

We verify that ear-tags are not overlooked or incorrectly recorded at check stations by sending a letter to all successful hunters after the hunting season. The letter informs the hunter of his or her bear's age and asks if a capture history report was received for bears that were tagged. Failing to receive a capture report at the check station or in the mail with their age letter indicates that tags were not recorded correctly.

Mark-recapture population estimates do have some limitations. The two most problematic ones for Pennsylvania are (1) marking enough bears annually so that estimates are precise and accurate; and (2) assuming that bears that are marked have an equal chance of being recaptured in the harvest. We are studying statistical variations of the mark-recapture method we use to hopefully address these problems (see *Current Research* section for more details). Thus, we may switch to another method of calculating population size in the future and the values reported here could change, but the trend should remain similar.

Annual population estimates were increasing an average of 394 bears per year between 1983 and 2000, but estimates in the last six years (2000–2005) have been relatively stable (Figure 11). In 2005, Pennsylvania's black bear population was estimated to be 15,713 animals (95 percent confidence interval was 13,404–18,575).

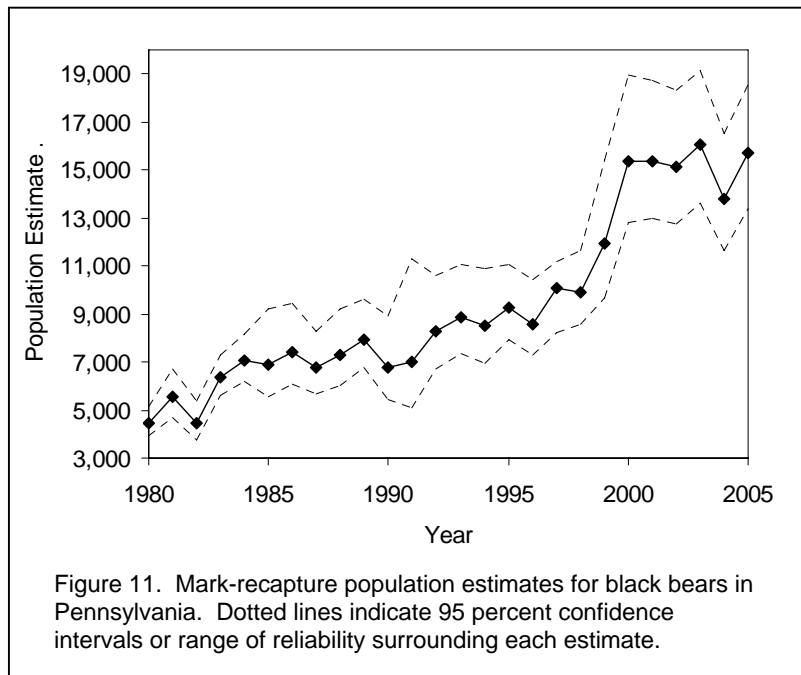


Figure 11. Mark-recapture population estimates for black bears in Pennsylvania. Dotted lines indicate 95 percent confidence intervals or range of reliability surrounding each estimate.

Current Harvest Statistics

Pennsylvania's statewide bear season is currently managed to harvest 20 percent of the bear population annually (i.e., 20 percent harvest rate). Harvest rate is calculated as the proportion of tagged bears harvested and has averaged 20.3 percent since 1986 with very little variation (95 percent confidence interval = 18.9 percent to 21.8 percent; Table 2). The 20 percent harvest objective was initially adopted to stabilize the bear population at 10,000 animals, but current population estimates now exceed that level.

A general hunting license (resident \$20.00; nonresident \$101.00) and bear license (resident \$16.00; nonresident \$36.00) are required to hunt bear. In 2005, a record 140,151 bear licenses were sold, although license sales have been increasing steadily since about 1994 (Table 2). Nonresidents typically comprise 3-4% of bear license sales.

About 3 percent, or 1 in 35 hunters, are successful at harvesting a bear, which is an increase from 1.7 percent (1 in 60 hunters) during the late 1980s (Table 2). Better success is most likely the result of increased bear abundance, but weather and food conditions greatly influence year-to-year variations. Harvests also have been steadily increasing over the past 20 years (Figure 7). The seven largest harvests on record have occurred in the last eight years, and annual harvests now average more than 3,000 bears (Table 2).

Equal numbers of males and females are typically harvested. However, males predominate in younger age classes (1 to 3 years old), while females increasingly outnumber males in older age classes. The average age of harvested bears is 2.2 years. Average live-weights of harvested bears are 82 pounds for cubs; 203 pounds for 1 to 3 year-old males; 160 pounds for 1 to 3 year-old females; 441 pounds for adult males; and 217 pounds for adult females. Large bears (i.e., more than 400 pounds) are harvested from a wide geographic area. In 2005, 41 of 52 counties harvested at least one bear with a live weight over 400 pounds, and there were 61 bears from 27 counties that had estimated live weights greater than 500 pounds (PGC unpublished data).

Current Research

Annual Statewide Bear Tagging Effort

Ear-tag data are the foundation of our population estimates and harvest rate calculations (see discussion above). Bears also are tagged annually to monitor age structure, growth and development, reproduction, survival, dispersal, and distribution characteristics, as well as documenting histories for bears involved in nuisance situations. The annual statewide tagging effort is expected to continue.

Improving Population Estimates

As the bear population increases, a larger number of bears should be tagged each year to maintain reasonably accurate population estimates, but time and personnel resources are finite. Therefore, together with the Pennsylvania State University Cooperative Fish and Wildlife Research Unit, we are researching statistical variations of the Lincoln-Petersen mark-recapture estimator for alternative analyses. An important assumption when using mark-recapture data is that bears fitted with ear tags remain available for harvest (recapture) after they are marked. However, we have evidence that this assumption may be violated because some bears begin hibernation before hunting season, making them underrepresented in the harvest. The severity of underrepresentation varies from year to year based on changing food conditions, with more bears choosing to den early in poorer food years. By studying the timing of denning under different food conditions, we hope to better account for this variation and subsequently improve population estimates without tagging larger samples of bears.

Characteristics of Reproduction and Survival in the Northcentral Bear Range

Most of the information we presently have on black bear reproduction in Pennsylvania came from studies conducted in the northeast region of the state. There are noticeable differences in habitat, land uses, and human demographics between this region and the northcentral bear range that may influence parameters such as litter size, breeding age, growth and development, and survival. We are presently monitoring a sample of adult female bears fitted with radio-collars in northcentral Pennsylvania to determine if there are significant differences from values currently believed to be representative of bears statewide.

Orphan Cub Reintroductions

We currently maintain radio-collars on 10 to 20 adult female bears to use as surrogate mothers for orphaned cubs. Depending on the time of year and condition of the cub, orphans can be successfully added to a foster litter. Other alternatives are to temporarily hold cubs in captivity until they are believed to be self-sufficient and then release them without a mother, euthanasia, or permanent captivity (e.g., at a zoo or research facility).

SECTION III. RECREATION, ECONOMIC SIGNIFICANCE, AND PUBLIC INTEREST

Hunting

Black bear hunting for recreation, food, or clothing has a long tradition in North America. Currently, black bears are classified as a game species in 34 states, although four have no open hunting season (Alabama, Nebraska, Nevada, and Oklahoma; Scheick 2002) and two have only recently opened a season (Maryland and New Jersey). Nineteen states require a special license (bear or big game) in addition to a general hunting license to hunt bear, thus a minimum estimate of bear hunters is now close to 500,000 people (Pelton et al. 1999).

Twelve to thirteen percent of Pennsylvania's hunters purchase a bear license and the number is steadily increasing; a record 140,151 hunters purchased a bear licenses in 2005 (Table 2). Game Take Survey results from 2002 and 2003 indicate that Pennsylvania hunters spend about 220,000 man-days a year hunting bear (one person for one day = one man-day). Pennsylvania black bear hunters are predominately male and have an average age of 40.

Hunters come from all over North America to participate in Pennsylvania's bear season. Since 1980, hunters from 40 states and several Canadian provinces have traveled to Pennsylvania and been successful at harvesting a bear (i.e., were interviewed at a check station). About 2,500 nonresident bear licenses are sold annually, which represents 4 percent of the hunters who come to Pennsylvania, however, a record 5,260 nonresidents purchased a bear licenses in 2005.

The Game Commission regularly receives requests to expand bear hunting opportunities. Expanding bear hunting opportunities was a common theme to many of the comments

collected during public review of this document (see Appendix 9 for a comment analysis), and archery enthusiasts have been routinely asking about adding an archery bear season for several years.

Although archery equipment is permitted in the current bear season, there has not been an archery-only season similar to what exists for white-tailed deer hunting. However, because of the apparent interest, a 2-day season will be offered for the first time in 2006.

Nearly 290,000 people purchase archery deer licenses in Pennsylvania and an additional 50,000 receive archery privileges by purchasing a combination license. Recent surveys indicate that 41 percent of archery license purchasers support the idea of an archery bear season but only 19 to 23 percent currently hunt bear. Thus, recreational interest in black bear hunting is probably much greater than currently indicated by bear license sales.

Table 2. Statewide black bear harvest statistics. Hunting season occurred during Monday–Wednesday the week of Thanksgiving each year except 2002 and 2003, when bear season was extended for 6 days the week after Thanksgiving in portions of northeast Pennsylvania.

| Year | Harvest | No. of Counties harvesting bear | Harvest rate ^a | No. of bear licenses sold | No. of hunters that hunted ^b | Hunter success ^c (%) |
|------|---------|---------------------------------|---------------------------|---------------------------|-----------------------------------------|---------------------------------|
| 1986 | 1,362 | 37 | 18.1 | 94,700 | not calculated | 1.4 |
| 1987 | 1,560 | 39 | 22.8 | 92,051 | not calculated | 1.7 |
| 1988 | 1,614 | 39 | 21.9 | 91,604 | not calculated | 1.8 |
| 1989 | 2,220 | 40 | 27.7 | 92,468 | not calculated | 2.4 |
| 1990 | 1,200 | 40 | 17.4 | 93,348 | 83,396 | 1.4 |
| 1991 | 1,687 | 40 | 22.7 | 89,452 | 84,404 | 2.0 |
| 1992 | 1,589 | 42 | 18.9 | 91,165 | 82,118 | 1.9 |
| 1993 | 1,760 | 44 | 19.9 | 89,623 | 81,436 | 2.2 |
| 1994 | 1,365 | 44 | 15.8 | 89,408 | 88,772 | 1.5 |
| 1995 | 2,190 | 49 | 23.5 | 90,091 | 82,919 | 2.6 |
| 1996 | 1,796 | 48 | 20.7 | 93,893 | 86,322 | 2.1 |
| 1997 | 2,110 | 50 | 20.8 | 116,946 | 98,277 | 2.1 |
| 1998 | 2,598 | 49 | 26.1 | 114,767 | 100,034 | 2.6 |
| 1999 | 1,741 | 47 | 14.4 | 101,908 | 89,122 | 2.0 |
| 2000 | 3,075 | 50 | 19.8 | 104,279 | 88,301 | 3.5 |
| 2001 | 3,063 | 50 | 20.8 | 109,250 | 85,855 | 3.6 |
| 2002 | 2,686 | 49 | 18.8 | 122,046 | 97,338 | 2.8 |
| 2003 | 3,000 | 52 | 17.6 | 123,911 | 89,496 | 3.4 |
| 2004 | 2,972 | 52 | 18.1 | 132,181 | no survey done | 2.2 |
| 2005 | 4,164 | 52 | 21.0 | 140,151 | not available yet | 3.0 |

^a Proportion of ear tagged bears harvested. Assumed to measure proportion of total population harvested. Only harvest data from the traditional 3-day statewide season are used.

^b Derived from annual Game-Take Survey, which occurred each year except in 2004.

^c Percent of hunters who hunted and killed a bear; if participation data are missing, percent of hunters that bought a license and killed a bear.

Non-Hunting Use

Interest in and admiration for bears has been a part of human culture for centuries. In North America, bears are a central figure in the spiritual beliefs of indigenous people (Rockwell 1991); they are common in folklore, children stories, appear on state flags (California), and

as icons for countries (e.g., Russia). To some, the bear is a symbol of wilderness or indicator of ecosystem health, and wildlife photographers and viewers prize them. Thus, many people value healthy bear populations for reasons other than hunting. The most significant non-hunting use for bears in Pennsylvania is wildlife watching, which may include incidental observations or specifically seeking out bears for viewing and photography.

Nearly 95 percent of Americans claim to be involved in some sort of outdoor recreation (Paige 2000). On a national survey, recreationists cited natural landscapes and seeing wild animals as important components of an outdoor activity (Duda and Young 1994). Sixty-three million Americans participate in wildlife viewing (Cordell et al. 1995). In Virginia, black bears were rated second only to eagles and hawks as the animal people were most interested in seeing (Virginia Dept. Game and Inland Fisheries 2003). It is not uncommon for people who have seen a bear in a natural setting to remember the circumstances for years and place a high value on the experience.

In 2001, 3.8 million people 16 years old and older fed, observed, or photographed wildlife in Pennsylvania (U.S. Fish and Wildlife Service 2003). Bears were likely one of the main interests because 23 percent (860,000 people) reported traveling more than a mile from home to specifically observe large land mammals, which bears are, and 26 percent indicated that the trip destination was woodland habitats, which is where bears live. An even greater number (1.2 million people or 32 percent) claim to have viewed large land mammals without leaving home.

Among the people who report watching wildlife in Pennsylvania, 59 percent are between the ages of 35 and 64, and 22 percent are 65 or older. Fifty-one percent are male; 55 percent live in urban areas, and 17 percent hunt (U.S. Fish and Wildlife Service 2003).

Economic Significance

Both hunting and non-hunting activities provide economic benefit. Roughly 13 million Americans, 16 years old or older, hunted in the United States during 2002. Collectively they spent more than \$20 billion annually on licenses, equipment, lodging, and travel expenses (U.S. Fish and Wildlife Service 2003). Pennsylvania hunters spent \$2.1 million in 2004 and 2.3 million in 2005 to purchase bear hunting licenses (Pennsylvania Game Commission 2005). People who hunt big game in Pennsylvania (bear, deer, elk, or turkey) also spend \$82 million on food and lodging, \$57 million on transportation, and \$340 million on equipment according to a 2002 survey (U.S. Fish and Wildlife Service 2003).

Nationwide, 66 million people enjoy watching wildlife. In 2001, wildlife-watchers throughout the U.S. spent \$33 billion on equipment and travel. In Pennsylvania, they spent \$901 million, which included \$59 million for transportation, \$101 million for food and lodging, and \$729 million on equipment (U.S. Fish and Wildlife Service 2003).

Unfortunately, black bears also can cause economic hardships. Documented bear-vehicle collisions have been steadily increasing over the past two decades and now average 350 per year (Fig. 6, page 9) plus an unknown number that are not reported. In 2003, wildlife

conservation officers examined a record 444 vehicle-killed bears. Colliding with a bear can be costly. The average vehicle repair bill for a deer collision is about \$1,500 (Conover et al. 1995), and adult bears are twice the size of adult deer in Pennsylvania. Bears also damage agricultural commodities, although the full cost is not known. In 2004, the Game Commission paid \$6,666.02 to people reporting damage caused by bears. However, only certain losses to livestock and beehives can qualify for compensation; the cost of crop damage, which is much more common, is not included.

Public Interest

Nuisance Bear Conflicts

Nuisance bear conflicts have economic and public safety consequences. They also impact accomplishments in other wildlife programs by consuming personnel resources, and they may decrease how people value all bears. The Game Commission attempts to reduce conflicts by removing (translocating or euthanizing) problem bears, hazing or aversively conditioning bears from nuisance areas, asking people to remove food attractants, and regulating the abundance of bears by adjusting hunting regulations.

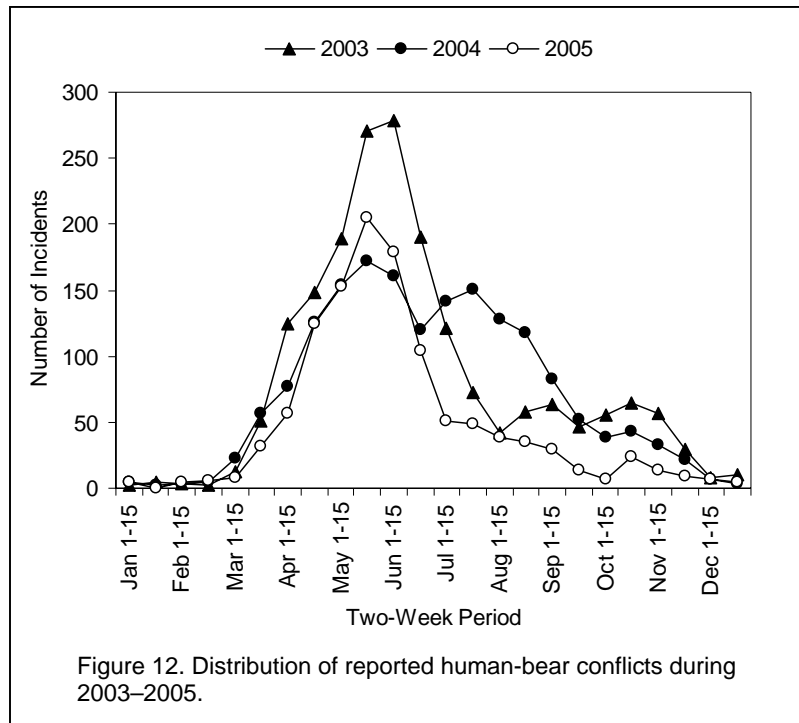


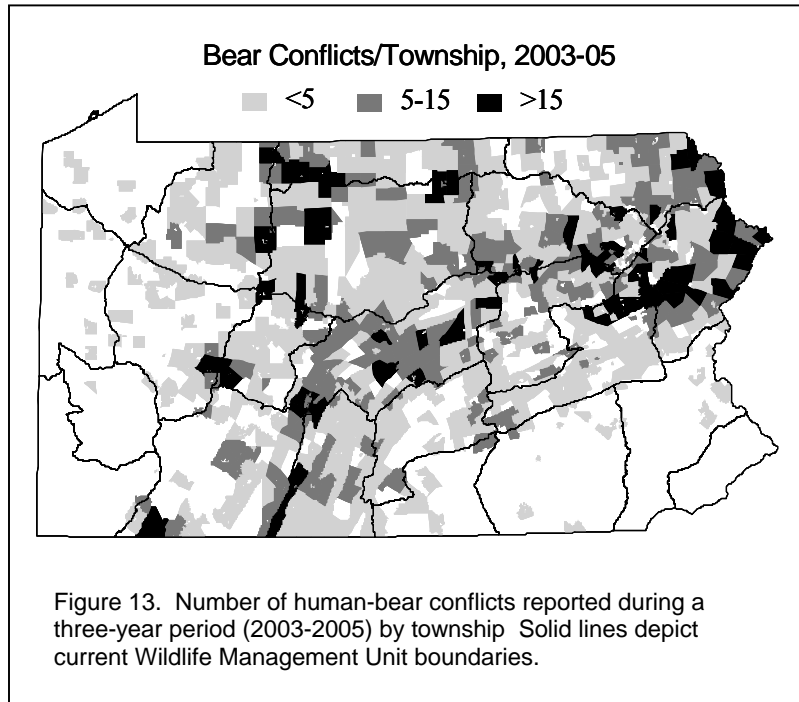
Figure 12. Distribution of reported human-bear conflicts during 2003-2005.

Conflict numbers can vary from year to year and seasonally. Conflicts tend to increase rapidly in April and May, peak in June, and then decline through mid-summer with a small increase in the fall. The post-June decline can be abrupt, as was the case in 2003 and 2005, or prolonged, as in 2004 (Fig. 12). Conflict trends are influenced by a variety of factors that include: seasonal changes in nutritional need, ripening dates of key foods, shifts in activity patterns, timing of breeding season, and timing of dispersal.

Conflict numbers also vary geographically. Although conflicts occur throughout the primary bear range, they are reported the most in Wildlife Management Unit 3D and adjoining portions of units 3B, 3C, 4C and 4E in the northeast region. Conflicts are also concentrated in unit 4D in the middle of the state, and in part of units 3A and 2G in the northcentral region (Fig. 13). In 2004 and 2005, there were 1,725 and 1,162 conflicts reported statewide, respectively.

Human-bear conflicts are more common and occur in more places today than they did a decade ago. There is a tendency to attribute the increase to increasing bear numbers, but studies have shown that nuisance bear conflicts correlate better with factors other than bear abundance (e.g., Shorger 1946, Piekielek and Burton 1975, Rogers 1987, Garshelis 1989, Garshelis and Noyce 2001). Although some relationship between bear density and number of conflicts probably exists, part of the explanation may also be that opportunity for human-bear encounters is increasing. Range expansion is placing more bears near suburban areas, while at the same time more people are moving into areas traditionally occupied by bears. These changes can occur without significant growth in the bear population, but still lead to more conflicts. People today also may be less prepared to avoid conflicts because an increasing number of people who move into bear habitats or live where bears are expanding their range have little or no experience at coexisting with them.

Regardless of why conflicts are increasing, the Pennsylvania Game Commission strives to reduce them. An increasing trend in human-bear conflicts is undesirable, because it leads to larger property damage costs, greater risks of human injury, and increasing costs for the agency to adequately respond to complaints.



Property, Livestock and Agricultural Damage

Bears may destroy apiaries (beehive colonies), kill livestock, raid agricultural crops, or cause damage around homes to birdfeeders, outbuildings, or anything else containing food. Damage may be minimal or serious, infrequent or habitual, localized or over a wide geographic area.

When bears raid an apiary they may eat honey or bees, destroy hives, reduce future production, damage equipment, and increase time and labor costs. In the eastern United States, apiary damage is probably the most economically significant of the different commodities damaged by bears (Jorgensen et al. 1978). The average cost of a bee damage claim submitted to the Game Commission for reimbursement is \$177. Total annual payments now average \$4,860.65 (Table 3). In 2003, damage claims exceeded \$8,000,

which was the highest amount paid in the past eight years, but not the highest on record (e.g., \$10,630 in 1995).

The number of honey producing colonies maintained in Pennsylvania has been steadily declining since 1987 and currently numbers less than 20,000 for producers with five or more hives. The value of honey produced during 2001 was estimated to be \$843,000 (Pennsylvania Department of Agriculture 2002).

The ideal location for an apiary tends to coincide with good bear habitat, which increases the likelihood of damage. In Pennsylvania, apiary damage is resolved by relocating problem bears, offering assistance with electric fencing, and, in some cases, permitting owners to shoot offending bears (see Appendix 5 for details). Elevating hives on stands that are inaccessible to bears also is recommended.

Table 3. Statistics associated with beehive damage claims submitted to the Game Commission for payment. See Appendix 2 for details on the type of claims that are approved.

| Fiscal Year | No. of Hives Destroyed | No. of Claims Approved | Average Cost/Hive | Total Cost Paid for Claims |
|-------------------|------------------------|------------------------|-------------------|----------------------------|
| 1998 | 41 | 25 | \$93.41 | \$3,829.69 |
| 1999 | 81 | 37 | \$78.41 | \$6,350.87 |
| 2000 | 57 | 26 | \$65.77 | \$3,748.81 |
| 2001 | 42 | 27 | \$67.37 | \$2,829.34 |
| 2002 | 79 | 43 | \$97.75 | \$7,722.11 |
| 2003 | 72 | 33 | \$116.49 | \$8,387.23 |
| 2004 | 42 | 26 | 103.50 | \$4,347.12 |
| 2005 ^a | 32 | 7 | 52.19 | \$1,670.06 |

^aAs of April 1, 2006, i.e., 75% of fiscal year.

The Game Commission reimburses farmers for the value of livestock killed by bears (see Appendix 5). Predation on poultry and rabbits is the most common, but not always the most expensive (Table 4). Other livestock claims include predation on hogs, goats, sheep, horses, propagated deer, and cattle. Average annual cost for damage claims over the past 10 years is \$10,000. Costs for unreported losses and non-qualifying claims are not available. Similarly, the Game Commission does not reimburse for bear-related damage to planted crops or orchards, which is more frequent and widespread than livestock losses. Thus, total value of agricultural damage caused by bears in Pennsylvania is probably much greater than currently documented.

Some level of livestock or crop depredation should be anticipated annually, however, modification of herding or harvesting practices and feed storage can minimize conflicts (Will 1980). Electric fencing also may be used to protect small areas, but it is generally impractical for protecting large fields. Removal of problem bears may be the best solution, but bears that have been caught before can be hard to catch again, and confirming that the right bear has been caught is difficult. Moreover, crop damage may not be detected until harvesting time and after the problem bears have stopped using the area, or bears that are in the area may have little interest in baits placed at traps because feeding is focused on the available crops. Lastly, relocating captured bears does not always prevent their return. Farmers in Pennsylvania are permitted to kill any bears they suspect of damaging crops (Appendix 5).

There are no data available on the cost of property damage at residences. However, residential damage is the most common type of complaint the Game Commission receives.

Bears may damage birdfeeders, garbage cans, barbeque grills, screen doors and windows. Less common complaints involve damage to buildings and siding, swimming pools, ornamental trees, and parked vehicles. Most residential damage is preventable by removing or securing attractants and preventing bears from being rewarded with food in the first place. Depending on the circumstances, nuisance bears may be trapped and relocated, or occasionally destroyed. Homeowners are not permitted to kill bears in defense of residential property.

Table 4. Statistics associated with verified claims of livestock depredation submitted to the Game Commission for reimbursement during 1998–2005. See Appendix 2 for details on what constitutes a payable claim.

| | Number of Animals Lost | | | | | | | |
|-------------------|---------------------------|----------|----------|------------|----------|------------|-------------------|----------|
| | Poultry | Rabbits | Hogs | Goats | Sheep | Horses | Deer ^a | Cattle |
| 1998 | 59 | 31 | 2 | 6 | 3 | 2 | 0 | 0 |
| 1999 | 48 | 35 | 0 | 6 | 5 | 1 | 31 | 0 |
| 2000 | 90 | 14 | 3 | 10 | 6 | 1 | 10 | 3 |
| 2001 | 39 | 7 | 5 | 5 | 3 | 0 | 2 | 0 |
| 2002 | 68 | 10 | 0 | 8 | 8 | 1 | 4 | 0 |
| 2003 | 48 | 63 | 1 | 12 | 2 | 0 | 17 | 4 |
| 2004 | 101 | 4 | 1 | 1 | 2 | 0 | 1 | 2 |
| 2005 ^b | 38 | 3 | 0 | 4 | 5 | 0 | 0 | 1 |
| Avg(98-04) | 65 | 23 | 2 | 7 | 4 | 1 | 9 | 1 |
| | Number of Claims Approved | | | | | | | |
| | Poultry | Rabbits | Hogs | Goats | Sheep | Horses | Deer ^a | Cattle |
| 1998 | 6 | 2 | 2 | 4 | 2 | 2 | 0 | 0 |
| 1999 | 3 | 8 | 0 | 6 | 2 | 1 | 2 | 0 |
| 2000 | 8 | 2 | 2 | 7 | 3 | 1 | 3 | 1 |
| 2001 | 4 | 3 | 3 | 4 | 2 | 0 | 1 | 0 |
| 2002 | 3 | 2 | 0 | 7 | 2 | 1 | 1 | 0 |
| 2003 | 6 | 6 | 1 | 7 | 2 | 0 | 2 | 3 |
| 2004 | 9 | 1 | 1 | 1 | 2 | 0 | 1 | 2 |
| 2005 ^b | 2 | 2 | 0 | 2 | 3 | 0 | 0 | 1 |
| Avg(98-04) | 6 | 3 | 1 | 5 | 2 | 1 | 1 | 1 |
| | Total Cost of Claims | | | | | | | |
| | Poultry | Rabbits | Hogs | Goats | Sheep | Horses | Deer ^a | Cattle |
| 1998 | \$1,513.25 | \$536.40 | \$329.75 | \$910.00 | \$735.00 | \$665.00 | \$0.00 | \$0.00 |
| 1999 | \$209.50 | \$336.95 | \$0.00 | \$380.00 | \$479.60 | \$165.00 | \$7,700.00 | \$0.00 |
| 2000 | \$560.80 | \$194.00 | \$164.00 | \$708.00 | \$867.00 | \$2,500.00 | \$2,895.00 | \$978.00 |
| 2001 | \$291.92 | \$42.00 | \$285.00 | \$490.00 | \$300.00 | \$0.00 | \$450.00 | \$0.00 |
| 2002 | \$155.44 | \$65.53 | \$0.00 | \$622.50 | \$625.00 | \$1,300.00 | \$300.00 | \$0.00 |
| 2003 | \$1,069.50 | \$407.00 | \$88.00 | \$1,244.00 | \$820.00 | \$0.00 | \$3,650.00 | \$660.00 |
| 2004 | \$464.90 | \$64.00 | \$150.00 | \$95.00 | \$145.00 | \$0.00 | \$300.00 | \$600.00 |
| 2005 ^b | \$185.11 | \$40.00 | \$0.00 | \$488.00 | \$505.00 | \$0.00 | \$0.00 | \$330.00 |
| Avg. | \$609.33 | \$235.13 | \$145.25 | \$635.64 | \$567.37 | \$661.43 | \$2,185.00 | \$319.71 |

^aPropagated.

^bAs of April 1, 2006, i.e., 75% of fiscal year.

Human Injuries

Between 1960 and 1980 more than 500 people were injured by black bears in North America. At least 90 percent of these injuries were minor and inflicted by bears that were conditioned to people's food (Herrero 1985). These types of injuries have declined, most noticeably in national and provincial parks, because of better garbage disposal and feeding regulations (Herrero and Fleck 1990, Gunther 1994). Black bears also can, on rare occasion, attempt to or even successfully attack people as prey. But given the large number of encounters that occur almost daily across North America between people and bears, it is extremely uncommon. At present, about 30 people are seriously attacked by bears annually in the U.S. (more may receive minor injuries and not be reported), of which one usually results in death (Conover 2002).

Accurate records on the number of people hurt by black bears in Pennsylvania do not exist, but there have been injuries. At present, the number of people injured by bears is believed to average 2 to 3 per year, and a fatality has never been documented. People are permitted to kill bears in self-defense (see Appendix 5 for details). The potential for injury is expected to increase as development and recreational activities expand further into traditional bear habitats (forested areas), bear numbers increase, and human-bear encounters become more frequent.

SECTION IV. BLACK BEAR MANAGEMENT OPTIONS

Regulatory Authority and Responsibility

The Game Commission has statutory responsibility for managing all wildlife in Pennsylvania, including black bears. Ideally, wildlife populations are to be managed so that they (1) provide ecological, aesthetic, recreational, and economic benefit to consumptive and non-consumptive users alike; (2) remain self-sustaining; and (3) result in as few human-wildlife conflicts as possible.

Options That Are Used To Manage Bear Populations

Hunting

Hunting is the most frequently used tool to manage black bear populations. Thirty states have a hunting season for bears. Population objectives are achieved by adjusting season length, timing, and method of take to alter the size and composition of the harvest. Key components for using regulated hunting as a management tool include: setting population objectives; determining where populations are relative to objectives; monitoring harvests and their effect on population levels; and adjusting season length, time, and methods of take to move populations (up or down) toward objectives.

Bear populations can be overharvested. Depleted populations can be slow to recover because of poor dispersal by females and low reproductive potential (i.e., relatively long interval between births and delayed onset of first reproduction). However, because non-hunting

mortality is often low, they do rebound if factors that allowed overexploitation are corrected. Closing the bear season in 1977 and 1978, maintaining short seasons thereafter, and creating a bear license in 1981 are examples of how overexploitation was corrected in Pennsylvania. Nonetheless, despite having the ability to reverse declining populations, conservative hunting seasons are preferred to avoid repeated cycles of overharvest and recovery.

High adult mortality, which leads to a population dominated by young animals, can alter productivity by reducing the number of females that are of reproductive age and average litter size, since young bears tend to produce smaller litters. Therefore, vulnerability of adult females is an important consideration when setting the length, timing, and methods of hunting. A high percentage or increasing trend in female harvest is indicative of overharvest. Social considerations, such as a desire for trophy-size animals, satisfaction with success rates, perceived quality of hunting experiences, cub orphaning, and disturbance of other recreationists or wildlife, also are important factors when determining season parameters.

If populations are below management objectives, hunting regulations can be adjusted to reduce female harvest. The simplest change is to shorten seasons or restrict the number of hunters. However, other alternatives that maintain hunting opportunity exist. For example, fall seasons can be opened after females start to den, which protects them from harvest. In Pennsylvania, the percent of solitary (pregnant) females denned during the traditional late November season may approach 50 percent some years (Alt et al. 1976, Alt 1980c). Likewise, spring seasons can be set to start before females emerge from dens, but after males and subadults are active. Some states also restrict the harvest of cubs, small bears, or bears visibly accompanied by cubs to protect females. However, the use of “cub laws” has been abandoned in Pennsylvania, because cubs are indistinguishable from subadults under most hunting conditions (Alt 1980a).

If populations are above management objectives, regulations should be adjusted to increase harvest. Larger harvests can be achieved by making seasons longer, adding special seasons, allowing hunting methods that improve success (e.g., baiting), and/or overlapping seasons with other hunting opportunities (e.g., deer hunting).

The most common black bear hunting method in Pennsylvania is organized drives. Hunting party size is restricted by regulation to 25 people or less. Still hunting, where hunters move through the woods alone or wait for game to come by, also is popular. The majority of bear hunters carry a rifle although archery equipment, crossbows, muzzleloaders, handguns, and shotguns are permitted in most parts of the state. Below is a discussion of four additional hunting methods that are currently not permitted in Pennsylvania, but are used elsewhere in North America.

Hound Hunting

In hound hunting, bears are pursued by dogs and harvested after being treed or while passing another hunter. Forty-two percent of states with open bear hunting seasons permit the use of dogs (see Appendix 7). Pennsylvania banned the use of dogs for bear hunting in 1935. Pursuit with hounds outside of the hunting season (i.e., training) also is prohibited.

Hound hunting is popular because it increases hunter success, allows hunters to be selective in what they kill, and provides a gratifying opportunity for dog owners to train and watch their animals. In many places where it is permitted, hound hunting has become a strong part of the bear hunting culture. In some areas, social hunts are the norm, with 10 or more hunters and twice that many hounds involved (DuBrock et al. 1978, Elowe 1990).

Hunting with hounds generally improves hunter success, but numerous variables are important and success is not guaranteed. Experience of the hounds, bear behavior, terrain, weather, time of year, habitat conditions, and ability of houndsmen to locate fresh tracks for pursuit moderate success. An average to good pack of hounds with knowledgeable handlers may tree 30 percent of the bears they actually run (Elowe 1990). In Michigan, where hound hunting is popular, houndsmen had a success rate of 17 to 32 percent, depending on whether or not bait was used to initiate the chase, whereas still hunters had a success rate of 11 percent (Peyton 1989). In Virginia, between 11 percent and 20 percent of houndsmen are successful (Inman and Vaughn 2002), and a similar success rate was reported for New Hampshire (Litvaitis and Kane 1994).

Because much of Pennsylvania's bear habitat is extensively roaded and composed of linear ridges with open understories, pursuit with hounds would significantly increase hunter success. The current success rate without hounds is between 2 and 3 percent, and at this rate 20 percent of the bear population is harvested. Steps would need to be taken to limit harvest if hound hunting was permitted; including possible changes to the existing season structure and license allocations.

There are several biological concerns related to hound hunting. Female black bears have smaller home ranges than males, which can make them more vulnerable to hound hunting in highly-roaded areas. Females with cubs are especially vulnerable because they are reluctant to leave cubs and repeatedly circle back or quickly tree (Allen 1984). However, houndsmen can be selective for males and release smaller bears that are typically female, although 40 percent of houndsmen in a Virginia survey did not or could not identify sex of treed bears (Inman and Vaughn 2002). Pursuit with hounds also may impose stress, disrupt reproduction, and alter foraging effectiveness of bears or other wildlife. Family groups may become separated, or cubs occasionally killed by hounds. However, several studies have concluded that most biological impacts from hound hunting are minimal (Allen 1984, Massopust and Anderson 1984), and the issue of hound hunting is largely social.

Hunting bears with hounds has come under considerable public attack, or at least, hard scrutiny (Elowe 1990). In 5 of 7 states where the issue was brought to public ballot, bear hunting with hounds was closed (Inman and Vaughn 2002). Some people view it as unethical because of a perceived advantage over the bear. Chases may disturb recreationists, including hunters, and cross private lands posted against trespass. Hound hunting can be highly visible. People may see or hear chases, or see vehicles with packs of dogs searching for tracks. Finally, hound hunting is usually not well received by non-hound hunters. In a survey of Michigan bear hunters, a large majority of still hunters (those that did not use bait

or hounds) believed using dogs was an unethical method of hunting that took an unfair number of bears, interfered with their own hunting, and should be stopped (Peyton 1989).

Pursuit-only seasons are allowed in some jurisdictions to provide training opportunities. They have not been permitted in Pennsylvania to minimize disturbance of wildlife, recreationists, property owners, and to prevent illegal taking of bear or possible separation of bear families. More importantly, though, because hound hunting is not a legal hunting method in Pennsylvania, a training season has not been considered necessary. Some people have suggested that training seasons are beneficial because they reduce success rates (pursued bears become harder to harvest) and can be used to chase nuisance bears from problem areas (e.g., cornfields).

Baiting

With bait hunting, a steady supply of food is used to attract bears closer to hunters or make them more visible. Bait site location and bait replenishment routines are designed to encourage visitation during daylight hours. Baits are usually placed prior to hunting near them, and several sites may be maintained simultaneously. Ten states that permit bear hunting allow baiting (38 percent; Appendix 7). Baiting is not allowed in Pennsylvania (Appendix 5).

Baiting is an effective harvest method with hunter success rates commonly ranging from 25 to 50 percent. However, success rates vary regionally and seasonally according to fluctuations in natural food crops, bear densities, habitat characteristics, and prevalence of commercial guides and outfitters (McLaughlin and Smith 1990). Like hound hunting, the legalization of bait in Pennsylvania would be a concern because of the potential for greater success rates, and steps would likely have to be taken to limit harvest.

Although baiting is widely practiced, it has received a considerable amount of public criticism over issues of fair chase and conflicts with other land uses (McLaughlin and Smith 1990). Some people consider the use of bait as unethical and an unfair advantage. Recreationists who encounter baits may consider them unsightly, and littering from baits can occur. Baiting may condition bears to associate people with food and possibly lead to increased nuisance bear problems, or attract bears to areas where they have a greater chance of causing trouble. Baiting also may increase bear-vehicle collisions and the potential for disease transmission. Finally, baiting may invite more poaching activity, because hunters see more bears. However, it is important to note that baiting conflicts are highly dependent on where and how bait is used.

Baiting can be a reliable method for increasing hunter selectivity. Bears that come to bait are usually visible for longer periods and provide better opportunity for judging size and sex than bears seen by still hunters. Baiting also may augment natural food supplies and mitigate the effects of poor food years. In some places across North America, harvest objectives are difficult to achieve without the use of bait, because hunter numbers or success is too low, making it a necessary management tool. Baiting also may provide increased hunting success

for handicapped people, increase the quality of hunting experiences by making more bears visible, and provide opportunities to photograph bears while hunting.

Regulations associated with baiting vary across North America. Most are designed to control the size and sex composition of the harvest and minimize conflicts with other land uses. Regulations often limit the number of baits allowed per hunter, the type and amount of bait that can be used, and the dates that baiting may occur. Registration of sites may be required, and number of sites per square mile may be restricted. Baiting near waterways, trails, roads, and campsites is usually prohibited to reduce nuisance bear problems or vehicle collisions, and bottles, cans, plastic, paper, or metal may be banned to avoid littering. Some jurisdictions require that baits be cleaned up after the close of the season (McLaughlin and Smith 1990).

Archery Hunting

Archery hunting for bear is becoming increasingly popular. In New York, West Virginia and Virginia, archery hunting has steadily accounted for a larger percentage of the total bear harvest each year (Fig. 14). Pennsylvania archers have progressively lobbied for an archery bear season during the past several year, and now a limited 2-day archery bear season will occur for the first time in 2006.

Archery bear seasons may occur separate from a general (firearms) season or be concurrent but restricted to an area where firearms are prohibited. Allowing archery equipment in a general season, which is what has traditionally occurred in Pennsylvania, is not considered an archery season.

Archery seasons increase recreational opportunity. Larger harvests also may be a benefit if the management objective is to reduce or stabilize bear numbers. In Pennsylvania, archery licenses for deer hunting now average 290,000 per year. About 19 to 23 percent of Pennsylvania deer archers currently hunt bear, leaving 230,000 hunters that have an active interest in archery but do not hunt bears. In a 2001 survey, more than half (59 percent) of those hunters supported the idea of creating an archery bear season. Thus, as many as 144,000 hunters (59 percent of 230,000 hunters) may take up bear hunting in

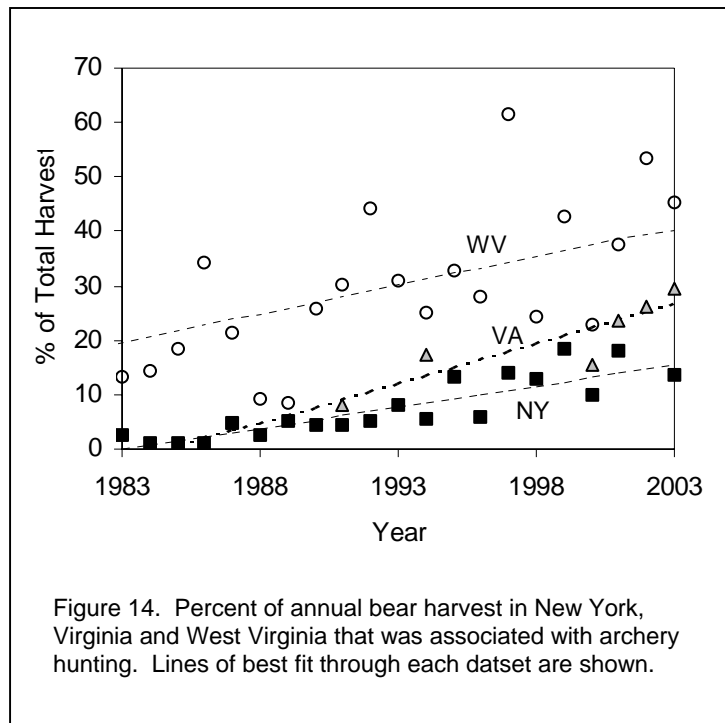


Figure 14. Percent of annual bear harvest in New York, Virginia and West Virginia that was associated with archery hunting. Lines of best fit through each dataset are shown.

Pennsylvania if an archery season was created, but actual participation would depend on season timing, length, and location.

Two earlier surveys in Pennsylvania had similar results. In 1990, seven public hearings focusing on bear management were held throughout the state during January and February. Attendants were able to submit comments on proposed regulation changes, of which one dealt with creating an archery bear season. Forty-six percent of the comments supported the change (Alt 1990). In 1995, hunters receiving the annual Game Take Survey were asked if they supported a primitive-sporting arms season for bear, which would be limited to archery and/or muzzleloading firearms. Thirty-eight percent supported the change (PGC unpublished data).

There are potential costs to adding an archery bear season. If too many hunters participate or success rates are too high, steps would need to be taken to limit the total harvest. They may include restricting the number of licenses available, developing an allocation system that apportions licenses between multiple seasons, or adjusting season dates (shorter or later) to reduce hunter success. Yet, in the 1990 bear management hearings, more than 79 percent of comments favored leaving the three-day bear season unchanged (Alt 1990). Check stations, which are manned by Game Commission personnel, may need to be open longer, and depending on season dates, adding another season may limit research or nuisance relocation work, because Game Commission personnel are prohibited from immobilizing black bears within 30 days of a hunting season. Finally, some segments of the public are concerned that archery hunting may increase wounding rates or illegal baiting activity, but little research has been done to confirm it.

Archery bear harvests tend to be correlated with fall mast (acorn) conditions. In years when mast conditions are poor, archery harvests go up, and vice versa in years when mast is abundant (Martin 2001, Igo 2001). This trend is opposite of what is observed for firearms seasons. Thus, a possible outcome from adding an archery season may be fewer low-harvest years. The affect of having periodic low-harvest years is not well understood, but they may mitigate the impact of periodic high-harvest years.

Trapping

Trapping usually accounts for only a small proportion of the total harvest where it is permitted. In eastern North America, four providences in Canada (Quebec, Nova Scotia, Newfoundland, Ontario) and one state (Maine) allow bear trapping. Trapping is not permitted in Pennsylvania.

The advantages of trapping are increased recreational opportunity, better success among hunters, and increased opportunity to harvest wary bears that may only be active at night. The use of traps can allow a hunter to be successful when other commitments such as work or family prevent him or her from participating in a traditional firearms season. When used in combination with bait, trapping can result in high success, which would be a concern if permitted in Pennsylvania.

The disadvantages with bear trapping are primarily social. It may be viewed as unfair, lacking in fair-chase, cruel and inhumane, or a public safety risk. Where it is permitted, regulations often restrict the size, type, and number of traps that can be set to prevent capture of more than one bear. Signs and fencing may be required around the trap to alert people, and trap modifications may be required to prevent traps from closing on non-target animals like pets or small bears.

Reservoir Areas

Reservoir areas are places where bears are lightly hunted or not hunted at all and bear abundance is limited only by the capacity of the habitat. Reservoir areas help to replenish bear numbers in adjacent areas where hunting pressure may be high by providing a steady supply of dispersing bears. However, because female bears rarely disperse far, the opportunity to influence productivity (number of young produced) is limited. Most bears that disperse from reservoir areas are male.

Reservoir areas, known as Wildlife Refuge Areas, were an important part of game management history in Pennsylvania (Kosack 1995). Today, reservoir areas where hunting is purposefully restricted to propagate game are not used, but reservoir-like areas exist in places because poor road access, trespass postings, regulations (e.g., safety zones or some Natural Areas and State Parks), or private leasing of hunting rights restrict hunter access. For example, in central Pennsylvania on the southern portion of the Sproul State Forest, which is a popular area for bear hunting, 73 percent of bear hunters hunt on 56 percent of the landscape – the area that is within one-half mile of a road. Hunter densities in these areas are approximately 1.4 hunters per square mile. On the remaining land (44 percent of the forest) hunter densities drop to 0.5 hunters per square mile, in effect creating reservoir areas (D. Diefenbach, PGC/PSU unpublished data). Other similar scenarios are believed to exist throughout much of the northcentral bear range.

Immunocontraception

Immunocontraception uses an animal's own immune system to disrupt reproduction. Vaccines are administered to the animal that fool the immune system into producing antibodies that interfere with sperm formation, egg development, fertilization, or implantation. Vaccines that target the egg's zona pellucida (ZP), the layer surrounding a mature mammalian egg, have received the most attention (Fagerstone et al. 2002). Injections of ZP proteins into the bloodstream cause the immune system to identify the proteins as foreign bodies and develop antibodies against them. This, in turn, interferes with sperm penetration of the ZP (Conover 2002). A common source of ZP protein is pig ovaries, and this type of ZP is referred to as porcine zona pellucida (PZP).

Current immunocontraceptive technology appears to be best suited for captive-animal studies with limited field applications (Miller et al 1998, Fagerstone et al. 2002). The greatest drawbacks to using it on free-ranging wildlife are (1) vaccinating enough animals to produce a population effect, (2) recognizing which animals have been vaccinated, and (3) resolving

possible human health effects from eating vaccinated animals. In some cases, re-dosing may be needed at multiple-year intervals to maintain contraception. More importantly, though, immunocontraception does not reduce the current population size, it only reduces recruitment of new animals, and other population reduction methods may still be required.

Some models have suggested that greater than 80 percent of the female bears in an area would need to be vaccinated before a population effect could be sustained. This would be a nearly impossible goal given that black bears are solitary, secretive, widely dispersed animals that live in relatively thick habitats. Presently, no ZP vaccines have been given FDA approval for use in bears.

Habitat Manipulations

Habitat condition influences the abundance and diversity of food, which can affect reproductive rates, survival, hunter success rates, nuisance bear activity, and the number of bear-vehicle collisions. Poor food availability usually reduces litter size, increases the age of sexual maturity, and encourages bears to travel more looking for food (i.e., more nuisance activity and vehicle collisions), whereas the opposite occurs when food is consistently abundant. Habitat diversity can help minimize the effects of key food crop failures by providing alternative foods, and it ensures that other habitat needs, such as adequate escape cover, are met.

Habitat manipulations that improve food availability, diversity, or provide escape cover can bolster bear populations, and also may alleviate some human-bear conflicts. Improving the regeneration of hard mast trees (e.g., oaks), planting soft mast trees and shrubs, diversifying forests with multi-age stands, maintaining openings for berry-producing plants, and protecting patches of dense hemlock, mountain laurel, or swamps are all ways that forests can be improved for bears in Pennsylvania. Conversely, forest management practices that fragment bear habitat or remove key foods (e.g., overharvesting mature oak trees) are detrimental.

Forest insect pests and pathogens can impact bear populations if they kill or inhibit regeneration of mast-producing trees and shrubs. For example, Gypsy moth (*Lymantria dispar*), beech scale, and dogwood anthracnose (*Discula* sp.) may eventually reduce the availability of important foods for bears in Pennsylvania. Likewise, overbrowsing by white-tailed deer, acid rain, conversion of oak-dominated stands into maple/cherry-dominated stands after cutting, and excessive timber harvesting can reduce the abundance of oak trees through time. Management practices that mitigate or avoid these problems are beneficial to bears.

Costs associated with habitat manipulations or pest/pathogen control vary depending on the activity. But in many cases, adding bears into current forest planning should be inexpensive, because most forest management practices and goals are compatible with bear management. Moreover, many wildlife species, in addition to bears, benefit from promoting mast-producing shrubs and trees. The real challenge with managing forests to improve habitat for bears is that 78 percent of Pennsylvania's forestlands (>12.4 million acres) is privately

owned. Fortunately, the Game Commission does own 1.4 million acres of State Game Lands where the primary land management goal is to improve habitat conditions for wildlife.

Orphan Cub Rehabilitation and Adoptions

Black bear cubs can become orphans if they are inadvertently separated from a litter or the mother is killed (e.g., hit by car, removed due to nuisance activity, shot in self-defense, or killed illegally). Once an orphan is reported to the Game Commission, there are five options: (1) return it immediately to the wild without a mother; (2) add it to another litter of cubs (adoption); (3) temporarily hold it in captivity and release without a mother once it develops more; (4) place it in permanent captivity; or (5) euthanasia. Returning orphaned cubs to the wild (options 1-3) has little biological significance because so few are handled each year, but it is preferred because public support for permanent captivity or euthanasia is lacking.

Several techniques for reintroducing orphans have been reported (Clarke et al. 1980, Alt 1984b, Alt and Beecham 1984, Carney and Vaughan 1987, Siebert et al. 1999, Clark et al. 2002b). Adoptions, where a cub is added to another bear's litter, can occur by dropping orphans into a den, adding them to a family of bears captured and immobilized in a culvert-style trap, or by treeing free-ranging cubs and sending the orphan up the tree with them. These techniques are primarily used if the orphan is less than 4 months old because older, free-ranging cubs are often hard to tree or capture. In Pennsylvania, we attempt to place healthy, normally developed cubs with an adoptive litter if it is orphaned before mid May.

Cubs can be released without a mother when an adoptive litter is unavailable, but survival may be better if releases are timed when a natural food source is abundant. In Pennsylvania, we usually hold orphans for 1-2 months when an adoptive litter is unavailable and release them during July when blueberry crops are ripe. Of 43 cubs we released in July without a mother, 22 or 51 percent were known to have survived because they were later recaptured or recovered in a hunting season (unpublished PGC data). Orphan cubs also can be held through the first denning period and released the following spring as year-old bears. But this technique is not used in Pennsylvania because of the increased risk of habituating captive bears to people, which may encourage nuisance bear problems after they are released.

Releasing orphan cubs can be costly. An adequate sample of female bears must be fitted with radio-collars so that adoptive litters can be readily found if needed. Radio-collared bears should be located periodically, and they must be visited annually at den sites to maintain radio-collars, readjust collar fit, and determine if cubs are present. Orphans should be placed with an adoptive litter as soon as possible to prevent them from imprinting on people. Thus, personnel may need to work extra hours on short notice to transport cubs, locate a suitable litter, and carry out the release. If orphans are not going to be placed with an adoptive litter, a temporary holding facility must be maintained with personnel available for daily care of cubs and food purchased or collected. Nevertheless, despite these costs, orphan cub reintroductions are done because of social pressure to avoid euthanasia or permanent captivity, and they are likely to continue in Pennsylvania if adequately funded.

Options That Are Used To Manage Nuisance Bears

Information and Education

Disseminating information about bears is a common and potentially successful means of reducing human-bear conflicts. Information can be offered on how to deter unwanted bears from returning (reactive), or it can be distributed to help people prevent conflicts from developing (proactive).

People tend to view bears as intelligent, culturally significant, charismatic, and similar to humans (Kellert 1994). This contributes to human-bear conflicts because people are tempted to encourage, or at least not discourage, viewing opportunities around their homes. They may feed bears or make no effort to keep bears from accessing garbage and other foods until significant property damage occurs. Furthermore, the number of people moving into bear habitats is growing. Many of these people come from urban centers that lack bears, so they have little knowledge about preventing human-bear conflicts. Bears also are recolonizing new areas where people have little knowledge about them. The result is that education and information needs are continuous and growing.

Informational materials may include advice on how to identify and remove attractants, build an electric fence, or why wildlife feeding is problematic. Guidance on how to interpret bear behavior, react in an encounter, and what to expect when living in bear country also are important. The importance of managing bear populations and what the consequences are if bears are allowed to access food should be clear.

There are several ways to distribute advice and information. Game Commission employees routinely provide advice over the phone and in person every time a person contacts the agency about a bear complaint. Unfortunately, though, this only educates people after they have had a problem and does not provide guidance to people who may experience a problem in the future. This is why information materials and outreach efforts should target the general public wherever bears are found, not just individuals reporting conflicts. Venues may include the Internet, programs to school or civic groups, newspapers, radio, brochures, and videos. The Game Commission currently uses all of these methods, but improving large-audience outreach efforts was recently identified as a need (Ternent et al. 2001).

The costs associated with developing and circulating information and education materials can be significant. During the 2004-2005 fiscal year, expenditures in the Game Commission's Bureau of Information and Education totaled \$3.6 million (5.5 percent of the agency's budget), although sales of printed materials and videos generated some revenue.

Food and Waste Management

Most human-bear conflicts occur because bears have discovered a food source near residential areas. These foods may be the result of intentional wildlife feeding (e.g., birdfeeders or other types of feeders), pets (e.g., unattended food dishes), gardens and fruit trees, compost piles, seasonal decorations (e.g., cornstalks or pumpkins in the fall), or

garbage. Eliminating these attractants can discourage bears from frequenting an area and learning to associate people with food.

Once bears are rewarded with food, they become conditioned to expect similar rewards in other similar situations. Food-conditioned bears, in an attempt to exploit their newly discovered food resource, will approach people and homes to search for more food. They can lose their fear of people and become bold at acquiring food, leading to an increased risk of property damage or human injury.

Policies that reduce the availability of food and waste around homes have obvious benefits for reducing human-bear conflicts. The Game Commission adopted a regulation in January 2003 that prohibits the intentional and, in certain situations, unintentional feeding of bears statewide. Similar regulations exist in New York, Virginia, New Jersey, and other jurisdictions. Almost all national parks in the United States have laws that prohibit the feeding of wildlife, and nuisance bear conflicts have decreased substantially since their passage, despite increases in the number of visitors and bears (Gunther 1994). Thus, maintaining or improving no-feeding regulations should help to alleviate nuisance bear conflicts in Pennsylvania (Ternent et al. 2001).

Other activities that could reduce food and waste around homes include: providing assistance to communities for purchase of bear-resistant garbage containers; changing municipal codes to require better handling of garbage, and intensifying efforts to inform people about how to eliminate food attractants.

The cost of better food and waste management may be high depending on the activity. Cost is commonly cited as the reason for not replacing traditional dumpsters with bear-resistant models, and some people may perceive feeding bans as recreational or private-rights infringements. The benefits, however, from reducing human-bear conflicts can be significant. Lowering the number of human-bear conflicts reduces property damage caused by bears, lessens the potential for human injuries, and saves time and money used to resolve conflicts. Thus, food and waste management is applicable to bear management in Pennsylvania.

Aversive Conditioning

Animals can be conditioned to avoid nuisance behaviors by exposing them to uncomfortable (pain, noise, nausea, or harassing) stimuli whenever they occur. The learning paradigm is referred to as aversive conditioning and is frequently suggested as a tool for reducing nuisance bear problems. However, it is not widely used in Pennsylvania, and there have been few studies done to evaluate its effectiveness at altering long-term behaviors.

Common conditioning agents include red pepper capsaicin sprays (Hunt 1984, Rogers 1984, Hyngstrom 1994), rubber bullets (Gillin et al. 1994, Schirokauer and Boyd 1998), emetic compounds (Colvin 1975, Ternent and Garshelis 1999), and electric shock. The process of capturing and immobilizing a bear also has been suggested as aversive (Clark 1999).

One advantage of aversive conditioning is that conflicts can be resolved without removing the animal. This would be important if management programs are trying to preserve or increase bear numbers, offending animals are highly valued, trap shy or too expensive to move, suitable relocation sites are limited, or public sentiment disapproves of removal. Some of these scenarios exist in Pennsylvania. If bears must be relocated, aversive conditioning can occur at the time of release.

Unfortunately, bears treated with aversive conditioning sometimes learn to only avoid a site rather than a behavior. They may avoid a particular backyard or campground where treated, but continue to cause problems at a new location. Aversive conditioning also can be ineffective on strongly habituated bears (McCullough 1982), making it better suited for young or first-time offenders, and some techniques might be perceived as cruel. Aversive conditioning also can be labor- and time-intensive, or impractical because of safety.

Moreover, aversive conditioning addresses only the symptoms of nuisance activity (bears visiting a site) and not the cause (food availability). Thus, food attractants must be removed to maintain aversions or else treated bears will learn that negative stimuli are temporary, and new bears also may be attracted. Despite the shortcomings, aversive conditioning is becoming a popular component of bear management programs throughout North America, and increasing its use in Pennsylvania has been recommended (Ternent et al. 2001).

The costs associated with aversive conditioning depend on the techniques used and how they are applied. Some techniques require training, special equipment, and supplies, and all are likely to increase the time spent handling a nuisance bear. Additional funding will therefore be needed if its use is expanded in Pennsylvania.

Repellents

Repellents are devices or substances that encourage a bear to leave an area. They are similar to aversive conditioning, except that pairing between stimuli and behavior may be less obvious and not lead to learned avoidance. Examples include ammonia, loud noises, motion-activated lights or water-spraying devices, and red pepper (Capsaicin) sprays used to repel attacking bears.

Capsaicin, sprayed directly on mucus membranes of the mouth, nose, and eyes, is effective at repelling black bears (Hunt 1984, Rogers 1984); however, the odor of Capsaicin may attract bears if sprayed on other objects (Smith 1998). Capsaicin spray is primarily used to divert charging bears at close range (<30 feet), and is widely available to people recreating in bear habitats.

Bears have been successfully repelled from bait sites using ammonia (Hunt 1984), but some eventually ignore it. For example, bears that repeatedly raided garbage cans in Juneau, Alaska were not repelled when cans were treated with ammonia (McCarthy and Seavoy 1994). Ammonia is widely available and occasionally recommended by the Game Commission for repelling nuisance bears from backyards.

Noise cannons, which use propane to generate a loud horn blast, have been used to repel bears from landfills and sheep herds. They are effective if bears are unfamiliar with them, but effectiveness tends to decline as bears become habituated to the sound. They also may be annoying to people. Noise cannons can be set to sound randomly, at intervals, or when remotely triggered by a passing animal. Noise repellents probably have little application as a broad-scale management tool in Pennsylvania, but they may be useful in specific situations. Standard noise cannons cost about \$300.

Electric Fencing

Electric fencing is routinely used to protect beehives from bears. If properly constructed and maintained, it can be extremely effective at preventing bear damage (Storer et al. 1938, McAtee 1939, Robinson 1963, Brady and Maehr 1982, Maehr 1983, among others). Electric fencing also may be used to exclude bears from small agricultural fields, outbuildings, livestock, campgrounds, garbage collection areas, and municipal landfills. The Game Commission routinely recommends electric fencing to protect beehives (Alt 1980g).

People usually support the use of electric fencing because it is nonlethal. However, electric fencing may be too costly or impractical for protecting large areas, such as cornfields (Calvert et al. 1992, Hygnstrom 1994, Jonker et al. 1998). Construction and maintenance costs also are a concern. Posts, wire, chargers, and power sources need to be periodically checked, and all vegetation growing near wires should be regularly cut to prevent grounding.

The Game Commission has an electric fence assistance program available to apiary owners (see Appendix 5 for a full description). The number of fencing requests reviewed and total cost of materials provided to applicants has been steadily declining since 1995. Less than five applications are approved annually; none were accepted in 2005 (Table 5). Ironically, while fencing applications were declining, the number of beehive damage claims was not, with notably high numbers reported in 2002 and 2003 (Table 3, page 27).

Translocations

Translocating, or capturing and moving bears away from sites that are experiencing nuisance bear problems, is a widely used management practice (Warburton and Maddrey 1994), although in some jurisdictions it may be infrequent. In Pennsylvania, between 200 and 300 bears are translocated each year and the number is increasing (Fig. 15).

Translocations receive wide public support because they avert the euthanasia of bears and provide people with a sense of satisfaction that someone is responding to their problem. Translocations also have been used to successfully augment or

Table 5. Number of fences provided and annual cost associated with the Game Commission's electric fence assistance program available to qualifying beehive owners.

| Fiscal Year | No. of Fences Provided | Total Cost For Fences |
|-------------------|------------------------|-----------------------|
| 1995 | 13 | \$2,390.91 |
| 1996 | 32 | \$5,055.92 |
| 1997 | 15 | \$3,352.08 |
| 1998 | 9 | \$1,860.02 |
| 1999 | 7 | \$1,392.34 |
| 2000 | 5 | \$1,237.41 |
| 2001 | 4 | \$692.20 |
| 2002 | 4 | \$1,015.78 |
| 2003 | 6 | \$1,504.00 |
| 2004 | 1 | \$97.61 |
| 2005 ^a | 0 | \$0.00 |

^aAs of April 1, 2006, i.e., 75% of fiscal year.

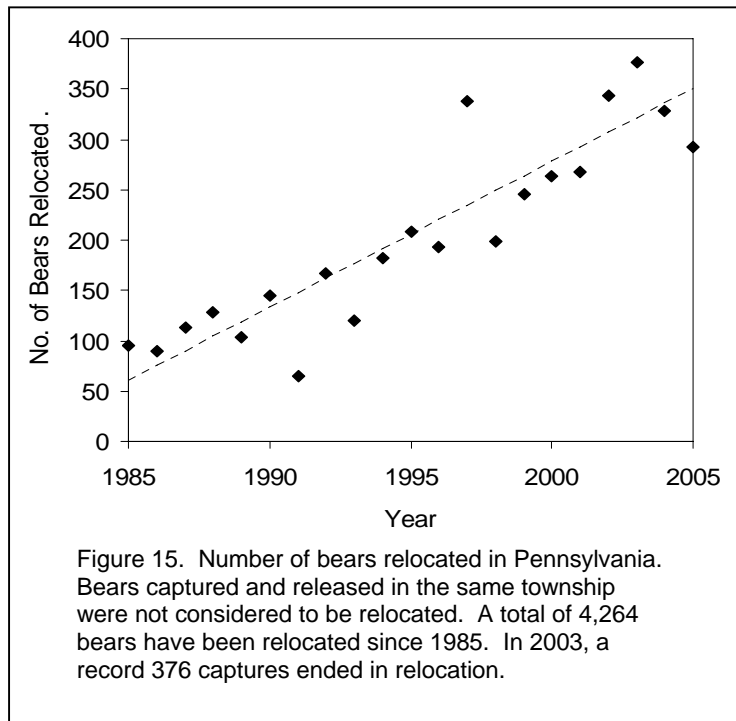
reestablish bears in new areas (Shull et al. 1994, Clark et al. 2002a). In fact, the recovery of bear populations in Pennsylvania is partly the result of translocation work done in the early 1920s and again in the 1980s (see page 15, *Relocation and Restoration Efforts* for details). Almost all of the bears in the 1920 project and some of the bears in the 1980 project were captured as nuisances before being relocated.

Unfortunately, a significant problem with translocating bears today is selecting a suitable release site. Release sites should contain enough forested habitat to be usable by bears, but lack large numbers of people, homes, roadways, or agriculture so problems do not redevelop. Release sites also should have relatively low numbers of bears to reduce stress and aggression between resident and translocated bears, and be located far from capture sites to discourage homing. Because a growing number of people are choosing to live in rural places, and because nuisance bear problems are occurring over such a wide geographic area today, few places remain in Pennsylvania that meet all of these criteria. There are virtually no places left with suitable habitat where bears are understocked.

Age, reproductive status, and distance affect the likelihood of bears returning home after being translocated. Although adults return home more often than

subadults, and solitary females more than females with cubs, return rates generally decrease if bears are moved >40 miles (64 km; Sauer and Free 1969, Alt et al. 1977, Massopust and Anderson 1984, Rogers 1986, Shull et al. 1994). Bears that are moved more than 100 miles almost never return (Alt et al. 1982). Previous policies by the Game Commission encouraged translocations to be 40 miles or more for first-time offenders and greater than 100 miles thereafter. Today, however, availability of suitable release sites and administrative boundaries (Appendix 8) are the primary determinants of translocation distance, and most bears are moved less than 40 miles.

Translocating bears can be costly and labor intensive. Portable traps, typically a culvert-style cage mounted on wheels, are needed to capture and transport bears, but new culvert-traps cost approximately \$3,500. The time spent checking traps and transporting bears can be substantial, and it may reduce the time available for other duties. Cost of translocating an individual black bear was estimated to be \$349 in Virginia (Comly 1993) and \$2,000 in New Jersey (Kelcey Burgeus, personal communication). Individual estimates are not available for



Pennsylvania, but Game Commission employees logged 7,884 hours during 2002 responding to nuisance bear complaints, which often resulted in the relocation of a bear.

Translocations can have short-term effects on reproduction. In Virginia, translocated females failed to produce cubs the first winter after being moved but reproduced normally thereafter (Comly 1993, Godfrey 1996). Opposition to translocations also may come from local hunters who fear that their chance of harvesting a bear will be reduced. Bears that are moved may experience greater mortality rates from vehicle collisions as they attempt to return home (Alt et al. 1982), and translocations that require bears to be immobilized cannot be performed within 30 days of a hunting season to avoid residual drugs in harvested bears.

Despite the problems, translocations are effective at reducing nuisance bear activity (McArthur 1981, Fies et al. 1987), including in Pennsylvania (Alt et al. 1977, Alt 1980*h*, McLaughlin et al. 1981). Some bears are only a brief nuisance when dispersing or when poor natural food crops urge them closer to people, and an occasional translocation resolves the problem. Although adult bears frequently return after being moved, many avoid the location that led to their capture (Alt 1980*h*, McLaughlin et al. 1981). Translocations also provide time to secure/remove attractants, harvest crops that were being damaged, and avoid the destruction of bears until hunters have an opportunity to legally harvest them, which is considered a better use of the resource. Thus, translocations are a common management practice of the Game Commission that will likely continue if funding is adequate (see Appendix 6 for current policy).

Euthanasia

Euthanasia is a relatively uncommon management practice for black bears, except for animals that present an immediate threat to human safety or have repeatedly been involved in human-bear conflicts (Warburton and Maddrey 1994). In general, people tend to prefer non-lethal options for bears that are not chronic nuisances. The Game Commission typically euthanizes less than 15 nuisance bears a year.

Permanent removal guarantees that target animals will not repeat nuisance activity, which can be a problem with other non-lethal management options (e.g., translocations, aversive conditioning, public education). If a nuisance bear is a female, removing her also can prevent problems from perpetuating by avoiding future offspring that learn the same behaviors.

Relying on hunting to remove problem bears is not always feasible. Hunting can control bear numbers but it may not be selective for individual bears, particularly if they live in areas closed to hunting, such as safety zones or private communities. If problem bears are female, their small home ranges may preclude them from being harvested on adjacent lands. Consequently, nuisance activity in residential areas can remain high, because of just one or two particularly bold bears despite high harvests. This problem is exacerbated if lands surrounding residential areas are closed to public hunting. Targeted removal may be the only way to eliminate these bears from the population.

Removing problem bears can improve public support for bear management. Support for greater bear densities or reoccupation of former range tends to decline if people perceive wildlife agencies as unwilling or ineffective at dealing with nuisance bears. Most troublesome are bears that cause frequent, expensive (e.g., killing large numbers of livestock), threatening (e.g., home-entries or aggressive behavior), or emotionally significant (e.g., killing pets) problems. Euthanizing these few individuals may have little impact on population parameters such as reproduction, abundance, or distribution, but failing to do so could significantly impact support for bear management goals. Removing chronic nuisances also may be a catalyst for people to improve how they live with bears (i.e., “a fed bear is a dead bear” slogans), or increase their tolerance of bears involved in less serious conflicts.

Unfortunately, bears that become chronic nuisances often continue the behavior until removed despite trying other non-lethal efforts, such as increasing public awareness and education, aversive conditioning, translocations, and repellents. Thus, permanent removal will likely continue to be used in Pennsylvania for specific bears (see Appendix 6 for current policy).

Reimbursements

Reimbursement programs pay owners for losses caused by wildlife. About one-third of states and provinces with black bear populations in North America offer reimbursement for damage caused by bears, although most only cover damage to crops, livestock, or bee keeping equipment (Wagner et al. 1997).

Compensation programs can increase public tolerance for nuisance activity, and increase public acceptance of management programs intended to increase or expand bear populations. However, paying for damage fails to address the situations that led to the problem and may become costly for state wildlife agencies. Despite being an intuitively appealing alternative to removing animals, compensation programs are not universally well received (Wagner et al. 1997), and a preference among some producers for other management options has been reported (McIvor and Conover 1994).

Criticisms typically include: unfair assessments, only partial payment for actual losses, high costs to administer programs, and a perception that agencies are unwilling to reduce human-bear conflicts.

Pennsylvania began a bear-damage compensation program in 1945 (See Appendix 5 for details). Payment is only provided for damage or loss to livestock, poultry, bees, and bee-keeping equipment, and the sum of payments cannot exceed \$50,000 per year. Payments now average \$10,000 annually although there is considerable variation from year to year (Table 6).

Table 6. Number of bear damage claims approved for payment and total cost of payments per year since 1995.

| Fiscal Year | No. of Claims Approved | Total Cost of Approved Claims |
|-------------------|------------------------|-------------------------------|
| 1995 | 66 | \$14,041.19 |
| 1996 | 53 | \$9,332.81 |
| 1997 | 38 | \$5,545.88 |
| 1998 | 52 | \$10,379.11 |
| 1999 | 59 | \$15,621.92 |
| 2000 | 53 | \$12,615.61 |
| 2001 | 44 | \$4,688.26 |
| 2002 | 59 | \$10,790.30 |
| 2003 | 67 | \$17,196.14 |
| 2004 | 44 | \$6,666.02 |
| 2005 ^a | 17 | \$3,218.17 |

^aAs of April 1, 2006, i.e., 75% of fiscal year.

Supplemental Feeding

Supplemental feeding has two management applications. First, it can be used to improve nutritional condition, which results in greater cub production. Bears that have access to supplemental food typically produce larger litters at an earlier age and have better cub survival (Rogers 1987, McLean and Pelton 1990). Supplemental feeding for nutrition is usually supported by the public because of a sense of satisfaction in helping wildlife, and it may increase wildlife viewing opportunities. However, black bear populations in Pennsylvania are not currently experiencing low reproductive rates or survival, so supplemental feeding for nutritional reasons is not justified.

Supplemental feeding also can be used to discourage damage caused by bears (diversion feeding). For example, commercial timber companies in the Pacific Northwest have successfully used feeders and large amounts of food to divert bears from debarking trees and eating the underlying sapwood. Similarly, supplemental food also can be used to divert nuisance bears out of areas where hunting is not permitted or practical, increasing their chance of harvest.

The use of diversion feeding is best suited for short-term problems or those that do not occur on a regular basis (Conover 2002). Diversion feeding can be expensive, labor intensive, and result in undesirable concentrations of animals. Furthermore, it may result in worse damage by habituating animals to people, conditioning animals to expect food, and attracting animals that normally would not be there. In fact many jurisdictions, including Pennsylvania, have adopted policies that prohibit the feeding of bears since it encourages nuisance bear problems. Because most bear conflicts in Pennsylvania occur in or near places where people live, supplemental feeding to divert damage is not practical. Diversion feeding in areas of minimal human use may have some application.

SECTION IV. LITERATURE CITED

- Allen, R. B. 1984. Experimental pursuit of black bears with trained bear dogs. Proceedings of the Eastern Black Bear Workshop on Bear Management and Research 7:54-58.
- Alt, G. L. 1977. Home range, annual activity patterns, and movements of black bears in northeastern Pennsylvania. M.S. Thesis, Pennsylvania State University, University Park, Pennsylvania. 67pp.
- Alt, G. L. 1978. Dispersal patterns of black bears in northeastern Pennsylvania: a preliminary report. Proceedings of the Eastern Black Bear Workshop on Bear Management and Research 4:186-199.
- Alt, G. L. 1979. Bear population establishment. Bureau of Wildlife Management annual job progress reports. Pennsylvania Game Commission, Harrisburg, Pennsylvania. Unpublished report.
- Alt, G. L. 1980 *a*. Pennsylvania's "Cub Law" controversy. Pennsylvania Game News 51(6):23-27.
- Alt, G. L. 1980 *b*. Rate of growth and size of Pennsylvania black bears. Pennsylvania Game News 51(12):7-17.
- Alt, G. L. 1980 *c*. Hunting vulnerability of bears. Pennsylvania Game News 51(7):7-10.
- Alt, G. L. 1980 *d*. Home range and movements of Pennsylvania black bear. Pennsylvania Game News 51(11):10-15.
- Alt, G. L. 1980 *e*. Management of Pennsylvania's black bear: past, present, and future. Pennsylvania Game News 51(10):18-21.
- Alt, G. L. 1980 *f*. Annual job progress reports for the Pennsylvania bear project (1979-80): Job Number 3, bear population establishment. Pennsylvania Game Commission, Harrisburg, Pennsylvania. Unpublished report.
- Alt, G. L. 1980 *g*. How do you handle a hungry bear? Pennsylvania Game News 51(2):15-17.
- Alt, G. L. 1980 *h*. Relocating nuisance bears. Pennsylvania Game News 51(3):20-22.
- Alt, G. L. 1981 *a*. Color phases of the black bear. Pennsylvania Game News 52(9):13-15.
- Alt, G. L. 1981 *b*. Reproductive biology of black bears of northeastern Pennsylvania. Transactions of the Northeastern Fish and Wildlife Conference 38:88-89. Abstract only.
- Alt, G. L. 1982. Reproductive biology of Pennsylvania black bears. Pennsylvania Game News 53(2):9-15.
- Alt, G. L. 1983 *a*. Timing of parturition of black bears (*Ursus americanus*) in northeastern Pennsylvania. Journal of Mammalogy 64:305-307.
- Alt, G. L. 1983 *b*. Bear dens under interstate highway. Pennsylvania Game News 54(8):8-10.
- Alt, G. L. 1984 *a*. Black bear cub mortality due to flooding of natal dens. Journal of Wildlife Management 48:1432-1434.
- Alt, G. L. 1984 *b*. Cub adoption in the black bear. Journal of Mammalogy 65:511-512.
- Alt, G. L. 1987. Characteristics of bear cubs at birth. Pennsylvania Game News 58(1):10-13.
- Alt, G. L. 1989. Reproductive biology of female black bears and early growth and development of cubs in northeastern Pennsylvania. Ph.D. Dissertation, West Virginia University, Morgantown, West Virginia. 127pp.
- Alt, G. L. 1990. Bear management in the 1990s. Pennsylvania Game News 61(9):7-11.
- Alt, G. L. 1995. Black bear population establishment in southwestern Pennsylvania. Final Report for Project 06230-Job 23002, Pennsylvania Game Commission, Harrisburg, Pennsylvania. 14pp.
- Alt, G. L., R. J. Askey, D. E. Jones, and D. C. Madl. 1982 (abstract only). Movements and mortality of black bears relocated 100+ air-miles in Pennsylvania. Transactions of the Northeastern Fish and Wildlife Conference 39:16. Abstract only.
- Alt, G. L., F. W. Alt, and J. S. Lindzey. 1976. Home range and activity patterns of black bears in northeastern Pennsylvania. Transactions of the Northeastern Fish and Wildlife Conference 33:45-56.
- Alt, G. L., and J. J. Beecham. 1984. Reintroduction of orphaned black bear cubs into the wild. Wildlife Society Bulletin 12:169-174.
- Alt, G. L., and J. M. Gruttadauria. 1984. Reuse of black bear dens in northeastern Pennsylvania. Journal of Wildlife Management 48:236-239.
- Alt, G. L., and J. S. Lindzey. 1980. Management of Pennsylvania's black bear: past, present, and future. Transactions of the Northeastern Fish and Wildlife Conference 37:58-70.
- Alt, G. L., G. J. Matula, Jr., F. W. Alt, and J. S. Lindzey. 1977. Movements of translocated nuisance black bears of northeastern Pennsylvania. Transactions of the Northeastern Fish and Wildlife Conference 34:119-126.
- Alt, G. L., G. J. Matula, Jr., F. W. Alt, and J. S. Lindzey. 1980. Dynamics of home range and movements of adult black bears in northeastern Pennsylvania. International Conference on Bear Research and Management 4:131-136.
- Arner, D. H. 1948. Fall food of the black bear in Pennsylvania. Pennsylvania Game News 19(9):13.
- Bacon, E. S., and G. M. Burghardt. 1976. Learning and color discrimination in the American black bear. International Conference on Bear Research and Management 3:27-36.
- Bennett, L. J., P. F. English, and R. L. Watts. 1943. The food habits of the black bear in Pennsylvania. Journal of Mammalogy 24:25-31.
- Blackman, E. C. 1873. History of Susquehanna County. Claxton, Remsen & Haffelfinger, Philadelphia, Pennsylvania. 640pp. Microfilm reproduction. 1973.
- Brady, J. R., and D. S. Maehr. 1982. A new method for dealing with apiary-raiding black bears. Proceedings of the Annual Conference of the Southeastern Association of Fish and Wildlife Agencies 36:571-577.

- Briscoe, N., J. G. Humphreys, and J. P. Dubey. 1993. Prevalence of *Toxoplasma gondii* infections in Pennsylvania black bears, *Ursus americanus*. *Journal of Wildlife Diseases* 29:599–601.
- Bunnell, F. L., and D. E. N. Tait. 1981. Population dynamics of bears — implications. Pages 75–98 in C. W. Fowler and T. D. Smith, editors. *Dynamics of large mammal populations*. John Wiley & Sons, New York, New York.
- Calvert, R. D. Slate, P. DeBow. 1992. An integrated approach to bear damage management in New Hampshire. *Proceedings of the Eastern Black Bear Workshop on Bear Management and Research* 11:96–107.
- Carney, D. W., and M. R. Vaughan. 1987. Survival of introduced black bear cubs in Shenandoah National Park, Virginia. *International Conference on Bear Research and Management* 7:83–85.
- Clark, J. E. 1999. Capture and on-site release of nuisance black bears and survival of orphaned black bears released in the Great Smoky Mountains. M.S. Thesis, University of Tennessee, Knoxville, Tennessee.
- Clark, J. D., D. Huber, and C. Servheen. 2002. a. Bear reintroductions: lessons and challenges. *Ursus* 13:335–345.
- Clark, J. E., M. R. Pelton, B. J. Wear, and D. R. Ratajczak. 2002b. Survival of orphaned black bears released in the Smoky Mountains. *Ursus* 13:269–273.
- Clarke, S. H., J. O'Pezio, and C. Hackford. 1980. Fostering black bear cubs in the wild. *International Conference on Bear Research and Management* 4:163–166.
- Colvin, T. R. 1975. Aversive conditioning black bear to honey utilizing lithium chloride. *Proceedings of the Annual Conference of the Southeastern Association of Fish and Wildlife Agencies* 29:450–453.
- Comly, L. M. 1993. Survival, reproduction, and movements of translocated nuisance black bears in Virginia. M.S. Thesis, Virginia Polytechnic Institute and State University, Blacksburg, Virginia.
- Conover, M. 2002. *Resolving human-wildlife conflicts, the science of wildlife damage management*. Lewis Publishers, CRC Press Company, Washington, D.C. 418pp.
- Conover, M. R., W. C. Pitt, K. K. Kessler, T. J. DuBow, and W. A. Sanborn. 1995. Review of human injuries, illnesses, and economic losses caused by wildlife in the United States. *Wildlife Society Bulletin* 23:407–414.
- Cordell, H. K., B. L. McDonauld, R. J. Teasley, and J. Bergstrom. 1995. NSRE: National survey on recreation and the environment. Sporting Goods Manufacturers Association, North Palm Beach, Florida and United States Department of Agriculture Forest Service, Washington, D.C.
- Coy, P. L. 1999. Geographic variation in reproduction of Minnesota black bears. M.S. Thesis, University of Minnesota, Minneapolis, Minnesota. 104pp.
- DeCoster, L. A. 1995. *The legacy of Penn's woods: a history of the Pennsylvania Bureau of Forestry*. Pennsylvania Historical and Museum Commission, Harrisburg, Pennsylvania. 95pp.
- Diefenbach, D. R., and G. L. Alt. 1998. Modeling and evaluation of ear tag loss in black bears. *Journal of Wildlife Management* 62:1292–1300.
- Diefenbach, D. R., J. L. Laake, and G. L. Alt. 2003. *In review*. Spatio-temporal and demographic variation in the harvest of black bears in Pennsylvania. *Journal of Wildlife Management* 00:000–000.
- Dubey, J. P., J. G. Humphreys, and P. Thulliez. 1995. Prevalence of viable *Toxoplasma gondii* tissue cysts and antibodies to *T. gondii* by various serologic tests in black bears (*Ursus americanus*) from Pennsylvania. *Journal of Parasitology* 81:109–112.
- DuBrock, C. W., A. R. Tipton, and J. B. Whelan. 1978. Evaluation of bear hunters survey and its implications on black bear management in Virginia. *Proceedings of the Annual Conference of the Southeast Association of Fish and Wildlife Agencies* 32:202–207.
- Duda, M. D., and K. C. Young. 1994. *Americans and wildlife diversity. Responsive Management*, Harrisonburg, Virginia.
- Elowe, K. D. 1990. Bear hunting with hounds: techniques and effects on bears and the public. *Proceedings of the Eastern Black Bear Workshop on Bear Management and Research* 10:101–109.
- Environmental Resources Research Institute. 1996. *Digital map: Pennsylvania's physiographic regions*, PA Explorer CD-ROM edition. Pennsylvania State University, University Park, Pennsylvania.
- Eveland, J.F. 1973. Population dynamics, movements, morphology, and habitat characteristics of black bear in Pennsylvania. M.S. Thesis, Pennsylvania State University, University Park, Pennsylvania. 157pp.
- Fagerstone, K. A., M. A. Coffey, P. D. Curtis, R. A. Dolbeer, G. J. Killian, L. A. Miller, and L. M. Wilmot. 2002. *Wildlife fertility control*. Wildlife Society Technical Review 02-2. 29pp.
- Fies, M. L., D. D. Martin, and G. T. Blank, Jr. 1987. Movements and rates of return of translocated black bears in Virginia. *International Conference on Bear Research and Management* 7:369–372.
- Folk, G. E., M. A. Folk, and J. J. Monor. 1972. Physiological condition of three species of bears in winter dens. *International Conference on Bear Research and Management* 2:107–124.
- Folk, G. E., A. Larson, and M. A. Folk. 1976. Physiology of hibernating bears. *International Conference on Bear Research and Management* 3:373–380.
- Garshelis, D. L. 1989. Nuisance bear activity and management in Minnesota. Pages 169–180 in M. Bromley, editor. *Bear-people conflicts – proceedings of a symposium on management strategies*. Northwest Territories Department of Natural Resources, Yellowknife, Northwest Territories.
- Garshelis, D. L. 1994. Density-dependent population regulation of black bears. Pages 3–14 in M. Taylor, editor. *Density-dependent population regulation in black, brown, and polar bears*. *International Conference on Bear Research and Management Monograph Series Number 3*. 43 pp.

- Garshelis, D. L., and K. V. Noyce. 2001. Trends in black bear-human conflicts during a 2-decade burgeoning bear population. *Western Black Bear Workshop* 7:13. Abstract only.
- Garshelis, D. L., and M. R. Pelton. 1981. Movements of black bears in the Great Smoky Mountains National Park. *Journal of Wildlife Management* 47:405–412.
- Gerstell, R. 1939. The growth and size of Pennsylvania black bears. *Pennsylvania Game News* 10(8):4–7.
- Giles, J. M., and W. S. Kordek. 1979. Pennsylvania bear hunting, recent trends and future prospects. *Pennsylvania Game News* 50(12):15–17.
- Gillin, C. M., F. M. Hammond, C. M. Peterson. 1994. Evaluation of an aversive conditioning technique used on female grizzly bears in the Yellowstone Ecosystem. *International Conference On Bear Research and Management* 9(1):503–512.
- Godfrey, C. L. 1996. Reproductive biology and denning ecology of Virginia's exploited black bear population. M.S. Thesis, Virginia Polytechnic Institute and State University, Blacksburg, Virginia.
- Gordon, S. E. 1923. Raising native game in a wild state on refuges – trapping and releasing the surplus on shot-out territory. *Proceedings of the International Association of Game, Fish, and Conservation Commissioners* 17:38–44.
- Gunther, K. A. 1994. Bear management in Yellowstone National Park, 1960–93. *International Conference on Bear Research and Management* 9(1):549–560.
- Hall, E. R. 1981. *The mammals of North America*. 2nd edition. John Wiley & Sons, New York, New York. 1181pp.
- Harshyne, W. A., D. D. Diefenbach, G. L. Alt, and G. M. Matson. 1998. Analysis of error from cementum-annuli age estimates of known-age Pennsylvania black bears. *Journal of Wildlife Management* 62:1281–1291.
- Herrero, S. 1985. *Bear attacks: their causes and avoidance*. Nick Lyons Books, Winchester Press, Piscataway, New Jersey. 287pp.
- Herrero, S. 1999. In *Introduction*. Pages 144–156 in C. Servheen, S. Herrero, and B. Peyton, compilers. *Bears. Status survey and conservation action plan*. IUCN/SSC Bear and Polar Bear Specialist Groups. IUCN, Gland, Switzerland and Cambridge, United Kingdom. 309pp.
- Herrero, S., and S. Fleck. 1990. Injury to people inflicted by black, grizzly or polar bears: recent trends and new insights. *International Conference on Bear Research and Management* 8:25–32.
- Hock, R. J., and A. M. Larson. 1966. Composition of black bear milk. *Journal of Mammalogy* 47:539–540.
- Hunt, C. L. 1984. Behavioral responses of bears to tests of repellents, deterrents, and aversive conditioning. M.S. Thesis, University of Montana, Missoula, Montana.
- Hynstrom, S. E. 1994. Black bears. Pages c5–c15 in S. E. Hynstrom, R. M. Timm, and G. E. Larson, editors. *Prevention and control of wildlife damage*. University of Nebraska Press, Lincoln, Nebraska.
- Igo, W. K. 2001. West Virginia status report. *Proceedings of the Eastern Black Bear Workshop on Bear Management and Research* 16:88–98.
- Inman, K. H., and M. R. Vaughan. 2002. Hunter effort and success rates of hunting bears with hounds in Virginia. *Ursus* 13:223–230.
- Jenness, R., A. W. Erickson, and J. J. Craighead. 1972. Some comparative aspects of milk from four species of bears. *Journal of Mammalogy* 53:34–47.
- Jonker, S. A., J. A. Parkhurst, R. Field, and T. K. Fuller. 1998. Black bear depredation on agricultural commodities in Massachusetts. *Wildlife Society Bulletin* 26:318–324.
- Jorgensen, C. J., R. H. Conley, R. J. Hamilton, and O. T. Sanders. 1978. Management of black bear depredation problems. *Proceedings of the Eastern Black Bear Workshop on Bear Management and Research* 4:297–321.
- Kellert, S. R. 1994. Public attitudes toward bears and their conservation. *International Conference on Bear Research and Management* 9(1):43–50.
- Kolenosky, G. B., and S. M. Strathearn. 1987. Black bear. Pages 442–455 in M. Novak, J. A. Baker, M. E. Obbard, and B. Mallock, editors. *Wild furbearer management and conservation in North America*. Ontario Ministry of Natural Resources, Toronto, Canada.
- Kordek, W. S., and J. S. Lindzey. 1980. Preliminary analysis of female reproductive tracts from Pennsylvania black bears. *International Conference on Bear Research and Management* 4:159–161.
- Kosack, J. *The Pennsylvania Game Commission 1895–1995, 100 years of wildlife conservation*. Pennsylvania Game Commission, Harrisburg, Pennsylvania. 233pp.
- Lindzey, J. S., G. L. Alt, W. S. Kordek, and G. J. Matula, Jr. 1979. Hunting, bear populations, and stress. *Research Paper Number 230 of the Pennsylvania Cooperative Wildlife Research Unit*, Pennsylvania State University, University Park, Pennsylvania. 8pp.
- Lindzey, J. S., G. L. Alt, C. R. McLaughlin, and W. S. Kordek. 1983. Population response of Pennsylvania black bears to hunting. *International Conference on Bear Research and Management* 5:34–39.
- Litvaitis, J. A., and D. M. Kane. 1994. Relationship of hunting technique and hunter selectivity to composition of black bear harvest. *Wildlife Society Bulletin* 22:604–606.
- Maehr, D. S. 1983. Black bear depredation on bee yards in Florida. *Proceedings of the Eastern Wildlife Damage Control Conference* 1:133–135.
- Martin, D. 2001. Virginia status report. *Proceedings of the Eastern Black Bear Workshop on Bear Management and Research* 16:87–88.
- Massopust, J. L., and R. K. Anderson. 1984. Homing tendencies of translocated nuisance black bears in northern Wisconsin. *Proceedings of the Eastern Black Bear Workshop on Bear Management and Research* 7:66–73.
- Massopust, J. L., and R. K. Anderson. 1984. The response of black bears to being chased by hunting dogs. *Proceedings of the Eastern Black Bear Workshop on Bear Management and Research* 7:59–65.
- Matson, J. R. 1954. Observations on the dormant phase of a female black bear. *Journal of Mammalogy* 35:28–35.

- Matula, G. J., Jr., J. S. Lindzey, and H. Rothenbacher. 1980. Sex, age, and seasonal differences in the blood profile of black bears captured in northeastern Pennsylvania. International Conference on Bear Research and Management 4:49–56.
- McArthur, K. L. 1981. Factors contributing to effectiveness of black bear transplants. *Journal of Wildlife Management* 45:102–110.
- McCarthy, T. M., and R. J. Seavoy. 1994. Reducing nonsport losses attributable to food conditioning: human and bear behavior modification in an urban environment. International Conference on Bear Research and Management 9(1):75–84.
- McAtee, W. L. 1939. The electric fence in wildlife management. *Journal of Wildlife Management* 31:928–929.
- McCullough, D. R. 1982. Behavior, bears, and humans. *Wildlife Society Bulletin* 10:27–33.
- McIvor, D. E., and M. R. Conover. 1994. Perceptions of farmers and non-farmers towards management of problem wildlife. *Wildlife Society Bulletin* 22:212–221.
- McLaughlin, C. R. 1981. Home range, movements, and denning behavior of female black bears in northcentral Pennsylvania. M.S. Thesis, Pennsylvania State University, University Park, Pennsylvania. 63pp.
- McLaughlin, C. R., C. J. Baker, W. E. Drake, and G. Waldman. 1981. Movements of tagged black bears in northcentral Pennsylvania, a preliminary report. Pennsylvania Game Commission, Harrisburg, Pennsylvania. 17pp. Unpublished report.
- McLaughlin, C. R., C. J. Baker, A. Sallade, and J. Tamblin. 1981. Characteristics and movements of translocated nuisance black bears in northcentral Pennsylvania. Pennsylvania Game Commission, Harrisburg, Pennsylvania. 31pp. Unpublished report.
- McLaughlin, C. R., and H. L. Smith. 1990. Baiting black bears: hunting techniques and management issues. Proceedings of the Eastern Black Bear Workshop on Bear Management and Research 10:110–119.
- McLean, P. K., and M. R. Pelton. 1990. Some demographic comparisons of wild and panhandler bears in the Smoky Mountains. International Conference on Bear Research and Management 8:105–112.
- Miller, L. A., B. E. Johns, and D. J. Elias. 1998. Immunocontraception as a wildlife management tool: some perspectives. *Wildlife Society Bulletin* 26:237–243.
- Paige, L. C. 2000. America's wildlife: the challenge ahead. International Association of Fish and Wildlife Agencies. Washington, D.C.
- Pelton, M. R. 1982. Black bear (*Ursus americanus*). Pages 504–514 in J. A. Chapman and G. A. Feldhamer, editors. *Wild mammals of North America*. The Johns Hopkins University Press, Baltimore, Maryland.
- Pelton, M. R., A. B. Coley, T. H. Eason, D. L. Martinez, J. A. Pederson, F. T. Van Manen, and K. M. Weaver. 1999. American black bear conservation action plan. Pages 144–156 in C. Servheen, S. Herrero, and B. Peyton, compilers. *Bears. Status survey and conservation action plan*. IUCN/SSC Bear and Polar Bear Specialist Groups. IUCN, Gland, Switzerland and Cambridge, United Kingdom. 309pp.
- Pennsylvania Department of Agriculture. 2002. Pennsylvania agricultural statistics 2001–2002. Pennsylvania Agricultural Statistics Service, Pennsylvania Department of Agriculture, Harrisburg, Pennsylvania. 113pp.
- Pennsylvania Game Commission. 2005. Pennsylvania Game Commission annual report, 2003–04. Available online at www.pgc.state.pa.us, Reports & Minutes.
- Peyton, B. 1989. A profile of Michigan bear hunters and bear hunting issues. *Wildlife Society Bulletin* 17:463–470.
- Piekielek, W., and T. S. Burton. 1965. A black bear population study in northern California. *California Fish and Game* 61:4–25.
- Quinn, R. 1981. Parasites of black bears in Pennsylvania. M.S. Thesis, Pennsylvania State University, University Park, Pennsylvania. 70pp.
- Rhoads, S. N. 1903. *The mammals of Pennsylvania and New Jersey*. Privately published, Philadelphia, Pennsylvania. 266pp.
- Robinson, F. A. 1963. Beekeeping among the bears. *American Bee Journal* 103:454–456.
- Rockwell, D. 1991. Giving voice to bear: North American Indian rituals, myths, and images of the bear. Roberts Rinehart, Niwot, Colorado. 224pp.
- Rogers, L. L. 1977. Social relationships, movements, and population dynamics of black bears in northeastern Minnesota. Ph.D. Dissertation, University of Minnesota, Minneapolis. 194 pp.
- Rogers, L. L. 1984. Reactions of free-ranging black bears to capsaicin spray repellent. *Wildlife Society Bulletin* 12:59–61.
- Rogers, L. L. 1986. Effects of translocation distance on frequency of return by adult black bears. *Wildlife Society Bulletin* 14:76–80.
- Rogers, L. L. 1987. Effects of food supply and kinship on social behavior, movements, and population growth of black bears in northeastern Minnesota. *Wildlife Monograph* 97. 72pp.
- Rose, L. 2001. Bears on the rise. *Pennsylvania Game News* 72(11):11–13.
- Rosenberry, C. S., and M. L. Lovallo. 2002. A uniform system of management units for managing Pennsylvania's wildlife resources. Pennsylvania Game Commission, Harrisburg, Pennsylvania. 40pp. Unpublished report.
- Sauer, P. R., and S. Free. 1969. Movements of tagged bears in the Adirondacks. *New York Fish and Game Journal* 16:205–223.

- Schad, G. A., D. A. Leiby, C. H. Duffy, K. D. Murrell, and G. L. Alt. 1986. *Trichinella spiralis* in the black bear (*Ursus americanus*) of Pennsylvania: distribution, prevalence and intensity of infection. *Journal of Wildlife Diseases* 22:36–41.
- Scheick, B. K. 2002. A survey of regulations on black bears in the United States. *International Bear News* 11(4):24–25.
- Schirokauer, D. W., and H. M. Boyd. 1998. Bear-human conflict management in Denali National Park and Preserve 1982–94. *Ursus* 10:395–403.
- Servheen, C. 1990. The status and conservation of the bears of the world. International Conference on Bear Research and Management Monograph Series Number 2. 32pp.
- Shoemaker, H. W., and J. C. French. 1921. The black bear of Pennsylvania. Times Tribune Company, Altoona, Pennsylvania. 92pp.
- Shull, S. D., M. R. Vaughan, and L. Comly. 1994. Use of nuisance bears for restoration purposes. Proceedings of the Eastern Black Bear Workshop on Bear Management and Research 12:107–114.
- Shorger, A. W. 1946. Influx of bears into St. Louis Co., Minnesota. *Journal of Mammalogy* 27:177.
- Siebert, S. G., W. H. Stiver, K. D. Delozier, and M. R. Pelton. 1999. Reuniting black bear cubs to their natural mother. Proceedings of the Eastern Black Bear Workshop on Bear Management and Research 14:58–59.
- Smith, T. S. 1998. Attraction of brown bears to red pepper spray deterrent: caveats for us. *Wildlife Society Bulletin* 26:92–94.
- Storer, T. I., G. H. Vansell, and B. D. Moses. 1938. Protection of mountain apiaries from bears by the use of electric fences. *Journal of Wildlife Management* 2:172–178.
- Ternent, M. A., and D. L. Garshelis. 1999. Taste-aversion conditioning to reduce nuisance activity by black bears in a Minnesota military reservation. *Wildlife Society Bulletin* 27:720–728.
- Ternent, M. A., T. Conway, R. M. Hough, G. Feaser, R. D. Buss, S. E. Harshaw, and M. S. Rutkowski. 2001. Recommendations for reducing nuisance black bear conflicts in Pennsylvania. Report of the Nuisance Black Bear Management Committee, Pennsylvania Game Commission, Harrisburg, Pennsylvania. 24pp.
- True, F. W. 1882. On a cinnamon bear from Pennsylvania. Proceedings of the Academy of Natural Sciences of Philadelphia 5:653–656.
- Truman, J. B. 1926. Biennial report of the Board of Game Commissioners of the Commonwealth of Pennsylvania for the 1925–1926 biennium. Pennsylvania Game Commission, Harrisburg, Pennsylvania.
- United States Environmental Protection Agency. 1994. Digital map of forest cover types derived from F. H. Eyre. 1980. Forest cover types of the United States and Canada. Society of American Foresters. Bethesda, Maryland. 148 pp. Digitized by S.H. Azevedo. 1989. Forest Ozone Team, United States Environmental Protection Agency Environmental Research Lab, Corvallis, Oregon.
- United States Fish and Wildlife Service. 2003. 2001 national survey of fishing, hunting, and wildlife-associated recreation: Pennsylvania. United States Department of the Interior Fish and Wildlife Service and United States Department of Commerce Census Bureau, Washington, D.C. 46pp.
- Vaughn, M. 2002. Oak trees, acorns, and bears. In M. J. McShea and W. N. Healy, editors. Oak forest ecosystems – ecology and management for wildlife. The Johns Hopkins University Press, Baltimore, Maryland. 432 pp.
- Virginia Department of Game and Inland Fisheries. 2003. Virginia black bear management plan. Virginia Department of Game and Inland Fisheries. Richmond, Virginia.
- Vreeland, J. J. 2002. Fawn survival in Pennsylvania. *Pennsylvania Game News* 73(9):12–16.
- Wagner, K. K., R. H. Schmidt, and M.R. Conover. 1997. Compensation programs for wildlife damage in North America. *Wildlife Society Bulletin* 25:312–319.
- Warburton, G. S., and R. C. Maddrey. 1994. Survey of nuisance bear programs in eastern North America. Proceedings of the Eastern Black Bear Workshop on Bear Management and Research 12:115–123.
- Whitaker, J. O., Jr., and W. J. Hamilton, Jr. 1998. Mammals of the eastern United States. Cornell University Press, Ithaca, New York.
- Will, G. B. 1980. Black bear-human conflicts and management considerations to minimize and correct these problems. Proceedings of the Eastern Black Bear Workshop on Bear Management and Research 5:75–88.
- Williamson, D. F. 2002. In the black: status, management, and trade of the American black bear (*Ursus americanus*) in North America. TRAFFIC North America, World Wildlife Fund, Washington, D.C. 161pp.
- Wimsatt, W. A. 1963. Delayed implantation in the Ursidae, with particular reference to the black bear (*Ursus americanus* Pallus). Pages 49–76 in A. C. Enders, editor. Delayed implantation. University of Chicago Press, Chicago, Illinois.

APPENDIX 1. Establishing the mission, goals, and objectives for Pennsylvania’s bear management plan.

Introduction

Stakeholders from 6 areas of interest were invited to an all-day meeting to discuss what they value about Pennsylvania’s black bear resource. Organizations that were contacted include:

Sportsmen Interests

PA Federation of Sportsmen’s Clubs
Unified Sportsmen of Pennsylvania
United Bowhunters of Pennsylvania
Pennsylvania Nite Hunters
Fox Chasers Association
Governor’s Sportsmen’s Advisory Council

Agricultural Interests

Pennsylvania Farm Bureau
Pennsylvania Vegetable Growers Association State
Pennsylvania State Grange
Private Apiary Owner/Operator
Pennsylvania Department of Agriculture
Habitat

Public & Private Forestry Interests Regional

Forest Investments Associates
Kane Hardwood Inc.
USDA Forest Serv.-Allegheny Nat. Forest
PA Dept. of Cons. & Natural Resources

Environmental Conservation Interests

PA Audubon Society
Western Pennsylvania Conservancy
The Nature Conservancy
Pennsylvania Wildlife Federation

Local, County, and State Regulatory Interests

County Commissioners Assoc. of PA
State Assoc. of Township Supervisors
Legislature

Game Commission Employees

Wildlife Conservation Officers
Biologist
Directors

An invitation letter was sent to each participant along with pages 1-49 and appendices 1-5 of this document so that participants would be knowledgeable of black bear biology, population status, history, management, and current issues before attending.

The meeting was held at the State College Ramada Inn on October 17, 2003, from 9:30 am to 3:30 pm. Frances Teslar and Paul Hindmarsh, management consultants from the Bureau of Management Consulting in the Governor’s Office of Administration, facilitated the meeting.

The objective of the meeting was to gather input from groups that have an interest in how bear populations in Pennsylvania are managed. Specifically, we wanted participants to (1) develop a mission statement for bear management in Pennsylvania; (2) agree upon goals that are important to that mission, and (3) list values they consider important, which we could use to develop objectives and strategies for achieving those goals.

The facilitators summarized notes collected during the meeting and provided a written report to the Game Commission. Flip-charts with comments recorded during the meeting also were provided.

Results

Shaping the Vision: Characteristics of a successful plan

Participants were asked, “In the future, what characteristics, attributes or outcomes would you consider as evidence that this plan was successful”. The result was:

- A balance between bears and people.
- A bear population that is managed for consensus of all the public’s needs and wants.
- A public tolerant and better educated about bears.
- Commercial interests that are satisfied with bear population levels.
- Bear populations that are sustainable.
- Better public access to bear habitats with increased hunting opportunities.
- A reduction in human-bear conflicts.
- Better integration of bear management (e.g., public education and conflict resolution) into management programs of other wildlife species.

Participants then drafted a vision (mission statement) for bear management in Pennsylvania:

“A black bear population in balance with other wildlife species, and with the needs of the consumptive and non-consumptive public met.”

Identifying Goals

Participants broke out into 5 groups and individually discussed, “What do you want this plan to accomplish”. Items that were listed (some by more than one group) include:

- Determine the cultural carrying capacity for bears in each wildlife management unit.
- Adjust bear populations (up or down) so they are at cultural carrying capacity.
- Improve ways to avoid conflicts between bears and agriculture.
- Develop solutions that are applied at small scale in areas with local problems.
- Improve how the Game Commission responds to bear conflicts.
- Develop a statewide policy for handling nuisance bears.
- Increase information and education efforts about bear biology and how to avoid conflicts.
- Improve efforts to educate new residents that move into bear habitats about bears and promote higher tolerance/understanding levels.
- Refine the focus of educational efforts to resolving specific bear problems.
- Continue to ban the feeding of bears.
- Preserve bear hunting as a management tool.
- Increase bear hunting opportunities without jeopardizing bear populations.

- Open bear hunting season on a Saturday.
- Consider adding a trapping season for bear.
- Consider adding a bear season for youth hunters only.
- Maintain consistency in hunting seasons, particularly a traditional bear season.
- Stabilize bear populations.
- Ensure that bear populations are healthy.
- Use sound management practices that are based in science.
- Use science when developing population goals.
- Continue research and monitoring efforts.
- Maintain quality bear habitats.
- Inventory existing habitats for bear and evaluate for potential problems.
- Attempt to mitigate threats or potential problems with bear habitats.
- Provide options for managing bear habitats.
- Earmark funds specifically for bear management.
- Develop partnerships with possible sources of additional funding for bear management.
- Solicit political support for bear management.
- Increase staffing to adequate levels for implementing the bear management plan.
- Increase public involvement in bear management planning.
- Periodically review and update the bear management plan in the future.

Participants identified 5 subject areas that encompass all the actions suggested in this list: Populations; Information and Education; Recreation; Habitats; and Public Relations. These subject areas were used to develop the 4 goals listed in this plan.

Identifying Values

Participants listed topics that they value as important to consider when developing a bear management plan:

- | | |
|-----------------------------------------------|------------------------------------|
| • Carrying capacity (biological and cultural) | • Maintaining balance among issues |
| • Enjoyment/recreation (hunting and viewing) | • Flexibility |
| • Hunting/trapping heritage | • Clarity of management direction |
| • Resolving human-bear conflicts | • Use of science |
| • Providing assistance to the public | • Bear ecology |
| • Human safety | • Sense of wildness |
| • Protecting life and property | • Honesty |
| • Having low bear damage levels | • Ethics |
| • Information and education | • Bear productivity/sustainability |
| | • Preserving habitats |
| | • Habitat quality |

These values, along with the desired actions listed above and technical or practical limitations identified by agency personnel were used to develop the 9 objectives and 26 strategies contained in this plan.

APPENDIX 2. Target dates for completing objectives and strategies.

| Objective | Strategy | By End of Year | | | | | | | | | |
|-------------------------------------------------------------------------|------------------------------------------------------------------------------------|----------------|------|------|------|------|------|------|---------------|------|---------------|
| | | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
| 1.1 Develop population objectives for each WMU by Apr. 2009 | 1.1.1 Survey PA residents about satisfaction with existing bear populations | | | ● | | | | | ● (repeat) | | |
| | 1.1.2 Annually document type and number of human-bear conflicts | ● ^a | | | | | | | | | |
| 1.2 Continue to monitor harvest annually | 1.2.1 Use mandatory check stations to measure harvest by WMU | ● ^a | | | | | | | | | |
| 1.3 Monitor population status in WMUs by Dec. 2012 | 1.3.1 Annually estimate population size using mark-recapture methods | ● ^a | | | | | | | | | |
| | 1.3.2 Develop a population model for predicting trend and evaluating management | | | | ● | | | | | | |
| | 1.3.3 Recommend appropriate research if data are insufficient for a reliable model | | | | | ● | | | | | |
| | 1.3.4 Monitor for changes in reproduction, survival, and animal health/condition | | | | | | | ● | | | |
| 2.1 Monitor forest traits important to bears in WMUs by Dec. 2011 | 2.1.1 Identify important forest characteristics and report measurements/threats | | | | | | ● | | | | ● (repeat) |
| | 2.1.2 Conduct a statewide, annual wildlife food survey | ● ^a | | | | | | | | | |
| | 2.1.3 Implement hard-mast survey developed by Northeast Turkey Technical Committee | | | ● | | | | | | | |
| 2.2 Improve forested habitats for black bears where needed by Dec. 2013 | 2.2.1 Increase participation in forest conservation programs | | | | ● | | | | | | |
| | 2.2.2 Purchase lands for addition to State Game Land system | ● ^a | | | | | | | | | |
| | 2.2.3 Identify practices that improve habitat conditions for black bears | | | | | | ● | | | | |
| | 2.2.4 Incorporate habitat improvements practices into State Game Lands planning | | | | | | | ● | | | |

^a Would occur annually thereafter. Target date represents when work should begin.

APPENDIX 2, continued.

| Objective | Strategy | By End of Year | | | | | | | | | |
|---------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|----------------|------|------|------|------|------|------|------|------|------|
| | | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
| 2.2 Continued. | 2.2.5 Promote/encourage habitat improvement practices among private forest owners | | | | | | | | • | | |
| 3.1 Improve methods of reducing nuisance bear behavior by Dec. 2012 | 3.1.1 Remove bears identified as chronic nuisances from the population | • ^a | | | | | | | | | |
| | 3.1.2 Develop/improve conflict-prevention outreach materials | | | • | | | | | | | |
| | 3.1.3 Evaluate aversive conditioning or other practices to develop BMPs | | | | | • | | | | | |
| | 3.1.4 Develop research proposals if a practice cannot be adequately evaluated | | | | | | | • | | | |
| 3.2 Lower bear numbers in local areas where they | 3.2.1 Develop criteria for selecting and delineating local management areas | | • | | | | | | | | |
| | 3.2.2 Implement use of harvest objectives that are evaluated annually to adjust season dates/limits | | | • | | | | | | | |
| 4.1 Allow bear hunting annually | 4.1.1 Establish harvest goals by WMU to reach population objectives | | | | • | | | | | | |
| | 4.1.2 Hold a traditional, statewide bear-only season each November | • ^a | | | | | | | | | |
| | 4.1.3 Identify WMUs where harvest is below goals and consider adding new opportunities | | | | | • | | | | | |
| | 4.1.4 Estimate recreational benefit for any new opportunities; select those with greatest benefit | | | | | | • | | | | |
| 4.2 Improve nonhunting recreational opportunity by Dec. 2010 | 4.2.1 Add information on bear viewing and photography to outreach materials | | | | | | • | | | | |

^a Would occur annually thereafter. Target date represents when work should begin.

APPENDIX 3. Personnel that may be involved with implementing objectives and strategies. List is intended to depict the scope of resources that may be required for each strategy, other personnel groups or agencies may be required.

| Objective | Strategy | Executive Office | | | Region Offices | | | | Bur. Administ. Services | | Bureau of Information & Education | | | | | Bureau of Land Management | | | Bureau Law Enforcement | | Bur. Automated Technology | | Bur. Wildl. Mgmt. | | |
|-----------|----------|------------------|----------|--------|------------------------|-----------------|---------------------|-------------------------|-------------------------|-----------|-----------------------------------|-------------|------------|--------------|--------------|---------------------------|----------------|------------|------------------------|--------------------|---------------------------|------------|-------------------|----------|-------------|
| | | Personnel | Training | Policy | Law Enforcement (WCOs) | Land Management | Wildlife Management | Information & Education | Procurement | Licensing | Publications | Information | Hunter Ed. | Conserv. Ed. | Audio/Visual | Forestry | Habitat/Envir. | Game Lands | Technical Serv. | Enforcement (WCOs) | Technical Serv. | Operations | Data Resources | Research | Propagation |
| 1.1 | 1.1.1 | | | | | | | | | | | | | | | | | | | • | | • | • | | |
| | 1.1.2 | | | | • | | • | | | | | | | | | | | | | | • | | • | • | |
| 1.2 | 1.2.1 | | | | | | • | | | | | | | | | | | | | • | | | • | • | |
| 1.3 | 1.3.1 | | • | | • | • | • | | | | | | | | | | | | | | | | • | • | • |
| | 1.3.2 | | | | | | | | | | | | | | | | | | | | | | | • | • |
| | 1.3.3 | | | | | | | | | | | | | | | | | | | | | | | • | • |
| | 1.3.4 | | | | | | | • | | | | | | | | | | | | | | | | • | • |
| 2.1 | 2.1.1 | | | | | • | • | • | | | | | | | | • | | | | | | | | • | • |
| | 2.1.2 | | | | • | • | • | | | | | | | | | • | | | | | | | | • | • |
| | 2.1.3 | | | | | | • | | | | | | | | | • | | | | | | | | • | • |
| 2.2 | 2.2.1 | | | | | | | • | | | • | • | | • | • | | | | | | | | | | |
| | 2.2.2 | | | | | | | | | | | | | | | | | | | | | | | | |
| | 2.2.3 | | | | | | • | • | | | | | | | | • | • | | | | | | | • | |
| | 2.2.4 | | | | | | • | • | | | | | | | | • | • | | | | | | | | |
| | 2.2.5 | | | | | | | • | | | • | • | | • | • | | | | | | | | | | |
| 3.1 | 3.1.1 | | | | • | | | • | | | • | • | | | | | | | | | | | | • | |
| | 3.1.2 | | | | | | | • | | | • | • | | | | | | | | | | | | • | |
| | 3.1.3 | | | | | | | • | | | | | | • | | | | | | | | | | • | |
| | 3.1.4 | | | | | | | | | | | | | | | | | | | | | | | • | • |
| 3.2 | 3.2.1 | | | | | | • | | | | | | | | | | | | | | | | | • | • |
| | 3.2.2 | | | | | | | | | | | | | | | | | | | | | | | • | • |
| 4.1 | 4.1.1 | | | | | | | | | | | | | | | | | | | | | | | • | • |
| | 4.1.2 | | | | • | | • | | | | • | • | | | | | | | • | • | | | | • | • |
| | 4.1.3 | | | | | | | | | | | | | | | | | | | | | | | • | • |
| | 4.1.4 | | | | | | | • | | | | | • | | | | | | • | | • | | | • | • |
| 4.2 | 4.2.1 | | | | | | | • | | • | • | | • | • | | | | | | | | | • | • | |

APPENDIX 4. Additional literature that pertains to black bears in Pennsylvania but was not cited in the report.

- Alt, G. L. 1978. 14 1/2 miles of bear tracks. Pennsylvania Game News 49(6):24–29.
- Alt, G. L. 1979. Where the hunters came from and where they went: three years of bear harvests. Pennsylvania Game News 50(11):26–29.
- Alt, G. L. 1979. Training and information manual for bear project cooperators. Pennsylvania Game Commission, Harrisburg, Pennsylvania. 24pp. Mimeographed.
- Alt, G. L. 1980. Bears, beehives, and beekeepers. Gleanings in Bee Culture 108:137–140.
- Alt, G. L. 1980. Factors affecting bear harvests. Pennsylvania Game News 51(8):23–25.
- Alt, G. L. 1980. Preliminary results of Pennsylvania's 1979 bear harvest. Pennsylvania Game News 51(4):13–20.
- Alt, G. L. 1980. Pennsylvania bear harvest trends. Pennsylvania Game News 51(9):8–15.
- Alt, G. L. 1981. Bear hibernation: subject of ecological and medical research. Pennsylvania Game News 52(5):15–16.
- Alt, G. L. 1981. Results of Pennsylvania's 1980 bear harvest. Pennsylvania Game News 52(10):20–25.
- Alt, G. L. 1982. Results of Pennsylvania's 1981 bear season. Pennsylvania Game News 53(5):18–25.
- Alt, G. L. 1983. Results of Pennsylvania's 1982 bear season. Pennsylvania Game News 54(5):17–21.
- Alt, G. L. 1984. Results of Pennsylvania's 1983 bear season. Pennsylvania Game News 55(12):26–30.
- Alt, G. L. 1986. 1985 bear season results. Pennsylvania Game News 57(4):20–22.
- Alt, G. L. 1988. 1987 bear season results. Pennsylvania Game News 59(4):43–45.
- Alt, G. L. 1992. Just one more time. Pennsylvania Game News 63(4):3–6.
- Alt, G. L. 1994. 1993 bear season results. Pennsylvania Game News 65(3):22–23.
- Alt, G. L. 1996. 1995 bear season results. Pennsylvania Game News 67(6):9–13.
- Alt, G. L. 1998. 1997 bear season results. Pennsylvania Game News 69(4):12–15.
- Alt, G. L. 1999. 1998 bear season results. Pennsylvania Game News 70(8):10–13.
- Alt, G. L., and J. S. Lindzey. 1980. Movements and behavior of bears tracked by radio. Science in Agriculture, Pennsylvania State University, College of Agriculture, Agricultural Experiment Station 28(1):7.
- Alt, G. L., C. R. McLaughlin, and K. H. Pollock. 1985. Ear tag loss by black bears in Pennsylvania. Journal of Wildlife Management 49:316–320.
- Anonymous. 1952. The black bear in Pennsylvania. Pennsylvania Game News 23(4):11–18.
- Falker, S. T., and M. C. Brittingham. 1998. Black bears. Wildlife damage control publication Number 3. Pennsylvania State University, College of Agricultural Sciences Cooperative Extension, University Park, Pennsylvania. 3pp.
- Fegely, T. 1980. Black monster of the Promised Land. Pennsylvania Game News 51(11):21–24.
- Fergus, C. Black bear. Wildlife Notes 175-29, Black bear. Pennsylvania Game Commission, Harrisburg, Pennsylvania. 2pp. Informational brochure.
- Giles, J. M. 1978. Bear management: an increasing worldwide concern. Pennsylvania Game News 49(8):23–25.
- Giles, J. M. 1981. A brief account of the management and natural history of the Pennsylvania black bear. Pennsylvania Game News 52(4):26–33.
- Giles, J. M. 1982. Bear 424-956. Pennsylvania Game News 53(4):8–9.
- Giles, J. M., and W. K. Shope. 1981. Aging the 1979 Pennsylvania hunter-killed black bears. Pennsylvania Game News 52(2):19–20.
- Gordon, S. E. 1922. The black bear as a game animal in Pennsylvania. Bulletin of the American Game Protective Association 2(1):2–5.
- Kirkpatrick, C. E., D. A. Leiby, D. Abraham, and C. H. Duffy III. 1986. *Gongylonema pulchrum molin* (Nematoda: Gongylonematidae) in black bears (*Ursus americanus pallus*) from Pennsylvania. Journal of Wildlife Diseases 22:119–121.
- Kordek, W. S. 1973. An investigation of the structure, stability, and movements of Pennsylvania black bear with particular emphasis on Pike county. M.S. Thesis, Pennsylvania State University, University Park, Pennsylvania. 77pp.
- Kordek, W. S., and J. M. Giles. 1978. Weights of Pennsylvania bears. Pennsylvania Game News 49(10):8–9.
- Kulp, B. 1987. How I got the Number 3 bear. Pennsylvania Game News 58(2):26–30.
- Lindzey, J. S., W. S. Kordek, and et al. 1976. The black bear in Pennsylvania: status, movements, values, and management. International Conference on Bear Research and Management 3:215–224.
- Marks, T. A. 1998. Bear days. Pennsylvania Game News 69(3):32–33.
- Matula, G. J. 1976. Behavioral and physiological characteristics of black bears in northeastern Pennsylvania. M.S. Thesis, Pennsylvania State University, University Park, Pennsylvania. 187pp.
- Matula, G. J., Jr., and J. S. Lindzey. 1976. Blood analysis, a potential research tool for studies of black bears. Transactions of the Northeastern Fish and Wildlife Conference 33:57–69.
- Maugans, B. 1987. Number 1 black bear. Pennsylvania Game News 58(2):3.
- Pennsylvania Game Commission. 1975. Pennsylvania hunting facts: hunting seasons and bag limits, game harvests and related statistics from 1915 through 1974. Pennsylvania Game Commission, Harrisburg, Pennsylvania. Informational brochure.
- Pennsylvania Game Commission. 2000. Living with Pennsylvania's black bear. Pennsylvania Game Commission, Harrisburg, Pennsylvania. 6pp. Informational brochure.

- Pennsylvania General Assembly. 1905. Pages 248– 255 *in* Laws of the General Assembly of the Commonwealth of Pennsylvania passed at the session of 1905. WM. Stanley Ray, State Printer of Pennsylvania, Harrisburg, Pennsylvania.
- Pennsylvania General Assembly. 1919. Pages 822– 829 *in* Laws of the General Assembly of the Commonwealth of Pennsylvania passed at the session of 1919. J.L.L. Kuhn, Printer to the Commonwealth, Harrisburg, Pennsylvania.
- Pennsylvania General Assembly. 1921. Pages 420– 421 *in* Laws of the General Assembly of the Commonwealth of Pennsylvania passed at the session of 1921. J.L.L. Kuhn, Printer to the Commonwealth, Harrisburg, Pennsylvania.
- Rose, L. 2001. Bear check stations, a wealth of information. Pennsylvania Game News 72(2)19– 21.
- Storm, G. L., G. L. Alt, G. J. Matula Jr., and R. A. Nelson. 1988. Blood chemistry of black bears from Pennsylvania during winter dormancy. Journal of Wildlife Diseases 24:515– 521.
- Ternent, M. A. 2002. 2001 bear season. Pennsylvania Game News 73(8):8– 12.
- Wakefield, G. C. 1969. Movements, habitat, and population characteristics of the American black bear in Pennsylvania. M.S. Thesis, Pennsylvania State University, University Park, Pennsylvania. 95pp.
- Wakefield, G. C. 1972. A summary of the black bear population characteristics in Pennsylvania. International Conference on Bear Research and Management 2:43– 52.
- Wutsch, A. 2001. Have you ever eaten bear meat? Pennsylvania Game News 72(11):31– 33.

APPENDIX 5. Highlights of the Pennsylvania Game Code that involve black bears.

Buying and Selling of Bear Parts

- Unless otherwise provided, it is unlawful for anyone to buy or sell any part of a game animal (§ 2312.a).
- However, § 2312.c2 authorizes the Game Commission to establish by regulation exceptions for the buying and selling of inedible wildlife parts.
- The current regulation for bear allows non-edible parts to be sold only by the hunter harvesting the bear, provided the sale occurs within 90 days of the end of the hunting season when the bears was harvested.
- Non-edible parts include the hide, skull, bones, and claws. Gall bladders are considered an edible part, and therefore cannot be sold or bought under this exception.
- Properly licensed taxidermists are permitted to sell finished products (tanned skins, mounts, etc) to recoup expenses associated with work not claimed or paid for by a hunter.

Killing Bears in Self-Defense

- Bears can be killed in self-defense only when it is clearly evident that a human is about to be injured and there is no other course of action (§ 2141.a). Simply perceiving that there is a threat of injury is not sufficient; the facts must corroborate that injury was actually going to occur.
- The incident must be reported as soon as possible and within 24 hours (§ 2141.b).
- The bear cannot be retained by the person killing it (§ 2141.c).

Killing Bears to Protect Property

- Farmers may kill any bear perceived as a threat to cultivated crops, fruit trees, vegetables, livestock, poultry, or beehives (§ 2121.a.1-3). A farmer is anyone cultivating land as a primary means of income, or lessees and employees of the farmer that regularly assist with cultivation (§ 2121.c).
- Bears cannot be killed by anyone other than a farmer, lessees, or employees even if agricultural damage is occurring on their property, or to protect any property other than cultivated crops, fruit trees, vegetables, livestock, poultry, or beehives even if the damage is occurring on a farm.
- Bears that are killed to protect agricultural items must be reported within 24 hours (§ 2122) and cared for to prevent spoilage unless otherwise directed (§ 2123).
- The person killing a bear can retain the carcass for consumption if it was not killed at a site where deterrent fencing had been provided and if the property is open to public hunting. Only one carcass can be in possession at any given time (§ 2124).

Damage Compensation Payments

- Payment is only provided for damage or loss to livestock, poultry, bees, and bee-keeping equipment (§ 551.a).
- Damage must be reported by sworn written statement within 10 days and the land where the damage occurred open to public hunting (§ 551.a).
- Only Pennsylvania residents can receive damage payments (§ 551.c).
- Payments represent the true value of damage sustained, not projected losses (§ 553). If the value of damages cannot be mutually agreed upon, claimants can request a hearing to resolve the matter (§ 554).
- The sum of all bear-related damage payments in any year cannot exceed \$50,000 (§ 555).
- When paying for bees or bee-keeping equipment, a bear must not have been killed at the site; affected hives must be within 300 yards of the owner's residence or the residence of a person overseeing the hives; and the claim cannot be a second or subsequent claim unless a Commission-approved electric fence was erected and maintained (§ 551.b.1-3).

Applying to Receive Commission-Purchased Electric Fencing

- Anyone who has 10 or more beehives in one location, allows public hunting on their land, and is experiencing or anticipating bear damage to their hives can request electric fencing materials from the Game Commission (§ 541). Unsuccessful applicants may request a hearing to resolve the matter (§ 545).
- There is no cost to the recipients, but they are responsible for erecting and maintaining the fence (§ 545).
- The Commission-approved fence design includes 3 strands of 12 gauge, 4-point barbed wire suspended at 10, 20, and 30 inches above the ground between insulated posts that are a maximum of 10 feet apart. Fences operate on either a 12-volt DC (battery) system or AC current. Solar-charging systems are not provided. Recipients are encouraged to "bait" the wire by hanging bacon over the wire at several locations.
- Fences are expected to last 10 years. If the recipient no longer needs a fence (e.g., stops producing honey) before 10 years have passed, they are required to repay the cost of fencing materials prorated at a 10% annual depreciation rate.
- Annual expenses for supplying fencing materials cannot exceed \$300,000, excluding fences erected on commercial forestlands (§ 546).

Prohibiting The Feeding of Bears

- Feeding of certain wildlife can be prohibited by the Game Commission (Title 58, § 137.33).
- "It is unlawful to, except for normal or accepted farming, habitat management practices, oil and gas drilling, mining, forest management activities or other legitimate commercial or industrial practices, intentionally lay or place food, fruit, hay, grain, chemical, salt or other minerals anywhere in this Commonwealth for the purpose of feeding bears, or to intentionally lay or place food, fruit, hay, grain,

chemical, salt or other minerals that may cause bear to congregate or habituate an area. If songbird feeders are being used by bears, the Commission may issue a written notice prohibiting the songbird feeding.”

- Regulation given final approval at April 2003 Board of Game Commissioners meeting.
- Expiration (sunset) date of October 2004 removed from regulation in July 2004.

Hunting Restrictions

- Only manually operated centerfire rifles, handguns and shotguns; muzzleloading firearms of any caliber; long, recurve, and compound bows; or crossbows can be used.
- Bullets must be designed to expand on impact, and bullets or balls must be all-lead. Buckshot is illegal. Arrows must be fitted with broadheads of cutting edge design.
- Hunters cannot use electronic devices to locate bears fitted with radiotransmitters or alert other hunters to the presence of game. Electronic calls, and any device that emits a beam of light onto the animal also are prohibited.
- Hunting near bait or areas baited within the past 30 days is prohibited (Title 34, § 2308.a8). Lures or scents are considered bait and cannot be used.
- Bears in dens cannot be killed or harassed.
- Organized parties of hunters cannot exceed 25 people, and they must maintain a roster of hunters belonging to the group. (Title 58, § 141.42)
- It is unlawful to hunt, disturb, or chase bears within 150 yards of any building (i.e., Safety Zone) without the permission of the occupants.
- It is unlawful to hunt from a vehicle, have a loaded firearm in a vehicle, or exit a vehicle and shoot at bears unless the hunter has moved at least 25 yards from the roadway. Shooting at bears on roads open to public travel, and shooting over a road is prohibited unless the bullet trajectory is high enough to not be a danger.
- At least 250 square inches of fluorescent orange on the head, chest and back combined so as to be visible 360 degrees is required while hunting bear.
- Hunters are required to make a reasonable effort to retrieve any bears injured or killed.
- Bears must be tagged by the successful hunter before being moved.
- Tagged bears must be taken to an established check station within 24 hours of harvest. Hunters must bring their hunting license, bear license, and proof of identification with them to the check station (Title 34, § 2323.a2).
- Bears cannot be hunted on Sunday.

Possession of Vehicle-Killed Bears

- Unlike deer, individuals that kill a bear with a vehicle cannot pick up the carcass and keep it in their possession (Title 34, § 2307).
- However, carcasses of vehicle-killed bears that are salvageable may be sold by the Game Commission, including to the individuals who struck the bear (Title 58 §147.141).

APPENDIX 6. Pennsylvania Nuisance Black Bear Policy approved by Board of Game Commissioners, January 23, 2001.

BUREAU OF WILDLIFE MANAGEMENT

Policy Item – A request to approve an agency policy concerning the handling of black bear conflicts.

Commentary: Pennsylvania's black bear population has noticeably increased and expanded in range since the late 1970s. From two core areas in the northcentral and northeast regions, the population has grown to include an estimated 10,000+ animals distributed across two-thirds of the state. Expansion of human development and residential areas into occupied bear habitats has also occurred. Unsurprisingly, the number of human-bear conflicts has increased, and responding to bear incidents is now a common duty for many Pennsylvania Game Commission personnel in all regions of the state. Teaching people about bears resolves many of the conflicts encountered and information/education efforts are currently used by all regions, but some incidents require additional action. A policy for dealing with these incidents was needed to provide direction and address a growing public concern.

5501 – Bear Response Policy

Bear in Boroughs, Towns and Cities

Public Education, Hazing, and Coordination with Local Authorities Transient bears pose minimal threat to public safety under most circumstances, and educating the public about bears may be the only required intervention. However, if a Pennsylvania Game Commission employee or Deputy Wildlife Conservation Officer considers it unlikely that a bear will leave an area on its own, he or she will work with local authorities to haze the bear away from the borough, town or city. Hazing includes any activity intended to move or lure a black bear in a desired direction, such as crowd control, traffic control, or noise (i.e., cracker shells).

Immobilization and Relocation is authorized when it has been determined that a bear cannot leave an area on its own, creates a traffic or other hazard, or is in imminent danger. The bear will be relocated to the nearest suitable habitat.

Destruction is authorized when a bear presents an imminent threat to public health or safety and immobilization is not feasible, or when a bear is deemed a human-habituated nuisance and previous relocation efforts have failed to resolve the problem.

Bear Exhibiting Aggressive Behavior

Reducing Attractants, Hazing, Aversive Conditioning, or Tranquilization and Relocation

Foods that encourage bears to aggressively approach humans should be discouraged or removed. Bears exhibiting aggressive behavior may be hazed, subjected to aversive conditioning, or immobilized and relocated to a suitable, non-conflict area depending on the situation. Aversive conditioning may include the use of rubber bullets, pepper spray, water, loud noises or other devices and activities that associate a negative stimulus with the unwanted bear behavior. Aggression due to defense of young outside of residential areas will not be interpreted as unnatural or unprovoked behavior.

Destruction is authorized if a bear exhibits aggression that presents an imminent threat to public health or safety. Any Pennsylvania Game Commission employee or Deputy Wildlife Conservation Officer may make this emergency determination and take action without consent from the Region Director or his designee. In those instances where action must precede regional notification, a full report will be made to the Region Director immediately after the animal is destroyed and the scene controlled.

Property Damage

Preventative Measures Taken by Landowner Pennsylvania Game Commission employees and Deputy Wildlife Conservation Officers will work with landowners and homeowners to prevent or minimize bear-related conflicts on their properties by providing technical advice (e.g., on the use of bird and other wildlife feeders, securing food sources, etc.) or assistance (e.g., permanent fencing as provided under Title 34, temporary fencing, repellent, equipment for hazing bear, etc.).

Hazing and Aversive Conditioning is authorized if preventative measures fail to adequately reduce damage.

Immobilization and Relocation is authorized if preventative measures, hazing, or aversive conditioning fail to reduce damage or are impractical. Relocation should occur in a suitable, non-conflict area as far as possible from the site of damage.

Destruction is authorized if the responsible bear is identifiable, a clear history of persistent property damage is apparent, and previous relocation efforts have failed to resolve the problem.

Injured or Orphaned Bears

Immobilization and Relocation Bears are resilient and can recover from most injuries without assistance. However, bears that threaten public safety or appear to require treatment for recovery may be immobilized and relocated to the nearest suitable habitat.

Orphaned bears cubs will be placed with an adoptive female bear. If adoption is not possible, orphaned cubs will be rehabilitated and released to the wild if human habituation did not occur during captivity.

Destruction is authorized when chance of recovery from injury is deemed unlikely or impractical, or if human habituation precludes release into the wild.

General Comments

Any bear that is immobilized will be inspected for ear-tags and tagged in both ears prior to release. Any carcass that results from destruction of a black bear will be utilized in an appropriate manner as determined by the Region Director or his designee.

APPENDIX 7. Summary of black bear hunting regulations in the U.S. (modified from Scheick 2002).

| State or Province | Listed Status | Any Bear Season | Dog Hunting Season | Baiting | Comments |
|-------------------|---------------|-----------------|--------------------|---------|------------------------------------------------------------------------------------------------------------------------------------|
| Alabama | Game | No | No | No | Small population in very southern Alabama only. |
| Alaska | Game | Yes | Yes | Yes | Dogs and bait require permits, use of dogs is very rare. |
| Arizona | Game | Yes | Yes | No* | *Baiting season in commission rules, but has not been authorized in over 15 years. |
| Arkansas | Game | Yes | No | No* | *No harvest over bait, can bait 30 days prior to start of season. |
| California | Game | Yes | Yes | No | |
| Colorado | Game | Yes | No | No | |
| Connecticut | Protected | No | No | | |
| Delaware | Exotic | No | No | No | No wild bear population since colonial times. |
| Florida | Threatened* | No | No | No** | *State designation except in 2 counties with no listed status, **Baiting for deer is legal on private lands, which feeds bears. |
| Georgia | Game | Yes | Yes | No* | *No harvest over bait, can bait all year except for during season or 2 week prior. |
| Hawaii | Unclassified* | No | No | No | *Not part of historic or current bear range. |
| Idaho | Game | Yes | Yes | Yes | |
| Illinois | Extirpated | No | No | No | No wild bear population, may be some transients. |
| Indiana | Extirpated | No | No | | |
| Iowa | Game | No | No | | No wild bear population, occasional transients from Minnesota or Wisconsin. |
| Kansas | Wildlife | No | No | No | No wild bear population, incidental sightings in extreme southeast and far west. |
| Kentucky | Protected | No | No | | |
| Louisiana | Threatened* | No | No | | *Federal designation. |
| Maine | Game | No | Yes | Yes | Trapping also permitted. |
| Maryland | Game | Yes | No | No | First season occurred in fall 2004. |
| Massachusetts | Game | Yes | No | No | |
| Michigan | Game | Yes | Yes | Yes | |
| Minnesota | Game | Yes | Yes | | |
| Mississippi | Endangered* | No | No | No** | *State designation, southern half also Federally designated as Threatened for <i>U. a. luteolus</i> , **Feeding wildlife is legal. |
| Missouri | Rare | No | No | | |

APPENDIX 7, continued.

| State or Province Status | Listed | Any Bear Season | Dog Hunting Season | Baiting | Comments |
|--------------------------|---------------|-----------------|--------------------|---------|--------------------------------------------------------------------------------------------------------------|
| Montana | Game | Yes | No | No | |
| Nebraska | Game | No No No | | | No population, occasional transient. |
| Nevada | Game | No No | No | | |
| New Hampshire | Game | Yes | Yes | Yes | |
| New Jersey | Game | Yes* | No | No** | *First season occurred in fall 2003, **No hunting in 300ft of baited areas. |
| New Mexico | Game | Yes | Yes | No | |
| New York | Game | Yes | No | No* | Feeding bears is illegal. |
| North Carolina | Game | Yes | Yes | No | |
| North Dakota | Protected | No No No | | | No wild bear population, occasional transients from Canada or Minnesota. |
| Ohio | Endangered* | No | No | No | *State designation, population estimated at 50-75 bears. |
| Oklahoma | Game | No | No | No | Population newly colonized from Arkansas, only in 1-2 counties in SE. |
| Oregon | Game | Yes | No | Yes | Only nuisance bears can be baited or hounded. |
| Pennsylvania | Game | Yes | No | No* | *Can feed wildlife, but not hunt over bait. Cannot feed bears. |
| Rhode Island | Unclassified* | No | No | No** | *Protected by closed season, **Feeding bears is illegal. |
| South Carolina | Game | No | No | No* | *Illegal to entice bears for any purpose. |
| South Dakota | Threatened | No | No | No | No wild bear population. |
| Tennessee | Game | Yes | Yes | No | |
| Texas | Threatened* | No | No | No | *State designation, east Texas has added federal listing as Threatened for <i>U. a. luteolus</i> . |
| Utah | Game | Yes | Yes | Yes | |
| Vermont | Game | Yes | Yes* | No** | *6 dog max, with permit. **Can strike hounds over bait, but not hunt over bait. |
| Virginia | Game | Yes | Yes | No* | *Feeding bears allowed on private lands only. |
| Washington | Game | Yes | No* | No | *Hounding and pursuit season removed by voters' initiative, but use of hounds for nuisance bears is allowed. |
| West Virginia | Game | Yes | Yes | No | |
| Wisconsin | Game | Yes | Yes | Yes* | *Baiting starts 2 months prior to season. |
| Wyoming | Game | Yes* | No | Yes** | *Spring and fall seasons, **except within grizzly areas. |

APPENDIX 8. Game Commission administrative regions.



Each region is comprised of the following counties:

- Northwest: Butler, Clarion, Crawford, Erie, Forest, Jefferson, Lawrence, Mercer, Venango, and Warren
- Southwest: Allegheny, Armstrong, Beaver, Cambria, Fayette, Greene, Indiana, Somerset, Washington, and Westmoreland
- Northcentral: Cameron, Centre, Clearfield, Clinton, Elk, Lycoming, McKean, Potter, Tioga, and Union
- Southcentral: Adams, Bedford, Blair, Cumberland, Franklin, Fulton, Huntingdon, Juniata, Mifflin, Perry, and Snyder
- Northeast: Bradford, Carbon, Columbia, Lackawanna, Luzerne, Monroe, Montour, Northumberland, Pike, Sullivan, Susquehanna, Wayne, and Wyoming
- Southeast: Berks, Bucks, Chester, Dauphin, Delaware, Lancaster, Lebanon, Lehigh, Montgomery, Northampton, Philadelphia, Schuylkill, and York

APPENDIX 9. Summary of public comments.

A draft version of this management plan was made available for public comment from October 11 to December 9, 2005 (60-day comment period). A news release and posting on the Game Commission’s web page announced the public comment period. The document was available electronically through the Game Commission’s web page, or in printed format by request. Comments could be submitted via the web page, through e-mail, or in writing to the agency’s Harrisburg Office.

One hundred eighty-four correspondences were received. Twenty-three were identical duplicates of comments previously submitted by the same individuals and therefore excluded from further analyses. Two hundred fifty-one comments were identified from the remaining 161 correspondences. For example, a correspondence that stated, “I support an archery bear season, but also would like to see a baiting and hound hunting season for bear” would be divided into 3 comments: one each supporting archery hunting, baiting, and pursuit with hounds.

Forty-five topics were identified from the 251 comments. The number of comments received for each topic is noted below, along with the management plan strategies most related to the topic.

| Com Topic | ments Received | Most Related Strategy |
|-----------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|--------------------------|
| 1. Create an archery bear hunting season, but would prefer it to be longer than currently proposed and/or concurrent with archery deer season | 53 | 4.1.3; 4.1.4 |
| 2. Lengthen firearms bear hunting season into firearms deer season; offer concurrent bear-deer firearms opportunities | 20 | 4.1.3; 4.1.4 |
| 3. Do not create an archery bear hunting season | 18 | 4.1.2; 4.1.4 |
| 4. Create an archery bear hunting season; did not mention changing the archery bear season proposed for 2006..... | 14 | 4.1.3; 4.1.4 |
| 5. Allow the use of bait when hunting bear; offer a baiting season or baiting license..... | 14 | 4.1.3; 4.1.4 |
| 6. Close or reduce the extended bear hunting season; concerned about overharvest | 12 | 3.2.2; 4.1.1 |
| 7. Create regulations that prohibit cubs from being harvested | 9 | none |
| 8. Do not change bear hunting seasons; happy with traditional 3-day season | 8 | 4.1.2 |
| 9. Create an archery bear hunting season, but expand the area that will be open from what is currently proposed | 8 | 4.1.3; 4.1.4 |
| 10. Reduce the number of bears and/or stop the expansion of bears into areas where bear densities were once low..... | 7 | 1.1.1; 3.2.1; |
| 11. Open bear hunting season on Saturday and/or permit bear hunting on Sunday | 6 | 4.1.1 4.1.3; 4.1.4 |
| 12. Increase educational efforts to reduce human-bear conflicts | 6 | 3.1.2 |
| 13. Offer a spring bear hunting season | 5 | 4.1.3; 4.1.4 |
| 14. Maintain or increase the current number of bears | 5 | 1.1.1; 4.1.1 |

APPENDIX 9, continued.

| Com Topic | ments Received | Most Related Strategy |
|-----------------------------------------------------------------------------------------------------------------------|-------------------|--------------------------|
| 15. Allow the use of hounds when hunting bear; offer a hound season or hound license | 4 | 4.1.3; 4.1.4 |
| 16. Use a lottery, harvest quota, or limit license sales if needed to expand bear hunting opportunities | 4 | 4.1.3; 4.1.4 |
| 17. Stop relocating nuisance bears; concerned about problems with relocated bears near release sites | 4 | 3.1.3 |
| 18. Increase penalties for illegal use of bait to harvest bears | 3 | none |
| 19. Require a bowhunter education/proficiency class before archery bear hunting | 3 | none |
| 20. Would prefer to see more forestry management; e.g., make more irregular-shaped clear cuts | 2 | 2.2.3; 2.2.4 |
| 21. Temporarily close bear hunting season or only open season every-other-year to increase bear populations..... | 2 | 1.1.1; 4.1.1 |
| 22. Open 3-day bear hunting season later to protect more early-denning females..... | 2 | 4.1.1; 4.1.2 |
| 23. Create regulations that prohibit the use of organized drives when hunting bear | 2 | none |
| 24. Do not allow bait, hound, or traps to be used in bear harvest seasons | 2 | 4.1.4 |
| 25. Do not use hunting to control bear populations; opposed to bear hunting..... | 2 | none |
| 26. Allow houndsmen to chase nuisance bears as a form of aversive conditioning or to capture specific offenders | 2 | 3.1.3 |
| 27. Maintain a list of hunters to contact for removing nuisance bears instead of agency staff euthanizing bears | 2 | 3.1.3 |
| 28. Reduce the frequency of bear encounters near homes; concerned about safety of children..... | 2 | 3.1.1; 3.1.2; |
| 29. Make maps of harvest location data available online and/or post harvest data by township..... | 2 | 3.2.1 none |
| 30. Eliminate the requirement to take bears to a check station | 1 | 1.2.1 |
| 31. Eliminate the bear hunting license; require only a general hunting license | 1 | none |
| 32. Supports the purchase of more State Game Lands acreage to protect forested habitats..... | 1 | 2.2.2 |
| 33. Keep bear populations at huntable levels | 1 | 1.1.1; 4.1.1 |
| 34. Only allow residents to purchase bear hunting licenses | 1 | none |
| 35. Make more use of emergency extensions if harvest during 3-day bear hunting season is insufficient | 1 | 4.1.3; 4.1.4 |
| 36. Allow the use of calls and scents when hunting bear | 1 | 4.1.3; 4.1.4 |
| 37. Enhance opportunities to view bears; create sanctuary areas that have reliable viewing opportunities | 1 | 4.2.1 |
| 38. Solicit input from hunters on bear management decisions | 1 | 1.1.3 |
| 39. Consider deer and turkey management plans in bear management decisions | 1 | 1.1.3 |
| 40. Consult with neighboring states so that management decisions are regionally compatible and uniform | 1 | 1.1.3 |
| 41. Provide farmers with compensation for damage caused by bears | 1 | none |

APPENDIX 9, continued.

| Com Topic | ments Received | Most Related Strategy |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|--------------------------|
| 42. Eliminate regulations that allows farmers to kill bears causing damage and encourage farmers to allow public hunting as a substitute | 1 | none |
| 43. Impose fines for people who repeatedly report nuisance bear conflicts without taking action to eliminate attractants | 1 | none |
| 44. Add ecosystem protection to mission statement | 1 | none |
| 45. Miscellaneous comments that included: unsatisfied with deer populations, seeking employment opportunities, questions about regulations, suggestion for changing design of field tags attached to harvested bears, inquiring about age of hunter's bear, reporting problems with web page, reporting unique sighting of bears or general compliment on management plan (i.e., no specific topic mentioned) | 13 | none |

