NORTH CAROLINA BLACK BEAR

MANAGEMENT PLAN

2012-2022

North Carolina Wildlife Resources Commission

Funding for 2012-2022 Black Bear Management Plan was partially provided through a Pittman-Robertson Wildlife Restoration Grant. The Federal Aid in Wildlife Restoration Act, popularly known as the Pittman-Robertson Act, was approved by Congress on September 2, 1937, and began functioning July 1, 1938. The purpose of this Act was to provide funding for the selection, restoration, rehabilitation and improvement of wildlife habitat, wildlife management research, and the distribution of information produced by the projects. The Act was amended October 23, 1970, to include funding for hunter training programs and the development, operation and maintenance of public target ranges.

Funds are derived from an 11% Federal excise tax on sporting arms, ammunition, and archery equipment, and a 10% tax on handguns. These funds are collected from the manufacturers by the Department of the Treasury and are apportioned each year to the States and Territorial areas (except Puerto Rico) by the Department of the Interior on the basis of formulas set forth in the Act. Funds for hunter education and target ranges are derived from one-half of the tax on handguns and archery equipment.

Each state's apportionment is determined by a formula which considers the total area of the state and the number of licensed hunters in the state. The program is a cost-reimbursement program, where the state covers the full amount of an approved project then applies for reimbursement through Federal Aid for up to 75 percent of the project expenses. The state must provide at least 25 percent of the project costs from a non-federal source

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INTRODUCTION

Statutory Responsibilities of the North Carolina Wildlife Resources Commission

In 1947, the North Carolina Wildlife Resources Commission (NCWRC) was created by the North Carolina General Assembly (NCGA) to protect and manage the wildlife resources of the state. The following excerpt from the NCWRC employee handbook summarizes how the efforts of various stakeholders led to the development of the NCWRC:

> "Prior to 1947, the wildlife conservation program in North Carolina was part of the Department of Conservation and Development. Hunters, anglers, and conservationists across the state were dissatisfied with the low emphasis given wildlife programs under the Department of Conservation and Development and wanted their license dollars spent in a productive and accountable manner on fish and wildlife management and enforcement activities. The result of their coordinated effort was unanimous enactment of the Wildlife Resources Law of 1947 that established the agency known as the Wildlife Resources Commission that continues today."

At the time of the NCWRC's inception, the NCGA obligated the agency, through Chapter 143, Article 24, to the conservation and management of the state's fish and wildlife resources.

> **§ 143-239. Statement of purpose.**
> The purpose of this Article is to create a separate State agency to be known as the North Carolina Wildlife Resources Commission, the function, purpose, and duty of which shall be to manage, restore, develop, cultivate, conserve, protect, and regulate the wildlife resources of the State of North Carolina, and to administer the laws relating to game, game and freshwater fishes, and other wildlife resources enacted by the General Assembly to the end that there may be provided a sound, constructive, comprehensive, continuing, and economical game, game fish, and wildlife program directed by qualified, competent, and representative citizens, who shall have knowledge of or training in the protection, restoration, proper use and management of wildlife resources. (1947, c. 263, s. 3; 1965, c. 957, s. 13.)

Since 1947, the WRC has been dedicated to our responsibilities to manage the state's fish and wildlife resources, including our legal responsibility for managing the state's black bear (*Ursus americanus*) populations. Our bear-related policies and programs are based on scientifically sound resource management, assessment and monitoring, applied research, and public input (Appendix A).

Role of the Black Bear Committee

The Division of Wildlife Management's (DWM) Black Bear Committee (BBC) was created in 1991. The goal of the BBC was to bring together NCWRC biologists from around the state to provide a sounding board for the Black Bear Project Biologist and Surveys and Research Program Coordinator as they developed plans and recommendations related to black bear management. Over time, the role of the BBC has evolved as more responsibility has been given

to members of the committee in providing recommendations with management decisions (Appendix B). The BBC served as the lead instrument in developing the 2012-2022 Black Bear Management Plan (BBMP).

The current BBC composition developed over the years as needs arose for personnel with specific expertise in certain areas. The current BBC members remain members until they retire or resign from NCWRC, request to be removed from the Committee, are reassigned, or change positions. Any recommended changes in committee composition or designated representatives for members listed above will be submitted by the committee to the Division of Wildlife Management for approval.

The current BBC is composed of the following DWM personnel:

Surveys and Research Program
Black Bear and Furbearer Biologist (Colleen Olfenbuttel, Committee Chairman)
Surveys and Research Program Coordinator (David Sawyer)

Land Management Program
Western Region Land Management Supervisor (Gordon Warburton)

Private Lands Program
Eastern Region Private Lands Supervisor or designated representative
(Robbie Norville)
Central Region Private Lands Supervisor or designated representative
(Ken Knight)
Western Region Private Lands Supervisor or designated representative
(Mike Carraway)
Private Lands Program Coordinator
(Brad Howard)

The following DWM biologists attend as desired:

Wildlife Management
Chief, Division of Wildlife Management (David T. Cobb, Ph.D.)
Section Manager, Surveys & Research and Wildlife Diversity Programs (Perry Sumner)
Section Manager, State and Private Lands (Isaac Harrold)

This composition allows for better representation of "supervisory" personnel responsible for setting work plans and agendas for the respective regions. Most of the data collection efforts of the Black Bear Program (BBP) are accomplished with assistance from personnel supervised by the Game Lands and Private Lands program supervisors, and including these supervisors in the decision making process should improve and stabilize data collection efforts. Additionally, the supervisors' participation in the process should foster a positive working environment among programs.

Development and Overview of the Black Bear Management Plan

The first and only BBMP for the state of North Carolina (NC) was developed in 1981. Since the development of the 1981 plan, the State's black bear populations have grown dramatically despite increasing human populations. The "success-story" of the black bear recovery in the state has not been without consequences. The ever-adaptable black bear conjures diverse images in the minds of citizens ranging from Disney's "Winnie the Pooh" to one of a dangerous predator. The truth actually lies somewhere in-between depending on circumstances and one's point of view.

Managing a large carnivore in a state with a diverse and increasing human populations and associated development requires NCWRC staff to address management issues never before experienced in NC. The recovery of the black bear has created complicated challenges related to a variety of topics including bear hunting, bear hunting techniques (Appendix C), human/bear interactions, management of bear habitat, law enforcement, and many others. In order to more effectively manage black bears now and in the future, the BBC was charged with developing a new statewide BBMP, scheduled to be completed by July 1, 2012.

Herein, we will describe the history, status, and future management direction of bears in NC, as well as provide a framework for achieving the goals and objectives identified in the BBMP. By formalizing a process for attaining our goal, this plan will assist the NCWRC's Board of Commissioners, NCWRC administrators and staff, and the public in addressing current and future bear issues. Meeting the goal will require the successful management of conflicts between bears and people, public acceptance of management tools (e.g., hunting), and maintaining bear habitats.

The BBC based the 2012-2022 BBMP on biologically-sound management principles, with incorporation of public values. To ascertain the public's views regarding bears, bear management and bear hunting, the NCWRC conducted surveys of both North Carolina citizens and North Carolina bear hunters in 2005 (Palmer 2006, Palmer 2009). Results from the surveys were reviewed by the BBC and incorporated into the 2012-2022 BBMP. In addition, a draft of the BBMP was posted on the NCWRC website (www.ncwildlife.org) from June 2011 through November 2011 and March through April 2012 in order to solicit public comments. Comments that were relevant to the BBMP were reviewed by the BBC.

This document was endorsed by a majority vote of the full North Carolina Wildlife Resources Commission at their meeting on Thursday, July12 2012.

Process for Changes to the Black Bear Management Plan

Future evaluations and revisions to the BBMP will be addressed by the BBC. The BBC will review the 2012-2022 BBMP at least every 10 years and identify issues or sections of the plan which need to be addressed, modified, removed, or added. Proposed changes to the BBMP will be submitted to the DWM Chief for decisions regarding the propriety of the changes and the need for discussion with the director's office and/or the NCWRC's Board of Commissioners.

HISTORY OF THE BLACK BEAR PROGRAM

Historical Records

Black bears were abundant in North Carolina when Europeans first arrived (Timberlake 1765, Arthur 1914). According to accounts from early historical records, Native Americans and European settlers hunted bears for food, clothing, and medicine (Bartram 1998). John Lawson traveled into the piedmont area of North Carolina in 1701 and reported that "Bear-hunting is a great sport in America, both with the English and the Indians" (Lawson 1967). In 1761, Colonel Henry Timberlake accompanied a delegation of Cherokees into the area of eastern Tennessee and western North Carolina and reported the presence of many bears (Timberlake 1765). William Bartram reported that "The bears are yet too numerous" when he explored areas of western North Carolina in 1774 (Bartram 1998). Bears were common in many parts of North Carolina in the 18th and through much of the 19th centuries.

The European expansion and settlement of most areas of the state took its toll on bear populations in the latter part of the 19th century as forested areas were converted into agricultural croplands (Carlock et al. 1983, Pelton & Van Manen 1997). Settlers considered bears to be a threat to livestock and killing was intensive and unregulated. Legendary bear hunters, such as "Big Tom" Wilson, his father Tom Wilson, and others are reported to have killed hundreds of bears during their lifetimes in many areas of North Carolina in the 1800's and early 1900's (Aleshire 2008). Extensive logging decimated habitat in the early part of the twentieth century as vast areas of the state were clear-cut. As forests began to recover, the chestnut blight, introduced in 1925, further decimated bear habitat (Carlock et al. 1983). American chestnuts had provided a consistent and abundant food supply for bears and other wildlife throughout the fall and winter months. Half of the chestnuts were dead by 1940, and virtually all of the mature chestnut trees were dead by the early 1950's (LaFollette 1974). By the middle part of the 20th century, bears had been extirpated from the piedmont, and populations had receded into remote areas of the mountains and coastal plain.

In a 1975 symposium on endangered species in North Carolina, concern over declining bear populations was indicated by them being declared a "species of special concern" (Carlock et al. 1983). This designation was based on population estimates and occupied range (bears were considered to be rare), the potential for exploitation (illegal gall bladder trade), vulnerability to specific pressures (development and loss of habitat), and other criteria. In a re-evaluation of mammals by the North Carolina Museum of Natural History in 1987 reported that "Black Bear populations have declined in North Carolina in direct relationship to the extent of their interactions with humans" and that "we should anticipate that Black Bears and humans will not be able to share habitat extensively in North Carolina in the future" (Powell 1987). Even though conclusions about their status and concerns about the future of bears in North Carolina were expressed in 1975 and 1987, there was no formal or recognized process for officially designating the status of bears or other wildlife in North Carolina until the passage of the North Carolina Endangered Species Act in 1987 (NC General Statute Chapter 113, Article 25; Powell 1987). Black Bears have never been legally designated as endangered, threatened, or as a species of special concern under the North Carolina Endangered Species Act.

Early Protections

The first real protection for bear populations in North Carolina began with the establishment of the Great Smoky Mountains National Park (GSMNP) in 1936 and the creation and expansion of national forests in North Carolina beginning in the 1930's and 1940's. The GSMNP was the first bear sanctuary in the state with over 300,000 acres of habitat (on the North Carolina side) protected from hunting, logging, settlement, and development. Although national forests continued to be hunted, vast areas of habitat were protected, and the forests that had been decimated by extensive logging began to recover.

Early Regulations

Hunters were responsible for initiating regulations to protect and manage bears in North Carolina. The first statewide hunting season for bears was established in 1927, and ran from October 15 to January 1 with no bag limit. Since that time, several regulations and statutes have been enacted and/or modified, with some of these occurring to better address bear management goals.

Creation of the Sanctuary System

One of the most important developments in the recovery of North Carolina's black bear populations began in 1971 with the creation of a bear sanctuary system. Twenty-eight bear sanctuaries were established to close approximately 800,000 acres of habitat to bear hunting. The idea behind the sanctuary system was to protect core areas of habitat that encompassed the relatively small home ranges of breeding females. The females would reproduce in the sanctuaries, and bear populations would increase and expand into surrounding areas. The bear sanctuary system, which North Carolina was the first North American jurisdiction to implement, has been one of the most successful and important innovations in the history of bear management in North America and has been a primary factor in the recovery of bear populations in this state.

1981 Black Bear Management Plan

The 1981 BBMP contained sections addressing nine topics: 1) History, Status, and Distribution, 2) Surveys for Black Bear, 3) Research Needs, 4) Population Management, 5) Habitat Management, 6) Conservation Education, 7) Sportsman Interaction, 8) Management Policy, and 9) Management Priorities.

Many of the specific recommendations addressed in the 1981 BBMP have been implemented by the NCWRC and are now considered a normal part of our statewide BBP. For example, we annually collect teeth to analyze age structure and reproductive output. The plan listed 14 management priorities (Table 1). Looking back thirty-one years after the completion of the 1981 plan, it is clear that many of these recommendations have been met successfully while the priority of others may have changed. Herein, we build upon the concepts developed in 1981 and identify objectives appropriate for black bear management in the 21st Century.

Table 1. Management priorities identified in North Carolina's 1981 Black Bear Management Plan.

Listed in Order of Importance
1) Preserve key habitat types such as pocosins, carolina bays and hardwood swamps.
2) Continue to monitor the population with appropriate surveys.
3) Establish seasons in several eastern counties.
4) Complete sanctuary evolution study in process.
5) Formulate procedures for handling bear-human conflicts and depredation problems.
6) Prepare an annual big game harvest report.
7) Continue to stress habitat manipulation.
8) Review and improve the Wildlife Cooperator Agent Program.
9) Determine the effects of human disturbance on bear populations.
10) Review cub and baiting laws.
11) Revise life history and management slide program and hunting pamphlet.
12) Determine need for restoration areas and formulate guidelines for establishment.
13) Complete a life history and management pamphlet in 1981.
14) Complete a bear range map in 1981.

GOAL, OBJECTIVES AND STRATEGIES

Statement of Goal

In 1947, the NCWRC was entrusted with the legal responsibility to manage, conserve and regulate the state's black bear (*Ursus americanus*) populations. Since that time the policies, regulations, and programs created were developed to meet our responsibilities in a manner based on scientifically-sound resource management, assessment and monitoring, applied research, and public input.

North Carolina's black bear populations have grown dramatically despite increasing human populations. Managing a large carnivore in a state with increasing and diverse human populations and development requires NCWRC staff to address management issues never before seen in the state. With the changes that have occurred since the 1981 BBMP, the BBC has created the following goal to meet the present challenges facing responsible management of the bear population:

> **"Use science-based decision making and biologically-sound management principles to manage black bear populations in balance with available habitats and human expectations to assure long-term existence and hunting opportunities."**

The recovery of the black bear has created complicated challenges related to a variety of topics including bear hunting, bear/human interactions, management of bear habitat, law enforcement, and many others. Meeting this goal will require the successful management of conflicts between bears and people, public acceptance of management tools (e.g. hunting), and maintaining bear habitats. The BBMP addresses all these aspects of black bear management necessary to meet NCWRC goal.

Statewide Management Objectives

Objective #1: To increase our ability to determine impacts of changes in management on bear populations and hunting, NCWRC shall develop methods to collect data on an annual basis on hunter effort data by hunting method, number of resident bear hunters, non-reported harvest and bear hunter success rates.

Background: Due to the current licensing structure, the NCWRC has no method for identifying bear hunters. This results in our inability to gather other data, such as the annual statistics on the number of bear hunters, hunter success rates, and hunter effort. In addition, biological staff cannot easily conduct surveys on specific harvest statistics (e.g., hunter effort by method). Therefore, it is difficult for biological staff to demonstrate cause-effect relationships of several factors that influence harvest levels, such as regulatory and statutory changes, number of bear hunters, changes in hunting methods, and changes in bear population levels. The lack of information on number of bear hunters and hunter effort also increases the uncertainly in evaluating how current and proposed regulations and statutes will impact bear populations.

Strategies:

1) Develop and implement a system for identifying resident bear hunters on an annual basis.
2) Develop and implement a methodology for monitoring annual bear hunter success rates.
3) Conduct annual surveys of bear hunters to collect bear harvest statistics, including data on hunter effort, hunter success rates by method of harvest, and non-reported harvest.

Objective #2: Use regulated hunting to achieve and maintain black bear population objectives.

Background: The black bear hunting heritage in North Carolina dates back to early Native Americans and was adopted by early colonial settlers. Bear hunting continues to be an important tradition in North Carolina. In addition, regulated hunting is an effective means of regulating local bear populations and reinforcing a bear's natural fear of people. Where bear hunting occurs, some problem bears are taken while others learn to associate humans with negative consequences.

Strategies:

1) Use regulated hunting, in accordance with bear population objectives, as the primary population management option for stabilizing or reducing bear population numbers.
2) Promote bear hunting as an effective tool in managing bear populations and human-bear conflicts.
3) Evaluate effectiveness of existing and potential hunting opportunities on bear sanctuaries in meeting bear population objectives.
4) Develop a system to monitor the impact of bear hunting on bear populations and hunter satisfaction.
5) Develop a structured decision making process to evaluate how bear management proposals will impact bear populations.
6) Provide bear hunting opportunities on newly acquired lands when hunting is in compliance with bear population and other management objectives.
7) Educate agricultural interests on compatibility and benefits of managing agricultural lands for bears and bear hunters.
8) Educate private landowners and communities about the benefits of allowing bear hunters to access their properties.
9) Explore potential methods to connect private landowners and bear hunters in order to increase bear hunting opportunities on private lands.
10) Work with the Hunter Retention Program to implement the Hunting Heritage Strategic Plan to retain and recruit new bear hunters.

Objective #3: Monitor black bear populations and trends using existing survey techniques, while also investigating new methods for monitoring efforts.

Background: To address the challenges presented by an expanding bear and human population, the NCWRC uses several survey techniques to monitor the bear population. These techniques allow NCWRC biological staff to monitor various aspects of black bear demographics, such as bear population trends, non-hunting mortality, and sex and age composition of the population. Since the 1970's, data provided by these techniques have been used by NCWRC biological staff in making sound and scientific management decisions.

However, the successful recovery of the bear population has presented new challenges that may require an examination of current and new survey techniques, so that the NCWRC can continue to effectively manage bears. In order to maintain long-term datasets, the NCWRC should continue using existing techniques, while also investigating whether new methods may better assist us in monitoring and managing the bear population.

Strategies:

1) Monitor and record bear observations made outside of the 2010 established occupied range for bears in North Carolina.
2) Update database on the occupied range of black bears every five years.
3) Monitor and record human-bear interactions.
4) Estimate the bear population in huntable areas and examine feasibility of estimating bear population in non-huntable areas.
5) Assess the population trends of black bears; assess currently used surveys and implement new surveys and techniques as they become available and appropriate.
6) Assess and monitor sex and age structure of the population and harvest and determine if sex and age structure of sampled harvest represents sex and age structure of actual harvest
7) Assess and monitor bear condition, as defined by weight in relation to age.
8) Maintain and/or increase educational efforts about Bear Cooperator Program and seek ways to increase sampling submission rates.
9) Monitor and record non-hunting mortality.
10) Stay up-to-date with current bear-related research and techniques through literature reviews, site visits to active bear research projects, and participation in professional meetings with other bear biologists.

Objective #4: Conserve and manage black bear habitat in accordance with bear population objectives for each BMU.

Background: North Carolina is approximately 84% privately owned, emphasizing the key role that private landowners play in determining the fate of the state's natural resources (NRCS 1997). North Carolina experienced a 19% increase in population from 2000 to 2010, and growth continues unabated (US Census 2010). The Natural Resources Conservation Service (NRCS) reported that the state ranked sixth in the country for total acres of land developed between 1992 and 1997 (NRCS 1997). As land development and population growth rates have increased, fish and wildlife habitats have been altered, fragmented and destroyed.

Habitat is very important to maintaining bear populations and reducing human-bear interactions. Conserving habitat is also important in maintaining or creating bear hunting opportunities. In addition, black bears move extensive distances during certain times of the year. It is important for movement to occur between the various subpopulations of bears across the state to help maintain bear numbers and genetic connectivity and allow bears to repopulate suitable, but unoccupied range. Conserving travel corridors would connect these suitable habitats while providing linkages for many other wildlife species to travel between core habitat areas.

Strategies:

1) Maintain database on estimated amount of black bear habitat in North Carolina by Bear Management Unit (BMU).
2) Use GIS technology to monitor changes in land-use (i.e., forests, crop composition, wetlands).
3) Identify, acquire and maintain property that would provide habitat for black bears.
4) Identify key movement corridors and work, either through acquisition, easements, or agreements, to conserve these areas.
5) Identify Game Lands that can be managed to create or maintain bear habitat and bear travel corridors.
6) Support habitat management practices that benefit bear management objectives on both private and public lands.
7) Work with other governmental and non-governmental entities to manage their properties to provide optimal habitat conditions for black bears.
8) Educate agricultural interests on compatibility and benefits of managing agricultural lands for bears and bear hunters.
9) Continue surveys of soft and hard mast in mountain region.

Objective #5: Maintain, develop and promote educational materials and programs on black bear biology, management, and human-bear interactions.

Background: In a 2005 survey conducted by Responsive Management, the majority of North Carolina residents (75%) could not name the state government agency that is most responsible for managing and conserving fish and wildlife in North Carolina (Duda et al., 2005). In another survey, nearly 100% of the respondents knew that black bears lived in North Carolina, but the lack of knowledge about bears was rather high with 65% having very little or some knowledge of black bears (Palmer 2006). This lack of knowledge about bears and the NCWRC is occurring concurrently with a rise in human-bear interactions, though a majority of these reports can be resolved through education.

An important tool for managing the bear population is hunting, yet some residents have misconceptions about bear hunting, often not aware that regulations exist to allow a long-term sustainable harvest. Fortunately, in a 2005 survey, a majority (74%) of North Carolina residents indicated they supported regulated bear hunting if wildlife managers determined it was necessary (Palmer 2006). Education will be the ultimate tool to acclimate both new and long-term residents to living with bears and to inform them of the tools (e.g., hunting, removal of attractant) that can be used to prevent bear conflicts.

Strategies:

1) Maintain updated information on the "Black Bears in North Carolina" section of the NCWRC website.
2) Update, as needed, and implement "Guidelines for WRC Staff in Responding to Bear Conflicts with Humans" (Appendix D).
3) Update, as needed, and approve "Guidelines for NCWRC Response to a Bear Attack Resulting in Serious Human Injury or Death" (Appendix E).
4) Educate enforcement agencies and animal control officers on the guidelines available to address human-bear interactions (Appendix F).
5) In cooperation with the Hunting Heritage Program and Division of Conservation Education, promote bear hunting and bear dog training as methods for managing bear populations and for preventing and resolving bear conflicts.
6) Promote the "*The Bear Facts, Interactive Educators Edition*" dvd to all school systems in cooperation with the Division of Conservation Education.
7) Provide bear-related educational materials (e.g., the annual bear brochure) to the NCWRC Wildlife Educational Centers.
8) Develop bear-related educational videos and press releases, and use appropriate social media outlets during strategic times of the year in cooperation with the NCWRC's Public Information Officer.
9) Promote "Living with Black Bears" brochure in cooperation with the NCWRC's Public Information Officer.
10) Educate the public, subdivisions, municipalities, and camp grounds on the effectiveness of bear-proof garbage containers.
11) Participate in sportsmen shows (e.g. Dixie Deer Classic) to provide information to sportsmen on NCWRC's BBP and to address questions and/or concerns.

Objective #6: Improve record keeping and data management of violations pertaining to black bear.

Background: The NCWRC can use information on bear violations to ascertain impacts on the bear population. However, there is a paucity of information and the "lumping" of violations into generalized codes such as "hunt" or "sanctuary". Many species were recorded as "furbearing animal", and the species involved is unknown. The first record reported under a specific code for bear was in 1994, and between 1994 and 2007, only 157 bear violations have been documented as being processed in the judicial system. The NCWRC invests much effort collecting back bear data from hunters, road kills, and bear-human conflicts. An updated reporting system of violations regarding bears may be a useful addition to managing the overall bear resource.

Strategies:

1) In cooperation with the Division of Law Enforcement, develop system for tracking bear-related violations on an annual basis.

Objective #7: Encourage and develop methods to reduce highway impacts on bear populations and habitat.

Background: The leading cause of non-harvest mortality in bears is vehicular collisions and the number of highways and drivers continue to increase in North Carolina. While the bear population has increased during the past 30+ years, there are concerns about how highways will impact bear populations. Thus, it is important to understand the impacts that highways have on bear populations and on the integrity of bear habitat. One way to reduce highway impacts on wildlife is through the construction of wildlife underpasses, which allows wildlife to safely travel under the highway. Not only does this reduce bear-vehicle collisions, thus reducing non-harvest bear mortality, but it increases human safety by reducing collisions with bears and other wildlife (e.g., deer). Wildlife underpasses can also conserve important travel corridors, providing linkages for bear populations and many other wildlife species.

Strategies:

1) Encourage use of wildlife crossing corridors on all new highway construction projects.
2) Evaluate if existing highways can be altered to reduce bear-vehicle collisions.
3) Support research efforts to examine highway impacts on bear populations.
4) Support or conduct research that identifies high-use bear crossings on new and existing highways.
5) Evaluation of planed transportation corridors for fragmentation of existing habitat.
6) Educate the public on the importance of wildlife crossing corridors.

Sanctuary System

A. History: In 1971, the NCWRC established 28 black bear sanctuaries totaling over 800,000 acres. North Carolina was among the first to establish such a system of protected areas and led the way with the largest acreage in this designation. Sanctuaries were established to protect a breeding nucleus of female bears and to produce a dispersing surplus of bears that could be harvested without detriment to the population. Sanctuaries have played a major role in the expansion of North Carolina's bear population over the last 40 years.

B. Current Status: Currently there are approximately 490,000 acres of designated bear sanctuaries in North Carolina and 1,390,000 acres of land that functions as *de facto* sanctuaries (Figure 1). These *de-facto* sanctuaries are primarily other lands owned by state and federal land owners such as the North Carolina Division of Parks and Recreation, the National Park Service, the U.S. Fish and Wildlife Service, U.S. Department of Defense, and local municipalities.

Until 2009, the NCWRC would designate and post privately-held property as designated bear sanctuary at the request of the landowner. However, this designation does not hold the landowner to any legal obligations and the landowner can withdraw their property from the designation at anytime. Landowners have the option to prohibit bear hunting on their properties and to post their property appropriately. Additionally, issues of concern by landowners can be addressed through the Landowners' Protection Act; local law enforcement and NCWRC's wildlife enforcement can be notified to address illegal bear hunting on their property. For these reasons, since 2009 the NCWRC has not designated private lands as bear sanctuary.

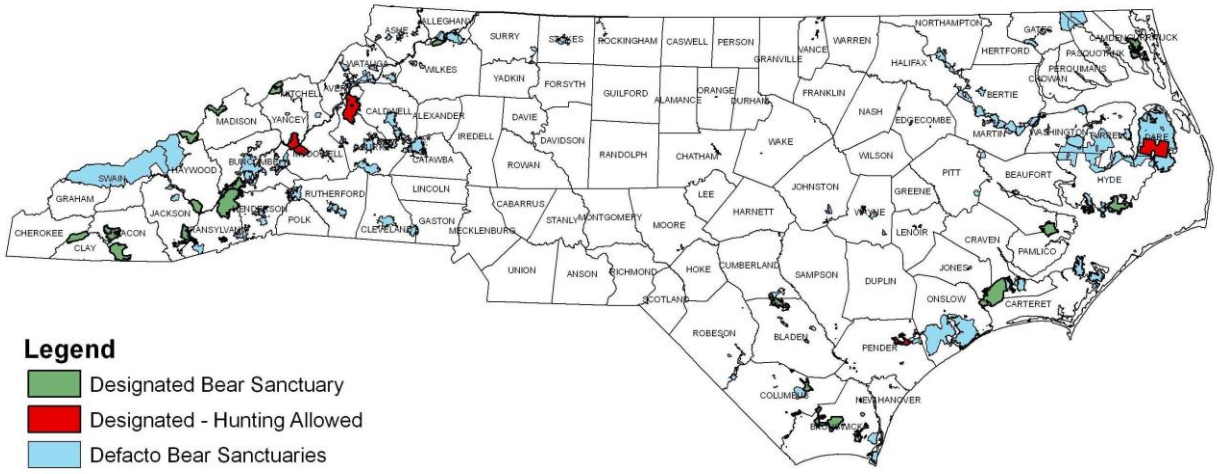

Figure 1. Designated and defacto bear sanctuaries in North Carolina.

C. Identification of Need by BMU: As described in Appendix G, the percent of sanctuary in a BMU impacts total harvest and harvest rate. Our human dimensions surveys have been used to determine hunter satisfaction with current population levels and harvest rates. Further, human-bear interactions are a consideration. At the higher levels of percent sanctuary,

human-bear interactions have been noted, especially when sanctuaries border areas that cannot be hunted and harvested. Adjustments to the percent sanctuary can be made according to hunter desires and public concerns. We need to retain the flexibility to add or remove sanctuary acreage as needed to meet management goals. It is clear that adjusting this one variable can have more of an impact than changes in season structure.

D. **Impact on human-bear interactions**: Sanctuaries can and do affect levels of human-bear interactions. Our system needs the flexibility to allow adjustments in the amount of sanctuary in a given BMU. Ideally, we would like to add or remove sanctuary based on bear population objectives, in combination with hunter desires and human-bear interactions. For example, looking at Figure 2, the area in brown is the Mount Mitchell bear sanctuary and surrounding de-facto unhunted areas. These areas produce large numbers of bears that are hunted (dots). The red outlines are "zones of influence" from the sanctuary boundaries that contain 75% of the harvest locations. Clearly, the developed areas of Black Mountain, Montreat and Asheville (green), where almost not bear harvest occurs, are within these zones. In cases like this, changes in bear sanctuary boundaries or designation are warranted. In addition to flexibility to adjust or remove sanctuary acreage, we recommend the continued tracking of human-bear interactions, and in particular, noting locations of these interactions. Such information is important when adjustments to sanctuary boundaries or status are being considered.

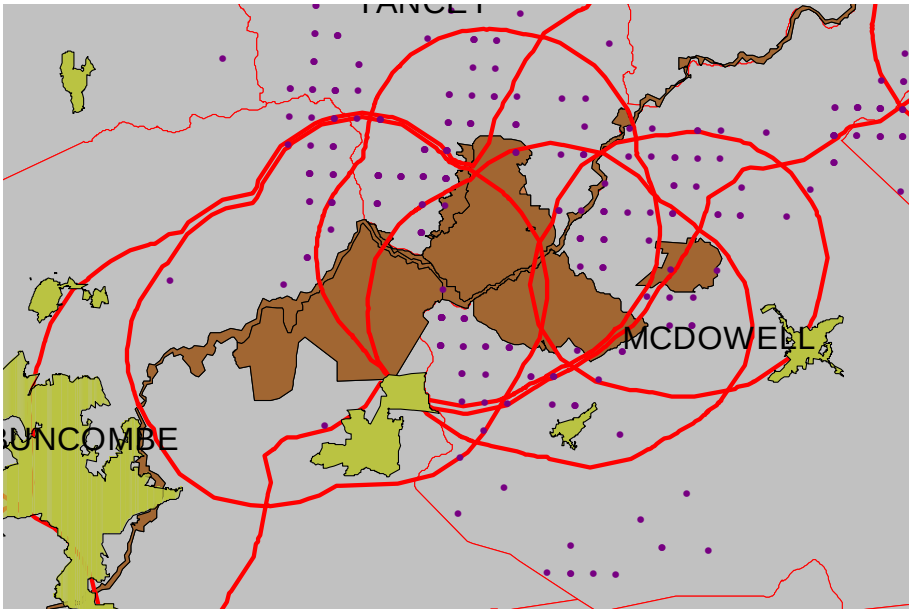

Figure 2. Zones of influence (red circles; 6 km.) and number of bears harvested (dots) surrounding Mount Mitchell Bear Sanctuary (brown) Developed areas are within the zones of influence are indicated in green.

E. **Sanctuary Objective**: Sanctuaries management, which is a form of spatial management, has proved an effective means of managing bears in North Carolina. Bear populations have recovered in the coastal and mountain regions of North Carolina. However, as human

development increases, new defacto bear sanctuaries are created and hunting opportunities decline. The concurrent decrease in huntable areas with the recovery of the bear population prompts biological staff to redefine the original objective of the bear sanctuaries as follows.

> **"**Bear Sanctuaries are delineated areas where hunting mortality can be adjusted independently from that of the surrounding area to address local bear densities and to meet population goals for BMUs. Adjustment of mortality is achieved by regulating harvest pressure, which can range from no hunting to a hunting season consistent with that of the local bear season."

Strategies:

1) Maintain system of designated bear sanctuaries.
2) Update and maintain spatial database of designated bear sanctuaries and de facto sanctuaries every ten years.
3) Annually monitor permitted bear hunts on bear sanctuaries and collect biological information from harvested bears.
4) Continue to examine spatial data:
    a. to further refine and develop relationships between harvest rates and sanctuary area.
    b. to determine the relationship between size of sanctuary and harvest.
    c. to examine the relationship between unhunted areas and human-bear interactions.
5) Establish criteria for opening designated bear sanctuaries to bear hunting opportunities after study of BMU population levels and trends, hunter satisfaction, and human-bear interactions.
6) Periodically, reexamine designated sanctuary boundaries and, where possible, conform sanctuary boundaries to recognizable geographic features.

Mountain Bear Management Unit

A. General Description: The mountain bear management unit (MBMU) consists of the counties in and west of Surry, Wilkes, Caldwell, Burke, and Cleveland counties (Figure 3). The unit encompasses the entire mountain physiographic region of the State and a small portion of the western foothills.

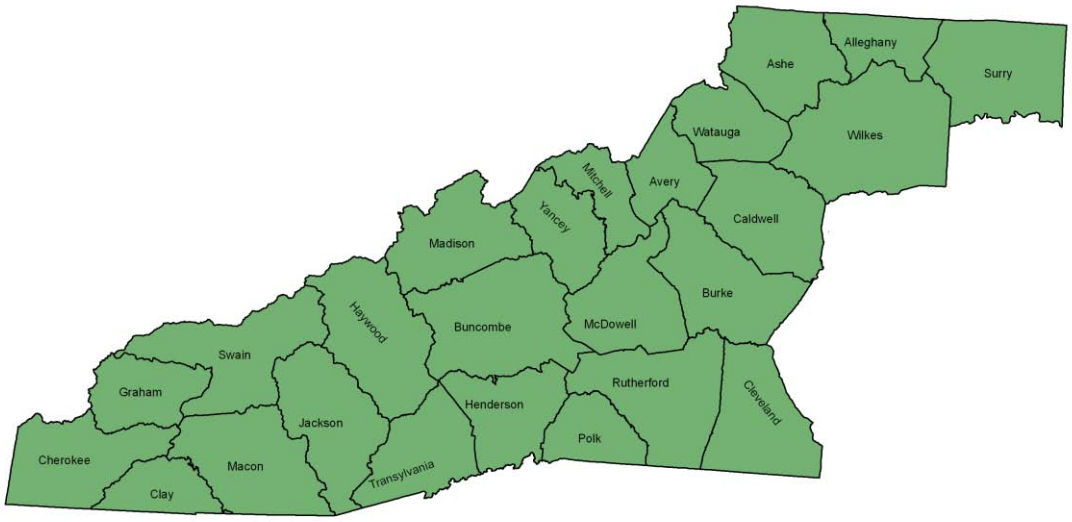

Figure 3. Mountain Black Bear Management Unit (MBMU).

The MBMU consists mostly of large mountains with predominantly mixed hardwood stands except in high elevations where coniferous forests prevail. The mast driven ecosystem of the mountain region creates a greater fluctuation in available food resources than the agriculture driven system in some areas of the coastal plain. Large blocks of public lands exist throughout the unit. National Forest, National Parks, State Parks and other municipal public land holdings create a well distributed mixture of public and private landholdings. Public lands generally consist of older age class forests with limited early successional habitat management taking place at this time. Private lands consist of a mixture of rural farm lands, urban development, and the ever increasing percentage of rural development. These private developments create a unique blend of quality bear habitat combined with human food sources that often lead to human-bear interactions such as bears visiting neighborhoods and bears getting into garbage, bird feeders, and outdoor grills.

B. Population Trends: Current indices show an increasing bear population for the MBMU; both the population reconstruction model and bait station index show similar trends in the MBMU bear population (Figure 4).

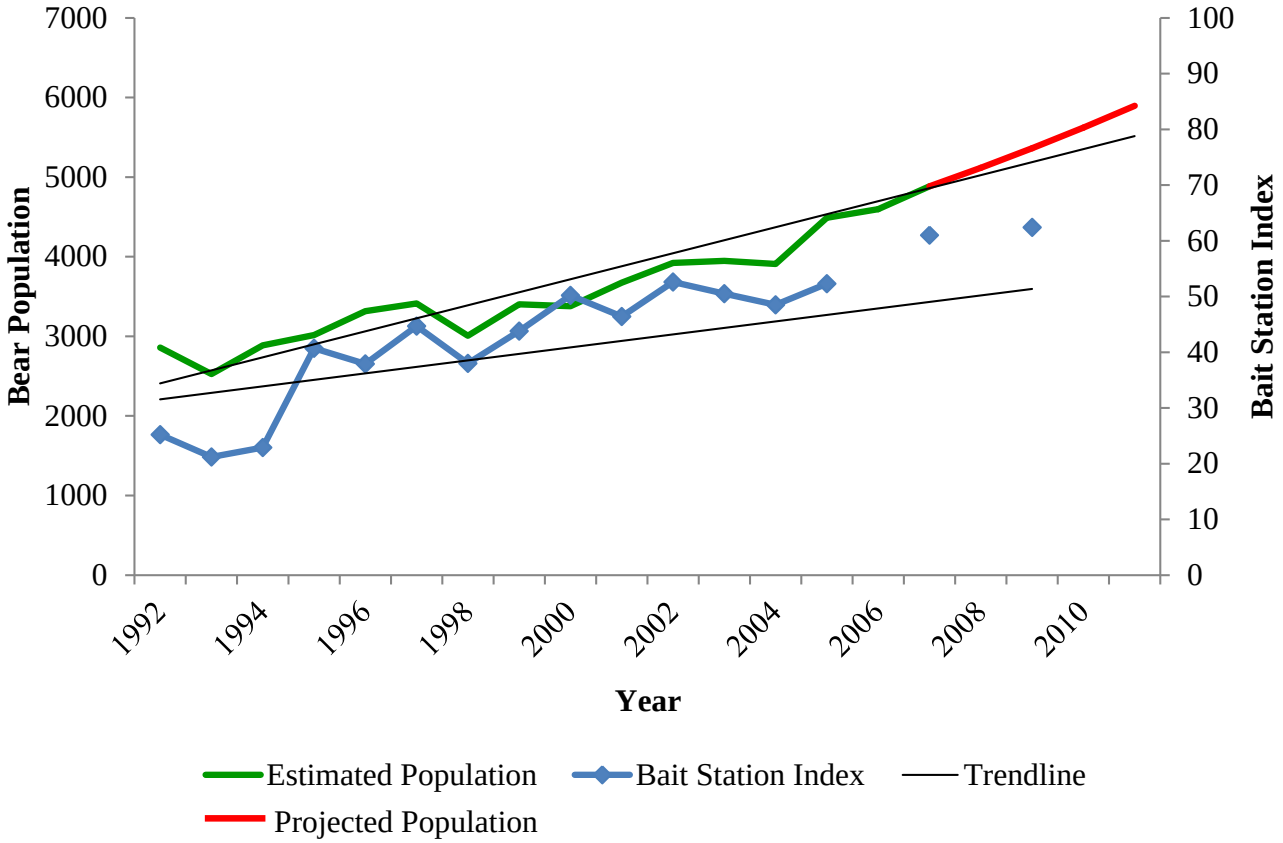

Figure 4. Bear population estimate and projection (1992-2011) and bait station index (1992-2009) for the Mountain Bear Management Unit in North Carolina.

While the increase in human-bear interactions in the MBMU may reflect a growing bear population (Figure 5), these interactions are also driven by other factors, such as increased fragmentation of forested habitat, an increasing human population and annual variation in mast abundance and other natural food resources. These factors can also influence harvest and non-harvest mortality (Figure 6 and 7), which have also increased over the past 30 years. However, when we consider the continued expansion of occupied bear range since 1971 (Figure 8), as well as the similar trends shown in all the indices used to monitor the bear population, we can conclude that the bear population in the MBMU continues to increase.

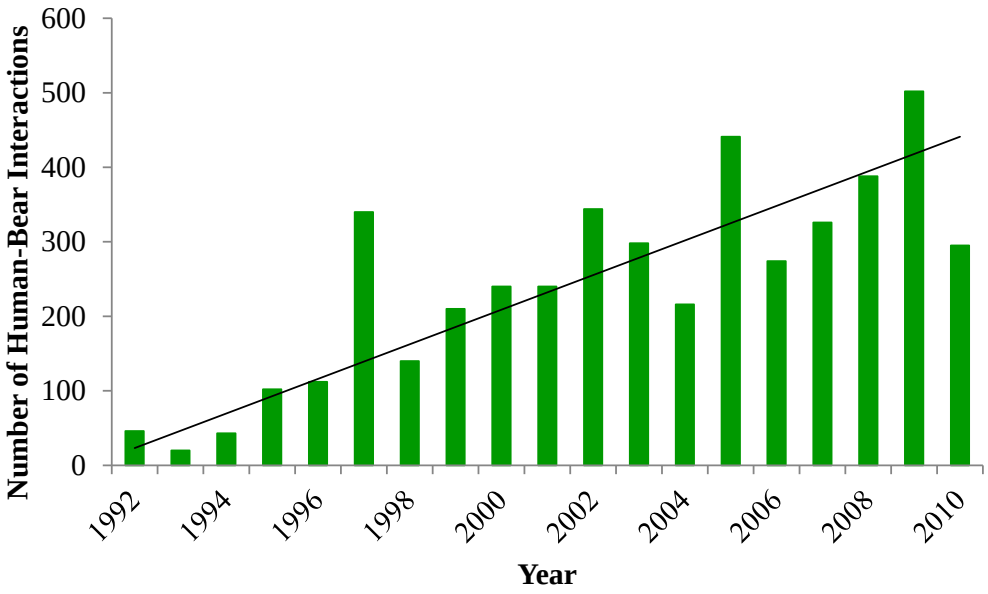

Figure 5. Annual number of reported human-bear interactions in the Mountain Bear Management Unit of North Carolina, 1993 through 2010.

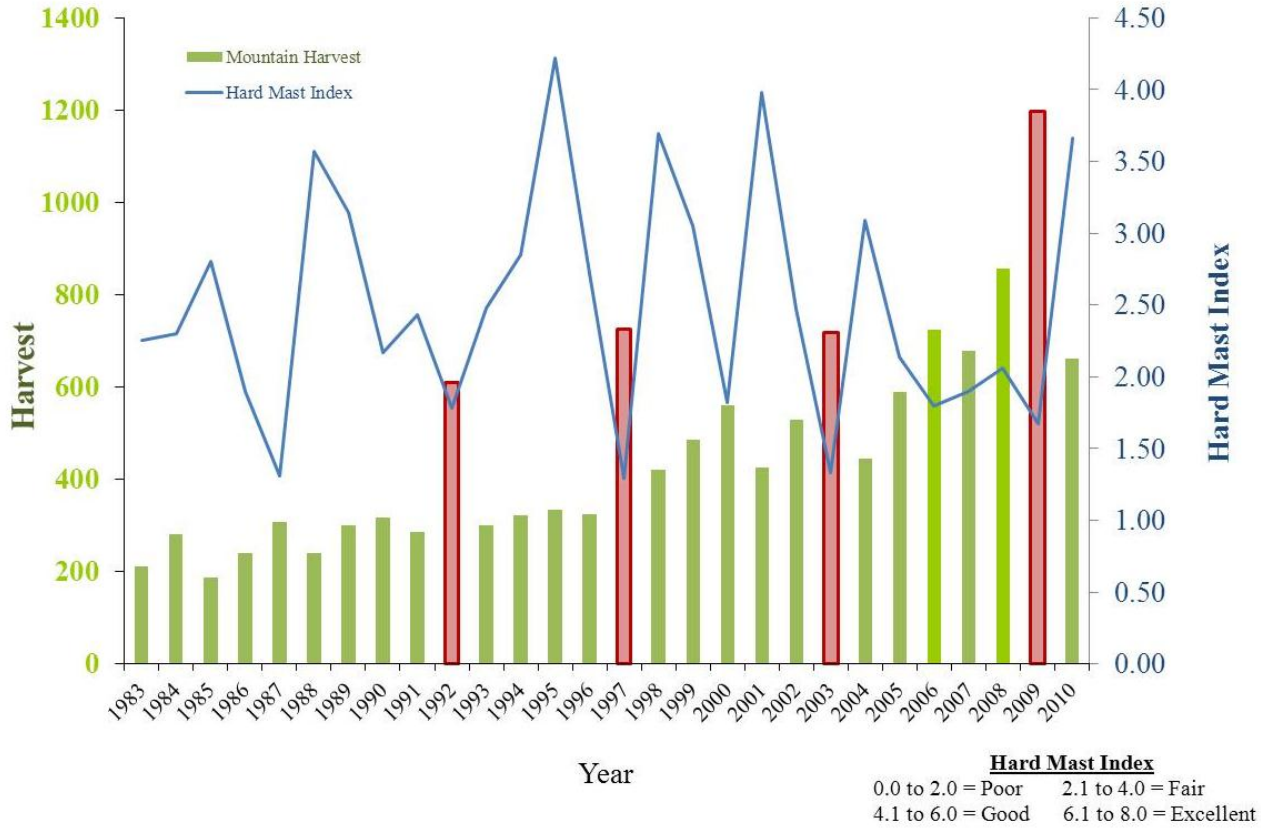

Figure 6. Registered bear harvest and hard mast index in the Mountain Bear Management Unit of North Carolina, 1983 through 2010, with largest percentage increase in harvest indicated by the red bars.

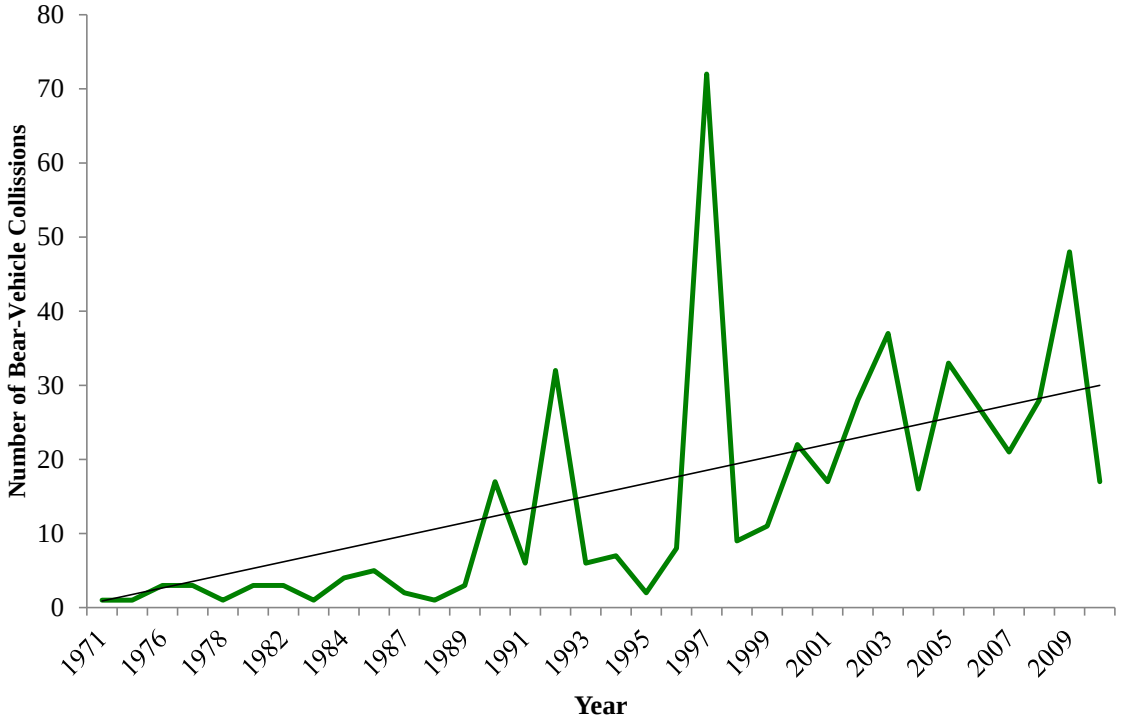

Figure 7. Number of bear-vehicle collisions in the Mountain Bear Management Unit of North Carolina, 1971 through 2010.

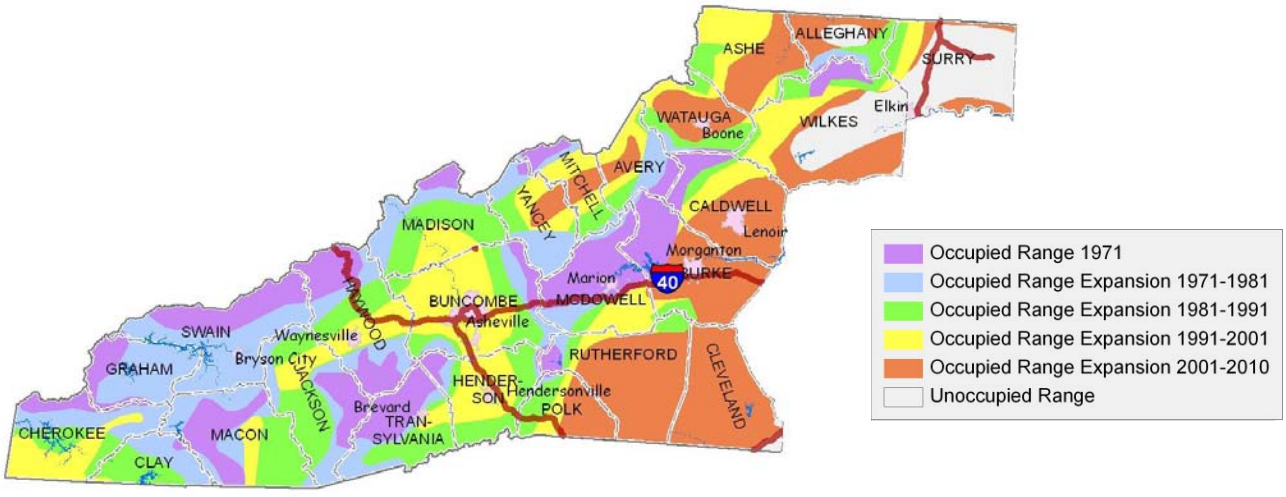

Figure 8. Occupied range of black bears in the Mountain Bear Management Unit of North Carolina, 1971 through 2010.

C. Sanctuary Status: As mentioned previously, the establishment and maintenance of bear sanctuaries is and will continue to be a vital component of black bear management throughout the state. Currently, 260,000 acres of designated sanctuary exists in the MBMU. An estimated 510,000 acres of de-facto sanctuaries exist resulting in 770,000 acres of protected habitat. Acres of de-facto bear sanctuaries are increasing substantially with the conversion of previously undeveloped forest lands to residential communities that do not allow bear hunting.

As of June 2011, two designated bear sanctuaries allow limited bear hunting opportunities during the MBMU bear hunting season. Permit hunts were allowed on Mt. Mitchell Bear Sanctuary in October 2006, followed by the opening of Daniel Boone Bear Sanctuary to permit hunts in October 2009. Both these bear sanctuaries were opened to bear hunting opportunities in response to an increase in de-facto sanctuary lands around these areas, resulting in increased human-bear interactions and loss of huntable areas for bear hunters.

D. Current Hunting Season: The MBMU has North Carolina's longest bear season (average of 54 days). There is currently a uniform bear hunting season within the MBMU consisting of two phases (Figure 9). The first phase opens the Monday on or nearest October 15th and runs through the Saturday before Thanksgiving. The second phase opens the third Monday after Thanksgiving through January 1. This allows 52-57 days of hunting (including Sunday hunting with archery only) depending on when the opening occurs in October. Bear hunting occurs in all counties within the unit.

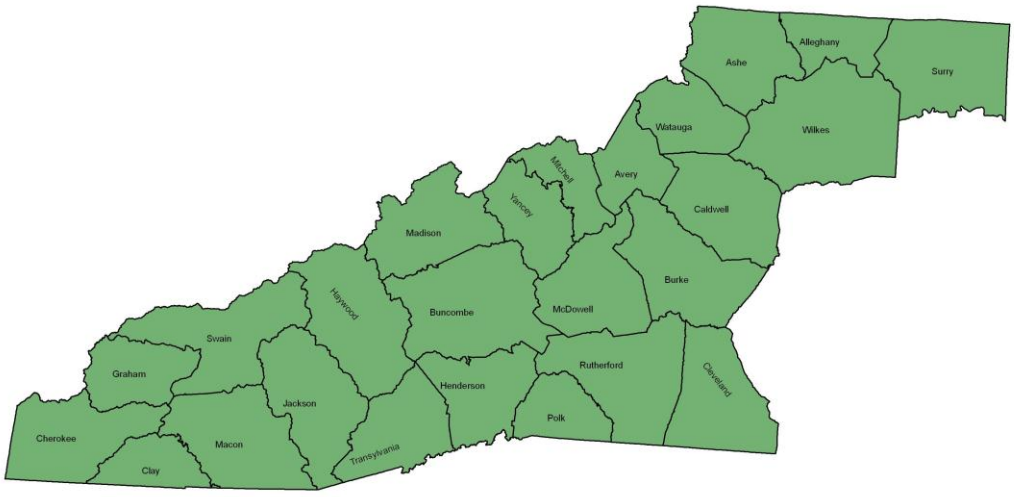

Figure 9. 2012-2013 bear hunting season (green) in the Mountain Bear Management Unit.

E. Current Harvest Trends: Prior to 1988, the mountain bear harvest exceeded the coastal bear harvest, but the coastal harvest has surpassed the mountain harvest in recent years (Figure 10). Mountain harvests are tied to the availability of hard and soft mast (food such as nuts and berries); harvest levels rise in years of poor food availability (Figure 6).

Four of the highest increases in mountain harvests recorded (1992, 1997, 2003, and 2009) coincided with poor hard mast crops (Figure 6). When there is a lack of hard mast, bears look for food over larger unfamiliar areas, making them more vulnerable to harvest and more attracted to unnatural food resources (e.g., corn). Harvest is also influenced by weather, number of hunters, the bear population, land available to hunting, and changes in hunting methods.

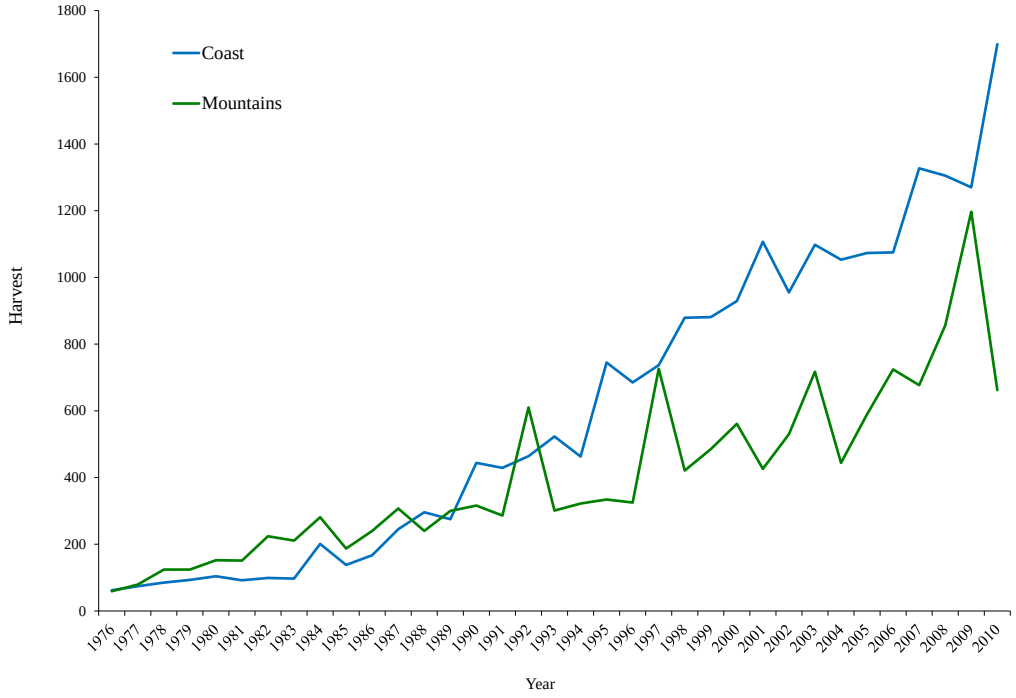

Figure 10. Reported harvest of black bears in the coastal and mountain region of North Carolina, 1976 through 2010.

Harvest data are often the primary source of information that state wildlife managers have to monitor their state's bear population. In collaboration with research cooperators, some states have developed indices based on their harvest data to measure harvest pressure and assess its impacts on their bear population(s). In Virginia, Program RISKMAN models based on nine years of mark-recapture data showed that Virginia's western bear population could remain stable and provide a sustainable harvest if 28% of the bear population was harvested and females comprised up to 47% of the harvest (Bridges 2005). Based on population reconstruction and the registered harvest, 18% of the MBMU bear population is harvested on an annual basis and females comprise 36% of the registered harvest (5-year averages; Figure 11). If we apply Virginia's criteria to North Carolina's MBMU bear population, our harvest has not yet reached levels in which bear population growth will stop.

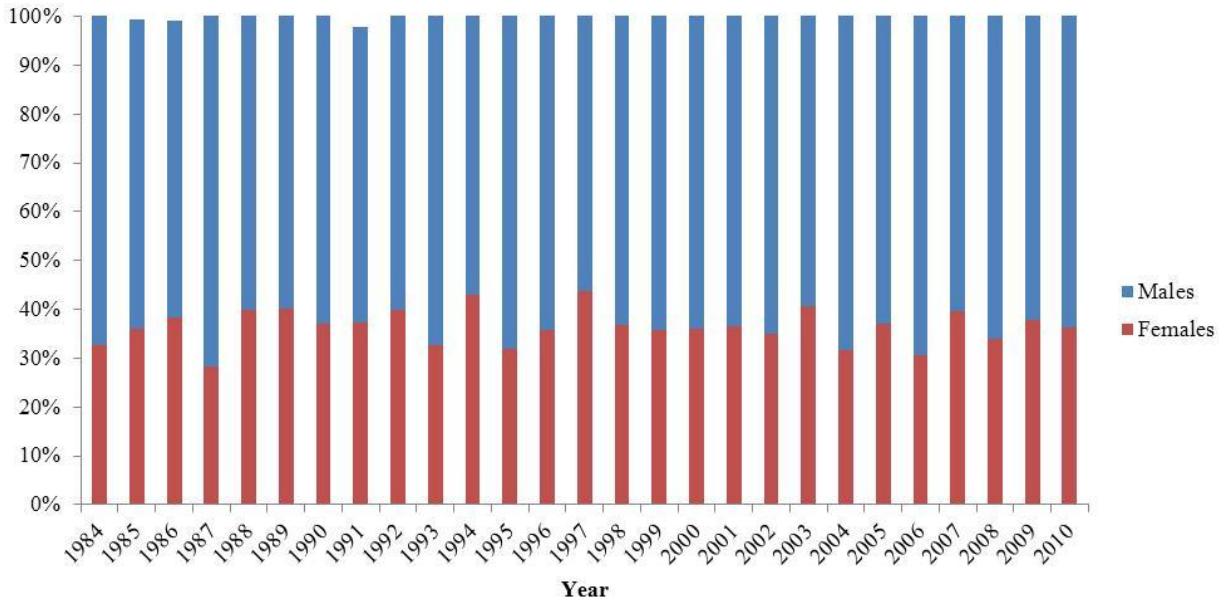

Figure 11. Sex ratio of the registered bear harvest in the Mountain Black Bear Management Unit of North Carolina, 1984 through 2010.

The mean age of harvested female bears sampled has remained stable since 1998, while the mean age of harvested male bears sampled has declined slightly (Figure 12). Annual age of sampled harvested bears in the MBMU change primarily due to hunting pressure and harvest vulnerability. In accordance with Statewide Objective 3, the NCWRC will continue to use existing techniques and investigate new techniques to determine if our harvest data can provide sufficient information on current and future bear population trends.

As observed with age, the average weight of a harvested male bear sampled by NCWRC biological staff has showed a slightly declining trend from 1998 through 2010 (Figure 13). There has been little change in the average weight of a female bear harvested in the MBMU. Annual weights of sampled harvested bears in the MBMU change primarily due to hunting pressure levels and the availability and abundance of natural food resources.

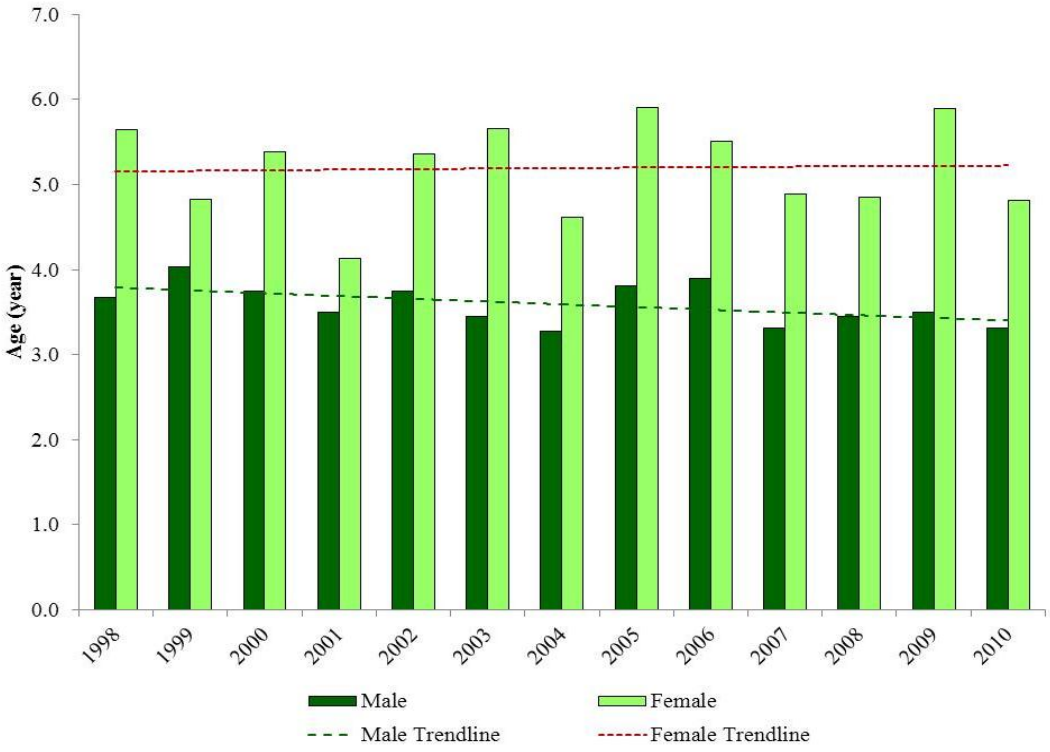

Figure 12. Average age of male and female bears sampled during the bear hunting seasons in the Mountain Bear Management Unit from 1998 through 2010.

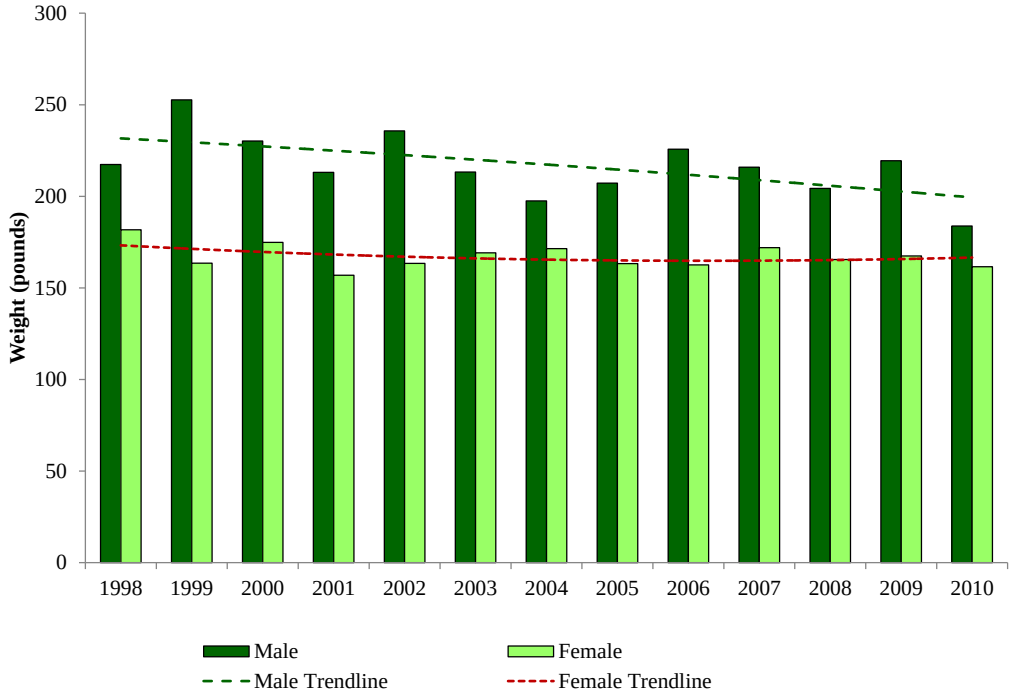

Figure 13. Average weight of male and female bears sampled during the bear hunting seasons in the Mountain Bear Management Unit from 1998 through 2010.

Hunting on Game Lands: The percent of the harvest in the MBMU that occurs on game lands has remained fairly stable (Figure 14). Game lands serve as important areas in providing bear hunting opportunities in the MBMU. Over the past five years, a majority of bears (54%) have been harvested on game lands in the MBMU. With human populations projected to increase in the MBMU, it is likely that there will be a continued increasing trend in the number of de-facto bear sanctuaries. As the availability of huntable areas decrease, NCWRC game lands will become increasingly important in providing bear hunting opportunities and population management via harvest.

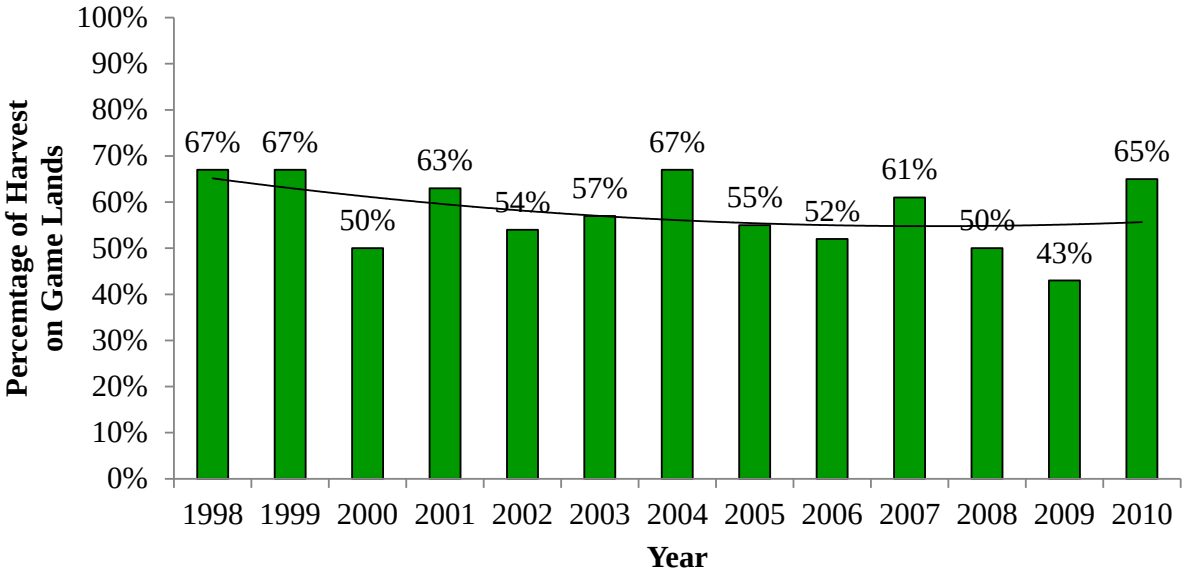

Figure 14. Percentage of registered bear harvest that occurs on NCWRC Game Lands in the Mountain Bear Management Unit of North Carolina, 1998 through 2010.

MBMU OBJECTIVES

Objective #1. Stabilize the mountain bear population at the current level.

Background: The population indices utilized by NCWRC staff all indicate an increasing bear population. While these data suggest that the bear population has not achieved biological carrying capacity, a 2005 survey of the public indicates the bear population is approaching social carrying capacity (Palmer 2006), likely due to the number of human-bear interactions (Figure 5). When asked if they wanted the bear populations to increase, decrease, or remain the same, the majority (51%) indicated they prefer the population remain at current levels. A lesser number (24%) indicated a desire for an increase in the bear population, and only 8% of respondents indicated that they would prefer a decrease in the population levels.

The MBMU already has North Carolina's longest bear season (average of 54 days) and survey results indicate that most MBMU hunters are satisfied with the current season length (58%; Palmer 2009). In addition, MBMU hunters are also satisfied with current bag limits (71%), and would be polarized over special weapons season; 35% of hunters would strongly to slightly favor this season while 46% of the hunters would moderately to strongly oppose the season. Due to the long length of the season and satisfaction with the current season framework, other harvest strategies may need to be examined to achieve our objective.

The MBMU bear population has recovered from historically low numbers and with its recovery, NCWRC must now implement harvest management strategies to stabilize the population to prevent or reduce negative human-bear interactions. As non-huntable areas increase, game lands and designated bear sanctuaries will need to be examined for ways these areas can assist in managing the MBMU bear population.

Strategies:

1) Maintain the current MBMU bear season structure (Figure 9).

2) Initiate bear hunting on designated MBMU bear sanctuaries that meet the criteria developed for allowing bear hunting opportunities on bear sanctuaries.

3) Explore options that will increase bear harvest registration and influence harvest rates in order to assist in population modeling and meet MBMU population objective (i.e. season timing, season length, bag limits, urban archery season).

4) Evaluate MBMU trends every three years (e.g., 2012, 2015, 2018, 2021) in the following: age at harvest, harvest sex ratios, harvest level, population estimation trend and other population indices. If changes are detected, NCWRC staff should recommend changing the following as appropriate:
   a. Number of days in the bear hunting season.
   b. Timing of the bear hunting season.
   c. Number of permit hunt opportunities on designated bear sanctuaries.
   d. Bag limit.
   e. New and/or proven harvest techniques.

Objective #2. Use lethal and non-lethal techniques to address human-bear interactions.

Background: The MBMU has experienced an increase in human-bear interactions (Figure 5) with a majority of these involving the observation of a bear near a home or neighborhood, likely attracted by bird feeders and unsecured garbage. In 2009, 78% of all human-bear interactions reported to NCWRC District Biologists in North Carolina occurred in the MBMU, though the Coastal Bear Management Unit (CBMU) bear population is higher. Clearly, both bears and people are distributed across the landscape throughout this unit, and interactions between the two are common.

The MBMU's public support for the use of lethal and non-lethal techniques to resolve bear conflicts depended on the severity of the conflict (Palmer 2006). Education was the preferred option (93%) for addressing bears observed in residential areas, while a majority (79%) disapproved in the destruction of the bear. However, if a person was injured by a bear, a majority (64%) supported the lethal removal of the bear. The majority (77%) of the public in the MBMU supported the use of regulated hunting for bear population management, if wildlife managers determined it was necessary (Palmer 2006).

Strategies:

1) Increase assistance to MBMU Wildlife District Biologists in dealing with human-bear interactions.

2) Educate county and municipal law enforcement officers on the "Guidelines for Local Law Enforcement for Responding to Bear Observations and Conflicts with People." (Appendix F)

3) Encourage municipalities and subdivisions to adopt ordinances requiring bear-proof garbage containers and dumpsters.

4) Develop model ordinances for municipalities and subdivisions that prohibit the feeding of bears.

5) Encourage municipalities and subdivisions to adopt ordinances prohibiting the feeding of bears.

6) Encourage county and municipal officials to address human-bear conflicts by allowing still hunting opportunities on areas not open to hunting or conducive to hunting with dogs.

Coastal Bear Management Unit

A. General Description: The CBMU consists of the areas in and east of Northampton, Halifax, Nash, Wilson, Wayne, Sampson, Cumberland, and Robeson counties (Figure 15). This entire area lies within the coastal physiographic region.

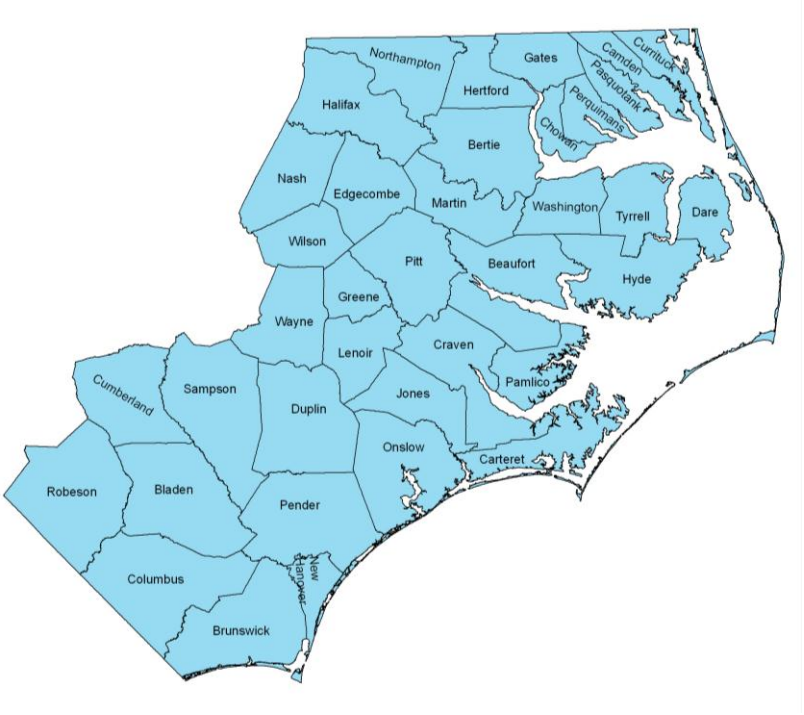

Figure 15. Counties within the Coastal Bear Management Unit (CBMU).

Habitat type and quality varies greatly from north to south and east to west. Several major river systems lie within the CBMU. These systems provide important corridors for movement of bears to available habitat. Much of the range expansion since 1981 has occurred as a result of bears utilizing habitats along these river systems. Outside of the bottomland hardwood forests, the coastal landscape is a mix of pine flat woods, pocosin, and large expanses of industrial forest lands and agricultural lands. Food supplies remain stable from year to year with bears keying on agricultural foods in June and September to December. Bottomland forests and pocosin areas consistently produce mast in the form of black gum, tupelo, various bay species, and oak trees. The rich edges adjacent to agricultural lands and within managed forest sites produce a myriad of soft mast species for bears.

Bears have colonized nearly all available habitat within the coastal region; however they are also losing habitat. Waterfront development and the expansion of infrastructure to support a burgeoning human population have encroached heavily on historical bear range. North Carolina's attractiveness due to its mild climate and coastal recreational opportunities will continue to draw an ever increasing retirement contingent. While this development has encroached on important bear range, thus far the impacts to bear populations appear to be minimal. However, this will likely change.

B. Population Trends: Current population levels within this unit vary from north to south with bear densities being greater in areas of the central and northern coastal plain. The population in the CBMU stabilized for a few years during the early 2000's, but started to show an increasing trend in 2006 (Figure 16). Variable harvest levels (see Current Hunting Trend section) and bear occupancy of all available habitats within most of the CBMU (Figure 17) are the main two contributors to the trend observed in the bear population.

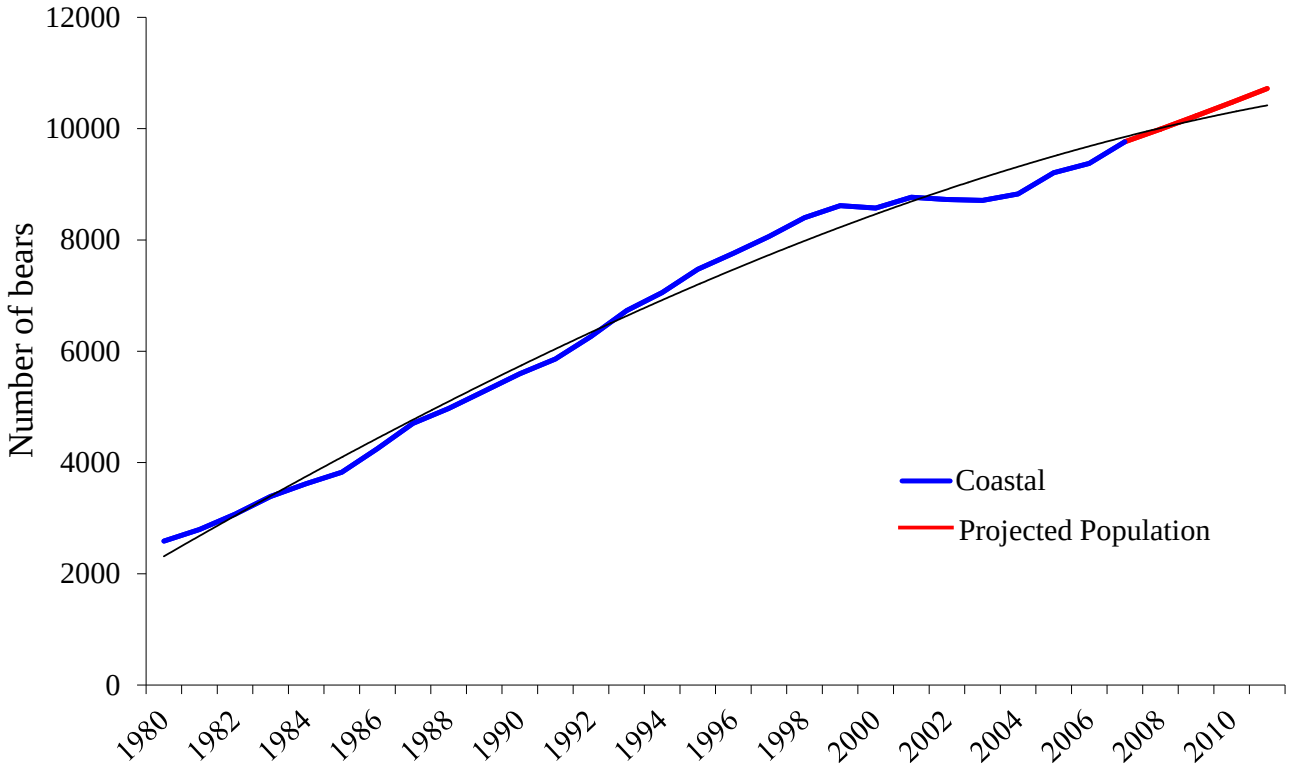

Figure 16. Bear population estimate and projection for the Coastal Bear Management Unit in North Carolina, 1980 through 2011.

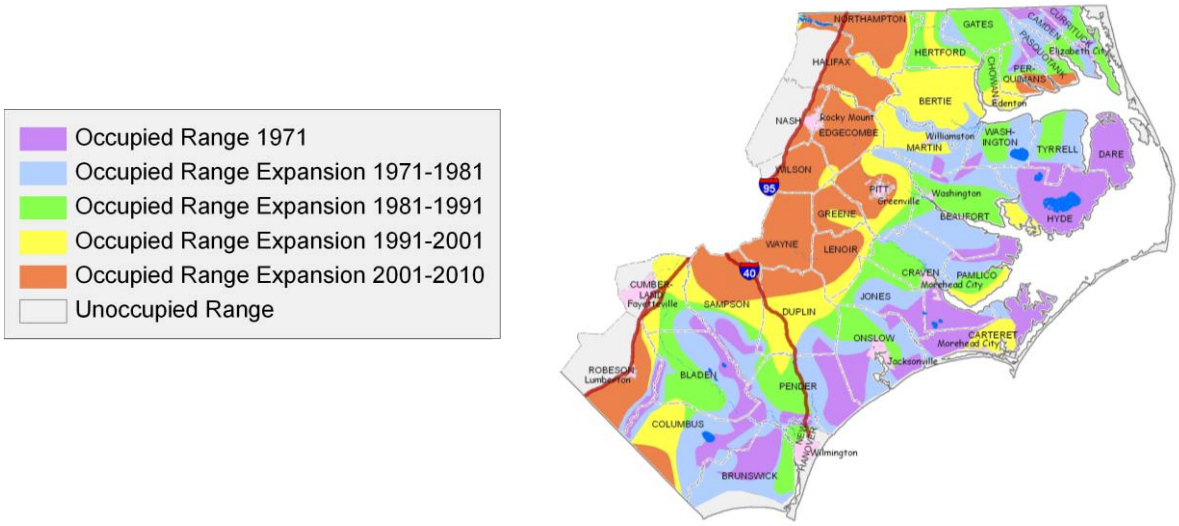

Figure 17. Occupied range of black bears in the Coastal Bear Management Unit of North Carolina, 1971 through 2010.

The number of human-bear interactions in the CBMU has fluctuated since the NCWRC started monitoring interactions in 1992, but the overall trend is increasing (Figure 18). The increase in human-bear interactions in the CBMU reflects a number of factors including an expanding bear population (Figure 17), an increasing human population, and increased fragmentation of habitat due to development and roads. These factors, as well as increased cooperation with State Highway Patrol and the North Carolina Department of Transportation, also influence the number of reported bear-vehicle collisions (Figure 19), which has increased over the past 30 years.

Bear populations in the CBMU have likely stabilized in counties that have been occupied by bears since 1991 (Figure 17) and have a bear hunting season to manage the population. However, bear expansion continues in counties on the western fringe of the CBMU and will facilitate expansion into the eastern edge of the Piedmont Bear Management Unit (PBMU). This margin of unoccupied range is adjacent to areas of heavy human population.

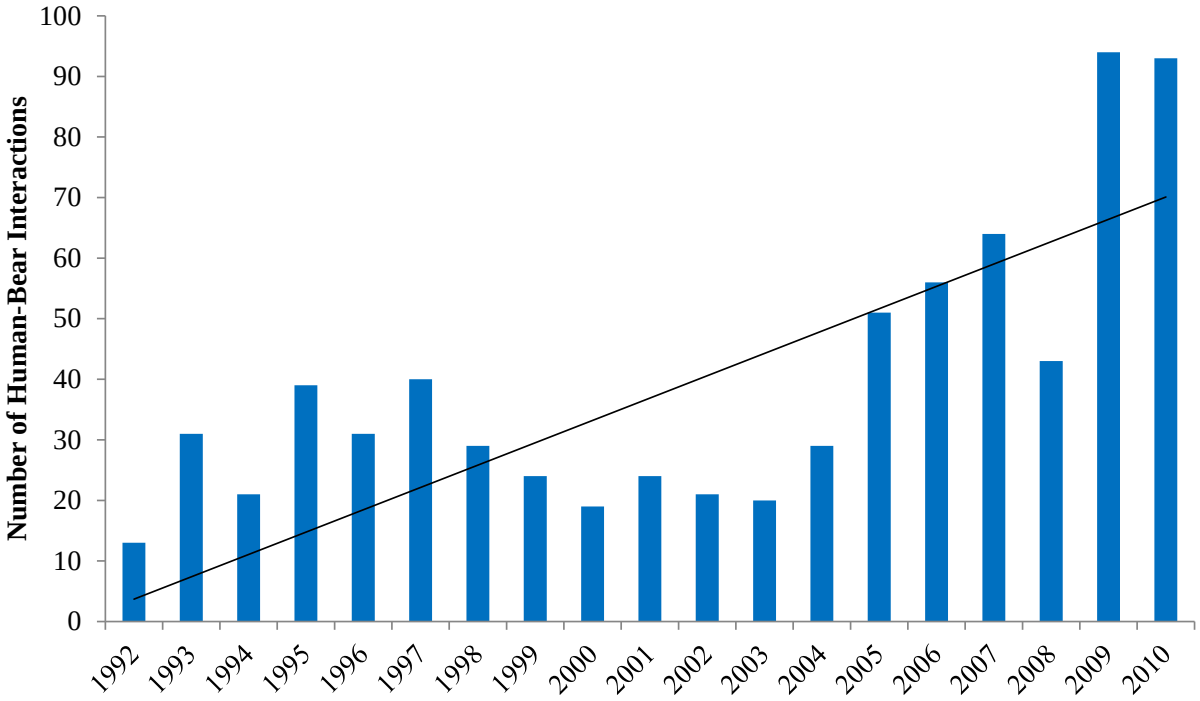

Figure 18. Reported number of human-bear interactions in the Coastal Bear Management Unit of North Carolina, 1992 through 2010.

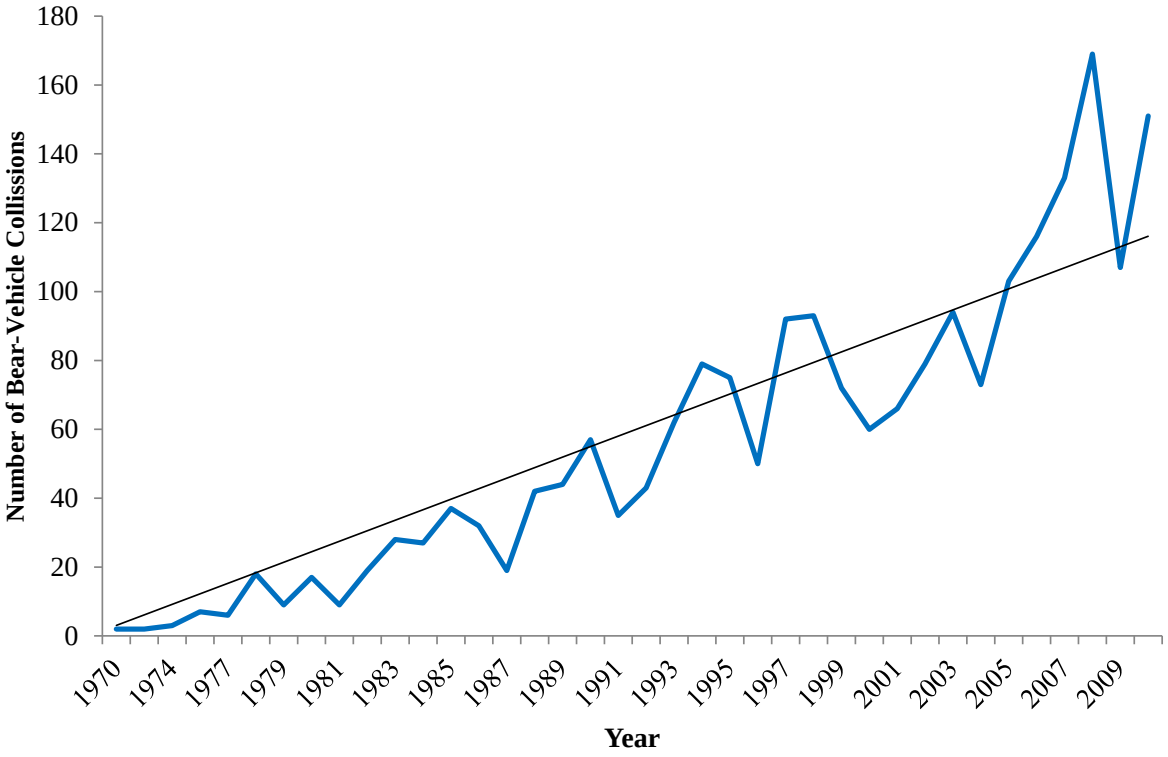

Figure 19. Number of bear-vehicle collisions in the Coastal Bear Management Unit of North Carolina, 1970 through 2010.

C. Sanctuary Status: The CBMU has approximately 1,100,000 acres of sanctuary, of which only 230,000 acres are designated by NCWRC. The total acreage of sanctuary includes areas of significant habitat such as Alligator River National Wildlife Refuge (NWR), Pocosin Lakes NWR, Roanoke River NWR, portions of the Croatan National Forest, and three military installations. The bulk of the sanctuary (72%+) lies within the upper coastal plain of the CBMU.

D. Current Hunting Seasons: Currently, all but one county has a bear season and four different season frameworks exist within the CBMU (Figure 20).

1) The second Monday in November – January 1 in Bladen, Carteret, Cumberland, Duplin, New Hanover, Onslow, Pamlico, Pender, and Sampson. This allows 48-55 days of hunting (includes Sunday hunting with archery only).
2) The first Monday in December until the Saturday before Christmas in Brunswick and Columbus. This allows 20 days of hunting (includes Sunday hunting archery only).
3) The second Monday in November for 6 days and the second Monday in December for 2 weeks in Beaufort, Craven, Dare, Greene, Halifax, Hyde, Jones, Lenoir, Martin, Northampton, Pitt, Tyrrell, and Washington. This is a 19 day season (includes Sunday hunting with archery only).
4) The Saturday prior to the opening in #3 above and continuing for the same days thereafter in Bertie, Camden, Chowan, Currituck, Gates, Hertford and Pasquotank. This is a 21 day season (includes Sunday hunting with archery only).

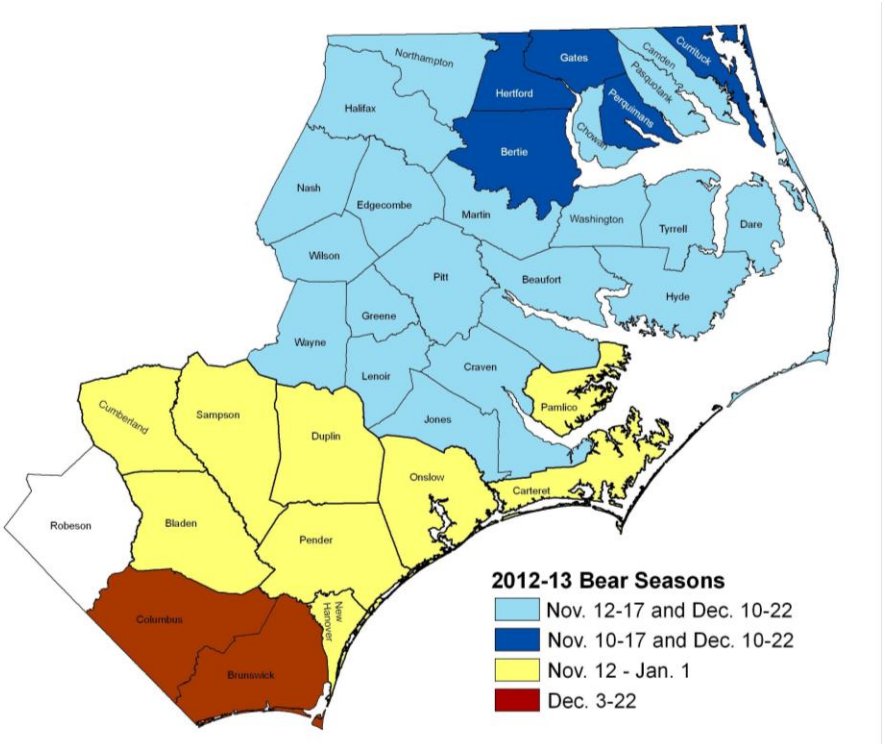

Figure 20. 2012-13 bear hunting seasons in the Coastal Bear Management Unit.

E. Current Harvest Trends: Prior to 1988, the reported bear harvest in the mountains exceeded the coastal bear harvest (Figure 10). However, the reported coastal harvest has consistently surpassed the mountain harvest since 1993 and continues to show an overall increasing trend (Figure 10 and 21). While the mountain harvest is closely tied to the availability of hard and soft mast, the coastal harvest is affected by weather, the bear population, number of hunters, changes in bear hunting season structure and hunting methods, agricultural crop production and availability of private lands for hunting. Examples of how some of these factors have influenced harvest are given below.

Weather: In 2008, heavy precipitation and warm weather occurred in the final three days of the November bear season segment in most CBMU counties. The heavy precipitation reduced bear hunting activity, while warm weather impacted the ability of bear hounds to track and chase a bear. In 2009, heavy rains preceding the opening week of the bear season caused high water, making it difficult for bear hounds to track bears. In addition, a "Nor'easter" came into the CBMU during the opening week of the bear season and prevented bear hunting for three days. These weather conditions likely influenced the slight decline in bear harvest that occurred during 2008 and 2009.

Bear hunting season structure and hunting methods: From the late 1980's through 2000, many counties in the CBMU expanded their season or were opened to bear hunting, resulting in increased harvest during this time period (Figure 21). In 2001, Weyerhaeuser lifted the prohibition on the use of bear hounds for hunt clubs that lease their lands (415,102 acres); harvest increased 19% (+178 bears), partially due to Weyerhaeuser's change in policy.

In 2007, a statute was modified to allow the release of dogs in the vicinity of an unprocessed food product. During the 2007 coastal bear season, harvest increased 23% (+252 bears) when compared to the prior season. This was the highest harvest increase to occur since 1995, when harvest increased 63% (+292 bears) from the prior season. The harvest increase in 1995 was due to the addition of the December segment in 14 counties and the expansion of a bear hunting season into two counties.

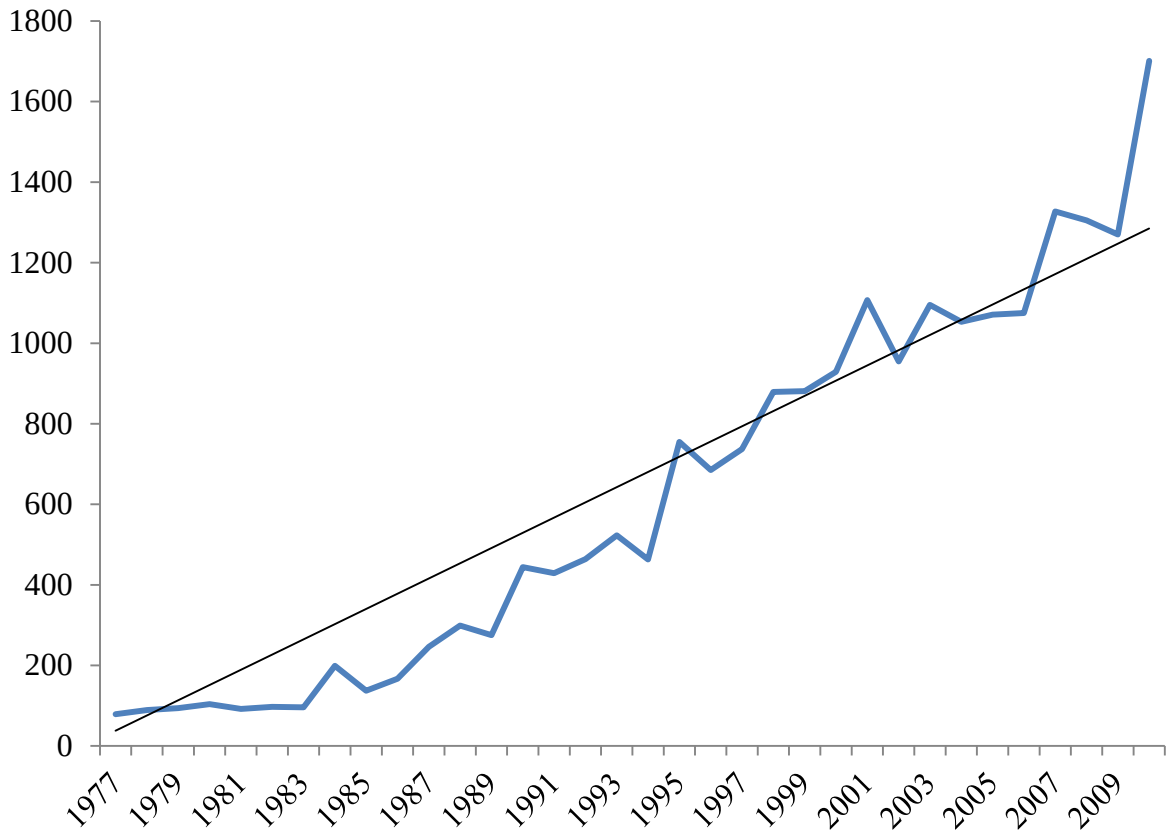

Figure 21. Reported harvest of black bears in the Coastal Bear Management Unit of North Carolina, 1976 through 2010.

Harvest data are often the primary source of information that state wildlife managers have to monitor their state's bear population. In collaboration with research cooperators, some states have developed indices based on harvest data to measure harvest pressure and assess its impacts on their bear population(s). In Virginia, Program RISKMAN models based on nine years of mark-recapture data showed that Virginia's western bear population could remain stable and provide a sustainable harvest if 28% of the bear population was harvested and females comprised up to 47% of the harvest (Bridges 2005). Based on population reconstruction and the registered harvest, 16% (5-year average) of the CBMU bear population is harvested on an annual basis and females comprise 40% of the registered harvest (5-year average; Figure 22). If we apply Virginia's criteria to North Carolina's CBMU bear population, our harvest has not yet reached levels in bear population growth would stop. In accordance with Statewide Objective #3, the NCWRC will continue to use existing techniques and investigate new techniques, including those described earlier, to determine if our harvest data can provide sufficient information on current and future bear population trends.

The mean age of harvested female bears sampled in the CBMU peaked in 2003 and showed a decline until 2007, when the mean age increased; since 2007 the mean age of

female bears sampled has fluctuated. Since 1998, there has been a slight decline in the mean age of harvested male bears sampled (Figure 23).

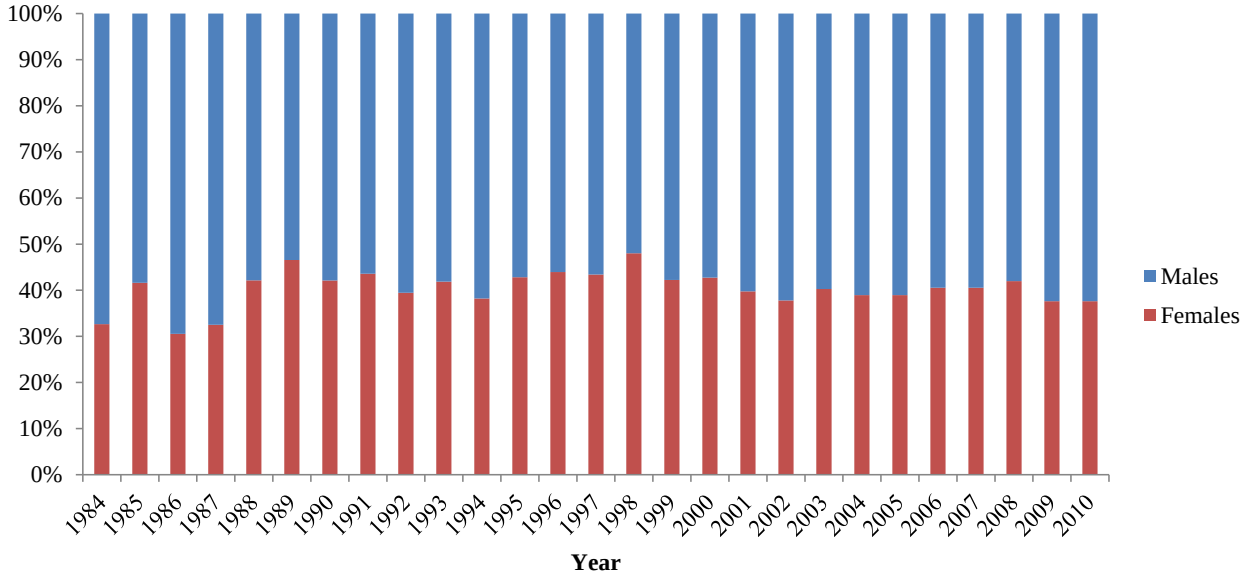

Figure 22. Sex ratio of reported black bear harvest in the Coastal Bear Management Unit in North Carolina, 1984 through 2010.

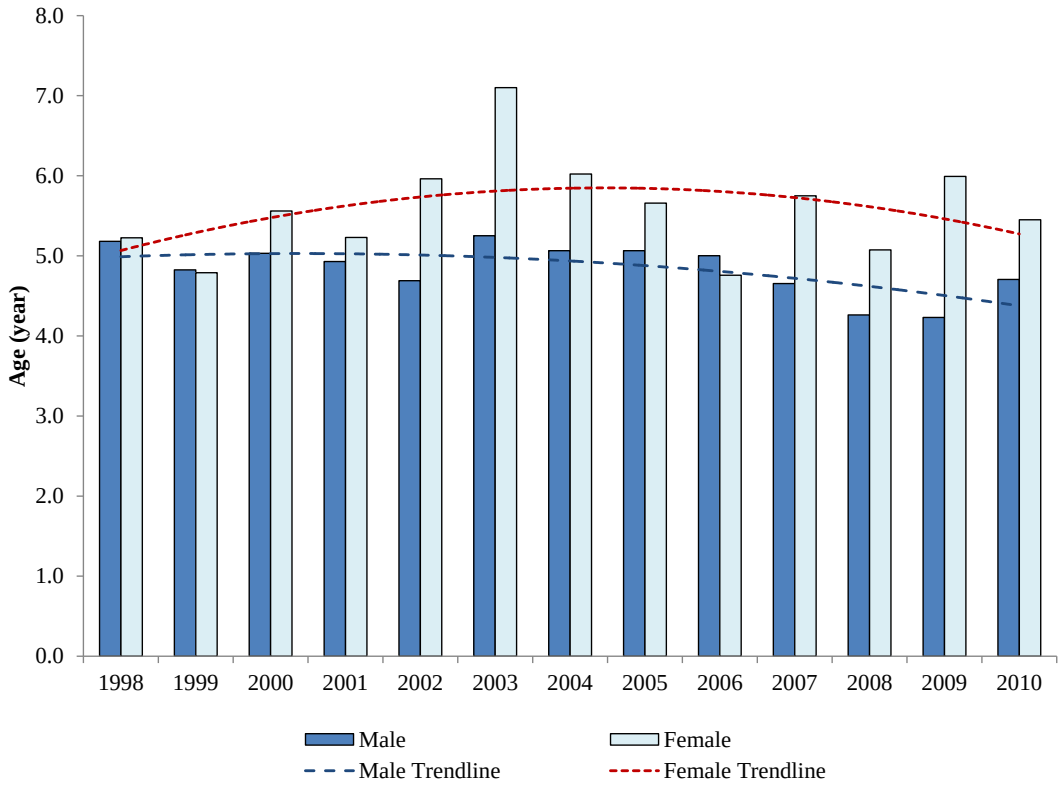

Figure 23. Average age of male and female bears sampled during bear hunting seasons in the Coastal Bear Management Unit from 1998 through 2010.

The CBMU has gained a nationwide reputation for producing "trophy" bears (>500 lbs.) and all but one of the estimated 18 bear outfitters in North Carolina conducts their guide activities in the CBMU. Seventy percent of coastal bear hunters were satisfied with the size of individual bears (Palmer 2009). Average weight of both male and female bears sampled during the hunting season has remained fairly stable (Figure 24).

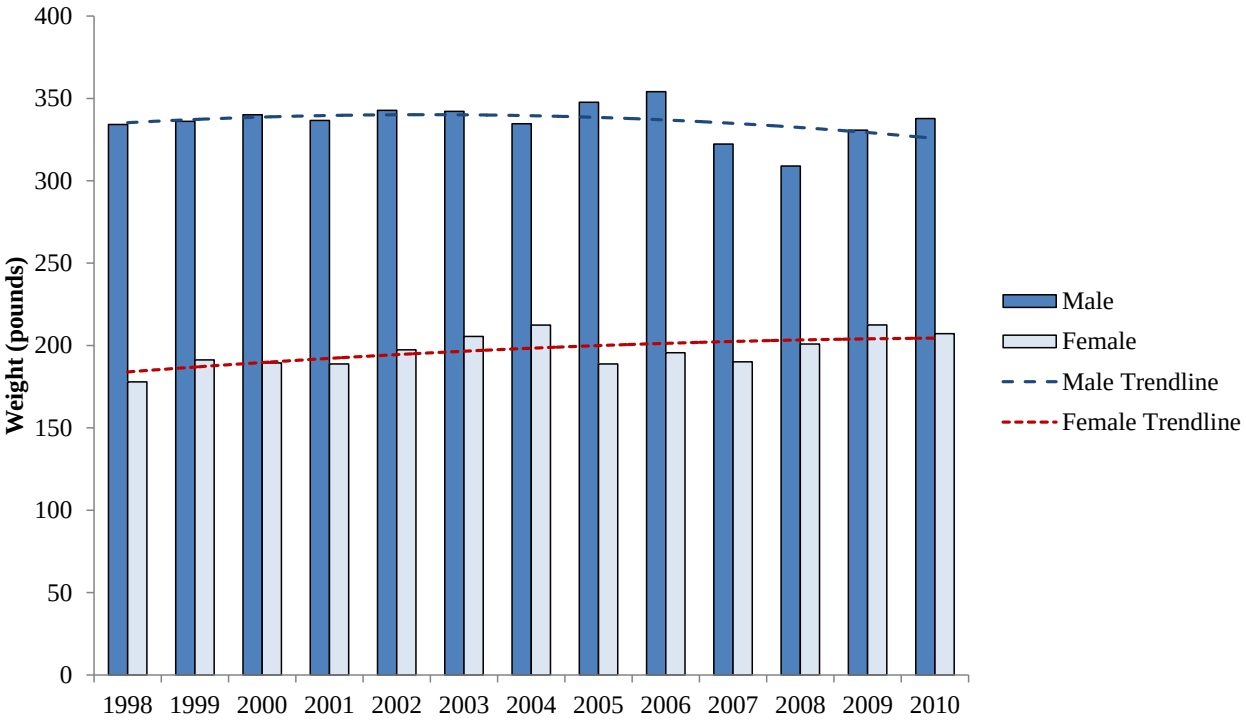

Figure 24. Average weight (lbs.) of male and female bears sampled during the bear hunting seasons in the Coastal Bear Management Unit from 1998 through 2010.

Hunting season frameworks based on sound biological principles promote a diverse age structure, and as a result, provides hunters with the opportunity to harvest older, and larger, black bears. Current season structures are maintaining the harvest of trophy bears, but the number of bears harvested <500 lbs. has increased at a higher rate than that of trophy bears (Figure 25). Male bears typically must reach 6-10 years of age to approach trophy status and the percentage of these bears in the harvest has slightly declined in recent years (Figure 26).

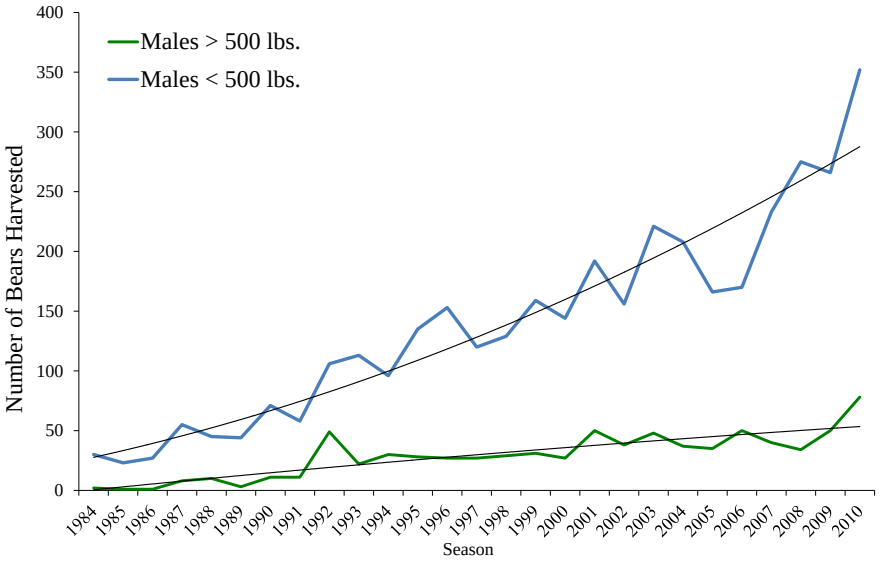

Figure 25. Number of harvested male bears sampled from the Coastal Bear Management Unit that weighed under 500 pounds or ≥ 500 pounds.

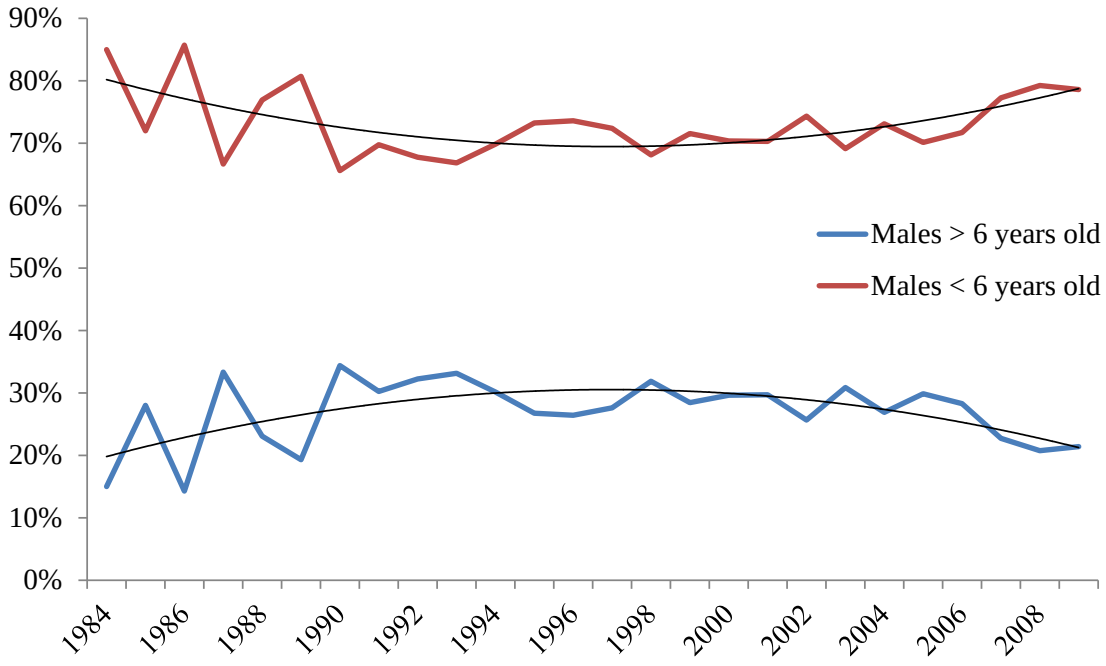

Figure 26. Percent of harvested male bears sampled from the Coastal Bear Management Unit that were under six-years old or ≥ six-years old from 1984 through 2010.

Hunting on Game Lands: Though most of the CBMU bear harvest occurs on private lands, there is a slightly increasing trend in harvest that occurs on game lands (Figure 27). Over the past eleven years, approximately 5% of bears have been harvested on game lands in the CBMU, with a majority (65%) of the game land harvest occurring on five game lands: Croaton National Forest (23%), Buckridge (14%), Bladen Lakes State Forest (11%), Alligator River (10%), and Van Swamp (7%). With human populations projected to increase in the CBMU and the increasing cost of leasing private lands, NCWRC game lands will become increasingly important in providing bear hunting opportunities.

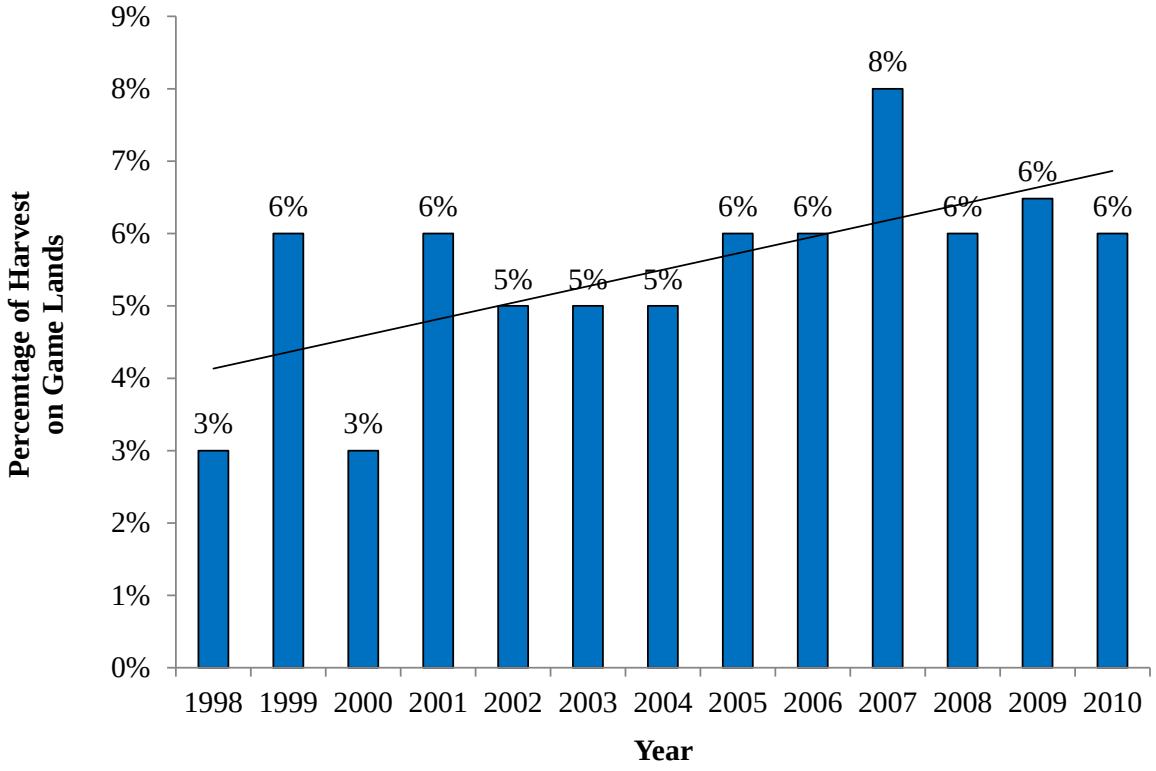

Figure 27. Percentage of registered bear harvest that occurs on NCWRC Game Lands in the Coastal Bear Management Unit of North Carolina, 1998 through 2010.

CBMU OBJECTIVES

Objective #1. Maintain the coastal bear population at current levels.

Background: Bear populations in the huntable areas of the CBMU are estimated to be approximately 9,000 bears and are no longer increasing at the rate that was observed in the 1990's (Figure 16). Current season structures seem to be resulting in stable bear populations in some areas of the CBMU. Bear hunters seemed satisfied with current NCWRC management; in a 2005 survey, 52% of bear hunters were satisfied with the abundance of bears in the CBMU, while 27% of bear hunters felt that the bear population was too low in certain regions within the CBMU (Palmer 2009).

Expansion of the bear population is occurring on the western fringe of the CBMU, as evidenced by the increase in occupied bear range that occurred from 2001 through 2010 (Figure 17). All counties in the CBMU are now partially or completely occupied by bears. With human-bear interactions expected to increase in western CBMU and in the PBMU, hunting should be the primary management tool used to manage the bear population. A majority (72%) of the residents in the CBMU support regulated bear hunting in their area if wildlife managers determined it was necessary (Palmer 2006).

The CBMU bear population has recovered from historically low numbers, but with increased development and recent changes in bear hunting methods, NCWRC should continue to closely monitor the bear population and maintain current harvest management strategies to retain the population at current biological and sociological levels.

Strategies:

1) Maintain 2012-2013 bear season structure in all CBMU counties (Figure 20), but every three years (e.g., 2012, 2015, 2018, 2021) NCWRC biological staff will evaluate the CBMU trends in the following: age at harvest, harvest sex ratios, harvest level, human-bear interactions, population estimation trend and other population indices. If changes are detected, NCWRC biological staff should consider recommending changes to the following as appropriate:
    a) Simplify bear seasons when consistent with the CBMU's bear population objective.
    b) Number of days in the bear hunting season.
    c) Timing of the bear hunting season.
    d) Permit hunt opportunities on designated bear sanctuaries.
    e) New and/or proven harvest techniques.

2) Maintain permit hunts on Dare County Bombing Range and Holly Shelter Game Land.

3) Increase bear hunting opportunities in certain regions of the CBMU after reviewing proposals through a structured decision making process (Statewide Objective #2, Strategy #6).

Objective #2. Use lethal and non-lethal techniques to address human-bear interactions.

Background: The CBMU accounts for a relatively small proportion (9% in 2009) of the state's reported human-bear interactions considering approximately two-thirds of North Carolina's bears and bear range occur in this unit. However, in a 2009 survey, 23% of corn producers and 20% of peanut producers reported damage due to bears (NCAGR 2009). One explanation for the low number of agricultural conflicts reported to the NCWRC is that most producers seek technical assistance from the cooperative extension office in their area.

Based on a 2005 survey conducted by the NCWRC, the CBMU's public support for the use of lethal and non-lethal techniques to resolve bear conflicts depended on the severity of the conflict (Palmer 2006). Education was the preferred option (93%) for addressing bears observed in

residential areas, while a majority (73%) disapproved in the destruction of the bear. However, if a person was injured by a bear, a majority (62%) supported the lethal removal of the bear. The majority (77%) of the public in the CBMU supported the use of regulated hunting for bear population management, if wildlife managers determined it was necessary.

Strategies:

1) Increase assistance to CBMU Wildlife District Biologists in dealing with human-bear interactions.

2) Educate agricultural producers and cooperative extension offices on the benefits of allowing hunting on or leasing property for bear hunting opportunities.

3) Educate agricultural producers and cooperative extension offices on the assistance available from NCWRC District Biologists and Wildlife Enforcement Officers in advising on lethal (i.e., depredation permits) and non-lethal techniques available to resolve conflicts.

4) Educate county and municipal law enforcement officers on the "Guidelines for Local Law Enforcement for Responding to Bear Observations and Conflicts with People." (Appendix F)

5) Encourage municipalities and subdivisions to adopt ordinances requiring bear-proof garbage containers and dumpsters.

6) Develop model ordinances for municipalities and subdivisions that prohibit the feeding of bears.

7) Encourage municipalities and subdivisions to adopt ordinances prohibiting the purposeful feeding of bears.

8) NCWRC staff will encourage county and municipal officials to address human-bear conflicts by allowing still hunting opportunities on areas not open to hunting or conducive to hunting with dogs.

Piedmont Bear Management Unit

A. General Description: The Piedmont Bear Management Unit (PBMU) consists of 38 counites within the central region of North Carolina (Figure 28). The area contains counties in the west that may be considered "foothills" and counties in the east that may be considered "sand hill or in some respects coastal plain topography". Habitats within this unit are diverse and change significantly across the unit. Southeastern portions of this unit include sand hill/pine forest. Northeastern areas contain significant river drainages with bottomland hardwoods providing excellent black bear habitat and potential major travel corridors for bear movement into this area from current occupied bear range. The western portion of this area consists of rolling foothills with mixed hardwoods and rural agriculture lands mostly in hay or pasture lands.

Within the PBMU, there are several counties that are heavily urbanized (pink counties in Figure 26). Encompassing what is commonly referred to as the Piedmont Crescent, this unit includes counties along the I-85/I-40 corridor. The unit consists of mostly urban or highly suburbanized land use patterns, high human population densities, and major human travel corridors. The unit contains most of the major metropolitan areas of the state including Burlington, Charlotte, Durham, Greensboro, Raleigh, and Winston-Salem.

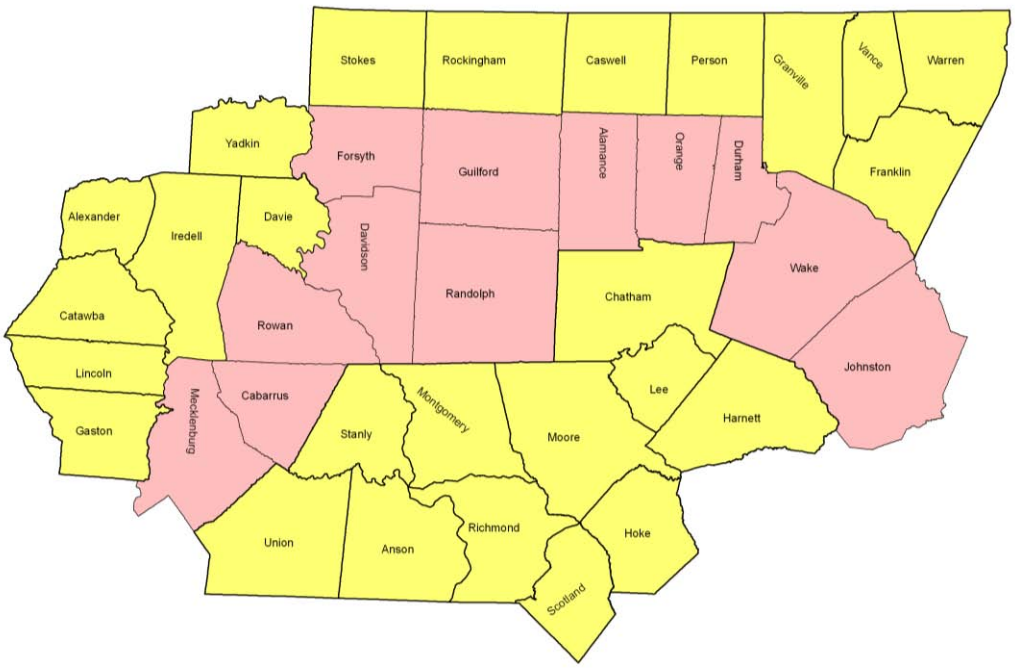

Figure 28. Piedmont Bear Management Unit with heavily urbanized counties highlighted in pink.

B. Population Trends: Although high human populations exist in the PBMU, the landscape and adaptability of black bears still render this unit capable of having bears, as evidenced by expansion of the bear population from Virginia, the MBMU, and the CBMU (Figure

29). The Cape Fear, Neuse, and Tar-Pamlico river basins are likely conduits for range expansion from the CBMU, while the Roanoke and Yadkin-PeeDee river basins likely facilitates bear disperal from Virginia and the MBMU (Figure 30). Much of the habitat in the PBMU is east of a line formed by NC Highway 11 and NC Highway 258, though habitat also exists in largly rural Richmond County and Montgomery County, where Uwharrie National Forest comprises 16% of the county's acreage.

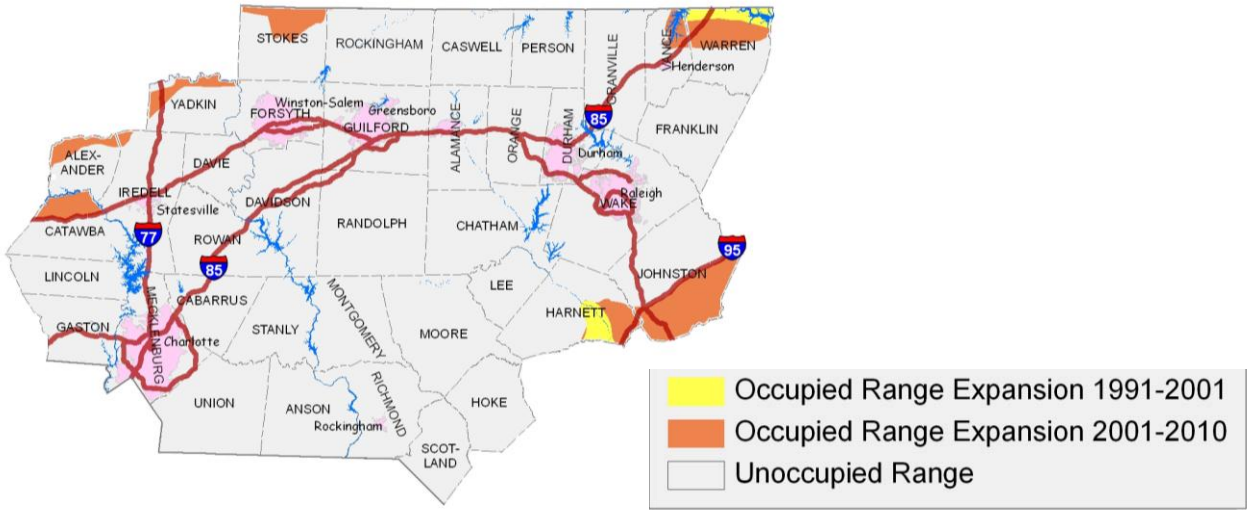

Figure 29. Occupied range of black bears in the Piedmont Bear Management Unit of North Carolina, 1971 through 2010.

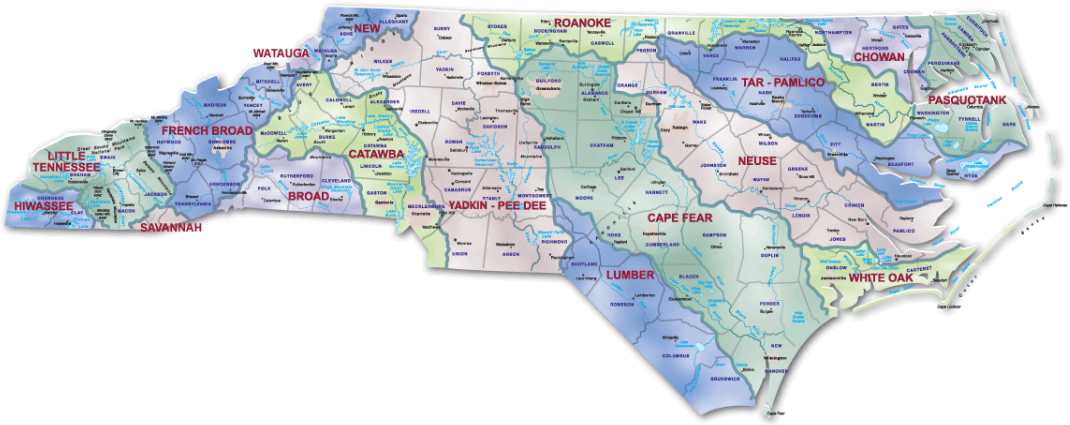

Figure 30. River basins of North Carolina.

With most of the area in the PBMU outside of currently occupied bear range (Figure 29), bear population densities are low in this unit. However, human-bear interactions in this unit are becoming more common (Figure 31), with most reports being that of young, male bears dispersing through the area.

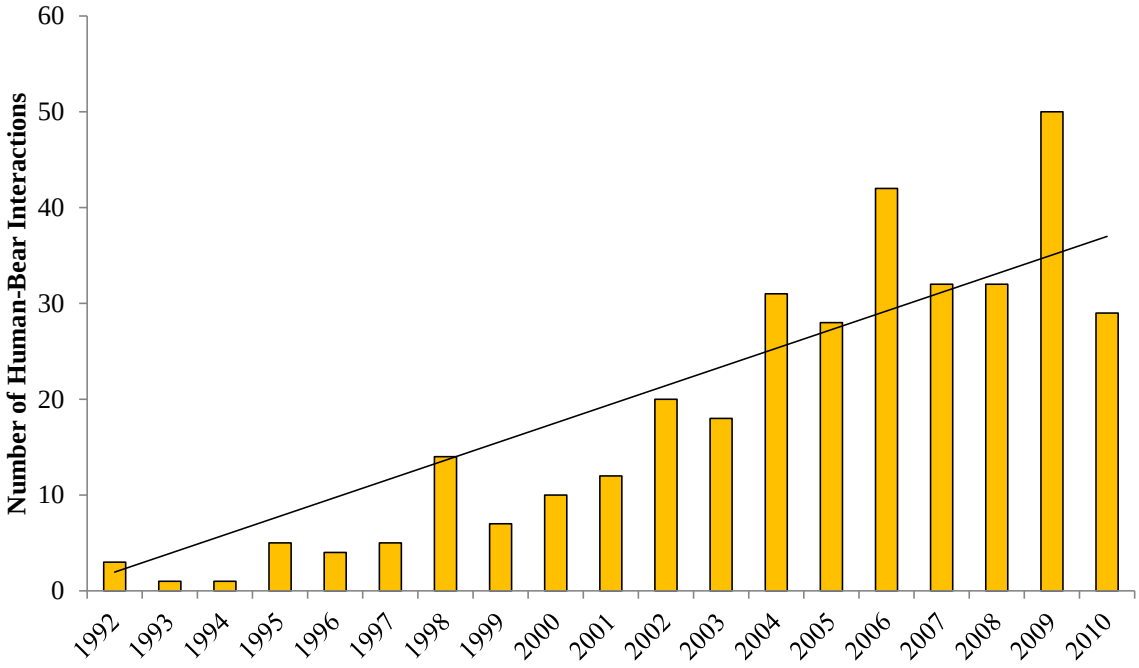

Figure 31. Annual number of reported human-bear interactions in the Piedmont Bear Management Unit of North Carolina, 1992 through 2010.

Within the PBMU, reports of bears tend to be higher in counties within or on the fringe of occupied bear habitat in North Carolina and Virginia, such as Stokes, Rockingham, Caswell, Johnston, Catawba, Gaston, Iredell and Forsyth (Figure 32). However, bear reports can be influenced by human population densities and peoples' unfamiliariaty with bears; the chances of a transient bear being observed and reported increases if it travels through a county with high human populations that are not used to observing bears, such as Wake and Durham counties.

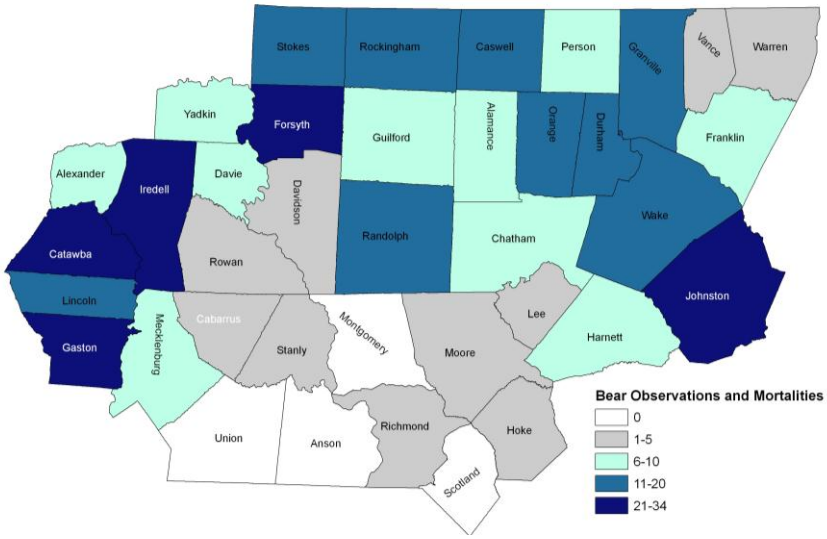

Figure 32. Total number of reported bear observations and non-harvest mortalities in the Piedmont Bear Management Unit of North Carolina, 1992 through 2010.

Expansion of bears into the PBMU is also evidenced by an increasing trend in non-harvest bear mortalities, with mortality reaching 4 bears per year since 2007 (Figure 33).

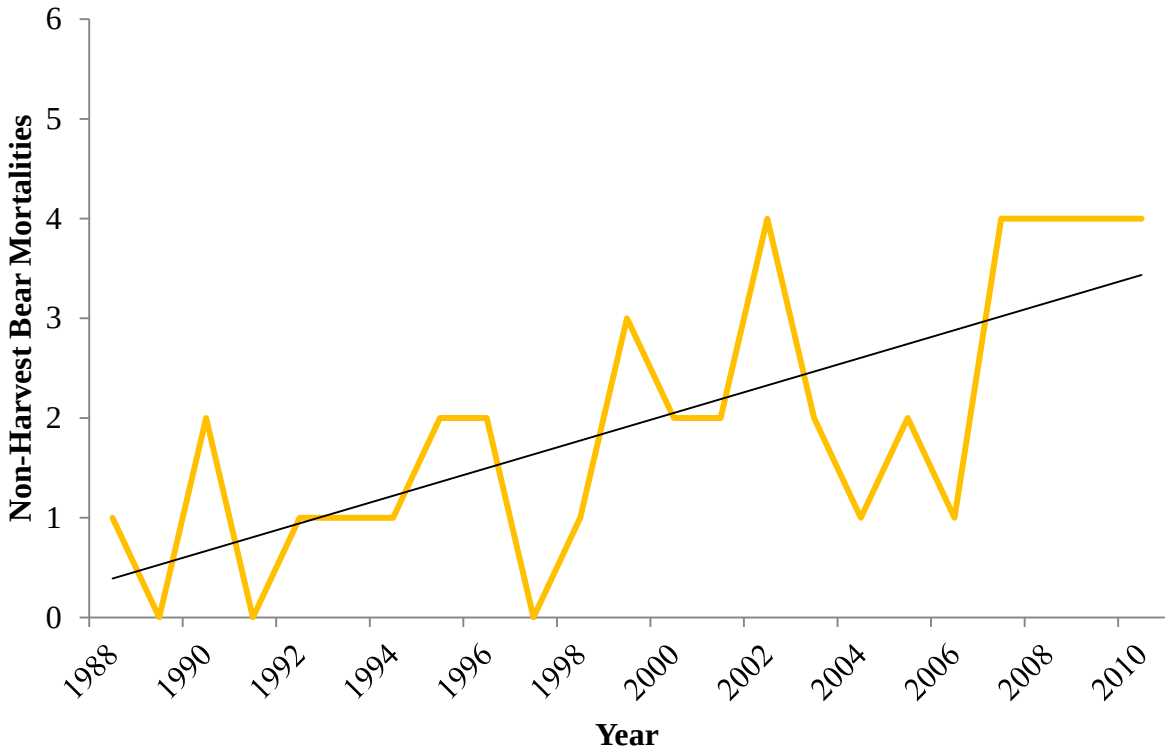

Figure 33. Annual number of reported non-harvest mortality in the Piedmont Bear Management Unit of North Carolina, 1990 through 2010.

In summary, though most of the PBMU is not occupied by an established bear population, the indices (i.e., occupied bear range, human-bear interactions, non-harvest mortality) used by NCWRC biological staff to monitor the PDMU bear population all indicate an increasing trend in bear range expansion and bear dispersal.

A. Sanctuary Status: There are no desiganted bear sanctuaries in the PBMU.

B. Current Hunting Seasons: From 2005-2011, portions of 4 counties in the western portion of the PBMU had a bear hunting season. For the 2012-13 season, 8 counties in the PBMU have a bear hunting season (Figure 34).

1) The second Monday in November for 6 days and the second Monday in December for 2 weeks in Alexander, Catawba, Harnett, Iredell, Johnson, and Vance, Warren, Yadkin. This is a 19 day season.

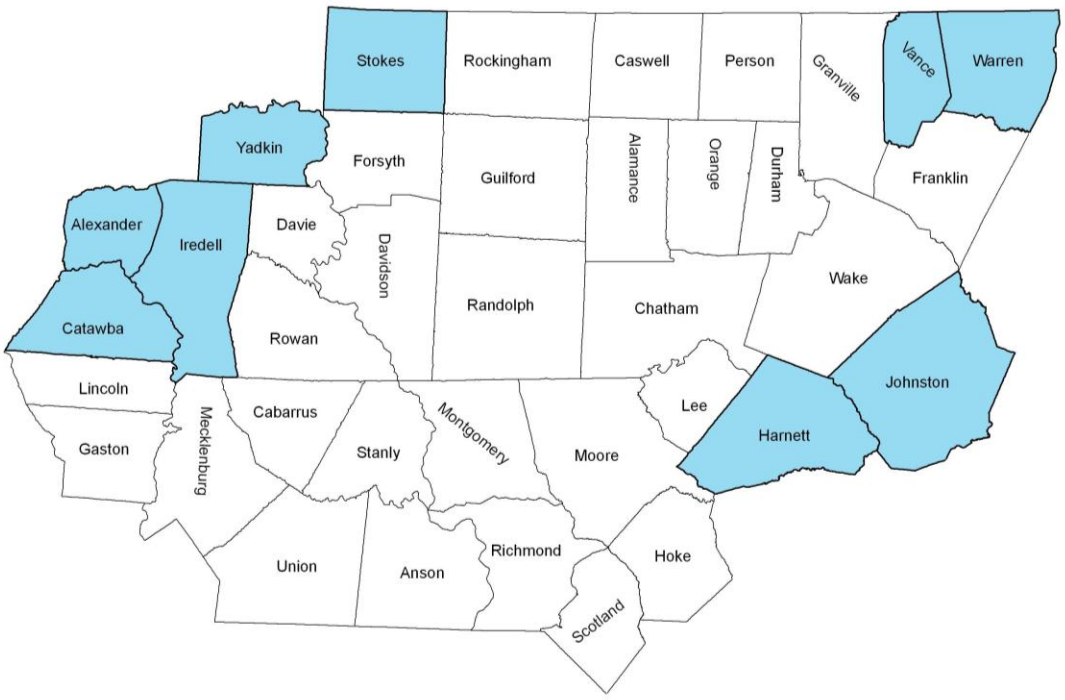

Figure 34. Counties in the Piedmont Bear Management Unit with a bear hunting season (blue) in 2012-2013.

C. Current Harvest Trends: The bear harvest has been extremely low in the PBMU (Figure 35), likely due to the low bear population densities in the western portion of the PBMU. All bears harvested in the PBMU (n=4) since 2005 have occurred in Catawba County during November and December. Still hunting is the predominant hunting method, likely due to the nature of the landscape and hunting traditions in this area. Land ownership patterns are such that hunting with hounds would be difficult in most of the PBMU.

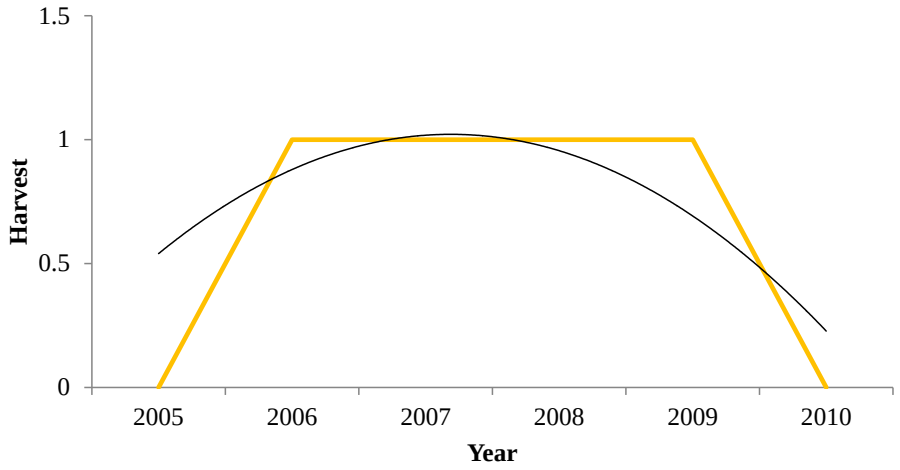

Figure 35. Annual reported black bear harvest of the Piedmont Bear Management Unit (PBMU), 2005 through 2010.

Objective #1. Manage the PBMU as a "limited bear population zone."

Background: Due to the high degree of fragmented habitat and high human populations, allowing the occupied bear range to expand into most areas of the PBMU is not a preferred management strategy. Increased expansion of the bear range will lead to an increase in bear-vehicle collisions and bear-human interactions; coupled with increased urbanization, the NCWRC's ability to use hunting to manage the bear population will be difficult in the PBMU.

Based on a 2005 survey, a plurality (48%) of residents in the PBMU indicated they wanted no change in the bear population, while 9% prefered a decrease (Palmer 2006). PBMU residents also indicated that they either preferred no bears exist in the unit (29%) or that they would prefer only occasional sightings of bears in the rural areas (48%). Support for having bears in the PBMU is not as high as observed in the other two bear mangement units. Most residents in the PBMU (72%) supported regulated bear hunting in the area if managers determine it is necessary. Due to the fragmented land ownwership patterns and low bear densities, most of the bear harvest that occurs in the PBMU will likely be opportunistic to deer hunting.

Strategies:

1) Establish a bear hunting season in all PBMU counties.

2) Every three years (e.g. 2012, 2015, 2018, 2021) evaluate trends in the and consider recommending changes in the following as appropriate:

    a. Number of days in the bear hunting season.
    b. Timing of the bear hunting season.
    c. Bag limit
    d. New and/or proven harvest techniques.

Objective #2. Use lethal and non-lethal techniques to address human-bear interactions.

Background: In 2005, few PBMU residents (2%) indicated that they had previously had an interaction with a bear (Palmer 2006). However, the NCWRC monitoring activities indicates that bear range is expanding into the PBMU and reports of human-bear interactions are increasing (Figure 31). Interaction ranged from observing a bear to having a bear damage agricultural crops. However, the majority of experiences involved seeing a bear or seeing evidence that a bear had been near their home.

The PBMU's public support for the use of lethal and non-lethal techniques to resolve bear conflicts depended on the severity of the conflict (Palmer 2006). Education was the preferred option (90%) for addressing bears observed in residential areas, while a majority (72%) disapproved in the destruction of the bear. However, if a person was injured by a bear, a majority (60%) supported the lethal removal of the bear. The majority (72%) of the public in the PBMU supported the use of regulated hunting for bear population management, if wildlife managers determined it was necessary.

Strategies:

1) Educate county and municipal law enforcement officers on the "Guidelines for Local Law Enforcement for Responding to Bear Observations and Conflicts with People." (Appendix F)

2) Encourage municipalities and subdivisions to adopt ordinances requiring bear-proof garbage containers and dumpsters.

3) Develop model ordinances for municipalities and subdivisions that prohibit the feeding of bears.

4) Encourage municipalities and subdivisions to adopt ordinances prohibiting the purposeful feeding of bears and other wildlife species.

5) Educate agricultural producers and cooperative extension offices on the benefits of allowing hunting or leasing property for bear hunting opportunities.

6) Educate agricultural producers and cooperative extension offices on the assistance available from NCWRC District Biologists and Wildlife Enforcement Officers in advising on lethal (i.e. depredation permits) and non-lethal techniques available to resolve conflicts.

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Appendices

Appendix A

HISTORY OF BLACK BEARS IN NORTH CAROLINA

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Life History of Black Bears

A. Physical Characteristics: In North Carolina, the black bear is usually black with a brown muzzle. Occasionally, a black bear will have a white patch on its chest, also called a "chest blaze." In other areas of North America, it is more common for black bears to be cinnamon in color or a more rare white. The average length of a black bear is five to six feet and the average height is two to three feet when standing on all fours. On average, adult females weigh between 100 to 300 pounds and adult males weigh between 200 to 700 pounds. The current world record black bear was harvested in Craven County in 1998 and weighed 880 pounds.

B. Habitat Requirements and Food Habits: North Carolina black bears primarily inhabit the Mountain and Coastal regions of the state and are uncommon in the heavily-developed Piedmont region.

The essential habitat components needed by bears are access to food, water, escape cover, den sites, travel corridors and enough space to exist. Bears are commonly associated with forested cover and make use of a variety of forest habitat types to meet all their seasonal needs. Despite expanding human populations and land-use changes, bears have persisted due to their adaptability to a variety of habitat types.

Optimal habitat conditions should be diverse, so that the habitat provides mast producing trees, early successional habitats (i.e., young forests created and maintained by timber/land management practices or other natural perturbations), edges of various successional stages, streamside management zones, and wildlife clearings. Agricultural crops, commonly found in the coastal plain region of North Carolina, can enhance habitat suitability for bears.

Fragmentation of bear habitat can have implications on population viability since fragmentation can restrict bear movements resulting in smaller populations that are more vulnerable to genetic isolation and mortality. The minimum area needed for populations of black bears will differ based on several factors, such as habitat quality and population management objectives (Rudis and Tansey 1995). Based on known and apparently viable bear populations in the Southeast, researchers have suggested that 79,000 acres of forested wetlands and 198,000 acres of forested uplands are needed as the minimum areas to support a black bear population. Another study in eastern North Carolina suggested 99,000 acres were needed in pocosin habitat (Zeveloff 1983).

Black bears must fulfill their nutritional needs for the entire year in 5-8 months for normal body maintenance, storage of body fat for the winter, and production and maintenance of cubs by females (Beeman and Pelton 1980). Researchers have observed that bears in areas that experience mast crop failures suffer from lower reproductive rates (Rogers 1987), decreased yearling survival, and disperse outside their home range (Jonkel and Cowan 1971, Reynolds and Beecham 1980, Garshelis and Pelton 1981, Rogers 1987, Smith and Pelton 1990). Therefore, feeding is one of the most important activities bears participate in and is reflected in the areas they use (Pelchat and Ruff 1986).

1) Mountains: Black bears in the Southern Appalachian Mountains of western North Carolina survive in a predominantly oak-hickory and mixed mesophytic forest. These

forest communities support important food plants such as blueberry (Vaccinium sp.), huckleberry (Gaylussacia sp.), and raspberry and blackberry (Rubus sp.). Evergreen thickets of laurel (Kalmia latifolia) and rhododendron (Rhododdendron sp.) provide dense escape cover.

Bear habitat use in the mountains shifts as food crops become available. In the spring, as bear emerge from dens, important foods such as bear corn (conopholes spp.), grasses, clovers, insects, and carrion are utilized. As fruit maturation continues into the summer, bear consume large volumes of blueberry, huckleberry, and other soft mast species. In fall, bears shift towards the hard mast like acorns and hickorynuts. The hard mast produced by a variety of oaks is heavily utilized by bears. However, hard mast is highly variable and depends upon weather conditions such as last frost and rain during acorn and nut development. During years of poor hard mast production, bears have been documented moving significant distances in search of this preferred food. In addition, bears seek soft mast species such as grapes, cherries, pokeberries, and dogwood berries, and all these species undergo fluctuations from year to year and area to area.

2) Coastal Plain: In the coastal plain of our state, habitat use is diverse and shifts with the seasons. Important habitat communities include Carolina Bays and pocosins, gum-cypress swamps, pine flatwoods, agricultural areas, and brackish marsh edges.

Carolina Bays and pocosins are an extremely important habitat component of coastal bears (Hamilton 1978, Lombardo 1993, Jones and Pelton 2003). This habitat type provides escape cover and a variety of fruits that make up a large volume of the bear's diet (Hamilton 1978). Important foods that are common in these habitats include gallberry (*Ilex coriacea*), blueberry, huckleberry, blackberries, greenbrier (*Smilax sp*.), devil's walking stick (*Aralia spinosa)*and horse sugar (*Symplocus tinctoria*) (Maddrey 1995, Hamilton 1978). Fruits are used extensively in late summer (Maddrey 1995).

Utilization of agricultural areas increases significantly as crops mature. In the spring, bear forage on green winter wheat (*Triticum aestivum*) eating the green foliage early after den emergence in April and shifting to the grain heads as they develop in May and June. Bears will continue eating wheat heads until they are removed by harvest. Shortly after wheat harvest, bears direct their attention to corn (*Zea mays*) fields. Beginning in late June to mid-July, corn begins to enter the milk stage, and the diet of bears in agricultural areas is dominated by corn (Maddrey 1995). Although corn is consumed until it is harvested and gleamed from the field, the heaviest usage occurs during the milk stage (Maddrey 1995). In late fall, as black gum fruit declines, bears shift their diets to soybeans (*Glycine max*) (Maddrey 1995). This high protein food is easily obtained and widely utilized by bears.

As the season progresses into the fall, bears increase their use of black gum-cypress swamps. This habitat type provided both food and refuge. Black gum (*Nyssa sylvativa)* and tupelo gum (*Nyssa aquatica)* trees provide fruits that are heavily utilized by bears (Hamilton 1978, Hellgren 1988). In addition to providing important fall foods, the typically large swampy characteristics of this vegetative community provided excellent

refuge from man and hounds. Escape habitat may be one of the most critical habitat components for black bears on the coast (Jones et al. 2003).

C. Home Range and Movements: Burt (1943) provided one of the first descriptions of home range, which is still widely cited by researchers; home range is "that area traversed by the individual in its normal activities of food gathering, mating, and caring for young. Occasional sallies outside the area, perhaps exploratory in nature, should not be considered as in part of the home range."

1) Factors influencing bear movements: Several characteristics can affect the size and shape of a bear's home range. These include sex, age (Reynolds and Beecham 1980, Garshelis and Pelton 1981), kinship (Jonkel and Cowan 1971, Garshelis and Pelton 1981), social behavior (Jonkel and Cowan 1971, Lindzey and Meslow 1977), reproductive status (Hellgren and Vaughan 1989), and food availability and distribution (Jonkel and Cowan 1971, Young and Ruff 1982, Smith and Pelton 1990). Individuals foraging in habitats containing large amounts of food likely have an advantage over those foraging in habitats containing smaller amounts of food because they can reduce the amount of energy they expend in searching for food. Smith and Pelton (1990) stated that home ranges could be indicative of habitat quality and that comparative analyses of the sizes of black bear home ranges in different populations would be useful in evaluating habitats.

   Concentrations of hard mast, soft mast, and/or artificial food resources appear to stimulate seasonal change in home range movements. Responses to hard mast failures have resulted in black bears exhibiting increased fall movements and home range expansions (Beeman 1975, Amstrup and Beechum 1976, Garshelis and Pelton 1981, Garris 1983, Pelchat and Ruff 1986, Rogers 1987). Powell et al. (1997) found that both male and female black bears responded to yearly variations in productivity of hard mast in fall. In years when hard mast abundance was great, male and female annual home range size, summer home range size, and fall home range size were smaller than in years when hard mast abundance was low. When mast abundance was low, bears in Tennessee, Idaho, Alberta, and North Carolina increased their movements and expanded their home ranges (Beeman 1975, Amstrup and Beechum 1976, Garshelis and Pelton 1981, Garris 1983, Pelchat and Ruff 1986, Powell et al. 1997).

2) Dispersal: When the female's offspring are just over a year old, they will separate from their mother sometime after den emergence (April through early June) and disperse until they establish a home range (Rogers 1987, Schwartz and Franzmann 1992). Purported advantages to dispersing include reduction of feeding competition with female kin, reduced mate competition with male kin, and inbreeding avoidance (Rogers 1987). However, these advantages are more applicable to male bears. It appears that female yearlings and subadults do not travel as extensively as males after family breakup, and in fact, often they don't disperse (Elowe and Dodge 1989, White et al. 2000). Rather they establish their home range adjacent to or within their mother's home range (Alt 1978, Rogers 1987, Schwartz and Franzmann 1992, Lee 2003).

3) Home Range Size: Numerous studies in North America and in North Carolina consistently show that annual home ranges of males are larger than home ranges of females, (Beeman 1975, Amstrup and Beecham 1976, Lindzey and Meslow 1977, Reynolds and Beecham 1980, Alt et al. 1980, Garshelis and Pelton 1981, Hugie 1982, Young and Ruff 1982, Carr 1983, Hellgren 1988, Smith and Pelton 1990, Fuller 1993, VanManen 1994). Male home range size may be function of larger male body size (Harestad and Bunnell 1979, Quigley 1982), breeding behavior (Rogers 1977, Herrero and Hamer 1977), and site fidelity exhibited by females (i.e. females stay in one area, thus males must travel to encounter them; Clark 1991). Male bears likely travel more extensively in search of food to meet the metabolic needs necessary to maintain their larger body size. Other factors affecting range size of male and female bears may be differences in their strategy for maximizing individual fitness. The reproductive success of males likely depends on their ability to breed with several females (Orians 1969, Rogers 1987, Powell et al. 1997). Hence, it is advantageous for promiscuous males to be mobile, less attached to specific areas, and occupy large areas that overlap with ranges of many females. The reproductive success of females is not as likely to improve by breeding with many males, so females could maximize fitness through detailed knowledge of resource abundance, phenology, and location within their home range (White 1996). Thus, they are less mobile, occupying areas only extensive enough to ensure adequate food for self-maintenance and the development of young (Amstrup and Beecham 1976).

   Several studies have been conducted in North Carolina since the 1970's (Table 1). Based on these studies, the average home range is 13 km^2 for coastal females and 110 km^2 for coastal males; 14 km^2 for mountain females and 47 km^2 for mountain males.

Table 1. Home range size (km^2) of male and female black bears in North Carolina.

Location	Source	Year	Male	Female
Coastal Region Dare County	Hardy	1974	175.0	11.0
Coastal Region Bladen County	Hamilton	1978	91.0	8.0
Coastal Region Great Dismal NWR	Hellgren and Vaughan	1989	111.7	27.0
Coastal Region CampLejeune	Lombardo	1993	60.5	20.4
Coastal Region Neuse Pamlico Peninsula	Jones	1996	--	8.6
Coastal Region Alligator River NWR	Allen	1999	N/A	N/A
Coastal Region Washington County	McCollister and van Manen	2001	--	2.7 - 3.9
Coastal Region Big Pocosin	Jones and Pelton	2003	--	11.6
Coastal Region Gum Swamp	Jones and Pelton	2003	--	6.6
Coastal Region Hyde County	Langer	2006	18.8	5.6
Coastal Region Washington County	McCollister and van Manen	2007	--	7.4 - 8.0
Mountain Region Great Smoky Mtn. NP	Garshelis and Pelton	1981	42.0	15.0
Mountain Region Pisgah National Forest	Warburton	1983	61.0	16.9
Mountain Region Pisgah National Forest	Beringer	1986	--	14.8
Mountain Region Pisgah National Forest	Brody and Pelton	1989	18.7 – 28.3	11.4 – 12.7
Mountain Region Pisgah National Forest	Seibert	1989	39.0	12.0
Mountain Region Pisgah National Forest	Reagan	1991	--	9.1

D. Denning Behavior: Bears utilize various types of structures for dens in North Carolina. The preferred den consists of a suitable cavity inside a standing tree, whether it is live or a snag. Research indicates that tree dens are more efficient at thermoregulation; in one study, tree

dens resulted in 15.5% savings in energy expended for body maintenance compared to ground dens (Lentz et al. 1983). Tree dens provides insulation and increased protection from weather elements and disturbances versus ground dens. Bears will also utilize a hollow log on the ground, the cavity formed in the ground as the result of a wind-blown tree, a dug-out ground cavity, a natural cavity under a rock outcropping or simply a bed on top of the ground in a thicket.

Bear usually begin to enter their winter dens in mid-December and emerge in late March or early April. Bears in eastern North Carolina entered dens as early as November and as late as January. Weather and food availability can affect timing of den entrance and den emergence. Females typically hibernate longer than males. Females with cubs emerge from their dens last in spring; emergence is dependent on weather and cub development. A female bear will emerge from her den once her cubs are capable of leaving the den and following her.

In its simplest definition, hibernation is a specialized reduction in metabolism brought about by low food availability and/or low temperatures. Several body changes occur to bears during hibernation. These include lower heart rates, constriction of blood vessels, suppressed shivering, reduced breathing, lower oxygen consumption, and lower body temperature. Bears drop their body temperatures by 10-15 degrees in most cases. In addition, bears do not consume food, defecate or urinate during hibernation. During hibernation bears are lethargic, but can be easily disturbed and are in full charge of their faculties within seconds of the disturbance.

E. Reproduction: Black bears in North Carolina attain sexual maturity at age 2.5 years old and over half breed at this age (Collins 1973, Carlock, et al. 1983, Powell et al. 1996). Mating occurs from June through early August, peaking in early July (Eiler et al. 1989). Implantation of the blastocyst (i.e. the fertilized egg) is delayed until late fall. Once the blastocyst implants, the true gestation period begins. The overall gestation period for black bears is 45-60 days and cubs are born from January through mid-Feburary. An average of two to three blind and hairless cubs, weighing less than one pound, are born in winter dens. In North Carolina and throughout North America, younger females (3- and 4-year old) have smaller litter sizes than older females ($\geq$ 5 years old; Elowe and Dodge 1989, Kordek and Lindzay 1980, Kolenosky 1990, Noyce and Garshelis 1994, Costello et al. 2003, Bridges 2005).

Cubs stay with their mother for their first two winters. When the female's offspring are just over a year old, they will separate from their mother sometime after den emergence (Rogers 1987, Schwartz and Franzmann 1992, Lee et al. 2003). Once the female's offspring have separated, the female bear will mate again that summer (Brown 1996). Females mate every other year, resulting in low reproductive potential when compared to other animals.

F. Mortality: Adult black bears have very low natural mortality rates, due to the fact they have no natural predators and they seem relatively unaffected by disease and parasites (Brown 1993). Causes of mortality include legal harvest, poaching, vehicle collisions, depredation permit kills, starvation, and intra-specific predation. Of these, human-induced mortality is the greatest source of black bear mortality in North Carolina (Figure 1). Various factors increase

a bear's vulnerability to mortality, such as increased access (i.e. roads) into bear habitats and increased movements by dispersing bears or bears in search of food sources.

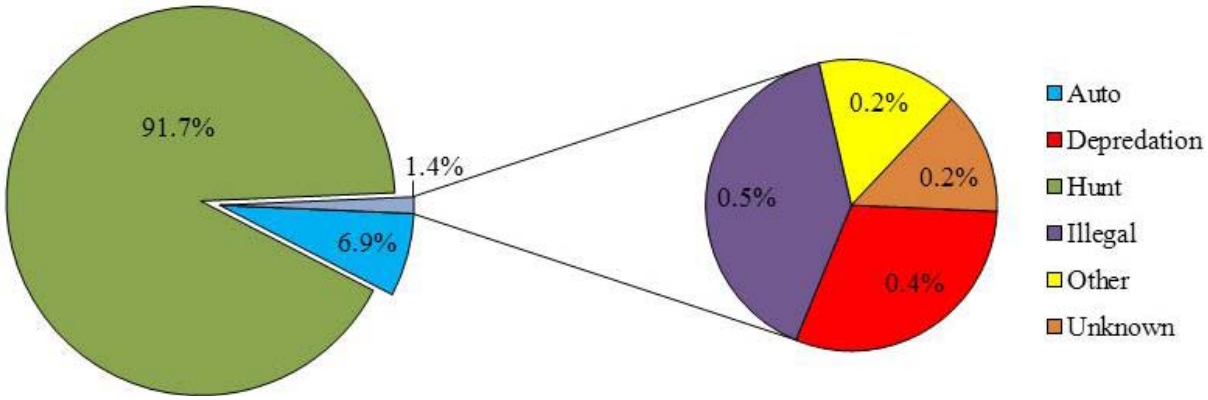


Figure 1. Causes of mortality among bears sampled by NCWRC from 1969 through 2010.

There have been few studies examining survivorship rates on black bears in North Carolina and the Southeast. Hellgren and Vaughan (1989) estimated annual survival rates of 0.87 for females (>2.5 years old) and 0.59 for males (>2.5 years old) in the Great Dismal Swamp. From 1981 through 2007, survival rates of female bears in the Pisgah Bear Sanctuary in the southern Appalachian mountains of western North Carolina ranged from 0.59 to 0.83 (Brongo et al. 2005). Powell et al. (1996) calculated the proportion of radio-tagged bears surviving from each age to the next and found survivorship ranging from 0.60 to 0.75 for bears in the Pisgah Bear Sanctuary and adjacent huntable areas (Table 2).

Table 2. Mean survivorship for bears in the Pisgah Bear Sanctuary and adjacent areas (1981-1990).

Bear age (years)	Survivorship (SE)	n
1	0.75 (±0.14)	12
2	0.73 (±0.12)	15
3	0.62 (±0.12)	16
4	0.67 (±0.15)	9
5	0.60 (±0.22)	5
6+	0.73 (±0.12)	15

Overall, survivorship is higher among females than males, with males more vulnerable to mortality due to increased dispersal distances, increased movements during breeding season, and bear hunters selectivity towards male bears. Survivorship rates reported in North Carolina were similar to what has been observed in other states. Based on bear population growth that has occurred since the early 1980's, the reported survivorship rates of North Carolina bears appear to allow a growing bear population.

1. History of the Black Bear Program (BBP)

A. Historical Records: Black bears were abundant in North Carolina when Europeans first arrived (Timberlake 1765, Arthur 1914). According to accounts from early historical records, native Americans and European settlers hunted bears for food, clothing, and medicine (Bartram 1998). John Lawson traveled into the piedmont area of North Carolina in 1708 and reported that "Bear-hunting is a great sport in America, both with the English and the Indians" (Lawson 1967). In 1761, Colonel Henry Timberlake accompanied a delegation of Cherokees into the area of eastern Tennessee and western North Carolina and reported the presence of many bears (Timberlake 1765). William Bartram reported that "The bears are yet too numerous" when he explored areas of western North Carolina in 1774 (Bartram 1998). Bears were common in many parts of North Carolina in the 18th and through much of the 19th centuries.

The European expansion and settlement of most areas of the state took its toll on bear populations in the latter part of the 19th century as forested areas were converted into agricultural croplands (Carlock et al. 1983, Pelton & Van Manen 1997). Settlers considered bears to be a threat to livestock and killing was intensive and unregulated. Legendary bear hunters, such as "Big Tom" Wilson, his father Tom Wilson, and others are reported to have killed hundreds of bears during their lifetimes in many areas of North Carolina in the 1800's and early 1900's (Aleshire 2008). Extensive logging decimated habitat in the early part of the twentieth century as vast areas of the state were clear-cut. As forests began to recover, the chestnut blight, introduced in 1925, further decimated bear habitat (Carlock et al. 1983). American chestnuts had provided a consistent and abundant food supply for bears and other wildlife throughout the fall and winter months. Half of the chestnuts were dead by 1940, and virtually all of the mature chestnut trees were dead by the early 1950's (LaFollette 1974). By the middle part of the 20th century, bears had been extirpated from the piedmont, and populations had receded into remote areas of the mountains and coastal plain.

In a 1975 symposium on endangered species in North Carolina, concern over declining bear populations was indicated by them being declared a "species of special concern" (Carlock et al. 1983). This designation was based on population estimates and occupied range (bears were considered to be rare), the potential for exploitation (illegal gall bladder trade), vulnerability to specific pressures (development and loss of habitat), and other criteria. In a re-evaluation of mammals by the North Carolina Museum of Natural History in 1987 reported that "Black Bear populations have declined in North Carolina in direct relationship to the extent of their interactions with humans" and that "we should anticipate that Black Bears and humans will not be able to share habitat extensively in North Carolina in the future" (Powell 1987). Even though conclusions about their status and concerns about the future of bears in North Carolina were expressed in 1975 and 1987, there was no formal or recognized process for officially designating the status of bears or other wildlife in North Carolina until the passage of the North Carolina Endangered Species Act in 1987 (NC General Statute Chapter 113, Article 25; Powell 1987). Black Bears have never been legally designated as endangered, threatened, or as a species of special concern under the North Carolina Endangered Species Act.

B. Early Protection: The first real protection for bear populations in North Carolina began with the establishment of the Great Smoky Mountains National Park (GSMNP) in 1936 and the creation and expansion of National Forests in North Carolina beginning in the 1930's and 1940's. The GSMNP was the first bear sanctuary in the state with over 300,000 acres of habitat (on the North Carolina side) protected from hunting, logging, settlement, and development. Although National Forests continued to be hunted, vast areas of habitat were protected, and the forests that had been decimated by extensive logging began to recover.

C. Early Regulations: Hunters were responsible for initiating regulations to protect and manage bears in North Carolina. The first statewide hunting season for bears was established in 1927, and ran from October 15 to January 1 with no bag limit. Since that time, several regulations and statutes have been enacted and/or modified, with several of these occurring in to better address bear management goals.

D. Creation of the Sanctuary System: One of the most important developments in the recovery of black bear populations in North Carolina began in 1971 with the creation of a bear sanctuary system. Twenty-eight bear sanctuaries were established to close approximately 800,000 acres of habitat to bear hunting. The idea behind the sanctuary system was to protect core areas of habitat that encompassed the relatively small home ranges of breeding females. The females would reproduce in the sanctuaries, and bear populations would increase and expand into surrounding areas. The bear sanctuary system, which North Carolina was the first North American jurisdiction to implement, has been one of the most successful and important innovations in the history of bear management in North America and has been a primary factor in the recovery of bear populations in this state.

E. 1981 Bear Management Plan: The 1981 Black Bear Management Plan contained sections addressing nine topics: 1) History, Status, and Distribution, 2) Surveys for Black Bear, 3) Research Needs, 4) Population Management, 5) Habitat Management, 6) Conservation Education, 7) Sportsman Interaction, 8) Management Policy, and 9) Management Priorities.

Many of the specific recommendations addressed in the 1981 Plan have been implemented by the NCWRC and are now considered a normal part of our statewide Black Bear Program. For example, we annually collect teeth and reproductive tracts to analyze age structure and reproductive output. The plan listed 14 management priorities (Table 3). Looking back 26 years after the completion of the 1981 plan, it is clear that many of these recommendations have been met successfully while the priority of others may have changed. In our 2007 BBMP, we build upon the concepts developed in 1981 and identify objectives appropriate for black bear management in the 21st Century.

Table 3. Management priorities identified in North Carolina's 1981 Black Bear Management Plan.

Listed in Order of Importance
1) Preserve key habitat types such as pocosins, Carolina Bays and hardwood swamps.
2) Continue to monitor the population with appropriate surveys.
3) Establish seasons in several eastern counties.
4) Complete sanctuary evolution study in process.
5) Formulate procedures for handling bear-human conflicts and depredation problems.
6) Prepare an annual Big Game harvest report.
7) Continue to stress habitat manipulation.
8) Review and improve the Wildlife Cooperator Agent Program.
9) Determine the effects of human disturbance on bear populations.
10) Review cub and baiting laws.
11) Revise life history and management slide program and hunting pamphlet.
12) Determine need for restoration areas and formulate guidelines for establishment.
13) Complete a life history and management pamphlet in 1981.
14) Complete a bear range map in 1981.

F. Occupied Range and Current Population Status:

1) Occupied Range: The WRC defines black bear range as a geographic area capable of supporting black bears throughout all seasons of the year and is considered to be occupied when there is evidence of reproducing females. Although the seasonal and incidental range of the black bear population fluctuates annually, the occupied range moves at a slower pace as females expand or move home ranges.

   The occupied range of the black bear in North Carolina has continued to expand since the inception of management strategies in the early 1970s and black bear populations were recovering by the late 1980's and early 1990's. Harvest reports, vehicle mortality, and bear range surveys indicates that the number of bears has increased and occupied range continues to expand (Figures 2 and 3). Today's occupied range probably represents the largest geographic distribution of black bears in the State in over 150 years.

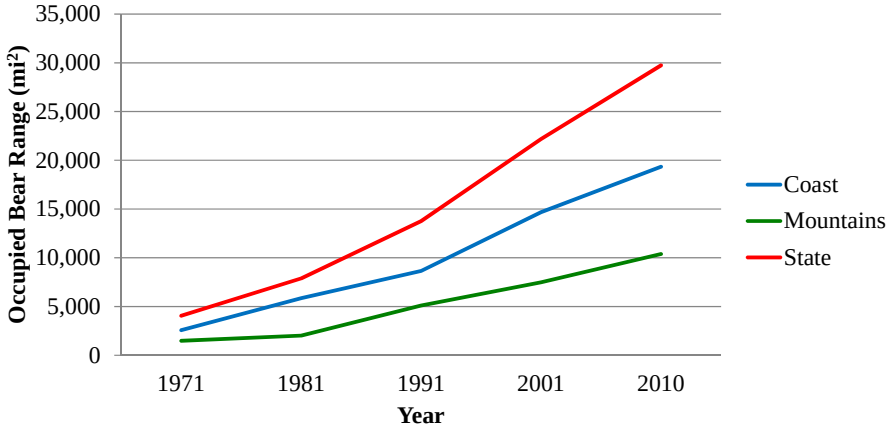


Figure 2. Occupied Black Bear Range in North Carolina (mi^2), 1971-2010.

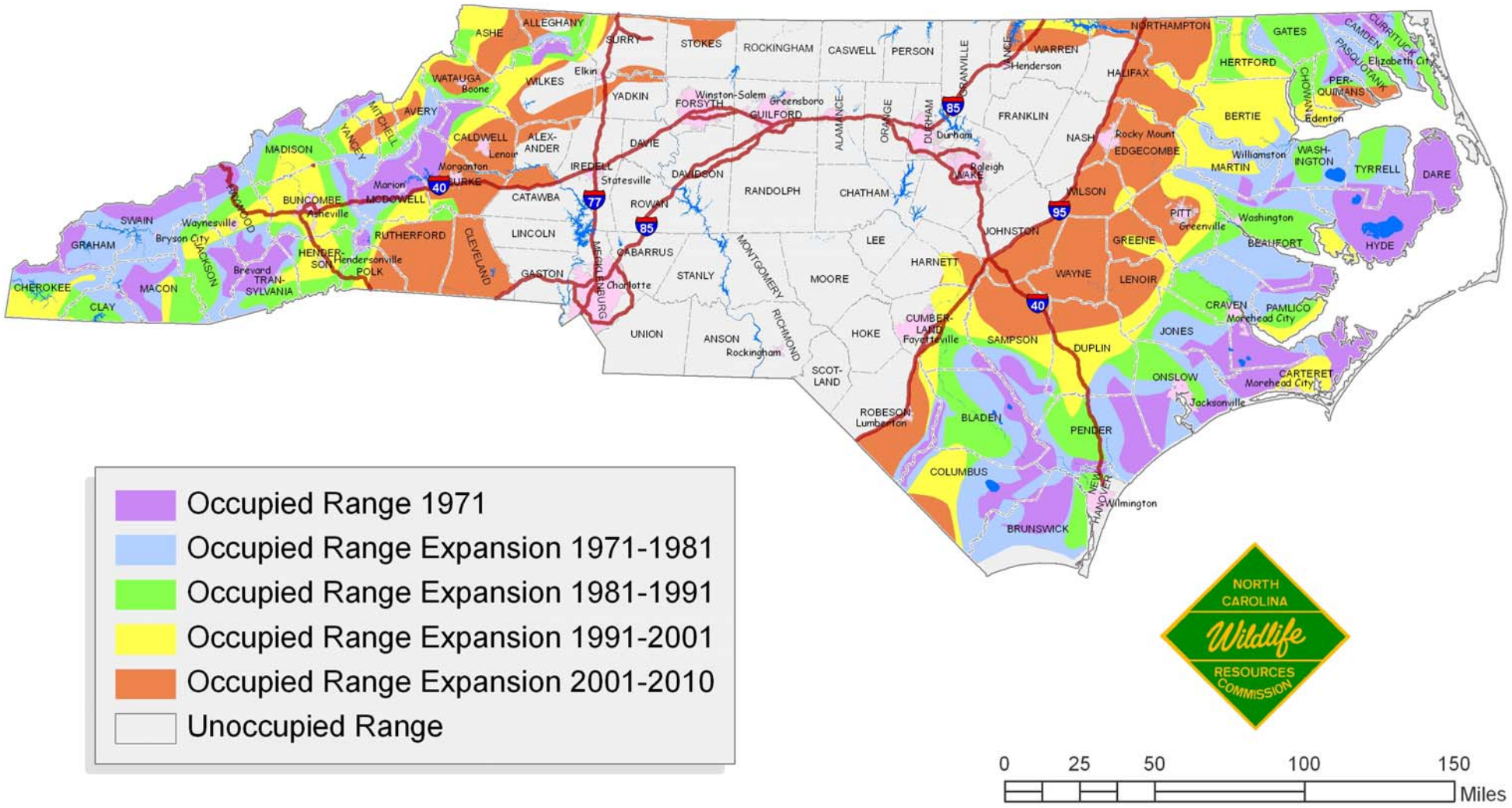


Figure 3. North Carolina Occupied Black Bear Range, 1971-2010.

2) Population Status: Success of the bear sanctuary program and management efforts began to yield benefits as harvest numbers increased each year, and bear range maps prepared by NCWRC biologists began to indicate an expanding population. Bear populations in North Carolina began to rebound in the mid-1980s (Figure 4). By the mid-1990's, the number of bear-human conflicts began to increase, and it became apparent that black bears were much more adaptable to the presence of humans than anyone had anticipated (Figure 5).

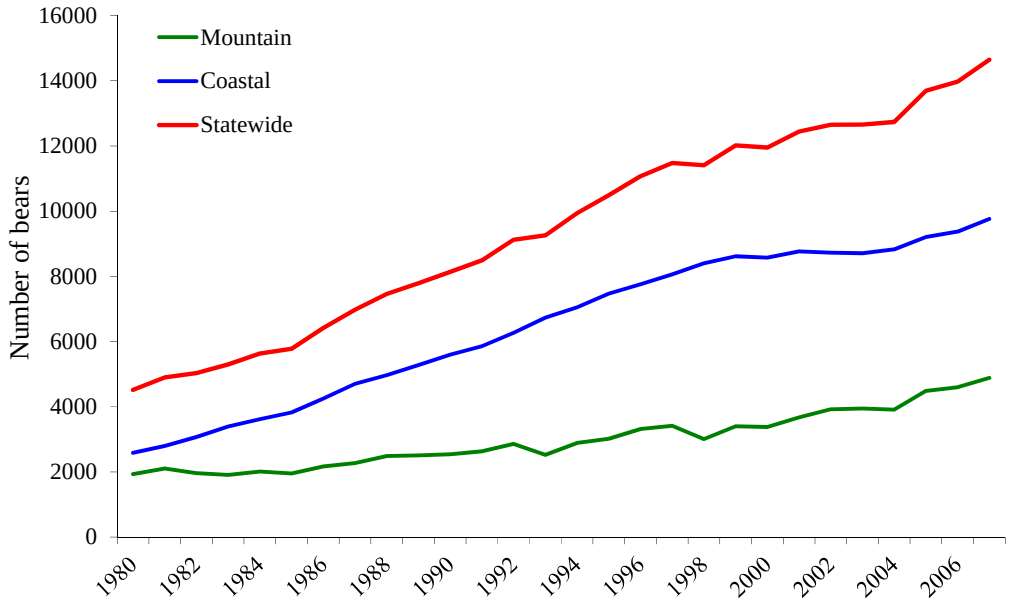


Figure 4. Estimated Black Bear Population in North Carolina, 1980-2007

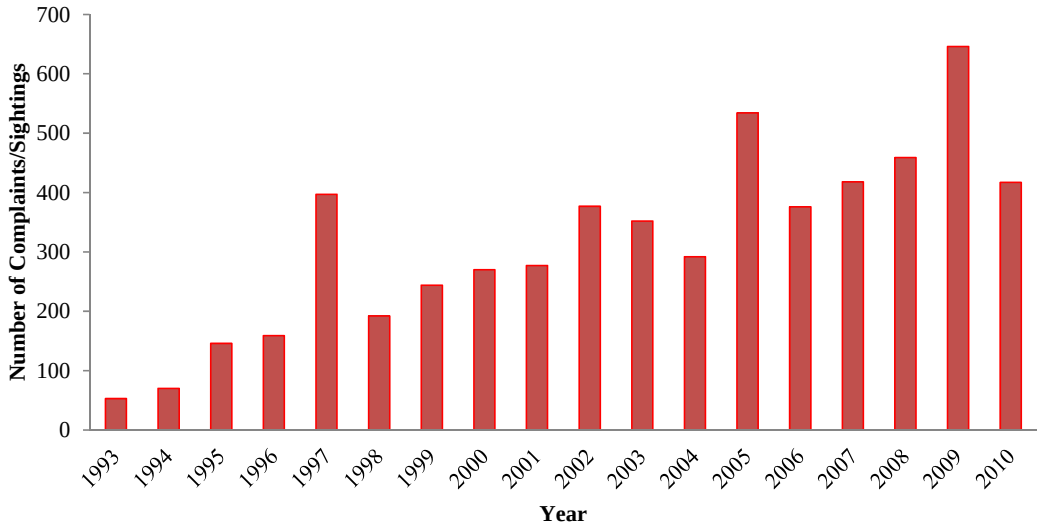


Figure 5. Number of bear complaints and observations recorded by NCWRC District Wildlife Biologists in North Carolina, 1993-2010.

Bear populations in North Carolina in 2012 continue to thrive in many areas and expand their populations into previously unoccupied habitats. Loss of habitat and increased human development continue to be the most critical concerns for the future of bears in North Carolina. Social Carrying Capacity (SCC; i.e., how many bears are people willing to tolerate) is now considered to be the primary limiting factor for bears in many areas of the state.

Many of the old beliefs that bears could not adapt to human development and increasing numbers of roads and highways began to fade as bears started to appear in areas of high human activity. Human-bear conflicts began to rise substantially in the 1990s, primarily in residential areas of western North Carolina. Bear mortality from vehicular accidents also began to increase, primarily in eastern North Carolina, because of the combined effect of more bears, more roads, and more traffic. Residential developments became, in effect, small bear sanctuaries because hunting was not allowed or was unfeasible. Bears that grow-up in protected areas without experiencing the negative behavioral effects of being chased by dogs and exposed to hunting often lose their fear of people. Loss of habitat to residential, suburban, and urban development is the most critical problem facing black bear populations in North Carolina today. Protection of additional large blocks of habitat through public land acquisition and conservation easements is essential for the future of bears in the state.

North Carolina's mountain and coastal bear population growth is stabilizing to slightly increasing. Both populations continue to move into previously unoccupied habitats on the periphery of traditional core habitat areas. There are probably more bears in North Carolina today than there have been at any time in the last 100 years. NCWRC biologists now view bear managements' critical questions in terms of SCC rather than biological carrying capacity (i.e., how many bears habitats can support). Based on the increase in human-bear interactions reported in western North Carolina, some areas of the state may have already reached or exceeded SCC. Educating the public on issues relating to bear/human interactions is a very important aspect of bear management today, but the challenge for biologists of the future may rest on finding ways to stabilize or reduce bear populations in and around areas of high human population.

G. Summary of Research Studies: The results of a status survey in 1967 prompted the NCWRC to initiate the first bear research study in 1969. The study was initiated by the WRC to collect biological information upon which to examine the steadily declining bear population. North Carolina State University (NCSU) was a cooperative partner in these early research efforts. At the time, the only biological information, such as bear age, was available in VA and PA. Bear range, reproduction, mortality data (i.e. sex ratios, age, weight, etc…), and harvest statistics were among the research topics examined. Several of the studies initiated in 1969 continue today.

In 1972, cooperative studies with NCSU were initiated to analyze black bear movements and home ranges at Camp Lejeune and to study habitat suitability in known bear range. Bears were radio-collared and tracked at Camp Lejeune, and scats were collected in Bladen and Dare counties and analyzed to determine food habits and habitat suitability. Over the years,

the NCWRC has entered into cooperative agreements with NCSU, the University of Georgia (UGA), the University of Tennessee (UT), and Virginia Tech (VT) to conduct major research projects on the biology and management of black bears in North Carolina. Additionally, researchers from Auburn University have worked under a permit from the NCWRC on the Pisgah Sanctuary in western North Carolina.

Although the bear sanctuary system had been established and biologists in North Carolina were continuing efforts to monitor bear populations, there was still much concern over the status of bears in 1976. John Collins reported, "populations of black bear in North Carolina have declined drastically in past years" (1976 NCWRC Annual Report). It was generally recognized that bear populations in western North Carolina were not confined by state lines but were part of a larger population that included bears and bear habitat in several states in the southern Appalachians. North Carolina entered into a cooperative relationship with Georgia and Tennessee, coordinated by UT and involving UGA, known as the Tri-State Bear Study in 1976. The purpose of the study was to characterize bear populations and habitats in the tri-state area and provide better information for making sound biological and management decisions on a regional basis. Each of the members involved in the Tri-state study were assigned different job segments with respect to processing specimens, compiling data, and preparing reports. Data were collected from 1976-1980, and the final report, published in 1983, provided a wealth of information to the member states for the purpose of formulating plans and regulations to better manage shared bear populations. The study also led to a continuing long-term research project by UT to monitor bear populations in the GSMNP. Although the Tri-state Bear Study was formally completed in the 1980's, the cooperative relationship among the original members continued with the formation of the Southern Appalachian Black Bear Study Group (SABBSG). South Carolina and Virginia state agency biologists began to participate, and other cooperators from Federal and State agencies occasionally attend meetings. The SABBSG continues to meet twice each year to discuss issues related to bear biology and management and coordinate research efforts. Georgia, North Carolina, South Carolina, and Tennessee form the current SABBSG with participation from UT, GSMNP, Big South Fork National Recreation Area, and other invited guests. States in the central Appalachians formed a mid-Appalachian Black Bear Study Group comprising Maryland, Ohio, Pennsylvania, Virginia, and West Virginia and coordinated with assistance from Virginia Tech.

Another study that began in 1976, "An Analysis and Evaluation of a Black Bear Sanctuary in North Carolina", was a cooperative effort between the WRC and NCSU to gather basic biological data on bears and bear habitat and compare "utilization" of habitats in sanctuary and non-sanctuary areas in western North Carolina. The NCSU effort also developed into a long-term research project and provides valuable information for managing black bears in North Carolina.

Since the early 1970's, there have been over 20 bear studies have been conducted partially or entirely in the state of North Carolina. The WRC's biological staff uses information from research projects to provide a basis for making sound management decisions and adopting regulations to benefit bear populations and bear habitats throughout the state.

H. Monitoring Activities: NCWRC biological staff can assess the status of the bear population through various monitoring indices derived from harvest, non-harvest mortality, scent stations, nuisance activity, and bear observations. Population estimates and growth rates are based on a population reconstruction model (Downing 1980), which estimates the population three years prior to collection of biological data from harvested bears. The information derived from these monitoring activities help NCWRC track trends in the bear population and provides for science-based decision making and biologically-sound management principles,

1) Documentation of Bear Range: Since 1971, WRC biological staff has monitored the areas of North Carolina that are occupied by black bears (Figure 2 and 3). Occupied black bear range is defined as a geographic area capable of supporting black bears throughout all seasons of the year and is generally considered to be occupied when evidence of reproducing females is found. Black bear range maps are updated every ten years using non-harvest mortality reports and bear observations.

2) Human-Bear Interactions: Since 1993, WRC biological staff have recorded human-bear interaction reports and recorded bear observations that occur outside the established bear range (Figure 6 and 7). A human-bear interaction includes both bear observations and conflicts with bears. This information not only aids in tracking bear population trends, behavior and occurrences, but helps the WRC predict when most interactions may occur (Figure 7 and 8) and identify common sources of conflict so that we can properly address human-bear interactions and provide effective technical guidance to resolve conflicts.

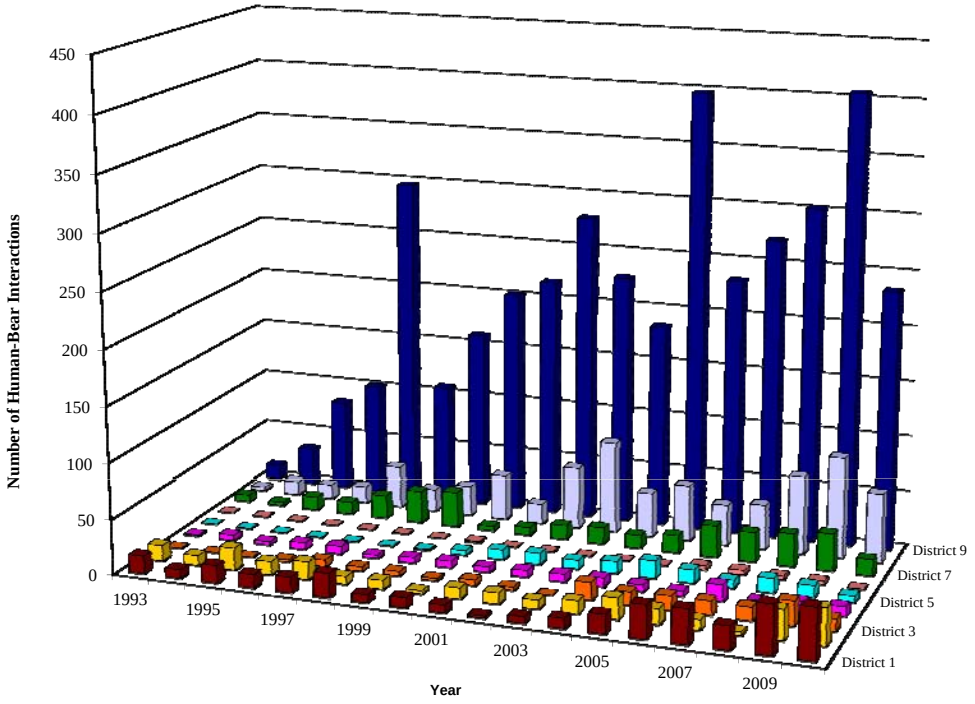


Figure 6. Number of human-bear interactions by district and by year in North Carolina, 1993 through 2010.

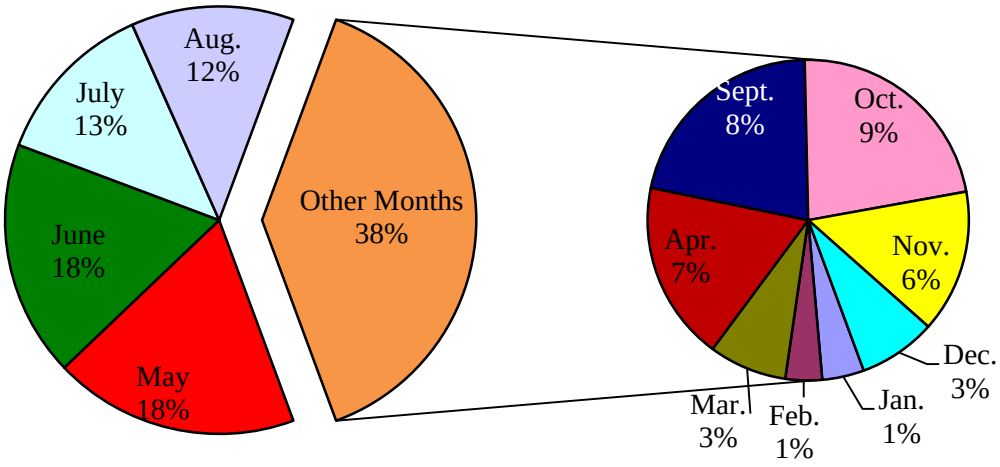


Figure 7. Percentage of human-bear interactions reported to WRC District Wildlife Biologists by month in North Carolina, 1993-2010.

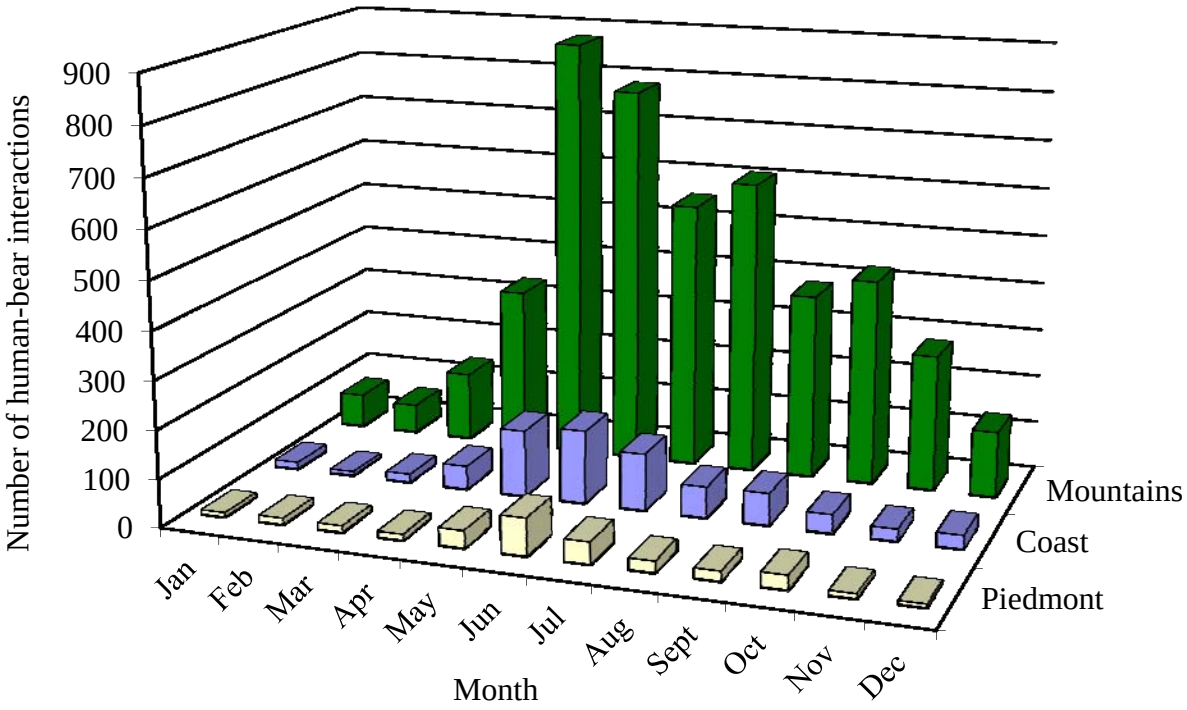


Figure 8. Number of human-bear interactions by month and region in North Carolina, 1993 through 2010.

3) Bear Cooperator Program: Mortality information from harvested bears, including the collection of premolar teeth and reproductive tracts, began in 1969. NCWRC biologists and technicians continue to work closely with bear hunters to collect biological data from harvested bears. Age, sex, and reproductive information gathered from biological samples are used for analyzing the age structure (Figure 9) of the harvested population and for population reconstruction modeling (Figure 4).

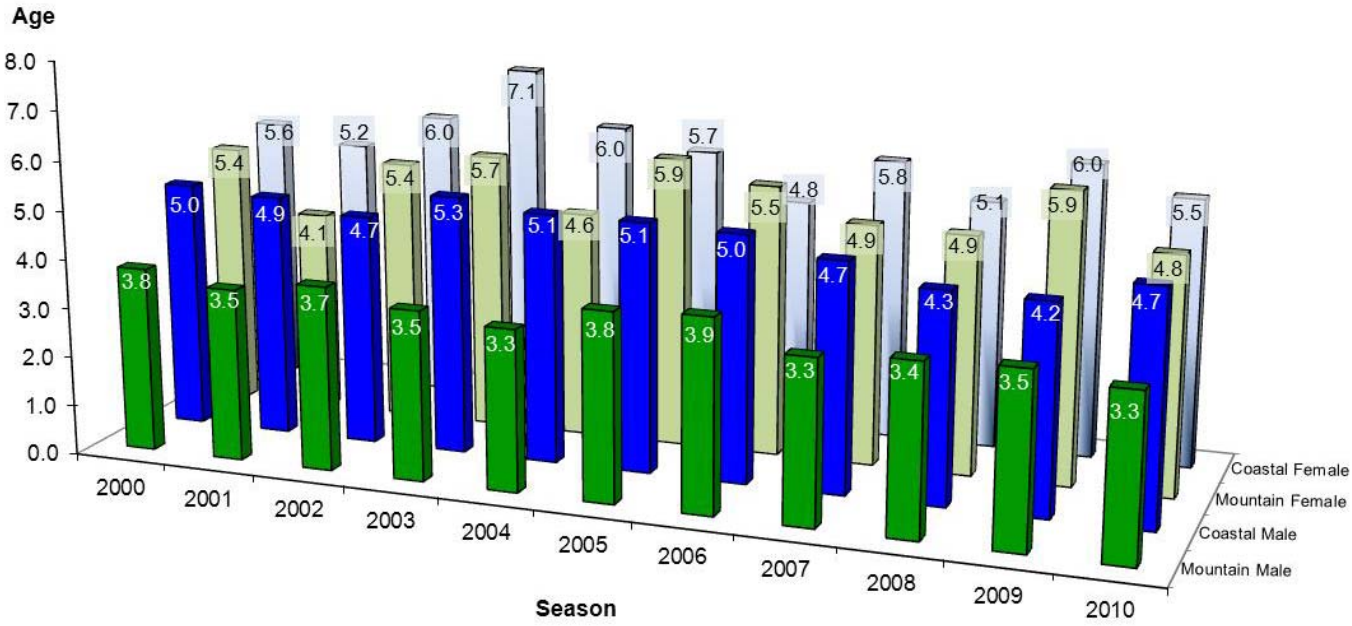


Figure 9. Average age of harvested bears sampled in North Carolina, 1998-2010.

The oldest bear documented in North Carolina was a 26.75 year-old female bear harvested in McDowell County in 2003 by a still hunter. The oldest male documented was 23.75 years old and was harvested in Bertie County in 2005 by a still hunter. Information collected from this program also allows the NCWRC to monitor the weights of the harvested bear population (Table 4 and 5; Figure 10).

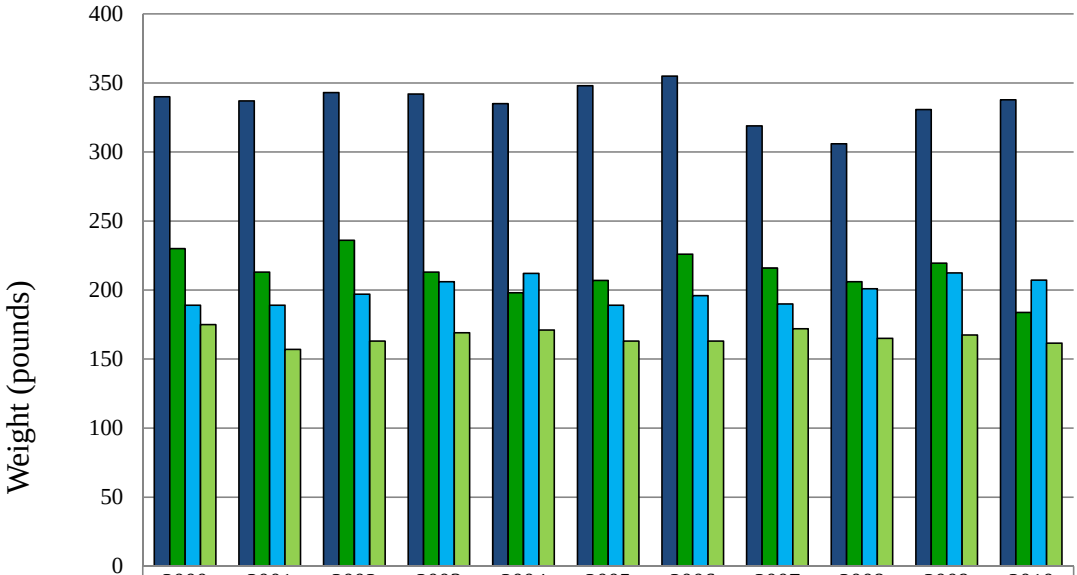
The CBMU has gained a reputation nationwide for its producing "trophy" bears (>500 lbs.) and all but one of the estimated 18 bear outfitters in North Carolina conducts their guide activities in the CBMU (Table 4 and 5). While the NCWRC does not manage for quality bears, the production of "trophy" bears is an outcome when harvest pressure allows for bears to grow old enough to achieve weights over 500 lbs.

Table 4. Top ten bear weights recorded by NCWRC during the bear hunting seasons in North Carolina, 1969-2010.

Rank	Year	County	Region	Type of Hunt	Weight	Sex	Age
1	1998	CRAVEN	C	DG	880	M	10.75
2	2009	HYDE	C	ST	760	M	6.75
3	2007	DARE	C	ST	752	M	7.75
4	2001	GATES	C	DG	742	M	9.75
5	2001	BEAUFORT	C	DG	740	M	13.75
6	2003	HYDE	C	DG	725	M	9.75
6	2009	BERTIE	C	DG	725	M	8.75
7	1990	BEAUFORT	C	ST	720	M	8.75
7	2005	CRAVEN	C	DG	720	M	12.75
8	2010	BERTIE	C	ST	711	M	7.75
9	2010	DARE	C	ST	708	M	N/A
10	2002	HYDE	C	DG	705	M	10.75

Table 5. Number of harvested male bears weighing over 500 lbs. in North Carolina, 1969-2010.

Weight Category	Total bears	Mountains	Coast
> 500 lbs.	793	32	761
> 600 lbs.	154	3	151
> 700 lbs.	11	0	11
> 800 lbs.	1	0	1



	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Coastal Male	340	337	343	342	335	348	355	319	306	331	338
Mountain Male	230	213	236	213	198	207	226	216	206	219	184
Coastal Female	189	189	197	206	212	189	196	190	201	212	207
Mountain Females	175	157	163	169	171	163	163	172	165	167	162

Figure 10. Average weight (pounds) of harvested bears sampled in North Carolina, 1998-2010.

4) Hunter Harvest Survey: Approximately every 3 years since the 1950s, the NCWRC has conducted a mail survey of licensed hunters to estimate population numbers of hunters for specific game species, hunter effort and hunter harvest. From 1976 through 2001, the survey did not ask bear-related questions. However, starting with the 2005-06 survey, hunters were asked if they hunted bears and for how many days.

   The latest survey was conducted after the 2007-2008 season. Commission staff mailed questionnaires to a random sample of 2% of the licensed hunters. The initial frame size was 482,588 licensed hunters and the initial sample size of potential hunters to be contacted was 9,652 hunters for a target of a 2% initial sample. An increase in bear hunter success was observed between 2005 and 2007, while there was no change in kill per unit effort (Table 6). Kill per unit effort remained at 0.02 for both survey years. However, there was very high variability in both surveys due to under-sampling of bear hunters. In the 2007-08 hunter harvest survey report, the authors reported that good precision could occur if standard error was less than 10% of the estimate. The standard error for estimated harvest and number of hunting days exceeded 10%. To improve on precision and reduce standard error, the authors suggested implementing a system to identify species hunters (e.g. turkey hunters, bear hunters) so that a smaller specialist framework would be available to survey.

Table 6. Results of the 2005-6 and 2007-08 Hunter Harvest Survey conducted by the NCWRC.

	Bear Hunters	Hunting Days	Bears Harvested[1]	Kill per Unit Effort[2]	Success Rate
2005 season	17,369	112,633	2,290	0.020	13.2%
2007 season	18,393	132,031	3,148	0.024	17.1%

[1] Bears harvested based on harvest survey and reflects non-registrations.
[2] Kill per unit effort calculated by dividing the number of bears harvested by the number of hunting days.
[3] Success rate calculated by dividing the number of bears harvested by the number of bear hunters.

5) Harvest Mortality: Hunters who harvest a bear are required to report and register the bear with the NCWRC. We use this opportunity to collect data on the date and county of harvest, as well as the sex of the bear harvested. Starting in 2009, we used the registration system to collect data on weapon used and whether dogs assisted in the harvest. This was initiated so that we could increase our understanding of method of harvest in different regions of North Carolina. There has been an increasing trend in the registered harvest, likely reflecting an increasing bear population (Figure 11). A majority of the bear mortality documented in North Carolina is due to hunter harvest (Figure 1). Unlike the other sources of bear mortality, the NCWRC can manage the level of harvest mortality through the timing, location and length of our regulated bear season, thus allowing us to also actively manage the bear population.

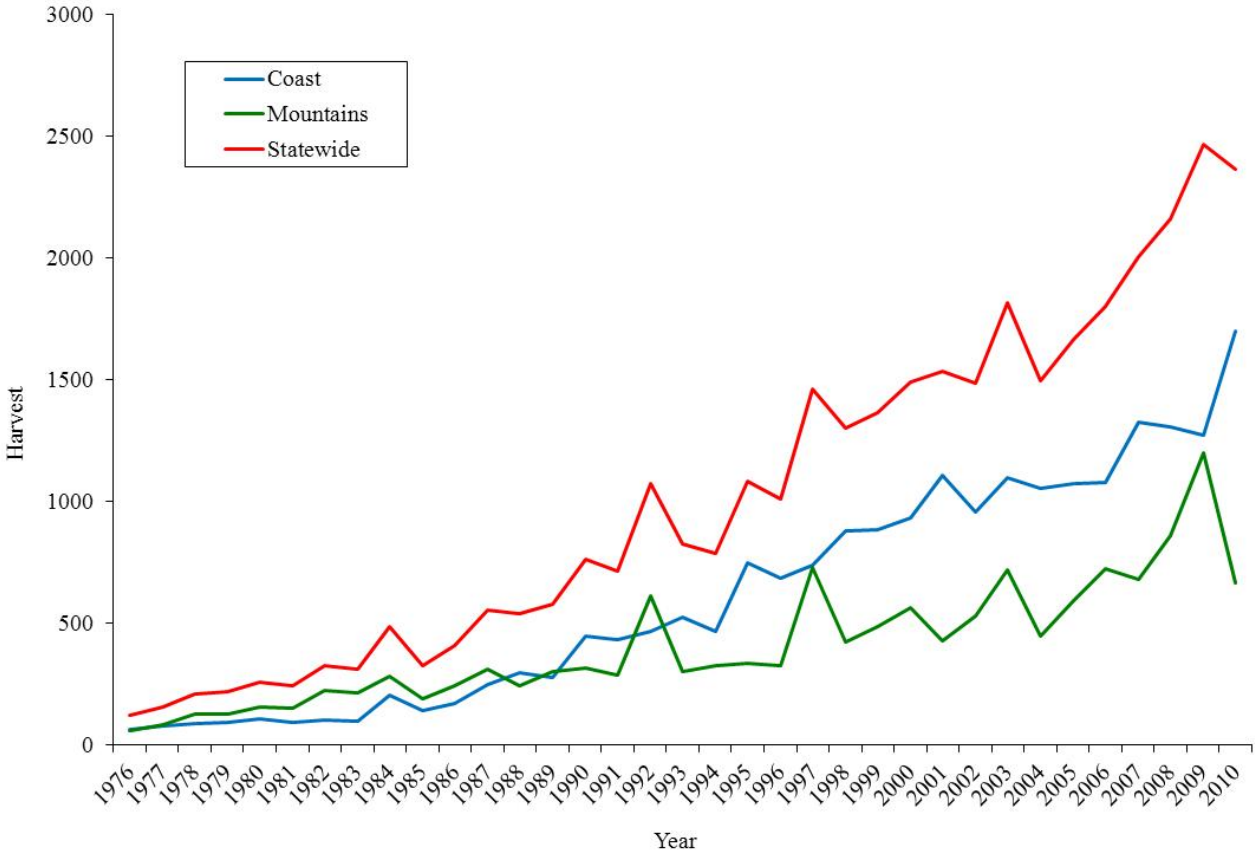


Figure 11. Statewide harvest of black bears in North Carolina, 1976 through 2010.

6) Non-Harvest Mortality: The NCWRC collects biological data from bears killed for other reasons besides legal hunting (e.g. highway mortality, depredation). The data helps us estimate the amount of non-harvest mortality occurring in the bear population (Figure 12 and 13) and identify areas along roadways that are more prone to bear-vehicle collisions. The data also helps us document the occurrence of bears outside established bear range.

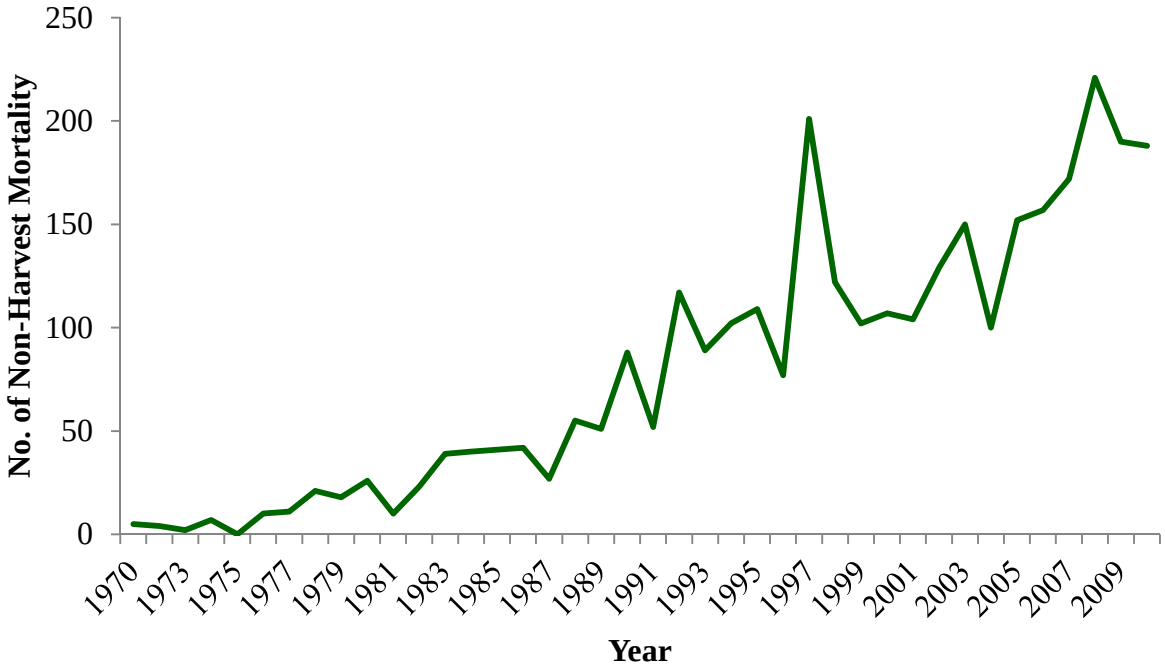


Figure 12. Number of non-harvest bear mortalities documented by NCWRC, 1970-2010.

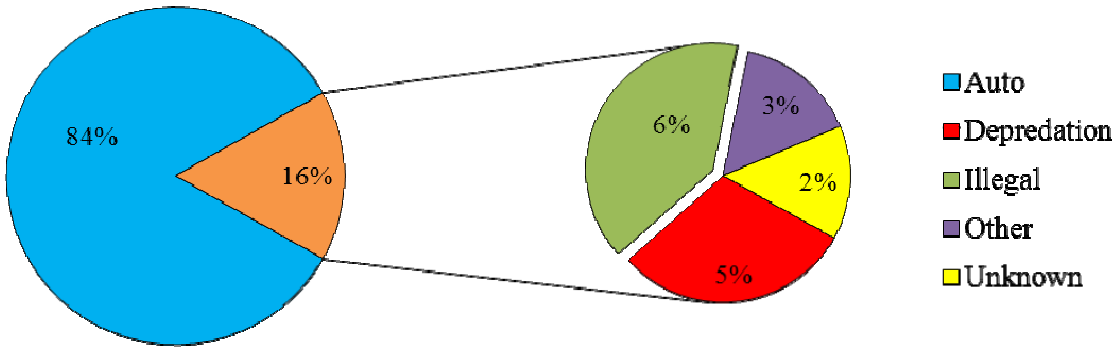


Figure 13. Cause of non-harvest mortalities in North Carolina, 1970-2010.

7) Bait Station Surveys: The NCWRC's mountain bait station survey is the only current survey technique to assess relative changes in bear numbers over time. The NCWRC began conducting bait station surveys in 1981 in the Harmon Den area of western North Carolina as part of a regional effort to establish an index for monitoring bear populations. Additional survey routes have been added since 1992, and as of 2009, almost 800 bait sites were used to

evaluate bear population trends in western North Carolina (Figure 14). Although useful as a tool to monitor changes in relative densities and complement our population reconstruction, this survey only provides an index (percent visitation to baits) to population trends. This trend information should not be evaluated alone, but compliments other data we collect. A coastal bait station survey was discontinued in 1999 because of a lack of statistical power to detect a change in the coastal population using available levels of manpower in the region.

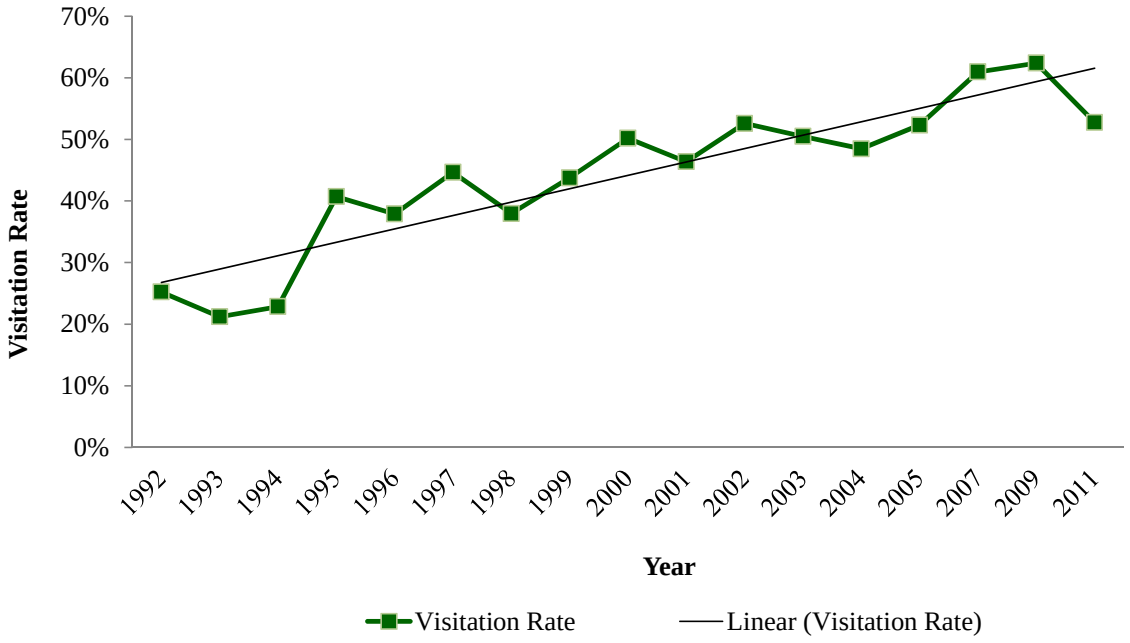


Figure 14. Black bear visitation rates to bait stations in the Mountain region of North Carolina, 1992-2011.

8) Mast surveys: Surveys of soft and hard mast began in 1982 to monitor long-term trends in food availability (Table 7 and 8). Current mast surveys are restricted to the Mountain region where mast has more of an impact on bear condition, productivity, hunter success, and bear-human conflicts.

   Our hard mast survey follows the technique originally described by Whitehead (1969) and modified by Wentworth (1992). Beginning with the 2006 survey, we are using a new protocol and formula for determining mast indices (Greenberg and Warburton 2007). The new protocol only requires simple calculation of percent crown with acorns in the field. In order to maintain consistency with the old technique, the new technique uses statistically verified equations to convert mast index values to numbers previously used with the Whitehead (1969) method. All state game and fish agencies in the southern Appalachian region along with the GSMNP currently utilize the same survey technique. Our historical data and management experiences indicate that in years of hard mast failures there is an increase in bear harvest coupled with a decline in bear condition and reproduction. Bear-human conflicts increase following a mast failure, and cub survival

declines. This situation may be altered and somewhat buffered by good quantities of soft mast (both summer and fall producing types).

These surveys continue to be an important measure of fall food production for bears and are useful when compared to reproductive data, hunter and vehicle mortality rates, denning behavior, and bear-human conflicts.

Table 7. Results of Mountain Summer Soft Mast Surveys, 1993-2011[1].

Year	Blueberry	Huckleberry	Blackberry	Pokeberry
1993	3.20	3.60	3.80	2.40
1994	3.20	3.50	3.50	1.40
1995	1.90	2.50	3.10	1.20
1996	2.00	2.00	3.40	1.50
1997	2.80	3.00	3.80	2.00
1998	1.90	1.20	3.30	2.33
1999	2.72	2.45	2.90	1.78
2000	2.70	2.72	2.99	1.64
2001	2.27	2.73	2.87	0.87
2002	1.87	2.22	3.55	1.32
2003	2.27	2.74	3.20	1.02
2004	1.67	1.61	4.25	1.41
2005	1.57	1.41	4.07	1.48
2007	2.11	1.23	2.48	1.84
2009	2.08	2.06	2.78	1.09
2011	1.69	1.53	3.28	1.37
Average	**2.24**	**2.27**	**3.31**	**1.53**

[1] After 2005, summer soft mast surveys are conducted every two years.

Numerical Rating = Crop Quality

0.0 to 2.0 = Poor	2.1 to 4.0 = Fair
4.1 to 6.0 = Good	6.1 to 8.0 = Excellent

Table 8. Hard Mast Survey Results for Western North Carolina, 1983-2011.

Year	White Oak	Red Oak	All Oaks	Hickory	Beech	Total
1983	1.43	2.59		1.99	5.51	2.25
1984	1.08	2.73		3.05	4.28	2.30
1985	2.01	3.66		0.80	3.06	2.80
1986	1.32	1.98		2.25	5.22	1.90
1987	1.16	0.56		3.57	5.75	1.31
1988	3.16	4.07		2.04	4.25	3.57
1989	0.43	4.89		2.78	6.44	3.14
1990	1.85	2.62		1.20	1.89	2.17
1991	2.38	1.93		3.75	6.89	2.43
1992	1.07	2.45		0.72	1.17	1.78
1993	0.65	3.58		2.43	4.77	2.48
1994	2.06	3.48		2.02	6.20	2.85
1995	2.80	5.60		2.48	0.36	4.22
1996	3.70	1.99		2.81	4.31	2.72
1997	0.53	1.79		1.17	2.35	1.29
1998	2.26	4.68		3.27	4.70	3.69
1999	3.28	2.76		2.80	6.22	3.05
2000	0.50	2.11		2.73	5.71	1.82
2001	2.83	4.92		2.88	3.97	3.98
2002	1.90	3.01		1.75	3.44	2.47
2003	1.24	0.68		3.58	5.42	1.33
2004	3.99	2.93		1.32	1.65	3.09
2005	0.70	3.11		1.86	4.30	2.14
2006	1.70	1.40	1.50*	3.20	4.10	1.80
2007	3.02	1.19	2.04	0.73	2.71	1.90
2008	1.01	2.40	1.76	3.82	4.34	2.06
2009	0.48	2.47	1.55	1.72	5.58	1.67
2010	3.46	3.97	3.75	3.50	0.87	3.66
2011	1.17	2.22	1.74	1.30	4.96	1.76
Average	**1.83**	**2.82**	**2.06**	**2.33**	**4.15**	**2.47**

Numerical Rating = Crop Quality	
0.0 to 2.0 = Poor	2.1 to 4.0 = Fair
4.1 to 6.0 = Good	6.1 to 8.0 = Excellent

* Not reported for prior years.

9) Other Population Surveys: Previous camera-resight studies that were conducted by the NCWRC in both the Mountains and Coastal Plain (Jones et al. 2001) demonstrated the potential for utilizing new techniques to estimate bear numbers. Current research that also is being supported by our agency involves examining the potential use of hair DNA with standard mark-recapture techniques to estimate bear numbers. This technique shows much promise for obtaining periodic estimates of bear densities and potentially may work in both regions of the state. Studies to evaluate the use of this method for monitoring bear population densities are being conducted on several sites in the Coastal Plain, viz. the Highway 64 study (UT/NCWRC, Kindall 2004, Thompson 2003), the Hyde County study (NCSU/NCWRC, Langer 2006), and the study on National Wildlife Refuges in northeastern NC (VT) and the Mountains (Settlage 2005).

10) Stakeholder Surveys: By understanding how our constituents view bears and bear management, we can more effectively manage North Carolina's bears. In order to improve this understanding, we conducted studies focusing on two groups of stakeholders in 2005. The first study assessed the views of bear hunters regarding season frameworks, bear quality and abundance, hunter densities, etc. The second study assessed the views of North Carolina residents regarding bears and bear management. We also gained insight into the bear population levels that are tolerated by various stakeholder groups as a measure of SCC. Currently, conducting more frequent surveys of bear hunters is difficult, because the NCWRC has no method for identifying bear hunters using the NCWRC license database.

I. Management Activities: The modern era of black bear management in North Carolina began in 1969. The NCWRC became the forerunner in bear research and management in the United States. Biologists John Collins, A.E. Ammons, Ted Mitchell, and Daniel Benfield were assigned to conduct a four year study of the status of black bears in North Carolina. A literature search was conducted to compile a list of articles and reports relating to bear research and management. Projects were initiated to study the biology of captive bears, inventory bear range in North Carolina, interview bear hunters, collect bear data (stomach samples, reproductive tracts, and canine teeth for aging), and monitor bear harvest in the state. Sample analyses were conducted in a cooperative effort with NCSU. These efforts initiated a long term program to monitor bear populations using scientific data, and this program continues today.

1) Role of hunting in bear management: North Carolina has a strong black bear hunting heritage dating back to colonial times. Early colonists relied on bears for food and hides to feed and clothe their families. Bear hunting was unregulated until the 1930's when hunters and conservationists pushed for bear hunting regulations and for the creation of a state wildlife agency to manage wildlife and enforce wildlife laws.

   Hunting has proven to be the only successful management tool for controlling bear populations. NCWRC biologists monitor the impacts of season lengths, harvest sex ratios, and reproductive rates to ensure the resource is properly managed through hunting. Aside from being the only population management tool, hunting also serves as a

traditional activity where groups of friends or families partake in the ritual and social aspects of the hunt.

a. **Hunting Methods**: Two types of hunting are utilized, still and dog hunting. The use of dogs to "strike" and "tree" bears has been a technique that goes back centuries. North Carolinians developed a strain of hound to hunt bears, known as the Plott Hound, which has been designated by the Legislature as the official state dog of North Carolina. Still hunting or stand hunting is also an important hunting method. This is a technique whereby hunters place stands on either trails, field edges, or in areas frequented by bears to feed.

   Recent bear hunter surveys indicate that dog hunting is still a very popular method to hunt bear (Palmer 2006) and more likely to be the main form of hunting in the mountain region. More mountain hunters (43%) than coastal hunters (21%) used only dogs to harvest bears. In contrast, coastal hunters (50%) were more likely to only still hunt bears than mountain hunters (31%). Twenty-six percent and 29% of mountain and coastal hunters, respectively, hunt bears using both methods. In 2009, the NCWRC started collecting data on method of harvest when licensed hunters registered their bears. Dog hunting is the main method of harvest in both the coast and mountain regions (Table 9). This data only reflects harvest method of successful hunters; it may not be representative of the hunting method used by all licensed hunters who attempted to harvest a bear or participate in hunting parties.

Table 9. Method of harvest by region, based on 2009[1] and 2010 registered harvest.

	Coastal Plain			Mountains			Piedmont	
Year	**Still**	**Dog**	**Unknown**	**Still**	**Dog**	**Unknown**	**Still**	**Dog**
2009[1]	39%	59%	1.7%	33%	66%	0.3%	100%	0%
2010[2]	36%	64%	0.1%	15%	84%	0.3%	0%	0%

[1]In 2009, the big game registration system started collecting information on method of hunting on all three registration methods (i.e. on-line, telephone, big game cooperator sheets).
[2] In 2010, method of harvest on the big game cooperator sheets was refined to improve data collection.

b. **Attitudes towards bear hunting**: The general public, when surveyed about bear hunting, indicated that a majority (63%) of respondents agreed that bear hunting, when properly managed, is compatible with viable bear populations, and 44% agreed that it is important for people to have opportunities to hunt bears in North Carolina. Respondents' support for regulated bear hunting increases (74%) if wildlife managers determined it was necessary. The survey indicated that 58% of the respondents agreed that they generally support NCWRC bear management. Seventy two percent of bear hunters agreed that they generally support how the NCWRC is managing bears.

   These survey results, along with economic benefits of bear hunting, North Carolina's strong hunting tradition, and the best available biological information, all point to the continued need for bear hunting as the primary means of managing populations in the state well into the foreseeable future.

2) Changes in Regulations and Statutes: Hunters were responsible for initiating regulations to protect and manage bears in North Carolina. The first statewide hunting season for bears was established in 1927, and ran from October 15 to January 1 with no bag limit. Since that time, several regulations and statutes have been enacted and/or modified, with several of these occurring in to better address bear management goals.

   a. **Licenses**: As of 2010, an annual Sportsman License, Lifetime Sportsman License, or Big Game Hunting Privilege License was required to legally hunt bear. Because these licenses allow the purchaser to harvest deer, bear and turkey, we are unable to identify our bear hunters on an annual basis.

      A non-resident bear/wild boar hunting license was established in 1995 for non-residents hunting bears and/or wild boar in North Carolina at a cost of $125.00 per year, in addition to other required non-resident hunting licenses.

   b. **Guides and Outfitters**: In order to serve for hire as a hunting guide, a Hunting and Fishing Guide License must be purchased. There are no restrictions or requirements to purchase a guide license.

   c. **Registration**: In 1974, the NCGA enacted legislation granted the WRC authority to require that bears harvested be registered. A hunter harvesting a bear is required by law to validate, register and report the kill through a wildlife cooperator agent (WCA), by telephone, or by the online reporting system (Figure 15). A regulation requiring the mandatory tagging of hunter-killed bears was passed in 1975.

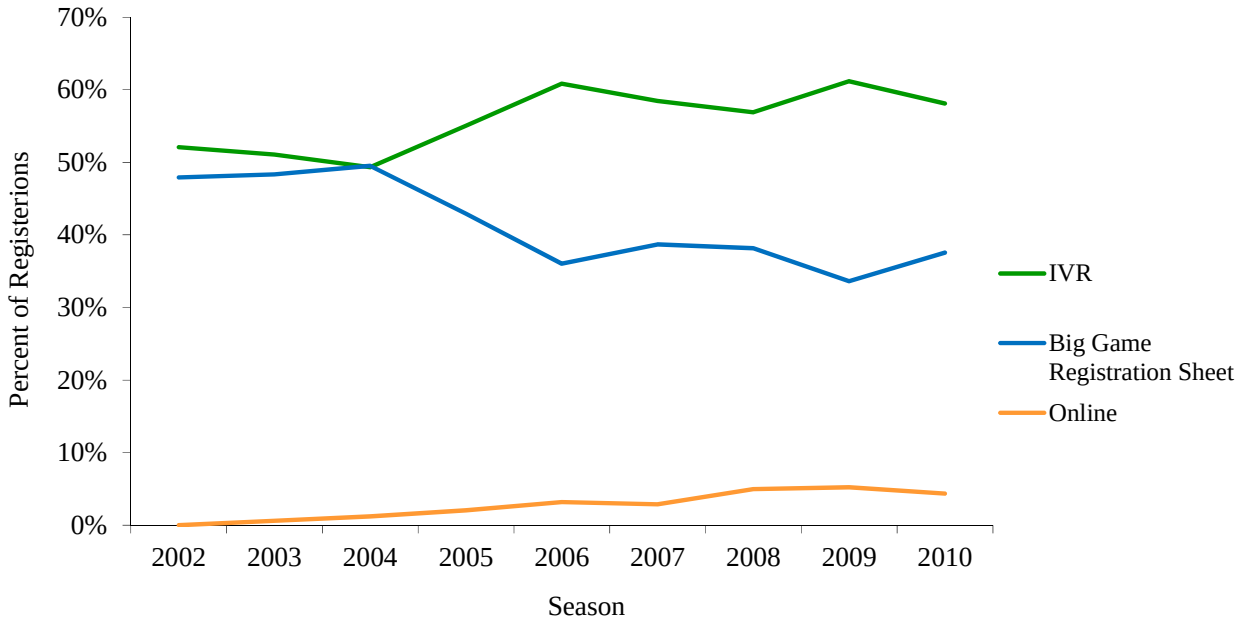


Figure 15. Percent of bears registered by reporting system in North Carolina, 2002-2010.

d. **Seasons**: The first statewide hunting season for bears was established in 1927, and ran from October 15 to January 1. In 1969, Gates County temporarily closed the portion of the county west of Highway 32 to bear hunting. During the 1970's, ten counties in eastern North Carolina closed their counties to bear hunting season by local legislation, due to concerns for the status of the bear population and due to conflicts between landowners and bear hunters. These counties were: Beaufort, Camden, Chowan, Currituck, Dare, Hyde, Pasquotank, Perquimans, Tyrrell, and Washington counties. In 1981, Camden County reopened their bear hunting season, followed by Hyde County in 1985. From 1987 through 1995, most of the remaining eastern counties had repealed the local legislation that had closed their county to bear hunting. In 2006, Perquimans County regained a bear hunting season through regulations promulgated by the WRC.

As of 2012, there are five bear hunting seasons in North Carolina, comprising seventy-two counties (Figure 16).

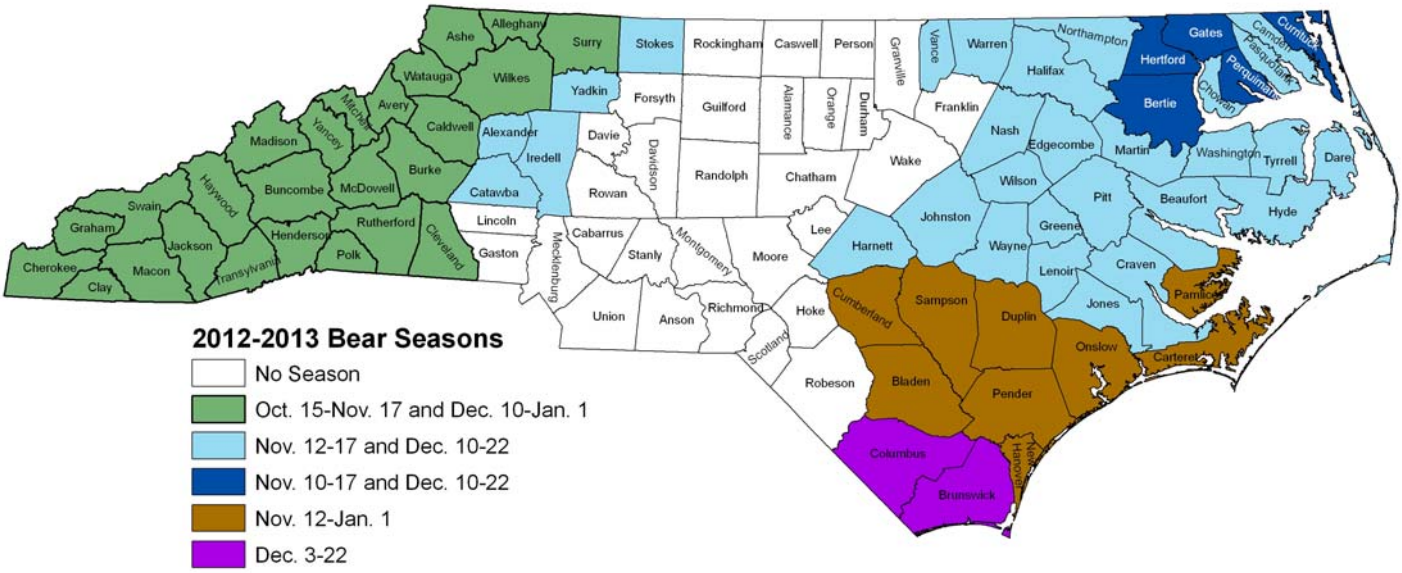


Figure 16. 2012-2013 bear hunting seasons in North Carolina.

e. **Bag limits**: Until the mid-1930's, there were no bag limits on bears (Table 10). Presently, the legal limit is one adult bear per hunter per year. In 1936, the first bag limit was set at two bears. After the NCWRC was established in 1947, the bag limit for bears was set at 1 per day, 2 in possession, and 2 per season for the 1948 hunting season. In 1971, the bag limit for bears was changed to 1 per day, 1 in possession, and 1 per season. The bag limits implemented in 1971 continue today and has the support of bear hunters. In a 2005 survey, 68% of bear hunters were satisfied with the current bag limits and 50% were opposed to any proposal to increase the season bag limit.

Table 10. History of black bear hunting season bag and possession limits in North Carolina, 1927 -2012.

Year	Daily Bag Limit	Possession Limit	Season Limit	Region
1927-1935	No Limit	No Limit	No Limit	Statewide
1936-1946	2		2	Statewide
1947	No Limit	No Limit	No Limit	Statewide
1948	2	2	2	Statewide
1949-1955	2	2	No Limit	Eastern NC
	1	2	2	In and west of Alleghany, Wilkes, Caldwell, Burke, Rutherford
1956-1966	2	2	No Limit	In and east of Surry, Yadkin, Alexander, Catawba, and Cleveland
	1	2	2	Western NC
1967 and 1968	1	2	2	Statewide
1969 and 1970	1	1	2	Statewide
1971-Present	1	1	1	Statewide

f. **Method of harvest**: Bear hunters can either use pursuit hounds or still hunt. It is illegal to harvest a bear using traps. The most popular hunting technique involves the use of dogs either treeing a bear or baying it on the ground in dense vegetation. As bears inhabit large areas of undeveloped land in relatively remote areas, sometimes with poor access and difficult terrain, bear hunting with dogs is normally a group effort. Still hunting is popular in many coastal counties where bears can be hunted adjacent to agricultural crops.

g. **Bear-dog Training Season**: It is legal to train bear dogs year-round. It is unlawful to train dogs or allow them to run unleashed between March 1 and the Monday on or nearest October 15 on bear sanctuaries in Alamance County south of I-85; Orange County south of I-85; Chatham County; Lee County; Wake County south of NC 98; and in and west of Rockingham, Guilford, Randolph and Montgomery Counties and that part of Anson County west of NC 742.

   While training or running bear-dogs, it is unlawful to possess firearms, axes, saws or tree-climbing equipment during the closed season.

h. **Protection of cubs**: Regulations in the 1940s made it unlawful to kill a female bear with a cub or cubs at its side. An additional regulation was passed in 1950 that made it illegal to kill a cub bear, and in 1952, it became illegal to kill a cub weighing less than 50 pounds.

i. **Wildlife Management Areas (WMAs)**: WMAs were established throughout the state and managed intensively for small game and big game species. Area managers assigned to the WMAs were responsible for managing habitat, enforcing wildlife regulations, and conducting strictly controlled hunts on the areas. Bear hunts consisted of separate dog hunts and still hunts, but harvest numbers on the controlled

hunts were low. Not much is known about bear harvest numbers outside of the management areas.

j. **Baiting**: During the 1986-87 hunting season, it became unlawful to take a bear with the use or aid of bait. However in 2007, the NCGA enacted new legislation that allows dogs to be released in the vicinity of any unprocessed food product.

k. **Possession of bear or bear parts**: It is illegal to possess a live black bear; unless the WRC has issued a captivity license to the institution or individual. To be issued a captivity license, the individual or institution must meet several requirements, such as minimum holding facilities and justification for possessing the bear.

It is illegal to trade in bear viscera or parts, including bear pelts. It is illegal for a person to possess any bear parts unless that owner legally harvested the bear or was granted a collector's permit from the WRC. However, residents may purchase bear parts and pelts from states where it is legal to sell such items.

2. Human-Bear Conflict Management: Each year, the NCWRC receives numerous requests from concerned citizens, local law enforcement authorities, and government agencies for assistance with human-bear conflicts. These problems include bears frequenting areas outside their normal range, destroying and raiding bird feeders, raiding garbage disposal areas, damaging bee hives and agricultural crops, being hit by vehicles, and other miscellaneous complaints.

The general policy of the NCWRC is not to trap bears unless human safety is threatened. Simply catching and relocating every bear that someone sees is not an option; we have few remote places left to relocate bears where they will not come into contact with humans. Resolving conflicts by moving bears perceived as a problem sends the wrong message about learning to live with bears. Additionally, the process of catching bears is difficult, and can be more dangerous for the bear, the public, and those involved.

Bears will not be trapped because they are perceived as a nuisance or as creating a problem. In many cases, people are the cause of the problem, and the best solution simply may involve a combination of public education and removal of attractants rather than trapping and destruction of the bear. This general policy addresses the goal of long-term maintenance of our bear population as well as issues of public safety.

a. **Guidelines for preventing and resolving conflicts**: WRC biological staff and Wildlife Enforcement Officers (WEOs) developed several guidelines for preventing and resolving bear conflicts.

1) "Guidelines for WRC Staff in Responding to Bear Conflicts with Humans"

These guidelines were developed for NCWRC personnel to address the challenges of managing bears and humans in an effective and professional manner (Appendix D).

Included in the document are guidelines for the following:

- Transient Bears
- Bears treed or within developed areas.
- Bears in public use areas, campgrounds and picnic areas
- Bear breaking into unoccupied dwelling
- Bear breaking into occupied dwelling
- Injured bears
- Bear makes contact with a person
- Capture and transport of a bear
- Depredating bears
- Bear carcass disposal
- Handling orphaned bear cubs and bears held illegally

2) "Guidelines for NCWRC Response to a Bear Attack Resulting in Serious Human Injury or Death"

Black bear attacks on humans are rare across the U.S. and in North Carolina. Black bears are rarely aggressive and most attacks result in minor injuries to people. However, numerous serious and fatal attacks have occurred in North America and two fatal attacks have occurred in Tennessee since 2000. While these serious and fatal attacks are the exception rather than the rule, it was imperative that NCWRC develop guidelines for responding and handling an attack should one occur in North Carolina (Appendix E).

3) "Guidelines for Local Law Enforcement for Responding to Bear Observations and Conflicts with People"

These guidelines were developed by WRC biological staff and WEOs to help law enforcement effectively address bear situations that may occur in their jurisdiction (Appendix F). Because local law enforcement are usually the first point of contact with the public and are often the first to arrive on the scene, this document will help address basic questions about bears in developed areas, as well as help establish guidelines for dealing with bears and improve their understanding of the legal aspects of taking bears.

b. **Education**: Due to a large influx of people to North Carolina, human-bear interactions will continue to rise. In a 2005 survey, 31%-44% of respondents expressed concern about potential conflicts with bears; the range in response was due to different types of conflict categories offered to respondents, such as public safety threats, bear/vehicle accidents, threats to pets, and property damage. Education will be the ultimate tool to acclimate both new and long-term residents to living in bear country.

Based on human-bear interaction reports received by WRC biological staff, a majority of these reports can be resolved through education and removing items that attract bears, such as garbage and bird feeders. Because education has proven effective and efficient at solving most bear complaints, the NCWRC has developed several educational tools to inform the public.

1) Preventing and Resolving Conflicts with Bears section on NCWRC internet site:

2) *The Bear Facts, The Story of a North Carolina Treasure* documentary: In 2004, Black Bear Project personnel completed a documentary, *The Bear Facts, The Story of a North Carolina Treasure* (Appendix H). This documentary features information on how people can coexist with bears and hunting's role in managing for conflicts.

3) *The Bear Facts, Interactive Educators Edition*: In 2007, the Black Bear program released *The Bear Facts, The Story of a North Carolina Treasure, Interactive Educators Edition* (Appendix H). The goal of this interactive DVD is to inform educators and students about black bear issues in North Carolina, to provide bear safety tips, to explain bear management, and to clear up myths about this natural treasure

4) *Black Bear Wildlife Profile*: The *Black Bear Wildlife Profile* (Appendix I) was updated in 2009 with more information on human-bear interactions and how to prevent them.

2. Habitat Management: Black bears are tied to forested areas and in the southeastern United States, forest distribution matches the distribution of bears very closely (with some exceptions). In many parts of the region, bears are dependent on oak trees with their energy-rich acorns and on a diversity of soft mast species. In other parts of the region, where Oaks are not the dominant species, other mast producing hardwoods are critical. Bears are opportunistic omnivores and find a variety of foods in both young and mature forests and in different forest types. Therefore, a diversity of forest types and ages is important for black bears.

   a) Habitat Management on Game Lands (GL): Habitat management on GL adheres to a three prong approach of protection, acquisition, and enhancement. Protection involves the protection of current lands that are critical to black bear populations and habitats. Habitats are primarily protected by incorporation into the GL and/or Bear Sanctuary Programs (BSP). Under the BSP program, activities can be managed to benefit bear populations. Regulations can control or limit hunting, set season restrictions, establish permit hunts, and implement restrictions on activities such as dog training.

   The second prong of management involves the acquisition of privately owned tracts that offer benefits to black bears. Through the purchase of large, unfragmented tracts

of oak-hickory forests, pocosins, Carolina Bays and oak/gum stands, important components required by bears can be placed into state ownership and protected for perpetuity. Once purchased, the tract, if appropriate, can be moved into the sanctuary program under NCWRC authority.

The third prong of management involves habitat enhancement of NCWRC tracts. Several practices are utilized to improve areas and habitat for bears. Direct habitat improvements include the use of prescribe fire, management of soft mast species, timber stand improvements, food plot plantings, and access control.

i. **Prescribed Fire**: Burning on game lands is generally conducted on a 2-3 year rotation. Within this time frame, most upland sites will be scheduled to be prescribed burned either using a dormant or growing-season fire. Large pocosin areas are not burned due to liability issues that arise from smoke and fire control. However, during wildfire events, every opportunity will be used to allow these areas to burn without endangering private property or life.

ii. **Soft Mast Management**: Management of soft mast species along road-sides, trails, and openings is employed to produce species that provide summer and fall foods for bears. Particularly, blackberries are encouraged to spread along road-sides, and these species are fertilized and omitted from mowing. Other species such as grapes (*Vitis rotundifolia),* pokeberry (*Phytolacca americana),* devils walking stick, elderberry, (*Sambucus canadensis)* gallberry, and wild cherry (*Prunus serotina)* are all excellent bear foods and are encouraged to grow and produce fruits.

iii. **Food Plots**: On selected game lands, numerous wildlife openings are planted in annuals and perennials that benefit many species of wildlife. Many of these plantings focus on providing improved brood conditions for turkeys and bobwhite quail and to attract deer for hunters. However, many of these plantings are utilized by bears at different times of the year. Clover stands for example, an important source of protein, are utilized by bears in the spring following den emergence.

iv. **Access**: Access control is another technique used in managing bears. With uncontrolled access, local bear populations can be harvested to low levels in a short period. The use of gates and access control to prevent over-harvest is an extremely beneficial tool in managing harvest levels.

A major goal of GL bear management is to provide access to allow hunters the opportunity to enjoy their sport without hurting the resource. Most (64%) bear hunters spent 0-20% of their time bear hunting on Game Lands during the past three years. Mountain hunters (40%) were significantly more likely and Coastal Plain hunters (6%) significantly less likely to have bear hunted over 80% of the time on Game Lands. In 2008, 48% of mountain hunters harvested their bear on a Game Land, whereas only 6% of coastal hunters did the same (Figure 17). This difference is likely due to the greater amount of large tracts of public lands available in the mountain region in comparison to the coast.

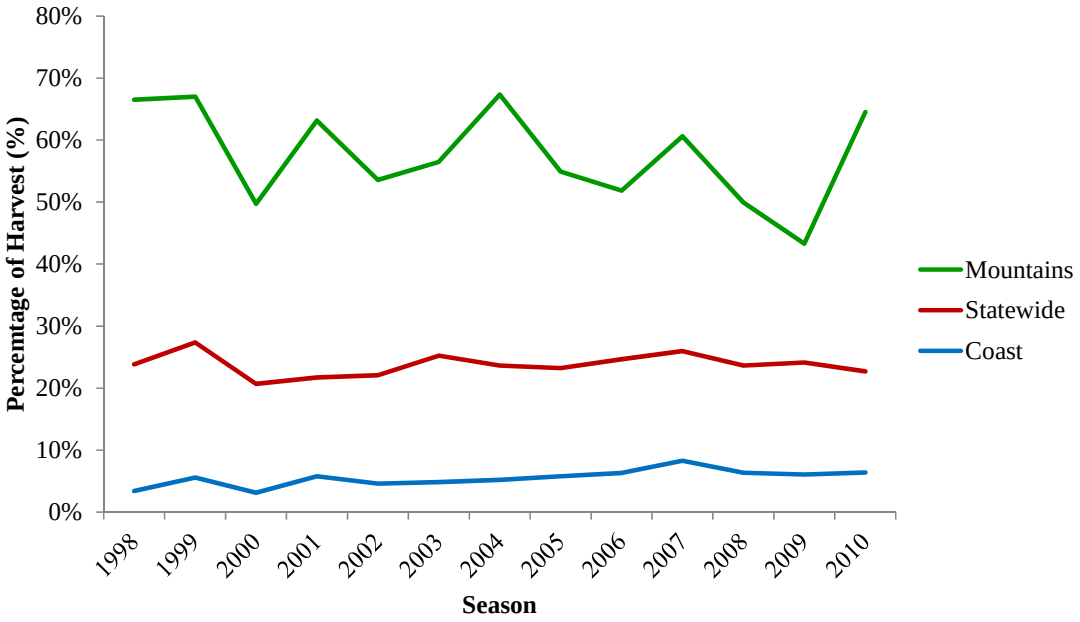


Figure 17. Percentage of bears harvested on Game Lands in North Carolina, 1998-2010.

b) Habitat Management on National Forests: The NCWRC, in conjunction with the SABBSG, developed a document titled *Forest Management Prescriptions For Black Bears in the Southeastern United States* (Appendix J). These guidelines promote the use of sound silvicultural practices to foster oak forests while promoting sufficient soft mast production and will be used to guide timber prescriptions and evaluations of timber management activities on U.S. Forest Service lands in western North Carolina. These guidelines were sanctioned by the Southeastern Association of Fish and Wildlife Agencies Directors in 2005.

c) Habitat Management in coastal North Carolina: In coastal North Carolina, bear habitat consists of agricultural cropland, loblolly pine plantations, bottomlands, mixed hardwoods, upland hardwoods, and pocosins. The majority of occupied bear habitat in this region as well as the rest of the Atlantic Coastal Plain is concentrated on private lands (Wooding et al. 1994). With this ownership pattern, management objectives should be directed in working with corporate and private interest groups to benefit bears.

Based upon research conducted by Jones and Pelton (2003), the management of intensive pine plantations will have a significant impact on North Carolina's coastal bears. Intensively managed pine plantations lack the cover and foods preferred by bears (Jones and Pelton 2003). However, clear cuts helped to compensate for lack of thick cover and soft mast (Jones and Pelton 2003). The interspersion of clear cuts across the loblolly pine plantation landscape will provide critical habitat preferred by bears and is recommended. Clear cuts should be dispersed and <200 acres in size. In addition to clear cuts, timber management that promotes open canopies that allow light penetration to promote soft mast production and cover should be employed.

Conversion of wetland forest types and pocosin has degraded the quality of habitat available for bears. Efforts should be made to restore pocosin and wetland forest types when practical (Jones et al. 1998, Jones and Pelton 2003). During this process, species selection should be considered that mimics the natural ecosystem to benefit bears. In addition, the use of broad spectrum herbicides to reduce competition in pine plantations may eliminate the soft mast plants that bears depend on from spring through early fall.

Where possible, attempts should be made at the planning level to keep large blocks of habitat within the landscape free of human development (Jones et al. 1998). With increased development and improved road access, large corporate ownerships should consider limiting human activities to certain areas or zones and allowing other areas to remain free of human activities.

d) Corridors: Black bears move extensive distances during certain times of the year. It is important for movement to occur between the various subpopulations of bears across the state to help maintain bear numbers and genetic connectivity and allow bears to repopulate suitable but unoccupied range. As such, corridors for movement are important. Within the mountains and coastal plain of North Carolina, significant growth has and is continuing in areas once inhabited by black bears. Development, especially along major highways and interstates, results in habitat degradation to large unaltered landscapes. Development activities such as residential subdivisions, road construction, and retail development have and will continue to displace black bears and place bears in closer contact with humans.

   NCWRC efforts should continue to identify key movement corridors and to work either through acquisition, easements, or agreements to conserve these areas. It should be noted that bears do have the ability to move across fairly "hostile" and open areas. As such, efforts to reduce bear-human conflict may be important in allowing bears to cross through residential areas and other areas of human occupation.

e) Highway Development: Highways can impact wildlife in 5 basic ways: (1) habitat fragmentation, (2) associated human development, (3) direct mortality, (4) direct habitat loss, and (5) displacement and avoidance (Ruediger 1998). Furthermore, animals such as black bears and white-tailed deer (*Odocoileus virginianus*) can have an economic impact due to vehicle collisions and be a direct threat to human safety.

   i. **U. S. Highway 64 Research**: The NCWRC Black Bear Program has taken a lead role in addressing these issues. In 1999, the BBP studied movement patterns of black bears, white-tailed deer, red wolves (*Canis rufus*), and coyotes (C. *latrans*) along the proposed route for U.S. Highway 64 (US64) in Washington County. The results of this study (Schieck and Jones 1999) became the basis for locating three wildlife underpasses along a section of new highway constructed in Washington County spanning approximately 19.3 km (12 miles).

In 2000, as part of the long-term research on US64, researchers from the University of Tennessee began work under contract with NCWRC to monitor the effects of the new highway and measure the potential benefits of the wildlife underpasses (van Manen et al. 2001). The study design involved the monitoring of radio-collared black bears as well as the use of DNA technology to measure bear population characteristics and includes a control area where no road construction is scheduled to occur to allow for statistical comparison to the proposed highway study area. Work has also included pre-construction and post-construction research. All pre-construction bear research was conducted from 2000-2002 and summarized by Thompson (2003) and Kindall (2004). Research into the post-construction issues along US64 was conducted from 2006-2007 and summarized in final reports in 2009.

Overall, the studies concluded that the wildlife underpasses and fencing along sections of the highway were effective in facilitating genetic and demographic connectivity and reducing animal-vehicle collisions (primarily deer; McCollister 2008, Nicholson 2009). However, there were changes in bear habitat use and activity patterns as a result of the new highway. Bears were closer to the road and more active in the morning when highway traffic was low. Another conclusion of the study was that the bear population declined in the area where the new highway was built, likely due to displacement during highway construction and bear-vehicle mortality occurring on the new highway. The researchers cautioned that the impacts of new highways on bear population abundance should be an important consideration for transportation infrastructure planning.

f) Acquisitions and Easements: Within North Carolina, federal (U.S. Forest Service - USFS, U.S. Fish and Wildlife Service - USFWS, Department of Defense – DOD), state (NCWRC, North Carolina State Parks - NCSP, North Carolina Forest Service - NCFS) and private (Coastal Land Trust - CLT, The Nature Conservancy - TNC, North Carolina Forestry Foundation – NCFF, Weyerhaeuser) ownerships of large contiguous tracts of land provide important and stable habitat for black bears.

In addition to present ownerships, the NCWRC land acquisition program, funded by state, private and federal sources has helped to obtain large tracts that are important to black bears. Supporting acquisition efforts, groups such as the Onslow Bight and Cape Fear Arch play a vital role in forming cooperative collaborations to identify and assist in protecting bear habitat.

i. **Current ownership**: The NCWRC owns 196,766 acres within the coastal portion of North Carolina and 80,000 acres in the mountains that can be considered important to black bears. In addition, U.S. Forest Service lands contribute over 1.1 million acres of important bear habitat primarily in the mountains. Nearly all game lands located within the coastal and mountain regions are located within black bear range.

Large GL such as the Pisgah, Nantahala, and Croatan National Forests plus smaller areas like Suggs Mill Pond, Columbus County, Holly Shelter, Angola Bay, Goose

Creek, Van Swamp, Gull Rock, Bachelor Bay, North River, Roanoke River, and Chowan Swamp provide crucial habitat needs and function as core areas, corridors, or sanctuaries.

ii. **Coastal Plains**: In 2004, Coastal biologists met to identify important wildlife corridors and potential acquisition boundaries to guide future acquisition projects (Figure 18). During this process 9.1 million acres were identified with a major emphasis placed on creating corridors that would create bridges to large areas of protected habitat. With black bears in mind as an "umbrella species" to provide habitats for diverse wildlife species, the "bridge" concept would provide linkages for many species to use to travel between core habitat areas.

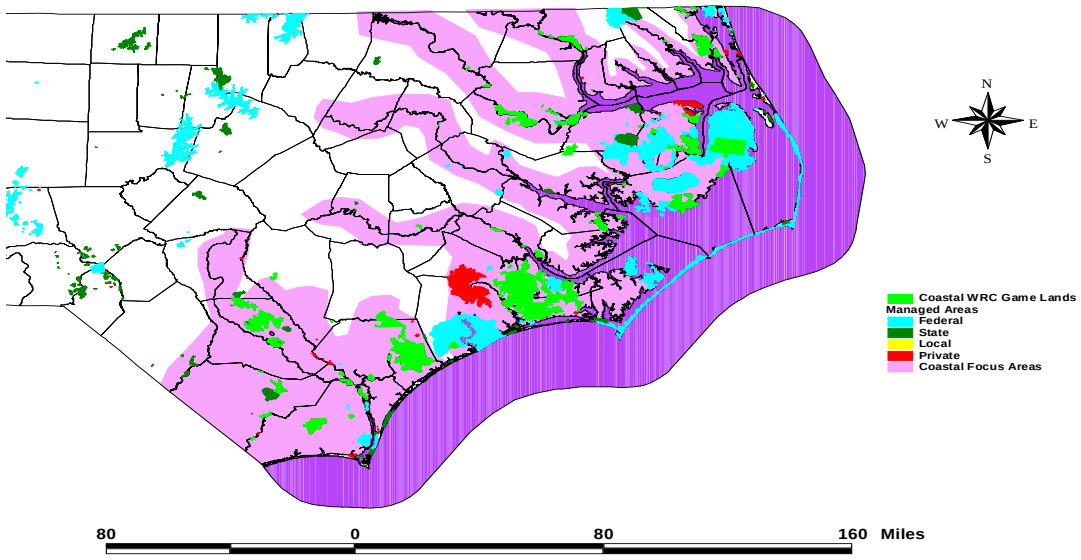


Figure 18. Coastal Region Black Bear Focus Areas.

Future acquisition efforts continue to fall within the broad boundaries of this focus area. Continued funding will play a critical role in the NCWRC's ability to acquire key areas for black bears and other species. Priority acquisitions should be focused on areas where bear populations are well established and expansion of core habitat is possible.

Using this as a guideline, emphasis should be placed on acquiring lands near Suggs Mill Pond Game Land, Colly Swamp, Green Swamp Bear Sanctuary, Holly Shelter/Angola Bay Game Lands Complex, Neuse/Pamlico peninsula, linking Hoffman Forest to Croatan National Forest, Albemarle/Pamlico peninsula, and the North River Game Land.

iii. **Mountains**: In the mountains, efforts have focused on acquisitions along the escarpment between the Blue Ridge Mountains and the Piedmont. Key areas for acquisition include: 1) the areas surrounding Thurmond Chatham south to the

USFS lands and North to the VA line, 2) providing connections between South Mountain Game Land and Green River Game Land, and 3) providing corridors from USFS lands in Burke and Caldwell to the areas near Lake Rhodhiss. All of these efforts will promote bear habitat and corridors for bear movements.

J. Education: In 2006, a series of meetings were held with focus groups to test a draft of a survey instrument. The mail survey was conducted to obtain information on a wide range of subjects dealing with the SCC concerning bears in the general public's view. One question surveyed the respondents' knowledge of black bears. While nearly 100% of the respondents were aware that there were black bears in North Carolina, the lack of knowledge about bears was rather high with 65% having very little or some knowledge of black bears. Eight-five percent of respondents indicated that having black bears in North Carolina was important. This means that bear conservation efforts in North Carolina are likely to be supported by most North Carolinians.

Since the 1970's, NCWRC staff have produced numerous publications on black bears in North Carolina. These publications range from pamphlets, a booklet, hand-outs, news articles, Wildlife in North Carolina articles, and, within the last 10 years, information on the NCWRC website. The following are examples of educational efforts made by NCWRC staff within the past ten years.

1) Black Bears of North Carolina section on NCWRC website: In 2009, the NCWRC website was reformatted, which allowed for greater content and easier navigation. With this change, the Black Bear Project Leader was able to edit the bear section on the website in order to add addition information on black bear populations, human-bear interactions and the black bear program activities and reports.

   The following main topics can be found in the bear section:

   a. The Bear Facts: Black Bear Wildlife Profile
   b. Preventing and Resolving Conflicts
   c. North Carolina's Black Bear Population and Occupied Range Expansion
   d. Monitoring and Estimating Black Bear Populations
   e. North Carolina's Black Bear Hunting Heritage
   f. Monitoring Quality Bears
   g. NCWRC's Bear Management
   h. Bear Reports and Surveys
   i. Documentary: The Bear Facts: The Story of a North Carolina Treasure

2) *Management and Harvest of Black Bears in North Carolina* brochure: Since 2001, the Black Bear Project Leader has created an annual brochure that provides information on bear population estimates and harvest statistics. Since that time, additional information has been provided in the brochure, such as North Carolina's hunting heritage, bear facts, and on-going research projects.

Until 2009, the brochure was distributed only to bear hunters that NCWRC biological staff encountered during the bear harvest seasons. In 2009, it was recognized that the brochure would be educational to a wider audience, especially the non-hunting public. Starting in 2009, the brochure was distributed to the NCWRC's three Wildlife Education Centers and is available under the "Reports and Surveys" section of the bear section website.

3) *Black Bear Wildlife Profile*: The *Black Bear Wildlife Profile* (Appendix H) was initially created in the early 1990's, along with several other species-specific profiles. The profile's intent was to provide a brief review of the following main topics: Population Status, Habitat and Habits, Range and Distribution, and People Interactions. In 2008, the NCWRC's Conservation Education section, working in cooperation with the Black Bear Project Leader, updated the profile in order to address the expanded occupied range of the bear and increases in human-bear interactions.

4) *The Bear Facts, The Story of a North Carolina Treasure* documentary (Appendix I): Black Bear Project personnel completed a documentary, *The Bear Facts, The Story of a North Carolina Treasure*, in 2004. This documentary features segments on bear history and biology, NCWRC research and monitoring, information on how people can coexist with bears, North Carolina's hunting traditions, and the future of bears in our state. It has aired on numerous television stations in cities including Asheville, Raleigh, and Wilmington as well as on UNCTV's system of 19 statewide affiliates.

5) *The Bear Facts, The Story of a North Carolina Treasure, Interactive Educators Edition* (Appendix I): In 2007, the Black Bear program released *The Bear Facts, The Story of a North Carolina Treasure, Interactive Educators Edition*. This product, based on the made-for-TV documentary, offers the original documentary plus eight additional interactive functions for students to enjoy. The DVD is accompanied by a CD containing lesson plans, bear-related activities, maps, and a wealth of educational materials suitable for grades K-12.

   Educators across the Tar Heel state can request the new and unique learning tool for children at no cost from NCWRC. In addition to public and private school teachers, the package is available to church groups, wildlife clubs, Boy and Girl Scout troops, museums and state parks, and other educational groups. The free resource can be easily applied to subjects like geography, history and math, in addition to the sciences. The offering is available through a funding grant provided by the Wildlife Resources Commission and a private foundation. The product was screened and approved by a panel of 80 educators from across the state. More than 1,500 teachers have already received the free learning tool. Educators can request this information from NCWRC's website at www.ncwildlife.org. This program should be expanded, and NCWRC should make this and similar educational initiatives a high priority involving support from the Division of Conservation Education.

6) Black Bear Powerpoint Presentation: The BBPL has developed a powerpoint presentation that is available to all NCWRC biological staff. The presentation covers various aspects

of the BBP, such as management, monitoring and research activities, harvest statistics, bear population estimates and bear life history.

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Appendix B

September 23, 2008
revised May 25, 2011

DWM Black Bear Committee
Goals and Objectives

1) To provide representative experience and expertise to discuss, evaluate, and recommend actions regarding bear management issues.

2) To develop, implement, and follow a structured decision-making process, using the best available science, for making recommendations for bear management activities.

    a) To make recommendations regarding bear hunting regulations using this structured decision-making process.

    b) To assist in managing bear hunting to maintain healthy bear populations consistent with habitat in which they occur and with the consideration of the desires of N.C. citizens.

3) To development and recommend to senior DWM staff actions needed to continue sound management of our black bear resource.

    a) To develop and periodically update a bear management plan.

4) To evaluate and provide feedback as requested on bear management issues sent to the committee from senior DWM staff, including issues generated from the Wildlife Resources Commission.

5) To monitor pertinent bear research in N.C. and elsewhere and make recommendations on incorporation of research results into management decisions. In addition, use available research results to make recommendations on new research studies that should be initiated if necessary.

6) To evaluate the contribution of bear management activities to other programs within the DWM (e.g., GL management for other species, implementation of the WAP, etc.) and agency.

    a) To recommend steps to initiate or improve inter-program coordination and implementation.

Appendix C

An Evaluation of Baiting Scenarios on Bear Populations and Hunting

Report to the Wildlife Resources Commission

Division of Wildlife Management

Updated October 2010

Executive Summary

Any changes to the use of bait for taking bears will require action by the General Assembly to revise North Carolina General Statute (NCGS) § 113-291.1. Herein, we present three possible options for actions by the WRC regarding the use of bait to take bears. Regardless of the option selected, harvest levels should be within ranges identified as sustainable, should maintain desirable levels of bear populations, and be consistent with bear management goals.

Based on currently available data and these criteria, we recommend different harvest ranges for North Carolina's two bear populations. For the bear population in our mountains to be sustained, reported harvest should not exceed 19-23% of the minimum mountain bear population estimate, and females should comprise ≤40% of the reported harvest. These criteria translate into a recommended harvest of 873-1,057 bears during 2010. In the Coastal Plain, reported harvest should not exceed 14-16% of the estimated coastal bear population and females should comprise ≤40% of the reported harvest. These criteria translate into a recommended harvest of 1,317-1,410 bears in the coastal population during 2010.

Recommendations for each of three options are presented, and if implemented, will allow staff to monitor impacts of different hunting methods and maintain sustainable harvest under each option.

Option A: Prohibit Any Take of Bears with the Use or Aid of Bait (DWM Preferred Option). Recommendations under Option A:

- Seek revision to NCGS § 113-291.1 to prohibit any taking of bears with the use or aid of bait.
- Establish statutes and NCAC rules sufficient to require the removal of bear bait sites 10 days prior to the start of the bear hunting season.
- In the North Carolina Administrative Code (NCAC), define a "cleaned" bear bait site.
- Evaluate the feasibility of establishing in NCAC rule an exclusionary zone around deer bait sites within which a bear could not be taken.
- Initiate research on relevant questions regarding bear behavior and movements in response to baiting.
- Implement a mechanism to identify North Carolina bear hunters.

Option B. Allow All Hunters to Take Bears with the Use or Aid of Bait
Recommendations under Option B:

- Establish a quota hunt system with total bear harvest regulated by an annual number of permits as specified herein.
- Implement a mechanism to identify North Carolina bear hunters prior to the first bear season in which baiting by all hunters is legal.
- Implement an annual survey of bear hunters.
- Seek authority from the General Assembly to regulate the use of bait (e.g., location, amount, type) through rule.
- Maintain regulatory authority to adjust bear harvest season structure as needed.
- Limit baiting to unprocessed foods only.

Option C. No Change in the Current Baiting Statute as it Pertains to Bears
Recommendations under Option C:

- Initiate research on relevant questions regarding bear behavior and movements in response to baiting.
- Implement a mechanism to identify North Carolina bear hunters.
- Implement an annual survey of bear hunters.
- Seek authority from the General Assembly to regulate the use of bait (e.g., location, amount, type) through rule.
- Maintain regulatory authority to adjust bear harvest season structure as needed.

We recommend that the WRC adopt the bear management goal to use science-based decision making and biologically-sound management principles to assure long-term viability of bear populations in balance with available habitat and human expectations; maintain and promote fair chase bear hunting opportunities, and minimize human-bear conflicts.

Introduction

At their May 2009 meeting, the Wildlife Resources Commission's (WRC) Big Game Committee (BGC) directed Division of Wildlife Management (DWM) staff to evaluate issues related to making access to North Carolina's black bear resource equitable between houndsmen and still hunters. Staff was specifically directed to evaluate three options:

- prohibiting any take of bears with the use or aid of bait,
- allowing take of bears with the use or aid of bait by all hunters, or
- no change in the current statute that allows houndsmen to take bears with the use or aid of bait in some situations.

For each option, staff was directed to recommend harvest levels and season structures and evaluate potential impacts on bear populations and hunting. As evaluations of each option occurred, additional considerations and recommendations were identified and are provided in this updated report.

Bear Management Goals and Baiting

While bear management goals have not been presented at the agency level for consideration by the WRC, the DWM bear management goal is to use science-based decision making and biologically-sound management principles to:

- assure long-term viability of bear populations in balance with available habitat and human expectations,
- maintain and promote fair chase bear hunting opportunities, and
- minimize human-bear conflicts.

We recommend that the WRC similarly adopt this goal as the WRC's bear management goal. Whether baiting is consistent with "Fair Chase" principles or whether the WRC should develop a position and/or regulate these principles are issues that may require further consideration by the BGC and WRC.

Bear Baiting in North Carolina

In 1986, due to a desire to prevent over-harvest and establish a sustainable bear harvest, NCGS § 113-291.1 (b)(2) was changed to make it unlawful to take bear with use of salt or bait. In 2006, WRC biologists, North Carolina State University researchers and bear hunters expressed concerns about the significant health impacts on individual bears and on bear population dynamics caused by the placement of processed food products (e.g., candy and chocolate blocks). However, sportsmen also raised concerns that the baiting prohibition established in NCGS § 113-291.1 placed them at risk of violating wildlife laws if their dogs were to tree or bay a bear in the vicinity of an unknown bait site. In response, NCGS § 113-294 was amended in 2007, prohibiting the placement of processed food products as bait in any area of the state where the WRC has set an open season for taking black bears and allowing the release of dogs in the vicinity of any food source that is not a processed food product (Appendix A). At that time, DWM staff supported the prohibition on the use of processed food products, but opposed the legalization of taking bears with dogs using bait because of concerns that allowing any bear hunting activity near a bait site may result in an unsustainable harvest and other negative implications associated with supplemental food for bears and other wildlife (i.e., unnatural

crowding, increased risk of disease transmission, and malnourishment due to lower nutrients found in most processed and unprocessed foods (e.g., corn)). Since NCGS § 113-294 was amended in 2007, still hunters have commented that that there is an inequity in the law, whereby one set of hunters (i.e., houndsmen) are allowed to use bait to take bears while another set of hunters (i.e., still hunters) are not are allowed to do the same. Additionally, in August and September 2010, Hyde and Tyrrell counties, respectively passed resolutions requesting that the WRC address the inequity in the current baiting statute (Appendix B).

Use of Bait for Hunting Bears in the United States

Of the 30 states that have a bear hunting season (including North Carolina), 19 prohibit the use of bait for bear hunting (Figure 1; Appendix C). Ten of the 12 states that allow bears to be taken with the aid of bait require hunters to have a bear permit/license (Figure 1). Arkansas and North Carolina do not have a bear permit/license, but Arkansas does have a quota system, as do six other states that allow the use of bait to hunt bears. With the exception of North Carolina and Oklahoma, the remaining states that allow hunters to hunt bears with the aid of bait, also place restrictions on the use of bait (Figure 2; Appendix C).

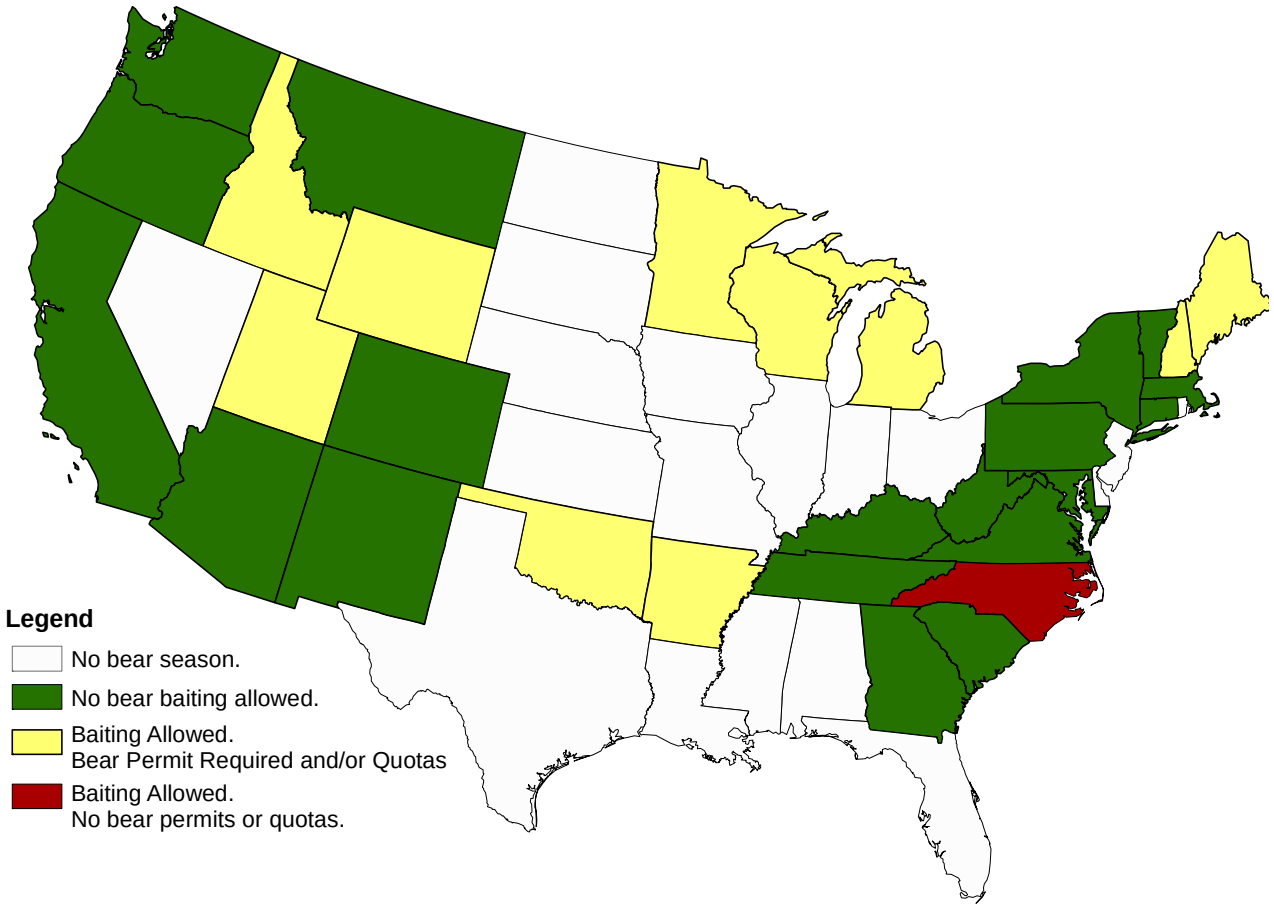

Figure 1. Bear hunting seasons, baiting prohibitions, and permits and/or quota systems in the United States (excluding Alaska, in which baiting is allowed and a hunting permit is required).

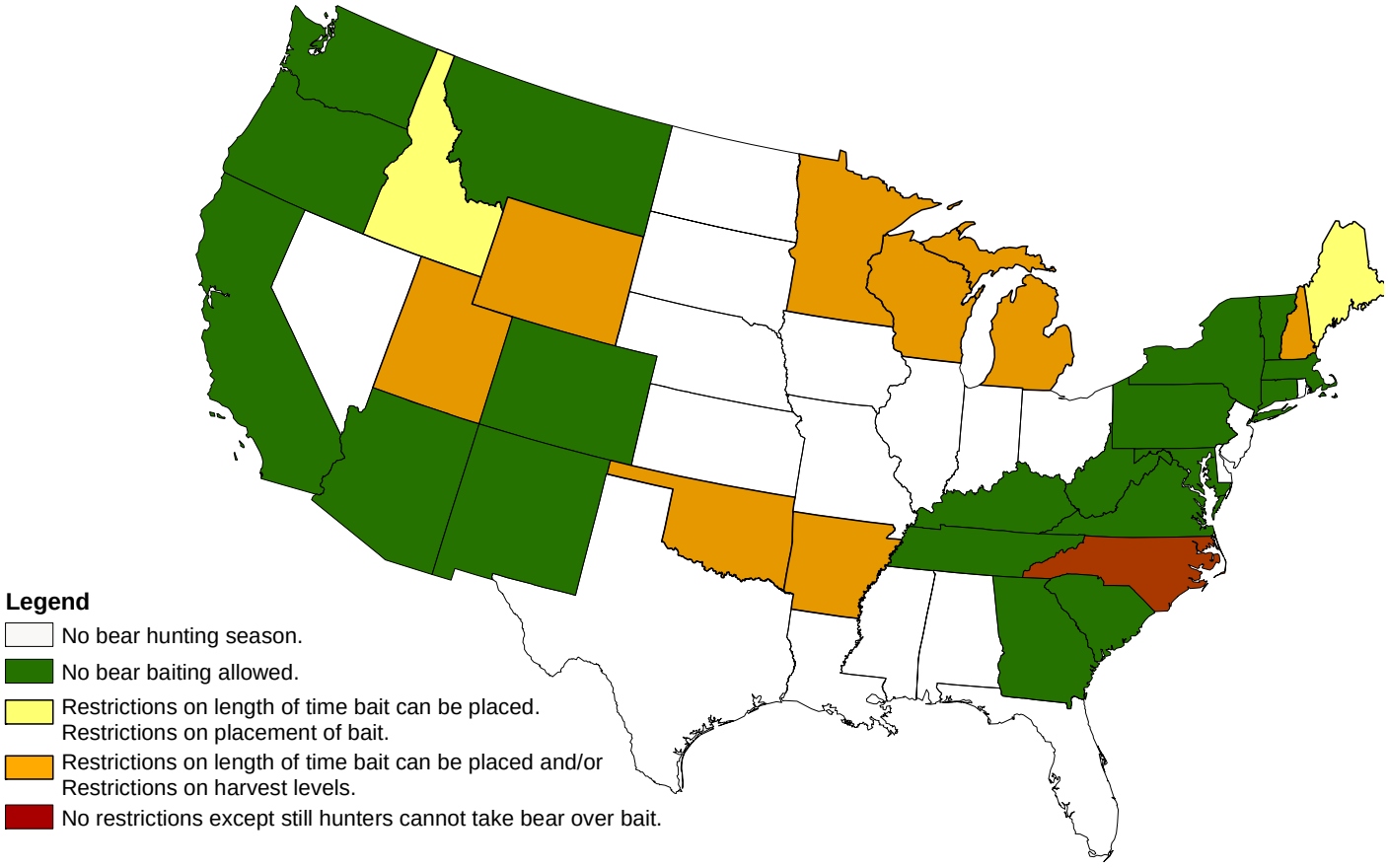

Figure 2. Bear hunting seasons and baiting restrictions in the United States (excluding Alaska in which baiting is allowed with restrictions).

Bear Baiting in Southeastern States

In the southeast, seven of 10 states with a bear hunting season prohibit hunters from using bait to take bears. Bear biologists in states that prohibit or restrict the use of bait have identified 6 reasons for the prohibitions and restrictions:

- overharvest concerns due to increased hunter success,
- increased nuisance activity in areas baited by hunters,
- litter and trash issues,
- concerns about nutritional impacts and disease transmission,
- concerns about changes in bear behavior and increased intra-specific interaction, and
- ethical and philosophical concerns about using bait as a technique for managing bear populations.

The Wildlife Society's Position on Baiting Wildlife

The Wildlife Society, a professional organization of wildlife biologists, issued a position statement in 2007 on the issue of baiting wildlife (Appendix D), identifying nine management concerns created by baiting:

- concentrating wildlife at greater than natural densities;
- increasing direct and indirect contact among wildlife species;
- increasing wildlife habituation to humans, and detracting from wild behavior;
- increasing likelihood of disease transmission within and among species, and maintaining endemic disease reservoirs;
- reducing home range size, increasing fecundity, and affecting carrying capacity;
- causing habitat damage in areas of baiting sites;
- significantly affecting populations of non-target wildlife species;
- increasing intra-and inter-specific competition and stress among and within target and non-target wildlife populations; and
- redirecting attention, resources, and effort away from wildlife habitat management on private and public lands and often forcing management agencies to divert resources from habitat and population management to address disease outbreaks, eradication efforts, and related monitoring of affected population.

Management in States that Allow Bear Baiting

The 11 states other than excluding North Carolina that allow bear baiting appear to have successfully maintained bear populations at levels consistent with bear management objectives. However, these states placed restrictions on the use of bait (e.g., type of bait, placement of bait, length of time, baiting permits; Figure 2; Appendix C), require a bear tag, and/or implemented harvest quotas (Figure 1) in order to assure that baiting would not lead to human-bear conflicts, decline in health of bear populations (e.g., disease or nutritional condition), or result in unacceptable population declines due to increased hunter success. Arkansas allows the use of bait in taking bears, but restricts baiting to certain bear hunting zones and in these zones, harvest quotas exist. When the bear harvest quota is met, the bear hunting season is closed in that zone. Oklahoma does not have baiting restrictions, but does require hunters to purchase a bear license to take bear and closes the bear hunting season when 20 bears have been killed. North Carolina restricts the type of bait (i.e., unprocessed foods only) and allows the use of bait for hunting bears by houndsmen only.

Bear Behavior, Hunter Behavior, and Baiting

Bears are more likely to be attracted to bait during years when natural foods (e.g., hard mast, soft mast, agricultural crops) are scarce. Researchers in Minnesota found that both male and female black bears were more attracted to human-related food (Noyce and Garshelis 1997). Hunter success and mean age of female bears harvested increased in years of poor natural foods, likely due to their increased vulnerability to hunting from increased movements. In 2009, North Carolina's mountain region experienced a mast failure; harvest increased 40% from the prior year and exceeded 1,000 bears for the first time since record keeping began. Due to the mast failure, bears were more vulnerable to harvest due to increased movements to search for food and increased interest in unnatural foods.

In New Hampshire, harvest levels by hunters using bait increased during years when hard mast was scarce. Female bears were more vulnerable to harvest; they comprised more of the harvest by hunters using bait during poor mast years. In 2006, a good mast year, 30% of the bears killed in New Hampshire by hunters using bait were females (New Hampshire Fish and Game 2006). In 2007, a poor mast year, 42% of the bears killed by hunters using bait were females (New Hampshire Fish and Game 2007). The following year was a good mast year and the percent of females killed by hunters using bait declined to 36% (New Hampshire Fish and Game 2008).

Baiting also influences bears by concentrating them into areas in which they would not naturally occur. Pennsylvania documented adult male bears exhibiting dominance behavior at bait stations, sometimes resulting in aggressive behavior. In an investigation of an illegal bait site, enforcement officers found a bear cub mauled and killed by a dominant bear.

Hunters using bait have stated that viewing bears at bait sites allows them to select for larger (i.e., older) male bears and avoid killing females with nursing cubs. No data are available from North Carolina, however, to confirm or refute this belief. In New Hampshire, hunters using bait killed a higher ratio of males than hunters not using bait (Appendix E, Table 1). In Idaho, age of bears harvested by still hunters, both with and without bait, was slightly lower than bears harvested by houndsmen (Beecham and Rohlman 1994), but results were not significantly different.

Evidence from other states indicates that the use of bait increased hunter success, and consequently harvest levels (Appendix E). These states were able to collect this information and make scientifically-sound decisions regarding manipulations to their season structure or permitting systems due to their ability to identify their bear hunters on an annual basis.

Baiting could decrease human-bear conflicts by facilitating bear hunting near areas of high human densities or where property size precludes the use of hounds. Conversely, it could increase human-bear conflicts by attracting bears to areas of high human densities or to habitats that would not naturally support a bear population.

Considerations for North Carolina

Projected Impacts of Baiting

Hunter success data from North Carolina is limited because we cannot identify bear hunters and we have no data differentiating among hunting methods (i.e., baiting, no baiting, still, houndsmen). We do, however, have data from the 2005 and 2007 hunter harvest surveys. This mail survey is sent to a sample of Big Game License holders every 2-3 years. During the 2005-2006 hunting season, bear hunters reported a success rate of 13%; baiting was illegal during this season (Table 1). During the 2007-2008 hunting season, when baiting was permissible for houndsmen, the reported success rate for bear hunters (both still and houndsmen) increased to 17%. This increase in success rate should be interpreted with caution, however, as the response rate was low from hunters that indicated they hunted bear, resulting in a high standard error and low confidence in the results.

Table 1. Results of the 2005-06 and 2007-08 Hunter Harvest Survey conducted by the WRC.

	Bear Hunters	Hunting Days	Estimated Harvest[1]	Kill per Unit Effort[2]	Success Rate
2005 season	17,369	112,633	2,290	0.02	13.2%
2007 season	18,393	132,031	3,148	0.02	17.1%

[1] Estimated bears harvested based on hunter harvest survey.
[2] Kill per unit effort calculated by dividing the number of bears harvested by the number of days hunted.
[3] Success rate calculated by dividing the number of bears harvested by the number of bear hunters.

To manage bear harvest at sustainable levels, other states that allow baiting have placed restrictions on season length and timing of bait placement, and have issued bear permits/licenses and/or implemented bear harvest quotas (Appendix C). If baiting is allowed for all bear hunters in North Carolina, we recommend that similar restrictions be considered for implementation to insure that bear harvest levels remain sustainable.

Bear Hunter Survey

From 1986 through 2006, bear harvest levels increased 340% while the population grew an estimated 167%. Hunters annually harvested an average of 16% of the bear population during this time period. The WRC was able to provide sustainable bear hunting opportunities and increased harvest levels while still allowing for bear population growth. In a 2005 survey of bear hunters, 72% generally supported how the WRC managed bears. Bear hunters were supportive during a period when baiting was prohibited and indicated they were satisfied with bear hunting opportunities in North Carolina. The 20-year prohibition on baiting did not reduce bear hunting opportunities, but, rather, likely expanded them.

North Carolina bear hunters are conflicted on the use of bait for hunting bears. While 54% of bear hunters approved of hunting bears from stands over bait, a plurality (49%) disapproved of hunting bears with dogs by tracking them from bait. If baiting were allowed up to 10 days prior to the opening of the bear season, a majority of bear hunters (58%) approved of using bait. In addition, a plurality (49%) of bear hunters believed the current abundance of bears was about right, while 35% indicated that bear abundance was too low. With increased hunter success, increased harvest levels may result in lowered bear abundance, which would be counter to the desires expressed by bear hunters in this survey.

Recommended Bear Harvests

North Carolina's bear population estimates and growth rates are generated using a population reconstruction model through which the population size in a particular year is estimated for the third year prior to the most recently collected data. For example, once age data were available from the 2009 bear hunting seasons, the model estimated the bear population through 2006. Therefore, impacts of harvest on the bear populations are not known until 3 years after a change has occurred. Because of this lag time in evaluating the impacts of regulatory changes, caution should be taken in setting very specific harvest levels for bears. In addition, our sparse data on bear hunter effort makes it difficult to identify factors that influence changes in harvest levels and bear populations. As additional data are obtained (i.e., age and sex composition of harvest), recommended harvest levels may change based on recalculations of population growth rates.

Bears have the second lowest reproductive rate of any North American land mammal, resulting in relatively slow population recovery if over harvested. Traditionally, harvest has been successfully managed by manipulating season length, season timing, and bag limits. Other states have investigated using their harvest and population data to determine sustainable harvest rates and have found rates ranging from 15% (McLaughlin 1998) to 28% (Bridges 2005) of the estimated bear population. In Virginia, Bridges (2005) predicted that population growth would cease if ≥28% of the estimated bear population was harvested and females comprised up to 47% of the harvest.

WRC biologists will continue to use existing techniques and investigate new techniques to determine if our harvest data can provide sufficient information on current and future bear population trends. Until new techniques are found, we will base our recommended harvest levels on data obtained from the reported harvest and from minimum population estimates calculated from our population reconstruction model.

Based on currently available data, we recommend different harvest ranges for North Carolina's two bear populations:

> Mountains.- For this bear population to be sustained reported harvest should not exceed 19-23% of the minimum estimated bear population, and females should comprise ≤ 40% of the reported harvest. These criteria translate into a recommended harvest of 873-1,057 bears during 2010.
>
> Coastal Plain. - Reported harvest should not exceed 14-16% of the estimated coastal bear population and females should comprise ≤ 40% of the reported harvest for this bear population to be sustained. These criteria translate into a recommended harvest of 1,317-1,410 bears in the coastal population during 2010.

As additional harvest data are obtained and monitoring techniques improve, these recommendations may change based on recalculations of population growth rates.

Option A: Prohibit Any Take of Bears with the Use or Aid of Bait (DWM Preferred Option).

Recommended Changes in Season Structure

Prohibiting the take of bears with the use or aid of bait would allow the WRC greater flexibility in prescribing bear management through regulations. According to a 2005 survey of bear hunters, a plurality (49%) of hunters felt that the duration of the bear season in the county they spent the most time bear hunting was the right length. In addition, most bear hunters (68%) felt that the timing of the bear season was about right. Under Option A, we recommend that current season structures (e.g., season lengths timing, and bag limits) remain unchanged, but that we retain the possibility of altering season length, opening new areas to bear hunting, and/or increasing permitted hunting opportunities in the future if biological data support such changes.

Projected Impacts

Disallowing the use of bait for all hunters would mimic bear baiting policies during 1986 - 2006. During this period, bait was prohibited, harvest levels were sustained, and bear numbers

increased. These conditions allowed for incremental increases in bear hunting opportunities (e.g., expanded seasons, expanded areas opened to hunting, and permitted hunts on bear sanctuaries). Prior to the 2007 change to the baiting statutes, 72% of bear hunters expressed support for how our agency managed bears.

Option A does not, however, address the complexity of enforcing prohibitions on taking bears with the use or aid of bait in areas where there is overlap between the bear and deer hunting seasons, during which hunting deer over bait on private lands is legal. There are at least two significant enforcement issues related to bear baiting that will be relevant if taking bears with the use or aid of bait is prohibited.

Hunting in the proximity of an active deer bait site.

Enforcing a prohibition on taking bears with the use or aid of bait is complicated by the practice of baiting deer on private lands. Many baits used to attract deer also attract black bears, thus a deer bait site can be indistinguishable from a bear bait site. From an enforcement perspective, the distinction is clear because under Option A taking of bear with the aid of bait is prohibited, regardless of the purported target of the bait. However, from the bear hunters' perspective, deer bait sites can be problematic in that they may take a bear in proximity to an active and unknown deer bait site.

Under Option A, a bear hunt using dogs could not legally start or conclude at an active deer bait site, as such activities would constitute taking of bear with the aid of bait. Nor would a still hunter be allowed to take a bear with the aid of bait. The issue becomes more complex for hunts that begin or end at varying distances from the bait or for a hunter who may not be aware of a near-by, active deer bait site. Currently, there are no biological data indicating the distance from a bait site in which a bear's behavior would not be influenced by that bait. A biologically defensible exclusionary distance could not be established unless research was initiated to examine this question.

Hunting in proximity to an inactive bait site

In North Carolina, there is no required withdrawal period in which bait for bears must be removed before hunting can occur at or near the site. There is a required withdrawal period for wild turkey; bait must be removed 10 days prior to taking a wild turkey from an area in which bait has been placed. The absence of specific guidance on withdrawal periods introduces uncertainty among bear hunters on the legality of hunting in areas where bait has previously been placed, but removed.

There is an absence of data demonstrating the amount of elapsed time needed for bears' movements to cease being influenced by the former bait site. It would be beneficial to conduct research to evaluate the behavior of bears following removal of bait from a site. The results of this project would provide the basis for prescribing a withdrawal period within which a significant percentage of bears cease being influenced by the site.

Some other states require a withdrawal period for bait prior to the hunting season for bear, deer, wild turkey and other wildlife species. These withdrawal periods range from 10 to 30 days.

Recommendations under Option A

- Seek revision of NCGS § 113-291.1 to prohibit any taking of bears with the use or aid of bait.
- Establish statutes and NCAC rules sufficient to require the removal of bear bait 10 days prior to the start of the bear hunting season.
- In the NCAC, define a “cleaned” bear bait site.
- Evaluate the feasibility of establishing in NCAC rule an exclusionary zone around deer bait sites within which a bear could not be taken.
- Initiate research on relevant questions regarding bear behavior and movements in response to baiting.

Option B. Allow All Hunters to Take Bears with the Use or Aid of Bait

Recommended Changes in Season Structure

Establish Quota Hunt System

Without additional data on hunter effort, impacts on the bear population due to further changes in the baiting statute will be difficult to accurately quantify. As stated, our bear population estimates and growth rates are based on a population reconstruction model and impacts of harvest are not known until three years after any change has occurred. Unless improved monitoring mechanisms are implemented, it will not be possible for WRC biologists to accurately monitor how the use of bait impacts harvest levels and bear populations. An annual survey would provide data on a shorter time frame; this would not only enable us to better monitor harvest levels and bear populations, but would also enable us to respond more rapidly through regulation changes if overharvest occurred. Identifying bear hunters would enable us to survey them annually in order to gain data on hunter success by method of take (i.e., still, hounds, bait, no bait), and assess how hunting methods impact harvest levels.

A mechanism to identify bear hunters could be to establish a bear hunting license/stamp or under Option B a quota system using a prescribed number of permits/licenses/stamps. Under Option B, we recommend establishing a quota permit system to limit bear harvest levels to those recommended herein. Such a quota system would also enable us to identify bear hunters and directly manage harvest at recommended levels (example in Appendix F). However, under a quota permit system not all license holders with the big game hunting privilege would have the opportunity to annually kill a bear.

Seek Authority to Regulate Use of bait

Currently, baiting on private lands is regulated by the General Assembly. As previously stated, excluding North Carolina, all 10 states that allow bears to be taken by aid of bait have additional restrictions (Figures 1 and 2). To manage bear harvest at sustainable levels, these states implemented restrictions, such as duration, location, amount, and type of bait, and/or baiting permits (Appendix C). The WRC does not currently have authority to establish such restrictions through rule making, except on game lands.

Ensure Regulatory Authority fort Bear Hunting Season Structures

Because baiting is regulated by the General Assembly, if over-harvest of bears occurs, the WRC would only be able to respond by changing season structure (e.g., shortening season lengths). If Option B is implemented, there will likely need to be reductions in season length unless other restrictions (e.g., baiting restrictions, quotas) are implemented. Shortening the bear hunting season will be unfavorable to bear hunters (72% were opposed to decreasing bear season length to meet our population goals). Developing recommendations for season lengths in bear management units (BMU) will take additional time and analyses beyond that reported herein.

Under Option B, we would recommend implementing a bear quota system using permits. If such a system using permits is implemented, other aspects of the season structure could potentially be liberalized, including season length and areas open to hunting, because bear harvest levels would be controlled by the number of permits issued. A permit system would provide a framework in which we

could annually modify the number of permits based on harvest levels and bear population objectives within a region or BMU.

Recommendations under Option B:

- Establish a quota hunt system with total bear harvest regulated by an annual allocation of permits as specified herein.
- Seek authority from the General Assembly to regulate the use of bait (e.g., location, amount, type) through rule.
- Maintain regulatory authority to adjust bear harvest season structure as needed.
- Limit baiting to unprocessed foods only.
- Implement a mechanism to identify North Carolina bear hunters prior to the first bear season in which baiting by all hunters is legal.
- Implement an annual survey of bear hunters.

Option C. No Change in the Current Baiting Statute as it Pertains to Bears.

Recommended Changes in Season Structure

From 2000 through 2006, there was an annual average increase in the statewide bear harvest of 5%. From 2007 through 2009, the number of bears harvested annually increased an average of 11%. Based on currently available data, it is unclear if the increase in the rate of change in annual bear harvest is due to changes in the legality of baiting by houndsmen or changes in other factors (e.g., food abundance, bear population, and/or hunter effort). An increase in bear hunter success was observed between 2005 and 2007, while there was no change in kill per unit effort (Table 1). During the 2005 season statewide hunter success was 13%, whereas in 2007 statewide hunter success was 17%. Kill per unit effort remained at 0.02 for both survey years. However, there was high variability in both surveys due to under-sampling of bear hunters. Without additional data on hunter effort and success rates, it continues to be difficult to determine with any level of certainty whether the 2007 change in the baiting statue had any impacts on the bear population.

If no change in the bear baiting statute occurs, it is recommended the season structure (e.g., season length, season timing, bag limits) remain unchanged until more data are available to determine if current baiting laws are negatively impacting bear harvest levels and/or populations. To increase our ability to determine impacts of changes in bear management on bear populations and hunting, we must implement an annual survey of identified bear hunters in order to collect data on annual hunter effort, annual bear hunter success rates, and age composition of the harvest.

Recommendations under Option C:

- Seek authority from the General Assembly to regulate the use of bait (e.g., location, amount, type) through rule.
- Maintain regulatory authority to adjust bear harvest season structure as needed.
- Initiate research on relevant questions regarding bear behavior and movements in response to baiting.
- Implement a mechanism to identify North Carolina bear hunters prior to the first bear season in which baiting by all hunters is legal.
- Implement an annual survey of bear hunters.

Appendix A.

GENERAL ASSEMBLY OF NORTH CAROLINA

SESSION 2007

SESSION LAW 2007-96
SENATE BILL 1246

AN ACT TO PROHIBIT PLACEMENT OF PROCESSED FOODS IN AREAS WHERE THE WILDLIFE RESOURCES COMMISSION HAS SET AN OPEN SEASON FOR TAKING BLACK BEARS.

The General Assembly of North Carolina enacts:

SECTION 1. G.S. 113-294 is amended by adding a new subsection to read:

"(r) It is unlawful to place processed food products as bait in any area of the State where the Wildlife Resources Commission has set an open season for taking black bears. For purposes of this subsection, the term "processed food products" means any food substance or flavoring that has been modified from its raw components by the addition of ingredients or by treatment to modify its chemical composition or form or to enhance its aroma or taste. The term includes substances modified by sugar, honey, syrups, oils, salts, spices, peanut butter, grease, meat, bones, or blood, as well as extracts of such substances. The term also includes sugary products such as candies, pastries, gums, and sugar blocks, as well as extracts of such products. Nothing in this subsection prohibits the lawful disposal of solid waste or the legitimate feeding of domestic animals, livestock, or birds. The prohibition against taking bears with the use and aid of bait shall not apply to the release of dogs in the vicinity of any food source that is not a processed food product as defined herein. Violation of this subsection constitutes a Class 2 misdemeanor."

SECTION 2. This act becomes effective 1 October 2007.

In the General Assembly read three times and ratified this the 14th day of June, 2007.

s/ Beverly E. Perdue
President of the Senate

s/ Joe Hackney
Speaker of the House of Representatives

s/ Michael F. Easley
Governor

Approved 7:11 p.m. this 20th day of June, 2007

Appendix B. Hyde and Tyrrell County Resolutions on Baiting

COUNTY OF HYDE

Board of Commissioners
Tom Davis, Chair
Sharon Spencer, Vice-chair
Anson Byrd
Ken Collier
Darlene Styron

30 Oyster Creek Road
PO Box 188
SWAN QUARTER, NORTH CAROLINA 27885
252-926-4400
252-926-3701 Fax

David M. Smitherman
Interim County Manager
Clerk to the Board

Sid Hassell
County Attorney

August 19, 2010

Mr. Steve Windham
Chairman of the North Carolina Wildlife Resources Commission
2688 River Road SE
Winnabow, N. C. 28479

Dear Mr. Windham,

The Hyde County Commissioners at their last meeting on August 2, 2010, asked that a resolution be sent to the NC Wildlife Resources Commission, its members and others regarding bear baiting.

The Board of Commissioners feel that bear hunting without the use of dogs should have the exact same rules and regulations as those that use dogs. They have asked that the commission consider this resolution and apply it to Hyde County.

After all the debate that has surrounded this issue Hyde County would be a good test place to see how the bears would react and adapt to this type of hunt. Hyde has a large population of bears and hunters come from all over the state to hunt during bear season.

We would be a good place to test this out, if not permanently, then for a trial period of 6 months or a year. This would allow both sides of the debate to gather data needed to have a definitive answer.

Sincerely,

David M. Smitherman
Interim Manager, Hyde County

cc: Wildlife Resources Commission Members
Senator Marc Basnight
Representative Tim Spear
Gordon Myers, Executive Director of Wildlife Resources Commission

RECEIVED
AUG 20 2010
NCWRC DIRECTOR'S OFFICE

COUNTY OF HYDE

30 Oyster Creek Road
PO Box 188
SWAN QUARTER, NORTH CAROLINA 27885
252-926-4400
252-926-3701 Fax

RESOLUTION

REQUESTING PERMISSION FOR THE

STILL OR STAND HUNTING OF BEAR OVER BAIT IN HYDE COUNTY

WHEARAS, Hyde County is a desired destination for those that hunt bear; and,

WHEREAS, bear hunting has a positive impact on the economy of in Hyde County and numerous businesses rely on the sport for their productive livelihood; and,

WHEREAS, the North Carolina Wildlife Resources Big Game Committee is considering changes to the current rules on the baiting of bear; and

WHEREAS, an inequality exists between still or stand hunting of bear and the hunting of bear with dogs as it related to baiting of the bear; and

WHEREAS, Hyde County believes that stand or still bear hunting deserves the same rights as those hunting bear with dogs; and,

NOW, THEREFORE BE IT RESOLVED, that Hyde County respectfully requests the North Carolina Department of Wildlife Resources Commission to allow the taking of bear with the use of natural bait by all hunters in Hyde County.

Duly adopted this the 2nd day of August, 2010

Geo. Thomas Davis, Jr., Chairman
Hyde County Board of Commissioners

ATTEST:

David M. Smitherman, Clerk to the Board

Tyrrell County Board of Commissioners
P.O. Box 449
Columbia, North Carolina 27925
Telephone (252) 796-1371

RESOLUTION
REQUESTING PERMISSION FOR THE
STILL OR STAND HUNTING OF BEAR OVER BAIT IN TYRRELL COUNTY

WHEREAS, Tyrrell County is a desired destination for those that hunt bear; and,

WHEREAS, bear hunting has a positive impact on the economy in Tyrrell County and numerous businesses rely on the sport for their productive livelihood; and

WHEREAS, the North Carolina Wildlife Resources Big Game Committee is considering changes to the current rules on the baiting of bear; and

WHEREAS, an inequality exists between still or stand hunting of bear and the hunting of bear with dogs as it relates to baiting of the bear; and

WHEREAS, Tyrrell County believes that stand or still bear hunting deserves the same rights as those hunting bear with dogs; and

NOW THEREFORE BE IT RESOLVED, that Tyrrell County respectfully requests the North Carolina Wildlife Resources Commission to allow the taking of bear with the use of natural bait by all hunters in Tyrrell County.

Adopted this 21st day of September, 2010.

Anthony F. Sawyer

Anthony F. Sawyer, Chairman

ATTEST:

Penny Rhodes Jones

Penny Rhodes Jones, Clerk to the Board

Appendix C. Baiting regulations among states that have a bear harvest season.

State	Bear Season	Bait Allowed	Bait Permits?	Bait Restrictions?	Harvest Quotas	Bear Permit/License
Arizona	Yes	No	N/A	N/A	Yes	Yes
California	Yes	No	N/A	N/A	Yes	Yes
Colorado	Yes	No	N/A	N/A	Yes	Yes
Georgia	Yes	No	N/A	N/A	No	No
Kentucky	Yes	No	N/A	N/A	Yes	Yes
Maryland	Yes	No	N/A	N/A	Yes	Yes
Massachusetts	Yes	No	N/A	N/A	No	Yes
Montana	Yes	No	N/A	N/A	Yes (certain zones)	Yes
New Mexico	Yes	No	N/A	N/A	Yes	Yes
New York	Yes	No	N/A	N/A	No	Yes
Oregon	Yes	No	N/A	N/A	N/A	Yes
Pennsylvania	Yes	No	N/A	N/A	No	Yes
South Carolina	Yes	No	N/A	N/A	No	Yes
Tennessee	Yes	No	N/A	N/A	No	No
Vermont	Yes	No	N/A	N/A	No	No
Virginia	Yes	No	N/A	N/A	No	No
Washington	Yes	No	N/A	N/A	No	Yes
West Virginia	Yes	No	N/A	N/A	No	No[14]
Alaska	Yes	Yes	Yes	Yes[1]	No	Yes
Arkansas	Yes	Yes	No	Yes[2]	Yes	No
Idaho	Yes	Yes	Yes	Yes[3]	No	Yes
Maine	Yes	Yes	Yes	Yes[4]	No	Yes
Michigan	Yes	Yes	No	Yes[5]	Yes	Yes
Minnesota	Yes	Yes	No	Yes[6]	Yes	Yes
New Hampshire	Yes	Yes	Yes	Yes[7]	No[8]	Yes
North Carolina	Yes	Yes[9]	No	Yes[9]	No	No
Oklahoma	Yes	Yes	No	No	Yes[10]	Yes
Utah	Yes	Yes[11]	Yes	Yes[11]	Yes	Yes
Wisconsin	Yes	Yes	No	Yes[12]	Yes	Yes
Wyoming	Yes	Yes	Yes	Yes[13]	Yes	Yes

[1] Alaska: Bait site must be registered with state.
Restriction on time of year that bait can be placed.
Restrictions on where bait site can be located in proximity to water, houses, dwellings, roads, trails, campgrounds, and recreational areas.
Bait station must have sign with registration number.
Bait is prohibited in certain regions.
ADF&G may prohibit baiting in an area.

[2] Arkansas: Bait only allowed in certain bear hunting zones.
Restrictions on time of year that bait can be placed.

[3] Idaho: Restrictions on location of bait in relation to water, houses, dwellings, roads, trails, campgrounds, administrative sites.
Restriction on time of year that bait can be placed.
Restrictions on containers that can be used for baiting.
Bait location must be marked with tag supplied by the state.
Bait prohibited in certain zones.

[4] Maine: Can only use bait to hunt bears from August 25th to September 20th.
Restriction on type of bait.
Restrictions on time of year that bait can be placed.
Restriction on location of bait in relation to travel way, permanent dwellings, solid waste disposal site and campgrounds.
The stand, blind, or bait area is plainly labeled with a 2 inch by 4 inch tag with the name and address of the baiter.
[5] Michigan: Restriction on time of year that bait can be placed.
Bait must be inaccessible to deer.
Hunter can have up to three bait stations.
[6] Minnesota: Restriction on time of year that bait can be placed.
Tag displaying hunter's identification must be displayed at bait site.
[7] New Hampshire: Restriction on time of year that bait can be placed.
Can only use bait to hunt bears during portion of entire bear hunting season.
[8] There are no quotas, but NH Fish & Game Dept. has closed the bear season early in response to high female harvest.
[9] North Carolina: The prohibition against taking bears with the use and aid of bait shall not apply to the release of dogs in the vicinity of any food source that is not a processed food product.
Only unprocessed foods can be used as bait.
[10] Oklahoma: Season closes after 20 bears have been harvested.
[11] Utah: Only holders of limited-entry archery permit can use bait to hunt bears.
Restriction on time of year that bait can be placed.
Restriction on location of bait in relation to water, permanent dwellings, roads, trails and campgrounds.
Cannot take bear over bait with dogs or firearm.
Must receive certificate of registration to set up a bait station.
[12] Wisconsin: Restriction on time of year that bait can be placed.
Restrictions on location of bait in relation to
Restrictions on type of bait.
Restriction on types of containers that can be used for bait.
Restriction on amount of bait that can be placed (maximum=10 gallons).
Automated feeders are prohibited.
Bait must be inaccessible to deer.
[13] Wyoming: Restriction on time of year that bait can be placed.
Restriction on location of bait in relation to
Bait site must be registered with Wyoming Game & Fish Department.
Bait site must be marked with registration number.
Certain areas are closed to using bait for bear hunting.
[14] West Virginia: WVDNR is currently attempting to implement a separate bear tag/license.

Appendix D: Final TWS Position Statement – Baiting and Supplemental Feeding of Game Wildlife Species

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Final TWS Position Statement

Baiting and Supplemental Feeding of Game Wildlife Species

Humans have baited wildlife species since the early history of human/wildlife interactions and human dependence on wildlife. The purpose was to attract wildlife to a specific location where the likelihood of capture or harvest was enhanced, a practice that continues among some hunters and trappers today. From the infancy of wildlife restoration efforts in North America to the present, baiting and supplemental feeding have been useful management tools to capture live wildlife, including threatened and endangered species, for restoration or reintroduction; for monitoring population trends; and other research and management programs. However, pioneers in wildlife management including Leopold in 1933 and Allen in 1954 understood clearly the need for careful regulation of public baiting and feeding.

Today, there is significant controversy within the wildlife profession as well as among the public over the real and perceived positive and negative impacts of baiting and supplemental feeding, and the scale on which these practices are used. Further complicating the issues are the many differences in state and provincial regulations on public baiting and feeding of various game wildlife species. State and provincial wildlife agencies charged with the public trust of wildlife management must face complex biological, social, economic, and political issues. Adding to the debate are public interest groups and conservation organizations pursuing ballot initiatives and legislative changes and manufacturers and vendors of feed and feed dispensers who bring economic pressures to bear in lobbying state legislators.

Baiting, as used herein, is defined as the act of intentionally placing food, or nutrient substances to manipulate the behavior of wild species for the purpose of:

a) Attracting wildlife to a specific location to enhance hunter harvest, trapping, or viewing opportunities;
b) Capture and/or treatment of animals for control of infectious and non-infectious diseases and vectors;
c) Reducing or controlling overabundant native or exotic wildlife populations, invasive species, or problem wildlife that pose a threat to human health or safety, domestic animals, or private property;
d) Capturing wildlife for relocation or population augmentation and restoration; and,
e) Capturing wildlife for implementation of research and management programs.

Supplemental feeding, as used herein, is defined as the act of intentionally placing any food for use by wildlife on an annual, seasonal, or emergency basis with the intent of:

a) Providing additional food sources to wildlife in emergency situations when natural foods become unavailable or severely restricted due to natural or human-induced perturbations (e.g. periods of severe drought, winters, or wildfire);

b) Attracting or luring wildlife to alternate locations to reduce damage to agricultural crops, livestock, and timber stands, or to reduce threats to human health and safety;
c) Artificially attracting or concentrating wildlife to enhance recreational opportunities (e.g. hunter harvest, wildlife viewing, photography); and,
d) Attempting to improve the condition of individual animals such as body mass, growth rates, antler size, or population performance such as survival, fecundity, restoration, and growth.

Provision of wildlife openings or food plots planted consistent with accepted local/regional agricultural guidelines is not considered baiting or supplemental feeding in this position statement.

A review of the relevant literature indicates that public baiting and/or feeding of game species may create a variety of potential management concerns, including:

a) Concentrating wildlife at greater than natural densities;

b) Increasing direct and indirect contact among wildlife species;

c) Increasing wildlife habituation to humans, and detracting from wild behavior;

d) Increasing the likelihood of disease transmission within and among species, and maintaining endemic disease reservoirs;

e) Reducing home range size, increasing fecundity, and affecting carrying capacity;

f) Causing significant habitat damage in areas of baiting and feeding sites;

g) Significantly affecting populations of non-target wildlife species;

h) Increasing intra-and inter-specific competition and stress among and within target and non-target wildlife populations;

i) Redirecting attention, resources, and effort away from wildlife habitat management on private and public lands and often forcing management agencies to divert resources from habitat and population management to address disease outbreaks, eradication efforts, and related monitoring of affected populations.

Regional differences in game species management needs and traditional hunting and trapping practices preclude development of a uniform baiting and supplemental feeding policy for adoption by all federal, state, and provincial wildlife management agencies in North America. For example, in some areas throughout North America, small-scale baiting is thought by some to be critical to hunter and trapper success as well as achieving harvest goals of some wildlife management agencies.

However, because public baiting and feeding of game is often detrimental to wildlife resources, the practices merit careful examination of the short and long-term biological, social, and economic impacts that such activities have on wildlife resources and people in North America. The future of wildlife management within North America depends on wild places to naturally support diverse, healthy, and sustainable populations of wildlife compatible with human interests and desires. Public policies that allow or promote baiting and supplemental feeding by the general public may convey the erroneous concept that such practices are suitable replacements for adequate habitat and scientific management of wildlife. A public that associates illegal baiting and/or supplemental feeding with stewardship may be unprepared to understand and act on the real and substantive threats to wildlife sustainability.

The policy of The Wildlife Society in regard to baiting and supplemental feeding of game wildlife species is to:

1. Encourage fish and wildlife agencies to develop education modules to inform and educate the public, professional natural resource managers, administrators, and policy-makers about the potential consequences of baiting and supplemental feeding of game wildlife species.

2. Encourage federal, state, and academic institutions to expand and intensify investigation and monitoring of the full spectrum of all wildlife species affected by baiting and supplemental feeding.

3. Where appropriate, encourage that existing public baiting and feeding practices be replaced by habitat conservation and population management practices to improve food resources and habitat productivity for native wildlife populations.

4. Encourage studies to determine actual spread of pathogens among domestic and wild migratory and upland game birds that are baited or fed in common areas.

5. Encourage efforts to examine the physiological impacts on bears and other wildlife commonly using bait and supplemental feed sites intended for ungulates, and investigate the increased potential for disease transmission between and among bears, ungulates, and other wildlife species at these sites.

6. Encourage the Association of Fish and Wildlife Agencies and all federal, state, and provincial fish and wildlife agencies to cooperate in reviewing and revising their baiting and feeding policies to ensure that they address all costs and benefits to wildlife conservation.

7. Encourage research regarding the impacts of baiting and supplemental feeding on game species home range size, fecundity, behavior, habituation to people, harvest, and disease transmission in all affected species.

8. Renew and expand educational efforts to emphasize the importance of habitat conservation and management as the primary conservation approach for wildlife species, biological diversity, and habitats.

9. Advocate for strengthened authority to be granted to federal, state, and provincial fish and wildlife agencies to regulate supplemental feeding and baiting.

10. Encourage fish and wildlife agencies, wherever possible, to phase-out supplemental feeding of wild ungulate populations, both in-house and by the general public, and to manage populations at levels that are compatible with the long-term carrying capacity of the habitat.

Approved by Council March 2007. Expires March 2012.

Appendix E: Impacts of Baiting on Bear Populations

Hunter Success with Baiting: Examples from Other States

While limited research has been conducted on the impacts of hunting using bait on bear populations, there are indications from other states (see below) that it increases hunter efficiency.

Michigan. - Houndsmen who used bait had a success rate of 32%, whereas success rates of other hunters were 19% for still hunters using bait, 17% for houndsmen not using bait, and 11% for still hunters not using bait (Frawley 2002). Researchers stated that hunter success appeared to be enhanced by using bait, especially when dogs were started from a bait pile.

Idaho. - Bear hunters who used bait were 1.5 times more successful than still hunters not using bait and 4 times more successful than incidental hunters (Beecham and Rohlman 1994). While houndsmen harvested slightly older bears, there were no significant differences in the mean age of harvest among weapon type or hunting method (i.e., hounds, still, bait, incidental). Bear baiting is allowed across most of the state and 38% of bears were harvested using this technique. Still hunting and stalking accounted for 29% of the harvest, incidental 17%, hound hunting 14%, and other techniques 2%.

Maine. - Guides in Maine advertise that hunting bears over bait is an ideal opportunity for a first-time bear hunter to successfully harvest their first bear. Certain guides report success rates of 65% for hunting bears over bait (source: Enhanced Outfitters). In 2007, Maine reported that the low availability of late fall natural food crops resulted in an increased harvest of bears over bait. In 2007, 80% of bears were taken over bait. The use of bait has not been without controversy; in 2004 a ballot referendum allowed voters to determine if baiting, as well as other bear harvest practices (e.g., use of dogs and use of foothold traps) should be prohibited. The referendum was defeated with 53% of voters opposing the prohibitions.

New Hampshire. - The 5-year mean success rate for hunters using bait was 31%, while the mean success rate for still hunters was 2.0% (Andrew Timmons, pers. commun.). Hunters using bait harvested a higher ratio of male bears than still hunters (Table 3), but mean age of harvest did not differ between methods of harvest (Table 4). The percent of the harvest by method has averaged 44% for both bait and still hunters from 2003-2008. Bears harvested by houndsmen comprised 13% of the harvest. It should be noted that the hound season starts three weeks later than the still and bait hunting season. In addition, there is not a strong hound hunting tradition in New Hampshire.

Table 1. Mean harvest sex ratios by method of harvest in New Hampshire.

5-Year Mean (2004-2008)		**N**
Bait	1.49 males per female	1,029
Still	1.26 males per female	1,167
10-Year Mean (1999-2008)		
Bait	1.58 males per female	1,799
Still	1.13 males per female	2,734

Table 2. Mean harvest age by method of harvest in New Hampshire.

5-Year (2004-2008)		Mean
Female	Bait	5.72
	Still	5.30
Male	Bait	3.95
	Still	3.48
10-Year (1999-2008)		
Female	Bait	5.70
	Still	5.33
Male	Bait	4.00
	Still	3.52

Minnesota. - During years when natural foods (e.g., hard mast, soft mast, agricultural crops) were poor, researchers in Minnesota found that both male and female black bears were more attracted to human-related food (Noyce and Garshelis 1997). Hunter success, female harvest and mean age of female bear harvested all increased in years of poor natural foods. At the time of the study, 75% of Minnesota bear hunters used bait to hunt bears.

Hunter Success without Baiting: Examples from Other States and North Carolina.

While baiting can increase hunter success, and consequently harvest levels, there are other methods that can be employed to increase harvest levels, such as hunter skill and knowledge and modifications to hunting seasons.

While baiting is prohibited in Pennsylvania, hunter success actually increased when hard mast was abundant. This was due to hunters locating areas in which mast-producing trees were concentrated, thus increasing the likelihood of encountering a bear (Alt 1980). The state of Washington banned the use of hounds and bait in 1996. Consequently, bear hunting success rates declined. However, Washington then lengthened bear seasons to maintain harvest objectives. Average success rate of bear hunters is 7.2%, which is similar to pre-1996 success rates.

In 1999, the Virginia Department of Game and Inland Fisheries (VDGIF) adopted a regulation that prohibited the feeding of wildlife on national forest and department-owned lands. In July 2003, another regulation was passed to prohibit all feeding of bears year-round, statewide. Feeding was prohibited due to concerns which included: littering, habituation of bears to people, disease implications for other wildlife, changes in bear behavior, hunting in the area of feeding locations, and an abnormal reliance by bears on artificial foods. VDGIF reported harvest levels were not negatively impacted by the feeding ban, likely due to harvest regulatory changes and illegal feeding that occurs during the deer feeding period (January 4 through August 31).

Appendix F: Quota Permit System

If hunting bears with the use or aid of bait is allowed for all hunters, a quota system based on a limited number of permits could be implemented to directly manage harvest at recommended levels. It is difficult to determine the number of permits that should be issued under all possible scenarios because we do not have data on bear hunter success rates under various hunting methods (i.e., still, dogs, bait, no bait). While we do conduct a survey of big game license holders every three years, there is high variability in the survey results due to under-sampling of bear hunters. Our recommended harvest levels and permit allocations are, however, based on these results and the other available data.

If a quota hunt using a permit system is implemented, season lengths could be liberalized because harvest levels would be controlled through the number of permits.

Recommendations for a quota hunt using permits.

1. Each permittee should be allowed to kill one bear each year.
2. Limit the number of permits available in each region or BMU.
    a. The number of permits available will be based on bear population objectives (currently being developed by DWM staff) for each region/BMU.
        - Currently, it is difficult to determine the number of permits needed by BMU because we do not have accurate data on hunter success rates by region or by hunting method (i.e., bait versus non-bait).
        - Based on the 2007-08 hunter harvest survey, hunter success in the mountains ranged from 10% to 23% and coastal hunter success ranged from 13% to 24%. Variation was due to high standard errors caused by low response rate from bear hunters.
        - Due to the anticipated increase in the success of hunters using bait, the maximum success rate from the 2007-08 hunter harvest survey should be used to calculate the number of permits issued.

    b. Using the 2007-08 hunter harvest survey data and recommended harvest levels calculated for 2010, permit allocations should be as follows (Number of permits = (Recommended Harvest) **x** (Regional Hunter Success)):

Table 1. Recommended permits for mountain and coastal regions under current baiting statute.

Region	**Reported Harvest**	**Recommendation**	**Number of Permits[1]**
Mountains	818 (19% of population)	1,057 (23% of population)	3,638 – 4,404
Coastal	1,317 (14% of population)	1,495 (16% of population)	5,530 – 6,278

[1] Based on maximum success rates in mountain (23%) and coast (24%) as reported in 2007-08 hunter harvest survey.

3. Hunters would apply prior to the bear hunting season (i.e., June, July or August).
4. A nonrefundable application fee should be required to apply for a permit.
5. Hunters could apply for both regions, but would indicate a preferred region/BMU.
6. Hunters would be selected to hunt in one region/BMU.

7. A random computer drawing will be used to select permitees for each hunt region/BMU and notifications will be sent out.
8. Party hunts will be allowed, however only the permit holder should be authorized to harvest a bear.
9. Permit holders would be required to respond to a survey and submit both upper pre-molars of the killed bear by January 31 or be ineligible to apply for future bear hunting permits.

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Appendix D

GUIDELINES FOR WRC STAFF IN RESPONDING TO BEAR CONFLICTS WITH HUMANS

(Revised May 2011)

Introduction

Black bear management has become progressively more challenging as human development diminishes historical bear habitats/rural landscape and bears adapt to areas where humans reside. In addition, increased human-bear interactions have led to a need to educate the public about bears and how people need to adapt their behaviors and lifestyle to live in bear country.

Each year, staff of the North Carolina Wildlife Resources Commission (NCWRC) receives numerous requests from concerned citizens, local law enforcement authorities, and government agencies for assistance with human-bear interactions. These problems include bears frequenting areas outside their normal range, destroying and raiding bird feeders, raiding garbage disposal areas, damaging bee hives and agricultural crops, being hit by vehicles, and other miscellaneous complaints.

NCWRC's General Policy for Handling of Bear Situations

The general policy of the NCWRC is that bears will not be trapped unless human safety is threatened. Simply catching and relocating every bear that someone sees is not an option; we have few remote places left to relocate bears where they will not come into contact with humans. Resolving conflicts by moving bears perceived as a problem sends the wrong message about learning to live with bears. Additionally, the process of catching bears is difficult, and can be more dangerous for the bear, the public, and those involved than letting the bear take its natural course.

Bears will not be trapped because they are perceived as a nuisance or as creating a problem. In many cases, people are the cause of the problem, and the best solution usually involves a combination of public education and removal of attractants rather than trapping and destruction of the bear. This general policy addresses the goal of long-term maintenance of our bear population as well as issues of public safety. The following guidelines are developed for NCWRC personnel to address the challenges of managing bears and humans in an effective and professional manner.

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I. Bear Observations

Any employee receiving the report shall determine if the problem is temporary and can be resolved simply by explaining bear habits. If this appears to be the case, use the following information.

A. If report received during spring or summer months, explain reasons for increased bear sightings during this time period.

1) Natural food supplies are lower during this period of the year resulting in increased bear movement to find food.

2) Mating season occurs during June and July resulting in more bear movements.

3) Dispersal of yearlings occurs from May through July. Most bears in a dispersal stage reside in an area for less than two weeks.

4) Emphasize that the major problems facing black bears and the future of bear populations in the state is loss of unfragmented habitat due to human development.

B. If report received during fall months, explain that natural food sources, such as acorns and fall fruits, may be in low supply resulting in increased bear movements to find food.

C. Caution complainants about provoking bears or feeding bears. Inform citizens that feeding bears endangers both bears and the public.

1) All food items such as grain, garbage, pet food, bird food, horse feed and other potential food should be stored in a location inaccessible to bears.

2) All outside cooking units should be cleaned and cooking grease should not be poured on the ground.

3) Explain that feeding will condition the animal to remain in the area and could cause an escalation in bold behavior as the bear becomes habituated to human foods.

D. Reassure the complainant that the bear likely will leave in a short period of time if food sources are removed. Advise interested persons and authorities that transient bears are not dangerous unless provoked or fed and that it is unlawful to harm them. Offer the address to our website (www.ncwildlife.org), educational pamphlets and provide phone numbers for convenient contact with local Wildlife Enforcement Officers (WEO) and District Wildlife Biologist (DB).

Note: Complete a Black Bear Complaint Report (Appendix i) or document the complaint using another means. Documentation has proven invaluable in situations that escalated and required review of staff actions. DBs should record the report in the “Bear Complaints and Observation” excel database.

II. Bears that are Treed or within Suburban and Urban Areas

The Wildlife Commission employee that receives the initial complaint should:

A. Determine if the bear poses a threat to public safety or property or if the bear is significantly threatened.

B. Bears treed in urban areas should be handled jointly by the closest available WEO and closest available DB if it remains in the tree for over 24 hours without human disturbances.

C. If the bear is located in a populated area and human onlookers are a problem, advise local authorities that we will not anesthetize a bear because state statute does not authorize Division of Wildlife Management (DWM) personnel to use controlled substances. Advise authorities that their best course of action is to clear the area of all disturbances (such as people, traffic, or dogs) and allow the bear to leave the area on its own. Bears may not leave until after dark under the best of circumstances. Under no circumstances should local authorities or residents be allowed to keep the bear in the area, in a tree, or to harass the bear.

D. If the bear does not leave the area after one or more nights without human disturbances, is injured, or if the safety of the bear or people becomes an issue, then capture, aversive conditioning or euthanasia of the bear becomes an option. **See Section V (page 5) for guidelines**.

E. Where the DB has determined it is appropriate, the assistance of bear houndsmen may be used to chase the bear with hounds out of the area.

1. Where the chase of the bear may result in continued pursuit onto a bear sanctuary, a depredation permit must first be obtained from the DB authorizing this activity on the sanctuary.

2. Each member of the pursuit party participating in the chase should be provided a copy of the depredation permit by their party leader.

3. The term of the permit will be the shortest time necessary to accomplish the objective.

III. Bears that are in Public Use Areas, Campgrounds, and Picnic Areas.

A. All food items such as garbage and other potential food should be stored in a location inaccessible to bears.

B. Facility owners should be encouraged to install bear-proof containers to prevent bears from having easy access to refuse and food.

C. Where the DB has determined it is appropriate, the assistance of bear houndsmen may be used to chase the bear with hounds out of the area (see page 4, section II(E) for stipulations).

D. DWM and Division of Law Enforcement (DLE) personnel may offer aversive conditioning in accordance with the "Guidelines for Utilization of Projectiles for Nuisance Bear Deterrents" (Appendix iii).

IV. Bear that Breaks into Unoccupied Dwelling, Unoccupied Tent or Unoccupied Car.

A. Any employee receiving the report shall determine if the problem is temporary and can be resolved simply by removing or securing food attractants.

B. DWM and DLE personnel may use aversive conditioning in accordance with the "Guidelines for Utilization of Projectiles for Nuisance Bear Deterrents" (Appendix iii).

C. DWM and DLE personnel may issue projectiles to other law enforcement, security personnel, or other qualified State or Federal Employees in accordance with the "Guidelines for Utilization of Projectiles for Nuisance Bear Deterrents" (Appendix iii).

D. Where the DB has determined it is appropriate, the assistance of bear houndsmen may be used to chase the bear with hounds out of the area (see page 4, section II(E) for stipulations).

V. Human-Bear Conflicts that may require the use of aversive conditioning, capture, immobilization or lethal action.

Notes:

- Such actions are to be discretely used only in situations documented to be extreme in nature (see Section V. 1-5). Necessary actions are at the discretion of field staff, but must ensure timely and complete notification of the supervisory chain, preferably prior to an action being taken. However, in cases where no prior notice is possible, the supervisory chain should be informed of all details and actions immediately after actions are taken.

- NCWRC personnel are responsible for ensuring that anyone authorized to kill a bear uses a euthanasia method approved by the American Veterinary Medical Association. Final means will be determined by DWM or DLE personnel.

- Firearms are allowed to be carried by authorized DWM personnel and used when necessary to euthanize a bear when situation allows for appropriate and safe use. DWM personnel are not exempt from municipal ordinances restricting the discharge of firearms unless specifically authorized by municipal authorities.

- Current state statute does not authorize DWM staff to use controlled substances (i.e. anesthetic drugs) for immobilization. Until the state statute is modified, use of anesthetic drugs by DWM personnel is not an option.

- If a bear is captured (refer to section VI, page 6) and controlled substances are needed for euthanasia, DWM personnel will coordinate with the Black Bear Biologist on transport of the bear to pre-approved university or agency (e.g. USDA/Wildlife Services) for euthanasia.

1. Bears that are Injured

A. In the case of vehicle collision or other situations where a bear is injured, DWM or DLE personnel will investigate and exercise one of the following options (see Injured Bear policy in Appendix ii):

1) If injuries are minor and bear can leave the scene, bear should be left undisturbed and allowed to leave on its own.

2) Euthanasia is acceptable for bears suffering from injuries that obviously will lead to death or an inability to function normally in the wild (e.g. broken leg, severe bleeding, unconsciousness, severe head trauma, bleeding from mouth or nose, etc…).

3) DWM and DLE personnel may euthanize bears if public safety is a concern due to injury of the bear.

2. Bear makes Contact with a Human

A. Refer to "Guidelines for NCWRC Response to Bear Attack Resulting in Serious Human Injury or Death."

1) These situations are conditional and can be disregarded in cases where a person was trying to approach, feed, or photograph a bear and was contacted in self-defense. Females with cubs can be especially protective and should not be captured if simply defending offspring.

2) This is for bears that are obviously aggressive and attack a person unprovoked.

B. Any person scratched or bitten by a bear should be advised to seek medical attention for possible rabies exposure. If bear is captured, NCWRC staff should preserve the brain of the bear for testing.

3. Bear Breaks into an Occupied Dwelling, Occupied Tent or Occupied Car.

A. DWM and DLE personnel may use lethal force on a bear found inside or exiting an occupied dwelling, tent, or car.

B. To protect themselves and their property, homeowners may use lethal force on a bear found inside their dwelling.

C. Local law enforcement may use lethal force on a bear found inside an occupied dwelling (i.e. people present in the dwelling).

1) Lethal force should only be used in cases when those inside the dwelling are in immediate danger and are not endangered by the officer's actions.

2) If local law enforcement kills a bear, they should be instructed to contact DWM or DLE staff so that biological data can be collected from the bear.

D. If lethal force is used, this action should be reported to the District Captain, Wildlife Biologist Supervisor II or DB, Black Bear Biologist, and Raleigh Office (RO) staff member as soon as possible using e-mail or telephone.

E. If bear repeatedly returns to an area and continues activity, DWM personnel may place a trap to capture the bear (refer to Section VI, page 6). This may be a useful option if lethal force cannot be used at the problem site and non-lethal techniques have been implemented.

F. If it can be done without risk to human safety, the property owner can be advised to open as many doors as possible to allow the bear to escape.

4. Bear Cornered in a Municipal Area with No Clear Avenue of Escape.

A. Crowd Control: The best course of action is to establish an avenue of escape by claring the area of all disturbances (such as people, traffic, or dogs) and allow the bear to leave the area on its own. Bears may not leave until after dark under the best of circumstances.

B. Only when there is an immediate threat of human injury should the bear be killed at the problem site by DWM and DLE personnel.

1) If it is necessary to kill the bear, this action should be reported to the District Captain, Wildlife Biologist Supervisor II or DB, Black Bear Biologist, and RO staff member as soon as possible using e-mail or telephone.

5. Bear Demonstrates No Fear of People and Aggressive Behavior.

A. DWM and DLE personnel may use lethal force on a bear that demonstrates aggressive behavior and no fear of people.

1) Personnel may capture the bear (refer to Section VI, page 6) and euthanize the bear off-site.

2) Personnel may euthanize the bear on-site if deemed safe and discreet.

B. DWM and DLE personnel may use lethal force on a bear that repeatedly returns to residences after all food sources (bird food, dog food, garbage, etc.) have been removed for one week.

1) A biologist must verify that residents have complied with educational recommendations and eliminated bear attractants for this one week period. The biologist must verify that a public threat is eminent.

C. Such actions are to be discretely used only in situations documented to be extreme in nature. Necessary actions are at the discretion of field staff, but must ensure timely and complete notification of the supervisory chain, preferably prior to an action being taken. However, in cases where no prior notice is possible, the supervisory chain should be informed of all details and actions immediately after actions are taken.

D. In situations where appropriate, DWM and DLE personnel may use aversive conditioning as an alternative in accordance with the "Guidelines for Utilization of Projectiles for Nuisance Bear Deterrents" (Appendix iii).

VI. Procedures for Capture (using anesthetic drugs and/or traps) and Transport of Black Bears

Note: Current state statute does not authorize DWM staff to use controlled substances (i.e. anesthetic drugs). Until the state statute is modified, use of anesthetic drugs by DWM personnel is not an option.

1. Bears should only be captured if criteria outlined in Section V are met.

2. Only trained DWM personnel may set traps or use anesthetic drugs to capture bears. If it is necessary to capture a bear, DWM personnel will make arrangements for the necessary equipment to be dispatched to the scene.

3. Traps may be set without prior authorization from a Private Lands Regional Supervisor or Private Lands Coordinator, but the Supervisory chain must be notified in a timely manner of situations escalating to this point.

4. Traps must be set in a location and manner to minimize the risk of catching non-target species. Traps must be monitored to ensure the humane treatment of any captured bear and to provide for the safety of members of the public that might be in the area. Culvert

traps should be marked with warning signs and monitored to ensure public safety (Appendix v).

5. Only trained DWM personnel may use capture equipment. Except in emergency situations where human safety or safety of the bear is being threatened, capture guns should not be used at night or when the bear is in an elevated position that might result in injury to the bear. Proper procedure for darting a bear in an elevated position requires that the area be clear from electrical or other hazards. Proper equipment and sufficient manpower should be available and in place to absorb the animal's fall without injury to the animal or to those assisting with the capture.

6. All provisions of NCWRC's drug use policy should be followed anytime anesthetic drugs are used. This policy requires any bear drugged within 60 days of or during a North Carolina bear season to be held in captivity at Caswell for 60 days or to be euthanized in order to comply with Federal drug laws and protect the public from consuming tainted meat. Therefore, biologists should use culvert-type traps to capture bears and avoid anesthetic drugs if incidents occur between August 15 – January 1 in the Mountains and September 8 – January 1 on the Coast.

Options for Disposition of Trapped Bears

1. The biologist on site should coordinate with the Private Lands Regional Supervisor or Private Lands Coordinator and determine if circumstances (e.g. bear treed for greater than 24 hrs., bear unable to leave urban area) allow for a given bear to be relocated. DWM Staff should identify several appropriate sites.

2. If a bear has demonstrated unusual aggressive behavior (e.g. entering occupied dwelling, approaching people, injured a person, boldly approaching people, repeatedly creating highway safety issues due to long-term feeding) the animal should be euthanized, discreetly if possible, by field staff using approved measures. This is conditional and can be disregarded in cases where a person is trying to feed, approach, or photograph a bear and is slapped in self-defense (**please see page 6, Section V. 2. A. 1**).

3. If bear is captured and controlled substances are needed for euthanasia, DWM personnel will coordinate with the Black Bear Biologist on transport of bear to pre-approved university or agency (e.g. USDA/Wildlife Services) for euthanasia.

4. In cases where it is necessary to transport bears to the Caswell Facility due to public relations, inability to release or euthanize drugged bears, etc., please follow protocols established in **Section X (page 13)**.

5. All captured, trapped, or euthanized bears should be reported by e-mail using the Captured Black Bear Form. The Private Lands Regional Supervisor or Private Lands Coordinator or DB, Black Bear Biologist, and other involved personnel should be included in the e-mail.

VII. Depredating Bears

The local WEO or DB should conduct the initial on-site investigation. The following information should be utilized as appropriate.

A. Inform the complainant that control measures such as fences, platforms, bear proof garbage receptacles, aversive conditioning, chemicals, and auditory devices may be used to alleviate the problem. If the complainant expresses an interest in any of these approaches, advise complainant to contact the DB for additional assistance.

1. Complete the Black Bear Complaint Report and forward it to the DB or, if quick action is require, contact the biologist by radio and advise him of the problem. If the complainant has no interest in control measures and insists on removing the problem bear, follow Sections C, D, E, or F below.

B. Offer to put the complainant in contact with local bear hunters who may chase the bears with their dogs.

1. The local WEO should be contacted and notified if this option is chosen.

2. Complete the Black Bear Complaint Report and forward it to the DB or, if quick action is require, contact the biologist by radio and advise him of the problem. If the complainant has no interest in control measures and insists on removing the problem bear, follow Sections C, D, E, or F below.

C. Advise the complainant that harvest of problem bears during the legal bear season should be utilized to control the population whenever possible.

D. Advise the complainant that NCWRC policy does not allow for the trapping and relocation of depredating bears.

E. The landowner/farm operator has the option, under NC General Statue 113-274 (c) (1a) and 15A NCAC 10B .0106, to kill a black bear using a firearm without a permit, if the bear is in the act of damaging or destroying the property of the landowner.

F. A depredation permit may be issued by a DB or regional Private Lands Supervisor under 15A NCAC 10B.0106 (a) (2), upon approval by a Section Manager, to authorize the landowner/farm operator to take any black bear which is or has been damaging or destroying his/her property, provided there is evidence of substantial property damage.

All bear depredation permits must be approved by the State and Private Lands Section Manager or the Surveys and Research/Wildlife Diversity Section Manager.

DBs and/or Section Managers should confer with a WEO to ensure that Field personnel should adhere to the following procedures and prepare the depredation permit form prior to submission to the Section Managers.

1. DWM and DLE will specify manner of taking [15A NCAC 10B.0106 (c) (2)]. Live trapping by landowners will not be permitted.

2. "No depredation permit shall authorize the taking of wildlife by any method by any landholder upon the lands of another." [15A NCAC 10B.0106 (c) (2)].

3. Further, "it is unlawful…to intentionally wound a wild animal in a manner so as not to cause its immediate death as suddenly and humanely as the circumstances permit." [15A NCAC 10B.0106 (c) (3)].

4. The term of the permit will be the shortest time necessary to accomplish the control objective. The permit will be issued for only the time that actual damage is occurring and for only the time prior to crop harvest. [15A NCAC 10B.0106 (b)].

5. The number of bears to be taken and term and duration of the permit will be determined by the DB. [15A NCAC 10B.0106 (a) (2)].

6. All permit kills made "shall be reported to the North Carolina Wildlife Resources Commission within 24 hours, following the time of such killing,.. " [15A NCAC 10B.0106 (e)]. At such time arrangements for disposition of carcass and for collection of biological samples will be made. The field person coordinating this will follow procedures outlined in **Section VIII**.

7. Any bears "killed…under depredation permit, shall be buried or otherwise disposed of in a safe and sanitary manner on the property of the landowner in whose name the permit is issued or who kills such wildlife while committing depredations." [15A NCAC 10B.0106 (d) (1)].

8. It is unlawful to possess any portion or part of a bear taken under a depredation permit.

Use of Second Parties:

For situations where a depredation permit is issued, landowners/farm operators may be allowed to use second parties to implement the control actions prescribed on the permit. The names of additional persons may be entered upon the permit as authorized users [15A NCAC 10B.0106 (a) (2)]. The use of second parties to assist landowners with control actions should be used only as a means of assisting landowners experiencing substantial damage. The DB shall determine "substantial damage", whether reasonable attempts have been made to abate the problem through other means, including harvest during the season, and whether the applicant is "incapable of accomplishing the necessary control without "help".

Use of second parties is not intended to provide a second bear season nor is it intended to encourage unnecessary killing of bears. Therefore, the following guidelines should be used to administer the use of second parties on depredation permits. The DB and local WEO should cooperatively administer these second party permits.

1. To be eligible for second party permits, applicants must try different abatement tactics at the advice of the DB and allow harvest of bears during the established season, unless there are circumstances that do not allow for these options. [15A NCAC 10B.0106 (a) (2)].

2. DBs will have the authority to determine if second party use is a viable option. [15A NCAC 10B.0106 (a) (2)]. DBs should confer with DL

3. No more than 3 individuals may be listed as the second party. Additional persons may participate, but may not carry firearms.

VIII. Black Bear Data Collection

Biological data should be collected from all dead black bears using the guidelines listed below.

A. Due to the critical need for accurate black bear population data, DWM and DLE personnel are assigned joint responsibility for collecting black bear mortality data. The DWM will provide the DLE with necessary materials and training for collecting bear data (Appendix vi).

B. Any employee encountering a dead bear (hunter kill, road kill, depredation kill, illegal kill, or other kill) should fill out the information on the tooth envelope and collect both upper premolars (Appendix vi). The location of kill should be noted, preferably using GPS coordinates (UTM or Lat/Long), but can also can be recorded using a County Quad, Block, Square Map. Send the location and completed tooth envelope containing a tooth to the appropriate DB. The DB should complete the mortality data form, including block, square, point of kill location, and attach the envelope to it.

C. It should be considered practical to collect black bear mortality data when on-duty agency personnel are not involved in higher priority assignments and when the collection effort requires less than 2 hours and less than 100 miles travel.

D. Raleigh telecommunicators should contact the DB or closest DWM Crew member during normal working hours (7 A.M. – 5 P.M.) for all bears within a given District. Other DWM field staff should be contacted if DB or Crew members are not available. Outside of normal working hours, DWM field staff should be the first contact for bears within an employee's county of residence. The closest available Enforcement Officer should be contacted for bears outside normal working hours and outside the county of residence of DWM personnel. In these cases, the local Enforcement Officer can determine the status of the situation and arrange later contact with DWM personnel as needed.

IX. Black Bear Carcass Disposal

Agency personnel should use the guidelines below for making decisions on proper carcass disposal.

A. Responsibility for bear carcass disposal will be shared by the DLE and DWM.

B. DBs and WEOs will work jointly to establish sufficient sites for proper disposal of carcasses. The North Carolina Department of Transportation (NCDOT) should be contacted to determine if they will pick up and dispose of road-killed bears. Disposal sites should be established at county landfills for the disposal of bear carcasses that NCDOT will not pick up. DWM will provide disposal sites on game lands where practical.

C. DWM and DLE personnel will have the authority to contract with a local wrecker service to have the bear carcass removed when no other means of transport is practical.

X. Handling Orphaned Bear Cubs or Bears Held Illegally

A. WEOs have the responsibility for responding to cases where an individual is holding a bear cub without authorization. DWM personnel will assist with the seizure of cubs when necessary and transport the cubs to Caswell if necessary.

B. WEOs have the responsibility of determining whether captive bears are lawfully possessed bears and will request assistance from the Division of DWM with seizure when necessary. After obtaining approval from the Raleigh Office, DWM personnel will relocate adult bears to approved release sites or to the Caswell holding facility.

C. Seizure of orphaned and illegally-held bear(s), when practical, should be scheduled to allow direct delivery of the seized animal to the Caswell holding facility between the hours of 0800-1600 on weekdays. DWM personnel should call the Caswell Depot and advise personnel of the expected time of delivery, number, and age of bears being delivered. The investigating WEO's name, pending court action, date of seizure, sex of bear, necessary medical treatment, and the county and district from where the bear was seized should accompany the bear.

- Orphaned or illegally held bears that are habituated to humans and, thus, not suitable for release into the wild should be euthanized. This should be determined by the DB, the Private Lands Coordinator and the Black Bear Project Leader.

D. Any bears seized should be reported using the Captured Black Bear Form. Copies should be e-mailed to the Private Lands Regional Supervisor, Private Lands Coordinator, Black Bear Biologist, the Caswell Facility, and other involved personnel. The Caswell facility should notify the Black Bear Biologist by e-mail when any bear is removed from the facility and returned to the wild, donated to a Zoo, etc.

E. DWM personnel will collect hair samples from all bears returned to the wild. The hair sample will be analyzed and the data added to a DNA database of captured bears.

Appendix i

BLACK BEAR COMPLAINT REPORT
North Carolina Wildlife Resources Commission
All completed forms should be submitted to the District Biologist.

OFFICER'S REPORT

Investigating Officer _____ Date _____

Complainant's Name _____ Phone _____

Address _____

Nature of the Complaint (check one):
Crop Depredation ___ Road Kill ____ Human-Bear Conflict_____ Other_____

County _____ Location of problem _____

Name of and distance to nearest Bear Sanctuary _____

Number of bears involved: Males _____ Females _____ Cubs _____

Action (check one): ____ No further action necessary

____ Immediate action necessary (Explain in comments below.) Notify Wildlife Management Division ASAP if assistance is required.

____ Referred to District Biologist for further action at a later date.

Comments: _____

BIOLOGIST'S REPORT

Investigating Biologist _____ Date _____

Description of Problem Situation _____

Action: ____ No further action necessary

____ Immediate action necessary. (Explain in comments below.) Contact Division prior to anesthetizing or relocating a bear.

If relocated: Date: _____
Location: _____

Comments: _____
_____

Appendix ii

North Carolina Wildlife Resources Commission

Richard B. Hamilton, Executive Director

Policy on Handling Injured Bears
June 4, 2007

This policy is to address concerns relating to the greatly increasing number of bear/vehicle collisions and the issues that occur during these situations.

No bears injured as a result of a bear/vehicle collision shall be transported to a rehabilitator for care.

Seriously injured bears (broken legs, severe bleeding, unconsciousness, severe head trauma, bleeding from mouth or nose, etc.) may be euthanized. Any Wildlife Management employee, Wildlife Enforcement Officer, or designated representative may conduct or authorize discreet, humane, euthanasia (including but not limited to the use of firearms) and disposition of such animals.

If the animal does not have a serious or life-threatening injury, it should be left undisturbed and allowed to leave on its own.

Richard B. Hamilton

Richard B. Hamilton

Division of Wildlife Management
Mailing Address: 1722 Mail Service Center, Raleigh, N.C. 27699-1722
Physical Address: 1751 Varsity Drive, Raleigh, N.C. 27606
Phone: 919-707-0050
Fax: 919-707-0067

Appendix iii

Guidelines for Utilization of Projectiles by NCWRC staff for Nuisance Bear Deterrents

1. Use of projectiles (i.e. rubber buckshot, rubber slugs, paintballs, etc.) for deterring nuisance bears is permitted by NCWRC employees.
2. Staff is permitted to use back-up lethal ammunition of choice for self protection.
3. DWM personnel are authorized to transport a firearm suitable for firing approved projectiles when responding to a nuisance bear situation.
4. For safety reasons, only 12 gauge break action or pump action shotguns with cylinder bore or improved cylinder choke will be used.
5. Due to safety concerns for the bear, the target should be the rump area.
6. Use of projectiles should be recorded by the DB in the "Bear Complaints and Observation" excel database or on the Black Bear Complaint form (Appendix i).
    - Documentation has proven invaluable in situations that escalated and required review of staff actions.
7. In situations where it is realistic and more efficient, projectiles may be issued to other law enforcement, security personnel, or other qualified State or Federal Employees so long as it relates to their official duties.
    - In the event that projectiles are provided, safety information must be supplied, either verbally or by written copy.
    - Lethal action should only be used if necessary for self-protection.
    - In addition, a waiver must be signed by the recipient. Have two copies signed and retain one copy for DWM files (Appendix iv).
    - The original signed waiver should be forwarded to the Raleigh office.

A brief follow-up email report should be submitted through supervisory channels within two weeks following the expiration of the permit.

Appendix iv

RELEASE AND HOLD HARMLESS AGREEMENT

By my signature below, I acknowledge that I understand and agree to the following:

1. At no cost to me, the Wildlife Resources Commission will provide to me 3 rounds of Sellier and Bellot, rubber buckshot ammunition.

2. This ammunition is to be used by me solely in conjunction with the execution of the bear depredation permit issued to me and dated _____ and must be used in accordance with the terms of that permit.

3. Use of this ammunition for any other purpose will result in the immediate revocation of the depredation permit.

4. I agree to release and hold harmless the North Carolina Wildlife Resources Commission for any injury or damage which may occur to any persons or property as a result of the use of this ammunition, regardless of the manner in which it is used or the purpose for which it is employed.

This the___ day of _____, 20___.

_____

(Signature of Permit Holder)

Appendix v

DANGER!

BEAR TRAP

NORTH CAROLINA Wildlife RESOURCES COMMISSION

This trap has been set in this area for a Problem Bear.

<u>Keep Away!!</u>

Tampering with this trap is in violation of §113-295 and will be prosecuted to the fullest extent of the law!

Appendix vi

Black Bear Mortality Report

1) ID # _____
(Do not write in this space)

November 2009 Form

(Please use this form in place of older versions)

2) Date of Mortality: _____/_____/_____ (month/day/year)

3) County of Mortality: _____

4) Region of Mortality: _____ (C=Coastal, P=Piedmont, M=Mountains)

5) Bear harvested on (check one): ☐ **P**rivate land ☐**G**ame land Game land Name: _____

6) Cause of Death (check one): ☐**HUNT**ing ☐**AUTO**mobile ☐**DEPR**edation ☐**IL**le**G**a**L**

☐**O**ther ☐**UNKN**own

7) Weapon (check one): ☐**R**ifle ☐**S**hotgun ☐**P**istol ☐**M**uzzleloader

☐**B**ow ☐**O**ther ☐**N**ot **A**pplicable

8) Type of Hunt (check one): ☐**D**o**G** ☐**St**ill ☐**O**ther ☐**N**ot **A**pplicable

9) Actual Weight (lbs) Gross: _____ Dressed: _____

10) Estimated Wt. (lbs.): Gross: _____ Dressed: _____

11) Sex (F=female, M=male, U=unknown): _____

12) Hunter Name_____ 13) Send age to: ☐**H**unter, ☐**L**eader, ☐**B**oth

Address: _____ Phone: _____

City: State: Zip Code:

Name and Address Required to Receive Age and Hat

14) Party Leader Name: _____ Phone: _____

Address: City: State: Zip Code:

Name and Address Required to Receive Age and Hat

15) Location of Mortality:
(description)

or GPS Coordinates: Latitude(N) or UTM (N): , Longitude(W) or UTM(E):

or NCFS Quad, Block, Square Map location: QUAD _____ BLOCK _____ SQ. _____PT. _____

16) Comments:

17) Bear Marked: Yes ☐, No ☐ Tattoo Number _____ Tag Number _____

18) Tooth Collected: Yes ☐, No ☐ (staple tooth envelope to upper left hand corner of data sheet)

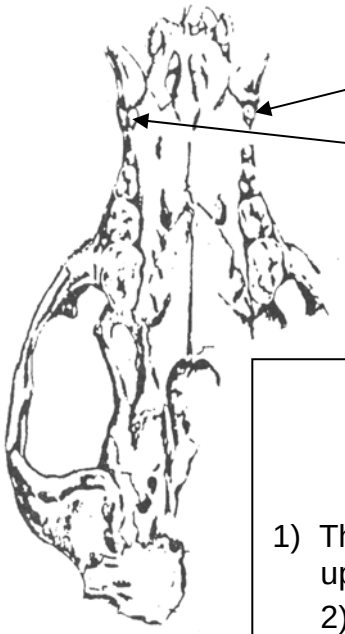
Sheet Completed by: _____ Date: _____

Appendix vi

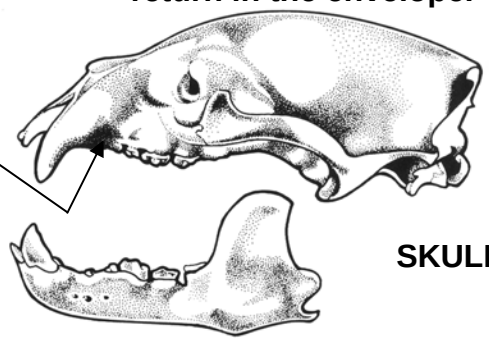
Instructions for Collecting Bear Teeth

First Upper Premolars

<u>Take both upper first premolars</u> and return in the envelope.



SKULL - bottom view



SKULL - side view

Instructions for Pulling Bear Teeth
<u>Please submit both first premolars from the upper jaw</u>
(see drawing)

1) The tooth we need is the very small tooth immediately behind the upper canine tooth (see drawing).
2) Use a screwdriver, ice pick, or knife blade to push the gum down and away from the tooth.
3) Pull the tooth out with pliers or pry it out using the canine as a lever. **DO NOT BREAK THE TOOTH OFF AT THE GUMLINE; WE NEED THE WHOLE TOOTH INCLUDING THE ROOT.**
4) Put both premolar teeth in the envelope, then seal it. Fill in the data on the envelope and data sheet sheet and include your address if you want us to send the age of the bear to you and get a hat. Contact wildlife personnel to make arrangements for all data to be turned in.

Appendix E

GUIDELINES FOR NCWRC RESPONSE TO A BEAR ATTACK RESULTING IN SERIOUS HUMAN INJURY OR DEATH

Black bear attacks on humans are rare across the U.S. and in North Carolina. Black bears are rarely aggressive and most attacks result in minor injuries to people. However, numerous serious and fatal attacks have occurred in North America and two fatal attacks have occurred in Tennessee since 2000. While these serious and fatal attacks are the exception rather than the rule, it is imperative that NCWRC develop guidelines for responding and handling an attack should one occur in North Carolina.

PRELIMINARY ACTIONS

Certain activities and actions should occur as soon as possible to ensure the guidelines functions properly.

1. Wildlife Management (WM) should maintain an inventory of available traps and snares.
2. WM will identify appropriate DNA laboratory facilities to send samples for DNA analyses.
3. Law Enforcement (LE) will identify hunters by work area that may be used as a resource for tracking bears should an attack occur.
4. LE should ensure that all staff (including WM personnel) are properly educated regarding scene containment, evidence protection and collection etc.
5. All county law enforcement and rescue agencies shall be contacted and briefed LE and given a copy of our guidelines to be kept on file.
6. Due to the potential of rabies exposure from bear attack, each District Wildlife Biologist should compile and maintain a list of contacts with telephone numbers of public health department personnel for each jurisdiction within their respective district. This information is available at www.ncalhd.org/county.htm for each North Carolina County.

FIRST RESPONSE

In all likelihood the first contact to the agency will come either though the local Wildlife Enforcement Officer (WEO) or by contact with the Raleigh Communications Officer. If first contact is made with any other staff or division the first step should be to notify Raleigh Communications so that LE may be contacted and can proceed to the scene. It is imperative that any individual receiving contact collect a name, phone number, and address from the person submitting the information.

ARRIVAL AT SCENE

1. Ensure Public Safety.
2. Dispatch bear or authorize the dispatch of the bear if it is on the scene. Do not shoot bear in head; the bear's brain must remain intact in order for public health to test for rabies.
3. Determine if anyone is injured or missing and initiate a search if necessary.
4. Secure scene and tape or mark-off area if not done by local law enforcement.
5. Notify emergency personnel not to destroy or remove from the scene items that might be considered evidence (such as clothing from a victim that may contain important DNA evidence needed.
6. Notify emergency medical personnel (or coroner in case of a death) that DNA evidence may be needed from the victim.
7. Identify witnesses or person(s) discovering scene.
8. Notify Appropriate NCWRC staff as soon as feasible.

DUTIES AND RESPONSIBILITIES OF DIVISIONS

Law Enforcement

1. Respond and attempt to confirm that a bear attack actually occurred with assistance from Wildlife Management staff.
2. Once a bear attack has been confirmed, the WEO on scene should contact WM personnel (preferably the District Biologist) to inform them of the attack and activate the instructions provided in this guideline.
3. A ranking supervisor (meaning a Lt. or the District Captain) shall be called to assist with the investigation.
4. Determine who has jurisdiction and/or who will be the lead agency. In a National Park, the NPS may be the lead agency and the WRC may only act in a support role subject to the NPS protocol. Similarly, in a National Forest, the USFS may take the role of lead agency and the WRC will assist and focus primary efforts on capture of the bear.
5. In cooperation with local law enforcement and/or the lead agency in charge, secure the scene and prepare for investigation to determine actual events.
6. Secure DNA evidence using appropriate techniques. Saliva, hair and blood are the most likely sources of DNA. All may possibly be found on a victim.
7. The District Captain will appoint a family liaison and proceed with standard protocol as related to family notification of accidents.
8. In coordination with other state, federal and local authorities a single point of contact should be assigned to the family of a victim to provide accurate information and make arrangements for travel, food, lodging, access to medical facilities, treatment options for potential rabies exposure, coordination with media outlets, and consideration for any other needs of the family and the victim that may arise.

Wildlife Management

1. The District Biologist should proceed to the scene to confirm the situation and determine the approach most suitable for capturing the bear.
2. The DB will notify appropriate supervisory staff.
3. The Regional Private Lands Supervisor will ensure that Raleigh Administrative Staff, Surveys and Research Program staff and others as appropriate are notified as soon as possible.
4. All wildlife management staff will assist Law Enforcement with evidence collection, scene containment, and crowd/media interaction as requested by the ranking officer on scene.
5. The District Biologist or Private Lands Supervisor should contact the Management Biologist and Regional Lands Management Supervisor to inform them of a bear attack. The Management Biologist will begin preparation for potential trapping to include contacting appropriate crews.
6. The District Biologist will notify the Management Biologist regarding the number of traps needed.
7. The Management Biologist will coordinate with all available crews in the Region to deliver traps as needed.
8. The DB will notify the local county health department who can advise on procedures for picking up and delivering suspect bear to public health for rabies testing.
9. The District Biologist along with local Wildlife Enforcement will determine if hunting dogs should be used to attempt to kill the bear. In the event this decision is made, the local hunters will be contacted and asked to proceed to the scene.

CAPTURE OF BEAR

1. The decision should be made quickly as to whether to use tracking dogs to attempt to locate the bear. This decision should be made based on local enforcement and wildlife management staff's knowledge concerning terrain, human population density, and the probability of actually running and/or treeing the bear.
2. The purpose of running the bear with dogs will be to kill the bear as quickly as possible, not to chase it from the scene. If it is unlikely that chasing/trailing will result in the ability to kill the bear then dogs should not be used.
3. Traps should be set surrounding the site and monitored twice daily or more if needed.
4. Law Enforcement and Wildlife Management will share joint responsibility of monitoring traps. Monitoring will be coordinated by the District Biologist or their designee.
5. Any bear captured or shot should have appropriate DNA samples removed and stored.
6. All bears trapped will be removed from the scene, euthanized, and the carcass prepared for necropsy. The necropsy will be designed to determine potential biological conditions that may have caused or contributed to the attack.
7. WM staff are authorized to travel out of state, without pre-approved travel authorization, for the purposes of delivering bear(s) for necropsy to authorized lab (e.g. SCWDS).
8. The bear involved must be tested for rabies by public health. Please see appendix A for instructions on properly handling rabies suspect(s).

MEDIA COORDINATION

1. Immediate media contacts and coordination should be handled professionally by the ranking staff member of each Division on scene. Efforts should be made to keep the media informed of the investigation.
2. Media coverage will likely be very intense, so media contacts should contain only brief statements of fact until further evidence is available.
3. The Raleigh office will be contacted and made aware of the situation. Administrative staff should appoint a media liaison responsible for handling all further media contacts, press releases, and news conferences as appropriate.
4. Field personnel should be notified immediately when this individual is appointed and provided appropriate contact information for that person. Once established all media contacts should go to that individual. Local personnel may speak with media or appear on camera but prior to doing so they should coordinate with the media liaison.
5. All personnel should avoid speculation regarding what happened. Only report known facts, and report known facts to the Raleigh Administration as soon as they can be verified.

POTENTIAL RABIES EXPOSURE

1. Due to the possibility of rabies exposure, the local county health department should immediately be notified of incident.
    a. Human exposure is defined as a bite or as contamination of scratches, abrasions, open wounds, or mucous membranes with infectious saliva. Exposure should be assumed if the potentially rabid animal has been handled with bare hands.

2. If the county health department can not be contacted immediately (weekends and holidays) the victim and their family should be instructed to contact their family physician or hospital emergency physician for guidance regarding rabies treatment.
3. Review instructions in Appendix A for properly handling rabies suspect(s).
4. To avoid damage to the brain, bear(s) that are to be tested should not be shot or hit in the head. Store the head on ice (place head in a plastic bag and place bag in bucket or a second bag containing ice). Do not freeze.

APPENDIX A

SAFETY GUIDELINES FOR HANDLING TERRESTRIAL WILDLIFE RABIES SUSPECTS

1. Disposable rubber gloves should be worn when handling dead wildlife or removing samples for diagnosis. Be sure to remove the rubber gloves carefully so as not to expose skin to the outer portion of either glove and dispose of them properly. An alternative to rubber gloves is to pick up a dead specimen through a heavy plastic bag and turn the bag inside-out so that the animal is contained within the bag.
2. To avoid possible leakage of fluids, dead specimens should be sealed in at least two heavy plastic bags for transport. Animals with exposed claws or teeth should be placed in a plastic bag that is enclosed in a heavy paper bag or cardboard box and sealed inside another heavy plastic bag.
3. Live free-ranging wildlife rabies suspects should be dispatched before handling or transport if at all possible. They can be safely and humanely dispatched with a well placed shot from a pistol or rifle bullet in the shoulder/chest area. This protects the head area for rabies testing yet immediately kills the animal. Extreme care regarding safety when shooting a suspected rabid animal must be taken as well as judgment as to when this method might be appropriate.
4. Live confined wildlife disease suspects must be handled with extreme care. Handle live animals using only gloves as a last resort. A mechanical restraining device such as a Ketch-All should be used to handle live animals. Safety glasses, rubber gloves under leather gloves and either an apron or coveralls should be worn to prevent skin contact with saliva or excrement when handling live specimens. It is also a good idea to keep your mouth closed to prevent contamination. Unavoidable skin contact should be taken care of by immediately washing with soap and water.
5. Always transport live specimens in a secure cage that is either located in an area of the vehicle that can be thoroughly cleaned or on some material such as a canvas or plastic tarp that can be removed and cleaned. Animals must be placed where they cannot be reached by the public.
6. Be sure to disinfect all restraining devices, cages, or vehicle areas that come into contact with the animal, its fluids or excrement as soon as possible after delivery to a diagnostic facility. A 20% solution of chlorine bleach works well as a disinfectant. Failure to do so could result in contamination of yourself or other animals handled with the same equipment.

Appendix F

GUIDELINES FOR LOCAL ENFORCEMENT FOR RESPONDING TO BEAR OBSERVATIONS AND CONFLICTS WITH PEOPLE

Introduction

Black bear management has become progressively more challenging as human development diminishes historical bear habitats and bears adapt to areas where humans reside. In addition, increased bear-human interactions have led to a need to educate the public about bears and how people need to adapt their behaviors and lifestyle to live in bear country.

Each year, the North Carolina Wildlife Resources Commission (NCWRC) receives numerous requests from concerned citizens, local law enforcement authorities, and government agencies for assistance with bear-human conflicts. These problems include bears frequenting areas outside their normal range, destroying and raiding bird feeders, raiding garbage disposal areas, damaging bee hives and agricultural crops, being hit by vehicles, and other miscellaneous complaints.

NCWRC handling of bear situations

The general policy of the NCWRC is not to trap bears unless human safety is threatened. Simply catching every bear that someone sees is not an option; we have no remote places left to relocate bears where they will not come into contact with humans. Additionally, the process of catching and relocating bears is difficult, and can be more dangerous for the bear, the public, and those involved than letting the bear take its natural course.

Bears are not trapped because they are perceived as a nuisance or as creating a problem. In many cases, people are the cause of the problem, and the best solution often involves a combination of public education and removal of attractants rather than relocation or destruction of the bear.

This general policy addresses the goal of long-term maintenance of our bear population as well as issues of public safety.

Purpose of these guidelines

The following guidelines were developed by WRC personnel to help law enforcement effectively address bear situations that may occur in their jurisdiction. Because local law enforcement are usually the first point of contact with the public and are often the first to arrive on the scene, this document will help address basic questions about bears in developed areas, as well as help establish guidelines for dealing with bears and improve your understanding of the legal aspects of taking bears.

If you have not already done so, make contact with your WRC district biologist and WRC enforcement officer before a situation occurs (page 9). This assures that if your department starts to receive reports of a bear in the area, you will know who to contact for guidance and/or assistance. This will also provide an opportunity for your department to have questions answered and to learn additional information that may not be specifically covered in this document. You can also find more information on bears on our website: www. ncwildlife.org

Key Points:

1. NCWRC policy is not to relocate bears:
    - Most bear conflicts do not warrant trapping.
        i. Simply being in a neighborhood is not threatening or cause for trapping.
    - There are no remote places left where relocated bears will not come in contact with people.
    - Most conflicts can be solved by removing attractants (unsecured garbage, bird feeders).
    - <u>State law does not authorize NCWRC personnel to utilize immobilization drugs.</u>
    - Process of catching bears is difficult and more dangerous for the bear, the public, and those involved in the capture.
        i. A bear will not necessarily go into a trap placed to capture it. This is likely because the bear is moving through the area and will not be in the same area as originally sighted, unless attractants have not been removed or secured.
        ii. It is difficult to dart a bear in a populated area:
            1. Similar care must be taken in discharging a dart pistol or dart rifle in a populated area as in discharging a firearm.
            2. Despite their size, dart placement is important to avoid injuring the bear. Proper dart placement is made even more difficult in a populated area.
        iii. Bears do not immediately become immobilized after being successfully darted.
            1. Under the best of circumstances, it takes 10-20 minutes for the immobilization drugs to take effect. If the bear is distressed, it often takes longer.
            2. Until the drugs cause the bear to become completely immobilized, the bear's behavior can be dangerous, due to the effects of the drug. This places the public, the bear and the capturers at risk.
2. If a bear's behavior is escalating to aggression, as determined by NCWRC, our policy is to capture and euthanize the bear. Situations that warranted this action have not been common.
3. It is common for bears to show up in developed areas. The bear population is expanding and more sightings are occurring as bears disperse.
4. The best solution for resolving bear conflicts are:
    - Remove attractants.
    - Crowd control
        i. Keep people and enforcement a safe distance away from the bear until it leaves the area.

ii. Avoid creating an unwarranted panic or the appearance of an emergency situation while responding to bear sighting calls. The manner in which law enforcement responds largely contributes to public and media perceptions of the situation.

5. Lethal Control is warranted only in very critical circumstances (see page 7).
    - A bear in a neighborhood does not warrant lethal action.
    - Bears are rarely aggressive, and usually will not approach people. North Carolina has not experienced an unprovoked bear attack.
    - NCWRC enforcement investigates all cases of bears being killed to determine justification.

Basic Bear Facts

Please review these bear facts to have a better understanding of bear behavior and why bears may be appearing more frequently.

1. It is not uncommon for bears to show up in developed areas. The bear population is expanding and more sightings are occurring, even in the Piedmont region, as bears disperse through.

    Bears move frequently in late spring and summer for various reasons:

    a. Young bears have left their mothers and are looking for new territory.

    b. Natural food sources can be scarce in spring and summer, resulting in increased movement of bears to find food.

    c. Breeding season occurs in summer, resulting in increased movement of male bears.

    It is not uncommon for a bear to be sighted for a few weeks as it disperses through the area.

2. Bears are rarely aggressive, and usually will not approach people. North Carolina has not experienced an unprovoked bear attack.

    a. Simply observing a bear walking through a yard is not cause for alarm.

    b. If a bear stands on its hind legs, it is attempting to see or smell. This is not a threatening behavior.

    c. If a bear feels threatened or stressed, it will start to vocalize, in the form of huffs, snorts, blowing, moans, and the popping of its jaw (a chomping sound).

        i. If a bear exhibits these behaviors, people should back away from the bear. Through visuals and sounds, the bear is telling you it is feeling threatened and you are too close.

        ii. As long as no one approaches or corners the bear, or provides food, the bear will leave the area.

   d. See page 7 for more information on what is considered threatening behavior.

3. Black bears may become bold if they become accustomed to feeding on human-provided foods, such as garbage and bird seed. These food sources should be removed if a bear is in the area.

4. All attractants should be removed, so the bear has no reason to stay and will leave the area.
   a. Examples of attractants: Garbage, bird feeders, hummingbird feeders, unclean grills, outdoor pet food.

5. WRC will not trap the bear, unless human safety is threatened. WRC will determine if a bear should be trapped.

   Note: Situations that warranted this action have not common.

Guidelines for Responding to a Bear in the Area

*****Please feel free to direct inquires from the news media to WRC District Biologists.*****

A. Bear in the Neighborhood.

1. Simply observing a bear walking through a yard is not cause for alarm.

2. Inform the caller that all food and attractants should be removed.

   a. Bird feeders, garbage cans, and pet food must be taken down or placed in a secured location not accessible by the bear.

   b. Removal of attractants should be a neighborhood effort. If even one person is still providing an attractant, the bear may not leave the area.

   c. The bear is not there to harm them, only to seek free food.

   d. Observations of bears in and around houses and communities are not uncommon and just seeing a bear is not cause for alarm.

   e. If all attractants are removed, the bear has no reason to stay in the area.

      i. If food is not provided, a bear will usually leave the neighborhood within a day, though they may be sighted in an area for up to 2 weeks.

3. Inform the complainant not to provoke, approach or feed the bear.

4. Dogs should be leashed or kept inside while the bear is in the area.

5. Contact the appropriate WRC district biologist and/or WRC enforcement officer for technical guidance (page 9).

6. Crowd Control: If local law enforcement does a site visit and observes the bear, the best course of action is to clear the area of all disturbances (such as people, traffic, or dogs) and allow the bear to leave the area on its own. Bears may not leave until after dark under the best of circumstances.

7. Local law enforcement should maintain distance between themselves and the bear.

    a. If the bear is heading towards an undeveloped area, do not attempt to follow it. The bear is doing what it should do and following it may cause it to wander back into a developed area.

    b. If the bear is exhibiting defensive behavior (vocalizations such as moaning, grunts and popping of the jaw), people are too close to the bear and should back away to allow the bear to leave the area.

    c. If a bear stands on its hind legs, it is attempting to see or smell. While it may look intimidating to the observer, this is not a threatening behavior.

8. If local law enforcement feels the bear is threatening, as based on WRC criteria outlined on page 7, all measures should be taken to contact the appropriate WRC district biologist and/or WRC enforcement officer for assistance and guidance. These WRC personnel are experienced in interpreting bear behavior and in handling bears in developed areas.

B. Bear in an Occupied Dwelling where People are Present

Note: This is not applicable to bears found outside a home, on a deck/porch, in a storage shed, or in an unoccupied dwelling.

1. To protect themselves and their property, homeowners may use lethal force on a bear found inside their dwelling.

2. Local law enforcement may use lethal force on a bear found inside an occupied dwelling (i.e. people present in the dwelling).

    a. Lethal force should only be used in cases when those inside the dwelling are in immediate danger and are not endangered by the officer's actions.

    b. Contact WRC enforcement officer or WRC district biologist (page 9) so that biological data can be collected from the bear. No part of a killed bear can be possessed.

3. The presence of a bear inside an occupied dwelling warrants immediate contact with the appropriate on-duty WRC enforcement officer (page 9).

4. The WRC Enforcement officer will contact the local Wildlife Management staff to inform them of the situation.

C. Bears Hit by Vehicles

1. Contact the closest WRC on-duty wildlife enforcement officer or WRC district biologist (page 9).

2. Crowd Control: Instruct any on-site enforcement personnel to implement crowd and traffic control measures and keep all people away from bear.

3. If the animal does not have a serious or life-threatening injury, it should be left undisturbed and allowed to leave on its own.

4. Seriously injured bears (broken legs, severe bleeding, unconsciousness, severe head trauma, bleeding from mouth or nose, etc.) may be euthanized by those listed below:

    a. Any Wildlife Management employee, Wildlife Enforcement Officer, or designated representative may conduct or authorize discreet, humane, euthanasia (including but not limited to the use of firearms) and disposition of such animals.

D. Bears Treed within City Limits

1. Crowd Control: Instruct any on-site enforcement personnel to implement crowd control measures and keep all people away from bear.

2. Contact the closest available WRC enforcement officer (page 9).

    a. Bears treed in urban areas should be handled jointly by the closest available WRC enforcement officer if it remains in the tree for over 24 hours.

3. WRC will not anesthetize a bear for simply being in a tree in a residential area.

    a. Due to current state statue, WRC is not authorized to use immobilization drugs.

    b. The best course of action is to clear the area of all disturbances (such as people, traffic, or dogs) and allow the bear to leave the area on its own.

    c. Bears may not leave until after dark under the best of circumstances.

    d. Under no circumstances should local authorities or residents be allowed to keep the bear in the area, in a tree, or to harass the bear.

    e. If the bear does not leave the area after one night without human disturbances, is injured, or if the safety of the bear or people becomes an issue, then capture of the bear may be an option. Contact WRC enforcement officer (page 9).

E. Orphaned Bear Cubs or Bears Suspected of Being Held Illegally

1. Contact the closest available WRC enforcement officer (page 9).

F. Bears causing Property Damage

1. If a bear is causing property damage, please refer the caller to a WRC district biologist or a WRC enforcement officer or tell them to visit our website (www.ncwildlife.org) for information on resolving conflicts with bears.

Legal Aspects of Taking Bears

Bears can be killed ONLY under the following conditions:

1. **By a licensed hunter during the bear hunting season**: Bears can be taken during the legal bear hunting season by a licensed hunter. Please check WRC regulations for hunting dates and areas of the state that have an open bear hunting season.

2. **Under a depredation permit**: A landowner or lessee of property may be issued a depredation permit under 15A NCAC 10B.0106 (a) (2) to authorize him/her to take any black bear which is or has been damaging or destroying his property provided there is evidence of substantial property damage.

    a. Only NCWRC can issue a depredation permit to take bear.

3. **By a landowner if the bear is in the act of damaging property**: The landowner or lessee of property, under NC General Statue 113-274 (c) (1a), may kill a black bear without a permit if the bear is in the act of damaging or destroying the property of the landowner.

    a. A bear getting into trash cans, bird feeders, pet food, etc. is not justification for the landowner or lessee to kill the bear without a permit.

    b. The killing shall be reported to the WRC within 24 hours following the time of such killing.

    c. Bear must be disposed of in a safe and sanitary manner on the property where bear was taken. The bear, nor parts thereof, can be possessed.

4. **Bear is an immediate threat to human safety**: Only when there is an immediate threat to human life may the bear be killed at the problem site.

    a. The measures below should be taken before this becomes an option to resolve a conflict.
        i. Keep people and enforcement officers a safe distance from the bear.

        ii. Remove attractants.

        iii. Do not corner the bear. Maintain an escape corridor for the animal.

        iv. Get guidance from WRC biologists and WRC enforcement.

    b. Examples of threatening bear behavior include:

        i. Bear charges towards a person.
            1. This often occurs only when people have cornered the bear or have placed themselves too close to the bear.

        ii. Bear approaches a person directly, despite efforts to harass it away.

iii. Bear follows a person, despite efforts to harass it away.

c. Examples of bear behavior that <u>is not an imminent threat</u>:

i. Simply being in a neighborhood.

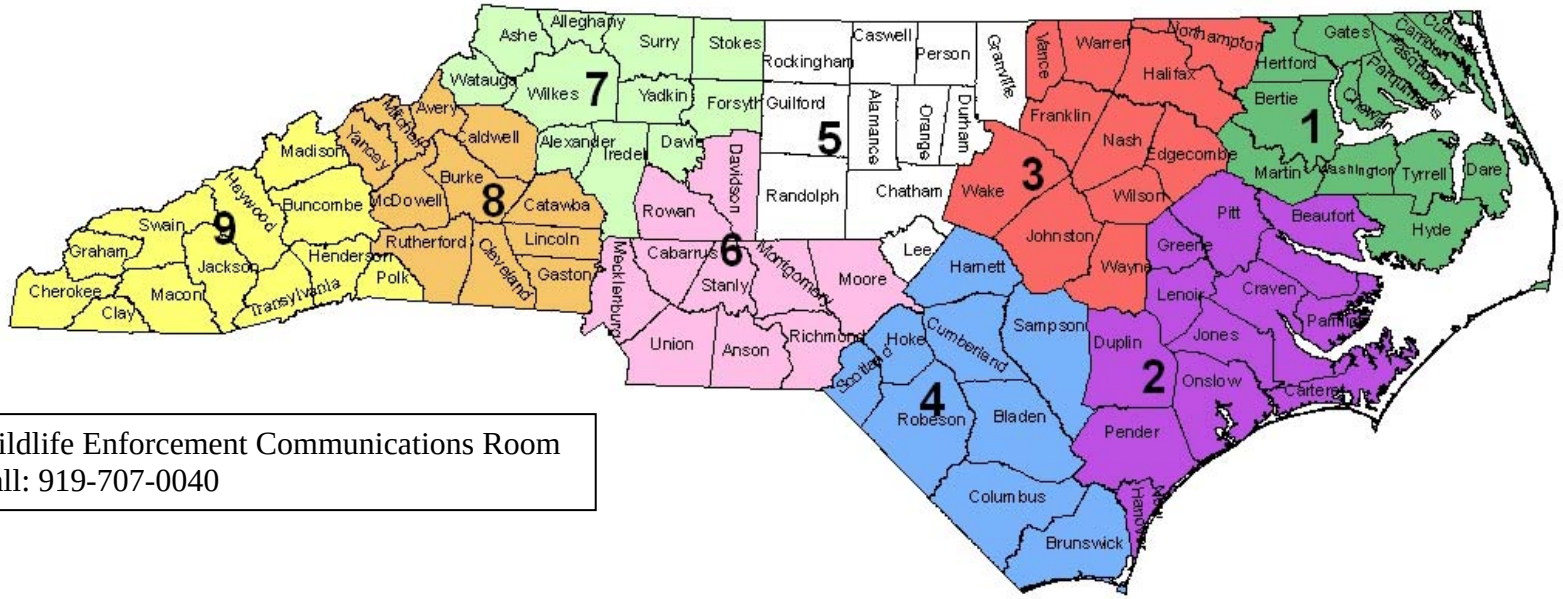
ii. Being in a neighborhood with children.

iii. Standing on its legs. If a bear stands on its hind legs, it is attempting to see or smell.

iv. Vocalizations. If a bear feels threatened or stressed, it will start to vocalize, in the form of huffs, snorts, blowing, moans, and the popping of its jaw (a chomping sound).

1. If a bear exhibits these behaviors, people should back away from the bear. Through visuals and sounds, the bear is telling you it is feeling threatened and you are too close.

North Carolina Wildlife Resources Commission District Boundaries



Wildlife Enforcement Communications Room
Call: 919-707-0040

District 1:
District Biologist Chris Turner: 252-221-9961 (office)

Captain Norman Watts: 252-558-6648 (office)
919-707-0040 (Communications)

District 2:
Regional Biologist Robbie Norville: 252-523-8540 (office)

Captain Rick Venable: 252-571-7795 (office)
919-707-0040 (Communications)

District 3:
District Biologist Greg Batts: 919-239-9731 (office)

Captain John Reams: 252-886-3605 (office)
919-707-0040 (Communications)

District 4:
District Biologist Thomas Padgett: 910-645-4115 (office)

Captain Brent Spivey: 910-316-7189 (office)
919-707-0040 (Communications)

District 5
District Biologist Jason Allen: 336-524-9801 (office)
Captain Billy Holland: 919-410-9657, 919-707-0040 (Communications)

District 6:
District Biologist Jonathan Shaw: 704-474-7202 (office)

Captain John Campbell: 704-680-2288 (office)
919-707-0040 (Communications)

District 7:
District Biologist Chris Kreh: 336-386-0892 (office)

Captain Rusty Hunter: 336-367-5818 (office)
919-707-0040 (Communications)

District 8:
District Biologist Daniel Ray: 828-391-1161 (office)

Captain Ted Brothers: 828-397-5082 (office)
919-707-0040 (Communications)

District 9:
Regional Biologist Mike Carraway: 828-646-9913 (office)

Captain Greg Daniels: 828-337-9425 (office)
919-707-0040 (Communications)

Appendix G

A. Spatial Management Theory: McCullough (1996) introduced the concept of spatial management for harvesting animals. Harvest can be controlled spatially using a mosaic of hunted and unhunted areas. In Figure 1, the dark shaded squares indicate areas progressively opened to hunting:

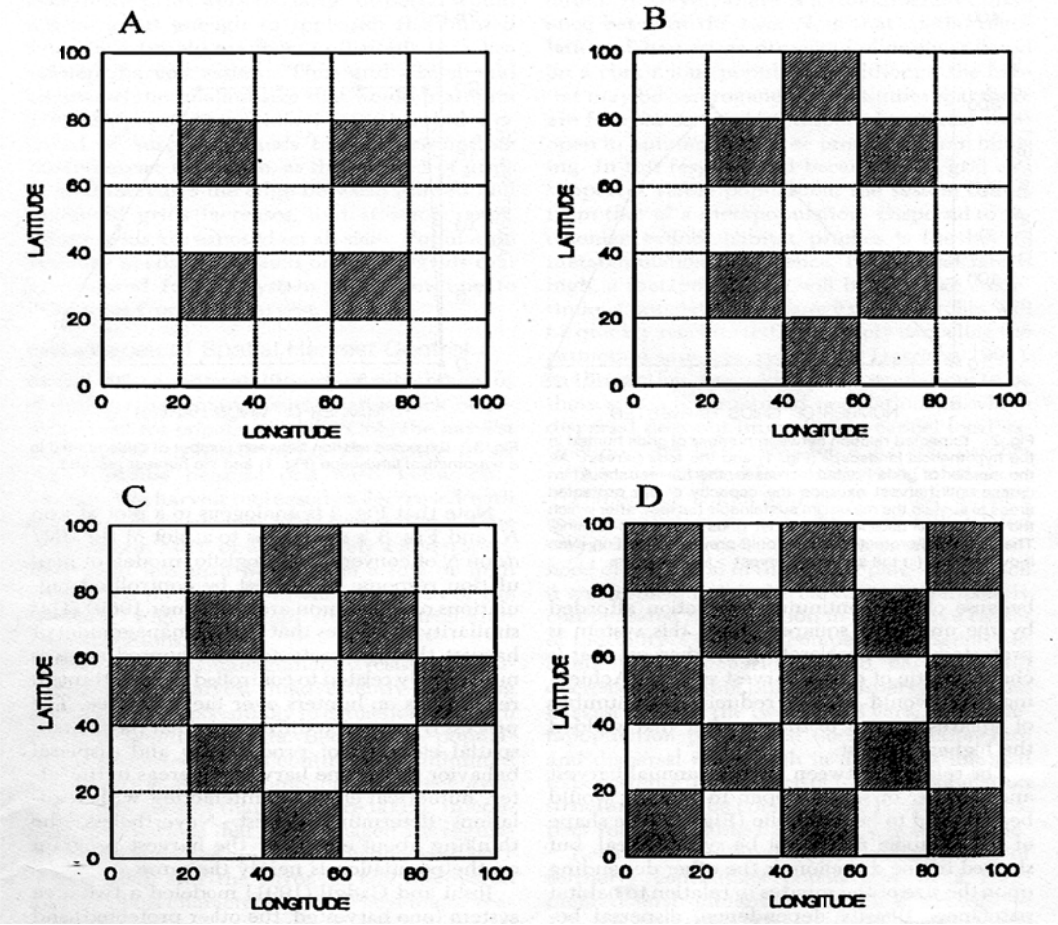


Figure 1. Hypothetical landscape divided into grids of habitat large enough to support viable populations of a game species. Shaded grids are open to harvest and open grids are not (McCullough, 1996).

As we progress from figure A to figure D, more animals are harvested as areas are opened to hunting. At some point, more animals are harvested than protected areas can support and harvest eventually declines (Figure 2).

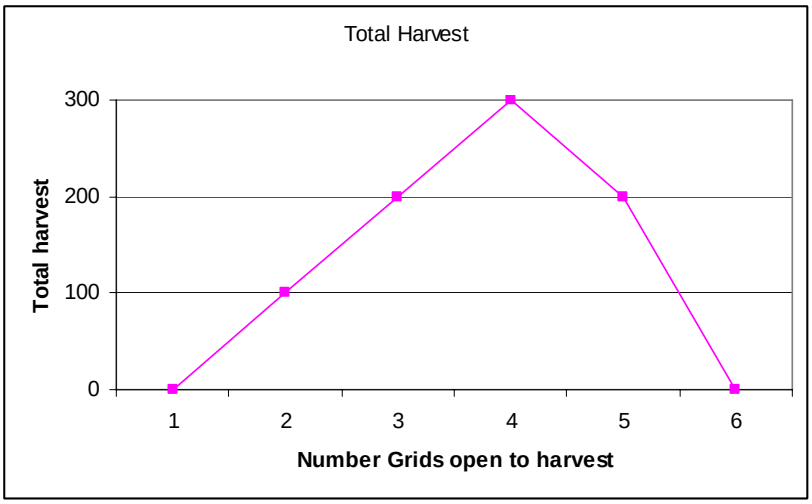


Figure 2. Expected relationship between number of grids hunted and the hypothetical landscape in Figure 1. As the number of grids harvested increases the total harvest increases until the point where the protected areas can no longer sustain the harvest. After that point harvest continues to decline. This is similar to a graph of r versus N.

The relationship between harvest and the proportion of huntable areas is presumed to be parabolic and thus analogous to the logistic models of population response to harvest using a standard population regulatory approach (Figure 3).

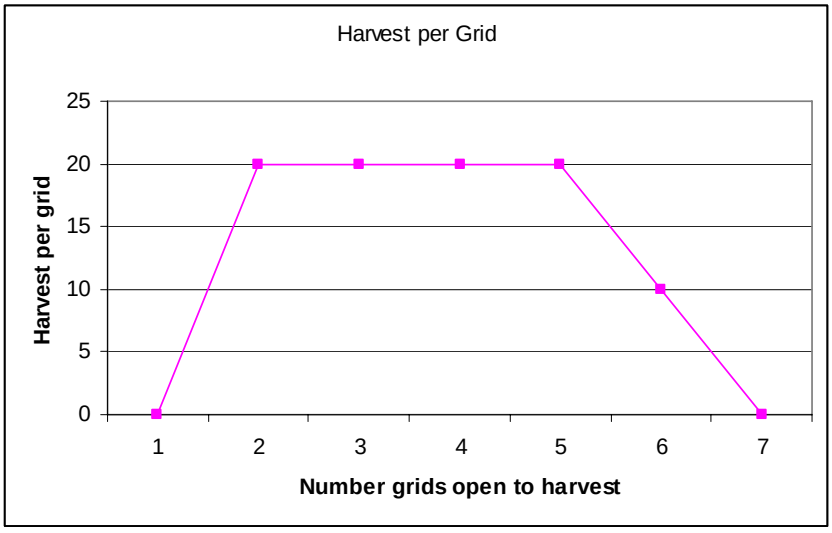


Figure 3. Expected relationship between the number of grids harvested and harvest per grid in the hypothetical landscape (Fig. 1). This is similar to a graph of dN/dT on N which is the conventional logistic model of population response to harvest.

Once the spatial relationship to harvest level is established, managers need only two pieces of information to manage a harvested population; amount of unhunted area and an estimate or index of total harvest. The actual relationship can be developed as the system is implemented by beginning with a protected area and gradually opening up huntable areas. Given effective protection of bears within unhunted areas, numerical management (seasons, bag limits, permits, etc.) becomes less important and in theory, unnecessary.

North Carolina was the first jurisdiction in North America to establish black bear sanctuaries (areas of no hunting within occupied bear range that is hunted) beginning in 1971, and today the state has the largest system of designated sanctuaries in North America. Other "de-facto" sanctuaries such as National Parks and National Wildlife Refuges act to significantly increase unhunted areas. North Carolina also has mandatory hunter kill registration and a system of field data collection that allows locations of mortality to be determined. Hence, we have a system that lends itself to testing and implementing spatial management theory.

B. Case Study Using North Carolina Data: We collected data from 3,460 locations of hunter-harvested bears from 1998-2002 and used these data to examine the effects of unhunted areas on harvest. We found that spatial management was an effective management system. Over 75% of harvest locations were within 6 km of a sanctuary and females were harvested significantly closer to unhunted areas than males.

Further, we established significant linear relationships between kill rate and the percent of unhunted areas. The latter however only covered range of unhunted areas from 0 to 30%. To explore the full range of values, we examined the Albemarle-Pamlico peninsula in finer detail. We used a grid of one mi^2 cells imposed over the area and then examined a 10 mi^2 window around the center of each cell for total kill and percent sanctuary. In this way, we were able to develop the full relationship on a sub-regional scale as follows (Figure 4).

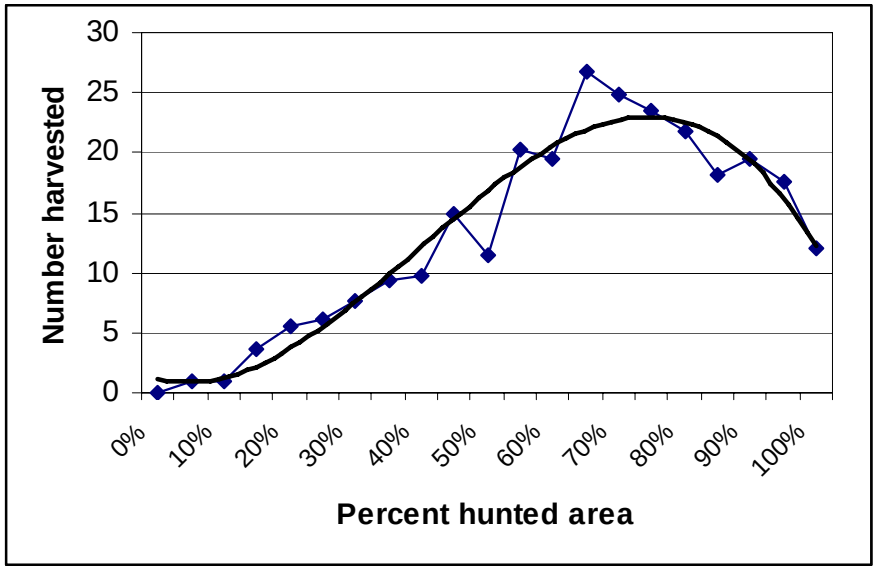


Figure 4. Emperically derived relationship of the percent area open to hunting and total harvest (Figure 3). Maximum harvest occurs when approximately 25-30% of an area is unhunted.

Based on these data, harvest is maximized with about 25-30% of a given area in sanctuary. Note that the graph does not intercept 0 when 100% of the window is hunted. The theoretical relationship assumes no numerical regulations (i.e. hunting seasons, bag limits, etc.). With our current season on the peninsula, and based on the spatial management theory, bears may be harvested below a sustained yield.

C. Relationship to Numerical Management: In theory, when spatial management is fully implemented, numerical management is less important. Season length and bag limits are an additional "insurance" policy against over-harvest and should remain in place. However, when population reduction is a goal, adjustments to harvest regulations may be needed to increase kill rates.

D. Identification of Need by BMUs: It is clear that the percent sanctuary in a BMU impacts total harvest and harvest rate. Our human dimensions surveys have been used to determine hunter satisfaction with current population levels and harvest rates. Further, bear-human conflicts are a consideration. At the higher levels of percent sanctuary, bear-human conflicts have been noted, especially when sanctuaries border areas that cannot be hunted. Adjustments to the percent sanctuary can be made according to hunter desires and public concerns. We need to retain the flexibility to add or remove sanctuary acreage as needed to meet management goals. It is clear that adjusting this one variable has more impact than season structure or habitat variables.

E. Impact on Bear-human Conflicts: As noted above, sanctuaries can and do affect levels of bear-human conflicts. Our system needs to be flexible enough to be able to adjust the amount of sanctuary in a given BMU. Ideally, we would like to add or remove sanctuary based on biological factors in combination with hunter desires and bear-human conflicts. For example, looking at Figure 6, the area in brown is the Mount Mitchell bear sanctuary and surrounding de-facto unhunted areas. These areas produce large numbers of bears that are hunted (dots). The red outlines are "zones of influence" of 6 km from the sanctuary boundaries that contain 75% of the harvest locations. Clearly, the developed areas of Black Mountain, Montreat and Asheville (green) are within these zones where almost no bear harvest occurs. In cases like this, changes in bear sanctuary boundaries or designation are warranted. In addition to flexibility to adjust or remove sanctuary acreage, we recommend the continued tracking of bear-human conflicts, and in particular, noting locations of these problems. Such information is important when adjustments to sanctuary boundaries or status are being considered.

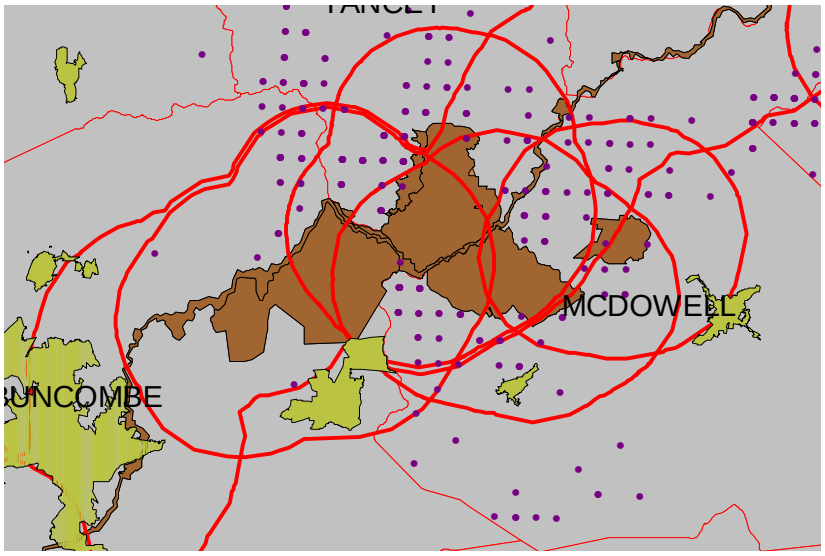


Figure 5. Zones of influence (red circles) and number of bears harvested (dots) surrounding Mount Mitchell Bear Sanctuary (brown) Developed areas are within the zones of influence are indicated in green.

Appendix H

THE BEAR FACTS, THE STORY OF A NORTH CAROLINA TREASURE

The Original Full-Length Documentary

The Bear Facts, The Story of a North Carolina Treasure contains 5 segments:

- History and biology
- Research and monitoring
- Coexisting with bears
- Hunting tradition
- The future of black bears in North Carolina

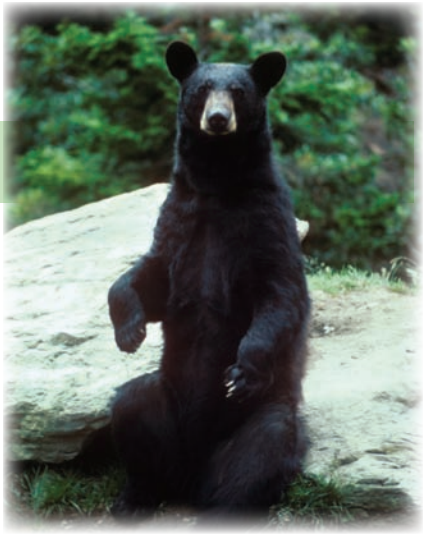
The program takes the viewer on location across the state covering a variety of black bear topics. Our main goal is to inform the public on black bear issues in North Carolina in hopes of educating viewers on bear safety tips, bear management, and to clear up myths about this North Carolina treasure. The program contains excellent footage of black bears in North Carolina and interviews with experts on bear-related issues.

Below are some still shots from the documentary:

NORTH CAROLINA Wildlife RESOURCES COMMISSION

Interested in learning more about the documentary? Go to the N.C. Wildlife Resources Commission's Web site, www.ncwildlife.org. Click on the species links and black bear. To purchase a copy on DVD ($16) or VHS ($12) using a major credit card, visit the NC Wild Store online at www.ncwildlife.org or call (866) 945-3746. Orders can be mailed by sending a check or money order made payable to NCWRC at N.C. WILD Store, Black Bear Documentary, 1710 Mail Service Center, Raleigh, N.C. 27699-1710. The documentary also can be purchased at the Commission sales counter located at 1751 Varsity Drive in Raleigh.

THE BEAR FACTS:
THE STORY OF A NORTH CAROLINA TREASURE



Interactive Educators Edition

The N.C. Wildlife Resources Commission has produced an Interactive Educator's Edition DVD based on our popular 36 minute TV documentary about North Carolina's black bears!

The original documentary (and the Educator's Edition on which it is based) contains five segments:

- Bear history and biology.
- Bear research and monitoring.
- Coexisting with bears.
- North Carolina's bear hunting traditions.
- The future of black bears in North Carolina.

Purpose

Our goal is to inform educators and students about black bear issues in North Carolina, to provide bear safety tips, to explain bear management, and to clear up myths about this state treasure. The program contains excellent footage of black bears in North Carolina and interviews with bear experts.

New Features in the Interactive School Edition DVD

The Interactive Educator's DVD includes the full-length documentary with special features.

- Optional Formats that give the educator the ability to tailor the presentation for different classes by showing the 5 segments as "episodes" or as a seamless feature-length documentary.

- Eight Interactive Functions that engage students on key topics:
  1) Are Bears Dangerous?
  2) Bear Management
  3) Explore a Bear
  4) Wildlife Extras
  5) Bear Facts
  6) Meet the Experts
  7) Meet a Bear Hunter
  8) Take a Bear Quiz

The Interactive Educator's Edition will soon be available free to any North Carolina teacher or educator. If you teach, work at a park or museum, or have other educational responsibilities (including home school), please look for the Educator's Edition available Dec. 15, 2006.

To find out more about the DVD, visit the Wildlife Resources Commssion's Web site:
www.ncwildlife.org

Appendix I

Black Bear

North Carolina Wildlife Profiles

Black Bear

Ursus americanus

There are three species of bears in North America—the polar bear, the brown (grizzly) bear and the black bear. The black bear is the only species found in North Carolina or anywhere in the eastern United States and is an important part of North Carolina's cultural, historical and natural heritage.

History and Status

Before Europeans came to the New World, black bears lived in all forested regions of North America and were abundant in the area that would one day become North Carolina. However, like mountain lions and gray wolves, black bears were often killed by early settlers to protect their families, crops and livestock. In time, bears across the state were impacted by human development. By the early 1900s, black bears were found only in the most remote mountains and coastal swamps of the Tarheel State.

Compounding the decrease in available habitat, the American chestnut blight (a tree-killing fungus) hit the Mountain Region in the 1920s, causing the loss of the most important nut-producing tree for bears and other species of wildlife. As a result, bear populations suffered. Mountain lion and gray wolf populations never recovered, but the black bear has made a remarkable recovery in both population and range over the last 30 to 40 years.

Bears have come back to the state without the aid of stocking efforts like those used to bring back wild turkeys and white-tailed deer. Black bear expansion has occurred naturally as bears have moved into suitable, but previously unoccupied, habitats at a rapid rate. As of the late 2000s, there were approximately 11,000 bears in the state, occupying 50% of the state's total land area.

Description

The black bear is an omnivore with a diet of both plants and animals. In North Carolina, the black bear is usually black with a brown muzzle and sometimes a white patch on its chest. In other areas of North America, black bears can be a very common brown color or a more rare blue and white.

All bear species have five toes on each foot and each toe has a sharp curved claw enabling the bear to feed on insects and grubs in decaying logs. Black bears rely mostly on their sense of smell and hearing due to poor eyesight, but are adept at climbing, running, swimming and digging. **They have been clocked at speeds of 35 miles per hour over short distances.**

Habitat and Habits

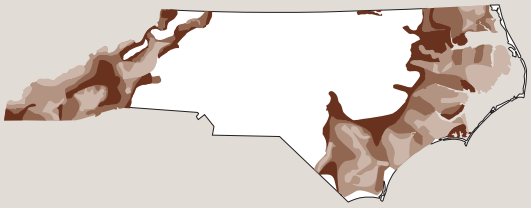
Bears prefer large expanses of uninhabited woodland or swampland with dense cover. In the east, lowland hardwoods, swamps and pocosins, provide good

According to Cherokee legend, the bear is the keeper of dreams.

Range and Distribution

- Bears are very common in the Mountain and Coastal regions of North Carolina but rarely live in the heavily populated Piedmont.
- Bears live in an area (home range) of 5,000 to 50,000 acres depending on their gender and the quality of the habitat. Ranges often overlap in high-quality habitats.
- Male bears sometimes fight each other during the summer breeding season, and young juvenile males are often forced to leave areas inhabited by large, dominant male bears.

Range Map



Occupied range 1971
Occupied range 1971-1981
Occupied range 1981-1991
Occupied range 1991-2001
Unoccupied range

Black Bear

Wildlife Profiles—North Carolina Wildlife Resources Commission

bear habitat. Recent research has shown bears to be much more adaptable to habitat changes than previously thought.

Bears put on additional weight in autumn to prepare for winter denning. They build dens in cavities of live trees, hollow logs, caves, rock outcroppings, cavities in the ground, or in a thicket. Usually black bears construct nests of leaves, sticks, and grass within the den, which often resemble giant bird nests. In North Carolina, den entry can occur as early as the end of November or as late as the beginning of January. Most North Carolina bears emerge from their dens in March or early April, depending on the weather and food availability.

People Interactions

Plott Hound

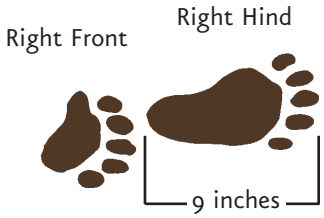
The black bear is a very shy, non-aggressive animal that avoids human beings in most cases. Occasionally bears wander into towns or residential areas in search of food. In coastal areas where agricultural products like corn, peanuts, soybeans and wheat are common, bears often feed on and damage these crops.

Bears should never be fed human-processed foods, such as garbage, pet food or bird food. Dependence on human food may cause bears to pursue these foods and can lead to increased interaction with people. Frequent bear-human contact can cause bears to become aggressive and dangerous.

Approximately 500,000 acres of land have been designated as bear sanctuaries by the North Carolina Wildlife Resources Commission. These areas permit bear populations to thrive. Bear populations are stable or increasing in most areas of North Carolina.

Bear hunting is a tradition dating back to early Native Americans who depended on bears for meat, fat to season foods, and hides to make clothing. Early colonists in North Carolina quickly learned from the Indian tribes and developed a strong bear-hunting tradition that continues into the 21st century. Today, approximately 70 percent of hunters use hounds to pursue bears, including the Plott Hound—the official North Carolina state dog and famous bear-hunting breed. The Plott Hound breed originated in the mountains of North Carolina around 1750 and is the only breed of dog known to have originated in this state.

Tracks



Wild Facts

Classification

Class: Mammalia
Order: Carnivora

Average Size

Length: 5-6 ft.
Height: 2-3 ft. on all fours
Weight: adult females 100-300 lbs.; adult males 200-700 lbs. The current world record black bear, from Craven County, North Carolina, weighed 880 lbs.

Food

Acorns, berries, carrion, corn, fish, frogs, fruits, grasses, grubs, honey, insects, larvae, leaves, nuts, peanuts, reptiles, roots, seeds, small mammals, soybeans and wheat.

Breeding

Males are called boars and females are called sows. Bear reproduction depends on delayed implantation. While the egg is fertilized in the summer, it is not implanted in the womb until late fall or early winter. Cubs are born about eight weeks after implantation.

Young

Young are called cubs. Cubs usually stay with their mother through their first winter. Yearling siblings may stay together for another year. Bears live up to 20 years or more.

Life Expectancy

Average 4-5 years; few live longer than 10 years. Oldest wild bear was 26.

NCWRC Interaction: How You Can Help

In a world where declining wildlife species make news on a daily basis, the successful comeback of the American black bear represents one of wildlife management's greatest achievements. Black bears were restricted to remote areas and reached very low population levels in the early 1900s. Today, black bears are found on almost 50 percent of the total land area of North Carolina. Biologists trap and release live bears and attach radio collars to monitor the bears' home ranges and habitat use.

Rising bear populations can have consequences. In many areas of the state, humans and bears increasingly are coming into contact. The N.C. Wildlife Resources Commission uses management efforts that increase population in some areas and contain population levels in others. You can help, too. Never feed bears or any wild animal, even accidentally with your trash. If you see a bear, try to stay calm and keep a safe distance. If you happen to meet a bear at close range, back away slowly and make lots of noise.

The Commission has implemented a long-term education program to inform citizens about this majestic species and released an Interactive DVD (IDVD), *The Bear Facts, The Story of a North Carolina Treasure*. To learn more about this IDVD, visit our Web site at www.ncwildlife.org and click on *Wildlife Species and Conservation*, then Species, and then *Black Bear*.

Q&A

1. **Name the three different kinds of bear found in North America. Which bear is the only one found in North Carolina?**

   The polar bear, the brown (grizzly) bear and the black bear. The black bear is the only species found in North Carolina.

2. **What three things caused a change in the once-abundant black bear population?**

   - Early settlers killed bears to protect their families and for food and fur.
   - Human development forced bears from original habitats.
   - The blight that killed mountain chestnut trees caused the loss of the most important nut-bearing tree for bears.

Links

To hear what a black bear sounds like, go to http://animals.nationalgeographic.com/animals/mammals/black-bear.html.

For video, go to http://www.bear.org/.

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Credits

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Illustrated by J.T. Newman. Bear and cub photo used with permission from National Geographic. Other photos by North Carolina Wildlife Resources Commission.

Appendix J

Forest Management Prescriptions

For Black Bears in the

Southeastern United States

Introduction

Black bears are tied to forested areas. In the Southeastern United States, forest distribution matches the distribution of bears very closely (with some exceptions). In some parts of the region, bears are dependent on oak trees with their energy-rich acorns and on a diversity of soft mast species. In other parts of the region where Oaks are not the dominant species, other mast producing hardwoods are critical. Bears are opportunistic omnivores and find a variety of foods in both young and mature forests and in different forest types. A diversity of forest types and ages, therefore, is important for black bears.

The continued success of black bear populations is dependant on the wise management and conservation of oak forests (Vaughan 2002). Oaks are adapted to high-disturbance environments. Many of our oak forests are in decline, in part as a result of the suppression of fire over the last 50-100 years in addition to other factors. Bears also take advantage of the foods produced in disturbed environments and hence bear habitat management is compatible with active oak forest management.

If we wish to use the tools most effective in promoting oak forests, we must explain the ecological values of oak forests and the role of disturbance in maintaining these systems to both landowners and stakeholders.

Goals

When managing forests for black bears, practices should be geared toward meeting the following goals:

- Provide a year-round, continuous supply of foods eaten by black bears, including both soft and hard mast species.
- Provide a forested area with a diversity of oak forest types and a diversity of forest ages.
- Provide adequate cover for feeding, escape and denning.
- Ensure that adequate population regulation measures are implemented to manage population levels and trends.
- Balance human access (roads and trails) with effective black bear population management.
- Reduce the potential for bear/human conflicts.

Importance of Population Regulation Measures

Good habitat is very important to maintaining bear populations. Moreover, the effects of population management cannot be isolated from habitat. Much of the dramatic increase in our bear population can be traced directly to the designation of large tracts of contiguous forest (U.S. Forest Service, U.S. Fish and Wildlife Service, etc.), maturation of hardwood forests all across the southeast, and changes in habitat on private land. However, some credit needs to be given to the development of stringent hunting regulations specific to bears, better compliance among hunters, public knowledge and acceptance of bears, tough legislation against poaching, and increased law enforcement efforts.

Bears, when allowed to survive, will do well in a variety of conditions. We now find bears in places that were not considered as potential bear habitat just 15 years ago. In fact, managers now find themselves in the position of dealing with the tremendous success of management programs. Escalating bear-human conflicts are a big concern. Human views and attitudes toward bears ultimately will determine the future for bears. High bear numbers and problems need to be addressed so that "cultural carrying capacity" for bears is maintained or improved. Education of the public about living in bear country and the value of black bears is a priority among state wildlife agencies in their continuing efforts to successfully manage bear populations.

Prescriptions

The following are recommendations for maintaining quality bear habitat. However, bears show a high degree of adaptability to many conditions. These are general guidelines; on-the-ground and site specific analyses to fit local conditions will be necessary.

Minimum management area

The minimum management area to apply prescriptions for black bears can be directly correlated to the average size of female home ranges within that particular area.

General Forest Condition

Forest management should emphasize hard and soft mast production. Management schemes for quality oak sawtimber are generally compatible with this goal.

In order to maintain a steady supply of hard mast in the most productive age classes, ensure that a minimum of 40% of forest communities, where oaks and hickories are prominent components, are in prime mast-producing years. Exceptions can be made if management units are dominated by forest types where oak is not a prominent component. In these cases, apply the standard to a larger area.

Establish and maintain a diversity of oak species of mast bearing age in dominant and co-dominant crown classes. This will augment low production by certain species in a given year by production of other species.

Establish and maintain a diversity of soft mast producing species so that berries and fruits are available in all seasons. Soft mast availability can temper the impacts of bear food availability during those years when hard mast production is poor.

Ensure that hard and soft mast producing species are well distributed throughout the forest.

Ensure that oaks and other nut-producing trees are dominant components of oak forests in the future.

Develop acceptable hardwood rotation ages for adequate production of hard mast. Actual rotation age depends on community type and other factors.

Den Sites/Old growth

Bears are not an old growth obligate species, but areas of old growth may increase habitat quality for bears. Old growth areas can also provide food such as insects and fungi in down and dead wood as well as hard mast. Large diameter trees in old growth areas can also provide tree dens, which are preferred by females in some areas. However, bears are quite able to find alternative sites when den trees are not available.

Manage at least 5-10% of the area in old growth forests. Areas managed for old growth should be identified and distributed throughout the forest. Beyond this, consider portions of management units that are scenic areas, riparian areas and low productivity areas to designate as old growth for bear management purposes. Portions of units that are unsuitable for timber production may also develop into old growth stands. Old growth areas should not be managed passively. Fire can be an important factor in the maintenance of old growth forests.

Suitable cavity trees should be left while conducting forest management treatments to ensure that the distribution of such trees is even across the forest.

Regeneration

Regenerating stands provide a steady, diverse and dispersed supply of soft mast species. Such diversity is important to bears. Stands are regenerated also to supply hard mast producing species in productive age classes. The diversity of oak types and sites demands flexibility in the types of regeneration methods used.

Management units should consist of a dispersed system of openings (i.e., savannahs, woodlands, clearcuts, permanent and transitory openings) with a total minimum of 10% (percent) in the 0-10 age class created by forest management activities.

Design regeneration units with irregular shapes and disperse throughout the area.

Smaller units (25-40 acres) may be used to maximize edge.

Use the most appropriate methods to ensure adequate advanced oak reproduction (Loftis, 1990, Van Lear and Brose, 2002). Even aged, single unit regeneration cuts, clearcuts, and shelterwood cuts can be used. Residual trees left by shelterwood methods provide potential cover for females with cubs and may enhance use of soft mast resources (Clark et al., 1994). Residual trees can also provide for hard mast production and for cavity trees in developing new stands. Select residual trees that have the potential to become large diameter trees favored by bears. These trees will be from 1 to 2 times rotation age. Group selection cuts also work to regenerate oak in certain situations.

Avoid use of singletree methods, as adequate regeneration of oaks has not been demonstrated (with one exception in MO).

Improve previously high-graded stands and other poor quality stands on sites capable of greater mast production than being realized currently (Black Bear Conservation Committee, 1997).

Use site preparation techniques that enhance berry and fruit production (soft mast).

Cavity trees should be identified and protected during forest management practices.

Conversion

In general, monoculture pine habitats are not good bear habitat. However, bears tolerate stands of pine and in some cases exist in areas with relatively large proportions of pine types when other food sources are available. In general, in bear areas:

- Do not convert to pines on hardwood sites.

- Maintain mixed oak-pine habitats rather than conversion to pure pine.

Intermediate Treatments

Oak trees with open-grown crowns receiving plenty of sunlight help to maintain regeneration and to stimulate soft mast and browse production. Thinning should be employed to provide structural diversity and to extend the value of regeneration areas for soft mast.

To extend the soft mast and vegetative values of regeneration areas, thin in early pole stage stands by cutting 30-40% of stand basal area (Beck and Harlow, 1981). Avoid significant reductions in midstory fruit-producing species and take steps to ensure adequate oak component.

Create open oak woodland and savanna-like conditions using thinning and fire (note below).

Thin non-oak species to favor oaks in stands.

Burning

Use repeated fire to mimic natural fire history to create and maintain open oak woodlands and oak-pine mixtures, which contain extensive understories of soft mast species.

Use fire in conjunction with thinning and shelterwood cuts to develop advanced oak reproduction and enhance soft mast production where applicable (Van Lear and Brose, 2002).

Use fire to create and maintain permanent openings for soft mast production. Adjust burning cycle to favor a variety of soft mast species.

Also, monitor the various effects of growing season versus dormant season burns and adjust prescriptions to produce desired outcomes.

Key Areas

Key areas are seasonally important areas for bears.
Key areas will differ greatly between management units. Examine the entire area and determine specific aspects of bear habitat that are unique and important to bears. Examples of key areas include: abandoned orchards, den trees, mountain bogs, hardwood swamps, cypress ponds, stands dominated by red oaks or white oaks if mast is lacking in an area, old home sites, spring seeps, and areas with heavy concentrations of saw palmetto, blueberry, black cherry, or grape.

Identify key areas in management units and either manage to enhance or maintain the key resource or identify it as an inclusion during timber management activities.

Retain important soft mast species (i.e., saw palmetto, dogwood, black gum, hawthorn, grapes, serviceberry, blackberry, pokeberry, etc.) during site preparation.

Access Management

The effectiveness of bear habitat management practices can be influenced by human disturbance along roadways. Roads transecting forestlands range from interstates to seeded logging roads, which may be open, closed, or closed seasonally. Roads receive uses of various types, in varying amounts or levels, and at various times of the year. Managers are concerned about bear mortality on roadways and the reduction of carrying capacity as a by-product of human access. Bears now inhabit areas with road densities above those once believed to be harmful. Although restrictions in open road densities are still a part of bear habitat management, specific recommendations should be made on an area by area basis depending on the trend in local bear numbers, desired levels of harvest, numbers of bear-human conflicts in surrounding areas, levels of illegal activities, etc. In general for access management:

- Enhance positive values of gated or closed roads by planting favorable wildlife mixtures and daylighting roadsides to encourage soft mast.

- Minimize human access during spring to late summer to reduce disturbance of females with cubs (i.e., close roads from March to August).

- Recognize hunter access management as a population regulation tool. Tighten or loosen controls on access depending on bear population goals.

- Develop a system to assess impacts of roads and trails that accounts for volume, type of traffic, timing of disturbances, etc.

- Research is needed on the impacts of various recreational levels and types of activities on bears.

- Education and outreach efforts are needed to reach people who use forests inhabited by bears.

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