2022

Comprehensive Black Bear (*Ursus americanus*) Management Policy

New Jersey

Prepared by:

NJ Fish and Game Council

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Background

The New Jersey Fish and Game Council (Council) has been mandated by the New Jersey State Legislature to protect and conserve game birds, mammals, and fish and to provide an adequate supply for recreational harvest. Council's current and future management decisions regarding black bears have been and will continue to be based on the best available scientific data. Based on scientific evidence presented by the Department, the Council opens and closes seasons, set season lengths, bag limits, and manner of take to ensure healthy and long-term stable wildlife populations and to maximize and equitably distribute recreational opportunity to various user groups. The Council accomplishes this through rule-making processes and the scientific evidence presented by state biologists. In addition, the Council, subject to the approval of the Commissioner of Environmental Protection (Commissioner), formulates the State's Comprehensive Black Bear Management Plan (CBBMP). An approved CBBMP is required in order to enact provisions with the State Game Code relating to black bear (N.J.A.C. 7:25-5.6).

On February 28, 2005, the New Jersey 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 the factors that should be considered when determining which tools will be utilized. The 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. 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's goals for bear management reflect the legislative mandate of the DEP and the Council, and the mission and goals of the DEP and DEP's Fish and Wildlife. The New Jersey State Legislature mandated that Council has the responsibility of protecting and conserving game birds, mammals, and fish and providing an adequate supply for recreational harvest. The Mission of NJDEP Fish and Wildlife 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 NJFW include; maintaining New Jersey's rich variety of fish and wildlife species at stable, healthy levels and protecting and enhancing the many habitats on which they depend; educating New Jerseyans on the values and needs of our fish and wildlife and fostering a positive human/wildlife co-existence; and maximizing the recreational and commercial use of New Jersey's fish and wildlife for both present and future generations.

I. INTRODUCTION

This document defines the Council's 2022 Comprehensive Black Bear Management Policy (CBBMP). Council periodically re-evaluates its policies, recommendations, and regulations as information on the wildlife species under its jurisdiction and the needs of New Jersey'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 has directed that NJFW manage black bears to ensure their continued survival in New Jersey, while addressing residents' and farmers' property damage and safety concerns. Council recognizes that instances of black bears injuring humans have occurred in New Jersey and that 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, reinforcing the human safety concern associated with managing this species. Since 2010, NJFW has documented six incidences of bears injuring humans including the 2014 fatal attack. With careful management, however, the black bear provides an overall benefit to the citizens of New Jersey in the form of wildlife appreciation, observation, and hunting.

The Council finds that NJFW should manage the bear population at a level commensurate with available habitat and consistent with reducing risk to public safety and property. Council recognizes that there are no non-lethal methods currently available to effect a population reduction in bears. In 2020, the estimated black bear population in the hunted area of the State (Bear Management Zones 1 - 5) exceeded 3,000 bears, which has not occurred since 2014. In response to the dangerously elevated population level of 2014, Council took immediate action to expand the hunting season (2015 CBBMP) to reduce this high level of bears and protect public safety. The season's expansion quickly reduced the bear population, thereby lessening the threat to public safety; the estimated bear population was 1,527 in 2018. Public lands were closed to bear hunting for the 2018, 2019 and 2020 bear seasons. There was a 29% decrease in the average number of bear permits sold for these three years. The average harvest rate for the 2018, 2019, and 2020 seasons was 14.3%, compared to an average harvest rate of 20.1% for the preceding seasons (2015, 2016, and 2017). Annual harvest rate is the percentage of tagged

bears versus untagged bears that are harvested in a given season. A harvest rate of 20% is needed to affect a population reduction.

In 2020, damage and nuisance complaints involving bears increased by 50% since 2018. In 2021, Council advised that unless public lands are re-opened to bear hunting, the bear population (3,158 in 2020) could quickly increase to unprecedented levels, creating an increased risk to public safety.

Council directs that NJFW should use Integrated Wildlife Damage Management, which seeks to prevent, reduce, or stop wildlife damage by integrating a combination of methods sequentially or concurrently (USDA WS WI 2002, Raithel et al. 2016). The integrated approach to black bear management used by NJFW in New Jersey includes all available methods within its fiscal and personnel resources, including population control through regulated hunting, research, educational programs, promoting the use of bear-resistant garbage containers, lethal bear damage control, and non-lethal bear damage control.

Scientific data from NJFW's bear research program, which began in the 1980s, demonstrates that New Jersey has a productive black bear population that can support a regulated hunting season (McConnell et al. 1997). Data from hunting seasons and continued research and monitoring efforts has also shown that a regulated hunting season effectively reduces New Jersey's bear population to manageable levels when properly implemented, including being allowed on all available public properties. Current research has shown that regulated hunting seasons are the only tool available for effective population control of free-ranging black bears (NEBBTC 2012;

Lackey et al. 2018). Council notes that the State Game Code contains regulatory safeguards that assure that bear harvests remain below the population's sustained yield capabilities (N.J.A.C. 7:25-5.6). Data also shows that when a hunting season is properly implemented, nuisance complaints are mitigated, and bear population growth is slowed or reversed. Conversely, data shows that when bear hunting is closed entirely, or prohibited on public lands, both the bear population and incidents, including dangerous Category I incidents, increase. Although fertility control and sterilization continue to be researched, these methods of population control are not effective for free-ranging populations and are not economically feasible, as evaluated either by an efficacy or cost metric. Regulated hunting remains the only available safe and effective management tool to provide recreation and to control New Jersey's black bear population.

Aside from a regulated hunting season as a tool for bear population control, Council recognizes the importance of other available tools, including non-lethal methods, to reduce the likelihood of bears becoming a nuisance or a danger to humans. NJFW staff has trained over 1,550 local police officers, State troopers, and state, county, and municipal park rangers to assist in problem bear response. In this effort, NJFW and its partners utilize lethal control on high-risk, dangerous bears and non-lethal aversive conditioning techniques on nuisance bears. 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. NJFW and the Department of Environmental Protection (DEP) have also stepped-up law enforcement activities on bear feeding and garbage containment.

NJFW 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. Since 2007, Bureau of Law Enforcement staff has inspected thousands of residential properties in high bear incident areas and found nearly complete compliance with black bear garbage management guidelines, suggesting the black bear education effort has been effective in compliance. In 2021, NJFW received a $1.5 million appropriation for non-lethal bear management, a portion of which was spent to hire a consultant on an extensive campaign which utilized a new webpage, social media like Facebook and Instagram; YouTube videos; and messaging through connected TV/OTT like ROKU, Amazon Fire, and Google TV; and streaming audio on Pandora and Audacy, reaching millions of people throughout the State, not just in bear country. Due to the success of NJFW's educational efforts, Council has determined that NJFW should increase this expanded program, including municipal outreach. NJFW received an additional $1.5 million appropriation in 2022 to cover bear related staff positions and to continue enhanced outreach efforts.

Council has determined that NJFW is using all the tools available, as resources allow, to properly manage the black bear resource and further recommends the continued use of a properly implemented and regulated 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.

Black Bear Management Objectives

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

- Manage the bear population at a level commensurate with available habitat and consistent with reducing risk to public safety and property.
- Sustain a robust black bear population as part of New Jersey's natural resource base.
- Continue to 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 properties, and their communities.
- Ensure that regulated hunting remains a safe and effective management tool to provide recreation and control New Jersey's black bear population.
- Strengthen and 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.

II. STATUS OF BLACK BEARS IN NEW JERSEY

The black bear occurred Statewide in New Jersey through the 1800s, however, by the mid-1900s 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, and NJFW

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. Based upon data gathered through these regulated hunting seasons, NJFW assessed the bear population status and the Council subsequently closed the black bear hunting season in 1971 (Lund 1980). NJFW commenced a population research and monitoring project in 1988, providing data showing that the bear population was increasing and expanding and could support a regulated hunting season. Based on these data, Council prescribed regulated hunting seasons in 2003, 2005, and 2010 through 2020. The NJFW continues to conduct population monitoring and research and to collect and analyze data collected during regulated hunting seasons to ensure the best available scientific data is available to Council for making management decisions.

In years with hunting seasons between 2003 and 2014, bear population modeling was performed by Pennsylvania State University (PSU) as well as NJFW. The PSU model estimated 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 NJFW estimated the bear population within the same area using the Lincoln-Petersen Index, which is a method of mark-recapture population estimation. Since the Lincoln-Petersen Index tracked well with the PSU estimates during this period, NJFW continues to use the Lincoln-Petersen Index to calculate the size of New Jersey's bear population. As the method utilizes hunter harvest as the recapture effort the Index can only be calculated when a hunting season takes place.

Bear hunting seasons in 2003, 2005, and 2010 through 2015 were designed to be conservative, occurring in December and limiting hunting to bears that had not yet entered winter dens. By

utilizing this conservative approach, Council allowed important data to be collected on hunted bears and hunter demographics to ensure that bears in New Jersey could be harvested safely and sustainably. In 2010, the bear population estimate was approximately 3,200 in the area north of Interstate 78 and west of Interstate 287 and was at first reduced through yearly hunting seasons (Figure 1). This conservative December-only season structure was insufficient to manage the bear population and mitigate complaint levels long term. By 2014 the population and complaints rebounded to 2010 levels (Figure 1). The data indicates that the initial decrease in population size was attributable to higher harvest rates during 2010 and 2011. After 2011, harvest rates during the December season decreased, leading to an increase in population by 2014. In response, Council expanded the hunt area to include BMZ 5, expanded season dates to include a hunting segment in October and the ability to extend the season in December, and expanded legal weaponry for bear hunting to address the increase in the bear population.

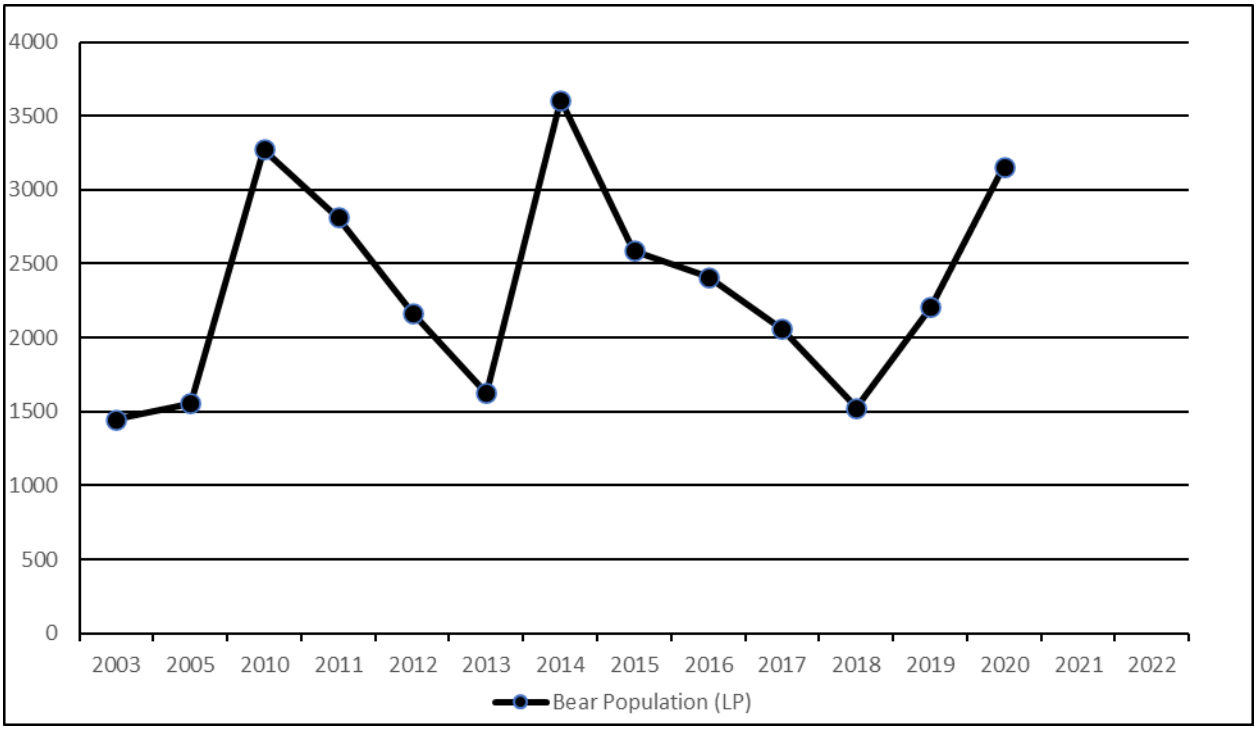

Figure 1: Lincoln-Petersen bear population estimates for 2003, 2005, and 2010 through 2020.

There was no regulated hunting season in 2004, 2006-2009 or 2021, and in 2022, hunting only occurred for a portion of Segment B. Thus, there is no LP estimate for those years.

In the 2015 CBBMP revision which included the above-mentioned season structure changes, Council recognized that in order to control the bear population and reduce negative human-bear interactions, it was important that there was adequate hunter participation. Because Council believes hunter participation and access to hunting land are inherently linked, both public and private lands were opened to bear hunting to provide for this participation. Public land access to hunters is especially important for both meeting bear population management objectives and for providing recreational opportunity. New Jersey's public lands contain excellent bear habitat, and many hunters only have access to these public lands. That many hunters only have access to public lands for bear hunting is evidenced by the sharp decline in bear hunting permit purchases subsequent to the temporary closure of state lands in 2019 and 2020.

The changes to the bear hunting season structure implemented by Council in 2015 allowed harvest rates to increase, resulting in a population reduction in 2016 and 2017 (Figure 2). This decrease in bear population resulted in a 50% decrease in complaints between 2016 and 2018 (Figure 2). The relief experienced by the public through this reduction in bear population did not last, however. State lands were closed to bear hunting during the 2018 through 2020 seasons, reducing accessibility to bears, thereby decreasing harvest rates during these seasons. The number of individual hunters who purchased bear permits for the three seasons between 2015 and 2017 was fairly consistent (range 7,105 – 8,098; average 7,590). The number of individuals who purchased permits from 2018 to 2020 was also fairly consistent but lower (range 5,360 – 5,505; average 5,423). Thus, a 29% decrease in the average number of bear permit holders followed the closure

of State lands and resulted in harvest rate declines measured between the 2015 – 2017 seasons (average harvest rate = 20.1%) and the 2018 – 2020 seasons (average harvest rate = 14.3%).

The Council believes this land closure was instrumental in allowing the bear population to increase between 2018 and 2020 and led incidents to increase 50% during this same period (Figure 2). Prior to the closure of these public lands to bear hunting, approximately 40% of the annual bear harvest came from State lands, which supports the Council's position on the importance of access to these lands for bear population control. The Council also views access to State lands by hunters as critical for re-enforcing bears' natural fear of people. State lands contain prime areas for New Jersey's public to camp and recreate. If closure of these lands to bear hunting continues, bears in New Jersey's State parks and forests may become progressively emboldened due to a lack of hunting pressure on these grounds, potentially increasing public safety risk. Public land hunting closure and the subsequent reversal in population and incident trends demonstrate the importance of hunter access to these lands to meet bear population management objectives.

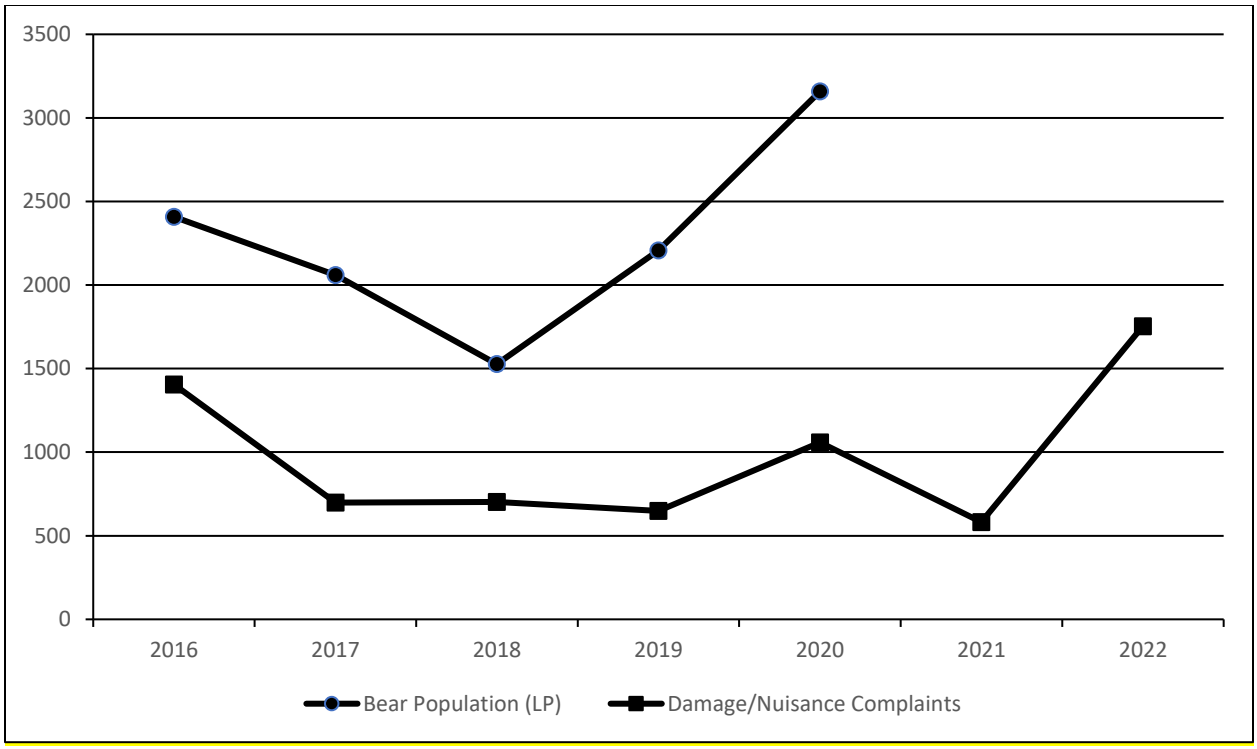

Figure 2: Lincoln-Petersen bear population estimates, and damage and nuisance complaints received by NJFW, 2016 through 2022. Bear hunting seasons were open on State lands during the 2016, 2017, and 2022 seasons and were closed on these same lands during the 2018 through 2020 seasons. In 2021, there was no regulated hunting season, and 2022, hunting only occurred for a portion of Segment B. Thus, there is no LP estimate for those years.

Based on research data, the 2020 black bear population estimate for Bear Management Zones (BMZs) 1 through 5 was 3,158 bears, an increase of 107% since State lands were closed to hunting in 2018 (Figure 1). Council notes that in 2010 and 2014, the estimated population exceeded 3,000 bears in New Jersey. In response to these high estimates and the associated elevated risk to public safety and property, Council reinstated the hunting season (2010) and expanded the season (2015) to reduce the dangerously high bear population. Council believes that the black bear population (3,158 in 2020) will continue to increase unless State lands remain open to black bear hunting.

III. INTEGRATED BLACK BEAR MANAGEMENT STRATEGY

Council believes that it is imperative to have a broad, integrated approach in place to address the growing potential for human-bear conflict. Such a strategy includes implementing population control through the regulated hunting season, monitoring the bear population through research, educating people about black bear ecology, recommending human behavioral adjustments while in bear range, enforcing laws that minimize human-bear conflicts, taking action against bears exhibiting dangerous and nuisance behavior, and protecting habitat.

Since 2000, NJFW has instituted a more proactive integrated black bear management strategy, implementing an enhanced educational effort, more assertive control measures, and increased research and monitoring activities. From FY01 through FY20, NJFW has devoted more than $15.3 million to black bear management, including $2.5 million to education, $2.6 million to law enforcement, and $10.3 million to control, research, and monitoring activities. These funds came from the general treasury subsidy ($5.5 million allocated between 2001 and 2010), the Hunters' and Anglers' Fund ($4.3 million), and the Federal Aid for Wildlife Restoration Fund ($5.5 million). From 2010 to2020, the Hunters and Anglers fund and Federal Aid grants have supported NJFW's integrated bear management program. A state appropriation to expand non-lethal bear management measures is currently proposed for FY22.

In adopting an integrated strategy, Council recognizes that both lethal and non-lethal methods are necessary to manage black bears. The Council notes, with emphasis, that non-lethal methods, when used alone, cannot control New Jersey's black bear population growth or minimize complaints. Black bears in New Jersey, as well as those in adjacent northeastern Pennsylvania and southeastern New York, are some of the most productive bears in North America. Based on winter den research, NJFW biologists have determined that bears in New Jersey have an average

litter size of 2.7 cubs. It is important to note that this average litter size has remained remarkably consistent since research began in the 1980s, a time when bears were only found in undeveloped and heavily forested regions of the State, such as the Kittatinny Ridge, and thus had limited access to human foods. In northern New Jersey, a mix of southern oak-hickory forest and northern beech-maple forest combine to offer bears exceptional natural food resources in the form of hard mast such as acorns, hickory nuts, walnuts, and beech nuts (USDA Forest Service 2008) along with soft mast associated with these forest types. Large parcels of forested public land adjacent to and intermixed with high quality habitat on private lands in northern New Jersey offer autumn mast as well as summer foods such as berries. In fall, bears in New Jersey rely heavily on these mast crops to gain fat reserves to survive the winter months and produce cubs. Due to the high diversity of mast producing tree species in New Jersey, it is rare that there is a complete failure of natural foods in autumn.

To further illustrate the dependence on and preference for natural foods compared with human sourced foods by New Jersey's bears during the late summer and fall, NJFW biologists analyzed bear complaint calls received between 2001 and 2020. The analysis shows that complaints concerning bears are, on average, 43.3% less numerous from mid-September to mid-November than they are from mid-May through mid-July. During the fall period of hyperphagia, when bears are eating extensively to gain fat for winter denning and cub production, bears are accessing human foods less than during the summer breeding and weight-maintenance period. Since 2001, there have been only two years when total complaint calls during the late summer and fall hyperphagia period were higher than total complaint calls during the late spring and summer maintenance period, most likely indicating years when mast availability during the fall

was limited. In eighteen of the past twenty years, complaint calls during the autumn hyperphagia period were lower than during the summer, as bears sought high value natural foods over human foods. Bears require and actively seek out these natural foods in late summer and fall to meet their high, pre-denning caloric needs, and thus in most years, damage incident totals are reduced during this time. Coupled with this, New Jersey's public residences and businesses are over 90 percent compliant with NJFW's recommendations for keeping human provided foods away from bears. This data indicates that the most significant driver of bear production in New Jersey is its relatively consistent natural food base. Conversely, in regions without consistent and adequate natural foods, litter sizes are smaller and cub production is less consistent, as in the southern Appalachians and the Western United States - areas with litter sizes ranging from 1.8 to 2.2 cubs per litter (Baldwin and Bender 2009, Coley 1995).

Because of New Jersey's excellent habitat providing a consistent natural food base, control of human-provided food cannot control bear population growth. Council notes that if access to human-provided foods was completely eliminated, the consistency of adequate natural autumn food crops in New Jersey would allow productivity to remain high in most years, and the bear population would continue to increase without lethal control efforts in place. While non-lethal bear control measures such as education and control of human-derived food sources are critical to lessen the effects of a high bear density on the landscape and to prevent bears from becoming accustomed or conditioned to people, they are not effective to control bear population growth in New Jersey.

Every component of New Jersey's integrated black bear management strategy, including the regulated hunting season, is critical to meeting the Council's management objectives. Following are the components of this integrated strategy.

A. Bear Population Management

Policy:

Council's goal is to manage the New Jersey black bear population at a level 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.

Discussion:

Council recognizes that NJFW has conducted bear population monitoring that has shown bear population growth and range expansion. Council notes that the bear population has spread south and east, impacting people in areas of the State that have not had bears in more than a century. Council also recognizes that emigration of bears into neighboring Pennsylvania and New York has impacted these states. The concurrent expanding human population and bear population in this region of New Jersey, Pennsylvania, and New York provides high potential for human-bear conflicts. The 1997 Black Bear Management Plan (BBMP) recommended managing New Jersey bears at the same density as our neighboring states (1 bear per 2½ square miles) since bears living along our respective borders represent one regional population. NJFW 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.

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 conflicts in this region. New York took similar action increasing 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 trends in bear population estimates between 2005 and 2020 have generally correlated with trends in bear-related complaints received by NJFW (Figure 3). Researchers in Minnesota found a similar correlation and determined that complaints related to human–bear conflicts increased with an increasing bear population. They also found that the relationship between population size and complaints was evident despite highly-varying food conditions (Garshelis et al. 2020). Council notes that the bear population, as well as bear calls and complaints, increased substantially between 2006 and 2010 when the bear hunting season was closed, rose after the 2013 hunting season, which had a low harvest rate, and has risen substantially again since 2018 when state lands were closed to bear hunting. Council notes with emphasis that during these times when the bear population and bear incidents were rising, NJFW continued to employ all non-lethal methodologies available to help offset the effects of the growing population.

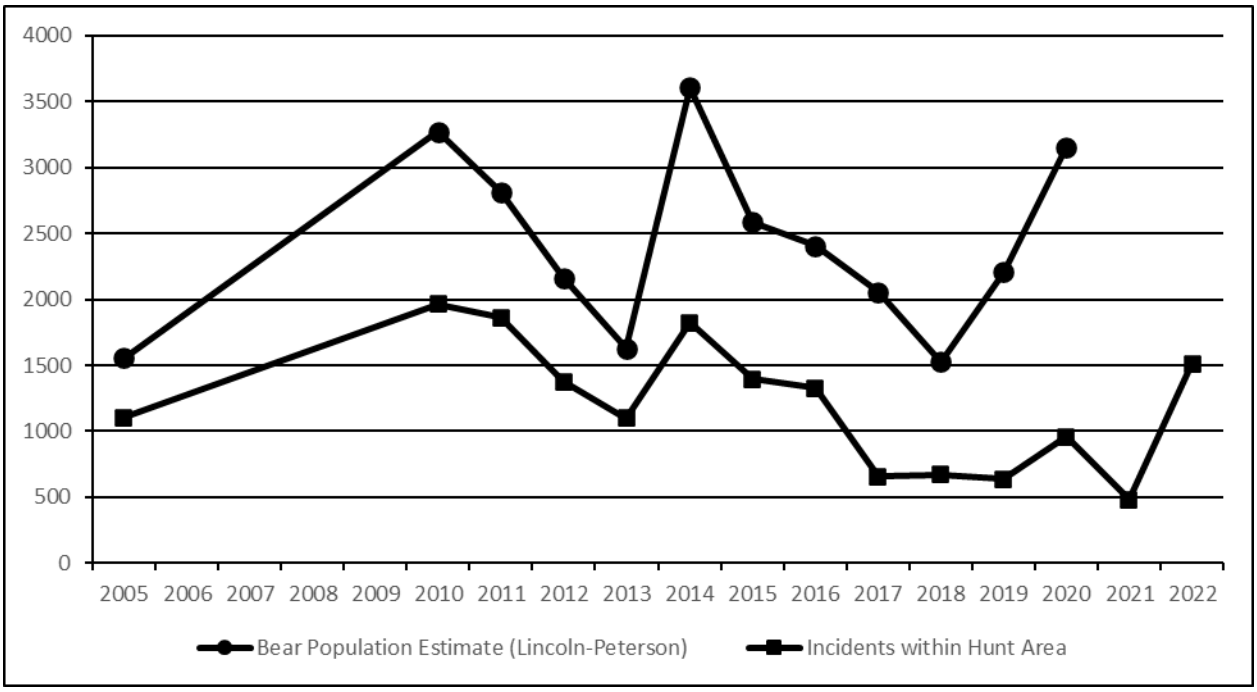

Figure 3: Estimated black bear population size and number of nuisance and damage complaints within the hunt area from 2005 to 2022. Black bear population estimates were calculated using a Lincoln-Petersen Index and represent the bear population on the day before the hunting season of the year estimated. There was no regulated hunting season in 2004, 2006-2009 or 2021, and in 2022, hunting only occurred for a portion of Segment B. Thus, there is no LP estimate for those years.

Bear population control through a regulated hunting season that is open on public and private lands is essential for meeting population management objectives. Council also recognizes that negative interactions between humans and bears not only result in economic loss to individual citizens, but can also create a budgetary burden on responding agencies. Council notes that maintaining an adequate level of bear response by NJFW is not sustainable at current funding levels without an appropriation from the General Treasury to cover the increasing costs of this work.

The tools available for population reduction are few. The New Jersey 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 also recognizes that NJFW must consider the proven efficacy of the tools and the experience of other states in addition to implementation costs.

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

Various methods to manage the size of the bear population have been suggested to the Council, DEP, and NJFW by New Jersey residents. 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 New Jersey 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. In the early 1980s, NJFW 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 New Jersey quickly put a halt to this option. However, as a result of the population pressures created by an expanding northern New Jersey bear population, bears are naturally dispersing and have been sighted in all

21 counties (Figure 4).

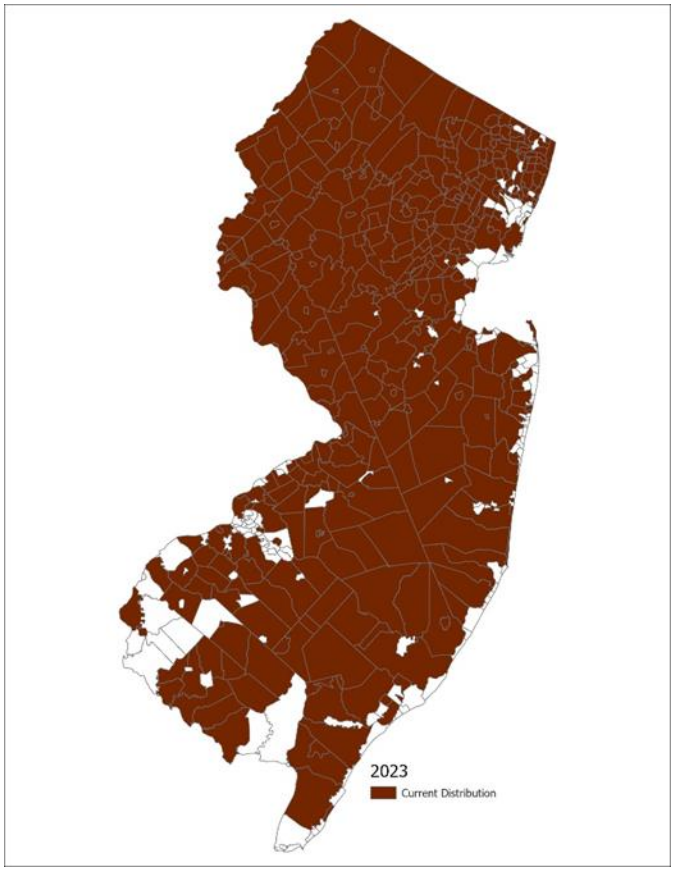

Figure 4. Black bear distribution in New Jersey as of December 31, 2022. This map depicts all municipalities reporting bear activity between 1995 and 2022.

Council also believes that relocation of bears into other areas of New Jersey would not address the problem but would simply transfer the issue to a new location Council has determined that no other state or provincial agency in North America would accept excess bears from New Jersey.

Additionally, relocation of nuisance and/or problem bears to unoccupied range comes with a level of risk, substantial costs, and potential liability should a relocated bear injure or kill someone.

Based upon the cost and opposition to relocating bears, and particularly nuisance bears, Council does not consider this a viable option for 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. The review concluded that fertility control is not 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 affect population control, even if a licensed fertility agent existed for bears (Frakker et al. 2006).

Similarly, in 2018, Stockton University was commissioned by NJFW to re-evaluate the feasibility of fertility control for New Jersey black bears. The study also concluded that fertility control is not a feasible option for large-scale black bear management in New Jersey and that serious limitations to the implementation and effectiveness of fertility control programs still remain, and will likely always remain, particularly for free-ranging black bears (Tredick 2018).

NJDEP Division of Science and Research reviewed and concurred with the Stockton University findings in 2019. It also reevaluated the literature review in 2020 and concluded that there was no new information, and that fertility control is still not a viable option for free-ranging bear populations.

The Northeast Black Bear Technical Committee (NEBBTC) has reviewed this topic and determined that fertility control not a viable option for the management of free ranging populations (NEBBTC 2012). Council supports continued testing of fertility control by credible scientists and has adopted criteria that will allow NJFW, 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).

Council has directed that NJFW biologists continue to consult the published literature and stay informed on developments in the science of alternative bear population control methods. However, based upon the lack of success with current research and logistical problems discussed in the above cited literature reviews, Council concludes that fertility control is not currently a viable tool for bear population control.

3. Regulated Hunting

Hunting is a safe, legal, responsible use of the renewable 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 utilizes experience and monitoring to manage wildlife populations, which allows the management agency to make necessary changes to maintain the natural resource (bear population) in the desired condition. As NJFW conducts ongoing monitoring, the Council can make necessary changes by regularly reviewing and revising hunting regulations in the State Game Code.

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 sustainability of the species. Under this approach, the control of a species that can become a public nuisance or widespread threat to the general public is transferred 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 administered through the State Game Code, including an in-season closure mechanism and bag limit, assure that bear harvests are below the population's sustained yield capabilities (N.J.A.C. 7:25-5.6). 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 % (Ternent 2001). However, these rates are higher than desired by most states, including Pennsylvania, in order to sustain a population over the long term. Therefore, the Council believes that bear season formats in New Jersey should mandate season closure if harvest rates reach 30%. Council agrees with the finding that no significant negative effects 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 33 states. There are 41 states that have viable black bear populations, though there is no bear hunting in 8 of these due to limited population size or other factors. Two of these 8 states have recently proposed seasons or are now considering them as a population management tool. Many of the states that allow bear hunting charge an additional permit fee for bear hunting that is used to support bear research and management. All states with bear hunting seasons allow archery, including New Jersey. Firearms and archery equipment are both 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; 2016 - 2020). Archery has been popular and effective for harvesting black bears in New Jersey. During the 2020 bear season, 86.6% of bears during Segment A (71% of bears overall with both segments combined) were taken with archery equipment. Council believes archery should continue to be integrated into the regulated hunting season as a method of controlling the black bear population.

New Jersey hunting seasons have established that hunters can safely harvest black bears in a controlled manner. During these seasons, NJFW has collected biological data on the harvested bears and demographic data on hunter success and participation, which Council uses to develop management actions. Council recognizes that data collected from harvested bears comprise a substantial component of NJFW's research efforts.

Council recognizes that regulated bear hunting seasons can alleviate damage and nuisance complaints through control of the population and also because individual nuisance bears are eliminated through these seasons. In their analysis of New Jersey data, Raithel et al. (2016) showed that during years immediately following bear harvest, human-bear conflicts declined,

whereas human-bear conflicts increased significantly during years immediately following bear harvest moratoria. Bears tagged at nuisance sites have been harvested in each bear season**,** further contributing to the effect of hunting harvest on complaint totals. These same researchers also concluded that in New Jersey, adult bears previously designated as a nuisance and/or threat were more likely to be harvested than those never identified as a problem, and also that harvest and lethal control disproportionately removed bears categorized as problem bears (Raithel et al. 2016). Researchers from West Virginia University studied bears using Global Positioning Collars along the wildland-urban interface in New Jersey, New York, and West Virginia and found that these bears were vulnerable to harvest. They further concluded that hunting of bears is a viable management tool for state agencies (Tri et al. 2017). Researchers in Minnesota, studying a long-term data set of complaint totals and population estimates in that state, concluded that conflicts could be kept within tolerable bounds by managing population size through hunting (Garshelis et al. 2020). Council recognizes that without some method of population control to manage the bear population in New Jersey at densities compatible with the human population, both human-bear conflicts and the costs involved with managing these conflicts will increase.

In response to declining harvest rates and subsequent increases in bear population and incidents, Council prescribed an expansion of the bear season in 2015. As a result, the season harvest rate increased substantially in 2016, which led to a decrease in population size and incidents the following year. Between 2016 and 2017, the number of counties reporting bear activity dropped 11%, reports of Category I complaints dropped 61%, and reports of Category II complaints dropped 58%. Category III reports fell 51% (Figure 6). The decrease in bear incidents shows that dangerous and nuisance bears are removed from the population through hunting, thus reducing the

risk to public safety and property.

Hunting has been used as a tool to reinforce the aversive conditioning methods employed by NJFW 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 some other human-bear interactions.

Bears that inhabit areas which are closed to hunting are not subjected to hunting pressure and the associated fear of humans, and the data indicates that negative bear-human interactions continue to be problematic in these and adjacent communities. Negative conditioning of bears through hunting is particularly important on State lands due to the extensive campground and public recreation areas found on these properties. On many public land parcels in New Jersey, hunting of other species is allowed but bear hunting is restricted. For bear management in New Jersey to be most successful, Council strongly recommends that owners and managers of these properties allow bear hunting. Due to the overall size and habitat quality of State lands specifically, the Council believes the closure of these lands to bear hunting has disproportionately affected bear population and incident levels in northern New Jersey as a whole. Noting, that Category I bear complaints, increased 25% between 2019 and 2020.

In reviewing the tools available for population control and the costs associated with each, the Council concludes that relocation is not a tool for bear population control. Non-lethal methods such as sterilization and chemical fertility control have been shown to be ineffective at this time, though these tools should be re-evaluated as new methodologies come forth. In contrast, Council concurs with the experience of all states that manage bear populations through the regulated hunting of bears that a regulated hunting season is the most cost-effective and practical tool to control bear populations.

Recommendations:

1. An annual, regulated black bear hunting season should be used to manage New Jersey's bear population.

2. Relocation should not be used as a means of population control.

3. NJFW will actively review current research on alternative population control techniques, such as fertility control.

4. NJFW will advise the Council on harvest parameters which will serve as a benchmark to gauge the progress of bear population management.

5. All public lands in BMZs 1 – 5 should be opened for bear hunting.

B. Bear Control: Lethal and Non-Lethal

Policy:

Council believes the NJFW Black Bear Rating and Response Criteria (BBRRC) (NJNJFW BWM 2015) is the most effective strategy for response to bears that are a threat to human safety, agricultural crops, property, or are a nuisance. Council supports that the strategy 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 or dangerous bears.

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

Council supports the issuance of bear depredation permits, which allows farmers, via special permit, to control black bears that are damaging crops or depredating livestock (N.J.A.C. 7:25-5.32) and recognizes that these permits provide valuable relief to farmers experiencing such financial loss from bears.

NJFW should continue to use non-lethal control techniques such as aversive conditioning to modify the behavior of nuisance bears. Council also believes that new non-lethal control techniques should be investigated and implemented if effective.

Discussion:

Council recognizes that increases in human development in New Jersey, 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 such as bear damage to property including livestock will continue. DEP's WARNDEP Hotline and NJFW's Wildlife Control Unit (WCU) receive complaint calls concerning bear damage and nuisance activity and the WCU provides response and control consistent with the BBRRC.

NJFW has had a policy of responding to problem black bears since the 1980s, and a more aggressive black bear strategy, the BBRRC, was instituted on November 16, 2000. The BBRRC was developed by the NJFW and approved by the Council. The BBRRC defines three categories of black bear behavior and describes how DEP and other governmental agency personnel should respond.

The BBRRC defines Category I black bears as 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 property damage (>=$1000). Category I behaviors include human attacks, home entries, attempted home entries, agricultural crop damage, killing or injuring protected livestock, and killing or injuring pets. Category I black bears are euthanized as soon as possible to protect the public or eliminate further damage to agricultural crops or other property. Council notes that NJFW personnel, law enforcement personnel, landowners, and farmers have killed 543 dangerous Category I bears since 1993.

The BBRRC defines Category II black bears as nuisance bears that are not an immediate threat to

life and property. Examples of Category II behavior are habitual visits to dumpsters or birdfeeders**,** property damage less than $1000, and bears that kill or injure unprotected livestock. Category II black bears are aversively conditioned so they associate a negative experience with the location and people. If trapped, nuisance bears are released on site and aversively conditioned. If conditions are unsuitable for onsite release, trapped Category II bears are taken to the nearest State land where they are released and aversively conditioned.

The BBRRC defines Category III bears as bears that are exhibiting normal behavior and are not creating a threat to the safety of the public or a nuisance. Generally, these are animals observed and reported by the public or local authorities. 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 other people visiting the outdoors. Category III bears may occasionally utilize birdfeeders and trash containers as supplemental food sources in the course of their activities. 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 poses a high risk of a bear-vehicle collision. Any dispersing Category III bears requiring capture in urban or suburban settings are released on the nearest State-owned property with suitable bear habitat. Although municipal officials in the towns where the bears are released have occasionally criticized such relocations, Council recognizes this as the most acceptable public policy at this current time.

Council notes that calls and complaints in all three categories declined after the implementation of the October hunting segment in 2016 and have increased subsequent to restrictions in access to huntable lands in 2018 (Figure 6).

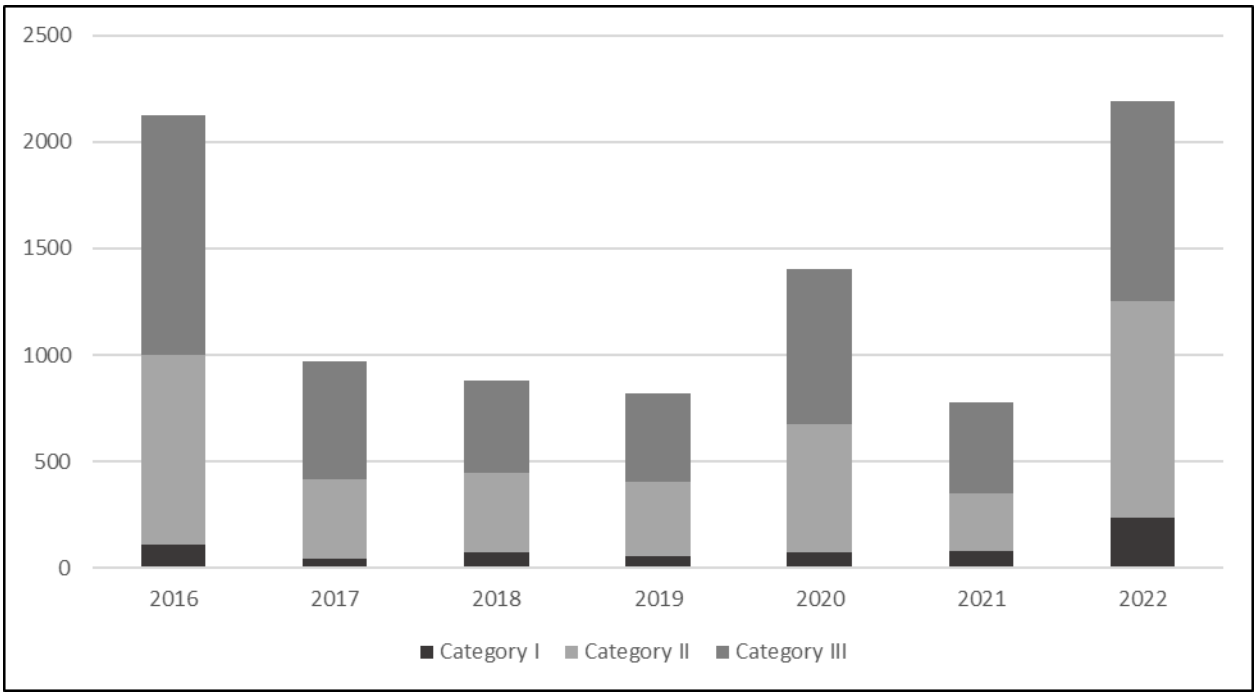

Figure 6. Statewide reports received by the New Jersey Department of Environmental Protection for black bears exhibiting Category I, Category II, and Category III behaviors (as defined by the NJDEP Fish and Wildlife's Black Bear Rating and Response Criteria).

Council recognizes that the cooperation of law enforcement personnel from all levels of governmental agencies within black bear range is essential to implementing the bear response policy. Council notes that since January 2001, NJFW has trained over 1,550 municipal, county, and State law enforcement officers from 130 municipalities, 14 counties, and 33 State, county, and federal parks to assist NJFW in black bear control. Council recognizes that municipal law enforcement agencies that cooperate with NJFW on the implementation of the CBBMP are affected by increasing workloads and limited funding and personnel availability and commends

these cooperating agencies in this shared task of protecting public safety despite these hardships. Prior to FY 22, Council notes that NJFW has spent over $150,000 for this task, and that funding for this work came entirely from the Hunters and Anglers Fund. Since this training directly benefits the citizens of New Jersey as law enforcement officers respond to bear complaints, it is Council's recommendation that funding for this training should continue to be supported from the State's General Fund in the form of an appropriation to NJFW. Since bears have expanded their range throughout New Jersey (Figure 4), the Council recognizes that there will be a continued need to respond to bear complaints, especially if the population is allowed to continue to increase, and that NJFW and local law enforcement agencies will share the increasing burden for this response.

Council recognizes that farmers can alleviate damage caused by black bears if allowed the opportunity. Allowing farmers to act quickly to protect their crops and livestock constitutes responsible action by NJFW to manage the growing black bear resource while minimizing negative impacts to humans, agricultural crops, livestock, and property. Council notes that both requests from farmers for agricultural depredation permits and the number of bears killed under the authority of these permits declined after the implementation of the October hunting segment in 2016. In contrast, permit requests and the number of bears killed under issued permits have increased subsequent to restricted hunting access in 2018 (Figure 7).

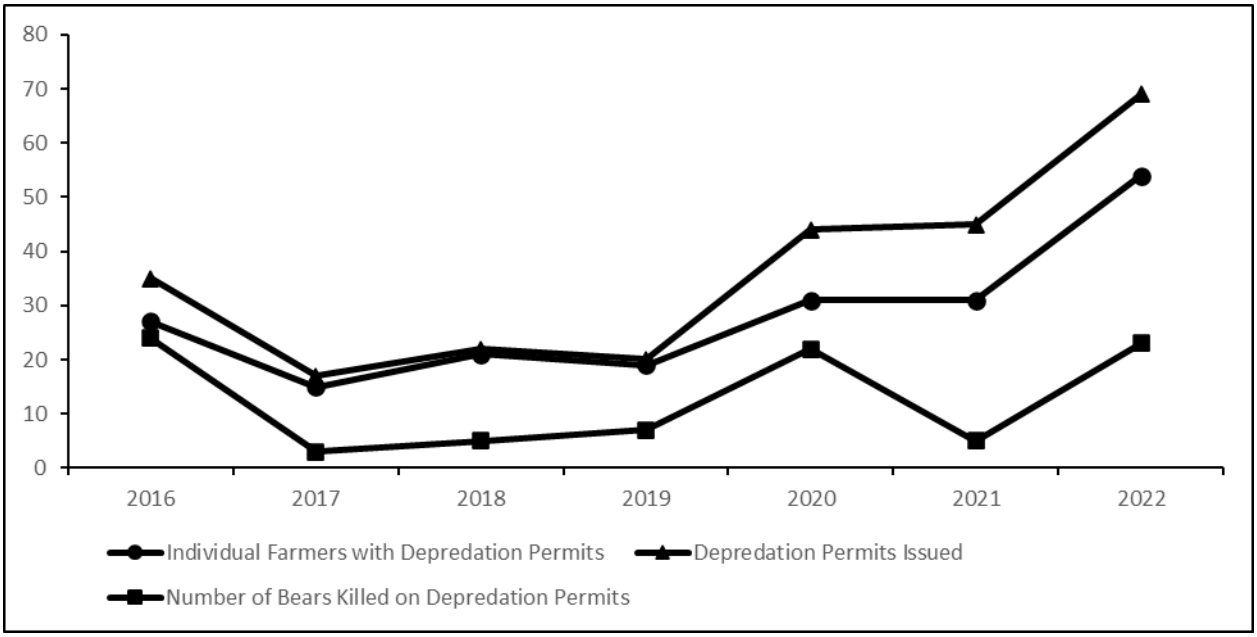

Figure 7. Total number of depredation permits issued from 2016 through 2022 and the number of different farmers receiving depredation permits during this same time frame (farmers must obtain separate permits for disjunct farm parcels). The total number of black bears killed under the authority of depredation permits is also depicted.

In addition to bear population size, 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, declines in natural foods 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 human-bear incidences has generally increased and decreased with changes in the bear population (Figure 3).

In addition to a reduction of bear complaints through euthanasia of Category I bears, control actions by municipal and State police, NJFW's educational efforts, increased public tolerance of bears through the destruction of Category I bears, and the regulated hunting season, have also contributed to complaint reductions.

NJFW uses the non-lethal technique of aversive conditioning to deal with nuisance bears. Council recognizes that NJFW has determined that aversive conditioning has limited short-term effectiveness (Northeast Wildlife DNA Laboratory 2010, Madonia 2011). Other state and federal agencies and institutions have come to similar determinations about the limited efficacy of aversive conditioning on black bears. 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). NJFW continues to explore non-lethal methods to respond effectively to nuisance bears.

Council recognizes that when a Category I bear must be euthanized, NJFW and local law enforcement follow euthanasia procedures recommended by the American Veterinary Medical Association (Leary et al. 2020). NJFW 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. NJFW personnel and any law enforcement officers trained by NJFW will continue to operate under the BBRRC, which guides response to bear calls and incidents.

2. NJFW should continue to refer Category II complaints to those local law enforcement agencies that employ professionals with relevant training to address these complaints to expedite response times.

3. NJFW will continue to train its bear response and law enforcement personnel, as well as State and local police officers and State Park Police officers, so that they can respond to problem black bears.

4. NJFW will continue to develop aversive conditioning techniques to reduce human-bear conflict and scientifically evaluate these and other non-lethal control measures to determine their effect on bear behavior and bear related problems.

5. Legislation is needed that requires reporting of bear response activities by municipalities to NJFW so that an accurate assessment of bear activity within each region can be made.

6. NJFW will continue issuing depredation permits to farmers experiencing bear-related crop damage and should encourage farmers experiencing such damage to allow hunting on their property.

7. As NJFW's bear incident control response work benefits the general public, funding for this control work should not come from Hunter and Angler funds.

C. 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, visitors,

campers, and outdoor enthusiasts within bear country can reduce or eliminate the potential for negative interactions with black bears by simply adjusting their activities. The Council, DEP, NJFW, and the public support continuing and expanding black bear education efforts.

Discussion:

Council recognizes that it is important to make educational messages 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 therefore 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 resolve all problems associated with bears, and does not control the bear population, those who adjust their behavior to take into account bear activity will be less likely to have problems. Council recognizes that NJFW 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 with such simple actions as reducing damage to bird feeders and using electric fencing to protect beehives.

NJFW has conducted an extensive educational campaign to provide New Jersey residents and visitors with techniques and methods for minimizing negative interactions in areas where black bears exist and has distributed over 215,950 copies of various educational materials to residents and visitors of New Jersey between 2015 and 2020 (Table 1). Since 2007, more than 1,750,000 pieces of information and materials have been published by NJFW. Council notes that this educational campaign is having a positive effect, especially in terms of keeping human-provided

food away from bears. The NJFW campaign, “Do Not Feed Bears,” emphasizes the importance of never feeding bears, either intentionally or unintentionally. Some of NJFW'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 NJFW regarding bears; (7) producing a Spanish version of the “Know the Bear Facts” brochure; (8) providing self-help manuals, PSAs and other bear related information on the NJFW webpage; (9) posting on social media outlets, including Facebook and Instagram, to distribute these messages to a broader base of residents and visitors; and (10) engaging towns through a municipal outreach program to enhance educational efforts at a finer scale.

Table 1: Summary of bear related educational materials distributed by the NJFW from 2015 through 2020.

Description	Number Distributed to Public
Know The Bear Facts Brochure (English)	89,660
Know The Bear Facts Camper Cards	54,150
Know The Bear Facts Brochure (Spanish)	39,750
Know The Bear Facts Kids Activity Guide	31,822
Tyvek Bear Safety Sign	3,650
Living With NJ Black Bears Documentary	557 Copies of The DVD

Understanding Black Bears Curriculum Kit	11 Hard Copies & on Division Website until 2020
Statewide Black Bear News Releases	17
Statewide Radio PSA Campaign	1
Division's Black Bear Website Hits	257,130
Division's Instagram Account	7 Posts with 26,418 People Reached
Division's Facebook Account	23 Posts with 960,747 People Reached

NJFW provides New Jersey residents and visitors with techniques and methods for reducing negative interactions while spending time in areas where black bears exist. 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 have been aired for the bear activity seasons in spring, summer, and fall. NJFW's Web Page (www.njfishandwildlife.com) provides additional black bear biology, natural history, and bear-proofing information, including a black bear slide show, sources for bear-resistant garbage containers, and several self-help guides on topics such as electric fencing and birdfeeder use in bear country. Council recognizes that NJFW has also produced two educational videos.

Education programs designed to reduce human-black bear conflict have been instituted by NJFW and other states, entities, and institutions. These programs, which seek to reduce the magnitude or frequency of human-black bear conflict and/or increase the awareness of human actions that result in conflict, 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.

Table 2: Summary of attendance numbers at bear education programs by county from 2015 through 2020.

County	Bear Education Presentation or Exhibit Attendance
Atlantic	80
Bergen	491
Burlington	1,597
Camden	162
Cape May	0
Cumberland	60
Essex	407
Gloucester	0
Hudson	0
Hunterdon	205
Mercer	897
Middlesex	195
Monmouth	66
Morris	716
Ocean	4,014
Passaic	723
Salem	14
Somerset	3,760
Sussex	2,456
Union	2,280
Warren	3,442

Since 2015, NJFW has broadened educational efforts in southern New Jersey. Prior to this time, bear education efforts were concentrated in northern and central New Jersey counties, but it became necessary for the NJFW to increase its education efforts in the southern counties as bear sightings and incidents increased in these areas. Council believes educational efforts statewide should be expanded.

Data indicates that intense education of campers and visitors to several national parks 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. In recognition of the success of these park programs, NJFW printed 6,500 bear safety information trailhead signs and distributed them to managers of state, federal, county, municipal, and privately-owned parklands for posting. These signs instruct hikers and visitors not to feed bears and steps to take if a bear is encountered on the property.

Council recognizes that the internet is a powerful tool increasingly utilized for information and education by New Jersey residents, with visits to NJFW's main bear webpage exceeding 257,000 from 2015 through 2020. Residents now look to social media such as Facebook and Instagram for information about many subjects. NJFW has expanded use of these media platforms to increase public awareness about bears. Between 2015 and 2020, NJFW posts concerning black bears on Facebook and Instagram resulted in thousands of shares and likes with over 987,000 people reached. Council notes that a focus on social media and internet-based educational messaging is especially important because these tools are bolstered by online language translation services that can greatly increase the number of citizens reached. Council recognizes that increased use of the internet and social media by NJFW will reduce the funding needed for printing and distribution of materials and reduce the amount of time NJFW personnel will spend speaking to the public via telephone and through in-person seminars.

DEP's Office of Local Government Assistance is recognized by Council as an important resource that has been used by NJFW to customize and enhance educational campaigns at the municipal scale. Through DEP-assisted municipal outreach such as weekly updates to mayors, specialized mailings concerning bears and seasonal bear activity, and information presented through New

Jersey's League of Municipalities, NJFW's messaging can affect a broader audience. NJFW provides educational materials to municipalities, which in turn distribute and broadcast this information to members of their communities in the most efficient and effective way possible. Since 2007, NJFW has partnered with the Office of Local Government Assistance to provide municipal outreach such as publishing bear-related articles in the New Jersey League of Municipalities magazine and distributing letters and bear educational DVDs to mayors. NJFW can further enhance this outreach program by such actions as recommending municipalities and counties post links to the Division's bear educational resources on their webpages. Council recommends expanding NJFW's municipal outreach program to further maximize the benefits and impact of NJFW's educational efforts.

Recommendations:

1. NJFW will continue educational efforts throughout the State.

2. NJFW will expand educational efforts in urban areas and will increase educational efforts in the southern counties.

3. DEP should evaluate the effectiveness of NJFW's educational campaign for residents and visitors.

4. NJFW will continue to develop educational products in the Spanish language, in addition to the educational material and public service announcements (PSAs) produced in English.

5. NJFW will continue to utilize a more web-based approach (including social media) for its educational programs so that residents and visitors to the State can view, download, and print items as needed.

6. NJFW will continue to provide information on the NJFW website in the form of self-help guides that are directed at educating younger residents and visitors, and will continue to make available information for the public and farmers on techniques that can be used to mitigate bear damage..

7. NJFW will continue to 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.

8. DEP and NJFW will continue to expand municipal and county outreach efforts to better customize, expand, and enhance educational messaging throughout New Jersey.

9. As NJFW's educational programs benefit the general public, funding for these programs should not come from Hunter and Angler funds. DEP should provide additional sources of funding for these programs.

D. 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, New Jersey 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. Although NJFW has drafted amendments to the bear feeding legislation to provide more effective enforcement, the statute has thus far remained unchanged. NJFW's Bureau of Law Enforcement continues to support policies and proposed legislation that uphold and enhance the original intent behind the current feeding ban legislation.

Council notes that complaints fielded by NJFW Conservation Police Officers (CPOs) concerning bear feeding are few, averaging only 25 per year from 2016 to 2020, and that there exist a limited number of citizens in New Jersey that intentionally feed bears. Additionally, upon investigation, some of the complaints received are found to be without merit. Since 2007, NJFW 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 NJFW's black bear education effort has been effective in obtaining such compliance. While it is important from a public safety perspective to strengthen language in the bear feeding statute to

help prevent the habituation of individual bears to people and human foods, the issuance of citations for the relatively few reported incidences of bear feeding activity cannot be expected to control bear population growth.

NJFW's CPOs continue to inspect scores of homes and businesses and have worked with additional State and local law enforcement officials to enforce the law. Since 2015, NJFW CPOs have issued 70 verbal and 52 written warnings to residents and business owners for bear feeding and have issued 9 summonses to repeat offenders. The result of this effort has shown that over 90% of homeowners are complying with the law's requirements.

DEP has a trash policy of "Carry In – Carry Out" that reduces the garbage at State parks and forests. Council recognizes that DEP has installed bear-resistant garbage dumpsters and bear-proof food storage boxes in North Jersey and has placed bear-resistant dumpsters in park and forest locations in central New Jersey. NJFW has installed bear-resistant garbage dumpsters on Wildlife Management Areas (WMAs) in the northern part of the State.

NJFW telemetry studies and observations have determined that bears will alter their movements to access household garbage left on the street for hauler pick-up. NJFW 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. Installation of a community bear-resistant dumpster would further limit access to garbage by these bears.

Council recognizes that NJFW provides information and resources to municipalities to educate

residents on proper garbage management techniques and ways to avoid attracting bears. Through this exchange with NJFW, 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 legislation could be enacted that requires the use of bear-resistant receptacles for public and private campgrounds and closed communities.

Due to New Jersey's excellent and consistent natural food base for bears, Council recognizes that the reduction or elimination of provisioning from garbage sources would not result in the decrease in fecundity necessary to control the New Jersey bear population. However, control of bear access to human provided food will result in decreased habituation and fewer nuisance and public safety-related complaints.

Recommendations:

1. Legislation is needed that strengthens the current feeding ban statute by tightening enforcement provisions and clarifying that both intentional and unintentional feeding of bears is prohibited.

2. Legislation is needed that requires public and private campgrounds in habitat occupied by bears to install bear-resistant dumpsters and food boxes.

3. Legislation is needed that would mandate the use of bear-resistant garbage containers in entire communities and require closed communities to make a bear-resistant community dumpster facility available to residents.

E. 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 acknowledges that NJFW personnel and its cooperating partners are highly qualified professionals who provide the data and analyses to ensure that black bears remain a viable component of New Jersey's landscape at a level consistent with a reduced risk to public safety and property.

Discussion:

Since the 1980s, NJFW has conducted intensive and extensive research on bears throughout New Jersey. The data collected and analyzed during this time form a solid, long-term, and extremely valuable database upon which to base management decisions.

NJFW personnel have handled over 10,380 individual black bears since 1981. NJFW staff have tagged and released alive over 4,721 bears, including 1,109 young-of-the-year bear cubs at dens. During this same period, NJFW personnel have collected data from 8,030 bears that died for

various reasons, including vehicle strikes (1,858), control actions (589), and during regulated hunting seasons in New Jersey, Pennsylvania, and New York (5,266). Council recognizes that since 2003, research data collected on harvested bears has been critical for ensuring New Jersey bear harvests remain within acceptable limits and have provided the data necessary to adjust season parameters as needed to meet management objectives.

NJFW continues to radio-collar and monitor bears using radio telemetry to acquire information on reproduction, survival, mortality, home range size, and habitat use. NJFW currently has approximately 15 female bears fitted with radio collars to monitor reproduction and survival. NJFW 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 remained remarkably stable over the 40 years that NJFW has conducted research. This consistent cub birth rate supports the Council's position that the superior bear habitat in the northern New Jersey - northeastern Pennsylvania - southeastern New York area is the most significant driver of population expansion of black bears in this region. Without properly formatted and implemented regulated hunting seasons to offset this high productivity level, the population will continue to increase and expand. In contrast, other less productive areas of the country average fewer than 2.2 cubs per litter. In New Jersey, litters of 5 and 6 have been documented through den site visits and staff observation of bears outside dens. Litters of this size are infrequently seen in North America and are a measure of New Jersey's excellent bear habitat.

In 2015, NJFW updated its Bear Management Zone (BMZ) designations, dividing the State into 7 BMZs (Figure 5). NJFW developed a ranking of bear habitat throughout New Jersey based on

bear use of varying landscapes as defined by Land Use / Land Cover data for New Jersey and analyzed habitat in each BMZ based on this ranking. NJFW has conducted extensive research in BMZs 1 through 5 and has begun research in BMZs 6 and 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 BMZs 1 through 5 which have been studied intensively for many years.

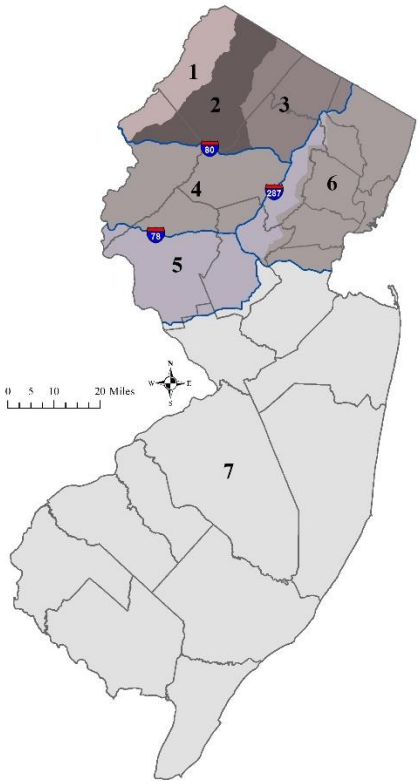

Figure 5. New Jersey's Black Bear Management Zones. BMZs 1 and 3 are heavily forested and have the highest bear densities, while BMZs 2, 4, and 5 have lower bear densities due to a higher component of open space and agriculture. BMZs 6 and 7 have the lowest bear densities in the State.

From 2010 to 2016, NJFW participated in a mid-Atlantic cooperative study of black bear habitat use utilizing GPS-radio collars. The study found that black bears used forested slopes and

riparian corridors in the urban–wildland interface. Black bears on the urban–wildland interface selected habitats similarly to wildland bears. Habitat selection was similar for males and females, regardless of study area, time of day, season, or year. The results indicate that managers can employ the same suite of management tools to reduce bear-human conflicts at the urban–wildland interface that they use to deal with black bear conflicts in wildland areas (Tri et al. 2016).

Council recognizes that the current bear population in southern New Jersey 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 New Jersey, as is the case for white-tailed deer and wild turkeys (Burke and Predl 1990, McBride 2003). Council recognizes that estimating the population in this region by undertaking a trap and tagging operation for bears at the current low density is not cost-effective. Therefore, NJFW should attempt to collect as much data as possible when other research opportunities present themselves in central and southern New Jersey. Any data collected will be valuable in formulating management strategies for this region.

Recommendations:

1. NJFW will continue to conduct research on the black bear population and will continue to collect data that informs black bear recruitment, mortality, and density and population estimates.

2. NJFW will continue to collect data from harvested bears and nuisance incidents to inform research and management efforts.

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

4. NJFW should continue to update bear habitat analyses as new data becomes available.

5. As NJFW's research programs benefit the general public, funding for these programs should not come from Hunter and Angler funds. DEP should provide additional sources of funding for these programs.

F. Cooperative Research

Policy:

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

Discussion:

Council recognizes that NJFW 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 (New Jersey), and the adjacent states of Pennsylvania and New York (Appendix I). This research is intended to expand knowledge about New Jersey black bears and to collect scientific information upon which management decisions are based. These projects have provided research on home range and habitat use, food habits, reproduction, diseases (West Nile Virus and Toxoplasmosis), parasites (*Trichinella)*, aversive conditioning, taste aversion, use of contraceptive techniques for population management, genetic relatedness using DNA**,** developing habitat suitability models**,** and the use of recreational harvest and incident response as conflict management tools.

NJFW is cooperating with East Stroudsburg University's Northeast Wildlife DNA Laboratory (NEWDL) to generate a black bear population estimate using microsatellite analysis, to build a black bear DNA database for determining genetic identity and diversity. The work will also allow for forensic DNA investigation, which can determine the population health of New Jersey black bears. This DNA collection has also helped 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.

The Council continues to note that there should be regional consistency in the management of black bears due to the documented movements of bears across state lines. Towards this goal, NJFW biologists meet with biologists and administrators from New York, Pennsylvania, 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 NJFW biologists attending annual and semi-annual bear conferences such as the International Bear Association (IBA), Eastern Black Bear Workshop (EBBW), and Northeast Black Bear Technical Committee (NEBBTC) to further their understanding of management issues, develop new collaborative partnerships, and to learn new management strategies that can be implemented in New Jersey. Council also recognizes that NJFW biologists have valuable information to provide to agency biologists from other states who also attend these events.

Recommendations:

1. NJFW will continue to cooperate in research projects with other state and federal agencies, universities and entities.

2. NJFW will 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. NJFW biologists will 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. As NJFW's cooperative research programs benefit the general public, funding for these programs should not come from Hunter and Angler funds. DEP should provide additional sources of funding for these programs.

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:

NJFW 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. NJFW has assisted in these acquisition efforts by providing $1.4 million in funding for Green Acres to acquire and protect additional habitat in the Highlands Region since 2015.

Council recognizes that the Pinelands and Highlands Protection Acts help in ensuring that bears remain part of New Jersey'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. NJFW should continue to use GIS technology to identify and rank black bear habitat and travel corridors.

3. The protection of wildlife habitat through purchase and acquisition should be supported.

4. Future properties acquired through the State's acquisition program should be opened for regulated bear hunting as an important component of the Department's integrated management approach.

IV. CONCLUSION

Council supports active, integrated bear management and NJFW's goal of maintaining a healthy and sustainable bear population, minimizing human-bear conflicts, and reducing emigration of bears to unsuitable habitat in suburban and urban areas.

Council recognizes that bears can cause considerable damage to personal property and that the amount of damage and the threat to public safety have been shown to increase and decrease commensurate with the size of the bear population. Even though NJFW responds to high-risk bear incidences where public safety is threatened and personal property is damaged, Council strongly recommends approval of the 2022 CBBMP to maintain a regulated bear hunting season to address public safety concerns related to a growing bear population.

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

Council supports the need for additional funding for NJFW to continue its research, education, and nuisance control activities throughout New Jersey. The Council acknowledges the FY22 and FY23 $1.5 million appropriation of General Treasury Funds to assist in implementing and expanding non-lethal bear management strategies. The appropriation has supported additional staff to respond to negative human-bear interactions and has allowed NJFW to expand bear outreach activities. Since responsible bear management benefits all citizens of New Jersey, New

Jersey's sportsmen and sportswomen should not bear the sole responsibility for funding bear management in New Jersey. Over time, a bear population managed at appropriate levels 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, changes in human tolerance for bears brought about by education, possible changes in bear behavior, and the willingness of humans to make lifestyle changes in order to adapt to living in bear country. Council is confident that with careful management of this species, black bears will be able to thrive in suitable habitats in New Jersey at appropriate levels where they can safely coexist with New Jersey residents.

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Appendix I:

A. Summary of Cooperative Black Bear Research Efforts.

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 NJNJFW

   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 NJNJFW

   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 NJNJFW

   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 NJNJFW

   Major Findings: *Anaplasma phagocytophilum* 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 NJNJFW

   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 NJNJFW

   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 NJNJFW

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 NJNJFW

   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 NJNJFW

    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 NJNJFW

    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 NJNJFW

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 NJNJFW

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.

2017. A. N. Tri, J. W. Edwards, C. W. Ryan, C. P. Carpenter, P. C. Carr, M. A. Ternent, M. P. Strager, and J. T. Petty. HARVEST RATES AND CAUSE-SPECIFIC MORTALITY OF AMERICAN BLACK BEARS IN THE WILDLAND–URBAN INTERFACE OF THE MID-ATLANTIC REGION, USA.

Partners: West Virginia University, West Virginia DNR, PA Game Commission, NJNJFW.

Major Findings: Black bears in the Wildland Urban Interface were vulnerable to harvest; therefore, regulated harvest is a viable management tool. Agencies may prefer that hunters act as a compensatory mortality mechanism by harvesting problem bears that would otherwise be euthanized or killed in bear–vehicle collisions.

2016. A. N. Tri, J. W. Edwards, C. W. Ryan, C. P. Carpenter, P. C. Carr, M. A. Ternent, M. P. Strager, and J. T. Petty. HABITAT USE BY AMERICAN BLACK BEARS IN THE URBAN–WILDLAND INTERFACE OF THE MID-ATLANTIC, USA

Partners: West Virginia University, West Virginia DNR, PA Game Commission, NJNJFW.

Major Findings: Black bears used habitat similarly among study areas and between sexes. Black bears used forested slopes and riparian corridors in the urban–wildland interface. Black bears on the urban–wildland interface selected habitats similarly to wildland bears within the body of literature. Habitat selection was similar for males and females, regardless of study area, time of day, season, or year. Our results indicate that managers can employ the same suite of management tools to reduce human–bear conflicts at the urban–wildland interface that they use to deal with black bear conflicts in wildland areas.

2016. Raithel, J. D., Reynolds-Hogland, M. J., Koons, D. N., P. C. Carr, and L. M. Aubry. RECREATIONAL HARVEST AND INCIDENT-RESPONSE MANAGEMENT REDUCE HUMAN-CARNIVORE CONFLICTS IN AN ANTHROPOGENIC LANDSCAPE.

Partners: Utah State University, Bear Trust International, and NJNJFW

Major Findings: Adult bears previously designated as a nuisance and/or threat were more likely to be harvested than those never identified as a problem. Across age classes, individuals assigned problem status, were significantly more likely to be lethally controlled. Given continuing failures in conserving exploited carnivores, their recreational harvest and lethal management remain polarizing. Within this social-ecological system, the well-regulated harvest of carefully monitored black bear populations represents a pragmatic approach to achieve population objectives. Furthermore, the integration of harvest and incident-response management (both lethal and non-lethal practices) with educational programmes aimed at reducing anthropogenic attractants can result in subsequent reductions in problem behaviours reported.

2016. Chern, K, M. Bird and K. Frey, TICKS AND TICK-BORNE PATHOGENS OF BLACK BEARS IN NEW JERSEY.

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

Major Findings: Ticks were collected from NJ black bears in 2015. These ticks were tested for various pathogens and some ticks tested positive for Rickettsia, Borrelia, Babesia, Anaplasma, and Bartonella. The blood of these same bears was tested for these pathogens and only one bear tested positive for Babesia spp. Although Babesia spp. were detected in

black bear blood, it remains unclear whether or not this pathogen can be transmitted from infected bears to uninfected ticks.

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, NJNJFW 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 NJNJFW 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 NJNJFW 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. 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 NJNJFW 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.

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 NJNJFW and the Northeast Wildlife DNA Laboratory

Major Findings: On 18 march 2006, during annual den research, personnel from the new Jersey NJDEP 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 NJNJFW 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 NJNJFW 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 NJDEP Fish and Wildlife.

Partners: East Stroudsburg University and NJNJFW 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.