

1985

CONSERVATION REPORT



MARINE CORPS BASE

CAMP LEJEUNE, NORTH CAROLINA

ABOUT THE COVER A Light Amphibious
Assault Vehicle (LAAV) camouflaged during
Solid Shield 1985.

Camp Lejeune, the world's most complete
amphibious training base, has been home
for the 2d Marine Division and its re-
quired supporting commands since 1941.
Natural resources management began in
1946 and Camp Lejeune takes pride in its
ability to accomplish the military mis-
sion and managing its natural resources
under a multiple-use management system.

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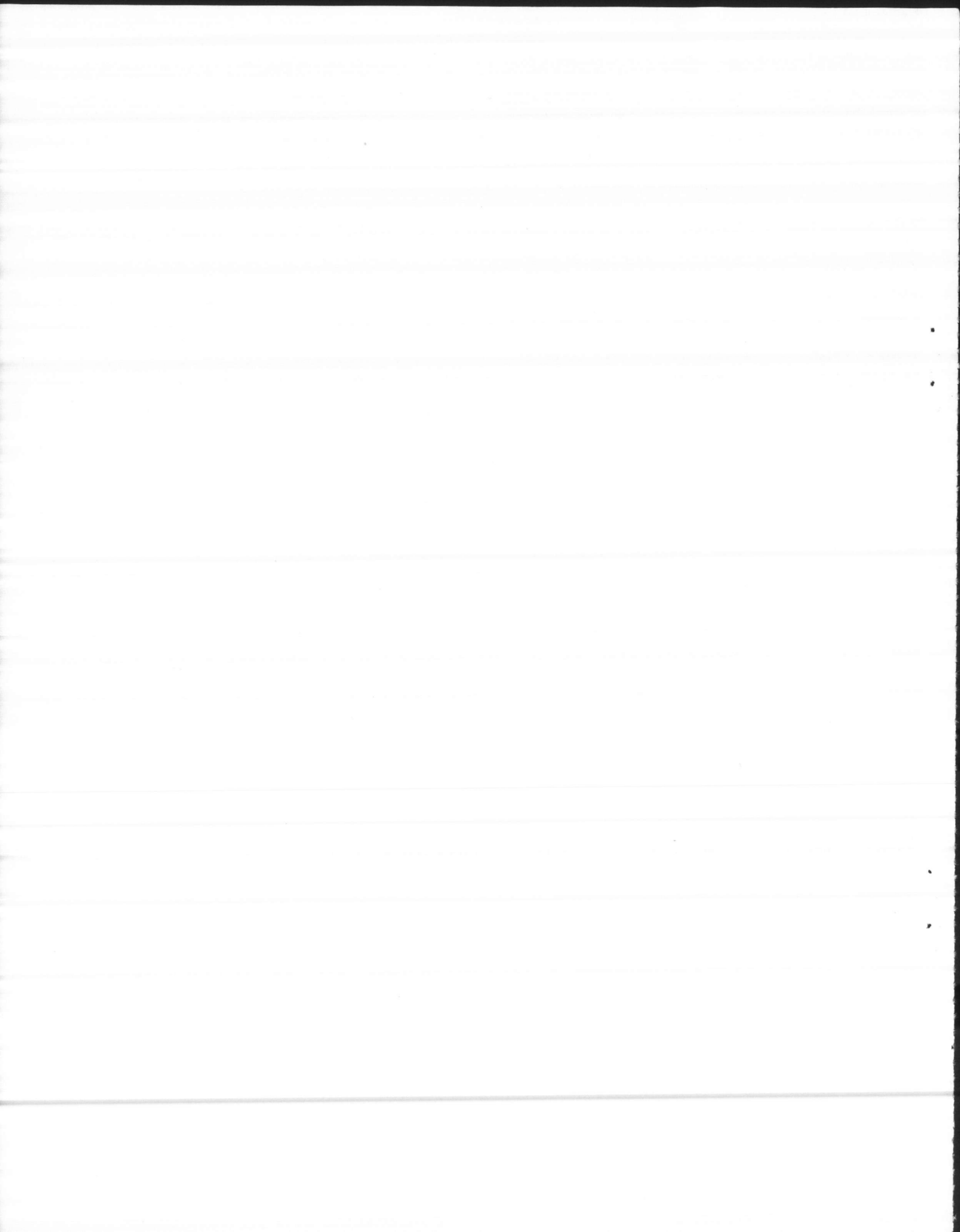
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INTRODUCTION, MISSION AND POPULATION

INTRODUCTION

Marine Corps Base, Camp Lejeune, the world's most complete amphibious training base, is situated on the southeast coast of North Carolina with a twelve-mile front extending from Bear Inlet to New River Inlet and encompasses approximately 170 square miles of land and water.

Established in 1941 and named in honor of Lieutenant General John A. Lejeune, the base houses six Marine Corps Commands and two Navy Commands: Marine Corps Base; II Marine Amphibious Force, FMF; 2d Marine Division, Division, FMF; 2d Force Service Support Group (Rein), FMFLANT; 6th Marine Amphibious Brigade, FMFLANT; Marine Corps Air Station, New River; Naval Hospital and Naval Dental Clinic.

The base takes pride in the management of natural resources and the following report is submitted to provide an overview of planned and accomplished efforts promoting restoration, improvement and preservation of renewable natural resources and other environmental assets. Report period is for calendar years 1983, 1984 and 1985.

MISSION

The mission of Marine Corps Base, Camp Lejeune, is as follows:

- a. Provide housing, training facilities, logistic support and certain administrative support for Fleet Marine Force Units and other units assigned.
- b. Conduct specialized schools and other training as directed.
- c. Receive and process personnel as assigned and conduct individual combat training as directed.

In addition to the above assigned mission, the base is charged with the responsibility to ensure that management provides for the following:

- a. Protection and conservation of the watershed and natural landscapes, soil, beneficial forest and timber growth, and fish and wildlife as vital elements of an optimum natural resources program.
- b. Utilization and preservation of natural resources in the combination best serving the present and future needs of the United States and its people.
- c. Optimum ecological development of land and water and controlled public access to such areas.

d. Active participation of activity personnel assigned to resource management positions in assessing the impact of activity programs on the natural environment within the confines of the activity and on public and private resources outside the confines of the activity which may be affected by planned actions.

POPULATION

The present military population of Camp Lejeune is over 42,000 military personnel, augmented by approximately 4,400 civilian employees. Military dependents are in excess of 31,000 on and off base, while the retired military population is over 33,000.

GENERAL AREA DESCRIPTION

History - Prior to 1941, the land of Camp Lejeune was privately owned. Tracts ranged in size from less than an acre to several thousands of acres. There were approximately 6,000 acres of cleared land with most of the woodland having been cut over and denuded of timber. There was little or no fire protection, and the wildlife habitat generally was poor. After government ownership began in 1941 and with the implementation of multiple-use management programs, environmental conditions for flora, fauna and humans have improved steadily.

Topography - The topography of the base is typical coastal plain ranging in elevation from sea level to 70 feet above. Surface relief ranges from flat, savannah-like to gentle rolling. Deep wooded forests characterize the better upland sites while most of the branches and watercourses are headed by inaccessible swamps and pocosins. The principle watershed drainage areas are New River, Northeast Creek, Southwest Creek, Wallace Creek, French Creek, Bear Creek, Freeman Creek and Duck Creek.

Soils - There are 25 different soil series of varying structures ranging from sandy loams to fine sand and mulch, but the soil type generally is classified as sandy loam. Some of the soil is low in organic matter and fertility, but most of the land produces abundant crops of timber and forage for wildlife.

In 1965, the Soil Conservation Service conducted a low-intensity soil suitability survey of woodlands on the reservation. This survey was updated in 1974. Soils, were also rated as to their game potential and fisheries possibilities. This makes it possible to compare present timber stands with the appropriate soil suitability map to determine optimum management. This plan is valuable in establishing vegetative cover programs and improved drainage as it relates to requirements for improved forestry and fish and wildlife programs.

Climate - Located just below the 35th parallel of latitude, Camp Lejeune has a mild climate. Summers are from mild to hot and humid. Winters are fairly mild with the temperature frequently dropping below freezing. Snow is the exception rather than the rule. Average annual precipitation is 52 inches while the average temperature is 61 degrees. There is a long growing season of approximately 230 days.

Vegetation - Vegetation on the base is typical of the southeastern coastal plain. Extensive tracts of both pure pine and pine-hardwood mixtures dominate the landscape. Pines consist of loblolly and longleaf; while the hardwoods are represented by southern red oak, white oak, turkey oak, willow oak, red gum, tupelo gum, hickory, etc. The upland swamps, commonly referred to as pocosins, are overgrown with fetter bush, cyrilla, pond pine and greenbrier.

Several unique carnivorous plants including the venus flytrap, sundew, bladderwort and several species of pitcher plants commonly are found on poorly drained sites having infertile, acid soils.

Types of acreage under management at Camp Lejeune are listed below.

LAND UTILIZATION (ACRES)

I.	Improved Ground		7,237
	a. Housing and Recreational	2,479	
	b. Industrial Complex	4,758	
II.	Semi-improved Ground		3,356
	a. TLZ's and OP's	1,065	
	b. Cleared Ranges	1,338	
	c. Other Cleared Ground	1,289	
	d. Freshwater Ponds	82	
III.	Unimproved Ground		61,240
	a. Non-forested Area	794	
	b. Forested Area	60,446	
	1. Commercial Forest	57,881	
	(a) Non-restricted	52,590	
	(b) Restricted Wet-		
	lands	2,369	
	(c) Restricted Metal/		
	Buffer Zone	2,922	
	2. Non-commercial Forest	2,565	
	(a) Non-managed		
	Wetlands	1,900	
	(b) Non-managed Forest	345	
	(c) Modified Management		
	Zones	320	
IV.	Impact Areas and Surface Danger Zones		11,418
	a. G-10 Impact Area	6,334	
	b. K-2 Impact Area	3,472	
	c. BT-3 Impact Area	1,612	

PROGRAM SUMMARY

HIGHLIGHTS 1983-85

FOREST ACCESS ROADS - During the three years covered by this report, the Forestry Branch graded and repaired 40.5 miles of forest access roads and hauled and spread 17,441 tons of stone prior to timber harvesting operations. Also 48 miles of access roads were seeded and fertilized for erosion control and wildlife improvement after harvesting contracts were closed.

REFORESTATION - Artificial regeneration took place on 228 acres and natural regeneration occurred on 260 acres. Site preparation took place on 258 acres for natural and artificial regeneration.

FIRE MANAGEMENT - Forest fire suppression and prescribed or controlled burning received high priority during the past three years. A total of 232 wildfires were reported which burned 2,858 acres. Only minor damage resulted because of an aggressive prescribed or controlled burning program. The Forestry Branch prescribed burned 22,960 acres of commercial forestland and controlled burned 28,500 acres of ranges and impact areas.

FOREST PEST MANAGEMENT - The Forestry Branch made 10 southern pine beetle detection flights and located and assessed potential expansion on 139 active spots. In cooperation with the U. S. Forest Service, Pest Management Section and the Forestry Branch three male gypsy moths were trapped in 21 trapping locations aboard the base.

TIMBER STAND IMPROVEMENT - Timber stand improvement was accomplished on 1,184 acres of pine regeneration to prevent stagnation of young stands and to extend the benefits to wildlife of the early successional stages.

TIMBER MANAGEMENT - Intermediate and regeneration cuts were marked on 2,964 acres. Gross proceeds from the sale of forest products totaled \$1,664,929.29, while expenses totaled \$1,007,809.00.

RED-COCKADED WOODPECKER - North Carolina State University is conducting a research study for the endangered Red-Cockaded Woodpecker as contracted by Marine Corps Base.

INDIAN OSSUARY - Approximately 10-12 skeletal remains were removed from the Jarretts Point Indian Ossuary under a contract administered by the U. S. Park Service for Marine Corps Base.

GREEN SEA TURTLE - The same Green Sea Turtle, a threatened species which previously nested four times here in 1980, returned to nest five times during the 1985 nesting season at Onslow Beach.

BASE GAME WARDEN - The Base Game Warden Unit was realigned from the Natural Resources and Environmental Affairs Division to the Provost Marshal in 1984.

COMMITTEES OR BOARDS INFLUENCING THE NATURAL RESOURCES PROGRAM

- Committee for Environmental Enhancement/Environmental Impact Review Board -
The committee receives its authority from Base Order 11015.2G. The board consists of seven members and 10 advisors. The members consist of: Chairman (as appointed by the Commanding General), Base Training Facilities Officer, Base Maintenance Officer, Public Works Officer, and representatives from 2d Marine Division, FMF, 2d Force Service Support Group (Rein) FMFLANT, 6th Marine Amphibious Force, FMFLANT and Marine Corps Air Station, New River. Advisors to the board consist of: Director, Natural Resources and Environmental Affairs Division, Base Ecologist, Base Forester, Base Wildlife Manager, Base Game Warden and Base Safety Officer.

This committee, originally established in 1962, assists and advises the Commanding General on matters pertaining to conservation and management of natural resources and the processing of environmental impact statements. Responsibilities of the committee encompass general cognizance over the Natural Resources and Environmental Affairs program with recommendations for implementation, instructions, procedures, regulations and programs.

INFORMAL INFLUENCES

An increased awareness of the requirements and benefits of a sound conservation program has been observed throughout the base. As a consequence, the efforts of individual commanding officers, Marines, civilian employees, and dependents have been producing excellent results.

Many base organizations and clubs other than sections primarily concerned with conservation also have provided invaluable assistance in various programs. These include Base Special Services, Rod and Gun Club, Boy and Girl Scouts and the Camp Lejeune Dependents' School System.

BACKGROUND

MANAGEMENT PLANS AND COOPERATIVE AGREEMENTS

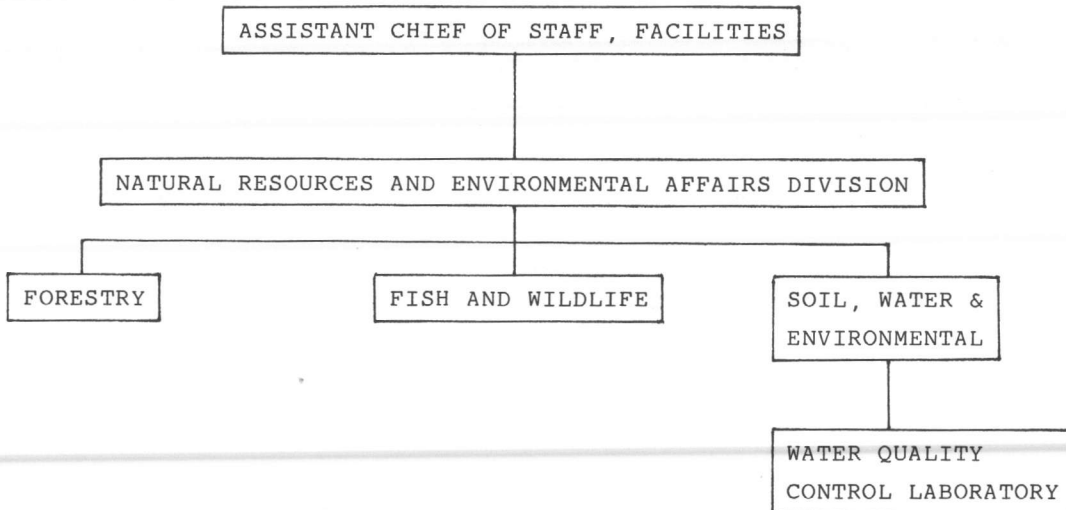
With the assistance of the Soil Conservation Service, the Long Range Multiple-Use Natural Resources Management Plan is presently being revised and will be implemented 1 October 1986. This long range plan, in conjunction with specific Annual Operational Plans, will guide natural resources activities to accomplish the following objectives:

- a. To protect and conserve wildlife habitat, soil, forest, timber growth and suitable vegetative cover.
- b. Provide for multiple-uses of the land and water areas of Camp Lejeune.
- c. Improve the quality of water, wildlife habitat and forestland to maximize benefits derived from the land.

To assist in accomplishing the above objectives, cooperative agreements have been executed by both forestry and wildlife branches. Forestry Branch agreements were executed in 1972 with the North Carolina Forest Service and the United States Forest Service, and provide for mutual assistance for suppression of forest fires.

ORGANIZATION AND STAFFING

The Assistant Chief of Staff, Facilities has staff responsibility for the management of natural resources. Management is accomplished primarily through the Natural Resources and Environmental Affairs Division of the Assistant Chief of Staff, Facilities Department. However, other divisions of the Facilities Department provide significant contributions. Sections within the Natural Resources and Environmental Affairs Division include: Environmental, Forestry and Fish and Wildlife. This organization is structured as depicted below:



ACCOMPLISHMENTS

FOREST MANAGEMENT

MULTIPLE-USE COORDINATION

Coordination of multiple-use at Camp Lejeune has continued to improve during this interval. The initiation of formal prescription reviews has been fundamentally responsible for increasing coordination between wildlife, environmental and planned forestry operations. Prior to beginning preparations for future timber sales, areas are prescribed for treatment using United States Forest Service guidelines as modified for Camp Lejeune. The resulting prescriptions were based on sound scientific principles and detailed field measurements. Each branch head is presented a copy for review and comment. A formal meeting is then scheduled, providing an opportunity for discussing potential problem areas, alternative actions or modifications of the proposals. Proposals are considered not only with respect to forest management objectives but wildlife habitat goals, recreation, aesthetics and military training requirements. During this interval, preliminary environmental assessments for planned annual timber sales and control burning projects are submitted to the Environmental Impact Review Board for review.

The base continues to comply with and coordinate management activities around provisions of the U. S. Fish and Wildlife Service Recovery Plan for the Red-Cockaded Woodpecker aboard Camp Lejeune. Since the Red-Cockaded Woodpecker colony sites and designated habitat occupy about 2,500 acres of Camp Lejeune, it is essential that management activities be closely coordinated in these areas.

To insure compatibility of the forest management with military training, day-to-day coordination of planned activities is required. Long term commitments of land associated with reforestation plans and expenditures are of particular concern and require extensive coordination. Planned reforestation projects are submitted to the Assistant Chief of Staff, Training and Operations for review prior to initiation.

REFORESTATION

Reforestation projects pose special problems for the forest management program and its interrelationship with military training. The creation of new openings in the forest provides not only diversity in plant composition and wildlife habitat but also sites formerly unavailable to certain types of military training. Multiple-use of these sites is innate in their creation. However, the risks that are associated with reforestation are somewhat higher on land where timber production is not the primary land use. Experience has shown that through careful planning, site selection, the appropriate reforestation technique, early pre-commercial thinning and an active forest protection and prescribed burning program, acceptable reforestation goals can be met with an overall benefit to military training as well.

Both artificial and natural regeneration techniques are currently being used for pine regeneration. Natural regeneration techniques are used for regenerating hardwood stands and where possible, are the preferred method for pine. These techniques are less labor intensive and although they don't allow planting of superior growing stock, they often produce healthier stands that are better matched to the site.

Approximately 488 acres of both pine and hardwood have been regenerated during the interval. An additional 258 acres have been site prepared and planted for artificial reforestation, but temporarily deferred pending training requirements for the affected land. Approximately 150 acres have now been released for reforestation and will be planted this coming fiscal year. Hardwood regeneration has been limited; however, several new locations have been marked for timber sales and plans are for hardwood regeneration using clearcut and shelterwood methods.

TIMBER STAND IMPROVEMENT

Timberstand improvement (TSI) projects are initiated with a variety of specific goals and objectives, but the overriding concern is for forest health and productivity. The benefits derived through the maintenance of a healthy forest are dispersed over the many multiple uses of the forestland. Side benefits derived are a reduction in fuels and creation of browse and wildlife habitat improvement. TSI work can be accomplished by sanitation and salvage timber harvests where practical, or pre-commercial thinning when areas to be treated do not involve merchantable products.

Pre-commercial thinning, using heavy equipment and a drum chopper, is used extensively in naturally regenerated pine stands where overstocking is a problem. To provide the most desirable results, this work should be accomplished while the seedlings/saplings are within the four to five foot height range. As regeneration becomes larger, or in the case of hardwood regeneration, where species selection is a strong consideration, this work may require hand crews. A total of 1,174 acres have been pre-commercially thinned during this interval and an additional 10 acres were selectively treated by hand, favoring mast producing hardwood species.



PRE-COMMERCIAL THINNING BY DRUM CHOPPING PREVENTS OVERSTOCKED STANDS FROM BEING SUPPRESSED AND ALSO EXTENDS THE BENEFITS OF THE REGENERATION FOR WILDLIFE HABITAT.

PLANNING AND BUDGETING

Improvements in the development of annual work plans, required manpower, equipment hours, materials and supplies have been made during this interval. Better record keeping and the development of a data base for comparable work accomplished have been responsible for these improvements. Annual work plans are an essential tool in assembly of manpower funding requirements and budgets. While unforeseen budget problems have arisen during this interval, they were primarily due to personnel vacancies, equipment problems and operator unavailability. Backlogs of programmed work are now being reduced and current operations are well ahead of schedule.

Further improvements in budgeting, planning and utilization of manpower are expected with the implementation of the computerized Land Use Management System (LUMS). When fully implemented, this system should dramatically improve natural resources management utilization, coordination and planning aboard Camp Lejeune. Preparations for digitizing the resources data for this system have progressed and are currently ahead of schedule.

TIMBER HARVEST FOR CALENDAR YEARS 1983-1985

<u>PRODUCT</u>	<u>VOLUME</u>	<u>GROSS INCOME</u>
1983		
Pine Sawtimber	3,744.153 MBF	
Pine Pulpwood	8,730.6 Cds	
Hardwood Sawtimber	17.290 MBF	
Hardwood Pulpwood	73.8 Cds	
Total		\$607,583.38
1984		
Pine Sawtimber	2,382.280 MBF	
Pine Pulpwood	2,990.87 Cds	
Hardwood Sawtimber	1.000 MBF	
Hardwood Pulpwood	29.00 Cds	
Total		419,357.28
1985		
Pine Sawtimber	4,401.00 MBF	
Pine Pulpwood	5,687.00 Cds	
Hardwood Sawtimber	0	
Hardwood Pulpwood	163.00 Cds	
Total		637,988.63
Grand Total		\$1,664,929.29

PROCEEDS RETURNED TO THE STATE OF NORTH CAROLINA
FOR USE BY THE ONSLOW COUNTY SCHOOL SYSTEM
IN ACCORDANCE WITH PL 97-99 AS AMENDED

FY 83	\$54,913.50
FY 84	20,751.71
FY 85	98,039.05

PRESCRIBED BURNING

The managed forestry land aboard Camp Lejeune is burned on a five-year cycle with only those stands where fire is desirable being burned. Ranges and impact areas are burned annually to maintain visibility and reduce wildfire potential. Fire is a valuable tool in habitat management for the Bobwhite Quail and the Red-Cockaded Woodpecker, and areas targeted for their management are burned on a one and three year cycle respectively. The primary benefits derived from the prescribed burning program are:

- a. Wildfire hazard reduction
- b. Wildlife habitat improvement
- c. The control of undesirable species and
- d. Maintenance of an open understory.

The average annual acreage control burned during this period has been:

a. Ranges and impact areas	9,500 acres
b. Red-Cockaded Woodpecker Habitat	837 "
c. Quail Management areas	997 "
d. Cyclic forest management burning	7,653 "
Total average annual burning	18,987 "
e. Annual fireline construction	115 miles



DURING PRESCRIBED BURN PLANNING, SMOKE MANAGEMENT IS OF PRIME IMPORTANCE. AREAS ARE BURNED UNDER SPECIFIC WEATHER CONDITIONS TO KEEP SMOKE AWAY FROM ROADS, HOUSING AND WORKING AREAS.

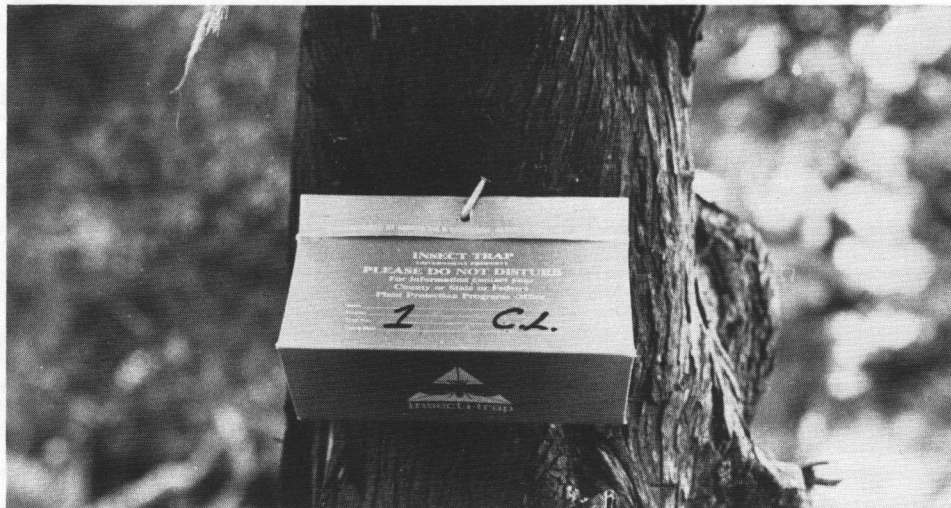
WILDFIRE

Fire is part of the natural ecology in the southeast. Although control burning does effectively reduce the danger, scope and intensity of wildfire, the problem of uncontrolled wildfires during severe weather conditions is always present. Properly trained and equipped wildfire suppression crews are essential to protect and conserve our natural resources. The base has experienced an average of 53 wildfires requiring tractor plow units annually during the past three years. The 1985 fire season was one of the most severe in recent memory when below normal rainfall, low relative humidity, low fuel moisture and high winds combined to create severe wildfire conditions and intense fires; suppression was extremely difficult. Two wildfires occurred on the base in 1985 which consumed over 1,000 acres and dramatically inflated the average acreage consumed per fire. The average fire size where suppression required the commitment of tractor plow units was 16.6 acres. Through active presuppression and detection, coupled with rapid wildfire response, the damages to the natural resources have been kept at a minimum.

INSECT DISEASE

The primary losses of forest products from insects and disease at Camp Lejeune are associated with the activities of the southern pine beetle. This insect, in conjunction with other less aggressive bark-engraving beetles, is responsible for the annual loss of \$12,500,000 of pine timber in the southeast. This reporting interval has been minor outbreaks of the southern pine beetle (SPB) resulting in some timber mortality. However, through close monitoring of SPB outbreaks using aerial reconnaissance, rapid treatment of located spots, and low overall beetle populations, the actual losses at Camp Lejeune have been minimal during this interval. A total of 139 spots have been located with 18 of these spots requiring the salvage of 258 cords of pine. The untreated spots were either small or warranted no control measures.

In recent years another forest pest, the gypsy moth, has caused concern as it spread into formerly uninfested areas. The Base Forestry Branch, in cooperation with the Forest Pest Management Field Office of the U. S. State Forest Service at Doraville, Georgia, is currently monitoring 21 gypsy moth traps distributed through Camp Lejeune. No evidence of gypsy moth defoliation has occurred thus far; however, three male moths have been trapped on the base.



GYPSY MOTH TRAPS ARE PLACED NEAR HOUSING AND CAMPING AREAS, WHICH HISTORICALLY ARE AREAS OF HIGH POTENTIAL INFESTATION

PROTECTION OF NATURAL AREAS

During this interval, the base has entered a memorandum of understanding with the State Department of Natural Resources and Community Development designating two forested areas as being unique natural areas warranting protection. The first of these areas is the Longleaf Pine Natural Area. It consists of 26 acres of naturally regenerating longleaf pine with some evidence of former naval stores activity. The area includes an active Red-Cockaded Woodpecker colony and has been essentially undisturbed since the late 1800s. This area is surrounded by swamp wetlands and pocosins, which act as a natural barrier to human disturbances. The second area, Wallace Creek Natural Area, includes 115 acres of cypress gum swamp and associated mixed hardwoods in the tributaries to the remnants of an old mill pond. Portions of the earth works remain at the former dam site and mill pond area where old growth bald cypress trees dominate the overstory. Both of these areas provide diversity in wildlife habitat as well as being exceptional natural areas of historical interest. These sites have been formally recognized in the North Carolina "Registry of Natural Heritage Areas."

The nature study area adjacent to Camp Lejeune High School provides diverse wildlife habitat and vegetative cover. This area contains 186 acres where timber management activities, hunting and wildlife habitat manipulations are restricted. The nature study area provides students with the opportunity to observe natural ecosystems of loblolly pine, mixed pine/hardwood and upland hardwoods timber types.

Old home spots are often discovered during compartment examinations and timber marking operations. These areas are typically overgrown with a variety of plant vegetation. They provide excellent diversity for wildlife habitat as well as being potentially significant historical or archaeological sites. These home spots are protected from management activity disturbances by deleting the area and a suitable

buffer. Furthermore, "Off Limits to Logging" signs are placed whenever logging activities are being conducted in the vicinity.



OLD HOME SITES ARE NOT ONLY ARCHAEOLOGICALLY
AND HISTORICALLY SIGNIFICANT BUT CAN ALSO
PROVIDE SIGNIFICANT WILDLIFE HABITAT

COOPERATIVE AGREEMENTS AND COORDINATION WITH STATE AND FEDERAL AGENCIES

The base continued to participate in the Mutual Assistance Agreement for fire fighting. This agreement was initiated in 1972 with Onslow County, the City of Jacksonville, North Carolina Forest Service and U. S. Forest Service. This agreement has proven extremely valuable for the base in securing both aerial and ground support for wildfire suppression. The North Carolina Forest Service has been particularly helpful in providing this assistance and equipment. With acquisition of the low-ground pressure equipment and hauling units in 1981, the base is now able to support off-base wildfire suppression teams in emergency situations with plowing units as well as military details and Fire Department pumpers and tankers. This added capability has also improved on-base forest fire suppression and fewer requests for outside assistance are required.

FISH AND WILDLIFE MANAGEMENT

VARIETY OF SPECIES AND HABITAT

a. Pocosins - Camp Lejeune has a considerable pocosin acreage. "Pocosin" is a traditional name for a unique type of fire-adapted wetlands found on the Atlantic Coastal Plain. Pocosins are among the last remote regions to be used by man because of their thick vegetation and wet organic soils. Pond pine, red maple, sweet bay and red bay are principal tree species of pocosins. Most true pocosin wildlife dwellers are either insectivorous warblers, vireos, swallows, bats, and tree frogs or omnivorous mice and bear. Few pocosin dwellers are strictly carnivorous because of the thick vegetation and low vertebrate biomass. Bobcats are the only true carnivores found in pocosins. Wildlife that makes good use of the pocosin edges are deer, marsh rabbit, raccoon, opossum, dove, quail, red-cockaded woodpecker, waterfowl, timber rattlesnakes, skunks, tree frogs, salamanders and ranid frogs.



AN INVENTORY AND CLASSIFICATION OF WETLANDS WAS CONDUCTED BY A CONTRACT ADMINISTERED BY THE U. S. ARMY CORPS OF ENGINEERS

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Cooperative assistance in insect and disease control, from the United States Forest Service, Pest Management Field Office, has benefited with the forest management on base and ongoing pest research. The Base Forestry Branch provides field data on southern pine beetle activity and monitors gypsy moth traps. Assistance and technical expertise provided by the U. S. Forest Service has proven invaluable in monitoring and controlling these destructive forest insects.

b. Freshwater Ponds - Shallow freshwater ponds are often associated with pocosins that have developed on upland flats or in Carolina bays. Many of these freshwater ponds have no natural inlets or outlets. The ponds vary in size, shape, depth, water quality, and character of bottom sediments. Bottoms range from sandy to mucky and are probably the main factor controlling water quality. Those with sandy bottoms have a pH near neutral, while those with muck bottoms have water that is acid and strongly colored. Many of these ponds attract waterfowl and five on the base are managed extensively for freshwater fishing. Another pond has been impounded as a green tree impoundment and managed for waterfowl. It is flooded in the fall and the water is released in the spring. Fish species found in these ponds are chain pickerel, red-fin pickerel, mosquito fish, flier perch, warmouth and yellow bullhead catfish. Fish species found in the ponds managed extensively for recreational fishing include bluegill, red-ear sun fish, large-mouth bass and channel catfish.



HENDERSON POND IS ONE OF ELEVEN PONDS MANAGED FOR FRESHWATER FISHING AT CAMP LEJEUNE

c. Savannahs - Savannahs at Camp Lejeune are associations of grasses and scattered longleaf pine trees. They invariably occur in conjunction with pocosins, developing on ridges or other high areas that are sufficiently elevated to prevent the accumulation of peat soils. The ridges or high areas may occur as part of broad upland flats, relict barrier island complexes or rims of Carolina bays. The difference in elevation between the savannahs and surrounding pocosins is often a matter of inches. Since adjacent pocosins accept little drainage, savannahs can be inundated by heavy rains and are actually a type of paludal wetlands.

Savannahs are maintained by frequent fire and their species are fire-adapted. Unique plant species adapted to the savannah ecosystem include the Venus fly-trap,

sweet pitcher plant, yellow fringed orchid, Well's pyxie-moss, wireleaf dropseed and others.

d. Gum-Cypress Swamp - Since much of the land here is relatively flat, the streams develop broad swampy flood plains. Streams in the coastal lowlands tend to have black water that is low in silt but strongly colored by humic acids bleached from the organic soils which head in pocosins. These swamps are dominated by bald cypress and blackgum trees which have developed on the organic flood plains. Bald cypress is most common near the streams and blackgum is the most dominant species elsewhere. Swamp ash, red maple, and tupelo gum are minor components. There is usually little undergrowth with only a few swamp herbs finding footholds on logs, stumps and the swollen butts of gum trees. Many wildlife species inhabit gum-cypress swamp areas of the base including black bear, white-tail deer, bobcat, muskrat and beaver. Some of these provide food for larger creatures like otter, mink, raccoon, herons, egrets, raptors, etc. Flooded swamps are also nurseries for many valuable fish such as bass, which find many places to lay their eggs; the young fish also find plentiful food and hiding places. Even salt water fish such as alewife and blueback herring make their way to the flooded bottomlands to spawn, and the young then return to the sea. This area produces some of the highest fish populations of any habitat. Most swamp hardwoods produce showy flowers and nectar that attract pollinating insects. The nectar, along with broad leaves and diverse bark and branch patterns, supports many insects and related creatures that make up the food base for the majority of wildlife in the forest. Bottom-land swamps can support two to five times as many game animals as nearby mixed pine and hardwood stands of timber.

e. Oak-Pine and Oak-Hickory - As the elevation increases slightly next to the gum-cypress swamp, oak and water hickory may take over, followed by other species of oaks and hickories in the slightly drier spots, then sweet gum, water oak, pine and other trees better adapted to drier land. The hard and soft mast produced in this habitat type rate at the top of the wildlife food list. Their greatest value is in the winter season when other foods are scarce. Acorns of the white oak groups are more palatable to wildlife. The comparatively small acorns of the water oak and willow oak are eaten by black ducks, mallards, wood ducks, white-tail deer, wild turkey, bear, squirrels and quail. Many game and nongame species feed on the fruits and berries produced by the holly, dogwood, hornbeam and sourwood trees in the understory of hardwood stands. Oak-pine types include eastern red cedar-hardwood, loblolly pine hardwood. Oak-hickory types include red oak, hickory, post oak, black oak, chestnut oak, white oak, yellow poplar and sweetgum.

f. Marshes - The tributaries and shores of Camp Lejeune estuarines are commonly fringed with marshes dominated by either smooth cordgrass, black needlerush, giant cordgrass, sawgrass or cattail. Any of these species may occur in a given marsh but dominance is generally determined by the salinity of adjacent estuarine waters. At salinities as great as 20 parts per thousand, smooth cordgrass and black needlerush are usually dominant. As salinity decreases,

marshes become dominated by giant cordgrass and sawgrass. Fresh or very low salinity marshes are dominated by cattail. The marshes grow on peat, silt and clay soils are often underlain by a sandy soil. Marshes are important nursery areas for brown, white and pink shrimp and commercially important fin fish such as croaker, flounder, menhaden and spot. Marshes provide quality habitat for raccoons, beaver, ducks and several other aquatic species of birds and animals including the endangered American alligator.



THIRTY-THREE ALLIGATORS HATCHED FROM THIS NEST ON 9 SEPTEMBER 1985

g. Open Water Portions of Estuaries - Camp Lejeune has an extensive system of bays and estuaries which empty into the Atlantic Ocean through Bear, Brown and New River Inlets. These are partially enclosed by a series of long barrier islands, the larger of which is known as Onslow Beach. While tidal input of salt water through the inlets is relatively consistent, the input of freshwater from the land may vary considerably, causing salinity to change with seasonal and sporadic patterns of freshwater flow. These areas produce a wide variety of salt water fish and shellfish for both commercial and sports fishing. Boating, sailing, water skiing, bird watching and photography are other recreational uses of these areas.

PROTECTION OF ENDANGERED AND THREATENED SPECIES

Protection of endangered and threatened species is accomplished in accordance with the Environmental Policy Act of 1968 and the Endangered Species Act of 1973. Principal endangered and threatened species on the national list which are found here are the red-cockaded woodpecker, American alligator, Eastern brown pelican, green sea turtle, Atlantic loggerhead sea turtle, fin whale, humpback whale, right whale, and sei whale. Consultation has been conducted with the U. S. Fish and Wildlife Service and National Marine Fisheries Service, as required, for all endangered and threatened species which occur here. Biological opinions have been rendered by the respective agencies with management guidelines recommended for protecting listed species. These opinions have been implemented through Base Orders and the Natural Resources Management Plans.

Marine Corps Base initiated a research study for the endangered red-cockaded woodpecker at Camp Lejeune in 1985. Funds of \$64,000 for the research were transferred by reimbursable agreement to the Cooperative Research Unit, U. S. Fish and Wildlife Service. The research contract was awarded to North Carolina State University.

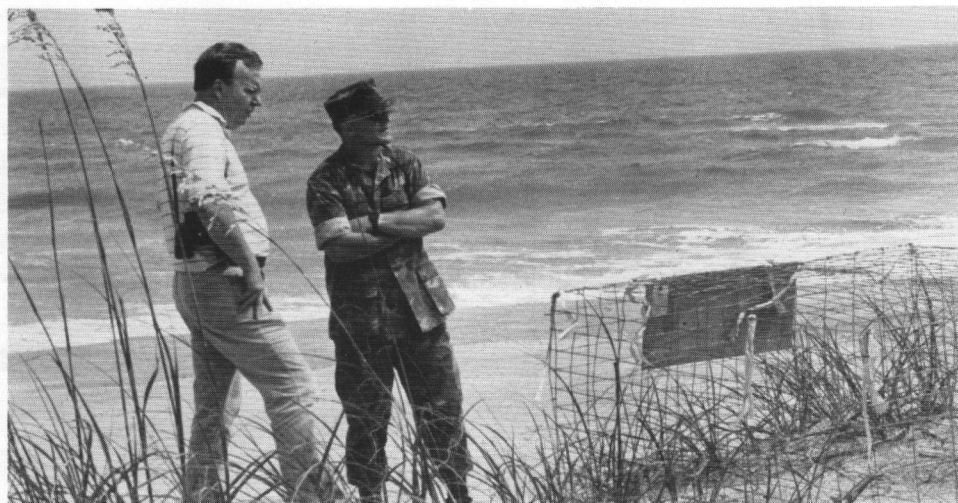
Field work was initiated in September by a PhD candidate in wildlife biology and a team of graduate students. The initial field work is being conducted to collect base line data at each woodpecker colony site, tag cavity trees, trap and color band all individual woodpeckers prior to the 1986 nesting season. Approximately 80% of the woodpecker clans have been trapped and banded.

Further field work during the year will determine the population size and composition in terms of the number of breeding birds, the occurrence of non-breeding helpers and non-breeding clans. The study will include nesting effort and success in terms of the numbers of young successfully fledged. Woodpecker clans will be observed to determine home range and habitat use for a representative sample of the family group. The effects of military mechanized training on woodpecker nesting success will also be evaluated.



MR. JAY CARTER, PhD CANDIDATE, N. C. STATE UNIVERSITY, COLOR BANDS A MALE RED-COCKADED WOODPECKER AT COMBAT TOWN

The endangered species permit to protect the green and Atlantic loggerhead sea turtles was renewed by the U. S. Fish and Wildlife Service in 1985. The permit authorizes the Natural Resources personnel to tag and measure adult turtles and to relocate nests for the purpose of scientific research and enhancement of survival. Only nests threatened by erosion, tides, predators or military activities are moved. Nests may only be relocated to safe beach areas aboard base. Relocated nests are monitored and hatching success is documented. Nests can only be moved within 24 hours after laying is completed without damaging the embryo; mosts nests are moved within six hours after laying occurs. Annual reports are completed and submitted to the U. S. Fish and Wildlife Permit Officer, the North Carolina Wildlife Resource Commission and the National Marine Fisheries Service after each nesting season.



THE ASSISTANT CHIEF OF STAFF, FACILITIES IS BRIEFED RELATIVE TO PROTECTION OF SEA TURTLES AT ONSLOW BEACH



THIS GREEN TURTLE PREVIOUSLY NESTED HERE IN 1980 RETURNED TO NEST AT ONSLOW BEACH FIVE TIMES IN 1985

A green turtle nested here five times in 1985, laying a total of 892 eggs from which 727 young successfully hatched. This same turtle nested four times at Camp Lejeune in 1980. These are the first documented nestings of the green turtle north of the Georgia coastline.

Sea turtle nesting habitat at Onslow Beach is surveyed nightly to locate nests, tag and measure adults, relocate nests threatened by tides, erosion or predators and to protect the nests. Twenty-nine aerial surveys were conducted during peak nesting periods over Onslow Beach, Browns Island and off-shore waters to monitor sea turtle nesting activity. These aerial observations are correlated with nightly beach surveys. Each nest is protected by placing a wire cage over it to exclude predators such as raccoons and foxes, but allow hatchlings to escape and enter the sea. The following are the results of the 1983-1985 nesting seasons:

Number of nests located	141
Number of crawls	316
Number of nests protected with wire cages	141
Number of nests lost to high tides	8
Number of nests lost to hurricanes	3
Number of adults tagged	75
Number of tagged turtles returning to beach	88
Number of eggs laid	17,069
Number of hatchlings	11,935
Hatching Success Percentage	69.2%

PERMANENT FOOD PLOTS, WILDLIFE OPENINGS AND ESCAPE COVER

A well dispersed system of wildlife openings and food plots has been established over the years at Camp Lejeune. Not only are these sites used frequently by game species, but they also greatly benefit non-game species. Openings provide a woodland edge for supplementing the natural food supply and enhancing cover conditions for upland game birds. Insect populations in and around openings are much higher than in forested areas, thereby providing greater benefit to wildlife species.

Some openings are simply maintained by disking or mowing at three year intervals while others are established in planted corps for wildlife. Planted openings are usually established in rye, wheat, subterranean clover, chufas or summer annuals. Perennials such as common lespedeza, bahiagrass, partridge pea and fescue are planted in many openings to reduce maintenance cost and provide semi-permanent planted sites for all wildlife species. Crop rotation is practiced in the planted openings and efforts to maintain good plant diversity are implemented.

One hundred and seventy-two openings have been established for the use of game and nongame species. These areas provide hunters a better opportunity for bagging the game they seek, and an open view in the woodlands for those who just want to observe wildlife from selected vantage points. Wildlife openings are frequently

used by military training units and thereby support the primary mission of Camp Lejeune.

GAME AND NONGAME FISH AND WILDLIFE HABITAT IMPROVEMENT

Work activities have been directed at planning, administering and coordinating the conservation of wildlife populations through the development, maintenance and management of natural habitat. Habitat development projects included the maintenance and development of 500 acres of clearings for wildlife which are well dispersed throughout the base; maintenance of the quail management area; establishment of Autumn olive and bicolor lespedeza seedlings for game species; the maintenance of waterfowl improvements for migratory game birds and the management of freshwater ponds for recreational fishing. The following projects were conducted annually for the benefit of game, nongame, threatened and endangered species.

Individual cavity trees utilized by the endangered red-cockaded woodpecker were treated to prevent loss from wildfires. Treatment consisted of clearing woody debris and prescribed burning a twenty foot area around the base of each cavity tree each year.



RED-COCKADED WOODPECKER CAVITY TREES ARE PROTECTED FROM WILDFIRE BY CLEARING AWAY WOODY DEBRIS AND PRESCRIBED BURNING ANNUALLY

Wildlife clearings were seeded to summer annuals to improve the broad range of wild turkey, other game and nongame species. Annual seed mixtures consisting of chufas, millet, grain sorghum, partridge pea and lespedeza. Winter grains consisting of Abruzzi and wheat were seeded in the fall. Subterranean clover was over-seeded on the clearings planted to winter grains. This is a new variety of clover which is adapted for planting on acid soils and is able to resist competition from weeds.

Approximately 20 miles of forest access roads were seeded each year to perennial grasses and legumes. This helps improve access for management activity, provides supplemental food sources for game and nongame species, reduce soil erosion and subsequent road maintenance costs, and enhances the aesthetic quality of the woodlands.

Continued management of the Town Creek Impoundment, established in 1968 is providing satisfactory results. Twelve wood duck nesting boxes were erected within the impoundment and are maintained each year. Annual maintenance consists of flooding the impoundment in September and draining it in March. Nesting boxes are inspected in late Winter-early Spring and nesting material is replaced in December.

An additional 50 boxes for Eastern bluebirds were erected to augment the 400 nest boxes previously erected. These boxes were constructed and erected by Cub Scout Pack No. 496 in cooperation with the wildlife staff as a community project for wildlife conservation. All the nest boxes were checked and cleaned after nesting occurred. Bluebirds nested in many of the boxes three times each nesting season.



A CUB SCOUT ERECTS A NESTING BOX FOR EASTERN BLUEBIRDS ASSISTED BY THE CHIEF OF STAFF, MARINE CORPS BASE AND HIS SCOUTMASTER

REINTRODUCTIONS AND STOCKING

Enhancement of the wild turkey restoration project continues at Camp Lejeune. One hundred and twenty wild turkeys were removed from the base by live-trapping during 1983-1985. The birds were trapped with drug-treated grain and relocated to six restoration areas in eastern North Carolina selected by the North Carolina Wildlife Resources Commission. These transplants have adapted very well on the restoration areas and the success of the relocation projects reflect a cooperative effort between Marine Corps Base, Camp Lejeune and the North Carolina Wildlife Resources Commission. This cooperative effort is nationally known for restoration of the wild turkey into much of its former range in North Carolina.

DEGREE OF ACCESS AND USE OF HUNTING AND FISHING OPPORTUNITIES

a. Public use of wildlife resources	
Total number of hunter trips	32,849
Total number of hours hunted	203,687
Number of trips by military personnel	35,396
Number of trips by civilian employees	3,038
Number of trips by civilian guests	3,402
b. Number of hunting, fishing and trapping permits issued	
Hunting and fishing to civilian guests (seasonal)	1,206
Hunting and fishing to civilian guests (daily)	24
Military hunting and fishing	5,587
Civilian employee hunting and fishing	474
Military and civilian employee fishing	1,001
Minor dependent hunting	166
Trapping	69
c. Game and fur bearers harvested	
Bobwhite quail	83
Squirrel	359
Rabbit	33
Dove	436
Raccoon	274
Opossum	28
Skunk	14
Otter	7
Mink	4
Duck	26
Turkey	74
Bear	10
Deer	2,355

IMPROVEMENTS IN PERMIT PROGRAM; FEE SCHEDULE FOR HUNTING, FISHING OR OTHER OPPORTUNITIES, RATIO OF PERMITS TO GENERAL PUBLIC

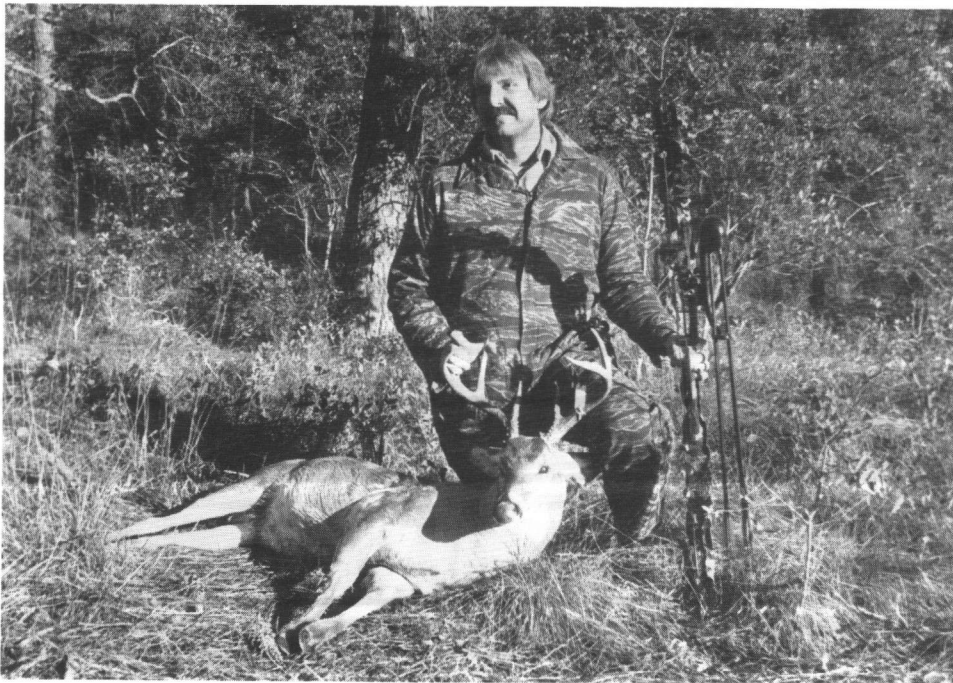
a. Production, printing and serializing of permits is contracted through a local commercial printer. Serializing of permits assures greater control of permits and accountability for collecting public funds from the permit seller.

b. Fee schedule for hunting, fishing, and trapping permits:

<u>TYPE</u>	<u>FEE</u>
Hunting/fishing military	\$7.00
Hunting/fishing civilian employee	7.00
Hunting/fishing civilian guest seasonal	7.00
Hunting/fishing civilian guest daily	3.00
Fishing military/civilian employee	3.00
Trapping military/civilian employee	10.00

c. Ratio of permits to general public versus DOD personnel:

Permits issued to DOD personnel	8,423
Permits issued to civilian guests	1,230
Ratio of permits issued to civilian guests	14.6%



RECREATIONAL HUNTING IS VERY IMPORTANT FOR THE CONTROL AND MANAGEMENT OF THE BASE DEER HERD

PROTECTION OF ARCHAEOLOGICAL AND HISTORICAL RESOURCES

Approximately 10-12 skeletal remains were removed from an Indian Ossuary at Jarrett's Point in 1985. The ossuary was located at the edge of a borrow pit by an employee of a construction firm who was working on a Public Works project. Marine Corps funding requirements for excavating the remains were transferred to the U. S. Parks Service to facilitate the removal. The U. S. Park Service coordinated a contract with the Department of Archaeology and Anthropology, University of North Carolina at Wilmington, North Carolina for removal of the skeletal remains. They will be cataloged and studied at the university and a complete report will be submitted to Camp Lejeune when laboratory analysis is completed.

Funding has been transferred to the U. S. Park Service for coordinating the formulation of a Cultural Resource Management Plan for Camp Lejeune. The National Park Service expects to award a contract for the plan in the near future.



PROFESSIONAL ARCHAEOLOGIST EXCAVATE 10-12 SKELETAL REMAINS FROM THE JARRETT'S POINT OSSUARY, WHILE A CLASS OF LEJEUNE HIGH SCHOOL STUDENTS OBSERVE

OUTDOOR RECREATION

Camp Lejeune's Special Services operates one of the largest and most varied recreation programs within the Armed Forces. Military personnel, their dependents and guests daily utilize and enjoy the many recreational facilities and natural resources available at Camp Lejeune.

The Base Stables is one of the more popular facilities, offering the outdoorsman a variety of activities to enjoy. Organized activities include horse shows and early morning rides through the Camp Lejeune forest that climax with a hearty meal of steak, eggs and grits. In addition, for those horsemen wishing to try pot-luck dinners, there are bi-monthly dinner rides. There are 40 horses and ponies available for use, and boarding facilities for 50 privately-owned mounts. Classes in jumping, western, and English riding are available to patrons.

The Base Archery Range, consisting of a practice area and a nationally approved 28-target field course, is another popular facility during the Spring and Summer months. The Archery Range is located in a beautifully wooded area close to the main part of the base.

Gottschalk Marina is located on Wallace Creek, a tributary of New River. It is a haven for sailors during the Spring and Summer months. Equipment available includes motorboats, sailboats, canoes, paddleboats and boat trailers for use both on and off-base. Berthing facilities for privately-owned craft are also available. Qualified personnel are present to assist those patrons who wish to take part in Gottschalk Marina's boating programs. The Summer Youth Program conducted each year offers classes in small craft safety which includes basic canoeing, rowing, sailing and motor boating. The smaller but very popular Courthouse Bay Marina has similar equipment plus catamarans.

The Base Skeet Range caters to many skeet and trap enthusiasts, both recreationally and competitively. Shotguns and ammunition are available to the shooters for a nominal fee. Skeet matches, including state and invitational matches, are conducted each year.

Onslow Beach, a popular spot from April through September, plays host to thousands of military personnel, their dependents and guests. Twenty-eight completely furnished beach cabanas are available for a nominal fee to those who would enjoy a three or four-day stay at the beach. In addition, three large pavilions offering food and drink, showers and lockers are located along the scenic 1 1/2 miles of recreation beach. Also available are open-air cabanas for daytime use. Qualified lifeguards and beach personnel are assigned each year to Special Services to ensure safe and efficient operation of the beach.

Special Services operates deep sea fishing crafts from March through October to carry fishermen to enjoy off-shore fishing resources of the Carolina coast.

Paradise Point Golf Course offers two of the finest 18-hole courses in this part of the country.

Camping trailers, tents and camping accessories are available for those who would enjoy a weekend in the great outdoors. Trailer hitches to fit most cars are also available. In addition, two major camping areas with seventy-four camping sites are located in the Onslow Beach area. These camping sites are adjacent to swimming, surfing and fishing areas and are equipped with sanitary facilities. Shelters, water, electricity and barbecue grills have been installed in the campsites for the convenience of campers.

Parallel to the shores of the New River and winding through the North Carolina pine forest, Area 5 Recreation Area offers the novice outdoorsman a venture into dynamic land-use and development. Picnic tables, shelters, barbecue grills and sanitary facilities provide patrons with every convenience. Hospital Point Recreation Area is the latest addition that provides the patron with the ultimate in picturesque picnic grounds. Totally equipped, it too is nestled along the New River. In addition, freshwater ponds stocked with bream and bass await the enthusiastic angler throughout the base.

The Boy Scout Program includes Cub Scout to Explorer Scout levels. Adult participation is commendable with individuals acting as Cubmasters, Scoutmasters, Commissioners and Unit Committeemen.

The Scout camping area on the base is a beautiful spot on the bank of Northeast Creek. This site provides an excellent location to perfect camping and woodsman-ship skills and to increase appreciation of the outdoor environment. Scout troops from other areas are frequently hosted at this campsite. Contributions to the conservation program by Boy Scouts have proven to be timely and effective. Boy Scouts have assisted in a number of projects including planting pine seedlings and shrub lespedeza seedlings for wildlife. Another project was building and placing bird houses in appropriate locations. A recent project included the clearing away of logging debris from a southern pine beetle salvage operation in a scenic area.

CONSERVATION EDUCATION

A specific program was established by the Natural Resources and Environmental Affairs Division and Camp Lejeune Dependent Schools for enhancing environmental studies for students on the base. Natural Resources personnel are working with the schools in program presentations, field trips and nature study.

Natural Resources personnel have coordinated video filming of various program functions with the Training Audio-Visual Support Center. Numerous video tapes have been produced for presenting natural resources programs to military organizations in the community.

We coordinated a research study of pine savannas by the North Carolina Division of Coastal Management. The purpose of the research is to analyze trees, shrubs, herbs and soils within four selected study areas located in savannas. The research was continued along the staggered blooming times of savanna flowers from May - October.

A research study was coordinated with the Department of Entomology, North Carolina State University, Raleigh, North Carolina. The research involves the study of the tick population and the impact of controlled winter burning on tick populations. These data relate to investigation into tick-transmitted Lyme disease. Ticks and blood samples have been collected from several hundred deer during the 1984-85 hunting seasons. Samples have also been collected from raccoon, opossum and wild turkey.

The partial section of a large tooth was discovered on Onslow Beach in 1984. The specimen was forwarded to the Smithsonian Institution in Washington, D. C. for identification. The specimen was identified as a partial (right, lower, third molar) Gomphothere tooth of the Gomphotheriidae family. The Gomphothere was a mastodon-like creature that lived during the Miocene, Pliocene and Pleistocene periods. The tooth has been catalogued in the Department of Paleobiology under the number 374281.

Marine Corps Base hosted wildlife biology students from North Carolina State University and Wayne Community College on field trips of the natural resources program. Other groups such as the North Carolina Forestry Association and the North Carolina State Chapter of the National Wild Turkey Federation were given tours of the base to observe natural resources management programs.



OFFICERS AND ENLISTED PERSONNEL ARE BRIEFED RELATIVE TO PROTECTION OF RED-COCKADED WOODPECKER HABITAT BY NATURAL RESOURCES PERSONNEL



MARINE CORPS BASE HOSTS THE NORTH CAROLINA FORESTRY ASSOCIATION TO A NATURAL RESOURCES AND ENVIRONMENTAL AFFAIRS TOUR

COMMUNITY RELATIONS

The Natural Resources and Environmental Affairs staff presented conservation slide presentations to civic organizations such as Rotary and Ruitan Clubs. The staff was pleased to assist in the recertification of Onslow County teachers by presenting special conservation programs to selected teachers. Field trips showing multiple-use management have also been presented to interested organizations, such as members of the North Carolina Forestry Association and members of the Weyerhaeuser Tree Farm Family organization.

The cooperative fire fighting agreements were exercised by the state and federal Forest Services in 1985 because of the extremely severe forest fire conditions that existed. Marines were sent to assist in suppressing the 98,000-acre Allen Road fire in Hyde, Washington and Dare counties and low-ground pressure heavy equipment and personnel were sent to help fight a 6,000-acre wildfire in the Croatan National Forest.

