite our requests for a meeting no dates were offered and no meeting occurred. We also began to receive confusing reports from the community about a bear with a red radio-collar and a bear with a radio-collar and ear-tags. We don't use colored collars and we don't ear-tag bears. We never saw a bear fitting either description but wondered if a strange bear might be causing the problems so we relayed these reports to the DNR.

Spring/Summer 2006

Two collared research bears, June and Solo, were occasionally radio-located in the heavily-populated Walsh Road area of Eagles Nest Township. This was the first year any of our research bears had been located in this area. We wondered what had drawn them to the area and if they were generating complaints. Education is a major factor in coexistence with bears. If people are concerned about any bear, we answer their questions, offer them a can of pepper spray, and offer to introduce them to a bear to counteract the mental images we all grow up with. However, without additional information from the DNR on the reported complaints there was not much we could do. This lack of information deprived us of a terrific research opportunity and an opportunity to head off developing problems.

Fall 2006

Regrettably, I exchanged angry words with a hunter when I felt he mocked my grad student. I was charged with hunter harassment. Although I apologized to the hunter and the charge was dismissed, the MN DNR published unfounded statements on their website and in 2 outdoor newspapers about researchers treating hunters poorly. No documentation to back up these claims has been provided to us despite repeated requests. These statements fueled hatred towards research within the hunting community. Hunters within the Eagles Nest community and officials within the DNR were vocal about their feelings that I should have been convicted of the hunter harassment charge.

Spring 2007

The stage was set for big trouble. Residents who had called the DNR the summer of 2006 felt their concerns had not been addressed. Others, incensed over the hunter incident the previous fall, had vowed to teach researchers "a lesson." Nothing had been done about the plethora of bird feeders and deer feeders on Walsh Road and again research bears were drawn to that area. A few disgruntled residents stirred up their neighbors with rumors and half-truths, and complaints were called in to the DNR office. The DNR contributed to the growing unrest by soliciting complaints and telling residents that research was creating their bear problems. The DNR made unfounded assumptions about our research, gave us no opportunity for input, and created a huge backlash against research in the township. Wildlife Manager Tom Rusch told us that when anyone called him about anything from Eagles Nest Township, he asked them about bears and wrote it up as a complaint if their answer sounded like something he would consider a problem. The DNR suggested to one of the township residents that he go to the town board for a resolution the DNR could act on. The resident did, and the Eagles Nest Town Board suggested he circulate a petition. The petition led to a town meeting. We were notified of the meeting by the town board—our first realization of what was happening. Between the DNR soliciting complaints and several members of the community working to generate complaints, the total grew to 17 by the end of 2007.

Town Meeting – August 14, 2007
In the town meeting, several angry residents denounced me for what they had read about the hunter harassment charge. A uniformed DNR official, Lt. Greg Payton, stated that I should have been convicted of the harassment charge. Residents complained about not being able to feed birds and about bears that were not afraid of people. DNR Wildlife Manager Tom Rusch, speaking about the research, told the audience they had a bad situation that would only get worse. At the end of the town meeting, Dan Humay, chairman of the town board, announced he was forming a committee to dig into the public comments, get the facts, and make decisions about how to deal with bears in the township.

Eagles Nest Community Bear Committee
A 14-member committee met six times in four months. Led by Dan Humay, the committee overcame initial rancor and created a set of recommendations which supported research and suggested ways to coexist with bears. Topics included managing attractants, ways to deter bears, feeding strategy, and community action. The town board accepted the recommendations unanimously. The community was coming together. Community action included (1) facilitating communication to thwart rumors about bears and research, (2) a Bear Help Line to assist residents who feel they need help dealing with unwelcome bears, (3) a Bear Council to serve as a sounding board on bear issues and coordinate communication with the DNR and research, (4) a recommendation for a higher level of cooperation between the DNR and research to work in a complementary way to help the community deal with bear issues, and (5) a Bear 101 course to provide information to the public. People volunteered time and money in support.

Late Summer and Fall 2007
Solo, the subject of most of the complaints, moved away from Walsh Road in mid-August and began using a remote section of her territory. This was about the time of the town meeting. People who blamed research for the problems thought we had "done something" to get her away from Walsh Road. We had not. However, when it was time to hibernate, Solo and her cubs returned to Walsh Road to den in the open crawl space of an unoccupied cabin. The landowner called the DNR and asked to have Solo and her cubs removed.

2007 was a year of people retaliating against research for non-research reasons. It was a year of residents being stirred up by words from DNR officials blaming research rather than looking at attractants in the problem area. All the while, research was shut out from all information on complaints, not given an opportunity for input, and secretly cast as the villain. Disgruntled residents urged each other to submit complaints and run up the tally. The DNR solicited complaints. As a result of the DNR blaming research, people predictably put pressure on the DNR to "do something." It was more about people and politics than about the bears. When we requested copies of the complaints to respond to DNR accusations, the complaints arrived with the names and addresses erased, making it impossible for us to determine which of the complaints were legitimate and which were written without the person's knowledge or intent as in the case of the "complaint" the DNR attributed to Darnell Stage. We also found that there were far fewer complaints (20) recorded than the 31 the DNR had stated. Many of the complaints the DNR had claimed as being the result of research were from dozens of miles away where no research bear has ever traveled. Meanwhile, we continue to get reports of a red-collared bear in the area where complaints were generated.

DNR letter of January 31, 2008

On January 31, 2008, we received a letter stating, "…your actions and recommendations are creating potential for public safety problems as well as jeopardizing the safety of the bears themselves if their close interactions with humans are misinterpreted or unwelcome. Your project has led directly to feeding and habituation of bears and has encouraged direct public interaction with bears."

We asked for clarification regarding our "actions and recommendations" that create potential for public safety problems" and received none. We certainly have made no recommendations along that line. Any misconception about recommendations might be because we do not put out blanket statements telling how dangerous bears are. Our purpose is to tell the truth about black bears. Black bears are powerful animals, but the record shows the danger from black bears to be low. Blanket statements serve no helpful purpose. Bear personalities differ. Rare individuals (about 1 out of a million) have killed people. The vast majority are shy. Some have learned to trust people. These trusting bears have shown that they are no more danger to people than any other bears, as we document in the section "Do WRI methods create nuisance bears or bears that jeopardize public safety? (page 30). The idea that bears that trust people are more likely to attack assumes in part that bears would like to attack if they only dared, which is not true. They repeatedly have demonstrated that they are basically shy and prefer to forage safely without conflict. Only about one in a million looks for an opportunity to attack like bears are portrayed in outdoor magazines and taxidermy. Hungry bears may seek food around residences and campgrounds.

The letter mentions "jeopardizing the safety of the bears if their close interactions are misinterpreted or unwelcome." We address this in more detail in the section "Do WRI methods jeopardize bears?" (page 36). That statement might refer to Solo, who was a very trusting bear. A few people complained about Solo's trusting nature, and the DNR chose to listen to those people over the vast majority of Eagles Nest residents who adored and appreciated her. Most people thought there was no reason for the DNR to put her and her cubs into captivity without ever asking the people who complained to remove attractants or getting the opinions of the community as a whole. Solo had not harmed anyone, had not broken into any houses, and did not jeopardize public safety and we are falsely accused of habituating her (see below).

The letter goes on, "Your project has led directly to feeding and habituation of bears and has encouraged direct public interaction with bears." We don't understand "encouraged direct public interaction" because we have made no recommendation along that line. We have not recommended feeding bears. Our web site (www.bearstudy.org) states, "I do not recommend that people feed bears even though I do it as part of my research as seen on the Animal Planet TV documentary, "The Man Who Walks With Bears." In various publications, Rogers has pointed out that hand-feeding bears has led to injuries in national parks. Despite that, many residents of Eagles Nest Township hand-feed bears in their yards, and some carry food with them in case they see a bear and can try to entice it. Any hand-feeding associated with the research is by research volunteers or as part of courses for wildlife professionals and the public and is done under strict supervision with bears of known temperament. It is not fair to say our research "project has led directly to feeding and habituation of bears and has encouraged direct public interaction with bears" when people have been doing that in the study area since the mid 1960's. People have been doing that in their yards, having friends and neighbors over to do it, and one place was frequented by members of the general public. This is not something we started. It is something we are studying. The level of coexistence that has resulted in the rapidly expanding

Eagles Nest Township is noteworthy, which is why the BBC is filming a 1-hour documentary on "Bear conservation in their increasingly urbanized environment" and why WRI offers courses of the same name for wildlife professionals and a limited number of people from the public to learn bear vocalizations, body language, ecology, and principles of bear-human coexistence. Participants in the courses are taught bear behavior and given opportunities to safely learn from the bears themselves under supervision. This is good. It is beneficial to science, public understanding of bears, and bear management.

The same things have been done by the U. S. Forest Service and MN DNR. We ask, "How is what we are accused of as being wrong different from beneficial U. S. Forest Service and MN DNR projects and practices?"

Public interaction with government study bears

During 1986-1991, USFS researchers habituated and food-conditioned 7 bears and walked with them to determine habitat use. The purpose was to learn details of bear behavior and ecology and how forests can be managed for bears. USFS officials and researchers walked with the bears and assessed safety. USFS officials included Deputy Chief George Leonard from Washington, D. C. (July 30, 1989); Regional Forester Floyd "Butch" Marita (July 2, 1990) from Milwaukee, Wi; Superior National Forest Supervisor Dave Filius (July 2, 1990), North Central Forest Experiment Station Director Ron Lindmark (July 16, 1989), and Superior National Forest Biologist Ed Lindquist (June 5, 1989, and June 27, 1990). They concluded the bears did not jeopardize public safety. The bears saw so many people that they became generally habituated to all people, providing an opportunity for more extensive research coverage. The USFS enlisted nearly 200 volunteers from the general public to walk with the bears and record data in 1990 and 1991. To protect the project, the bears, and their observers, the MN DNR closed the study area to hunting—an area of 20 square miles, including a campground and residential area. Ninety-six Earthwatch volunteers and dozens of other volunteers walked with the bears. Volunteers included anyone interested, including grandmothers, secretaries, hunters, teachers, etc. None of the volunteers had prior close-up experience with bears. When a volunteer joined a bear, he or she gave the bear a handful of food containing a marker and began recording data as the bear went about its business. Volunteers collected scats to determine passage rates of markers. Volunteers spent many hours alone with the bears. No one was harmed. The bears roamed wild with uncontrolled access to the public. They did not jeopardize public safety. One of the bears generated nuisance complaints until we cured her using a shock collar. She never harmed anyone.

Susan Randolph is one of nearly 200 volunteers the U. S. Forest Service recruited from the general public to walk with wild research bears in 1990 and 1991. The Minnesota Department of Natural Resources protected the bears and the USFS volunteers by closing the study area to bear hunting. The bears foraged, napped, played, and cared for their cubs while the volunteers recorded valuable data. No one was harmed.

The USFS also held "bear weekends" in which USFS officials, the public, and the media accompanied USFS researchers to bear dens to raise money for the research. Some of the winter den visits were promoted through Vermilion Community College as winter courses. Vermilion Community College also promoted public den visits as winter courses for MN DNR Bear Biologist David Garshelis.

The point is that the research and educational opportunities were good things, not something to be decried as in the letter of January 31, 2008. The activities advanced science and improved public knowledge and public tolerance of bears. Public tolerance helps keep Minnesota's bear population strong. The MN DNR frequently states that public education about bears is needed. WRI is conducting one of the largest public education efforts in the world, and we would think the DNR would support that.

USFS researchers habituating bears versus residents habituating bears

There is one difference between the USFS project and the present WRI project. In the USFS project, researchers habituated bears for study. In the present study, researchers are studying bears habituated primarily by residents. This is especially so with Solo and June.

Solo at a feeding station in 2007

With cubs nearby, Solo relaxes at a favorite feeding station in Eagles Nest Township. The record shows that fully habituated wild bears like Solo pose no more threat to people than other bears, contrary to a common misconception. Solo never harmed anyone.

Did WRI researchers habituate Solo and June?

Again, WRI is studying the results of feeding and habituation that have occurred in Eagles Nest Township for over 40 years. Communications from the DNR seem to assume that researchers habituated June and Solo, the subjects of most of the complaints in Eagles Nest Township in 2007. In actuality, researchers cannot take credit for that, as we will document below.

For perspective, June and Solo are 2 bears out of 105 identified at feeding stations in Eagles Nest Township since research began in 1996. The 105 bears include cubs, transients, bears that have dispersed to other areas, and bears that occasionally visit the Township. The basic resident population of Eagles Nest Township remains at about 1 bear per 1.5 square mile, which is similar to the overall regional density according to the MN DNR.

Solo

Solo visited the research station only occasionally, preferring feeding stations in the heart of her territory. At those feeding stations, she became accustomed to being petted and hand-fed (photo below). She typically was radio-collared at those feeding stations. At one feeding station, she had a routine in which she nudged the owner with her nose and then followed her to get Oreo cookies. Unlike June, Solo spent much of her time on private land. This meant that researchers seldom (only twice) could walk with her. Like June, Solo had a calm nature and was a gentle

bear. Despite statements about what "could" happen and about Solo jeopardizing public safety, Solo never harmed or threatened anyone.

June

Researchers never had contact with June until May 19, 2002, when she was 1 ½ years old. Before that, June spent considerable time at several feeding stations where she played with an owner's grandchildren (see photo) and became accustomed to them being with her and walking with her. This was before we got to know June. From the time June was a cub, people petted and hand-fed her. She never harmed them. The first time I saw June she allowed me to place a radio-collar on her. June rarely visits the research station (in some years not at all), so when she drops a radio-collar, we typically re-collar her at whichever feeding station calls and says she is there without a radio-collar. We began walking with June because we could. She became a true research partner, revealing a little more each year about the importance of various forest components and about her relationships with other bears. Each year, observations are made in the context of a richer history, providing deeper insights into the intricacies of bear life,

June Bear before researchers knew her

June grew up peacefully hanging out with people of all ages at feeding stations. When researchers first met and radio-collared her, they noticed her gentle, trusting nature and radio-collared her without tranquilizers. Eventually, researchers discovered they could walk with her in the woods. June now spends most of her time foraging for wild foods. Although researchers did not habituate her, they took full advantage of her potential. She now trusts researchers, but remains wary of strangers she hears or sees in the woods away from the trusted ground of the feeding stations.

June is now 7 years old. Each year she provides data in an ever richer context of known relationships with her ursine neighbors and known use of her home range. Videotapes of June created most of the exhibits at the North American Bear Center, including the popular weekly video updates for "What are bears around Ely doing now?"

June is providing the world with a window in natural bear life. She and the Eagles Nest Community are being featured in a 1-hour BBC documentary on "Bear Conservation in Their Increasingly Urbanized Environment." The BBC is using their full range of BBC technology and helicopter-mounted cameras to showcase the beauty of northeastern Minnesota. Filming began March 10 and will continue through October 31, 2008.

communication, social organization, and mental ability. June is unique in the world, providing data that can be obtained in no other way. June trusts researchers whose voices she knows but avoids people she hears in the distance. June has never harmed anyone beyond understandable nips and scratches. Her worst crime is eating from the occasional bird feeder. As with Solo, most people welcome her and a few call the DNR.

Studies of bear-human conflict are needed to find ways to mitigate it

According to a recent issue of Ursus (18(2) 2007), it is critical to study bear-human conflict and ways to mitigate it. Spencer et al (2007) stated, "Managing human-bear conflict is arguably one of the most challenging priorities wildlife managers face today because black bears throughout most of North America have a high tolerance for anthropogenic activities and readily adapt to artificial food sources. ...it is critical for wildlife researchers and managers to continue investigating human-bear conflicts to better understand behavioral patterns of bears and people. Developing and nurturing grassroots outreach efforts that are dedicated to disseminating accurate information about bears and conflict prevention through sanitation can be extremely effective. ...we encourage bear managers and agencies to engage the public as they develop, improve, or implement a black bear education campaign. Public input may help agencies to provide the most effective, useful, and well received education programs. ...there may be small but critically important regional differences on issues..."

WRI research is not creating nuisance bears or bears that jeopardize public safety. WRI is studying what happens when bears are fed and bears become trusting. This is part of a study to better understand bear-human conflict and ways to mitigate it. We are finding that whether bears are habituated or not, the occasional black bear will do something that someone considers a problem, but fully habituated bears are no more dangerous than other bears (see page 30).

Eagles Nest Township has stated its desire to work with WRI research and the MN DNR to learn about bear behavior and find ways to reduce conflict and promote coexistence with bears. WRI's desire is to work harmoniously with the MN DNR and the community for the good of bears and the public. The DNR holds all the power and is charged with managing wildlife. WRI has over 40 years of research experience and is generally considered the world leader in studies of bear behavior. Partnership would benefit all parties, the resource, and the public.

Literature Cited

Mansfield, S. A., and L. L. Rogers. 2005. Effects of supplemental feeding on black bears in northeastern Minnesota. [Poster]. 15th Eastern Black Bear Workshop, Tallahassee, FL. Apr 2005.

Spencer, R. D., R. A. Beausoleil, and D. A. Martorello. 2007. How agencies respond to human-black bear conflicts: as survey of wildlife agencies in North America. Ursus 18(2):217-229.

Wognum, N. 1985. Ed Orazem: the man who feeds the bears. Ely Echo, August 26, 1985

Do habituated and food-conditioned black bears jeopardize public safety?

Although habituation and food-conditioning are to be avoided in campgrounds, roadsides, and any area where there is high turnover in human use, the record shows that fully habituated black bears are less likely to attack, contrary to a widespread misconception.

First, let's look at killings by black bears.

Killings by black bears

Of the 60 killings by black bears across America since 1900, 45 (75%) have been in remote areas of Canada and Alaska where black bears and people live at low densities and the bears have little chance of becoming habituated or food-conditioned. Only 3 (5%) of the 60 killings were in the Eastern United States (NY (1) and TN (2)) where people and bears frequently mix and bears have a higher tendency to lose their fear of people. In the 19 eastern states with substantial bear populations (CT, FL, GA, KY, ME, MA, MD, NH, NJ, NY, NC, OH, PA, RI, SC, TN, VT, VA, WV), over 101,000 black bears live among 122 million people (Spencer et al. 2007).

Let's look at the contrast between remote areas and populated areas in more detail.

The two provinces with the most killings are British Columbia (14 killings) and Ontario (10 killings). Together, these two provinces account for 24 (40%) of the 60 killings across North America since 1900. British Columbia is 364,764 square miles, and Ontario's black bear range covers 308,800 square miles. The black bear populations are 140,000 and 100,000, respectively. Bear density is similar in the two provinces: British Columbia has 0.38 bears per square mile and the bear range of northern Ontario has 0.32 bears per square mile. Both areas have low human densities. British Columbia has 4,177,000 people, including Vancouver and Victoria, for an average human density of 11.5 people per square mile, but government statistics for the black bear range of British Columbia lists human density at only 4.4 people per square mile. Ontario's bear range has 841,288 people for an average human density of 2.7 people per square mile. Combining density numbers, the two provinces have about 3.5 people per square mile living with about 0.35 black bears per square mile. These low densities mean chances of bears becoming habituated and food-conditioned are low.

By contrast, the eastern states where chances of bears becoming habituated and food-conditioned are highest are Pennsylvania and New Jersey. The main bear range of those two states includes 11 counties in Pennsylvania and 6 counties in New Jersey. Those 17 counties hold 3,716,000 people and 17,000 black bears in 11,302 square miles. In terms of density, those counties have 328 people per square mile living with 1.5 bears per square mile. That's 94 times the density of people and 4.3 times the density of black bears found in the bear range of British Columbia and Ontario. Chances of bears becoming habituated and food-conditioned are one to two orders of magnitude higher in Pennsylvania and New Jersey compared with British Columbia and Ontario. Yet, Pennsylvania and New Jersey have had no killings. Habituation and food-conditioning evidently are not major contributors to killings by black bears, as Steve Herrero (1985) pointed out in his book Bear Attacks, Their Causes and Avoidance.

There is another difference between these two areas—food. British Columbia and northern Ontario have low natural food abundance. Interior British Columbia, where the killings

occurred, has rugged mountains with low fertility. Coastal British Columbia, which has had no killings despite a higher than average bear density for that province, is richer in food. Northern Ontario is also infertile. It is located on the Canadian Shield, which has shallow soil of notoriously low fertility. Bears in interior British Columbia and northern Ontario have been selected for foraging behavior that enables them to survive through 6-7 months of hibernation. Nuisance problems in those provinces include many house break-ins, and the killings all appear to have been predatory.

By contrast, Pennsylvania and New Jersey have the best black bear habitat in North America. They have many species of oak, hickory, beech, and cherry trees, and a plethora of berry-producing shrubs. Garbage and birdseed are far more abundant than in the two provinces, and some people actively feed bears. Chances of bears becoming habituated and food-conditioned are probably the highest in North America. Pennsylvania is the home to one of the best-known examples of bears and people coexisting at high densities. For over two decades, Dr. Gary Alt studied bears and people in a gated village called Hemlock Farms (pers. comm). Alt found that 21 bears lived among 7,000 people in the seven square miles of that village. Three bears per square mile is a higher bear density than is found in any national park or national forest. A thousand people per square mile may be the highest human density to coexist with that many black bears. Residents hand-fed the bears, fed them in backyard feeding troughs, and invited them into their homes. The bears became thoroughly habituated to people. No one was attacked or killed.

Habituation is a normal response that does not predispose black bears to attack

Habituation is a normal response to repeated stimuli that animals learn is not a threat. Contrary to widespread misconceptions, neither habituation nor food-conditioning predispose black bears to attack or kill people. From the above, chronic lack of food may be a major factor that predisposes black bears toward the rare killings that have occurred. There is no indication from the above that habituation or food-conditioning of black bears jeopardizes public safety.

Are food-conditioned bears a danger?

Is there a difference in danger from food-conditioned black and brown bears? In his book Bear Attacks (1985), Steve Herrero made a connection between attacks and food-conditioning for brown bears but not for black bears. Food-conditioned black bears have not shown a pattern of attacking.

Do habituation and food-conditioning differ?

Food-conditioning differs from habituation. Herrero et al. (2005) stated "There is evidence that habituated brown bears are less likely to threaten or attack hikers or bear viewers on a per-encounter basis. In Yellowstone, no roadside bear viewers have been injured by a brown bear."

Brown bears have also become habituated to people at McNeil River Falls in Alaska. People walk among wild habituated brown bears for over a mile from the camping area to the viewing area and back. The bears remain calm and trusting and do not run away. At the viewing area, people are confined to a specific patch of ground, but no fences separate them from the bears. Bears lie down next to the viewing area and nurse their cubs. Bears rest, fight, and mate only a few feet from observers. Herrero et al. (2005) wrote, "At McNeil River Falls State Game Sanctuary, in over 28 years and roughly 60,000 encounters between brown bears and people, a bear has never injured a person, nor has a bear had to be removed or killed. At McNeil there have been 13 documented charges by brown bears toward people. However, none of these has been by a fully habituated bear."

Similarly, Dr. Stephen Stringham (in press) wrote "There is little risk of being mauled by fully acclimated bruins–those that both trust and respect people." Stringham did not make that statement lightly. He has had over 10,000 encounters with wild black and brown bears, has led thousands of people on bear-viewing excursions, and is the founder of the Bear-viewing Association.

Do habituated and food-conditioned black bears jeopardize public safety?
Probably less than other bears. Let's look at the behavior of the most fully habituated black bears we know. Again, habituation and food-conditioning, especially hand-feeding, are to be avoided in campgrounds, roadsides, or where there is high turnover in human use. Bears in those situations are out of place and can cause conflict whether they are habituated or not. Bears in campsites have bitten bulges in tents that turned out to be people. Such things can happen whether or not bears are fully habituated. Around rural communities, a growing body of data gives no indication that habituation or food-conditioning jeopardizes public safety.

1. Across America, for over a half century, generations of people watched black bears at garbage dumps. In Minnesota, people watched dozens of habituated bears feeding together in dumps at Lutsen, Tofte, Grand Marais, Finland, Little Marais, and Hovland. The bears did not run from people and became tourist attractions. Bears mingled with people, approached them for food, or simply ignored them. In 1971, those dumps were so important as tourist attractions that legislators mandated that bears be protected from hunting within a half mile of them. Bear-viewing at dumps remained popular until most of the dumps were closed in the mid to late 1980's. When people drove in with pickups full of garbage to dump, bears waited for bags of garbage to be thrown to them, or they climbed in and helped themselves. Throughout the black bear range, people spent summer evenings watching bears at local dumps. Some stayed in their cars. Others walked among the bears, hand-feeding them, taking intimate photographs of themselves or their kids with the bears, and teasing bears with food. Bears were tolerant of the shenanigans. It was hard to tease bears with food with so much garbage present. In 1989, at the International Conference on Bear Research and Management in Victoria, BC, I asked the audience if anyone had ever heard of a person being attacked at a garbage dump. The audience included hundreds of bear researchers and managers from virtually every state and province that has bears. It included researchers who specialize in chronicling bear attacks. No one had ever heard of an attack at a garbage dump.

2. In Eagles Nest Township, residents have fed wild black bears for over 40 years. Dozens of bears have become habituated and food-conditioned there over the years. The bears have never jeopardized public safety. No one has been attacked.

3. At Vince Shute Wildlife Sanctuary near Orr, MN, people have hand-fed, petted, and mingled with hundreds of wild black bears for over 25 years (photo on page 33). Over 70 different bears visit the feeding area each year, with over 40 often being visible at a time. The majority do not fear the 20,000 people who visit the sanctuary each year. During the 1980's and early 1990's, the public was free to walk among these wild bears without rules or supervision. Bears readily approached people and checked them for food. People teased bears with food to create photo opportunities. Toddlers sometimes steadied themselves against 500-pound bears (photos available). People lifted children up to bears' mouths for reasons beyond understanding. This went on day after day from






Vince Shute Wildlife Sanctuary

At the Vince Shute Wildlife Sanctuary, bears have been habituated and food-conditioned for over 25 years. The Sanctuary draws 20,000 visitors and over 80 bears a year. For over a decade, the public was allowed uncontrolled access without supervision. People of all ages mingled with wild bears and did things WRI would not recommend. Was anyone seriously hurt? No. A few people were nipped or scratched while hand-feeding, which WRI does not recommend, but the bears did not come after anyone and hurt them.

The same bears roam miles outside the Sanctuary. Is there an unusually high number of nuisance complaints from the Orr area? I don't think so. Has anyone been attacked in that part of the state? No. During the quarter century bears have been habituated and food-conditioned at the Vince Shute Wildlife Sanctuary, 5 people were attacked in Minnesota, but none was in the vicinity of the Sanctuary.

Although some people are uncomfortable seeing bears that show trust, there is no evidence that such bears jeopardize public safety. As people move into bear habitat, more and more bears will become accustomed to seeing people. Public education and management decisions need to take into account that habituation is normal and not a cause for fear or removal.

Memorial Day through Labor Day year after year. What is the worst that happened? Occasional defensive nips and scratches. No one was killed or seriously injured. The operation continues today with workers mingling daily with habituated black bears. Do the bears then leave the sanctuary and behave in trusting ways with people elsewhere? Bears that are trusting at the Sanctuary are typically wary and timid elsewhere. They live long lives despite heavy hunting pressure in the area. For example, 800-pound Duffy, one of the most trusting bears at the sanctuary and one of the most sought-after trophies in the population, left the sanctuary each year near the beginning of bear hunting season but avoided hunters until a hunter waited for him at the edge of the property when Duffy was 16 ¾ years old. His long life is the more remarkable considering that non-habituated black bears are killed on the average at 2 by hunters in Minnesota.

4. Around Ely, researchers and over a hundred volunteers have spent thousands of hours walking with dozens of habituated black bears, including mothers with cubs, for over two decades. The observers spent much of their time within touching distance of the bears and were never attacked. The bears increasingly ignored the observers. The scientific publication "How to obtain behavioral and ecological data from free-ranging, researcher-habituated black bears" by Lynn Rogers and Gregory Wilker (1990, Ursus 8:321-327) describes this research method. One bear (Gerry) that differed from the other bears in that she had spent her critical socialization period as a cub in captivity discovered Outward Bound and became a bit of a nuisance there until researchers curbed her behavior with an experimental shock collar in 1991. When the study ended early in 1992, the DNR opted to put this bear into captivity. However, Gerry's sibling, Mary, continued to live in the wild with a non-functional radio-collar that made her recognizable. During the study, over a hundred people had walked with Mary and occasionally hand-fed her. When the study ended, people wondered if Mary would approach people for food, visit the Kawishiwi River Campground in her territory, and become a nuisance at residences. She did not. She disappeared. Local residents, hikers, and blueberry pickers watched for her each summer for years. The summer of 1995 was of extra interest because DNR surveys showed bear food to be the lowest since 1985. Bears became nuisances all over northeastern Minnesota. Yet, Mary wasn't seen. On September 4, 1995, though, she succumbed to a hunter's bait and was killed at the age of 6¾ --twice the average age at which female bears are killed in Minnesota.

5. In Michigan, during 1990-1999, Terry DeBruyn conducted his Ph.D. research by walking with wild black bears, including mothers with cubs. Many other people walked with the same habituated and food-conditioned bears. The bears encountered their share of hikers and blueberry pickers. However, the bears did not attack them, DeBruyn, or anyone else. They did not become nuisances. Dr. DeBruyn's experiences are chronicled in his book "Walking With Bears."

6. Near Grand Marais, MN, Jack Becklund spent 1990-1995 forming close relationships with 10 bears around his rural residence. Day after day he sat with the habituated and food-conditioned bears in an atmosphere of mutual trust as is documented in his book "Summers with the bears." The bears did not attack anyone.

7. In Smoky Mountains National Park, Dr. Jane Tate studied wild black bears that people hand-fed along roadsides in the early 1980's. This differed from people feeding bears in garbage dumps because roadsides do not have the abundant food found in garbage dumps. Teasing bears with food along roadsides can elicit aggressive behavior. In those days, roadside

feeding generated the majority of injuries from black bears in national parks. Nevertheless, Dr. Tate watched in disbelief as people hand-fed bears, put honey on babies' faces for bears to lick, poured beer on bears' heads, and crowded around bears laughing and screaming. To her surprise, the worst that happened was minor nips and scratches, mainly by bears new to human contact. She found habituated and food-conditioned bears to be "amazingly tolerant and restrained." She said *the more accustomed the bears were to people the less likely they were to cause injury.* She documented her findings in her Ph.D. dissertation (1983) "A profile of panhandling black bears in the Great Smoky Mountains National Park."

Conclusion

Habituation is a normal response to non-threatening stimuli. Habituated black bears are less likely to flee and less likely to attack. There is no record of habituated black bears like those in the study area attacking or killing anyone. There is no evidence that habituated black bears like those in the study area jeopardize public safety any more than others bears.

Literature Cited

Becklund, J. 1999. Summers with the Bears: Six Seasons in the North Woods. Hyperion, New York, NY. 178pp.

DeBruyn, T. 1999. Walking with Bears: One Man's Relationship with Three Generations of Wild Bears. The Lyons Press. 320 pages.

Herrero, S. 1985. Bear attacks: their causes and avoidance. Nick Lyons Books, New York, NY. 287pp.

Herrero, S., T. Smith, T. D. DeBruyn, K. Gunther, and C. A. Matt. 2005. From the field: brown bear habituation to people—safety, risks, and benefits. Wildl. Soc. Bull. 33(1):362-373.

Rogers, L. L., and G. W. Wilker. 1990. How to obtain behavioral and ecological information from free-ranging, researcher-habituated black bears. Bear Res. and Manage. 8:321-328.

Spencer, R. D., R. A. Beausoleil, and D. A. Martorello. 2007. How agencies respond to human-black bear conflicts: as survey of wildlife agencies in North America. Ursus 18(2):217-229.

Stringham, S. F., (in press) When bears whisper do you listen? Negotiating close encounters with wild bruins.

Tate, J. 1983. A profile of panhandling black bears in the Great Smoky Mountains National Park. Ph.D. Thesis. Univ. of Tenn., Knoxville. 135pp.

Do WRI methods jeopardize study bears?

There is always a risk for animals in research projects, but the risk to bears in this project is far below that of projects using standard capture and drugging methods. In other bear studies, bears may be injured during capture or accidentally killed by drugs or by falls from trees while tranquilized. Researchers record these deaths, but few published papers report handling mortality. Higgins (1997) reported 6% of females and 2% of males processed during a 1994-1995 study in Virginia died from handling. These numbers did not include 2 cubs that died when abandoned by their mothers following den visits and 1 cub that died during handling. We avoid those risks by using trust instead of traps and tranquilizers to place radio-collars on bears. No bears have died as a direct result of our current research methods.

A question we often hear is "*Don't these habituated bears just walk up to a hunter and get shot?*" Not as often as other bears. Some of the bears trust people at the research station but are wary and unapproachable in the woods. Others allow researchers to walk with them in the woods but are cautious of other people—even while accompanied by a researcher. Overall, the study bears survive at a slightly higher rate than other bears in Minnesota. The average age at which other males are killed in Minnesota is 2, but hunters have not killed radio-collared males in this study. The average age at which other females are killed in Minnesota is 3, and the average age at which 4 radio-collared females were killed was 4.25. The remaining 9 radio-collared females average 5.3 years of age, not counting 18-year-old Shadow, which dropped her collar just before hibernation. Shadow is the matriarch of the clan being studied. Several non-radio-collared males we are studying are over 10.

We are also asked "*Aren't these trusting bears more vulnerable to being shot as nuisances?*" It is always possible that someone could shoot any bear if they misinterpreted its actions or judged it to be unwelcome, but data show the risks for research bears are lower than for the population as a whole. Bears are shot throughout their range by fearful or intolerant people. A large component of our research is public education to counter these attitudes. The more people know about bears the more willing they are to coexist with them. There is no better way of counteracting the false images of bears portrayed by the media than to allow people to watch these wild research bears—either firsthand or through video footage of these bears engaged in normal bear behaviors.

All bears benefit as we share our research with over a hundred million people each year and change attitudes about bears worldwide.

Literature Cited

Higgins, J. C. 1997. Survival, home range and spatial relationships of Virginia's exploited black bear population. Master's thesis. Virginia Polytechnic Institute and State University. Blacksburg, Virginia.

What makes a nuisance black bear?

Reducing nuisance problems has been an area of interest for me ever since I began studying bears in 1967. I spent my first two years catching and moving nuisance bears and learning what causes problems. It took me many years to get past the many misconceptions on this issue.

Three factors create a nuisance bear: hunger (usually due to a lack of high quality natural food), available human food, and an intolerant human.

Hunger is the primary factor. Black bears seek human food much more when high quality natural foods are scarce. Hunger is far more important in creating a nuisance bear than is habituation to people or prior experience with birdseed or garbage. Hungry black bears recognize these items as food whether they have tasted them before or not. Like chipmunks, bears can overcome fear if they are hungry enough, but they prefer to forage where they don't have to face aggressive competitors (bears and humans) or risk injury from dogs, wolves, large cats, and grizzly bears. So they tend to revert back to natural foods and the safety of the forest when high quality natural foods become abundant again.

To say that a different way, what bears eat depends upon what the alternatives are—at least to an extent. Variety is also important. When preferred foods like ant pupae and tent caterpillars are abundant in late spring and early summer, or when hazelnuts, ant pupae, berries, and hornet larvae are abundant in mid to late summer, bears can satisfy their nutritional needs in the wild, and nuisance problems are minimal. When top natural foods are lacking, bears must choose between eating mature vegetation, which has many of its nutrients tied up as indigestible cellulose by summer, or following their noses to birdseed, garbage, and camp food. These foods have become available over much of the black bear range due to people moving into black bear habitat. Where people are common, black bears readily and normally habituate to them.

To deter nuisance behavior people have tried removing attractants and using aversive conditioning. These tactics may or may not work depending upon whether bears can turn to high quality food elsewhere (natural or diversionary food). If there are no alternative high quality foods, aversive conditioning makes bears sneakier and removing outdoor attractants (bird feeders, garbage, fruit trees, etc.) removes buffers against house break-ins. Across America, the communities most conscientious about removing attractants have the most house break-ins when high quality natural foods are lacking. This is most evident in western towns where drought and frost cause severe natural food failures. That is where diversionary food can play a role (see page 41). In Snowmass Village, CO, where attractants are diligently removed, I accompanied police as they investigated three house break-ins in a couple hours—one of them on the fourth floor of a high-rise. However, in Lake Tahoe, CA, where there were about 3 house break-ins per day in 2007, citizens experimentally provided diversionary food in an area, and the house break-ins there immediately stopped. House break-ins continued where diversionary food was not used. There is growing evidence that aversive conditioning and removing attractants are most effective where bears can turn to natural or diversionary food.

Attitude is a huge determinant in whether seeing a bear is a pleasure or cause to call the DNR (see page 40). That's where education can come in. The more people know about bears the more willing they are to coexist with them. Citizens of Eagles Nest Township have been using diversionary food for over 40 years and most are knowledgeable about bears. As a result, there have been few complaints to the DNR from that township except in the unusual circumstance of 2007.

Do cubs of nuisance mothers become nuisances?

Not necessarily—perhaps not usually. Breck et al. (2008) stated "*there was little indication that conflict behavior in black bears partitioned along related lineages. This indicates that the acquisition of human food conditioning behavior was a function of asocial learning and/or social learning independent of parents*."

Our multi-generational studies in northeastern Minnesota support this finding.

For females, a recent example involved Solo and her sister Sunshine. Their mother's territory included several feeding stations in Eagles Nest Township. After family breakup, Solo continued to visit those feeding stations while her sister dispersed to the edge of the Boundary Waters Canoe Area Wilderness where there are few people and little supplemental food. These bears had the same background but made opposite choices about where to live with respect to people and supplemental food. Later, when wolves raised pups in Solo's territory, Solo moved her cubs to a residential area where there were no wolves. When the wolves moved on in mid-August, Solo and cubs returned to their usual territory. Bears often find and select dens during summer travels, so Solo and cubs returned to hibernate under a cabin in the residential area. Another example involves siblings Gerry and Mary. Although raised by the same mother, these unrelated, adopted female siblings made different choices. Gerry frequented a campground and outdoor education facility while Mary spent her life mostly unseen until a hunter shot her at the age of 6 ¾.

In our experience, where female bears choose to live depends primarily on available space in the territorial social system rather than on the location of people and human food. Nuisance behavior is mainly a function of hunger, personality, and availability of bird feeders and garbage within the home range.

For males, subadults voluntarily disperse whether or not they have access to human food in their mothers' territories (Rogers 1987, and current studies). The long survival of males that were habituated and food-conditioned as cubs suggests that their experiences prior to dispersal did not get them killed as nuisances in disproportionate numbers. The average age at which males are killed by hunters in the overall population is two years. Yet, the most fully habituated male we know of, Duffy, survived to 16 ¾ before he was killed by a hunter, and several habituated males in Eagles Nest Township are 10 or more.

A study by Matthew Binks (2008) and Dr. Joseph Hamr provided related data on how cub experience—including habituation to people—influences the likelihood of cubs becoming nuisances as they grow up. The study divided orphaned cubs into two groups, those raised with frequent human contact and those raised without minimal human contact. After release, the two groups were compared with a control group of wild cubs raised by their mothers. According to Dr. Hamr, only 8.3% of the rehabilitated cubs exhibited any nuisance behavior and there was no significant difference in nuisance behavior among the 3 groups.

Literature Cited

Binks, M. 2008. Survival and Behaviour of Orphaned and Rehabilitated Black Bears in Central Ontario. M.S. Thesis. Laurentian University. In preparation.

Breck, S. W., C.L. Williams, J. P. Beckmann, S. M. Matthews, C. W. Lackey and J. J. Beecham. 2008. Using genetic relatedness to investigate the development of conflict behavior in black bears. J. Mamm. 89(2):428-434.

Rogers, L. L. 1987. Effects of food supply and kinship on social behavior, movements, and population growth of black bears in northeastern Minnesota. Wildl. Monogr. 97, 1-72.

What is a “nuisance” bear?

A “nuisance” bear is a bear someone considers unwelcome. Attitudes vary about what makes a bear unwelcome and when a bear should be removed from the population.

To some, a bear should be removed if it lives nearby. This was the frontier attitude that made people respond with traps, poison, and guns whenever a bear was seen. But many people have learned enough about bears to move beyond this attitude. For many people today, seeing a bear is a pleasure.

To some, a bear should be removed if it invades their yard, while others enjoy occasional glimpses of wildlife.

To some, a bear should be removed if it eats from a bird feeder, while others feel seeing a bear at a feeder is the joy of their day.

To some, a bear should be removed if it does not run at the sight of a human, while others see a trusting black bear as an opportunity for observation. They know the record shows that such bears are no more dangerous than other black bears.

To some, a bear should be removed if it frequents a residential area, while others remove food attractants if they don't want to see bears.

To some, a bear should be removed if it tears into a storage shed, while others determine what attracted the bear and prevent it from happening again.

To some, a bear should be removed if it enters a house, while others close windows and doors to prevent it from happening again.

To some, a bear should be removed if it lightly nips someone who attempts to handle it, hand-feed it, or tease it, while others refrain from such activities or learn from them.

To some, a bear should be removed if it displays bluster which they interpret as a threat, while others understand that bluster expresses nervousness and is not a threat.

To some, a bear should be removed if it bites someone, while others request leniency for the bear if the circumstances were extenuating and the bear is not a threat to public safety.

Each person who moves into bear habitat has a different idea of what northwoods living should be. Some want bears removed. Others want to learn about them and coexist.

Break-ins or Diversionary Feeding?

Across America, attempts to reduce black bear-human conflicts have long focused simply on removing bird-feeders, garbage, and other attractants. However, preventing conflicts is more complicated than removing attractants.

When wild food is moderately abundant, removing attractants is effective. When favorite wild foods like white oak acorns, hazelnuts, berries, tent caterpillars, or ant pupae are very abundant, removing attractants is hardly necessary because bears essentially disappear from residential areas. Where removing attractants fails is in years when drought or frost makes wild foods extremely scarce. Desperate bears, especially lactating mothers, must find food if they are to survive, reproduce, or provide milk for their cubs. Cub mortality becomes high in those years. High quality wild foods are nearly absent in some years, driving bears to explore residential areas or campgrounds. They don't have to learn that bird seed or garbage is edible. They know it whether or not they have prior experience with it. They follow their noses to the best food available whether it is inside or outside houses.

In recent years, people have added aversive conditioning to the arsenal of ways to prevent conflict. This involves giving bears unpleasant experiences with crackershells, rubber bullets, or pepper spray. Together with removing attractants, aversive conditioning can be effective when wild food is even moderately abundant, but it is often unsuccessful when wild food is scarce. It can make bears sneakier, but they have to eat somewhere and when the only food is around dwellings or campgrounds, they have to keep trying.

In recent years, black bears have demonstrated their persistence, or desperation, in western towns that were hit with frosts and a multi-year drought that dried up high country grasses and killed berry and acorn crops and millions of acres of pinyon pines. Starving bears descended from mountains to find green vegetation in valleys and ended up in residential neighborhoods. The bears ate what they could from bird-feeders, garbage cans, and domestic fruit trees. Where those foods were removed to avoid attracting bears, the remaining food was inside houses, and house break-ins became common.

On August 10, 2004, Lynn Rogers accompanied police for a couple hours in Snowmass Village, Colorado, as they investigated 3 break-ins, one of them on the fourth floor of a high rise. A hungry mother and cubs had scrambled up the outside terraces and found an empty apartment with an open window. They tore the screen, entered the apartment, and went straight for the refrigerator and dismantled it. Formaldehyde insulation in refrigerator walls gives off formic acid, which smells like an ant colony—a favorite food. In 2005, Crystal Lake, Colorado, had 131 break-ins. In 2007, break-ins and attempted break-ins soared in Aspen, Colorado, reached 92 in Whistler Valley, British Columbia, and 3 per day in Lake Tahoe, California.

Lake Tahoe residents decided to try something new in 2007. They ignored official pronouncements that bears quickly become addicted to human food. They recognized that the bears were hungry and had little natural food. They experimentally put out diversionary food, contrary to most recommendations. Residents hiked far into the woods to put out nuts and other foods similar to the bear's natural diet. They arranged for food to be air-dropped in the woods where the bears could avoid the stress of residential areas. House break-ins ceased in that area but continued in other areas where diversionary food was not used.

In Nova Scotia, wildlife officials have begun experimenting with diversionary feeding. In a personal communication, Wildlife Technician Jenny Costelo states "*I have fed bears close to where we have had bear calls and have often felt that by feeding them, there was a decrease in calls, but no concrete data exists to support this idea*."

The idea is not new. In the Pacific Northwest, the timber industry has long established diversionary feeding stations to prevent bears from stripping bark from valuable trees to eat cambium in spring (Flowers 1987). Do the bears get addicted to the supplemental pellets? Ziegltrum (2004) wrote, "*If given a choice among sapwood, pellets, and berries, bears prefer berries. In July, bears quickly wean off the man-made feed*." Did the feeding stations concentrate bears and reduce home ranges? Fersterer et al. (2001) wrote, "*The home range sizes of bears in feeding areas did not differ (P>0.35) from home ranges of bears in non-feeding areas*."

Bears in Virginia also weaned off supplemental food when natural food appeared. Members of the Virginia Bear Hunters Association placed between 3200 and 6400 tons of food in the woods for bears per year but said "*bears will not use feeding sites, or will greatly reduce their rate of use, when acorns begin dropping from trees in late summer and early fall*." (Gray et al. 2004 citing minutes from the Virginia Department of Game and Inland Fisheries board meeting of March 4 and 5, 1999). Gray et al. (2004) surmised, "*Use of feeding sites may be compensatory rather than additive, and may only affect [increase] reproduction when acorns and other natural foods are scarce*."

In 1984 and 1985, U. S. Forest Service bear researchers in northeastern Minnesota experimented with diversionary food a quarter mile from a U. S. Forest Service campground that had had perennial bear problems over the years. They eliminated problems those two years despite 1985 being a year of record statewide bear problems due to a record scarcity of bear foods according to MN DNR records (Rogers 1989).

For many years, garbage dumps provided diversionary food in northeastern Minnesota. The effectiveness of garbage dumps in reducing bear-human conflict was clearly shown in 1985, the record year of wild food scarcity. At the Colville Dump near Grand Marais, MN, bear numbers swelled to as many as 44 feeding in the dump at once. Throughout the region, bear complaints were rampant. But within a 10-mile radius of the dump, there were no complaints of damage despite the concentration of bears at the dump (personal communication, MN DNR Wildlife Manager William Peterson, cited by Rogers 1989). Also, resort operator Duffy Bauer reported he had few problems with bears until a dump a half mile away was removed. For the next decade or more, problems were more numerous (Rogers 1989).

The Eagles Nest Community in northeastern Minnesota began feeding and habituating black bears in the mid-1960's. This diversionary feeding effort started with a man who wanted to draw a bear away from his neighbor's garbage. It worked, and a dozen other residences scattered around the edges of the community followed suit, and they continue today over 40 years later. Rather than introducing bears to nuisance activity, the feeding has served as a buffer against it. House break-ins are virtually unheard of in the community, and complaints are far below the state average. The MN DNR began keeping records of complaints in 1985. As of 2005, no complaint had been filed from the Eagles Nest Community (Mansfield and Rogers 2005).

Conclusion

Diversionary feeding does not eliminate all problems with bears and may not be appropriate for all areas. However, there is mounting evidence that diversionary food, judiciously placed, can act as a buffer against nuisance behavior—especially against house break-ins.

Literature Cited

Fersterer, P., D.L. Nolte, G.J. Ziegltrum, and H. Gossow. 2001. Effect of feeding stations on the home ranges of American black bears in western Washington. Ursus 12:51-54.

Flowers, H. 1987. Supplemental feeding of black bear in tree-damaged areas of western Washington. P. 147-148 *in* Animal damage management in Pacific Northwest forestry. Baumgartner. D.M., et al. (symp. co-chairs). Coop. Extension, Wash. State Univ. Press, Pullman.

Gray, R.M., M.R. Vaughan, and S.L. McMullin. 2004. Feeding wild American black bears in Virginia: a survey of Virginia bear hunters, 1998-99. Ursus 15:188-196.

Mansfield, S. A., and L. L. Rogers. 2005. Effects of supplemental feeding on black bears in northeastern Minnesota. [Poster]. 15th Eastern Black Bear Workshop, Tallahassee, FL. Apr 2005.

Rogers, L. L. 1989. Black bears, humans, and garbage dumps. Pages 43-46 *in* Marianne Bromley (ed.). Bear-People Conflicts: Proceedings of a Symposium on Management Strategies. Yellowknife, NWT, Canada, April 6-10, 1987.

Ziegltrum, G.J. 2004. Efficacy of black bear supplemental feeding to reduce conifer damage in western Washington. J. Wildl. Manage. 68:470-474.

To Feed or Not to Feed: Consequences of feeding black bears

Misconceptions about effects of human food on black bears are prevalent across North America. Many of the statements below were disseminated by professional wildlife managers in brochures, etc. Among the most common misconceptions are the beliefs that supplemental food makes bears dependent on it, bears prefer it over wild food, and they forget how to forage naturally. Other assumptions are that supplemental food disrupts natural movements and social organization. Scientific studies show that these beliefs are unfounded. Following, *in italics*, are statements commonly given for not feeding bears. Some of them may be true from time to time, but none typify black bear behavior. The bulleted information is from actual research—either cited from other sources or from our own research.

1. *A fed bear is a dead bear.*
   - This slogan was developed by campground managers to promote clean camping. A fed bear often does end up a dead bear in campground situations, but people blindly recite this rhyme as a mantra for all situations, not realizing it has no science behind it.

2. *When bears congregate around feeding stations they spread communicable diseases to each other.*
   - Birds (Altizer et al 2004) and deer (Dobson and Foufopoulos 2001), can spread disease when congregating at feeders, but we know of no disease spread among bears in this way. We are currently conducting a study to determine whether a higher incidence of intestinal parasites occurs among bears that congregate around feeding areas.

3. *Supplemental feeding is not necessary for bears. They survive well on natural foods.*
   - In good food years, black bears do survive well on natural foods, but in poor food years, cubs and yearlings may starve to death.
   - In poor food years, hunger may drive bears to human food sources, and some of those bears are killed by landowners. Often, the bears are only gut-shot, resulting in slow, inhumane, and wasteful deaths.
   - An increasing body of data from across North America suggests that diversionary feeding can help prevent problems around some rural communities. Where there is diversionary food for hungry bears to turn to, efforts to reduce nuisance problems by reducing attractants and using aversive conditioning are more effective and house break-ins are rare, resulting in fewer bears killed.

4. *Bears prefer human foods over natural foods*
   - What bears eat depends upon what the alternatives are. If the only natural alternatives are low quality foods, bears may temporarily prefer human foods. However, when high quality natural foods like emerging vegetation, colonial insects, nuts, and berries become abundant, bears demonstrate their preference for those foods and spend little or no time seeking human foods.
   - In the State of Washington, where foresters provide diversionary food to reduce tree damage, Ziegltrum (2004) stated, “If given a choice among sapwood, pellets, and berries, bears prefer berries. In July [when berries ripen], bears quickly wean off the man-made feed.”

- Until recently, hunters in Virginia fed bears year-round. One hundred twenty-eight hunters surveyed provided 6,473,267 pounds of feed in a year (Gray et al. 2004). The Virginia Bear Hunters Association maintained that this supplemental feeding did not cause bears to cease their natural feeding and that bears will not use feeding sites, or will greatly reduce their rate of use, when acorns begin dropping from trees in late summer and early fall (Gray et al. 2004).
- In Minnesota, bears are killed over bait in higher numbers in years when natural foods are scarce (Garshelis and Noyce 2007).
- In Minnesota garbage dumps, most bear droppings during the summer berry season are natural food. Only after natural foods wane do most droppings contain garbage (Rogers 1989)

5. *Bears may prefer natural food, but foods that people feed are more concentrated and easier to obtain – making for lazy, dependent bears.*
   - Researchers in northeastern Minnesota who walk with wild bears that have access to supplemental food find that black bears prefer high quality natural foods and forgo supplemental food to forage for natural foods when those foods are available. They say, "Anyone who thinks a fed bear is lazy should try following one around for a day as the bear travels far and works hard for wild foods. Variety is important in bear diets."

6. *Feeding is simply for human entertainment, not for the health of the bears.*
   - In many cases feeding bears <u>is</u> simply for human entertainment, as is feeding of deer, birds, or any other wildlife. People enjoy watching wildlife.
   - Feeding in some areas is turning out to be important in reducing nuisance problems—whether it is done for entertainment or to divert bears from problem areas in times of natural food shortage.
   - Feeding bears enables people to learn about bears and get past the ferocious images most people carry in their minds. This leads to better coexistence.
   - Wildlife Research Institute feeds bears for research, keeping records of bear visits, weights, social interactions, and activities. The bears are also radio-tracked to learn what they do away from the feeding station. The study is revealing some of the information written here. Feeding also enables researchers to establish the trust needed to place radio-collars on bears without drugs, adjust collars for growth, and walk with bears to learn aspects of bear biology that could not be learned in any other way.

7. *Bears get unnaturally fat when feeding on human foods.*
   - What is 'unnaturally fat' for a bear? Bears are not like people and dogs. Bears are built to gain and lose huge amounts of weight over the course of a year so they can hibernate overwinter, and produce and nourish cubs for several months before emerging from the den. Fat bears maintain favorable HDL/LDL ratios.
   - Ely researchers are not aware of any data that show harmful effects from supplementary human foods. WRI has obtained more weights on free-ranging wild black bears than any other bear study in the world. In northeastern Minnesota, adult bears with unlimited access to high-quality supplemental food do not show consistent weight gains until mating season ends and berries ripen.
   - Out of 105 bears that have been observed at feeding stations during the 12 years to date, only two (both pregnant females) might be considered "obese." Both produced healthy cubs.

- In captivity, an obese female black bear set a longevity record of 34 years at Grandfather Mountain, North Carolina.

8. *Even if the bear you're feeding does not damage your property, it may create nuisance problems and cause property damage at your neighbor's home.*
   - This may happen from time to time, but data from Alaska, Montana, Colorado, Wisconsin, British Columbia, Michigan, and Minnesota show that hungry, emaciated bears (not fed bears) are the ones most likely to be nuisances, damage property, break into houses, and cause problems in campgrounds.
   - House break-ins are most common where natural food is scarce and there is no diversionary food.
   - Supplementary feeding sites are just another source of food to bears—along with natural feeding areas—but the reliability of supplementary food can become important in years of scarce natural food.
   - Property damage is always possible with bears, whether they are fed or not, but people who feed bears in Eagles Nest Township experience very little damage, and neighbors of people who feed bears see few or no bears in the course of a year.

9. *Feeding Bears = Tame Bears. A tame bear's inherent wildness is compromised by feeding, making it unwary of people. This results in more unwanted human-bear encounters, which overall reduces the value, appreciation and tolerance of bears by the general public.*
   - Many people believe it is wrong to feed birds, bears, or any wildlife. Perhaps that would be ideal. However, in many parts of the country people are moving into bear habitat and usurping valleys and shoreline areas where bears once fed. More needs to be learned about how people and bears can coexist.
   - In Eagles Nest Township, where residents have fed bears for over 40 years, DNR records show fewer complaints over that period than elsewhere in the state.
   - Although bears learn to trust people at feeding locations, most run when they encounter people in the woods where people are not expected.
   - If "inherent wildness" means inherent fear of people, we are not sure there is such a thing. Wild bears are intelligent animals whose behavior depends more upon learning than instinct. Bears are seeing more and more people in their habitat and are adapting to it. Bear personalities vary greatly. Some adapt more readily than others. More and more, bears are learning that they can continue foraging and caring for cubs without wasting energy running from people. This is normal habituation. Does this ability to learn mean they are not wild?
   - In Eagles Nest Township, the vast majority of bears cause no trouble—even when natural food is scarce and bears in other townships become nuisances. Only 2 out of 105 bears identified at feedings stations in the township since our research began in 1996 have been the source of complaints. By contrast, in a nearby community that did not provide diversionary food, 1 out of every 9 households killed a "nuisance" bear each year during an 8-year study (Rogers and Allen 1987). Whether it is better to feed bears or kill them when natural food is scarce is a matter of opinion.
   - Where bears are fed, neighbors commonly come over, meet the bears, and overcome misconceptions. This increases the value, appreciation, and tolerance of bears by the general public and enables people to enjoy the woods without fear.

10. *Too many bears concentrated in one area can create a multitude of problems including threat to humans, bodily injury, property damage, car kills, and vulnerability to illegal killing.*
    - This could happen if feeding were done to excess in the wrong place. However, the resident population of Eagles Nest Township is no larger than DNR estimates for surrounding areas—about 1 bear per 1½ square miles.
    - "*Threat to humans, bodily injury*" It is well known that black bears pose little threat to humans. It is disturbing that wildlife agencies continue to portray bears as dangerous.
    - "*Car kills*" Bears routinely cross roads and occasionally get killed whether or not they have access to supplemental food. In Eagles Nest Township, the core of the study area, 2 bears out of 105 seen in the township during 1996 to 2007 were killed by vehicles. Both were over a mile from any feeding station.
    - *"Vulnerability to illegal killing."* Bears are illegally killed throughout their range. In the Eagles Nest Study Area, after four decades of feeding, most people are more knowledgeable and tolerant of bears than people elsewhere.

11. *Bears concentrated at feeding areas fight with each other and kill cubs.*
    - Where bears concentrate around food sources of any kind, aggression can increase as bears integrate into a peaceful hierarchy. Some bears watch from treetops until they have an opportunity to feed without conflict. Chases occur, but injuries are rare. By far the vast majority of injuries to black bears occur during mating season when bears are scattered and seldom use feeding stations.
    - Of 59 cubs born during 1996 to 2007, none were killed at feeding stations. One was killed by a bear elsewhere.

12. *Mother bears teach their cubs to be nuisances.*
    - Research has shown otherwise. Most mother bears with access to supplemental food spend the majority of their time foraging on natural foods away from feeding stations.
    - Breck et al. (2008) stated "there was little indication that conflict behavior in black bears partitioned along related lineages. This indicates that the acquisition of human food conditioning behavior was a function of asocial learning and/or social learning independent of parents."

13. *Bears that get food at a house will then generalize and go from house to house looking for food.*
    - Research has shown otherwise when there is adequate diversionary food. Neighbors of feeding stations seldom see bears. Where there is adequate diversionary food, bears are less likely to go from house to house. Where there is adequate diversionary food, bears hardly bother with houses where owners have made minimal efforts to reduce attractants. Bears do go from house to house where there is minimal food in the woods, no adequate diversionary food, and each house provides a small amount of food from bird feeders, garbage, a dirty barbecue grill, a bowl of pet food, etc.

14. *Feeding often lures bears to areas where hunting is not allowed. Wildlife agencies rely on regulated hunting to thin out populations to reduce potential bear-human conflicts.*
    - When hunters distribute literally tons of bait in the woods, most bears are drawn away from diversionary feeding stations until the hunters stop baiting a month or so later. Hunters' baits are a major source of supplemental food each year.

- In Virginia, a survey revealed that 128 bear hunters each distributed, on average, over 50,000 pounds of bear food/year (Gray et al. 2004).
- In Eagles Nest Township, MN, 4 collared bears and several non-collared bears with access to supplemental food were killed over bait between 2000 and 2007.

15. *Bears accustomed to being fed by people will approach hunters and be killed.*
    - Habituation to humans seems to be location specific. Bears that are comfortable with people in their yards where they are used to seeing people generally avoid or run from people they encounter in the woods where they don't expect to see people.
    - Habituated, food-conditioned bears are not more susceptible to hunters.

16. *Black Bears have lived for eons in Northern Minnesota habitats without supplemental feeding. In fact, today's northern forests, with an interspersed diversity of types and ages, produce more natural bear foods than they did in the past.*"
    - Today's forests likely do produce more natural bear foods than they did in the past, but scarce food years still occur.
    - For many decades, bears ate at garbage dumps when natural foods were scarce. Since 1971, bear hunters have been putting tons of bear food in the Minnesota woods each year from mid-August until after mid-September.
    - Bears survived for eons before people arrived with birdfeeders and garbage to lure hungry bears to be shot as nuisances.
    - Bears and humans have competed for human food throughout history (Schorger 1946, 1949). WRI is studying ways to reduce the conflict.

17. *Female bears that are supplementally-fed breed and produce cubs at a younger age and at shorter intervals; this artificially inflates their reproductive rate and hence the growth of the local population.*
    - Bears with access to supplemental food, including diversionary food, hunters' bait, garbage, and bird-feeders often do have a higher reproductive rate. Where access to these foods is widespread, as with hunters' bait, it could increase the overall population.
    - However, where diversionary feeding was used in a portion of Eagles Nest Township, the local population did not increase. The population appeared to be limited by female territoriality, dispersal, and mortality. The number of territorial adult females (5-6) remained about the same—although the individuals changed over time—which each female occupying approximately 6 square miles. This territory size is consistent with that of females without access to supplemental food. The territoriality of resident females effectively limits the local bear population. Fersterer et al (2001) found that the home range sizes of bears with access to supplemental food in the state of Washington did not differ significantly from home ranges of bears in non-feeding areas.
    - Of 21 females that held territories or were born in the 36-square-mile study area in Eagles Nest Township during 1996-2006, 7 (including a yearling) were still in the township in 2007, 8 moved out of the township, 5 were shot by hunters, and 1 died as a cub. Most juvenile males left their mothers' territories and the study area at 1 or 2 years of age.
    - Gray et al. (2004) stated that use of feeding sites in Virginia may be compensatory rather than additive, and may only affect reproduction when acorns and other natural foods are scarce.

18. *Supplemental feeding disrupts the normal social system of bears.*

- Nothing in any study we know of supports that claim. Where it has been studied, females establish and defend territories normally, mothers care for cubs normally, families break up normally, bears court and mate normally, males disperse normally, bears make forays outside their usually areas normally, and bears forage on natural foods normally.
- Some of the forays are to diversionary feeding stations where social hierarchies reflect the social status of these bears within the overall study area. The same is seen at salmon streams or dense food patches across America.

19. *Bear feeding often draws bears across busy roadways, increasing their chance of mortality as well as increasing the chance of dangerous car accidents for people.*
    - Highway deaths are a problem whether or not bears have access to diversionary food. Where bears do not have access to a few diversionary feeding stations, they are more likely to visit many bird feeders and garbage cans at houses along roads. In this study, 3 research bears were killed on Highway 169 and two others were hit and survived. Four of these were more than a mile from any diversionary feeding station. The fifth was seen being chased by a male during mating season minutes before it was killed.

20. *Bears are adapted to natural food shortages. They have excellent memories and travel long distances to natural food sources. Supplemental feeding disrupts this.*
    - This statement wrongly assumes that bears prefer diversionary food over natural food and that bears become lazy and remain near feeding stations—a misconception that was covered above. When natural food is scarce, bears that remain near residential areas do spend more time at diversionary feeding stations than in other years, but these bears and other bears also make long trips to natural feeding sites.
    - In a nearby study area, 40 percent of the females and 69 percent of the males made excursions outside their usual areas. Eagles Nest bears with access to supplemental food show a similar pattern. As examples,
        1. In September 1999, a bear with access to diversionary food traveled 24 miles outside her usual range for reasons unknown.
        2. On Sept 17, 2005 a female and cubs with access to diversionary food traveled 15 miles north to feed on acorns in the Boundary Waters Canoe Area Wilderness.
        3. On August 13, 2007, a 2-year-old female with access to supplemental food left her territory east of Soudan and moved 4 miles outside her territory to a remote area for 19 days.
        4. Non-radio-collared bears are absent from diversionary feeding sites for up to a 10 months at a time, depending upon natural food supply.

21. *Bears feeding on natural foods rarely die of starvation, either in summer or winter. Supplemental feeding does not improve their chances of survival.*
    - Starvation is uncommon among <u>adult</u> bears, but cubs and yearlings often starve in years of scarce natural food. In a nearby study, cub survival ranged from 59% to 88%, depending upon natural food supply (Rogers 1987). Adding diversionary food increased cub survival to 91% (Mansfield 2007). Survival of yearlings after emerging from dens depended upon food and bodyweight (Rogers 1987). Only 40% survived as yearlings if they weighed less than 22 pounds upon emergence, 85% survived if they weighed 22-29 pounds, and all survived if they weighed over 29 pounds (Rogers 1987).
    - The data clearly show that supplemental feeding <u>does</u> improve chances of survival. It also shows why bears become nuisances or go to diversionary feeding sites in years of

scarce natural food. Some of them are literally starving to death. Also, pregnant females that don't get enough to eat are unable to maintain pregnancies.

22. *Help us keep our bears wild, healthy, free-ranging, and a source of enjoyment for all!*
    - "Wild" The black bears of Eagles Nest Township are truly wild whether or not they are accustomed to seeing people. All intelligent animals learn not to waste energy running from creatures that pose no threat, and yet they remain wild.
    - "Healthy" The bears of Eagles Nest Township are very healthy. They eat mainly wild foods and use human foods as a supplement. They are above average in growth and reproductive success.
    - "Free-ranging" The bears of Eagles Nest Township are indeed free-ranging. They show the same travel patterns that bears showed in a nearby study area where bears were not fed. Bears travel for many purposes, including mating, maintaining territories, and finding a variety of foods.
    - "Source of enjoyment for all" Bears that are fed are a source of enjoyment and education for many. If the diversionary feeding were stopped, homeowners who feed deer and birds would likely have more bear visits, which may not be a source of enjoyment for them.

Literature Cited

Altizer, S., W. M. Hochachka, and A. A. Dhondt. 2004. Seasonal dynamics of mycoplasmal conjunctivitis in eastern North American house finches. Journal of Animal Ecology. 73:309-322.

Breck, S. W., C.L. Williams, J. P. Beckmann, S. M. Matthews, C. W. Lackey and J. J. Beecham. 2008. Using genetic relatedness to investigate the development of conflict behavior in black bears. J. Mamm. 89(2):428-434.

Fersterer, P., D.L. Nolte, G.J. Ziegltrum, and H. Gossow. 2001. Effect of feeding stations on the home ranges of American black bears in western Washington. Ursus 12:51-54.

Gray, R.M., M.R. Vaughan, and S.L. McMullin. 2004. Feeding wild American black bears in Virginia: a survey of Virginia bear hunters, 1998-99. Ursus 15:188-196.

Garshelis, D. and K. Noyce. 2007. Status of Minnesota Black Bears, 2006. Report to Bear Committee. Minnesota Department of Natural Resources.

Mansfield, S. A. 2007. Effects of supplemental food on weights and reproductive success of black bears in northeastern Minnesota. Unpublished master's thesis. Antioch University New England, Keene, New Hampshire. 49pp. plus Appendix.

Miller R., J. B. Kaneene, S. D. Fitzgerald, and S. M. Schmitt. 2003. Evaluation of the influence of supplemental feeding of white-tailed deer (*odocoileus virginianus)* on the prevalence of bovine tuberculosis in the michigan wild deer population. Journal of Wildlife Diseases: Vol. 39, No. 1 pp. 84–95

Rogers, L. L., and Arthur W. Allen. 1987. Habitat suitability index models: black bear, Upper Great Lakes Region. National Ecology Center, U.S. Fish Wildl. Service, Biol. Rep. 82(10.144). 54 pp. (Peer reviewed)

Rogers, L. L. 1989. Black bears, humans, and garbage dumps in Minnesota. Pages 43-46. In, M. Bromley (ed.) Bear-people conflicts—Proc. Of a Symposium on Management Strategies (1989). Northwest Territories Dept. of Renew. Res.

Schorger, A. W. 1946. Influx of bears into St. Louis County, Minnesota. J. Mammal. 27:177.

Schorger, A. W. 1949. The black bear in early Wisconsin. Trans. Wis. Acad. Sci., Arts, and Letters 39:151-194.

Ziegltrum, G.J. 2004. Efficacy of black bear supplemental feeding to reduce conifer damage in western Washington. J. Wildl. Manage. 68:470-474.

APPENDICES

WRI Publications

Peer-reviewed publications

Rogers, L. L. 1974. Shedding of foot pads by black bears during denning. J. Mamm. 55(3):672-674. (Cited by 3)

Rogers, L. L. 1975. Parasites of black bears (Ursus americanus Pallas) of the Lake Superior Region. J. Wildl. Diseases 11:189-192. (Cited by 21)

Rogers, L. L., and S. M. Rogers. 1976. Parasites of bears: a review. Bear Research and Manage. 3:411-430.

Rogers, L. L., C. M. Stowe, and A. W. Erickson, 1976. Succinylcholine chloride immobilization of black bear. Bear Research and Manage. 3:431-436. (Cited by 5)

Rogers, L. L., D. W. Kuehn, A. W. Erickson, E. M. Harger, L. J. Verme, and J. J. Ozoga. 1976. Characteristics and management of black bears that feed in garbage dumps, campgrounds, or residential areas. Bear Research and Manage. 3:169-175.

McMillin, J. M., U. S. Seal, L. L. Rogers, and A. W. Erickson. 1976. Annual testosterone rhythm in the black bear (Ursus americanus). Biology of Reproduction 15:163-167. (Cited by 18)

Rogers, L. L. 1977. Fourth International Conference on Bear Research and Management, a review. Wildl. Soc. Bull. 5(4):196:197.

Applegate, R., L. L. Rogers, D. Casteel, and J. Novack. 1979. Germination of cow parsnip seeds from grizzly bear feces. J. Mamm. 60:655. (Cited by 6)

Rogers, L. L., L. D. Mech, D. K. Dawson, M. Korb, and J. Peek. 1980. Deer distribution in relation to wolf pack territory edges. J. Wildl. Manage. 44(1):253-258. (Cited by 14)

Rogers, L. L. 1980. Inheritance of coat color and changes in pelage coloration in black bears in northeastern Minnesota. J. Mamm. 61(2):324-327. (Cited by 5)

Barnes, D., and L. L. Rogers. 1980. Clostridial myonecrosis associated with drug administration. J. Wildl. Diseases 16(3):315-317.

Hamer, D., S. Herrero, and L. L. Rogers. 1981. Differentiating black and grizzly bear feces. Wildl. Soc. Bull. 9(3):210-212.

Ohmann, L. F., D. F. Grigal, and L. L. Rogers. 1981. Estimating plant biomass for undergrowth species of northeastern Minnesota. U.S. Dep. Agric., For. Serv., GTR NC-61. 10 pp. (Peer reviewed) (Cited by 4)

Rogers, L. L., and L. D. Mech. 1981. Interactions of wolves and black bears in northeastern Minnesota. J. Mamm. 62(2):434-436. (Cited by 19)

Rogers, L. L., J. J. Mooty, and D. K. Dawson. 1981. Foods of white-tailed deer in the Upper Great Lakes Region: A review. U.S. Dep. Agric., For. Serv., GTR NC-65. 24 pp. (Peer reviewed)

Rogers, L. L. 1983. Effects of food supply, predation, cannibalism, parasites, and other health problems on black bear populations. pp. 194-211. In: F. Bunnell, D. S. Eastman, and J. M. Peek (eds.). Symposium in Natural Regulation of Wildlife Populations. Forest, Wildlife, and Range Experiment Station Proceedings 14. Univ. of Idaho, Moscow. 225 pp. (Peer reviewed) (Cited by 6)

Rogers, L. L., and Arthur W. Allen. 1987. Habitat suitability index models: black bear, Upper Great Lakes Region. National Ecology Center, U.S. Fish Wildl. Service, Biol. Rep. 82(10.144). 54 pp. (Peer reviewed) (Cited by 17)

Rogers, L. L., and R. Applegate. 1983. Dispersal of fruit seeds by black bears. J. Mamm. 64(2):310-311. (Cited by 12)
Rogers, L. L. 1984. Reactions of free-ranging black bears to capsaicin spray repellent. Wildl. Soc. Bull. 12(1):59-61. (Cited by 4)
Moen, A. N., and L. L. Rogers. 1985. Radiant surface temperatures and hair depths of a black bear, Ursus americanus. Canadian Field-Naturalist 99(1):47-50. (Cited by 4)
Rogers, L. L. 1985. Aiding the wild survival of orphaned bear cubs. Wildlife Rehabilitation 4:104-111.
Rogers, L. L. 1986. Effects of translocation distance on frequency of returns by black bears. Wildl. Soc. Bull. 14(1):76-80. (Cited by 13)
Rogers, L. L. 1986. Long-term survival of adopted black bear cubs in suboptimal habitat. Wildl. Soc. Bull. 14(1):81-83. (Cited by 1)
Rogers, L. L. 1986. Homing by black bears in Minnesota. Canadian Field-Naturalist 100(3):350-353.
Rogers, L. L. 1987. Navigation by adult black bears. J. Mamm. 68(1):185-188. (Cited by 8)
Rogers, L. L., A. N. Moen, and M. L. Shedd. 1987. Rectal temperatures of 2 free-ranging white-tailed deer fawns. J. Wildl. Manage. 51(1):59-62. (Cited by 8)
Rogers, L. L. 1987. Seasonal changes in defecation rates of free-ranging white-tailed deer. J. Wildl. Manage.51(2):328-331. (Cited by 24)
Rogers, L. L. 1987. Effects of food supply and kinship on social behavior, movements, and population dynamics of black bears in northeastern Minnesota. Wildlife Monograph 97. 72 pp. (Cited by 164)
Rogers, L. L., and S. C. Durst. 1987. Evidence that black bears reduce peripheral blood flow during hibernation. J. Mamm. 68(4):872-875. (Cited by 1)
Rogers, L. L. 1987. Factors influencing dispersal in black bears. Pages 75-84 In: B. D. Chepko-Sade and Z. T. Halpin, eds. Mammalian dispersal patterns: the effects of social structure on population genetics. University of Chicago Press. 342 pp. (Peer reviewed) (Cited by 25)
Chepko-Sade, B. D., W. H. Shields, J. Berger, Z. T. Halpin, W. T. Jones, L. L. Rogers, J. Rood, and A. Smith. 1987. The effects of dispersal and social structure on effective population size. Pages 287-321 In: B. D. Chepko-Sade and Z. T. Halpin, eds. Mammalian dispersal patterns: the effects of social structure on population genetics. University of Chicago Press. 342 pp. (Peer reviewed) (Cited by 31)
Maxwell, R., J. Thorkelson, L. L. Rogers, and Robert B. Brander. 1988. Field energetics of winter-dormant black bear (Ursus americanus) in northeastern Minnesota. Can. J. Zool. 66:2095-2103. (Cited by 14)
Rogers, L. L., and G. W. Wilker. 1990. How to obtain behavioral and ecological information from free-ranging, researcher-habituated black bears. Bear Res. and Manage. 8:321-328.
Rogers, L. L., G. A. Wilker, and S. S. Scott. 1991. Reactions of black bears to human menstrual odors. J. Wildl. Manage. 55(4):632-634. (Cited by 10)
DelGiudice, G. D., L. L. Rogers, A. W. Allen, and U. S. Seal. 1991. Weights and hematology of wild black bears during hibernation. J. Wildl. Dis. 27(4):637-642. (Cited by 10)
Baldridge, A., and L. L. Rogers. 1992. Harbor seal predation on a wolf-eel. Calif. Fish and Game J. 77(4)Fall 1991:210-211.
Hellgren, E. C., L. L. Rogers, and U. S. Seal. 1993. Serum chemistry and hematology of black bears: physiological indices of habitat quality or seasonal patterns? J. Mamm. 74(2):304-315. (Cited by 27)
Rogers, L. L. 1997. Nectar-feeding by Cape May, Tennessee, and Nashville Warblers in Minnesota. The Loon 69(2):55-56.

Brooks, Robert T., Ronald McRoberts, and Lynn L. Rogers. 1998. Predictive relationships between age and size and front foot pad width of northeastern Minnesota black bears, *Ursus americanus*. Canadian Field-Naturalist 112(1):82-85.

McRoberts, R. E., R. T. Brooks, and L. L. Rogers. 1998. Using nonlinear mixed effects models to estimate size-age relationships for black bears. Canadian J. Zool. 76:1098-1106. (Cited by 6)

Rogers, L. L. 1999. Black bear. Pages 157-160 in Don E. Wilson and Sue Ruff, eds. The Smithsonian Book of North American Mammals. Smithsonian Institution Press. Washington, D.C.

Rogers, L. L. 2005. Weight-carrying ability and caching behavior of Gray Jays, Perisoreus canadensis: Adaptations to boreal winter. The Canadian Field-Naturalist 119(1):101-104. (Cited by 1)

Peters, G., Owen, M. & Rogers, L. 2007. Humming in bears: a peculiar sustained mammalian vocalization. Acta Theriologica 52: 379-389.

Government publications

Mech, L. D., and L. L. Rogers. 1977. Status, distribution, and movements of martens in northeastern Minnesota. USDA Forest Service Research Paper NC-143. 7 pp. (Cited by 3)

Rogers, L. L. 1988. How to live in black bear country. U.S. For. Serv., N. Central Forest Exp. Station. HT-66.

Rogers, L. L. 1992. Watchable wildlife: the black bear. USDA, Forest Service, North Central Forest Experiment Station. 15p. (Cited by 3)

Rogers, L. L., and R. McRoberts. 1992. Estimation of shrub leaf biomass available to white-tailed deer. Gen. Tech. Rep. NC-307. 16p.

Conference proceedings, symposium proceedings, and graduate theses

Rogers, L. L. 1970. An analysis of succinylcholine chloride immobilization of black bears. M.S. Thesis. June 12, 1970. 59 pages.

Rogers, L. L. 1975. Black bears of the Lake Superior Region. North Land 3(1):1-6.

Rogers, L. L. 1976. Effects of mast and berry crop failures on survival, growth, and reproductive success of black bears in northeastern Minnesota. Trans. North Amer. Wildl. and Natural Resour. Conf. 41:431-438. (Cited by 111)

Rogers, Lynn Leroy. 1978. Social relationships, movements, and population dynamics of black bears in northeastern Minnesota. Dissertation Abstracts International, Volume XXXIX, Number 1, 1978. 2p. (Cited by 39)

Rogers, L. L. 1979. Interpretation of cementum annuli in first premolars of bear. Proc. 4th Eastern Black Bear Workshop: 102-112. (Cited by 1)

Folk, G. E., P. S. Cooper, L. L. Rogers, C. V. Gisolfi, and V. J. Morinello. 1980. Studies on hibernation-inducing factor. Report No. 22 from the Laboratory of Environmental Physiology, The University of Iowa, Iowa City, Iowa. 30 pp.

Rogers, L. L. 1984. Recent advances in studies of homing mechanisms. Proc. East. Workshop Black Bear Manage. Res.7:75-76. (Cited by 1)

Rogers, L. L. 1984. Homing by black bears and other large mammals. Proc. East. Workshop Black Bear Manage. Res. 7:76-77. (Cited by 1)

Rogers, L. L. 1984. Black bear homing panel summary. Proc. East. Workshop Black Bear Manage. Res. 7:78.

Rogers, L. L. 1988. Homing tendencies of large mammals: a review. Pages 76-92 In: L. Nielsen and R. Brown, eds. Translocation of wild animals. Wisconsin Humane Society, Milwaukee. 335 pp. (Cited by 4)

Rogers, L. L., G. A. Wilker, and A. W. Allen. 1988. Managing northern forests for black bears. Pages 140-146 In: Economic and social development: a role for forests and forestry professionals. Proc. of the Society of American Foresters National Convention. October 18-21, 1987. Minneapolis, Minnesota. Reprinted as L. L. Rogers, G. A. Wilker, and A. W. Allen. 1988. Managing northern forests for black bears. Pages 36-42 In: T. W. Hoekstra and J. Capp, Compilers. Integrating forest management for wildlife and fish. U.S. Forest Service General Technical Report NC-122. (Cited by 2)

Rogers, L. L., and S. S. Scott. 1989. Bear diet and habitat in the Great Lakes Region, 1988 progress report. 15 pages. USDA, Forest Service, progress report to forest supervisors, Lakes States Forests, January 1, 1989.

Rogers, L. L. 1989. Black bears, people, and garbage dumps in Minnesota. Pages 48-51 In: M. Bromley and P. A. Gray, eds. Proc. Symp. Bear-people conflicts. Yellowknife, N.W.T. Canada. (Cited by 6)

Ream, R. R., L. L. Rogers, and J. M. Peek. 1990. Managing natural populations of wildlife in wilderness. Pages 357-362 In D. W. Lime (ed). Managing America's enduring wilderness resource. University of Minnesota Press, Minneapolis. 706pp.

Rogers, L. L., G. A. Wilker, and S. S. Scott. 1990. Managing natural populations of black bears in wilderness. Pages 363-366 In D. W. Lime (ed). Managing America's enduring wilderness resource. University of Minnesota Press, Minneapolis. 706pp.

Rogers, L. L., and E. L. Lindquist. 1991. Black bears and the oak resource in northeastern Minnesota. Pages 107-114 in S. B. Laursen and J. F. DeBoe (eds.), The oak resource in the upper midwest--implications for management. Minnesota Extension Serv. Publ. NR-BU-5663-S, Univ. Minnesota, St. Paul.

Johnson, L. B., G. E. Host, J. K. Jordan, and L. L. Rogers. 1991. Pages 507-517 in Use of GIS for landscape design in natural resource management: habitat assessment and management for the female black bear. Proc. GIS/LIS '91 Conf. Atlanta, Georgia. October 28-November 1, 1991.

Rogers, L. L., and Edward L. Lindquist. 1992. Supercanopy white pine and wildlife. Pages 39-43 in Robert A. Stine and Melvin J. Baughman (eds.) White Pine Symposium Proceedings NR-BU-6044. Symposium held September 16-18, 1992, at the Duluth Entertainment Convention Center. Available from Minnesota Extension Service, Distribution Center, Room 3, Coffey Hall, 1420 Eckles Avenue, University of Minnesota, St Paul, MN 55108-6064 (612) 625-8173 or FAX (612) 625-2207. (Cited by 3)

Rogers, L. L. 1993. The role of habitat quality in the natural regulation of black bear populations. Proc. 4th Western Black Bear Workshop: 95-102. Yosemite National Park, California. Technical Report NPS/NRWR/NRTR-93/12. (Cited by 5)

Mansfield, S. A., and L. L. Rogers. 2005. Effects of supplemental feeding on black bears in northeastern Minnesota. [Poster]. 15th Eastern Black Bear Workshop, Tallahassee, FL. Apr 2005

Mansfield, S. A. 2007. Effects of supplemental food on weights and reproductive success of black bears in northeastern Minnesota. Unpublished master's thesis. Antioch University New England, Keene, New Hampshire. 49pp. plus Appendix.

Abstracts

Maxwell, R., J. Thorkelson, and L. L. Rogers. 1972. The energetics of wintering bears (Ursus americanus) in northeastern Minnesota. Bull. Ecol. Soc. Amer. 53(2):21. (Abstract)

Rogers, L. L. 1972. Movement patterns and social organization of black bears in northeastern Minnesota. Bull. Ecol. Soc. Amer. 53(2)21. (Abstract)

Rogers, L. L. 1975. The use of dental annuli as an index to reproductive success. p. 62 In: Abstracts of technical papers presented at the 55th annual meeting of the American Society of Mammalogists. Univ. Montana, Missoula. 121 pp. (Abstract) (Cited by 2)

Rogers, L. L. 1980. The use of tame, free-ranging deer in studies of food habits. Abstracts of papers presented at the 42nd Midwest Fish and Wildlife Conference, St. Paul, Minnesota. Dec. 7-10, 1980. (Abstract)

Rogers, L. L. 1982. Wolf, deer decline prompts intensive deer study in northeastern Minnesota. Restoration and Management Notes 1(2):22. (Abstract) (Cited by 6)

Wolfe, R. R., R. A. Nelson, T. P. Stein, L. L. Rogers, and M. H. Wolfe. 1982. Urea nitrogen reutilization in hibernating bears. Federation Proceedings 41:1623. (Abstract)

Wolfe, R. R., R. A. Nelson, M. H. Wolfe, and L. L. Rogers. 1982. Nitrogen cycling in hibernating bears. Proc. Amer. Soc. Mass Spectrometry 30:426. (Abstract) (Cited by 5)

Ensrud, E. R., R. A. Nelson, G. Alt, T. Beck, G. Matula, and L. Rogers. 1986. Seasonal variation in the ratio of serum urea to creatinine (U/C) in black bears. The Physiologist 29(4):116 (Abstract).

Rogers, L. L., and G. A. Wilker. 1987. Researcher-conditioned black bears provide detailed habitat use data (abstract). Pages 177-178 in Abstracts of the 49th Midwest Fish and Wildlife Conf. December 5-9, 1987. Milwaukee, Wisconsin. 282 pp. (Abstract)

Rogers, L. L., G. A. Wilker, and V. D. O'Connor. 1989. Continuous observation reveals habitat use, diet, activity patterns, and communication methods of black bears in northeastern Minnesota. Eighth International Conference on Bear Research and Management. Victoria, British Columbia, Canada. February 20-25, 1989. (Abstract)

Rogers, L. L., G. A. Wilker, and S. S. Scott. 1989. What is important to black bears in the Lakes States? Proc. Aspen Symp. '89. July 25-27, 1989. Duluth, Minnesota. (Abstract)

Rogers, L. L., and G. A. Wilker. 1989. Habitat use, diet, activity patterns, and communication methods of wild, researcher-habituated black bears (abstract). Pages 111-112 in Abstracts of the 51st Midwest Fish and Wildlife Conf. December 3-6, 1989. Springfield, Illinois. 264 pp.

Rogers, L. L., P. S. Beringer, R. E. Kennedy, and G. A. Wilker. 1990. Fawn predation by black bears. Page 261 in Abstracts: 52nd Midwest Fish and Wildlife Conf. December 2-5, 1990. Minneapolis, Minnesota. 406 pp. (Abstract)

Rogers, L. L. 1991. The black bear in a changing environment. Page 7 in Views of a changing planet: a strategy for the 1990s. March 9, 1991. Harvard University. Cambridge, Massachusetts. (Abstract)

Host, G. E., L. B. Johnson, J. Jordan, and L. L. Rogers. 1991. Geographic information systems for spatial analysis and landscape design in natural resource management. Page 34 in Abstracts of papers: Emerging issues in northern hardwood management: air pollution, climate change, and biodiversity. May 21-23, 1991. Mackinac Island, Michigan. (Abstract)

Rogers, L. L., P. A. Beringer, D. A. Trauba, and G. A. Wilker. 1992. Black bear predation on fawns. Ninth International Conference on Bear Research and Management. Missoula, Montana. February 24-28, 1992. (Abstract)

Rogers, L. L. 1995. White pine use by female black bears in northeastern Minnesota. In Abstracts of the Tenth International Conference on Bear Research and Management. Fairbanks, Alaska. July 16-20, 1995. (Abstract)

Popular or semi-popular articles and book chapters

Rogers, L. L. 1970. Black bear of Minnesota. Naturalist 21(4):42-47.

Rogers, L. L. 1974. On the trail of a big black bear. National Rifle Association Hunting Annual. 1974:20-21, 167-169.

Rogers, L. L. 1977. The ubiquitous American black bear. pp. 28-33. In: Wm. H. Nesbitt and S. S. Parker (eds.) North American Big Game. Boone and Crockett Club and National Rifle Association of America. Washington, D.C. 367 pp. Reprinted in The Minnesosta Arrow 6(5):28-32, October 1978.

Rogers, L. L. 1979. Shorter bear season needed to prevent overkill. The Minnesota Arrow 7(2):37-39. April 1979.

Kramer, G., and L. L. Rogers. 1980. Bear-ly visible. National Geographic World Magazine No. 64 (December 1980):4-9.

Buech, R. R., L. L. Rogers, and L. D. Mech. 1980. People and wildlife--bringing them together. Naturalist 31(4):12-20.

Rogers, L. L. 1981. Walking with deer. pp. 29-34. In: W. H. Nesbitt and P. L. Wright (eds.). Records of North American Big Game. Boone and Crockett Club, Publisher. Alexandria, VA.

Rogers, L. L. 1981. A bear in its lair. Natural History 90(10):64-70. Translated and reprinted as: L. L. Rogers. 1981. Die Gefahr Vershlafen (Sleeping through hard times). Weltwoche 9(52):34. Also translated and reprinted as: L. L. Rogers. 1984. Sieben monate auf der Barenhaut (Seven months of laziness). Das Tier 1/84:4-9. (Cited by 11)

Rogers, L. L. 1986. Habits of black bears in Minnesota. Minnesota Forests 1986 (Fall):8-9.

Rogers, L. L., and A. Taylor. 1986. Why black bears are masters of winter survival. (Woods Wise column published in Minnesota Out of Doors, Woodland Management, Minnesota Forests, National Woodlands, Illinois Wildlife, Pennsylvania Forests, Missouri Wildlife, Michigan Out of Doors, Hoosier Conservation, Forestry Forum, and Northbound Magazine)

Rogers, L. L. 1987. Portrait of a black bear. Encounters 10(2):10-13.

Rogers, L. L. 1987. Habits of black bears: Bears and people in the Superior National Forest. Boundary Waters Journal 1(1):44-47.

Rogers, L. L. 1987. Spring beckons mother and cubs from birth den. Minnesota Volunteer 50(291):32-35.

Rogers, L. L. 1987. Boundary waters bears. BWCA Wilderness News (Spring-Summer):10-11.

Rogers, L. L., and D. L. Garshelis. 1988. The BWCA bear attacks of 1987. Boundary Waters Journal 2(1):48-50, 56.

Rogers, L. L., D. L. Garshelis, and John R. Chell. 1988. Hunt for the rogue bear. Minnesota Volunteer 51(299):57-62.

Rogers, L. L. 1989. Foster families found for deserted cubs. The Minnesota Volunteer 52(July-August)(305):26-31. Reprinted in: L. L. Rogers. 1991. Foster families found for deserted cubs. Pages 98-102 In John Henricksson (ed.) North Writers: A Strong Woods Collection. University of Minnesota Press, Minneapolis. 292p.

Rogers, L. L. 1989. Home, sweet-smelling home. Natural History 9/89:60-67,96.

Rogers, L. L. 1989. A year in the life of a black bear in northern Minnesota. Page 1 In 1990 Minnesota Weatherguide Calendar. Publ. by Science Museum of Minnesota, Freshwater Foundation, and WCCO Weather Center. Mpls., Minn.
Rogers, L. L. 1990. Black bears are known to roam--but their den is always home. Outdoor News 23(31):7. August 3, 1990.
Rogers, L. L. 1990. Bear fact: black bear not as harmful as it looks or acts. Outdoor News 23(31):8. August 3, 1990.
Rogers, L. L. 1990. Preface. Pages 6-7 in Jeff Fair (author). The Great American Bear. NorthWord Press, Inc. Minocqua, Wisconsin. 192pp.
Rogers, L. L. 1991. Are white pines too valuable to cut? The Minnesota Volunteer: Department of Natural Resources. Sept-Oct. 1991:8-21.
Rogers, L. L. 1991. Bears and other carnivores. Pages 184-193 in R. Robin Baker, ed. Fantastic journeys: the marvels of animal migration. Weldon Owen Publishing, Sidney, Australia.
Yarmark, D., and L. L. Rogers. 1991. The three bears of Kawishiwi River: researcher learns lots about Minnesota black bears, GBF helps. Bear News vol 9(1)Spring 1991. Great Bear Foundation.
Rogers, L. L. 1993. Bear navigation. Page 78 In Ian Stirling, ed. Bears: majestic creatures of the wild. Rodale Press. Emmaus, Pennsylvania.
Rogers, L. L. 1993. Studying habituated black bears. Pages 210-211 In Ian Stirling, ed. Bears: majestic creatures of the wild. Rodale Press. Emmaus, Pennsylvania.
Rogers, L. L. 1994. The waning Minnesota white pine. Inner Voice 6(2):15 (March/April 1994).
Rogers, L. L. 1995. The black and white of it: black bears and their white pines. Bears Magazine, Fall 1995:9-11, 44.
Rogers, L. L. 1996. How dangerous are black bears? Can we coexist with them? Take Action 5(1):5. Reprinted in The North Bearing News (North American Bear Center Publication) 1(1):1-2. December 1996. Reprinted in The Botany Bulletin (North Carolina), December 2000.
Rogers, Lynn. 1997. The orphaned cubs: a true story. Pages 85-89 *in* The end of the road reader (Karin Hokkanen and Anne Stewart, eds). Published by Northwoods Writers Guild, PO Box 749, Ely, MN 55731-0749. Printed by Echo Press, Alexandria, MN.
Rogers, L. L. 1999. Spring and the mating season. North American Bear Center Newsletter 3(2), Spring, 1999:1-2.
Rogers, Lynn. 1999. Black bear fun facts. Lake Country Journal 3(4)July/August 1999:cover, 8-9.
Rogers, L. L. 1999. The summer of the bear attacks: What's behind the Wisconsin bears in the news? North American Bear Center Newsletter 3(3), Summer, 1999:1-2. Reprinted in Northland Reader 3(57), September 16, 1999: 14.
Rogers, L. L. 1999. Bear center conducts hibernation study. North American Bear Center Newsletter 3(4):1-3.
Rogers, L. L. 2000. Bear family group. Fish & Game Finder, vol 23, no. 7, November 2000, pages 9-13. (Slightly edited version of a letter Rogers wrote to Ainslie Willock of the Animal Alliance of Canada on March 18, 1998).
Fair, J., and L. Rogers. 2006. Bears for kids, 2nd edition. Wildlife Research Institute. Ely, Minnesota. 48 pages.

Behavior, wild diets and weight gains of supplementally-fed black bears in northeastern Minnesota

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Introduction

People are increasingly moving into black bear (*Ursus americanus*) habitat, seeing more bears, and often feeding them intentionally or unintentionally. There are many untested beliefs about the effects this supplemental feeding has on bear behavior, food preferences, natural foraging activities, relations with humans, and longevity. This study compares bears receiving supplemental food with those in a nearby study area where bears were not supplementally fed (Rogers 1987; Rogers, unpublished data).

This ongoing study explores effects of supplemental feeding on:

- Territoriality and social organization
- Wild foraging patterns
- Preference for natural versus human foods
- Seasonal changes in use of supplemental foods
- Weight gain
- Habituation and reactions to people
- Mortality

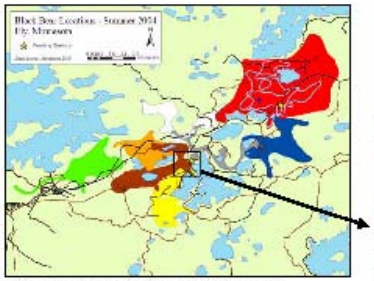

Fig. 2. Summer 2004 territories of 10 female black bears.

Fig. 2a. Individual bedding sites maintained near feeding stations.

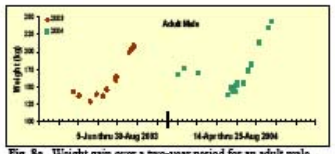

Fig. 8a. Weight gain over a two-year period for an adult male black bear.

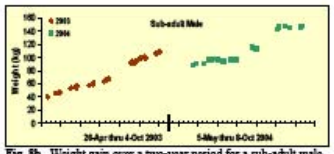

Fig. 8b. Weight gain over a two-year period for a sub-adult male black bear.

Methods

Study Area

- A rural community of over 300 households within a 200 km² area where approximately 3% of those households regularly feed bears (Fig. 1)

Study Population

- 18 related bears up to 14 years old plus 12 unrelated bears

Territories

- Ten radio-collared primary study bears located 597 times between 28 May and 1 September 2004
- Territories estimated by 100% minimum convex polygons, 95% kernel density, and by using behavioral data in addition to locations as in Rogers (1987)

Diet

- Diet determined by scat analysis and 41 hours observing foraging behavior
- Scat markers fed to observed bears to determine passage rates and obtain scats of known composition to assess biases in scat analysis

Activity Patterns

- Activity patterns recorded by remote telemetry and by recording activities of closely observed bears using a hand-held computer and CyberTracker software

Weights

- 411 weights recorded from 22 bears that entered a baited 900-lb capacity Toledo Platform Scale Model 2181 (Fig. 3)

Fig. 1. Yearling black bear checking out backyard bear feeder.

Table 1. Territory calculations for 10 female black bears during the summer of 2004 in northeastern Minnesota (km²)

Status	*N*	100% Min Convex Hull	95% Kernel Density	Subjective	Rogers 1987
Adult	8	26.3 ± 4.7 SE	28.8 ± 6.8 SE	8.0 ± 2.6 SE	9.6 ± 0.5 SE
Yearling	2	10.2 ± 1.5 SE	9.3 ± 0.6 SE	6.1 ± 0.6 SE	6.7 ± 0.6 SE

Fig. 3. Young black bear weighing in on the platform scale at field station.

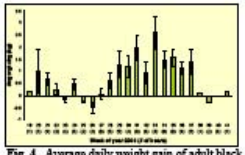

Fig. 4. Average daily weight gain of adult black bears.

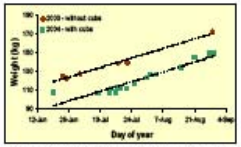

Fig. 5a. Summer weight gains of 7-year-old (2004) female black bear in consecutive years.

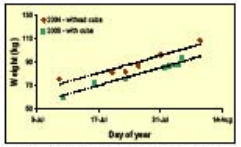

Fig. 5b. Summer weight gains of 4-year-old (2004) female black bear in consecutive years.

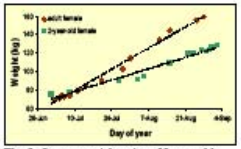

Fig. 6. Summer weight gains of 2-year-old sub-adult and adult female black bears.

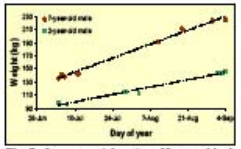

Fig. 7. Summer weight gains of 2-year-old sub-adult and 7-year-old adult male black bears.

Results

Behavior

- Adult females defended individual territories (Fig. 2)
- Yearlings ranges were primarily within their mother's territory (Fig. 2)
- Territory sizes (Table 1) not significantly different from Rogers (1987)
- Adults maintained discrete bedding areas near feeding stations (Fig. 2a)

Wild Diets

- Closely-observed bears spent 81% of their active time foraging for wild foods despite the availability of human food sources nearby

Use of Supplemental Foods

- Use of supplemental foods increased as wild food became scarce in late summer.
- Supplementally-fed bears did not became nuisances at homes not actively feeding bears

Weight Gain

- Weight gains of adult bears began to increase the first week of July and tapered off significantly the second week of September 2004 (Fig. 4)
- Females gained at the same rate (P=0.876 and P=0.974) in years with cubs as years without but mean weights were 21.0 and 7.5 kg more without cubs (Fig. 5a, 5b)
- Rate of weight gain by two breeding-age females of differing ages was significantly different (P<.0001) (Fig. 6)
- Rate of weight gain by an adult and sub-adult male differed significantly (P<.0001) (Fig. 7)
- Adult males lost up to 37.6 kg during the mating season (Fig. 8a) while sub-adult males continued to gain (Fig. 8b)

Contact Information

Susan A. Mansfield (603) 358-6234 sus.mansfield@verizon.net
Lynn L. Rogers (218) 365-4480 lrogers@bearstudy.org

Discussion

Several homeowners within the study area have been feeding black bears for over 25 years. While we do not recommend feeding bears, our studies indicate many beliefs about the negative consequences of feeding bears are unfounded.

While some bears seemed 'tame' at feeding stations, they did not approach people in other parts of their ranges. In the 16 years Minnesota DNR has kept records of nuisance bear activity, no complaints have been registered from the study area. In years of scarce natural food, the feeding stations may have functioned as buffers against nuisance activity.

At several feeding stations, unlimited supplemental foods were made available to bears throughout their active seasons. Nevertheless, bears gained little weight during May and June and adult males lost weight during this time. Rapid weight gains began in July as mating season ended and wild berries began to ripen.

Study bears established territories along matriarchal lines with yearlings occupying ranges within their mothers' territories as described in an earlier study of non-fed bears (Rogers 1987). Adult females crossed their mothers' territories to reach feeding stations and maintained discrete bedding areas near the stations.

Feeding on supplemental foods increased as wild foods became scarce. Bears appeared to use supplemental foods as they would a concentrated wild food source such as a beech, oak or hazelnut stand. Supplemental feeding did not prevent bears from hibernating. During September and October, all bears abandoned abundant supplemental food and settled down for the winter.

Literature Cited

Rogers, L. L., 1987. Effects of food supply and kinship on social behavior, movements, and population dynamics of black bears in northeastern Minnesota. Wildlife Monograph 97: 72 pp.

Acknowledgements

Many thanks to the friends of the Wildlife Research Institute for their assistance with the ongoing research. Thanks to my advisor, Jon Atwood, for his sage advice and patient guidance. Thank you to Susannah Lerman for her steadfast friendship and encouragement. Thank you to Barb Heffner for providing the picture of the bear on the scale. A special thanks to my husband, Al Hoops, for his enthusiastic support of my endeavors and his enduring patience with my studies.

Affidavit of Darnell Stage

1. In 1987, my wife Bonnie and I moved to Eagles Nest Township, 1476 Klondike Road, Ely, MN, 55731 partly to see wildlife.
2. We have enjoyed seeing bears in Eagles Nest Township as long as we have lived there.
3. We have seen fewer bears in our yard since 1996 when Lynn Rogers moved in as our neighbor and began feeding bears. We saw up to 8 bears/year in our yard before 1996 and up to 4 bears/year since 1996. In some years since Lynn Rogers began feeding bears we have seen no bears in our yard.
4. We did not complain to the DNR about bears. Darnell stopped in at the DNR office in Tower, MN, to discuss a beaver dam. Wildlife Manager Tom Rusch asked about bears. We understand Mr. Rusch filed a false bear complaint dated December 12, 2005 in our name without our knowledge.
5. We understand the complaint states that the complainant said he, "sees bears often, cannot feed the birds, puts up w/L. Rogers bear traffic to be neighborly," and there is "not much he can do." These are not my statements.
6. I disapprove of the DNR filing a false bear complaint in my name without my knowledge.
7. We feed hummingbirds in summer and have had no trouble with bears. We know better than to provide birdseed in summer no matter where we live in bear habitat. We would not complain that we "cannot feed birds."
8. We store garbage in our garage. We have never had a bear break in to get it, but a bear once scattered the garbage when we left the door open. We consider that our fault and would not complain about it.
9. Lynn Rogers is a good neighbor and his research is not a problem to us.
10. We feel that people should not complain about bears if they choose to live among them, feed birds, and be careless with garbage. We did not make any complaint about bears or Lynn Rogers.
11. Please provide us with an explanation of how such a complaint was filed in our name without our knowledge.

Signature Darnell Stage

Witness Bonnie Stage

Date 3-20-08

Letters from
Black Bear Field Study Course
Attendees

WISCONSIN
DEPT. OF NATURAL RESOURCES

State of Wisconsin \ DEPARTMENT OF NATURAL RESOURCES

Jim Doyle, Governor
Scott Hassett, Secretary
John Gozdzialski, Regional Director

Hayward DNR Service Center
10220N State Highway 27
Hayward , Wisconsin 54843
Telephone 715-634-9658
FAX 715-634-9232
TTY 715-123-4567

August 14, 2007

Lynn Rogers & Sue Mansfield
Wildlife Research Institute
1482 Trygg Road
Ely, MN 55731

Greetings Lynn and Sue,

Hope this finds you well and enjoying this very busy season for bears and bear researchers in the North Country. I wanted to drop a line and say "Thank you!" for the excellent Black Bear Field Study Course that you recently put on for the small group of staff from resource agencies working in the state of Wisconsin.

I personally found that the information you presented greatly increased my knowledge and understanding of black bear biology and behavior even after working with management of this species for more than 20 years. The experience of interacting with and observing wild black bears both at the research station and in the "woods" during the course of study helped broaden my perspective and increase my appreciation of this often misunderstood forest dweller. Also of great value were the impromptu discussions that we had covering a wide variety of issues surrounding black bear and human interaction. Those conversations and the knowledge that the two of you shared were extremely valuable for me, providing insights that I will put to use in policy and management decisions as well as public educational opportunities regarding bears in my state.

So here's wishing you both all the best of luck in the future with everything you do. I look forward to hearing more about your findings in the black bear research arena and continuation of all the good things that you have started for bears and people alike.

Keep the Faith!!

Ken Jonas

Ken Jonas
Area Wildlife Supervisor
Hayward, Wisconsin

USDA

United States Department of Agriculture

Animal and Plant Health Inspection Service

Wildlife Services
P O Box 1064
Rhinelander, WI 54501
715-369-5221
Fax-715-369-1257

November 5, 2007

DR. Lynn Rogers
Susan Mansfield,WRI Researcher
Wildlife Research Institute
Ely, MN 55731

I wanted to thank you again for the hospitality and time shared at the field research station in Ely, MN. I felt very comfortable there. Todd Hoffman and his wife did a great job with getting us there and arranging meals etc.

The bears of course were the stars, I really enjoyed being with them, and watching all their interactions, behaviors and personalities. I particularly liked getting out in the field and locating "Braveheart" and her cubs with telemetry. It was very educational for me.

Lynn's lectures were very informative, (I liked the casual atmosphere) and I thank you both for taking the time to answer my questions.

The North American Bear Center itself was fantastic, very educational, and just a wonderful place for anyone to visit. Sue's videos were terrific, and there was a great variety of information and publications available. Your web site is also terrific.

This is a great outreach program and was a great experience for me. I would recommend that anyone seeking additional knowledge regarding bears visit you. However, I hope that the general public while visiting keeps a healthy respect for bears in mind, and that these individuals won't return home to feed or attract bears for their own observation.

Thank you again for this opportunity and sharing your knowledge.

Sincerely,

Anita Nelson
Wildlife Services Specialist

United States Department of the Interior

NATIONAL PARK SERVICE
St. Croix National Scenic Riverway
401 Hamilton Street
St. Croix Falls, Wisconsin 54024-0708

IN REPLY REFER TO:

September 6, 2007

A34(SACN)

Dr. Lynn Rogers
Mrs. Susan Mansfield
Wildlife Research Institute
145 West Conan Street
Ely, Minnesota 55731

Dear Dr. Rogers and Mrs. Mansfield:

I apologize it has taken me so long to properly thank both of you for letting me participate in the excellent black bear course held July 31 to August 2, at the Wildlife Research Institute. As the Namekagon District Interpretive Park Ranger for the Saint Croix National Scenic Riverway, I am constantly confronted with questions about bears. The answers I gave people before taking your course were based only on what I read and heard, but not on direct experience with bears or interactions with experts. Spending time with both of you and your study bears gave me a much deeper, more nuanced understanding of this species. Most importantly, your course provided me with the tools to be a much more effective interpreter for the hundreds of Park visitors who come to me seeking black bear information.

I deeply appreciate your hospitality during my stay at the Wildlife Research Institute. I cannot thank both of you enough for exposing me to the bear research, and of course most importantly, thank you so much for giving me the rare opportunity to see wild black bears up close.

I wish you both the best. If there is anything I can do for either of you please do not hesitate to ask.

Sincerely,

Branda Thwaits
Namekagon District Interpreter

Comments on the Black Bear Field Study Course
Wildlife Research Institute, Ely , Minnesota
May, 2006

In May of 2006, I was fortunate enough to be able to attend the black bear field study course at the Wildlife Research Institute in Ely, Minnesota. I was sent on the course by my employer, the Nova Scotia Department of Natural Resources, and was accompanied by one of our regional biologists, Kim George. I have worked as a Wildlife Technician with the Department for over 30 years, and have been involved with black bear issues since 1986. During the last five years, the black bear population has increased in Nova Scotia, as evidenced by an increase in bear complaints, bear sightings, and the number of bears killed by hunters or other causes. A large part of my job during the summer and fall is spent dealing with the public about black bears on their properties. When it comes to bears, education is the key and I believe the more the public learn about this fascinating, woods creature, the less they may fear the animal. Although I have handled many bears over the years in the course of my job, the bears were either in traps, tranquilized or had died for various reasons. I had also spent time observing bears in tree stands, as I have always had a great attraction for this species. Attending the bear course put on by Dr. Lynn Rogers, Donna Phalen and Sue Mansfield gave me an opportunity to spend time with black bears while they were in their natural habitat. This intimate contact with bears was an extremely rewarding experience. I was also able to observe many different size bears as they came to the bait stations at the research institute. Both Dr. Rogers and Ms. Mansfield were extremely knowledgeable about bears and were able to provide detailed information on bear ecology and bear signs. This was in addition to all the information they shared about the individual bears we spent time with while taking the course. I would highly recommend this course to any person who has a natural interest in black bears or deals with black bears in their work environment. Kim George and I learned a great deal about black bears while taking this course and found it a thrilling experience to be able to get so close and personal with these wonderful animals.

Jenny Costelo, Wildlife Technician
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19 February 2008

Lynn Rogers
Wildlife Research Institute
1482 Trygg Road
Ely, MN 55731

Dear Lynn,

I want to formally thank you and Sue for sharing your time with my winter ecology course on 17 and 18 January. My students (and me too) continue to rave about the experience. Having the opportunity to spend so much quality time with the world's two greatest experts on black bear ecology was a wonderful and rare experience.

Your scientific research program, methodologies and findings are important and compelling. I believe that perhaps the best indication of the value of our time with you two is the ongoing interest my students continue to show in your work and the possibility of summer research internships under your direction. I look forward to discussing the options.

I was particularly impressed with the work you two have done in designing the new North American Bear Center, your phenomenal body of research, and the clarity with which you were able to share what you've learned with our group. Having just come from two days at the International Wolf Center it struck me that the Bear Center has done a much better job of immersing visitors in the latest scientific research. Both the quality and quantity of primary research materials you present your visitors greatly overwhelm that available at the Wolf Center.

I'm also extremely grateful for the effort you put into your formal lecture to us as well as our informal conversations and the extended time we spent together out in the field. Having my students get the opportunity to hear you summarize your lifetime body of scientific research, ask you questions while sharing meals, and accompany you to an active bear den were incredibly valuable educational experiences.

I'm so impressed with the scientific and public outreach work you and Sue do and the passion with which you two pour your hearts into it.

Keep up the great work!

Sincerely,

Jerald Dosch, Ph.D.
V. Asst. Prof.

Mansfield 2007
Antioch University New England
Master's Thesis