CHAPTER 11
WILDLIFE AND FISHERIES MANAGEMENT

11.1 Introduction

Camp Lejeune's first wildlife management plan was developed in 1968 with the goal of enhancing wildlife species, their habitats, and recreational use of wildlife. Since the first planning effort, the wildlife management program has evolved from a featured species strategy to a landscape level approach focusing on habitats versus individual species. This basic strategy to restore and maintain native landscapes in an ecosystem and adaptive management framework in support of military training benefits the widest range and diversity of both game and nongame species. By focusing attention on habitat components vs individual species, Camp Lejeune ensures the long-term sustainability and viability of wildlife populations on the Installation.

The Land and Wildlife Resources Section has cognizance over wildlife and fisheries management activities on Camp Lejeune and coordinates all action with military trainers, forest management activities, and habitat requirements for threatened and endangered species. Recreational use of wildlife resources, as with the Installation's first management plan, is an important component of annual planning activities. A summary of annual activities includes: wildlife clearing maintenance and management; collection and analysis of harvest data; hunting season planning and coordination; artificial nest box management for game and nongame species; waterfowl impoundment management; a wildlife damage management program including nuisance wildlife and Bird-Animal Strike Hazard (BASH) mitigation; recreational fishing pond management (fish stocking, shoreline maintenance); and invasive species management.

Camp Lejeune continues to operate under the terms of the 1995 Cooperative Agreement For Conservation of Fish and Wildlife Resources (Appendix P). This agreement with USFWS and the NCWRC addresses inventories, wildlife plans, interagency cooperation, harvesting of wildlife, permits and fees.

Species of special concern are discussed in **Chapter 4, Threatened and Endangered Species** and **Chapter 5, Species at Risk**. Migratory birds are discussed in **Chapter 6, Migratory Birds.** Forest pests and exotic species are discussed in **Chapter 8, Forest Protection.** Recreational use of the Base related to fish and wildlife resources is discussed in **Chapter 12, Public Access, Outdoor Recreation, and Enforcement**.

11.2 Wildlife Management

Wildlife management aboard Camp Lejeune is a broad program that includes wildlife clearing management, game species, non-game species, and wildlife damage management. The majority of wildlife habitat improvements on the Base occurs through the forest management program and through Land and Wildlife Resource Section staff actions. Management of wildlife on Camp Lejeune is primarily concerned with maintaining quality habitat as it exists in the native landscape, and in providing specific habitat improvements where deficiencies are identified. This approach to management and the understanding that wildlife and their habitats are part of natural communities and systems lends itself to the broader application of ecosystem management and maintenance of native biological diversity.

Camp Lejeune currently manages approximately 210 acres of wildlife clearings in 161 plots. The number and size of clearings within individual forest compartments vary, but the overall percentage of available forest land area in managed wildlife clearings is approximately 0.20 percent. The interspersion of clearings supplements native forage availability and provides additional cover, nesting, and brood range for a variety of game and non-game species. Current planting/maintenance schedules are devised to promote site-soil relationships, reduce annual tillage requirements, provide a continuous flow of forage opportunities for various wildlife species, and maintain a quality recreational hunting experience associated with managed wildlife clearings.

Each spring, approximately 40 acres are planted in grain-type crops (millets and sunflowers) specifically for doves and quail. Fall or cool season plantings on the remaining acreage are tailored toward deer, turkey, quail, and other game species. A number of clearings are left fallow within each forest compartment to evenly distribute simple grassy openings for wildlife. Hunters benefit from the interspersion of managed clearings by having breaks in contiguous forestland that provide a variety of hunting opportunities.

The decision to create new wildlife clearings is based on identified need, soil type, interspersion of existing clearings, proximity to other forest openings, and relationship/integration with other land management activities. The most efficient means to propose or establish new wildlife clearings is to integrate clearing development with annual forest prescription plans discussed in **Chapter 7 – Forest Management**. Future planned maintenance of mission support openings - landing zones, gun positions, access roads, and rights of way for example will provide a better balance of habitat requirements for game and non-game wildlife.

OBJECTIVE WLF1: Maintain an appropriate balance of managed forest openings throughout the Camp Lejeune landscape.

- **Action 11-01:** *Develop annual wildlife clearing management plan.*
- **Action 11-02:** *Manage wildlife clearings.*

11.2.1 Game Management

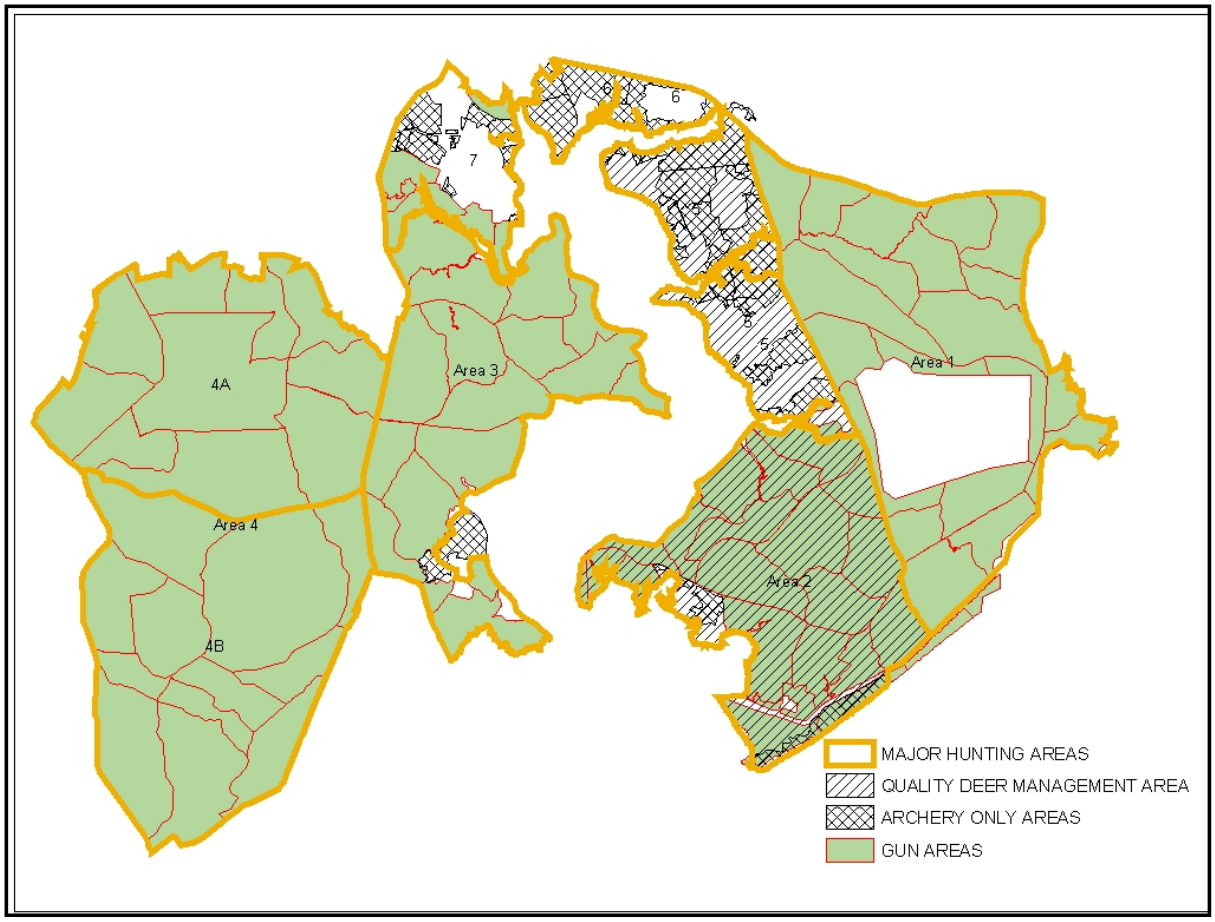
Camp Lejeune's game management program focuses on a variety of species including upland game birds, small game, big game, furbearers and migratory waterfowl. Open hunting seasons for species within these groupings are controlled by state and federal regulations and are coordinated with Base programs and policy regulations. The lack of a specific management strategy for any given species does not detract from that species importance and contribution to ecosystem-level processes and planning.

Three game check stations are maintained for harvest data collection and information dissemination to recreational users. Each game check station contains weighing scales, data collection sheets, and the necessary equipment to properly collect biological data. Game check stations are manned during peak recreational use periods to ensure that complete data records are obtained from harvested animals. Data collection instruction guides are provided to recreational users when wildlife personnel are not on site. This information is vital for sound, scientific management of wildlife resources.

Camp Lejeune's game check stations also serve as official North Carolina Wildlife Cooperator Agent sites. Through the Wildlife Cooperator Agent program, the Base shares its big game harvest information with state biologist for inclusion in county and state harvest figures. Wildlife Cooperator Agent status also permits Camp Lejeune to issue a big game harvest authorization number to successful hunters. This authorization number is required for legal possession of harvested game.

Hunting opportunities for game species on Camp Lejeune take many forms from individual bow and arrow hunting, individual hunting with shotgun and primitive weapons, and organized hunting with dogs. Hunting is performed on the Base within designated military training areas and other managed forest compartments. Approximately 10,000 acres of woodland are designated as bow hunting only for safety reasons. Twenty-two small forested blocks, totaling 1000 acres, scattered throughout residential and built-up areas, were designated as Deer Management Units to create additional recreational opportunities and to address urban white-tailed deer management issues. The remainder of Camp Lejeune is open to firearms hunting in accordance with BO 5090.115, Hunting Fishing, and Trapping Regulations (Figure 11.1).

Figure 11.1. Major Hunting Areas, Marine Corps Base, Camp Lejeune.

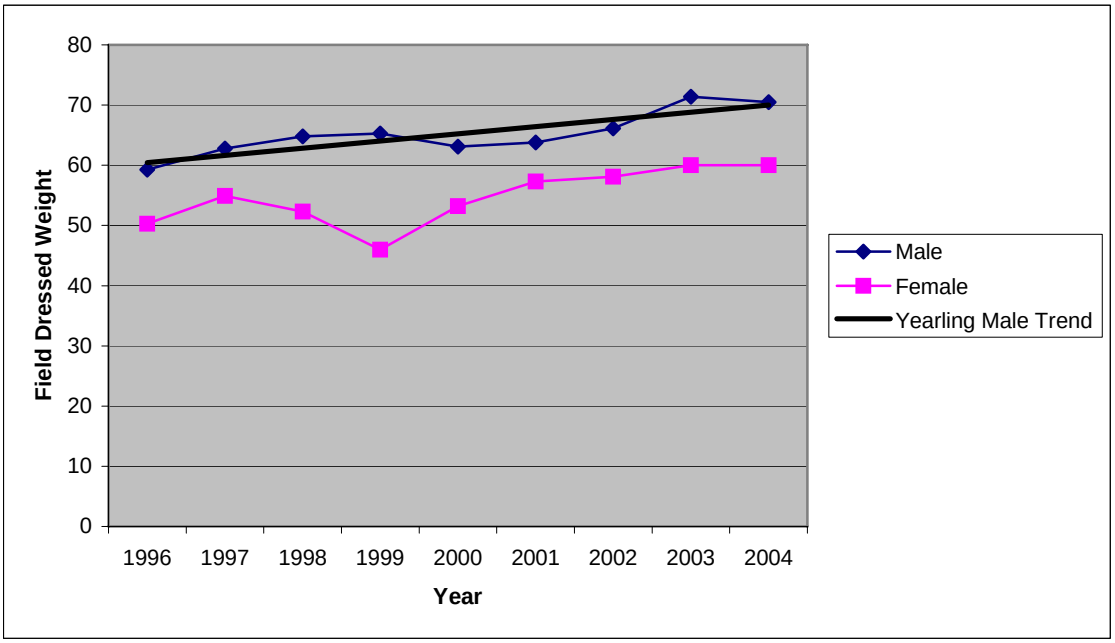


11.2.1.1 Big Game

Big game species on Camp Lejeune are white-tailed deer, black bear, and wild turkey. Pursuit of these species by recreational hunters comprises the majority of user days and hours spent in the field. Each year approximately 800 deer, 20 wild turkey, and one bear are harvested and reported to the North Carolina Wildlife Resources Commission (Table 11.1). During the 2004-2005 hunting season, recreational hunters in pursuit of game on Camp Lejeune logged in approximately 60,000 hours.

White-tailed deer densities vary across the Camp Lejeune landscape and are linked to habitat quality, hunting pressure and hunter access. Densities range from one deer per thirty-two acres in poor-quality habitat to one deer per fourteen acres in high-quality habitat that receives limited or restricted harvest pressure. The overall goal for white-tailed deer management has been directed toward improving the sex and age ratio of the resident deer herd through aggressive harvest strategies and maintaining the herd within ecological and cultural carrying capacities. Over the last decade, the deer population across the Base has stabilized at approximately one deer per twenty-eight acres. Improvements in fawn-to-doe ratios, increases in body weights of yearling deer and slight improvements in antler development suggest the overall health of the deer herd has improved under current management strategies (Figure 11.2). A Quality Deer Management Program was implemented in 1998 on approximately 20,000 acres to include Hunting Areas 2 and 5.

Figure 11.2. Yearling White-tailed Deer Body Weights, Camp Lejeune.



The black bear population aboard the Base has an uneven distribution related to available habitat. Black bears in coastal plain environments utilize the edge of large expanses of pocosin-type vegetation more frequently than other habitat types. The use of these habitats and adjacent ecotones is evenly distributed throughout all seasons demonstrating their importance for various aspects of bear ecology.

A recent black bear investigation estimated the Greater Sandy Run Area (GSRA) bear population to be 40-80 animals. Data from home range analyses indicate three primary use areas; the northern and southern pocosins and the northwest corner of the area inclusive of Base and private lands. The bear population on Mainside Base east of New River is estimated at 10-15 bears and concentrated near remnant pocosin and bottomland hardwood habitats. Bear hunting on Camp Lejeune is permitted only within the GSRA area.

Management for wild turkeys, as with other important game species, is based upon providing quality habitat throughout the life cycle of the species. In a 1992-1997 research study at Camp Lejeune done by Clemson University, a lack of quality brood-rearing habitat was identified as a potential cause for high poult (chick) mortality. The presence of herbaceous and grassy vegetation between 30 (11.81 inches) and 70 cm (27.56 inches) tall was deficient, even within habitat that appeared suitable based upon visual inspection. As a result of changes in forest practices related to red-cockaded woodpecker habitat management, better brood range has been created while maintaining other habitat components such as nesting habitat, escape cover, and fall foraging areas.

Turkey hunting at Camp Lejeune is limited to a spring-only season. Harvests are highly variable between years and follow trends in hunting area availability, harvest pressure, and poult recruitment from previous breeding seasons. Annual call counts are conducted each spring to provide an index of relative abundance and gauge breeding season activity. Brood surveys are conducted during late summer to monitor poult survival.

Table 11.1. Big Game Harvests and Hunting Trips, Camp Lejeune, 2000-2004.

Year	White-tailed Deer	Wild Turkey	Black Bear	Trips Hunting
2000	898	18	0	--*
2001	791	6	0	17,176
2002	748	10	2	15,577
2003	710	18	0	14,925
2004	682	27	1	13,760

* 2000 Hunter usage data not available.

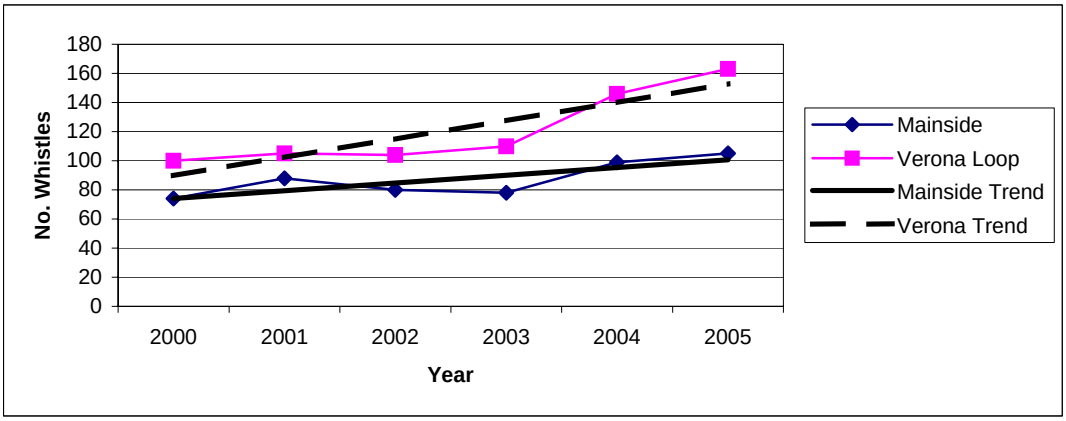
11.2.1.2 Small Game

Small game species at the Base are web-less migratory birds such as doves and woodcock, as well as waterfowl and small mammals. Fox squirrels, considered by many as a trophy small game animal, are abundant along with grey squirrels, rabbits and other furbearers.

Population declines of bobwhite quail have been recorded throughout eastern North Carolina during the last 10 years. Conversely, early summer call counts on Camp Lejeune have suggested an increasing trend in quail abundance (Figure11.3). A possible factor influencing this observed increase is habitat changes due to major storm events and post-hurricane salvage and site preparation work. Salvage operations leave in their wake prolific native ground cover and an abundance of seed producing grasses and vines. These habitat conditions provide optimum

nesting, foraging and escape cover habitat for quail. Hunter harvests have been highest in these newly created "forest openings" resulting from salvage harvest treatments.

Figure 11.3. Quail Call Counts, Camp Lejeune, 2000-2005.



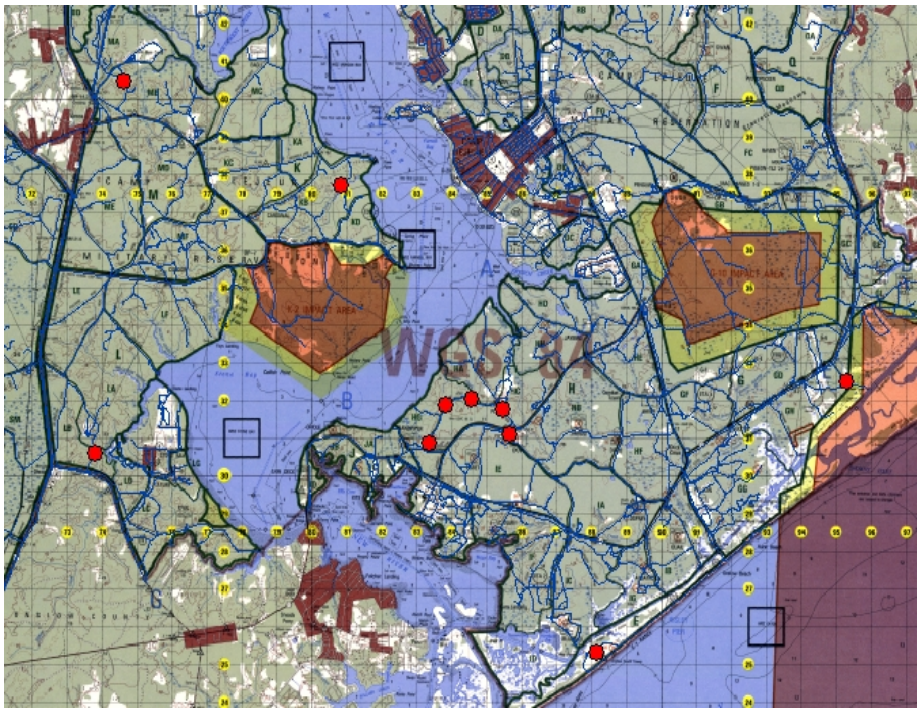
An additional factor influencing quail distribution and abundance is forest management related to RCW recovery efforts. Through the use of prescribed fire, forest thinning activities, and restoration of long-leaf pine, bobwhite quail receive multiple habitat benefits.

All avid recreational hunters look forward to the opening day of hunting season. In eastern North Carolina and on Camp Lejeune, the first day of hunting is opening day of dove season. In 1995 and again in 2001, an aggressive effort was made to improve habitat conditions and availability of suitable hunting areas for this species. A new dove management area was created during 2001 behind Camp Lejeune's old sanitary landfill. A total of 12 acres are included in this complex as three separate wildlife clearings. The creation of this management area was a unique effort to utilize otherwise restricted and idle lands for wildlife habitat improvements.

Several species of squirrel found in the eastern United States are found on Camp Lejeune. Two species, gray and fox squirrel, are featured in Camp Lejeune's management programs. Southern flying squirrels are present on Camp Lejeune. The Installation boasts one of the largest populations of fox squirrel in eastern North Carolina. An endemic of the fire-maintained longleaf pine-wiregrass community type, fox squirrels have a distinct advantage with the aggressive prescribed fire program on Base. Primarily seed and hard mast consumers, fox squirrels find ample foraging opportunity in the prolific cone-producing longleaf pine forest. A variety of oak trees such as turkey, bluejack, and blackjack oak provide relatively stable hard mast in alternate years.

The vast forested wetlands and coastal marshes of Camp Lejeune provide quality habitat for a variety of waterfowl. Maintenance activities (water-level manipulation) at green-tree reservoirs and impoundments, and the maintenance and monitoring of 80 artificial wood duck nest boxes constitutes the majority of management actions related to migratory waterfowl. A series of nine managed green-tree reservoirs totaling an estimated 16 acres provide excellent forested wetland habitat for puddle-ducks, such as black duck, mallard, green and blue-wing teal, and wood duck (see Appendix N for a more complete listing of migratory birds). A 77-acre fresh- water impoundment on Onslow Beach provides habitat that favors more open water species such as widgeon, redhead and gadwall (Figure 11.4). Waterfowl, and migratory shorebirds, are known to utilize the Mile Hammock Bay dredge disposal site. Beaver activity has also created additional unmanaged flooded timber and bottomlands that provide natural, scattered habitat.

Figure 11-4. Waterfowl Impoundment Map and typical wood duck nest box.



The New River, although not part of Camp Lejeune jurisdictional waters, provides vast foraging opportunities for migratory and over-wintering waterfowl. In some years, nearly 30,000 ducks can be seen on New River from Montford Point south to the Sneads Ferry Bridge. Camp Lejeune cooperates with the North Carolina Wildlife Resources Commission on gaining access through controlled airspace over the installation for over-wintering waterfowl surveys on the New River.

OBJECTIVE WLF2: Provide quality and sustainable hunting opportunities by monitoring and managing populations of game species.

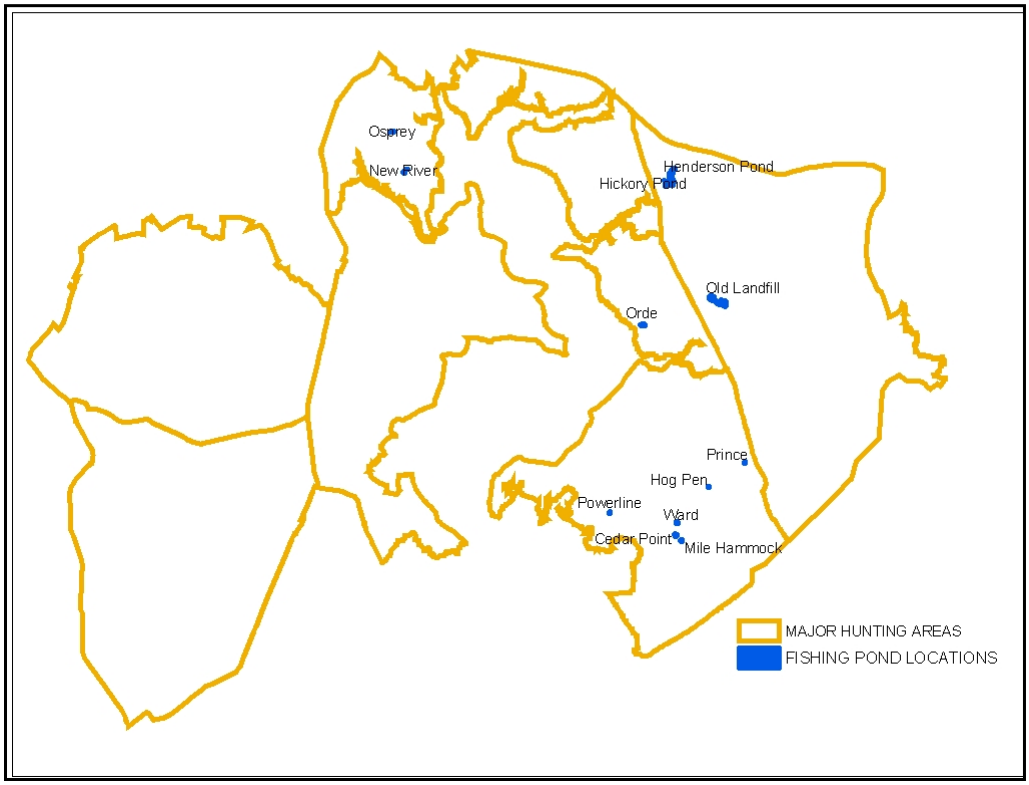
- **Action 11-03:** *Conduct annual surveys for important game species.*
- **Action 11-04:** *Collect data from harvested game animals.*
- **Action: 11-05:** *Maintain NCWRC Cooperator Agent Status for data reporting.*
- **Action 11-06:** *Manage green-tree reservoirs and impoundments.*
- **Action 11-07:** *Manage artificial nest boxes for wood ducks.*
- **Action 11-08:** *Continue cooperation with NCWRC on restricted airspace access for over-wintering waterfowl surveys.*

11.3 Sport Fisheries Management

There are a total of 12 managed freshwater fishing ponds on Camp Lejeune and MCAS New River, with a total surface area of 50 acres. The primary focus of fisheries and pond management is to meet user demand and provide safe, accessible ponds for recreational activities. Figure 11.5

depicts the location of inland, freshwater fishing ponds. Ponds are divided into a tiered strategy of (A) focused, (B) semi-natural, and (C) native pond management. Primary emphasis is placed on (A) focused management fisheries. The quality of recreational fishing opportunity under each strategy is dependent upon fisheries productivity and availability.

Figure 11-5. Freshwater ponds aboard MCB Camp Lejeune.



The freshwater ponds on Camp Lejeune are characteristic of warm water ponds found in the southern United States. The ponds are generally shallow in nature, with only a few ponds exceeding 8 feet in depth. Only the larger, manmade-ponds which include Henderson, Hickory, and Old Landfill Pond, a restored/reclaimed borrow area, exceed 15 feet in depth. Camp Lejeune often encounters problems inherent to shallow warm water bodies, such as erratic dissolved oxygen fluctuations, aquatic weed infestation, and limits on fisheries potential.

Freshwater fishing ponds are managed for the production of largemouth bass, bluegill, red ear sunfish, and channel catfish. Due to their limited size and depths, management for other fisheries, such as crappie and striped bass, has been excluded from consideration. Artificial fish stocking within the ponds runs on an annual to semi-annual cycle dependent upon natural reproduction and recreational fishing pressure. Focused management ponds receive priority during fish stocking operations and are stocked annually.

OBJECTIVE WLF3: Provide quality and sustainable fishing opportunities by managing recreational fishing ponds and populations of game fishes.

- **Action 11-09:** *Manage shoreline vegetation to promote access for fishing.*
- **Action 11-10:** *Manage aquatic vegetation to promote access for fishing.*

- **Action 11-11:** *Stock game fish within managed Base ponds.*
- **Action 11-12:** *Manage pond shoreline depths and water control devices.*
- **Action 11-13:** *Conduct annual fishing creel surveys.*
- **Action 11-14:** *Monitor fish population levels within ponds.*

11.4 Non-game Wildlife Management

In North Carolina, there are more than 1,000 non-game mammals, reptiles, birds, amphibians, mollusks and crustaceans. Non-game wildlife includes all wild animals except those that can legally be taken by hunting and fishing. In most areas of the United States, non-game species comprise greater than 80% of the faunal diversity. Many of these species are common backyard inhabitants, but some, such as the Carolina gopher frog or the spotted turtle, are habitat specialists and can only be found in specific habitat types and wetland areas. Federally-listed threatened or endangered species and species at risk, also considered non-game species, are given more attention due to their ecological importance. These species are addressed in Chapters 4 and 5, respectively. Programs and actions related to migratory birds are addressed in Chapter 6.

The Base continues to conduct, or support others in conducting, studies that help land managers better understand the diversity and distribution of non-game wildlife resources on Camp Lejeune. These studies have included monitoring neotropical migrant birds, surveys for arthropod (insect), lepidoptera (butterfly), herps (snakes, turtles), amphibians (frogs, toads, and salamanders) and wild turkey, as well as black bear studies, and long-term RCW monitoring.

Non-game management activities aboard Camp Lejeune are diverse and range from maintaining blue bird boxes and purple martin houses to making recommendations on new project proposals. Sensitive species such as amphibians are considered in forest management actions from a landscape perspective as these species have complex lifecycles with both terrestrial and aquatic components. Management strategies for most sensitive species on Camp Lejeune follow guidelines in Chapter 5, Species at Risk.

The unique lime-sink depression complexes present on Camp Lejeune contain a wide range of floral and faunal diversity and serve as breeding and forage areas for avian, amphibian, and reptile species. The Carolina gopher frog, a species at risk (See Chapter 5), is known to breed in a number of depression ponds on the Base. Annual frog call auditory surveys attempt to capture breeding activity by this and other species. Those natural depression ponds with permanent or semi-permanent water will routinely possess a well-developed macro-invertebrate fauna and have potential to harbor native fishes. These areas will be surveyed on a cyclic basis to document the presence of rare and endemic fishes.

Camp Lejeune's basic strategy to maintain training areas in a relatively natural state in support of training provides significant benefits to resident non-game wildlife species. Many non-game species also benefit from the various land management activities that take place aboard the Base such as managing wildlife clearings and prescribed fire.

OBJECTIVE WLF4: Conserve sensitive animal species and species that are indicators of habitat and ecosystem health.

- **Action 11-15:** *Conduct annual amphibian surveys.*
- **Action 11-16:** *Maintain artificial nest boxes for blue birds, purple martins, and other non-game species.*
- **Action 11-17:** *Survey natural freshwater depression ponds for native and endemic fishes.*

11.5 Wildlife Damage Management (Including Bird-Animal Strike Hazard)

Wildlife damage management, or control, is defined as the alleviation of damage or other conflicts caused by or related to the presence of wildlife. An integrated wildlife damage management (IWDM) approach, sometimes referred to as Integrated Pest Management, involves a combination of methods used or recommended to reduce wildlife damage. IWDM is an integral component of the wildlife management program at Camp Lejeune.

Wildlife damage management strategies on Camp Lejeune are applied in an integrated wildlife damage management framework and can be preventive or corrective in nature. The Base takes an active stance on preventative actions to include on-site education about wildlife and safety precautions, frightening techniques to disperse nuisance wildlife, and basic sanitation near residences to discourage wildlife from returning. Base directives address the disposition of family pets and companion animals, and provide guidelines that can minimize wildlife-domestic pet interaction.

Corrective actions, including live trapping and lethal control, are only applied when preventative measures have failed or do not achieve a satisfactory result. Use of lethal control is always the action of last resort in the decision making process. Camp Lejeune's wildlife biologists utilize techniques that achieve the level of control desired, while maintaining the highest level of humane treatment practical, given the technique used. All techniques used at Camp Lejeune conform to Federal/ State permitting authorities and American Veterinary Medical Association (AVMA) guidelines.

Within the operational area of MCAS New River, bird-animal strike hazards (BASH) exist due to geographic location and proximity to major watercourses, estuaries, and coastal marine waters. There is considerable overlap in wildlife damage control and management actions as they relate to game and non-game management programs, particularly in an airfield setting. Routine control actions must sometimes be more intense in this environment and therefore, baseline information on wildlife populations and seasonal patterns of wildlife use are critical to the development and implementation of a coordinated BASH program. MCAS New River's BASH program (Air Station Order 3710.40) is designed to identify and communicate hazardous conditions; establish operating procedures to avoid high hazard situations; and establish guidelines to eliminate, control, or reduce environmental factors that attract birds and other wildlife to the airfield.

OBJECTIVE WLF5: Protect the health and safety of Installation tenants and aircraft from the threats of bird-animal hazards (BASH), disease, animal-vehicle collisions, poisonous plants or animals, and general nuisance situations.

- **Action 11-18:** *Implement BASH Program.*

- **Action 11-19:** *Implement Wildlife Damage Management/Control program.*
- **Action 11-20:** *Maintain updated Special Airfield Depredation permits.*
- **Action 11-21:** *Update other Special Depredation permits to address wildlife damage control situations.*
- **Action 11-22:** *Develop educational materials for Base residents and other tenants on preventative measures to reduce wildlife/human interactions.*
- **Action 11-23:** *Respond to nuisance wildlife complaints.*

11.6 Exotic Invasive Species Control

11.6.1 Exotic Invasive Plants and Wildlife

Invasive, exotic plants are often detrimental to native communities. They may:

- compete with native plant species;
- reduce the diversity and quantity of native species;
- render habitat unsuitable for native animals by altering forage and shelter requirements;
- cause increased rates of erosion and stream sedimentation;
- create a system that is more susceptible to wildfires; and
- impair general ecosystem functions.

The same potential pattern of adverse environmental effects exists for exotic wildlife species. To help reduce exotic plant species impacts to ongoing military training and recreational activities, Camp Lejeune has conducted removal efforts for several targeted aquatic species to include alligator weed, Brazilian elodea, and water hyacinth. These species were removed manually, chemically treated or controlled via biological means (grass carp). Various native invasive species, such as common reed, have been controlled, but with limited success.

On Camp Lejeune, terrestrial invasive plant species are not currently a significant threat. Species of concern include kudzu, Japanese privet, Japanese honeysuckle, Autumn olive, and various lespedeza species. The extents of these species are known and have very limited distributions across the Base. No additional terrestrial invasive plants have been identified to date.

A number of exotic and invasive wildlife animals have been identified on Camp Lejeune over the last 20 years. These have included European wild boar, fallow deer, hutia (banana rat), and nutria. Only the nutria has been documented within the last five years from records obtained through fur trapping. This data indicates only scattered individuals in coastal marsh and brackish water swamp environments. The coyote, native to North America, is considered a non-native species in the state of North Carolina and on Camp Lejeune. Management programs for coyotes include harvest during legal hunting seasons and depredation actions to control population levels.

The cactus moth (*Cactoblastis cactorum*) once used as a biological control for ornamental cactus, has quickly spread throughout the southeastern United States and has become a significant invasive threat native prickly pear cacti populations. In cooperation with the United States Geological Survey, Camp Lejeune will be establishing a sentinel-monitoring site within

native prickly pear (*Opuntia* spp.) areas as part of a nationwide early-detection program. Although Camp Lejeune is significantly north of the northern most outbreak of the moth, having monitoring sites throughout the potential ecological range of the moth (North Carolina to California) will aide in early detection and provide information on rates of spread.

OBJECTIVE WLF6: Eliminate invasive exotic species from Camp Lejeune in order to conserve and enhance native flora and fauna and the functional value of natural systems.

- **Action 11-24:** *Monitor non-native and exotic invasive plant and animal species on Camp Lejeune.*
- **Action 11-25:** *Implement necessary control actions on known populations of non-native and exotic infestations of invasive species.*
- **Action 11-26***: Establish and monitor sentinel site for invasive cactus moth.*