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TITLE 7. ENVIRONMENTAL PROTECTION
CHAPTER 25. DIVISION OF FISH AND WILDLIFE RULES
SUBCHAPTER 5. 2015-2016 GAME CODE

N.J.A.C. 7:25-5.6 (2015)

§ 7:25-5.6 Black bear (Ursus americanus), bobcat (Felis rufus)

(a) There is a closed season for bobcat. It shall be illegal to intentionally take, kill, or attempt to take or kill a bobcat in the State of New Jersey at any time. Trappers shall report any bobcat incidentally caught within 24 hours of discovery to 1-877-WarnDEP (1-877-927-6337). Bobcat, including any part thereof, legally harvested in other U.S. states or Canadian provinces may be possessed provided they are affixed with a Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) tag from the state or province of harvest. It shall be illegal to use dogs to pursue or run black bears. There is a season for black bears in accordance with the approved Comprehensive Black Bear Management Policy (CBBMP) (see section Appendix, incorporated herein by reference). The season for black bears shall consist of two segments. Segment A shall be a period of six consecutive days beginning on the second Monday in October. Segment B shall be concurrent with the six-day firearm deer season as enumerated in N.J.A.C. 7:25-5.27(a). During each segment, black bear may only be harvested by the means specified in (a)4 below. Legal hunting hours for black bears shall be 1/2 hour before sunrise to 1/2 hour after sunset. Following the commencement of the season, the Director shall close the season if the harvest rate reaches 30 percent. The Director will announce such closure, which will become effective 24 hours from the daily legal closing time of the day on which the Division determines that the harvest rate reaches 30 percent, based upon data obtained and reviewed by the Division at the close of each day of the season. Harvest rate equals the number of harvested bears that were tagged in the current calendar year within bear management zones (BMZs) open to hunting divided by the number of bears that were tagged in the current calendar year that are available for harvest (total number of bears tagged in the current year within BMZs open to hunting minus known mortality of such tagged bears and number of such tagged bears known to have left the BMZs that are open to hunting). Season closure will be announced by news release, radio, the Division's website (www.njfishandwildlife.com) and other media.

1. Special black bear hunting permit requirement: All black bear hunters must have a current and valid firearm or archery hunting license and a current and valid special "black bear hunting permit" which will be issued by the Division. A total of 11,000 special black bear hunting permits, allocated by bear management zone (BMZ), will be available to properly licensed hunters. Black bear hunting permits and special farmer black bear permits are not transferable and must be in the possession of the hunter while hunting black bears. Hunters are limited to hunting in no more than two BMZs per season. Hunters are limited to purchasing up to two permits per (a)1iii below, one for each BMZ hunted, until the end of Segment A. If a hunter harvests one bear during Segment A, the hunter may purchase an additional permit for that BMZ, if available, so that the hunter may hunt in that BMZ during Segment B. Any permits unfilled in Segment A are valid for use in Segment B. After Segment A, a hunter may purchase an additional permit in a second BMZ, if available, if

that hunter had initially purchased only one permit for Segment A, and hunters who did not purchase any permits for Segment A may purchase up to two permits for Segment B, one for each BMZ hunted. Juvenile hunters aged 10 through 13 years of age must have a black bear hunting permit and be under the direct supervision of a properly licensed adult (21 years of age or older) while bear hunting. The adult must also possess a black bear hunting permit. Direct supervision means the juvenile hunter and the supervising adult are together at the same location. The juvenile hunter may not hunt independently of the adult.

i. Black bear hunting permits will be issued on an individual basis to holders of valid and current firearm and/or archery hunting licenses. Black bear hunting permits and special farmer black bear permits are valid only in the BMZ and year designated on the permit, and are not transferable.

ii. Black bear hunting permits consist of a back display and include a "Black Bear Transportation Tag." The back display shall be conspicuously worn in the middle of the back in addition to the valid firearm or archery license.

iii. Black bear hunting permits shall be issued on an individual basis to holders of valid and current firearm or archery hunting licenses, including juvenile licenses, via the Division's ELS or, in the event of ELS operating difficulties, by providing the same information at ELS locations through such alternate system as may be designated by the Division. All persons, while their hunting licenses are void under authority of law or as imposed by a court, are prohibited from procuring a black bear hunting permit. Any permit obtained by fraud shall be void.

iv. Special Farmer Black Bear Permits shall be applied for as follows:

(1) Only the owner or lessee of a farm, who resides thereon, or immediate members of his family 10 years of age or older who also reside thereon, may apply on forms provided for a special farmer black bear permit. Under this section a farm is an area of five acres or more and producing a gross income in excess of $ 500.00 and is tax assessed as farmland. Special farmer black bear permits will be issued only in those Black Bear Management Zones where a season is prescribed.

(2) Application forms may be obtained from the Division of Fish and Wildlife, MC 501-03, PO Box 420, Trenton, N.J. 08625-0420.

(3) The application shall be filled in to include Conservation ID Number or name, age, address, and any other information requested thereon. Properly completed application forms will be accepted in the Trenton office no later than October 15. There is no fee required and all qualified applicants will receive a Special Farmer Black Bear Permit delivered by mail.

(4) Application for a farmer black bear permit shall not preclude a farmer from procuring, as stated in (a)1iii above, a regular black bear season permit as a holder of a valid hunting license.

2. Bag limit: One bear of either sex and any age may be harvested per permit, but only one bear may be harvested per segment, regardless of the number of permits the hunter holds. It is unlawful to take or attempt to take or continue to hunt for more than the number of black bear permitted. Properly licensed hunters who harvest a black bear shall immediately complete and affix to the bear the "Black Bear Transportation Tag" from their Black Bear Hunting Permit. Information included on the black bear transportation tag shall include: the

hunters name, address and current firearm or archery license number; date and time of kill; BMZ, county, and municipality of kill; and the sex of the black bear. Successful hunters must take the black bear to a designated check station by 9:00 P.M. on the day of the kill during Segment A or by 7:00 P.M. on the day of the kill during Segment B. Hunters shall surrender the black bear transportation tag and will be issued a legal possession tag. Any legally killed black bear recovered too late to be brought to a designated black bear check station by 9:00 P.M. on the day of the kill during Segment A or by 7:00 P.M. on the date of the kill during Segment B must be reported immediately by telephone to the nearest regional Bureau of Law Enforcement office. Hunters must provide their name, address, and a telephone number where they can be reached on the telephone message recording device, if a Division representative is not available. Said black bear must be brought to a designated black bear check station on the next weekday to be registered and to receive a legal possession tag.

3. The black bear management zones are located as follows:

i. Zone 1. That portion of Warren and Sussex Counties lying within a continuous line beginning at the intersection of the Portland Bridge and the Delaware River at Columbia; then northward along the east bank of the Delaware River to the New York State Line; then east along the New York State Line to Rt. 519; then south along Rt. 519 to its intersection with Rt. 627; then south along Rt. 627 to its intersection with Rt. 626; then south along Rt. 626 to its intersection with Rt. 521; then southwest along Rt. 521 to its intersection with Rt. 94 in Blairstown; then southwest along Rt. 94 to the Portland Bridge, the point of beginning in Columbia. The islands of Labar, Tocks, Poxono, Depew, Namanock, Minisink and Mashipacong lying in the Delaware River are also included within this Hunting Area.

ii. Zone 2. That portion of Sussex, Warren and Morris Counties lying within a continuous line beginning at Portland Bridge in Columbia; then northward along Rt. 94 to its intersection with Rt. 521 in Blairstown; then north along Rt. 521 to its intersection with Rt. 626; then north along Rt. 626 to its intersection with Rt. 627; then north along Rt. 627 to its intersection with Rt. 519 in Branchville; then north along Rt. 519 to the New York State Line; then southeast along the New York State line to Rt. 517; then south along Rt. 517 to its intersection with Rt. 94; then south on Rt. 94 to its intersection with Rt. 23 in Hamburg Borough; then south along Rt. 23 to its intersection with Rt. 517 in Franklin; then south along Rt. 517 to its intersection with Rt. 15 in Sparta; then south along Rt. 15 to its intersection with Interstate 80 in Dover; then west along interstate 80 to its intersection with Rt. 94; then south along Rt. 94 to the intersection with the Portland Bridge and the Delaware River located in Columbia, the point of beginning.

iii. Zone 3: That portion of Sussex, Passaic, Morris, and Bergen Counties lying within a continuous line beginning at the intersection of Rt. 80 and Rt. 15 in Dover; then north along Rt. 15 to its intersection with Rt. 517 in Sparta; then north along Rt. 517 to its intersection with Rt. 23 in Franklin; then north along Rt. 23 to its intersection with Rt. 94 in Hamburg Borough; then north along Rt. 94 to its intersection with Rt. 517; then north along Rt. 517 to the New York State Line; then east along the New York State Line to its intersection with Rt. 287; then south along Rt. 287 to its intersection with Rt. 80; then west along Rt. 80 to its intersection with Rt. 15 the point of beginning in Dover.

iv. Zone 4. That portion of Sussex, Warren, Morris, Somerset and Hunterdon Counties lying within a continuous line beginning at the intersection of Route 78 and the Delaware River; then north along the east bank of the Delaware River to the Portland Bridge at Columbia; then northeast along Rt. 94 to its intersection with Rt. 80; then east along Rt. 80 to its intersection with Rt. 287; then southwest along Rt. 287 to its intersection with Rt. 78; then

west along Rt. 78 to the Delaware River the point of beginning.

v. Zone 5. That portion of Hunterdon, Mercer, Morris, Passaic, Somerset, and Warren Counties lying within a continuous line beginning at the intersection of Rt. 78 and the Delaware River; then east along Rt. 78 to its intersection with Rt. 287; then northeast along Rt. 287 to its intersection with Rt. 202 in Oakland; then south along Rt. 202 to its intersection with Rt. 23; then south along Rt. 23 to its intersection with Rt. 80; then west along Rt. 80 to its intersection with the Passaic River; then west along the north bank of the Passaic River to its intersection with Rt. 80; then west on Rt. 80 to its intersection with Rt. 280; then south along Rt. 280 to its intersection with Rt. 632; then south along Rt. 632 to its intersection with Rt. 608; then south along Rt. 608 to its intersection with Rt. 124; then southeast along Rt. 124 to its intersection with Rt. 638; then south along Rt. 638 to its intersection with Rt. 531; then south along Rt. 531 to its intersection with Rt. 527; then south along Rt. 527 to its intersection with Rt. 533; then south along Rt. 533 to its intersection with Rt. 206; then south along Rt. 206 to its intersection with Rt. 518; then west along Rt. 518 to its intersection with Rt. 165; then west along Rt. 165 to its intersection with Rt. 179; then west along Rt. 179 to the Delaware River; then north along the east bank of the Delaware River to its intersection with Rt. 78, the point of beginning.

vi. Zone 6. That portion of Bergen, Essex, Hudson, Middlesex, Morris, Passaic, Somerset, and Union Counties lying within a continuous line beginning at the intersection of Rt. 287 and the New York state line; then southeast along the New York state line to the Hudson River; then south along the west shore of the Hudson River to Upper New York Bay; then south along the shore of Upper New York Bay to the Kill Van Kull; then west along the north shore of the Kill Van Kull to Newark Bay; then west across Newark Bay to its confluence with the Arthur Kill; then south along the west shore of the Arthur Kill to its intersection with Route 440; then west along Route 440 to its intersection with Route 287; then west along Route 287 to its intersection with Rt. 533; then north along Rt. 533 to its intersection with Rt. 527; then north along Rt. 527 to its intersection with Rt. 531; then north along Rt. 531 to its intersection with Rt. 638; then north along Rt. 638 to its intersection with Rt. 124; then northwest along Rt. 124 to its intersection with Rt. 608; then north along Rt. 608 to its intersection with Rt. 632; then north along Rt. 632 to its intersection with Rt. 280; then northwest along Rt. 280 to its intersection with Rt. 80; then east along Rt. 80 to its intersection with the Passaic River; then east along the north bank of the Passaic River to its intersection with Rt. 80; then east along Rt. 80 to its intersection with Rt. 23; then north along Rt. 23 to its intersection with Rt. 202; then north along Rt. 202 to its intersection with Rt. 287; then north along Rt. 287 to its intersection with the New York state line, the point of beginning.

vii. Zone 7. That portion of Atlantic, Burlington, Camden, Cape May, Cumberland, Gloucester, Hunterdon, Mercer, Middlesex, Monmouth, Ocean, Salem, and Somerset Counties lying within a continuous line beginning at the intersection of Rt. 179 and the Delaware River; then east along Rt. 179 to its intersection with Rt. 165; then east along Rt. 165 to its intersection with Rt. 518; then east along Rt. 518 to its intersection with Rt. 206; then north along Rt. 206 to its intersection with Rt. 533; then north along Rt. 533 to its intersection with Rt. 287; then east along Rt. 287 to its intersection with Rt. 440; then east along Rt. 440 to its intersection with the Arthur Kill at Perth Amboy; then south along the west shore of the Arthur Kill to Raritan Bay, then south and east along the shore of Raritan Bay to Sandy Hook; then north along the east shore of Sandy Hook Bay to the tip of Sandy Hook; then south along the Atlantic Ocean to the Delaware Bay shore; then north and west along the shore of Delaware Bay to its intersection with the Delaware River; then north along the east bank of the Delaware River to its intersection with Rt. 179, the point of beginning.

4. During the entirety of Segment A, bows as described in N.J.A.C. 7:25-5.24 may be used. During the last three days of Segment A, muzzleloader rifles of .44 or larger caliber may also be used. During Segment A, no shotgun shall be used to hunt black bears. During Segment B, only shotguns no smaller than 20 gauge or larger than 10 gauge with rifled slugs, and/or muzzleloader rifles of .44 or larger caliber shall be used. In either segment, persons hunting with muzzleloader rifle must also possess a current and valid rifle-hunting permit.

5. Hunting manner shall be by stand hunting, still-hunting, or drive hunting with bow, shotgun, or muzzleloader rifle. Black bears may not be taken from dens. No person shall attempt to take or kill a black bear or have in their possession or control any firearm, or other weapon of any kind, while elevated in a standing tree or in a structure of any kind within 300 feet of a baited area (N.J.S.A. 23:4-24.2). Persons hunting black bears with a firearm must wear a cap made of daylight fluorescent orange or an outer garment containing at least 200 square inches of fluorescent orange material visible from all sides at all times while hunting.

6. A Black Bear Management Zone Map is on file at the Office of Administrative Law and is available from the Division. The Black Bear Hunting Season Permit Quotas are as set forth by Zone as follows:

BLACK BEAR HUNTING SEASON PERMIT QUOTAS

Bear Management Zone	Hunting Season Permit Quota	Portions of Counties Involved
1	2,000	Sussex, Warren
2	3,000	Sussex, Warren, Morris
3	3,000	Sussex, Passaic, Morris, Bergen
4	2,000	Warren, Hunterdon, Morris, Somerset, Sussex
5	1,000	Hunterdon, Mercer, Morris, Passaic, Somerset, and Warren
6	0	Somerset, Union, Middlesex, Bergen, Essex, Hudson, Morris, Passaic
7	0	Hunterdon, Mercer, Somerset, Ocean Middlesex, Monmouth, Burlington, Camden, Gloucester, Atlantic Salem, Cumberland, Cape May

(b) If the season harvest rate of black bears is less than 20 percent at the conclusion of the last day of Segment B, the season shall be extended for four additional consecutive days, beginning the Wednesday after the six-day firearm season as enumerated in N.J.A.C. 7:25-5.27(a), as an extension of Segment B. This extension shall be announced by press, radio, the Division's website (www.njfishandwildlife.com), and other media.

(c) Authority: The authority for the adoption of the foregoing section is found in N.J.S.A.

23:4.1 and other applicable statutes.

APPENDIX

Comprehensive Black Bear (*Ursus americanus*) Management Policy

EXECUTIVE SUMMARY

The New Jersey Fish and Game Council (Council) has been mandated by the NJ State Legislature to protect and conserve game birds, mammals and fish and to provide an adequate supply for recreational and commercial harvest. Council ensures long-term stable populations and maximizes and equitably distributes recreational opportunity to user groups by opening and closing seasons, setting season lengths, bag limits and manner of take. Council accomplishes this based on scientific evidence presented to it by the New Jersey Division of Fish and Wildlife (DFW) through the rule-making Game and Fish Code processes.

Council designated black bears as a game animal in 1953 and provided a limited hunting season from 1958 through 1970. Based on data gathered during the hunting seasons, DFW assessed the bear population and Council closed the hunting season in 1971. DFW commenced a population research and monitoring project in 1988, providing data showing that the bear population could support a regulated hunting season, so Council reinstated a limited hunting season in 2003, 2005, and 2010 through 2014. The DFW continues to conduct population monitoring and research.

On February 28, 2005, the NJ Supreme Court issued an opinion that comprehensive policies for black bear management should include the broad preservation goals of the Council, the tools at the Council's disposal to accomplish those goals, and most importantly, the factors that should be considered when determining which tools will be utilized. The Court also said the Council may include consideration, among other things, of the absolute size of the bear population, the number of harmful bear-human interactions and the fiscal and human resources available to carry out the stated goals.

The Council finds that DFW uses an integrated wildlife management approach for bear management, using all available methods within its fiscal and personnel resources, including research, educational programs, promoting the use of bear-resistant garbage containers, lethal control, and non-lethal control, including aversive conditioning. DFW staff has trained nearly 1,380 local police officers, State troopers, and State, county and municipal park rangers to assist in problem bear response. Recent studies in New Jersey as well as other states conclude that aversive conditioning has a limited short-term effect on reducing the negative behavior of nuisance bears.

DFW has determined, through its long-term research and monitoring program, that NJ has a productive black bear population that can support a regulated hunting season. Based upon 2014 research data, and using three different models, the average black bear population estimate for Bear Management Zones 1 through 4 has returned to at least that of 2010 (approximately 3,500 bears; Figure 2). A Statewide black bear population estimate cannot be generated without years of extensive population research and monitoring south of I-78.

DFW has conducted an intensive and extensive public education campaign about common-sense practices that may reduce the risk of negative black bear behavior on humans, their homes, their property and their communities. Law Enforcement staff has inspected thousands of residential properties in high bear incident areas and found near complete compliance with black bear garbage management guidelines, suggesting the black bear

education effort has been effective in terms of compliance.

Despite these efforts, serious complaints have continued as the bear population continues to expand. DFW uses lethal control on high-risk, dangerous bears and non-lethal aversive conditioning techniques on nuisance bears. DFW and the Department of Environmental Protection (DEP) have stepped-up law enforcement activities on bear feeding and garbage containment.

The Council also finds that DFW should reduce and stabilize the bear population at a level commensurate with available habitat and consistent with reducing risk to public safety and property. Although fertility control and sterilization have been studied, these methods of population control are not effective, evaluated either by an efficacy or cost metric. Regulated hunting seasons in 2003, 2005, and 2010 through 2014 demonstrated bears could be harvested safely. These seasons also showed that by using hunting as a management tool, nuisance complaints could be mitigated, and bear population growth could be slowed. Regulated hunting remains a safe and effective management tool to provide recreation and control NJ's black bear population.

Council has determined that DFW is using all the tools available, as resources allow, to properly manage the black bear resource and further recommends the adoption of a more liberal bear hunting season, both to provide mandated recreational opportunity and to more effectively control the population in the most cost effective manner. The proposed Comprehensive Black Bear Management Policy (CBBMP) continues the commitment to a multi-faceted bear management strategy and is guided by the latest science and data on the New Jersey black bear population.

I. INTRODUCTION

This document defines the Council's comprehensive black bear (*Ursus americanus*) policy and recommendations regarding the management of resident black bears (bears) to ensure their continued existence in suitable habitat in New Jersey. Council periodically re-evaluates its policies, recommendations and regulations as information on the wildlife species under its jurisdiction and the needs of NJ's citizens warrant. The black bear policy and management goals consider the cultural carrying capacity, which is the number of bears that can co-exist compatibly with the local human population in a given area, in concert with the biological carrying capacity of the land to support bears.

The Council's goals for bear management reflect the legislative mandate of the DEP and the Council (N.J.S.A. 13:1B-28 et seq.) and the mission and goals of DEP and DFW. The NJ State Legislature mandated that Council has the responsibility of protecting and conserving game birds, mammals and fish and providing an adequate supply for recreational and commercial harvest. (For more information on Council, see APPENDIX 1, Role of the Fish and Game Council.) The Mission of DFW is to protect and manage the State's fish and wildlife to maximize their long-term biological, recreational and economic values for all New Jerseyans. The Goals of DFW are:

To maintain NJ's rich variety of fish and wildlife species at stable, healthy levels and to protect and enhance the many habitats on which they depend;

To educate New Jerseyans on the values and needs of our fish and wildlife and to foster a positive human/wildlife co-existence;

To maximize the recreational and commercial use of NJ's fish and wildlife for both present

and future generations.

Based upon scientific evidence presented to it by DFW, Council opens and closes seasons and sets season lengths, bag limits and manner of take to ensure long-term stable populations and to maximize and equitably distribute recreational opportunity to user groups. Additionally, with some species such as black bear, white-tailed deer (*Odocoileus virginianus*), wild turkey (*Meleagris gallopavo*) and beaver (*Castor canadensis*), hunting and trapping can be used to control populations. Historically, Council has adjusted hunting and trapping seasons to control these species in order to minimize agricultural, residential or environmental damage. The Council recognizes that the most cost effective method of population control for these species is provided through regulated hunting and trapping seasons.

Council has directed that DFW manage black bears to assure their continued survival in NJ, while addressing the property damage and safety concerns of residents and farmers. In addition, Council recognizes that although instances of black bears injuring or killing humans are rare, human safety concerns must be considered as part of black bear management decisions. In 2014, the first documented human fatality from a black bear attack occurred in New Jersey and reinforces the human safety concern associated with managing this species. With careful management, however, the black bear provides an overall benefit to the citizens of NJ in the form of wildlife appreciation, observation and hunting.

Council notes that it is generally recognized that responsible management, not passive preservation, is necessary when managing agricultural and natural resources, or protecting property and human health and safety (USDA WS WI 2002). Council also notes that DFW uses Integrated Wildlife Damage Management (IWDM), which seeks to prevent, reduce or stop wildlife damage by integrating a combination of methods sequentially or concurrently (USDA WS WI 2002).

II. DECISION MAKING

Council's current and future management decisions regarding black bears have been and will continue to be based upon the best available scientific data. Based upon scientific evidence presented to it by DFW, Council opens and closes seasons, and sets season lengths, bag limits and manner of take to ensure long-term stable populations and to maximize and equitably distribute recreational opportunity to user groups. In addition, the Council, subject to the approval of the Commissioner of Environmental Protection (Commissioner), formulates comprehensive policies for the protection and propagation of fish, birds and game animals (N.J.S.A. 13:1B-28). It is this statutory framework that provides the basis for the CBBMP.

New Jersey Court Order and Decision on Bear Management

On February 28, 2005, the NJ Supreme Court held that a black bear hunt must conform to a comprehensive black bear management policy developed by the Council and approved by the DEP Commissioner (U.S. Sportsmen's Alliance Found. v. N.J.D.E.P., 182 N.J. 461, 867 A.2d 1147 (2005)). The opinion indicated that comprehensive policies should include: 1) black bear management objectives, 2) a detailed outline for meeting those objectives, 3) the tools at the Council's disposal, and 4) the criteria used to determine which tools are selected.

Fish and Game Council Black Bear Management Objectives

Council has set the following objectives for management of the NJ black bear population:

-- Sustain a robust black bear population as part of NJ's natural resource base.

-- Advance the scientific understanding of black bears.

-- Educate the public about common-sense practices that reduce the risk of negative black bear behavior on humans, their homes, their property and their communities.

-- Enforce the law on bear feeding and garbage containment.

-- Use lethal control on high-risk, dangerous bears.

-- Utilize non-lethal aversive conditioning techniques on nuisance bears.

-- Reduce and stabilize the population at a level commensurate with available habitat and consistent with reducing risk to public safety and property.

-- Ensure that regulated hunting remains a safe and effective management tool to provide recreation and control NJ's black bear population.

Council recognizes that management of NJ's expanding black bear population to meet these objectives requires a variety of measures. Council reiterates the conclusion of the 1997 Black Bear Management Plan (BBMP) (McConnell et al. 1997) that the New Jersey bear population is large enough to support a regulated recreational hunting season and that regulated hunting can result in a subsequent reduction in nuisance bear incidents, providing relief to people living in or near black bear habitat. This policy endorses education for people living and recreating in New Jersey, garbage management to reduce bear access to non-natural food, lethal control for dangerous bears, non-lethal control methods for nuisance bears and a hunting season to provide recreation and control the black bear population.

Council desires to reduce high-risk bear incidences that are a threat to public safety and property damage, and so has selected a range of management tools according to criteria consistent with current law, practicability in light of current resource constraints and demonstrated efficacy. A well-managed black bear population will require public education, proper waste management, enforcement, bear control, aversive conditioning, population control and other measures to reduce risk to people living close to black bears.

III. HISTORY

The black bear occurred Statewide in NJ through the 1800's, however, by the mid-1900's fewer than 100 existed and these were restricted to the northern portion of the State (Lund 1980, McConnell et al. 1997). In 1953, Council classified black bears as a game animal, thereby protecting bears from indiscriminate killing. This protection stabilized the population. DFW wildlife control agents (later wildlife technicians) responded to citizen complaints to alleviate black bear damage. Limited archery and firearm hunting was legal in 10 seasons from 1958-1970 and resulted in a harvest of 46 black bears. Based upon data gathered through these regulated hunting seasons, DFW assessed the bear population status and Council closed the black bear hunting season in 1971 (Lund 1980). Council reinstated a limited hunting season, resulting in a harvest of 2,497 bears in the seven seasons held in 2003, 2005, and 2010 through 2014.

Historically, management of black bears has been funded through the Hunters and Anglers Fund, which comes from the sale of hunting and fishing licenses. Additional funding is obtained from Federal Aid to Wildlife Restoration (Pittman-Robertson) grants. Funding for these grants is derived from a federal excise tax placed on hunting related equipment and ammunition that is passed on to State wildlife agencies for research, education and management activities. Bear management activities conducted by DFW were supplemented with General Treasury monies from 2001 to 2008.

Since the 1980's the black bear population has increased and its range has expanded (Figure 1) due in part to the protection afforded it by game animal status. Also contributing to this population increase were black bear population increases in Pennsylvania and New York and improved habitat in NJ, provided by the maturation of forested areas (McConnell et al. 1997). Using data collected from 1988 to 1992, DFW estimated a 1992 population of between 450 and 550 black bears in the 681 square mile Kittatinny (Western) and Bearfort (Eastern) study areas. Because of agricultural damage attributed to black bears, DFW and Council recognized that the level of human/bear conflict had become untenable in northern NJ and the black bear population was large enough to sustain a limited, regulated hunting season (McConnell et al. 1997).

The 1997 Black Bear Management Plan (BBMP) recommended that DFW stabilize NJ's black bear population using regulated hunting seasons in bear management zones (BMZs), institute a statewide ban on feeding black bears, install bear-proof (bear-resistant) dumpsters at public campgrounds within black bear range, educate beekeepers on the use of electric fences to deter black bear depredation, institute a black bear depredation permit for landowners suffering damage to property, agricultural crops or livestock, continue to analyze NJ black bear data as new technology and data becomes available, protect critical habitat and reduce illegal killing of bears (McConnell et al. 1997). After the release of the 1997 BBMP, DFW instituted these recommendations with some limitations. Council, in developing the 2010 CBBMP, charged the DFW to fully implement those recommendations and advance additional non-lethal control methodologies.

In 2000, DFW biologists estimated a bear population of 1,056 in the Kittatinny and Bearfort study areas, and in 2001, estimated 1,146 bears in the primary bear range of Sussex, Warren, Passaic and Morris counties. Since 2003, bear population modeling has been performed by Pennsylvania State University (PSU) as well as DFW biologists. The PSU model estimates the size of the bear population north of I-78 and west of I-287 using a modified Horvitz-Thompson estimator (Diefenbach et al. 2006). The DFW estimated the bear population within the same area using a Lincoln-Petersen Index, which is a method of mark-recapture population estimation. The main assumption behind the Lincoln-Petersen Index is that after a sample of the population is marked initially, the proportion of marked individuals recaptured in the second sample represents the proportion of marked individuals in the population as a whole. Together, these two approaches of estimating the black bear population within this area provide a basis for looking at population trends over time.

Through its partnership with PSU, and by using the Lincoln-Petersen Index, DFW estimated a 2003 population of 1,150 to 3,200 bears in the area north of Interstate 80 and west of Interstate 287 (NJDEP 2003). The 2005 PSU population estimate was 1,269 bears (range 700 to 2,306) in the Kitatinny and Bearfort study areas and 2,397 bears (range 1,328 to 4,329) in the areas north of I-80 and west of I-287 (Diefenbach 2006). The bear population north of I-78 and west of I-287 was estimated to be 3,531 in 2010 and decreased in 2012 to a population estimate of 1,911. The data indicates that this decrease in population size is largely attributable to regulated hunting seasons with high harvest rates during 2010 and 2011. Since the 2012 bear season, harvest rates during the December season have

decreased, leading to an increase in the population in 2013 and 2014 (Figure 2).

DFW continues to use the most advanced scientific knowledge and modeling available, in concert with its science and education partners, to provide the most accurate population count possible. In addition to the analysis performed by PSU, DFW has used the Lincoln-Petersen Index and a linear regression model to estimate the black bear population in BMZ 1-4. DFW has gathered extensive data through research over the past several years and has used this data to produce more informed population estimates. Using the midrange estimate (Lincoln Peterson), DFW estimated that in 2014 the black bear population has returned to at least the 2010 level (approximately 3,500 bears).

IV. INTEGRATED BLACK BEAR MANAGEMENT STRATEGY

DFW utilizes an integrated approach to managing black bears; this integrated black bear management strategy includes educating people about black bear ecology, recommending human behavioral adjustments while in bear range, enforcing laws that minimize human-bear conflicts, taking action against dangerous and nuisance bears, monitoring the bear population and implementing population control. Since 1980, the DFW has been conducting research on NJ black bears and has utilized an array of tools for managing black bears. This multi-prong approach is necessary because the bear population is increasing and expanding while the human population is also expanding through residential and commercial development. Council believes that it is imperative to have a broad, comprehensive approach in place to address the growing potential for human/bear conflicts. In November 2000, DFW instituted a more aggressive integrated black bear management strategy, implementing an enhanced educational effort, more aggressive control measures and increased research and monitoring activities. From FY01 through FY15, DFW has devoted more than $ 12 million to black bear management, including $ 2.3 million to education, $ 2.3 million to law enforcement, and $ 7.5 million to control, research and monitoring activities. These funds have come from the general treasury subsidy ($ 5.5 million), the Hunters' and Anglers' Fund ($ 3.7 million) and the Federal Aid to Wildlife Restoration Fund ($ 3 million).

A. Education

Policy:

Council believes there is a continued need to educate all people living and recreating in New Jersey about methods to minimize negative interactions with black bears. Residents, campers and outdoor enthusiasts within bear country can reduce or eliminate negative interactions with black bears by simply adjusting their activities. There is general support from the public, DEP, DFW and Council for continuing education efforts about bears.

Discussion:

Council recognizes that it is important to make the educational message available to as many citizens as possible. The majority of New Jersey residents do not live in black bear habitat; however, they do frequent areas of the State where black bears are prevalent and could encounter bears when they hike, camp, or become involved in other outdoor activities. Those residents who live in urban areas are in need of education just as much as those who live in prime bear habitat. While education alone will not solve all the problems associated with bears, those who adjust their activities to take into account bear activity will be less likely to have problems. Council recognizes that DFW has created and participated in "Bear Aware" programs like nearly all other states and provinces with bear populations.

These programs have resulted in declines in certain nuisance complaints over time, especially in such simple actions as reducing bear damage to bird feeders and using electric fencing to protect beehives.

DFW has conducted an extensive educational campaign to provide NJ residents and visitors with techniques and methods for minimizing negative interactions in areas where black bears exist and has distributed over 369,500 copies of various educational materials to residents and visitors of New Jersey between 2010 and 2014 (Table 1). Council notes that this educational campaign is having a positive effect. The DFW campaign emphasizes the importance of never feeding bears, either intentionally or unintentionally. Some of DFW's educational efforts include: (1) developing and distributing educational materials for homeowners and campers to reduce negative encounters with bears; (2) producing brochures, bookmarks, bumper stickers, coloring books and book covers for distribution to schools, municipalities, libraries, parks and environmental education centers; (3) conducting public presentations about living with black bears for schools, service organizations, township meetings, parks, camps and clubs; (4) producing and distributing radio and TV public service announcements (PSAs) and issuing Statewide news releases providing bear information and bear-proofing techniques; (5) addressing media inquiries and providing interviews regarding bears; (6) providing bear information and bear-proofing techniques to all persons who contact DFW regarding bears; (7) producing a Spanish version of the "Know the Bear Facts" brochure; and (8) providing self-help manuals, PSAs and other bear related information on its webpage.

DFW provides NJ residents and visitors with techniques and methods for reducing negative interactions while spending time in areas where black bears exist. The primary message is "Do Not Feed Bears," either intentionally or unintentionally. DEP developed and continues to issue news releases during the peak spring and fall activity periods, alerting the public to increased bear activity and reminding them with tips to minimize conflicts. PSAs are aired for the bear activity seasons in spring, summer and fall. DFW's Web Page (www.njfishandwildlife.com) provides additional black bear biology, natural history and bear-proofing information, including a black bear slide show and sources for bear-resistant garbage containers. Council recognizes that DFW has also produced two educational videos.

Education programs designed to reduce human-black bear conflict have been instituted by DFW and other states, entities and institutions. These programs seek to reduce the magnitude or frequency of human-black bear conflict and/or increase the awareness of human actions that result in conflict and have been well attended by New Jerseyans (Table 2). Council concurs with the recommendations of Gore et al. (2006) that emphasis should be placed on evaluating the efficacy of education programs to identify improvements or inform decisions about the allocation of scarce resources.

There is a need to increase educational efforts in southern New Jersey. Bear education efforts have been concentrated in northern and central New Jersey counties, but it has become necessary for the DFW to increase its education efforts in the southern counties as bear sightings and incidents have increased in these areas.

Data indicates that intense education of campers and visitors to several national parks (for example, Yellowstone, Yosemite and Great Smoky Mountains) has resulted in a reduction in bear nuisance complaints. Council agrees that educating campers and visitors to parks is a valid and successful way to minimize negative human-bear interactions in the campsite/park situation.

Council recognizes that the internet is a powerful tool increasingly utilized for information

and education by New Jersey residents, with visits to DFW's main bear webpage exceeding 220,000 from 2010 through 2014. Residents now look to social media such as Facebook for information about many subjects. The DFW should expand use of this medium to increase public awareness about bears. Council recognizes that increased use of the internet by DFW will reduce the funding needed for printing and distribution of materials and reduce the amount of time DFW personnel spend on the telephone educating the public.

Recommendations:

1. DFW should continue educational efforts throughout the State.

2. DFW should expand educational efforts to include urban areas, and should increase educational efforts in the southern counties.

3. DFW should evaluate the effectiveness of its educational campaign for residents and visitors.

4. DFW should evaluate the effectiveness of an educational campaign for residents and visitors to use bear resistant garbage cans.

5. DFW should develop educational products in the Spanish language, in addition to the educational material and public service announcements (PSAs) produced in English.

6. DFW should move to a more web-based approach for its educational programs (including social media) so that residents and visitors to the State can view, download and print items as needed.

7. DFW should increase the amount of information provided on the DFW website in the form of self-help guides that are directed at educating younger residents and visitors since it is this demographic that will be utilizing bear inhabited areas most frequently in the future.

8. DFW should include a self-help guide on its website that provides detailed guidance on protecting livestock and beehives from black bears and on the proper use and placement of birdfeeders.

9. DFW should provide detailed information on its website concerning bear encounters and the proper actions to take if a bear approaches a human or becomes aggressive.

10. DFW should encourage managers of State, federal, county, municipal and private properties to post bear-related signage at trailheads and on kiosks with information on bears and Q-R code links to the Division's website.

11. DEP should continue to explore additional sources of funding for DFW's educational programs in an effort to restore funding to no less than the FY05 level.

B. Control of Human-Derived Food

Policy:

Council believes that legislation and enforcement initiatives are necessary to ensure that human-related food sources and garbage do not unintentionally become a source of food for bears.

Discussion:

Council recognizes that in 2002 NJ enacted legislation that banned the intentional feeding of bears (N.J.S.A. 23:2A-14) because bears habituated to human food sources through intentional feeding can cause problems for entire communities. However, experience has shown that the ambiguous definition of unintentional feeding as contained in the statute has made effective enforcement difficult. DFW's Bureau of Law Enforcement continues to support policies and proposed legislation that uphold and enhance the current feeding ban statute. DEP and DFW law enforcement officers have inspected thousands of residential properties in high bear incident areas and found near complete compliance with black bear garbage management guidelines, suggesting the black bear education effort has been effective in obtaining such compliance.

DEP environmental officers have canvassed scores of homes and businesses and have worked with additional State and local law enforcement officials to enforce the law. The result of this effort has shown that over 90% of homeowners are complying with the law's requirements. Inspections of commercial establishments indicate that it is difficult to acquire bear-resistant dumpsters from garbage haulers and bear proofing dumpsters continues to be a problem.

DEP has a trash policy of "Carry In - Carry Out" that reduces the garbage at DEP-managed parks and forests. Council recognizes that DEP has installed bear resistant garbage dumpsters and bear proof food storage boxes in North Jersey and has begun placing bear resistant dumpsters in park and forest locations in central New Jersey.

DFW has installed bear resistant garbage dumpsters on North Jersey Wildlife Management Areas (WMAs).

DFW has identified closed or limited access communities in bear habitat where implementation of a bear resistant community dumpster would enhance efforts to limit access of bears to residential garbage. DFW telemetry studies and observations have determined that bears will alter their movements to access household garbage left on the street for hauler pick-up. Installation of a community bear-resistant dumpster would further limit access to garbage by these bears.

Council recognizes that DFW provides information and resources to municipalities to educate residents on proper garbage management techniques and ways to avoid attracting bears. Municipal officials are encouraged to work with local waste haulers to make certified bear-resistant garbage containers available to residents and businesses and to consider passing local waste disposal ordinances or resolutions encouraging the use of bear-resistant garbage containers. Council notes that it does not have the authority to mandate the use of bear-resistant cans, but that DFW has been successful at aiding municipalities and other entities in implementing important controls into their waste management programs (Table 3).

Council recognizes that no data exist that demonstrates that the reduction of provisioning from garbage sources would result in a decrease in fecundity within the NJ bear population. However, eliminating bear access to human provided food should result in decreased habituation and decrease nuisance and public safety related complaints.

Recommendations:

1. DEP should support legislation that strengthens the current feeding ban statute by tightening enforcement provisions and clarifying that both intentional and unintentional

feeding of bears is prohibited.

2. DEP should seek legislation to require public and private campgrounds in habitat occupied by bears to install bear-resistant dumpsters and food boxes.

3. DEP should seek legislation that would require closed communities to make a bear-resistant community dumpster facility available to residents.

4. Local authorities should mandate the use of bear-resistant garbage containers in entire communities with the coordination and cooperation of local garbage haulers. Regulations, funding and coordination with local garbage contractors is necessary in order to implement a successful program.

5. DEP should identify funding and grant sources and/or incentive programs to assist public and private entities to purchase bear-resistant garbage systems.

C. Research

Policy:

Council believes that using the best available scientific data is crucial for making management decisions regarding black bears, as it does for all wildlife and fish species under its jurisdiction. Council believes that DFW personnel and its cooperating partners are qualified and highly trained professionals who provide the data and analysis to ensure that black bears remain a viable component of New Jersey's landscape without exceeding cultural carrying capacity.

Discussion:

DFW has conducted intensive and extensive research on bears throughout NJ and more specifically in the Kittatinny (Western) and Bearfort (Eastern) regions of northern NJ since 1980, and the data represent a solid, long term and extremely valuable database upon which to make management decisions.

Since 1981 DFW personnel have handled over 7,200 individual black bears; DFW staff have tagged and released alive over 3,700 bears, including 1,016 young-of-the-year at dens.

During this same period, DFW personnel have collected data from 4,386 bears that died for various reasons, including vehicle strikes (1,238), control actions (413), and hunting seasons in NJ, PA and NY (2,735). A summary of DFW's tagging effort and the total number of bears handled since 2001 is summarized in Table 4.

DFW continues to radio-collar and monitor bears using radio telemetry to acquire information on reproduction, survival, mortality, home range size and habitat use. DFW currently has over 20 female bears fitted with radio collars to monitor reproduction and survival. DFW has determined that the average litter size is 2.7 cubs per litter. The most common litter size is 3 (43%), followed by litters of 4 (23%) and 2 (22%), which has not changed over the 35 years that DFW has conducted research. Litters of 5 and 6 have been documented either through den site visits or staff observation of bears outside dens. Litters of this size are rarely seen throughout the Country and are a measure of New Jersey's excellent bear habitat.

DFW has updated its Bear Management Zone (BMZ) designations from the 2010 CBBMP

(Figure 3A) and now divides the State into 7 BMZs (Figure 3B). DFW has conducted extensive research in BMZs 1 through 4 (the long-term established study area) and has begun research in BMZs 5 through 7 to gain bear population parameters (density, birth rates and survivability) in an area occupied by bears but which exhibits different habitat characteristics and human development pressures compared to the study areas already established and studied for the past 35 years.

DFW has employed population monitoring by determining individual identity using DNA analysis. DFW personnel continue to monitor bears using radio telemetry to acquire information on reproduction, survival, mortality, home range size and habitat use. Council also recognizes that DFW uses cooperating university statisticians to generate population size estimates.

Council recognizes that the current bear population in southern NJ is small. Although there is sufficient habitat for black bears to survive in the Pinelands, productivity and survival in this area will be different than in northern NJ, as is the case for white-tailed deer and wild turkey (Burke and Predl 1990, McBride 2003). Council recognizes that undertaking a trap and tagging operation for bears at the current low density is not cost effective, so DFW should attempt to collect as much data as possible when other research opportunities present themselves in central and southern NJ. Any data collected will be valuable in formulating management strategies for this region.

Based on the intensive population monitoring that DFW has conducted over the past 35 years, Council concludes that the NJ bear population is robust and viable, which maintains a high reproductive and survival rate. This finding is in concert with population parameters reported for other viable populations in the mid-Atlantic region. In fact, NJ's bear population, like all other mid-Atlantic populations are larger, denser and exhibit a higher rate of fecundity compared to other, less productive habitat areas of the country.

Recommendations:

1. DFW should continue to conduct research and analyze NJ's database on the black bear population in BMZs 1 through 4.

2. DFW should continue using sophisticated statistical analysis as new data and data analysis tools become available to obtain the most accurate density and population estimates.

3. DFW should continue to develop the simulation model of NJ's black bear populations in BMZs 1 through 4 to evaluate the effect of various recruitment and mortality factors and other factors contributing to bear population dynamics as new data is added to the existing database.

4. DFW should, as limited resources allow, conduct research in southern NJ and further develop an approach to estimating the population in BMZs 5, 6 and 7 in order to obtain a better understanding of the population of black bears Statewide.

5. DEP should continue to explore additional sources of funding for DFW's bear research program in an effort to restore funding to no less than the FY05 level.

D. Bear Habitat Analysis for NJ's Bear Management Zones

Policy:

Council believes that NJ contains suitable habitat to support a viable, robust black bear population and that habitat analysis is necessary to properly manage this renewable and valuable resource. Council believes that the designation and use of Bear Management Zones is the most effective manner in which to make decisions concerning bears.

Discussion:

DFW developed a ranking of bear habitat throughout NJ based on bear use of varying landscapes as defined by Land Use / Land Cover data for NJ (McLaughlin et al. 1987, Rogers and Allen 1987, MacKenzie 2003, Niles et al. 2004). DFW biologists and technicians overlaid the grid of Deer Management Units (DMUs), each DMU with an area of approximately 14 square miles, with the 2002 Land Use/Land Cover data, then used an Arcview GIS computer system to standardize the habitat evaluation. DFW determined the percentage of forested, wetland, agriculture, urban land, barren land and water in each DMU.

DFW designated the term Bear Management Zone (BMZ) to describe areas for bear management. BMZs delineate the boundaries for all areas of the State and are designated as zones where bears should be managed at various densities consistent with land use, and biological and cultural carrying capacities (Figure 3). Individual BMZs may or may not be open to regulated bear hunting.

DFW determined that optimal bear habitat consists of >= 51% forest land and <=33% urban land and <=26% agricultural land (Table 5). BMZs 1 and 3, which contain the black bear research study areas, have an average forest cover of 76% and are designated as excellent bear habitat (Figure 4).

BMZs 2 and 4 have an average forest cover of 50%, and are designated as moderate bear habitat (Figure 4). Council recognizes that the bear population in these BMZs is likely to exist at a lower density than BMZs 1 and 3.

BMZ 5 contains an average forest cover of >30% with a mosaic of forest, farmland, wetlands and urban land, which makes it low quality bear habitat (Figure 4). Council recognizes that the bear population in this BMZ is likely to exist at a lower density than BMZs 2 and 4.

BMZ 6 is the second largest zone (663 mi<2>), but contains only 13% forest cover, which is the lowest forest cover of any of the 7 bear management zones. The Council recognizes that this zone is unlikely to hold bears in high densities since 79% of the zone is considered to be low quality bear habitat (Figure 4).

Bear habitat in southern NJ has been designated as BMZ 7 (Figure 4). Although there is sufficient habitat for black bears to survive in the Pinelands, Council recognizes that productivity and survival in this area will be different than in northern NJ, as is the case for white-tailed deer and wild turkey (Burke and Predl 1990, McBride 2003). Currently the bear population in southern New Jersey is small and undetermined.

Recommendations:

1. DFW should continue to update the habitat analysis as new data becomes available.

2. DEP should continue to explore additional sources of funding for DFW's bear habitat analysis in an effort to restore funding to no less than the FY05 level.

E. Cooperative Research

Policy:

Council believes that cooperative research is the most efficient and cost effective manner for DFW to conduct research on wildlife species, including bears. This model has proven effective for waterfowl, bobwhite quail, wild turkey and bear. DFW should continue to partner with research institutions, federal and state agencies, which have the expertise, staff and economic resources to enhance the knowledge base on the NJ black bear population.

Discussion:

Council recognizes that DFW continues to participate in a number of cooperative studies with such institutions as Rutgers University, East Stroudsburg State University (PA), Cornell University (NY), Penn State University, West Virginia University, Utah State University, Stockton University (NJ), and the adjacent states of Pennsylvania and New York (Appendix II). This research is intended to expand knowledge about NJ black bears and to collect scientific information on which to base management decisions. These projects have included research on home range and habitat use, food habits, reproduction, diseases (West Nile Virus and Toxoplasmosis) and parasites (Trichinella), aversive conditioning, taste aversion, use of contraceptive techniques for population management, genetic relatedness using DNA and developing habitat suitability models.

DFW is cooperating with East Stroudsburg University's Applied DNA Sciences Center, Northeast Wildlife DNA Laboratory (NEWDL) and Fish & Wildlife Microbiology Laboratory (FWML) to generate a black bear population estimate using microsatellite analysis, to build a black bear DNA database for determining genetic identity and diversity and for forensic DNA investigation, to determine the population health of NJ black bears, and to build a serum database that provides information for managing wildlife health, including revealing where and to what extent wild animals carry disease that may affect human or domestic animal health.

DFW has partnered with PSU for estimating New Jersey's black bear population. For many years the Pennsylvania Game Commission (PGC) has had a successful cooperative agreement with PSU for population analysis. DFW formed a similar cooperative agreement to analyze New Jersey's black bear population. DFW also uses two other models for estimating the black bear population: the Lincoln-Petersen Index and a linear regression model. All models show identical trends (Figure 2).

DFW biologists meet with biologists and administrators from NY, PA, the Delaware Water Gap National Recreation Area and the U.S. Forest Service to discuss research, population monitoring, aversive conditioning and population control.

Council recognizes the importance of DFW biologists' attending annual and semi-annual bear conferences such as the International Bear Association (IBA), Eastern Black Bear Workshop (EBBW), and North East Black Bear Technical Committee (NEBBTC) to further their understanding of management issues and learn new management strategies that can be implemented in New Jersey. Council also recognizes that DFW biologists have valuable information to provide to other agency biologists that attend these events.

Recommendations:

1. DFW should continue to cooperate in research projects with other State and Federal agencies, universities and entities.

2. DFW should continue to participate in the bear summits with the bear biologists from the neighboring states of New York and Pennsylvania at regular intervals to continue to coordinate black bear management strategies and to ensure the success of black bear management efforts for this tri-state regional population.

3. DFW biologists should continue to meet regularly with bear biologists from the region and throughout North America to stay abreast of up-to-date research and management tools and techniques.

4. DEP should continue to explore additional sources of funding for cooperative bear research in an effort to restore funding to no less than the FY05 level.

F. Bear Control: Lethal and Non-Lethal

Policy:

Council believes the DFW Black Bear Rating and Response Criteria (BBRRC) (NJDFW BWM 2000) is the most effective operating policy for response to bears that are a threat to human safety, agricultural crops, and property, or are a nuisance. Council supports that the policy errs on the side of human safety. Council believes that despite educational efforts, situations will arise that will require private citizens, farmers, local police officers or DEP personnel to take action against problem bears.

Council supports DFW's policy, which allows farmers, via special permit, to destroy black bears depredating crops and livestock (N.J.A.C. 7:25-5.32) and recognizes that these permits provide valuable relief to farmers experiencing such damage from bears (Figure 5).

Council believes that continued cooperation between State and local law enforcement agencies and DFW is necessary to properly manage bears.

DFW should continue to use non-lethal control techniques such as aversive conditioning, to modify the behavior of nuisance bears. Council also believes that as interactions between humans and bears increase, additional non-lethal control techniques should be investigated, and if effective, be implemented.

Discussion:

Council recognizes that increases in human development in NJ, concurrent bear population increases, and the expansion of bear range southerly and easterly can result in an increase in human-bear conflicts. Council recognizes that incidents involving bear damage to property including livestock remain high in frequency and severity (Table 6), and that DFW's Wildlife Control Unit (WCU) and DEP's WARNDEP Hotline receive complaint calls and the DFW WCU provides response and control using the BBRRC.

DFW has had a policy of responding to problem black bears since the 1980's and a more aggressive black bear operating policy, the BBRRC, was instituted on November 16, 2000. The BBRRC was developed by the DFW and approved by the Council. The BBRRC defines three categories of black bear behavior and dictates how DEP and other governmental agency personnel should respond. Generally, in years following hunting seasons, the

number of incidents in each of these categories is reduced (Figure 6).

DFW has determined that Category I black bears are those bears exhibiting behavior that is an immediate threat to human safety or which cause agricultural damage to farmland as defined pursuant to the Farmland Assessment Act (N.J.S.A. 54:4-23.1 et seq.) or significant damage (>=$ 1000) to property. Examples of Category I behavior are human attacks, home entries, attempted home entries, agricultural crop damage, killing or injuring protected livestock, and killing or injuring pets. "Protected" means completely enclosed by properly installed and active electrified fencing, or otherwise enclosed in such a manner that reasonably prevents access by bears. Category I black bears are euthanized as soon as is possible in order to protect the public or eliminate further damage to agricultural crops or other property.

DFW has determined that Category II black bears are nuisance bears that are not a threat to life and property. Examples of Category II behavior are habitual visits to dumpsters or birdfeeders or property damage less than $ 1000 and bears that kill or injure unprotected livestock. Category II black bears are aversively conditioned so they receive a negative experience associated with the nuisance location and people. If trapped, nuisance bears are released on site and aversively conditioned, or if conditions are unsuitable, taken to the nearest State land where they are released and aversively conditioned.

DFW has determined that Category III bears are bears that are exhibiting normal behavior and are not creating a threat to the safety of the public or a nuisance. In general, these are animals observed and reported to DFW's WCU by the public or local authorities. Such animals may be considered by the caller to be a danger or a nuisance because the caller has not had the experience of interacting with bears. Category III black bears include dispersing animals that wander into densely populated areas, black bears passing through rural and suburban neighborhoods and black bears observed by hunters, hikers, campers and others using facilities in black bear habitat. Category III bears may occasionally utilize birdfeeders and trash containers as supplemental food sources in the course of their activities. Until a Category III black bear returns to a particular site and repeats utilization of these food sources, it is not considered to be a nuisance or problem animal (Category II). The WCU offers assistance in the form of technical advice on bear-proofing surroundings to callers reporting Category III encounters. No attempt is made to capture a Category III bear unless it is confined in a fenced area or treed in an urban area during daylight and any further movement will result in a threat to safety of the public or the animal due to potential vehicle collision.

The DFW BBRRC dictates that Category III bears from urban or suburban settings that must be extracted will be released on the nearest State-owned property with suitable bear habitat. Although municipal officials in the towns where the bear are released have criticized relocation, Council recognizes that it represents the most acceptable public policy at this current time.

Council recognizes that the cooperation of all law enforcement personnel from all levels of governmental agencies within black bear range is essential to the implementation of the bear response policy. Council notes that since January 2001, DFW has trained over 1,380 municipal, county and State law enforcement officers from 130 municipalities, 14 counties and 33 State, county and federal parks to assist DFW in black bear control. Council notes that DFW has spent over $ 100,000 for this task. Council recognizes that there will continue to be a need to respond to bear complaints. Since bears have expanded their range throughout NJ (Figure 1), such response will increasingly become the responsibility of local law enforcement agencies. The Council notes that some local enforcement agencies that

have received bear response training from DFW have not filed annual reports on bear incidents as agreed upon when training was received and that this lack of information has the potential to negatively impact bear management decisions made by the DFW and Council.

Council recognizes that DFW and local law enforcement officers cannot always respond immediately to situations involving depredating black bears and that farmers can alleviate damage caused by black bears if allowed the opportunity. Allowing farmers to act quickly to protect their crops, livestock and/or property constitutes responsible action by DFW to manage the growing black bear resource while minimizing negative impacts to humans, agricultural crops, livestock and property.

Council recognizes that depredation permits are invaluable for alleviating agricultural damage, especially when issued as soon as damage occurs. A telephone survey was conducted by DFW in 2014 to measure farmer satisfaction related to obtaining depredation permits. All twenty farmers that received a depredation permit in 2014 were contacted and asked questions pertaining to responsiveness of DFW technicians. All farmers surveyed reported they were satisfied with DFW's response time in delivering depredation permits. Many of the farmers further commended DFW personnel for their dedication and professionalism.

Council recognizes that nuisance bears can be eliminated through regulated hunting seasons. In each NJ hunting season since 2003, approximately 20% of the tagged bears harvested were known nuisance bears or bears captured at nuisance locations (Figure 7), thereby reducing bear related problems without cost to the taxpayer. Council recognizes that without some method of population control to reduce and then maintain a viable bear population in NJ at densities compatible with the human population, human-bear conflicts may increase.

Council recognizes that the number of serious bear complaints (Category I) reported to DFW and law enforcement agencies has decreased since 2010 but should be reduced further (Figure 6). Many factors contribute to bear related incidences including individual bear and human behavior. Small year-to-year fluctuations may be attributed to environmental factors. For example, natural food scarcity, such as mast failures, may cause bears to seek alternate food supplies resulting in more negative human-bear incidents. It is clear, however, that over time, the number of serious incidences has increased with the increase in the bear population. Of particular concern to the Council are increases in the number of Category I incidents in parts of the State without open black bear hunting seasons (Figure 8A), especially within BMZ 5 (Figure 8B). Although the number of overall complaints has varied since 1999, the number of Category I complaints remains unacceptably high.

The newly delineated BMZ 5 (see 5 above) is proposed to be opened for bear hunting. Proposed BMZ 5 incorporates areas south of Interstate 78 and east of Interstate 287 not previously open to bear hunting. As bears have spread into areas south of Interstate 78 and east of Interstate 287, bear damage and nuisance complaints in these areas have increased. From 2010 to 2014 in the proposed BMZ 5, Category I incidents increased 35%, Category II incidents increased 46%, and Category III incidents increased 19% (Figure 8b). New Jersey's bear population is highly correlated to the number of bear incidents reported each year (Figure 12), and this correlation can be used as a predictor of bear population changes. In the proposed BMZ 5, there was a 29% increase in bear incidents (all categories combined) since 2010, which corresponds to an increase in the bear population in this zone of 39% during the same period. Opening the proposed BMZ 5 to bear hunting is expected to provide relief from bear damage and nuisance to residents of Hunterdon, Somerset, eastern

Morris and southern Passaic Counties. Hunting in this area is also expected to lessen the number of bears that disperse into urban areas and then require capture and removal at a significant cost to State and municipal agencies.

DFW personnel, law enforcement personnel, State park police and landowners and farmers have killed 424 dangerous Category I bears since 1993.

Council recognizes that when annual reductions in bear complaints reported to DFW from 1999 to 2013 occurred (Figure 9), the available data suggest that these reductions were attributed to the following: (1) residents calling local police who have been trained by DFW for bear response; (2) euthanizing Category I bears thereby eliminating further negative behaviors by those animals; (3) DFW's education program successfully reaching residents who subsequently bear-proof their yards including proper garbage management; (4) an increased tolerance of bears by the public due to DFW's policy of destroying Category I bears; and (5) the short term population reduction achieved by the 2003, 2005, 2010, and 2011 black bear hunting seasons which included the harvest of nuisance bears by hunters.

DFW uses the non-lethal technique of aversive conditioning to deal with nuisance bears. Council recognizes that DFW determined, as have other state and federal agencies and institutions, that aversive conditioning can deter a bear from returning to the treatment location, but treated bears continue nuisance activity at other, different locations (Madonia 2011).

Council cites particular studies where aversive conditioning reduced but did not eliminate the occurrence of bears entering developed areas to forage on human food and trash in Sequoia National Park (Mazur 2010), Lake Tahoe Basin (Beckmann et al. 2004) and southern Louisiana (Leigh and Chamberlain 2008, Madonia 2011).

DFW continues to explore non-lethal methods to deal with nuisance bears. Council recognizes that DFW acquired specially trained Black Mouth Yellow Cur dogs to harass bears as part of the aversive conditioning technique.

In 2010, DFW and East Stroudsburg University conducted an evaluation of aversive conditioning techniques and found that rubber buckshot and dogs used to deter bears from returning to the spot of nuisance activity have limited short-term effectiveness. All bears, regardless of being unconditioned or conditioned, returned to urban settings within 17 days of capture and/or treatment. Overall, habitat use and availability of natural food in home ranges did not differ significantly between aversively conditioned and control group bears. Both conditioned and control bears were involved in subsequent nuisance behavior. The study concluded that the aversive conditioning protocol did not eliminate nuisance behavior in adult female black bears in NJ (Northeast Wildlife DNA Laboratory 2010). The results of this research continue to inform DFW's decision making when it comes to managing bears exhibiting nuisance behavior.

Council recognizes that when a Category I bear must be euthanized, DFW and local law enforcement follow euthanasia procedures recommended by the American Veterinary Medical Association (Beaver et al. 2001). DFW and local law enforcement personnel follow procedures for animal welfare and care with respect to humaneness, pain and suffering as addressed in USDA WS WI (2002) and CA FED (2000).

Recommendations:

1. DFW should continue to operate under the BBRRC, an operating policy to respond to bear

calls.

2. DFW personnel, law enforcement officers, State Park Police officers and park rangers trained by DFW should continue to follow and abide by the BBRRC.

3. DFW should continue to refer Category II complaints to those local law enforcement agencies that employ professionals with relevant training to address these complaints who can more quickly respond.

4. DFW should continue to train State and local police officers and State Park Police officers so that they can respond to problem black bears.

5. DFW should coordinate with universities on research to describe the distribution of black bear - human conflicts in NJ as they relate to spatial and temporal variables including anthropogenic development, habitat features and the demographic makeup of the human and nuisance bear populations.

6. DFW should continue to scientifically evaluate non-lethal control measures to determine their effect on bear behavior and bear related problems.

7. DFW should continue to develop aversive conditioning techniques for Category II bears for reducing conflict by altering bear behavior and movement.

8. DFW should open a dialogue with representatives of those municipalities and agencies that have failed to file the agreed-upon annual reports on their bear response activities. Those municipalities and agencies should be encouraged to submit these surveys so an accurate assessment of the bear activity within each region can be made. A letter stressing the importance of reporting should be sent to all participating agencies.

9. DFW should encourage farmers experiencing bear damage to allow bear hunting on their property.

10. DFW should continue issuing depredation permits to farmers experiencing crop damage.

11. DEP should continue to explore additional sources of funding for non-lethal and lethal bear control by DFW in an effort to restore funding to no less than the FY05 level.

G. Habitat Protection

Policy:

Council believes that DEP's open space acquisition program has been instrumental in protecting valuable bear habitat; Council supports habitat acquisition and improvement programs.

Discussion:

DFW has undertaken an effort to identify and protect critical black bear habitat. Council also recognizes that DEP, through its Green Acres Program and State Park and Wildlife Management Area systems, has acquired a significant amount of habitat which is important to black bears. Council recognizes that the Pinelands and Highlands Protection Acts will ensure that bears remain part of NJ's landscape. Council supports the monumental effort by the DEP to preserve wildlife habitat through its aggressive Green Acres Program and

Pinelands and Highlands legislation. Council realizes that black bear populations must be managed at a landscape level and therefore it is not appropriate to develop management plans on a parcel-by-parcel basis because of the size of bear home ranges.

Recommendations:

1. DEP should continue to protect black bear habitat as it becomes available through the State's open space acquisition programs.

2. DFW should continue to use GIS technology to identify and rank black bear habitat and travel corridors.

3. The State Legislature should continue to allocate funding to purchase wildlife habitat as it becomes available.

H. Bear Population Management

Policy:

Council believes that DFW should stabilize the NJ bear population, then evaluate and eventually maintain the population at a density that minimizes human/bear conflicts, provides for a sustainable population within suitable bear habitat and minimizes emigration of bears to unsuitable habitat in suburban and urban areas. Council's management goal is to decrease and stabilize the black bear population at a level consistent with the available habitat and cultural carrying capacity.

Discussion:

Council recognizes that DFW has conducted bear population monitoring which has shown bear population growth and range expansion. Council notes that the bear population has spread south and east, impacting people in areas of NJ that have not had bears for more than a century.

Council also recognizes that emigration of NJ bears into neighboring Pennsylvania and New York has impacted these states. The concurrent expanding human population and bear population in this region of NJ, PA and NY provides potential for conflict. The 1997 BBMP recommended managing NJ bears at the same density (1 bear / 2 1/2 square miles) as our neighboring states since bears living along our respective borders are essentially one regional population. Council notes that DFW research has found that in some areas in northwestern New Jersey black bear densities are as high as 2 - 3 bears / square mile, which is 5 to 7 times higher than the density recommended by the 1997 BBMP.

Council recognizes that Pennsylvania increased its bear hunting season in counties adjacent to New Jersey in 2002 due to an increase in the bear population and human/bear conflict problems in this region and that New York increased its bear hunting season length in the neighboring Catskill region. Council recognizes that to properly manage this tri-state bear population, density goals must be similar.

The data indicates that the population reductions achieved by the 2003, 2005, 2010, and 2011 bear hunting seasons correlated with reductions in bear related complaints received by DFW and cooperating law enforcement agencies (Figure 10). Council also notes that bear calls and complaints began to rise after the 2013 hunting season, which had a less than optimal harvest rate (Figure 11). Council also recognizes that negative interactions between

humans and bears not only result in economic loss to individual citizens, but also have created a severe budgetary burden on responding agencies, particularly DFW. Council notes that maintaining an adequate level of bear response by DFW is not sustainable at current funding levels without new sources of funding to cover the increasing costs of this work.

The tools available for population reduction are few. Council notes that the NJ Supreme Court instructed that Council may include consideration of the absolute size of the bear population, the number of harmful bear-human interactions and the fiscal and human resources available to carry out its goals. Council recognizes that DFW must consider the proven efficacy of the tools and the experience of other states and the cost of using the tools.

Council recognizes that wildlife managers, confronted with conflicting public perceptions of bears as both a nuisance and a valued game animal, are faced with a dilemma: how to maintain healthy populations of black bears while minimizing conflicts between bears and humans (USDA WS WI 2002). Council also recognizes that people in NJ express opinions on both sides of the hunting issue.

Council recognized the concerns of citizens and adopted a conservative approach to population reduction by regulated hunting in order to assure the public that the long-term viability of the bear population would be maintained. However, with recent increases in the bear population and bear related incidents following bear seasons with reduced harvest rates, the Council believes that a more liberal bear season is necessary in order to achieve the desired level of population control. Therefore, the addition of an archery and muzzleloader fall season, and the ability to extend the season when specified objective harvest goals are not met, are necessary. DFW examined bear population and bear complaint data and found they were positively correlated. This suggests that reductions in population size should contribute to reductions in bear complaints (Figure 11).

Various methods to stabilize or reduce the increasing bear population have been suggested to the Council, DEP and DFW by NJ citizens. The following is a discussion of these proposed methods.

1. Relocation:

Although relocation can be used to establish or reestablish bear populations, no state has successfully used relocation as a means of population control. Council recognizes that southern NJ contains quality long-term habitat for black bears. Over 1.1 million acres is contained in the Pinelands National Reserve, of which one third is publicly owned. Council also recognizes that in the early 1980's DFW conducted an Environmental Assessment of a plan to relocate black bears to the Pinelands (Lund et al. 1981). At that time, local opposition to the relocation of bears to southern NJ put a halt to this option. However, as a result of the population pressures created by an expanding northern NJ bear population, bears have been sighted in all 21 counties (Figure 1).

Council also believes that the bear population that is reestablished in southern NJ will grow. Once all available bear habitat is occupied, there will be no additional space for relocation in NJ. Council has determined that no other state or provincial agency in North America would accept excess bears from NJ.

Additionally, relocation of nuisance and/or problem bears to unoccupied range comes with a level of risk. Dedication of the necessary staff and funding to subsequently handle the resultant nuisance complaints from citizens in southern NJ will place additional burden on

already strained budgets.

Council believes that even if relocation of excess and/or problem bears to unoccupied range in southern NJ was acceptable to local residents, the cost of such a program would be prohibitive. DFW estimates that the cost to capture a bear during their research efforts is over $ 1,500. Transporting and removing bears out of their established home range would significantly increase labor and equipment costs. Due to lower success, costs for trapping nuisance bears are over $ 2,500. Relocating 1000-2000 bears from northern NJ to southern NJ would be cost prohibitive and likely a multi-year task. Council believes that DFW does not have the necessary staff and funding to make such a program practical. To the Council's knowledge, no state has successfully used relocation as a means of population control. Based upon the cost and opposition to relocating bears, particularly nuisance bears, Council does not consider this a viable option for population control. Therefore, Council concludes that relocation is not a suitable tool for bear population control.

2. Alternative Methods of Population Control:

DEP's Division of Science and Research commissioned a literature review of fertility control on bears and other wildlife, which concluded that fertility control is very unlikely to be a feasible means of managing the black bear population in New Jersey due to the costs involved with field capture and the inability to capture enough bears to effect population control, even if a licensed fertility agent existed for bears (Frakker et al. 2006).

Council's position on bear fertility control was presented in the 2005 CBBMP (Wolgast et al. 2005), which stated that Council has encouraged DFW and independent researchers to explore alternative population control techniques to determine if these techniques are viable for control of wild populations of bears. The Northeast Black Bear Technical Committee (NEBBTC) has reviewed this topic and determined that it is not a viable option for management of free ranging populations (NEBBTC, 2012).

In November 2002, the DEP entered into a Memorandum of Understanding with the Humane Society of the United States (HSUS) to investigate the feasibility of fertility control as a means of controlling the black bear population and DEP authorized a study investigating using sterilization as a means of controlling the black bear population. Both studies utilized captive bears at Six Flags Safari Park in Jackson, Ocean County, NJ. As of the publication date of this CBBMP, no results of these studies have become available. To the Council's knowledge, results of these studies have not been published.

Alternative non-lethal population control methods are still in the experimental phase and have yet to be tried on free roaming populations of bears. Current contraceptive techniques have been uneconomical or infeasible for practical implementation even in small localized populations of game species. The species for which contraceptives have been primarily tested (long-lived species such as deer and horses) are least suited for population reduction through use of fertility control (Fagerstone et al. 2002). In New Jersey, fertility control on a suburban deer population cost over $ 714 per deer (DeNicola 2004). Although fertility control in field situations has not been attempted on bears, the cost of capturing bears during research or nuisance control activities in New Jersey, reported above, are applicable and might double since it is likely that as in the case of deer, multiple captures and injections would be required.

In 2006, federal authority to regulate fertility control agents on wildlife was transferred from the US FDA to US EPA. Neither FDA nor EPA has approved any chemical fertility control on an experimental basis for any wild population of bears. Although physical sterilization does

not require FDA approval, the costs of trapping bears for such purposes would be prohibitive. Council notes that since New Jersey bears have a very high annual survival rate and are known to live over twenty years, population reduction, if any, through sterilization or fertility control would be slow.

Even though fertility control may not affect survival of individual bears, it can easily be lethal to populations (Hobbs et al. 2000). Animals with good immune systems will be most likely to mount a strong immune response when given an immunocontraceptive agent and so would be unlikely to reproduce. Animals with a poor immune system, either due to genetics, injury or disease, would be affected less and therefore be most likely to reproduce. The long-term implications of immunocontraceptives in wildlife populations would be that immunocontraception could artificially select for those individuals that are immunodeficient and produce populations of animals with weak immune systems and high susceptibility to disease and population fluctuations (Muller et al. 1997).

Council supports continued testing of fertility control by credible scientists and has adopted criteria that will allow DFW, with Council approval, to issue permits for legitimate research on fertility control when captive studies indicate that there is potential for controlling wild populations (N.J.A.C. 7:25-5.37).

Based upon the lack of success with current research and logistical problems discussed in the above cited literature review, Council concludes that fertility control, either chemical or physical, is not currently a viable tool for bear population control.

3. Regulated Hunting:

Hunting is a safe, legal, responsible use of the wildlife resource and a legitimate and effective means to control over-abundant game species in a cost-effective manner. Council notes that, as with other species such as waterfowl and deer, bear hunting relies on the principle of adaptive management as described by Walters (1986). This approach relies on managing wildlife populations through experience and monitoring which allows the management agency to make necessary changes to maintain the natural resource (bear population) in the desired condition. Council further notes that because DFW has ongoing monitoring, any changes needed can be made by annually reviewing hunting regulations.

Black bear populations can withstand regulated hunting on an annual basis (CA FED 2000, Williamson 2002, Ternent 2006, NEBBTC 2012). Historically, managed hunting has been an effective system for protecting bear populations because it has enlisted a clientele interested in the continued abundance of the resource while transferring the killing of a species whose members can become a public nuisance or threat from the general public to a smaller group of people (hunters) (Garshelis 2002). Council notes that regulated hunting engenders a conservation minded constituency group, hunters, who ensure the appropriate population density of the species of interest, and who support and are willing to pay for research, habitat protection and conservation measures necessary to meet that end. Council recognizes that hunters provide an important service to the public without increasing the general tax burden.

Although the activity of regulated hunting of black bears results in the death of individual bears, specific safeguards, including an in-season closure mechanism and bag limit, will assure that bear harvests are below the population's sustained-yield capabilities. Council agrees with the finding that no significant negative effects, individually or cumulatively, on bears as a species are expected to result from hunting (CA FED 2000).

Council notes that hunting is the primary means of managing and regulating black bear populations in 29 states. Many of these states charge an additional permit fee for bear hunting that is used to support bear research and management. With the exception of New Jersey, all states with bear hunting seasons allow archery (Table 7). Firearms and archery equipment are effective in hunting bears (CA FED 2000, Kurzejeski et al. 1999) and both shotguns and archery equipment were allowed in past bear hunting seasons in New Jersey (archery 1958-1970). Council believes archery should once again be integrated into DFW's regulated hunting season as a method of controlling the black bear population.

Council recognizes that the 1997 BBMP stated that "continual fragmentation of habitat and the projected growth of the human population has made it untenable to continue maintaining a black bear population at its present level and density" (McConnell et al. 1997, p. 76) and that the black bear population could sustain a limited, regulated hunting season (McConnell et al. 1997, p. 78).

No other method of black bear population control has been identified and implemented in states with resident bear populations. Hunting is considered one element of an integrated approach to manage bear populations. Bear hunting seasons provide recreational opportunities, provide data on hunter participation and success rates, and reduce the black bear population density in order to reduce the associated human/bear conflicts, including property damage caused by bears.

The 2003, 2005, and 2010 through 2014 hunting seasons established that hunters could safely harvest black bears in a controlled manner (Figure 13). During these seasons, DFW collected biological data on the bears and demographic data on hunter success and participation, which DFW uses to design future management actions.

Bear hunting seasons can alleviate damage and nuisance incidents caused by problem bears. Approximately 20% of the tagged bears that were harvested during the past seven seasons were bears tagged at nuisance sites or in urban situations (Figure 7). The data suggests that as a result of the 2010 through 2012 hunting seasons, nuisance calls between 2011 and 2013 dropped 40% (Figure 6). In 2014, DFW measured an increase in the number of nuisance incidents which, the data suggests, is the result of an increase in the bear population due to a low harvest rate during the 2013 season (Figure 10).

The hunting season structure of 2003, 2005, and 2010 through 2014 was timed to be conservative, restricting harvest to bears that had not yet entered winter dens. This conservative structure allowed important data to be collected on New Jersey bear harvest rates without negatively impacting the population. However, employing this conservative, late season structure during the past several years has likely allowed harvest rates to fall (Figure 11), which in turn, has likely led to an increase in estimated bear population numbers from 1,911 in 2012 to 3,500 in 2014 (Figure 2); factors contributing to this decrease in harvest rate are discussed below.

The Council recognizes that bear harvest rates can be used as a guide to prevent overharvest of bears or to inform decisions to expand hunting seasons in order to achieve desired levels of population control. Research suggests that black bear populations can sustain annual harvest rates of 15-20% with little or no decline in population size (Miller 1989). Conversely, in order to protect populations from overharvest there are upper limits to the sustainable harvest rates. In certain counties in Pennsylvania harvest rates exceeded 30-35 percent (Ternent 2001). These rates are higher than desired by most states including PA, however, in order to sustain a population over the long term. Therefore, the Council believes that a harvest rate between 20-30% for black bears is appropriate for New Jersey.

Three different models indicate that the black bear population has returned to at least the 2010 level (approximately 3,500 bears, Figure 2). Although the point estimates for each model differ, the predicted population trends over time are similar. Additionally, the bear population has expanded beyond the northwest portion of New Jersey (Figure 1) and bear/human interactions have increased greatly outside BMZs 1-4 over the past 5 years (Figure 8A). Municipalities that are completely or partially contained within BMZ 5 showed high numbers of both Category I and Category II incidents from 2010 through 2014 (Figure 8A and 8B).

The DFW has identified four factors that have contributed to diminishing bear season harvest rates: 1) season timing, 2) bear behavior, 3) hunter behavior, and 4) hunter participation (Geist 2003). The following is a discussion of all four of these factors, including recommendations to offset their effects.

1. Season Timing:

The current hunting season occurs late in the fall and is affected by weather conditions both before and during the season. Early occurrence of cold weather and/or snow-cover forces bears into their winter dens early, making them unavailable for harvest. Severe winter weather occurring during the season induces denning activity as well, and also reduces hunter numbers, which exacerbates the low harvest potential. In addition, the current season takes place after most pregnant female bears have denned, rendering them unavailable for harvest and increasing production potential the following year. Therefore, with a season timed in December alone, consistent appropriate harvest rates cannot be achieved. New Jersey bear seasons should include dates early in the fall, when weather is unlikely to have a large impact on harvest rates.

2. Bear Behavior:

Bears have a natural fear of humans that is reinforced by hunting activity. Bears that survive a hunting season learn from the experience and become more wary. Where bears are hunted consistently, their increased wariness makes it more difficult for hunters to be successful. A longer hunting season will help increase the harvest since there will be greater opportunity for wary bears to be harvested through the increased probability of hunters encountering a bear during a longer season. Furthermore, utilizing different hunting techniques, such as archery, will also increase the harvest of wary bears because archery is a stealthy method of hunting, which does not create the gun shot sounds that firearm hunting creates in the woods.

3. Hunter Behavior:

Since 2003, many sportsmen and women in New Jersey have been successful in harvesting a black bear. Many of these hunters continue to hunt bears, but have become more selective as to the specific bear taken. An increase in season length will help offset the negative effects on harvest rate due to selectivity amongst hunters. Hunters will be able to spend a greater amount of time hunting, and thus have a greater chance of harvesting a bear that they select for.

4. Hunter Participation:

Some successful New Jersey bear hunters have chosen to abstain from bear hunting in subsequent seasons. The great amount of effort required to extract such a large animal

from the field and properly prepare the hide and meat are the main reasons for this. New Jersey is not a state with a strong bear hunting tradition, which would help counter reduced participation; however, additional hunting opportunities such as earlier season timing and additional weapon choices can also stimulate interest among these hunters. Additionally, earlier season and weapon choice opportunities will also stimulate interest among hunters who have never tried bear hunting before.

Hunting has been used as a tool to reinforce the aversive conditioning methods employed by DFW and trained law enforcement officers. Council refers to the review of the scientific literature conducted by Conover (2001), who determined that hunting reduces wildlife damage by reinforcing an animal's fear of humans and causing animals to avoid areas where they might come into contact with humans. Conover (2001) also stated that hunting should increase the effectiveness of non-lethal techniques because the animals learn to associate humans with negative consequences. Although some nuisance bears are eliminated during hunting seasons, others are pursued but not harvested, thereby imparting a negative experience on the bear. This negative interaction for the bear counters the positive food reward in other human/bear interactions.

Council recognizes there is a significant amount of land, both public and private, that is closed to bear hunting. Bears that inhabit these locations are not subjected to hunting pressure, and the data indicates that bear-human interactions remain high in those and adjacent communities. On many of these parcels, hunting of other species is allowed but bear hunting is restricted. In order for bear management in New Jersey to be most successful, the owners/managers of these properties should be encouraged to allow bear hunting.

The adaptive management process will guide the future structure of bear population management. This dynamic process is already in place as the Game Code where DFW biologists evaluate the results of the bear hunting season on the bear population and bear related conflicts.

Council will continue to rely on the expertise of DFW biologists, who through data collection and analysis provide recommendations regarding the structure and timing of future seasons which will ensure black bear populations are maintained in appropriate habitat at desired densities compatible with existing land use.

In reviewing the tools available for population control and the costs associated with each, the Council concludes that relocation will never be a viable tool for bear population control. Additionally, non-lethal tools such as sterilization and chemical fertility control have been shown to be ineffective at this time. However, research in this area should continue as new methodologies arise. In contrast, Council concurs with the experience of all states which manage viable bear populations through the regulated sport hunting of bears that this is the most cost effective and practical tool to control bear populations.

Recommendations:

1. DFW should continue to allow an annual regulated black bear hunting season in BMZs 1, 2, 3, and 4, and should expand the season into BMZ 5. DFW should adopt an appropriate structure for bear hunting seasons that reduces and then stabilizes the bear population at a level compatible with the availability and quality of habitat, which is consistent with public safety and residential and agricultural concerns. Future season structures should be based on data collected from the regulated bear hunting seasons and population monitoring. Permit quotas and season length should be adjusted as necessary to regulate hunting

pressure in BMZs. Season formats should use all hunting implements legally available such as archery and muzzleloaders, should incorporate a fall season as seen in other states (Table 7), and should mandate season closure if harvest rates reach 30% or season extension if harvest rates fall short of 20%.

2. DFW should not use relocation as a means of population control.

3. DFW should continue to review current research on alternative population control techniques, such as fertility control.

4. DFW should use harvest parameters, including harvest rates, as a benchmark to gauge the progress of the population reduction and stabilization, and to trigger adjustments to future season structures.

5. Council supports legislation that would establish a fee of $ 28 for a bear permit. Hunters will pay for the privilege to participate in a regulated hunting season with the fees used to cover the costs of administering the hunt. A bear permit fee comparable to the deer permit ($ 28) has the potential to generate $ 308,000.

6. In the future, DFW should consider including BMZs 6 and 7 in regulated seasons and modifying existing zones as needed.

V. CONCLUSION

Council supports active, integrated bear management and DFW's population goal of maintaining bears at a density that provides for a sustainable population within suitable bear habitat, minimizes human-bear conflicts and reduces emigration of bears to unsuitable habitat in suburban and urban areas.

Council recognizes that bears are causing considerable damage to personal property and that the amount of damage and threats to public safety have increased commensurate with the bear population. Home entries and attempted home entries increased significantly in the late 1990s and remain unacceptably high despite intensive efforts to eliminate problem bears and despite intensive education efforts. Even though DFW has been proactive in response to high risk bear incidents that are a threat to public safety and property damage, Council is not willing to continually subject the citizens of New Jersey to this level of risk to public safety and property damage from black bears and so must take the responsible action of reducing the bear population.

Council recommends that DFW continue its integrated strategy for black bear management that includes continuing the educational campaign, pursuing legislative initiatives, conducting research and population monitoring, continuing appropriate control measures, investigating all population control methods and implementing population reduction through a regulated hunting season. Bear population management through regulated hunting will satisfy the Council's legislative mandate of conserving the bear resource and providing recreational opportunity. Additionally, the use of regulated hunting as a tool for population control satisfies the NJ Supreme Court mandate to consider the most appropriate tools available.

Council supports the need for additional funding for DFW to continue its research, education, and nuisance control activities throughout New Jersey. Adequate funding for black bear management at the 2014 population level is estimated to be $ 1.25 million annually. This amount combined with the Hunters and Anglers funds and federal funds must

continue in order for the State to maintain an adequate black bear management program. It is unrealistic to believe that NJ's sportsmen and women share the sole responsibility for paying for this cost. Since responsible bear management benefits all citizens of NJ, it is appropriate that it continue to be funded through other sources. Over time, a reduction in the bear population should reduce the associated management costs as well as reduce the economic losses incurred by citizens of New Jersey resulting from bear related property damage.

Council realizes that the desirable bear population level will be influenced over time by many dynamic factors such as the amount of available bear habitat, human population growth and resulting development, and changes in human tolerance for bears brought about by education, possible changes in bear behavior, and the willingness to change lifestyles to adapt to living in bear county. Council is confident that with careful management of this species, black bears will be able to thrive in suitable habitat in NJ where they can more safely coexist with NJ residents.

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Figure 1. Extent of known black bear distribution (mapped by municipality) in New Jersey in 1995-2014. Dark shading represents the previously known distribution and light shading represents those municipalities where black bear occurrences were documented between previous years. Occurrence data is based on reports that were received by the New Jersey Department of Environmental Protection and are maintained within the New Jersey Department of Environmental Protection's NJEMS (NJ Environmental Management System) database.

Figure 2. Estimated black bear population size within New Jersey's Black Bear Management Zones 1-4 for 2010 through 2014. Population estimates were calculated by researchers at Pennsylvania State University using a modified Horvitz-Thompson estimator (■), by NJDFW staff using a Lincoln-Petersen Index (▲), and by NJDFW staff using the linear regression model (*) created by correlating Lincoln-Petersen Index estimates model with the incidents per year (w/in BMZs 1-4; from 2003-2013) to generate a 2014 estimate (Figure 12). Estimates represent the black bear population on the day before the hunting season of the year estimated.

Figure 3. (A) Zone boundaries designated in the 2012 Game Code. (B) Current boundaries of the 7 Black Bear Management Zones (BMZ) in New Jersey. Boundaries of BMZs 1 through 4 have remained unchanged. BMZs 1and 3 are heavily forested and have the highest bear densities, while BMZs 2, 4 and 5 have lower bear densities due to a higher component of open space and agriculture. BMZs 6 and 7 have the lowest bear densities in the State, but are experiencing an increase in bear activity as the population expands into these areas.

Figure 4. Ranking of black bear habitat based on 4 parameters using 2011 Land Use/ Land cover data. Land considered to be OPTIMAL/HIGH bear habitat will have greater than or equal to 51% forest cover, less than or equal to 26% agricultural land, less than or equal to 33% urban cover and greater than or equal to 2% but less than or equal to 42% wetlands. Habitat considered to be MODERATE will consist of forest cover greater than or equal to 31% but less than or equal to 50%, agricultural land will cover no more than 50% of the area, urban land will be no greater than 59%, and wetlands will comprise greater than 1%

but less than or equal to 52% of the area. LOW bear habitat will be comprised of less than 30% forest cover, 0% agricultural lands, greater than 60% of the area will be considered urban, and there will be less than 30% of the area considered to be wetlands.

Figure 5. Total number of depredation permits issued (●) from 2010 through 2014 and the number of different farmers receiving depredation permits (▲) during this same timeframe (farmers must obtain separate permits for disjunct farm parcels). The total number of black bears killed under the authority of depredation permits (■) is also depicted.

Figure 6. Reports received by the New Jersey Department of Environmental Protection for black bears exhibiting Category I (■) , Category II (●), and Category III (▲) behaviors (as defined by the Division of Fish and Wildlife's Black Bear Rating and Response Criteria) throughout New Jersey from 2001 through 2014. These reports are maintained within the New Jersey Department of Environmental Protection's NJEMS (NJ Environmental Management System) database and are obtained from residents, law enforcement agencies, and municipalities reporting bear activity. Vertical dashed lines indicate years with a regulated black bear hunt.

Figure 7. The percent (%) of harvested bears during each hunting season from 2003 through 2014 that were known to be involved in nuisance behavior. These bears were previously trapped and tagged by New Jersey Division of Fish and Wildlife staff, at nuisance locations, for exhibiting nuisance behavior or damage behavior. Because there was no

controlled hunt during 2004 or 2006-2009 no nuisance bears were removed from the New Jersey population by means of legal hunting during these years.

Figure 8A. Reports received by the New Jersey Department of Environmental Protection for black bears exhibiting Category I (A) , Category II (B), and Category III (C) behaviors (as defined by the Division of Fish and Wildlife's Black Bear Rating and Response Criteria) in the portion of New Jersey without an open black bear hunting season from 2008 through 2014. Incidents are reported by municipality and for the purposes of this figure black bear incident numbers for municipalities that were partially outside and partially within the huntable area were adjusted proportionally to the percentage of the municipality that fell outside the huntable area. For example, a municipality that was 50% outside, and 50% inside, the huntable area would only have half of its total incidents included in this summary. These reports are maintained within the New Jersey Department of Environmental Protection's NJEMS (NJ Environmental Management System) database and are obtained from residents, law enforcement agencies, and municipalities reporting bear activity.

Figure 8B. Reports received by the New Jersey Department of Environmental Protection for black bears exhibiting Category I (B), Category II (C), and Category III (D) behaviors (as defined by the Division of Fish and Wildlife's Black Bear Rating and Response Criteria) in municipalities that are completely, or partially, within the newly proposed BMZ 5 from 2010 through 2014; total incidents are also reported (A). These reports are maintained within the New Jersey Department of Environmental Protection's NJEMS (NJ Environmental Management System) database and are obtained from residents, law enforcement agencies, and municipalities reporting bear activity.

Figure 9. Total statewide nuisance and damage reports for black bear in New Jersey from 2003 through 2014. These reports are held within the New Jersey Department of Environmental Protection's NJEMS (NJ Environmental Management System) database and are obtained from residents, law enforcement agencies, and municipalities reporting bear activity. Downward arrows ([downward arrow]) indicate years with a regulated black bear hunt.

Figure 10. Estimated black bear population and number of black bear nuisance and damage reports (excluding sightings) in BMZs 1-4. Population estimates were calculated using a Lincoln-Petersen Index and represent the black bear population on the day before the hunting season of the year estimated. Nuisance and damage reports are held within the New Jersey Department of Environmental Protection's NJEMS (NJ Environmental Management System) database and are obtained from residents, law enforcement agencies and local municipalities reporting bear activity.

Figure 11. Black bear harvest rates during New Jersey's black bear hunting seasons from 2010 through 2014. Harvest rates are calculated as the percentage of bears tagged in a given year that are harvest during the hunting season of the same year. A harvest rate of 15% (indicated by the dashed line above) is often used as a minimum threshold for population stability. Harvest rates below 15% are believed to result in subsequent years of population increase.

Figure 12. Correlation between black bear population size and black bear nuisance and damage reports in New Jersey. Black bear population estimates were calculated using a Lincoln-Petersen Index and represent the black bear population on the day before the hunting season of the year estimated. Data are from 2003, 2005, and 2010 through 2014.

Figure 13. Number of black bears harvested in New Jersey (BMZ 1-4) during each of the regulated hunting seasons from 2010 through 2014.

Table 1: Summary of bear related educational materials distributed by the DFW from 2010 through 2014.

Description	Number Distributed to Public
Know The Bear Facts Brochure (English)	200,000
Camper Cards	90,000
Know The Bear Facts Activity Guide	60,000
Know The Bear Facts Brochure (Spanish)	15,000
Living With NJ Black Bears Documentary	4,500 Copies Of The DVD
Understanding Black Bears Curriculum Kit	190 Hard Copies Also On Division Website

Table 2: Summary of attendance numbers at bear education programs by county from 2010 through 2014.

County	Bear Education Presentation or Exhibit Attendance
Atlantic	530
Bergen	2,334
Burlington	2,074
Camden	390

Cape May	150
Cumberland	0
Essex	2,278
Gloucester	95
Hudson	25
Hunterdon	831
Mercer	2,828
Middlesex	1,291
Monmouth	542
Morris	9,651
Ocean	6,384
Passaic	3,422
Salem	0
Somerset	3,965
Sussex	6,123
Union	1,526
Warren	9,536

Table 3. Summary of successful and ongoing waste management programs implemented in partnership with DFW. These programs were implemented in an effort to reduce human-derived food sources for black bear in New Jersey.

Municipality/ Agency	Description	Year Implemented
National Park Service (DWGNRA)	Installation of bear resistant garbage containers at all camping locations.	2005
Great Gorge Village, Vernon NJ	Installation of bear resistant retro fitted dumpster lids.	2008
Denville Township	Implementation of a community wide bear resistant garbage container program (funding needed). Bear resistant dumpsters have been installed at the local schools.	Started in 2011 and is ongoing
Mountain Lakes Borough	Implementation of a community wide bear resistant garbage container program (pursuing funding).	Starting in 2011 and is ongoing
New Jersey State Parks	Installation of bear resistant dumpsters at all Parks north of I-80. Installation of bear resistant food storage lockers at	2005

	remote camping locations and along the Appalachian Trail (AT) in Northern New Jersey.	
New Jersey DFW Field Offices	Installation of bear resistant dumpsters at field offices in northern New Jersey.	2008
West Milford Twp	DEP provision of a community grant to purchase 3,000 bear resistant cans.	2008
Beaver Lake Community	Transition to centralized bear resistant dumpsters and garbage pick-up twice per day.	2009

Table 4. The DFW has handled more than 200 individual bears annually since 2001 through 2014. The animals were tagged, tattooed, and analyzed for research and control purposes. Data collected from tagged bears enables DFW to perform mark and recapture studies for population estimates, determine reproductive and recruitment rates, make health assessments of the population, and determine movement and expansion of the population throughout the State. The average cost of handling a bear exceeds $ 2,000.

Table 5. Ranking of black bear habitat based on 4 parameters using 2011 Land Use/ Land cover data. Land considered to be OPTIMAL/ HIGH bear habitat will have greater than or equal to 51% forest cover, less than or equal to 26% agricultural land, less than or equal to 33% urban cover and greater than or equal to 2% but less than or equal to 42% wetlands. Habitat considered to be MODERATE will consist of forest cover greater than or equal to 31% but less than or equal to 50%, agricultural land will cover no more than 50% of the area, urban land will be no greater than 59%, and wetlands will comprise greater than 1% but less than or equal to 52% of the area. LOW bear habitat will be comprised of less than 30% forest cover, 0% agricultural lands, greater than 60% of the area will be considered urban, and there will be less than 30% of the area considered to be wetlands.

Rank	Forest	Ag	Urban	Wetlands
OPTIMAL /HIGH	>/=51%	</=26%	</=33%	>/=2% and </= 42%
MODERATE	>/=31% and </=50%	</=55%	</=59%	>/=1% and </=52%
LOW	</=30%		>60%	<30%

Table 6. Bear-related Category I calls (by incident type) received by NJDEP from 2001 through 2014. Incident types are based on the Black Bear Rating and Response Criteria (BBRRC).

AD= Agricultural Damage
AHE= Attempted Home Entry
DA= Dog Attack (Unprovoked)
HA= Human Attack
HE= Home Entry
LS= Livestock Attack
PD+= Property Damage > $ 500
PH= Protected Beehives
RA= Rabbit Attack
TA= Aggressive Bear
TE= Tent Entry
UH= Unprotected Beehives
VE= Vehicle Entry

Table 7. Summary of bear hunting seasons in North America. Weapon type allowed and inclusion of a fall season (anytime from August through November) are indicated for each state or Canadian Province.

State/Province	Rifle/Shotgun	Muzzleloader	Archery	Fall Season
Alaska	Yes	Yes	Yes	Yes
Arizona	Yes	Yes	Yes	Yes
Arkansas	Yes	Yes	Yes	Yes
California	Yes	Yes	Yes	Yes
Colorado	Yes	Yes	Yes	Yes
Georgia	Yes	Yes	Yes	Yes
Idaho	Yes	Yes	Yes	Yes
Kentucky	Yes	Yes	Yes	Yes
Maine	Yes	Yes	Yes	Yes
Maryland	Yes	Yes	Yes	Yes
Massachusetts	Yes	Yes	Yes	Yes
Michigan	Yes	Yes	Yes	Yes
Minnesota	Yes	Yes	Yes	Yes
Montana	Yes	Yes	Yes	Yes
New Hampshire	Yes	Yes	Yes	Yes
New Jersey	Yes	Yes	No	No
New Mexico	Yes	Yes	Yes	Yes

New York	Yes	Yes	Yes	Yes
Nevada	Yes	Yes	Yes	Yes
North Carolina	Yes	Yes	Yes	Yes
Oklahoma	No	Yes	Yes	Yes
Oregon	Yes	Yes	Yes	Yes
Pennsylvania	Yes	Yes	Yes	Yes
South Carolina	Yes	Yes	Yes	Yes
Tennessee	Yes	Yes	Yes	Yes
Utah	Yes	Yes	Yes	Yes
Vermont	Yes	Yes	Yes	Yes
Virginia	Yes	Yes	Yes	Yes
Washington	Yes	Yes	Yes	Yes
West Virginia	Yes	Yes	Yes	Yes
Wisconsin	Yes	Yes	Yes	Yes
Wyoming	Yes	Yes	Yes	Yes
Alberta	Yes	Yes	Yes	Yes
British Columbia	Yes	Yes	Yes	Yes
Manitoba	Yes	Yes	Yes	Yes
New Brunswick	Yes	Yes	Yes	Yes
Newfoundland/Labrador	Yes	Yes	Yes	Yes
Northwest Territories	Yes	Yes	Yes	Yes
Northwest Territories	Yes	Yes	Yes	Yes
Nova Scotia	Yes	Yes	Yes	Yes
Ontario	Yes	Yes	Yes	Yes
Quebec	Yes	Yes	Yes	Yes
Saskatchewan	Yes	Yes	Yes	Yes
Yukon	Yes	Yes	Yes	Yes

Appendix I. Role of the Fish and Game Council

Council has historically worked closely with DFW, utilizing the scientific expertise of its biologists to regulate the taking of wildlife in order to ensure its abundance and minimize wildlife related damage. Council's ability to manage is primarily through its rule-making authority to regulate hunting and trapping (Game Code) and fishing (Fish Code). The ability to implement various Council policies is constrained by the fiscal and human resources of governmental agencies, particularly DEP and DFW, as well as those of interested non-governmental organizations. Therefore, with regard to the Supreme Court opinion suggesting that absolute size of the black bear population may be an important factor in determining which tools will be utilized to accomplish the DEP's broad preservation goals (

U.S. Sportsmen's Alliance Found. v. N.J.D.E.P., 182 N.J. 461, 867 A.2d 1147 (2005)), the Council recognizes that the ability to measure wildlife populations is subject to the scientific tools available and that the population status is most often measured through the use of population indices and estimates, as opposed to absolute counts. Except for highly visible small populations such as bald eagles, it is impossible to obtain absolute counts on wildlife species. The CBBMP relies on estimates of abundance within the bear study areas as well as the changes in human-bear related incidences when considering bear management decisions.

Council was established by the legislature in 1945; Council's current makeup of 11 members was established in 1979. The makeup and authority of Council was upheld by the NJ Supreme Court in 1976 (Humane Society of the U.S. vs. NJ State Fish and Game Council, 70 N.J. 565 (1976), appeal dismissed 429 U.S. 1032, 50 L.Ed. 2d 744) and more recently the Superior Court in 2002 (Mercer Cty. Deer Alliance vs. NJDEP, 349 N.J. Super. 440 (App. Div. 2002)). The Governor, with advice and consent of the Senate, appoints each member. Three members of the Council are farmers, recommended by the Agricultural Convention; six members are sportsmen, recommended by the State Federation of Sportsmen's Clubs; one member is a public member knowledgeable in land use management and soil conservation practices, and the final member is the Chairperson of the Endangered and Nongame Advisory Committee (N.J.S.A 13:1B-24).

Council is mandated with the responsibility of protecting and conserving game birds, mammals and fish and providing an adequate supply for recreational and commercial harvest. This mandate is carried out through Council's adoption of the Fish and Game Codes, which determine "under what circumstances, when and in what localities, by what means and in what amounts and numbers [fish and game species] may be pursued, taken, killed, or had in possession so as to maintain an adequate and proper supply thereof ...." (N.J.S.A. 13:1B-30, 13:1B-32).

"In addition to its powers and duties otherwise hereinafter provided, the Fish and Game Council shall, subject to the approval of the commissioner, formulate comprehensive policies for the protection and propagation of fish, birds and game animals ...." (N.J.S.A. 13:1B-28). It is this statutory authority that provides the basis for the CBBMP.

Appendix II:

A. Summary of Cooperative Black Bear Research Efforts from 2008 through 2014.

1. Project: Temporal, Spatial, and Environmental Influences on the Demographics and Harvest Vulnerability of American Black Bears (*Ursus americanus*) in Urban Habitats in New Jersey, Pennsylvania and West Virginia

Partners: West Virginia University; NJ, PA, and WV Cooperators

Major Findings: Bears captured at urban nuisance and damage locations and released on site can be harvested by hunters.

2. Project: Retrofitting Dumpsters with Bear Resistant Lids to Reduce Negative Human-Bear Interactions in New Jersey

Partners: East Stroudsburg University and NJDFW

Major Findings: Bears that were unable to obtain food from retrofitted dumpsters moved to

other unsecure dumpsters within the community.

3. Project: Evaluation of Aversive Conditioning Using Satellite Collars on Black Bears in New Jersey

Partners: East Stroudsburg University and NJDFW

Major Findings: Both aversively conditioned bears and non-aversively conditioned bears returned to an urban setting after being released. Bears that were aversively conditioned displayed a temporary avoidance of the site where conditioning occurred but eventually returned to this site. Aversive conditioning may provide a temporary, short term avoidance of the conditioning site, and nuisance behavior could shift to other locations.

4. Project: Genetic Diversity and Multiple Paternities of American Black Bears in New Jersey

Partners: East Stroudsburg University and NJDFW

Major Findings: No significant difference was found between the genetic diversity in New Jersey and northeastern Pennsylvania black bears. No evidence was found of a geographic barrier preventing gene flow between New Jersey and Pennsylvania, indicating that the movement of black bears from northeastern Pennsylvania likely made a contribution to the repopulation of New Jersey. Data from eight microsatellite loci permitted assigning of paternity for cubs in four out of 15 (26.7%) litters.

5. Project: The Occurrence of Tick-Borne Pathogens in Black Bears (*Ursus americanus*) in New Jersey

Partners: East Stroudsburg University and NJDFW

Major Findings: *Anaplasma phagocytophilumm* and *Babesia* spp. were detected in 0.01% and 39.8%, respectively, of the 317 blood samples taken from New Jersey black bears. *Rickettsia rickettsii* and *Babesia* spp. were detected in 5.2% and 94.5%, respectively, of 634 adult engorged *Ixodes scapularis* and *Dermacentor variabilis* attached to black bears. *Francisella tulrensis* was not present in any of the blood samples or tick pools screened.

6. Project: Seroprevalence of *Toxoplasma gondii*, *Trichinella spiralis*, and *Borrelia burgdorferi* in Northern New Jersey Black Bears (*Ursus americanus*)

Partners: East Stroudsburg University and NJDFW

Major Findings: Of the 240 serum samples collected from black bears located in northern New Jersey, antibody prevalence to *Toxoplasma gondii* was 73.7%, to *Trichinella spiralis* was 0%, and to *Borrelia burgdorferi* was 87.0%.

People living in New Jersey must protect themselves from ticks and cook wild game meat properly to prevent infection by these particular parasites.

7. Project: Genetic Structure of American Black Bears (*Ursus americanus*)

Partners: East Stroudsburg University and NJDFW

Major Findings: Aspects of genetic diversity and gene flow for 4 management zones in NJ

using genotypic data from 9 microsatellite loci were evaluated.

Measures of genetic diversity were estimated at the individual level, as well as within and between management areas. A total of 84 alleles were observed at the 9 microsatellite loci amplified in a multiplex reaction. The degree of variation ranged from 6 to 12 alleles per locus, with an average of 9.33 alleles per population at each locus. Results indicated that genetic diversity was high in the black bears. Results from STRUCTURE 2.3.4 suggest that NJ black bears represent a panmictic population.

8. Project: Case-Control of Study of NJ Black Bears (*Ursus americanus*) Infected with *Babesia* spp.

Partners: East Stroudsburg University and NJDFW

Major Findings: Blood samples were taken from 65 black bears. Of the 25 bears that tested positive for *Babesia* initially, 52% of them cleared the infection and 48% had a persistent infection. Of the remaining 38 bears that tested negative for *Babesia* at baseline, 71% of them remained free of infection and 29% acquired infections at follow-up.

9. Project: *Babesia* sp. in Black Bears (*Ursus americanus*) in New Jersey

Partners: East Stroudsburg University and NJDFW

Major Findings: The tick-borne zoonosis, *Babesia*, was detected in 84 of 201 (41.8%) black bear blood samples collected from five counties in northwestern New Jersey. Sequence analysis confirmed the presence of *Babesia* spp. in all of the PCR positive samples. This data represents the first report of *Babesia* spp. in American black bears.

10. Project: Aerobic Oral and Nasal Bacteria in New Jersey Black Bears (*Ursus americanus*) with Antibiotic Susceptibility of *Escherichia coli*

Partners: East Stroudsburg University and NJDFW

Major Findings: Twelve aerobic bacterial species, representing 9 genera, were identified from the oral swabs from the buccal and lingual bupragingival tooth surfaces and nasal swab samples obtained from 22 research trapped bears in Warren County, New Jersey during June 2014. The most frequently isolated bacteria were *Bacillus* sp., *Klebsiella* sp., *Micrococcus luteus*,*Pseudomonas aeruginosa* and *Staphylococcus epidermidis*. The diversity in the aerobic oral and nasal flora of black bears in New Jersey suggests the importance of including these organisms in basic health risk assessment protocols and suggests a potential tool for assessment of bear/habitat interactions. To evaluate the role of black bears in the spread of antibiotic resistant *E.coli*, oral and nasal samples were collected from 8 black bears (two sows and six cubs). Antibiotic resistance was measured for tetracycline and streptomycin. There were a total of 21.7% *E.coli*resistance for tetracycline (7.69%) and streptomycin (14%) and a total of 65.4% intermediate resistance for tetracycline (15.4%) and streptomycin (50%).

11. Project: Case Report: Fatal Disseminated Toxoplasmosis in a Black Bear Cub

Partners: East Stroudsburg University and NJDFW

Major Findings: At necropsy, the lungs were reddened and noncollapsed and had multiple pale round foci. Foci of necrosis were associated with *Toxoplasma gondii* cysts and

tachyzoites in several organs. Rabies antigen was not detected.

12. Project: Case Report: *Staphylococcus intermedius* Dermatitis in Denning New Jersey Black Bears (*Ursus americanus*)

Partners: East Stroudsburg University and NJDFW

Major Findings: In March 2006, a 5-yr-old female and three yearling black bears with severe dermatitis were examined. The female and three yearlings all exhibited weight loss. Deep skin scrapings were taken and examined. No mites were found in the skin scrapings. *Staphylococcus intermedius* was the only bacterial species isolated from the four bears. To our knowledge this is the first report of non-mange related dermatitis caused by s. *intermedius* in black bears.

13. Project: Food Habits and Blood Chemistry of New Jersey Black Bears

Partners: East Stroudsburg University and NJDFW

Major Findings: Ninety-one black bear stomachs were examined for food contents in the fall, summer and spring. Vegetation (63%) and grasses (70.3%), fruit, seeds and berries (52.4%), and acorns and beechnuts (42.7%) occurred most often in the black bear stomachs. In spring, New Jersey black bears consumed new vegetative growth, human food, animal tissue and refuse. During summer, herbaceous material, nuts and fruits were the primary food items. During fall, bears fed mostly on plants, mast, and animal tissue. Complete blood chemistry was analyzed for 16 adult bears during the fall trapping season. Blood chemistry reveled triglyceride concentrations 175.9 mg/dL +/- 53.7 and cholesterol levels of 354.1 +/- 73.2 mg/dL. Glucose concentrations were obtained for 129 bears in the field during the fall, spring and summer. Glucose concentrations averaged 121.8 mg/dL for males and 124.2 mg/dL for females during autumn months and 102.8mg/dL males and 116.7 for mg/dL for females during summer months.

B. Summary of Published Literature and Reports

2014. Shaw, M., N. Kolba, and J.E. Huffman. *BABESIA* SP. IN BLACK BEARS (*URSUS AMERICANUS*) IN NEW JERSEY. Northeastern Naturalist - *Submitted*

Partners: East Stroudsburg University, NJDFW and the Northeast Wildlife DNA Laboratory

Major Findings: *Babesia* is emerging as a cause of tick-borne zoonosis worldwide and various wildlife species animals are the principal reservoir hosts for zoonotic *Babesia* species. The primary vectors of *Babesia* are Ixodid ticks, with the majority of zoonotic species being transmitted by species in the genus *Ixodes*. The protozoan infects and lyse red blood cells. The tick-borne zoonosis, *Babesia*, was detected in 84 of 201 (41.8%) samples. Sequence analysis confirmed the presence of *Babesia* spp. in all of the PCR positive samples. This data represents the first report of *Babesia* spp. in American black bears (*Ursus americanus*).

2014. Lisowski, S., N. Chinnici and J.E. Huffman AEROBIC ORAL AND NASAL BACTERIA IN NEW JERSEY BLACK BEARS (*URSUS AMERICANUS*) WITH ANTIBIOTIC SUSCEPTIBILITY OF *ESCHERICHIA COLI*. Journal of the Pennsylvania Academy of Science 88(2): 95-100, 2014- Submitted

Partners: East Stroudsburg University and NJDFW and the Northeast Wildlife DNA

Laboratory

Major Findings:- The microbiology of animal bite wound infections is often polymicrobial. Black bear attacks have been a rare occurrence in the past, and with few published studied on their oral flora, the bacteria present in black bear bite wounds is largely unknown. This study examines the oral and nasal aerobic bacteria from research trapped bears in Warren County, New Jersey during June 2014. Twelve aerobic bacterial species, representing nine genera were identified from the oral and nasal samples. The most frequently isolated bacteria were *Bacillus* sp., *Klebsiella*sp., *Micrococcus luteus*, *Pseudomonas aeruginosa* and *Staphylococcus epidermidis*. The diversity in the aerobic oral and nasal flora of black bears in New Jersey suggests the importance of including these organisms in basic health risk assessment protocols and suggests a potential tool for assessment of bear/habitat interactions. To evaluate the role of black bears in the spread of antibiotic resistant *E.coli*, oral and nasal samples were collected from eight black bears (two sows and six cubs). Antibiotic resistance was measured for tetracycline and streptomycin. There were a total of 21.7 percent *E.coli* resistance for tetracycline (7.69%) and streptomycin (14%) and a total of 65.4 % intermediate resistance for tetracycline (15.4%) and streptomycin (50%).

2014. Huffman, J.E., and D.E. Roscoe. CASE REPORT: FATAL DISSEMINATED TOXOPLASMOSIS IN A BLACK BEAR CUB. Journal of the Pennsylvania Academy of Science 88(2): 101-106, 2014- Submitted

Partners: East Stroudsburg University and NJDFW and the Northeast Wildlife DNA Laboratory

Major Findings: A black bear (*Ursus americanus*) cub with signs of neurological disease was captured in West Milford, NJ. The animal died in captivity and was examined because of suspected rabies. At necropsy, the lungs were reddened and noncollapsed and had multiple pale round foci. Foci of necrosis were associated with *Toxoplasma gondii* cysts and tachyzoites in several organs. Rabies antigen was not detected.

2012. Keeler, P. Shamus, K.I. Burguess, H. Lemasters, , and J.E. Huffman. CASE REPORT: *STAPHYLOCOCCUS INTERMEDIUS* DERMATITIS IN DENNING NEW JERSEY BLACK BEARS (*URSUS AMERICANUS*) Journal of the Pennsylvania Academy of Science 86(1): 75-78, 2012- Submitted

Partners: East Stroudsburg University and NJDFW and the Northeast Wildlife DNA Laboratory

Major Findings: On 18 March 2006, during annual den research, personnel from the New Jersey Division of Fish and Wildlife Black Bear Project examined a 5-yr-old female and three yearling black bears (*Ursus americanus*) with severe dermatitis. The female and three yearlings all exhibited weight loss. Deep skin scrapings were taken and examined under a stereomicroscope.*Staphylococcus intermedius* was the only bacterial species isolated from the four bears. To our knowledge this is the first report of non- mange related dermatitis caused by *s. intermedius* in black bears.

2010. Huffman, J.E., C.L. Heidelberger, K.I. Burguess. FOOD HABITS AND BLOOD CHEMISTRY OF NEW JERSEY BLACK BEARS. Journal of the Pennsylvania Academy of Sciences 85: 76-80. Submitted

Partners: East Stroudsburg University and NJDFW and the Northeast Wildlife DNA

Laboratory

Major Findings: We investigated the seasonal feeding habits, and blood chemistry of black bears (*Ursus americanus*) across their geographic range in New Jersey. We also evaluated glucose concentrations in trapped bears in the field. Ninety-one black bear stomachs were examined for food contents in the fall, summer and spring. Complete blood chemistry was analyzed for 16 adult bears during the fall trapping season. Glucose concentrations were obtained for 129 bears in the field during the fall, spring and summer. Vegetation (63%) and grasses (70.3%), fruit, seeds and berries (52.4%), and acorns and beechnuts (42.7%) occurred most often in the black bear stomachs. In spring, New Jersey black bears consumed new vegetative growth, human food, animal tissue and refuse. During summer, herbaceous material, nuts and fruits were the primary food items. During fall, bears fed mostly on plants, mast, and animal tissue. Blood chemistry reveled triglyceride concentrations 175.9 mg/dL +/- 53.7 and cholesterol levels of 354.1 +/- 73.2 mg/dL. Glucose concentrations averaged 121.8 mg/dL for males 124.2 mg/dL for females during autumn months and 102.8mg/dL males 116.7 for mg/dL for females during summer months in 2003 and 2004.

2010. Skirta, E.A., J.E. Huffman, A. Zeller , K.I. Burguess, M. Madonia, T. Ombrello. SATELLITE MONITORING OF SPATIAL AND SEASONAL LANDSCAPE USE BY BLACK BEARS IN NEW JERSEY BEARFORT NOUNTAINS Technical Commission VII Symposium 2010 (2010-06-29 14:28:16)- Submitted

Partners: East Stroudsburg University and NJDFW and the Northeast Wildlife DNA Laboratory

Major Findings: This paper reports the results of a collaborative research project integrating the efforts of the New Jersey Fish and Wildlife Commission, ESU and the Northeast DNA Laboratory to advance understanding of landscape patterns of black bear distribution, environmental relationships, and population monitoring tools by using satellite monitoring of a group of female black bears. The experiment was implemented in 2008-2009 in the Bearfort Mountains region in New Jersey. Our goal is to model ecological inferences from statistical analyses of bear movements and environmental conditions based on Geographic Information System (GIS)-collected data. Multivariate regression analysis and compositional analysis along with canonical correspondence analysis (CCA) were used to analyze variation in bear home range selection and distance analysis. Spatial and seasonal home range variations based on parametric and non-parametric statistical methods and current spatial applications of CCA are presented, and methods for integrating CCA with GIS coverage of the environment as a bear habitat use are examined.

2010. Huffman, J.E., E. Skirta, A.S. Zellner, NEW JERSEY BLACK BEAR AVERSIVE CONDITIONING REPORT. Submitted to the New Jersey Division of Fish and Wildlife.

Partners: East Stroudsburg University and NJDFW and the Northeast Wildlife DNA Laboratory

Major Findings: Bears aversively conditioned using Def tech 12 gauge rubber buckshot pellets, pyrotechnics and specially trained black mouth yellow curs dogs stayed away from the location they were caught and conditioned an average of 19 days. Bears did resume the same Category II activity for which they had been originally captured for. Bears also remained in the same area where they were captured and conditioned.

2012. Daniel, B.J., J.E. Huffman, T.A. Ombrello, GENETIC ANALYSES OF AMERICAN BLACK

BEARS (*URSUS AMERICANUS*) IN NEW JERSEY AND NORTHEAST PENNSYLVANIA

Partners: East Stroudsburg University and NJDFW and the Northeast Wildlife DNA Laboratory

Major Findings: Samples taken legally harvested black bears or bears captured for research purposes were analyzed to determine the level of genetic diversity there is between the two states. Bears located in western New Jersey and eastern Pennsylvania was found to genetically related more so than bears located in eastern New Jersey. Bears located in New Jersey and Pennsylvania have a high degree of genetic diversity and are considered to be healthy.

HISTORY:

Amended by R.1995 d.427, effective August 7, 1995.

See: 27 N.J.R. 1897(a), 27 N.J.R. 2889(a).

Amended by R.2000 d.365, effective September 5, 2000 (operative September 10, 2000).

See: 32 N.J.R. 1673(a), 32 N.J.R. 3294(a).

Rewrote the section.

Notice of stay of black bear hunting season.

See: 32 N.J.R. 3592(a).

Amended by R.2001 d.300, effective August 20, 2001 (operative August 25, 2001).

See: 33 N.J.R. 1527(a), 33 N.J.R. 2829(a).

Rewrote (a); deleted (b) through (g); recodified (h) as (b).

Amended by R.2003 d.359, effective September 2, 2003 (operative September 7, 2003).

See: 35 N.J.R. 1804(a), 35 N.J.R. 4053(a).

Rewrote (a).

Amended by R.2004 d.385, effective October 4, 2004 (operative October 9, 2004).

See: 36 N.J.R. 2325(a), 36 N.J.R. 4513(b).

In (a), substituted "6-11, 2004 and shall be concurrent with the six-day firearm deer season" for "8-13, 2003" following "shall be December" in the introductory paragraph, and substituted "2004" for "2003" throughout 1.

Amended by R.2005 d.321, effective September 19, 2005 (operative September 24, 2005).

See: 37 N.J.R. 1959(a), 37 N.J.R. 3657(a).

Rewrote (a).

Amended by R.2007 d.239, effective August 6, 2007.

See: 39 N.J.R. 587(a), 39 N.J.R. 3324(a).

Rewrote (a)1iii.

Amended by R.2009 d.276, effective September 8, 2009 (operative September 13, 2009).

See: 41 N.J.R. 1320(a), 41 N.J.R. 3217(b).

In the introductory paragraph of (a)1 and in (a)1i, substituted "BMZ" for "black bear hunting area"; in the introductory paragraph of (a)1, substituted "bear management zone (BMZ)" for "black bear hunting area"; in (a)1iii, substituted "two applications" for "one application" following "Only", the first occurrence of "BMZ" for "black bear hunting area" and the second occurrence of "BMZ" for "hunting area", and inserted "one application for an initial permit lottery and one application for a left-over permit for a different BMZ", "for the initial permit lottery or for a left-over permit" and "or unclaimed"; in (a)2, inserted "annually" and "BMZ" and substituted "7:00" for "8:00"; in the introductory paragraph of (a)3, substituted "management zones" for "hunting areas"; in (a)3i, (a)3iii, (a)3iv, (a)3v and (a)3vi, substituted "Zone" for "Black Bear Hunting Area No."; in (a)3i, substituted "then" for "the" preceding "southwest"; in (a)3ii, substituted "Zone" for "Black Bear Hunting No. Area"; and in header of the first column of the BLACK BEAR HUNTING SEASON PERMIT QUOTAS table in (a)6, substituted "Bear Management Zone" for "Black Bear Hunting Area".

Amended by R.2010 d.262, effective November 15, 2010 (operative November 20, 2010).

See: 42 N.J.R. 753(a), 42 N.J.R. 2754(c).

In the introductory paragraph of (a), inserted "(see section Appendix, incorporated herein by reference)"; and added the section Appendix.

Amended by R.2011 d.237, effective September 6, 2011 (operative September 11, 2011).

See: 43 N.J.R. 1112(a), 43 N.J.R. 2307(a).

Rewrote the introductory paragraph of (a) and of (a)1; in (a)1i, inserted "and special farmer black bear permits"; in (a)1iii, substituted "15" for "30"; and added (a)1iv.

Amended by R.2013 d.115, effective September 16, 2013 (operative September 21, 2013).

See: 45 N.J.R. 787(a), 45 N.J.R. 2121(a).

In the introductory paragraph of (a), inserted a comma following "kill"; and in (a)3iii, inserted a comma following "Morris", and substituted "then north along Rt. 23 to its intersection with Rt. 94 in Hamburg Borough; then north along Rt. 94 to its intersection with Rt. 517;" for "then north along Rt. 23/517 to its intersection with 517 in Hamburg Borough;".

Amended by R.2015 d.147, effective September 8, 2015 (operative September 13, 2015).

See: 47 N.J.R. 577(a), 47 N.J.R. 2264(a).

In the introductory paragraph of (a), inserted the second sentence; and in (a)1iv(2), updated the address.

Amended by R.2015 d.173, effective November 16, 2015 (operative November 21, 2015).

See: 47 N.J.R. 929(a), 47 N.J.R. 2753(c).

Rewrote the section.

CASE NOTES:

Decision of the Commissioner of the Department of Environmental Protection not to implement the 2005 Comprehensive Black Bear Management Plan (CBBMP) was affirmed since the policy was not adopted pursuant to the rulemaking provisions of the Administrative Procedure Act (APA); because the 2005 CBBMP set guidelines as to when and if a hunt can occur, it implicated matters of general administrative policy, warranting rulemaking pursuant to the APA. N.J. Animal Rights Alliance v. N.J. Dep't of Envtl. Prot., 396 N.J. Super. 358, 934 A.2d 52, 2007 N.J. Super. LEXIS 324 (App.Div. 2007).