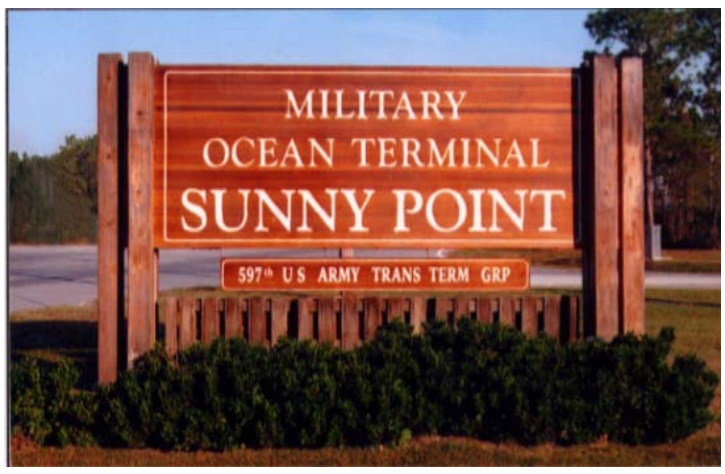
INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN FOR THE MILITARY OCEAN TERMINAL, SUNNY POINT, NORTH CAROLINA

GENERAL PLAN

LAND MANAGEMENT AND GROUNDS MAINTENANCE



FOREST MANAGEMENT PLAN

FISH AND WILDLIFE MANAGEMENT PLAN

OUTDOOR RECREATION PLAN

ENDANGERED SPECIES MANAGEMENT PLAN

Prepared For:

MILITARY OCEAN TERMINAL SUNNY POINT
Southport, North Carolina

Prepared By:

CZR INCORPORATED
Wilmington, North Carolina

DIAL CORDY AND ASSOCIATES INC.
Wilmington, North Carolina

and

SAVANNAH DISTRICT
U.S. ARMY CORPS OF ENGINEERS
Savannah, Georgia

FINAL

JUNE 2009

Coordination Revisions: 2005-2009

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Prepared For:
MILITARY OCEAN TERMINAL, SUNNY POINT
Southport, North Carolina

Agency Coordination and Revisions Provided By:
DIAL CORDY AND ASSOCIATES INC.
Wilmington, North Carolina

Submitted: July 2000
Modified: April 2009
Coordination Revisions: 2005-2009

INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN

MILITARY OCEAN TERMINAL, SUNNY POINT, NORTH CAROLINA

APPROVAL

This Integrated Natural Resources Management Plan meets the requirements of the Sikes Act (16 U.S.C. 670a *et seq.*) as amended.

Mark J. Hagan
Colonel, US Army
Commanding Officer
Military Ocean Terminal, Sunny Point

22 JAN 2010
Date

Gordon S. Myers
Executive Director
North Carolina Wildlife Resources Commission

19 FEB 10
Date

Pete Benjamin
Field Supervisor
Raleigh Field Office, North Carolina
U.S. Fish and Wildlife Service

2/11/10
Date

THE INTEGRATED NATURAL RESOURCES MANAGEMENT
PLAN FOR THE MILITARY OCEAN TERMINAL, SUNNY POINT,
NORTH CAROLINA

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1.0 SCOPE

In accordance with Army Regulation 200-3 and, as referenced to in the Sikes Act, Integrated Natural Resources Management Plans will be developed and maintained for all Army installations. The following Integrated Natural Resources Management Plan has been developed for Military Ocean Terminal, Sunny Point (MOTSU), Brunswick County, North Carolina and will be maintained, reviewed annually and revised as necessary.

2.0 PURPOSE

The Integrated Natural Resources Management Plan for MOTSU will be used to assist planners and implementors of mission activities as well as natural resources managers. The integrated natural resources management plan will be a component and supporting element of the installation master plan. This plan includes parts: I General; II Land Management and Grounds Maintenance; III Forest Management; IV Fish and Wildlife Management; and V Outdoor Recreation. Once approved by the installation commander, the Endangered Species Management Plan will be included as part VI Endangered Species Management.

3.0 OBJECTIVES

The following criteria are essential to the integration of the natural resources management plan.

(1) All renewable natural resources and areas of critical or special concern are adequately addressed from both technical and policy standpoints.

(2) The natural resources management methodologies will sustain the capabilities of the renewable resources to support military requirements.

(3) The plan includes current inventories and conditions of natural resources; goals; management methods; schedules of activities and projects; priorities; responsibilities of installation planners and decision makers; monitoring systems; protection and enforcement systems; land use restrictions (Figure 1), limitations, and potentials or capabilities; and resource requirements including professional and technical manpower.

(4) Each plan segment or component (that is, land, forest, fish and wildlife, and outdoor recreation) exhibits compatible methodologies and goals including compliance with the Endangered Species Act and applicable Endangered Species Management Plans.

(5) The plan is compatible with the installation's master plan, pest management plan, and Master Training Schedule.

4.0 IMPLEMENTATION

Natural resources management plans will be prepared, implemented, and monitored by natural resources management professionals. At MOTSU, the installation forester is responsible for these activities. The plans will be coordinated with appropriate federal, State, and local natural resources managers and agencies with natural resources expertise and will be made available for public comment.

5.0 REGULATIONS AND GUIDELINES

AR 200-1. Environmental Protection and Enhancement. (Cited in paras 1-5c, 2-1c, 5-1b, 8-1c, 8-3, 8-4c, 11-6a(2), and 11-6g(1).)

AR 200-2. Environmental Effects of Army Actions. (Cited in paras 1-5c, 1-4d, 2-1c, 2-2a, 2-2b, 5-1b, and 11-6f(1).)

AR 200-3. Environmental Quality. Natural Resources– Land, Forest and Wildlife Management. Headquarters, Department of the Army, Washington, DC. 28 February 1995.

AR 210-20. Master Planning for Army Installations. (Cited in paras 2-2b, 7-2, 8-2b, 9-2b, and 11-6a(5).)

TM 5-630, NAVFAC MO-100.1, AFM 126-2. (Cited in paras 2-18b, 4-8a, 9-3a, 9-3b, and 9-5). Natural Resources-Land Management. Departments of the Army, the Navy, and the Air Force. July 1982

TM 5-631, NAVFAC MO-100.2, AFM 126-3. (Cited in paras 5-4d, 9-3a, 9-3b, and 9-5.) Natural Resources-Forest Management. Departments of the Army, the Navy, and the Air Force. December 1981.

TM 5-633, NAVFAC MO-100.3, AFM 126-4. (Cited in paras 9-3a, 9-3b, and 9-5.) Natural Resources-Fish Wildlife Management. Departments of the Army, the Navy, and the Air Force. February 1982.

TM 5-635, NAVFAC MO-100.4, AFM 126-5. (Cited in paras 9-3a, 9-3b, and 9-5.) Natural Resources-Outdoor Recreation and Cultural Values.

50 CFR 402. Interagency Cooperation-Endangered Species Act of 1973, as amended. (Cited in paras 11-7a(1)(b) and 11-7(a)(2).) Endangered Species Act (ESA) of 1973, as amended (16 USC 1531-1544). (Cited in paras 11-1a and 11-7a(1)(a).) National Environmental Policy Act (NEPA) of 1969, as amended (42 USC 4321-4370d). (Cited in para 11-6f.) SIKES Act, as amended (16 USC 670a-670o). (Cited in chap.9.)

ENVIRONMENTAL CONSTRAINTS MAP

At the request of Military Ocean Terminal, Sunny Point (MOTSU), an Environmental Constraints Map (see Figure 1) has been developed to assist MOTSU management personnel in determining quickly and easily what areas located within the Main Terminal are available for use. Environmental constraints consist of wetlands and endangered species.

100' BUFFER AREA FOR ROUGH-LEAVED LOOSESTRIFE
ROUGH-LEAVED LOOSESTRIFE LOCATION

RED-COCKADED WOODPECKER TREE

200' BUFFER FOR TREES ASSOCIATED WITH ACTIVE CLUSTERS

FORAGING AREA (ONE-HALF MILE RADIUS FROM IDENTIFIED TREE)
MAIN TERMINAL
WETLANDS

SOURCE: ROUGH-LEAVED LOOSESTRIFE LOCATIONS AND RED-COCKADED WOODPECKER LOCATIONS WERE ENTERED WITH A C.M.T. GPS UNIT (PCGPS VERSION 3.2), NAD 1927, BY CZR INCORPORATED, WILMINGTON, NORTH CAROLINA IN 1997. WETLAND DATA BASED ON VEGETATION DATA (BRVEG27.E00) PROVIDED BY THE CORPS OF ENGINEERS, WILMINGTON DISTRICT, IN ARC INFO FORMAT, NAD 1927, AND RECEIVED BY CZR INCORPORATED ON 3 MARCH 1998. BASE INFORMATION PROVIDED BY THE CORPS OF ENGINEERS, SAVANNAH DISTRICT IN MICROSTATION (.DGN) FORMAT, NAD 1927, DATED 7 AUGUST 1995, AND RECEIVED BY CZR INCORPORATED IN SEPTEMBER 1997.

ENVIRONMENTAL CONSTRAINTS

MILITARY OCEAN TERMINAL SUNNY POINT

FILE: RCWFORIN	DRAWN BY: JEJ	0 — 3000'
DATE: 05/27/99	APPROVED BY:	

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FIGURE 1

OVERALL INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN

THE INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN FOR THE MILITARY OCEAN TERMINAL, SUNNY POINT, NORTH CAROLINA

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[a] Data summarized from data collected by CZR Incorporated during the 1997-1998 forest inventory.

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LIST OF FOREST INVENTORY DATA (1997/1998) FOR THE FOREST MANAGEMENT PLAN

[The forest inventory data for the following areas are bound in a separate volume on file in the office of the MOTSU Forester, and are not included in the INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN.]

- INTRODUCTION
- CUTTING UNIT I (includes Forest Management Blocks A01 through A04)
- CUTTING UNIT II (includes Forest Management Blocks A05 through A10)
- CUTTING UNIT III (includes Forest Management Blocks A12 through A16, A20, A22, and A27)
- CUTTING UNIT IV (includes Forest Management Blocks A11, A17, A18, A21A, and A26)
- CUTTING UNIT V (includes Forest Management Blocks A19, A21B, A25, B01, and B23)
- CUTTING UNIT VI (includes Forest Management Blocks A23, A24, B21, B22, and B25)
- CUTTING UNIT VII (includes Forest Management Blocks B18 and B24)
- CUTTING UNIT VIII (includes Forest Management Blocks B12, B15, B16, B19, and B20)
- CUTTING UNIT IX (includes Forest Management Blocks B09 through B11, and B17)
- CUTTING UNIT X (includes Forest Management Blocks (B02 through B08, B13, and B14)
- CUTTING UNIT XI (includes Forest Management Blocks (FT01 and FT02)
- CUTTING UNIT XII (includes Forest Management Blocks (K01 through K05)
- CUTTING UNIT XIII (includes Forest Management Blocks (C01 and C04)
- CUTTING UNIT XIV (includes Forest Management Blocks (FP01 and FP02)
- CUTTING UNIT XV (includes Forest Management Blocks (L01 through L04)
- ROUGH FOREST INVENTORY MAPS

PART III. FOREST MANAGEMENT PLAN (continued)

LIST OF FOREST INVENTORY SUMMARIES
HARD COPIES AND COMPUTER DISKS

[Hard copies and a computer disk of the forest inventory summaries spreadsheets are bound in a separate volume on file in the office of the MOTSU Forester, and are not included in the INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN. All files were created using Microsoft Excel 5.0 for Windows 95.]

Cu_ss.xls	VOLUMES AND WEIGHTS PER ACRE, STEMS PER ACRE, AND BASAL AREAS PER DBH CLASS BY CUTTING UNIT
Cuvol.xls	CUTTING UNIT VOLUMES AND WEIGHTS PER ACRE AND TOTAL PER CUTTING UNIT - CURRENT
Cuvol10.xls	CUTTING UNIT VOLUMES AND WEIGHTS PER ACRE AND TOTAL PER CUTTING UNIT - PROJECTED 10 YEARS TO 2007
Cuvol20.xls	CUTTING UNIT VOLUMES AND WEIGHTS PER ACRE AND TOTAL PER CUTTING UNIT - PROJECTED 20 YEARS TO 2017
Cureg.xls	AVERAGE PINE AND HARDWOOD REGENERATION PER ACRE BY CUTTING UNIT
Cuttree.xls	CURRENT, 10-YEAR, AND 20-YEAR PROJECTED TREES PER ACRE BY CUTTING UNIT
Cugrow.xls	AVERAGE PINE AGES IN EVEN-AGED, UNEVEN-AGED, AND MIXED PINE-HARDWOOD STANDS BY CUTTING UNIT
Sicu.xls	SITE INDICES, AVERAGE AGES, AND AVERAGE HEIGHTS OF PINE SPECIES BY CUTTING UNIT
Cuptons.xls	TOTAL PINE TONS PER ACRE PER DBH CLASS BY CUTTING UNIT
Fmb_ss.xls	VOLUMES AND WEIGHTS PER ACRE, STEMS PER ACRE, AND BASAL AREAS PER DBH CLASS BY FOREST MANAGEMENT BLOCK
Fmbvol.xls	FOREST MANAGEMENT BLOCK VOLUMES AND WEIGHTS PER ACRE - CURRENT
Fmbvol10.xls	FOREST MANAGEMENT BLOCK VOLUMES AND WEIGHTS PER ACRE - PROJECTED 10 YEARS TO 2007
Fmbvol20.xls	FOREST MANAGEMENT BLOCK VOLUMES AND WEIGHTS PER ACRE - PROJECTED 20 YEARS TO 2017
Fmbreg.xls	AVERAGE PINE AND HARDWOOD REGENERATION PER ACRE BY FOREST MANAGEMENT BLOCK

PART III. FOREST MANAGEMENT PLAN (concluded)

Fmbtree.xls	CURRENT, 10-YEAR, AND 20-YEAR PROJECTED TREES PER ACRE BY FOREST MANAGEMENT BLOCK
Fmbgrow.xls	AVERAGE PINE AGES IN EVEN-AGED, UNEVEN-AGED, AND MIXED PINE-HARDWOOD STANDS BY FOREST MANAGEMENT BLOCK
Sifmb.xls	SITE INDICES, AVERAGE AGES, AND AVERAGE HEIGHTS OF PINE SPECIES BY FOREST MANAGEMENT BLOCK
Fmbtons.xls	TOTAL PINE TONS PER ACRE PER DBH CLASS BY FOREST MANAGEMENT BLOCK
St_ss.xls	VOLUMES AND WEIGHTS PER ACRE, STEMS PER ACRE, AND BASAL AREAS PER DBH CLASS BY STAND TYPE
Stvol.xls	STAND TYPE VOLUMES AND WEIGHTS PER ACRE AND TOTAL PER STAND TYPE - CURRENT
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PART I.

GENERAL PLAN

OF THE INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN FOR THE MILITARY OCEAN TERMINAL, SUNNY POINT, NORTH CAROLINA

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PART I. GENERAL PLAN

OF THE INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN FOR THE MILITARY OCEAN TERMINAL, SUNNY POINT, NORTH CAROLINA

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PART I. GENERAL PLAN

1.0 INTRODUCTION

Army Regulation AR 200-3 requires that all military installations prepare and implement an Integrated Natural Resources Management Plan which includes, as one of its components, a General Plan. The General Plan was prepared for the Department of Defense (DOD) facility, Military Ocean Terminal at Sunny Point (MOTSU). It is in compliance with AR 200-3 and in accordance with guidelines provided in "Technical Manual 5-630, Natural Resources- Land Management" (U. S. Departments of the Army, the Navy and the Air Force, July 1982).

1.1 Scope. The General Plan has been developed for MOTSU and is applicable to all lands and waters comprising the installation. It includes technical information for natural resources management personnel engaged in land management at MOTSU. The General Plan describes the natural resources of the installation and describes the management and conservation practices undertaken at this facility.

1.2 Purpose. The purpose of the General Plan is to provide a ready source of information that describes how natural resources will be managed at MOTSU. This information will enable installation personnel to supplement ongoing management efforts, conserve the natural resources on Department of Defense lands, maintain and improve the appearance of grounds, and promote operational safety and efficiency.

1.3 Objectives. Natural resources management is the program for development, improvement, and maintenance and conservation of the real property at DOD installations. Utilization of the General Plan by MOTSU managers will insure that the following DOD objectives are met:

1) Conserve, develop, manage and maintain all land (includes soil, ground cover, and water areas) under DOD jurisdiction in accordance with proven scientific methods, procedures and techniques to facilitate military missions and operations.

2) Protect land investments from depreciation by adopting land use practices based upon soil capabilities.

3) Remove or screen unsightly debris or landscape blemishes.

4) Prevent installations from contributing to pollution through waste disposal or erosional debris.

5) Improve the appearance of installations and facilities through the preservation of the natural terrain and vegetation and by appropriate new plantings.

6) Prevent damage or destruction of valuable natural resources through fire or misuse.

1.4 Implementation. The General Plan contains information on specific topics as outlined in Appendix B of TM 5-630, listed above. The plan contains descriptions of the facilities and the management activities currently undertaken at MOTSU. These facilities and related activities are not expected to change. Any major changes to the management strategy at MOTSU, however, will be incorporated in a five-year revision.

2.0 MISSION AND LOCATION

2.1 Mission, Land Acquisition, and Status.

2.1.1 Mission. The Military Ocean Terminal at Sunny Point (MOTSU) was declared operational in September 1955. The primary mission was to plan, coordinate, and execute the safe movement and transfer of defense munitions, hazardous materials, and other general cargo through MOTSU and activate the Ports of Wilmington and Morehead City, North Carolina, during both exercise and contingency operations. The original mission remains basically unchanged today. The ability of MOTSU to accomplish the mission is measured against a target maximum throughput capability. Procedures and operations, organizational structure, and the size and composition of the workforce are all oriented toward continued performance of the basic transshipment mission, while maintaining the capability to achieve and sustain the target throughput, when and if required (USACE 1994).

MOTSU is the primary ammunition terminal supporting the European theater and southwest Asia and plays an essential role in the Army Strategic Mobility Program. It is the first deep water port in the U.S. designed specifically for the safe transshipment of munitions and related hazardous cargo, and the only terminal in the continental U.S. that is equipped to safely handle large volumes of containerized ammunition. MOTSU is not, however, a storage depot and accommodates only short-term storage associated with transshipment operations (USACE 1994).

Personnel at MOTSU plan, coordinate, and support the shipment and receipt of cargo other than munitions in support of military operations and training exercises. This other cargo, typically military equipment and supplies, is moved through the terminal in much the same manner as ammunition (USACE 1994).

In addition, MOTSU personnel arrange for movement of similar, nonexplosive military cargo by shipping agreement through the commercial ports of Wilmington and Morehead City, which are owned and operated by the North Carolina State Ports Authority (NCSPA) (USACE 1994).

2.1.2 Land Acquisition. MOTSU currently comprises approximately 16,000 acres. The Main Terminal consists of 8,645 acres located on the west bank of the Cape Fear River in rural Brunswick County, 25 miles south of the City of Wilmington and 10 miles north of the mouth of the river. The Main Terminal accommodates all administrative, operational, storage, and waterfront facilities. Surrounding the terminal to the north, west, and south is a 4,267-acre blast safety easement. To the east is the Cape Fear River. The combined area of the terminal and easement is 12,912 acres.

The Leland Interchange Yard is located in Brunswick County near the town of Leland. The 652-acre railyard is used as a transfer point between the commercial CSX Railroad and the Government-owned rail line. A 400-acre easement runs along the rail corridor (19.6 miles long by 180 feet wide) from the Main Terminal to .7 mile north of the Leland Interchange Yard (USACE 1994).

Fort Johnston is a 6-acre property with a historic residential garrison house and two other residential structures located near downtown Southport. The facilities are used as residences for the commander of MOTSU and other military personnel assigned to the installation (USACE 1994). [Note: Fort Johnston, as of September 2007, is no longer MOTSU property. Agency coordination resolution of Part I occurred prior to property transfer.]

In New Hanover County, stretching along the east bank of the Cape Fear River directly opposite the Main Terminal, is a narrow 2,267-acre crescent-shaped property also belonging to MOTSU. The undeveloped and uninhibited tract, designated as the Carolina Beach Blast Safety Zone (CBBSZ) (a.k.a. New Hanover County Bufferzone) because of its proximity to the Town of Carolina Beach, is retained by the Government as a buffer zone to mitigate the effect of any accidental blast that might occur on the wharf or a ship docked at MOTSU. The zone also borders other area beaches along the island peninsula, to include Hanby Beach, Wilmington Beach, and Kure Beach, as well as the North Carolina Aquarium and the Fort Fisher State Park, part of which is actually in the blast zone. Also within the zone are the inactive Fort Fisher Air Force Station (now used for recreational purposes) and the North Carolina National Guard Training Center (USACE 1994).

2.1.3 Status. The army installation at MOTSU remains on active status while retaining its role as a critical element in the Army Strategic Mobility Program. MOTSU is the primary east coast ammunition terminal supporting U.S. and allied forces in Europe and Southeast Asia (USACE 1994).

2.2 Principal Transportation Routes.

2.2.1 Highways. Two interstate highways serve the region. Interstate 40 (I-40) runs across the entire United States, from Barstow, California on the west coast all the way to east coast, terminating in Wilmington, North Carolina. Interstate 95 (I-95) runs north-south along the entire east coast and passes through eastern North Carolina (USACE 1994).

US Highway 17, much of which has been improved to a 4-lane divided roadway with relatively limited access, is the primary north-south route through the region. US Highways 117 and 421 also connect the region with points north, but do not pass through the area, terminating in Wilmington and Carolina Beach. Combined US Highways 74 and 76 connect the region to points west, diverging after about 50 miles near Whiteville. From there, US 74 tracks northwestward through North Carolina, intersecting I-95 near Lumberton, NC, approximately 80 miles west of Wilmington. US 76 drops to the south and heads due west across South Carolina, also crossing I-95 near Florence, South Carolina, approximately 70 miles from Whiteville and 130 miles west of Wilmington. All of these routes are four-lane divided roadways as they approach Wilmington, where they all terminate (USACE 1994).

NC Highways 87 and 133 provide access through the region in a north-south direction from Wilmington to Southport. NC 133 passes by the main entrance to MOTSU and connects with US 74/76 near Wilmington. NC 87, which originates well within the interior of the State, intersects US 17 about 10 miles west of MOTSU and also converges with NC 133 at the installation main entrance (USACE 1994).

NC 211 enters the area from a more westerly direction, intersecting US 17 approximately 9 miles west of Southport. It intersects combined NC 133/87 approximately 2 miles south of the main entrance to MOTSU (USACE 1994).

In general, these roadways are in good repair and are of adequate condition and capacity to accommodate cargo and personnel traffic moving to and from MOTSU. This is particularly true of the interstate routes, as well as the US highways, many of which are being upgraded in the area. The State owned and maintained routes are also adequate, but not on the same level as the US highways (USACE 1994).

2.2.2 Railroad. The CSX Transportation Corporation provides the only rail link to the region, limited to a single, freight-only line. These tracks run northwesterly from Wilmington to Pembroke, where they connect to the north-south CSX line serving the Fayetteville-Fort Bragg area. From Pembroke, the tracks continue westward to a connection with the main north-south CSX line at Hamlet, and then continue west to Charlotte. There are no rail lines connecting the region directly to points north or south (USACE 1994).

The Davis Classification Yard, located north of Navassa, just to the west of Wilmington, is the commercial interchange yard for rail traffic in and out of the region. The yard has a capacity of 1,750 railcars (USACE 1994).

The CSX line connecting Wilmington to Fort Bragg through Pembroke and the connection to Charlotte are both segments of the Strategic Rail Corridor Network (STRACNET). Local segments of the line are classified as low density, branch connectors (USACE 1994).

The STRACNET is a 30,000+ mile system of Class A main rail lines identified as strategically important militarily, industrially, and commercially to the defense of the United States. Branch lines typically connect military installations with the STRACNET. The STRACNET system is defined by the Federal Railroad Administration based on carrying and speed capacity, maintenance posture, structural limitations, and trackside clearance criteria (USACE 1994).

Approximately 80 percent of the landside movement of cargo through MOTSU is by rail. Accordingly, rail access to the Leland Interchange Yard and to the Main Terminal is essential to mission accomplishment. Conversely, there is no requirement for rail access to either of the other properties owned and operated by MOTSU at Fort Johnston or Carolina Beach (USACE 1994).

All rail traffic entering and leaving MOTSU is carried on a single Government-owned and operated line. The line connects the Main Terminal to the commercial rail system, 18.5 miles to the north, through the Government-owned Leland Interchange Yard. The interchange yard, located immediately to the southwest of the town of Leland, connects to a spur of the CSX line approximately .7 mile farther north. From there, the CSX spur runs approximately 4 miles to the east, to the Davis Rail Classification Yard at Navassa where it joins the main east-west CSX-line (USACE 1994).

2.2.3 Airways. Provisions for air transportation to and from MOTSU and the surrounding region are relatively limited due to a moderate to small population and passenger base, the absence of major centers of activity requiring air travel access, and a minimum number of commercial or industrial enterprises that require air freight or passenger support. MOTSU does not ship or receive cargo by air in conjunction with its basic munitions transshipment mission (USACE 1994).

The primary regional airport is the Wilmington International Airport (formerly the New Hanover International Airport) located north of Wilmington in New Hanover County. Total passenger traffic for 1997 was over 400,000 passengers. The facility has two active bituminous surface runways. Runway 6-24 has a dual wheel pavement strength of 160,000 pounds and a dual tandem wheel strength of 275,000 pounds. Runway 17-35 has a dual wheel pavement strength of 185,000 pounds and a dual tandem wheel pavement strength of 300,000 pounds. The design aircraft is the Boeing 727-100. Runway 17-35, the primary instrument runway, runs north-south and is 7,000 feet long by 150 feet wide. Runway 6-24, the crosswind runway, is 8,000 feet long and 200 feet wide. Taxiways are 75-foot-wide asphalt (USACE 1994; Personal communication, 6 January 1998, Willard G. Plentl, Airport Director, Wilmington International Airport).

Hangar space is approximately 30,000 square feet. A 90,000+ square-foot terminal building provides four commercial gates and one commuter gate. Additional improvements include construction of a new fire/rescue building, upgrade of the runway lighting system, and extension of the taxiways (USACE 1994).

In Brunswick County there are two publicly-owned general-purpose airports, the Brunswick County Airport in Southport and the Ocean Isle Beach Airport in Ocean Isle Beach. The Brunswick County Airport is located on the mainland across from the beach in the southeastern corner of the county in Southport. It provides charter service through Ocean Aire Aviation. In addition to many passenger-related amenities, the runway has been widened and additional airplane parking area provided (USACE 1994; Personal communication, 6 January 1998, Franklin Howard, Manager, Brunswick County Airport). Ocean Isle Beach Airport is located on the mainland across from the beach in the southwestern corner of the county in Ocean Isle Beach. It has a landing strip and tie-down, but offers no passenger services. Both facilities have Master Plans which are approved by the Federal Aviation Administration (FAA). In the early 1980's, the county prepared an Airport Zoning Ordinance which is currently enforced by the county's Building Inspections Division and the respective airport managers. The county also provides financial support to the operation, maintenance, and development of both airports (USACE 1994; Personal communication, 6 January 1998, Franklin Howard).

There are several other privately-owned airstrips scattered throughout the county. The largest of these is the Winnabow International Airport near Bolivia in the midwestern part of the county. It has a relatively large paved and lighted runway with less than ten homebased aircraft. The majority of the other private airstrips are grassed and unlighted (USACE 1994).

MOTSU is primarily in the business of moving large quantities of hazardous cargo by truck, rail, and oceangoing vessel. There is little need or practical application to expand that capability to air transport, and MOTSU has no plans for increased aviation operations (USACE 1994).

2.3 Distances to Principal Cities and Towns. Southport, with a 1997 population of 2,500, is located approximately 5 miles south of the terminal. Wilmington, with a 1997 population of 62,269, is located 25 miles to the north.

3.0 LAND USE INVENTORY

Land use classifications at MOTSU include improved, semi-improved, and unimproved grounds. Grounds consist of all land and water acreage for which an installation commander has responsibility. Activities included under each classification are listed in the referenced tables. General acreage information regarding mowing, weed control, and other maintenance activities are also provided in these tables.

Information provided below on classification of grounds is taken from Technical Manual 5-630, NAVFAC MO-100.1, AFM 126-2, Natural Resources-Land Management, Departments of the Army, the Navy, and the Air Force, July 1982, pages 2-2 and 2-3.

3.1 Improved Grounds. This category includes acreage on which intensive maintenance activities must be planned and performed annually as fixed requirements. Included are areas within the built up section of an installation which contain lawns and landscape plants; parade grounds; drill fields; athletic facilities; cemeteries; golf courses (excluding roughs); and similar areas. Maintenance operations include mowing, irrigating, fertilizing, cultivating, aerifying, seeding, sodding, spraying, pruning, trimming, weed control, vegetative insect and disease control, planting for landscape effect, wind and sound abatement and other intensive practices. There are 424 acres of improved grounds at MOTSU (Table I-1, page I-6.)

3.2 Semi-improved Grounds. This category includes areas on which periodic recurring maintenance is performed but to a lesser degree than on improved grounds. Included are small arms ranges, antenna facilities, picnic areas, mowed road shoulders, golf course roughs, ammunition storage areas, airfield shoulders and clear zones, drop zones, firebreaks, and similar areas. Practices normally include such cyclic variables as soil sterilization, weed and brush control, erosion and dust control, drainage maintenance, and mowing for fire protection. There are 333 acres of semi-improved grounds at MOTSU (Table I-2, page I-7.)

3.3 Unimproved Grounds. This category includes all other acreage not classified as improved or semi-improved. Included are bombing and gunnery areas; impact areas, training and maneuver areas; forest areas; agricultural and grazing lands, lakes, ponds and swamps; beach and similar areas requiring limited or no maintenance. Practices and intervals of attention are generally unpredictable such as might evolve from the military mission; soil, water and wildlife conservation, floods, fires, and insect or disease epidemics. There are often the most extensive land areas under military control and generally afford the greatest potential for the development of a natural resources management program. There are 3158 acres of unimproved grounds at MOTSU (Table I-3, page I-8.)

3.4 Commercial Forest Land. This category is not included in any of the categories above, but comprises those areas classed as economically productive or economically potentially productive

Table I-1. Inventory of land use – improved grounds.

Improved grounds classification	Total acres	Acres maintained with				Mowing frequency
		Power Mowers [5]		Tractor mowers[6]		
		Irrigated[7]	Unirrigated	Irrigated[7]	Unirrigated	Mo. Yr.
Lawns mowed by facilities engineer[1]	0	0	0	0	0	0
Lawns mowed by others[1]	20	16	4	0	0	26/year
Athletic fields[2]	2					
Golf courses by facilities engineer	0					
Golf courses by others	0					
Parades and drill grounds	0					
Post cemeteries	0					
Private cemeteries	2					
Airfield and heliport (landing and parking)[3]	0					
Other improved grounds (road, shoulders)[4]	390				390	
(Specify kinds and use) (landscape sites)	10	2	8			
Total	424	18	12		390	

[1] Include areas adjacent to buildings & structures normally described as lawns.
[2] Include turf area of ball fields and other outdoor recreational facilities (other than golf).
[3] Grassed landing and parking areas.
[4] List separately such areas as: ground cover (ivy, iceplant, periwinkle), crushed rock or gravel blanket on improved grounds, other landscape planted areas, and road shoulders in improved ground areas.
[5] Include acres mowed with hand push and self contained power units.
[6] Include acres mowed with farm or industrial type tractor mowers.
[7] Include acres regularly irrigated to prevent loss of turf. Do not include lawn areas in humid climate zones irrigated to preserve green color.

Table I-2. Inventory of land use -- semi-improved grounds.

Semi-improved classification	Total acres	Mowed	Weed control	Other maintenance
Airfield and heliports[1]	0			
Ammunition storage[2]	146	146		
Antenna fields	0			
Drop zones	0			
Small arms ranges	0			
Firebreaks[3]	0			
Road shoulders and railroad beds and appurtenant land areas[4]	167	167	51	
Picnic area[5]	0			
Wildlife food plots[6]	20	20		20
Other grounds[7]				
Totals	333			

[1] Do not include landing and parking area.
[2] Do not include unimproved area.
[3] Do not include firebreaks in forest areas.
[4] Do not include road shoulders of improved grounds or railroad acres of unimproved areas.
[5] Include picnic grounds and similar recreational areas.
[6] Include areas planted to annual and perennial plants and browse and seed crop areas provided incidentally by timely mowing or tilling operations.
[7] Include crushed rock or gravel for dust control within semi-improved areas.

Table I-3. Inventory of land use -- unimproved grounds.

Unimproved classification	Total acres	Mowed	Weed control (chemical)	Other maintenance	Not maintained
Ammunition storage[1]	313	239			
Agricultural leases[2]	0				
Pond, lakes and streams[3]	738		50		
Pavements and railroads[4]	219				
Buildings and structures[4]	14				
Non-merchantable forest land[5]	780				
Other areas[6]	1318				
Totals	3382				

[1] Do not include semi-improved areas.
[2] Indicate work performed by lessee and lessor (not to exceed total area leased.)
[3] Include surface areas in "maintained" and "not maintained" columns as appropriate.
[4] Include land area occupied and report in "not maintained" column. Do not include railroad acreage reported as maintained in semi-improved areas.
[5] Those areas composed of tree or brush cover, not economically productive and maintained for one or more uses such as: watershed protection, soil stabilization, military training, and for natural resource values such as wildlife habitat, natural beauty, and to enhance recreation potential.
[6] Include ranges other than small arms, maneuver areas, safety and security zones, areas prescribed burned not otherwise managed, dessert and swamp areas, open storage areas, open storage areas other than ammunition storage, and crushed rock or gravel within unimproved areas.

COMMERCIAL FOREST LAND. TOTAL ACRES 7,431
(Those areas classed as economically productive or economically potentially productive of wood products on a sustained yield basis.
(AMS Code 728012-23000)

INSTALLATION TOTAL ACRES 11,570
(Combined acreage of improved, semi-improved and unimproved grounds and commercial forest land)

of wood products on a sustained yield basis. There are 7,431 acres of commercial forest land at MOTSU (Table I-3, page I-8.)

3.5 Installation Total Acres. The combined acreage of improved, semi-improved, and unimproved grounds and commercial forest land is 11,570 acres.

4.0 NATURAL ENVIRONMENT

4.1 Climate. Climatic data summarized here and in Tables I-4 through I-6 were obtained from the Southeast Regional Climate Center and the North Carolina Climatic Data Center for Southport, North Carolina. The longtime averages are determined from the 30-year period occurring from 1961-1990.

The climate in the MOTSU area is mild and humid with an average relative humidity of 80 percent during the summer. The wettest period of the year occurs in the months of July, August, and September. Average annual rainfall is approximately 56 inches. Temperature extremes ranged from a low of -3 degrees Fahrenheit in December 1989 to a high of 102 degrees in July 1986. The probability that 5 years in 10 the daily minimum temperature during the growing season would be higher than 32 degrees Fahrenheit is 234 days.

4.2 Topography. Southeastern North Carolina falls within the Atlantic Coastal Plain Physiographic Province, a typically flat area sloping gently to the east and southeast to the Atlantic Ocean. The plain is formed by recently emerged sea bottom upon which is a veneer of marine deposits (USACE 1994). The terrain of the MOTSU facility is forested, swampy, poorly drained, and within the lower elevations of surface water drainage courses subject to seasonal and tidal flooding (Ecology and Environment, Inc. 1996).

4.3 Soils. Four areas comprising MOTSU are the Main Terminal, CBBSZ, Leland Interchange Yard, and Fort Johnston. The number and types of soils varies greatly between these areas. A description of principal soils by each area is listed below. A complete listing of soils and their locations is found in Figures I-1 through I-4. Information pertaining to principal soils were obtained from the Soil Survey of Brunswick County, North Carolina (United States Department of Agriculture, Soil Conservation Service, 1986).

4.3.1 Principal Soils.

Main Terminal -- (BaB) Baymeade fine sand, 1 to 6 percent slopes, (Lo) Leon Fine Sand, (Mu) Murville mucky fine sand, and (YaB) Yaupon silty clay loam, 0-3 percent slopes.

Baymeade fine sand -- This well drained soil is found on low ridges and convex divides. Typically, the surface layer is dark gray fine sand 3 inches thick. The subsurface layer, 20 inches thick, is light gray fine sand in the upper part and very pale brown fine sand in the lower part. The subsoil is 39 inches thick. It is yellowish brown fine sandy loam in the upper part, light yellowish brown fine sandy loam in the middle part, and light yellowish brown loamy sand in the lower part. The underlying material to a depth of 80 inches is very pale brown fine sand. Surface runoff is slow. Permeability is moderately rapid, and the available water capacity is low. The soil is very strongly acid or strongly acid throughout. The seasonal high water table is 4 to 5 feet below the surface. Baymeade soil is mostly in woodland. The areas of this soil are poor to fair habitat for deer, rabbit, fox, quail, and other wildlife. With regard to urban usage, seepage and caving of cutbacks are the main limitations. Lawns and shrubs are difficult to establish and maintain because of droughtiness and leaching of plant nutrients. The sandy nature of this soil is its main limitation.

Leon fine sand -- This nearly level, poorly drained soil is in broad, smooth, interstream areas and in depressions in undulating areas. Typically, the surface layer is dark gray fine sand 6 inches

Table I-4. Longtime averages for temperature (Fahrenheit) determined from the 30-year period occurring from 1961-1990, Southport, North Carolina.[a]

	(degrees Fahrenheit)						
Month	Maximum	Minimum	Mean	Extreme high	Date	Extreme low	Date
Jan	54.5	32.3	43.6	79	3/85	0	21/85
Feb	57.5	34.8	46.5	81	25/82	9	4/81
Mar	64.6	42.2	53.7	90	11/74	8	4/80
Apr	72.4	50.1	61.4	94	24/85	25	10/72
May	79.3	58.7	69.2	97	29/75	36	12/69
Jun	85.3	66.9	76.3	100	20/84	45	2/72
Jul	88.2	70.8	79.8	102	20/86	48	9/85
Aug	87.5	70.0	79.0	100	22/83	53	17/79
Sep	83.4	64.0	74.0	96	9/83	35	24/81
Oct	75.5	51.7	63.9	94	6/86	23	27/62
Nov	68.3	44.4	56.5	88	10/86	16	23/81
Dec	59.1	35.7	47.6	80	2/82	-3	25/89
Annual	73.0	51.8	62.6	102	7/20/86	-3	12/25/89

[a] Southeast Regional Climate Center and the North Carolina Climatic Data Center.

Table I-5. Longtime averages for precipitation (inches) for the 30-year period occurring from 1961- 1990, Southport, North Carolina.[a]

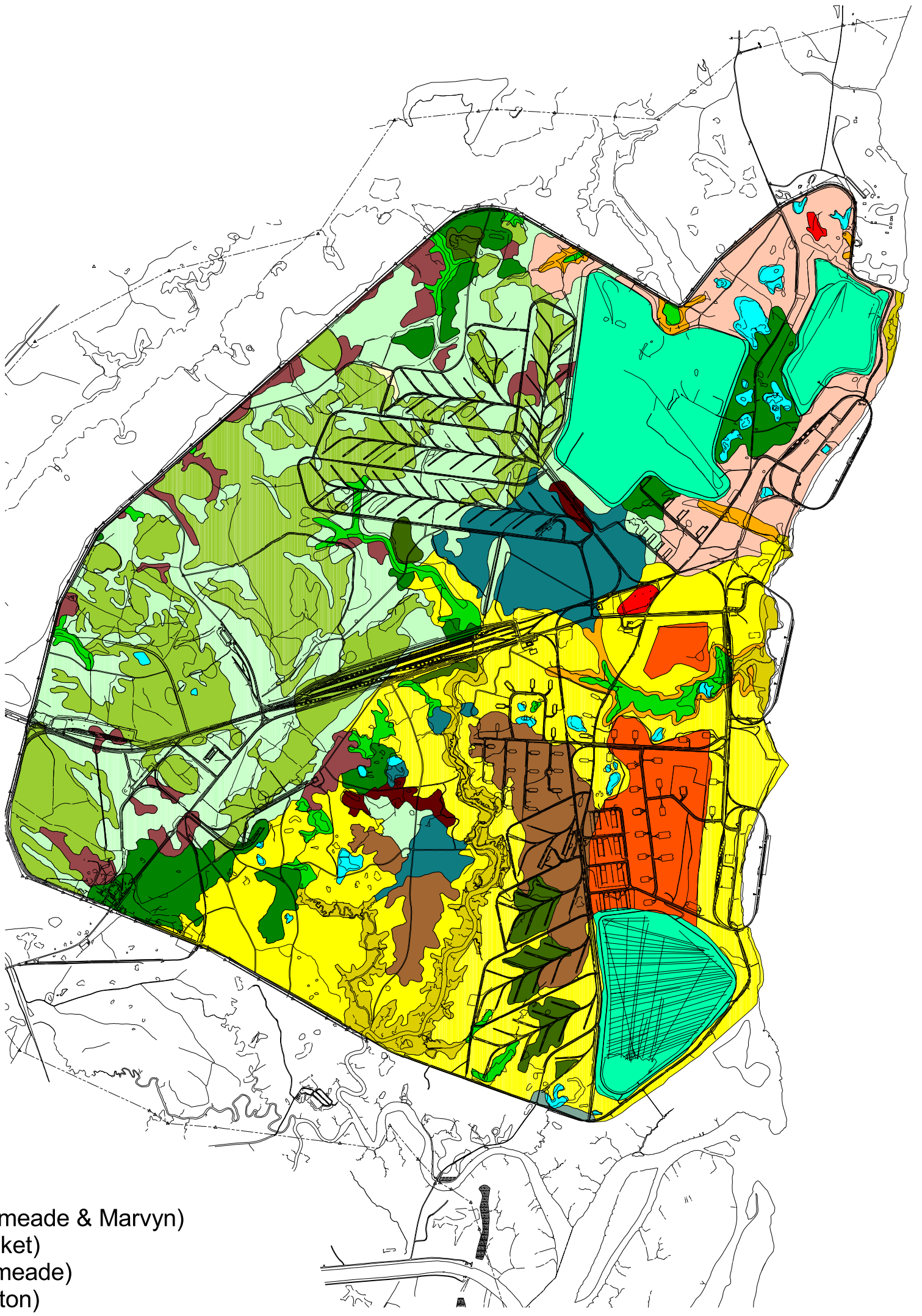
	Precipitation (inches)				
Month	Mean	High	Year	Low	Year
Jan	4.69	8.13	1979	1.23	1981
Feb	4.43	11.13	1983	1.25	1976
Mar	4.35	7.77	1965	0.78	1967
Apr	2.94	8.59	1961	0.24	1976
May	3.96	7.63	1988	1.04	1983
Jun	4.98	9.62	1973	0.68	1984
Jul	6.76	11.95	1972	2.36	1990
Aug	7.17	12.43	1976	1.39	1980
Sep	6.95	30.34	1984	2.02	1990
Oct	3.23	10.93	1971	0.40	1972
Nov	3.16	10.41	1985	1.09	1981
Dec	4.19	7.19	1976	0.22	1988
Annual	56.82	70.65	1975	31.35	1968

[a] Southeast Regional Climate Center and the North Carolina Climatic Data Center.

Table I-6. Freeze/frost occurrence data for Southport, North Carolina.[a]

Temperature (Fahrenheit)	Freeze/frost occurrence data: Spring date probability level (%)			Fall date probability level (%)		
	90	50	10	90	50	10
36	Mar 16	Apr 4	Apr 23	Oct 16	Oct 31	Nov 15
32	Feb 28	Mar 21	Apr 12	Oct 24	Nov 11	Nov 25
28	Feb 4	Mar 8	Apr 8	Nov 8	Nov 24	Dec 11

[a] Southeast Regional Climate Center and the North Carolina Climatic Data Center.



LEGEND

SOIL TYPE

- BDC (Baymeade & Marvyn)
- BO (Bohicket)
- BaB (Baymeade)
- BnB (Blanton)
- BrB (Bragg)
- DO (Dorovan)
- Fo (Foreston)
- KrB (Kureb)
- Lo (Leon)
- Ma (Mandarin)
- Mu (Murville)
- NoB (Norfolk)
- On (Onslow)
- Pt (Pits)
- Tm (Tomahawk)
- To (Torhunta)
- Ur (Urban)
- W (Water)
- YaB (Yaupon)

SOURCE: SOILS DATA (BRSOILS.EOO) PROVIDED BY THE CORPS OF ENGINEERS, SAVANNAH DISTRICT, IN ARC INFO FORMAT, NAD 1927, DATED 31 OCTOBER 1995, AND RECEIVED BY CZR INCORPORATED IN SEPTEMBER 1997. BASE INFORMATION PROVIDED BY THE CORPS OF ENGINEERS, SAVANNAH DISTRICT IN MICROSTATION (.DGN) FORMAT, NAD 1927, DATED 7 AUGUST 1995, AND RECEIVED BY CZR INCORPORATED IN SEPTEMBER 1997. GRAPHICS ORIGINALLY PRODUCED BY CZR INCORPORATED, MAY 1998.

MAIN TERMINAL
SOILS MAP

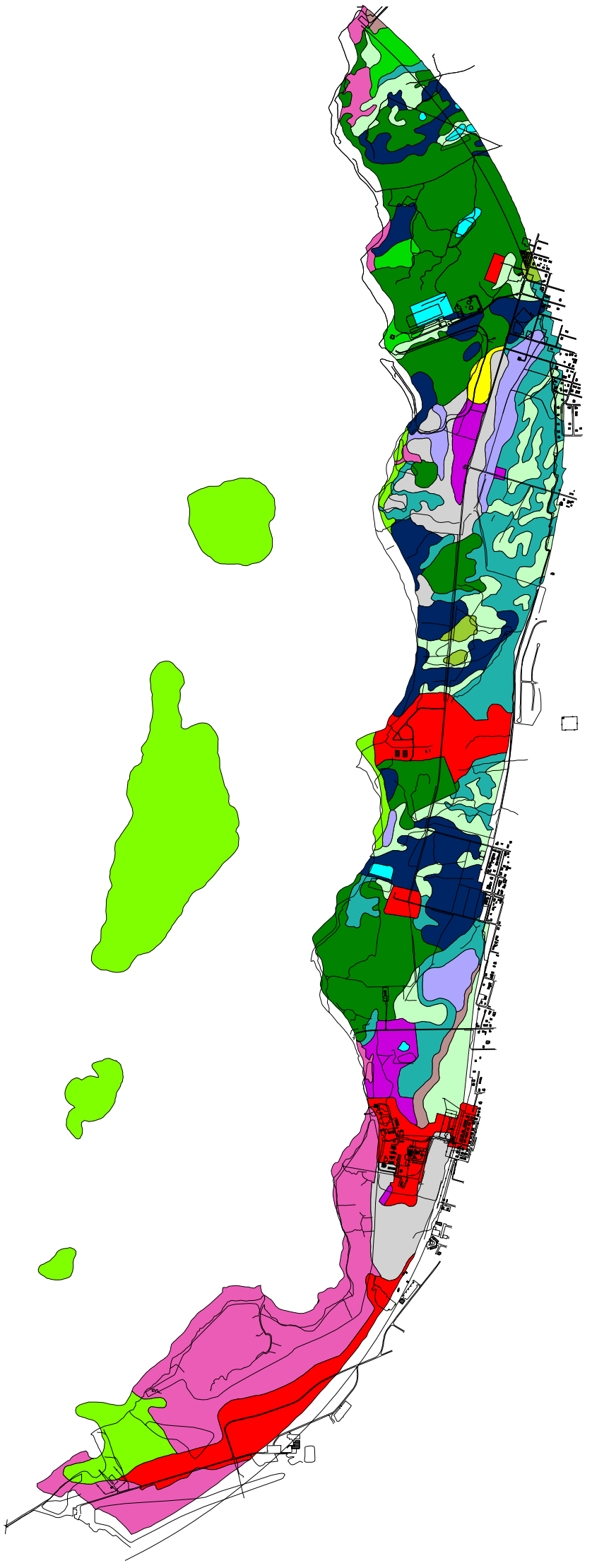
MILITARY OCEAN TERMINAL
SUNNY POINT

FILE: 17BORVER	DRAWN BY: JEJ	0 — 3000'
DATE: 5/26/98	APPROVED BY:	

CZR INCORPORATED
ENVIRONMENTAL CONSULTANTS
4709 COLLEGE ACRES DRIVE
SUITE 2
WILMINGTON, NORTH CAROLINA 28403
TEL 910/392-9253
FAX 910/392-9139

CP#1627.01

Figure I-1



LEGEND

SOIL TYPE

- Be(Baymeade)
- Bp (Borrow Pits)
- DO (Dorovan)
- JO (Johnston)
- Kr (Kureb)
- La (Lakeland)
- Le (Leon)
- Ly (Lynn Haven)
- Mu (Murville)
- Nh (Newhan)
- Rm (Rimini)
- TM (Tidal Marsh)
- Ur (Urban)
- W (Water)
- Wa (Wakulla)

SOURCE: SOILS DATA (CBSOIL27.EOO) PROVIDED BY THE CORPS OF ENGINEERS, WILMINGTON DISTRICT, IN ARC INFO FORMAT, NAD 1927, AND RECEIVED BY CZR INCORPORATED ON 3 MARCH 1998. BASE INFORMATION PROVIDED BY THE CORPS OF ENGINEERS, SAVANNAH DISTRICT IN MICROSTATION (.DGN) FORMAT, NAD 1927, DATED 7 AUGUST 1995, AND RECEIVED BY CZR INCORPORATED IN SEPTEMBER 1997. GRAPHICS ORIGINALLY PRODUCED BY CZR INCORPORATED, MAY 1998.

CAROLINA BEACH BLAST SAFETY ZONE
SOILS MAP

MILITARY OCEAN TERMINAL
SUNNY POINT

FILE: 17BORVER	DRAWN BY: JEJ	0 3000'
DATE: 5/26/98	APPROVED BY:	

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4709 COLLEGE ACRES DRIVE
SUITE 2
WILMINGTON, NORTH CAROLINA 28403
TEL 910/392-9253
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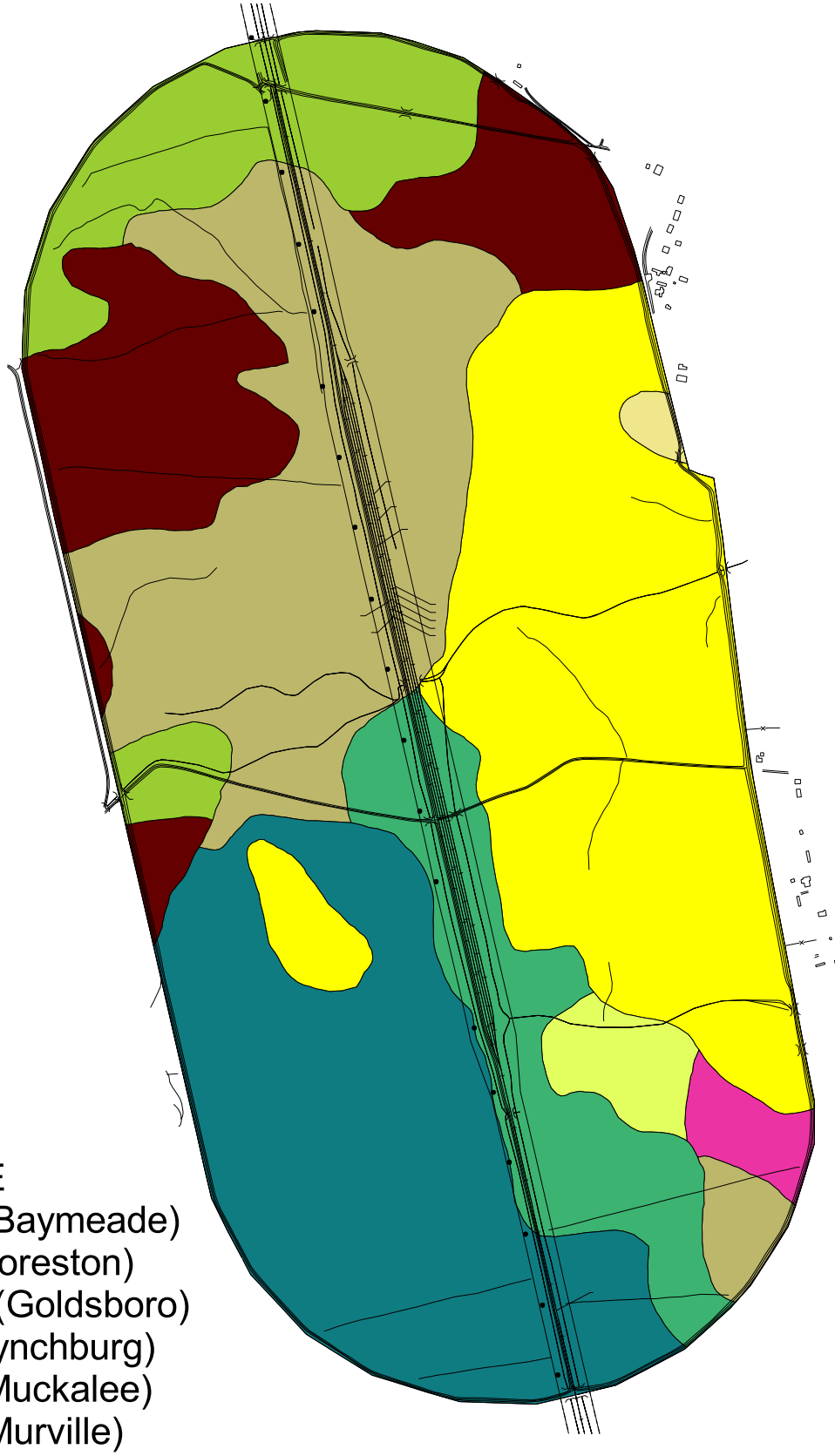
CP#1627.01

Figure I-2



LEGEND

SOIL TYPE

- BaB(Baymeade)
- Fo (Foreston)
- GoA (Goldsboro)
- Ly (Lynchburg)
- Mk (Muckalee)
- Mu (Murville)
- Pn (Pantego)
- Ra (Rains)
- To (Torhunta)

SOURCE: SOILS DATA BASED ON SOIL SURVEY OF BRUNSWICK COUNTY, NORTH CAROLINA, 1982. BASE INFORMATION (RRBASE27.DGN) PROVIDED BY THE CORPS OF ENGINEERS, WILMINGTON DISTRICT IN MICROSTATION FORMAT, NAD 1927, AND RECEIVED BY CZR INCORPORATED ON 3 MARCH 1998.

LELAND INTERCHANGE YARD
SOILS MAP

MILITARY OCEAN TERMINAL
SUNNY POINT

FILE: LELANDS	DRAWN BY: JEJ	0 1000'
DATE: 2/27/98	APPROVED BY:	

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ENVIRONMENTAL CONSULTANTS
4709 COLLEGE ACRES DRIVE
SUITE 2
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TEL 910/392-9253
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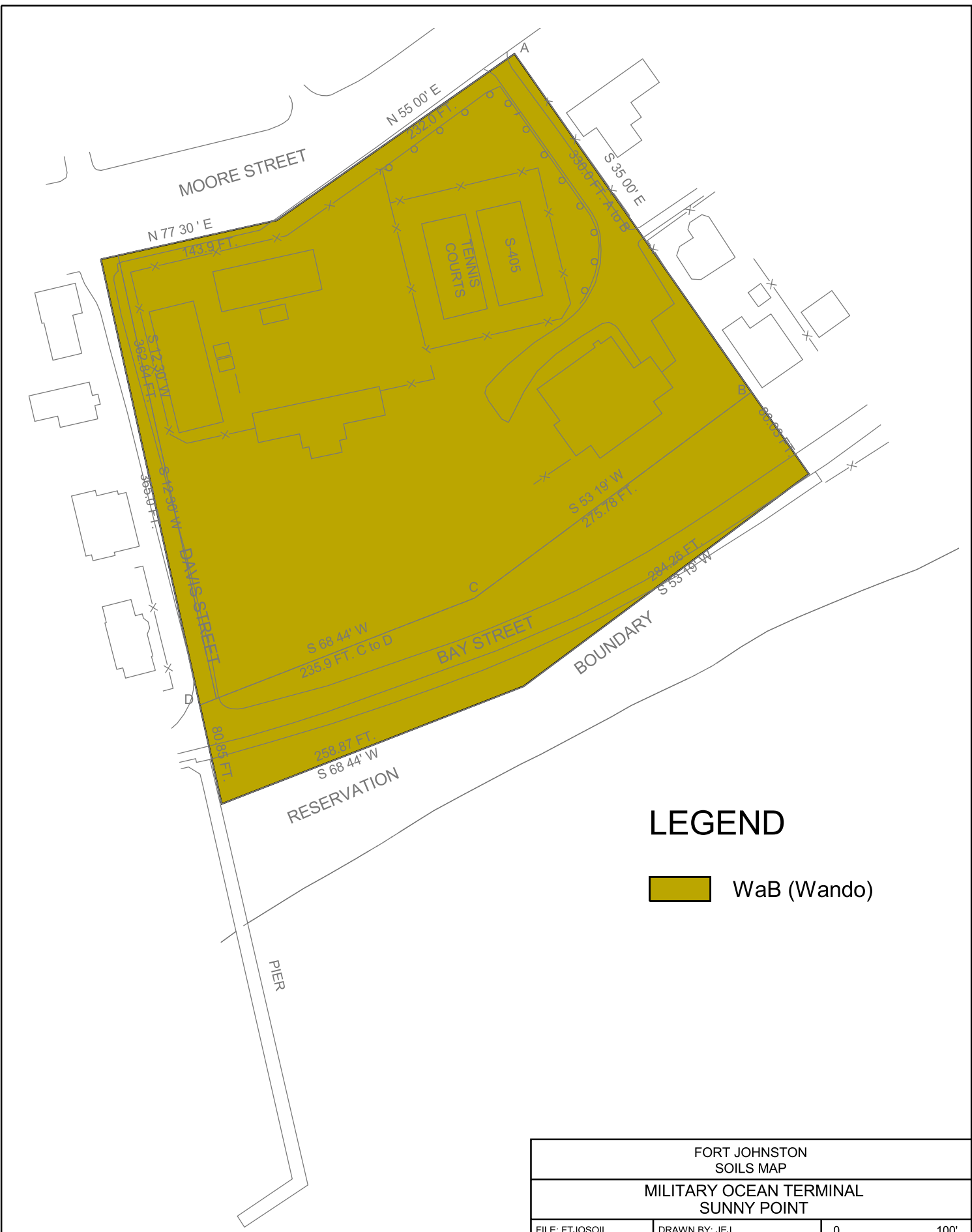
CP#1627.01

Figure I-3



SOURCE: SOILS DATA BASED ON SOIL SURVEY OF BRUNSWICK COUNTY, NORTH CAROLINA, 1982. BASE INFORMATION (BASELUFJ.DGN) PROVIDED BY THE CORPS OF ENGINEERS, SAVANNAH DISTRICT IN MICROSTATION FORMAT, NAD 1927, AND RECEIVED BY CZR INCORPORATED IN SEPT. 1997

FORT JOHNSTON
SOILS MAP

MILITARY OCEAN TERMINAL
SUNNY POINT

FILE: FTJOSOIL	DRAWN BY: JEJ	0 100'
DATE: 3/4/98	APPROVED BY:	

CZR INCORPORATED
ENVIRONMENTAL CONSULTANTS
4709 COLLEGE ACRES DRIVE
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TEL 910/392-9253
FAX 910/392-9139

CP#1627.01

Figure I-4

thick. The subsurface layer is light gray fine sand 8 inches thick. The subsoil is black and dark reddish brown fine sand 9 inches thick. The underlying material to a depth of 80 inches is light gray fine sand in the upper part, black and brown fine sand in the middle part, and black fine sand in the lower part. Surface runoff is slow. Permeability is rapid in the surface layer and moderate to rapid in the subsoil. The available water capacity is low. When artificially drained, the subsoil exhibits properties of a weakly cemented pan and may restrict some root penetration. Ditchbanks cave, and the soil has a high seepage rate. The soil is extremely acid or very strongly acid throughout, unless the surface layer has been limed. The seasonal high water table is at or near the surface. Leon soil is mostly in woodland. The areas of this poorly drained soil are fair to poor as habitat for deer, raccoons, fox, rabbit, bobcat, opossum, birds, black bear, and other wildlife. Leaching of plant nutrients, seasonal high water table, and caving of cutbanks are the main limitations.

Murville mucky fine sand -- This nearly level, very poorly drained soil is in depressions in broad interstream areas. Typically, the surface layer is black mucky fine sand 5 inches thick. The subsoil to a depth of 80 inches is black and dark reddish brown fine sand. Surface runoff is very slow. Permeability is rapid in the surface layer and moderately rapid in the subsoil. The available water capacity is low. When artificially drained, the subsoil may exhibit properties of a weakly cemented pan that may restrict some root penetration. The soil ranges from extremely acid to strongly acid throughout, unless the surface layer has been limed. The seasonal high water table is at or near the surface. Murville soil is mostly in the woodland. This soil is important as habitat for deer, raccoons, fox, rabbit, bobcat, black bear, opossum, birds, and other wildlife. Wetness from a seasonal high water table, surface ponding, high rates of seepage, and caving of cutbanks are the main limitations.

Yaupon silty clay loam, 0 to 3 percent -- This soil consists of somewhat poorly drained to moderately well drained, clayey soil. It is near the edges of the mainland and Cape Fear River. Typically, the surface layer is dark gray silty clay loam 7 inches thick. The underlying material to a depth of 85 inches is dark gray silty clay in the upper part, dark greenish gray silty clay in the middle part, and black fine sandy loam in the lower part. Surface runoff is slow. Permeability is slow or very slow, and the available water capacity is moderate. This soil has a high shrink-swell potential that produces wide, deep cracks during the dry season. The soil ranges from very strongly acid to medium acid in the surface and subsurface layers. It ranges from very strongly acid to moderately alkaline in the underlying material. The seasonal high water table is about 2 to 4 feet below the surface. Deer raccoons, cottontail rabbit, eastern brown pelican, and bobwhite quail occasionally use areas of this soil as habitat. This soil is generally not used for forestry, agricultural, residential, or recreational uses because of high shrink-swell potential, slow or very slow permeability, and wetness.

<u>CBBSZ</u> – (Kr) Kureb fine sand, 1 to 8 percent slopes, (TM) Tidal Marsh, (Ly) Lynchburg fine sandy loam, and (Ur) Urban land.

Kureb fine sand -- This excessively drained soil is in undulating areas. Nearly all of the acreage is in woodland. Typically, the surface layer is gray fine sand 4 inches thick. The subsurface layer is light gray fine sand 16 inches thick. The underlying material to a depth of 80 inches is brownish yellow fine sand in the upper part and light yellowish brown fine sand in the lower part. Surface runoff is slow. Permeability is rapid, and the available water capacity is very low. Seepage is rapid, and trench walls and ditchbanks cave. The soil ranges from strongly acid to neutral throughout, unless the surface layer has been limed. Seedling mortality and difficulty using equipment on sand are the main limitations. Lawns and shrubs are difficult to establish and maintain because of leaching of plant nutrients and droughtiness. Caving of ditchbanks and trench walls and seepage are other urban problems.

Tidal marsh – This land type occurs on the nearly level flats between the coastal dunes and the interior uplands, and along the Cape Fear River. Most are flooded daily by tides, with the water table at or above the surface most of the time. Parent material consists of silty and clayey fluviomarine deposits. The surface layer is typically black clay loam about 18 inches thick. The underlying material, to a depth of more than 60 inches, is very dark gray and black silty clay loam. Tidal marsh areas provide

natural habitat for numerous terrestrial and aquatic species. Saltmarsh cordgrass (*Spartina alterniflora*) dominates in areas that are flooded daily by saltwater. Areas where saltwater is diluted by freshwater, a mixture of saltmarsh cordgrass and black needlerush (*Juncus roemerianus*) occurs. Wetness and daily flooding are the main limitations.

Lynchburg fine sandy loam -- This nearly level, somewhat poorly drained soil is in interstream areas. Typically, the surface layer is dark gray fine sandy loam 9 inches thick. The subsoil is 55 inches thick. It is light yellowish brown fine sandy loam in the upper part and gray sandy clay loam in the lower part. The underlying material to a depth of 80 inches is gray clay loam. Surface runoff is slow. Permeability is moderate, and the available water capacity is moderate. The soil ranges from extremely acid to strongly acid throughout, unless the surface layer has been limed. The seasonal high water table is 0.5 foot to 1.5 feet below the surface. Lynchburg soil is mostly in woodland. These somewhat poorly drained areas are important as habitat for deep, raccoons, fox, rabbit, bobcat, opossum, birds, and other wildlife. Wetness from a seasonal high water table is the main limitation.

Urban land -- This map unit consists of areas that are more than 85 percent covered by buildings, houses, streets, parking lots, airports, railroad yards, and other urban development. Because of the extensive urbanization, the natural soils have been altered, and the topography and the original landscape have been changed. Slope is commonly 0 to 6 percent. Due to the nature of this unit, precipitation runoff is a problem resulting in increased probability of flood hazard in low-lying areas.

Leland Interchange Yard -- (BaB) Baymeade fine sand , 1 to 6 percent slopes, (Pn) Pantego mucky loam, (To) Torhunta mucky fine sandy loam, and (Fo) Foreston loamy fine sand.

Baymeade fine sand -- (see the description above under Main Terminal).

Pantego mucky loam -- This nearly level, very poorly drained soil is in broad interstream areas. Typically, the surface layer is black mucky loam 11 inches thick. The subsurface layer is dark gray loam 4 inches thick. The subsoil is dark gray sandy clay loam 49 inches thick. The underlying material to a depth of 80 inches is gray sandy loam. Surface runoff is very slow. Permeability is moderate, and the available water capacity is moderate. The soil ranges from extremely acid to strongly acid throughout, unless the surface layer has been limed. The seasonal high water table is at or near the surface. Pantego soil is mostly in woodland. The soil is important as habitat for deer, raccoons, fox, black bear, rabbit, bobcat, opossum, birds, and other wildlife. Wetness from a seasonal high water table and seepage are the main limitations.

Torhunta mucky fine sandy loam -- This nearly level, very poorly drained soil is in broad interstream areas and on stream terraces. Typically, the surface layer is black mucky fine sandy loam 11 inches thick. The subsurface layer is dark grayish brown fine sandy loam 28 inches thick. The underlying material to a depth of 80 inches is light gray loamy sand. Surface runoff is very slow. The soil has moderately rapid permeability, and the available water capacity is moderate. Ditchbanks and trench walls cave, and the seepage rate is high. The soil ranges from extremely acid to strongly acid throughout, unless the surface layer has been limed. The seasonal high water table is 0.5 foot to 1.5 feet below the surface, and water may pond during the wet season for brief periods. Torhunta soil is mostly in woodland. This soil is important as habitat for deer, raccoons, fox, rabbit, bobcat, opossum, black bear, birds, and other wildlife. Wetness from a seasonal high water table is the main limitation. Seepage and caving of cutbanks are also limitations.

Foreston loamy fine sand -- This nearly level, moderately well drained soil is on slightly convex interstream areas. Typically, the surface layer is dark gray loamy fine sand 4 inches thick. The subsurface layer is yellowish brown loamy fine sand 8 inches thick. The subsoil, 66 inches thick, is

yellowish brown fine sandy loam in the upper part and light gray fine dandy loam in the lower part. The underlying material to a depth of 85 inches is light gray loamy sand. Surface runoff is slow. Permeability is moderately rapid, and the available water capacity is moderate. Ditchbanks and trench walls cave, and the soil has a high seepage rate. The soil is very strongly acid or strongly acid throughout, unless the surface layer has been limed. The seasonal high water table is 2.5 and 3.5 feet below the surface. Foreston soil has large areas in woodland. These areas are important as habitat for deer, raccoons, fox, rabbit, bobcat, opossum, birds, and other wildlife. Wetness from a seasonal high water table and seepage are the main limitations.

Fort Johnston -- (WdB) Wando-Urban land complex, 0 to 6 percent slopes.

Wando-Urban land complex -- This excessively drained soil is on the uplands. The relatively undisturbed Wando soil has a dark brown fine sand surface layer 8 inches thick. The underlying material to a depth of 99 inches is strong brown fine sand in the upper part and yellow fine sand in the lower part. Surface runoff is slow. Permeability is rapid, and the available water capacity is low to very low. This soil ranges from strongly acid to neutral in the surface and subsurface layers. It ranges from very strongly acid to neutral in the underlying material. Trench walls and cutbanks cave, and the rate of seepage is rapid. The urban land part of this map unit consists of soils that are covered with concrete, asphalt, buildings, or other impervious surfaces. The sandy surface layer is easy to work, but plant nutrients leach readily. Erosion is a hazard where the surface layer is not protected. Seepage and caving of cutbanks are the main limitations.

4.3.2 Hydric Soils. A hydric soil is a soil that is saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions that favor the growth and regeneration of hydrophytic vegetation (US Department of Agriculture (USDA) Soil Conservation Service (SCS) 1985, as amended by the National Technical Committee for Hydric Soils (NTCHS) in December 1986). The following is a list of the hydric soils by type occurring at three of the four areas comprising MOTSU (see also Figures I-5 thru I-7). There are no hydric soils at Fort Johnston.

Main Terminal:

Bohicket
Dorovan
Leon
Murville
Torhunta

CBBSZ:

Dorovan
Johnston
Leon
Murville
Lynn Haven

Leland Interchange Yard:

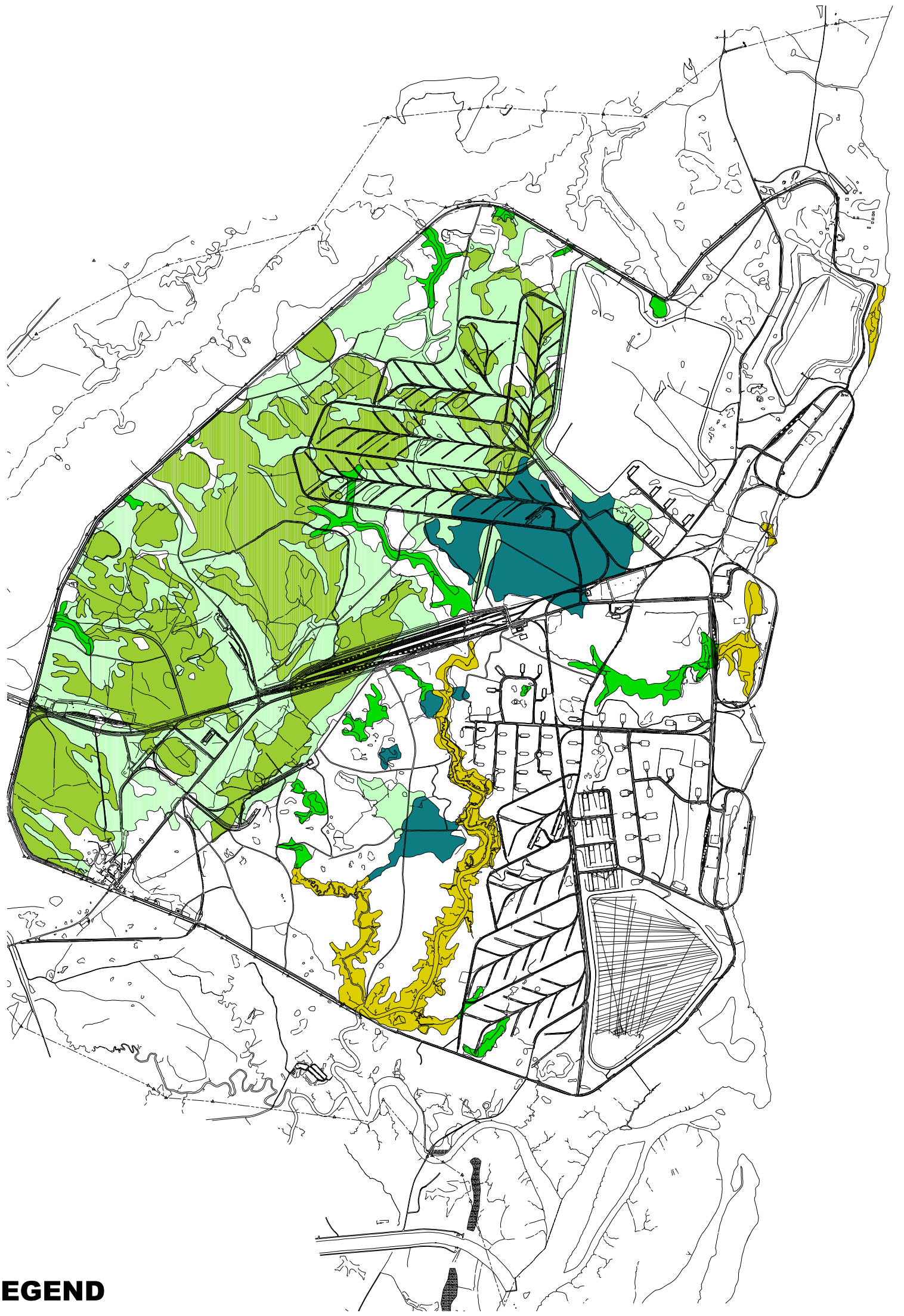
Muckalee
Murville
Pantego
Rains
Torhunta

Fort Johnston:

(none)

4.3.3 Chemical Analyses. When chemical analyses are required on soils at MOTSU, soil samples taken are provided to the North Carolina Cooperative Extension Service for Brunswick County. The soil samples are then sent to the North Carolina Department of Agriculture, Agronomic Division - Soils Test Lab in Raleigh, for analysis. MOTSU receives the results and follows recommendations based on the analyses to insure proper application of fertilizer per acre.

4.3.4. Mechanical Analyses. Mechanical analyses of soils are performed for those projects involving construction of foundations. Generally, personnel at MOTSU contract with the U.S. Army Corps of Engineers, Wilmington District for the design work of the proposed project. The Corps in turn contracts with an Architectural and Engineering firm who either performs the analyses in-house or contracts with a company who does mechanical soil testing.



LEGEND

HYDRIC SOIL TYPE

- BO (Bohicket)
- DO (Dorovan)
- Lo (Leon)
- Mu (Murville)
- To (Torhunta)

SOURCE: SOILS DATA (BRSOILS.EOO) PROVIDED BY THE CORPS OF ENGINEERS, SAVANNAH DISTRICT, IN ARC INFO FORMAT, NAD 1927, DATED 31 OCTOBER 1995, AND RECEIVED BY CZR INCORPORATED IN SEPTEMBER 1997. BASE INFORMATION PROVIDED BY THE CORPS OF ENGINEERS, SAVANNAH DISTRICT IN MICROSTATION (.DGN) FORMAT, NAD 1927, DATED 7 AUGUST 1995, AND RECEIVED BY CZR INCORPORATED IN SEPTEMBER 1997.

MAIN TERMINAL
HYDRIC SOILS MAP

MILITARY OCEAN TERMINAL
SUNNY POINT

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DATE: 6/8/98	APPROVED BY:	

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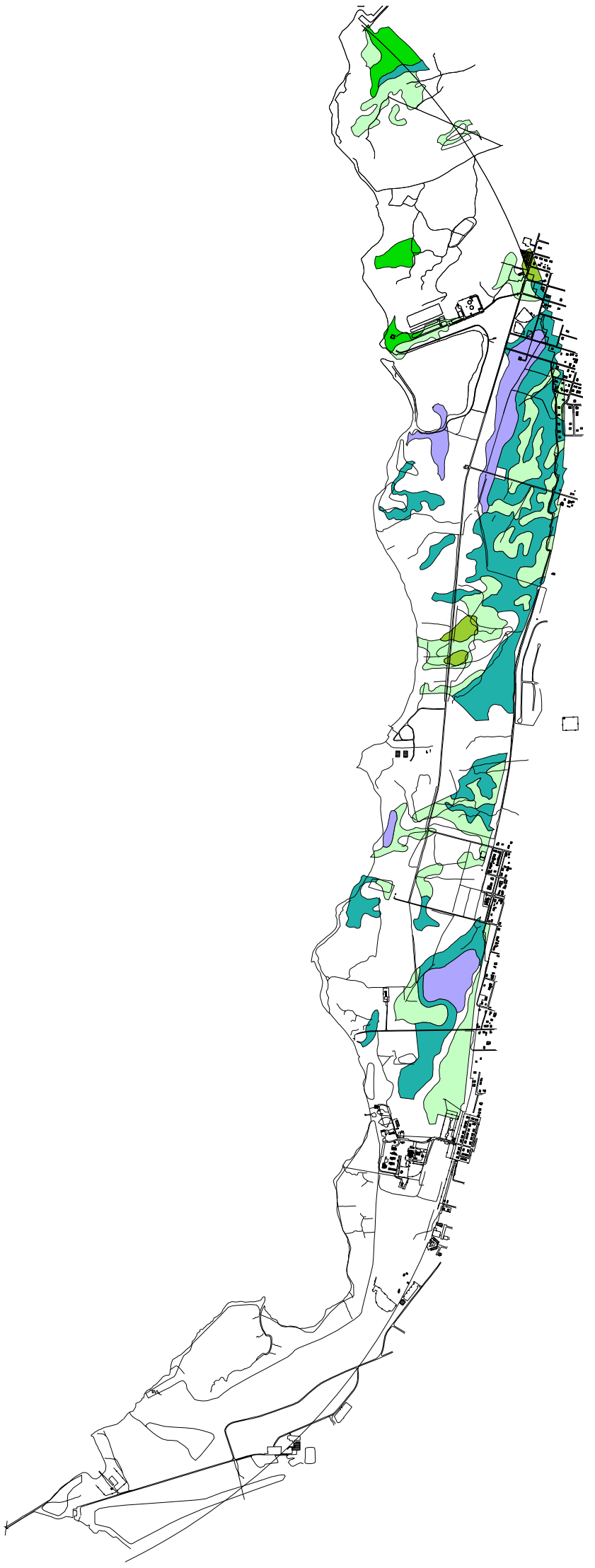
Figure I-5



LEGEND

HYDRIC SOIL TYPE

- DO (Dorovan)
- JO (Johnston)
- Le (Leon)
- Ly (Lynn Haven)
- Mu (Murville)

SOURCE: SOILS DATA (CBSOIL27.EOO) PROVIDED BY THE CORPS OF ENGINEERS, WILMINGTON DISTRICT, IN ARC INFO FORMAT, NAD 1927 AND RECEIVED BY CZR INCORPORATED ON 3 MARCH 1998. BASE INFORMATION PROVIDED BY THE CORPS OF ENGINEERS, SAVANNAH DISTRICT IN MICROSTATION (.DGN) FORMAT, NAD 1927, DATED 7 AUGUST 1995, AND RECEIVED BY CZR INCORPORATED IN SEPTEMBER 1997.

CAROLINA BEACH BLAST SAFETY ZONE
HYDRIC SOILS MAP

MILITARY OCEAN TERMINAL
SUNNY POINT

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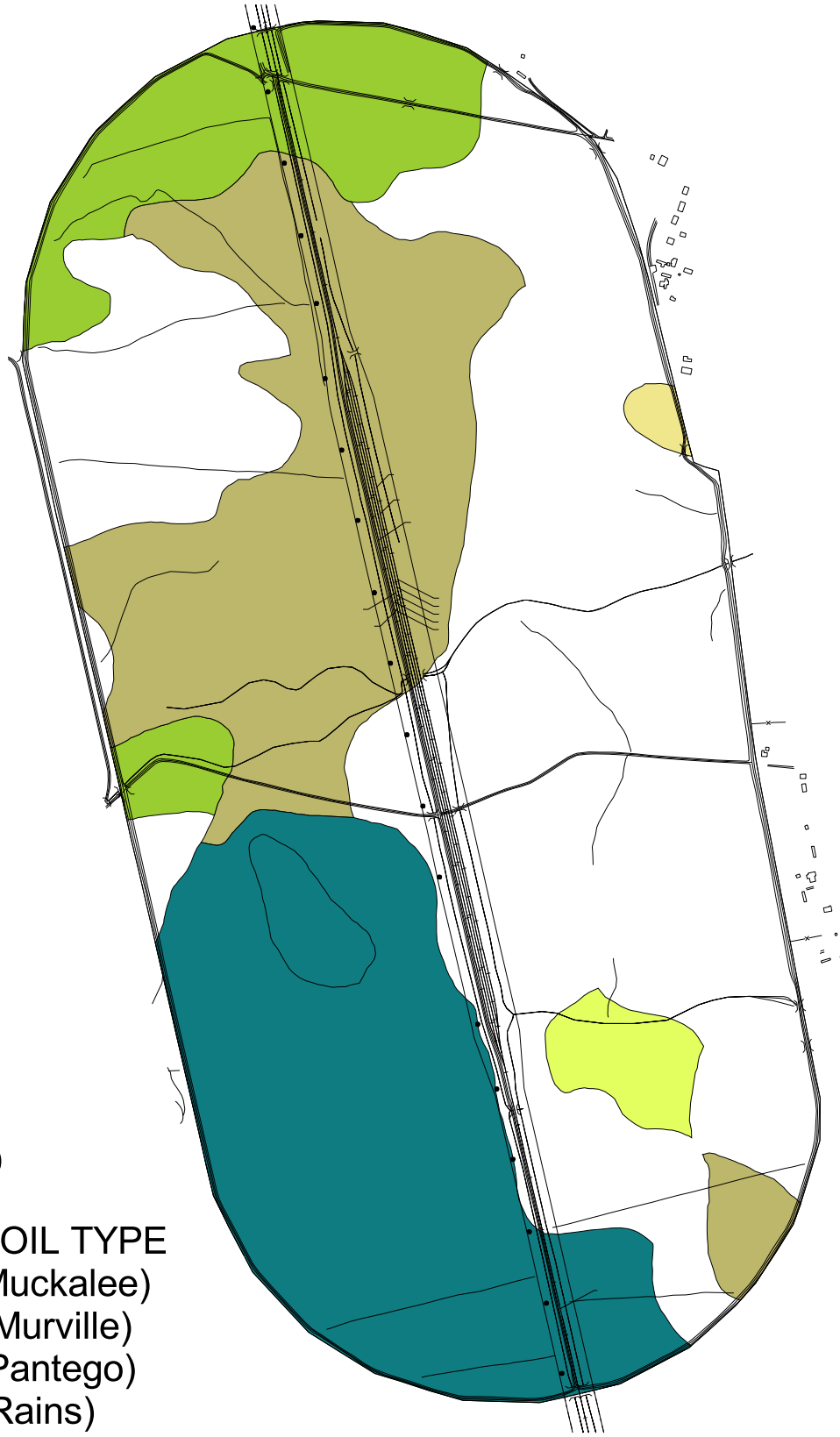
Figure I-6



LEGEND

HYDRIC SOIL TYPE

- Mk(Muckalee)
- Mu (Murville)
- Pn (Pantego)
- Ra (Rains)
- To (Torhunta)

SOURCE: SOILS DATA BASED ON SOIL SURVEY OF BRUNSWICK COUNTY, NORTH CAROLINA, 1982. BASE INFORMATION (RRBASE27.DGN) PROVIDED BY THE CORPS OF ENGINEERS, WILMINGTON DISTRICT IN MICROSTATION FORMAT, NAD 1927, AND RECEIVED BY CZR INCORPORATED ON 3 MARCH 1998.

LELAND INTERCHANGE YARD
HYDRIC SOILS MAP

MILITARY OCEAN TERMINAL
SUNNY POINT

FILE: LELANDS	DRAWN BY: JEJ	0 1000'
DATE: 2/27/98	APPROVED BY:	

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Figure I-7

4.4 Natural Vegetation.

4.4.1 Vegetation Types. A complete inventory describing all species on MOTSU has not been done. However, a vegetative inventory by type was performed by the U. S. Army Corps of Engineers in 1991 and information resulting from this inventory is included in a non-published report entitled "Wetlands and Vegetation Types." This report is located in Appendix I-A. Maps developed from the inventory are found in Figures I-8 thru I-10. Vegetation types listed in the legend are described in detail in Appendix I-A.

4.4.2 Wetlands. According to the USACE (Federal Register 1982) and the United States Environmental Protection Agency (USEPA) (Federal Register 1980), wetlands are jointly defined as: Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas. Map designations for wetlands at MOTSU, as found on Figures I-8 thru I-10, include "E" for estuarine, "P" for palustrine and some "M" modified or constructed. In addition, Figures I-11 thru I-13 contrast uplands from wetlands for Main Terminal, CBBSZ, and Leland Interchange Yard.

All vegetation cover depicted on Figures I-8 thru I-13 was mapped from 1988 aerial photography and ground-truthed by U. S. Army Corps of Engineers, Wilmington District in 1992. Mapped delineations between wetland and upland habitats are very approximate. Their locations should in no way be construed to mean that a jurisdictional (Section 404, Clean Water Act) determination has been made or is implied. Before work could be undertaken however, a wetland delineation would be necessary to confirm the exact extent of wetlands in the proposed development area. *The maps provided in this plan are for general planning purposes only.*

4.4.3 Undisturbed Woodland Sites. A list of principal tree and shrub species which occur in undisturbed woodland sites is located in Table I-7.

4.4.4 Native Grasses and Shrubs. No areas at MOTSU were originally in grassland.

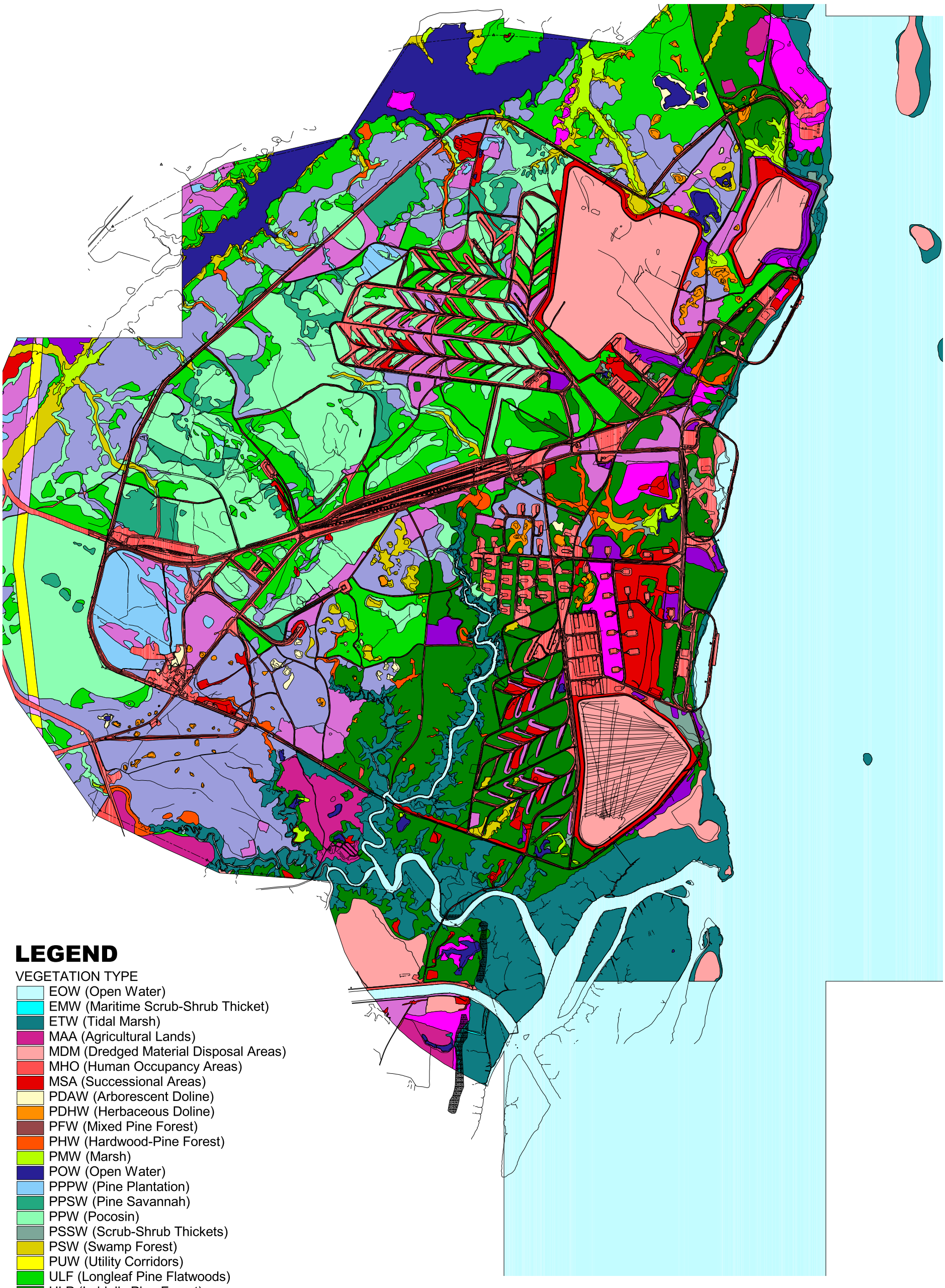
4.4.5 Desert Areas. No desert areas are located at MOTSU.

4.4.6 Native Vegetative Species Beneficial For Wildlife. A list of native vegetative species which are important as wildlife food and cover is located in APPENDIX IV-A. PART IV. FISH AND WILDLIFE MANAGEMENT PLAN.

4.4.7 Endangered and Threatened Plant Species. A list and discussion of endangered and threatened plant species are found in PART VI. ENDANGERED SPECIES MANAGEMENT PLAN.

4.4.8 Noxious and Poisonous Plants. A list of the primary noxious and poisonous plants occurring at MOTSU is located in Table I-8.

4.5 Off-road Vehicle Areas. Off-road vehicle (ORV) areas are not found on the main installation and interchange yard, but exist in the southern half of the CBBSZ (MOTSU 1988; Personal communication, 16 December 1997, Hershel A. Gaw, Jr. Forester, MOTSU). Because ORV use has the potential to degrade sand dunes, increase erosion, disturb fauna and flora, destroy historic sites, and compromise the safety efficiency of the "blast zone," the area has been posted "U. S. Government Property - No Trespassing." If posting of this regulation does not deter ORV users from traversing this property, increased patrols and enforcement of regulations is recommended.



LEGEND

VEGETATION TYPE

- EOW (Open Water)
- EMW (Maritime Scrub-Shrub Thicket)
- ETW (Tidal Marsh)
- MAA (Agricultural Lands)
- MDM (Dredged Material Disposal Areas)
- MHO (Human Occupancy Areas)
- MSA (Successional Areas)
- PDAW (Arborescent Doline)
- PDHW (Herbaceous Doline)
- PFW (Mixed Pine Forest)
- PHW (Hardwood-Pine Forest)
- PMW (Marsh)
- POW (Open Water)
- PPPW (Pine Plantation)
- PPSW (Pine Savannah)
- PPW (Pocosin)
- PSSW (Scrub-Shrub Thickets)
- PSW (Swamp Forest)
- PUW (Utility Corridors)
- ULF (Longleaf Pine Flatwoods)
- ULP (Loblolly Pine Forest)
- ULT (Longleaf Pine-Turkey Oak Woodlands)
- UMH (Mixed Pine-Hardwood Forest)
- UPP (Pine Plantation)
- USST (Scrub-Shrub Thickets)
- UUC (Utility Corridors)

E = Estuarine
P = Palustrine
U = Uplands
M = Modified (man-influenced, may contain wetlands and/or uplands)

SOURCE: VEGETATION DATA (BRVEG27.EOO) PROVIDED BY THE CORPS OF ENGINEERS, WILMINGTON DISTRICT, IN ARC INFO FORMAT, NAD 1927, AND RECEIVED BY CZR INCORPORATED ON 3 MARCH 1998. BASE INFORMATION PROVIDED BY THE CORPS OF ENGINEERS, SAVANNAH DISTRICT IN MICROSTATION (.DGN) FORMAT, NAD 1927, DATED 7 AUGUST 1995, AND RECEIVED BY CZR INCORPORATED IN SEPTEMBER 1997. GRAPHICS ORIGINALLY PRODUCED BY CZR INCORPORATED, MAY 1998.

MAIN TERMINAL
VEGETATION MAP

MILITARY OCEAN TERMINAL
SUNNY POINT

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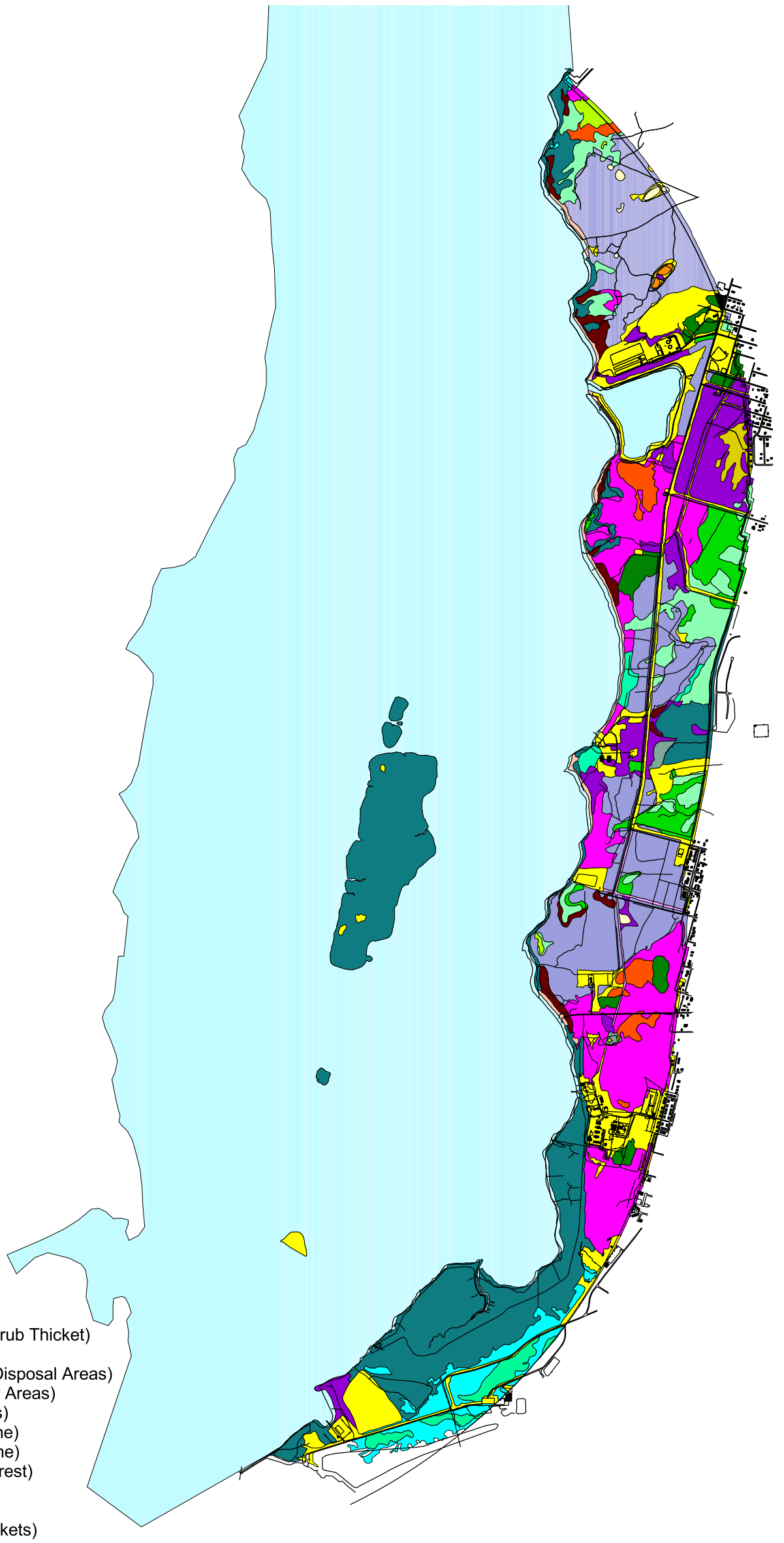
Figure I-8



LEGEND

VEGETATION TYPE

- EOW (Open Water)
- EMW (Maritime Scrub-Shrub Thicket)
- ETW (Tidal Marsh)
- MDM (Dredged Material Disposal Areas)
- MHO (Human Occupancy Areas)
- MSA (Successional Areas)
- PDAW (Arborescent Doline)
- PDHW (Herbaceous Doline)
- PHW (Hardwood-Pine Forest)
- PMW (Marsh)
- PPW (Pocosin)
- PSSW (Scrub-Shrub Thickets)
- PSW (Swamp Forest)
- PUW (Utility Corridors)
- UBD (Beach-Dune Complex)
- UHF (Hardwood Forest)
- ULF (Longleaf Pine Flatwoods)
- ULP (Loblolly Pine Forest)
- ULT (Longleaf Pine-Turkey Oak Woodlands)
- UMH (Mixed Pine-Hardwood Forest)
- UMT (Maritime Scrub-Shrub Thicket)
- UOT (Live Oak Thicket)
- USST (Scrub-Shrub Thicket)
- UUC (Utility Corridors)

E = Estuarine
P = Palustrine
U = Uplands
M = Modified (man-influenced, may contain wetlands and/or uplands)

SOURCE: VEGETATION DATA (CBVEG.EOO) PROVIDED BY THE CORPS OF ENGINEERS, SAVANNAH DISTRICT, IN ARC INFO FORMAT, NAD 1927, DATED 26 SEPT. 1995, AND RECEIVED BY CZR INCORPORATED IN SEPTEMBER 1997. BASE INFORMATION PROVIDED BY THE CORPS OF ENGINEERS, SAVANNAH DISTRICT IN MICROSTATION (.DGN) FORMAT, NAD 1927, DATED 7 AUGUST 1995, AND RECEIVED BY CZR INCORPORATED IN SEPTEMBER 1997. GRAPHICS ORIGINALLY PRODUCED BY CZR INCORPORATED, MAY 1998.

CAROLINA BEACH BLAST SAFETY ZONE
VEGETATION MAP

MILITARY OCEAN TERMINAL
SUNNY POINT

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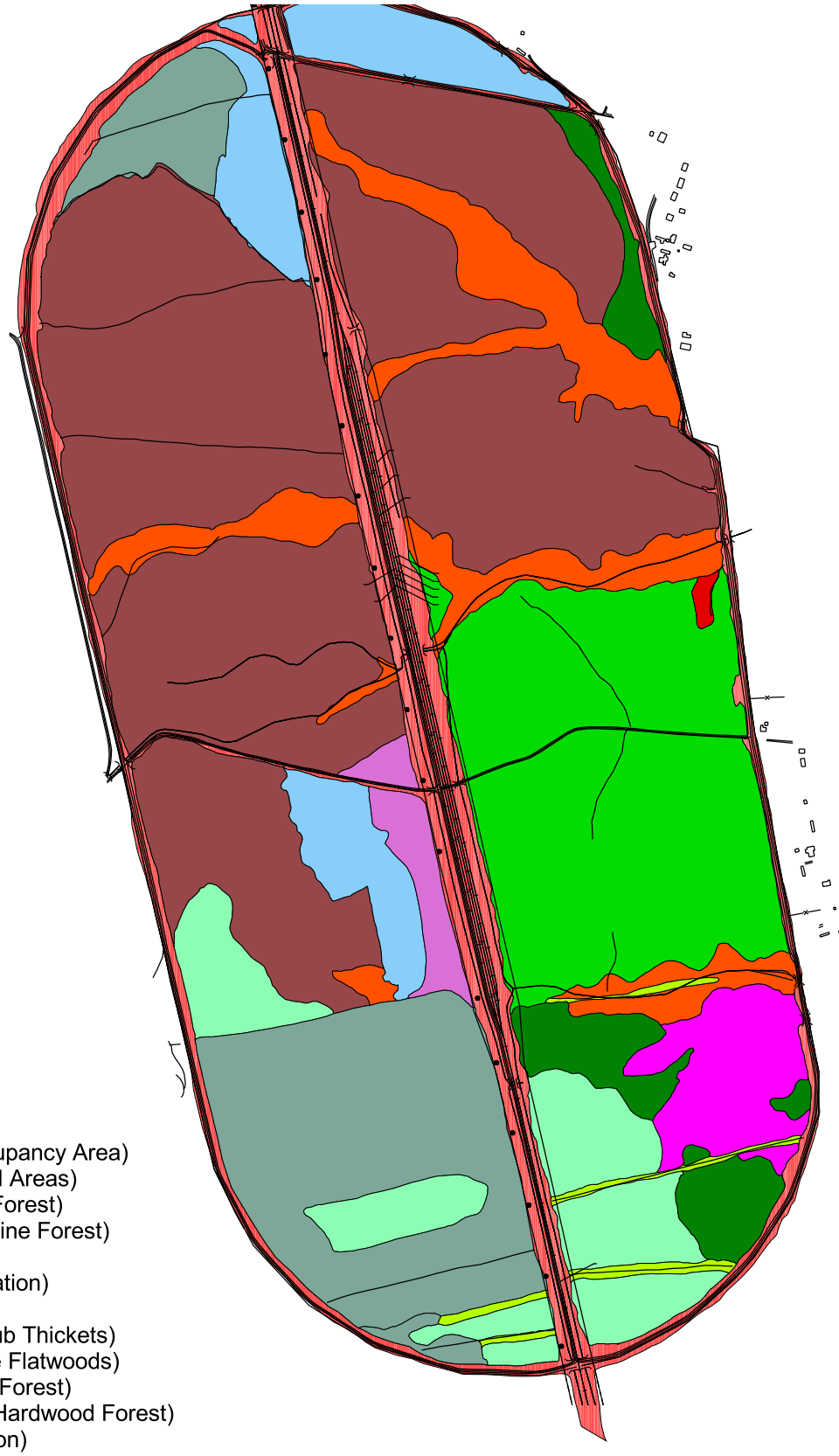
Figure I-9



LEGEND

VEGETATION TYPE

- MHO (Human Occupancy Area)
- MSA (Successional Areas)
- PFW (Mixed Pine Forest)
- PHW (Hardwood-Pine Forest)
- PMW (Marsh)
- PPPW (Pine Plantation)
- PPW (Pocosin)
- PSSW (Scrub-Shrub Thickets)
- ULF (Longleaf Pine Flatwoods)
- ULP (Loblolly Pine Forest)
- UMH (Mixed Pine-Hardwood Forest)
- UPP (Pine Plantation)

E = Estuarine
P = Palustrine
U = Uplands
M = Modified (man-influenced, may contain wetlands and/or uplands)

SOURCE: VEGETATION DATA (RRVEG27.E00) PROVIDED BY THE CORPS OF ENGINEERS, WILMINGTON DISTRICT, IN ARC INFO FORMAT, NAD 1927, AND RECEIVED BY CZR INCORPORATED ON 3 MARCH 1998. BASE INFORMATION (RRBASE27.DGN) PROVIDED BY THE CORPS OF ENGINEERS, WILMINGTON DISTRICT IN MICROSTATION (.DGN) FORMAT, NAD 1927, AND RECEIVED BY CZR INCORPORATED ON 3 MARCH 1998.

LELAND INTERCHANGE YARD
VEGETATION MAP

MILITARY OCEAN TERMINAL
SUNNY POINT

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Figure I-10

LEGEND

- WETLANDS
- UPLANDS
- MODIFIED (man-influenced, may contain wetlands and/or uplands)

SOURCE: WETLAND DATA (BRVEG27.EOO) PROVIDED BY THE CORPS OF ENGINEERS, WILMINGTON DISTRICT, IN ARC INFO FORMAT, NAD 1927, AND RECEIVED BY CZR INCORPORATED ON 3 MARCH 1998. BASE INFORMATION PROVIDED BY THE CORPS OF ENGINEERS, SAVANNAH DISTRICT IN MICROSTATION (.DGN) FORMAT, NAD 1927, DATED 7 AUGUST 1995, AND RECEIVED BY CZR INCORPORATED IN SEPTEMBER 1997. GRAPHICS ORIGINALLY PRODUCED BY CZR INCORPORATED, JULY 1998.

MAIN TERMINAL
WETLANDS/VEGETATION MAP

MILITARY OCEAN TERMINAL
SUNNY POINT

FILE: 17BORVER	DRAWN BY: JEJ	0 3000'
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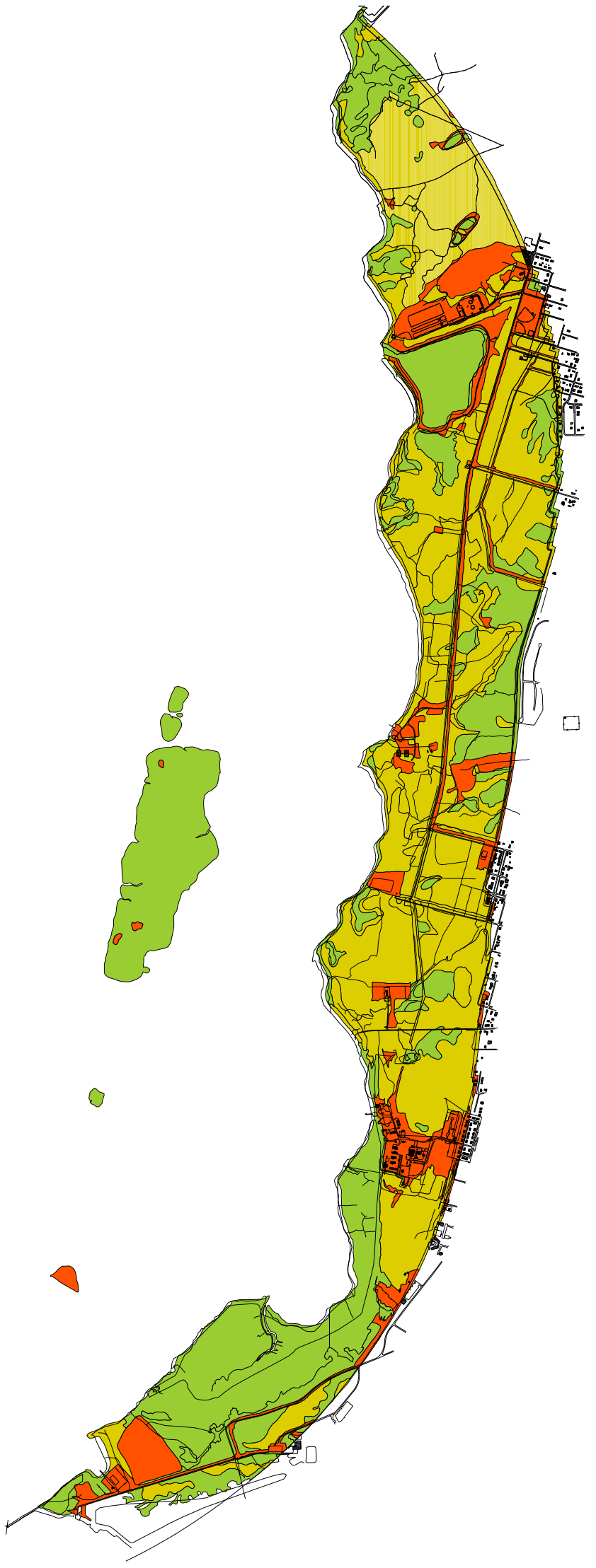
Figure I-11



LEGEND

- WETLANDS
- UPLANDS
- MODIFIED (man-influenced, may contain wetlands and/or uplands)

SOURCE: WETLAND DATA (CBVEG.EOO) PROVIDED BY THE CORPS OF ENGINEERS, SAVANNAH DISTRICT, IN ARC INFO FORMAT, NAD 1927, DATED 26 SEPT. 1995, AND RECEIVED BY CZR INCORPORATED IN SEPTEMBER 1997. BASE INFORMATION PROVIDED BY THE CORPS OF ENGINEERS, SAVANNAH DISTRICT IN MICROSTATION (.DGN) FORMAT, NAD 1927, DATED 7 AUGUST 1995, AND RECEIVED BY CZR INCORPORATED IN SEPTEMBER 1997. GRAPHICS ORIGINALLY PRODUCED BY CZR INCORPORATED, JULY 1998

CAROLINA BEACH BLAST SAFETY ZONE
WETLANDS/VEGETATION MAP

MILITARY OCEAN TERMINAL
SUNNY POINT

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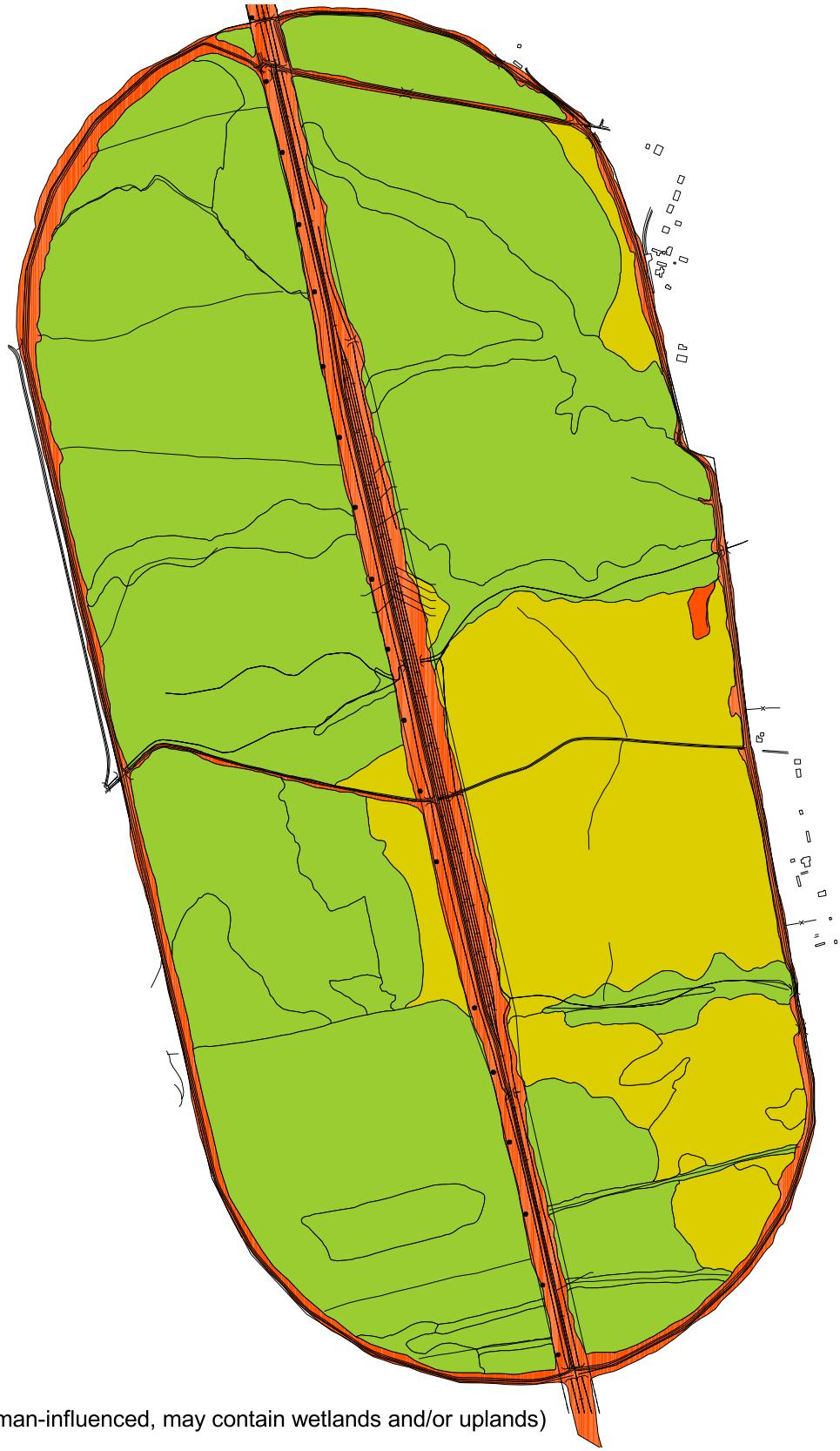
Figure I-12



LEGEND

- WETLANDS
- UPLANDS
- MODIFIED (man-influenced, may contain wetlands and/or uplands)

SOURCE: WETLAND DATA (RRVEG27.E00) PROVIDED BY THE CORPS OF ENGINEERS, WILMINGTON DISTRICT, IN ARC INFO FORMAT, NAD 1927, AND RECEIVED BY CZR INCORPORATED ON 3 MARCH 1998. BASE INFORMATION (RRBASE27.DGN) PROVIDED BY THE CORPS OF ENGINEERS, WILMINGTON DISTRICT IN MICROSTATION (.DGN) FORMAT, NAD 1927, AND RECEIVED BY CZR INCORPORATED ON 3 MARCH 1998.

LELAND INTERCHANGE YARD
WETLANDS/VEGETATION MAP

MILITARY OCEAN TERMINAL
SUNNY POINT

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Figure I-13

Table I-7. Principal tree and shrub species which occur in relatively undisturbed woodland sites at MOTSU.

Common name	Scientific name
Trees	
Red maple	*Acer rubrum*
Red bay	*Persea palustris*
Sweet bay	*Magnolia virginiana*
Loblolly bay	*Gordonia lasianthus*
Pond pine	*Pinus serotina*
Longleaf pine	*Pinus palustris*
Turkey oak	*Quercus laevis*
Scrubby post oak	*Quercus margarettiae*
Loblolly pine	*Pinus taeda*
Bald cypress	*Taxodium distichum*
Pond cypress	*Taxodium ascendens*
Shrubs	
Fetter-bush	*Lyonia lucida*
Wax myrtle	*Myrica cerifera*
Sand myrtle	*Leiophyllum buxifolium*
Zenobia	*Zenobia pulverulenta*
Bitter gallberry	*Ilex glabra*
Blueberry	*Vaccinium corymbosum*
Sparkleberry	*Vaccinium arboreum*
Leucothoe	*Leucothoe racemosa*
Virginia tea	*Itea virginiana*
Swamp rose	*Rosa palustris*
Ink berry	*Ilex coriacea*

Table I-8. Primary noxious and poisonous plants occurring at MOTSU.

Common name	Scientific name
Poison ivy	*Toxicodendron radicans*
Poison oak	*Toxicodendron pubescens*
Poison sumac	*Toxicodendron vernix*
Trumpet creeper	*Campsis radicans*
Sand nettle	*Cnidoscolus stimulosus*

4.6 Drainage.

4.6.1 Storm Drainage. Maintenance and repair of storm drainage systems is accomplished by a contractor as specified in MOTSU Service Contract, page 77, sections C.14.5 through C.14.5.7 (MTMCEA 1997).

Most of the MOTSU land east of the Cape Fear River serves as the CBBSZ, part of which has been leased to various State and local governments. The area now under lease consists of sand beaches, ridges, and dunes and lies west of the beach resort towns of Kure Beach and Carolina Beach. The land is flat to gently rolling with sparse vegetation. Elevations range from near sea level along the river bank to as much as 15 meters at some points in the vicinity of the Carolina Beach Sewage Treatment Plant. Drainage of this part of the installation is generally westward into the Cape Fear River which can be seen in Figure I-14 (U.S. Army 1980; Personal communication, 16 December 1997, Hershel A. Gaw, Jr.).

The MOTSU Main Terminal and two small detached areas (Fort Johnston and Leland Interchange Yard) lie on the west side of the Cape Fear River. The topography of the MOTSU Main Terminal is in general flat to gently rolling. Marsh areas and small lakes are common especially in the eastern half of the Main Terminal. A considerable number of manmade surface alterations of MOTSU have been made which include construction of protective barriers, sewage lagoons, and at least three relatively large dike-enclosed areas that have been used for dumping of dredged material removed from the Cape Fear River. Elevations range from near sea level along shorelines to a maximum of approximately 17 meters above mean sea level (MSL) at some localities in the western part of the installation. Surface drainage of the main part of MOTSU is in several directions. Generally, the drainage in the south and southwest parts is into Nigis Creek, Fisher Creek, and Governors Creek and several of its tributaries in the extreme southwest corner. These streams drain the Administrative Area, the South Holding Yard, part of the North Holding Yard, the Classification and Disposition Yard, the Truck Holding Yard, and part of the Dike 4 Area (U.S. Army 1980; Personal communication, 16 December 1997, Hershel A. Gaw, Jr.).

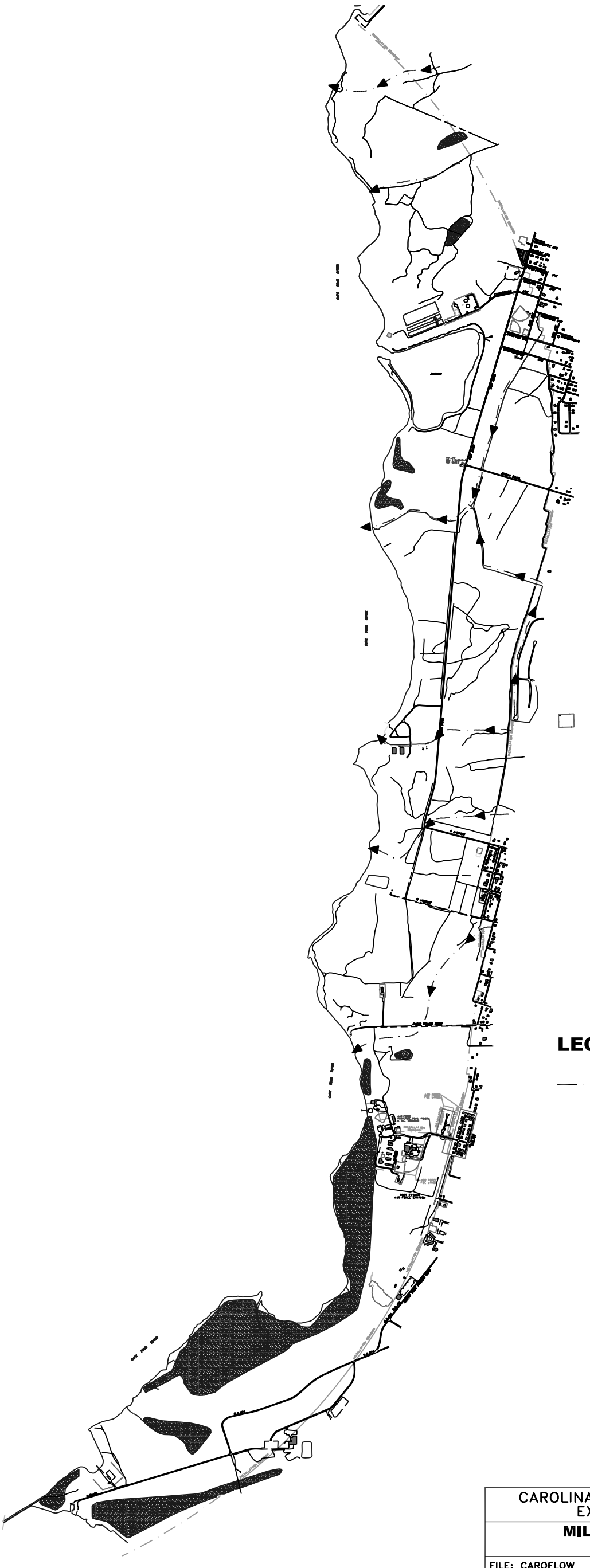
Streams in the north and northwest, including Toms Branch, flow generally to the northwest into Orton Creek or north toward Orton Pond. These streams drain the northern part of the North Holding Yard, and Dike 1 and 2 Areas. Runoff from the eastern parts of MOTSU Main Terminal is directly into the Cape Fear River via numerous streams and drainageways. The eastern area contains three sewage lagoons, a diesel oil storage/disposal station, and four hardstand work sites (U.S. Army 1980; Personal communication, 16 December 1997, Hershel A. Gaw, Jr.).

Storm drainage occurring at Fort Johnston is a result of runoff from buildings and man-made surfaces. Drainage generally remains on-site and penetrates into the soil. Some runoff at the south and eastern edge of the site flows into the street drains and into the Cape Fear River.

Directional water flow for Leland Interchange Yard can be seen in Figure I-15. Drainage is generally east to southeast with approximately 98 percent of the water flowing into Mill Creek by way of Sturgeon Creek and the remaining 2 percent from Morgan Branch into Town Creek.

4.6.1.1 Drainage Map. Drainage maps showing contour elevations, boundaries of principal watersheds, location and size of principal subsurface storm drains and culverts, and/or watershed vegetation are located in maintenance contract drawer 45 (maps TE 8-15 through TE 8-26) in the Division of Public Works building, MOTSU Main Terminal area. Additional drainage information is also found in contract drawer 73 (System Maps: road, railroad, water, sanitary sewer, storm drainage).

4.6.1.2 History of Flooding in Built-up Areas. There is no history of flooding in built-up areas at MOTSU.



LEGEND

DIRECTIONAL FLOW

CAROLINA BEACH BLAST SAFETY ZONE
EXISTING DRAINAGE MAP

MILITARY OCEAN TERMINAL
SUNNY POINT

FILE: CAROFLOW	DRAWN BY: JEJ	0 2400'
DATE: 3/6/98	APPROVED BY:	

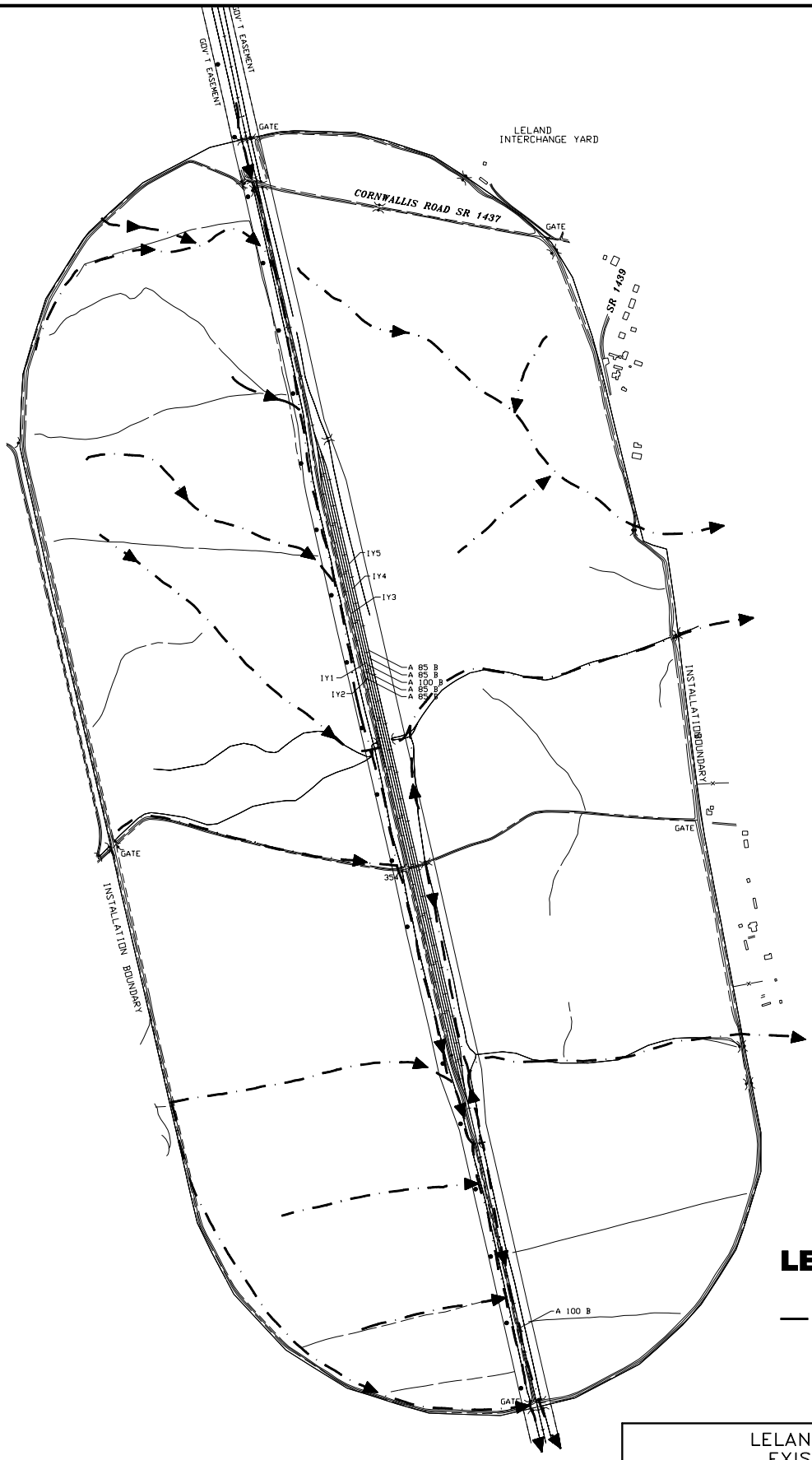
CZR INCORPORATED
ENVIRONMENTAL CONSULTANTS

4709 COLLEGE ACRES DRIVE
SUITE 2
WILMINGTON, NORTH CAROLINA 28403
TEL 910/392-9253
FAX 910/392-9139

CP#1627.01

FIGURE I-14

SOURCE: BASE INFORMATION PROVIDED BY THE CORPS OF ENGINEERS, SAVANNAH DISTRICT IN MICROSTATION (.DGN) FORMAT, NAD 1927, DATED 7 AUGUST 1995, AND RECEIVED BY CZR INCORPORATED IN SEPTEMBER 1997.



LEGEND

DIRECTIONAL FLOW

LELAND INTERCHANGE YARD
EXISTING DRAINAGE MAP

MILITARY OCEAN TERMINAL
SUNNY POINT

FILE: LELANDS	DRAWN BY: JEJ	0 1000'
DATE: 3/5/98	APPROVED BY:	

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FIGURE I-15

SOURCE: BASE INFORMATION (RRBASE27.DGN) PROVIDED BY THE CORPS OF ENGINEERS, WILMINGTON DISTRICT IN MICROSTATION FORMAT, NAD 1927, AND RECEIVED BY CZR INCORPORATED ON 3 MARCH 1998.

4.6.1.3 Principal Channels Through Improved Grounds. Ditches vary in size through improved grounds. Main drains are 12 to 15 feet wide at the top and 2 feet at the base. Side-slope is from 1:1 to 1:2. Channel bottoms are graded at 10 inches in 1000 feet. The vegetative cover found in channels is grass.

4.6.1.4 Storm Drainage Structures. Different kinds of storm drainage structures are used at MOTSU. Drop inlets are used for drain entrances. Open ditches are provided to act as storm drainage structures along roads and throughout the facility. Pipe channels are used in built-up areas.

4.6.2 Tile Drainage. Three main rail backing yards and the classification yard at MOTSU are drained with field tile. The tile is 4-inch diameter metal perforated pipe with aluminum coating surrounded by filter cloth. The only other tile used at MOTSU lines sewage drain fields.

4.6.3 Marsh Areas. A discussion of marsh areas is found in section 3.4.1 Vegetation Types above, and are shown in Figure IV-1 in PART IV. FISH AND WILDLIFE MANAGEMENT PLAN. Natural resources management personnel protect these areas from degradation.

4.7 Soil Eroded Areas. According to MOTSU Service Contract, page 72, section C.13.8, a contractor is responsible for control of soil erosion. Areas particularly susceptible to erosion include the following: barricades within rail holding yards and Containerized Ammunition Distribution System holding areas, in the Interchange Yard, big class yard hardstand drainways and surrounding dredged material disposal areas; and 25 acres within the CBBSZ in New Hanover County, North Carolina (MTMCEA 1996).

4.8 Firebreaks. At MOTSU, roads and plowed fire lines comprise the system of 100 miles of firebreaks throughout the installation.

4.8.1 Roads. All roads running through the interior parts of MOTSU are considered firebreaks/access lanes. There are approximately 30 miles of these firebreaks/access lanes at the Main Terminal and 6.6 miles of firebreaks at Leland Interchange Yard. Each entrance into a firebreak at the Main Terminal is identified by a number and posted. These locations are shown in Figure I-16. All firebreaks on the southside are numbered 1 - 29. All firebreaks located on the northside are numbered from 30 to 49. Firebreaks are approximately 14 feet wide with surfaces consisting of marl or gravel and stable top soil. Firebreaks are graded quarterly with a motor grader. Firebreaks at the Leland Interchange Yard are numbered, but have not been posted (Figure I-17). There are undetermined miles of interior, dirt roads at CBBSZ that are used as firebreaks, but which are not annually maintained by personnel at MOTSU. In addition, DOW road which runs north and south and splits the CBBSZ in half from Carolina Beach to Kure Beach is considered a firebreak. Numberous streets in this area also serve as firebreaks/access lanes. There are approximately 20 miles of railroad right-of-way from the Main Terminal to .7 mile beyond the Leland Interchange Yard with a firebreak running along the entire length of the right-of-way. (MOTSU 1988; Personal communication, 16 December 1997, Hershel A. Gaw, Jr.).

4.8.2 Plowed Fire Lines. The Main Terminal is divided into Forest Management Blocks (FMBs). There are approximately 70 miles of interior plowed fire lines located throughout the FMBs within the Main Terminal and at the CBBSZ and Leland Interchange Yard. In general, plowed fire lines are refurbished every 3 to 5 years or sooner as necessary for control burning. The plowed fire line located along the entire length of the CBBSZ from Carolina Beach to Fort Fisher is refurbished annually.

LEGEND:

FB 13 — FIREBREAK

SOURCE: BASE INFORMATION PROVIDED BY THE CORPS OF ENGINEERS, SAVANNAH DISTRICT IN MICROSTATION (.DGN) FORMAT, NAD 1927, DATED 7 AUGUST 1995, AND RECEIVED BY CZR INCORPORATED IN SEPTEMBER 1997. BASE INFORMATION WAS CONVERTED TO AUTOCAD AND ALL ADDITIONAL MAPPING WAS PRODUCED IN AUTOCAD REL. 14 (.DWG) FORMAT.

MAIN TERMINAL
FIREBREAK MAP

MILITARY OCEAN TERMINAL
SUNNY POINT

FILE: AY-MAINT	DRAWN BY: JEJ	0 — 2400'
DATE: 6/8/98	APPROVED BY:	

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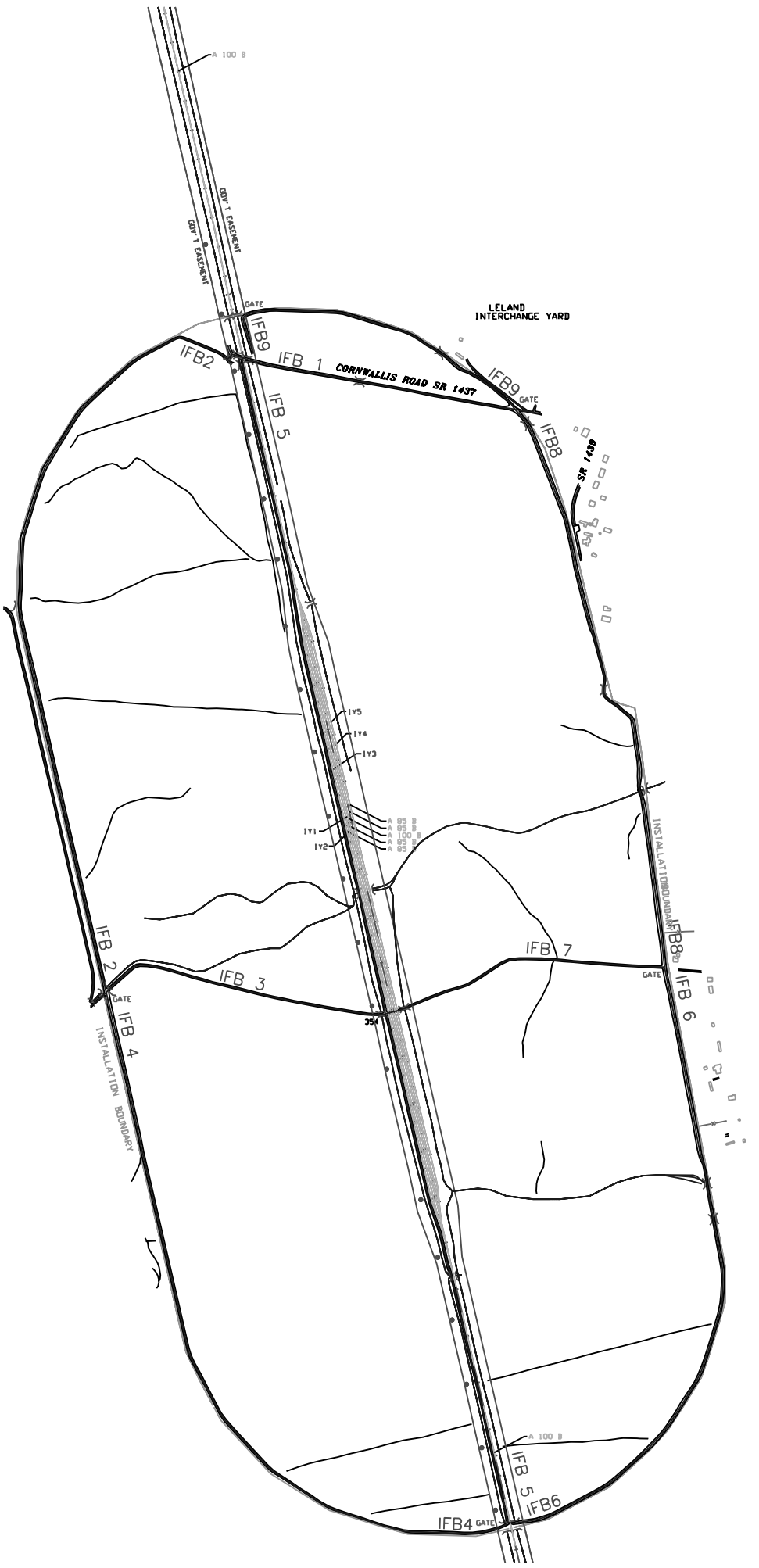
CP#1627.01

Figure I-16



LEGEND:

IFB 4 — INTERCHANGE FIREBREAK

SOURCE: BASE INFORMATION (RRBASE27.DGN) PROVIDED BY THE CORPS OF ENGINEERS, WILMINGTON DISTRICT, IN MICROSTATION (.DGN) FORMAT, NAD 1927, AND RECEIVED BY CZR INCORPORATED ON 3 MARCH 1998. BASE INFORMATION WAS CONVERTED TO AUTOCAD AND ALL ADDITIONAL MAPPING WAS PRODUCED IN AUTOCAD REL. 14 (.DWG) FORMAT.

LELAND INTERCHANGE YARD
FIREBREAK MAP

MILITARY OCEAN TERMINAL
SUNNY POINT

FILE: AY-LELAND	DRAWN BY: JEJ	0 — 1000'
DATE: 6/8/98	APPROVED BY:	

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Figure I-17

5.0 MANAGEMENT PRACTICES AND MAINTENANCE PROCEDURES

5.1 Chemical Control of Vegetation.

5.1.1 Use of Herbicides. Various herbicides are used on the installation. The following is a list of herbicides with either a description of the areas or the extent to which they are used:

Arsenal -- railroad beds (21 feet wide), 48 miles per year; and railroad drainage ditches (12 feet wide), 28 miles per year.

Garlon -- 3A (basal spray) -- longleaf pine stands for hardwood control, 80 acres

Cutrinet -- aquatic weed control (lily pads), 20-acre lake of water to be treated with cutrinet

Spectracide, Poast -- landscape beds, unwanted vegetation

Rodeo, Reward -- sewage lagoons (duckweed), 3 acres, 1 gallon per surface acre

Pramitol 25E, Finale -- perimeter fence, guard rails, powerpoles; unwanted vegetation

Krinite S -- brush control on earthen berms (stump treatment), marl pit work site, railroad supply storage and ballast storage site

5.1.2 Control of Noxious Weeds and Plants. Wild onions (*Allium* spp.) and sandspur (*Cenchrus* spp.) on the lawns at MOTSU and Fort Johnston are treated when needed with Atrozine (0.92 percent) mixed in fertilizer. This is applied in the spring of the year, just prior to the plants breaking dormancy. Johnson grass (*Sorghum halepense*) is also a problem and is sprayed with Roundup herbicide during the early spring (MOTSU 1988).

5.1.3 Personnel Training and Certification. According to MOTSU Service Contract, pages 84, section C.15.14.7, contractors are involved in chemical control of vegetation at MOTSU. Adequate training and certification of contractors are required by contract (MTMCEA 1997).

5.2 Soil Erosion Control. Areas subject to erosion are reestablished with appropriate fill material and ground cover using a variety of control measures to achieve stabilization. The installation is responsible for approving ground cover and erosion control measures.

5.2.1 Control Measures. Sheet erosion is controlled by mulching sites and planting grasses. Permanent concrete check dams are constructed in many of the main drainage ditches. Riprap is placed in ditches which are subject to gully erosion. A hydro-spread of mulch and grass is used at a rate of 2 to 5 pounds of seed per 1000 square feet to prevent wind erosion by stabilizing soil (Personal communication, 16 December 1997, Hershel A. Gaw, Jr.).

Additional soil erosion control measures are performed by a contractor and can be found in MOTSU Service Contract, page 77, section C.14.6.1 through C.14.6.3 (MTMCEA 1997).

5.2.2 Maintenance Requirements. Maintenance requirements of critical vegetated sites is to be met through annual fertilization, regrading where needed, and mulching and seeding to the new seed bed (MOTSU 1988).

5.3 Drainage Requirements.

5.3.1 Maintenance and Restoration Methods. Due to the bush growth of vegetation in this warm coastal region, continued maintenance is required to keep drainage ways open.

Where possible, the vegetative growth is cut annually with rotary type mowers and by hand. In isolated sites, periodic clearing is done with a Crowley Excavator; where possible, only the lower one-third part of the ditch is cleared of vegetation. This allows vegetation to keep the upper part of the banks stabilized. The areas disturbed by the spoil dumping are then sown in a grass mixture to establish game food plots. Repairs to ditch banks are made with mulch, vegetative cover, sand bags, gabbons, or riprap. All ditches that are highly visible, such as those along the entrance road into the installation, will be mowed at least once monthly. All others are inspected yearly and cleaned and repaired on an "as needed" basis (Personal communication, 30 June 1998, Hershel A. Gaw, Jr. Forester, MOTSU).

5.3.2 Flooding. Flooding which could affect built-up areas, important roadways or structures at MOTSU has not been a recurring problem.

5.4 Prescribed Burning. Prescribed burning is undertaken at MOTSU in support of the installation's mission as described in 2.1 above. (See Appendix I-C for "Procedures of Operations for Control Burns on Property Controlled by Sunny Point").

5.4.1 Benefits Derived from Burns. Prescribed burning prevents build-up of fuels and provides hazard reduction, habitat improvements, and timber management. As a result of the regular burning program, the longleaf pine-wiregrass ecosystem which once prevailed is being restored. In addition, a number of other fire dependent species are benefiting.

5.4.2 Time of Year for Burn in Particular Areas. Most burning occurs in the winter months due to the amount of organic duff in bay and pocosin areas and the prevailing winds that are mostly from the north. Areas in which endangered plants exist are burned during the January through March time-frame. On sandy ridges where pine straw raking is done, areas are burned in the April through June time-frame (Personal communication, 16 December 1997, Hershel A. Gaw, Jr.). Additional information pertaining to prescribed burning can be found in PART III. FOREST MANAGEMENT PLAN.

5.4.3 Coordination with Other Offices and Agencies. On the day in which a burn is scheduled, a check is made with the U. S. Weather Bureau and with the North Carolina State Forest Service in Whiteville, North Carolina. Prescribed burning is done on the Main Terminal and Leland Interchange Yard as a single operation. Along the right-of-way and within the woodlands, burns are used to reduce fuel accumulations and to eliminate undesirable vegetative competition. Control burns in woodlands are also used to improve game habitat, as well as the habitat for the endangered red-cockaded woodpecker, endangered rough-leaved loosestrife and the State-protected Venus' flytrap (see PART IV. FISH AND WILDLIFE MANAGEMENT PLAN and PART VI. ENDANGERED SPECIES MANAGEMENT PLAN). Proper precautions, as outlined in "Policy and Management Guidelines for Red-cockaded Woodpecker on Army Installations," are to be followed when control burning (Appendix VI-E, Part VI. ENDANGERED SPECIES MANAGEMENT PLAN).

Additional rare species that may co-exist in the fire adapted ecological communities at MOTSU are Arogos skipper (*Atrytone arogos arogos*) and Venus' flytrap cutworm moth (*Hemipachnobia subporphyrea*). These species have not been documented as occurring at MOTSU, but suitable conditions do occur. USFWS would like to see the installation work with the appropriate state (e.g., North Carolina Natural Heritage Program) and non-governmental organizations to consider these species in their prescribed burning program.

5.4.4 Specific Procedures, Precautions, and Equipment During Burns. Due to the amount of ammunition that is moved through the terminal and/or temporarily stored on the hardstand areas, close coordination must be made with Cargo Operations, the fire department, and Security Division before burning is initiated. The pad storage sites and land adjacent to the ship loading facilities on the eastern part of the terminal are burned first. The Main Terminal is divided into numerous FMBs. Each block is separated from the other by a series of firebreaks, streams, or roads. The FMBs, which range in size from 37 acres to 423 acres, are burned in predesignated order. The Main Terminal fire department and tractor plow units are responsible to stand by in case the fire were to get out of control (Personal communication, 16 December 1997, Hershel A. Gaw, Jr.).

The railroad right-of-way (19.6 miles) is also burned in March or April to reduce fuel build-up and prevent train-related fires. In the past, train-caused fires have burned over several hundred acres of adjoining property. When controlled burning is initiated on the access railroad right-of-way, a train equipped with two 10,000 gallon tanks of water and pumper accessories provides suppression capabilities. A fire plow unit also provides suppression backup (Personal communication, 16 December 1997, Hershel A. Gaw, Jr.).

5.5 Fire Protection. Fire protection is provided by Department of Defense firefighters 24 hours-a-day. The firefighters are trained Emergency Medical Technicians and operate emergency ambulance service on the terminal. The firefighters also operate a fireboat equipped for firefighting from the waterside (MTMC 1997a).

5.5.1 Prevention. No lighters, matches or open fires are allowed below the administrative area (Post 2 - Security Check Thru) except when control burning. Welding or cutting with cutting torches can be done only after a permit is obtained through the fire department. The permit will not be given if explosives or other hazards are in the area. Smoking below Post 2 may be done only in buildings designated for smoking and equipped with electric lighters (Personal communication, 16 December 1997, Hershel A. Gaw, Jr.).

5.5.2 Suppression. Two fire stations are located on MOTSU. This provides for a more rapid response to fires on the installation. Fire department personnel extinguish ship, building, vehicle, and vegetative fires. Fire department personnel use direct application of water to extinguish fires around buildings, roads, and fire/truck accesses. The grounds crew is responsible for suppression of vegetative fires including such activities as raking and backfiring. The fire chief or assistants are in charge of all fires except vegetative. An agreement between the fire chief and the forester establishes responsibilities related to suppression activities on vegetative fires. Once the forester is on-site, suppression activities are under the direction of the forester (Personal communication, 16 December 1997, Hershel A. Gaw, Jr.).

5.5.3 Training. Grounds crews who are involved in control burning activities receive instruction on maintenance of plow lines, construction of fire lines, backfiring and safety procedures (Personal communication, 16 December 1997, Hershel A. Gaw, Jr.).

5.5.4 Mutual Aid Agreement. An agreement of mutual aid exists between MOTSU, Leland, Federal Point, Southport, and Boiling Springs Fire Departments. A copy of a typical mutual aid agreement (Leland Fire Department) is provided in Appendix I-B. The purpose of the agreement is to provide benefits of mutual aid in emergency rescue, fire prevention, life and property protection, and firefighting.

5.6 Resource Requirements.

5.6.1 Personnel, Equipment, and Materials.

Personnel

Natural Resources Management activities at MOTSU are performed by the forester and the contractor as stated below:

Forester
- monitors hunting activities
  - regulates deer harvest numbers
  - cooperates with NCWRC to set "either sex" harvest dates
  - monitors small game harvest
  - monitors migratory birds
  - reintroduces native game birds
  - manages wildlife procedures/practices for all types of small game, wild turkey flock, deer herd, and integrate with woodland management practices
  - conducts annual/mandatory hunters safety course prior to beginning of hunting season

- monitors fishing activities
  - regulates salt and freshwater fishing
  - manages 20 naturally formed freshwater ponds for recreational fishing

- manages for endangered species
  - marks buffer boundaries on Red-cockaded woodpecker clusters to comply with new Department of Defense standards
  - establishes and mark boundaries on endangered plant, rough-leaved loosestrife

- manages timber
  - cruises sections of timberland yearly to gather data for timber harvest and to upgrade woodland management plan
  - selects harvest blocks, cruises and marks timber for harvest, and prepare and submit availability report
  - selects and prepares availability reports for special forest product harvests (pine straw and firewood)
  - coordinates harvesting inspections with Corps of Engineers Realty Foresters
  - site prepares acreages for fall seedling planting of longleaf and superior loblolly pine
  - supervises tree seedling planting by contractor to ensure proper planting, and good survival rate
  - prescribe burns 2600 acres for fuel reduction and 400 acres of g rowing season burns for hardwood control in longleaf pine savannas
  - completes 80 acres of timberstand improvement through eradication of undesirable hardwoods from Red-cockaded woodpecker clusters for habitat improvement on longleaf pine sites to increase acreage for prime pine needle harvesting
  - checks woodland for insect damage and/or outbreak and take corrective action, if needed
  - directs contractor in maintaining 50 miles of firebreaks (prescribed burn acreage) and additional 35 miles of breaks maintained on woodland perimeters for protection from wildfires on adjoining properties

- coordinates update of woodland, endangered species (plant and animal), wildlife, pest control and wetland management plans

- specifies yearly objectives and monitors contract work

Contractor

- provides labor, equipment, and materials to prepare soil, plant, and mow wildlife food plots annually

- provides labor to plow selected fire lanes annually

- annually assists in control burning

- assists in wildfire suppression activities

- marks boundary lines around endangered species habitat

- assists in woodland improvement activities consisting of seedling release and hardwood eradication measures in longleaf pine stands

- provides labor for planting tree seedlings
- provides labor to clear protective boundary around RCW cavity trees prior to control burning of site
- supplies labor and chemicals to treat 20 acre-feet of freshwater ponds

Equipment

The following equipment is used by Natural Resources Management personnel at MOTSU. These materials are D-5 and D-7 dozers, two (2) fire plows with 12' disc, crawler-tracked backhoe, road grader, faron Tractor with 7' disc, and power take-off seed and fertilizer spreader.

Materials

A variety of materials are necessary to accomplish natural resources management activities at MOTSU. These materials are provided or requested, as specified in the MOTSU Service Contract (MTMCEA 1997).

5.6.1.1 Natural Resources Management Personnel.

An organizational chart of Natural Resources Management Personnel is found in Table I-9.

5.6.1.2 Conditional Equipment and Supplies.

A D-6 dozer with extra wide track is needed where wet conditions result in low ground pressure. This dozer is part of the fire plow unit. An amphibious rotary ditcher is needed in spoiled dike areas for use in mosquito control.

5.6.2 Agricultural Outleases. Due to the nature of MOTSU's mission and the security requirements involved, no outleases are permitted on this installation.

5.6.3 Maintenance Contracts. Natural resources maintenance requirements at MOTSU are met by utilizing both in-house and contract personnel. An annual MOTSU Service Contract includes work to be performed by contract personnel. There are no requirements to contract work, but contracting is utilized on an as-needed basis. The amount of contracting changes from year to year and is dependent upon the overall amount of work to be completed by natural resources management personnel (MTMCEA 1996).

5.6.4 Funding Sources.

5.6.4.1 Appropriated. MOTSU is partially funded through the Defense Budget Operating Funds (DBOF). In addition, MOTSU receives revenues from customers to whom they provide services.

5.6.4.2 Nonappropriated. MOTSU does not receive nonappropriated funds.

5.6.4.3 Special Permits. No funding is provided by special permits. The only special permits issued by MOTSU are for hunting and fishing and these are provided at no charge.

5.6.4.4 Reimbursable Funds. The amount of reimbursable funds for Fiscal Year 1998 is $51,900. Site preparation work is included under this category.

Table I-9. Organizational chart for personnel responsible for the natural resources management activities at Military Ocean Terminal, Sunny Point, North Carolina.

Position	Location	Name	Grade	Percent time
Commander	MOTSU	Mark J. Hagan	Colonel	2
Director of Public Works	MOTSU	Matt C. Swanson	GS-13	4
Chief, Environmental and Land Management Branch	MOTSU	Richard P. Lockwood	GS-12	20
Natural Resources Manager	MOTSU	Michael B. Fuller	GS-11	95
Real Estate Forester, Fort Bragg	Fort Bragg	Stan Theis[a]	GS-11	2
North Carolina Wildlife Resources Commission (NCWRC) Fisheries Biologist	Elizabethtown, NC	Keith M. Ashley	—	NA[b]
NCWRC Wildlife Biologist	Elizabethtown, NC	Thomas M. Padgett	—	NA[b]
United States Fish and Wildlife Service (USFWS)	Raleigh, NC	John Hammond	—	NA[b]

[a] Handles sale of forest products for MOTSU
[b] NA = not applicable

NOTE: Where "forester" is mentioned throughout the INRMP, duties are now handled by the Natural Resources Manager. MOTSU's forester has since retired.

5.7 Revisions. A major revision to this plan will occur every 5 years in order to keep the plan current.

6.0 REFERENCES

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APPENDIX I-A

VEGETATION INVENTORY DESCRIPTIONS

APPENDIX A.
VEGETATIVE INVENTORY DESCRIPTIONS

VEGETATIVE TYPES

A complete inventory describing all species on MOTSU has not been done. However, a vegetative inventory by type was performed by the U. S. Army Corps of Engineers in 1991 and information resulting from this inventory is included in a non-published report entitled "Wetlands and Vegetation Types." This report is located in Appendix I-A along with maps developed from this inventory.

There are four systems of habitats represented by the vegetation types found in the MOTSU project area [The project area consists of MOTSU Main Terminal and the Leland Interchange Yard in Brunswick County, the MOTSU Blast Safety Easement also in Brunswick County, the islands in the Cape Fear River, and the Carolina Beach Blast Safety Zone (CBBSZ) (a.k.a. New Hanover County Bufferzone) along the river]. Information pertaining to the MOTSU Easement and Cape Fear islands is included in the discussion below, but should be considered supplemental for the purpose of the Integrated Natural Resources Management Plan. Two of the systems, estuarine and palustrine, constitute the wetland habitats of the project area. The other two systems, upland and modified or constructed features, constitute the upland habitats. The map designations of the palustrine systems are prefixed with a P and suffixed with a W. Map designators of upland and modified systems are prefixed with U and M, respectively, so that they may appropriately identified (Figures I-8 through I-13). Additional designations (e.g. PFO1A) indicate the National Wetlands Inventory (NWI) mapping classifications used by the U. S. Fish and Wildlife Service (Cowardin et al. 1979). One or several NWI designations may be suggested as appropriate for each of the mapped vegetation units that is considered a wetland. The actual mapping conventions used in the NWI mapping of coastal North Carolina were not used in the course of this mapping effort, and the NWI designations that are mentioned are for approximate reference only.

Mapping within the project area was accomplished in two different ways. The process of mapping using aerial photography within the MOTSU facility was accompanied by ground truthing. Lands not in Government ownership outside the perimeter, but within the easement were mapped without the benefit of site reconnaissance during the course of this project. It was generally assumed that most of the easement lands, which are in private ownership, would be inaccessible. Thus, two levels of accuracy may be reflected in the mapping process, with the higher accuracy within the perimeter at MOTSU Main Terminal and within the CBBSZ in New Hanover County.

ESTUARINE SYSTEMS (E)

Wetlands of the estuarine system are those wetlands that regularly receive tidal flood waters bearing at least a small portion of ocean derived salt. For the purposes of this study, the salt content will be considered fresh and the habitat will be included in the palustrine system if it is 0.5 parts per thousand or less of salt concentration. Normal salt strength for ocean water is near 35 parts per thousand. Habitats influenced by these concentrations or those that are somewhat above sea strength salinities will also be considered within an estuarine system. Salt concentrations were not measured for this study, but are mentioned only to serve as general guides.

Open Water (EOW) (E1UB3L)

Estuarine open water within the project area consists of tidal waters that vary in salinity from near strength to the normal lower limit of brackish waters. Most of the occurrence of this map unit is found within the Cape Fear River and its tributaries, including Governor's Creek. Unlike Governor's

Creek, most of the tributaries are short and consist largely of fresh water flow above the influences of the tidal flux. Generally, if there is visible mappable open water within a stream, it will be tidal and subject to at least some salt water intrusion during periods of low flow. Open waters were not assessed for their biotic components.

Tidal Marsh (ETW) (E2EM1N)

Marshes flooded by brackish waters ranging in salinity from near sea strength to near fresh are included within the tidal marsh mapping unit. The salinities of the waters combined with flooding regimes and fresh water inflows influence the character and the species content of the tidal marsh within the project area.

Three areas of tidal marsh are found within the confines of the project area, (a) the littoral margin along the intertidal edges of the Cape Fear River including the minor tidal creeks on either side of the river, (b) the headwater portions of Governor's Creek, and (c) undiked dredged material disposal islands in the river.

Most of the tidal brackish marsh on the Cape Fear River within the project area occurs along the eastern section of the CBBSZ on the New Hanover County side and in the marshes of Governor's Creek in Brunswick County. The largest areal extent of river marsh within the project area occurs at the southern end of New Hanover County in the vicinity of Fort Fisher and the North Carolina Department of Transportation ferry terminal. From the area of Fort Fisher north, the extent of tidal marsh within the project area diminishes to thin strips along the river and pockets along the lower ends of the few small streams that drain the land to the east. Modifications within the watersheds of each one of these streams has been responsible for altering the original salinity regimes and hence the growth of tidal marsh within these small streams.

The western side of the Cape Fear River supports a marsh fringe that connects to tidal marsh growing along the edges of streams rising in the interior portions of the mainland. Brackish marsh follows the wetland edges of the creeks until the salinity regime is diluted to the extent that vegetation adapted to fresh water conditions becomes dominant. Some creeks have been diverted or blocked by construction of MOTSU facilities and dredged material disposal areas.

The two major tributaries of Governor's Creek within the project area become progressively less saline from their mouths to their upper reaches where the interior, freshwater flows leave the uplands. Modifications of the original freshwater flows resulting from the construction of roads, ditches and railyards have most likely changed the character of the original salinity regimes within the two major tributaries of the creek.

Wetland soils bordering the margins of the river and the tributary streams sustain a variety of marsh plant species depending on salinity and flooding regimes. Species competing best in the higher salinity and flooding regimes include smooth cordgrass (*Spartina alterniflora*) and salt grass (*Distichlis spicata*). These species are usually dominant in marshes that are most regularly flooded. Different degrees of flooding and salinity may support other species combinations. Black needle rush (*Juncus roemerianus*) may dominate in less frequently flooded areas. Creek margins in such situations may still support smooth cordgrass, while interior or fresher portions of the marshes may support varying combinations of three-square (*Scirpus robustus*) and giant cordgrass (*Spartina cynosuroides*), saltmeadow cordgrass (*Spartina patens*) and saw-grass (*Cladium mariscus ssp. jamaicense*). A mixture of narrow leaf cattail (*Typha angustifolia*) and three-square (*Scirpus americanus*) can frequently be found in the very lightly brackish conditions closest to upland

habitats. Common reed (*Phragmites australis*) may be dominant in areas where some degree of disturbance has taken place, often at the upper edge of tidal flux. Typical habitats include wetlands that have been disturbed by deposition of dredged material. The occurrence of several species of shrubs commonly associated with the next type generally mark the upper end of this community.

Maritime Scrub-Shrub Thicket (EMW) (E2SS3P)

Maritime scrub-shrub thickets that have developed in hydric soils above the normal tidal flux are ordinarily supported in fresh water systems that are subject to irregular incursions of ocean derived salt water during periods of abnormal storm tides. Additional salt enters the community as a result of wind-laden sea spray carried over-land. Extensive or isolated kills of vegetation by wind-born salt in these communities are not unusual. Such kills can happen with a regularity that will prevent the growth of well developed forest, although individual large trees are not uncommon. Most occurrences of this type are located in the vicinity of Fort Fisher.

The trends of dominance and the clear development of strata are difficult to distinguish because of irregular disturbance. Tree-size individuals of certain species are not uncommon. Red bay (*Persea borbonia*), live oak (*Quercus virginiana*), hackberry (*Celtis laevigata*), persimmon (*Diospyros virginiana*) and red cedar (*Juniperus virginiana*) are scattered within this vegetation type. Shrub species commonly occurring as a part of this community are was myrtle (*Myrica cerifera*), yaupon (*Ilex vomitoria*), silverling (*Baccharis halimifolia*), low-tide bush (*Iva frutescens*) and privet (*Ligustrum sinense*). Several species of woody vines that are abundant include catbriar (*Smilax auriculata*), poison ivy (*Toxicodendron radicans*), Virginia creeper (*Parthenocissus quinquefolia*), muscadine (*Vitis rotundifolia*) and rattan (*Berchemia scandens*). Upland inclusions are not uncommon within this community type, and will be discussed further below.

PALUSTRINE SYSTEMS (P)

Palustrine systems are in areas that receive essentially fresh water from rainfall or stream flow or a combination of both. Palustrine systems may be tidal, but are generally less than 0.5 parts per thousand ocean derived salt. Salinities were not measured during the course of the study and are mentioned here only as a guide.

Open Water (POW) (PUB3H)

Open water situations in freshwater systems are limited to the open centers of ponds and lakes. There are no freshwater streams of sufficient size in the project area to identify as open water. Some of these ponds may support non-persistent emergent, submersed, rooted floating-leaf or floating aquatic plant species that were not visible at the time the aerial photography used during the process of mapping was taken, and no extensive submerged aquatic examinations were made during the course of the field survey. These aquatic species are discussed below under doline and marsh vegetation.

Marsh (PMW) (PEM2A)

Marsh vegetation occurs at the project area both within MOTSU Main Terminal and along the easement outside the perimeter fence. In both instances it is associated with aquatic systems that have undergone some degree of modification. Along the north easement, leached salt and other materials associated with Diked Area 2 have created an environment in which rooted aquatics and emergents have thrived in the upper reaches of Tom's Branch. Past construction in the vicinity of the Central Wharf and along River Road at the South Perimeter Road have blocked old tidal creeks which have since become freshwater systems dominated by various hydrophytic species.

Within the easement outside the perimeter of the Terminal tributaries of Tom's Branch are the most extensive examples of marsh dominated by rooted aquatic and emergent wetland plant species.

No close survey of these southern extensions of Orton Pond have been made in recent years, but water-weed (*Egeria densa*) has been extremely successful in forming dense, floating mats of vegetation. Saw-grass, common reed and cattail (*Typha latifolia*) (as well as other wetland species, it is presumed) are now apparently invading this floating mat as it begins to sink under its own weight.

Impounded tidal creeks have been created in at least two areas by the construction of roadways through the project area. One area near Center Wharf is now dominated by cattail and saw-grass. An additional area along River Road was separated from tidal flow by the construction of Perimeter Road. This impounded body of water now supports a thick floating mat of duckweeds (*Spirodela spp*. and *Wolffia sp*.). Yellow pond lily (*Nuphar lutea*) is common in scattered colonies and water loosestrife (*Decodon verticillatus*) fringes much of the pond with mats that have supplied substrate for other species. Black willow (*Salix nigra*) surrounds much of the shore of the impoundment and has spread out into the wetland in some instances.

Herbaceous Doline (PDHW) (PEM1/AB3G)

Dolines are geomorphic basins that have formed as a result of slumping of surface and subsurface deposits after underlying limestone has been dissolved by water action. The pond-like features that result from this slumping become subject to the accumulation of organic material, and are eventually sealed by the formation of spodic soil horizons. Many of these ponds dot the landscape within the project area and have, along with other types of ponds, been the subjects of botanical investigations at MOTSU (DuMond 1978, MTMC 1981, Leonard 1983).

Stages in the development of herbaceous vegetation in doline ponds are very complex, and have likely resulted from the interaction of a number of physical factors not the least important of which has been fire. The results are manifested by the growth of a wide variety of plant species often occurring in concentric rings around the ponds relative to water level fluctuations. Various species of grasses and forbs occupy the drier side slopes of the dolines while species that are more characteristically aquatic, floating and emergent occupy the more aquatic portions.

These habitats as well as the habitats in dolines containing arborescent vegetation are subject to water level modifications that influence the surrounding landscape. Even though dolines are sealed with spodic horizons, they may loose water faster than they gain it if the underlying groundwater aquifers near the surface are truncated by deep ditches or other excavations. Deep ditches dug before 1957 southeast of Carolina Beach State Park may have been partially responsible for the slow loss of water from herbaceous dolines in the park, which are largely dry now.

Plant species found in these zones include several species which are considered rare, at least in North Carolina (Weakley 1990). Two species known from the doline ponds of the project area are considered Threatened in the State. These are bladderwort (*Utricularia olivacea*) and loose water-milfoil (*Myriophyllum laxum*) (MTMC 1981). Both are submerged aquatic species. Water shield (*Brasenia schreberi*), pond lily (*Nymphaea odorata*), yellow pond lily and banana plant (*Nymphoides aquatica*) are the most visible of the aquatics in these ponds. Zones at the upper edges of water fluctuation around the ponds occasionally support growth of pond spice (*Litsea aestivalis*). Asian pennywort (*Centella asiatica*) is the most common non-aquatic wetland species. Occasional individuals of pond cypress (*Taxodium ascendens*) may be present, reflecting a pre-existing stand of this species that once occurred within or surrounding the upper edges of the ponds. At least two species of peat mosses (*Sphagnum macrophyllum* and *S. cuspidatum*) can become abundant in these open ponds, particularly if they are shallow.

Arborescent Doline (PDAW) (PFO2C)

Dolines have frequently escaped fire for a long enough period of time to have developed a vegetated margin and/or interior that support pond cypress and a heavy growth of understory shrubs.

In such situations, the tree and shrub species may have developed to the exclusion of most herbaceous species. The resulting communities bear some similarity to pocosin vegetation, a community that is dominated by evergreen shrubs. Swamp black gum (*Nyssa biflora*) and red maple (*Acer rubrum*) may also be present in the canopy.

The most common shrub species associated with these ponds are fetter-bush (*Lyonia lucida*) and titi (*Cyrilla racemiflora*). Bamboo briar (*Smilax laurifolia*) is the most abundant of the woody vines along the wetland edges of the ponds, while Virginia chain fern (*Woodwardia virginica*) is the dominant vascular herb. The extensive mats of terrestrial and aquatic peat moss (*Sphagnum macrophyllum*, *S. palustre* and *S. portoricense*) that occupy the water and moist soil surfaces probably constitute the bulk of the herbaceous material under the shrub stratum in many of the arborescent doline ponds.

Swamp Forest (PSW) (PF01/2B)

Swamp forest within the project area is not abundant. Most of this type occurs along the upper ends of drainage ways that are subject to almost constant inundation and along the borders and head of Orton Pond. Since there are no large fresh water streams that drain the area, swamp forests are uncommon in these habitats. One of the headwater streams of Tom's Branch contains a small stand of live swamp forest. Other, more extensive stands may be found along the margins and small tributaries of Orton Pond in or just outside the perimeter of the installation. Most of these stands are down-slope along drainage ways from pocosins, and depend upon slow release of unpolluted water from the pocosins as well as flooding from below for their continued existence.

The canopy of swamp forest is dominated by cypress (bald cypress, *Taxodium distichum*, and pond cypress, *Taxodium ascendens*). Red maple, swamp black gum and red bay can also be found in the canopy. The edges of this habitat type are often pocosin-like with a thick shrubby zone. Tree bases and stumps provide anchorage for shrubs and herbs above the water in areas that are more typically flooded for long periods of time. Shrubs including wax myrtle, Virginia tea (*Itea virginica*) and swamp rose (*Rosa palustris*) are typically found on tree bases and stumps. Royal fern (*Osmunda regalis*) and cinnamon fern (*Osmunda cinnamomea*) are clump-forming species of low stumps. Open water, quiet areas are frequently occupied by various water lilies including yellow pond lily and water lily.

Pocosin (PPW) (PFO7B, PSS3B, PEM1B)

Pocosin is the most extensive wetland vegetation type found within the project area. They are generally characteristic of broad interstream divides and narrow stream channels. The character of the type is that of a stratum of dense, evergreen shrubs overtopped by a broken canopy of typically pond pine (*Pinus serotina*). Occasional pond cypress, blackgum and red maple can be found either as isolated individuals or small stands scattered throughout the greater context of the higher shrub stratum. The most typical shrubs are fetter-bush, zenobia (*Zenobia pulverulenta*), blueberry (*Vaccinium spp*.), titi, ink berry (*Ilex coriacea*), bitter gallberry (*Ilex glabra*), leather-leaf (*Cassandra calyculata*), red bay, sweet bay (*Magnolia virginiana*) and loblolly bay (*Gordonia lasianthus*). The last three species can often be small trees that emerge from the somewhat lower shrub canopy. Bamboo briar is commonly found growing throughout the shrub layer and canopy of this vegetation type.

Breaks in the shrub stratum of the pocosin resulting from fire or wind throw in wetter areas can provide habitat for the growth of more open wetlands that are vegetated by Virginia chain fern and peat moss (*Sphagnum spp*.) Purple pitcher plant (*Sarracenia purpurea*) is characteristic of such habitats as is sundew (*Drosera intermedia*).

Pine Savannah (PPSW) (PFO4A)

Pine savannah habitat is actually pocosin that has been partially cleared and is maintained by

repeated fire. Within the project area, habitats on the western side of the river are regularly burned as a forestry management practice. The resulting vegetation aspect of the savannahs is that of scattered pines with an herbaceous understory dominated by grasses. Pine savannahs are usually adjacent to pocosins, by virtue of their origin. They frequently occur between pocosin and other, usually drier habitats. There may be a considerable range of edaphic conditions in savannahs that span a gentle gradient ranging from soils that have an organic surface horizon at pocosin edges to mineral soils that are almost non-hydric adjacent to longleaf pine flatwoods.

The two species of trees dominate the scattered canopy of savannahs, longleaf pine (*Pinus palustris*) and pond pine. Since both of these pines are well adapted to periodic fires, both have survived the controlled burning that is a part of the forestry management practices at the Sunny Point side of the project area. Other species of trees can be found, including red maple, red bay, loblolly bay, sweet bay and blackgum. Several of the shrubs that occur in pocosins can be found in savannahs where islands of vegetation have been regularly bypassed by fire. Fetter-bush is the most common, but zenobia and bitter gallberry are also quite abundant.

In most situations the herbaceous layer is dominated by wire grass (*Aristida stricta*), but many other species can be abundant as well. At Sunny Point there are extensive areas in savannahs dominated by rush-featherling (*Pleea tenuifolia*). Other notable species that occur in these habitats are yellow pitcher plant (*Sarracenia flava*), Venus' fly trap (*Dionaea muscipula*) and several rare plant species including the endangered rough-leaf loosestrife (*Lysimachia asperulifolia*). This habitat often occurs in narrow bands that surround pocosins. The habitat type may increase or decrease in width through time depending upon the timing and severity of fire. Spring fires burn faster and with less heat than do dry season summer fires. As fires burn into the edges of the pocosins, additional savannah-like habitat is created and conditions favoring the growth of several savannah species of rare plants may be expanded.

Hardwood-Pine Forest (PHW) (PFO1A, PFO1C)

Hardwood-pine forested wetlands have canopys that are dominated or co-dominated by several tree species. These wetlands do not sustain the hydroperiod that is experienced in swamp forests or in the wettest pocosins. They are slightly depressional or they occur along stream drainage ways above swamp forests, and below wetlands that are found along interstream divides, like pocosins. The depressional forms of this type have longer hydroperiods than does the form occurring in flowage lines. Swamp forests and pocosins share many species in common with hardwood-pine forested wetlands. Some expressions of this forest type are elsewhere called bay forest because of the relative importance of at least two species of bay trees in the subcanopy and understory strata.

A wide range of hardwood species are found in the canopy of these forests type. Red maple, black gum, sweetgum (*Liquidambar styraciflua*), and loblolly pine (*Pinus taeda*) are usually the most abundant. Along the more well drained edges, water oak (*Quercus nigra*) and tulip poplar (*Liriodendron tulipifera*) mark the upper extent of areas that may be considered wetland, while occasional pond pine green ash (*Fraxinus pennsylvanica*) and cypress are confined to the wettest portions of these habitats. The latter two species generally only occur where water stands for significant periods of time through the year.

Understory or subcanopy species consist of red, sweet bay and American holly (*Ilex opaca*). Characteristic shrubs are fetter-bush, dog-hobble (*Leucothoe axillaris*), leucothoe (*Leucothoe racemosa*), bitter gall berry and ink berry. The woody grass, bamboo (*Arundinaria gigantea*) may be scattered throughout the less wet portions of these habitats. Woody vines supported in these habitats include bamboo briar (*Smilax laurifolia*) in the wettest soils and muscadine (*Vitis rotundifolia*) in the drier or upland soils along the slopes of drainage lines.

The variation in herbaceous species is dependent upon the range of soil conditions combined with the availability of sunlight. Various species of sedge (*Carex spp*.) and spike rush (*Eleocharis spp*.) along with lizard's tail (*Saururus cernuus*) are characteristic in the wetter areas. Side slopes may support climbing bind-weed (*Mikania scandens*) along with partridge berry (*Mitchella repens*) at moist soil surfaces. Netted chain fern (*Woodwardia areolata*) is characteristic in much of this habitat type except in the wettest of areas where water is present throughout most of the year.

Mixed Pine Forest (PFW) (PFO4A)

Mixed pine forest habitat is best included where the canopy is occupied by two or more species of pine. Three species of pine may be found where this mapping unit has been designated, pond pine, longleaf pine, and loblolly pine. Growing conditions that may favor this sort of situation seem to occur where there is a slow transition from pocosins to upland woodlands (longleaf pine-turkey oak woodlands). An additional factor may be that these transition areas have not sustained burning of sufficient intensity to eliminate loblolly from the areas where pond pine and longleaf pine usually overlap. The most frequent combination of pine in this habitat is that of pond and longleaf. The majority of this habitat is wetland, but considering the transitional character of the type, some of the drier soils would be considered non-hydric.

Vegetation components of this habitat differ little from the edges of pocosins. Scattered or thick gallberry shrubs are intermixed with fetter-bush, persimmon, red bay and live oak. The dominant herb is usually wire grass, but bracken fern (*Pteridium aquilinum*) and running blueberry (*Vaccinium crassifolium*) are frequently very common. Many other species can be found along these transition zones.

Scrub-Shrub Thickets (PSSW) (PSS1A)

Scrub-shrub thickets in wetlands have usually come about as a result of heavy disturbance sustained by arborescent communities. Where the tree or canopy layers have been removed by timbering or some other clearing process the process of forest regeneration may begin with the development of a very thick, tangled growth of woody plants including young trees, shrubs and woody vines. The designation of scrub-shrub thicket is not used where areas have been cleared for silvicultural purposes and subsequently planted in pine. If planted rows of trees are visible in such habitats they are referred to pine plantation.

Wetland scrub-shrub habitats are most common in areas that have been cleared in the past or more recently timbered within the CBBSZ in New Hanover County and in the Leland Interchange Yard in Brunswick County. Habitats once associated with the old Dow Plant holding pond along near Kure Beach have developed a cover of young woody vegetation covered by a very thick tangle of woody vines. Weedy species which are found in such situations are catbriar, gallberry, pepper-vine (*Ampelopsis arborea*), muscadine, wild black cherry (*Prunus serotina*), winged sumac (*Rhus copallinum*), Virginia creeper and privet. Several species of young trees can be found in such areas. Water oak, red bay, and laurel oak (*Quercus laurifolia*) are often common.

Habitats at the Leland Interchange Yard in addition to cutting, have been drained. The vegetation that is in the process of regenerating following timbering is pocosin-like in nature. Since pocosin was the previous vegetation type, that regeneration is expected.

Utility Corridors (PUW) (PSS/EM1A, and others)

A variety of wetland habitats may be created where utility corridors have been constructed for pipe lines or power lines. Marsh or scrub-shrub wetlands are usually sustained by regular maintenance of utility line corridors, particularly those for power lines. The plant species complement that occupies such wetland areas is very similar to that found in marsh, pocosin or scrub-shrub habitat.

Pine Plantation (PPPW) (PFO4A/B)

Natural vegetation has been replaced in many areas by pine plantation at Sunny Point and to a small extent at the Leland Railyard. One area of plantation has been created along Dow Road in the CBBSZ in New Hanover County. Silviculture practices result in the removal of the canopy of a forest system and its eventual replacement by the planted species. Stump and root sprouts from pre-existing trees and shrubs usually regenerate during growth of the planted species. The species that regenerate reflect the species content of the pre-existing vegetation association.

UPLAND SYSTEMS (U)

Hardwood Forest (UHF)

Hardwood forest stands within the project area are generally small and uncommon. Intensive landuse practices including timbering, farming and burning may have been responsible for precluding the regeneration of hardwood forest stands. Most of the stands in the project area are associated with sandy ridges located along the east bank of the Cape Fear River in New Hanover County.

Canopy species in this forest type include live oak, water oak and diamond-leaf oak (*Quercus hemisphaerica*). Pale hickory (*Carya pallida*) and mockernut hickory (*Carya tomentosa*) occur more casually as canopy species. Subcanopy species are not common, but American holly is the most regularly occurring species while dogwood (*Cornus florida*) is widely scattered. Regeneration of canopy species adds considerably to the thickness of this forest type where fire has not been used a management tool. Shrubs including yaupon, wild olive (*Osmanthus americanus*), bitter gallberry and American beauty berry (*Callicarpa americana*) are quite common. Catbriar as well as Virginia creeper (*Parthenocissus quinquefolia*) and muscadine are the important woody vines associated with this forest type.

Mixed Pine-Hardwood Forest (UMH)

Much of the upland forest that has regenerated from old fields, pastures or areas that have been timbered currently displays a mixed canopy composed of hardwoods and pine. This forest type is distinct in that loblolly pine and water oak, live oak and diamond-leaf oak all share the canopy dominance. The percentage that each species shares may vary considerably from stand to stand. More mesic or moist versions of this forest type may support red maple, black gum and sweetgum along with or instead of the oaks. Southern red oak (*Quercus falcata*), black-jack oak (*Quercus marilandica*), pale hickory and mockernut hickory may be present at drier sites. American holly and flowering dogwood are subcanopy species in richer situations. Red bay and sweet bay can be found in wetter woodlands. Shrub species are very similar to those found in hardwood forest.

Loblolly Pine Forest (ULP)

The areal extent of forests dominated by loblolly pine is greater at the Sunny Point portion of the project area. Though well developed in some areas this forest type has not attained the same areal coverage at the Leland Interchange Yard and along the CBBSZ in the New Hanover County portion of the project area. Loblolly pine forest has in most areas regenerated from some sort of previous clearing such as agricultural fields, pastures, severely burned areas or from logging. This habitat occupies flats and gentle slopes of drainage divides where sandy soils dominate. In some cases longleaf pine-turkey oak woodland vegetation has been suppressed through fire protection, and loblolly pine forest has become the dominant forest type.

Loblolly pine is generally the dominant species found in the canopy of this upland forest type, but longleaf pine can be present and share as much as half to three fourths of the canopy in excessively well drained sandy soils on bluffs above streams and marshes. The occurrence of these

variations in the pine canopy dominance can, to a certain extent, be predicted, but the overall areal extent of the variations can not be seen on aerial photography or mapped with any accuracy. Where hardwood species appear in the forest canopy, a designation of mixed pine-hardwood will apply. Hardwood species or pond pine may become scattered in the canopy in areas transitional to wetland soils.

Hardwood tree species that will eventually assume dominance in the canopy exist for time in the subcanopy or in other understory strata in this forest type. Sweetgum, water oak, black gum (*Nyssa sylvatica*), post oak (*Quercus stellata*), live oak and southern red oak are the most common of these species. Species that usually occupy the subcanopy in more mature forests include redbay, sassafras (*Sassafras albidum*) and American holly. Shrubs or low understory tree species, more abundant in forests that have not been burned in the course of silvicultural management, include huckleberry (*Gaylussacia frondosa*), blueberry, false indigo (*Amorpha herbacea*) bitter gallberry, yaupon, horse sugar (*Symplocos tinctoria*), and sparkleberry (*Vaccinium arboreum*). Muscadine, Virginia creeper, and poison ivy are the most abundant woody vines. Bracken fern is the most commonly occurring herb.

Longleaf Pine Flatwoods (ULF)

Longleaf pine flatwoods is one of the most extensive vegetation types found within the project area where fire has been used regularly as a silvicultural management tool. This forest type occupies well to excessively well drained sandy soils on flats across interstream divides. This community dominated by longleaf pine exists adjacent to wetter pocosin and savannah habitats as well as drier habitats dominated by longleaf pine. Both drier and wetter inclusions may have occurred in the mapping of this forest type.

Like almost all habitats in which longleaf pine is an important canopy constituent, the community type is strongly influenced by fire, and indeed, its long term existence is closely linked to fire frequency. Elimination of fire from this habitat promotes the growth of shrubs and the invasion of transgressive species including loblolly pine, which, in turn, results in a decrease in the diversity of herbaceous plants. When well developed, the longleaf pine canopy is not continuous except in young stands. Black gum, sweet bay, scrubby post oak (*Quercus margarettiae*) and turkey oak (*Quercus laevis*) may be scattered. Characteristic shrub species include sand myrtle (*Leiophyllum buxifolium*), wax myrtle, St. John's wort (*Hypericum reductum*), running blueberry, highbush blueberry (*Vaccinium corymbosum*), bitter gallberry and titi. Characteristic herbaceous species are wire grass, black-root (*Pterocaulon pycnostachyum*), and yellow star-grass (*Xyris caroliniana*) and vanilla plant (*Trilisa odoratissima*).

Longleaf Pine-Turkey Oak Woodlands (ULT)

The driest of the longleaf pine communities is longleaf pine-turkey oak woodland. These are fire-maintained habitats supported on course sands in very well to excessively well drained soils. The community is characterized by four distinct strata. Longleaf pine dominates the canopy, while turkey oak dominates the subcanopy. Live oak and blue-jack oak (*Quercus incana*) are occasional subcanopy constituents. The shrub layer usually contains two or three species. The shrubby form of live oak, the shrubby form of wax myrtle and St. John's wort are most common. The dominant herb is wiregrass, but many other herbs are common.

Beach-Dune Complex (UBD or PBW where intertidal beach may be included)

Exposed or intertidal sands along the eastern shore of the Cape Fear River in New Hanover County and the adjacent dunes, where present, are components of the beach-dune complex. Vegetation along the beach is sparse, and limited to a scattering in smooth cord grass. The dune

vegetation may include panic grass (*Panicum virgatum*), dune panic grass (*Panicum amarum*) and cactus (*Opuntia humifusa var. humifusa*).

Live Oak Thicket (UOT)

Live oak thickets constitute something of a northward extension of upland maritime shrub thicket community in New Hanover County. This community intergrades with adjacent longleaf pine-turkey oak habitat, and may constitute only a phase of that community that is adapted to the near-shore sands of low dunes that parallel the Cape Fear River. The canopy of the community consists of live oak and occasionally blue jack and turkey oak. Loblolly pine may be found growing from place to place. The understory consists largely of younger individuals of live oak. Catbriar and American olive are the main woody vine and shrub species. Persimmon frequently occurs as a scattered shrub or young tree. Sedge (*Carex arenaria*), cactus and clumps of panic grass are herb species with the most cover.

Maritime Scrub-Shrub Thicket (UMT)

Non-wetland counterparts of maritime scrub-shrub thickets are usually supported in sandy soils well above the affects of all but the highest of storm tides. Air-born salt is an ecological factor in this community, and may have an influence on the form taken on by thickets in the direct course of wind and salt spray. The disturbance factors limiting development of these thickets to mixed pine-hardwood or to hardwood forests are usually associated with the activities of humans rather than flooding by salt water. At least some stands of this community type can be found as inclusions in the wetland counterpart discussed above. The shrub community may reach a height of 25-30 feet with additional trees emergent above the shrub layer. The forest form of this type which may logically develop is mapped in this report as mixed pine-hardwood forest.

Most of this community has a natural occurrence in the vicinity of Fort Fisher at the southern end of the CBBSZ. There is a gradient of decreasing salt spray influence northward from the southern end of the safety zone. Upland shrub communities found in the vicinity of the Fort Fisher Museum and northward are relegated to community types other than those associated with salt spray primarily for the sake of mapping convenience.

Many of the same species present in the wetland counterpart are also present in this community. Juvenile forms of live oak usually dominate. Red bay, yaupon, wild olive and American beauty-berry are usually abundant. Catbriar and poison ivy constitute the most common woody vines. Muscadine and yellow jessamine (*Gelsemium sempervirens*) are nearly as common. Loblolly pine seedlings and saplings are scattered through some openings in this community type. Catbriar and American beachgrass (*Ammophila breviligulata*) can be very abundant at the edges of openings.

Scrub-Shrub Thickets (USST)

Upland scrub-shrub thickets occur in areas where some sort of disturbance has taken place. The growth of these thickets may develop after two or three years where timbering has not been followed by intensive site preparation for pine plantation. Other sites that have been cleared, as those around human occupation areas, and have been allowed to regenerate toward natural vegetation may develop a thick vegetation cover consisting of shrubs and woody vines.

The assortment of species found growing under the above conditions is high variable. Individuals of tree and shrub species may include diamond-leaf oak, sassafras, loblolly pine, wax myrtle, privet, wild black cherry and bitter gall berry. Woody vines can frequently be poison ivy, muscadine, pepper-vine, trumpet vine (*Campsis radicans*), rattan (*Berchemia scandens*) and Japanese honeysuckle (*Lonicera japonica*).

Utility Corridors (UUC)

Utility corridors passing through upland habitats are generally less apt to permanently modify the landscape than are those that pass through wetland habitats. Regular maintenance of the corridors promotes a mowed or bush-hogged effect where many plant species adapted to a regime of mowing can abound. Almost any of the weedy or shrubby species mentioned above can be effective competitors in this type of habitat.

Pine Plantation (UPP)

Upland pine plantations are generally dominated by pine more quickly following planting than are wetland habitats. Various species of grasses and shrubs are capable of growing for a time following planting, and then become shaded out after the pine growth creates effective shade. Once the trees have grown for several years, other, shade tolerant species of shrubs and trees may become important in the subcanopy and other understory layers. Once the pine has reached a stage of post-maturity the hardwood tree species may eventually dominate the canopy, but thinning and cutting or clearing processes usually have the affect of temporarily reducing the competition. Most of the species found in pine and pine-hardwood forests are also characteristic of pine plantation.

MODIFIED OR CONSTRUCTED FEATURES (M)

Modified or constructed features are those habitats that have been created as a direct result of the activities of man. These habitats are essentially anthropogenic in nature and come about as a result of the combined effects of habitation by man and, at least in part, natural ecological processes. Urban-residential areas, borrow pits, landfills, dredged material disposal areas, utility areas, construction areas, roads, fields and agricultural areas, buildings, and recently abandoned usage areas are all considered part of this system of habitats. Because of their significantly large areal extent, four of these habitats have been delineated separately as described below.

Dredged Material Disposal Areas (MDM)

Dredged material disposal areas are those areas that have been used for the deposit of confined and unconfined materials generated during the course of dredging within the Cape Fear River. Several of the islands in the river that have been delineated as tidal brackish marsh are in actuality constructed of dredged material. In several instances, the centers of these marsh islands are higher where coarser materials were deposited. These higher centers are designated as dredged material disposal areas. Diked dredged material disposal areas in the river associated with Sunny Point basin maintenance have also also been indicated. Dredged material disposal areas in the river are constantly changing, and the mapped representations may be highly inaccurate.

On the mainland there are three recognizable dredged material disposal areas associated with Sunny Point. There are two such areas within the easement south of MOTSU, and one dredged material disposal area associated with the North Carolina Department of Transportation's ferry operations at Fort Fisher.

All of these disposal areas have different vegetation, depending upon the sort of regime in which they have been created. Salt tolerant shrubs including silverling low-tide bush as well as salt meadow cordgrass are supported in the river on the undiked islands. Diked islands support largely common reed. Upland dredged material disposal areas support a variety of wetland and upland species including common reed, widgeon grass (*Ruppia maritima*) (where flooded), silverling, camphor weed (*Heterotheca subaxillaris*), pig-weed (*Chenopodium ambrosioides*) and Johnson grass (*Sorghum halepense*). Eventually the processes of natural succession lead to the development of scrub-shrub thickets or young loblolly pine forest.

Human Occupancy Areas (MHO)

Human occupancy areas are dominated by the activities of man. They support only fragments of semi-natural communities, usually so small that they are included in the present type. Often these areas are dominated by bare soils, grass lawns or small weedy areas. Occasional stands of trees may be representative of pine or hardwood forest. There are many species of plants that can be found associated with this type.

Successional Areas (MSA)

Successional areas are those areas that have been abandoned for a long enough period of time to allow the growth of weedy species. The growth of these weedy species mark the onset of natural succession that will, if not again disturbed, will lead to the development of one of the specific forest types already discussed above. A great variety of herbaceous weeds, vines and shrubs are associated with successional areas, and the exact complement is often related to the type of disturbance that dominated the area and to the type of soil present.

Agricultural Lands (MAA)

Agricultural lands within the project area consist mostly of fields used in the cultivation of grain crops. Several large agricultural fields are located within the MOTSU easement to the south of Governor's Creek. Additional fields are located in the easement to the north of the facility, just north of Old Brunswick Town State Historic Site. No agricultural fields were located within the perimeter of the MOTSU facility and none currently exist in the CBBSZ in New Hanover County.

Outside of the crops grown for commercial purposes, only species of weedy herbaceous plants occur regularly in and at the edges of agricultural fields. Many plant species including persimmon, frost aster (*Aster pilosus*), horse-weed (*Conyza canadensis*), Johnson grass, nut grass (*Cyperus esculentus*), crab-grass (*Digitaria filiformis*) and pig-weed (*Chenopodium album*) can be found in the fields during most portions of the growing season.

APPENDIX I-B

MUTUAL AID AGREEMENT, LELAND VOLUNTEER FIRE DEPARTMENT

1303rd MAJOR PORT COMMAND
AGREEMENT OF MUTUAL AID

This agreement, entered into this 1 day of March. 1996 between the Secretary of the Army acting according to the authority of section 1856a, title 42, United States Code and the Leland Volunteer Rre Department, is to secure for each benefits of mutual aid in emergency rescue; fire prevention; the protection of life and property from fire; and firefighting. It is agreed that:

a. On request to a representative of the 1303D Major Port Command. Sunny Point Fire & Emergency Services by a representative of the Leland Volunteer Fire Department, firefighting and rescue equipment and personnel of the Sunny Point Fire & Emergency Services will be dispatched when available to any point within the area for which the Leland Volunteer Fire Department normally provides fire & rescue protection as designated by the representative of the Leland Volunteer Fire Department.

b. On request to a representative of the Leland Volunteer Fire Department by a representative of the Sunny Point Fire & Emergency Services, firefighting equipment and personnel of the Leland Volunteer Rre Department will be dispatched to any point within the fire fighting jurisdiction of the Sunny Point Fire & Emergency Services.

c. The rendering of assistance under the terms of this agreement shall not be mandatory, but the party receiving the request for assistance should immediately inform the requesting agency if, for any reason, assistance cannot be rendered.

d. Any dispatch of equipment and personnel pursuant to this agreement is subject to the following conditions:

(1) Any request for aid under this agreement will include a statement of the amount and type of equipment and personnel requested, and will specify the location to which the equipment and personnel are to be dispatched; however, the amount and type of equipment and number of personnel to be furnished will be determined by a representative of the responding organization.

(2) The responding organization will report to the officer in charge of the requesting organization at the location to which the equipment is dispatched, and will be subject to the orders of that official.

(3) The responding organization will be released by the requesting organization when the services of the responding organization are no longer required, or when the responding organization is needed within the area for which it normally provides fire and rescue protection.

(4) If a crash of aircraft owned or operated by the United States or Military aircraft of any foreign nation occurs within the area of which Leland Volunteer Fire Department normally provides fire protection, the chief of the Sunny Point Fire & Emergency Services or his or her representative may assume full command on arrival at the scene of the crash.

(5) Mutual aid firefighting forces will not be used for biological, chemical, radioactive, or explosive responses but may he used for support functions.

(6) Fire equipment and personnel will be provided at no cost to the requesting organization.

e. Each party hereby waives all claims against every other party for compensation for any loss, damage, injury or death occurring as a consequence of the performance of this agreement except those claims authorized under 15 U.S.C. 2210.

f. The chief fire officers and personnel of the fire departments of both parties to this agreement are invited and encouraged, on a reciprocal basis, to frequently visit each other's activities for guided familiarization tours consistent with local security requirements and, as feasible, to jointly conduct prefire planning inspections and drills.

g. All equipment used by the Leland Volunteer Fire Department in carrying out this agreement will, at the time of action, be owned by the Leland Volunteer Fire Department, and all personnel acting for the Leland Volunteer Fire Department under this agreement will, at the time of such action, be an employee or volunteer member of the Leland Volunteer Fire Department.

h. Areas of response for Sunny Point are outlined in attached letter. Responses beyond those areas will be on a case by case basis.

i. This agreement shall become effective upon the date hereof and remain in force for two years and shall renew automatically for one additional year unless canceled by mutual agreement of the parties hereto or by written notice by one party to the other party, giving thirty (30) days notice of said cancellation.

For Leland Volunteer Fire Department

Daniel R. Williams
Signature

FIRE CHIEF
Title

The Secretary of the Army

Donald D. Parker
Colonel, U.S. Army
Commanding

BRUNSWICK COUNTY
EMERGENCY COMMUNICATION SERVICES
P.O. Box 249 • 3395 Ocean Highway East
Bolivia, North Carolina 28422

ADMINISTRATIVE
1-919-253-5383

NC WATTS
1-800-522-2346

FAX
1-919-253-7498

March 14, 1995

Chief Warren Frazier
Sunny Point Fire Department
Military Ocean Terminal Sunny Point
Southport, NC 28461

Dear Chief Frazier:

Confirming discussions held between yourself and Brunswick County Emergency Services, I would request that your department be available for mutual aid response for fire suppression, rescue and/or emergency medical call assistance for the following areas:

1. From your base perimeter and access road, along River Road (NC Highway 87/133) and adjoining roadways toward the City of Southport, including areas within the City limits of the City of Southport; along Southport-Supply Road (NC Highway 211) from the Southport area to the intersection of that highway with Long Beach Road, including the major shopping center areas adjacent to that intersection.

2. From your base perimeter and access road, along George II Highway (NC Highway 87) toward the City of Boiling Spring Lakes, to the bridge crossing the Boiling Spring Lake; developed areas within the City of Boiling Spring Lakes lying between George II Highway, the Boiling Spring Lake and River Road (NC Highway 133).

3. From your base perimeter and access road, along River Road (NC Highway 133) toward Wilmington to Allen Creek, just past the intersection of River Road and Orton Road.

Requests for mutual aid shall normally be made through Brunswick County Emergency Communication Services (911 - C COMM), at the direction of the OIC for the following stations/agencies:

Station 3 - Southport Fire Department
Station 4 - Boiling Spring Lakes Fire Department
Station 25 - Southport Rescue Squad
Station 27 - Boiling Spring Lakes Rescue
Brunswick County EMS
Brunswick County Fire Marshal (EMC 1)

Additionally, when conditions may require large scale mobilization of resources, a mutual aid request may be made to assist with major natural or manmade disasters in other parts of Brunswick County. Such requests shall be coordinated through C COMM.

It is understood that requests for mutual aid assistance are always subject to availability of resources from your Department, which resources are contingent on the operational status and needs of MOTSU. Commitments on base always take precedence over off base requests.

Requests for emergency medical assistance only shall be for reported medical emergencies, not convalescent transfers; also, except for areas close to the main access road, mutual aid emergency medical requests would normally only be where the normal provider has no personnel available and the nature of the call appears to be life threatening.

Requests for mutual aid rescue normally would be for reported motor vehicle accidents or other possible entrapments, particularly in the area north of the base along River Road, where your resources could be on scene before resources of the normal responder to that area.

Thank you for your commitment and the commitment of your base commander and staff in allowing your resources to assist with civilian needs in the area adjacent to the base. At any time you find a need to alter areas of response or amend any of these procedures, please contact me.

Very Truly Yours,

Douglas Ledgett, JD
Director

cc: Cecil Logan, B.C. Fire Marshal; Emergency Management Director
911 - C COMM Personnel
B. C. EMS Personnel
Boiling Spring Lakes Fire Department
Boiling Spring Lakes Rescue Squad
Southport Fire Department
Southport Rescue Squad

APPENDIX I-C

OPERATIONAL PROCEDURES FOR CONTROL BURNS AT MOTSU

APPENDIX C.
OPERATIONAL PROCEDURES FOR CONTROL BURNS AT MOTSU

1. Forester is responsible for selecting sites to be burned in accordance with forest management plan. The goal is to burn areas on a 3 to 5 year cycle.

2. A map showing the proposed burning areas will be prepared and submitted to Chief DPW the last week of December for the next years project.

3. In cooperation with the N.C. Division of Forest Resources and the wood-using Industries in Brunswick County, the Sunny Point Forester has agreed to participate in a volunteer Smoke Management Program. This program limits the amount of burnable fuel that will be ignited per 25 square mile area. This will allow for better smoke dispersal as the woodland burns. This should prevent the accumulation of dense smoke in any one area and keep citizens complaints to a minimum. This approach may prevent passage of laws in which prescribed burning would not be available as a forest management tool.

4. Daily scheduling of prescribed burns will be as follows:

   a. Notify the on-base contractor at least the day before of a possible burn, to enable them to schedule their people. This also allows for the check of the fire plow unit and radio to insure they are operating properly. Advise them again the morning of the burn if it's a go for the burn.

   b. Coordinate with the Fire Department Chief, the day before and the day of the burn, to insure a tanker of rail flat crew is available to accompany the burn crew.

   c. Coordinate with safety office, Explosive Safety (QASAS) Chief, the day before and day of the burn, as to areas cleared of explosive cargo as well as where explosives are located.

   d. Notify the 911 Emergency Center in Bolivia of burn area, time, and location.

   e. If the burn is to be done on the railroad ROW coordinate with Rail Operations Chief (84), at least the day before for train support with the water tank cars and rail flat care with the mounted high pressure water guns.

   f. For burns on the railroad ROW, notify Boiling Springs Lakes Police Department and Leland Fire Department of burn time and location.

   g. If the burn is to be done in the buffer zone in New Hanover County, notify the Federal Point, Carolina Beach, Kure Beach Fire Departments of the intent and the location. Request assistance from Federal Point if men are available.

   h. If the burn is to be done at the Leland Interchange Yard, notify the Leland Fire Department of intent and the location.

   i. After 0900 hours, call the North Carolina Division of Forest Resources (NCFS), Fire Weather Station at Whiteville to obtain the fire weather report for zone 16. This report will provide the information needed to make the decision to proceed with plans to burn.

j. Utilizing the N.C. Division of Forest Resources Smoke Management, Fuel Tonnage Estimation Guidelines, and smoke management map, the following details should be completed and provided to the NCFS at Whiteville prior to any burning at (910) 642-5093.

   1. Total acres to be burned
   2. Fuel tonnage from tables
   3. Name of Burning Boss
   4. BSP (Block, Square, Point), location (map)
   5. Time of ignition
   6. Purpose of burn
   7. Distance to nearest SSA (Smoke Sensitive Area)

k. Should thunder clouds develop in the surrounding area on a day of a burn, additional weather information would be needed as to wind speed, direction, and/or possible wind shifts. Contact the U.S. Weather Bureau in Wilmington at 763-8331 for this information.

l. Notify via phone the Fire Department, Security, Safety (QASAS), contractor, and PW chief, of "go" situation, including time of start and location.

m. Notify other Division Chiefs and Commander's office of the prescribed burn. Include time of start and location via CC-Mail.

n. Go to a local business (Stewards Hardware) and get a NCFS burning permit. Permit is usually good for 3 days and insures compliance with state regulations on day time burning.

o. Insure the bulk fuel tank is properly filed with mixed diesel and gasoline.

p. Make sure the drip torches are functioning properly. Have at least 6 fire rakes, and 2 flaps on the truck.

q. If burning along the perimeter fence, the following additional equipment is needed; two 6 foot step ladders and a bolt cutter. Step ladders will allow for fast "over the fence attack" if the prescribed burn should spot across the fence. Should the initial over the fence attack fail, the bolt cutters will allow the fence to be taken down so the fire plow unit, on foot fire fighters, and hoses from the tanker trucks may be used on the fire outside of the fence boundaries.

r. When proceeding to the burn site, stop at the fire station and get a fire department hand held radio. (At least one hand held with regular channel should be obtained).

s. Once on-site, the crew will be briefed on weather conditions, map blocks to be burned, the origins of each ignition point, type of fire behavior to look for as they advance down the line, what their reaction should be if fire behavior is different than what has been discussed.

Safety practices and procedures to follow while working with fire.

1. Drive around the blocks to be fired prior to torching time; inspect; and become aware of any thing out of the ordinary. Eliminate any surprises!

2. MAKE SURE PERSONNEL USING TORCHES UNDERSTAND WHICH SIDE OF FIRE LINE IS TO BE FIRED, AND WHERE TO START AND STOP. REPEAT INSTRUCTIONS. DON'T TAKE ANY THING FOR GRANTED.

3. Brief the fire plow unit operator and MOTSU FD Tanker personnel of where they are to be positioned, and what actions should be taken in case of emergency.

4. Make sure all persons on the fire line are aware of what to do in order to escape the fire should it get out of control. Practice the black line policy.

5. Always run a small test fire, and watch its reaction before starting large fire procedures. Make sure small fire start is at an area where it can be extinguished, if necessary.

6. Make sure personnel using torches have on cotton type clothes; no polyesters.

7. Patrol the site once the fire is burning and keep a close check on men located on the firing line.

8. Make sure fire is proceeding the way it was intended. Take corrective action to get the fire to accomplish the type of burn required.

9. Before firing additional blocks or leaving for the night, make sure that all fire blocks have burned back at least 100 yards from any fire break structure. Insure that all fire is in ground cover only and no crowns are burning.

10. Patrol burned area the first thing each morning to inspect the preceding days results. Obtain contract crew if mop up work is needed.

11. In case the fire jumps to another block, alert the plow unit operator and tanker unit, giving details as to where they are to proceed, type of attack need to contain the jump. Get ground personnel to accompany and assist the two above units.

12. Should on the grounds crew be unable to handle the fire, notify Fire Department and Security. Have the FD to request assistance through the cooperative agreement with local VFD units. Should this attack fail and additional units be needed, have security call the NC Forestry Division for assistance.

FOLLOW THE ABOVE PROCEDURES FOR A NEW DAY'S BURN.

PART II.
LAND MANAGEMENT AND GROUNDS MAINTENANCE PLAN

OF THE INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN FOR THE MILITARY OCEAN TERMINAL, SUNNY POINT, NORTH CAROLINA

Prepared By:
CZR INCORPORATED
Wilmington, North Carolina

DIAL CORDY AND ASSOCIATES INC.
Wilmington, North Carolina

and
SAVANNAH DISTRICT, U.S. ARMY CORPS OF ENGINEERS
Savannah, Georgia

Prepared For:
MILITARY OCEAN TERMINAL, SUNNY POINT
Southport, North Carolina

Agency Coordination and Revisions Provided By:
DIAL CORDY AND ASSOCIATES INC.
Wilmington, North Carolina

Submitted: July 2000
Modified: March 2005
Coordination Resolution: September 2005
FINAL: June 2009

PART II. LAND MANAGEMENT AND GROUNDS MAINTENANCE PLAN

OF THE INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN FOR THE MILITARY OCEAN TERMINAL, SUNNY POINT, NORTH CAROLINA

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PART II. LAND MANAGEMENT AND GROUNDS MAINTENANCE PLAN

1.0 INTRODUCTION

Army Regulation AR 200-3 requires that all military installations prepare and implement an Integrated Natural Resources Management Plan which includes, as one of its components, a Land Management and Grounds Maintenance Plan. The following Land Management and Grounds Maintenance Plan was prepared for Military Ocean Terminal at Sunny Point (MOTSU), in compliance with AR 200-3 and in accordance with guidelines provided in "Technical Manual 5-630, Natural Resources-Land Management" (U. S. Departments of the Army, the Navy and the Air Force, July 1982).

1.1 Scope. The Land Management and Grounds Maintenance Plan has been developed specifically for MOTSU. MOTSU is comprised of the Main Terminal, Carolina Beach Blast Safety Zone (CBBSZ) (a.k.a. New Hanover County Bufferzone), Leland Interchange Yard and Fort Johnston. The Land Management Plan is applicable to all lands and waters of the installation. The Grounds Maintenance section of the plan applies only to the Main Terminal and Fort Johnston. The Land Management and Grounds Maintenance Plan includes technical information for personnel engaged in natural resources management. [Note: Fort Johnston, as of September 2007, is no longer MOTSU property. Agency coordination resolution of Part II occurred prior to property transfer.]

1.2 Purpose. The purpose of the Land Management and Grounds Maintenance Plan is to provide a ready source of information related to natural resources management activities at MOTSU. This information, when properly applied, will enable installation personnel to supplement ongoing management efforts, conserve the natural resources on Department of Defense lands, maintain and improve the appearance of grounds and promote operational safety and efficiency.

1.3 Objectives. Land management and grounds maintenance operations will be conducted in an orderly sequence designed and adjusted to take advantage of the varied ecological factors involved, including climate, topography, soil, vegetation, and land use. Timeliness in the application of accepted agronomic practices and techniques is essential to their success.

The following objectives are established for DOD installations, as outlined in TM 5-630:

1) Maintenance of grounds, essential to the mission of MOTSU, will be a priority.

2) Lands, facilities, and equipment will be protected continuously from deterioration and depreciation by dust and erosion.

3) Welfare and morale of personnel will be fostered by healthful, pleasant surroundings, and suitable outdoor recreational facilities.

1.4 Implementation. The Land Management and Grounds Maintenance Plan contains information on specific topics as outlined in Appendix C of TM5-630, listed above. The plan also specifies the management activities that are presently undertaken at MOTSU. Upon approval, this plan will be used for a period of five years, at which time any changes to the management strategy at MOTSU will be incorporated in the five-year revision.

2.0 PROPERTY DESCRIPTION

MOTSU is comprised of four areas: Main Terminal, CBBSZ, Leland Interchange Yard and Fort Johnston (See PART I. GENERAL PLAN for information pertaining to location and acreages of these areas). These areas are under the jurisdiction of the Department of Defense and are subject to regulations which govern property utilization and protection. The Land Management plan includes the

four areas mentioned above. The Grounds Maintenance Plan includes only the Main Terminal Administrative Area and Fort Johnston.

2.1 Planted Areas. The characteristic sandy soils of the MOTSU area mandate the need for a quick vegetative cover to prevent serious sheet and gully erosion. The sites around the administration area, the barricades around the Container (ammunition) holding pads, family housing at Fort Johnston in Southport, and roadway and railroad right-of-ways have all been seeded to annual grasses. The terrain varies on these sites from level to moderately steep slopes (barricades, established at a 1 to 1.5 ratio). The degree of success in establishing a grass cover appears to be closely correlated with soil type and amount of fertilizer used. These soils are inherently low in fertility, particularly in nitrogen and potash. Soil test results show most soils to have a low pH value, indicating a relatively high acid condition. The addition of agricultural limestone is required to correct this acidic condition. The sandy and sandy loam soils are also low in organic material and require approximately 500 pounds of crushed limestone per acre to raise the pH one (1) point. Many of these soils have a pH value of 5.0, therefore it requires an addition of 1,000 pounds of limestone per acre to raise the pH to 7.0.

2.1.1 Grasses and Other Ground Covers. The following are grasses and ground covers used on improved, semi-improved, and unimproved grounds, including lawns at Fort Johnston and the administration area, road right-of-ways, and barricades and pad areas (Appendix II-A).

Improved grounds: Bahia, Bermuda, centipede
Fort Johnston lawn: St. Augustine, Bermuda
Administration lawn: centipede, Bahia, Bermuda

Semi-improved grounds:
Road right-of-ways: Bahia, Bermuda
Barricades and pad areas: Bermuda, Kobe, lespedeza, KY 31 fescue, weeping love grass

Unimproved grounds: Bermuda

2.1.2 Landscape Plantings. The following are shade trees, shrubs, and ground cover plants used on improved grounds at Fort Johnston and the administration area (Appendices II-A and II-B).

Shade trees (optimal survival with native species)

Carya illinoensis (Pecan)
Cercis canadensis (Redbud)*
Cornus florida (Flowering dogwood)*
Ilex cornuta burfordi (Burford holly)
Ilex helleri
Ilex opaca (American holly)*
Ilex rotundra
Ilex vomitoria (Yaupon holly)*
Juniperus virginiana (Eastern red cedar)*
Lagerstroemia indica (Crape myrtle)
Magnolia virginiana (Southern magnolia)*
Pinus palustris (Longleaf pine)*
Pinus taeda (Loblolly pine)*
Podocarpus macrophylla make (Yew podocarpus)
Pyrus communis (Pear)
Quercus falcata (Southern red oak)*
Quercus virginiana (Live oak)*

Shrubs (for best survival, plants should adapt to semi-arid regions due to hot dry summers)

Berberis sp. (Barberry)**
Chaenomeles lagenaria (Peach flowering quince)
Forsythia x intermedia (Forsythia)
Juniperus chinensis pfitzerian (Pfitzer juniper)
Ligustrum sp. (Privet)**
Myrica cerifera (Wax myrtle)*
Nerium sp. (Flowering oleander)
Photinia sp. (Photinia)
Pittsoporum tobira 'Wheeler's dwarf' (Pittsoporum)
Prunus caroliniana (Cherry laurel)*
Pyracantha coccinea (Pyracantha)
Raphiolepsis indica 'Enchantress' (Indian hawthorn)
Rhododendron sp. (Azalea)*

Ground cover plants

Juniperus chinensis sargentii (Sargent juniper)
Juniperus conferta 'Blue Pacific' (Blue Pacific juniper)
Juniperus horizontalis 'Prince of Wales' (Prince of Wales juniper)
Sabal minor (Sabal minor palm)*

* Species recommended as most favorable for plantings by USFWS.
** Species discouraged as plantings by USFWS.

2.1.3 Landscape Plan. The Landscape Plan covers the administration area (20 acres) and the Family Housing area at Fort Johnston (6 acres). Both areas were landscaped in the mid- to late 1950's. New construction in the past five years has caused the plan to be altered. The most recent plan for the installation included planting shrubs around the new Cargo Operations Building (1995) (Appendix II-A).

2.2 Areas Leased for Agricultural Purposes. No areas are leased for agricultural purposes.

2.3 Golf Courses. No golf courses are located on this installation.

2.4 Cemeteries. No cemeteries are located within the terminal on the west side of the Cape Fear River. Two cemeteries (Newton family and St. Paul's United Methodist Church) are located in the CBBSZ on the east side of the river. The Newton cemetery and adjacent property (1 acre) has been selected as a historical site. Maintenance of these cemeteries rests with the original property owners.

2.5 Ammunition Storage Areas.

2.5.1 Number of Earth-Covered Magazines. No earth-covered magazines are located on this installation. However, 61 earthen mounds (barricades) have been constructed around 45 asphalted hardstands (rubber-tired vehicular parking sites). An additional 96 barricades exist around 80 railroad storage sites.

2.5.2 Condition of Soil Cover. Seventy (70) of the original barricades support stands of merchantable pine timber. When the trees have been harvested, the disturbed areas will be sown with Bahia grass. Of the remaining 87 earthen structures, 82 are stabilized and support good grass cover. At the present an additional 15 barricades are under construction in the southeastern part of the terminal.

2.6 Irrigation System. MOTSU is located in the hot, humid climate of southeastern North Carolina. This location requires that lawns at Fort Johnston and the Main Terminal Administrative Area be irrigated on a regular basis to insure growth and maintenance of ground cover.

2.6.1 Fort Johnston. Irrigation at Fort Johnston is supplied on an as-needed basis. It consists of a portable pipe system of 2-inch diameter galvanized metal 30 feet in length. Twenty-two sprinkler heads, each capable of producing 6.34 gallons of water per minute, are utilized. When irrigation is necessary, a 3-inch fire hose is connected to the system of sprinkler heads and then to a fire hydrant which uses City of Southport water. The site is irrigated for an acceptable period of time and then disconnected and disassembled. (The city is notified prior to usage so that they may plan for the increased water demand.) Time-in-use and water volume used is reported by a MOTSU contractor to the city for billing. Approximately two acres of lawn are irrigated at Fort Johnston.

2.6.2 Main Terminal Administrative Area. Three different irrigation systems are used at the Main Terminal Administrative Area: an underground system of pop-up sprinkler heads, a portable pipe system like that used at Fort Johnston described in 2.6.1 above, and soaker hoses. The underground sprinkler system is located in the following areas: 1) in front of the Public Works building, 2) between Public Works and Headquarters Loop Road, 3) and between Headquarters Loop Road and the Freight Traffic building. Approximately one acre of lawn is irrigated by the underground sprinkler system with nine acres of additional vegetative cover irrigated by either of the remaining two systems.

3.0 MANAGEMENT PRACTICES AND MAINTENANCE PROCEDURES

3.1 Planting. Establishing a vegetative cover on the 1.5-to-1 slopes of the barricades requires that additive material be incorporated into the soil to a depth of 6 inches. This provides essential plant nutrients for good root system development. With a fresh seed bed prepared, and just prior to seeding, a bulldozer tracks the slopes. This practice roughens the slopes and helps prevent seed loss in wet weather. It also provides moisture traps and helps reduce sheet erosion problems by reducing the force of the water.

3.2 Plant Feeding.

3.2.1 Procedures. The MOTSU contractor takes soil samples annually at the Main Terminal administrative area and Fort Johnston to determine the fertilizer requirements for lawns in these areas (MOTSU Service Contract, page 72, Section C.13.10 (MTMCEA 1997). Samples are taken to the Brunswick County Extension Office and are processed through the Soils Test Laboratory, N. C. Department of Agriculture, Agronomic Division in Raleigh, N. C. There they are analyzed for nitrogen, phosphorus, potassium, and micronutrients.

On vegetated slopes subject to soil erosion, soil should be tested every 3 years, and the appropriate fertilizer mixture and limestone added just before the start of the growing season.

Lawns where turf is subject to intensive foot traffic should be maintained by twice-yearly (spring and fall) applications of a high-nitrogen fertilizer due to the loose structure of the sandy soil. Irrigation of these sites should start as soon as the grass shows signs of reduced growth. Soil samples should be taken every 3 to 5 years to insure proper application of needed soil nutrients.

The contractor shall apply a commercial type fertilizer on approximately 70 acres of improved grounds based on the chemical composition and application rates recommended by the analyzing laboratory.

3.2.2 Historical Rates of Application. MOTSU has used approximately 300 pounds of fertilizer per acre annually. Lime has been and will continue to be applied according to the amount per acre required by the soil analysis.

3.3 Mowing. Mowing at the Main Terminal and Fort Johnston is accomplished by a contractor as specified in MOTSU Service Contract, pages 69 thru 71, sections C.13.2 thru C.13.2.11 (MTMCEA 1997). Mowing is generally performed 10 months of the year excluding February and March when vegetative growth is minimal. Improved grounds are mowed 20 to 26 times per year, semi-improved grounds are mowed 4 to 6 times per year, and unimproved grounds are mowed 1 to 2 times per year (see Figure II-B-1 for location information).

The majority of mowing (about 98 percent) is done by the Contractor [MOTSU Service Contract, pages 69-71, Section 13.2 (MTMCEA 1997)]. Mowing responsibilities include:

- removal of accumulations of clippings
- grass cutting on 427 acres of improved grounds
- grass cutting on 2.5 acres at the Family Housing area at Fort Johnston
- grass cutting on 237 acres of semi-improved grounds
- grass cutting on 239 acres of unimproved grounds
- grounds maintenance on barricades and in ditches
- edging on 5280 linear feet of sidewalks, driveways and curbs
- grass trimming from around trees, shrubs, fences, poles, fire hydrants, buildings, structures, and parking lot bumper blocks
- turf repair and re-establishment

3.3.1 Mowing schedule. Base personnel are responsible for mowing approximately 97 miles of railroad right-of-way (15 feet wide on either side of track) four times per year during the months of April thru December. The track leading to the access track, the three back-up yards and the classification yard are mowed four times per year. The remaining areas including the holding yards are mowed two times per year. This constitutes about 2 percent of the annual mowing responsibilities. Refer to the Maintenance Contract Mowing Schedule TE 8-29, Appendix II-C.

3.3.2 Instructions Given to Occupants of Family Housing. Occupants of Family Housing are not responsible for mowing activities.

3.4 Irrigation.

3.4.1 Irrigation Plan. The two areas at MOTSU that require irrigation are Main Terminal and Fort Johnston. Due to the limited acreage to be irrigated (as stated in section 1.6 above), the portable pipe system will continue to be utilized. Irrigation is accomplished by the MOTSU contractor [refer to MOTSU Service Contract, page 72, Section 13.9 (MTMCEA 1997)]. Contractor responsibilities include:

- irrigation on improved grassy areas during the grass growing season (normally five times per year between May 1 through October 31)
- irrigation of shrub sites throughout the year (normally 11 times per year)
- taking precautions to prevent runoff into streets and drainage ditches
- taking precautions to prevent accumulation in low-lying areas

3.4.2 Recommendations of the State Irrigation Specialist. The contractor is responsible for knowing the recommendations of the State Irrigation Specialist.

3.4.3 Supervisory Responsibility. The Contractor is responsible for all irrigation activities [refer to Service Contract, page 72, Section 13.9 (MTMCEA 1997)].

3.4.4 Instructions Given to Occupants of Family Housing. Occupants of Family Housing are not responsible for irrigation activities.

3.5 Tree, Shrub, and Special Ground Cover Plants.

3.5.1 Requirements for Feeding, Weeding, Mulching, and Pruning. The Contractor is responsible for feeding, weed, mulching, and pruning of all trees, shrubs, and special ground cover plants [refer to Service Contract, page 72 Section 13.7.1 and page 74 Section 13.15, respectively (MTMCEA 1997)]. Contractor responsibilities include:

- weed removal and mulching of plant beds, hedges, shrubs and tree saucers
- pruning of trees in accordance with the National Arborist Association Standards
- pruning of shrubs and hedges (Family Housing)
- replacement of trees and shrubs lost by disease, winter-kill, drought, damage, or acts of God
- relocation of healthy trees and shrubs within MOTSU

3.5.2 Management/Maintenance Requirements. Plant maintenance requirements are noted in Section 2.5.1. Urban Forest Management will conform to criteria identified in AR 200-3 and guidelines addressed in this section.

3.5.3 Removal of Trees and Shrubs. The Contractor is responsible for removing and replacing trees and shrubs according to the Service Contract, pages 72 and 74, Sections 13.6 and 13.15.4, respectively (MTMCEA 1997).

Carolina Power and Light (CP&L) or MOTSU personnel clear hardwoods along railroad right-of-ways at the main terminal and Leland Interchange yard every 4 to 5 years. The hardwoods are cut and left to decompose.

3.5.4 Pruning Requirements. The Contractor is responsible for pruning trees, shrubs, and hedges according to the Service Contract, page 74, Sections 13.15.2 and 13.15.3 (MTMCEA 1997).

3.6 Policing for Landscape Maintenance.

3.6.1 Definition. Policing – to regulate, control or keep in order; to make neat in appearance; to clean.

3.6.2 Policing Plan. Ninety-five percent of policing is done by contractor [refer to Service Contract, page 73 Section 13.12 (MTMCEA 1997)]. Contractor duties include pickup and disposal of trash and litter on 90 acres of improved grounds (twice weekly) and on 500 acres of semi-improved grounds (twice yearly).

Four percent of policing is done by longshoremen, who police wharf areas and work sites during and after each project. Policing of railroad beds (the remaining 1 percent) is done in-house by the rail maintenance crew. Policing priorities are noted in Section 2.6.1 for in-house policing crew.

3.6.3 Priorities. Policing priorities are noted in Section 2.6.1 for in-house policing crew.

3.7 Disease and Insect Control and Sanitation.

3.7.1 Major Diseases of Turf, Trees, and Shrubs. The major turf diseases and control methods for each at MOTSU include:

Disease:	Control:
Dollar spot	Fungicides, nitrogen fertilizer, plenty of water
Fairy ring	Aerating of soil and increased watering and fertilizer
Powdery mildew	Fungicides

The major tree and shrub diseases at MOTSU and the control methods for each include:

Disease:	Control:
Fire flight	Pruning and burning of infected limbs
Powdery mildew	Fungicides

3.7.2 Major Insect Pests.

The major damaging turf, tree, and shrub insects at MOTSU and their control methods include:

Damaging turf insects:	Control:
Mole cricket	Insecticide
White grubs	Treat area affected with granular insecticide and soak into soil

Damaging tree insects:	Control:
Bark beetles	Spray damaged areas on stem, remove dead or dying trees
Defoliators	Insecticides, pruning of infected limbs
Leaf beetles	Insecticides or dusts

Damaging shrub insects:	Control:
Love bug	Insecticides
Red spider mites	Insecticides
Scale	Insecticides

3.7.3 Sanitation Measures. Most plants selected for landscaping are adapted to local soil and climate conditions. Their resistance to disease and insect attack is also a reason for their selection. If chemical control of either disease or insect infestation cannot be accomplished on a woody plant, the affected part or entire stem is severed and burned. Turfed areas will be broken up and a new seedbed prepared and resown. The type of infestation will dictate if a different species of grass should be planted. In the case of certain leaf diseases, the leaves will be collected and burned.

3.7.4 Installation Pest Control Services. Pest control is done by the Contractor [refer to Service Contract, pages 84-85, Sections 15.12.6 through 15.13.9 (MTMCEA 1997)]. Contractor responsibilities related to land management and grounds maintenance include the survey and control of fungus, bacteria, leaf sucking and chewing insects on shrubs, lawns, and improved grounds. These areas include:

- railroad beds, switch signs, signposts, and crossing areas
- chain link fencing strips
- ditch lines and other mosquito breeding sites
- pavement expansion joints
- borders around buildings, utility poles, guardrails, signposts, hose houses, electrical and telephone distribution boxes, and reservoir
- pine tree regeneration areas (control of hardwood and other undesirable growth)
- waste water lagoons and fresh water ponds (aquatic weed management)

3.7.5 Coordination with Local, State, or Federal Agencies. Disease and insect control and sanitation is coordinated with the North Carolina Department of Agriculture and the County Extension Office.

3.8 Work Programming. Contractor responsibilities are outlined in the MOTSU Service Contract (MTMCEA 1997). A copy of the current contract can be found in the office of the Quality Assurance Inspector in the Public Works building. The Annual Work Plan is located in Appendix D.

4.0 REFERENCES

Military Traffic Management Command Eastern Area (MTMCEA). 1997. MOTSU Service Contract, DAHC21-96-C0003. Bayonne, New Jersey.

APPENDIX II-A

LANDSCAPE PLAN – TERMINAL LANDSCAPING IMPROVEMENTS

TERMINAL LANDSCAPING IMPROVEMENTS
GENERAL LOCATION PLAN

MILITARY OCEAN TERMINAL
SUNNY POINT

FILE: 291L1.DWG	DRAWN BY: POH,INC/JEJ	0 3000'
DATE: 3/9/98	APPROVED BY:	

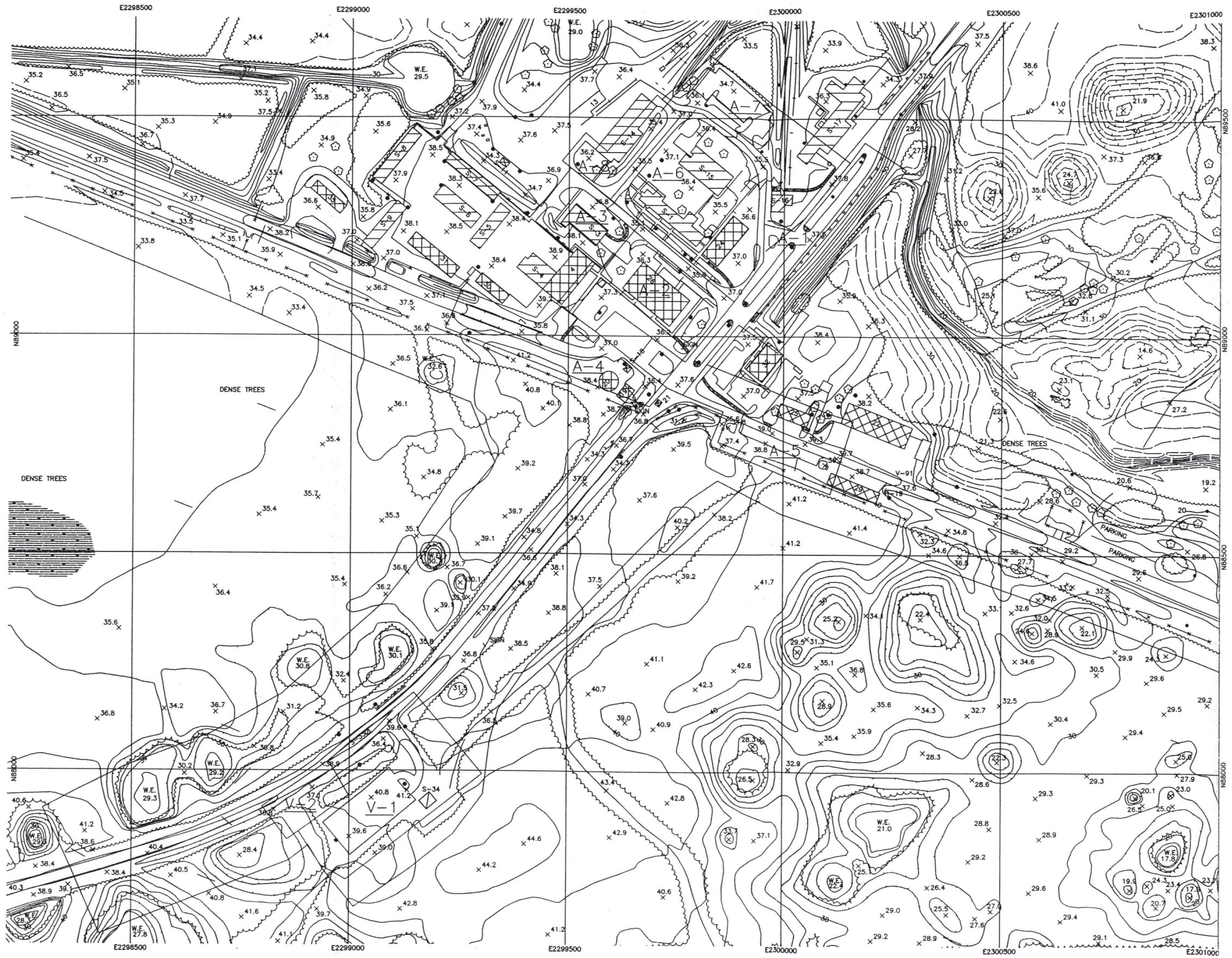
CZR INCORPORATED
ENVIRONMENTAL CONSULTANTS

4709 COLLEGE ACRES DRIVE
SUITE 2
WILMINGTON, NORTH CAROLINA 28403
TEL 910/392-9253
FAX 910/392-9139

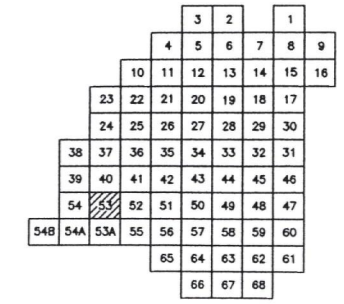
CP#1627.02

FIGURE II-A-1

SOURCE: LANDSCAPE PLAN PREPARED BY PIEDMONT OLSEN HENSLEY, INC., ENGINEERS-ARCHITECTS, RALEIGH, NORTH CAROLINA IN MICROSTATION (.DGN) FORMAT, 291L1.DGN, DRAWING CODE SU106-01-136, DATED 29 NOVEMBER 1994



SOURCE: LANDSCAPE PLAN PREPARED BY PIEDMONT OLSEN HENSLEY, INC., ENGINEERS–ARCHITECTS, RALEIGH, NORTH CAROLINA IN MICROSTATION (.DGN) FORMAT, 291L2.DGN, DRAWING CODE SU106–01–136, DATED 29 NOVEMBER 1994



KEY

LEGEND

EXISTING

- PERMANENT BUILDING
- SEMI–PERMANENT BUILDING
- TEMPORARY BUILDING
- ROADS AND PARKING
- TRAIL
- RAILROAD
- FENCE
- SHORELINE
- TREELINE
- RESERVATION BOUNDARY
- SWAMP AREA
- UTILITY POLE
- 25 INDEX CONTOUR
- INTERMEDIATE CONTOUR
- DEPRESSION

500' GRID BASED ON NORTH CAROLINA STATE PLANE COORDINATE SYSTEM (NAD 27), TOPOGRAPHY COMPILED FROM AERIAL PHOTOGRAPHY DATED FEBRUARY 10, 1989 AND AERIAL PHOTOGRAPHY DATED MARCH 28, 1992 USING PHOTOGRAMMETRIC METHODS. PHOTOGRAMMETRY AND MAPPING BY KUCERA INTERNATIONAL INC. AND AERO–DYNAMICS, CORP.

SITE LOCATION PLAN

MILITARY OCEAN TERMINAL SUNNY POINT

FILE: 291L2.DWG	DRAWN BY: POH, INC/JEJ	0 240'
DATE: 3/9/98	APPROVED BY:	

CZR INCORPORATED
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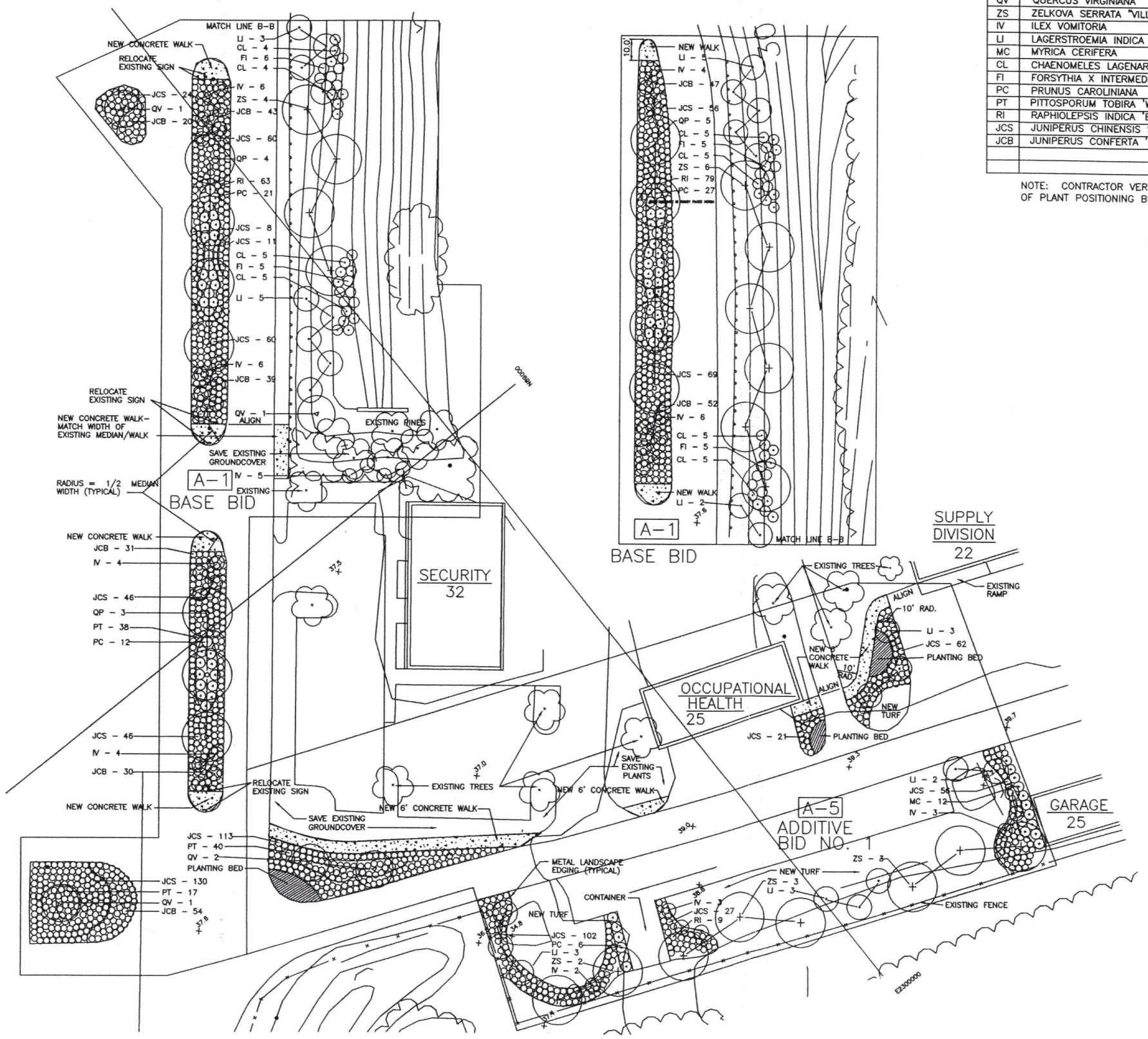
CP#1627.02

FIGURE II–A–2



PLANT SCHEDULE						
KEY	BOTANICAL NAME	COMMON NAME	SIZE	SPACING	QUANTITY	
					A-1	A-5
QP	QUERCUS PHELLOS	WILLOW OAK	2.5-3" CAL.	30' O.C.	12	–
QV	QUERCUS VIRGINIANA	LIVE OAK	2-2.5" CAL.	30' O.C.	3	2
ZS	ZELKOVA SERRATA "VILLAGE GREEN"	JAPANESE ZELKOVA	2.5-3" CAL.	30' O.C.	10	8
IV	ILEX VOMITORIA	MULTISTEM TREE FORM YAUPON HOLLY	6-8' B&B	10' O.C.	35	8
LI	LAGERSTROEMIA INDICA	RED CRAPE MYRTLE	9-10' B&B	15' O.C.	15	11
MC	MYRICA CERIFERA	WAX MYRTLE	4-5' B&B	5' O.C.	–	12
CL	CHAENOMELES LAGENARIA	PEACH FLOWERING QUINCE	3 GAL.	4' O.C.	38	–
FI	FORSYTHIA X INTERMEDIA	FORSYTHIA	3 GAL.	5' O.C.	21	–
PC	PRUNUS CAROLINIANA	CAROLINA CHERRY LAUREL	3-4' B&B	5' O.C.	60	6
PT	PITTOSPORUM TOBIRA 'WHEELER'S DWARF'	JAPANESE PITTOSPORUM (SOLID GREEN)	3 GAL.	3' O.C.	56	40
RI	RAPHIOLEPSIS INDICA 'ENCHANTRESS'	INDIAN HAWTHORN	3 GAL.	3' O.C.	152	9
JCS	JUNIPERUS CHINENSIS SARGENTII	SARGENT JUNIPER	3 GAL.	3' O.C.	537	380
JCB	JUNIPERUS CONFERTA 'BLUE PACIFIC'	BLUE PACIFIC SHORE JUNIPER	3 GAL.	3' O.C.	316	–

NOTE: CONTRACTOR VERIFY LOCATION OF UNDERGROUND UTILITY LINES AND OBTAIN CONTRACTING OFFICER'S APPROVAL OF PLANT POSITIONING BEFORE PLANTING

GENERAL NOTES FOR ALL PLATES:

1. ALL NEW TURF AREAS SHALL BE BERMUDA 419. TURF ALL DISTURBED GROUND AREAS AND AREAS WITH POOR EXISTING STANDS OF TURF (AS DEFINED IN SPECIFICATIONS) IN IMMEDIATE VICINITY OF ALL NEW LANDSCAPING AND WALKS.

2. PREPARE ALL AREAS DENOTED "PLANTING BED" FOR FUTURE INSTALLATION OF ANNUALS/PERENNIALS. PROVIDE CULTIVATION, SOIL AMENDMENTS RECOMMENDED BY SOIL TESTS, AND MULCHING AS SPECIFIED.

3. PROVIDE SPECIFIED METAL LANDSCAPE EDGING FOR EDGES OF ALL PLANTING AREAS WHERE ADJACENT TO TURF AND PLANTING BEDS.

4. REMOVE EXISTING TURF IN ALL PLANTING AND WALK AREAS.

5. REMOVE EXISTING PLANTS & RETURN TO GOVERNMENT AS DIRECTED BY CONTRACTING OFFICER, WHERE DISPLACED BY NEW PLANTS. REMOVE ALL EXISTING CHINESE HORNED HOLLY, ILEX CORNUTA ROTUNDA.

6. PROVIDE POROUS WEED CONTROL FABRIC IN ALL PLANTING AREAS.

7. RELOCATE ALL EXISTING TRAFFIC SIGNS IN AREAS OF NEW WORK AS DIRECTED BY CONTRACTING OFFICER.

8. PROVIDE EXPANSION JOINT MATERIAL AROUND EXISTING POWER POLES LOCATED WITHIN NEW WALKS. DO NOT COVER GROUND WIRES WITH CONCRETE.

9. VERIFY LOCATION OF UNDERGROUND UTILITY LINES AND TANKS. OBTAIN CONTRACTING OFFICER'S APPROVAL OF PLANT REPOSITIONING IN CASE OF CONFLICT. DO NOT PLANT OVER UNDERGROUND TANKS.

10. BASE BID INCLUDES AREAS: A-1, A-2, V-1, V-2, AND A-4.

ADDITIVE BID NO. 1 INCLUDES AREAS: A-5 AND A-6.

ADDITIVE BID NO. 2 INCLUDES AREAS: A-7, A-3 AND A-8.

SEE PLATE L-5 FOR CONCRETE WALK DETAILS

SEE PLATE L-6 FOR PLANTING DETAILS

SOURCE: LANDSCAPE PLAN PREPARED BY PIEDMONT OLSEN HENSLEY, INC., ENGINEERS-ARCHITECTS, RALEIGH, NORTH CAROLINA IN MICROSTATION (.DGN) FORMAT, 291L3.DGN, DRAWING CODE SU106-01-136, DATED 29 NOVEMBER 1994

ADMINISTRATION AREA
AREAS A-3 AND A-5

MILITARY OCEAN TERMINAL
SUNNY POINT

FILE: 291L3.DWG	DRAWN BY: POH,INC/JEJ	0 60'
DATE: 3/9/98	APPROVED BY:	

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WILMINGTON, NORTH CAROLINA 28403
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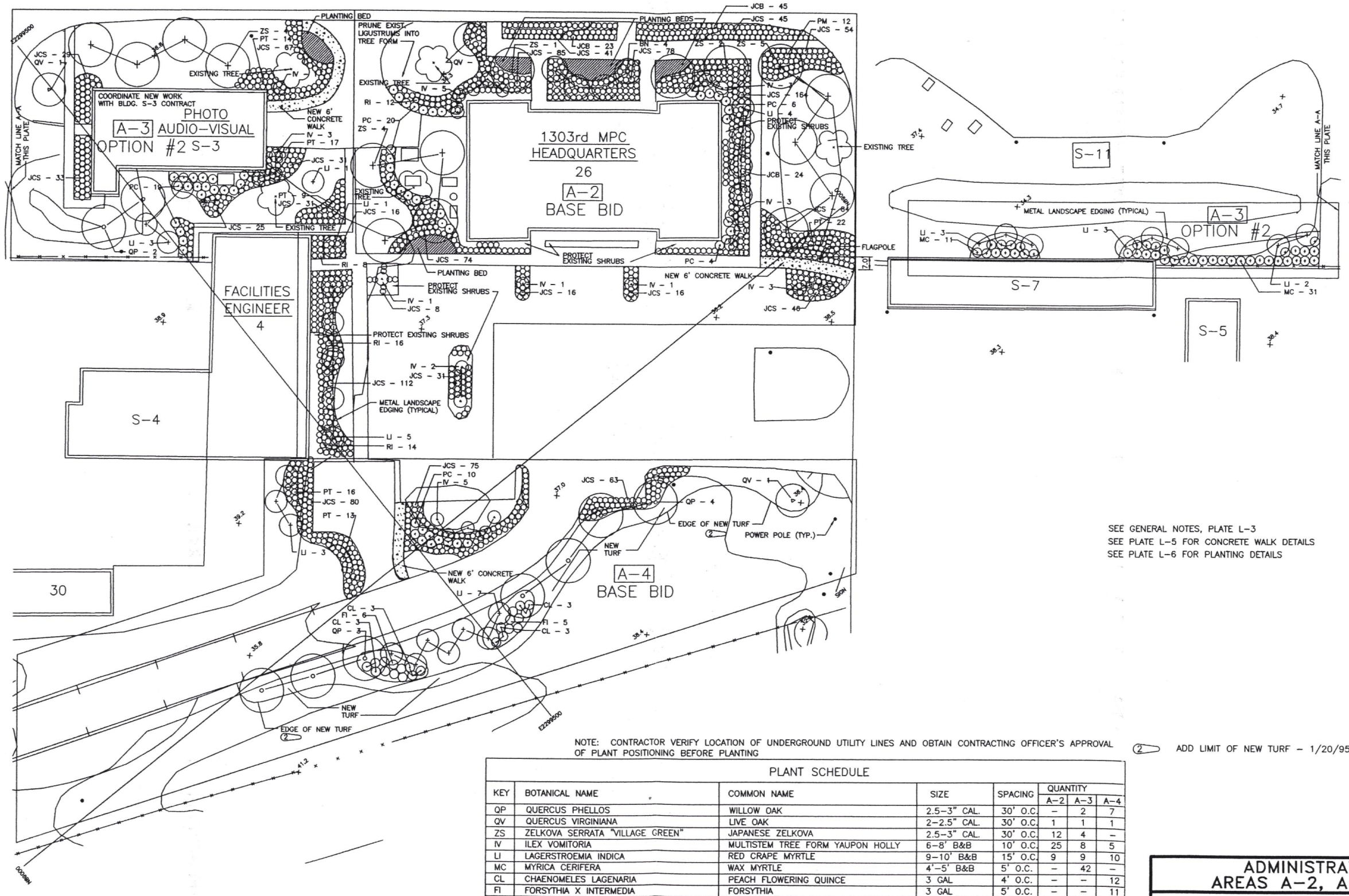
FAX 910/392-9139

CP#1627.02

FIGURE II-A-3



SEE GENERAL NOTES, PLATE L-3
SEE PLATE L-5 FOR CONCRETE WALK DETAILS
SEE PLATE L-6 FOR PLANTING DETAILS

NOTE: CONTRACTOR VERIFY LOCATION OF UNDERGROUND UTILITY LINES AND OBTAIN CONTRACTING OFFICER'S APPROVAL OF PLANT POSITIONING BEFORE PLANTING

(2) ADD LIMIT OF NEW TURF - 1/20/95

PLANT SCHEDULE

KEY	BOTANICAL NAME	COMMON NAME	SIZE	SPACING	QUANTITY A-2	QUANTITY A-3	QUANTITY A-4
QP	QUERCUS PHELLOS	WILLOW OAK	2.5-3" CAL.	30' O.C.	-	2	7
QV	QUERCUS VIRGINIANA	LIVE OAK	2-2.5" CAL.	30' O.C.	1	1	1
ZS	ZELKOVA SERRATA "VILLAGE GREEN"	JAPANESE ZELKOVA	2.5-3" CAL.	30' O.C.	12	4	-
IV	ILEX VOMITORIA	MULTISTEM TREE FORM YAUPON HOLLY	6-8' B&B	10' O.C.	25	8	5
LI	LAGERSTROEMIA INDICA	RED CRAPE MYRTLE	9-10' B&B	15' O.C.	9	9	10
MC	MYRICA CERIFERA	WAX MYRTLE	4'-5' B&B	5' O.C.	-	42	-
CL	CHAENOMELES LAGENARIA	PEACH FLOWERING QUINCE	3 GAL	4' O.C.	-	-	12
FI	FORSYTHIA X INTERMEDIA	FORSYTHIA	3 GAL	5' O.C.	-	-	11
PC	PRUNUS CAROLINIANA	CAROLINA CHERRY LAUREL	3-4' B&B	5' O.C.	30	19	10
PT	PITTOSPORUM TOBIRA 'WHEELER'S DWARF'	JAPANESE PITTOSPORUM (SOLID GREEN)	3 GAL.	3' O.C.	34	-	-
RI	RAPHIOLEPSIS INDICA 'ENCHANTRESS'	INDIAN HAWTHORN	3 GAL.	3' O.C.	40	40	29
JCS	JUNIPERUS CHINENSIS SARGENTII	SARGENT JUNIPER	3 GAL.	3' O.C.	816	215	218
JCB	JUNIPERUS CONFERTA 'BLUE PACIFIC'	BLUE PACIFIC SHORE JUNIPER	3 GAL.	3' O.C.	93	-	-

SOURCE: LANDSCAPE PLAN PREPARED BY PIEDMONT OLSEN HENSLEY, INC., ENGINEERS-ARCHITECTS, RALEIGH, NORTH CAROLINA IN MICROSTATION (.DGN) FORMAT, 291L4.DGN, DRAWING CODE SU106-01-136, DATED 29 NOVEMBER 1994, REVISED 20 JANUARY 1995

ADMINISTRATION AREA
AREAS A-2, A-3, AND A-4

MILITARY OCEAN TERMINAL
SUNNY POINT

FILE: 291L4.DWG	DRAWN BY: POH,INC/JEJ	0 60'
DATE: 3/9/98	APPROVED BY:	

CZR INCORPORATED ENVIRONMENTAL CONSULTANTS
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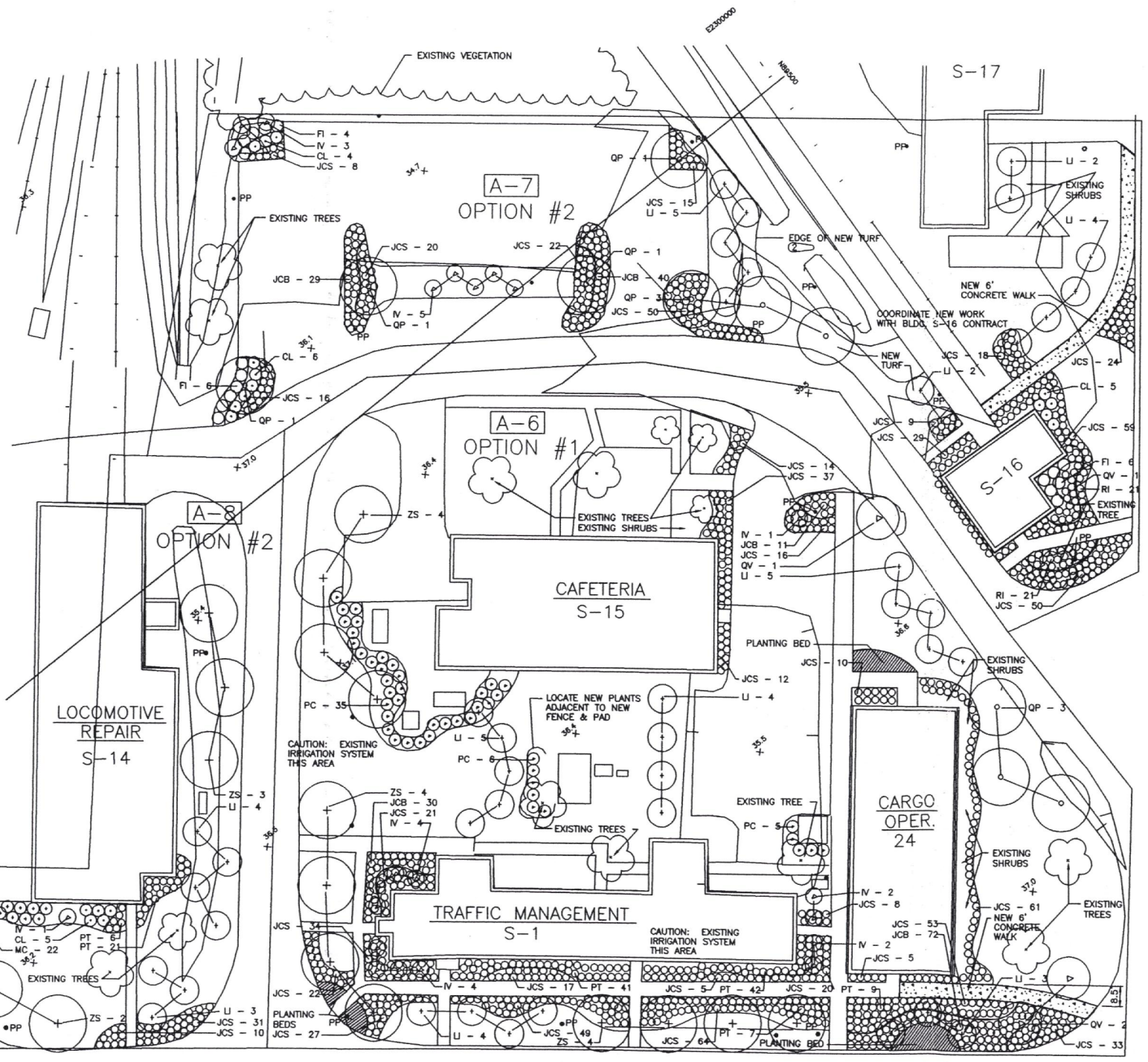
FAX 910/392-9139

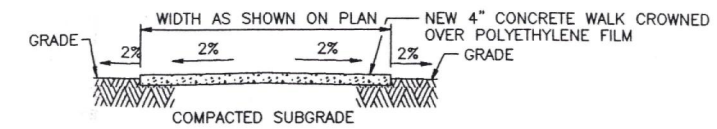
CP#1627.02

FIGURE II-A-4

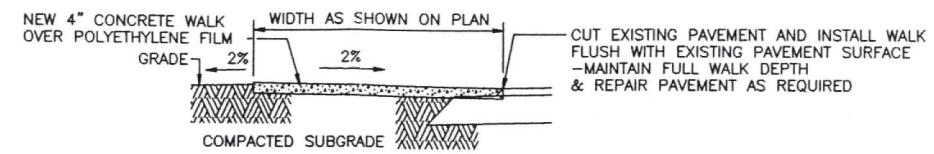


PLANT SCHEDULE							
KEY	BOTANICAL NAME	COMMON NAME	SIZE	SPACING	QUANTITY		
					A-6	A-7	A-8
QP	QUERCUS PHELLOS	WILLOW OAK	2.5-3" CAL.	30' O.C.	3	7	–
QV	QUERCUS VIRGINIANA	LIVE OAK	2-2.5" CAL.	30' O.C.	3	1	–
ZS	ZELKOVA SERRATA "VILLAGE GREEN"	JAPANESE ZELKOVA	2.5-3" CAL.	30' O.C.	12	–	5
IV	ILEX VOMITORIA	MULTISTEM TREE FORM YAUPON HOLLY	6-8' B&B	10' O.C.	13	8	1
LI	LAGERSTROEMIA INDICA	RED CRAPE MYRTLE	9-10' B&B	15' O.C.	21	13	7
MC	MYRICA CERIFERA	WAX MYRTLE	4-5' B&B	5' O.C.	–	–	22
CL	CHAENOMELES LAGENARIA	PEACH FLOWERING QUINCE	3 GAL.	4' O.C.	–	15	5
FI	FORSYTHIA X INTERMEDIA	FORSYTHIA	3 GAL.	5' O.C.	–	16	–
PC	PRUNUS CAROLINIANA	CAROLINA CHERRY LAUREL	3-4' B&B	5' O.C.	46	–	–
PT	PITTOSPORUM TOBIRA 'WHEELER'S DWARF'	JAPANESE PITTOSPORUM (SOLID GREEN)	3 GAL.	3' O.C.	99	–	27
RI	RAPHIOLEPSIS INDICA 'ENCHANTRESS'	INDIAN HAWTHORN	3 GAL.	3' O.C.	–	42	–
JCS	JUNIPERUS CHINENSIS SARGENTII	SARGENT JUNIPER	3 GAL.	3' O.C.	508	319	41
JCB	JUNIPERUS CONFERTA 'BLUE PACIFIC'	BLUE PACIFIC SHORE JUNIPER	3 GAL.	3' O.C.	113	69	–

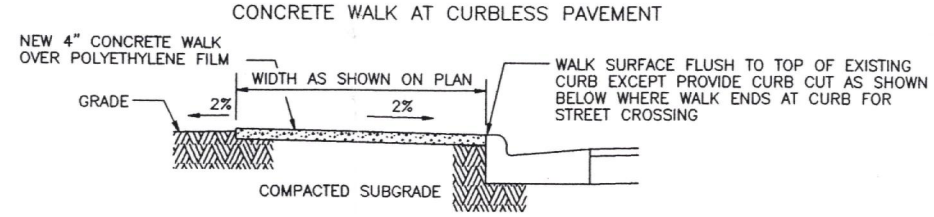
NOTE: CONTRACTOR VERIFY LOCATION OF UNDERGROUND UTILITY LINES AND OBTAIN CONTRACTING OFFICER'S APPROVAL OF PLANT POSITIONING BEFORE PLANTING



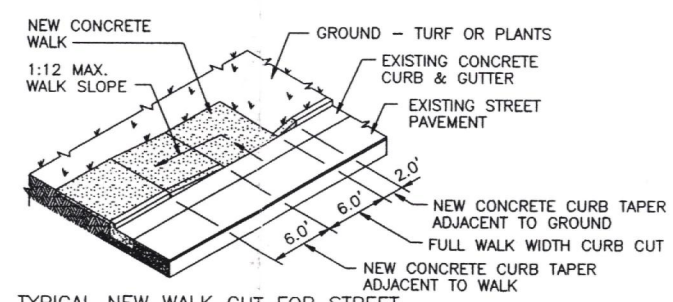
TYPICAL NEW CONCRETE WALK



CONCRETE WALK AT CURBLESS PAVEMENT



CONCRETE WALK AT EXISTING CURB



TYPICAL NEW WALK CUT FOR STREET CROSSING AT EXISTING CURB

1 / L-5 TYPICAL CONCRETE WALK DETAILS

NOT TO SCALE

NOTE: SEE SPECIFICATIONS FOR JOINTING

2 ADD LIMIT OF NEW TURF

1-20-95

SEE GENERAL NOTES, PLATE L-3

SEE PLATE L-6 FOR PLANTING DETAILS

ADMINISTRATION AREA
AREAS A-6, A-7, AND A-8

MILITARY OCEAN TERMINAL SUNNY POINT

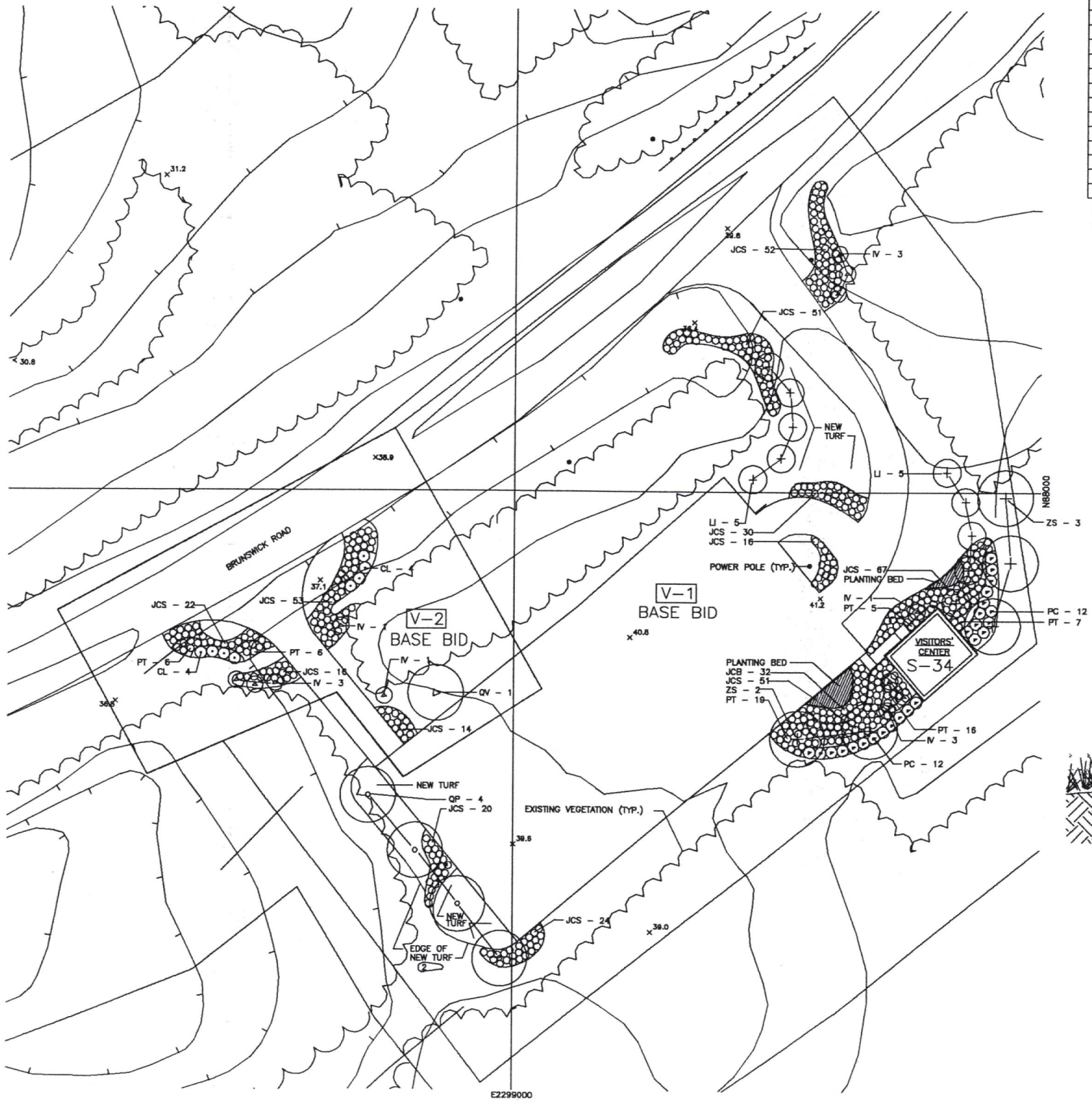
FILE: 291L5.DWG	DRAWN BY: POH,INC/JEJ	0 60'
DATE: 3/9/98	APPROVED BY:	

CZR INCORPORATED ENVIRONMENTAL CONSULTANTS
4709 COLLEGE ACRES DRIVE SUITE 2
WILMINGTON, NORTH CAROLINA 28403
TEL 910/392-9253
FAX 910/392-9139

CP#1627.02

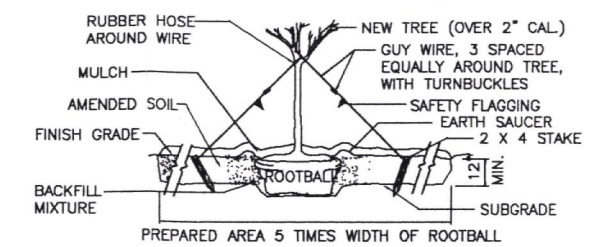
FIGURE II-A-5

SOURCE: LANDSCAPE PLAN PREPARED BY PIEDMONT OLSEN HENSLEY, INC., ENGINEERS-ARCHITECTS, RALEIGH, NORTH CAROLINA IN MICROSTATION (.DGN) FORMAT, 291L5.DGN, DRAWING CODE SU106-01-136, DATED 29 NOVEMBER 1994, REVISED 20 JANUARY 1995



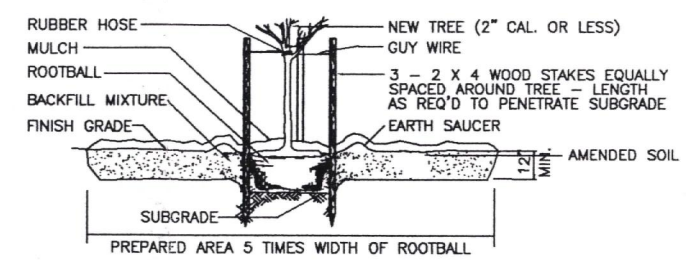
PLANT SCHEDULE						
KEY	BOTANICAL NAME	COMMON NAME	SIZE	SPACING	QUANTITY	
					V-1	V-2
QP	QUERCUS PHELLOS	WILLOW OAK	2.5-3" CAL.	30' O.C.	4	–
QV	QUERCUS VIRGINIANA	LIVE OAK	2-2.5" CAL.	30' O.C.	–	1
ZS	ZELKOVA SERRATA "VILLAGE GREEN"	JAPANESE ZELKOVA	2.5-3" CAL.	30' O.C.	5	–
IV	ILEX VOMITORIA	MULTISTEM TREE FORM YAUPON HOLLY	6-8' B&B	10' O.C.	7	5
LI	LAGERSTROEMIA INDICA	RED CRAPE MYRTLE	9-10' B&B	15' O.C.	10	–
MC	MYRICA CERIFERA	WAX MYRTLE	4-5' B&B	5' O.C.	–	–
CL	CHAENOMELES LAGENARIA	PEACH FLOWERING QUINCE	3 GAL.	4' O.C.	–	8
FI	FORSYTHIA X INTERMEDIA	FORSYTHIA	3 GAL.	5' O.C.	–	–
PC	PRUNUS CAROLINIANA	CAROLINA CHERRY LAUREL	3-4' B&B	5' O.C.	24	–
PT	PITTOSPORUM TOBIRA 'WHEELER'S DWARF'	JAPANESE PITTOSPORUM (SOLID GREEN)	3 GAL.	3' O.C.	42	12
RI	RAPHIOLEPSIS INDICA 'ENCHANTRESS'	INDIAN HAWTHORN	3 GAL.	3' O.C.	–	–
JCS	JUNIPERUS CHINENSIS SARGENTII	SARGENT JUNIPER	3 GAL.	3' O.C.	311	105
JCB	JUNIPERUS CONFERTA 'BLUE PACIFIC'	BLUE PACIFIC SHORE JUNIPER	3 GAL.	3' O.C.	32	–

NOTE: CONTRACTOR VERIFY LOCATION OF UNDERGROUND UTILITY LINES AND OBTAIN CONTRACTING OFFICER'S APPROVAL OF PLANT POSITIONING BEFORE PLANTING



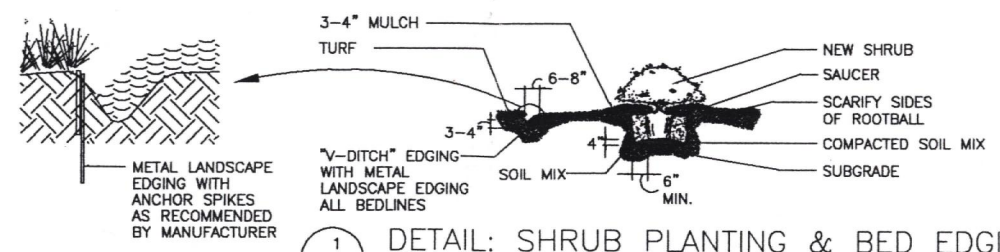
3 / L-6 DETAIL: TREE PLANTING (OVER 2" CAL.)

NO SCALE



2 / L-6 DETAIL: TREE PLANTING (2" CAL. OR LESS)

NOT TO SCALE



1 / L-6 DETAIL: SHRUB PLANTING & BED EDGING

NOT TO SCALE

SEE GENERAL NOTES, PLATE L-3

(2) ADD LIMIT OF NEW TURF 1-20-95

SOURCE: LANDSCAPE PLAN PREPARED BY PIEDMONT OLSEN HENSLEY, INC., ENGINEERS-ARCHITECTS, RALEIGH, NORTH CAROLINA IN MICROSTATION (.DGN) FORMAT, 291L6.DGN, DRAWING CODE SU106-01-136, DATED 29 NOVEMBER 1994, REVISED 20 JANUARY 1995

VISITORS' CENTER
AREAS V-1 AND V-2

MILITARY OCEAN TERMINAL
SUNNY POINT

FILE: 291L6.DWG	DRAWN BY: PON,INC/JEJ	0 60'
DATE: 3/9/98	APPROVED BY:	

CZR INCORPORATED
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FAX 910/392-9139

CP#1627.02

FIGURE II-A-6

APPENDIX II-B

ENVIRONMENTALLY AND ECONOMICALLY BENEFICIAL LANDSCAPING PRACTICES

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS AIR COMBAT COMMAND
LANGLEY AIR FORCE BASE, VIRGINIA
OFFICE OF THE COMMANDER
205 DODD BOULEVARD SUITE 207
LANGLEY AFB VA 23665-2788

MEMORANDUM FOR ACC WINGS/CC

29 JUN 1995

SUBJECT: Environmentally and Economically Beneficial Landscaping Practices

1. The President has directed all federal agencies to develop sustainable landscaping practices to address environmental concerns These include, but are not limited to, water conservation, energy conservation, erosion control, and the reduction in use of fertilizers and pesticides. Sustainable landscaping practices are also necessary for the Air Force to reach the federally mandated goals for pollution prevention in Executive Order 12856, which requires a 50% reduction in pesticide use by FY 2000 using FY 93 as the baseline.

2. To attain this goal, all ACC installations should review their landscaping practices, paying particular attention to environmental concerns. Installation landscaping practices should incorporate sound design planning, which compliments the local environment, while minimizing requirements for fertilizer and pesticides. Bases must start by selecting low maintenance, self-sustainable varieties of native trees, grasses and flowering plants adapted to their local climate. Landscape design should also incorporate proper use of mulches to effectively conserve water, reduce weeds, and control erosion. Recycling of green yard wastes, recycled water or high-efficiency irrigation systems, and proper placement of ornamental shade trees can also net significant long-term savings in grounds maintenance, water, and energy costs. Attachment 3, "Energy-Efficient and Environmental Landscaping", provides additional guidance for developing and managing sustainable landscaping practices.

3. Questions on environmentally and economically beneficial landscaping may be directed to Mr. Jim Sabo or Mr Donald Teig, ACC/CEOO, at DSN 574-2766 or (804) 764-2766.

THAD A WOLFE
Lieutenant General, USAF
Vice Commander

Attachments:

1. DUSD(ES)/PP Memo, 23 Sep 94.

2. The White House Memo, 26 Apr 94.

3. HQ AFCESA Publication, Energy-Efficient and Environmental Landscaping *(not included)*

Attachment 1

OFFICE Of THE UNDER SECRETARY OF DEFENSE
3000 DEFENSE PENTAGON
WASHINGTON DC 20301-3000

DUSD (ES)/PP

23 SEP 1994

MEMORANDUM FOR ASSISTANT SECRETARY OF THE ARMY (INSTALLATIONS, LOGISTICS & ENVIRONMENT)

ASSISTANT SECRETARY OF THE ARMY (MANPOWER & RESERVE AFFAIRS)

ASSISTANT SECRETARY OF THE NAVY (INSTALLATIONS & ENVIRONMENT)

ASSISTANT SECRETARY OF THE NAVY (RESEARCH, DEVELOPMENT & ACQUISITION)

ASSISTANT SECRETARY OF THE AIR FORCE (MANPOWER, RESERVE AFFAIRS, INSTALLATIONS & ENVIRONMENT)

DIRECTORS OF DEFENSE AGENCIES

SUBJECT: Environmentally and Economically Beneficial Practices on Federal Landscaped Groups

The President directed a series of actions to increase environmentally and economically beneficial landscaping practices at Federal facilities in his April 26, 1994, memorandum on that subject. These practices should become standard policy in all our integrated natural resource management plans. I am enclosing a copy for your information.

The Department of Defense strongly supports all aspects of the President's memorandum. It is DoD policy to use regionally native plants and grasses to the maximum extent feasible on all lands under our control. This will reduce maintenance requirements, sharply reduce water consumption, reduce insect and plant disease problems, and result in installations that appear to fit more naturally into their environment. Retrofitting solely to achieve the use of regionally native plants and grasses is not authorized. Replacements and new or extended landscaped areas will comply with the policy and all other requirements of the President's memorandum.

In carrying out the policy, local assets, such as Department of Agriculture Field Extension Offices, should be used in selecting appropriate plantings and conservation techniques.

The opportunity offered by implementing the President's directive will improve the environment, conserve precious natural resource and save the Department money--a true win-win-win situation. I urge your wholehearted support and request that you make sure that the policy and attendant requirements are communicated to all operating levels. It is imperative all concerned

elements of the local command, including the engineering and maintenance, the environmental and the morale, welfare and recreation staffs, be involved in implementing the directive. I also

ask that each Military Service and the Defense Logistics Agency nominate one installation that best demonstrates the goals outlined in the President's memorandum and provide me information on that installation's program by December 1, 1994. A format for this submittal is attached.

Sheri W. Goodman
Deputy Under Secretary of Defense
(Environmental Security)

Attachments
(as stated)

cc:
Under Secretary of Defense (Policy)
Director, Defense Research & Engineering
Assistant Secretaries of Defense
Comptroller
General Counsel
Inspector General
Director, Operational Test & Evaluation
Assistants to the Secretary of Defense
Director, Administration & Management

Attachment 2

THE WHITE HOUSE

WASHINGTON

April 26, 1994

MEMORANDUM FOR THE HEADS OF EXECUTIVE DEPARTMENTS AND AGENCIES

SUBJECT: Environmentally and Economically Beneficial Practices on Federal Landscaped Grounds

The Report of the National Performance Review contains recommendations for a series of environmental actions, including one to increase environmentally and economically beneficial landscaping practices at Federal facilities and federally funded projects. Environmentally beneficial landscaping entails utilizing techniques that complement and enhance the local environment and seek to minimize the adverse effects that the landscaping will have on it. In particular, this means using regionally native plants and employing landscaping practices and technologies that conserve water and prevent pollution.

These landscaping practices should benefit the environment, as well as generate long-term cost savings for the Federal Government. For example, the use of native plants not only protects our natural heritage and provides wildlife habitat, but also can reduce fertilizer, pesticide, and irrigation demands and their associated costs because native plants are suited to the local environment and climate.

Because the Federal Government owns and landscapes large areas of land, our stewardship presents a unique opportunity to provide leadership in this area and to develop practical and cost-effective methods to preserve and protect that which has been entrusted to us. Therefore, for Federal grounds, Federal projects, and federally funded projects, I direct that agencies shall, where cost-effective and to the extent practicable:

(a) use regionally native plants for landscaping;

(b) design, use, or promote construction practices that minimize adverse effects on the natural habitat;

(c) seek to prevent pollution by, among other things, reducing fertilizer and pesticide use, using integrated pest management techniques, recycling green waste, and minimizing runoff. Landscaping practices that reduce the use of toxic chemicals provide one approach for agencies to reach reduction goals established in Executive Order No. 12856, "Federal Compliance with Right-To-Know Laws and Pollution Prevention Requirements;"

(d) implement water-efficient practices, such as the use of mulches, efficient irrigation systems, audits to determine exact landscaping water-use needs, and recycled or reclaimed water and the selecting and siting of plants in a manner that conserves water

and controls soil erosion. Landscaping practices, such as planting regionally native shade trees around buildings to reduce air conditioning demands, can also provide innovative measures to meet the energy consumption reduction goal established in Executive Order No. 12902, "Energy Efficiency and Water Conservation at Federal Facilities;" and

(e) create outdoor demonstrations incorporating native plants, as well as pollution prevention and water conservation techniques, to promote awareness of the environmental and economic benefits of implementing this directive. Agencies are encouraged to develop other methods for sharing information on landscaping advances with interested nonfederal parties.

In order to assist agencies in implementing this directive, the Federal Environmental Executive shall:

(a) establish an interagency working group to develop recommendations for guidance, including compliance with the requirements of the National Environmental Policy Act, 42 U.S.C. 4321, 4331-4335, and 4341-4347, and training needs to implement this directive. The recommendations are to be developed by November 1994; and

(b) issue the guidance by April 1995. To the extent practicable, agencies shall incorporate this guidance into their landscaping programs and practices by February 1996.

In addition, the Federal Environmental Executive shall establish annual awards to recognize outstanding landscaping efforts of agencies and individual employees. Agencies are encouraged to recognize exceptional performance in the implementation of this directive through their awards programs.

Agencies shall advise the Federal Environmental Executive by April 1996 on their progress in implementing this directive.

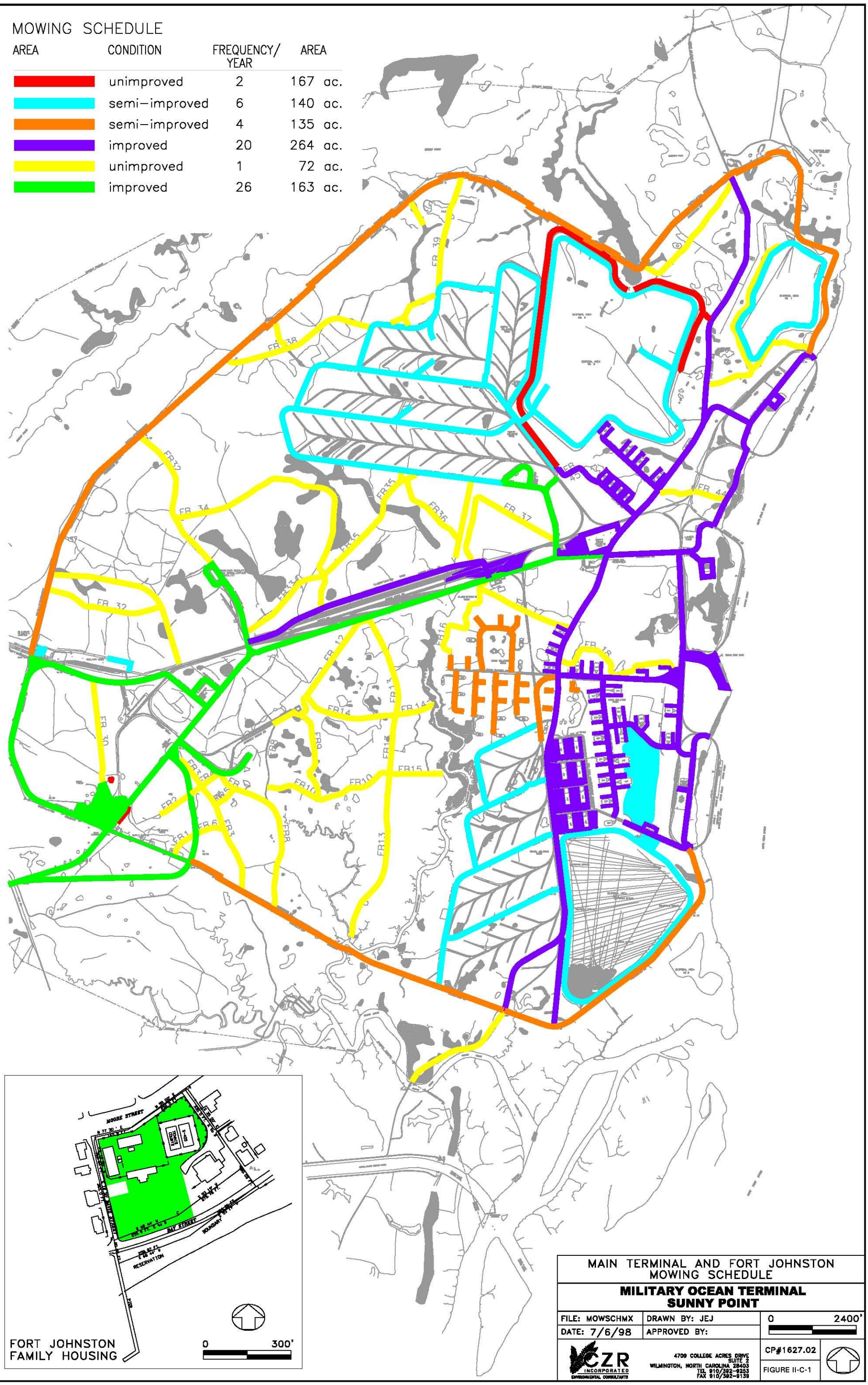
To enhance landscaping options and awareness, the Department of Agriculture shall conduct research on the suitability, propagation, and use of native plants for landscaping. The Department shall make available to agencies and the public the results of this research.

APPENDIX II-C

MAINTENANCE CONTRACT MOWING SCHEDULE TE 8-29

MOWING SCHEDULE

AREA	CONDITION	FREQUENCY/ YEAR	AREA
	unimproved	2	167 ac.
	semi–improved	6	140 ac.
	semi–improved	4	135 ac.
	improved	20	264 ac.
	unimproved	1	72 ac.
	improved	26	163 ac.



MAIN TERMINAL AND FORT JOHNSTON
MOWING SCHEDULE

MILITARY OCEAN TERMINAL
SUNNY POINT

FILE: MOWSCHMX	DRAWN BY: JEJ	0 2400'
DATE: 7/6/98	APPROVED BY:	

CZR INCORPORATED
ENVIRONMENTAL CONSULTANTS

4709 COLLEGE ACRES DRIVE
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WILMINGTON, NORTH CAROLINA 28403
TEL 910/392-9253
FAX 910/392-9139

CP#1627.02

FIGURE II-C-1

APPENDIX II-D

ANNUAL WORK PLAN

SO Planner by Task ID number

TASK ID	TASK NAME	LOCATION	FREQ	INT	QTY	NEXT DUE	1st QUARTER	2nd QUARTER	3rd QUARTER	4th QUARTER
							1234567890123	1234567890123	1234567890123	1234567890123
CUP-GR-01	MOW "GREEN" ZONES	TE 8	26	0	1	10/25/96				
R-02	MOW "PINK" ZONES	TE 8	20	0	1	11/01/96				
UP-GR-03	MOW "LIGHT BLUE" ZONES	TE 8	6	0	1	07/26/96				
CUP-GR-04	MOW "DARK BLUE" ZONES	TE 8	4	0	1	08/23/96				
CUP-GR-05	MOW "RED" AND "YELLOW" ZONES	TE 8	2	0	1	10/15/96				
							1234567890123	1234567890123	1234567890123	1234567890123
CUP-GR-06	MOW DRAIN FIELDS	TE 8	2	0	1	09/14/96				
CUP-GR-07	MOW, INSPECT FAMILY HOUSING	BASE	52	0	1	07/26/96				
CUP-GR-08	INSPECT BARRICADES	BASE	1	0	1	12/01/96				
CUP-GR-09	CLEAR BARRICADE BRUSH	BASE	1	0	1	11/01/96				
CUP-GR-10	BARRICADES - HERBICIDE	BASE	1	0	1	04/15/97				
							1234567890123	1234567890123	1234567890123	1234567890123
CUP-GR-11	DREDGE DRAINAGE DITCH	BASE	1	0	1	12/01/96				
CUP-GR-12	LEAF REMOVAL	BASE	5	0	1	12/02/96				
CUP-GR-13	FERTILIZATION - SOIL SAMPLES	BASE	1	0	1	03/03/97				
CUP-GR-14	FERTILIZE GROUNDS	BASE	1	0	1	04/15/97				
CUP-GR-15	MOW WELL SITES	TE 8	2	0	1	01/10/97				
							1234567890123	1234567890123	1234567890123	1234567890123
CUP-GR-16	MAINTAIN PICNIC GROUNDS	BASE	36	0	1	08/02/96				
CUP-GR-17	MAINTAIN BASEBALL FIELD	BASE	7	0	1	09/06/96				
CUP-GR-18	POLICE IMPROVED GROUNDS	TE 8	52	0	1	07/26/96				
CUP-GR-19	POLICE UNIMPROVED GROUNDS	TE 8	2	0	1	01/20/97				
CUP-GR-20	MAINTAIN POST FIRING RANGE	BASE	4	0	1	08/15/96				
							1234567890123	1234567890123	1234567890123	1234567890123
CUP-GR-21	MAINTAIN FITNESS+EXERCISE TRLS	BASE	26	0	1	10/18/96				
CUP-GR-22	TREE PRUNING -IMPROVED GROUNDS	BASE	1	0	1	04/04/97				
C[illegible]R-23	PRUNE/FERTILIZE SHRUBS	BASE	3	0	1	10/15/96				
C[illegible]R-24	VARMIT CONTROL	BASE	26	0	1	08/02/96				
P-GR-25	SWEEP IMPROVED AREAS	TE 8	4	0	1	08/08/96				
							1234567890123	1234567890123	1234567890123	1234567890123
CUP-PC-01	MOSQUITO SURVEILLANCE+CONTROL	TE 8	34	0	1	10/04/96				
CUP-PC-02	PEST CONTROL MSDS	OFFICE	1	0	1	01/24/97				
CUP-PC-03	YEARLY TERMITE INSPECTION	BASE	52	0	1	07/26/96				
CUP-PC-04	HOUSEHOLD PEST INSPECTION	SEE MEMO	12	0	1	07/26/96				
CUP-PC-05	HOUSEHOLD PEST INSPECTION	SEE MEMO	12	0	1	08/16/96				
							1234567890123	1234567890123	1234567890123	1234567890123
CUP-PC-06	HOUSEHOLD PEST INSPECTION	SEE MEMO	6	0	1	07/20/96				
CUP-PC-07	HOUSEHOLD PEST INSPECTION	SEE MEMO	4	0	1	07/27/96				
CUP-PC-08	INSPECT BAIT BOXES (IF NEEDED)	BASE	12	0	1	08/16/96				
CUP-PC-09	HERBICIDING RAILROAD AREA	BASE	1	0	1	03/01/97				
CUP-PC-10	HERBICIDING BUILDINGS. FENCES	BASE	1	0	1	03/01/97				
							1234567890123	1234567890123	1234567890123	1234567890123
CUP-PC-11	HERBICIDING DITCHES	BASE	1	0	1	03/01/97				
CUP-PC-12	HERBICIDING HARDWOODS	BASE	1	0	1	04/01/97				
CUP-PC-13	HERBICIDING AQUATIC WEEDS	BASE	1	0	1	03/15/97				
CUP-PC-14	SUBMIT DD FORM 1532	BASE	12	0	1	08/01/96				

PART III.

FOREST MANAGEMENT PLAN

OF THE INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN FOR THE MILITARY OCEAN TERMINAL, SUNNY POINT, NORTH CAROLINA

Prepared By:
CZR INCORPORATED
Wilmington, North Carolina

DIAL CORDY AND ASSOCIATES INC
Wilmington, North Carolina
and
SAVANNAH DISTRICT, U.S. ARMY CORPS OF ENGINEERS
Savannah, Georgia

Prepared For:
MILITARY OCEAN TERMINAL, SUNNY POINT
Southport, North Carolina

Agency Coordination and Revisions Provided By:
DIAL CORDY AND ASSOCIATES INC.
Wilmington, North Carolina

Submitted: July 2000
Modified: March 2005
Coordination Resolution: November 2005
FINAL: June 2009

PART III. FOREST MANAGEMENT PLAN

OF THE INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN FOR THE MILITARY OCEAN TERMINAL, SUNNY POINT, NORTH CAROLINA

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LIST OF FOREST INVENTORY DATA (1997/1998) FOR THE FOREST MANAGEMENT PLAN

[The forest inventory data for the following areas are bound in a separate volume on file in the office of the MOTSU Forester, and are not included in the INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN.]

- INTRODUCTION
- CUTTING UNIT I (includes Forest Management Blocks A01 through A04)
- CUTTING UNIT II (includes Forest Management Blocks A05 through A10)
- CUTTING UNIT III (includes Forest Management Blocks A12 through A16, A20, A22, and A27)
- CUTTING UNIT IV (includes Forest Management Blocks A11, A17, A18, A21A, and A26)
- CUTTING UNIT V (includes Forest Management Blocks A19, A21B, A25, B01, and B23)
- CUTTING UNIT VI (includes Forest Management Blocks A23, A24, B21, B22, and B25)
- CUTTING UNIT VII (includes Forest Management Blocks B18 and B24)
- CUTTING UNIT VIII (includes Forest Management Blocks B12, B15, B16, B19, and B20)
- CUTTING UNIT IX (includes Forest Management Blocks B09 through B11, and B17)
- CUTTING UNIT X (includes Forest Management Blocks (B02 through B08, B13, and B14)
- CUTTING UNIT XI (includes Forest Management Blocks (FT01 and FT02)
- CUTTING UNIT XII (includes Forest Management Blocks (K01 through K05)
- CUTTING UNIT XIII (includes Forest Management Blocks (C01 and C04)
- CUTTING UNIT XIV (includes Forest Management Blocks (FP01 and FP02)
- CUTTING UNIT XV (includes Forest Management Blocks (L01 through L04)
- ROUGH FOREST INVENTORY MAPS

LIST OF FOREST INVENTORY SUMMARIES
HARD COPIES AND COMPUTER DISKS

[Hard copies and a computer disk of the forest inventory summaries spreadsheets are bound in a separate volume on file in the office of the MOTSU Forester, and are not included in the INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN. All files were created using Microsoft Excel 5.0 for Windows 95.]

Cu_ss.xls	VOLUMES AND WEIGHTS PER ACRE, STEMS PER ACRE, AND BASAL AREAS PER DBH CLASS BY CUTTING UNIT
Cuvol.xls	CUTTING UNIT VOLUMES AND WEIGHTS PER ACRE AND TOTAL PER CUTTING UNIT - CURRENT
Cuvol10.xls	CUTTING UNIT VOLUMES AND WEIGHTS PER ACRE AND TOTAL PER CUTTING UNIT - PROJECTED 10 YEARS TO 2007
Cuvol20.xls	CUTTING UNIT VOLUMES AND WEIGHTS PER ACRE AND TOTAL PER CUTTING UNIT - PROJECTED 20 YEARS TO 2017
Cureg.xls	AVERAGE PINE AND HARDWOOD REGENERATION PER ACRE BY CUTTING UNIT
Cuttree.xls	CURRENT, 10-YEAR, AND 20-YEAR PROJECTED TREES PER ACRE BY CUTTING UNIT
Cugrow.xls	AVERAGE PINE AGES IN EVEN-AGED, UNEVEN-AGED, AND MIXED PINE-HARDWOOD STANDS BY CUTTING UNIT
Sicu.xls	SITE INDICES, AVERAGE AGES, AND AVERAGE HEIGHTS OF PINE SPECIES BY CUTTING UNIT
Cuptons.xls	TOTAL PINE TONS PER ACRE PER DBH CLASS BY CUTTING UNIT
Fmb_ss.xls	VOLUMES AND WEIGHTS PER ACRE, STEMS PER ACRE, AND BASAL AREAS PER DBH CLASS BY FOREST MANAGEMENT BLOCK
Fmbvol.xls	FOREST MANAGEMENT BLOCK VOLUMES AND WEIGHTS PER ACRE - CURRENT
Fmbvol10.xls	FOREST MANAGEMENT BLOCK VOLUMES AND WEIGHTS PER ACRE - PROJECTED 10 YEARS TO 2007
Fmbvol20.xls	FOREST MANAGEMENT BLOCK VOLUMES AND WEIGHTS PER ACRE - PROJECTED 20 YEARS TO 2017
Fmbreg.xls	AVERAGE PINE AND HARDWOOD REGENERATION PER ACRE BY FOREST MANAGEMENT BLOCK
Fmbtree.xls	CURRENT, 10-YEAR, AND 20-YEAR PROJECTED TREES PER ACRE BY FOREST MANAGEMENT BLOCK

LIST OF FOREST INVENTORY SUMMARIES (continued)

Fmbgrow.xls	AVERAGE PINE AGES IN EVEN-AGED, UNEVEN-AGED, AND MIXED PINE-HARDWOOD STANDS BY FOREST MANAGEMENT BLOCK
Sifmb.xls	SITE INDICES, AVERAGE AGES, AND AVERAGE HEIGHTS OF PINE SPECIES BY FOREST MANAGEMENT BLOCK
Fmbtons.xls	TOTAL PINE TONS PER ACRE PER DBH CLASS BY FOREST MANAGEMENT BLOCK
St_ss.xls	VOLUMES AND WEIGHTS PER ACRE, STEMS PER ACRE, AND BASAL AREAS PER DBH CLASS BY STAND TYPE
Stvol.xls	STAND TYPE VOLUMES AND WEIGHTS PER ACRE AND TOTAL PER STAND TYPE - CURRENT
Stvol10.xls	STAND TYPE VOLUMES AND WEIGHTS PER ACRE - PROJECTED 10 YEARS TO 2007
Stvol20.xls	STAND TYPE VOLUMES AND WEIGHTS PER ACRE - PROJECTED 20 YEARS TO 2017
Streg.xls	AVERAGE PINE AND HARDWOOD REGENERATION PER ACRE BY STAND TYPE
Sttree.xls	CURRENT, 10-YEAR, AND 20-YEAR PROJECTED TREES PER ACRE BY STAND TYPE
Agedistr.xls	AGE DISTRIBUTIONS OF PINES IN UNEVEN-AGED PINE STANDS
Growstnd.xls	AVERAGE PINE AGES AND AGE SPREAD OF PINES PER STAND WITHIN EACH FOREST MANAGEMENT BLOCK
Plantage.xls	CALCULATIONS TO DETERMINE PRE-MERCHANTABLE PINE PLANTATIONS (AVERAGE DBH<8 INCHES) BY STAND
Stands.xls	ACREAGES BY CUTTING UNIT, STAND TYPE, AND LAND CLASS
Stypenac.xls	STAND TYPES AND ACREAGES PER STAND, STAND TYPE, FOREST MANAGEMENT BLOCK, AND CUTTING UNIT

PART III. FOREST MANAGEMENT PLAN

1.0 INTRODUCTION

1.1 Scope. Army Regulation AR 200-3 requires that all military installations prepare and implement an INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN which includes, as one of its components, a FOREST MANAGEMENT PLAN. The following FOREST MANAGEMENT PLAN was prepared for MOTSU in compliance with AR 200-3 and in accordance with guidelines provided in "Technical Manual 5-631, Natural Resources- Forest Management" (U. S. Departments of the Army, the Navy and the Air Force, December 1981).

1.2 Purpose. The FOREST MANAGEMENT PLAN will include technical information for forest management personnel engaged in forest management at Military Ocean Terminal, Sunny Point (MOTSU). Properly applied, the information outlined in this plan will provide guidance, standards, and technical aids to foresters, land managers, and others concerned with the protection and management of the MOTSU woodlands.

1.3 Objectives. The forest management program involves the establishment, improvement, maintenance, and protection of the woodlands at MOTSU in such a way as to benefit MOTSU, as well as society. The FOREST MANAGEMENT PLAN will provide managers with a ready source of information that when utilized, will fulfill the purpose stated above and insure that the following objectives are met:

- Contribute forest products to the local and national economy.
- Provide for the optimum sustained productivity.
- Enhance military training facilities by providing accessible woodland cover (through proper silvicultural practices), buffer zones, recreation areas, and scenic values.
- Will exercise in a manner that conserves unique natural communities that are also beneficial to the American public (e.g., red-cockaded woodpecker, rough-leaved loosestrife, fox squirrels, Venus flytraps, etc.).

1.4 Implementation. The forest inventory of the MOTSU woodlands was conducted in accordance with Appendix B of TM 5-631 and was integral to the preparation of the FOREST MANAGEMENT PLAN. The FOREST MANAGEMENT PLAN contains information on specific topics as outlined in Appendix A of TM 5-631, listed above. The plan also specifies the management activities that are presently undertaken at MOTSU. These activities are not expected to change. The management programs presently underway will continue. Any major changes to the management strategy at MOTSU will be incorporated in the five-year revision.

2.0 FORESTRY ASSET CHARACTERISTICS

2.1 Forest Land History. Since acquisition of the Military Ocean Terminal, Sunny Point (MOTSU) in 1954, over 74,340 tons of timber products have been harvested and nearly 1,100 acres have been planted or reforested with loblolly pine (*Pinus taeda*), longleaf pine (*P. palustris*), slash pine (*P. elliottii*), and bald cypress (*Taxodium distichum*) seedlings. In 1980, controlled burning of the Main Terminal and Leland Interchange Yard began and all of the wooded acreage in these two areas has been burned at least once since this time. Wild fires have been kept to a minimum with only 361 acres being burned unintentionally since 1954. Thirty miles of access roads and firebreaks and 70 miles of plowed fire lines have been constructed and maintained throughout the forested areas of MOTSU's Main Terminal, the Carolina Beach Blast Safety Zone (CBBSZ) (a.k.a. New Hanover County Bufferzone), and the Leland Interchange Yard.

In 1994, the Asian gypsy moth (*Lymantria dispar*) arrived at MOTSU transported by ship from Germany. Since then the North Carolina Department of Agriculture (NCDA) has been closely monitoring the MOTSU population via pheromone traps distributed throughout the base and coastal North Carolina. Fortunately, the gypsy moth population has not been able to establish itself sufficiently to become a serious threat to the forests of MOTSU. In 1995, the NCDA sprayed 95,000 acres in Brunswick and New Hanover counties. During this operation, all of MOTSU's land except the 650 acres of the Leland Interchange Yard were treated. Treatment consisted of spraying the *Bacillus thuringienses* (*bt*) bacterium and the species specific nucleopolyhedrosis virus (NPV), registered under the trade name of Gypcheck®. In 1996, trapping indicated that it was necessary to spray only 900 acres. There were no gypsy moths captured during the 1997 trapping. Currently the Department of Defense has an agreement with the North Carolina Division of Forest Resources to monitor this pest. A copy of the agreement is contained in Appendix III-A.

Another forest pest potentially threatening to MOTSU forests are two southern pine beetles (*Dendroctonus frontalis* and *Ips* spp.). The MOTSU forester reports no significant damage from either. While there have been a few "spots", they have not developed into a problem requiring treatment. Southern pine beetle populations are monitored visually by the MOTSU forester and by semi-annual flights by the North Carolina Division of Forest Resources.

2.2 Markets for Forest Products. Current local markets for forest products within a 50-mile radius of MOTSU consist of veneer, sawlogs, chips, poles, posts, pulpwood, plywood, and firewood. Within the 50-mile radius, there are 29 timber products buyers spread over six North Carolina counties and one South Carolina county (Brown 1996, Nodine 1993).

2.3 Forest Economic Profile. A prism cruise was conducted by CZR Incorporated from June to October 1997 and in January 1998 on the fifteen Cutting Units (CU) of the Main Terminal, the Leland Interchange Yard, and the CBBSZ to determine the timber volume present and the management requirements necessary for an optimum sustained-yield schedule. Tenth-acre regeneration plots were also taken at each plot, using a fixed-radius of 37.2 feet. Inventory data were recorded in the field using MC5-GPS hand-held computers designed and constructed by Corvallis Microtechnology. The resulting forest inventory data is contained in a separate volume (FOREST INVENTORY DATA FOR THE FOREST MANAGEMENT PLAN) on file in the office of the MOTSU Forester. Prior to each field visit, a rough forest inventory map was sketched using one inch equals 660 feet aerial photographs. Preliminary stand lines were drawn and a grid was used to locate plot centers. These rough forest inventory maps are contained in a separate volume (FOREST INVENTORY DATA FOR THE FOREST MANAGEMENT PLAN) on file in the office of the MOTSU Forester. Since a prism plot does not contain a fixed-radius, area determination is very difficult. Therefore, to create the three percent cruise required, acreage was based on the 0.1 acre regeneration plots. Also, in order to accommodate the five chain (330 feet) requirement between plots, cruise lines were 6.6 chains distant (435.6 feet) resulting in a three percent cruise of the wooded acreage.

2.3.1 Estimated Volume of Forest Products. The trees tallied were selected with a Basal Area Factor (BAF)-10 prism. Basal areas were calculated and summarized by diameter class and CU in Appendix III-B, by diameter class and Forest Management Block (FMB) (previously known as a timber management compartment) in Appendix III-C, and by diameter class and stand type in Appendix III-D. Pine and hardwood basal areas were summed across diameter classes and grouped per CU, FMB, and stand type in Appendix III-E. Diameter was measured at diameter at breast height (dbh), 4.5 feet above the ground, by 2-inch diameter classes. Height was recorded in 8-foot sticks with allowances made for bole quality (sawtimber-sized trees which were overly crooked or possessed low wood quality due to scaring and damage were tallied as pulpwood trees). Pulpwood trees were 5.0 to 8.9 inches dbh to a 4-inch top, diameter outside bark (dob); chip-n-saw trees were 9.0 to 12.9 inches dbh to a 6-inch top dob; and sawtimber trees were 13.0 inches dbh and larger to an 8-inch top

dob. The minumum tally length of a pulpwood tree was one stick, minimum tally length for a chip-n-saw tree was two sticks, and for a sawtimber tree was one stick. Merchantable timber volume formulas, giving board foot volume (Scribner Decimal-C Log Rule for pine and Doyle Log Rule for hardwood) for sawtimber and cords for chip-n-saw and pulpwood were used to compile the current volume of standing timber. Current and projected volumes and weights, and all other summaries and statistics were calculated by CZR Incorporated and Natural Resources Technologies in Montgomery, Alabama. All formulas and conversion factors used are collected in Appendix III-F.

At each prism plot, a 0.1-acre regeneration plot was taken. In each regeneration plot, pine and hardwood sapling regeneration, 0.5 to 5.0 inches dbh, was tallied. Summaries were made of stocking classes (heavy, medium, or light) for pine and hardwood regeneration by CU, FMB, and stand type (Appendix III-E). Ingrowth of regeneration, based on the field data, was used to project numbers of pine and hardwood trees per acre for 10 years and 20 years into the future. A detailed summary of current, 10-year, and 20-year projected numbers of pine and hardwood trees per acre by CU, FMB, and stand type is contained in Appendix III-G.

A growth study was conducted in conjunction with the prism cruise. The dominant pine tree in every other plot was bored at dbh. The age of the tree was estimated, total tree height was measured using a clinometer, and growth increment was measured to the nearest tenth inch to determine the diameter growth of the tree during the last 5 years. The tree core and tree height measurements were used to gauge the age of the stand, to determine the site index, and to predict the growth of the timber. Appendix III-H includes a tabulation of the average ages of pine in even-aged pine stands, uneven-aged pine stands, and mixed pine-hardwood stands, as well as the age distribution of pine stands. Appendix III-I summarizes the resulting site indices (base age 50 years), including average age and height, by CU and FMB for each pine species. Site indices for marketable hardwood species commonly found on MOTSU were obtained from the Brunswick County Soil Survey (USDA 1986) and are included in Appendix III-I.

Current (1998) wood volume by species and forest product is summarized in Table III-1. It is predicted that the pine sawtimber will grow at a rate of approximately 23 percent, pine chip-n-saw at a rate of 23 percent, and pine pulpwood at a rate of 23 percent during the next 10-year period, roughly yielding an additional 3,000,000 board feet (22,000 tons) of sawtimber, 8,000 cords (23,000 tons) of chip-n-saw and 6,000 cords (16,000 tons) of pulpwood. More detailed summaries of current volumes and weights of pine products and hardwood products broken down by diameter class are presented for each CU in Appendix III-J and for each FMB in Appendix III-K. These are further summarized by CU, FMB, and stand type (Appendix III-L) and projected 10 years (Appendix III-M) and 20 years (Appendix III-N) into the future.

2.3.2 Calculated Annual Allowable Harvest. Based on the 1997 inventory and resulting growth calculations, a rough estimate of the predicted annual allowable harvest per product has been calculated for the next 5 years. These calculations are contained in Table III-2.

2.3.3 Cutting Cycle. In order to simplify forest management on the MOTSU Main Terminal, 10 years has been designated in a cutting cycle. Of course, this plan may be altered depending on pest outbreaks, fire management situations, hurricane damage, economic feasibility, or any other unforseen disruption in the harvest schedule.

2.3.4 Estimated Operating Cost. The estimated operating costs, per fiscal year, for managing and protecting the forests of MOTSU over the next 5 years is summarized in Table III-3.

Table III-1. Current (1998) wood volume by species and forest product.

SPECIES	VOLUME		
	Sawtimber (MBF)	Chip-n-Saw (cds)	Pulpwood (cds)
Loblolly Pine	9,937	10,052	9,628
Longleaf Pine	2,611	15,531	8,222
Slash Pine	86	5,058	2,667
Pond Pine	726	6,375	6,674
Cypress	15	NA[a]	114
Other hardwoods	655	NA[a]	12,043
Totals	14,030	37,016	39,348

[a] Chip-n-saw was a designated forest product only for pine.

Table III-2. Predicted annual allowable harvest[a] over the next 5 years (1998-2002) by forest product.

Fiscal year	Pine sawtimber (MBF)	Pine chip-n-saw (cds)	Pine pulpwood (cds)	Hardwood sawtimber (MBF)	Hardwood pulpwood (cds)
1998	187	518	381	9	170
1999	189	523	384	9	172
2000	190	528	388	10	173
2001	192	532	391	10	175
2002	194	537	395	10	176
Total[b]	952	2,638	1,938	48	866

[a] Harvest volumes are 1.4 percent of the anticipated 2.3 percent annual growth.
[b] Totals may reflect slight rounding differences.

Table III-3. Estimated operating costs to manage and protect the MOTSU forests over the next 5 years (1998-2002).

	Estimated Costs	
Fiscal Year	Management	Protection
1998	$ 51,900	$ 6,000
1999	$ 60,000	$ 8,000
2000	$ 60,000	$ 8,000
2001	$ 60,000	$ 10,000
2002	$ 60,000	$ 10,000

Table III-4. Estimated value of forest products to be harvested over the next 5 years (1998-2002).[a]

Fiscal year	Pine sawtimber (MBF)	Pine chip-n-saw (cds)	Pine pulpwood (cds)	Hardwood sawtimber (MBF)	Hardwood pulpwood (cds)	Totals[b]
1998	$28,056	$20,729	$7,613	$938	$1,702	$59,038
1999	$28,309	$20,916	$7,682	$946	$1,717	$59,570
2000	$28,563	$21,104	$7,751	$955	$1,733	$60,106
2001	$28,820	$21,294	$7,821	$964	$1,748	$60,647
2002	$29,080	$21,485	$7,891	$972	$1,764	$61,193
Totals[b]	$142,828	$105,527	$38,759	$4,775	$8,664	$300,554

[a] Estimates based on past harvest data.
[b] Totals may reflect slight rounding differences.

2.3.5 Estimated Product Value. The MOTSU forest management program is not dependent on direct self-funding. The MOTSU program is funded through the Chief of the Installation Management Division. Revenues from the sale of MOTSU forest products go to the DOD Forestry Reserve Account. However, MOTSU attempts to offset its program costs by sustained forest production and has historically done so. The estimated value of forest products to be harvested over the next 5 years, categorized by product, is summarized in Table III-4 (page III-5).

2.3.6 Forest Fire Record. Because of the intensive controlled burn schedule implemented by the MOTSU forester, wildfires on the MOTSU woodlands have been kept to a minimum. A record of the uncontrolled unintentional fires since the formation of MOTSU in 1954 is summarized in Table III-5. MOTSU has entered into several protection agreements with neighboring community fire departments. These are listed in Appendix III-A.

3.0 DESCRIPTION OF FOREST LAND

3.1 Forest/Land Type Descriptions. There are 20 distinct forest types in the forests of MOTSU. Forest types are designated according to the species or combination of species with the dominant basal area. Appendix III-O contains a list of forest stand types, including the percent of each tree species comprising a particular stand type, as well as other land types and their abbreviations, which are used throughout this report. Appendix III-P lists commercial forest acreages by CU. Appendix III-Q further divides the MOTSU forests into pre-merchantable pine plantations and productive areas as of the 1997 forest inventory. Pre-merchantable land is defined as pine plantations with an average dbh of less than 8 inches, and productive land is all other wooded acreage.

3.2 Acreage by Forest/Land Type and Hazard Category. Table III-6 shows the acres of MOTSU woodlands by forest stand type. According to the MOTSU forester, there are no areas on the MOTSU property that are subject to metal contamination.

3.3 Acreage by Forest/Land Type, Commercial Potential, and Availability for Production. Table III-7 divides the MOTSU forests by land class and by availability for wood production, according to whether they are commercial, non-commercial, non-manageable, regulated, modified, or restricted, as defined in Subsection 3.4.

3.4 Definition of Land Classes. The following descriptions are according to the technical manual for Natural Resources Forest Management on Department of Defense installations (TM 5-631 1981).

3.4.1 Commercial Forest Land (CFL) - Land currently or prospectively available for timber production and capable of producing at least 20 cubic feet/year of commercial forest products.

3.4.2 Regulated - CFL presently available for management on a planned rotational basis with minimum restrictions. An example would be areas outside of the 0.5 mile radii of the red-cockaded woodpecker clusters.

3.4.3 Modified - CFL that cannot be managed on a planned rotational basis but is producing commercial products that are harvestable through salvage or silvicultural operations applied for other than timber production purposes. Examples are areas within the half-mile radius around a red-cockaded woodpecker cluster, recreation and scenic areas, stream and visual buffer zones, modified historical sites, areas managed primarily for military purposes, and wooded parts of containment areas.

Table III-5. Acres of MOTSU forest land burned due to wildfires since 1954.

Fiscal year	Managed forest area			
	Number of fires	Acres burned	Acres per fire	Number reportable[b]
1954-1956	0	0	0	0
1957-1966[a]	–	–	–	–
1967	1	254	254	1
1968-1982	0	0	0	0
1983	1	85	85	1
1984-1989	0	0	0	0
1990	1	5	5	1
1993	1	5	5	1
1995	1	5	5	1
1996	1	7	7	1
1997	0	0	0	0

[a] Wildfire data from 1957 to 1966 was missing from the 1983 forest management plan, from which data prior to 1983 was derived.
[b] Reportable denotes those fires large enough to report to the North Carolina Division of Forest Resources.

Table III-6. Forest acreage by forest type (1998).

Forest type	Forest acreage
Loblolly pine plantation (LYP)	354
Longleaf pine plantation (LLYP)	84
Slash pine plantation (SYP)	249
Loblolly/ slash pine plantation (LYP/SYP)	16
Loblolly pine (L)	1,721
Longleaf pine (LL)	1,467
Pond pine (PP)	1,023
Loblolly and longleaf pine (L, LL)	639
Loblolly and pond pine (L, PP)	85
Longleaf and pond pine (LL, PP)	541
Mixed pine (MP)	162
Lowland hardwood (LH)	107
Live oak (LO)	76
Mixed pine and live oak (MPLO)	206
Longleaf pine and live oak (LLLO)	27
Loblolly and lowland hardwood (LLH)	631
Loblolly and upland hardwood (LUH)	28
Pond pine and lowland hardwood (PPLH)	76
Mixed pine and lowland hardwood (MPLH)	92
Cypress (C)	7
Total[a]	7,590

[a] Total may reflect slight rounding differences.

Table III-7. MOTSU forests classed by land class and availability for wood production (1998).

Land class	Description	Acreage
Commercial Forest Land (CFL)	Productive woodlands	7,327
• Regulated	Woodlands available for production now	5,171
• Modified	Woodlands within 0.5 mile of RCW clusters Recreation and scenic areas Stream and visual buffer zones	1,956 100 100
• Restricted	Woodlands not available for production now, that will be available in the future	0
Non-CFL	Wooded old fill areas Woodlands within 200' buffer of RCW trees Woodlands within 100' buffer of RLL	40 120 103
Non-manageable	Ponds and marshes	1,240
All other acreage	Non-productive (rights-of-way, fire breaks, grassy areas, storage areas, dikes) Areas not included (hatched areas on large maps)	1,717 483

3.4.4 Restricted - CFL that is reserved for other uses and is not available for any production such as impact areas, cleared ranges, etc. These are areas that may become available for timber purposes in the foreseeable future or potentially productive land that is inaccessible during plan period. This category is excluded from the forest statistics because there are no areas on MOTSU that qualify for such restrictions.

3.4.5 Non-Commercial Forest Land - Land not capable of producing at least 20 cu.ft/year or land permanently removed from productive status such as natural areas, fill areas, or permanently inaccessible areas (such as areas within the 200-foot buffer around each red-cockaded woodpecker tree and areas within the 100-foot buffer of a rough-leaved loosestrife population).

3.4.6 Non-productive (Non-manageable) Land - Land not capable of producing 20 cu.ft./year, including natural and man-made wetlands that will not be converted to timber production in the foreseeable future.

3.4.7 All Other Acreage - Improved, semi-improved, and unimproved areas (See "Inventory of Land Use" Part I. General Plan).

4.0 MANAGEMENT

4.1 General. The principal forest products to be produced from MOTSU timber harvests are high quality coniferous sawtimber, poles, pilings, and pulpwood. Pulpwood, fence posts, and other products are by-products of thinning, which should be utilized to prevent waste. The purpose of thinning is to open up stands to increase the growth rate of crop trees, to reduce the fire hazard and to improve endangered species' habitat. Forest management can be only as intensive as funds, personnel, markets, and prime missions of the installation will permit.

The installation shall follow National Environmental Policy Act (NEPA) policies and procedures for timber harvests and sales as set forth in Army Regulation 200-3, paragraph 5-2.b (1)(b). Similarly, all forest management activity should follow forestry Best Management Practices (BMPs) as outlined in the North Carolina Division of Forest Resources' publications Forestry Best Management Practices Manual (DEHNR 1989) and Best Management Practices for Forestry in the Wetlands of North Carolina (DEHNR 1990).

Timber harvesting on the Leland Interchange Yard is ongoing and very profitable. The timber is primarily pine sawtimber and chip-n-saw quality interspersed with hardwoods located in a few lowland drains.

On MOTSU woodlands, the pines are currently being managed for maximum timber production to the extent consistent with requirements for endangered species. Integrated management for timber and the endangered species is being carried out in such a manner as to provide merchantable wood products, as well as to establish and maintain a desirable habitat for the red-cockaded woodpecker (*Picoides borealis*) and rough-leaved loosestrife (RLL) (*Lysimachia asperulaefolia*). Future updates of the FMP will incorporate new silvicultural guidelines set forth in the RCW Recovery Plan.

The red-cockaded woodpecker (RCW) population on MOTSU was well-studied during the 1980s. The status of the RCW at MOTSU was monitored from 1980 to 1988. Adult and fledgling birds were banded during this period to assist in the study of the population dynamics. In May and June of 1988, an inventory of known RLL populations and potential habitat areas at MOTSU was conducted. Search maps were created and eight sites containing RLL populations were identified at that

time (CZR Incorporated 1996). In 1997, CZR Incorporated conducted surveys to collect, compile, and analyze data required to document the status of these species at MOTSU. These surveys will be used to assist in developing forest management strategies for the MOTSU forests. A supplemental forest inventory completed in 2007 will be incorporated into the INRMP with the next update (agency coordination in Part VI. ENDANGERED SPECIES MANAGEMENT PLAN).

Each FMB which has RCW colonies or RLL populations, and those FMBs which will be set aside as recruitment areas for the RCW, will be managed according to the RCW Management Guidelines (Appendix III-R) and those recommendations detailed in Part VI. ENDANGERED SPECIES MANAGEMENT PLAN. [Note: New guidelines (Appendix VI-E) will be incorporated into the Forest Management Plan with the next update – see Part VI.) Since 1980 when the colonies were initially located and marked, the silviculture treatments practiced on the FMBs containing these colony sites have incorporated management procedures that would be beneficial to the endangered species. RCW studies since 1982 give a good indication of the bird's population, habitation of cavity trees, range, and foraging areas. In 1997, an updated inventory and marking of RCW den trees was completed by CZR Incorporated personnel. CZR also completed a forest inventory of MOTSU woodlands in January 1998. These studies have provided information that will allow planning for both a stable and healthy RCW population, as well as a well-managed forest on MOTSU.

Similarly, those areas containing RLL populations will be managed in such a manner as to protect and promote these populations. Management guidelines, as well as information on the ecology of RLL are detailed in Part VI. ENDANGERED SPECIES MANAGEMENT PLAN.

Urban forest management for the MOTSU urban forests is addressed in Part II. LAND MANAGEMENT AND GROUNDS MAINTENANCE, Section 3.0 Management Practices and Maintenance Procedures.

4.2 Selected Species. There are several forest tree species which are well-suited to be regenerated and managed on the MOTSU base. These species will be planted or naturally regenerated on sites to which they are adapted.

Loblolly pine should be managed for sawtimber and plywood. This species is the most commercially important forest species in the southern United States, where it makes up over one-half of the standing pine volume. Loblolly pine responds well to silvicultural treatments and can be managed as either even-aged or uneven-aged natural stands, or can be regenerated artificially and managed in plantations. Growth of planted and naturally regenerated loblolly stands may be affected adversely by drought, flooding, and nutrient deficiencies. During the crucial growing season period of April through October, tree growth is positively correlated with the amount of rainfall. Drainage (including bedding) and fertilization have been shown to increase dominant height and basal area growth, resulting in dramatic increases in volume growth. Yields of planted loblolly pine generally increase with higher planting density or closer spacing. However, if sawtimber is a primary management objective, then wider spacing or lower density are advantageous. Thinnings that salvage suppressed and moribund trees usually result in increased diameter growth of residual trees and allow the growth to be put on the better trees in the stand. Loblolly pine is a species in which individual trees tend to express dominance at an early age (Burns and Honkala 1990).

Longleaf pine should be managed for production of poles, pilings, sawtimber, plywood, and pine straw. This species produces a high quality timber tree if managed correctly. Longleaf naturally prunes itself well. Most stems are well formed, straight, and largely free of branches. Longleaf pine almost always has higher stemwood specific gravities and produces more dry wood per unit volume than either loblolly or slash pine. It responds well to release provided by thinning if the released trees have crowns equal to at least one-third to one-half of total tree height. Small-crowned intermediate or suppressed trees do not respond promptly to release. Thinning should be from below to release well-

formed dominant and codominant trees. The longleaf pine forest, if regularly burned, has a park-like appearance with an understory dominated by grasses and forbs, providing an excellent habitat for game, especially quail and deer. Mature longleaf stands also provide the most desirable habitat for the RCW (Burns and Honkala 1990).

Slash pine should be managed for production of poles, pilings, sawtimber, and plywood. This species makes rapid volume growth at early ages and is adaptable to short rotations under intensive management. Stand basal area density has a strong influence on merchantable yield at any age. Current merchantable volume increment in thinned stands reaches a maximum rate before 20 years and declines thereafter. Slash pine plantation yields are influenced by previous land use and interspecies competition. Plantations established after the harvest of natural stands and without any site treatment other than burning, generally have lower survival and lower basal area and volume than stands established on old fields. Landowners seeking maximum yields on a short rotation will seldom find commercial thinning beneficial. Where sawtimber is the objective, commercial thinnings provide early returns while improving the growth and quality of the sawtimber and maintaining the stands in a vigorous and healthy condition (Burns and Honkala 1990).

Bald cypress (*Taxodium distichum*) can be managed for special products including pilings and decking. Bald cypress tends to be slow growing and very long-lived. Under forest conditions, bald cypress stems generally require about 200 years to reach sufficient size to yield a high proportion of heartwood lumber. Also at about age 200, height growth ceases. This species grows well at high stand densities. Thinning sometimes results in faster growth of individual crop trees. Cypress swamps and other forested wetlands that receive periodic nutrient subsidies from floodwaters probably are some of the world's most productive ecosystems. Stillwater forested wetlands do not receive nutrient subsidies from floodwaters, and they have production rates comparable to or lower than those of terrestrial forests. Such wetlands, however, offer additional benefits such as storage of water and peat. Riverine swamps of bald cypress cause floodwaters to spread out, slow down, and infiltrate the soil. Thus, these stands reduce damage from floods and act as sediment and pollutant traps. Bald cypress has many benefits to wildlife. The seeds are eaten by wild turkeys, grosbeaks, and wood ducks. Large, old bald cypress furnish nesting perches for bald eagles and ospreys. Cypress wood has a multitude of uses, and is well known for its ability to resist decay. It has long been favored for boat planking, river pilings, furniture, siding, and flooring (Burns and Honkala 1990).

4.3 Rotation by Tree Species. The following rotations for final harvest are established as a result of the information from the 1997 forest inventory. Ideally, the intent of a final harvest is to produce sawtimber-sized trees, so these rotations are directed toward that end. The final harvest for longleaf, slash, and loblolly pines should be 60 years or 20 inches dbh, whichever is attained first, except in areas being managed for conservation and recovery of endangered species. In further development of MOTSU's program for their RCW installation recovery goal (see Part VI), timber rotations the installation plans to use for recruitment clusters and foraging habitat for RCWs will be incorporated into the Forest Management Plan in future updates. Bald cypress will be ready for a final harvest at 150 years or 36 inches dbh, whichever is attained first. Hardwoods (primarily the oaks, gums, and yellow poplar) should produce sawtimber-sized trees at 125 years or 20 inches dbh, whichever is attained first.

4.4 Cutting Cycle. The results of the 1997 inventory indicate that the pine tree growth reaches its peak at approximately age 60. Therefore, 10 years has been established as the length of the cutting cycle. One-tenth of the Main Terminal forest area is prescribed for treatment every year. Thus the entire area will be treated once every 10 years, unless disaster or sound forest management practices alter the schedule. The Leland Interchange Yard has recently undergone a salvage harvest of approximately 30 acres of the southwest quadrant or FMB L04. Therefore, the remaining trees will be harvested for sawtimber in 10 to 15 years, simultaneous with the first thinning operation of those FMBs freshly harvested and currently regenerating in loblolly and longleaf pine. Timber harvesting within the active RCW management areas on MOTSU will be managed so as to comply with the approved RCW management guidelines (Appendix III-R and Part VI. ENDANGERED SPECIES MANAGEMENT PLAN). Proper management will increase the overall growth.

4.5 Cutting Units (Compartments), Forest Management Blocks, and Stands. The MOTSU property is divided into manageable and defineable areas. The following is a description of each area. Table III-8 lists the wooded acreages used for this report as well as approximate acreages of forests, ponds and marshes, and non-productive land by CU and FMB. The acreage within each CU and FMB does not include large acreages covered by buildings, paved roads, and paved parking lots. These areas are denoted by the hatch marks on the maps, which are based on maps provided by the U.S. Army Corps of Engineers. To adapt them for this forestry section, the Microstation program was utilized.

4.5.1 Cutting Units. Fifteen Cutting Units (CUs) have been designated on the MOTSU property, ranging in size from 372 acres to 1,233 acres. Previously, these were referred to as Cutting Compartments and totaled 10 on the Main Terminal with the Leland Interchange Yard and the CBBSZ each comprising one Cutting Compartment. Currently, the Main Terminal consists of CUs I through X, the CBBSZ contains CUs XI through XIV, and the Leland Interchange Yard comprises CU XV. The boundary changes made in 1998 are graphically displayed on figures depicting the pre-1998 Cutting Compartments and 1998 CUs (Figures III-1 and III-2, respectively). Figures III-3 and III-4 depict the CU boundaries on the CBBSZ and Leland Interchange Yard, respectively.

4.5.2 Forest Management Blocks. Within each CU, Forest Management Blocks (FMBs) have been established varying in size from 37 acres to 423 acres. There are 54 FMBs on the Main Terminal, 13 FMBs within the CBBSZ, and four FMBs at the Leland Interchange Yard. Figures III-5, III-6, and III-7 show the FMB boundaries within the Main Terminal, CBBSZ, and the Leland Interchange Yard, respectively.

4.5.3 Stands. Within each FMB, forest stands have been broken out for management purposes. A stand is defined as a group of trees sufficiently uniform in species composition, arrangement of age classes, and condition to be a distinguishable unit (Smith 1986). Appendix III-S contains 48 forest inventory maps with one or more FMBs per map and stand designations and acreages within each FMB.

4.6 Silvicultural System.

4.6.1 General Practice. All pine and cypress forested areas are being grown in even-aged stands, while the hardwood sites are uneven-aged stands. There are several mature and overmature pine stands which should be harvested and regenerated naturally or via planting. These pine stands have a slow growth rate and are stagnating as a result. The trees are unable to respond to a thinning, because they are too old to utilize additional light, nutrient, and water resources made available by a thinning. Stands in this condition are vulnerable to pest and disease infestations because they are not as resistant as younger, healthier stands. Oftentimes, a pest outbreak begins by the pest attacking a weak stand, allowing the population to build and enabling it to attack adjacent healthier stands.

There are some pine stands, however, which will respond to a thinning or intermediate cut. The intermediate cuts will be mainly by the selection method in order to conduct a timber stand improvement harvest. Many of the bay areas support understocked stands. If these pine stands do not or can not support RCW or RLL populations, they should be cleared to enable site preparation (drum chopping and bedding, in the wetter areas) and regenerated in order to become fully productive. Of course, forest management modifications will be made to accommodate any endangered species populations, namely RCW and RLL.

Table III-8. 1998 Cutting Unit and Forest Management Block acreages by land type.

Cutting Unit (CU)	Forest Management Block	Wooded acres	Ponds and marshes	Non-productive acres[a]	Total acres
	A01[b]	74.70	0.00	0.00	74.70
	A01A	60.04	0.00	0.00	60.04
	A02[b]	47.85	1.05	0.00	48.90
	A03[b]	125.09	1.58	0.00	126.67
	A04[b]	150.36	0.00	9.71	160.07
CU I		**458.04**	**2.63**	**9.71**	**470.38**
	A05[b]	185.29	57.78	0.00	243.07
	A06[b]	140.96	10.79	0.00	151.75
	A07[b]	87.00	7.29	0.00	94.29
	A08	111.80	50.07	0.00	161.87
	A09	50.30	7.03	0.00	57.33
	A10[b]	68.77	14.45	0.00	83.22
CU II		**644.12**	**147.41**	**0.00**	**791.53**
	A12	120.62	5.30	8.31	134.23
	A13	78.13	1.19	25.80	105.12
	A14	65.05	0.90	12.88	78.83
	A15	52.49	14.94	54.49	121.92
	A16	95.52	6.93	35.57	138.02
	A20	68.53	38.93	12.31	119.77
	A22	78.64	3.97	13.72	96.33
	A27	32.17	0.00	6.66	38.83
CU III		**591.15**	**72.16**	**169.74**	**833.05**
	A11	44.48	6.17	2.72	53.37
	A17	27.42	9.94	292.63	329.99
	A18	71.19	3.62	199.89	274.70
	A21A	41.02	4.14	12.11	57.27
	A26	150.50	365.06	2.30	517.86
CU IV		**334.61**	**388.93**	**509.65**	**1233.19**
	A19	79.42	2.01	4.90	86.33
	A21B	41.17	26.53	6.71	74.41
	A25	112.83	7.83	2.63	123.29
	B01	99.06	10.73	2.81	112.60
	B23	46.52	0.00	0.00	46.52
CU V		**379.00**	**47.10**	**17.05**	**443.15**

Table 8. (continued)

Cutting Unit (CU)	Forest Management Block	Wooded acres	Ponds and marshes	Non-productive acres[a]	Total acres
	A23	168.21	4.12	5.59	177.92
	A24[b]	139.50	0.99	44.08	184.57
	B21[b]	218.25	1.87	0.00	220.12
	B22[b]	160.55	0.00	1.41	161.96
	B25[b]	99.85	0.00	12.29	112.14
CU VI		**786.36**	**6.98**	**63.37**	**856.71**
	B18[b]	423.25	0.00	0.00	423.25
	B24[b]	260.84	0.00	0.00	260.84
CU VII		**684.09**	**0.00**	**0.00**	**684.09**
	B12[b]	93.43	0.00	52.08	145.51
	B15[b]	136.55	0.00	60.01	196.56
	B16[b]	121.31	0.00	38.08	159.39
	B19[b]	180.24	0.00	0.00	180.24
	B20	140.00	0.00	15.33	155.33
CU VIII		**671.53**	**0.00**	**165.50**	**837.03**
	B09	119.19	9.86	32.69	161.74
	B10[b]	143.90	0.00	0.00	143.90
	B11[b]	69.26	0.00	21.58	90.84
	B17[b]	262.40	0.00	0.00	262.40
CU IX	**Total CU IX**	**594.75**	**9.86**	**54.27**	**658.88**
	B02	30.35	0.00	20.47	50.82
	B03	76.82	13.26	58.58	148.66
	B04	31.41	0.00	75.15	106.56
	B05	42.62	15.82	0.00	58.44
	B06	66.60	31.78	0.00	98.38
	B07	36.42	7.60	12.49	56.51
	B08	42.32	11.06	0.00	53.38
	B13	0.00	0.00	133.58	133.58
	B14	0.00	0.00	294.01	294.01
CU X	**Total CU X**	**326.54**	**79.52**	**594.28**	**1000.34**
	FT01	34.49	267.33	0.00	301.82
	FT02	73.19	40.82	6.98	120.99
CU XI		**107.68**	**308.15**	**6.98**	**422.81**

Table III-8. (concluded)

Cutting Unit (CU)	Forest Management Block	Wooded acres	Ponds and marshes	Non-productive acres[a]	Total acres
	K01	64.37	46.95	11.48	122.80
	K02	102.05	7.38	12.84	122.27
	K03	141.15	0.00	3.76	144.91
	K04	120.77	0.00	8.74	129.51
	K05	29.84	0.00	7.18	37.02
CU XII		**458.18**	**54.33**	**44.00**	**556.51**
	C01	165.84	0.00	8.77	174.61
	C02	101.03	77.02	25.74	203.79
	C03	299.43	0.00	0.00	299.43
	C04	102.06	0.00	19.76	121.82
CU XIII		**668.36**	**77.02**	**54.27**	**799.65**
	FP01	178.85	12.12	27.84	218.81
	FP02	119.66	33.32	0.00	152.98
CU XIV		**298.51**	**45.44**	**27.84**	**371.79**
	L01	173.33	0.00	0.00	173.33
	L02	154.27	0.00	0.00	154.27
	L03	122.45	0.00	0.00	122.45
	L04	136.59	0.00	0.00	136.59
CU XV		**586.64**	**0.00**	**0.00**	**586.64**
	Totals	**7,589.56**	**1,239.53**	**1,716.66**	**10,545.75**

[a] Non-productive areas include rights-of-way, firebreaks, grassy areas, storage areas, and dikes.
[b] Acreage under restricted management due to the presence of endangered species.

NOTE:

CUTTING UNIT XI– LELAND INTERCHANGE YARD
CUTTING UNIT XII– CAROLINA BEACH BLAST SAFETY ZONE

LEGEND:

IX — CUTTING UNIT

AREA NOT INCLUDED IN ACREAGE TOTALS (ROADS, FACILITIES, INTERCHANGE YARDS, WHARFS, ETC.)

SOURCE: PRE–1998 CUTTING UNIT BOUNDARIES WERE DESIGNATED WHEN M.O.T.S.U. WAS INITIALLY DIVIDED FOR MANAGEMENT. BASE INFORMATION PROVIDED BY THE CORPS OF ENGINEERS, SAVANNAH DISTRICT IN MICROSTATION (.DGN) FORMAT, NAD 1927, DATED 7 AUGUST 1995, AND RECEIVED BY CZR INCORPORATED IN SEPTEMBER 1997. BASE INFORMATION WAS CONVERTED TO AUTOCAD AND ALL FOREST INVENTORY, FOREST MANAGEMENT BLOCK, AND CUTTING UNIT MAPPING AND ACREAGE CALCULATIONS WERE DIGITIZED AND PRODUCED IN AUTOCAD REL. 14 (.DWG) FORMAT.

MAIN TERMINAL, LELAND INTERCHANGE YARD, AND CAROLINA BEACH BLAST SAFETY ZONE
PRE–1998 CUTTING COMPARTMENTS

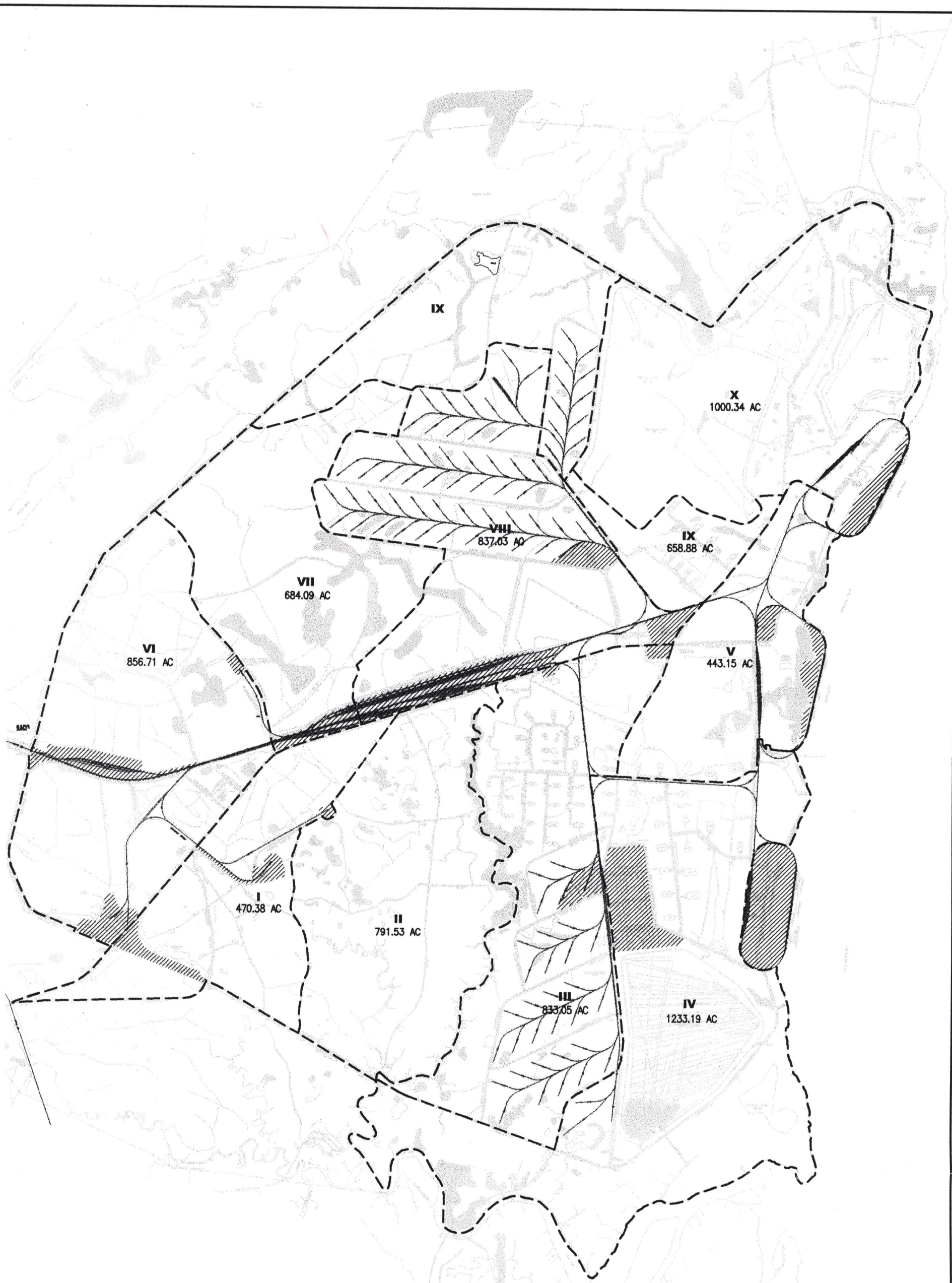
MILITARY OCEAN TERMINAL SUNNY POINT

FILE: MAINTERX	DRAWN BY: JEJ	0 — 2400'
DATE: 3/11/98	APPROVED BY:	

CZR INCORPORATED ENVIRONMENTAL CONSULTANTS
4709 COLLEGE ACRES DRIVE SUITE 2
WILMINGTON, NORTH CAROLINA 28403
TEL 910/392-9253
FAX 910/392-9139

CP#1627.03

FIGURE III–1



LEGEND:

IX CUTTING UNIT

AREA NOT INCLUDED (ROADS, FACILITIES, INTERCHANGE YARDS, WHARFS, ETC.)

SOURCE: POST-1998 CUTTING UNIT BOUNDARIES, DESIGNATED BY THE CURRENT M.O.T.S.U. FORESTER, WERE ALTERED SLIGHTLY FROM PRE-1998 BOUNDARIES. BASE INFORMATION PROVIDED BY THE CORPS OF ENGINEERS, SAVANNAH DISTRICT IN MICROSTATION (.DGN) FORMAT, NAD 1927, DATED 7 AUGUST 1995, AND RECEIVED BY CZR INCORPORATED IN SEPTEMBER 1997. BASE INFORMATION WAS CONVERTED TO AUTOCAD AND ALL FOREST INVENTORY, FOREST MANAGEMENT BLOCK, AND CUTTING UNIT MAPPING AND ACREAGE CALCULATIONS WERE DIGITIZED AND PRODUCED IN AUTOCAD REL. 14 (.DWG) FORMAT.

MAIN TERMINAL
1998 CUTTING UNITS

MILITARY OCEAN TERMINAL
SUNNY POINT

FILE: MAINTERX	DRAWN BY: JEJ	0 2400'
DATE: 3/11/98	APPROVED BY:	

CZR INCORPORATED
ENVIRONMENTAL CONSULTANTS
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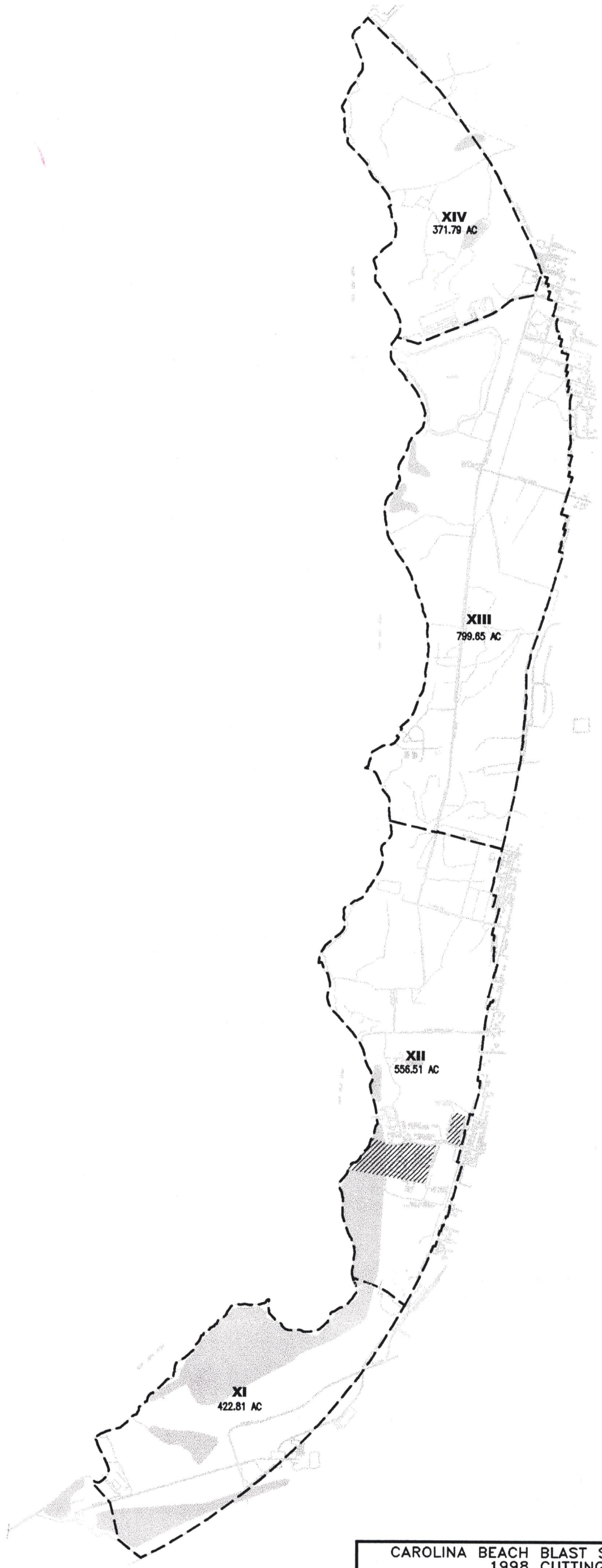
SUITE 2
WILMINGTON, NORTH CAROLINA 28403
TEL 910/392-9253
FAX 910/392-9130

CP#1627.03

FIGURE III-2



LEGEND:

IX — CUTTING UNIT

AREA NOT INCLUDED (ROADS, FACILITIES, INTERCHANGE YARDS, WHARFS, ETC.)

SOURCE: POST-1998 CUTTING UNIT BOUNDARIES, DESIGNATED BY THE CURRENT M.O.T.S.U. FORESTER, WERE ALTERED SLIGHTLY FROM PRE-1998 BOUNDARIES. BASE INFORMATION PROVIDED BY THE CORPS OF ENGINEERS, SAVANNAH DISTRICT IN MICROSTATION (.DGN) FORMAT, NAD 1927, DATED 7 AUGUST 1995, AND RECEIVED BY CZR INCORPORATED IN SEPTEMBER 1997. BASE INFORMATION WAS CONVERTED TO AUTOCAD AND ALL FOREST INVENTORY, FOREST MANAGEMENT BLOCK, AND CUTTING UNIT MAPPING AND ACREAGE CALCULATIONS WERE DIGITIZED AND PRODUCED IN AUTOCAD REL. 14 (.DWG) FORMAT.

CAROLINA BEACH BLAST SAFETY ZONE
1998 CUTTING UNITS

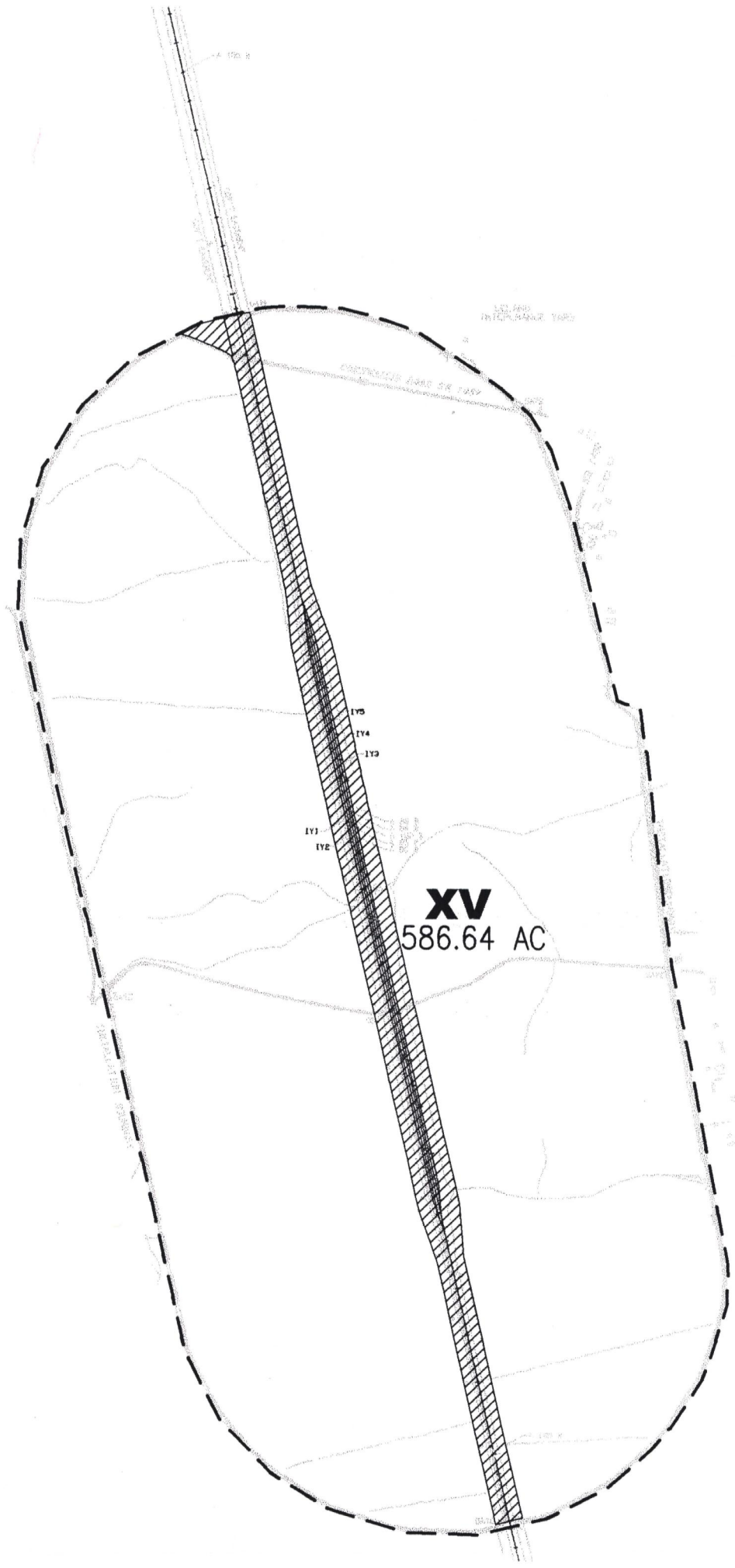
MILITARY OCEAN TERMINAL
SUNNY POINT

FILE: CAROLINX	DRAWN BY: JEJ	0 — 2400'
DATE: 3/11/98	APPROVED BY:	

CZR INCORPORATED
ENVIRONMENTAL CONSULTANTS
4709 COLLEGE ACRES DRIVE
SUITE 2
WILMINGTON, NORTH CAROLINA 28403
TEL 910/392-9253
FAX 910/392-9139

CP#1627.03

FIGURE III-3



LEGEND:

IX — CUTTING UNIT

AREA NOT INCLUDED (ROADS, FACILITIES, INTERCHANGE YARDS, WHARFS, ETC.)

NOTE: CUTTING UNIT ACREAGE DOES NOT INCLUDE THE RAILROAD RIGHT-OF-WAY. THE RAILROAD RIGHT-OF-WAY ACREAGE EQUALS 42.69 ACRES.

SOURCE: POST-1998 CUTTING UNIT BOUNDARIES, DESIGNATED BY THE CURRENT M.O.T.S.U. FORESTER, WERE ALTERED SLIGHTLY FROM PRE-1998 BOUNDARIES. BASE INFORMATION (RRBASE27.DGN) PROVIDED BY THE CORPS OF ENGINEERS, WILMINGTON DISTRICT, IN MICROSTATION (.DGN) FORMAT, NAD 1927, AND RECEIVED BY CZR INCORPORATED ON 3 MARCH 1998. BASE INFORMATION WAS CONVERTED TO AUTOCAD AND ALL FOREST INVENTORY, FOREST MANAGEMENT BLOCK, AND CUTTING UNIT MAPPING AND ACREAGE CALCULATIONS WERE DIGITIZED AND PRODUCED IN AUTOCAD REL. 14 (.DWG) FORMAT.

LELAND INTERCHANGE YARD
1998 CUTTING UNITS

MILITARY OCEAN TERMINAL SUNNY POINT

FILE: LELANDX	DRAWN BY: JEJ	0 — 1000'
DATE: 3/11/98	APPROVED BY:	

CZR INCORPORATED
ENVIRONMENTAL CONSULTANTS
4709 COLLEGE ACRES DRIVE
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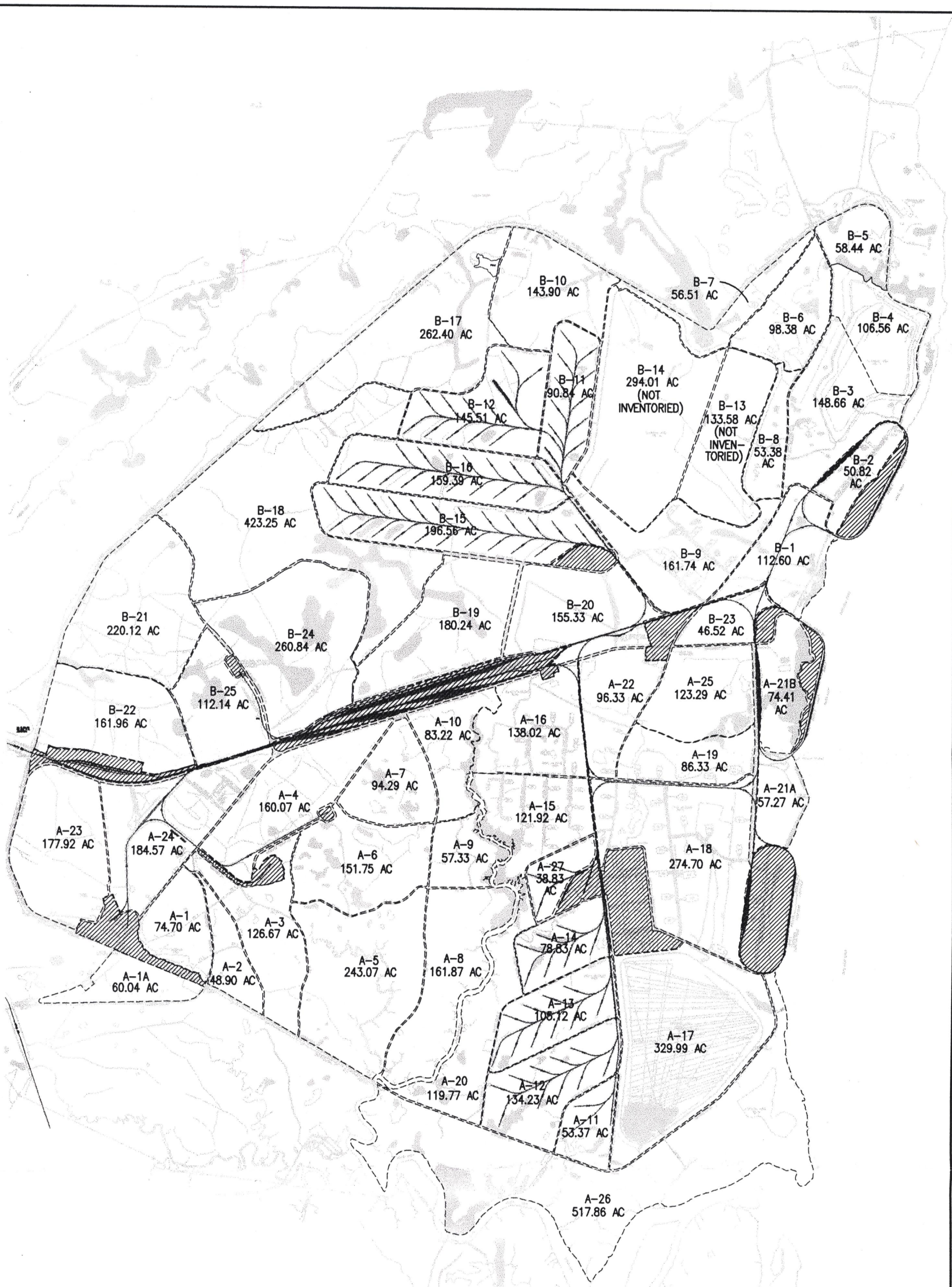
WILMINGTON, NORTH CAROLINA 28403
TEL 910/392-9253
FAX 910/392-9130

CP#1627.03

FIGURE III-4



LEGEND:

B-3 — FOREST MANAGEMENT BLOCK

AREA NOT INCLUDED IN ACREAGE TOTALS (ROADS, FACILITIES, INTERCHANGE YARDS, WHARFS, ETC.)

SOURCE: FOREST MANAGEMENT BLOCK BOUNDARIES WERE BASED ON EXISTING M.O.T.S.U. BOUNDARY DESIGNATIONS. BASE INFORMATION PROVIDED BY THE CORPS OF ENGINEERS, SAVANNAH DISTRICT IN MICROSTATION (.DGN) FORMAT, NAD 1927, DATED 7 AUGUST 1995, AND RECEIVED BY CZR INCORPORATED IN SEPTEMBER 1997. BASE INFORMATION WAS CONVERTED TO AUTOCAD AND ALL FOREST INVENTORY, FOREST MANAGEMENT BLOCK, AND CUTTING UNIT MAPPING AND ACREAGE CALCULATIONS WERE DIGITIZED AND PRODUCED IN AUTOCAD REL. 14 (.DWG) FORMAT.

MAIN TERMINAL
FOREST MANAGEMENT BLOCKS

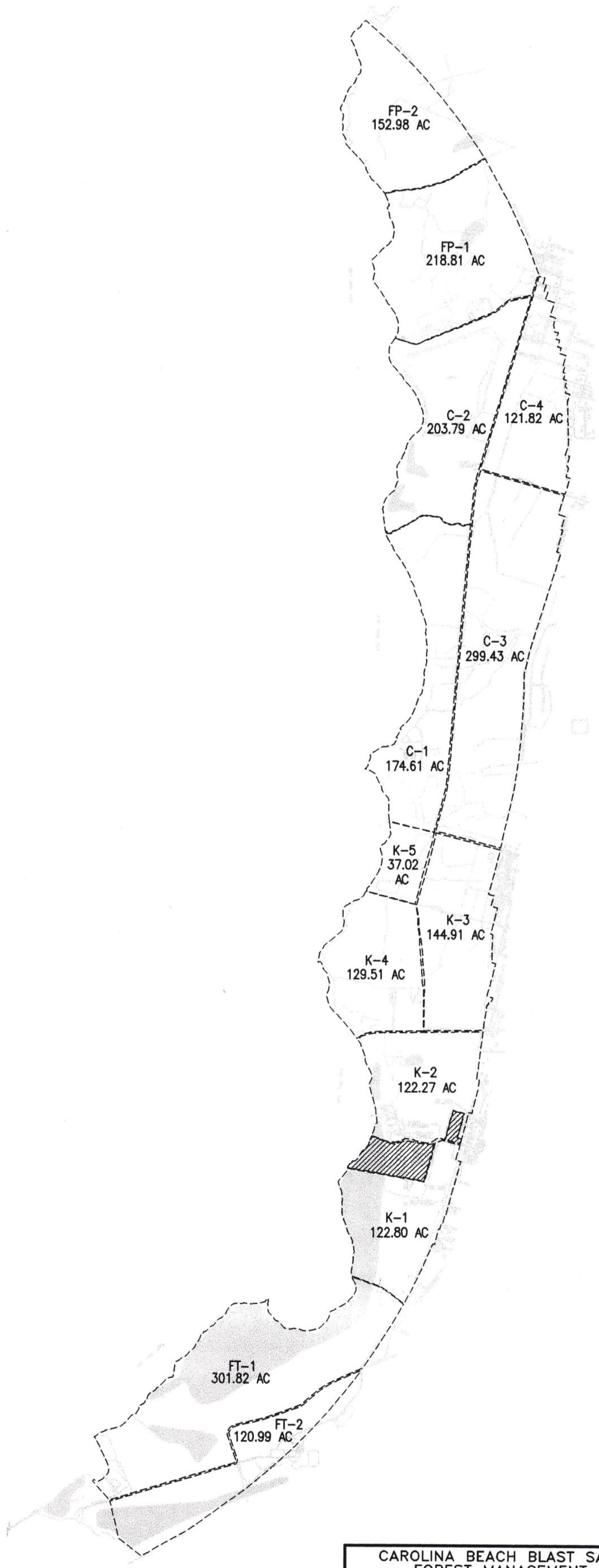
MILITARY OCEAN TERMINAL SUNNY POINT

FILE: MAINTERX	DRAWN BY: JEJ	0 — 2400'
DATE: 3/11/98	APPROVED BY:	

CZR INCORPORATED
ENVIRONMENTAL CONSULTANTS
4709 COLLEGE ACRES DRIVE
SUITE 2
WILMINGTON, NORTH CAROLINA 28403
TEL 910/392-9253
FAX 910/392-9139

CP#1627.03

FIGURE III-5



LEGEND:

B-3 FOREST MANAGEMENT BLOCK

AREA NOT INCLUDED (ROADS, FACILITIES, INTERCHANGE YARDS, WHARFS, ETC.)

SOURCE: FOREST MANAGEMENT BLOCK BOUNDARIES WERE BASED ON EXISTING M.O.T.S.U. BOUNDARY DESIGNATIONS. BASE INFORMATION PROVIDED BY THE CORPS OF ENGINEERS, SAVANNAH DISTRICT IN MICROSTATION (.DGN) FORMAT, NAD 1927, DATED 7 AUGUST 1995, AND RECEIVED BY CZR INCORPORATED IN SEPTEMBER 1997. BASE INFORMATION WAS CONVERTED TO AUTOCAD AND ALL FOREST INVENTORY, FOREST MANAGEMENT BLOCK, AND CUTTING UNIT MAPPING AND ACREAGE CALCULATIONS WERE DIGITIZED AND PRODUCED IN AUTOCAD REL. 14 (.DWG) FORMAT.

CAROLINA BEACH BLAST SAFETY ZONE
FOREST MANAGEMENT BLOCKS

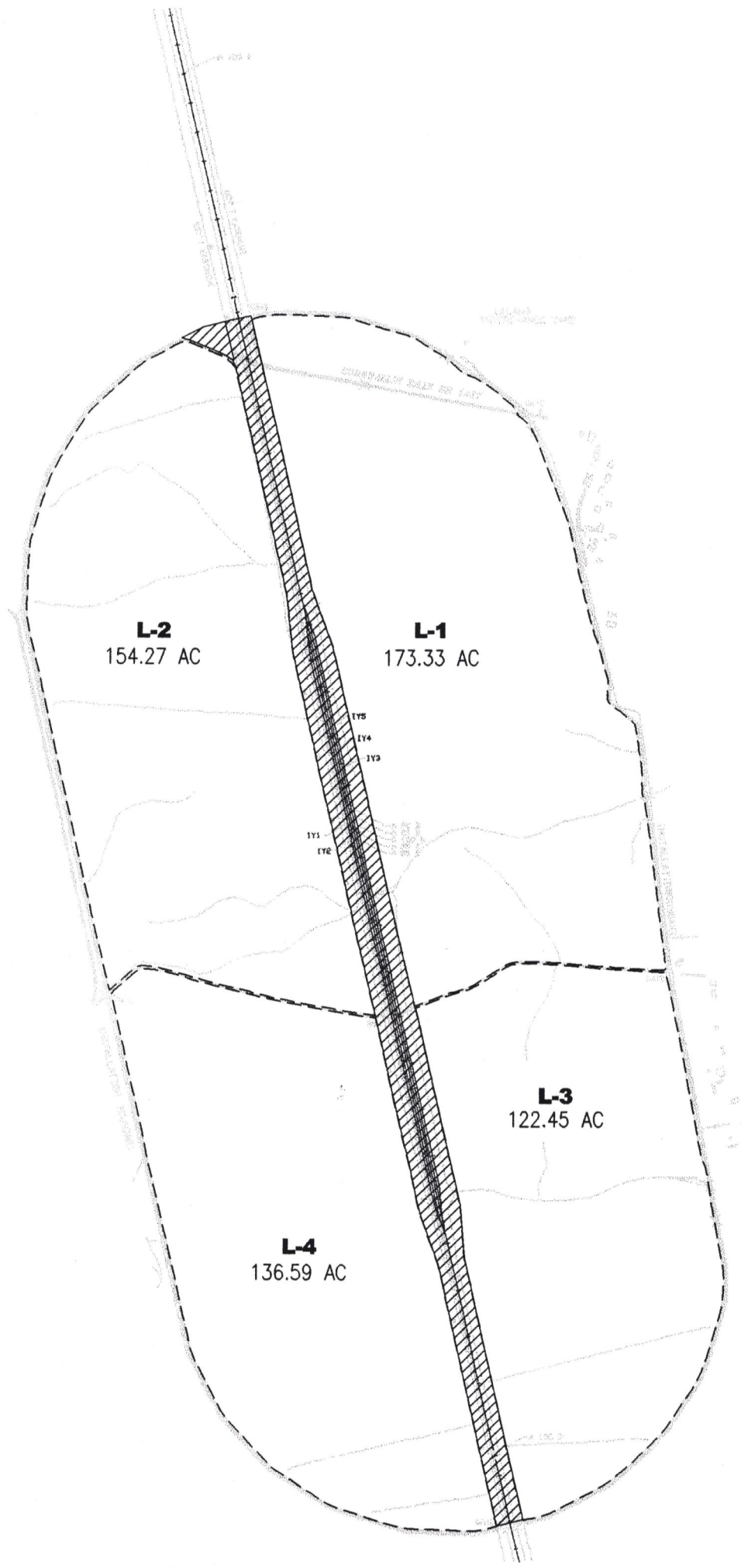
MILITARY OCEAN TERMINAL
SUNNY POINT

FILE: CAROLINX	DRAWN BY: JEJ	0 2400'
DATE: 3/11/98	APPROVED BY:	

CZR INCORPORATED
ENVIRONMENTAL CONSULTANTS
4709 COLLEGE ACRES DRIVE
SUITE 2
WILMINGTON, NORTH CAROLINA 28403
TEL 910/392-9253
FAX 910/392-9139

CP#1627.03

FIGURE III-6



LEGEND:

B-3 FOREST MANAGEMENT BLOCK

AREA NOT INCLUDED (ROADS, FACILITIES, INTERCHANGE YARDS, WHARFS, ETC.)

SOURCE: FOREST MANAGEMENT BLOCK BOUNDARIES WERE BASED ON EXISTING M.O.T.S.U. BOUNDARY DESIGNATIONS. BASE INFORMATION (RRBASE27.DGN) PROVIDED BY THE CORPS OF ENGINEERS, WILMINGTON DISTRICT, IN MICROSTATION (.DGN) FORMAT, NAD 1927, AND RECEIVED BY CZR INCORPORATED ON 3 MARCH 1998. BASE INFORMATION WAS CONVERTED TO AUTOCAD AND ALL FOREST INVENTORY, FOREST MANAGEMENT BLOCK, AND CUTTING UNIT MAPPING AND ACREAGE CALCULATIONS WERE DIGITIZED AND PRODUCED IN AUTOCAD REL. 14 (.DWG) FORMAT.

LELAND INTERCHANGE YARD
FOREST MANAGEMENT BLOCKS

MILITARY OCEAN TERMINAL SUNNY POINT

FILE: LELANDX	DRAWN BY: JEJ	0 1000'
DATE: 3/11/98	APPROVED BY:	

CZR INCORPORATED
ENVIRONMENTAL CONSULTANTS

4709 COLLEGE ACRES DRIVE
SUITE 2
WILMINGTON, NORTH CAROLINA 28403
TEL 910/392-9253
FAX 910/392-9130

CP#1627.03

FIGURE III-7

The hardwood areas are generally along drainages and low-lying wetter areas. In order to protect water quality and wildlife habitat, these stands will not be harvested. However, there are a few hardwood stands growing on upland areas which support high quality sawtimber or potential sawtimber trees. These stands may undergo a thinning from below of the lower quality suppressed trees in order to allow the higher quality oaks and gums increased access to light, water, and nutrient resources. This practice will also promote advanced regeneration of desirable species which will regenerate the stand naturally after final harvest. Advanced regeneration is defined as regeneration of a desired species, in this case oaks and gums, at least 2 feet in height, which is able to withstand minor disturbances, such as a one-time logging activity. It is best to plan for advanced regeneration at least 10 years before the final harvest.

4.6.2 Harvest Schedule. Timber will be harvested annually so that it will provide for a systematic removal of merchantable timber and allow for a better planning of harvests on marginal sites. Appendix III-T contains harvest planning charts consisting of current pine stand (volume) and stock (trees per acre) data by CU and FMB. Blank columns are provided for future volumes removed and volumes remaining. This can be utilized as a harvest planning tool, as well as a harvest tracking method. Table III-9 contains the dates and locations of timber harvests based on pre-1998 Cutting Compartments designations. A detailed summary of all sales sorted by contract number, contractor, volume of forest products harvested, and financial returns can be found in Appendix III-U.

4.6.3 Timber Sale Planning. Some areas may not support adequate volume or quality of wood to warrant an isolated harvest. These lower quality areas may need to be harvested simultaneous with adjacent or nearby harvests. Also, there are several areas within the FMBs that are inoperable harvest areas, primarily due to the presence of wetlands.

The timing and access for some harvesting operations may be restricted on sites adjacent to cargo storage and handling areas during certain military operations. In these areas, harvesting schedules should be coordinated with the MOTSU forester. Metal contamination of timber is non-existent due to MOTSU's specialized military operations.

4.6.4 Timber Marking.

4.6.4.1 Training. All management activities are currently being handled by the MOTSU forester. No personnel training is being conducted at this time.

4.6.4.2 Field Procedure. A marking crew normally consists of two field personnel: a marker and the estimator. When selectively thinning, all trees to be removed will be spot marked with yellow paint at ground level and at the approximate dbh height. All marking will face the same direction to aid the timber markers and procurers in locating trees to be harvested. Trees selected for harvest will be measured at dbh and merchantable heights will be obtained with a clinometer. These measurements will then be recorded according to the species, diameter class, and merchantable length. A guide for timber marking is detailed in Appendix III-V.

4.6.5 Timber Cruising and Seed Tree Marking. Trees which are deformed, diseased, insect infested, lightning or mechanically damaged, or overmature will be the first to be considered for removal except in areas managed for endangered species. The remainder of the trees to be removed will be chosen primarily from the suppressed and intermediate crown classes, leaving the dominant and codominant crown classes. In areas which have or are likely to support an endangered species, trees that promote the population of the endangered species will not be harvested.

Table III-9. Dates and locations of timber harvests based on pre-1998 Cutting Unit designations.

Cutting Unit	Date of first and subsequent harvests
I	1996
II	1989, 1992, 1996
III	1995, 1996
IV	1997
V	1985, 1992, 1995, 1996
VI	1986, 1996
VII	1984, 1985, 1986, 1995, 1996
VIII	1985, 1989, 1996
IX	1989
X	1986, 1988
XI	no harvests
XII	no harvests

With the aid of a tally meter, a tally will be kept of the total number of trees that are marked for removal. Every fifth sawtimber tree and every tenth pulpwood tree will be tallied by dbh, merchantable height, and product. This information will be used to prepare the declaration of availability.

Volume computations from field data will be by species, diameter class, and merchantable length. Some lower hardwood species may be entered as one species (for example sweetgum, blackgum, water tupelo, and swamp blackgum may be classed as “gums”).

The plotless cruise method is to be used when total merchantable volume is to be obtained on a clear cut area. A ten percent survey of the forested acreage is conducted, using a 10-BAF prism. The number of points to be sampled are determined from the Agricultural Handbook No. 232, Elementary Forest Sampling and cruise lines are set up to give a random type sampling of the existing forests. These lines are plotted on a map of the area to provide a check of actual ground work.

Pulpwood trees are tallied by 1-inch diameter classes (5.0 to 8.9 inches dbh), chip-n-saw trees by 2-inch classes (9.0 to 12.9 inches) and sawtimber trees by 2-inch diameter classes (13.0 inches dbh and larger). Volumes are computed from the field data using standard volume tables and volume computation formulas for hardwoods and coastal plain pines.

When the Seed Tree method of marking is being used, the desirable trees which are to be left are marked with paint bands. These trees are scattered throughout the area, and will be left singly. The number of trees left per acre will depend on their diameter. Thirty trees in the 10-inch class will be left per acre, while only ten trees per acre in the 12-inch class will remain.

4.6.6 Timber Harvesting. Harvest sites are selected by the Facility Forester, who shall also analyze the relevant tree data to determine timing and degree of harvesting. This ensures that all forests to be cut are in accordance with the installation mission. Prior to timber harvesting, all appropriate documentation, as applicable under NEPA or other required local, state, or federal standards, will be completed.

From the timber marking cruise data, volume for the merchantable products are computed, as well as information on any specific logging requirements that may be related to this area. The timber availability is then worked up and approved by the Facility Forester, forwarded to the Installation Commander, and from there to Commander, MTMC Eastern Area, ATTN: MTE-EN, Bayonne. A copy is also forwarded to the District Engineer representative for his information. A sample letter of timber availability and request for harvest approval is contained in Appendix III-W.

Due to this installation's mission, the logging crew will check with the Facility Forester prior to the first day of the logging operation. Additionally, the logging crew foreman will check-in every morning with the Facility Forester to notify him of the crew's arrival and every evening to notify him of the crew's departure. This is to ensure proper terminal clearance and knowledge of safety procedures.

Inspection of logging operations will be made at timely intervals during the harvesting operation. The inspector will observe the following items: adherence to forestry best management practices; excessive damage to future crop trees; utilization of marked trees; location of skid trails and log decks; damage to the installation road system; conditions around streams, ponds, or wetlands;

and other special logging requirements restrictive to the contract. If a logger is found in violation of the contract, the District Engineer's Representative will be notified via phone, and then by a follow-up letter.

After the harvesting operations are completed, a final inspection will be made to determine compliance with the contract. Any cut area which has not been previously visited will be inspected. Merchantable materials that are not utilized will be measured for volume content. Tree tops will be checked to ensure that topping has reduced the tops to proper height from ground and that tree stumps are no higher than 6 inches. Roads and firebreaks will also be checked to ensure that all logging debris has been removed and, if necessary, that they have been graded and or seeded to restore them to good condition.

4.6.7 Other Silvicultural Treatment. Woodland fuel reduction burning (controlled) will be used to reduce fuel accumulations, to kill undesirable vegetative competition, and to improve habitat for endangered species. Burning can be conducted either in the winter or during the growing season, depending on the purpose of the burn. For fuel reduction, a cooler winter burn is most desirable. The fire must be set to burn against the wind, creating a slow backing fire. Areas are to be burned in a one-day operation. Hotter and faster growing season fires, burning with the wind, are the most effective for killing competitive vegetation, as well as promoting the spread of wiregrass. Burning will be coordinated with all interested parties. Procedures for burning will be as set forth in TM 5-631 and safety regulations for MOTSU. When control burning sites around RCW cavity trees, precautions will be taken to prevent their destruction by fire, as per the RCW Management Guidelines contained in Appendix III-R and Part VI. ENDANGERED SPECIES MANAGEMENT PLAN. During the next five years, a combination of winter and growing season burns will be conducted on 3,500 to 4,000 acres each year. Burn schedules will be dependent on annual weather conditions. For example, no controlled burning occurred during 1998 because the El Niño weather pattern had saturated the MOTSU woodlands to the point where a successful burn would have been difficult to achieve.

Due to the strict control on herbicides, they will be used minimally. In the past, hardwood control on naturally regenerated longleaf sites has been conducted using Garlon 4 as a basal spray. The goal of this management technique is to promote the longleaf pine-wiregrass ecosystem and to allow pine straw raking. If vegetative control becomes necessary, the type of herbicide and the intended use will be coordinated with the proper authorities, including the NCDA and the Department of Defense.

4.6.8 Planting Plan. Site preparation is necessary on most areas that are to be planted with pine. The purpose of site preparation is to remove existing competition which will hinder the growth or kill the small pine seedlings. On cutover sites, a bulldozer can be used to clear the land of nonmerchantable trees. The waste material can then be drum chopped and, if necessary, burned. When a chopper is used, the ground cover will be pushed down and chopped by the chopper providing the fuel necessary to carry an adequate burn. It may not be necessary to chop the remaining woody material if the harvest provides ample slash to fuel a fire. If sufficient material is available to burn and if the site is not in a fire restricted area, a controlled burn can be used to further reduce competition and waste materials before planting. Bedding may be necessary in wetter areas to prevent flooding of newly established seedlings. Clearing will depend on coordinating the management activity with the U.S. Fish and Wildlife Service.

The areas to be planted will be those that do not have sufficient natural reproduction or reproduction of desirable species or quality on the site. These areas will be delineated to scale on a Planting Plan Map. The forest inventory maps, at a scale of 1 inch equals 660 feet, are well-suited for this purpose. They are contained in Appendix III-S.

Most areas will be planted with 1-0 superior loblolly stock. Since longleaf pine establishment is very site specific, this species will be planted as containerized seedlings on a limited acreage. Bald cypress may be planted if the proper sites are available. Seedlings will be acquired from the most reliable source. After a nursery that grows the desired quality and species of seedlings has been located, an order will be placed one year prior to the planting season. Local nurseries include the North Carolina Division of Forest Resources in Goldsboro, NC; Weyerhaeuser Nursery in Washington, NC; and International Paper Company in Lumberton, NC.

Spacing of the seedlings will be determined by the site index. Bay and hardpan areas will be planted 4-foot by 10-foot (1,089 seedlings per acre) or 5-foot by 10-foot (871 seedlings per acre) to facilitate trucks and logging equipment when thinning becomes necessary. Five-foot by 8-foot (1,089 seedlings per acre) and 6-foot by 8-foot (907 seedlings per acre) spacings will be installed when planting upland sites.

Planting in the past has been conducted by an on-base contractor, supervised by the MOTSU forester. If this method has been successful and if time and personnel requirements allow, then it should continue. Otherwise, there are several planting contractors in the vicinity. The optimum planting time is December to February, when tree growth is dormant. Hand planting has been used in the past and will continue to be used almost exclusively.

Some sites are poorly suited for direct seeding of pines. Bay and hardpan sites are plagued with heavy hardwood and brush competition, which makes it virtually impossible for pine seeds to germinate and grow due to the absence of mineral soil and light. Given an even start with brush and hardwood, pine seedlings will usually outgrow their competitors. MOTSU forest management history has shown that even-aged pine management is the most economical management system.

Other sites are poorly suited for natural regeneration of pines. Low quality, stagnant stands now occupy many of the sites. Good seed years for pine occur at intervals of 1 to 5 years and the quality of the seedlings produced from the seeds is directly related to the parent trees; therefore, planting is necessary to improve the quality and vigor of the present stands. Natural longleaf pine regeneration is dense, but patchy and unreliable, making it very difficult to manage a naturally regenerated longleaf stand. And although the planting success of longleaf seedlings has been sporadic, there has been extensive research in recent years pointing to greater success when planting containerized longleaf seedlings.

Table III-10 contains a reforestation schedule for the next 5 years by species, type of regeneration, and number of acres of site preparation required.

4.6.9 Annual Work Plan. An annual work plan will be developed prior to the end of each fiscal year. The plan should provide for all forest management work that is to be anticipated for the year. This plan is not static. It is intended to be the guide and work calendar for all personnel engaged in forest management activity. It provides the basis for determining required funds, personnel, and backup for proposed budgets and will be submitted to the appropriate military command for approval. Appendix III-X contains a sample annual work plan for forest management activities on MOTSU property. MOTSU relies on several cooperating agencies for technical assistance and up-to-date advice in implementing forest management activities. A list of these sources is contained in Appendix III-Y.

Table III-10. Regeneration schedule per fiscal year and species, including acres of site preparation required over the next 5 years.

Fiscal year	Acres of site preparation required	Acres to be planted	Acres naturally regenerated	Pine species	Total acres to be regenerated
1998	0	0	0	Loblolly	0
1999	25	25	0	Loblolly	25
2000	80	80	0	Loblolly	80
2001	60	60	0	Loblolly	60
2002	30	30	0	Loblolly	30
	30	30	0	Longleaf	30

4.7 Management Record System.

4.7.1 Maps. The Management Record System includes a CADD - produced Base Map, which includes the property boundaries, roads, waterways, and CU boudaries, as well as an FMB map and a Forest Inventory Map, showing the forest stand boundaries within the FMBs, for each of the three MOTSU properties (Main Terminal, CBBSZ, and the Leland Interchange Yard). All maps are at a scale of 1 inch equals 1,000 feet. The Main Terminal and CBBSZ maps are 30 inches by 42 inches and the Leland Interchange maps are 11 inches by 17 inches. These maps are on file in the MOTSU forestry office.

4.7.2 Reports. Appendix III-Z contains a list of required reports for each fiscal year and their reference numbers.

4.8 Planting Record. The planting record since the establishment of MOTSU is summarized in Table III-11. Planting, since 1958 is broken down by number of each species planted, acres planted, and CU.

Table III-11. Planting record by fiscal year (1958-1997), Cutting Unit (pre-1998), number of seedlings planted per species, and number of acres planted.

Fiscal year	Loblolly pine	Slash pine	Cypress	Longleaf pine	Acres planted	Acres converted[a]	Cutting Unit[b]
1958	18,000	0	0	0	18	9	V
1959	70,000	0	0	0	70	0	I
1960	0	0	0	0	35	4	V
1961	18,000	0	0	0	18	0	VI
1962	18,000	0	0	0	18	0	VI
1963	30,000	10,000	0	0	40	36	IV
1964	30,000	20,000	0	0	50	16	V
1965	0	50,000	0	0	50	0	VII
1966	0	50,000	0	0	50	0	III
1967	0	60,000	3,000	0	63	25 33 3 151	III I IX VI
1968	36,000	104,000	0	0	155	4	VIII
1981	40,000 (superior)	0	0	0	40	0	VIII, X, III
1982	0	0	0	40,000	40	0	VII, X, III, VIII
1983	0	0	0	0	0	0	--
1984	28,000 (superior)	0	0	4,000 (containerized)	30	0	IX, XI
1985	40,000 (superior)	0	0	0	80	0	VI, IX
1986	80,000 (superior)	0	0	0	80	0	XIII
1987	30,000 (superior)	0	0	0	38	0	IX
1988	20,000 (superior)	0	0	0	30	0	IX, XIII
1989	36,000 (superior)	0	0	0	54	0	IV

Table III-11. (concluded)

Fiscal year	Loblolly pine	Slash pine	Cypress	Longleaf pine	Acres planted	Acres converted[a]	Cutting Unit[b]
1990	7,500 (superior)	0	0	0	10	0	I
1991	0	0	0	0	0	0	--
1992	0	0	0	0	0	0	--
1993	35,000 (superior)	0	0	0	42	0	II
1994	0	0	0	0	0	0	--
1995	20,000 (superior)	0	0	0	28	0	VII
1996	0	0	0	33,000 (containerized)	52	0	I, III

[a] Of the total acres planted, “acres converted” represents the number of acres converted from hardwood to pine or returned to the original longleaf pine-wiregrass ecosystem.
[b] Cutting Unit designations are based on pre-1998 boundaries.

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APPENDIX III-A

FIRE AND FOREST PEST PROTECTION AGREEMENTS

Military Ocean Terminal, Sunny Point has Mutual Fire Protection Agreements with the following agencies:

Fire Protection

NC Department of Environmental Health and Natural Resources Division of Forest Resources New Hanover and Brunswick Counties Raleigh, NC	Main Terminal, Carolina Beach Blast Safety Zone, and Leland Interchange Yard
City of Southport Southport, NC	Main Terminal
Boiling Springs Lake Volunteer Fire Department Boiling Springs Lake, NC	Main Terminal
Federal Point Volunteer Fire Department Federal Point, NC	Carolina Beach Blast Safety Zone
Town of Leland Volunteer Fire Department Leland, NC	Leland Interchange Yard

Forest Pest Protection

North Carolina Department of Agriculture (NCDA)
Raleigh, NC

NC Department of Environmental Health and Natural Resources
Division of Forest Resources
Raleigh, NC

US Department of Agriculture
Forest Service
Atlanta, GA

APPENDIX III-B

SAMPLE SIZES (n), 95% CONFIDENCE INTERVALS (CI), AND STANDARD ERRORS (SE) FOR THE MEAN PINE AND HARDWOOD BASAL AREAS BY DIAMETER CLASS AND CUTTING UNIT

(using data from 1997/1998 inventory)

Appendix III-B. Sample sizes (n), 95% confidence intervals (CI), and standard errors (SE) for the mean pine and hardwood basal areas by diameter class and Cutting Unit.

Cutting Unit I

Diameter class	n (# plots)	Pine basal area (sq. ft. / ac)			Hardwood basal area (sq. ft. / ac)		
		Average	95% CI	SE	Average	95% CI	SE
6"	127	7.56	4.99-10.13	1.28	1.57	0.56-2.58	0.51
8"	127	8.50	6.36-10.64	1.07	0.79	0.31-1.27	0.24
10"	127	12.28	9.67-14.89	1.30	0.39	0.00-0.80	0.21
12"	127	10.31	7.82-12.80	1.24	0.39	0.00-0.90	0.26
14"	127	6.93	5.01-8.85	0.96	0.31	0.00-0.62	0.16
16"	127	2.76	1.68-3.94	0.54	0.31	0.00-0.62	0.16
18"	127	0.71	0.20-1.22	0.25	0.16	0.00-0.39	0.11
20"	127	0.63	0.20-1.06	0.22	0.24	0.00-0.72	0.24
22"	127	0.16	0.00-0.39	0.11	0.08	0.00-0.24	0.08
24" +	127	0.16	0.00-0.39	0.11	0.00	na	na

Cutting Unit II

Diameter class	n (# plots)	Pine basal area			Hardwood basal area		
		Average	95% CI	SE	Average	95% CI	SE
6"	201	5.41	3.97-6.85	0.72	3.32	2.24-4.40	0.54
8"	201	8.78	6.95-10.61	0.92	2.91	1.98-3.84	0.46
10"	201	11.79	9.26-14.32	1.26	3.21	2.15-4.27	0.53
12"	201	15.41	12.83-17.99	1.29	1.73	1.05-2.41	0.34
14"	201	13.62	11.53-15.71	1.05	1.33	0.56-2.10	0.38
16"	201	7.96	6.05-9.87	0.96	0.41	0.13-0.69	0.14
18"	201	2.24	1.53-2.95	0.35	0.41	0.09-0.73	0.16
20"	201	0.97	0.40-1.54	0.29	0.36	0.05-0.67	0.15
22"	201	0.31	0.02-0.60	0.14	0.05	0.00-0.15	0.05
24" +	201	0.05	0.00-0.15	0.05	0.20	0.00-0.40	0.10

Appendix III-B. (continued)

Cutting Unit III

Diameter class	n (# plots)	Pine basal area Average	Pine basal area 95% CI	Pine basal area SE	Hardwood basal area Average	Hardwood basal area 95% CI	Hardwood basal area SE
6"	200	8.25	6.35-10.15	0.95	3.35	2.34-4.36	0.50
8"	200	9.90	7.71-12.09	1.10	3.85	2.67-5.03	0.59
10"	200	12.20	9.83-14.57	1.18	2.55	1.74-3.36	0.41
12"	200	12.45	10.32-14.58	1.07	1.10	0.57-1.63	0.26
14"	200	12.85	10.66-15.04	1.09	1.70	1.00-2.40	0.35
16"	200	9.55	7.65-11.45	0.95	0.85	0.28-1.42	0.27
18"	200	4.40	3.25-5.55	0.57	0.45	0.07-0.83	0.19
20"	200	1.35	0.77-1.93	0.29	0.10	0.00-0.24	0.07
22"	200	0.35	0.05-0.65	0.15	0.10	0.00-0.30	0.10
24" +	200	0.20	0.00-0.40	0.10	0.10	0.00-0.24	0.07

Cutting Unit IV

Diameter class	n (# plots)	Pine basal area Average	Pine basal area 95% CI	Pine basal area SE	Hardwood basal area Average	Hardwood basal area 95% CI	Hardwood basal area SE
6"	102	4.31	2.65-5.97	0.83	2.25	0.92-3.58	0.67
8"	102	5.20	2.74-7.66	1.23	3.92	2.42-5.42	0.75
10"	102	7.06	4.45-9.67	1.30	3.14	1.69-4.59	0.72
12"	102	8.33	5.79-10.87	1.27	2.16	0.96-3.36	0.60
14"	102	11.08	7.93-14.23	1.58	1.47	0.71-2.23	0.38
16"	102	8.73	6.75-10.71	0.99	1.47	0.45-2.49	0.51
18"	102	5.69	3.85-7.53	0.92	0.49	0.00-1.00	0.26
20"	102	2.94	1.48-4.40	0.73	0.59	0.04-1.14	0.27
22"	102	1.37	0.53-2.21	0.42	0.39	0.01-0.77	0.19
24" +	102	0.39	0.01-0.77	0.19	0.00	na	na

Appendix III-B. (continued)

Cutting Unit V

Diameter class	n (# plots)	Pine basal area Average	Pine basal area 95% CI	Pine basal area SE	Hardwood basal area Average	Hardwood basal area 95% CI	Hardwood basal area SE
6"	119	2.86	1.29-4.43	0.78	4.71	2.89-6.53	0.91
8"	119	4.37	2.74-6.00	0.82	3.45	1.95-4.95	0.75
10"	119	7.31	4.96-9.66	1.17	4.29	2.64-5.94	0.82
12"	119	8.57	6.38-10.76	1.10	3.45	2.13-4.77	0.66
14"	119	9.16	6.70-11.62	1.23	3.61	2.16-5.06	0.72
16"	119	7.31	5.15-9.47	1.08	1.68	0.84-2.52	0.42
18"	119	3.28	2.08-4.48	0.60	0.92	0.39-1.45	0.27
20"	119	1.93	0.94-2.92	0.50	0.59	0.09-1.09	0.25
22"	119	0.67	0.21-1.13	0.23	0.50	0.10-0.90	0.20
24" +	119	0.59	0.16-1.02	0.22	0.58	0.15-1.01	0.22

Cutting Unit VI

Diameter class	n (# plots)	Pine basal area Average	Pine basal area 95% CI	Pine basal area SE	Hardwood basal area Average	Hardwood basal area 95% CI	Hardwood basal area SE
6"	268	11.95	9.86-14.04	1.04	0.84	0.21-1.47	0.31
8"	268	13.55	11.37-15.73	1.09	0.48	0.13-0.83	0.18
10"	268	12.31	10.23-14.39	1.04	0.36	0.10-0.62	0.13
12"	268	7.05	5.24-8.86	0.91	0.04	0.00-0.12	0.04
14"	268	2.87	1.79-3.95	0.54	0.08	0.00-0.19	0.06
16"	268	1.39	0.74-2.04	0.32	0.08	0.00-0.19	0.06
18"	268	0.28	0.07-0.49	0.10	0.00	na	na
20"	268	0.04	0.00-0.12	0.04	0.00	na	na
22"	268	0.00	na	na	0.00	na	na
24" +	268	0.00	na	na	0.00	na	na

Appendix III-B. (continued)

Cutting Unit VII

Diameter class	n (# plots)	Pine basal area Average	95% CI	SE	Hardwood basal area Average	95% CI	SE
6"	205	10.20	8.38-12.02	0.91	1.32	0.29-2.35	0.51
8"	205	11.27	9.67-12.87	0.80	0.98	0.29-1.67	0.35
10"	205	10.54	8.71-12.37	0.92	0.49	0.08-0.90	0.20
12"	205	5.51	1.67-6.79	0.64	0.24	0.00-0.49	0.13
14"	205	2.83	1.82-3.84	0.51	0.15	0.00-0.37	0.11
16"	205	0.39	0.09-0.69	0.15	0.00	na	na
18"	205	0.15	0.00-0.32	0.08	0.00	na	na
20"	205	0.10	0.00-0.24	0.07	0.00	na	na
22"	205	0.00	na	na	0.00	na	na
24" +	205	0.00	na	na	0.00	na	na

Cutting Unit VIII

Diameter class	n (# plots)	Pine basal area Average	95% CI	SE	Hardwood basal area Average	95% CI	SE
6"	228	8.11	6.57-9.65	0.77	1.24	0.64-1.84	0.30
8"	228	11.03	9.15-12.91	0.94	0.99	0.45-1.53	0.27
10"	228	13.22	11.07-15.37	1.08	0.56	0.19-0.93	0.18
12"	228	10.39	1.54-12.26	0.93	0.04	0.00-0.12	0.04
14"	228	7.25	5.65-8.85	0.80	0.09	0.00-0.22	0.06
16"	228	2.23	1.43-3.03	0.40	0.00	na	na
18"	228	1.80	1.12-2.48	0.34	0.00	na	na
20"	228	0.69	0.28-1.10	0.21	0.00	na	na
22"	228	0.04	0.00-0.12	0.04	0.00	na	na
24" +	228	0.09	0.00-0.22	0.06	0.00	na	na

Appendix III-B. (continued)

Cutting Unit IX

Diameter class	n (# plots)	Pine basal area			Hardwood basal area		
		Average	95% CI	SE	Average	95% CI	SE
6"	176	7.70	6.07-9.33	0.82	1.12	0.49-1.75	0.32
8"	176	9.78	7.81-11.75	0.99	0.96	0.46-1.46	0.25
10"	176	11.80	9.39-14.21	1.20	0.73	0.09-1.37	0.32
12"	176	8.71	1.01-10.91	1.10	1.12	0.44-1.79	0.34
14"	176	6.01	4.32-7.70	0.84	0.39	0.10-0.68	0.15
16"	176	2.64	1.64-3.64	0.50	0.67	0.07-1.27	0.28
18"	176	1.12	0.47-1.77	0.33	0.39	0.00-0.79	0.20
20"	176	0.73	0.25-1.21	0.24	0.22	0.00-0.44	0.11
22"	176	0.22	0.00-0.44	0.11	0.06	0.00-0.18	0.06
24" +	176	0.12	0.00-0.29	0.08	0.40	0.00-0.90	0.24

Cutting Unit X

Diameter class	n (# plots)	Pine basal area			Hardwood basal area		
		Average	95% CI	SE	Average	95% CI	SE
6"	103	10.19	7.02-13.36	1.59	1.94	0.94-2.94	0.50
8"	103	14.76	10.75-18.77	2.00	2.52	1.24-3.80	0.64
10"	103	14.27	10.96-17.58	1.65	3.11	1.41-4.81	0.85
12"	103	10.78	0.00-13.33	1.28	2.04	0.00-3.48	0.72
14"	103	10.78	7.85-13.71	1.46	1.46	0.57-2.35	0.45
16"	103	6.21	4.28-8.14	0.97	1.17	0.05-2.29	0.56
18"	103	2.23	1.20-3.26	0.52	0.10	0.00-0.30	0.10
20"	103	0.97	0.17-1.77	0.40	0.10	0.00-0.30	0.10
22"	103	0.29	0.00-0.62	0.17	0.29	0.00-0.62	0.17
24" +	103	0.00	na	na	0.49	0.06-0.92	0.21

Appendix III-B. (continued)

Cutting Unit XI

Diameter class	n (# plots)	Pine basal area			Hardwood basal area		
		Average	95% CI	SE	Average	95% CI	SE
6"	12	0.00	na	na	9.17	7.50-10.84	0.83
8"	12	0.00	na	na	8.33	3.51-13.15	2.41
10"	12	0.00	na	na	3.33	0.00-7.09	1.88
12"	12	0.00	na	na	0.00	na	na
14"	12	0.00	na	na	0.00	na	na
16"	12	0.00	na	na	0.00	na	na
18"	12	0.00	na	na	0.00	na	na
20"	12	0.00	na	na	0.00	na	na
22"	12	0.00	na	na	0.00	na	na
24" +	12	0.00	na	na	0.00	na	na

Cutting Unit XII

Diameter class	n (# plots)	Pine basal area			Hardwood basal area		
		Average	95% CI	SE	Average	95% CI	SE
6"	185	1.78	0.73-2.83	0.52	6.15	4.23-8.07	0.96
8"	185	2.59	1.28-3.90	0.66	7.56	5.10-10.02	1.23
10"	185	4.07	2.00-6.14	1.04	5.26	3.55-6.97	0.85
12"	185	5.63	0.00-7.43	0.90	3.85	0.00-5.50	0.83
14"	185	7.56	4.89-10.23	1.34	5.19	3.24-7.14	0.97
16"	185	4.89	3.13-6.65	0.88	2.07	0.96-3.18	0.56
18"	185	3.26	1.81-4.71	0.73	1.56	0.55-2.57	0.50
20"	185	1.04	0.33-1.75	0.35	0.37	0.00-0.76	0.19
22"	185	0.30	0.00-0.67	0.18	0.07	0.00-0.21	0.07
24" +	185	0.15	0.00-0.45	0.15	0.07	0.00-0.21	0.07

Appendix III-B. (continued)

Cutting Unit XIII

Diameter class	n (# plots)	Pine basal area Average	95% CI	SE	Hardwood basal area Average	95% CI	SE
6"	176	3.79	2.21-5.37	0.79	5.36	3.61-7.11	0.88
8"	176	4.31	2.73-5.89	0.79	3.92	2.55-5.29	0.68
10"	176	7.12	5.21-9.03	0.95	4.71	2.98-6.44	0.87
12"	176	5.10	0.00-6.62	0.76	3.33	0.00-4.79	0.73
14"	176	6.08	4.11-8.05	0.99	3.14	1.87-4.41	0.63
16"	176	2.61	1.62-3.60	0.50	2.09	1.21-2.97	0.44
18"	176	1.50	0.72-2.28	0.39	0.59	0.16-1.02	0.21
20"	176	0.78	0.31-1.25	0.24	0.52	0.08-0.96	0.22
22"	176	0.33	0.00-0.68	0.17	0.00	na	na
24" +	176	0.26	0.00-0.52	0.13	0.20	0.00-0.60	0.13

Cutting Unit XIV

Diameter class	n (# plots)	Pine basal area Average	95% CI	SE	Hardwood basal area Average	95% CI	SE
6"	77	2.73	1.31-4.15	0.71	2.99	1.10-4.88	0.94
8"	77	4.16	1.93-6.39	1.11	1.30	0.37-2.23	0.47
10"	77	6.88	4.34-9.42	1.27	0.78	0.06-1.50	0.36
12"	77	6.88	1.58-9.53	1.32	0.26	0.00-0.63	0.18
14"	77	3.77	2.24-5.30	0.76	0.13	0.00-0.39	0.13
16"	77	1.56	0.00-3.26	0.85	0.52	0.00-1.56	0.52
18"	77	0.26	0.00-0.63	0.18	0.52	0.00-1.25	0.36
20"	77	0.00	na	na	0.13	0.00-0.39	0.13
22"	77	0.13	0.00-0.39	0.13	0.00	na	na
24" +	77	0.13	0.00-0.39	0.13	0.00	na	na

Appendix III-B. (concluded)

Cutting Unit XV

Diameter class	n (# plots)	Pine basal area			Hardwood basal area		
		Average	95% CI	SE	Average	95% CI	SE
6"	178	5.54	4.14-6.94	0.70	2.80	1.88-3.72	0.46
8"	178	7.26	5.57-8.95	0.84	2.74	1.72-3.76	0.51
10"	178	9.88	7.68-12.08	1.10	2.62	1.63-3.61	0.49
12"	178	13.87	1.68-14.12	20.52	1.79	1.07-2.51	0.36
14"	178	10.24	8.29-12.19	0.98	1.49	0.67-2.31	0.41
16"	178	8.63	6.43-10.83	1.10	0.42	0.06-0.78	0.18
18"	178	5.12	3.68-6.56	0.72	0.18	0.00-0.39	0.10
20"	178	2.56	1.59-3.53	0.48	0.06	0.00-0.18	0.06
22"	178	0.77	0.21-1.33	0.28	0.00	na	na
24" +	178	0.96	0.39-1.53	0.28	0.42	0.06-0.78	0.18

APPENDIX III-C

SAMPLE SIZES (n), 95% CONFIDENCE INTERVALS (CI), AND STANDARD ERRORS (SE) FOR THE MEAN PINE AND HARDWOOD BASAL AREAS BY DIAMETER CLASS AND FOREST MANAGEMENT BLOCK

(using data from 1997/1998 inventory)

Appendix III-C. Sample sizes (n), 95% confidence intervals (CI), and standard errors (SE) for the mean pine and hardwood basal areas by diameter class and forest management block

Forest Management Block A01

Diameter class	n (# plots)	Pine basal area			Hardwood basal area		
		Average	95% CI	SE	Average	95% CI	SE
6"	22	2.73	0.00-5.73	1.50	3.18	0.00-6.75	1.79
8"	22	5.00	1.58-8.42	1.71	1.82	0.13-3.51	0.84
10"	22	12.27	7.02-17.52	2.63	1.36	0.00-3.35	1.00
12"	22	13.18	6.57-20.07	3.44	0.00	na	na
14"	22	4.09	1.57-6.61	1.26	0.45	0.00-1.35	0.45
16"	22	3.18	0.43-5.93	1.38	0.45	0.00-1.35	0.45
18"	22	0.91	0.00-2.73	0.91	0.00	na	na
20"	22	0.45	0.00-1.35	0.45	0.00	na	na
22"	22	0.00	na	na	0.45	0.00-1.35	0.45
24" +	22	0.00	na	na	0.00	na	na

Forest Management Block A01A

Diameter class	n (# plots)	Pine basal area			Hardwood basal area		
		Average	95% CI	SE	Average	95% CI	SE
6"	15	4.67	1.36-7.98	1.65	5.33	0.00-10.80	2.74
8"	15	8.00	2.41-13.59	2.79	0.67	0.00-2.01	0.67
10"	15	13.33	6.12-20.54	3.61	0.00	na	na
12"	15	14.67	0.00-22.69	4.01	0.00	na	na
14"	15	10.67	2.75-18.59	3.96	0.00	na	na
16"	15	2.67	0.00-5.74	1.53	0.00	na	na
18"	15	0.00	na	na	0.00	na	na
20"	15	0.00	na	na	0.00	na	na
22"	15	0.00	na	na	0.00	na	na
24" +	15	0.00	na	na	0.00	na	na

Appendix III-C. (continued)

Forest Management Block A02

Diameter class	n (# plots)	Pine basal area			Hardwood basal area		
		Average	95% CI	SE	Average	95% CI	SE
6"	11	6.36	2.30-10.42	2.03	1.82	0.00-5.46	1.82
8"	11	8.18	1.14-15.22	3.52	2.73	0.00-5.55	1.41
10"	11	12.73	2.97-22.49	4.88	0.91	0.00-2.73	0.91
12"	11	25.45	3.63-33.25	3.90	2.73	0.00-8.19	2.73
14"	11	18.18	14.54-21.82	1.82	1.82	0.00-4.26	1.22
16"	11	6.36	2.30-10.42	2.03	0.91	0.00-2.73	0.91
18"	11	2.73	0.00-5.55	1.41	0.00	na	na
20"	11	0.91	0.00-2.73	0.91	0.00	na	na
22"	11	0.91	0.00-2.73	0.91	0.00	na	na
24" +	11	0.91	0.00-2.73	0.91	0.00	na	na

Forest Management Block A03

Diameter class	n (# plots)	Pine basal area			Hardwood basal area		
		Average	95% CI	SE	Average	95% CI	SE
6"	36	7.50	1.57-13.43	2.96	0.56	0.00-1.34	0.39
8"	36	9.72	4.35-15.09	2.69	0.28	0.00-0.84	0.28
10"	36	16.39	10.98-21.80	2.71	0.28	0.00-0.84	0.28
12"	36	10.83	0.00-15.00	2.08	0.56	0.00-1.34	0.39
14"	36	9.72	5.94-13.50	1.89	0.28	0.00-0.84	0.28
16"	36	4.72	2.02-7.42	1.35	0.56	0.00-1.34	0.39
18"	36	1.11	0.05-2.17	0.53	0.56	0.00-1.34	0.39
20"	36	1.67	0.41-2.93	0.63	0.83	0.00-2.49	0.83
22"	36	0.28	0.00-0.84	0.28	0.00	na	na
24" +	36	0.00	na	na	0.00	na	na

Appendix III-C. (continued)

Forest Management Block A04

Diameter class	n (# plots)	Pine basal area			Hardwood basal area		
		Average	95% CI	SE	Average	95% CI	SE
6"	43	11.40	6.26-16.54	2.57	0.23	0.00-0.69	0.23
8"	43	9.53	6.34-12.72	1.59	0.23	0.00-0.69	0.23
10"	43	8.37	4.11-12.63	2.13	0.00	na	na
12"	43	3.02	0.00-5.80	1.39	0.00	na	na
14"	43	1.86	0.00-4.28	1.21	0.00	na	na
16"	43	0.00	na	na	0.00	na	na
18"	43	0.00	na	na	0.00	na	na
20"	43	0.00	na	na	0.00	na	na
22"	43	0.00	na	na	0.00	na	na
24" +	43	0.23	0.00-0.69	0.23	0.00	na	na

Forest Management Block A05

Diameter class	n (# plots)	Pine basal area			Hardwood basal area		
		Average	95% CI	SE	Average	95% CI	SE
6"	55	4.18	2.33-6.03	0.92	2.36	0.99-3.73	0.68
8"	55	4.18	2.00-6.36	1.09	2.55	0.66-4.44	0.94
10"	55	8.36	4.89-11.83	1.74	4.00	1.82-6.18	1.09
12"	55	8.00	0.00-10.91	1.45	2.36	0.00-3.91	0.78
14"	55	11.45	7.59-15.31	1.93	2.00	0.03-3.97	0.98
16"	55	8.36	5.13-11.59	1.62	0.91	0.13-1.69	0.39
18"	55	2.55	1.15-3.95	0.70	0.55	0.00-1.36	0.40
20"	55	2.00	0.41-3.59	0.80	0.91	0.00-1.85	0.47
22"	55	0.73	0.00-1.61	0.44	0.00	na	na
24" +	55	0.18	0.00-0.54	0.18	0.36	0.00-0.86	0.25

Appendix III-C. (continued)

Forest Management Block A06

Diameter class	n (# plots)	Pine basal area			Hardwood basal area		
		Average	95% CI	SE	Average	95% CI	SE
6"	44	6.14	2.75-9.53	1.70	2.27	0.00-4.77	1.25
8"	44	10.91	6.66-15.16	2.13	1.14	0.00-2.31	0.58
10"	44	12.50	8.23-16.77	2.14	0.91	0.00-2.34	0.71
12"	44	21.14	3.65-26.43	2.65	0.00	na	na
14"	44	13.64	9.79-17.49	1.93	0.00	na	na
16"	44	3.41	1.58-5.24	0.92	0.00	na	na
18"	44	1.14	0.00-2.31	0.58	0.00	na	na
20"	44	0.00	na	na	0.00	na	na
22"	44	0.00	na	na	0.00	na	na
24" +	44	0.00	na	na	0.00	na	na

Forest Management Block A07

Diameter class	n (# plots)	Pine basal area			Hardwood basal area		
		Average	95% CI	SE	Average	95% CI	SE
6"	26	4.23	0.52-7.94	1.85	4.62	0.29-8.95	2.16
8"	26	14.23	6.53-21.93	3.85	3.08	0.19-5.97	1.44
10"	26	20.77	8.77-32.77	6.00	2.69	0.00-6.12	1.71
12"	26	17.31	10.33-24.29	3.49	1.15	0.00-2.84	0.85
14"	26	12.69	6.97-18.41	2.86	1.15	0.00-3.45	1.15
16"	26	3.08	0.19-5.97	1.44	0.00	na	na
18"	26	0.38	0.00-1.14	0.38	0.00	na	na
20"	26	0.38	0.00-1.14	0.38	0.00	na	na
22"	26	0.38	0.00-1.14	0.38	0.00	na	na
24" +	26	0.00	na	na	0.00	na	na

Appendix III-C. (continued)

Forest Management Block A08

Diameter class	n (# plots)	Pine basal area			Hardwood basal area		
		Average	95% CI	SE	Average	95% CI	SE
6"	33	5.15	0.97-9.33	2.09	6.67	3.70-9.64	1.49
8"	33	7.27	3.76-10.78	1.76	3.94	1.65-6.23	1.15
10"	33	7.58	3.99-11.17	1.80	5.76	3.00-8.52	1.38
12"	33	14.24	9.09-19.39	2.58	3.33	1.26-5.40	1.04
14"	33	16.36	12.02-20.70	2.17	1.82	0.00-3.85	1.02
16"	33	12.73	7.94-17.52	2.39	0.61	0.00-1.46	0.42
18"	33	4.55	2.58-6.52	0.98	1.21	0.06-2.36	0.58
20"	33	0.30	0.00-0.90	0.30	0.30	0.00-0.90	0.30
22"	33	0.00	na	na	0.00	na	na
24" +	33	0.00	na	na	0.60	0.00-1.44	0.42

Forest Management Block A09

Diameter class	n (# plots)	Pine basal area			Hardwood basal area		
		Average	95% CI	SE	Average	95% CI	SE
6"	16	5.00	1.34-8.65	1.83	1.25	0.00-2.96	0.85
8"	16	7.50	1.87-13.13	2.81	2.50	0.00-5.39	1.44
10"	16	8.13	1.24-15.02	3.44	3.13	0.11-6.15	1.51
12"	16	8.75	3.96-13.54	2.39	3.13	0.11-6.15	1.51
14"	16	11.88	2.18-21.58	4.85	3.13	0.11-6.15	1.51
16"	16	11.25	1.61-20.89	4.82	0.63	0.00-1.89	0.62
18"	16	3.13	0.00-6.66	1.76	0.00	na	na
20"	16	0.00	na	na	0.00	na	na
22"	16	0.63	0.00-1.89	0.62	0.00	na	na
24" +	16	0.00	na	na	0.00	na	na

Appendix III-C. (continued)

Forest Management Block A10

Diameter class	n (# plots)	Pine basal area			Hardwood basal area		
		Average	95% CI	SE	Average	95% CI	SE
6"	27	9.09	3.52-14.66	2.78	2.73	0.38-5.08	1.17
8"	27	12.73	7.95-17.51	2.39	5.91	2.51-9.31	1.70
10"	27	17.27	8.14-26.40	4.57	2.73	0.00-6.00	1.64
12"	27	26.82	13.83-39.81	6.49	0.91	0.00-2.17	0.63
14"	27	17.27	9.47-25.07	3.90	0.45	0.00-1.35	0.45
16"	27	12.27	3.07-21.47	4.60	0.00	na	na
18"	27	1.82	0.00-3.96	1.07	0.45	0.00-1.35	0.45
20"	27	2.73	0.04-5.42	1.35	0.45	0.00-1.35	0.45
22"	27	0.00	na	na	0.45	0.00-1.35	0.45
24" +	27	0.00	na	na	0.00	na	na

Forest Management Block A11

Diameter class	n (# plots)	Pine basal area			Hardwood basal area		
		Average	95% CI	SE	Average	95% CI	SE
6"	14	3.57	0.19-6.95	1.69	2.14	0.00-5.23	1.55
8"	14	4.29	0.00-9.31	2.51	5.00	0.00-10.03	2.51
10"	14	5.00	0.00-10.84	2.92	3.57	0.00-8.07	2.25
12"	14	7.14	1.83-12.45	2.66	0.00	na	na
14"	14	10.00	2.44-17.56	3.78	0.00	na	na
16"	14	11.43	5.94-16.92	2.74	0.00	na	na
18"	14	7.86	1.86-13.86	3.00	0.00	na	na
20"	14	2.14	0.00-4.41	1.14	0.00	na	na
22"	14	1.43	0.00-3.37	0.97	0.00	na	na
24" +	14	0.71	0.00-2.13	0.71	0.00	na	na

Appendix III-C. (continued)

Forest Management Block A12

Diameter class	n (# plots)	Pine basal area			Hardwood basal area		
		Average	95% CI	SE	Average	95% CI	SE
6"	33	8.79	2.35-15.23	3.22	2.12	0.43-3.81	0.84
8"	33	10.61	4.52-16.70	3.04	5.76	2.17-9.35	1.80
10"	33	12.12	4.75-19.49	3.69	2.73	0.55-4.91	1.09
12"	33	9.09	4.79-13.39	2.15	1.21	0.00-2.65	0.72
14"	33	10.00	6.01-13.99	1.99	2.12	0.03-4.21	1.04
16"	33	11.52	6.29-16.75	2.62	1.52	0.00-3.06	0.77
18"	33	3.64	1.54-5.74	1.05	0.30	0.00-0.90	0.30
20"	33	2.73	0.55-4.91	1.09	0.30	0.00-0.90	0.30
22"	33	0.30	0.00-0.90	0.30	0.00	na	na
24" +	33	0.00	na	na	0.00	na	na

Forest Management Block A13

Diameter class	n (# plots)	Pine basal area			Hardwood basal area		
		Average	95% CI	SE	Average	95% CI	SE
6"	27	6.67	1.12-12.22	2.77	2.96	0.39-5.53	1.29
8"	27	10.00	3.17-16.84	3.42	2.96	0.00-6.13	1.58
10"	27	5.93	2.35-9.51	1.79	1.48	0.00-3.23	0.88
12"	27	8.89	4.20-13.58	2.35	1.11	0.00-2.74	0.82
14"	27	12.22	6.54-17.90	2.84	1.85	0.00-3.71	0.93
16"	27	7.04	2.66-11.42	2.19	0.37	0.00-1.11	0.37
18"	27	2.22	0.27-4.17	0.97	0.00	na	na
20"	27	0.74	0.00-1.77	0.51	0.00	na	na
22"	27	0.00	na	na	0.00	na	na
24" +	27	0.00	na	na	0.00	na	na

Appendix III-C. (continued)

Forest Management Block A14

Diameter class	n (# plots)	Pine basal area			Hardwood basal area		
		Average	95% CI	SE	Average	95% CI	SE
6"	22	8.18	3.50-12.86	2.34	1.36	0.00-2.85	0.75
8"	22	12.27	3.07-21.47	4.60	0.45	0.00-1.35	0.45
10"	22	18.18	9.00-27.36	4.59	0.91	0.00-2.17	0.63
12"	22	11.36	6.05-16.67	2.66	0.45	0.00-1.35	0.45
14"	22	7.27	1.98-12.56	2.65	0.91	0.00-2.17	0.63
16"	22	4.55	0.89-8.21	1.83	0.00	na	na
18"	22	1.36	0.00-2.85	0.75	0.00	na	na
20"	22	0.00	na	na	0.00	na	na
22"	22	0.00	na	na	0.00	na	na
24" +	22	0.00	na	na	0.00	na	na

Forest Management Block A15

Diameter class	n (# plots)	Pine basal area			Hardwood basal area		
		Average	95% CI	SE	Average	95% CI	SE
6"	23	9.57	4.78-14.36	2.39	5.22	1.27-9.17	1.98
8"	23	8.70	2.76-14.64	2.97	5.65	1.71-9.59	1.97
10"	23	14.78	7.46-22.10	3.66	3.91	0.90-6.92	1.51
12"	23	14.78	7.15-22.41	3.82	2.17	0.01-4.33	1.08
14"	23	17.83	10.61-25.05	3.61	1.30	0.00-2.73	0.72
16"	23	13.91	6.83-20.99	3.54	0.00	na	na
18"	23	4.35	0.21-8.49	2.07	0.00	na	na
20"	23	2.17	0.01-4.33	1.08	0.00	na	na
22"	23	2.17	0.01-4.33	1.08	0.00	na	na
24" +	23	0.00	na	na	0.00	na	na

Appendix III-C. (continued)

Forest Management Block A16

Diameter class	n (# plots)	Pine basal area			Hardwood basal area		
		Average	95% CI	SE	Average	95% CI	SE
6"	35	10.29	6.49-14.09	1.90	2.57	0.51-4.63	1.03
8"	35	12.29	8.71-15.87	1.79	3.43	0.60-6.26	1.42
10"	35	15.71	9.78-21.64	2.96	1.71	0.00-3.63	0.96
12"	35	18.00	12.10-23.90	2.95	0.57	0.00-1.36	0.40
14"	35	16.86	9.72-24.00	3.57	0.57	0.00-1.36	0.40
16"	35	9.43	5.68-13.18	1.88	0.00	na	na
18"	35	7.14	3.00-11.28	2.07	0.29	0.00-0.87	0.29
20"	35	0.86	0.00-1.82	0.48	0.00	na	na
22"	35	0.00	na	na	0.00	na	na
24" +	35	0.29	0.00-0.87	0.29	0.00	na	na

Forest Management Block A17

Diameter class	n (# plots)	Pine basal area			Hardwood basal area		
		Average	95% CI	SE	Average	95% CI	SE
6"	8	6.25	0.00-12.73	3.24	6.25	0.99-11.51	2.63
8"	8	11.25	0.00-28.34	8.54	6.25	0.00-12.73	3.24
10"	8	17.50	0.00-37.05	9.77	6.25	0.00-12.73	3.24
12"	8	7.50	0.00-17.32	4.91	5.00	0.00-12.56	3.78
14"	8	2.50	0.00-7.50	2.50	5.00	0.00-10.35	2.67
16"	8	0.00	na	na	2.50	0.00-7.50	2.50
18"	8	1.25	0.00-3.75	1.25	0.00	na	na
20"	8	0.00	na	na	2.50	0.00-7.50	2.50
22"	8	0.00	na	na	0.00	na	na
24" +	8	0.00	na	na	0.00	na	na

Appendix III-C. (continued)

Forest Management Block A18

Diameter class	n (# plots)	Pine basal area			Hardwood basal area		
		Average	95% CI	SE	Average	95% CI	SE
6"	17	4.71	1.23-8.19	1.74	1.18	0.00-2.80	0.81
8"	17	5.29	0.72-9.86	2.29	4.12	0.66-7.58	1.73
10"	17	10.59	3.42-17.76	3.58	2.35	0.00-5.07	1.36
12"	17	7.65	2.64-12.66	2.50	1.76	0.00-4.32	1.28
14"	17	11.18	2.80-19.56	4.19	0.59	0.00-1.77	0.59
16"	17	8.24	2.75-13.73	2.74	0.00	na	na
18"	17	5.88	1.33-10.43	2.28	0.59	0.00-1.77	0.59
20"	17	1.18	0.00-2.80	0.81	0.59	0.00-1.77	0.59
22"	17	2.94	0.00-6.27	1.66	1.18	0.00-2.80	0.81
24" +	17	0.00	na	na	0.00	na	na

Forest Management Block A19

Diameter class	n (# plots)	Pine basal area			Hardwood basal area		
		Average	95% CI	SE	Average	95% CI	SE
6"	25	1.20	0.00-2.53	0.66	4.40	0.00-9.31	2.45
8"	25	2.00	0.00-4.00	1.00	3.20	0.69-5.71	1.25
10"	25	6.00	1.24-10.76	2.38	3.20	0.97-5.43	1.11
12"	25	6.40	1.66-11.14	2.37	5.60	1.42-9.78	2.09
14"	25	9.20	3.10-15.30	3.05	4.80	0.31-9.29	2.24
16"	25	2.00	0.00-4.00	1.00	0.80	0.00-1.91	0.55
18"	25	0.80	0.00-1.91	0.55	1.20	0.00-2.53	0.66
20"	25	0.80	0.00-1.91	0.55	0.00	na	na
22"	25	0.40	0.00-1.20	0.40	0.00	na	na
24" +	25	0.80	0.00-1.91	0.55	0.80	0.00-1.91	0.55

Appendix III-C. (continued)

Forest Management Block A20

Diameter class	n (# plots)	Pine basal area			Hardwood basal area		
		Average	95% CI	SE	Average	95% CI	SE
6"	23	6.96	1.41-12.51	2.77	6.52	2.62-10.42	1.95
8"	23	9.13	2.14-16.12	3.50	4.35	1.31-7.39	1.52
10"	23	10.00	5.64-14.36	2.18	4.35	1.89-6.81	1.23
12"	23	16.52	9.56-23.48	3.48	0.00	na	na
14"	23	14.35	8.89-19.81	2.73	2.17	0.01-4.33	1.08
16"	23	11.74	4.78-18.70	3.48	1.30	0.00-2.73	0.72
18"	23	5.65	2.37-8.93	1.64	1.30	0.00-2.73	0.72
20"	23	0.43	0.00-31.29	0.43	0.43	0.00-1.29	0.43
22"	23	0.00	na	na	0.00	na	na
24" +	23	0.00	na	na	0.43	0.00-1.29	0.43

Forest Management Block A21A

Diameter class	n (# plots)	Pine basal area			Hardwood basal area		
		Average	95% CI	SE	Average	95% CI	SE
6"	14	5.71	0.00-13.47	3.88	0.71	0.00-2.13	0.71
8"	14	4.29	0.83-7.75	1.73	0.71	0.00-2.13	0.71
10"	14	7.14	0.00-14.53	3.70	1.43	0.00-3.37	0.97
12"	14	7.14	0.00-14.53	3.70	0.71	0.00-2.13	0.71
14"	14	5.71	0.00-13.18	3.74	2.14	0.00-4.41	1.14
16"	14	5.71	0.70-10.72	2.51	2.86	0.35-5.37	1.25
18"	14	3.57	0.00-8.07	2.25	0.71	0.00-2.13	0.71
20"	14	2.86	0.00-6.13	1.63	0.00	na	na
22"	14	0.00	na	na	0.71	0.00-2.13	0.71
24" +	14	0.71	0.00-2.13	0.71	0.00	na	na

Appendix III-C. (continued)

Forest Management Block A21B

Diameter class	n (# plots)	Pine basal area			Hardwood basal area		
		Average	95% CI	SE	Average	95% CI	SE
6"	10	2.00	0.00-4.67	1.33	10.00	0.00-20.75	5.37
8"	10	7.00	1.00-13.00	3.00	4.00	0.00-10.11	3.06
10"	10	2.00	0.00-4.67	1.33	4.00	0.00-10.11	3.06
12"	10	9.00	4.33-13.67	2.33	2.00	0.00-4.67	1.33
14"	10	9.00	2.04-15.96	3.48	3.00	0.00-7.27	2.13
16"	10	12.00	3.16-20.84	4.42	1.00	0.00-3.00	1.00
18"	10	1.00	0.00-3.00	1.00	0.00	na	na
20"	10	2.00	0.00-4.67	1.33	2.00	0.00-4.67	1.33
22"	10	1.00	0.00-3.00	1.00	1.00	0.00-3.00	1.00
24" +	10	0.00	na	na	1.00	0.00-3.00	1.00

Forest Management Block A22

Diameter class	n (# plots)	Pine basal area			Hardwood basal area		
		Average	95% CI	SE	Average	95% CI	SE
6"	24	10.00	4.23-15.77	2.89	4.17	0.57-7.77	1.80
8"	24	10.00	4.62-15.38	2.69	4.58	0.78-8.38	1.90
10"	24	10.00	4.89-15.11	2.55	3.33	0.47-6.19	1.43
12"	24	11.25	5.31-17.19	2.97	2.50	0.33-4.67	1.09
14"	24	12.08	6.31-17.85	2.89	2.92	0.00-5.99	1.53
16"	24	7.92	2.96-12.88	2.48	2.50	0.00-6.58	1.70
18"	24	4.17	1.24-7.10	1.46	1.25	0.00-3.75	1.25
20"	24	1.67	0.11-3.23	0.78	0.00	na	na
22"	24	0.42	0.00-1.26	0.42	0.00	na	na
24" +	24	0.00	na	na	0.00	na	na

Appendix III-C. (continued)

Forest Management Block A23

Diameter class	n (# plots)	Pine basal area			Hardwood basal area		
		Average	95% CI	SE	Average	95% CI	SE
6"	61	26.30	19.20-33.40	3.55	3.04	0.07-6.01	1.49
8"	61	22.83	15.25-30.41	3.79	0.87	0.00-2.09	0.61
10"	61	14.35	8.17-20.53	3.09	0.22	0.00-0.66	0.22
12"	61	12.17	4.54-19.80	3.82	0.00	na	na
14"	61	1.74	0.00-3.74	1.00	0.00	na	na
16"	61	1.52	0.00-3.48	0.98	0.00	na	na
18"	61	0.00	na	na	0.00	na	na
20"	61	0.00	na	na	0.00	na	na
22"	61	0.00	na	na	0.00	na	na
24" +	61	0.00	na	na	0.00	na	na

Forest Management Block A24

Diameter class	n (# plots)	Pine basal area			Hardwood basal area		
		Average	95% CI	SE	Average	95% CI	SE
6"	54	10.58	6.72-14.44	1.93	0.19	0.00-0.57	0.19
8"	54	13.85	8.93-18.77	2.46	0.58	0.00-1.44	0.43
10"	54	15.19	10.14-20.24	2.52	0.38	0.00-0.91	0.27
12"	54	6.92	4.43-9.41	1.24	0.00	na	na
14"	54	4.23	0.74-7.72	1.74	0.19	0.00-0.57	0.19
16"	54	1.54	0.26-2.82	0.64	0.00	na	na
18"	54	0.00	na	na	0.00	na	na
20"	54	0.00	na	na	0.00	na	na
22"	54	0.00	na	na	0.00	na	na
24" +	54	0.00	na	na	0.00	na	na

Appendix III-C. (continued)

Forest Management Block A25

Diameter class	n (# plots)	Pine basal area			Hardwood basal area		
		Average	95% CI	SE	Average	95% CI	SE
6"	38	0.79	0.00-1.68	0.44	2.37	0.46-4.28	0.96
8"	38	1.84	0.02-3.66	0.91	2.63	0.83-4.43	0.90
10"	38	3.42	1.12-5.72	1.15	5.26	1.44-9.08	1.91
12"	38	7.63	3.98-11.28	1.83	2.89	0.77-5.01	1.06
14"	38	6.32	3.17-9.47	1.57	1.58	0.16-3.00	0.71
16"	38	7.63	3.34-11.92	2.15	0.79	0.00-1.68	0.44
18"	38	4.74	2.05-7.43	1.35	0.79	0.00-1.68	0.44
20"	38	1.84	0.00-4.21	1.18	0.00	na	na
22"	38	0.53	0.00-1.27	0.37	0.26	0.00-0.78	0.26
24" +	38	0.00	na	na	0.26	0.00-0.78	0.26

Forest Management Block A26

Diameter class	n (# plots)	Pine basal area			Hardwood basal area		
		Average	95% CI	SE	Average	95% CI	SE
6"	49	3.67	1.68-5.66	1.00	2.45	0.08-4.82	1.19
8"	49	4.69	1.00-8.38	1.85	4.08	1.83-6.33	1.13
10"	49	4.69	2.35-7.03	1.17	3.27	0.98-5.56	1.14
12"	49	9.39	5.33-13.45	2.03	2.86	0.92-4.80	0.97
14"	49	14.29	9.44-19.14	2.42	1.43	0.42-2.44	0.51
16"	49	10.41	7.61-13.21	1.40	1.84	0.02-3.66	0.91
18"	49	6.33	3.61-9.05	1.36	0.61	0.00-1.51	0.45
20"	49	4.29	1.55-7.03	1.37	0.61	0.00-1.30	0.35
22"	49	1.43	0.26-2.60	0.58	0.20	0.00-0.60	0.20
24" +	49	0.41	0.00-0.98	0.29	0.00	na	na

Appendix III-C. (continued)

Forest Management Block A27

Diameter class	n (# plots)	Pine basal area			Hardwood basal area		
		Average	95% CI	SE	Average	95% CI	SE
6"	13	1.54	0.00-4.62	1.54	2.31	0.00-5.64	1.66
8"	13	0.77	0.00-2.31	0.77	2.31	0.00-5.64	1.66
10"	13	9.23	0.00-18.69	4.73	2.31	0.00-4.74	1.22
12"	13	6.15	0.00-12.76	3.31	0.77	0.00-2.31	0.77
14"	13	10.00	2.49-17.51	3.76	2.31	0.00-5.64	1.66
16"	13	10.00	2.49-17.51	3.76	1.54	0.00-3.63	1.04
18"	13	6.92	3.42-10.42	1.75	0.77	0.00-2.31	0.77
20"	13	2.31	0.00-5.64	1.66	0.00	na	na
22"	13	0.00	na	na	1.54	0.00-4.62	1.54
24" +	13	2.31	0.00-4.74	1.22	0.77	0.00-2.31	0.77

Appendix III-C. (continued)

Forest Management Block B01

Diameter class	n (# plots)	Pine basal area			Hardwood basal area		
		Average	95% CI	SE	Average	95% CI	SE
6"	31	3.55	1.00-6.10	1.27	5.81	2.37-9.25	1.72
8"	31	7.42	3.17-11.67	2.12	5.81	1.38-10.24	2.21
10"	31	9.03	5.06-13.00	1.99	5.48	2.29-8.67	1.60
12"	31	8.71	3.74-13.68	2.49	3.55	1.36-5.74	1.09
14"	31	13.23	6.98-19.48	3.12	5.16	2.10-8.22	1.53
16"	31	9.03	5.06-13.00	1.99	3.23	0.88-5.58	1.17
18"	31	4.19	1.78-6.60	1.21	1.61	0.27-2.95	0.67
20"	31	3.23	1.28-5.18	0.97	1.61	0.00-3.24	0.82
22"	31	0.97	0.00-2.05	0.54	0.97	0.00-2.05	0.54
24" +	31	1.29	0.07-2.51	0.61	0.65	0.00-1.55	0.45

Forest Management Block B02

Diameter class	n (# plots)	Pine basal area			Hardwood basal area		
		Average	95% CI	SE	Average	95% CI	SE
6"	12	1.67	0.00-3.92	1.12	4.17	0.31-8.03	1.93
8"	12	1.67	0.00-3.92	1.12	3.33	0.49-6.17	1.42
10"	12	6.67	0.00-13.34	3.33	12.50	1.73-23.27	5.38
12"	12	12.50	4.67-20.33	3.92	7.50	0.00-15.33	3.92
14"	12	10.83	3.26-18.40	3.79	4.17	0.31-8.03	1.93
16"	12	1.67	0.00-3.92	1.12	5.83	0.00-12.08	3.13
18"	12	2.50	0.00-5.11	1.31	0.83	0.00-2.49	0.83
20"	12	1.67	0.00-3.92	1.12	0.83	0.00-2.49	0.83
22"	12	0.83	0.00-2.49	0.83	1.67	0.00-3.92	1.12
24" +	12	0.00	na	na	4.16	1.19-7.13	1.49

Appendix III-C. (continued)

Forest Management Block B03

Diameter class	n (# plots)	Pine basal area			Hardwood basal area		
		Average	95% CI	SE	Average	95% CI	SE
6"	20	5.50	1.28-9.72	2.11	2.50	0.00-5.36	1.43
8"	20	11.00	3.20-18.80	3.90	4.50	1.80-7.20	1.35
10"	20	11.00	4.69-17.31	3.15	4.50	0.53-8.47	1.98
12"	20	5.50	2.43-8.57	1.53	4.00	0.33-7.67	1.84
14"	20	14.00	7.13-20.87	3.43	3.50	0.17-6.83	1.67
16"	20	6.50	2.59-10.41	1.96	0.00	na	na
18"	20	1.50	0.00-3.69	1.09	0.00	na	na
20"	20	0.50	0.00-1.50	0.50	0.00	na	na
22"	20	0.50	0.00-1.50	0.50	0.00	na	na
24" +	20	0.00	na	na	0.00	na	na

Forest Management Block B04

Diameter class	n (# plots)	Pine basal area			Hardwood basal area		
		Average	95% CI	SE	Average	95% CI	SE
6"	5	0.00	na	na	0.00	na	na
8"	5	0.00	na	na	0.00	na	na
10"	5	4.00	0.00-8.90	2.45	0.00	na	na
12"	5	14.00	0.00-28.97	7.48	0.00	na	na
14"	5	30.00	5.51-54.50	12.25	0.00	na	na
16"	5	18.00	3.30-32.70	7.35	0.00	na	na
18"	5	0.00	na	na	0.00	na	na
20"	5	0.00	na	na	0.00	na	na
22"	5	0.00	na	na	0.00	na	na
24" +	5	0.00	na	na	0.00	na	na

Appendix III-C. (continued)

Forest Management Block B05

Diameter class	n (# plots)	Pine basal area			Hardwood basal area		
		Average	95% CI	SE	Average	95% CI	SE
6"	16	5.63	0.16-11.10	2.73	5.00	1.35-8.65	1.83
8"	16	6.25	1.13-11.37	2.56	3.13	0.73-5.53	1.20
10"	16	6.88	1.18-12.58	2.85	2.50	0.26-4.74	1.12
12"	16	8.13	3.57-12.69	2.28	2.50	0.00-7.50	2.50
14"	16	8.13	2.29-13.97	2.92	1.88	0.00-3.90	1.01
16"	16	10.00	3.68-16.33	3.16	3.13	0.00-8.21	2.54
18"	16	6.88	2.51-11.25	2.18	0.00	na	na
20"	16	2.50	0.00-6.37	1.94	0.00	na	na
22"	16	0.00	na	na	0.63	0.00-1.89	0.62
24" +	16	0.00	na	na	0.00	na	na

Forest Management Block B06

Diameter class	n (# plots)	Pine basal area			Hardwood basal area		
		Average	95% CI	SE	Average	95% CI	SE
6"	23	14.78	7.91-21.65	3.44	0.43	0.00-1.29	0.43
8"	23	23.91	13.11-34.71	5.40	2.17	0.00-6.51	2.17
10"	23	21.30	14.05-28.55	3.63	0.87	0.00-2.07	0.60
12"	23	12.17	5.89-18.45	3.14	0.00	na	na
14"	23	8.26	2.55-13.97	2.86	0.00	na	na
16"	23	6.52	2.43-10.61	2.05	0.00	na	na
18"	23	0.87	0.00-2.07	0.60	0.00	na	na
20"	23	0.43	0.00-1.29	0.43	0.00	na	na
22"	23	0.00	na	na	0.00	na	na
24" +	23	0.00	na	na	0.00	na	na

Appendix III-C. (continued)

Forest Management Block B07

Diameter class	n (# plots)	Pine basal area			Hardwood basal area		
		Average	95% CI	SE	Average	95% CI	SE
6"	10	34.00	19.03-48.97	7.48	0.00	na	na
8"	10	37.00	22.38-51.62	7.31	0.00	na	na
10"	10	17.00	6.23-27.77	5.39	0.00	na	na
12"	10	6.00	0.00-12.11	3.06	0.00	na	na
14"	10	4.00	0.00-10.11	3.06	0.00	na	na
16"	10	1.00	0.00-3.00	1.00	0.00	na	na
18"	10	1.00	0.00-3.00	1.00	0.00	na	na
20"	10	0.00	na	na	0.00	na	na
22"	10	0.00	na	na	0.00	na	na
24" +	10	0.00	na	na	0.00	na	na

Forest Management Block B08

Diameter class	n (# plots)	Pine basal area			Hardwood basal area		
		Average	95% CI	SE	Average	95% CI	SE
6"	17	8.82	1.78-15.86	3.52	0.59	0.00-1.77	0.59
8"	17	15.29	7.99-22.59	3.65	1.76	0.00-4.32	1.28
10"	17	22.35	11.85-32.85	5.25	1.18	0.00-3.54	1.18
12"	17	18.24	10.52-25.96	3.86	0.00	na	na
14"	17	11.18	4.13-18.23	3.52	0.00	na	na
16"	17	4.71	0.83-8.59	1.94	0.00	na	na
18"	17	1.76	0.00-3.66	0.95	0.00	na	na
20"	17	1.18	0.00-3.54	1.18	0.00	na	na
22"	17	0.59	0.00-1.77	0.59	0.00	na	na
24" +	17	0.00	na	na	0.00	na	na

Appendix III-C. (continued)

Forest Management Block B09

Diameter class	n (# plots)	Pine basal area			Hardwood basal area		
		Average	95% CI	SE	Average	95% CI	SE
6"	32	7.19	3.35-11.03	1.92	2.81	0.24-5.38	1.29
8"	32	10.00	5.60-14.40	2.20	2.81	0.96-4.66	0.92
10"	32	20.00	12.87-27.13	3.56	0.94	0.00-1.99	0.52
12"	32	22.50	14.99-30.01	3.76	2.50	0.49-4.51	1.00
14"	32	14.38	9.55-19.21	2.42	0.31	0.00-0.93	0.31
16"	32	6.25	2.69-9.81	1.78	0.63	0.00-1.51	0.43
18"	32	2.81	0.24-5.38	1.29	0.63	0.00-1.51	0.43
20"	32	1.88	0.00-3.78	0.95	0.31	0.00-0.93	0.31
22"	32	0.94	0.00-1.99	0.52	0.00	na	na
24" +	32	0.62	0.00-1.48	0.43	0.62	0.00-1.48	0.43

Forest Management Block B10

Diameter class	n (# plots)	Pine basal area			Hardwood basal area		
		Average	95% CI	SE	Average	95% CI	SE
6"	45	5.68	2.97-8.39	1.36	0.68	0.00-1.45	0.38
8"	45	7.05	4.17-9.93	1.44	0.91	0.00-2.00	0.55
10"	45	11.82	7.80-15.84	2.01	1.82	0.00-4.19	1.18
12"	45	6.36	3.17-9.55	1.60	1.36	0.00-3.03	0.83
14"	45	6.82	2.32-11.32	2.25	1.14	0.17-2.11	0.48
16"	45	2.05	0.38-3.72	0.83	1.59	0.00-3.81	0.95
18"	45	1.14	0.00-2.48	0.67	0.91	0.00-2.34	0.71
20"	45	0.23	0.00-0.69	0.23	0.45	0.00-1.08	0.32
22"	45	0.00	na	na	0.23	0.00-0.69	0.23
24" +	45	0.00	na	na	1.14	0.00-3.01	0.93

Appendix III-C. (continued)

Forest Management Block B11

Diameter class	n (# plots)	Pine basal area			Hardwood basal area		
		Average	95% CI	SE	Average	95% CI	SE
6"	24	5.38	2.20-8.56	1.59	0.00	na	na
8"	24	11.92	5.17-18.67	3.38	0.38	0.00-1.14	0.38
10"	24	11.54	6.49-16.59	2.52	0.38	0.00-1.14	0.38
12"	24	12.69	6.46-18.92	3.12	0.00	na	na
14"	24	8.08	4.75-11.41	1.67	0.00	na	na
16"	24	6.54	3.04-10.04	1.75	1.15	0.00-2.84	0.85
18"	24	1.54	0.10-2.98	0.72	0.38	0.00-1.14	0.38
20"	24	2.31	0.29-4.33	1.01	0.38	0.00-1.14	0.38
22"	24	0.38	0.00-1.14	0.38	0.00	na	na
24" +	24	0.00	na	na	0.00	na	na

Forest Management Block B12

Diameter class	n (# plots)	Pine basal area			Hardwood basal area		
		Average	95% CI	SE	Average	95% CI	SE
6"	27	8.44	4.95-11.93	1.75	0.00	na	na
8"	27	8.13	4.07-12.19	2.03	0.31	0.00-0.93	0.31
10"	27	3.13	0.68-5.58	1.22	0.31	0.00-0.93	0.31
12"	27	2.50	0.00-5.61	1.56	0.00	na	na
14"	27	1.88	0.00-4.16	1.14	0.00	na	na
16"	27	0.31	0.00-0.93	0.31	0.00	na	na
18"	27	0.63	0.00-1.51	0.43	0.00	na	na
20"	27	0.00	na	na	0.00	na	na
22"	27	0.00	na	na	0.00	na	na
24" +	27	0.00	na	na	0.00	na	na

Forest Management Block B13

(This forest management block was not inventoried because of its current use as a disposal area.)

Forest Management Block B14

(This forest management block was not inventoried because of its current use as a disposal area.)

Appendix III-C. (continued)

Forest Management Block B15

Diameter class	n (# plots)	Pine basal area			Hardwood basal area		
		Average	95% CI	SE	Average	95% CI	SE
6"	60	4.83	2.00-7.66	1.42	0.17	0.00-0.51	0.17
8"	60	8.83	5.78-11.88	1.52	0.33	0.00-0.79	0.23
10"	60	10.67	6.87-14.47	1.90	0.17	0.00-0.51	0.17
12"	60	8.17	5.50-10.84	1.33	0.00	na	na
14"	60	5.00	2.21-7.79	1.40	0.17	0.00-0.51	0.17
16"	60	2.00	0.67-3.33	0.66	0.00	na	na
18"	60	1.67	0.39-2.95	0.64	0.00	na	na
20"	60	1.17	0.39-2.95	0.48	0.00	na	na
22"	60	0.00	na	na	0.00	na	na
24" +	60	0.17	0.00-0.51	0.17	0.00	na	na

Forest Management Block B16

Diameter class	n (# plots)	Pine basal area			Hardwood basal area		
		Average	95% CI	SE	Average	95% CI	SE
6"	46	8.48	4.55-12.41	1.97	0.43	0.00-1.03	0.30
8"	46	11.09	6.55-15.63	2.27	0.43	0.00-1.03	0.30
10"	46	11.52	6.95-16.09	2.28	0.65	0.00-1.38	0.37
12"	46	5.87	3.42-8.32	1.23	0.00	na	na
14"	46	6.96	4.05-9.87	1.45	0.00	na	na
16"	46	0.65	0.00-1.38	0.37	0.00	na	na
18"	46	1.52	0.14-2.90	0.69	0.00	na	na
20"	46	0.65	0.00-1.38	0.37	0.00	na	na
22"	46	0.22	0.00-0.66	0.22	0.00	na	na
24" +	46	0.00	na	na	0.00	na	na

Appendix III-C. (continued)

Forest Management Block B17

Diameter class	n (# plots)	Pine basal area			Hardwood basal area		
		Average	95% CI	SE	Average	95% CI	SE
6"	75	9.87	7.03-12.71	1.42	1.05	0.17-1.93	0.44
8"	75	10.53	7.40-13.66	1.57	0.39	0.00-0.83	0.22
10"	75	8.42	4.85-11.99	1.79	0.13	0.00-0.39	0.13
12"	75	2.89	1.31-4.47	0.79	0.79	0.00-1.69	0.45
14"	75	1.32	0.37-2.27	0.47	0.13	0.00-0.39	0.13
16"	75	0.13	0.00-0.39	0.13	0.00	na	na
18"	75	0.26	0.00-0.78	0.26	0.00	na	na
20"	75	0.00	na	na	0.00	na	na
22"	75	0.00	na	na	0.00	na	na
24" +	75	0.00	na	na	0.00	na	na

Forest Management Block B18

Diameter class	n (# plots)	Pine basal area			Hardwood basal area		
		Average	95% CI	SE	Average	95% CI	SE
6"	128	11.88	9.36-14.40	1.26	1.64	0.06-3.22	0.79
8"	128	11.64	9.60-13.68	1.02	0.55	0.00-1.15	0.30
10"	128	10.23	8.02-12.44	1.11	0.39	0.00-0.80	0.20
12"	128	4.69	3.17-6.21	0.76	0.00	na	na
14"	128	2.81	1.64-3.98	0.59	0.00	na	na
16"	128	0.31	0.00-0.69	0.19	0.00	na	na
18"	128	0.08	0.00-0.24	0.08	0.00	na	na
20"	128	0.16	0.00-0.39	0.11	0.00	na	na
22"	128	0.00	na	na	0.00	na	na
24" +	128	0.00	na	na	0.00	na	na

Appendix III-C. (continued)

Forest Management Block B19

Diameter class	n (# plots)	Pine basal area			Hardwood basal area		
		Average	95% CI	SE	Average	95% CI	SE
6"	52	10.00	6.80-13.20	1.60	2.88	1.03-4.73	0.92
8"	52	17.50	12.44-22.56	2.53	1.73	0.20-3.26	0.76
10"	52	22.12	16.90-27.34	2.61	0.58	0.00-1.44	0.43
12"	52	11.15	7.36-14.94	1.90	0.00	na	na
14"	52	5.19	2.77-7.61	1.21	0.00	na	na
16"	52	1.15	0.10-2.20	0.52	0.00	na	na
18"	52	0.96	0.14-1.78	0.41	0.00	na	na
20"	52	0.38	0.00-1.14	0.38	0.00	na	na
22"	52	0.00	na	na	0.00	na	na
24" +	52	0.19	0.00-0.57	0.19	0.00	na	na

Forest Management Block B20

Diameter class	n (# plots)	Pine basal area			Hardwood basal area		
		Average	95% CI	SE	Average	95% CI	SE
6"	43	9.77	6.03-13.51	1.87	2.56	0.44-4.68	1.06
8"	43	8.37	5.11-11.63	1.63	2.09	0.15-4.03	0.97
10"	43	15.35	10.31-20.39	2.52	1.16	0.00-2.52	0.68
12"	43	23.26	17.43-29.09	2.91	0.23	0.00-0.69	0.23
14"	43	17.21	12.00-22.42	2.61	0.23	0.00-0.69	0.23
16"	43	6.98	3.75-10.21	1.61	0.00	na	na
18"	43	4.19	1.68-6.70	1.26	0.00	na	na
20"	43	0.93	0.00-2.23	0.65	0.00	na	na
22"	43	0.00	na	na	0.00	na	na
24" +	43	0.00	na	na	0.00	na	na

Appendix III-C. (continued)

Forest Management Block B21

Diameter class	n (# plots)	Pine basal area			Hardwood basal area		
		Average	95% CI	SE	Average	95% CI	SE
6"	68	9.71	6.28-13.14	1.71	0.00	na	na
8"	68	11.03	7.97-14.09	1.53	0.00	na	na
10"	68	8.82	5.64-12.00	1.59	0.00	na	na
12"	68	4.26	1.99-6.53	1.13	0.00	na	na
14"	68	0.44	0.00-0.94	0.25	0.00	na	na
16"	68	0.44	0.00-1.32	0.44	0.00	na	na
18"	68	0.15	0.00-0.45	0.15	0.00	na	na
20"	68	0.00	na	na	0.00	na	na
22"	68	0.00	na	na	0.00	na	na
24" +	68	0.00	na	na	0.00	na	na

Forest Management Block B22

Diameter class	n (# plots)	Pine basal area			Hardwood basal area		
		Average	95% CI	SE	Average	95% CI	SE
6"	51	6.27	3.97-8.57	1.15	1.18	0.00-2.51	0.67
8"	51	9.61	6.39-12.83	1.61	0.98	0.00-1.99	0.51
10"	51	13.14	8.82-17.46	2.16	0.98	0.00-1.99	0.51
12"	51	7.06	3.69-10.43	1.69	0.00	na	na
14"	51	5.49	2.84-8.14	1.32	0.00	na	na
16"	51	2.75	0.88-4.62	0.93	0.39	0.00-0.94	0.27
18"	51	0.98	0.14-1.82	0.42	0.00	na	na
20"	51	0.20	0.00-0.60	0.20	0.00	na	na
22"	51	0.00	na	na	0.00	na	na
24" +	51	0.00	na	na	0.00	na	na

Appendix III-C. (continued)

Forest Management Block B23

Diameter class	n (# plots)	Pine basal area			Hardwood basal area		
		Average	95% CI	SE	Average	95% CI	SE
6"	15	10.00	0.00-20.14	5.07	5.33	1.49-9.17	1.92
8"	15	6.67	0.92-12.42	2.87	0.67	0.00-2.01	0.67
10"	15	19.33	7.71-30.95	5.81	1.33	0.00-3.14	0.91
12"	15	14.00	7.89-20.11	3.06	2.00	0.00-4.90	1.45
14"	15	8.00	3.14-12.86	2.43	4.00	0.20-7.80	1.90
16"	15	8.67	1.40-15.94	3.63	2.67	0.00-5.74	1.53
18"	15	3.33	0.15-6.51	1.59	0.00	na	na
20"	15	1.33	0.00-3.14	0.91	0.00	na	na
22"	15	0.67	0.00-2.01	0.67	0.67	0.00-2.01	0.67
24" +	15	0.67	0.00-2.01	0.67	0.67	0.00-2.01	0.67

Forest Management Block B24

Diameter class	n (# plots)	Pine basal area			Hardwood basal area		
		Average	95% CI	SE	Average	95% CI	SE
6"	77	7.40	5.08-9.72	1.16	0.78	0.06-1.50	0.36
8"	77	10.65	8.05-13.25	1.30	1.69	0.15-3.23	0.77
10"	77	11.04	7.83-14.25	1.61	0.65	0.00-1.51	0.43
12"	77	6.88	4.59-9.17	1.14	0.65	0.00-1.33	0.34
14"	77	2.86	0.98-4.74	0.94	0.39	0.00-0.97	0.29
16"	77	0.52	0.01-1.03	0.25	0.00	na	na
18"	77	0.26	0.00-0.63	0.18	0.00	na	na
20"	77	0.00	na	na	0.00	na	na
22"	77	0.00	na	na	0.00	na	na
24" +	77	0.00	na	na	0.00	na	na

Appendix III-C. (continued)

Forest Management Block B25

Diameter class	n (# plots)	Pine basal area			Hardwood basal area		
		Average	95% CI	SE	Average	95% CI	SE
6"	34	7.65	4.16-11.14	1.74	0.00	na	na
8"	34	11.47	6.83-16.11	2.32	0.00	na	na
10"	34	10.88	6.08-15.68	2.40	0.29	0.00-0.87	0.29
12"	34	5.88	2.94-8.82	1.47	0.29	0.00-0.87	0.29
14"	34	3.24	0.22-6.26	1.51	0.29	0.00-0.87	0.29
16"	34	0.88	0.00-1.86	0.49	0.00	na	na
18"	34	0.29	0.00-0.87	0.29	0.00	na	na
20"	34	0.00	na	na	0.00	na	na
22"	34	0.00	na	na	0.00	na	na
24" +	34	0.00	na	na	0.00	na	na

Appendix III-C. (continued)

Forest Management Block C01

Diameter class	n (# plots)	Pine basal area			Hardwood basal area		
		Average	95% CI	SE	Average	95% CI	SE
6"	66	1.96	0.00-3.98	1.01	7.06	3.37-10.75	1.84
8"	66	3.33	0.33-6.33	1.50	5.10	2.57-7.63	1.26
10"	66	5.49	2.79-8.19	1.35	3.92	1.68-6.16	1.12
12"	66	3.92	1.23-6.61	1.35	2.55	0.62-4.48	0.96
14"	66	7.06	3.13-10.99	1.97	3.53	1.37-5.69	1.08
16"	66	3.53	1.77-5.29	0.88	2.16	0.64-3.68	0.76
18"	66	2.16	0.54-3.78	0.81	1.18	0.11-2.25	0.53
20"	66	0.98	0.00-1.99	0.51	0.39	0.00-0.94	0.27
22"	66	0.39	0.00-0.94	0.27	0.00	na	na
24" +	66	0.59	0.00-1.26	0.33	0.00	na	na

Forest Management Block C02

Diameter class	n (# plots)	Pine basal area			Hardwood basal area		
		Average	95% CI	SE	Average	95% CI	SE
6"	41	6.67	1.47-11.87	2.60	7.27	3.26-11.28	2.01
8"	41	5.45	1.85-9.05	1.80	3.94	0.69-7.19	1.62
10"	41	10.00	4.29-15.71	2.85	11.52	5.11-17.93	3.20
12"	41	6.67	3.01-10.33	1.83	9.39	4.17-14.61	2.61
14"	41	7.58	2.65-12.51	2.46	6.36	2.59-10.13	1.89
16"	41	3.64	0.65-6.63	1.50	5.15	2.38-7.92	1.38
18"	41	1.21	0.00-2.65	0.72	0.61	0.00-1.46	0.42
20"	41	0.61	0.00-1.46	0.42	1.21	0.00-2.89	0.84
22"	41	0.00	na	na	0.00	na	na
24" +	41	0.00	na	na	0.61	0.00-1.46	0.42

Appendix III-C. (continued)

Forest Management Block C03

Diameter class	n (# plots)	Pine basal area			Hardwood basal area		
		Average	95% CI	SE	Average	95% CI	SE
6"	58	3.97	1.88-6.06	1.04	3.45	1.22-5.68	1.12
8"	58	5.34	2.87-7.81	1.24	3.10	1.00-5.20	1.05
10"	58	7.76	4.89-10.63	1.44	1.90	0.86-2.94	0.52
12"	58	5.86	3.45-8.27	1.21	1.21	0.00-2.43	0.61
14"	58	5.00	2.48-7.52	1.26	1.38	0.00-2.89	0.76
16"	58	1.21	0.21-2.21	0.50	0.52	0.00-1.29	0.38
18"	58	0.69	0.02-1.36	0.34	0.17	0.00-0.51	0.17
20"	58	0.69	0.02-1.36	0.34	0.34	0.00-0.82	0.24
22"	58	0.00	na	na	0.00	na	na
24" +	58	0.17	0.00-0.51	0.17	0.00	na	na

Forest Management Block C04

Diameter class	n (# plots)	Pine basal area			Hardwood basal area		
		Average	95% CI	SE	Average	95% CI	SE
6"	11	2.73	0.00-8.19	2.73	1.82	0.00-4.26	1.22
8"	11	0.00	na	na	2.73	0.00-5.55	1.41
10"	11	2.73	0.00-6.63	1.95	2.73	0.00-6.63	1.95
12"	11	1.82	0.00-4.26	1.22	0.00	na	na
14"	11	2.73	0.00-8.19	2.73	0.91	0.00-2.73	0.91
16"	11	2.73	0.00-6.63	1.95	0.91	0.00-2.73	0.91
18"	11	3.64	0.00-9.22	2.79	0.00	na	na
20"	11	0.91	0.00-2.73	0.91	0.00	na	na
22"	11	2.73	0.00-6.63	1.95	0.00	na	na
24" +	11	0.91	0.00-2.73	0.91	0.00	na	na

Appendix III-C. (continued)

Forest Management Block FP01

Diameter class	n (# plots)	Pine basal area			Hardwood basal area		
		Average	95% CI	SE	Average	95% CI	SE
6"	47	2.77	0.87-4.67	0.95	3.83	1.28-6.38	1.27
8"	47	4.89	1.46-8.32	1.72	1.49	0.28-2.70	0.61
10"	47	5.32	2.41-8.23	1.45	1.06	0.00-2.15	0.55
12"	47	6.17	2.49-9.85	1.84	0.43	0.00-1.03	0.30
14"	47	4.68	2.42-6.94	1.13	0.21	0.00-0.63	0.21
16"	47	0.85	0.00-1.87	0.51	0.85	0.00-2.55	0.85
18"	47	0.21	0.00-0.63	0.21	0.85	0.00-2.04	0.60
20"	47	0.00	na	na	0.00	na	na
22"	47	0.00	na	na	0.00	na	na
24" +	47	0.21	0.00-0.63	0.21	0.00	na	na

Forest Management Block FP02

Diameter class	n (# plots)	Pine basal area			Hardwood basal area		
		Average	95% CI	SE	Average	95% CI	SE
6"	30	2.67	0.54-4.80	1.06	1.67	0.00-4.40	1.36
8"	30	3.00	1.05-4.95	0.98	1.00	0.00-2.47	0.74
10"	30	9.33	4.74-13.92	2.30	0.33	0.00-0.99	0.33
12"	30	8.00	4.36-11.64	1.82	0.00	na	na
14"	30	2.33	0.76-3.90	0.79	0.00	na	na
16"	30	2.67	0.00-6.74	2.03	0.00	na	na
18"	30	0.33	0.00-6.74	0.33	0.00	na	na
20"	30	0.00	na	na	0.33	0.00-0.99	0.33
22"	30	0.33	0.00-0.99	0.33	0.00	na	na
24" +	30	0.00	na	na	0.00	na	na

Appendix III-C. (continued)

Forest Management Block FT01

Diameter class	n (# plots)	Pine basal area			Hardwood basal area		
		Average	95% CI	SE	Average	95% CI	SE
6"	6	0.00	na	na	10.00	na	na
8"	6	0.00	na	na	11.67	3.64-19.70	4.01
10"	6	0.00	na	na	1.67	0.00-5.01	1.67
12"	6	0.00	na	na	0.00	na	na
14"	6	0.00	na	na	0.00	na	na
16"	6	0.00	na	na	0.00	na	na
18"	6	0.00	na	na	0.00	na	na
20"	6	0.00	na	na	0.00	na	na
22"	6	0.00	na	na	0.00	na	na
24" +	6	0.00	na	na	0.00	na	na

Forest Management Block FT02

Diameter class	n (# plots)	Pine basal area			Hardwood basal area		
		Average	95% CI	SE	Average	95% CI	SE
6"	6	0.00	na	na	8.33	5.00-11.66	1.67
8"	6	0.00	na	na	5.00	0.53-9.47	2.24
10"	6	0.00	na	na	5.00	0.00-11.83	3.42
12"	6	0.00	na	na	0.00	na	na
14"	6	0.00	na	na	0.00	na	na
16"	6	0.00	na	na	0.00	na	na
18"	6	0.00	na	na	0.00	na	na
20"	6	0.00	na	na	0.00	na	na
22"	6	0.00	na	na	0.00	na	na
24" +	6	0.00	na	na	0.00	na	na

Appendix III-C. (continued)

Forest Management Block K01

Diameter class	n (# plots)	Pine basal area			Hardwood basal area		
		Average	95% CI	SE	Average	95% CI	SE
6"	22	2.67	0.00-5.74	1.53	6.00	1.30-10.70	2.35
8"	22	3.33	0.00-7.06	1.87	5.33	0.00-11.14	2.91
10"	22	1.33	0.00-3.99	1.33	2.00	0.00-4.90	1.45
12"	22	10.00	3.53-16.47	3.24	5.33	0.22-10.44	2.56
14"	22	12.00	2.40-21.60	4.80	11.33	2.00-20.66	4.67
16"	22	7.33	0.17-14.49	3.58	6.00	0.91-11.09	2.54
18"	22	4.67	0.36-8.98	2.15	4.00	0.20-7.80	1.90
20"	22	2.00	0.00-4.90	1.45	1.33	0.00-3.99	1.33
22"	22	2.00	0.00-4.90	1.45	0.00	na	na
24" +	22	0.00	na	na	0.00	na	na

Forest Management Block K02

Diameter class	n (# plots)	Pine basal area			Hardwood basal area		
		Average	95% CI	SE	Average	95% CI	SE
6"	42	2.00	0.00-4.43	1.21	5.67	1.87-9.47	1.90
8"	42	1.00	0.00-2.47	0.74	12.33	4.56-20.10	3.89
10"	42	7.67	0.00-15.85	4.09	8.00	4.62-11.38	1.69
12"	42	7.00	2.29-11.71	2.36	4.33	1.67-6.99	1.33
14"	42	10.00	4.58-15.43	2.71	8.00	3.36-12.64	2.32
16"	42	7.33	2.64-12.02	2.35	3.33	0.92-5.74	1.21
18"	42	4.00	1.36-6.64	1.32	1.00	0.00-2.47	0.74
20"	42	1.00	0.00-2.47	0.74	0.00	na	na
22"	42	0.00	na	na	0.33	0.00-0.99	0.33
24" +	42	0.00	na	na	0.33	0.00-0.99	0.33

Appendix III-C. (continued)

Forest Management Block K03

Diameter class	n (# plots)	Pine basal area			Hardwood basal area		
		Average	95% CI	SE	Average	95% CI	SE
6"	51	0.71	0.00-1.76	0.53	5.00	1.86-8.14	1.57
8"	51	2.86	0.11-5.61	1.38	5.71	2.43-8.99	1.64
10"	51	2.62	0.68-4.56	0.97	2.38	0.14-4.62	1.12
12"	51	3.10	0.89-5.31	1.10	4.52	0.37-8.67	2.08
14"	51	4.76	0.00-9.78	2.51	4.05	1.32-6.78	1.37
16"	51	4.52	1.46-7.58	1.53	2.14	0.00-4.55	1.21
18"	51	2.62	0.68-4.56	0.97	2.86	0.19-5.53	1.33
20"	51	0.24	0.00-0.72	0.24	0.71	0.00-1.51	0.40
22"	51	0.24	0.00-0.72	0.24	0.00	na	na
24" +	51	0.48	0.00-1.44	0.48	0.00	na	na

Forest Management Block K04

Diameter class	n (# plots)	Pine basal area			Hardwood basal area		
		Average	95% CI	SE	Average	95% CI	SE
6"	53	1.79	0.01-3.57	0.89	7.44	3.30-11.58	2.07
8"	53	2.82	0.18-5.46	1.32	5.90	2.89-8.91	1.50
10"	53	3.33	1.34-5.32	0.99	4.62	1.34-7.90	1.64
12"	53	5.38	2.37-8.39	1.51	1.54	0.00-3.11	0.78
14"	53	6.67	2.12-11.22	2.27	0.26	0.00-0.78	0.26
16"	53	2.31	0.44-4.18	0.93	0.00	na	na
18"	53	1.79	0.00-4.09	1.15	0.00	na	na
20"	53	0.77	0.00-1.91	0.57	0.00	na	na
22"	53	0.00	na	na	0.00	na	na
24" +	53	0.00	na	na	0.00	na	na

Appendix III-C. (continued)

Forest Management Block K05

Diameter class	n (# plots)	Pine basal area			Hardwood basal area		
		Average	95% CI	SE	Average	95% CI	SE
6"	17	4.44	0.00-13.32	4.44	7.78	0.00-17.08	4.65
8"	17	4.44	0.00-10.31	2.94	11.11	0.00-24.63	6.76
10"	17	6.67	0.00-13.34	3.33	17.78	7.36-28.20	5.21
12"	17	6.67	0.00-16.10	4.71	6.67	0.00-13.34	3.33
14"	17	8.89	0.00-18.58	4.84	12.22	0.78-23.66	5.72
16"	17	5.56	0.00-11.44	2.94	0.00	na	na
18"	17	7.78	0.00-21.02	6.62	0.00	na	na
20"	17	4.44	0.00-10.31	2.94	0.00	na	na
22"	17	0.00	na	na	0.00	na	na
24" +	17	0.00	na	na	0.00	na	na

Appendix III-C. (continued)

Forest Management Block L01

Diameter class	n (# plots)	Pine basal area			Hardwood basal area		
		Average	95% CI	SE	Average	95% CI	SE
6"	55	3.96	1.53-6.39	1.21	3.58	1.71-5.45	0.94
8"	55	4.15	1.49-6.81	1.33	4.15	2.25-6.05	0.95
10"	55	6.60	3.20-10.00	1.70	4.91	2.52-7.30	1.19
12"	55	5.47	3.41-7.53	1.03	3.21	1.44-4.98	0.88
14"	55	9.43	6.36-12.50	1.53	3.77	1.54-6.00	1.12
16"	55	8.30	4.86-11.74	1.72	1.32	0.24-2.40	0.54
18"	55	8.11	5.26-10.96	1.43	0.57	0.00-1.22	0.32
20"	55	5.47	3.03-7.91	1.22	0.19	0.00-0.57	0.19
22"	55	1.70	0.30-3.10	0.70	0.00	na	na
24" +	55	2.26	0.77-3.75	0.74	1.14	0.10-2.18	0.52

Forest Management Block L02

Diameter class	n (# plots)	Pine basal area			Hardwood basal area		
		Average	95% CI	SE	Average	95% CI	SE
6"	43	6.98	4.11-9.85	1.43	2.33	0.72-3.94	0.80
8"	43	10.93	7.18-14.68	1.88	2.56	0.44-4.68	1.06
10"	43	14.88	9.62-20.14	2.63	1.40	0.14-2.66	0.63
12"	43	23.49	17.18-29.80	3.16	1.16	0.17-2.15	0.49
14"	43	12.56	7.94-17.18	2.31	0.00	na	na
16"	43	6.51	2.75-10.27	1.88	0.00	na	na
18"	43	3.49	1.19-5.79	1.15	0.00	na	na
20"	43	0.23	0.00-0.69	0.23	0.00	na	na
22"	43	0.00	na	na	0.00	na	na
24" +	43	0.46	0.00-1.10	0.32	0.23	0.00-0.69	0.23

Appendix III-C. (concluded)

Forest Management Block L03

Diameter class	n (# plots)	Pine basal area			Hardwood basal area		
		Average	95% CI	SE	Average	95% CI	SE
6"	39	4.55	1.52-7.58	1.51	3.94	1.49-6.39	1.23
8"	39	5.45	2.07-8.83	1.69	3.33	0.36-6.30	1.49
10"	39	6.67	3.22-10.12	1.72	2.12	0.22-4.02	0.95
12"	39	15.76	9.92-21.60	2.92	2.42	0.68-4.16	0.87
14"	39	15.45	11.01-19.89	2.22	1.52	0.00-3.29	0.88
16"	39	18.48	11.57-25.39	3.46	0.00	na	na
18"	39	7.27	3.07-11.47	2.10	0.00	na	na
20"	39	3.64	1.37-5.92	1.14	0.00	na	na
22"	39	1.21	0.00-2.89	0.84	6.98	na	na
24" +	39	0.61	0.00-1.83	0.61	0.00	na	na

Forest Management Block L04

Diameter class	n (# plots)	Pine basal area			Hardwood basal area		
		Average	95% CI	SE	Average	95% CI	SE
6"	41	6.92	3.97-9.87	1.48	1.28	0.00-2.59	0.66
8"	41	8.97	5.54-12.40	1.72	0.51	0.00-1.22	0.36
10"	41	11.54	6.86-16.22	2.34	1.28	0.00-2.78	0.75
12"	41	13.08	5.91-20.25	3.58	0.00	na	na
14"	41	4.36	1.53-7.19	1.41	0.00	na	na
16"	41	3.08	0.62-5.54	1.23	0.00	na	na
18"	41	1.03	0.00-2.26	0.61	0.00	na	na
20"	41	0.26	0.00-0.78	0.26	0.00	na	na
22"	41	0.00	na	na	0.00	na	na
24" +	41	0.00	na	na	0.00	na	na

APPENDIX III-D

SAMPLE SIZES (n), 95% CONFIDENCE INTERVALS (CI), AND STANDARD ERRORS (SE) FOR THE MEAN PINE AND HARDWOOD BASAL AREAS BY DIAMETER CLASS AND STAND TYPE

(using data from 1997/1998 inventory)

Appendix III-D. Sample sizes (n), 95% confidence intervals (CI), and standard errors (SE) for the mean pine and hardwood basal areas by diameter class and stand type

Loblolly Pine Plantation

Diameter class	n (# plots)	Pine basal area			Hardwood basal area		
		Average	95% CI	SE	Average	95% CI	SE
6"	71	11.91	0.00-736.31	362.25	2.06	0.00-106.18	52.03
8"	71	10.44	0.00-540.37	265.00	1.47	0.00-32.66	15.60
10"	71	10.74	0.00-558.05	273.54	0.74	0.00-32.45	15.75
12"	71	5.15	0.00-168.17	81.46	1.47	0.00-56.35	27.45
14"	71	4.41	0.00-196.23	95.95	0.88	0.00-28.87	14.03
16"	71	3.24	0.00-160.16	78.35	1.03	0.00-37.44	18.19
18"	71	0.88	0.00-22.96	11.07	0.00	na	na
20"	71	0.15	0.00-3.13	1.46	0.00	na	na
22"	71	0.15	0.00-3.13	1.46	0.15	0.00-3.13	1.46
24" +	71	0.29	0.00-0.70	0.21	0.15	0.00-0.45	0.15

Longleaf Pine Plantation

Diameter class	n (# plots)	Pine basal area			Hardwood basal area		
		Average	95% CI	SE	Average	95% CI	SE
6"	23	8.29	0.00-352.92	172.37	0.49	0.00-9.93	4.70
8"	23	7.56	0.00-173.28	82.87	0.49	0.00-9.93	4.70
10"	23	5.12	0.00-164.30	79.62	0.00	na	na
12"	23	2.44	0.00-168.25	82.87	0.00	na	na
14"	23	0.98	0.00-18.89	8.91	0.00	na	na
16"	23	0.24	0.00-4.98	2.41	0.00	na	na
18"	23	0.49	0.00-19.85	9.64	0.00	na	na
20"	23	0.00	na	na	0.00	na	na
22"	23	0.00	na	na	0.00	na	na
24" +	23	0.24	0.00-0.72	0.24	0.24	0.00-0.72	0.24

Appendix III-D. (continued)

Slash Pine Plantation

Diameter class	n (# plots)	Pine basal area			Hardwood basal area		
		Average	95% CI	SE	Average	95% CI	SE
6"	86	27.18	0.00-1055.08	514.01	1.97	0.00-135.86	67.01
8"	86	26.76	0.00-1330.46	651.86	0.56	0.00-22.48	11.03
10"	86	15.49	0.00-723.40	354.02	0.14	0.00-2.92	1.40
12"	86	9.30	0.00-930.73	460.51	0.00	na	na
14"	86	2.39	0.00-152.27	75.08	0.00	na	na
16"	86	1.27	0.00-63.40	31.01	0.00	na	na
18"	86	0.14	0.00-2.92	1.40	0.00	na	na
20"	86	0.00	na	na	0.00	na	na
22"	86	0.00	na	na	0.00	na	na
24" +	86	0.00	na	na	0.00	na	na

Loblolly/Slash Pine Plantation

Diameter class	n (# plots)	Pine basal area			Hardwood basal area		
		Average	95% CI	SE	Average	95% CI	SE
6"	8	16.25	0.00-600.89	292.32	0.00	na	na
8"	8	20.00	0.00-661.43	320.72	0.00	na	na
10"	8	26.25	0.00-717.80	345.77	0.00	na	na
12"	8	25.00	0.00-559.53	267.26	0.00	na	na
14"	8	6.25	0.00-109.82	51.78	0.00	na	na
16"	8	5.00	0.00-218.81	106.91	0.00	na	na
18"	8	2.50	0.00-42.59	20.04	0.00	na	na
20"	8	2.50	0.00-96.04	46.77	0.00	na	na
22"	8	1.25	0.00-24.64	11.69	0.00	na	na
24" +	8	0.00	na	na	0.00	na	na

Appendix III-D. (continued)

Loblolly Pine

Diameter class	n (# plots)	Pine basal area			Hardwood basal area		
		Average	95% CI	SE	Average	95% CI	SE
6"	542	5.52	0.00-232.73	113.64	3.24	0.00-87.26	42.07
8"	542	6.79	0.00-322.24	157.80	3.51	0.00-113.68	55.09
10"	542	8.94	0.00-416.29	203.62	3.09	0.00-94.39	45.70
12"	542	10.80	0.00-372.02	180.56	1.88	0.00-56.77	27.43
14"	542	12.28	0.00-421.03	204.01	1.99	0.00-74.26	35.49
16"	542	10.21	0.00-379.78	184.76	1.10	0.00-37.40	18.16
18"	542	4.91	0.00-139.15	67.18	0.57	0.00-14.37	6.89
20"	542	2.49	0.00-81.80	39.59	0.38	0.00-10.74	5.17
22"	542	0.82	0.00-22.77	10.92	0.17	0.00-4.27	2.06
24" +	542	0.32	0.16-0.48	0.08	0.25	0.11-0.39	0.07

Longleaf Pine

Diameter class	n (# plots)	Pine basal area			Hardwood basal area		
		Average	95% CI	SE	Average	95% CI	SE
6"	445	7.14	0.00-246.73	119.85	1.57	0.00-59.04	28.72
8"	445	10.96	0.00-420.36	204.70	0.75	0.00-28.72	13.97
10"	445	13.42	0.00-562.14	274.34	0.40	0.00-9.98	4.77
12"	445	10.73	0.00-441.84	226.20	0.16	0.00-3.31	1.61
14"	445	6.16	0.00-463.30	122.63	0.12	0.00-3.46	1.63
16"	445	2.25	0.00-251.45	44.18	0.16	0.00-8.81	4.43
18"	445	0.59	0.00-90.68	9.74	0.05	0.00-2.05	0.94
20"	445	0.14	0.00-2.90	1.39	0.00	na	na
22"	445	0.00	na	na	0.02	0.00-0.42	0.23
24" +	445	0.02	0.00-0.06	0.02	0.00	na	na

Appendix III-D. (continued)

Pond Pine

Diameter class	n (# plots)	Pine basal area			Hardwood basal area		
		Average	95% CI	SE	Average	95% CI	SE
6"	300	8.43	0.00-308.41	149.95	1.27	0.00-44.90	21.83
8"	300	10.43	0.00-283.96	136.83	1.20	0.00-46.39	22.67
10"	300	11.77	0.00-454.96	221.64	0.74	0.00-21.21	10.18
12"	300	7.39	0.00-228.22	110.44	0.50	0.00-19.36	9.46
14"	300	4.85	0.00-203.65	99.39	0.17	0.00-4.88	2.32
16"	300	1.10	0.00-27.38	13.19	0.03	0.00-0.63	0.33
18"	300	0.80	0.00-19.55	9.40	0.00	na	na
20"	300	0.40	0.00-10.76	5.20	0.00	na	na
22"	300	0.00	na	na	0.00	na	na
24" +	300	0.07	0.00-0.17	0.05	0.00	na	na

Loblolly and Longleaf Pine

Diameter class	n (# plots)	Pine basal area			Hardwood basal area		
		Average	95% CI	SE	Average	95% CI	SE
6"	198	7.56	0.00-231.37	111.98	2.07	0.00-70.26	34.14
8"	198	9.79	0.00-313.00	151.65	2.69	0.00-81.51	39.48
10"	198	15.80	0.00-654.64	319.49	1.71	0.00-61.31	29.80
12"	198	18.96	0.00-806.27	393.73	1.24	0.00-41.66	20.27
14"	198	15.34	0.00-537.04	260.80	0.78	0.00-21.46	10.30
16"	198	7.20	0.00-271.95	132.41	0.21	0.00-4.33	2.03
18"	198	3.37	0.00-127.20	61.88	0.31	0.00-6.33	3.02
20"	198	1.35	0.00-37.27	17.92	0.26	0.00-11.59	5.65
22"	198	0.26	0.00-5.34	2.53	0.05	0.00-1.05	0.52
24" +	198	0.21	0.00-0.42	0.10	0.10	0.00-0.24	0.07

Appendix III-D. (continued)

Loblolly and Pond Pine

Diameter class	n (# plots)	Pine basal area			Hardwood basal area		
		Average	95% CI	SE	Average	95% CI	SE
6"	36	3.33	0.00-70.88	33.81	0.56	0.00-22.64	10.96
8"	36	6.94	0.00-218.88	106.04	0.00	na	na
10"	36	5.00	0.00-112.05	53.53	0.00	na	na
12"	36	1.11	0.00-21.12	10.02	0.00	na	na
14"	36	1.11	0.00-32.38	15.65	0.28	0.00-5.80	2.74
16"	36	0.28	0.00-5.80	2.74	0.00	na	na
18"	36	0.28	0.00-5.80	2.74	0.00	na	na
20"	36	0.00	na	na	0.00	na	na
22"	36	0.00	na	na	0.00	na	na
24" +	36	0.28	0.00-0.84	0.28	0.00	na	na

Longleaf and Pond Pine

Diameter class	n (# plots)	Pine basal area			Hardwood basal area		
		Average	95% CI	SE	Average	95% CI	SE
6"	181	8.88	0.00-294.92	142.97	0.11	0.00-2.29	1.06
8"	181	11.50	0.00-406.03	197.22	0.27	0.00-5.54	2.61
10"	181	10.86	0.00-425.65	207.31	0.32	0.00-6.53	3.11
12"	181	6.63	0.00-237.99	115.70	0.00	na	na
14"	181	3.96	0.00-174.29	85.10	0.00	na	na
16"	181	1.55	0.00-51.39	24.93	0.16	0.00-5.46	2.66
18"	181	0.70	0.00-18.08	8.63	0.05	0.00-1.05	0.53
20"	181	0.37	0.00-9.63	4.69	0.05	0.00-1.05	0.53
22"	181	0.11	0.00-2.29	1.06	0.00	na	na
24" +	181	0.00	na	na	0.00	na	na

Appendix III-D. (continued)

Mixed Pine (Loblolly, Longleaf, and Pond Pine)

Diameter class	n (# plots)	Pine basal area			Hardwood basal area		
		Average	95% CI	SE	Average	95% CI	SE
6"	49	6.38	0.00-216.40	105.06	3.40	0.00-366.63	181.84
8"	49	6.38	0.00-190.61	92.16	2.34	0.00-81.58	39.63
10"	49	13.40	0.00-437.17	211.95	2.98	0.00-157.16	77.06
12"	49	14.68	0.00-813.39	399.38	0.64	0.00-21.38	10.34
14"	49	9.36	0.00-451.49	221.10	0.64	0.00-12.75	6.04
16"	49	4.47	0.00-149.13	72.30	0.64	0.00-13.03	4.12
18"	49	2.13	0.00-61.86	29.83	0.21	0.00-4.36	2.10
20"	49	0.64	0.00-12.75	6.04	0.43	0.00-8.75	4.12
22"	49	0.00	na	na	0.21	0.00-4.36	2.10
24" +	49	0.00	na	na	0.21	0.00-0.63	0.21

Lowland Hardwood

Diameter class	n (# plots)	Pine basal area			Hardwood basal area		
		Average	95% CI	SE	Average	95% CI	SE
6"	32	0.00	na	na	12.12	0.00-366.06	176.99
8"	32	0.00	na	na	10.30	0.00-299.29	144.54
10"	32	0.00	na	na	13.33	0.00-599.92	293.37
12"	32	0.30	0.00-6.21	2.98	9.70	0.00-446.62	218.39
14"	32	1.21	0.00-22.81	10.82	9.39	0.00-254.72	122.72
16"	32	0.30	0.00-6.21	2.98	6.67	0.00-249.46	115.82
18"	32	0.00	na	na	3.64	0.00-173.90	85.04
20"	32	0.61	0.00-12.25	5.78	0.61	0.00-12.25	5.78
22"	32	0.30	0.00-6.21	2.98	0.30	0.00-6.21	2.98
24" +	32	0.00	na	na	0.91	0.00-2.18	0.42

Appendix III-D. (continued)

Live Oak

Diameter class	n (# plots)	Pine basal area			Hardwood basal area		
		Average	95% CI	SE	Average	95% CI	SE
6"	6	0.00	na	na	10.00	na	na
8"	6	0.00	na	na	13.33	0.00-135.02	60.86
10"	6	0.00	na	na	6.67	0.00-128.45	60.86
12"	6	0.00	na	na	0.00	na	na
14"	6	0.00	na	na	0.00	na	na
16"	6	0.00	na	na	0.00	na	na
18"	6	0.00	na	na	0.00	na	na
20"	6	0.00	na	na	0.00	na	na
22"	6	0.00	na	na	0.00	na	na
24" +	6	0.00	na	na	0.00	na	na

Mixed Pine and Live Oak

Diameter class	n (# plots)	Pine basal area			Hardwood basal area		
		Average	95% CI	SE	Average	95% CI	SE
6"	62	1.27	0.00-30.97	14.88	6.55	0.00-316.63	154.94
8"	62	3.09	0.00-185.60	91.28	5.09	0.00-180.28	87.61
10"	62	4.00	0.00-147.86	71.93	3.27	0.00-113.68	55.25
12"	62	4.73	0.00-179.92	87.54	0.36	0.00-7.36	3.54
14"	62	4.00	0.00-118.50	57.25	0.91	0.00-39.65	19.35
16"	62	1.45	0.00-33.78	16.21	0.00	na	na
18"	62	0.55	0.00-18.45	8.87	0.36	0.00-14.63	7.21
20"	62	0.18	0.00-3.75	1.80	0.18	0.00-3.75	1.80
22"	62	0.18	0.00-3.75	1.80	0.00	na	na
24" +	62	0.18	0.00-0.54	0.18	0.00	na	na

Appendix III-D. (continued)

Longleaf Pine and Live Oak

Diameter class	n (# plots)	Pine basal area			Hardwood basal area		
		Average	95% CI	SE	Average	95% CI	SE
6"	7	0.00	na	na	2.86	0.00-46.99	22.04
8"	7	0.00	na	na	0.00	na	na
10"	7	4.29	0.00-119.03	57.31	0.00	na	na
12"	7	0.00	na	na	0.00	na	na
14"	7	2.86	0.00-46.99	22.04	0.00	na	na
16"	7	0.00	na	na	0.00	na	na
18"	7	0.00	na	na	0.00	na	na
20"	7	0.00	na	na	0.00	na	na
22"	7	0.00	na	na	0.00	na	na
24" +	7	0.00	na	na	0.00	na	na

Loblolly Pine and Lowland Hardwood

Diameter class	n (# plots)	Pine basal area			Hardwood basal area		
		Average	95% CI	SE	Average	95% CI	SE
6"	250	2.19	0.00-104.35	51.06	5.97	0.00-271.66	132.85
8"	250	3.08	0.00-141.40	69.27	6.22	0.00-332.73	163.22
10"	250	5.47	0.00-318.34	156.51	6.72	0.00-254.56	123.86
12"	250	5.97	0.00-249.72	121.88	5.17	0.00-200.72	97.85
14"	250	8.41	0.00-470.27	230.88	5.42	0.00-214.68	103.73
16"	250	5.62	0.00-226.47	110.46	2.29	0.00-67.64	32.65
18"	250	3.23	0.00-112.81	54.85	1.09	0.00-32.47	15.76
20"	250	1.04	0.00-29.64	14.37	0.60	0.00-15.92	7.62
22"	250	0.50	0.00-14.04	6.73	0.25	0.00-5.14	2.43
24" +	250	0.75	0.28-1.22	0.23	0.55	0.20-0.90	0.18

Appendix III-D. (continued)

Loblolly Pine and Upland Hardwood

Diameter class	n (# plots)	Pine basal area			Hardwood basal area		
		Average	95% CI	SE	Average	95% CI	SE
6"	3	0.00	na	na	0.00	na	na
8"	3	0.00	na	na	0.00	na	na
10"	3	0.00	na	na	0.00	na	na
12"	3	0.00	na	na	0.00	na	na
14"	3	0.00	na	na	0.00	na	na
16"	3	0.00	na	na	0.00	na	na
18"	3	0.00	na	na	0.00	na	na
20"	3	0.00	na	na	0.00	na	na
22"	3	0.00	na	na	0.00	na	na
24" +	3	0.00	na	na	0.00	na	na

Pond Pine and Lowland Hardwood

Diameter class	n (# plots)	Pine basal area			Hardwood basal area		
		Average	95% CI	SE	Average	95% CI	SE
6"	21	0.00	na	na	1.43	0.00-26.55	12.55
8"	21	0.95	0.00-18.56	8.83	0.95	0.00-18.56	8.83
10"	21	1.90	0.00-91.83	45.08	0.00	na	na
12"	21	0.95	0.00-18.56	8.83	0.00	na	na
14"	21	0.00	na	na	0.00	na	na
16"	21	0.00	na	na	0.00	na	na
18"	21	0.00	na	na	0.00	na	na
20"	21	0.00	na	na	0.00	na	na
22"	21	0.00	na	na	0.00	na	na
24" +	21	0.00	na	na	0.00	na	na

Appendix III-D. (concluded)

Mixed Pine and Lowland Hardwood

Diameter class	n (# plots)	Pine basal area			Hardwood basal area		
		Average	95% CI	SE	Average	95% CI	SE
6"	35	2.59	0.00-117.10	57.31	7.78	0.00-375.24	183.68
8"	35	2.22	0.00-142.98	70.45	6.30	0.00-174.70	84.15
10"	35	5.19	0.00-192.12	93.38	4.81	0.00-191.38	93.38
12"	35	5.93	0.00-221.35	107.64	2.96	0.00-90.66	43.89
14"	35	7.78	0.00-511.15	251.61	3.33	0.00-154.15	75.48
16"	35	4.44	0.00-115.04	55.36	2.22	0.00-67.58	32.71
18"	35	4.44	0.00-205.53	100.65	0.37	0.00-7.63	3.63
20"	35	1.85	0.00-47.65	22.92	0.74	0.00-14.71	6.99
22"	35	1.48	0.00-42.26	20.41	0.00	na	na
24" +	35	0.74	0.00-1.77	0.51	0.00	na	na

Cypress

Diameter class	n (# plots)	Pine basal area			Hardwood basal area		
		Average	95% CI	SE	Average	95% CI	SE
6"	2	0.00	na	na	0.00	na	na
8"	2	0.00	na	na	0.00	na	na
10"	2	0.00	na	na	5.00	0.00-75.71	35.36
12"	2	0.00	na	na	15.00	0.00-651.40	318.20
14"	2	0.00	na	na	0.00	na	na
16"	2	0.00	na	na	20.00	0.00-1151.38	565.69
18"	2	0.00	na	na	15.00	0.00-651.40	318.20
20"	2	5.00	0.00-75.71	35.36	0.00	na	na
22"	2	0.00	na	na	0.00	na	na
24" +	2	0.00	na	na	20.00	0.00-60.00	20.00

APPENDIX III-E

SAMPLE SIZES (n), 95% CONFIDENCE INTERVALS (CI), AND STANDARD ERRORS (SE) FOR THE MEAN PINE AND HARDWOOD REGENERATION STOCKING CLASSES AND BASAL AREAS BY CUTTING UNIT, FOREST MANAGEMENT BLOCK, AND STAND TYPE

(using data from 1997/1998 inventory)

Appendix III-E-1. Sample sizes (n), 95% confidence intervals (CI), and standard errors (SE) for the mean pine and hardwood regeneration and basal areas by Cutting Unit

Cutting Unit (post-1998)	n (# plots)	Pine regeneration Average	Pine regeneration 95% CI	Pine regeneration SE	Hardwood regeneration Average	Hardwood regeneration 95% CI	Hardwood regeneration SE	n (# plots)	Pine basal area Average	Pine basal area 95% CI	Pine basal area SE	Hardwood basal area Average	Hardwood basal area 95% CI	Hardwood basal area SE
I	129	57.21 [a]	39.94-74.48	8.63	64.42 [a]	45.62-83.22	9.40	127	50.00	44.03-55.98	2.99	4.24	2.93-5.55	0.66
II	205	26.44 [a]	17.82-35.06	4.31	88.83 [a]	73.30-104.36	7.76	201	66.54	59.59-73.49	3.47	13.93	12.81-15.05	0.56
III	200	38.15 [a]	26.80-49.50	5.67	72.05 [a]	62.98-81.12	4.54	200	71.50	63.82-79.18	3.84	14.15	13.12-15.18	0.52
IV	102	50.00 [a]	25.19-74.81	4.38	62.84 [a]	48.65-77.03	7.10	102	55.10	47.24-62.96	3.93	15.88	14.65-17.11	0.61
V	118	2.03 [a]	0.44-3.62	0.79	47.46 [a]	36.86-58.06	5.30	119	46.05	40.35-51.75	2.85	23.78	22.13-25.43	0.83
VI	287	79.55 [a]	67.08-92.02	6.23	26.48 [a]	19.33-33.63	3.57	268	49.44	45.95-52.93	1.74	1.88	1.12-2.64	0.38
VII	203	55.03 [a]	44.81-65.25	5.11	54.78 [a]	38.80-70.76	7.99	205	40.99	37.33-44.65	1.83	3.18	1.88-4.48	0.65
VIII	233	49.40 [a]	38.73-60.07	5.33	33.39 [a]	24.86-41.92	4.26	228	54.85	49.86-59.84	2.49	2.92	2.08-3.76	0.42
IX	169	62.31 [a]	47.85-76.77	7.23	31.30 [a]	23.53-39.07	3.88	176	48.83	44.06-53.60	2.38	6.06	4.80-7.32	0.65
X	103	9.90 [a]	2.11-17.69	3.90	59.32 [a]	47.87-70.77	5.73	103	70.48	60.20-80.76	5.14	13.22	11.15-15.29	1.03
XI	11	na	na	na	35.46 [a]	27.20-43.72	4.13	12	na	na	na	20.83	13.23-28.43	3.80
XII	186	10.65 [a]	6.53-14.77	2.06	197.20 [a]	177.54-216.86	9.83	185	31.27	30.17-32.37	0.55	32.15	30.09-34.21	1.03
XIII	176	28.30 [a]	19.20-37.40	4.55	210.34 [a]	184.99-235.69	12.68	176	31.95	29.52-34.38	1.21	23.86	23.33-24.39	0.27
XIV	77	42.47 [a]	31.84-53.10	5.31	252.73 [a]	208.43-297.03	20.79	77	26.50	24.53-28.47	0.98	6.63	4.36-8.90	1.13
XV	176	34.32 [a]	26.35-42.29	3.99	241.25 [a]	217.58-264.92	11.84	178	64.83	57.31-72.35	3.76	12.52	11.38-13.66	0.57

[a] Stocking class (samplings of marketable species 1/2 inch to 5 inches dbh) of fewer than 259 saplings per acre.
[b] Stocking class (samplings of marketable species 1/2 inch to 5 inches dbh) between 260 - 999 saplings per acre.
[c] Stocking class (samplings of marketable species 1/2 inch to 5 inches dbh) more than 1,000 saplings per acre.

Appendix III-E-2. Sample sizes (n), 95% confidence intervals (CI), and standard errors (SE) for the mean pine and hardwood regeneration and basal areas by forest management block

Forest Management Block	n (# plots)	Pine regeneration			Hardwood regeneration			n (# plots)	Pine basal area			Hardwood basal area		
		Average	95% CI	SE	Average	95% CI	SE		Average	95% CI	SE	Average	95% CI	SE
A01	22	37.73[a]	9.72-65.74	14.00	105.00[a]	47.38-162.62	28.81	22	41.81	29.73-53.89	6.04	7.71	4.01-11.41	1.85
A01A	15	76.67[a]	20.75-132.59	27.96	196.00[a]	120.54-271.46	37.73	15	54.01	33.24-74.78	10.38	6.00	0.55-11.45	2.73
A02	12	31.67[a]	7.32-56.02	12.18	40.83[a]	24.79-56.87	8.02	11	82.72	38.58-126.86	22.07	10.00	4.61-15.39	2.70
A03	37	16.76[a]	7.85-25.67	4.45	43.51[a]	26.01-61.01	8.75	36	61.94	46.84-77.04	7.55	3.91	1.75-6.07	1.07
A04	43	102.33[a]	61.29-143.37	20.52	22.33[a]	0.00-46.84	12.25	43	34.41	30.49-38.33	1.96	0.46	0.00-1.10	0.32
A05	51	16.47[a]	9.32-23.62	3.57	97.26[a]	75.89-118.63	10.68	55	49.99	40.12-59.86	4.94	16.00	14.31-17.69	0.84
A06	52	20.39[a]	12.15-28.63	4.12	70.39[a]	35.83-104.95	17.28	44	68.88	52.86-84.90	8.01	4.32	1.38-7.26	1.47
A07	26	11.15[a]	2.68-19.62	4.24	73.85[a]	36.62-111.08	18.61	26	73.45	54.07-92.83	9.69	12.69	7.42-17.96	2.63
A08	33	15.15[a]	9.11-21.19	3.02	58.79[a]	40.98-76.60	8.91	33	68.18	49.02-87.34	9.58	23.64	18.78-28.50	2.43
A09	16	130.63[a]	42.49-218.77	44.07	125.63[a]	82.20-169.06	21.72	16	56.27	36.42-76.12	9.92	13.77	13.12-14.42	0.32
A10	27	23.70[a]	12.65-34.75	5.52	137.78[a]	67.28-208.28	35.25	27	100.00	66.63-133.37	16.68	14.08	11.94-16.22	1.07
A11	14	0.71[a]	0.00-2.13	0.71	77.14[a]	30.34-123.94	23.40	14	53.57	30.66-76.48	11.45	10.71	4.98-16.44	2.86
A12	33	40.61[a]	2.39-78.83	19.11	80.30[a]	51.77-108.83	14.27	33	68.80	51.39-86.21	8.71	15.76	13.62-17.90	1.07
A13	27	34.82[a]	10.99-58.65	11.92	64.07[a]	40.97-87.17	11.55	27	53.71	39.43-67.99	7.14	10.73	7.21-14.25	1.76
A14	22	50.00[a]	11.21-88.79	19.40	44.55[a]	26.66-62.44	8.94	22	63.17	44.35-81.99	9.41	4.08	1.94-6.22	1.07
A15	23	19.57[a]	8.22-30.92	5.68	63.04[a]	38.23-87.85	12.41	23	88.26	58.10-118.42	15.08	18.25	17.24-19.26	0.51
A16	35	57.14[a]	29.74-84.54	13.70	74.86[a]	52.22-97.50	11.32	35	90.87	65.51-116.23	12.68	9.14	5.93-12.35	1.61
A17	8	12.50[a]	0.00-29.30	8.40	36.25[a]	1.42-71.08	17.42	8	46.25	37.74-54.76	4.25	30.00	15.36-44.64	7.32
A18	17	194.12[a,e]	na	na	26.47[a]	14.97-37.97	5.75	17	57.66	35.93-79.39	10.86	12.36	10.24-14.48	1.06
A19	25	4.40[a]	0.00-9.57	2.59	38.40[a]	20.26-56.54	9.07	25	29.60	25.05-34.15	2.27	24.00	22.37-25.63	0.82
A20	23	7.83[a]	1.55-14.11	3.14	95.65[a]	72.65-118.65	11.50	23	74.78	49.88-99.68	12.45	20.85	16.14-25.56	2.36
A21A	14	34.29[a]	3.71-64.87	15.29	25.71[a]	10.06-41.36	7.82	14	42.84	29.22-56.46	6.70	9.98[e]	na	na
A21B	10	0.00[a]	na	na	93.00[a]	36.43-149.57	28.29	10	45.00	22.15-67.85	11.43	26.00	22.00-30.00	2.00
A22	24	65.83[a]	19.39-112.27	23.22	86.25[a]	61.35-111.15	12.45	24	67.51	45.48-89.54	11.01	20.83	18.77-22.89	1.03

Appendix III-E-2. (continued)

Forest Management Block	n (# plots)	Pine regeneration			Hardwood regeneration			n (# plots)	Pine basal area			Hardwood basal area		
		Average	95% CI	SE	Average	95% CI	SE		Average	95% CI	SE	Average	95% CI	SE
A23	74	81.89[a]	45.49-118.29	18.20	31.76[a]	13.24-50.28	9.26	61	78.91	64.71-93.11	7.10	4.13	0.99-7.27	1.57
A24	60	81.00[a]	57.82-104.18	11.59	33.00[a]	15.51-50.49	8.75	54	52.31	43.21-61.41	4.55	1.34	0.24-2.44	0.55
A25	38	1.32[a]	0.00-2.87	0.77	47.37[a]	26.57-68.17	10.40	38	34.74	28.07-41.41	3.34	16.83	14.56-19.10	1.14
A26	49	24.69[a]	9.54-39.84	7.58	86.33[a]	63.57-109.09	11.38	49	59.60	46.74-72.46	6.43	17.35	15.26-19.44	1.04
A27	13	3.08[a]	0.00-6.58	1.75	54.62[a]	20.08-89.16	17.27	13	49.23	29.42-69.04	9.91	14.63	13.22-16.04	0.70
B01	31	2.58[a]	0.00-6.51	1.97	39.03[a]	24.96-53.10	7.04	31	60.65	43.62-77.68	8.51	33.88	25.91-41.85	3.95
B02	12	9.17[a]	0.00-21.60	6.21	44.17[a]	28.90-59.44	7.63	12	40.01	24.00-56.02	7.84	44.99	26.33-63.65	9.33
B03	20	0.00[a]	na	na	54.00[a]	34.24-73.76	9.88	20	56.00	37.33-74.67	9.34	19.00	16.90-21.10	1.05
B04	5	36.00[a]	0.00-108.00	36.00	6.00[a]	0.00-18.00	6.00	5	66.00	22.92-109.08	21.54	0.00	na	na
B05	16	13.75[a]	0.00-38.71	12.48	87.50[a]	40.50-134.50	23.50	16	54.40	32.86-75.94	10.76	18.77	17.06-20.48	0.85
B06	23	0.44[a]	0.00-1.32	0.43	59.13[a]	38.32-79.94	10.41	23	88.24	59.34-117.14	14.45	3.47	0.00-7.92	2.23
B07	10	3.00[a]	0.00-9.00	3.00	70.00[a]	26.80-113.20	21.60	10	100.00	49.67-150.33	25.17	0.00	na	na
B08	17	27.65[a]	0.00-61.24	16.79	59.41[a]	35.62-83.20	11.90	17	84.12	51.00-117.24	16.56	3.53	0.12-6.94	1.70
B09	32	20.00[a]	0.00-51.38	15.69	38.75[a]	23.39-54.11	7.68	32	86.57	61.91-111.23	12.32	11.56	9.53-13.59	1.01
B10	43	72.79[a]	41.35-104.23	15.72	31.86[a]	11.01-52.71	10.42	45	41.15	33.32-48.98	3.91	9.55	5.93-13.17	1.81
B11	26	20.77[a]	1.05-40.49	9.86	24.62[a]	9.48-39.76	7.57	24	60.38	41.93-78.83	9.22	2.67	0.59-4.75	1.05
B12	32	46.56[a]	22.73-70.39	11.92	42.19[a]	7.37-77.01	17.41	27	25.02	21.91-28.13	1.56	0.62	0.00-1.48	0.43
B13[d]	-	-	-	-	-	-	-	-	--	-	-	--	-	-
B14[d]	-	-	-	-	-	-	-	-	--	-	-	--	-	-
B15	59	55.25[a]	34.22-76.28	10.51	24.75[a]	10.72-38.78	7.01	60	42.51	35.44-49.58	3.54	0.84	0.11-1.57	0.36
B16	46	58.91[a]	34.22-83.60	12.34	33.91[a]	13.01-54.81	10.45	46	46.96	37.76-56.16	4.60	1.51	0.45-2.57	0.54
B17	68	91.47[a]	69.18-113.76	11.14	30.00[a]	19.19-40.82	5.41	75	33.42	30.30-36.54	1.56	2.37	1.13-3.61	0.62
B18	127	61.42[a]	47.53-75.31	6.95	63.54[a]	39.67-87.41	11.93	128	41.80	37.03-46.57	2.39	2.58	0.87-4.29	0.85
B19	53	50.76[a]	26.74-74.78	12.01	28.30[a]	13.74-42.86	7.28	52	68.64	54.45-82.83	7.10	5.19	2.89-7.49	1.15

Appendix III-E-2. (concluded)

Forest Management Block	n (# plots)	Pine regeneration			Hardwood regeneration			n (# plots)	Pine basal area			Hardwood basal area		
		Average	95% CI	SE	Average	95% CI	SE		Average	95% CI	SE	Average	95% CI	SE
B20	43	31.63[a]	6.46-56.80	12.58	44.42[a]	27.57-61.27	8.43	43	86.06	64.81-107.31	10.62	6.27	3.45-9.09	1.41
B21	68	100.74[a]	78.39-123.09	11.18	25.29[a]	12.89-37.69	6.20	68	34.85	30.80-38.90	2.03	0.00	na	na
B22	51	60.59[a]	43.06-78.12	8.76	24.51[a]	11.16-37.86	6.68	51	45.50	36.72-54.28	4.39	3.53	1.69-5.37	0.92
B23	14	0.00[a]	na	na	50.00[a]	19.19-80.82	15.41	15	72.67	43.35-101.99	14.66	17.34	13.67-21.01	1.83
B24	76	44.34[a]	30.23-58.45	7.06	40.13[a]	25.29-54.97	7.42	77	39.61	33.89-45.33	2.86	4.16	2.22-6.10	0.97
B25	34	57.94[a]	39.62-76.26	9.16	8.82[a]	2.81-14.83	3.01	34	40.29	31.45-49.13	4.42	0.87	0.00-1.84	0.49
C01	66	20.46[a]	11.04-29.88	4.71	262.27[a]	218.10-306.44	22.09	66	29.41	26.52-32.30	1.44	25.89	23.21-28.57	1.34
C02	41	27.32[a]	11.42-43.22	7.95	187.81[a]	154.72-220.90	16.55	41	41.83	34.07-49.59	3.88	45.45	35.57-55.33	4.94
C03	58	24.48[a]	8.69-40.27	7.90	184.31[a]	136.54-232.08	23.89	58	30.69	26.05-35.33	2.32	12.07	9.43-14.71	1.32
C04	11	99.09[a]	19.94-178.24	39.58	120.00[a]	36.40-203.60	41.80	11	20.93	18.94-22.92	1.00	9.10	5.84-12.36	1.63
FP01	47	48.51[a]	34.22-62.80	7.15	196.17[a]	153.05-239.29	21.56	47	25.10	24.45-25.75	0.32	8.72	5.70-11.74	1.51
FP02	30	33.00[a]	17.77-48.23	7.61	341.33[a]	253.03-429.63	38.97	30	28.66	23.56-33.76	2.55	3.33	0.25-6.41	1.54
FT01	6	0.00[a]	na	na	33.33[a]	21.04-45.62	6.15	6	0.00	na	na	23.34	10.34-36.34	6.50
FT02	5	0.00[a]	na	na	38.00[a]	26.34-49.66	5.83	6	0.00	na	na	18.33	8.56-28.10	4.89
K01	24	0.83[a]	0.00-2.49	0.83	138.75[a]	100.93-176.57	18.91	22	45.33	29.94-60.72	7.69	41.32	27.78-54.86	6.77
K02	41	8.78[a]	0.00-21.26	6.24	140.49[a]	112.43-168.55	14.03	42	40.00	35.11-44.89	2.44	43.32	33.95-52.69	4.69
K03	51	6.28[a]	1.83-10.73	2.22	243.92[a]	199.70-288.14	22.12	51	22.15	18.09-26.21	2.03	27.37	26.00-28.74	0.69
K04	53	21.89[a]	12.84-30.94	4.52	209.06[a]	169.74-248.38	19.66	53	24.86	24.60-25.12	0.13	19.76	16.51-23.01	1.62
K05	17	7.06[a]	1.18-12.94	2.94	239.41[a]	196.17-282.65	21.62	17	48.89	27.66-70.12	10.61	55.56	30.20-80.92	12.68
L01	53	37.17[a]	20.11-54.23	8.53	250.38[a]	211.80-288.96	19.29	55	55.45	43.62-67.28	5.92	22.84	19.67-26.01	1.59
L02	43	37.67[a]	20.27-55.07	8.70	257.91[a]	200.32-315.50	28.79	43	79.53	60.52-98.54	9.51	7.68	5.29-10.07	1.19
L03	39	40.51[a]	23.78-57.24	8.37	291.03[a]	242.05-340.01	24.49	39	79.09	56.80-101.38	11.14	13.33	10.62-16.04	1.35
L04	41	21.22[a]	11.49-30.95	4.87	164.63[a]	127.97-201.29	18.33	41	49.24	39.39-59.09	4.92	3.07	1.11-5.03	0.98

[a] Stocking class (samplings of marketable species 1/2 inch to 5 inches dbh) of fewer than 259 saplings per acre.
[b] Stocking class (samplings of marketable species 1/2 inch to 5 inches dbh) between 260 - 999 saplings per acre.
[c] Stocking class (samplings of marketable species 1/2 inch to 5 inches dbh) more than 1,000 saplings per acre.
[d] FMBs B13 and B14 were not inventoried since, as impounded dredge spoil areas, they support no trees.
[e] Sample size of one.

Appendix III-E-3. Sample sizes (n), 95% confidence intervals (CI), and standard errors (SE) for the mean pine and hardwood regeneration and basal areas by stand type

		Pine regeneration			Hardwood regeneration				Pine basal area			Hardwood basal area		
Stand Type	n (# plots)	Average	95% CI	SE	Average	95% CI	SE	n (# plots)	Average	95% CI	SE	Average	95% CI	SE
Loblolly Pine Plantation (LYP)	74	67.70[a]	42.88-92.52	12.41	75.14[a]	44.47-105.81	15.33	71	47.36	41.11-53.61	3.12	7.95	5.59-10.31	1.18
Longleaf Pine Plantation (LLYP)	35	51.43[a]	19.67-83.19	15.88	39.43[a]	9.15-69.71	15.14	23	25.36	23.16-27.56	1.10	1.22	0.18-2.26	0.52
Slash Pine Plantation (SYP)	98	63.67[a]	57.37-69.97	14.16	39.90[a]	24.41-55.39	7.74	86	82.53	69.55-95.51	6.49	2.67	0.59-4.75	1.04
Loblolly and Slash Pine Plantation (LYP/SYP)	0	0.00[a]	na	na	0.00[a]	na	na	8	105.00	39.10-170.90	32.95	0.00	na	na
Loblolly Pine (L)	543	29.72[a]	24.10-35.34	2.81	107.70[a]	96.87-118.53	5.42	542	63.08	58.94-67.22	2.07	16.18	15.77-16.59	0.20
Longleaf Pine (LL)	438	61.01[a]	53.72-68.30	3.65	83.38[a]	71.11-95.65	6.13	445	51.41	48.15-54.67	1.63	3.23	2.55-3.91	0.34
Pond Pine (PP)	298	43.89[a]	34.58-53.20	4.66	65.10[a]	51.89-78.31	6.61	300	45.24	41.76-48.72	1.74	3.91	3.05-4.77	0.43
Loblolly and Longleaf Pine (L, LL)	198	23.74[a]	16.71-30.77	3.51	53.18[a]	45.06-61.30	4.06	198	79.84	70.87-88.81	4.48	9.42	8.17-10.67	0.62
Loblolly and Pond Pine (L, PP)	36	37.50[a]	20.67-54.33	8.42	50.28[a]	31.00-69.56	9.64	36	18.33	16.64-20.02	0.85	0.84	0.00-2.08	0.61
Longleaf and Pond Pine (LL, PP)	188	62.13[a]	50.93-73.33	5.60	32.07[a]	21.70-42.44	5.19	181	44.56	40.39-48.73	2.08	0.96	0.50-1.42	0.23
Mixed Pine-Loblolly, Longleaf, and Pond Pine (MP)	48	26.04[a]	16.24-35.84	4.90	103.75[a]	66.90-140.60	18.43	49	57.44	45.70-69.18	5.87	11.70	7.12-16.28	2.21
Lowland Hardwood (LH)	36	3.06[a]	0.00-7.34	2.14	166.39[a]	118.95-213.83	23.72	32	2.72	1.15-4.29	0.79	66.97	48.80-85.14	8.92
Live Oak (LO)	6	0.00[a]	na	na	35.00[a]	26.44-43.56	4.28	6	0.00	na	na	30.00	10.68-49.32	9.66
Mixed Pine and Live Oak (MPLO)	66	25.15[a]	14.29-36.01	5.43	236.67[a]	193.24-280.10	21.72	62	19.63	18.08-21.18	0.78	16.72	13.65-19.79	1.54
Longleaf and Live Oak (LLLO)	7	47.14[a]	0.00-99.09	25.98	545.71[b]	374.03-717.39	85.85	7	7.15	1.43-12.87	2.86	2.86	0.00-6.55	1.84

Appendix III-E-3. (concluded)

Stand Type	n (# plots)	Pine regeneration Average	Pine regeneration 95% CI	Pine regeneration SE	Hardwood regeneration Average	Hardwood regeneration 95% CI	Hardwood regeneration SE	n (# plots)	Pine basal area Average	Pine basal area 95% CI	Pine basal area SE	Hardwood basal area Average	Hardwood basal area 95% CI	Hardwood basal area SE
Loblolly and Lowland Hardwood (LLH)	243	18.03[a]	10.17-25.89	3.93	160.00[a]	143.81-176.19	8.10	250	36.26	33.83-38.69	1.22	34.28	31.82-36.74	1.23
Loblolly and Upland Hardwood (LUH)	3	0.00[a]	na	na	0.00[a]	na	na	3	0.00	na	na	0.00	na	na
Pond Pine and Lowland Hardwood (PPLH)	21	11.43[a]	2.67-20.19	4.38	310.48[b]	216.59-404.37	46.94	21	3.80	0.58-7.02	1.61	2.38	0.48-4.28	0.95
Mixed Pine and Lowland Hardwood (MPLH)	34	32.35[a]	5.53-59.17	13.41	171.77[a]	127.38-216.16	22.19	35	36.66	28.89-44.43	3.89	28.51	23.70-33.32	2.40
Cypress (C)	2	0.00[a]	na	na	75.00[a]	0.00-225.00	75.00	2	5.00	0.00-15.00	5.00	75.00	0.00-185.91	55.45

[a] Stocking class (samplings of marketable species 1/2 inch to 5 inches dbh) of fewer than 259 saplings per acre.
[b] Stocking class (samplings of marketable species 1/2 inch to 5 inches dbh) between 260 - 999 saplings per acre.
[c] Stocking class (samplings of marketable species 1/2 inch to 5 inches dbh) more than 1,000 saplings per acre.

APPENDIX III-F

PINE SAWTIMBER, CHIP-N-SAW, AND PULPWOOD, AND HARDWOOD SAWTIMBER AND PULPWOOD CONVERSION FACTORS AND VOLUME FORMULAS

(using data from 1997/1998 inventory)

Section III-F-1. Pine sawtimber, chip-n-saw, and pulpwood and hardwood sawtimber and pulpwood volume conversion factors.

Pine Sawtimber Scribner Dec.-C:

14,500 pounds = 1 MBF (Fort Bragg Forest Resources [USACE])
cubic feet to board feet by diameter class (Table III-F-1-a)

Hardwood Sawtimber Doyle:

14,500 pounds = 1 MBF (Fort Bragg Forest Resources [USACE])
cubic feet to board feet by diameter class (Table III-F-1-a)

Table III-F-1-a. Multipliers to convert cubic feet to board feet by log rule and diameter class.

DBH (inches)	Doyle	Scribner Decimal C
10	2.30	4.45
12	3.00	5.10
14	3.70	5.55
16	4.20	5.85
18	4.70	6.15
20	5.10	6.35
22	5.50	6.50
24	5.90	6.65

USDA 1969

Section III-F-1 (concluded).

Pine pulpwood	5,411 pounds = 1 cord (Fort Bragg Forest Resources [USACE]) 2.7055 tons = 1 cord cubic feet to cords by diameter class (Table III-F-1-b)
Hardwood pulpwood	5,600 pounds = 1 cord (Fort Bragg Forest Resources [USACE]) 2.8000 tons = 1 cord cubic feet to cords by diameter class (Table III-F-1-b)

Pine chip-n-sawuse Pine pulpwood conversion factors

Table III-F-1-b. Cubic feet of wood per average cord (excluding bark).

DBH (inches)	Pine	Other softwood	Hardwood
6	61.0	68.2	60.0
8	68.1	76.0	68.4
10	73.1	81.4	73.4
12	76.7	85.2	76.4
14	79.4	88.2	78.4
16	81.6	90.4	79.8
18	83.3	92.3	80.8
20	84.8	93.8	81.5
22	86.0	95.1	82.1
24 +	87.8	98.2	83.1

Johnson 1990

Section III-F-2. Pine sawtimber, chip-n-saw, and pulpwood and hardwood sawtimber and pulpwood volume formulas.

Pine Sawtimber Scribner Dec.-C:

$$BF = -16.40224 + 0.06777 * dbh^2 + 0.02376 * [dbh^2 * (\#logs * 16.3)] - 0.00265 * [dbh * (\#logs * 16.3)^2] + 0.000097 * (\#logs * 16.3)^3$$ (Clark 1985)

Hardwood Sawtimber Doyle (Girard and Mesavage):

9" - 24" dbh $BF = 0.00153 (dbh^2)^{1.60122} * [(\#logs * 16.3)^3]^{0.21566}$ (Clark 1985)

> 24" dbh $BF = 0.00244 (dbh^2)^{1.48489} * [(\#logs * 16.3)^3]^{0.23199}$ (Clark 1985)

Pine Chip-n-saw : use pine pulpwood formula

Pine Pulpwood (Natural Pine to a 4" top):

5" - 9" dbh Cubic Feet / Tons = $a * [(dbh)^2 * \text{height in feet}]^b$ (Saucier and Clarke 1990)

> 9" dbh Cubic Feet / Tons = $a * [(dbh)^2]^b * (\text{height in feet})^c$ (Saucier and Clarke 1990)

where,

Species Coastal Plain	Coefficients					
	Volume (stem wood only)			Weight (stem wood and bark)		
	a	b	c	a	b	c
Natural pine ≤ 9"	0.02124	0.75609	NA	1.68293	0.74729	NA
Natural pine > 9"	0.00849	0.96481	0.75609	0.70338	0.94581	0.74729

Section III-F-2. (concluded).

Hardwood Pulpwood (to a 4" top)

< 11" dbh Cubic feet / Tons = a * $[(dbh)^2 * \text{height in feet}]^b$ (Saucier and Clarke 1990)

≥ 11" dbh Cubic feet / Tons = a * $[(dbh)^2]^b * (\text{height in feet})^c$ (Saucier and Clarke 1990)

where,

Species	Coefficients					
	Volume (stem wood only)			Weight (stem wood and bark)		
	a	b	c	a	b	c
White oak <	0.0213	0.7624	NA	1.9464	0.7422	NA
≥ 11"	0.00548	1.04659	0.76243	0.48349	1.03263	0.74223
Red oaks < 11"	0.03139	0.71925	NA	2.42448	0.72389	NA
≥ 11"	0.00826	0.99759	0.71925	0.77846	0.96078	0.72389
Water oaks < 11"	0.02222	0.76143	NA	1.95081	0.74867	NA
≥ 11"	0.00880	0.95462	0.76143	0.75786	0.94583	0.74867
Gums < 11"	0.02559	0.74068	NA	2.02923	0.73043	NA
≥ 11"	0.00624	1.03499	0.74068	0.47558	1.03296	0.73043
Hard hdwds <11"	0.02836	0.72908	NA	1.75926	0.74859	NA
≥ 11"	0.00664	1.03183	0.72908	0.40424	1.05524	0.74859
Soft hdwds < 11"	0.03046	0.72102	NA	2.26261	0.70784	NA
≥ 11"	0.00728	1.01957	0.72102	0.42747	1.05531	0.70784

APPENDIX III-G

SAMPLE SIZES (n), 95% CONFIDENCE INTERVALS (CI), AND STANDARD ERRORS (SE) FOR THE CURRENT MEAN PINE AND HARDWOOD TREES PER ACRE AND CURRENT (1998),10-YEAR, AND 20-YEAR PROJECTED PINE AND HARDWOOD TREES PER ACRE BY CUTTING UNIT, FOREST MANAGEMENT BLOCK, AND STAND TYPE

(using data from 1997/1998 inventory)

Appendix III-G-1-A. Sample sizes (n), 95% confidence intervals (CI), and standard errors (SE) for the current mean pine and hardwood trees per acre by Cutting Unit

Cutting Unit (post-1998)	n (# plots)	Current Pine TPA[a] Statistics						Current Hardwood TPA[a] Statistics					
		5"-10" dbh[b]			10"+ dbh[b]			5"-10" dbh[b]			10"+ dbh[b]		
		Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE
I	127	77.14	59.41-94.87	8.52	38.63	32.17-45.09	2.81	11.86	5.77-17.95	2.82	1.98	0.77-3.19	0.60
II	201	69.97	56.98-82.96	5.90	58.37	51.84-64.90	2.84	31.25	23.24-39.26	3.99	7.75	5.50-10.00	1.46
III	200	89.52	73.52-105.52	7.29	52.45	47.26-57.64	2.43	32.01	24.91-39.11	3.63	6.30	4.63-7.97	1.14
IV	102	42.52	28.16-56.88	7.32	40.77	33.71-47.83	3.37	26.47	16.59-36.35	5.31	8.90	5.33-12.47	2.33
V	119	42.29	27.12-57.46	6.06	42.13	34.77-49.49	3.02	44.64	31.13-58.15	6.31	17.09	12.49-21.69	2.42
VI	268	127.48	110.84-144.12	7.24	26.50	22.21-30.79	1.95	7.70	3.16-12.24	1.85	0.50	0.18-0.82	0.27
VII	205	95.50	84.09-106.91	5.61	21.69	18.27-25.11	1.56	12.62	4.59-20.65	3.31	1.14	0.24-2.04	0.53
VIII	228	92.09	79.62-104.56	5.76	43.41	38.08-48.74	2.16	13.16	7.88-18.44	2.04	0.79	0.30-1.28	0.36
IX	176	82.56	69.85-95.27	6.01	40.98	34.14-47.82	2.54	11.70	6.13-17.27	2.29	5.40	2.27-8.53	1.18
X	103	115.39	87.75-143.03	12.85	45.58	38.59-52.57	3.31	19.46	11.88-27.04	4.44	7.63	4.13-11.13	2.47
XI	12	na	na	na	na	na	na	83.17	61.69-104.65	9.90	4.00	0.00-8.51	3.45
XII	185	24.32	14.50-34.14	4.08	30.58	22.79-38.37	3.05	70.08	52.55-87.61	7.83	24.92	18.26-31.58	2.94
XIII	176	44.30	31.20-57.40	5.65	24.65	19.79-29.51	2.17	49.49	35.94-63.04	6.46	17.55	12.40-22.70	2.63
XIV	77	31.95	20.59-43.31	5.71	21.18	15.76-26.60	2.55	21.55	9.13-33.97	5.87	2.31	0.47-4.15	1.04
XV	178	60.88	49.29-72.47	5.53	52.54	46.16-58.92	2.86	25.95	20.15-31.75	3.00	6.83	4.56-9.10	1.49

[a] TPA denotes trees per acre.
[b] Trees in the 10" dbh class were divided evenly between 5-10" dbh and 10"+ dbh.

Appendix III-G-1-B. Current (1998), 10-year, and 20-year projected pine and hardwood trees per acre by Cutting Unit.

Cutting Unit (post-1998)	10-year projected TPA		20-year projected TPA		10-year projected TPA		20-year projected TPA	
	5"-10" dbh	10"+ dbh	5"-10" dbh	10"+ dbh	5"-10" dbh	10"+ dbh	5"-10" dbh	10"+ dbh
I	67.91	63.88	58.85	128.26	11.49	2.36	11.53	4.58
II	45.67	84.42	39.10	168.11	27.93	11.07	27.93	21.88
III	66.35	80.45	52.95	160.09	29.58	8.73	29.61	17.36
IV	28.91	54.85	27.91	108.05	23.89	11.83	24.49	23.21
V	26.50	58.16	18.86	114.68	39.61	22.12	39.61	43.42
VI	149.96	60.41	108.28	140.69	7.37	0.83	10.68	1.66
VII	93.45	48.36	101.13	96.64	12.02	1.74	12.02	3.48
VIII	83.80	74.68	66.77	148.99	12.53	1.42	12.84	2.83
IX	65.56	69.28	50.99	139.44	10.83	6.34	11.36	12.23
X	79.38	82.12	56.92	163.64	16.70	10.38	16.70	20.50
XI	0.00	0.00	0.00	0.00	79.17	7.99	79.17	15.98
XII	19.52	39.75	15.13	78.65	63.47	31.53	63.47	62.78
XIII	38.08	38.98	36.55	77.72	43.98	23.05	44.77	45.74
XIV	51.21	33.89	54.44	67.64	20.61	3.25	23.54	6.42
XV	50.78	73.11	44.61	145.08	23.41	9.37	29.35	18.62

[a] TPA denotes trees per acre

Appendix III-G-2-A. Sample sizes (n), 95% confidence intervals (CI), and standard errors (SE) for the current mean pine and hardwood trees per acre by forest management block

Forest Management Block	n (# plots)	Current Pine TPA[a] Statistics						Current Hardwood TPA[a] Statistics					
		5"-10" dbh[b]			10"+ dbh[b]			5"-10" dbh[b]			10"+ dbh[b]		
		Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE
A01	22	39.47	20.30-58.64	9.58	34.86	20.46-49.26	7.20	22.67	1.25-44.09	10.71	2.18	0.04-4.32	1.06
A01A	15	58.91	28.49-89.33	15.21	42.77	24.47-61.07	9.15	29.07	1.46-56.68	13.80	0.00	0.00	0.00
A02	11	67.51	39.51-95.51	14.00	68.22	58.72-77.72	4.75	17.91	0.00-36.40	9.24	6.01	0.00-13.70	4.26
A03	36	81.08	38.03-124.13	21.52	42.80	33.25-52.35	4.77	3.89	0.00-8.10	2.10	2.33	0.38-4.29	0.97
A04	43	93.03	62.61-123.45	15.21	13.32	6.92-19.72	3.20	1.85	0.00-4.54	1.34	na	na	na
A05	55	40.95	26.45-55.45	7.25	37.25	28.60-45.90	4.33	23.00	12.87-33.13	5.06	10.05	5.31-14.79	2.37
A06	44	73.96	49.06-98.86	12.45	54.20	45.34-63.06	4.43	15.68	1.22-30.14	7.22	0.83	0.00-2.13	0.65
A07	26	81.37	34.86-127.88	23.25	55.70	36.94-74.46	9.38	34.80	3.77-65.83	15.51	5.02	0.00-12.07	3.52
A08	33	54.03	23.96-84.10	15.03	52.20	44.24-60.16	3.98	50.52	31.16-69.88	9.68	12.30	7.07-17.53	2.68
A09	16	54.41	22.19-86.63	16.11	39.75	21.14-58.36	9.31	16.40	0.44-32.36	7.98	10.21	2.40-18.02	3.91
A10	27	98.59	62.01-135.17	18.29	77.19	49.09-105.29	14.05	33.33	12.74-53.92	10.29	4.73	0.00-9.93	2.60
A11	14	35.06	0.70-69.42	17.17	37.40	22.60-52.20	7.40	28.52	3.16-53.88	12.67	3.28	0.00-7.41	2.06
A12	33	86.25	41.18-131.32	22.54	43.70	33.03-54.37	5.34	29.80	15.29-44.31	7.25	7.22	3.26-11.18	2.03
A13	27	68.03	26.82-109.24	20.61	34.82	23.30-46.34	5.76	24.94	5.22-44.66	9.86	4.77	1.18-8.36	1.80
A14	22	93.50	43.49-143.51	25.01	41.97	26.55-57.39	7.71	9.08	0.00-18.33	4.62	2.27	0.00-4.62	1.16
A15	23	87.17	45.58-128.76	20.80	63.27	49.73-76.81	6.77	46.35	23.27-69.43	11.54	7.57	2.37-12.77	2.60
A16	35	101.99	73.69-130.29	14.15	64.35	52.55-76.15	5.90	24.49	10.19-38.79	7.15	2.99	0.00-6.17	1.59
A17	8	80.10	0.00-168.91	44.41	28.64	0.00-59.37	15.36	50.75	7.06-94.44	23.87	17.39	0.00-35.82	10.44

Appendix III-G-2-A. (continued)

Forest Management Block	n (# plots)	Current Pine TPA[a] Statistics						Current Hardwood TPA[a] Statistics					
		5"-10" dbh[b]			10"+ dbh[b]			5"-10" dbh[b]			10"+ dbh[b]		
		Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE
A18	17	48.85	15.63-82.07	16.61	40.77	23.19-58.35	8.79	19.95	8.51-31.39	5.72	6.01	0.00-12.84	3.41
A19	25	17.34	5.25-29.43	6.05	24.90	11.89-37.91	6.50	34.52	5.44-63.60	14.53	16.08	6.57-25.59	4.75
A20	23	70.75	29.05-112.45	20.85	55.43	42.99-67.87	6.22	49.66	27.63-71.69	11.02	8.03	5.03-11.03	1.50
A21A	14	47.27	1.20-93.34	23.36	27.97	13.17-42.77	7.57	7.00	0.00-14.99	3.99	6.94	2.54-11.34	2.20
A21B	10	32.09	14.20-49.98	8.94	32.16	18.41-45.91	6.88	66.06	4.64-127.48	30.71	9.49	2.65-16.33	4.09
A22	24	88.74	49.47-128.01	19.64	43.74	28.78-58.70	7.48	37.41	9.17-65.65	14.12	11.17	2.52-19.82	4.44
A23	61	212.53	165.11-259.95	23.70	31.38	17.24-45.52	7.07	18.19	1.48-34.90	8.35	0.20	0.00-0.60	0.20
A24	54	107.47	78.76-136.18	14.35	27.80	20.22-35.38	3.79	2.99	0.00-7.63	2.32	0.54	0.00-1.34	0.39
A25	38	12.44	3.32-21.56	4.56	27.95	17.23-38.67	5.36	24.43	7.68-41.18	8.37	11.18	4.49-17.87	3.34
A26	49	36.47	18.11-54.83	9.18	43.28	33.28-53.28	5.00	27.15	10.87-43.43	8.14	9.98	4.17-15.79	2.91
A27	13	18.51	0.00-41.14	11.31	38.42	17.86-58.98	10.28	20.48	0.00-43.18	11.35	7.62	1.28-13.96	3.17
B01	31	47.61	24.01-71.21	11.80	42.83	30.82-54.84	6.00	50.95	26.63-75.27	12.23	18.61	11.40-25.82	3.66
B02	12	19.38	2.00-36.76	8.69	35.06	16.72-53.40	9.37	42.23	16.28-68.18	12.97	31.35	11.41-51.29	9.97
B03	20	69.62	32.23-107.01	18.69	36.11	25.89-46.33	5.11	29.75	8.96-50.54	10.40	12.50	4.35-20.65	4.07
B04	5	3.67	0.00-8.16	2.25	62.43	27.02-97.84	17.71	na	na	na	na	na	na
B05	16	52.86	14.68-91.04	19.09	36.44	24.17-48.71	6.14	36.72	15.45-57.99	10.63	9.71	0.00-19.57	4.93
B06	23	163.32	103.14-223.50	30.10	48.11	31.34-64.88	8.39	9.24	0.00-26.90	8.83	0.80	0.00-1.91	0.55
B07	10	294.74	209.12-380.36	42.82	28.25	10.85-45.65	8.70	na	na	na na	na	na	na

Appendix III-G-2-A. (continued)

Forest Management Block	n (# plots)	Current Pine TPA[a] Statistics						Current Hardwood TPA[a] Statistics					
		5"-10" dbh[b]			10"+ dbh[b]			5"-10" dbh[b]			10"+ dbh[b]		
		Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE
B08	17	109.25	50.50-168.00	29.38	59.28	40.37-78.19	9.46	9.14	0.00-21.66	6.25	1.08	0.00-3.24	1.08
B09	32	83.58	52.61-114.55	15.49	67.86	53.73-81.99	7.06	23.25	6.21-40.29	8.51	5.42	0.77-10.07	2.34
B10	45	59.96	41.28-78.64	9.34	27.50	19.40-35.60	4.05	6.59	0.00-13.71	3.83	6.40	0.22-12.58	3.26
B11	24	72.16	40.82-103.50	15.67	41.06	29.30-52.82	5.87	1.46	0.00-3.76	1.14	1.59	0.00-3.41	0.90
B12	27	69.12	46.03-92.21	11.54	8.36	1.12-15.60	3.63	1.19	0.00-3.07	0.93	0.29	0.00-0.87	0.29
B13 [c]	—	—	—	—	—	—	—	—	—	—	—	—	—
B14 [c]	—	—	—	—	—	—	—	—	—	—	—	—	—
B15	60	59.71	38.18-81.24	10.77	27.78	20.56-35.00	3.62	1.97	0.00-4.13	1.07	0.32	0.00-0.77	0.22
B16	46	85.50	56.19-114.81	14.66	26.25	19.38-33.12	3.44	4.06	0.42-7.70	1.82	0.60	0.00-1.28	0.34
B17	75	88.13	68.48-107.78	9.83	12.89	8.35-17.43	2.27	5.94	1.41-10.47	2.52	1.25	0.00-2.63	0.69
B18	128	103.21	88.08-118.34	7.57	18.31	14.70-21.92	1.81	10.28	0.75-19.81	4.76	0.37	0.00-0.76	0.19
B19	52	121.34	96.81-145.87	12.27	40.93	33.88-47.98	3.53	20.18	8.45-31.91	5.86	0.53	0.00-1.31	0.39
B20	43	87.79	62.43-113.15	12.68	67.55	56.25-78.85	5.65	20.11	6.23-33.99	6.93	1.59	0.00-3.18	0.79
B21	68	89.13	66.68-111.58	11.22	14.33	9.42-19.24	2.45	0.00	0.00	0.00	0.00	0.00	0.00
B22	51	71.52	52.30-90.74	9.61	28.78	20.86-36.70	3.96	9.70	1.78-17.62	3.96	1.18	0.09-2.27	0.54
B23	15	87.75	18.21-157.29	34.77	52.19	36.04-68.34	8.08	30.29	11.13-49.45	9.58	9.85	2.40-17.30	3.73
B24	77	78.33	62.73-93.93	7.80	22.07	16.37-27.77	2.85	9.41	2.15-16.67	3.63	1.79	0.01-3.57	0.89
B25	34	81.78	58.42-105.14	11.68	21.29	13.03-29.55	4.13	0.27	0.00-0.81	0.27	0.92	0.00-1.96	0.52

Appendix III-G-2-A. (concluded)

Forest Management Block	n (# plots)	Current Pine TPA[a] Statistics						Current Hardwood TPA[a] Statistics					
		5"-10" dbh[b]			10"+ dbh[b]			5"-10" dbh[b]			10"+ dbh[b]		
		Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE
C01	66	24.58	8.56-40.60	8.01	21.17	14.03-28.31	3.57	54.16	30.70-77.62	11.72	12.52	7.09-17.95	2.72
C02	41	58.74	23.16-94.32	17.79	28.30	17.13-39.47	5.58	58.62	28.55-88.69	15.10	32.80	19.38-46.22	6.83
C03	58	42.62	27.32-57.92	7.65	20.87	14.10-27.64	3.39	28.19	12.24-44.14	7.97	5.19	2.10-8.28	1.55
C04	11	16.39	0.00-43.90	13.75	13.01	1.38-24.64	5.82	19.57	0.00-39.33	9.88	4.00	0.00-8.33	2.17
FP01	47	32.99	17.14-48.84	7.92	17.90	10.69-25.11	3.61	24.75	9.44-40.06	7.65	2.81	0.10-5.52	1.35
FP02	30	30.73	14.86-46.60	7.93	23.15	16.56-29.74	3.29	11.67	0.00-29.38	8.85	0.46	0.00-1.14	0.34
FT01	6	na	na	na	na	na	na	85.89	61.46-110.32	12.21	1.53	0.00-4.59	1.53
FT02	6	na	na	na	na	na	na	61.35	34.64-88.06	13.35	4.58	0.00-10.84	3.13
K01	22	24.35	6.19-42.51	9.08	34.74	15.72-53.76	9.51	47.68	12.11-83.25	17.78	26.40	8.61-44.19	8.89
K02	42	20.08	2.57-37.59	8.76	33.25	15.25-51.25	9.01	71.53	32.90-110.16	19.32	23.51	14.41-32.61	4.56
K03	51	14.24	3.00-25.48	5.62	15.87	7.16-24.58	4.35	44.01	20.96-67.06	11.53	15.21	5.42-25.00	4.89
K04	53	20.28	4.62-35.94	7.83	19.17	9.95-28.39	4.61	59.00	32.21-85.79	13.39	6.43	1.98-10.88	2.22
K05	17	41.49	0.00-102.29	30.39	33.34	15.65-51.03	8.84	87.74	12.50-162.98	37.62	36.21	16.18-56.24	10.02
L01	55	38.13	18.34-57.92	9.89	36.19	29.87-42.51	3.16	34.65	23.22-46.08	5.72	13.70	7.73-19.67	2.98
L02	43	80.50	57.06-103.94	11.72	62.17	50.59-73.75	5.79	20.46	10.22-30.70	5.12	2.83	0.71-4.95	1.06
L03	39	44.89	24.26-65.52	10.31	60.24	47.24-73.24	6.50	31.56	17.08-46.04	7.24	6.45	3.04-9.86	1.70
L04	41	71.54	50.01-93.07	10.77	34.21	20.57-47.85	6.82	9.18	1.70-16.66	3.74	1.18	0.00-2.56	0.69

[a] TPA denotes trees per acre
[b] Trees in the 10" dbh class were divided evenly between 5-10" dbh and 10"+ dbh.
[c] FMBs B13 and B14 were not inventoried since, as impounded dredge spoil areas, they support no trees.

Appendix III-G-2-B. Current (1998), 10-year, and 20-year projected pine and hardwood trees per acre by forest management block.

Forest Management Block	Pine				Hardwood			
	10-year projected TPA		20-year projected TPA		10-year projected TPA		20-year projected TPA	
	5"-10" dbh	10"+ dbh	5"-10" dbh	10"+ dbh	5"-10" dbh	10"+ dbh	5"-10" dbh	10"+ dbh
A01	38.49	53.27	24.69	113.29	21.42	3.43	18.82	9.30
A01A	35.23	66.45	48.99	132.90	29.07	0.00	29.07	0.00
A02	47.21	91.60	19.29	198.35	17.07	6.84	13.17	17.59
A03	61.88	71.75	28.85	161.71	3.63	2.58	4.00	5.18
A04	148.44	106.34	182.26	179.61	2.80	0.34	1.87	1.26
A05	27.29	50.90	32.53	100.54	19.33	13.71	19.33	26.89
A06	46.88	81.28	46.50	162.55	14.84	1.67	14.84	3.34
A07	41.94	95.12	24.98	189.90	32.33	7.49	32.33	14.98
A08	36.66	69.56	32.20	138.98	45.24	17.58	45.24	35.01
A09	72.23	57.94	51.62	128.37	13.53	13.08	9.95	29.74
A10	70.77	111.25	53.56	221.25	30.82	7.23	30.82	14.08
A11	24.46	48.12	9.22	103.59	25.24	6.55	18.08	20.27
A12	67.22	85.20	44.85	161.03	27.30	9.72	19.05	27.55
A13	67.85	68.90	50.88	125.79	23.58	6.13	29.79	16.51
A14	61.81	76.20	24.28	173.24	8.25	3.10	7.60	6.85
A15	61.17	89.28	51.86	176.73	42.76	11.15	42.76	22.30
A16	69.98	96.34	72.59	192.20	22.92	4.56	22.92	9.12
A17	1.46	108.74	2.93	154.88	43.11	29.12	20.03	73.03

Appendix III-G-2-B. (continued)

Forest Management Block	Pine				Hardwood			
	10-year projected TPA		20-year projected TPA		10-year projected TPA		20-year projected TPA	
	5"-10" dbh	10"+ dbh	5"-10" dbh	10"+ dbh	5"-10" dbh	10"+ dbh	5"-10" dbh	10"+ dbh
A18	23.97	65.65	0.00	138.45	11.89	14.06	13.54	21.50
A19	6.98	36.12	0.87	71.86	27.00	23.60	27.00	42.35
A20	50.35	77.68	19.55	172.86	45.67	12.02	39.44	29.93
A21A	44.37	40.00	30.65	87.59	5.69	8.25	7.80	16.23
A21B	20.22	44.02	5.09	91.84	62.39	13.15	56.66	30.41
A22	71.39	81.55	45.93	159.00	34.35	14.22	27.79	35.01
A23	159.78	176.91	6.16	375.04	16.75	1.65	39.58	3.29
A24	139.27	81.39	85.40	176.98	2.63	0.89	1.81	2.61
A25	7.15	33.72	4.51	66.40	19.60	16.00	19.60	31.84
A26	27.20	54.31	36.13	107.74	24.16	12.97	32.47	25.58
A27	7.97	49.07	4.05	98.17	18.36	9.73	15.06	21.95
B01	29.61	61.73	9.94	130.24	46.21	23.34	37.89	53.69
B02	8.49	45.94	4.25	90.28	30.77	42.80	26.00	88.58
B03	43.77	61.95	14.01	137.48	25.62	16.62	19.18	39.69
B04	0.00	66.09	0.00	132.18	0.00	0.00	0.00	0.00
B05	40.06	51.70	16.78	116.57	34.42	11.99	29.95	28.22
B06	75.29	136.14	0.10	278.86	8.44	1.60	5.33	6.32
B07	173.51	149.84	0.36	366.82	0.00	0.00	0.00	0.00
B08	46.77	123.58	24.30	225.05	8.06	2.16	5.53	6.85

Appendix III-G-2-B. (continued)

Forest Management Block	Pine				Hardwood			
	10-year projected TPA		20-year projected TPA		10-year projected TPA		20-year projected TPA	
	5"-10" dbh	10"+ dbh	5"-10" dbh	10"+ dbh	5"-10" dbh	10"+ dbh	5"-10" dbh	10"+ dbh
B09	66.84	100.52	48.65	232.38	24.64	6.28	20.61	16.29
B10	115.91	48.43	120.85	111.79	6.17	8.06	16.70	16.79
B11	52.12	68.72	21.33	149.94	1.10	1.94	0.55	4.25
B12	94.67	34.51	51.70	88.71	0.90	0.57	0.45	1.59
B13 [b]	--	--	--	--	--	--	--	--
B14 [b]	--	--	--	--	--	--	--	--
B15	87.68	62.87	75.37	112.16	1.81	0.47	1.33	1.42
B16	112.86	52.68	75.39	126.57	3.46	1.20	14.67	3.03
B17	228.65	75.89	246.04	206.42	22.87	1.94	31.66	3.87
B18	135.14	44.37	249.43	88.66	9.92	0.72	9.14	2.22
B19	116.38	86.27	65.85	197.77	19.65	1.06	17.17	4.60
B20	81.63	93.62	44.76	211.67	19.03	2.66	19.00	8.32
B21	162.11	54.02	137.40	101.16	0.00	0.00	0.00	0.00
B22	92.02	68.34	76.05	125.04	8.80	2.08	7.40	5.57
B23	60.48	79.45	25.47	183.29	29.07	11.07	28.12	22.67
B24	143.87	62.69	125.02	113.72	8.81	2.38	6.39	7.18
B25	95.61	64.12	76.14	114.85	0.00	1.19	0.00	2.38
C01	44.14	30.96	55.29	61.14	50.56	16.11	43.25	39.35
C02	41.77	45.29	47.70	90.29	48.33	43.07	48.33	85.40

Appendix III-G-2-B. (concluded)

Forest Management Block	Pine				Hardwood			
	10-year projected TPA		20-year projected TPA		10-year projected TPA		20-year projected TPA	
	5"-10" dbh	10"+ dbh	5"-10" dbh	10"+ dbh	5"-10" dbh	10"+ dbh	5"-10" dbh	10"+ dbh
C03	74.36	35.64	56.60	81.00	26.45	6.93	22.01	18.15
C04	16.77	22.46	0.00	53.09	13.17	10.41	30.15	20.81
FP01	96.64	36.79	82.55	73.58	23.77	3.78	21.64	9.70
FP02	20.82	36.00	51.72	71.86	11.36	0.76	55.21	1.37
FT01	0.00	0.00	0.00	0.00	84.36	3.06	85.89	4.59
FT02	0.00	0.00	0.00	0.00	56.77	9.16	61.35	13.74
K01	18.78	40.73	7.22	86.58	45.84	28.23	38.20	63.49
K02	16.37	43.15	11.70	88.07	64.20	30.84	46.53	79.11
K03	27.08	26.45	25.26	46.18	41.83	17.39	33.65	42.64
K04	38.76	26.26	30.15	56.74	54.77	10.66	46.32	29.77
K05	23.93	52.17	12.61	100.89	71.44	52.50	55.53	120.91
L01	53.81	48.19	37.77	102.65	30.15	18.19	40.89	42.02
L02	60.19	91.47	50.97	208.69	19.17	4.10	123.22	11.81
L03	49.34	74.17	31.06	157.64	29.61	8.40	24.83	21.57
L04	70.80	57.64	54.21	146.69	8.00	2.35	91.60	5.44

[a] TPA denotes trees per acre.
[b] FMBs B13 and B14 were not inventoried since, as impounded dredge spoil areas, they support no trees.

Appendix III-G-3-A. Sample sizes (n), 95% confidence intervals (CI), and standard errors (SE) for the current pine and hardwood mean trees per acre by stand type

		Current Pine TPA[a]						Current Hardwood TPA[a]					
		5"-10" dbh[b]			10"+ dbh[b]			5"-10" dbh[b]			10"+ dbh[b]		
Stand Type	n (# plots)	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE
Loblolly Pine Plantation (LYP)	71	100.44	67.83-133.06	16.31	23.59	16.45-30.73	3.56	15.39	4.29-26.49	5.54	4.27	0.84-7.70	1.69
Longleaf Pine Plantation (LLYP)	23	68.61	41.28-95.94	13.66	9.23	3.76-14.70	2.73	3.88	0.00-8.60	2.36	0.07	0.00-0.21	0.07
Slash Pine Plantation (SYP)	86	229.33	193.10-265.56	18.12	29.27	19.53-39.01	4.87	11.79	0.81-22.77	5.49	0.13	0.00-0.39	0.13
Loblolly and Slash Pine Plantation (LYP/SYP)	8	164.13	60.12-268.14	52.01	68.37	48.26-88.48	10.05	0.00	na	na	0.00	na	na
Loblolly Pine (L)	542	55.78	60.12-268.14	3.63	45.06	42.24-47.88	1.41	29.38	25.57-33.19	1.91	8.42	7.10-9.74	0.67
Longleaf Pine (LL)	445	80.06	71.89-88.23	4.09	33.76	30.50-37.02	1.63	10.41	7.27-13.55	1.59	0.85	0.42-1.28	0.21
Pond Pine (PP)	300	83.61	74.40-92.82	4.61	26.22	23.15-29.29	1.53	10.61	6.93-14.29	1.84	1.49	0.79-2.19	0.35
Loblolly and Longleaf Pine (L, LL)	198	81.07	69.60-92.54	5.74	60.83	54.92-66.74	2.95	19.85	13.97-25.73	2.94	4.39	2.77-6.01	0.80
Loblolly and Pond Pine (L, PP)	36	41.45	22.49-60.41	9.48	7.50	4.67-10.33	1.41	2.83	0.00-8.49	2.83	0.26	0.00-0.78	0.26
Longleaf and Pond Pine (LL, PP)	181	88.10	75.63-100.57	6.23	23.83	19.98-27.68	1.92	1.60	0.54-2.66	0.53	0.47	0.13-0.81	0.17
Mixed Pine-Loblolly, Longleaf, and Pond Pine(MP)	49	63.09	43.78-82.40	9.66	44.42	33.39-55.45	5.52	25.71	1.16-50.26	12.49	4.91	1.03-8.79	1.99
Lowland Hardwood (LH)	32	0.00	na	na	2.13	0.20-4.06	0.97	103.23	67.20-139.26	18.05	40.12	26.49-53.75	6.95
Live Oak (LO)	6	0.00	na	na	0.00	na	na	95.25	79.80-110.70	7.72	6.11	0.00-12.22	3.06

Appendix III-G-3-A. (concluded)

Stand Type	n (# plots)	Current Pine TPA[a]						Current Hardwood TPA[a]					
		5"-10" dbh[b]			10"+ dbh[b]			5"-10" dbh[b]			10"+ dbh[b]		
		Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE
Mixed Pine and Live Oak (MPLO)	62	19.03	7.28-30.78	5.87	14.99	9.32-20.66	2.83	50.93	28.51-73.35	11.21	4.61	2.06-7.16	1.27
Longleaf and Live Oak (LLLO)	7	3.93	0.00-9.38	2.73	6.61	0.00-13.25	3.32	14.55	0.00-33.33	9.39	0.00	na	na
Loblolly and Lowland Hardwood (LLH)	250	25.01	17.53-32.49	3.74	27.27	22.63-31.91	2.32	54.34	42.80-65.88	5.78	20.63	16.92-24.34	1.85
Loblolly and Upland Hardwood (LUH)	3	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
Pond Pine and Lowland Hardwood (PPLH)	21	4.47	0.04-8.90	2.22	2.97	0.00-6.99	2.00	10.00	0.13-19.87	4.94	0.00	na	na
Mixed Pine and Lowland Hardwood (MPLH)	35	24.33	1.29-47.37	11.52	26.87	14.29-39.45	6.29	62.07	27.19-96.95	17.43	13.46	5.02-21.90	4.22
Cypress (C)	2	0.00	na	na	2.29	0.00-6.87	2.29	4.58	0.00-13.74	4.58	52.85	0.00-158.55	57.53

[a] TPA denotes trees per acre
[b] Trees in the 10" dbh class were divided evenly between 5-10" dbh and 10" + dbh.

Appendix III-G-3-B. Current (1998), 10-year, and 20-year projected pine and hardwood trees per acre by stand type

Stand Type	Pine				Hardwood			
	10-year projected TPA		20-Year projected TPA		10-year projected TPA		20-Year projected TPA	
	5"-10" dbh	10"+ dbh	5"-10" dbh	10"+ dbh	5"-10" dbh	10"+ dbh	5"-10" dbh	10"+ dbh
Loblolly Pine Plantation (LYP)	166.17	63.32	201.03	210.28	19.49	4.93	31.55	11.86
Longleaf Pine Plantation (LLYP)	59.42	56.72	18.73	111.25	3.18	0.77	10.68	1.47
Slash Pine Plantation (SYP)	163.96	189.36	6.52	390.24	10.85	1.08	35.28	2.14
Loblolly and Slash Pine Plantation (LYP/SYP)	140.06	92.42	164.13	159.18	0.00	0.00	0.00	0.00
Loblolly Pine (L)	188.04	62.94	204.58	166.22	46.87	11.19	198.89	22.09
Longleaf Pine (LL)	469.82	77.43	663.99	159.78	10.04	1.20	19.71	4.55
Pond Pine (PP)	340.81	88.37	310.06	155.85	8.21	3.90	20.04	6.06
Loblolly and Longleaf Pine (L, LL)	75.18	103.37	36.65	216.42	14.42	9.77	10.55	19.36
Loblolly and Pond Pine (L, PP)	52.30	40.47	57.72	74.82	2.83	0.26	71.63	0.52
Longleaf and Pond Pine (LL, PP)	310.18	111.91	369.78	205.06	1.91	1.52	1.65	2.54
Mixed Pine-Loblolly, Longleaf, and Pond Pine(MP)	61.72	65.84	36.32	147.64	22.96	7.62	19.62	18.28
Lowland Hardwood (LH)	0.00	2.13	0.00	3.87	91.26	52.05	61.73	133.04

Appendix III-G-3-B. (concluded)

Stand Type	Pine				Hardwood			
	10-year projected TPA		20-Year projected TPA		10-year projected TPA		20-Year projected TPA	
	5"-10" dbh	10"+ dbh	5"-10" dbh	10"+ dbh	5"-10" dbh	10"+ dbh	5"-10" dbh	10"+ dbh
Mixed Pine and Live Oak (MPLO)	55.41	30.73	52.16	52.37	40.63	14.90	84.48	22.42
Longleaf and Live Oak (LLLO)	29.38	10.54	29.38	21.08	14.55	0.00	14.55	0.00
Loblolly and Lowland Hardwood (LLH)	58.94	41.11	72.55	83.63	48.19	26.71	30.38	70.69
Loblolly and Upland Hardwood (LUH)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pond Pine and Lowland Hardwood (PPLH)	22.50	7.43	22.50	12.14	10.00	0.00	8.64	1.36
Mixed Pine and Lowland Hardwood (MPLH)	31.99	34.80	20.21	77.81	40.63	14.90	69.53	44.44
Cypress (C)	0.00	2.29	0.00	2.29	0.00	57.43	0.00	108.50

[a] TPA denotes trees per acre

APPENDIX III-H

SAMPLE SIZES (n), 95% CONFIDENCE INTERVALS (CI), AND STANDARD ERRORS (SE) FOR THE MEAN AGES OF PINE IN EVEN-AGED PINE STANDS, UNEVEN-AGED PINE STANDS, MIXED PINE-HARDWOOD STANDS, AND AGE DISTRIBUTIONS OF PINE STANDS BY CUTTING UNIT AND FOREST MANAGEMENT BLOCK.

(using data from 1997/1998 inventory)

Appendix III-H-1. Sample sizes (n), 95% confidence intervals (CI), and standard errors (SE) for the mean ages of pine in even-aged pine stands, uneven-aged pine stands, and mixed pine-hardwood stands by Cutting Unit.

Cutting Unit (post-1998)	Mean ages of pine												Age distribution of multi-aged pine stands (age classes)[d, e]
	Even-aged pine stands[a]				Uneven-aged pine stands[b]				Mixed pine-hardwood stands				
	n[c] (# plots)	Average	95% CI	SE	n[c] (# plots)	Average	95% CI	SE	n[c] (# plots)	Average	95% CI	SE	
I	8	35.93	23.16-48.70	5.69	42	49.88	46.10-53.66	1.84	0	na	na	na	30, 40, 50, 60, 70
II	2	54.00	0.00	0.00	80	53.03	50.37-55.69	1.28	5	50.84	28.03-73.65	9.36	30, 50, 60, 70
III	17	45.78	37.65-53.91	3.67	73	48.26	45.09-51.43	1.60	0	na	na	na	30, 40, 50, 60
IV	7	31.70	19.36-44.04	6.15	36	46.07	42.54-49.60	1.78	0	na	na	na	20, 30, 40, 50, 60
V	18	43.89	41.78-46.00	1.01	14	44.25	34.87-53.63	4.90	10	46.39	37.32-55.46	3.98	30, 50, 90
VI	2	44.00	14.59-73.41	4.00	109	44.02	40.70-47.34	1.66	0	na	na	na	30, 40, 50, 60, 80
VII	0	na	na	na	95	51.82	46.42-57.22	2.71	0	na	na	na	30, 40, 50, 60
VIII	0	na	na	na	101	46.47	42.97-49.97	1.77	0	na	na	na	20, 30, 40, 50, 60, 70
IX	17	27.43	22.44-32.42	2.55	55	42.58	39.16-46.00	1.68	1	47.00	0.00	0.00	20, 30, 40, 50, 60, 70
X	5	38.46	26.11-50.81	4.19	39	39.91	35.09-44.73	2.37	0	na	na	na	20, 30, 40, 50, 60
XI	0	na	na	na	0	na	na	na	0	na	na	na	na
XII	0	na	na	na	7	37.00	33.50-40.50	1.57	38	42.12	37.20-47.04	2.51	----[f]
XIII	0	na	na	na	20	42.73	37.08-48.38	2.83	33	47.95	40.96-54.94	3.27	40, 50, 70, 80
XIV	1	42.00	0.00	0.00	22	53.78	46.92-60.64	3.52	7	37.42	24.31-50.53	5.99	60, 70, 80
XV	6	24.52	19.11-29.93	2.50	72	45.79	42.47-49.11	1.65	4	61.52	53.40-69.64	3.15	20, 30, 40, 50, 60, 70

[a] Even-aged pine stands are those stands of pine which have a high-low age spread of less than 10 years.
[b] Uneven-aged pine stands are those stands of pine which have a high-low age spread of 10 years or greater.
[c] Tree ages were measured at Growth plots and only of dominant or codominant pines, therefore plots and stands with no talliable pines were not used in these calculations.
[d] Multi-aged pine stands are (uneven-aged) pine stands with two or more frequently occurring (containing at least 25% of the trees sampled), significantly differing (by 10 years or more) age classes.
[e] Age classes are 10 year classes, i.e. age class 10 represents 1 year to 10 years, age class 20 represents 11 years to 20 years, age class 30 represents 21 years to 30 years, etc.
[f] There were no multi-aged pine stands in Cutting Unit XII.

Appendix III-H-2. Sample sizes (n), 95% confidence intervals (CI), and standard errors (SE) for the mean ages of pine in even-aged pine stands, uneven-aged pine stands, and mixed pine-hardwood stands by forest management block.

Forest Management Block	Mean ages of pine												Age distribution of multi-aged pine stands (age classes)[d, e]
	Even-aged pine stands[a]				Uneven-aged pine stands[b]				Mixed pine-hardwood stands				
	n[c] (# plots)	Average	95% CI	SE	n[c] (# plots)	Average	95% CI	SE	n[c] (# plots)	Average	95% CI	SE	
A01	0	na	na	na	9	51.76	43.58-59.94	3.54	0	na	na	na	40, 50, 60, 70
A01A	0	na	na	na	5	58.00	43.72-72.28	5.16	0	na	na	na	50, 70
A02	5	49.00	45.57-52.43	1.24	0	na	na	na	0	na	na	na	na
A03	0	na	na	na	15	51.17	44.30-58.04	3.12	0	na	na	na	30, 40, 50, 60
A04	3	18.25	3.74-32.76	3.51	13	43.81	34.93-52.69	3.98	0	na	na	na	40, 50, 60
A05	0	na	na	na	20	50.00	45.62-54.39	2.09	0	na	na	na	----[f]
A06	0	na	na	na	21	57.00	53.69-60.31	1.60	1	39.00	0.00	0.00	60, 70
A07	0	na	na	na	12	56.00	48.48-63.52	3.43	0	na	na	na	60, 70
A08	0	na	na	na	17	56.00	49.82-62.18	2.93	0	na	na	na	----[f]
A09	2	54.00	0.00	0.00	0	na	na	na	4	53.00	15.85-90.15	11.57	na
A10	0	na	na	na	10	43.70	33.30-54.10	4.56	0	na	na	na	50, 70
A11	0	na	na	na	7	48.00	36.76-59.24	4.58	0	na	na	na	40, 50
A12	3	33.00	21.38-44.62	2.73	13	47.00	37.33-56.67	4.45	0	na	na	na	----[f]
A13	3	26.38	15.03-37.73	2.67	9	43.00	32.67-53.33	4.48	0	na	na	na	----[f]
A14	6	44.11	31.95-56.27	4.57	2	39.00	0.00-166.06	10.00	0	na	na	na	30, 50
A15	0	na	na	na	11	51.00	46.20-55.80	2.15	0	na	na	na	50, 60
A16	2	68.74	0.00-376.05	19.00	14	54.00	46.54-61.46	3.43	0	na	na	na	----[f]
A17	2	18.00	0.00-50.67	2.50	0	na	na	na	0	na	na	na	na
A18	4	48.40	39.63-57.17	2.72	2	36.00	0.00-106.87	5.50	0	na	na	na	30, 50

Appendix III-H-2 (continued)

Forest Management Block	Mean ages of pine												Age distribution of multi-aged pine stands (age classes)[d, e]
	Even-aged pine stands[a]				Uneven-aged pine stands[b]				Mixed pine-hardwood stands				
	n[c] (# plots)	Average	95% CI	SE	n[c] (# plots)	Average	95% CI	SE	n[c] (# plots)	Average	95% CI	SE	
A19	1	50.00	0.00	0.00	0	na	na	na	7	42.00	28.51-55.49	5.55	na
A20	0	na	na	na	11	58.00	48.93-67.07	4.10	0	na	na	na	----[f]
A21A	1	20.00	0.00	0.00	4	47.00	36.39-57.61	3.35	0	na	na	na	50, 60
A21B	0	na	na	na	2	43.00	0.00-139.41	7.50	1	52.00	0.00	0.00	40, 50
A22	0	na	na	na	11	42.00	33.99-50.01	3.62	0	na	na	na	40, 50
A23	0	na	na	na	24	27.56	24.10-31.02	1.72	0	na	na	na	----[f]
A24	2	44.00	0.00-94.82	4.00	21	44.75	37.59-51.91	3.36	0	na	na	na	30, 40, 60
A25	5	43.53	37.19-49.87	2.24	0	na	na	na	2	43.00	0.00-106.53	5.00	na
A26	0	na	na	na	23	46.98	42.27-51.69	2.28	0	na	na	na	20, 50, 60
A27	3	60.00	51.87-68.13	1.45	2	37.00	0.00-146.48	8.50	0	na	na	na	30, 50
B01	8	44.05	40.80-47.30	1.36	0	na	na	na	8	51.00	36.63-65.37	6.07	na
B02	0	na	na	na	4	39.00	30.12-47.88	2.75	0	na	na	na	40, 50
B03	2	32.65	0.00-128.39	7.50	8	44.00	32.88-55.12	4.67	0	na	na	na	40, 50
B04	1	50.00	0.00	0.00	0	na	na	na	0	na	na	na	na
B05	0	na	na	na	8	44.00	37.29-50.71	2.84	0	na	na	na	40, 50
B06	0	na	na	na	11	42.71	26.95-58.47	6.68	0	na	na	na	40, 60, 100
B07	0	na	na	na	5	32.00	19.48-44.52	4.46	0	na	na	na	30, 50
B08	2	33.00	0.00	0.00	3	27.00	9.15-44.85	4.10	0	na	na	na	20, 30, 40
B09	0	na	na	na	16	42.65	34.44-50.86	3.72	0	na	na	na	20, 40, 70

Appendix III-H-2 (continued)

Forest Management Block	Mean ages of pine												Age distribution of multi-aged pine stands (age classes)[d, e]
	Even-aged pine stands[a]				Uneven-aged pine stands[b]				Mixed pine-hardwood stands				
	n[c] (# plots)	Average	95% CI	SE	n[c] (# plots)	Average	95% CI	SE	n[c] (# plots)	Average	95% CI	SE	
B10	2	20.99	0.00-146.79	12.50	15	43.73	38.26-49.20	2.54	1	47.00	0.00	0.00	40, 50, 60
B11	0	na	na	na	12	46.00	37.31-54.69	3.96	0	na	na	na	40, 50
B12	0	na	na	na	13	37.00	29.46-44.54	3.43	0	na	na	na	30, 40
B13[d]	-	-	-	-	-	-	-	-	-	-	-	-	-
B14[d]	-	-	-	-	-	-	-	-	-	-	-	-	-
B15	0	na	na	na	21	41.96	34.28-49.64	3.83	0	na	na	na	30, 40
B16	0	na	na	na	19	45.95	32.71-59.19	6.43	0	na	na	na	20, 30, 40
B17	15	27.84	22.47-33.21	2.62	12	38.44	31.84-45.04	2.88	0	na	na	na	20, 30, 40, 50
B18	0	na	na	na	59	53.26	44.91-61.61	4.14	0	na	na	na	30, 40, 50, 60
B19	0	na	na	na	26	50.66	46.26-55.06	2.13	0	na	na	na	50, 60
B20	0	na	na	na	22	52.41	46.08-58.74	3.00	0	na	na	na	20, 40, 60, 70
B21	0	na	na	na	25	47.87	43.19-52.55	2.32	0	na	na	na	30, 50, 60
B22	0	na	na	na	23	54.88	44.99-64.77	4.71	0	na	na	na	50, 60, 80
B23	4	41.00	35.19-46.81	1.83	4	45.00	3.72-86.28	12.97	0	na	na	na	30, 50, 90
B24	0	na	na	na	36	49.56	44.91-54.21	2.30	0	na	na	na	40, 50, 60, 70
B25	0	na	na	na	16	46.00	38.76-53.24	3.38	0	na	na	na	40, 50
C01	0	na	na	na	0	na	na	na	18	52.80	40.48-65.12	5.39	na
C02	0	na	na	na	3	63.00	30.71-95.29	7.51	8	42.00	36.12-47.88	2.46	50, 70, 80
C03	0	na	na	na	17	40.00	35.23-44.77	2.27	4	43.18	32.42-53.94	3.33	40, 50

Appendix III-H-2 (concluded)

Forest Management Block	Mean ages of pine												Age distribution of multi-aged pine stands (age classes)[d, e]
	Even-aged pine stands[a]				Uneven-aged pine stands[b]				Mixed pine-hardwood stands				
	n[c] (# plots)	Average	95% CI	SE	n[c] (# plots)	Average	95% CI	SE	n[c] (# plots)	Average	95% CI	SE	
C04	0	na	na	na	0	na	na	na	3	39.00	0.00-105.88	15.41	----[f]
FP01	0	na	na	na	11	45.00	35.23-54.77	4.38	6	39.00	20.61-57.39	7.06	----[f]
FP02	1	42.00	0.00	0.00	11	68.00	62.12-73.88	2.63	1	35.00	0.00	0.00	60, 70, 80
FT01	0	na	na	na	0	na	na	na	0	na	na	na	na
FT02	0	na	na	na	0	na	na	na	0	na	na	na	na
K01	0	na	na	na	7	37.00	33.15-40.85	1.57	0	na	na	na	----[f]
K02	0	na	na	na	0	na	na	na	12	41.76	34.77-48.75	3.33	na
K03	0	na	na	na	0	na	na	na	8	40.13	33.46-46.80	2.93	na
K04	0	na	na	na	0	na	na	na	14	44.39	31.67-57.11	5.95	na
K05	0	na	na	na	0	na	na	na	4	43.00	23.52-62.48	6.09	na
L01	0	na	na	na	25	42.23	38.12-46.34	1.95	2	61.00	0.00-157.08	7.50	20, 30, 40, 50, 60, 70
L02	3	20.00	18.59-21.41	0.33	18	56.00	50.08-61.92	2.82	2	63.00	0.00	0.00	60, 70
L03	0	na	na	na	16	46.31	41.37-51.25	2.33	0	na	na	na	40, 60
L04	3	31.00	27.25-34.75	0.88	13	39.70	27.21-52.19	5.44	0	na	na	na	20, 40, 50, 60, 70

[a] Even-aged pine stands are those stands of pine which have a high-low age spread of less than 10 years.
[b] Uneven-aged pine stands are those stands of pine which have a high-low age spread of 10 years or greater.
[c] Tree ages were measured at Growth plots and only of dominant or codominant pines, therefore plots and stands with no talliable pines were not used in these calculations.
[d] FMBs B13 and B14 were not inventoried since, as impounded dredge spoil areas, they support no trees.
[d] Multi-aged pine stands are (uneven-aged) pine stands with two or more frequently occurring (containing at least 25% of the trees sampled), significantly differing (by 10 years or more) age classes.
[e] Age classes are 10 year classes, i.e. age class 10 represents 1 year to 10 years, age class 20 represents 11 years to 20 years, age class 30 represents 21 years to 30 years, etc.
[f] There were no multi-aged pine stands in Cutting Unit XII.

APPENDIX III-I

SITE INDICES BY CUTTING UNIT AND FOREST MANAGEMENT BLOCK FOR PINE SPECIES AND SITE INDICES FOR MARKETABLE HARDWOOD SPECIES COMMONLY FOUND ON MOTSU

(using data from 1997/1998 inventory)

Table III-I-1. Site indices by Cutting Unit for pine species.

Cutting Unit	Pine species	Average age (years)	Average height (feet)	Site index$_{50}$ (feet)
I	Longleaf	52	52	50
	Loblolly	41	58	70
	Slash	0	0	0
	Pond	41	41	45
II	Longleaf	58	58	55
	Loblolly	51	72	70
	Slash	27	51	65
	Pond	0	0	0
III	Longleaf	63	59	55
	Loblolly	47	71	75
	Slash	28	44	55
	Pond	0	0	0
IV	Longleaf	0	0	0
	Loblolly	45	92	95
	Slash	0	0	0
	Pond	0	0	0
V	Longleaf	0	0	0
	Loblolly	45	74	80
	Slash	38	63	70
	Pond	0	0	0
VI	Longleaf	54	50	50
	Loblolly	28	46	70
	Slash	27	48	60
	Pond	43	42	45
VII	Longleaf	65	44	45
	Loblolly	36	49	60
	Slash	55	47	45
	Pond	46	42	40
VIII	Longleaf	53	54	50
	Loblolly	38	63	70
	Slash	0	0	0
	Pond	46	51	50
IX	Longleaf	46	53	60
	Loblolly	33	59	80
	Slash	24	44	60
	Pond	38	44	50

Table III-I-1. (concluded)

X	Longleaf	48	61	60
	Loblolly	38	64	75
	Slash	26	57	70
	Pond	0	0	0
XI	Longleaf	0	0	0
	Loblolly	0	0	0
	Slash	0b b	0	0
	Pond	0	0	0
XII	Longleaf	47	26	30
	Loblolly	42	46	50
	Slash	0	0	0
	Pond	30	34	45
XIII	Longleaf	49	38	40
	Loblolly	47	46	55
	Slash	0	0	0
	Pond	38	46	50
XIV	Longleaf	57	39	35
	Loblolly	36	50	65
	Slash	0	0	0
	Pond	0	0	0
XV	Longleaf	60	70	65
	Loblolly	39	75	85
	Slash	0	0	0
	Pond	42	51	55

Source: Growth data gathered during the 1997 forest inventory.

Table III-I-2. 1998 Site indices by forest management block for pine species.

Forest Management Block	Pine species	Average age (years)	Average height (feet)	Site index$_{50}$ (feet)
A01	Longleaf	0	0	0
	Loblolly	37	56	65
	Slash	0	0	0
	Pond	0	0	0
A01A	Longleaf	48	41	45
	Loblolly	0	0	0
	Slash	0	0	0
	Pond	0	0	0
A02	Longleaf	52	60	60
	Loblolly	0	0	0
	Slash	0	0	0
	Pond	0	0	0
A03	Longleaf	60	52	50
	Loblolly	0	0	0
	Slash	0	0	0
	Pond	0	0	0
A04	Longleaf	0	0	0
	Loblolly	0	0	0
	Slash	0	0	0
	Pond	0	0	0
A05	Longleaf	0	0	0
	Loblolly	43	78	90
	Slash	0	0	0
	Pond	0	0	0
A06	Longleaf	66	49	45
	Loblolly	0	0	0
	Slash	0	0	0
	Pond	0	0	0
A07	Longleaf	72	53	50
	Loblolly	0	0	0
	Slash	0	0	0
	Pond	0	0	0
A08	Longleaf	0	0	0
	Loblolly	57	79	80
	Slash	0	0	0
	Pond	0	0	0
A09	Longleaf	0	0	0
	Loblolly	61	56	60
	Slash	0	0	0
	Pond	0	0	0

Table III-I-2. (continued)

Forest Management Block	Pine species	Average age (years)	Average height (feet)	Site $index_{50}$ (feet)
A10	Longleaf	0	0	0
	Loblolly	64	66	60
	Slash	0	0	0
	Pond	0	0	0
A11	Longleaf	0	0	0
	Loblolly	0	0	0
	Slash	0	0	0
	Pond	0	0	0
A12	Longleaf	0	0	0
	Loblolly	38	74	95
	Slash	0	0	0
	Pond	0	0	0
A13	Longleaf	0	0	0
	Loblolly	55	72	70
	Slash	0	0	0
	Pond	0	0	0
A14	Longleaf	0	0	0
	Loblolly	29	69	100
	Slash	0	0	0
	Pond	0	0	0
A15	Longleaf	0	0	0
	Loblolly	53	71	70
	Slash	0	0	0
	Pond	0	0	0
A16	Longleaf	73	66	60
	Loblolly	0	0	0
	Slash	0	0	0
	Pond	0	0	0
A17	Longleaf	0	0	0
	Loblolly	20	60	110
	Slash	0	0	0
	Pond	0	0	0
A18	Longleaf	0	0	0
	Loblolly	30	75	105
	Slash	0	0	0
	Pond	0	0	0
A19	Longleaf	0	0	0
	Loblolly	46	83	85
	Slash	0	0	0
	Pond	0	0	0

Table III-I-2. (continued)

Forest Management Block	Pine species	Average age (years)	Average height (feet)	Site index$_{50}$ (feet)
A20	Longleaf	0	0	0
	Loblolly	83	66	50
	Slash	0	0	0
	Pond	0	0	0
A21A	Longleaf	0	0	0
	Loblolly	54	78	75
	Slash	0	0	0
	Pond	0	0	0
A21B	Longleaf	0	0	0
	Loblolly	35	67	85
	Slash	0	0	0
	Pond	0	0	0
A22	Longleaf	0	0	0
	Loblolly	52	75	70
	Slash	0	0	0
	Pond	0	0	0
A23	Longleaf	0	0	0
	Loblolly	0	0	0
	Slash	29	56	70
	Pond	0	0	0
A24	Longleaf	70	42	40
	Loblolly	0	0	0
	Slash	0	0	0
	Pond	0	0	0
A25	Longleaf	0	0	0
	Loblolly	36	77	95
	Slash	0	0	0
	Pond	0	0	0
A26	Longleaf	0	0	0
	Loblolly	0	0	0
	Slash	0	0	0
	Pond	0	0	0
A27	Longleaf	0	0	0
	Loblolly	45	86	95
	Slash	0	0	0
	Pond	0	0	0
B01	Longleaf	0	0	0
	Loblolly	50	80	80
	Slash	0	0	0
	Pond	0	0	0

Table III-I-2. (continued)

Forest Management Block	Pine species	Average age (years)	Average height (feet)	Site $index_{50}$ (feet)
B02	Longleaf	0	0	0
	Loblolly	0	0	0
	Slash	0	0	0
	Pond	0	0	0
B03	Longleaf	0	0	0
	Loblolly	24	61	100
	Slash	0	0	0
	Pond	0	0	0
B04	Longleaf	50	67	65
	Loblolly	0	0	0
	Slash	0	0	0
	Pond	0	0	0
B05	Longleaf	0	0	0
	Loblolly	50	83	95
	Slash	0	0	0
	Pond	0	0	0
B06	Longleaf	0	0	0
	Loblolly	0	0	0
	Slash	24	48	65
	Pond	0	0	0
B07	Longleaf	0	0	0
	Loblolly	25	57	95
	Slash	0	0	0
	Pond	0	0	0
B08	Longleaf	0	0	0
	Loblolly	0	0	0
	Slash	33	56	65
	Pond	0	0	0
B09	Longleaf	0	0	0
	Loblolly	0	0	0
	Slash	25	56	75
	Pond	0	0	0
B10	Longleaf	0	0	0
	Loblolly	47	92	95
	Slash	0	0	0
	Pond	0	0	0
B11	Longleaf	42	53	60
	Loblolly	0	0	0
	Slash	0	0	0
	Pond	0	0	0

Table III-I-2. (continued)

Forest Management Block	Pine species	Average age (years)	Average height (feet)	Site index$_{50}$ (feet)
B12	Longleaf	59	34	30
	Loblolly	0	0	0
	Slash	0	0	0
	Pond	0	0	0
B13[a]	—	—	—	—
B14[a]	—	—	—	—
B15	Longleaf	0	0	0
	Loblolly	21	41	80
	Slash	0	0	0
	Pond	0	0	0
B16	Longleaf	0	0	0
	Loblolly	0	0	0
	Slash	0	0	0
	Pond	0	0	0
B17	Longleaf	0	0	0
	Loblolly	0	0	0
	Slash	20	30	50
	Pond	0	0	0
B18	Longleaf	183	50	30
	Loblolly	0	0	0
	Slash	0	0	0
	Pond	0	0	0
B19	Longleaf	51	57	55
	Loblolly	0	0	0
	Slash	0	0	0
	Pond	0	0	0
B20	Longleaf	0	0	0
	Loblolly	48	97	100
	Slash	0	0	0
	Pond	0	0	0
B21	Longleaf	67	59	55
	Loblolly	0	0	0
	Slash	0	0	0
	Pond	0	0	0

Table III-I-2. (continued)

Forest Management Block	Pine species	Average age (years)	Average height (feet)	Site index$_{50}$ (feet)
B22	Longleaf	0	0	0
	Loblolly	0	0	0
	Slash	0	0	0
	Pond	54	60	55
B23	Longleaf	0	0	0
	Loblolly	39	79	90
	Slash	0	0	0
	Pond	0	0	0
B24	Longleaf	73	49	45
	Loblolly	0	0	0
	Slash	0	0	0
	Pond	0	0	0
B25	Longleaf	0	0	0
	Loblolly	0	0	0
	Slash	0	0	0
	Pond	47	47	50
C01	Longleaf	0	0	0
	Loblolly	122	68	35
	Slash	0	0	0
	Pond	0	0	0
C02	Longleaf	0	0	0
	Loblolly	71	58	40
	Slash	0	0	0
	Pond	0	0	0
C03	Longleaf	0	0	0
	Loblolly	50	64	65
	Slash	0	0	0
	Pond	0	0	0
C04	Longleaf	0	0	0
	Loblolly	0	0	0
	Slash	0	0	0
	Pond	35	55	65
FP01	Longleaf	0	0	0
	Loblolly	0	0	0
	Slash	0	0	0
	Pond	0	0	0
FP02	Longleaf	55	45	45
	Loblolly	0	0	0
	Slash	0	0	0
	Pond	0	0	0

Table III-I-2. (continued)

Forest Management Block	Pine species	Average age (years)	Average height (feet)	Site index$_{50}$ (feet)
FT01[b]	—	—	—	—
FT02[b]	—	—	—	—
K01	Longleaf	0	0	0
	Loblolly	37	68	80
	Slash	0	0	0
	Pond	0	0	0
K02	Longleaf	0	0	0
	Loblolly	46	72	75
	Slash	0	0	0
	Pond	0	0	0
K03	Longleaf	42	32	35
	Loblolly	0	0	0
	Slash	0	0	0
	Pond	0	0	0
K04	Longleaf	0	0	0
	Loblolly	0	0	0
	Slash	0	0	0
	Pond	0	0	0
K05	Longleaf	0	0	0
	Loblolly	37	34	40
	Slash	0	0	0
	Pond	0	0	0
L01	Longleaf	0	0	0
	Loblolly	0	0	0
	Slash	0	0	0
	Pond	0	0	0
L02	Longleaf	65	69	65
	Loblolly	0	0	0
	Slash	0	0	0
	Pond	0	0	0
L-3	Longleaf	0	0	0
	Loblolly	49	68	70
	Slash	0	0	0
	Pond	0	0	0

Table III-I-2. (concluded)

Forest Management Block	Pine species	Average age (years)	Average height (feet)	Site index$_{50}$ (feet)
L04	Longleaf	57	67	65
	Loblolly	0	0	0
	Slash	0	0	0
	Pond	0	0	0

[a] FMBs B13 and B14 were not inventoried since, as impounded dredged spoil areas, they support no trees.

[b] FMBs FT01 and FT02 are composed of hardwood trees, so that no pines were available to be measured.

Source: Growth data gathered during the 1997 forest inventory.

Table III-I-3. Site indices for marketable hardwood species commonly found on MOTSU.

Hardwood Species	Site $Index_{50}$
Southern red oak	66-85
Water oak	90
Sweet gum	90
Tulip poplar	92
Black gum	70
Water tupelo	60

Source: USDA 1986

APPENDIX III-J

SAMPLE SIZES (n), 95% CONFIDENCE INTERVALS (CI), AND STANDARD ERRORS (SE) FOR THE CURRENT VOLUMES AND WEIGHTS OF PINE SAWTIMBER, CHIP-N-SAW, AND PULPWOOD, AND HARDWOOD SAWTIMBER AND PULPWOOD BY DIAMETER (DBH) CLASS AND CUTTING UNIT

(using data from 1997/1998 inventory)

Appendix III-J-1-A. Sample sizes (n), 95% confidence intervals (CI), and standard errors (SE) for the current mean volumes of pine sawtimber, chip-n-saw, and pulpwood, and hardwood sawtimber and pulpwood by diameter (DBH) class and Cutting Unit

Cutting Unit I

DBH class	n (# plots)	Pine									Hardwood					
		Sawtimber			Chip-n-saw			Pulpwood			Sawtimber			Pulpwood		
		Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE
6"	127	0.00	na	na	0.00	na	na	1.38	0.92-1.84	0.23	0.00	na	na	0.25	0.08-0.42	0.08
8"	127	0.00	na	na	0.00	na	na	1.86	1.37-2.35	0.25	0.00	na	na	0.12	0.05-0.19	0.04
10"	127	0.00	na	na	2.35	1.78-2.92	0.29	0.17	0.02-0.32	0.07	0.00	na	na	0.04	0.00-0.08	0.02
12"	127	0.00	na	na	2.15	1.59-2.71	0.28	0.03	0.00-0.07	0.02	0.00	na	na	0.05	0.00-0.12	0.04
14"	127	561.64	394.05-729.23	82.91	0.02	0.00-0.05	0.02	0.05	0.00-0.11	0.03	8.47	0.00-18.36	4.95	0.02	0.00-0.06	0.02
16"	127	249.69	136.91-362.47	56.40	0.00	na	na	0.01	0.00-0.03	0.01	9.95	0.00-21.56	5.81	0.00	na	na
18"	127	65.45	17.82-113.08	23.82	0.00	na	na	0.00	na	na	2.77	0.00-8.31	2.77	0.03	0.00-0.09	0.03
20"	127	56.17	11.63-100.71	22.27	0.00	na	na	0.02	0.00-0.06	0.02	9.45	0.00-28.35	9.45	0.00	na	na
22"	127	23.36	0.00-56.64	16.64	0.00	na	na	0.00	na	na	0.00	na	na	0.02	0.00-0.06	0.02
24"+	127	12.06	0.00-36.18	12.06	0.00	na	na	0.01	0.00-0.03	0.01	0.00	na	na	0.00	na	na

Cutting Unit II

DBH class	n (# plots)	Pine									Hardwood					
		Sawtimber			Chip-n-saw			Pulpwood			Sawtimber			Pulpwood		
		Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE
6"	201	0.00	na	na	0.01	0.00-0.03	0.01	1.05	0.76-1.34	0.14	0.00	na	na	0.57	0.36-0.78	0.10
8"	201	0.00	na	na	0.00	na	na	2.08	1.64-2.52	0.22	0.00	na	na	0.52	0.34-0.70	0.09
10"	201	0.00	na	na	2.96	2.20-3.72	0.38	0.04	0.00-0.08	0.02	0.00	na	na	0.42	0.27-0.57	0.08
12"	201	0.00	na	na	4.01	3.30-4.72	0.36	0.01	0.00-0.03	0.01	7.54	0.00-19.65	6.05	0.18	0.07-0.29	0.05
14"	201	1385.24	1162.63-1607.85	111.27	0.00	na	na	0.00	na	na	42.53	11.67-73.39	15.43	0.05	0.00-0.10	0.02
16"	201	875.22	659.13-1091.31	108.03	0.01	0.00-0.03	0.01	0.00	na	na	18.21	4.38-32.04	6.92	0.01	0.00-0.03	0.01
18"	201	266.43	181.76-351.10	42.34	0.00	na	na	0.00	na	na	14.51	0.45-28.57	7.03	0.00	na	na
20"	201	121.76	48.58-194.94	36.59	0.00	na	na	0.00	na	na	7.28	0.00-15.85	4.28	0.04	0.00-0.10	0.03
22"	201	41.81	0.00-84.09	21.14	0.00	na	na	0.00	na	na	4.23	0.00-12.69	4.23	0.00	na	na
24"+	201	6.57	0.00-19.71	6.57	0.00	na	na	0.00	na	na	17.17	0.05-34.29	8.56	0.00	na	na

Appendix III-J-1-A. (continued)

Cutting Unit III

DBH class	n (# plots)	Pine									Hardwood					
		Sawtimber			Chip-n-saw			Pulpwood			Sawtimber			Pulpwood		
		Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE
6"	200	0.00	na	na	0.02	0.00-0.06	0.02	1.67	1.22-2.12	0.22	0.00	na	na	0.56	0.37-0.75	0.10
8"	200	0.00	na	na	0.04	0.00-0.10	0.03	2.28	1.74-2.82	0.27	0.00	na	na	0.77	0.52-1.02	0.12
10"	200	3.95	0.00-11.85	3.94	2.67	2.09-3.25	0.29	0.11	0.01-0.21	0.05	0.00	na	na	0.37	0.23-0.51	0.07
12"	200	5.51	0.00-16.53	5.51	2.95	2.42-3.48	0.27	0.02	0.00-0.05	0.01	1.70	0.00-5.10	1.70	0.10	0.03-0.17	0.04
14"	200	1265.19	1047.32-1483.06	108.90	0.02	0.00-0.05	0.02	0.00	na	na	45.09	19.45-70.73	12.82	0.09	0.03-0.15	0.03
16"	200	1035.44	821.10-1249.78	107.16	0.00	na	na	0.00	na	na	27.89	4.53-51.25	11.68	0.02	0.00-0.05	0.01
18"	200	517.56	374.66-660.46	71.46	0.01	0.00-0.03	0.01	0.00	na	na	21.19	0.46-41.92	10.37	0.00	na	na
20"	200	157.78	86.32-229.24	35.73	0.00	na	na	0.00	na	na	7.75	0.00-18.88	5.57	0.00	na	na
22"	200	48.69	6.68-90.70	21.01	0.00	na	na	0.00	na	na	8.29	0.00-24.87	8.29	0.00	na	na
24"+	200	29.72	0.00-59.79	15.03	0.00	na	na	0.00	na	na	9.02	0.00-21.74	6.36	0.00	na	na

Cutting Unit IV

DBH class	n (# plots)	Pine									Hardwood					
		Sawtimber			Chip-n-saw			Pulpwood			Sawtimber			Pulpwood		
		Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE
6"	102	0.00	na	na	0.00	na	na	0.72	0.42-1.02	0.15	0.00	na	na	0.42	0.16-0.68	0.13
8"	102	0.00	na	na	0.00	na	na	1.19	0.56-1.82	0.31	0.00	na	na	0.67	0.41-0.93	0.13
10"	102	0.00	na	na	1.54	0.89-2.19	0.32	0.10	0.00-0.20	0.05	0.00	na	na	0.41	0.17-0.65	0.12
12"	102	18.77	0.00-45.18	13.08	2.02	1.35-2.69	0.33	0.06	0.00-0.13	0.04	0.00	na	na	0.30	0.10-0.50	0.10
14"	102	1044.23	742.87-1345.59	149.21	0.02	0.00-0.06	0.02	0.00	na	na	15.95	0.00-32.13	8.01	0.14	0.04-0.24	0.05
16"	102	964.01	739.59-1188.43	111.12	0.02	0.00-0.06	0.02	0.03	0.00-0.09	0.03	42.26	6.28-78.24	17.81	0.13	0.03-0.23	0.05
18"	102	661.10	426.87-895.33	115.96	0.07	0.00-0.17	0.05	0.00	na	na	10.93	0.00-26.31	7.62	0.04	0.00-0.12	0.04
20"	102	337.52	169.71-505.33	83.09	0.00	na	na	0.00	na	na	14.12	0.00-30.67	8.20	0.07	0.00-0.16	0.05
22"	102	160.05	56.27-263.83	51.38	0.00	na	na	0.00	na	na	20.85	0.00-44.69	11.80	0.02	0.00-0.06	0.02
24"+	102	50.78	0.24-101.32	25.02	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na

Appendix III-J-1-A. (continued)

Cutting Unit V

DBH class	n (# plots)	Pine									Hardwood					
		Sawtimber			Chip-n-saw			Pulpwood			Sawtimber			Pulpwood		
		Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE
6"	119	0.00	na	na	0.00	na	na	0.53	0.21-0.85	0.16	0.00	na	na	0.81	0.49-1.13	0.16
8"	119	0.00	na	na	0.00	na	na	1.05	0.65-1.45	0.20	0.00	na	na	0.64	0.36-0.92	0.14
10"	119	0.00	na	na	1.91	1.48-2.34	0.43	0.31	0.09-0.53	0.11	0.00	na	na	0.80	0.44-1.16	0.18
12"	119	10.27	0.00-30.81	10.27	2.39	2.06-2.72	0.33	0.08	0.00-0.18	0.05	1.82	0.00-5.46	1.82	0.51	0.26-0.76	0.12
14"	119	933.70	667.78-1199.62	132.94	0.08	0.04-0.12	0.04	0.02	0.00-0.06	0.02	51.58	18.24-84.92	16.67	0.45	0.21-0.69	0.12
16"	119	857.38	596.82-1117.94	130.27	0.00	na	na	0.02	0.02-0.06	0.02	59.72	19.21-100.23	20.25	0.09	0.01-0.17	0.04
18"	119	419.63	258.49-580.77	80.56	0.03	0.00-0.06	0.03	0.00	na	na	40.08	11.47-68.69	14.30	0.05	0.00-0.11	0.03
20"	119	258.23	119.53-396.93	69.35	0.00	na	na	0.00	na	na	38.76	3.34-74.18	17.71	0.01	0.00-0.03	0.01
22"	119	87.43	25.58-149.28	30.92	0.00	na	na	0.00	na	na	36.46	6.79-66.13	14.83	0.00	na	na
24"+	119	64.27	15.31-113.23	24.48	0.00	na	na	0.00	na	na	40.32	4.08-76.56	18.12	0.02	0.00-0.05	0.02

Cutting Unit VI

DBH class	n (# plots)	Pine									Hardwood					
		Sawtimber			Chip-n-saw			Pulpwood			Sawtimber			Pulpwood		
		Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE
6"	268	0.00	na	na	0.02	0.00-0.06	0.02	2.10	1.73-2.47	0.18	0.00	na	na	0.14	0.03-0.25	0.05
8"	268	0.00	na	na	0.02	0.00-0.06	0.02	2.73	2.29-3.17	0.22	0.00	na	na	0.09	0.02-0.16	0.03
10"	268	0.00	na	na	3.20	2.51-3.89	0.34	0.42	2.29-3.17	0.14	0.00	na	na	0.06	0.01-0.11	0.03
12"	268	0.00	na	na	2.14	1.34-2.94	0.40	0.05	0.00-0.10	0.02	0.00	na	na	0.01	0.00-0.03	0.01
14"	268	209.51	132.58-286.44	38.47	0.00	na	na	0.00	na	na	2.07	0.00-4.99	1.46	0.00	na	na
16"	268	106.31	57.73-154.89	24.29	0.01	0.00-0.03	0.01	0.01	0.00-0.03	0.01	0.00	na	na	0.02	0.00-0.05	0.01
18"	268	29.56	6.59-52.53	11.48	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
20"	268	3.88	0.00-11.64	3.88	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
22"	268	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
24"+	268	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na

Appendix III-J-1-A. (continued)

Cutting Unit VII

DBH class	n (# plots)	Pine									Hardwood					
		Sawtimber			Chip-n-saw			Pulpwood			Sawtimber			Pulpwood		
		Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE
6"	205	0.00	na	na	0.01	0.00-0.03	0.01	1.86	1.51-2.21	0.17	0.00	na	na	0.27	0.03-0.51	0.12
8"	205	0.00	na	na	0.02	0.00-0.05	0.02	2.29	1.95-2.63	0.17	0.00	na	na	0.18	0.05-0.31	0.07
10"	205	0.00	na	na	1.65	1.30-2.00	0.18	0.31	0.18-0.44	0.06	0.00	na	na	0.05	0.01-0.09	0.02
12"	205	3.69	0.00-11.07	3.69	0.89	0.66-1.12	0.12	0.15	0.06-0.24	0.04	0.00	na	na	0.03	0.00-0.07	0.02
14"	205	220.00	137.30-302.70	41.35	0.00	na	na	0.00	na	na	0.00	na	na	0.03	0.00-0.07	0.02
16"	205	36.07	7.12-65.02	14.48	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
18"	205	12.48	0.00-26.98	7.25	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
20"	205	9.51	0.00-22.93	6.71	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
22"	205	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
24"+	205	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na

Cutting Unit VIII

DBH class	n (# plots)	Pine									Hardwood					
		Sawtimber			Chip-n-saw			Pulpwood			Sawtimber			Pulpwood		
		Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE
6"	228	0.00	na	na	0.00	na	na	1.49	1.20-1.78	0.15	0.00	na	na	0.19	0.09-0.29	0.05
8"	228	0.00	na	na	0.01	0.00-0.03	0.01	2.48	2.02-2.94	0.23	0.00	na	na	0.19	0.09-0.29	0.05
10"	228	0.00	na	na	2.78	2.26-3.30	0.26	0.15	0.06-0.24	0.04	0.00	na	na	0.06	0.02-0.10	0.02
12"	228	5.24	0.00-15.72	5.24	2.50	1.98-3.02	0.26	0.06	0.01-0.11	0.03	0.00	na	na	0.00	na	na
14"	228	492.59	377.62-607.56	57.48	0.07	0.01-0.13	0.03	0.03	0.00-0.07	0.02	0.00	na	na	0.01	0.00-0.03	0.01
16"	228	169.09	104.97-233.21	32.06	0.00	na	na	0.02	0.00-0.05	0.01	0.00	na	na	0.00	na	na
18"	228	114.29	70.38-158.20	21.96	0.03	0.00-0.07	0.02	0.01	0.00-0.03	0.01	0.00	na	na	0.00	na	na
20"	228	57.73	23.03-92.43	17.35	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
22"	228	3.07	0.00-9.21	3.07	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
24"+	228	7.52	0.00-18.28	5.38	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na

Appendix III-J-1-A. (continued)

Cutting Unit IX

DBH class	n (# plots)	Pine									Hardwood					
		Sawtimber			Chip-n-saw			Pulpwood			Sawtimber			Pulpwood		
		Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE
6"	176	0.00	na	na	0.00	na	na	1.32	1.02-1.62	0.15	0.00	na	na	0.16	0.06-0.26	0.05
8"	176	0.00	na	na	0.03	0.00-0.07	0.02	2.00	1.57-2.43	0.21	0.00	na	na	0.18	0.07-0.29	0.05
10"	176	0.00	na	na	2.34	1.83-2.85	0.26	0.19	0.04-0.34	0.08	0.00	na	na	0.08	0.01-0.15	0.03
12"	176	1.37	0.00-4.11	1.37	2.00	1.46-2.54	0.27	0.08	0.00-0.17	0.05	0.00	na	na	0.16	0.02-0.30	0.07
14"	176	441.75	300.74-582.76	70.51	0.11	0.02-0.20	0.04	0.04	0.00-0.09	0.02	6.68	0.00-16.15	4.73	0.04	0.00-0.08	0.02
16"	176	200.27	118.50-282.04	40.88	0.01	0.00-0.03	0.01	0.00	na	na	27.67	0.00-56.75	14.54	0.00	na	na
18"	176	112.54	39.06-186.02	36.74	0.00	na	na	0.00	na	na	20.20	0.00-46.41	13.10	0.00	na	na
20"	176	57.11	16.79-97.43	20.16	0.00	na	na	0.00	na	na	11.13	0.00-27.26	8.07	0.02	0.00-0.05	0.02
22"	176	16.07	0.14-32.00	7.97	0.00	na	na	0.00	na	na	3.94	0.00-11.82	3.94	0.00	na	na
24"+	176	11.66	0.00-28.82	8.58	0.00	na	na	0.00	na	na	30.86	0.00-82.11	25.62	0.02	0.00-0.05	0.01

Cutting Unit X

DBH class	n (# plots)	Pine									Hardwood					
		Sawtimber			Chip-n-saw			Pulpwood			Sawtimber			Pulpwood		
		Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE
6"	103	0.00	na	na	0.03	0.00-0.09	0.03	1.99	1.33-2.65	0.33	0.00	na	na	0.31	0.15-0.47	0.08
8"	103	0.00	na	na	0.14	0.00-0.30	0.08	3.42	2.45-4.39	0.48	0.00	na	na	0.47	0.25-0.69	0.11
10"	103	0.00	na	na	5.03	3.64-6.42	0.70	0.06	0.00-0.13	0.03	0.00	na	na	0.39	0.15-0.63	0.12
12"	103	18.04	0.00-43.87	12.92	3.34	2.39-4.29	0.47	0.02	0.00-0.06	0.02	0.00	na	na	0.21	0.03-0.39	0.09
14"	103	920.82	659.40-1182.24	130.71	0.00	na	na	0.00	na	na	49.72	19.75-79.69	14.98	0.03	0.00-0.07	0.02
16"	103	576.08	391.96-760.20	92.05	0.00	na	na	0.00	na	na	30.04	0.00-66.07	18.01	0.04	0.00-0.12	0.04
18"	103	234.64	110.56-358.72	62.04	0.00	na	na	0.00	na	na	5.36	0.00-16.08	5.36	0.00	na	na
20"	103	76.55	16.01-137.09	30.27	0.00	na	na	0.00	na	na	0.00	na	na	0.03	0.00-0.09	0.03
22"	103	40.36	0.00-88.23	23.93	0.00	na	na	0.00	na	na	8.70	0.00-20.94	6.12	0.00	na	na
24"+	103	0.00	na	na	0.00	na	na	0.00	na	na	30.49	0.00-65.37	17.44	0.00	na	na

Appendix III-J-1-A. (continued)

Cutting Unit XI

DBH class	n (# plots)	Pine									Hardwood					
		Sawtimber			Chip-n-saw			Pulpwood			Sawtimber			Pulpwood		
		Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE
6"	12	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	1.10	0.90-1.30	0.10
8"	12	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	1.07	0.37-1.77	0.35
10"	12	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.45	0.00-0.94	0.24
12"	12	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
14"	12	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
16"	12	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
18"	12	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
20"	12	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
22"	12	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
24"+	12	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na

Cutting Unit XII

DBH class	n (# plots)	Pine									Hardwood					
		Sawtimber			Chip-n-saw			Pulpwood			Sawtimber			Pulpwood		
		Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE
6"	185	0.00	na	na	0.00	na	na	0.23	0.10-0.36	0.07	0.00	na	na	0.72	0.48-0.96	0.12
8"	185	0.00	na	na	0.00	na	na	0.34	0.16-0.52	0.09	0.00	na	na	0.84	0.58-1.10	0.13
10"	185	0.00	na	na	0.38	0.18-0.58	0.10	0.16	0.04-0.28	0.06	0.00	na	na	0.54	0.36-0.72	0.09
12"	185	0.00	na	na	0.60	0.34-0.86	0.13	0.09	0.02-0.16	0.03	2.51	0.00-7.53	2.51	0.30	0.16-0.44	0.07
14"	185	373.53	233.83-513.23	69.85	0.01	0.00-0.03	0.01	0.03	0.00-0.07	0.02	79.13	44.80-113.46	17.17	0.20	0.06-0.34	0.07
16"	185	264.03	163.09-364.97	50.47	0.01	0.00-0.03	0.01	0.05	0.00-0.11	0.03	40.09	6.21-73.97	16.94	0.16	0.05-0.27	0.05
18"	185	176.17	91.98-260.36	42.10	0.00	na	na	0.02	0.00-0.05	0.02	41.96	6.44-77.48	17.76	0.06	0.00-0.12	0.03
20"	185	45.18	9.84-80.52	17.67	0.00	na	na	0.02	0.00-0.05	0.01	17.08	0.00-36.90	9.91	0.01	0.00-0.03	0.01
22"	185	13.84	0.00-31.14	8.65	0.00	na	na	0.00	na	na	0.00	na	na	0.01	0.00-0.03	0.01
24"+	185	5.94	0.00-17.82	5.94	0.00	na	na	0.00	na	na	0.00	na	na	0.02	0.00-0.06	0.02

Appendix III-J-1-A. (continued)

Cutting Unit XIII

DBH class	n (# plots)	Pine									Hardwood					
		Sawtimber			Chip-n-saw			Pulpwood			Sawtimber			Pulpwood		
		Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Averag	95% CI	SE	Average	95% CI	SE
6"	176	0.00	na	na	0.00	na	na	0.63	0.36-0.90	0.14	0.00	na	na	0.95	0.61-1.29	0.17
8"	176	0.00	na	na	0.00	na	na	0.83	0.53-1.13	0.15	0.00	na	na	0.68	0.42-0.94	0.13
10"	176	0.00	na	na	0.99	0.71-1.27	0.14	0.18	0.08-0.28	0.05	0.00	na	na	0.65	0.35-0.95	0.15
12"	176	0.00	na	na	0.80	0.54-1.06	0.13	0.06	0.01-0.11	0.03	7.25	0.00-16.15	4.45	0.20	0.10-0.30	0.05
14"	176	332.27	221.16-443.38	55.56	0.02	0.00-0.05	0.01	0.04	0.00-0.08	0.02	48.61	20.09-77.13	14.26	0.16	0.07-0.25	0.04
16"	176	193.73	107.46-280.00	43.14	0.01	0.00-0.03	0.01	0.02	0.00-0.05	0.02	57.24	28.25-86.23	14.50	0.09	0.01-0.17	0.04
18"	176	125.31	49.01-201.61	38.15	0.01	0.00-0.03	0.01	0.02	0.00-0.05	0.02	7.75	0.00-19.55	5.90	0.05	0.00-0.14	0.04
20"	176	63.71	21.67-105.75	21.02	0.00	na	na	0.00	na	na	17.50	1.72-33.28	7.89	0.02	0.00-0.06	0.02
22"	176	35.59	0.00-77.08	20.74	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
24"+	176	21.89	1.31-42.47	10.29	0.00	na	na	0.00	na	na	0.00	na	na	0.03	0.00-0.07	0.02

Cutting Unit XIV

DBH class	n (# plots)	Pine									Hardwood					
		Sawtimber			Chip-n-saw			Pulpwood			Sawtimber			Pulpwood		
		Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE
6"	77	0.00	na	na	0.00	na	na	0.42	0.19-0.65	0.11	0.00	na	na	0.36	0.13-0.59	0.11
8"	77	0.00	na	na	0.00	na	na	0.73	0.25-1.21	0.24	0.00	na	na	0.15	0.04-0.26	0.05
10"	77	0.00	na	na	0.70	0.38-1.02	0.16	0.23	0.08-0.38	0.07	0.00	na	na	0.11	0.00-0.22	0.05
12"	77	12.31	0.00-36.93	12.31	0.89	0.46-1.32	0.21	0.11	0.02-0.20	0.05	0.00	na	na	0.04	0.00-0.10	0.03
14"	77	144.57	68.61-220.53	37.98	0.04	0.00-0.10	0.03	0.12	0.02-0.22	0.05	0.00	na	na	0.00	na	na
16"	77	122.75	0.00-275.34	76.30	0.00	na	na	0.00	na	na	0.00	na	na	0.07	0.00-0.21	0.07
18"	77	17.04	0.00-43.23	13.09	0.00	na	na	0.00	na	na	0.00	na	na	0.04	0.00-0.12	0.04
20"	77	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
22"	77	9.29	0.00-27.87	9.29	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
24"+	77	16.73	0.00-50.19	16.73	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na

Appendix III-J-1-A. (concluded)

Cutting Unit XV

DBH class	n (# plots)	Pine									Hardwood					
		Sawtimber			Chip-n-saw			Pulpwood			Sawtimber			Pulpwood		
		Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE
6"	178	0.00	na	na	0.00	na	na	1.07	0.78-1.36	0.14	0.00	na	na	0.50	0.33-0.67	0.09
8"	178	0.00	na	na	0.00	na	na	1.74	1.33-2.15	0.21	0.00	na	na	0.49	0.31-0.67	0.09
10"	178	0.00	na	na	1.82	1.35-2.29	0.24	0.25	0.12-0.38	0.06	0.00	na	na	0.38	0.21-0.55	0.09
12"	178	9.00	0.00-27.00	9.00	3.08	2.41-3.75	0.33	0.11	0.03-0.19	0.04	5.37	0.00-13.17	3.90	0.16	0.06-0.26	0.05
14"	178	1029.46	834.89-1224.03	97.30	0.00	na	na	0.03	0.00-0.07	0.02	32.80	7.23-58.37	12.79	0.07	0.00-0.14	0.03
16"	178	1026.26	746.40-1306.12	139.94	0.04	0.00-0.10	0.03	0.00	na	na	20.23	1.83-38.63	9.20	0.00	na	na
18"	178	612.54	438.82-786.26	86.86	0.00	na	na	0.00	na	na	4.07	0.00-12.21	4.07	0.00	na	na
20"	178	316.29	193.95-438.63	61.18	0.00	na	na	0.00	na	na	5.50	0.00-16.50	5.50	0.00	na	na
22"	178	108.54	28.92-188.16	39.81	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
24"+	178	129.32	46.22-212.42	41.55	0.00	na	na	0.00	na	na	38.02	0.00-78.29	20.13	0.00	na	na

Appendix III-J-1-B. Current (1998) Volumes and Weights of Pine Sawtimber, Chip-n-saw, and Pulpwood and Hardwood Sawtimber and Pulpwood by Diameter Class and Cutting Unit

Cutting Unit I

DBH class	Pine						Hardwood			
	Sawtimber		Chip-n-saw		Pulpwood		Sawtimber		Pulpwood	
	BF/ac	tons/ac	cds/ac	tons/ac	cds/ac	tons/ac	BF/ac	tons/ac	cds/ac	tons/ac
6"	0.00	0.00	0.00	0.00	1.38	3.73	0.00	0.00	0.25	0.68
8"	0.00	0.00	0.00	0.00	1.86	5.03	0.00	0.00	0.12	0.32
10"	0.00	0.00	2.35	6.36	0.17	0.46	0.00	0.00	0.04	0.11
12"	0.00	0.00	2.15	5.82	0.03	0.08	0.00	0.00	0.05	0.14
14"	561.64	4.07	0.02	0.05	0.05	0.14	8.47	0.06	0.02	0.05
16"	249.69	1.81	0.00	0.00	0.01	0.03	9.95	0.07	0.00	0.00
18"	65.45	0.47	0.00	0.00	0.00	0.00	2.77	0.02	0.03	0.08
20"	56.17	0.41	0.00	0.00	0.02	0.05	9.45	0.07	0.00	0.00
22"	23.36	0.17	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.05
24"+	12.06	0.09	0.00	0.00	0.01	0.03	0.00	0.00	0.00	0.00
Totals	968.38	7.02	4.52	12.23	3.54	9.58	30.64	0.22	0.53	1.43

Cutting Unit II

DBH class	Pine						Hardwood			
	Sawtimber		Chip-n-saw		Pulpwood		Sawtimber		Pulpwood	
	BF/ac	tons/ac	cds/ac	tons/ac	cds/ac	tons/ac	BF/ac	tons/ac	cds/ac	tons/ac
6"	0.00	0.00	0.01	0.03	1.05	2.84	0.00	0.00	0.57	1.54
8"	0.00	0.00	0.00	0.00	2.08	5.63	0.00	0.00	0.52	1.41
10"	0.00	0.00	2.96	8.01	0.04	0.11	0.00	0.00	0.42	1.14
12"	0.00	0.00	4.01	10.85	0.01	0.03	7.54	0.05	0.18	0.49
14"	1,385.24	10.04	0.00	0.00	0.00	0.00	42.53	0.31	0.05	0.14
16"	875.22	6.35	0.01	0.03	0.00	0.00	18.21	0.13	0.01	0.03
18"	266.43	1.93	0.00	0.00	0.00	0.00	14.51	0.11	0.00	0.00
20"	121.76	0.88	0.00	0.00	0.00	0.00	7.28	0.05	0.04	0.11
22"	41.81	0.30	0.00	0.00	0.00	0.00	4.23	0.03	0.00	0.00
24"+	6.57	0.05	0.00	0.00	0.00	0.00	17.17	0.13	0.00	0.00
Totals	2,697.02	19.55	6.99	18.91	3.19	8.63	111.46	0.81	1.79	4.84

Appendix III-J-1-B. (continued)

Cutting Unit III

DBH class	Pine						Hardwood			
	Sawtimber		Chip-n-saw		Pulpwood		Sawtimber		Pulpwood	
	BF/ac	tons/ac	cds/ac	tons/ac	cds/ac	tons/ac	BF/ac	tons/ac	cds/ac	tons/ac
6"	0.00	0.00	0.02	0.05	1.67	4.52	0.00	0.00	0.56	1.52
8"	0.00	0.00	0.04	0.11	2.28	6.17	0.00	0.00	0.77	2.08
10"	3.95	0.03	2.67	7.22	0.11	0.30	0.00	0.00	0.37	1.00
12"	5.51	0.04	2.95	7.98	0.02	0.05	1.70	0.01	0.10	0.27
14"	1,265.19	9.17	0.02	0.05	0.00	0.00	45.09	0.33	0.09	0.24
16"	1,035.44	7.51	0.00	0.00	0.00	0.00	27.89	0.20	0.02	0.05
18"	517.56	3.75	0.01	0.03	0.00	0.00	21.19	0.15	0.00	0.00
20"	157.78	1.14	0.00	0.00	0.00	0.00	7.75	0.06	0.00	0.00
22"	48.69	0.35	0.00	0.00	0.00	0.00	8.29	0.06	0.00	0.00
24"+	29.72	0.22	0.00	0.00	0.00	0.00	9.02	0.07	0.00	0.00
Totals	3,063.81	22.21	5.72	15.48	4.08	11.04	120.92	0.88	1.92	5.19

Cutting Unit IV

DBH class	Pine						Hardwood			
	Sawtimber		Chip-n-saw		Pulpwood		Sawtimber		Pulpwood	
	BF/ac	tons/ac	cds/ac	tons/ac	cds/ac	tons/ac	BF/ac	tons/ac	cds/ac	tons/ac
6"	0.00	0.00	0.00	0.00	0.72	1.95	0.00	0.00	0.42	1.14
8"	0.00	0.00	0.00	0.00	1.19	3.22	0.00	0.00	0.67	1.81
10"	0.00	0.00	1.54	4.17	0.10	0.27	0.00	0.00	0.41	1.11
12"	18.77	0.14	2.02	5.47	0.06	0.16	0.00	0.00	0.30	0.81
14"	1,044.23	7.57	0.02	0.05	0.00	0.00	15.95	0.12	0.14	0.38
16"	964.01	6.99	0.02	0.05	0.03	0.08	42.26	0.31	0.13	0.35
18"	661.10	4.79	0.07	0.19	0.00	0.00	10.93	0.08	0.04	0.11
20"	337.52	2.45	0.00	0.00	0.00	0.00	14.12	0.10	0.07	0.19
22"	160.05	1.16	0.00	0.00	0.00	0.00	20.85	0.15	0.02	0.05
24"+	50.78	0.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Totals	3,232.43	23.44	3.68	9.96	2.11	5.71	104.11	0.75	2.19	5.93

Appendix III-J-1-B. (continued)

Cutting Unit V

DBH class	Pine						Hardwood			
	Sawtimber		Chip-n-saw		Pulpwood		Sawtimber		Pulpwood	
	BF/ac	tons/ac	cds/ac	tons/ac	cds/ac	tons/ac	BF/ac	tons/ac	cds/ac	tons/ac
6"	0.00	0.00	0.00	0.00	0.53	1.43	0.00	0.00	0.81	2.19
8"	0.00	0.00	0.00	0.00	1.05	2.84	0.00	0.00	0.64	1.73
10"	0.00	0.00	1.91	5.17	0.31	0.84	0.00	0.00	0.80	2.16
12"	10.27	0.07	2.39	6.47	0.08	0.22	1.82	0.01	0.51	1.38
14"	933.70	6.77	0.08	0.22	0.02	0.05	51.58	0.37	0.45	1.22
16"	857.38	6.22	0.00	0.00	0.02	0.05	59.72	0.43	0.09	0.24
18"	419.63	3.04	0.03	0.08	0.00	0.00	40.08	0.29	0.05	0.14
20"	258.23	1.87	0.00	0.00	0.00	0.00	38.76	0.28	0.01	0.03
22"	87.43	0.63	0.00	0.00	0.00	0.00	36.46	0.26	0.00	0.00
24"+	64.27	0.46	0.00	0.00	0.00	0.00	40.32	0.29	0.02	0.05
Totals	2,630.90	19.07	4.41	11.93	2.01	5.44	268.73	1.95	3.38	9.14

Cutting Unit VI

DBH class	Pine						Hardwood			
	Sawtimber		Chip-n-saw		Pulpwood		Sawtimber		Pulpwood	
	BF/ac	tons/ac	cds/ac	tons/ac	cds/ac	tons/ac	BF/ac	tons/ac	cds/ac	tons/ac
6"	0.00	0.00	0.02	0.05	2.10	5.68	0.00	0.00	0.14	0.38
8"	0.00	0.00	0.02	0.05	2.73	7.39	0.00	0.00	0.09	0.24
10"	0.00	0.00	3.20	8.66	0.42	1.14	0.00	0.00	0.06	0.16
12"	0.00	0.00	2.14	5.79	0.05	0.14	0.00	0.00	0.01	0.03
14"	209.51	1.52	0.00	0.00	0.00	0.00	2.07	0.02	0.00	0.00
16"	106.31	0.77	0.01	0.03	0.01	0.03	0.00	0.00	0.02	0.05
18"	29.56	0.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20"	3.88	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22"	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24"+	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Totals	349.27	2.53	5.38	14.56	5.31	14.37	2.07	0.02	0.32	0.87

Cutting Unit VII

DBH class	Pine						Hardwood			
	Sawtimber		Chip-n-saw		Pulpwood		Sawtimber		Pulpwood	
	BF/ac	tons/ac	cds/ac	tons/ac	cds/ac	tons/ac	BF/ac	tons/ac	cds/ac	tons/ac
6"	0.00	0.00	0.01	0.03	1.86	5.03	0.00	0.00	0.27	0.73
8"	0.00	0.00	0.02	0.05	2.29	6.20	0.00	0.00	0.18	0.49
10"	0.00	0.00	1.65	4.46	0.31	0.84	0.00	0.00	0.05	0.14
12"	3.69	0.03	0.89	2.41	0.15	0.41	0.00	0.00	0.03	0.08
14"	220.00	1.60	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.08
16"	36.07	0.26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18"	12.48	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20"	9.51	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22"	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24"+	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Totals	281.75	2.04	2.58	6.98	4.61	12.47	0.00	0.00	0.57	1.54

Cutting Unit VIII

DBH class	Pine						Hardwood			
	Sawtimber		Chip-n-saw		Pulpwood		Sawtimber		Pulpwood	
	BF/ac	tons/ac	cds/ac	tons/ac	cds/ac	tons/ac	BF/ac	tons/ac	cds/ac	tons/ac
6"	0.00	0.00	0.00	0.00	1.49	4.03	0.00	0.00	0.19	0.51
8"	0.00	0.00	0.01	0.03	2.48	6.71	0.00	0.00	0.19	0.51
10"	0.00	0.00	2.78	7.52	0.15	0.41	0.00	0.00	0.06	0.16
12"	5.24	0.04	2.50	6.76	0.06	0.16	0.00	0.00	0.00	0.00
14"	492.59	3.57	0.07	0.19	0.03	0.08	0.00	0.00	0.01	0.03
16"	169.09	1.23	0.00	0.00	0.02	0.05	0.00	0.00	0.00	0.00
18"	114.29	0.83	0.03	0.08	0.01	0.03	0.00	0.00	0.00	0.00
20"	57.73	0.42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22"	3.07	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24"+	7.52	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Totals	849.53	6.16	5.39	14.58	4.24	11.47	0.00	0.00	0.45	1.22

Cutting Unit IX

DBH class	Pine						Hardwood			
	Sawtimber		Chip-n-saw		Pulpwood		Sawtimber		Pulpwood	
	BF/ac	tons/ac	cds/ac	tons/ac	cds/ac	tons/ac	BF/ac	tons/ac	cds/ac	tons/ac
6"	0.00	0.00	0.00	0.00	1.32	3.57	0.00	0.00	0.16	0.43
8"	0.00	0.00	0.03	0.08	2.00	5.41	0.00	0.00	0.18	0.49
10"	0.00	0.00	2.34	6.33	0.19	0.51	0.00	0.00	0.08	0.22
12"	1.37	0.01	2.00	5.41	0.08	0.22	0.00	0.00	0.16	0.43
14"	441.75	3.20	0.11	0.30	0.04	0.11	6.68	0.05	0.04	0.11
16"	200.27	1.45	0.01	0.03	0.00	0.00	27.67	0.20	0.00	0.00
18"	112.54	0.82	0.00	0.00	0.00	0.00	20.20	0.15	0.00	0.00
20"	57.11	0.41	0.00	0.00	0.00	0.00	11.13	0.08	0.02	0.05
22"	16.07	0.12	0.00	0.00	0.00	0.00	3.94	0.03	0.00	0.00
24"+	11.66	0.08	0.00	0.00	0.00	0.00	30.86	0.22	0.02	0.06
Totals	838.48	6.08	4.48	12.12	3.63	9.82	100.48	0.73	0.66	1.79

Cutting Unit X

DBH class	Pine						Hardwood			
	Sawtimber		Chip-n-saw		Pulpwood		Sawtimber		Pulpwood	
	BF/ac	tons/ac	cds/ac	tons/ac	cds/ac	tons/ac	BF/ac	tons/ac	cds/ac	tons/ac
6"	0.00	0.00	0.03	0.08	1.99	5.38	0.00	0.00	0.31	0.84
8"	0.00	0.00	0.14	0.38	3.42	9.25	0.00	0.00	0.47	1.27
10"	0.00	0.00	5.03	13.61	0.06	0.16	0.00	0.00	0.39	1.06
12"	18.04	0.13	3.34	9.04	0.02	0.05	0.00	0.00	0.21	0.57
14"	920.82	6.68	0.00	0.00	0.00	0.00	49.72	0.36	0.03	0.08
16"	576.08	4.18	0.00	0.00	0.00	0.00	30.04	0.22	0.04	0.11
18"	234.64	1.70	0.00	0.00	0.00	0.00	5.36	0.04	0.00	0.00
20"	76.55	0.55	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.08
22"	40.36	0.29	0.00	0.00	0.00	0.00	8.70	0.06	0.00	0.00
24"+	0.00	0.00	0.00	0.00	0.00	0.00	30.49	0.22	0.00	0.00
Totals	1,866.48	13.53	8.53	23.08	5.49	14.85	124.30	0.90	1.49	4.03

Cutting Unit XI

DBH class	Pine						Hardwood			
	Sawtimber		Chip-n-saw		Pulpwood		Sawtimber		Pulpwood	
	BF/ac	tons/ac	cds/ac	tons/ac	cds/ac	tons/ac	BF/ac	tons/ac	cds/ac	tons/ac
6"	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.10	2.98
8"	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.07	2.89
10"	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.45	1.22
12"	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14"	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16"	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18"	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20"	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22"	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24"+	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Totals	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.62	7.09

Cutting Unit XII

DBH class	Pine						Hardwood			
	Sawtimber		Chip-n-saw		Pulpwood		Sawtimber		Pulpwood	
	BF/ac	tons/ac	cds/ac	tons/ac	cds/ac	tons/ac	BF/ac	tons/ac	cds/ac	tons/ac
6"	0.00	0.00	0.00	0.00	0.23	0.62	0.00	0.00	0.72	1.95
8"	0.00	0.00	0.00	0.00	0.34	0.92	0.00	0.00	0.84	2.27
10"	0.00	0.00	0.38	1.03	0.16	0.43	0.00	0.00	0.54	1.46
12"	0.00	0.00	0.60	1.62	0.09	0.24	2.51	0.02	0.30	0.81
14"	373.53	2.71	0.01	0.03	0.03	0.08	79.13	0.57	0.20	0.54
16"	264.03	1.91	0.01	0.03	0.05	0.14	40.09	0.29	0.16	0.43
18"	176.17	1.28	0.00	0.00	0.02	0.05	41.96	0.30	0.06	0.16
20"	45.18	0.33	0.00	0.00	0.02	0.05	17.08	0.12	0.01	0.03
22"	13.84	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.03
24"+	5.94	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.05
Totals	878.68	6.37	1.00	2.71	0.94	2.54	180.77	1.31	2.87	7.76

Cutting Unit XIII

DBH class	Pine						Hardwood			
	Sawtimber		Chip-n-saw		Pulpwood		Sawtimber		Pulpwood	
	BF/ac	tons/ac	cds/ac	tons/ac	cds/ac	tons/ac	BF/ac	tons/ac	cds/ac	tons/ac
6"	0.00	0.00	0.00	0.00	0.63	1.70	0.00	0.00	0.95	2.57
8"	0.00	0.00	0.00	0.00	0.83	2.25	0.00	0.00	0.68	1.84
10"	0.00	0.00	0.99	2.68	0.18	0.49	0.00	0.00	0.65	1.76
12"	0.00	0.00	0.80	2.16	0.06	0.16	7.25	0.05	0.20	0.54
14"	332.27	2.41	0.02	0.05	0.04	0.11	48.61	0.35	0.16	0.43
16"	193.73	1.40	0.01	0.03	0.02	0.05	57.24	0.41	0.09	0.24
18"	125.31	0.91	0.01	0.03	0.02	0.05	7.75	0.06	0.05	0.14
20"	63.71	0.46	0.00	0.00	0.00	0.00	17.50	0.13	0.02	0.05
22"	35.59	0.26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24"+	21.89	0.16	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.08
Totals	772.50	5.60	1.82	4.92	1.79	4.84	138.36	1.00	2.81	7.60

Cutting Unit XIV

DBH class	Pine						Hardwood			
	Sawtimber		Chip-n-saw		Pulpwood		Sawtimber		Pulpwood	
	BF/ac	tons/ac	cds/ac	tons/ac	cds/ac	tons/ac	BF/ac	tons/ac	cds/ac	tons/ac
6"	0.00	0.00	0.00	0.00	0.42	1.14	0.00	0.00	0.36	0.97
8"	0.00	0.00	0.00	0.00	0.73	1.98	0.00	0.00	0.15	0.41
10"	0.00	0.00	0.70	1.89	0.23	0.62	0.00	0.00	0.11	0.30
12"	12.31	0.09	0.89	2.41	0.11	0.30	0.00	0.00	0.04	0.11
14"	144.57	1.05	0.04	0.11	0.12	0.32	0.00	0.00	0.00	0.00
16"	122.75	0.89	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.19
18"	17.04	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.11
20"	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22"	9.29	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24"+	16.73	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Totals	322.69	2.34	1.63	4.41	1.61	4.36	0.00	0.00	0.77	2.08

Appendix III-J-1-B. (concluded)

Cutting Unit XV

DBH class	Pine						Hardwood			
	Sawtimber		Chip-n-saw		Pulpwood		Sawtimber		Pulpwood	
	BF/ac	tons/ac	cds/ac	tons/ac	cds/ac	tons/ac	BF/ac	tons/ac	cds/ac	tons/ac
6"	0.00	0.01	0.00	0.00	1.07	2.89	0.00	0.00	0.50	1.35
8"	0.00	0.00	0.00	0.00	1.74	4.71	0.00	0.00	0.49	1.33
10"	0.00	0.00	1.82	4.92	0.25	0.68	0.00	0.00	0.38	1.03
12"	9.00	0.07	3.08	8.33	0.11	0.30	5.37	0.04	0.16	0.43
14"	1,029.46	7.46	0.00	0.00	0.03	0.08	32.80	0.24	0.07	0.19
16"	1,026.26	7.44	0.04	0.11	0.00	0.00	20.23	0.15	0.00	0.00
18"	612.54	4.44	0.00	0.00	0.00	0.00	4.07	0.03	0.00	0.00
20"	316.29	2.29	0.00	0.00	0.00	0.00	5.50	0.04	0.00	0.00
22"	108.54	0.79	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24"+	129.32	0.93	0.00	0.00	0.00	0.00	38.02	0.28	0.00	0.00
Totals	3,230.24	23.42	4.95	13.39	3.19	8.63	105.98	0.77	1.60	4.33

APPENDIX III-K

SAMPLE SIZES (n), 95% CONFIDENCE INTERVALS (CI), AND STANDARD ERRORS (SE) FOR THE CURRENT VOLUMES AND WEIGHTS OF PINE SAWTIMBER, CHIP-N-SAW, AND PULPWOOD, AND HARDWOOD SAWTIMBER AND PULPWOOD BY DIAMETER (DBH) CLASS AND FOREST MANAGEMENT BLOCK

(using data from 1997/1998 inventory)

Appendix III-K-1-A. Sample sizes (n), 95% confidence intervals (CI), and standard errors (SE) for the current mean volumes of pine sawtimber, chi-n-saw, and pulpwood, and hardwood sawtimber and pulpwood by diameter (DBH) class and forest management block.

Forest Management Block A01

		Pine									Hardwood					
		Sawtimber			Chip-n-saw			Pulpwood			Sawtimber			Pulpwood		
DBH class	n (# plots)	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE
6"	22	0.00	na	na	0.00	na	na	0.41	0.00-0.86	0.23	0.00	na	na	0.56	0.00-1.21	0.32
8"	22	0.00	na	na	0.00	na	na	0.97	0.28-1.66	0.34	0.00	na	na	0.27	0.01-0.53	0.13
10"	22	0.00	na	na	2.35	1.17-3.53	0.59	0.00	na	na	0.00	na	na	0.15	0.00-0.36	0.10
12"	22	0.00	na	na	2.68	1.05-4.31	0.81	0.00	na	na	0.00	na	na	0.00	na	na
14"	22	221.50	68.95-374.05	76.28	0.00	na	na	0.09	0.00-0.27	0.09	0.00	na	na	0.13	0.00-0.39	0.13
16"	22	234.27	5.04-463.50	114.62	0.00	na	na	0.00	na	na	21.77	0.00-65.31	21.77	0.00	na	na
18"	22	33.55	0.00-100.65	33.55	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
20"	22	17.64	0.00-52.92	17.64	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
22"	22	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.10	0.00-0.30	0.10
24"+	22	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na

Appendix III-K-1-A. (continued)

Forest Management Block A01A

		Pine									Hardwood					
		Sawtimber			Chip-n-saw			Pulpwood			Sawtimber			Pulpwood		
DBH class	n (# plots)	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE
6"	15	0.00	na	na	0.00	na	na	1.02	0.23-1.81	0.40	0.00	na	na	0.73	0.00-1.52	0.40
8"	15	0.00	na	na	0.00	na	na	1.91	0.54-3.28	0.68	0.00	na	na	0.11	0.00-0.33	0.11
10"	15	0.00	na	na	2.91	1.26-4.56	0.82	0.00	na	na	0.00	na	na	0.00	na	na
12"	15	0.00	na	na	3.08	1.24-4.92	0.92	0.13	0.00-0.39	0.13	0.00	na	na	0.00	na	na
14"	15	996.80	279.20-1714.40	358.81	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
16"	15	215.80	0.00-521.80	153.01	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
18"	15	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
20"	15	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
24"+	15	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na

Appendix III-K-1-A. (continued)

Forest Management Block A02

		Pine									Hardwood					
		Sawtimber			Chip-n-saw			Pulpwood			Sawtimber			Pulpwood		
DBH class	n (# plots)	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE
6"	11	0.00	na	na	0.00	na	na	1.26	0.48-2.04	0.39	0.00	na	na	0.28	0.00-0.84	0.28
8"	11	0.00	na	na	0.00	na	na	1.94	0.53-3.35	0.71	0.00	na	na	0.46	0.00-0.94	0.24
10"	11	0.00	na	na	2.60	0.14-5.06	1.23	0.22	0.00-0.66	0.22	0.00	na	na	0.13	0.00-0.39	0.13
12"	11	0.00	na	na	5.60	3.78-7.42	0.91	0.00	na	na	0.00	na	na	0.37	0.00-1.11	0.37
14"	11	1654.73	1236.58-2072.88	209.10	0.00	na	na	0.00	na	na	60.73	0.00-144.62	41.94	0.00	na	na
16"	11	596.82	229.78-963.86	183.51	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
18"	11	290.45	0.00-615.70	162.63	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
20"	11	131.91	0.00-395.73	131.91	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
22"	11	155.18	0.00-465.54	155.18	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
24"+	11	139.27	0.00-417.81	139.27	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na

Appendix III-K-1-A. (continued)

Forest Management Block A03

		Pine									Hardwood					
		Sawtimber			Chip-n-saw			Pulpwood			Sawtimber			Pulpwood		
DBH class	n (# plots)	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE
6"	36	0.00	na	na	0.00	na	na	1.50	0.32-2.68	0.59	0.00	na	na	0.11	0.00-0.28	0.08
8"	36	0.00	na	na	0.00	na	na	2.30	0.98-3.62	0.66	0.00	na	na	0.05	0.00-0.15	0.05
10"	36	0.00	na	na	2.97	1.70-4.24	0.63	0.42	0.00-0.89	0.23	0.00	na	na	0.02	0.00-0.06	0.02
12"	36	0.00	na	na	2.18	1.23-3.13	0.47	0.05	0.00-0.15	0.05	0.00	na	na	0.08	0.00-0.19	0.06
14"	36	816.06	477.07-1155.05	165.16	0.04	0.00-0.12	0.04	0.00	na	na	11.33	0.00-33.99	11.33	0.00	na	na
16"	36	465.42	154.24-776.60	155.60	0.00	na	na	0.05	0.00-0.15	0.05	21.81	0.00-52.98	15.58	0.00	na	na
18"	36	121.64	0.00-243.88	61.12	0.00	na	na	0.00	na	na	9.78	0.00-29.34	9.78	0.09	0.00-0.27	0.09
20"	36	147.08	17.36-276.80	64.87	0.00	na	na	0.09	0.00-0.27	0.09	33.33	0.00-99.99	33.33	0.00	na	na
22"	36	35.00	0.00-105.00	35.00	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
24"+	36	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na

Appendix III-K-1-A. (continued)

Forest Management Block A04

		Pine									Hardwood					
		Sawtimber			Chip-n-saw			Pulpwood			Sawtimber			Pulpwood		
DBH class	n (# plots)	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE
6"	43	0.00	na	na	0.00	na	na	1.94	1.13-2.75	0.40	0.00	na	na	0.03	0.00-0.09	0.03
8"	43	0.00	na	na	0.00	na	na	1.92	1.25-2.59	0.33	0.00	na	na	0.02	0.00-0.06	0.02
10"	43	0.00	na	na	1.57	0.76-2.38	0.41	0.10	0.00-0.24	0.07	0.00	na	na	0.00	na	na
12"	43	0.00	na	na	0.64	0.04-1.24	0.30	0.00	na	na	0.00	na	na	0.00	na	na
14"	43	91.23	0.00-247.90	78.34	0.03	0.00-0.09	0.03	0.10	0.00-0.24	0.07	0.00	na	na	0.00	na	na
16"	43	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
18"	43	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
20"	43	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
22"	43	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
24"+	43	0.00	na	na	0.00	na	na	0.03	0.00-0.09	0.03	0.00	na	na	0.00	na	na

Appendix III-K-1-A. (continued)

Forest Management Block A05

		Pine									Hardwood					
		Sawtimber			Chip-n-saw			Pulpwood			Sawtimber			Pulpwood		
DBH class	n (# plots)	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE
6"	55	0.00	na	na	0.04	0.00-0.12	0.04	0.80	0.41-1.19	0.19	0.00	na	na	0.37	0.14-0.60	0.11
8"	55	0.00	na	na	0.00	na	na	0.93	0.44-1.42	0.24	0.00	na	na	0.50	0.11-0.89	0.19
10"	55	0.00	na	na	1.74	0.95-2.53	0.39	0.04	0.00-0.12	0.04	0.00	na	na	0.51	0.18-0.84	0.17
12"	55	0.00	na	na	1.79	1.14-2.44	0.33	0.00	na	na	26.87	0.00-69.86	21.50	0.16	0.02-0.30	0.07
14"	55	1173.45	770.14-1576.76	201.64	0.00	na	na	0.00	na	na	61.65	0.00-139.92	39.14	0.07	0.00-0.17	0.05
16"	55	941.00	557.45-1324.55	191.79	0.00	na	na	0.00	na	na	39.56	0.82-78.30	19.37	0.04	0.00-0.12	0.04
18"	55	310.78	138.05-483.51	86.37	0.00	na	na	0.00	na	na	28.85	0.00-71.17	21.16	0.00	na	na
20"	55	248.35	45.45-451.25	101.45	0.00	na	na	0.00	na	na	14.55	0.00-34.94	10.19	0.15	0.00-0.38	0.11
22"	55	107.89	0.00-246.13	69.12	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
24"+	55	23.42	0.00-70.26	23.42	0.00	na	na	0.00	na	na	32.00	0.00-76.85	22.42	0.00	na	na

Appendix III-K-1-A. (continued)

		Forest Management Block A06														
		Pine									Hardwood					
		Sawtimber			Chip-n-saw			Pulpwood			Sawtimber			Pulpwood		
DBH class	n (# plots)	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE
6"	44	0.00	na	na	0.00	na	na	1.34	0.61-2.07	0.36	0.00	na	na	0.44	0.00-1.00	0.28
8"	44	0.00	na	na	0.00	na	na	2.75	1.67-3.83	0.54	0.00	na	na	0.24	0.00-0.52	0.14
10"	44	0.00	na	na	2.95	1.91-3.99	0.52	0.00	na	na	0.00	na	na	0.03	0.00-0.09	0.03
12"	44	0.00	na	na	5.15	3.79-6.51	0.68	0.00	na	na	0.00	na	na	0.00	na	na
14"	44	1348.20	931.61-1764.79	208.30	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
16"	44	352.00	157.38-546.62	97.31	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
18"	44	111.27	0.00-225.34	57.04	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
20"	44	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
22"	44	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
24"+	44	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na

Appendix III-K-1-A. (continued)

		Forest Management Block A07														
		Pine									Hardwood					
		Sawtimber			Chip-n-saw			Pulpwood			Sawtimber			Pulpwood		
DBH class	n (# plots)	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE
6"	26	0.00	na	na	0.00	na	na	0.95	0.10-1.80	0.42	0.00	na	na	0.78	0.00-1.57	0.39
8"	26	0.00	na	na	0.00	na	na	3.31	1.51-5.11	0.90	0.00	na	na	0.56	0.00-1.15	0.29
10"	26	0.00	na	na	5.57	1.75-9.39	1.91	0.09	0.00-0.27	0.09	0.00	na	na	0.29	0.00-0.64	0.18
12"	26	0.00	na	na	4.29	2.57-6.01	0.86	0.00	na	na	0.00	na	na	0.00	na	na
14"	26	1103.42	602.58-1604.26	250.44	0.00	na	na	0.00	na	na	66.00	0.00-198.00	66.00	0.00	na	na
16"	26	255.58	4.04-507.12	125.77	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
18"	26	25.85	0.00-77.55	25.85	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
20"	26	37.50	0.00-112.50	37.50	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
22"	26	48.46	0.00-145.38	48.46	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
24"+	26	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na

Appendix III-K-1-A. (continued)

		Forest Management Block A08														
		Pine									Hardwood					
		Sawtimber			Chip-n-saw			Pulpwood			Sawtimber			Pulpwood		
DBH class	n (# plots)	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE
6"	33	0.00	na	na	0.00	na	na	0.92	0.11-1.73	0.41	0.00	na	na	1.07	0.58-1.56	0.24
8"	33	0.00	na	na	0.00	na	na	1.81	0.91-2.71	0.45	0.00	na	na	0.70	0.27-1.13	0.21
10"	33	0.00	na	na	1.63	0.87-2.39	0.38	0.00	na	na	0.00	na	na	0.84	0.36-1.32	0.24
12"	33	0.00	na	na	3.73	2.31-5.15	0.71	0.00	na	na	0.00	na	na	0.47	0.03-0.91	0.22
14"	33	1872.91	1354.86-2390.96	259.00	0.00	na	na	0.00	na	na	44.97	0.00-96.92	25.97	0.12	0.00-0.29	0.08
16"	33	1639.36	971.65-2307.07	333.84	0.00	na	na	0.00	na	na	32.97	0.00-79.21	23.12	0.00	na	na
18"	33	629.27	353.65-904.89	137.80	0.00	na	na	0.00	na	na	38.06	0.00-81.78	21.86	0.00	na	na
20"	33	60.00	0.00-180.00	60.00	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
22"	33	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
24"+	33	0.00	na	na	0.00	na	na	0.00	na	na	27.33	0.00-65.68	34.14	0.00	na	na

Appendix III-K-1-A. (continued)

		Forest Management Block A09														
		Pine									Hardwood					
		Sawtimber			Chip-n-saw			Pulpwood			Sawtimber			Pulpwood		
DBH class	n (# plots)	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE
6"	16	0.00	na	na	0.00	na	na	0.94	0.19-1.69	0.37	0.00	na	na	0.29	0.00-0.69	0.20
8"	16	0.00	na	na	0.00	na	na	1.74	0.53-2.95	0.60	0.00	na	na	0.52	0.00-1.20	0.34
10"	16	0.00	na	na	1.46	0.00-3.27	0.90	0.24	0.00-0.58	0.17	0.00	na	na	0.65	0.00-1.30	0.33
12"	16	0.00	na	na	1.81	0.38-3.24	0.71	0.09	0.00-0.27	0.09	0.00	na	na	0.75	0.00-1.56	0.40
14"	16	1237.88	85.54-2390.22	576.16	0.00	na	na	0.00	na	na	109.00	0.00-222.83	56.91	0.00	na	na
16"	16	1145.13	217.23-2073.03	463.96	0.00	na	na	0.00	na	na	19.13	0.00-57.39	19.12	0.00	na	na
18"	16	275.88	0.00-592.18	158.14	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
20"	16	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
22"	16	62.50	0.00-187.50	62.50	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
24"+	16	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na

Appendix III-K-1-A. (continued)

		Forest Management Block A10														
		Pine									Hardwood					
		Sawtimber			Chip-n-saw			Pulpwood			Sawtimber			Pulpwood		
DBH class	n (# plots)	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE
6"	27	0.00	na	na	0.00	na	na	1.50	0.68-2.33	0.41	0.00	na	na	0.49	0.05-0.93	0.22
8"	27	0.00	na	na	0.00	na	na	2.84	1.74-3.94	0.55	0.00	na	na	0.86	0.34-1.38	0.26
10"	27	0.00	na	na	6.05	2.76-9.34	1.65	0.00	na	na	0.00	na	na	0.33	0.00-0.80	0.24
12"	27	0.00	na	na	8.96	5.31-12.61	1.83	0.00	na	na	0.00	na	na	0.00	na	na
14"	27	1697.50	952.13-2442.87	372.69	0.00	na	na	0.00	na	na	0.00	na	na	0.07	0.00-0.21	0.07
16"	27	1147.00	240.30-2053.70	453.36	0.08	0.00-0.24	0.08	0.00	na	na	0.00	na	na	0.00	na	na
18"	27	199.05	0.00-438.11	119.53	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
20"	27	329.55	0.00-663.02	166.73	0.00	na	na	0.00	na	na	28.45	0.00-85.35	28.45	0.00	na	na
22"	27	0.00	na	na	0.00	na	na	0.00	na	na	37.68	0.00-113.04	37.68	0.00	na	na
24"+	27	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na

Appendix III-K-1-A. (continued)

		Forest Management Block A11														
		Pine									Hardwood					
		Sawtimber			Chip-n-saw			Pulpwood			Sawtimber			Pulpwood		
DBH class	n (# plots)	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE
6"	14	0.00	na	na	0.00	na	na	0.52	0.03-1.01	0.25	0.00	na	na	0.47	0.00-1.17	0.35
8"	14	0.00	na	na	0.00	na	na	1.15	0.00-2.48	0.66	0.00	na	na	0.69	0.07-1.31	0.31
10"	14	0.00	na	na	0.78	0.00-1.78	0.50	0.14	0.00-0.42	0.14	0.00	na	na	0.39	0.00-0.98	0.30
12"	14	0.00	na	na	1.67	0.38-2.96	0.64	0.00	na	na	0.00	na	na	0.00	na	na
14"	14	927.07	173.27-1680.87	376.91	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
16"	14	1204.86	543.15-1866.57	330.87	0.17	0.00-0.51	0.17	0.00	na	na	0.00	na	na	0.00	na	na
18"	14	789.79	160.64-1418.94	314.55	0.25	0.00-0.75	0.25	0.00	na	na	0.00	na	na	0.00	na	na
20"	14	278.79	0.00-576.15	148.68	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
22"	14	157.86	0.00-387.40	114.77	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
24"+	14	92.00	0.00-276.00	92.00	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na

Appendix III-K-1-A. (continued)

		Forest Management Block A12														
		Pine									Hardwood					
		Sawtimber			Chip-n-saw			Pulpwood			Sawtimber			Pulpwood		
DBH class	n (# plots)	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE
6"	33	0.00	na	na	0.00	na	na	2.06	0.33-3.79	0.87	0.00	na	na	0.32	0.03-0.61	0.14
8"	33	0.00	na	na	0.00	na	na	2.94	1.16-4.72	0.89	0.00	na	na	1.43	0.50-2.36	0.47
10"	33	0.00	na	na	2.73	1.00-4.46	0.87	0.06	0.00-0.18	0.06	0.00	na	na	0.52	0.12-0.92	0.20
12"	33	33.39	0.00-100.17	33.39	2.36	1.15-3.57	0.60	0.00	na	na	0.00	na	na	0.21	0.00-0.51	0.15
14"	33	1078.97	640.37-1517.57	219.31	0.00	na	na	0.00	na	na	32.61	0.00-84.05	25.72	0.14	0.00-0.35	0.10
16"	33	1355.79	725.35-1986.23	315.20	0.00	na	na	0.00	na	na	23.79	0.00-57.75	16.98	0.04	0.00-0.12	0.04
18"	33	459.12	181.86-736.38	138.63	0.00	na	na	0.00	na	na	10.67	0.00-32.01	10.67	0.00	na	na
20"	33	354.03	69.28-638.78	142.38	0.00	na	na	0.00	na	na	28.00	0.00-84.00	28.00	0.00	na	na
22"	33	38.18	0.00-114.54	38.18	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
24"+	33	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na

Appendix III-K-1-A. (continued)

Forest Management Block A13

		Pine									Hardwood					
		Sawtimber			Chip-n-saw			Pulpwood			Sawtimber			Pulpwood		
DBH class	n (# plots)	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE
6"	27	0.00	na	na	0.00	na	na	1.05	0.14-1.96	0.45	0.00	na	na	0.57	0.08-1.06	0.25
8"	27	0.00	na	na	0.00	na	na	2.32	0.71-3.93	0.80	0.00	na	na	0.54	0.00-1.12	0.29
10"	27	0.00	na	na	1.28	0.53-2.03	0.38	0.00	na	na	0.00	na	na	0.29	0.00-0.64	0.18
12"	27	0.00	na	na	1.86	0.83-2.89	0.51	0.00	na	na	12.56	0.00-37.68	12.56	0.12	0.00-0.36	0.12
14"	27	1319.96	682.68-1957.24	318.61	0.00	na	na	0.00	na	na	48.96	0.00-122.03	36.54	0.16	0.00-0.38	0.11
16"	27	801.85	280.01-1323.69	260.94	0.00	na	na	0.00	na	na	0.00	na	na	0.09	0.00-0.27	0.09
18"	27	281.30	14.80-547.80	133.26	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
20"	27	81.52	0.00-195.35	56.92	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
22"	27	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
24"+	27	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na

Appendix III-K-1-A. (continued)

Forest Management Block A14

		Pine									Hardwood					
		Sawtimber			Chip-n-saw			Pulpwood			Sawtimber			Pulpwood		
DBH class	n (# plots)	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE
6"	22	0.00	na	na	0.00	na	na	1.55	0.63-2.47	0.46	0.00	na	na	0.20	0.00-0.43	0.11
8"	22	0.00	na	na	0.00	na	na	2.84	0.67-5.01	1.08	0.00	na	na	0.08	0.00-0.24	0.08
10"	22	0.00	na	na	4.16	1.83-6.49	1.16	0.11	0.00-0.33	0.11	0.00	na	na	0.13	0.00-0.32	0.10
12"	22	0.00	na	na	3.00	1.55-4.45	0.73	0.00	na	na	0.00	na	na	0.00	na	na
14"	22	649.23	134.20-1164.26	257.51	0.13	0.00-0.39	0.13	0.00	na	na	0.00	na	na	0.22	0.00-0.52	0.15
16"	22	432.55	78.59-786.51	176.97	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
18"	22	157.36	0.00-338.72	90.68	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
20"	22	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
22"	22	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
24"+	22	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na

Appendix III-K-1-A. (continued)

Forest Management Block A15

		Pine									Hardwood					
		Sawtimber			Chip-n-saw			Pulpwood			Sawtimber			Pulpwood		
DBH class	n (# plots)	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE
6"	23	0.00	na	na	0.00	na	na	2.33	0.83-3.83	0.75	0.00	na	na	0.92	0.21-1.63	0.36
8"	23	0.00	na	na	0.00	na	na	2.19	0.42-3.96	0.88	0.00	na	na	0.98	0.27-1.69	0.36
10"	23	0.00	na	na	4.30	1.92-6.68	1.19	0.00	na	na	0.00	na	na	0.49	0.00-1.00	0.26
12"	23	0.00	na	na	4.22	1.81-6.63	1.20	0.10	0.00-0.30	0.10	0.00	na	na	0.06	0.00-0.18	0.06
14"	23	1942.09	1190.50-2693.68	375.81	0.00	na	na	0.00	na	na	41.00	0.00-98.21	28.60	0.06	0.00-0.18	0.06
16"	23	1724.65	810.76-2638.54	456.98	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
18"	23	652.57	31.00-1274.14	310.78	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
20"	23	271.70	0.00-572.01	150.16	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
22"	23	313.78	0.00-629.35	157.78	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
24"+	23	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na

Appendix III-K-1-A. (continued)

Forest Management Block A16

		Pine									Hardwood					
		Sawtimber			Chip-n-saw			Pulpwood			Sawtimber			Pulpwood		
DBH class	n (# plots)	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE
6"	35	0.00	na	na	0.00	na	na	1.85	1.07-2.63	0.39	0.00	na	na	0.44	0.05-0.83	0.19
8"	35	0.00	na	na	0.00	na	na	2.54	1.72-3.36	0.41	0.00	na	na	0.56	0.11-1.01	0.22
10"	35	0.00	na	na	2.91	1.62-4.20	0.64	0.18	0.00-0.39	0.10	0.00	na	na	0.33	0.00-0.73	0.20
12"	35	0.00	na	na	3.84	2.56-5.12	0.64	0.00	na	na	0.00	na	na	0.10	0.00-0.24	0.07
14"	35	1502.31	868.79-2135.83	316.74	0.00	na	na	0.00	na	na	22.71	0.00-56.30	16.80	0.00	na	na
16"	35	948.34	540.46-1356.22	203.94	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
18"	35	776.26	299.64-1252.88	238.29	0.00	na	na	0.00	na	na	0.00	na	na	0.03	0.00-0.09	0.03
20"	35	90.74	0.00-193.08	51.17	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
22"	35	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
24"+	35	29.17	0.00-87.51	29.17	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na

Appendix III-K-1-A. (continued)

Forest Management Block A17

		Pine									Hardwood					
		Sawtimber			Chip-n-saw			Pulpwood			Sawtimber			Pulpwood		
DBH class	n (# plots)	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE
6"	8	0.00	na	na	0.00	na	na	1.37	0.00-3.00	0.81	0.00	na	na	1.20	0.04-2.36	0.58
8"	8	0.00	na	na	0.00	na	na	3.61	0.00-9.44	2.92	0.00	na	na	0.89	0.00-2.01	0.56
10"	8	0.00	na	na	4.42	0.00-9.85	2.71	0.00	na	na	0.00	na	na	0.92	0.00-2.28	0.68
12"	8	0.00	na	na	1.98	0.00-4.81	1.41	0.00	na	na	0.00	na	na	0.46	0.00-1.17	0.35
14"	8	148.25	0.00-444.75	148.25	0.00	na	na	0.00	na	na	32.50	0.00-97.50	32.50	0.00	na	na
16"	8	0.00	na	na	0.00	na	na	0.00	na	na	119.75	0.00-359.25	119.75	0.00	na	na
18"	8	46.13	0.00-138.39	46.13	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
20"	8	0.00	na	na	0.00	na	na	0.00	na	na	50.00	0.00-150.00	50.00	0.40	0.00-1.20	0.40
22"	8	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
24"+	8	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na

Appendix III-K-1-A. (continued)

Forest Management Block A18

		Pine									Hardwood					
		Sawtimber			Chip-n-saw			Pulpwood			Sawtimber			Pulpwood		
DBH class	n (# plots)	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE
6"	17	0.00	na	na	0.00	na	na	0.65	0.13-1.17	0.26	0.00	na	na	0.19	0.00-0.46	0.13
8"	17	0.00	na	na	0.00	na	na	1.00	0.18-1.82	0.41	0.00	na	na	0.73	0.10-1.36	0.31
10"	17	0.00	na	na	2.26	0.72-3.80	0.77	0.11	0.00-0.33	0.11	0.00	na	na	0.43	0.00-0.99	0.28
12"	17	0.00	na	na	1.91	0.68-3.14	0.62	0.14	0.00-0.42	0.14	0.00	na	na	0.39	0.00-0.97	0.29
14"	17	915.18	349.23-1481.13	282.95	0.11	0.00-0.33	0.11	0.00	na	na	0.00	na	na	0.11	0.00-0.33	0.11
16"	17	903.59	320.05-1487.13	291.76	0.00	na	na	0.19	0.00-0.57	0.19	0.00	na	na	0.00	na	na
18"	17	669.88	104.57-1235.19	282.65	0.23	0.00-0.69	0.23	0.00	na	na	32.47	0.00-97.41	32.47	0.00	na	na
20"	17	144.24	0.00-341.75	98.75	0.00	na	na	0.00	na	na	36.82	0.00-110.46	36.82	0.00	na	na
22"	17	384.41	0.00-821.91	218.75	0.00	na	na	0.00	na	na	82.59	0.00-195.68	56.54	0.00	na	na
24"+	17	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na

Appendix III-K-1-A. (continued)

Forest Management Block A19

		Pine									Hardwood					
		Sawtimber			Chip-n-saw			Pulpwood			Sawtimber			Pulpwood		
DBH class	n (# plots)	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE
6"	25	0.00	na	na	0.00	na	na	0.21	0.00-0.46	0.12	0.00	na	na	0.77	0.00-1.72	0.47
8"	25	0.00	na	na	0.00	na	na	0.45	0.02-0.88	0.21	0.00	na	na	0.61	0.11-1.11	0.25
10"	25	0.00	na	na	0.72	0.00-1.55	0.42	0.56	0.00-1.28	0.36	0.00	na	na	0.65	0.21-1.09	0.22
12"	25	0.00	na	na	1.50	0.11-2.89	0.69	0.15	0.00-0.45	0.15	0.00	na	na	1.05	0.23-1.87	0.41
14"	25	1010.80	316.38-1705.22	347.20	0.00	na	na	0.00	na	na	32.64	0.00-77.83	22.59	0.74	0.00-1.57	0.41
16"	25	263.80	0.61-526.99	131.60	0.00	na	na	0.00	na	na	12.24	0.00-36.72	12.24	0.05	0.00-0.15	0.05
18"	25	103.16	0.00-246.50	71.67	0.00	na	na	0.00	na	na	38.96	0.00-116.88	38.96	0.13	0.00-0.31	0.09
20"	25	124.04	0.00-296.15	86.05	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
22"	25	59.80	0.00-179.40	59.80	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
24"+	25	183.84	0.00-438.37	71.94	0.00	na	na	0.00	na	na	44.08	0.00-132.24	44.08	0.08	0.00-0.24	0.08

Appendix III-K-1-A. (continued)

Forest Management Block A20

		Pine									Hardwood					
		Sawtimber			Chip-n-saw			Pulpwood			Sawtimber			Pulpwood		
DBH class	n (# plots)	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE
6"	23	0.00	na	na	0.00	na	na	1.25	0.26-2.24	0.50	0.00	na	na	0.84	0.33-1.35	0.26
8"	23	0.00	na	na	0.22	0.00-0.66	0.22	1.59	0.30-2.88	0.64	0.00	na	na	0.77	0.18-1.36	0.30
10"	23	34.30	0.00-102.90	34.30	1.78	0.97-2.59	0.40	0.12	0.00-0.30	0.09	0.00	na	na	0.68	0.22-1.14	0.23
12"	23	0.00	na	na	3.54	2.03-5.05	0.76	0.06	0.00-0.18	0.06	0.00	na	na	0.00	na	na
14"	23	977.43	618.32-1336.54	179.55	0.08	0.00-0.24	0.08	0.04	0.00-0.12	0.04	33.91	0.00-83.53	24.81	0.08	0.00-0.24	0.08
16"	23	979.70	356.22-1603.18	311.76	0.00	na	na	0.00	na	na	41.65	0.00-99.20	28.78	0.00	na	na
18"	23	489.39	199.28-779.50	145.06	0.10	0.00-0.30	0.10	0.00	na	na	54.61	0.00-116.46	30.93	0.00	na	na
20"	23	42.39	0.00-127.17	42.39	0.00	na	na	0.00	na	na	27.22	0.00-81.66	27.22	0.00	na	na
22"	23	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
24"+	23	0.00	na	na	0.00	na	na	0.00	na	na	39.22	0.00-117.66	39.22	0.00	na	na

Appendix III-K-1-A. (continued)

Forest Management Block A21A

		Pine									Hardwood					
		Sawtimber			Chip-n-saw			Pulpwood			Sawtimber			Pulpwood		
DBH class	n (# plots)	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE
6"	14	0.00	na	na	0.00	na	na	0.92	0.00-2.19	0.64	0.00	na	na	0.08	0.00-0.24	0.08
8"	14	0.00	na	na	0.00	na	na	0.98	0.22-1.74	0.38	0.00	na	na	0.12	0.00-0.36	0.12
10"	14	0.00	na	na	1.80	0.00-3.89	1.04	0.00	na	na	0.00	na	na	0.25	0.00-0.59	0.17
12"	14	0.00	na	na	2.18	0.00-4.46	1.14	0.00	na	na	0.00	na	na	0.00	na	na
14"	14	544.43	0.00-1220.01	337.79	0.00	na	na	0.00	na	na	67.36	0.00-159.85	46.24	0.10	0.00-0.30	0.10
16"	14	668.29	73.04-1263.54	297.63	0.00	na	na	0.00	na	na	77.71	0.00-184.17	53.23	0.34	0.00-0.80	0.23
18"	14	524.64	0.00-1182.38	328.88	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
20"	14	382.43	0.00-806.32	211.94	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
22"	14	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.14	0.00-0.42	0.14
24"+	14	92.00	0.00-276.00	92.00	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na

Appendix III-K-1-A. (continued)

Forest Management Block A21B

		Pine									Hardwood					
		Sawtimber			Chip-n-saw			Pulpwood			Sawtimber			Pulpwood		
DBH class	n (# plots)	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE
6"	10	0.00	na	na	0.00	na	na	0.35	0.00-0.82	0.23	0.00	na	na	1.44	0.00-3.01	0.79
8"	10	0.00	na	na	0.00	na	na	1.59	0.20-2.98	0.69	0.00	na	na	0.73	0.00-1.79	0.53
10"	10	0.00	na	na	0.38	0.00-0.91	0.26	0.00	na	na	0.00	na	na	0.65	0.00-1.95	0.65
12"	10	0.00	na	na	1.83	0.60-3.06	0.62	0.19	0.00-0.57	0.19	0.00	na	na	0.14	0.00-0.42	0.14
14"	10	812.20	182.42-1441.98	314.90	0.00	na	na	0.00	na	na	0.00	na	na	0.19	0.00-0.57	0.19
16"	10	1459.90	288.04-2631.76	585.90	0.00	na	na	0.00	na	na	30.60	0.00-91.80	30.60	0.00	na	na
18"	10	67.20	0.00-201.60	67.20	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
20"	10	245.20	0.00-572.13	163.47	0.00	na	na	0.00	na	na	138.20	0.00-323.48	92.64	0.00	na	na
22"	10	71.50	0.00-214.50	71.50	0.00	na	na	0.00	na	na	82.90	0.00-248.70	82.90	0.00	na	na
24"+	10	0.00	na	na	0.00	na	na	0.00	na	na	77.90	0.00-233.70	77.90	0.00	na	na

Appendix III-K-1-A. (continued)

Forest Management Block A22

		Pine									Hardwood					
		Sawtimber			Chip-n-saw			Pulpwood			Sawtimber			Pulpwood		
DBH class	n (# plots)	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE
6"	24	0.00	na	na	0.19	0.00-0.57	0.19	2.20	0.79-3.61	0.71	0.00	na	na	0.92	0.00-1.87	0.48
8"	24	0.00	na	na	0.13	0.00-0.39	0.13	2.31	1.10-3.52	0.60	0.00	na	na	1.00	0.13-1.87	0.44
10"	24	0.00	na	na	2.29	1.06-3.52	0.62	0.00	na	na	0.00	na	na	0.08	0.00-0.24	0.08
12"	24	0.00	na	na	2.56	1.15-3.97	0.70	0.00	na	na	0.00	na	na	0.16	0.00-0.39	0.11
14"	24	1406.63	725.82-2087.44	340.41	0.00	na	na	0.00	na	na	131.58	0.00-283.84	76.13	0.00	na	na
16"	24	908.25	410.26-1406.24	249.02	0.00	na	na	0.00	na	na	109.04	0.00-274.45	82.71	0.00	na	na
18"	24	533.88	140.84-926.92	196.52	0.00	na	na	0.00	na	na	69.00	0.00-207.00	69.00	0.00	na	na
20"	24	160.17	4.15-316.19	78.01	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
22"	24	52.50	0.00-157.50	52.50	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
24"+	24	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na

Appendix III-K-1-A. (continued)

Forest Management Block A23

		Pine									Hardwood					
		Sawtimber			Chip-n-saw			Pulpwood			Sawtimber			Pulpwood		
DBH class	n (# plots)	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE
6"	61	0.00	na	na	0.12	0.00-0.36	0.12	4.24	3.03-5.45	0.60	0.00	na	na	0.50	0.00-1.01	0.26
8"	61	0.00	na	na	0.09	0.00-0.27	0.09	4.33	2.83-5.83	0.75	0.00	na	na	0.15	0.00-0.36	0.10
10"	61	0.00	na	na	5.30	2.88-7.72	1.21	0.81	0.00-2.14	0.67	0.00	na	na	0.00	na	na
12"	61	0.00	na	na	5.75	1.87-9.63	1.94	0.00	na	na	0.00	na	na	0.00	na	na
14"	61	119.37	0.00-258.72	69.67	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
16"	61	90.00	0.00-209.89	59.95	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
18"	61	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
20"	61	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
22"	61	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
24"+	61	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na

Appendix III-K-1-A. (continued)

Forest Management Block A24

		Pine									Hardwood					
		Sawtimber			Chip-n-saw			Pulpwood			Sawtimber			Pulpwood		
DBH class	n (# plots)	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE
6"	54	0.00	na	na	0.00	na	na	1.87	1.13-2.61	0.37	0.00	na	na	0.04	0.00-0.12	0.04
8"	54	0.00	na	na	0.00	na	na	2.69	1.70-3.68	0.50	0.00	na	na	0.11	0.00-0.27	0.08
10"	54	0.00	na	na	3.92	2.58-5.26	0.67	0.44	0.00-0.89	0.23	0.00	na	na	0.05	0.00-0.12	0.03
12"	54	0.00	na	na	1.64	0.93-2.35	0.35	0.13	0.00-0.33	0.10	0.00	na	na	0.00	na	na
14"	54	230.27	49.83-410.71	90.21	0.00	na	na	0.00	na	na	5.00	0.00-15.00	5.00	0.00	na	na
16"	54	112.04	17.25-206.83	47.39	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
18"	54	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
20"	54	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
22"	54	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
24"+	54	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na

Appendix III-K-1-A. (continued)

Forest Management Block A25

		Pine									Hardwood					
		Sawtimber			Chip-n-saw			Pulpwood			Sawtimber			Pulpwood		
DBH class	n (# plots)	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE
6"	38	0.00	na	na	0.00	na	na	0.19	0.00-0.41	0.11	0.00	na	na	0.48	0.07-0.89	0.20
8"	38	0.00	na	na	0.00	na	na	0.49	0.00-0.99	0.25	0.00	na	na	0.48	0.15-0.81	0.16
10"	38	0.00	na	na	0.77	0.17-1.37	0.30	0.15	0.00-0.36	0.10	0.00	na	na	1.19	0.30-2.08	0.45
12"	38	0.00	na	na	2.00	1.03-2.97	0.49	0.09	0.00-0.27	0.10	0.00	na	na	0.58	0.14-1.02	0.22
14"	38	675.21	312.49-1037.93	181.35	0.00	na	na	0.07	0.00-0.21	0.07	10.74	0.00-32.22	10.74	0.27	0.01-0.53	0.13
16"	38	927.42	396.38-1458.46	265.53	0.00	na	na	0.00	na	na	12.61	0.00-37.83	12.61	0.12	0.00-0.29	0.09
18"	38	617.71	260.92-974.50	178.38	0.10	0.00-0.30	0.10	0.00	na	na	32.50	0.00-78.10	22.80	0.06	0.00-0.18	0.06
20"	38	266.61	0.00-614.78	174.08	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
22"	38	66.32	0.00-158.84	46.25	0.00	na	na	0.00	na	na	18.47	0.00-55.41	18.47	0.00	na	na
24"+	38	0.00	na	na	0.00	na	na	0.00	na	na	33.68	0.00-101.04	33.68	0.00	na	na

Appendix III-K-1-A. (continued)

Forest Management Block A26

		Pine									Hardwood					
		Sawtimber			Chip-n-saw			Pulpwood			Sawtimber			Pulpwood		
DBH class	n (# plots)	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE
6"	49	8.31	0.00-24.93	8.31	0.00	na	na	0.62	0.26-0.98	0.18	0.00	na	na	0.45	0.00-0.90	0.23
8"	49	0.00	na	na	0.00	na	na	0.91	0.16-1.66	0.38	0.00	na	na	0.75	0.34-1.16	0.20
10"	49	0.00	na	na	0.94	0.45-1.43	0.24	0.14	0.00-0.34	0.10	0.00	na	na	0.36	0.02-0.70	0.17
12"	49	38.69	0.00-92.83	27.07	2.08	1.07-3.09	0.50	0.08	0.00-0.20	0.06	0.00	na	na	0.41	0.07-0.75	0.17
14"	49	1390.24	896.29-1884.19	246.99	0.00	na	na	0.00	na	na	8.33	0.00-24.99	8.33	0.21	0.04-0.38	0.09
16"	49	1138.37	827.03-1449.71	155.67	0.00	na	na	0.00	na	na	45.35	0.00-101.12	27.88	0.17	0.00-0.34	0.08
18"	49	747.18	389.80-1104.56	178.70	0.00	na	na	0.00	na	na	11.27	0.00-33.81	11.27	0.08	0.00-0.24	0.08
20"	49	456.76	153.84-759.68	151.46	0.00	na	na	0.00	na	na	8.16	0.00-24.48	8.16	0.08	0.00-0.21	0.07
22"	49	151.43	18.70-284.16	66.36	0.00	na	na	0.00	na	na	14.33	0.00-42.99	14.33	0.00	na	na
24"+	49	52.10	0.00-126.51	37.21	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na

Appendix III-K-1-A. (continued)

Forest Management Block A27

		Pine									Hardwood					
		Sawtimber			Chip-n-saw			Pulpwood			Sawtimber			Pulpwood		
DBH class	n (# plots)	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE
6"	13	0.00	na	na	0.00	na	na	0.21	0.00-0.63	0.21	0.00	na	na	0.34	0.00-0.85	0.25
8"	13	0.00	na	na	0.00	na	na	0.16	0.00-0.48	0.16	0.00	na	na	0.48	0.00-1.13	0.32
10"	13	0.00	na	na	1.61	0.09-3.13	0.76	0.72	0.00-2.16	0.72	0.00	na	na	0.46	0.00-0.94	0.24
12"	13	0.00	na	na	1.68	0.01-3.35	0.84	0.00	na	na	0.00	na	na	0.15	0.00-0.45	0.15
14"	13	1078.54	305.87-1851.21	386.32	0.00	na	na	0.00	na	na	72.54	0.00-171.80	49.63	0.15	0.00-0.45	0.15
16"	13	1076.15	248.27-1904.03	413.95	0.00	na	na	0.00	na	na	93.69	0.00-220.55	63.43	0.00	na	na
18"	13	850.54	355.95-1345.13	247.31	0.00	na	na	0.00	na	na	74.92	0.00-224.76	74.92	0.00	na	na
20"	13	263.62	0.00-637.25	186.81	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
22"	13	0.00	na	na	0.00	na	na	0.00	na	na	127.54	0.00-382.62	127.54	0.00	na	na
24"+	13	1114.16	0.00-2293.61	200.40	0.00	na	na	0.00	na	na	202.46	0.00-607.38	69.38	0.00	na	na

Appendix III-K-1-A. (continued)

Forest Management Block B01

		Pine									Hardwood					
		Sawtimber			Chip-n-saw			Pulpwood			Sawtimber			Pulpwood		
DBH class	n (# plots)	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE
6"	31	0.00	na	na	0.00	na	na	0.59	0.13-1.05	0.23	0.00	na	na	0.97	0.43-1.51	0.27
8"	31	0.00	na	na	0.00	na	na	1.72	0.76-2.68	0.48	0.00	na	na	1.07	0.27-1.87	0.40
10"	31	0.00	na	na	1.82	0.90-2.74	0.46	0.25	0.00-0.64	0.19	0.00	na	na	0.77	0.16-1.38	0.30
12"	31	0.00	na	na	2.29	0.96-3.62	0.67	0.00	na	na	6.97	0.00-20.91	6.97	0.36	0.01-0.71	0.18
14"	31	1247.74	613.39-1882.09	317.15	0.24	0.00-0.52	0.14	0.00	na	na	68.97	0.00-146.36	38.69	0.76	0.22-1.30	0.27
16"	31	1002.45	511.35-1493.55	245.56	0.00	na	na	0.06	0.00-0.18	0.06	136.19	24.79-247.59	55.70	0.05	0.00-0.15	0.05
18"	31	537.39	193.03-881.75	172.18	0.00	na	na	0.00	na	na	82.58	12.82-152.34	34.88	0.00	na	na
20"	31	385.29	149.76-620.82	117.76	0.00	na	na	0.00	na	na	104.19	0.00-222.98	59.40	0.05	0.00-0.15	0.05
22"	31	150.77	0.00-320.66	84.94	0.00	na	na	0.00	na	na	63.84	0.00-137.29	36.73	0.00	na	na
24"+	31	536.06	7.13-1064.99	68.75	0.00	na	na	0.00	na	na	168.03	0.00-504.09	25.13	0.05	0.00-0.15	0.03

Appendix III-K-1-A. (continued)

Forest Management Block B02

		Pine									Hardwood					
		Sawtimber			Chip-n-saw			Pulpwood			Sawtimber			Pulpwood		
DBH class	n (# plots)	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE
6"	12	0.00	na	na	0.00	na	na	0.29	0.00-0.68	0.20	0.00	na	na	0.68	0.05-1.31	0.31
8"	12	0.00	na	na	0.00	na	na	0.46	0.00-1.10	0.32	0.00	na	na	0.64	0.05-1.23	0.30
10"	12	0.00	na	na	1.31	0.00-2.75	0.72	0.24	0.00-0.72	0.24	0.00	na	na	1.23	0.00-2.48	0.63
12"	12	91.83	0.00-275.49	91.83	3.22	1.15-5.29	1.04	0.00	na	na	0.00	na	na	0.28	0.00-0.66	0.19
14"	12	1056.42	199.98-1912.86	428.24	0.00	na	na	0.00	na	na	146.58	20.13-273.03	63.23	0.12	0.00-0.36	0.12
16"	12	199.33	0.00-477.81	139.24	0.00	na	na	0.00	na	na	167.17	0.00-412.27	122.55	0.31	0.00-0.93	0.31
18"	12	270.92	0.00-568.31	148.70	0.00	na	na	0.00	na	na	46.00	0.00-138.00	46.00	0.00	na	na
20"	12	139.25	0.00-330.13	95.44	0.00	na	na	0.00	na	na	0.00	na	na	0.24	0.00-0.72	0.24
22"	12	105.00	0.00-315.00	105.00	0.00	na	na	0.00	na	na	37.33	0.00-111.99	37.33	0.00	na	na
24"+	12	0.00	na	na	0.00	na	na	0.00	na	na	46.00	0.00-94.09	136.78	0.00	na	na

Appendix III-K-1-A. (continued)

Forest Management Block B03

		Pine									Hardwood					
		Sawtimber			Chip-n-saw			Pulpwood			Sawtimber			Pulpwood		
DBH class	n (# plots)	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE
6"	20	0.00	na	na	0.00	na	na	1.04	0.21-1.87	0.42	0.00	na	na	0.50	0.00-1.07	0.28
8"	20	0.00	na	na	0.00	na	na	2.34	0.74-3.94	0.80	0.00	na	na	1.00	0.37-1.64	0.32
10"	20	0.00	na	na	3.55	0.83-6.27	1.36	0.07	0.00-0.21	0.07	0.00	na	na	0.89	0.07-1.71	0.41
12"	20	37.80	0.00-113.40	37.80	1.59	0.59-2.59	0.50	0.00	na	na	0.00	na	na	0.94	0.07-1.81	0.43
14"	20	1374.20	627.32-2121.08	373.44	0.00	na	na	0.00	na	na	134.70	20.91-248.49	56.90	0.07	0.00-0.21	0.07
16"	20	746.75	276.75-1216.75	235.01	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
18"	20	198.70	0.00-495.99	148.65	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
20"	20	82.50	0.00-247.50	82.50	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
22"	20	94.85	0.00-284.55	94.85	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
24"+	20	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na

Appendix III-K-1-A. (continued)

Forest Management Block B04

		Pine									Hardwood					
		Sawtimber			Chip-n-saw			Pulpwood			Sawtimber			Pulpwood		
DBH class	n (# plots)	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE
6"	5	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
8"	5	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
10"	5	0.00	na	na	0.93	0.00-2.21	0.64	0.00	na	na	0.00	na	na	0.00	na	na
12"	5	0.00	na	na	3.19	0.17-6.21	1.51	0.00	na	na	0.00	na	na	0.00	na	na
14"	5	1970.00	413.11-3526.89	778.49	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
16"	5	1306.80	227.12-2386.48	539.84	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
18"	5	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
20"	5	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
22"	5	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
24"+	5	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na

Appendix III-K-1-A. (continued)

Forest Management Block B05

		Pine									Hardwood					
		Sawtimber			Chip-n-saw			Pulpwood			Sawtimber			Pulpwood		
DBH class	n (# plots)	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE
6"	16	0.00	na	na	0.00	na	na	1.01	0.00-2.02	0.51	0.00	na	na	0.73	0.23-1.23	0.25
8"	16	0.00	na	na	0.16	0.00-0.48	0.16	1.12	0.06-2.18	0.53	0.00	na	na	0.59	0.13-1.05	0.23
10"	16	0.00	na	na	1.44	0.16-2.72	0.64	0.00	na	na	0.00	na	na	0.28	0.00-0.67	0.19
12"	16	0.00	na	na	2.02	0.89-3.15	0.56	0.00	na	na	0.00	na	na	0.00	na	na
14"	16	765.19	232.01-1298.37	266.60	0.00	na	na	0.00	na	na	41.75	0.00-100.37	29.31	0.00	na	na
16"	16	1077.94	383.32-1772.56	347.32	0.00	na	na	0.00	na	na	68.00	0.00-204.00	68.00	0.00	na	na
18"	16	793.88	220.94-1366.82	286.47	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
20"	16	154.75	0.00-388.19	116.72	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
22"	16	0.00	na	na	0.00	na	na	0.00	na	na	28.00	0.00-84.00	28.00	0.00	na	na
24"+	16	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na

Appendix III-K-1-A. (continued)

Forest Management Block B06

		Pine									Hardwood					
		Sawtimber			Chip-n-saw			Pulpwood			Sawtimber			Pulpwood		
DBH class	n (# plots)	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE
6"	23	0.00	na	na	0.00	na	na	2.78	1.30-4.26	0.74	0.00	na	na	0.05	0.00-0.15	0.05
8"	23	0.00	na	na	0.38	0.00-0.98	0.30	5.09	2.81-7.37	1.14	0.00	na	na	0.32	0.00-0.96	0.32
10"	23	0.00	na	na	6.81	4.61-9.01	1.10	0.00	na	na	0.00	na	na	0.04	0.00-0.12	0.04
12"	23	0.00	na	na	3.10	1.63-4.57	0.74	0.00	na	na	0.00	na	na	0.00	na	na
14"	23	587.30	195.57-979.03	195.88	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
16"	23	504.52	185.36-823.68	159.58	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
18"	23	45.26	0.00-110.63	32.69	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
20"	23	30.26	0.00-90.78	30.26	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
22"	23	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
24"+	23	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na

Appendix III-K-1-A. (continued)

Forest Management Block B07

		Pine									Hardwood					
		Sawtimber			Chip-n-saw			Pulpwood			Sawtimber			Pulpwood		
DBH class	n (# plots)	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE
6"	10	0.00	na	na	0.30	0.00-0.90	0.30	6.58	3.47-9.69	1.56	0.00	na	na	0.00	na	na
8"	10	0.00	na	na	0.00	na	na	9.80	5.58-14.02	2.11	0.00	na	na	0.00	na	na
10"	10	0.00	na	na	7.96	2.91-13.01	2.52	0.00	na	na	0.00	na	na	0.00	na	na
12"	10	0.00	na	na	2.76	0.00-5.59	1.42	0.00	na	na	0.00	na	na	0.00	na	na
14"	10	283.20	0.00-676.00	196.40	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
16"	10	63.90	0.00-191.70	63.90	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
18"	10	67.20	0.00-201.60	67.20	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
20"	10	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
22"	10	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
24"+	10	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na

Appendix III-K-1-A. (continued)

Forest Management Block B08

		Pine									Hardwood					
		Sawtimber			Chip-n-saw			Pulpwood			Sawtimber			Pulpwood		
DBH class	n (# plots)	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE
6"	17	0.00	na	na	0.00	na	na	2.07	0.35-3.79	0.86	0.00	na	na	0.07	0.00-0.21	0.07
8"	17	0.00	na	na	0.18	0.00-0.54	0.18	3.95	1.74-6.16	1.11	0.00	na	na	0.26	0.00-0.63	0.18
10"	17	0.00	na	na	9.84	4.44-15.24	2.70	0.08	0.00-0.24	0.08	0.00	na	na	0.14	0.00-0.42	0.14
12"	17	0.00	na	na	7.42	3.28-11.56	2.07	0.11	0.00-0.33	0.11	0.00	na	na	0.00	na	na
14"	17	955.88	255.32-1656.44	350.29	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
16"	17	352.06	84.74-619.38	133.67	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
18"	17	148.71	0.00-317.14	84.22	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
20"	17	81.88	0.00-245.64	81.88	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
22"	17	58.82	0.00-176.46	58.82	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
24"+	17	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na

Appendix III-K-1-A. (continued)

Forest Management Block B09

		Pine									Hardwood					
		Sawtimber			Chip-n-saw			Pulpwood			Sawtimber			Pulpwood		
DBH class	n (# plots)	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE
6"	32	0.00	na	na	0.00	na	na	1.08	0.35-1.81	0.37	0.00	na	na	0.39	0.03-0.75	0.18
8"	32	0.00	na	na	0.00	na	na	1.76	0.97-2.55	0.40	0.00	na	na	0.41	0.12-0.70	0.14
10"	32	0.00	na	na	4.24	2.71-5.77	0.77	0.00	na	na	0.00	na	na	0.03	0.00-0.09	0.03
12"	32	0.00	na	na	5.50	3.64-7.36	0.93	0.00	na	na	0.00	na	na	0.10	0.00-0.25	0.07
14"	32	1053.31	632.20-1474.42	210.57	0.20	0.00-0.42	0.12	0.04	0.00-0.12	0.04	0.00	na	na	0.04	0.00-0.12	0.04
16"	32	384.47	151.40-617.54	116.53	0.00	na	na	0.00	na	na	14.97	0.00-44.91	14.97	0.00	na	na
18"	32	203.00	0.00-417.02	107.01	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
20"	32	120.88	0.06-241.60	60.36	0.00	na	na	0.00	na	na	0.00	na	na	0.03	0.00-0.09	0.03
22"	32	67.03	0.00-141.89	37.43	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
24"+	32	187.91	0.00-461.34	47.20	0.00	na	na	0.00	na	na	0.00	na	na	0.03	0.00-0.07	0.06

Appendix III-K-1-A. (continued)

Forest Management Block B10

		Pine									Hardwood					
		Sawtimber			Chip-n-saw			Pulpwood			Sawtimber			Pulpwood		
DBH class	n (# plots)	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE
6"	45	9.25	0.00-27.75	9.25	0.00	na	na	0.99	0.48-1.50	0.26	0.00	na	na	0.16	0.00-0.40	0.12
8"	45	0.00	na	na	0.00	na	na	1.54	0.85-2.23	0.34	0.00	na	na	0.25	0.00-0.59	0.17
10"	45	0.00	na	na	2.15	1.36-2.94	0.39	0.21	0.00-0.43	0.11	0.00	na	na	0.24	0.00-0.49	0.12
12"	45	0.00	na	na	1.37	0.54-2.20	0.41	0.28	0.00-0.63	0.17	0.00	na	na	0.34	0.00-0.85	0.25
14"	45	574.57	181.39-967.75	196.58	0.12	0.00-0.36	0.12	0.06	0.00-0.18	0.06	27.02	0.00-64.98	18.98	0.07	0.00-0.18	0.06
16"	45	234.18	28.43-439.93	102.87	0.00	na	na	0.00	na	na	70.25	0.00-177.33	53.54	0.00	na	na
18"	45	183.18	0.00-398.98	107.90	0.00	na	na	0.00	na	na	66.18	0.00-167.14	50.48	0.00	na	na
20"	45	37.50	0.00-112.50	37.50	0.00	na	na	0.00	na	na	27.84	0.00-83.52	27.84	0.07	0.00-0.21	0.07
22"	45	0.00	na	na	0.00	na	na	0.00	na	na	15.95	0.00-47.85	15.95	0.00	na	na
24"+	45	0.00	na	na	0.00	na	na	0.00	na	na	124.84	0.00-331.35	103.25	0.00	na	na

Appendix III-K-1-A. (continued)

Forest Management Block B11

		Pine									Hardwood					
		Sawtimber			Chip-n-saw			Pulpwood			Sawtimber			Pulpwood		
DBH class	n (# plots)	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE
6"	24	0.00	na	na	0.00	na	na	0.98	0.34-1.62	0.32	0.00	na	na	0.00	na	na
8"	24	0.00	na	na	0.08	0.00-0.24	0.08	2.72	1.23-4.21	0.75	0.00	na	na	0.09	0.00-0.27	0.09
10"	24	0.00	na	na	1.98	0.96-3.00	0.51	0.50	0.00-1.25	0.38	0.00	na	na	0.03	0.00-0.09	0.03
12"	24	0.00	na	na	2.64	1.17-4.11	0.74	0.09	0.00-0.27	0.09	0.00	na	na	0.00	na	na
14"	24	506.88	256.43-757.33	125.22	0.32	0.00-0.68	0.18	0.00	na	na	0.00	na	na	0.00	na	na
16"	24	477.00	195.86-758.14	140.57	0.05	0.00-0.15	0.05	0.00	na	na	52.15	0.00-124.78	36.32	0.00	na	na
18"	24	119.54	0.00-246.37	63.41	0.00	na	na	0.00	na	na	26.27	0.00-78.81	26.27	0.00	na	na
20"	24	178.77	0.00-366.87	94.05	0.00	na	na	0.00	na	na	29.08	0.00-87.27	29.08	0.00	na	na
22"	24	27.50	0.00-82.50	27.50	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
24"+	24	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na

Appendix III-K-1-A. (continued)

Forest Management Block B12

		Pine									Hardwood					
		Sawtimber			Chip-n-saw			Pulpwood			Sawtimber			Pulpwood		
DBH class	n (# plots)	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE
6"	27	0.00	na	na	0.00	na	na	1.43	0.78-2.08	0.32	0.00	na	na	0.00	na	na
8"	27	0.00	na	na	0.00	na	na	1.53	0.74-2.32	0.39	0.00	na	na	0.07	0.00-0.21	0.07
10"	27	0.00	na	na	0.47	0.04-0.90	0.22	0.04	0.00-0.12	0.04	0.00	na	na	0.05	0.00-0.15	0.05
12"	27	0.00	na	na	0.44	0.00-1.02	0.29	0.00	na	na	0.00	na	na	0.00	na	na
14"	27	134.53	0.00-302.73	84.10	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
16"	27	10.69	0.00-32.07	10.69	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
18"	27	50.47	0.00-121.73	35.63	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
20"	27	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
22"	27	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
24"+	27	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na

Forest Management Block B13

(This forest management block was not inventoried because of its current use as a disposal area.)

Forest Management Block B14

(This forest management block was not inventoried because of its current use as a disposal area.)

Appendix III-K-1-A. (continued)

Forest Management Block B15

		Pine									Hardwood					
		Sawtimber			Chip-n-saw			Pulpwood			Sawtimber			Pulpwood		
DBH class	n (# plots)	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE
6"	60	0.00	na	na	0.00	na	na	0.83	0.33-1.33	0.25	0.00	na	na	0.02	0.00-0.06	0.02
8"	60	0.00	na	na	0.00	na	na	1.89	1.21-2.57	0.34	0.00	na	na	0.07	0.00-0.17	0.05
10"	60	0.00	na	na	1.90	1.10-2.70	0.40	0.21	0.00-0.43	0.11	0.00	na	na	0.03	0.00-0.09	0.02
12"	60	0.00	na	na	1.55	0.96-2.14	0.29	0.20	0.02-0.38	0.09	0.00	na	na	0.00	na	na
14"	60	330.88	126.53-535.23	102.18	0.00	na	na	0.09	0.00-0.22	0.06	0.00	na	na	0.02	0.00-0.06	0.02
16"	60	162.25	30.91-293.59	65.67	0.00	na	na	0.04	0.00-0.12	0.04	0.00	na	na	0.00	na	na
18"	60	118.37	36.35-200.39	41.01	0.00	na	na	0.05	0.00-0.15	0.05	0.00	na	na	0.00	na	na
20"	60	102.13	16.39-187.87	42.87	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
22"	60	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
24"+	60	12.17	0.00-36.51	12.17	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na

Appendix III-K-1-A. (continued)

Forest Management Block B16

		Pine									Hardwood					
		Sawtimber			Chip-n-saw			Pulpwood			Sawtimber			Pulpwood		
DBH class	n (# plots)	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE
6"	46	0.00	na	na	0.00	na	na	1.67	0.90-2.44	0.39	0.00	na	na	0.05	0.00-0.12	0.04
8"	46	0.00	na	na	0.00	na	na	2.41	1.37-3.45	0.52	0.00	na	na	0.09	0.00-0.22	0.06
10"	46	0.00	na	na	2.07	1.05-3.09	0.51	0.22	0.00-0.48	0.13	0.00	na	na	0.12	0.00-0.26	0.07
12"	46	0.00	na	na	1.20	0.66-1.74	0.27	0.00	na	na	0.00	na	na	0.00	na	na
14"	46	412.28	235.00-589.56	88.65	0.03	0.00-0.09	0.03	0.04	0.00-0.12	0.04	0.00	na	na	0.00	na	na
16"	46	21.33	0.00-52.55	15.61	0.00	na	na	0.05	0.00-0.15	0.05	0.00	na	na	0.00	na	na
18"	46	81.11	8.86-153.36	36.12	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
20"	46	56.91	0.00-123.90	33.50	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
22"	46	15.54	0.00-46.62	15.54	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
24"+	46	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na

Appendix III-K-1-A. (continued)

Forest Management Block B17

		Pine									Hardwood					
		Sawtimber			Chip-n-saw			Pulpwood			Sawtimber			Pulpwood		
DBH class	n (# plots)	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE
6"	75	0.00	na	na	0.00	na	na	1.73	1.22-2.24	0.25	0.00	na	na	0.12	0.02-0.22	0.05
8"	75	0.00	na	na	0.03	0.00-0.09	0.03	2.12	1.44-2.80	0.34	0.00	na	na	0.06	0.00-0.13	0.04
10"	75	0.00	na	na	1.76	0.98-2.54	0.39	0.15	0.00-0.35	0.10	0.00	na	na	0.02	0.00-0.06	0.02
12"	75	3.21	0.00-9.63	3.21	0.67	0.28-1.06	0.19	0.00	na	na	0.00	na	na	0.15	0.00-0.32	0.09
14"	75	85.07	15.83-154.31	34.62	0.00	na	na	0.04	0.00-0.12	0.04	0.00	na	na	0.04	0.00-0.12	0.04
16"	75	8.41	0.00-25.23	8.41	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
18"	75	31.16	0.00-93.48	31.16	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
20"	75	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
22"	75	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
24"+	75	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na

Appendix III-K-1-A. (continued)

Forest Management Block B18

		Pine									Hardwood					
		Sawtimber			Chip-n-saw			Pulpwood			Sawtimber			Pulpwood		
DBH class	n (# plots)	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE
6"	128	0.00	na	na	0.02	0.00-0.06	0.02	2.19	1.70-2.68	0.24	0.00	na	na	0.36	0.00-0.74	0.19
8"	128	0.00	na	na	0.04	0.00-0.10	0.03	2.36	1.92-2.80	0.22	0.00	na	na	0.11	0.00-0.25	0.07
10"	128	0.00	na	na	1.62	1.20-2.04	0.21	0.29	0.13-0.45	0.08	0.00	na	na	0.03	0.00-0.07	0.02
12"	128	5.91	0.00-17.73	5.91	0.80	0.50-1.10	0.15	0.10	0.01-0.19	0.04	0.00	na	na	0.00	na	na
14"	128	209.40	120.84-297.96	44.28	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
16"	128	29.91	0.00-67.10	18.59	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
18"	128	7.37	0.00-22.11	7.37	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
20"	128	15.23	0.00-36.68	10.73	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
22"	128	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
24"+	128	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na

Appendix III-K-1-A. (continued)

Forest Management Block B19

		Pine									Hardwood					
		Sawtimber			Chip-n-saw			Pulpwood			Sawtimber			Pulpwood		
DBH class	n (# plots)	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE
6"	52	0.00	na	na	0.00	na	na	1.92	1.31-2.53	0.30	0.00	na	na	0.47	0.15-0.79	0.16
8"	52	0.00	na	na	0.00	na	na	4.30	2.96-5.64	0.67	0.00	na	na	0.29	0.03-0.55	0.13
10"	52	0.00	na	na	4.97	3.59-6.35	0.69	0.12	0.00-0.27	0.07	0.00	na	na	0.11	0.00-0.27	0.08
12"	52	0.00	na	na	2.82	1.60-4.04	0.61	0.04	0.00-0.12	0.04	0.00	na	na	0.00	na	na
14"	52	370.27	178.51-562.03	95.88	0.25	0.00-0.50	0.13	0.00	na	na	0.00	na	na	0.00	na	na
16"	52	120.15	3.45-236.85	58.35	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
18"	52	73.85	6.06-141.64	33.90	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
20"	52	32.13	0.00-96.39	32.13	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
22"	52	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
24"+	52	19.63	0.00-58.89	19.63	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na

Appendix III-K-1-A. (continued)

Forest Management Block B20

		Pine									Hardwood					
		Sawtimber			Chip-n-saw			Pulpwood			Sawtimber			Pulpwood		
DBH class	n (# plots)	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE
6"	43	0.00	na	na	0.00	na	na	1.76	1.05-2.47	0.36	0.00	na	na	0.40	0.03-0.77	0.18
8"	43	0.00	na	na	0.06	0.00-0.18	0.06	1.89	1.05-2.73	0.42	0.00	na	na	0.43	0.03-0.83	0.20
10"	43	0.00	na	na	3.82	2.52-5.12	0.65	0.13	0.00-0.32	0.10	0.00	na	na	0.02	0.00-0.06	0.02
12"	43	28.42	0.00-85.26	28.42	6.39	4.72-8.06	0.83	0.00	na	na	0.00	na	na	0.00	na	na
14"	43	1218.53	840.42-1596.64	189.04	0.05	0.00-0.15	0.05	0.00	na	na	0.00	na	na	0.00	na	na
16"	43	513.77	285.14-742.40	114.31	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
18"	43	240.51	76.48-404.54	82.01	0.15	0.00-0.37	0.11	0.00	na	na	0.00	na	na	0.00	na	na
20"	43	70.56	0.00-169.68	49.56	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
22"	43	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
24"+	43	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na

Appendix III-K-1-A. (continued)

Forest Management Block B21

		Pine									Hardwood					
		Sawtimber			Chip-n-saw			Pulpwood			Sawtimber			Pulpwood		
DBH class	n (# plots)	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE
6"	68	0.00	na	na	0.00	na	na	1.88	1.20-2.56	0.34	0.00	na	na	0.00	na	na
8"	68	0.00	na	na	0.00	na	na	2.31	1.66-2.96	0.32	0.00	na	na	0.00	na	na
10"	68	0.00	na	na	2.90	1.50-4.30	0.70	0.20	0.00-0.42	0.11	0.00	na	na	0.00	na	na
12"	68	0.00	na	na	1.27	0.53-2.01	0.37	0.00	na	na	0.00	na	na	0.00	na	na
14"	68	39.69	0.00-86.18	23.25	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
16"	68	22.63	0.00-67.89	22.63	0.04	0.00-0.12	0.04	0.00	na	na	0.00	na	na	0.00	na	na
18"	68	9.88	0.00-29.64	9.88	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
20"	68	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
22"	68	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
24"+	68	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na

Appendix III-K-1-A. (continued)

Forest Management Block B22

		Pine									Hardwood					
		Sawtimber			Chip-n-saw			Pulpwood			Sawtimber			Pulpwood		
DBH class	n (# plots)	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE
6"	51	0.00	na	na	0.00	na	na	1.14	0.69-1.59	0.23	0.00	na	na	0.22	0.00-0.46	0.12
8"	51	0.00	na	na	0.00	na	na	2.09	1.36-2.82	0.36	0.00	na	na	0.18	0.00-0.38	0.10
10"	51	0.00	na	na	2.01	1.27-2.75	0.37	0.40	0.02-0.78	0.19	0.00	na	na	0.21	0.00-0.44	0.12
12"	51	0.00	na	na	1.25	0.58-1.92	0.33	0.07	0.00-0.17	0.05	0.00	na	na	0.00	na	na
14"	51	434.12	221.36-646.88	106.38	0.02	0.00-0.06	0.02	0.00	na	na	0.00	na	na	0.00	na	na
16"	51	235.76	72.97-398.55	81.39	0.00	na	na	0.05	0.00-0.15	0.05	0.00	na	na	0.08	0.00-0.19	0.06
18"	51	109.08	11.79-206.37	48.65	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
20"	51	19.12	0.00-57.36	19.12	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
22"	51	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
24"+	51	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na

Appendix III-K-1-A. (continued)

Forest Management Block B23

		Pine									Hardwood					
		Sawtimber			Chip-n-saw			Pulpwood			Sawtimber			Pulpwood		
DBH class	n (# plots)	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE
6"	15	0.00	na	na	0.00	na	na	1.97	0.00-4.10	1.06	0.00	na	na	0.95	0.26-1.64	0.35
8"	15	0.00	na	na	0.00	na	na	1.70	0.00-3.41	0.85	0.00	na	na	0.11	0.00-0.33	0.11
10"	15	0.00	na	na	7.93	2.48-13.38	2.73	0.66	0.00-1.56	0.45	0.00	na	na	0.20	0.00-0.47	0.13
12"	15	81.47	0.00-244.41	81.47	5.45	3.12-7.78	1.17	0.00	na	na	0.00	na	na	0.00	na	na
14"	15	892.00	256.27-1527.73	317.88	0.13	0.00-0.39	0.13	0.00	na	na	185.07	6.92-363.22	89.07	0.00	na	na
16"	15	967.73	233.22-1702.24	367.24	0.00	na	na	0.00	na	na	119.60	0.00-319.27	99.84	0.19	0.19-0.57	0.19
18"	15	436.87	7.69-866.05	214.60	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
20"	15	206.73	0.00-489.12	141.20	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
22"	15	66.67	0.00-200.01	66.67	0.00	na	na	0.00	na	na	55.27	0.00-165.81	55.27	0.00	na	na
24"+	15	273.40	0.00-820.20	48.67	0.00	na	na	0.00	na	na	55.27	0.00-165.81	57.20	0.00	na	na

Appendix III-K-1-A. (continued)

Forest Management Block B24

		Pine									Hardwood					
		Sawtimber			Chip-n-saw			Pulpwood			Sawtimber			Pulpwood		
DBH class	n (# plots)	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE
6"	77	0.00	na	na	0.00	na	na	1.32	0.90-1.74	0.21	0.00	na	na	0.12	0.01-0.23	0.06
8"	77	0.00	na	na	0.00	na	na	2.17	1.61-2.73	0.28	0.00	na	na	0.31	0.04-0.58	0.14
10"	77	0.00	na	na	1.71	1.07-2.35	0.32	0.35	0.13-0.57	0.11	0.00	na	na	0.07	0.00-0.16	0.04
12"	77	0.00	na	na	1.04	0.66-1.42	0.19	0.24	0.05-0.43	0.10	0.00	na	na	0.07	0.00-0.16	0.04
14"	77	237.61	73.11-402.11	82.25	0.00	na	na	0.00	na	na	0.00	na	na	0.09	0.00-0.22	0.07
16"	77	46.32	0.03-92.61	23.15	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
18"	77	20.97	0.00-50.85	14.94	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
20"	77	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
22"	77	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
24"+	77	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na

Appendix III-K-1-A. (continued)

Forest Management Block B25

		Pine									Hardwood					
		Sawtimber			Chip-n-saw			Pulpwood			Sawtimber			Pulpwood		
DBH class	n (# plots)	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE
6"	34	0.00	na	na	0.00	na	na	1.45	0.85-2.05	0.30	0.00	na	na	0.00	na	na
8"	34	0.00	na	na	0.00	na	na	2.44	1.41-3.47	0.51	0.00	na	na	0.00	na	na
10"	34	0.00	na	na	1.61	0.83-2.39	0.39	0.31	0.05-0.57	0.13	0.00	na	na	0.07	0.00-0.21	0.07
12"	34	0.00	na	na	1.04	0.51-1.57	0.26	0.07	0.00-0.21	0.07	0.00	na	na	0.07	0.00-0.21	0.07
14"	34	302.47	5.84-599.10	148.31	0.00	na	na	0.00	na	na	7.65	0.00-22.95	7.65	0.00	na	na
16"	34	92.82	0.00-197.29	52.24	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
18"	34	34.82	0.00-104.46	34.82	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
20"	34	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
22"	34	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
24"+	34	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na

Appendix III-K-1-A. (continued)

Forest Management Block C01

		Pine									Hardwood					
		Sawtimber			Chip-n-saw			Pulpwood			Sawtimber			Pulpwood		
DBH class	n (# plots)	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE
6"	66	0.00	na	na	0.00	na	na	0.17	0.00-0.35	0.09	0.00	na	na	1.13	0.42-1.84	0.35
8"	66	0.00	na	na	0.00	na	na	0.38	0.06-0.70	0.16	0.00	na	na	0.74	0.32-1.16	0.21
10"	66	0.00	na	na	0.48	0.14-0.82	0.17	0.22	0.03-0.41	0.10	0.00	na	na	0.49	0.15-0.83	0.17
12"	66	0.00	na	na	0.49	0.08-0.90	0.20	0.03	0.00-0.09	0.03	6.65	0.00-19.95	6.65	0.15	0.02-0.28	0.07
14"	66	236.35	96.36-376.34	70.00	0.05	0.00-0.12	0.04	0.05	0.00-0.12	0.04	23.29	0.15-46.43	11.57	0.20	0.05-0.35	0.07
16"	66	226.73	87.16-366.30	69.78	0.00	na	na	0.03	0.00-0.09	0.03	40.18	0.00-84.50	22.16	0.16	0.00-0.34	0.09
18"	66	195.06	39.21-350.91	77.93	0.00	na	na	0.00	na	na	0.00	na	na	0.14	0.00-0.39	0.12
20"	66	88.51	0.00-181.12	46.30	0.00	na	na	0.00	na	na	20.12	0.00-48.99	14.43	0.00	na	na
22"	66	28.04	0.00-67.30	19.63	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
24"+	66	36.75	0.00-79.57	21.40	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na

Appendix III-K-1-A. (continued)

Forest Management Block C02

		Pine									Hardwood					
		Sawtimber			Chip-n-saw			Pulpwood			Sawtimber			Pulpwood		
DBH class	n (# plots)	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE
6"	41	0.00	na	na	0.00	na	na	1.15	0.25-2.05	0.45	0.00	na	na	1.30	0.48-2.12	0.41
8"	41	0.00	na	na	0.00	na	na	1.22	0.42-2.02	0.40	0.00	na	na	0.81	0.15-1.47	0.33
10"	41	0.00	na	na	1.25	0.56-1.94	0.34	0.22	0.00-0.47	0.12	0.00	na	na	1.77	0.60-2.94	0.58
12"	41	0.00	na	na	0.92	0.39-1.45	0.27	0.00	na	na	23.36	0.00-59.07	17.86	0.64	0.26-1.02	0.19
14"	41	415.15	166.81-663.49	124.18	0.00	na	na	0.00	na	na	153.91	43.97-263.85	54.97	0.30	0.04-0.56	0.13
16"	41	197.64	0.00-396.66	99.51	0.04	0.00-0.12	0.04	0.07	0.00-0.21	0.07	174.27	75.16-273.38	49.55	0.17	0.00-0.41	0.12
18"	41	48.94	0.00-146.82	48.94	0.04	0.00-0.12	0.04	0.07	0.00-0.21	0.07	25.27	0.00-75.81	25.27	0.00	na	na
20"	41	32.85	0.00-80.50	23.82	0.00	na	na	0.00	na	na	18.97	0.00-56.91	18.97	0.07	0.00-0.21	0.07
22"	41	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
24"+	41	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.07	0.00-0.17	0.11

Appendix III-K-1-A. (continued)

Forest Management Block C03

		Pine									Hardwood					
		Sawtimber			Chip-n-saw			Pulpwood			Sawtimber			Pulpwood		
DBH class	n (# plots)	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE
6"	58	0.00	na	na	0.00	na	na	0.77	0.36-1.18	0.21	0.00	na	na	0.71	0.26-1.16	0.22
8"	58	0.00	na	na	0.00	na	na	1.15	0.58-1.72	0.28	0.00	na	na	0.56	0.15-0.97	0.21
10"	58	0.00	na	na	1.37	0.85-1.89	0.26	0.16	0.01-0.31	0.08	0.00	na	na	0.15	0.02-0.28	0.06
12"	58	0.00	na	na	1.07	0.61-1.53	0.23	0.13	0.00-0.26	0.06	0.00	na	na	0.02	0.00-0.06	0.02
14"	58	389.59	179.80-599.38	104.90	0.00	na	na	0.06	0.00-0.15	0.04	20.19	0.00-49.81	14.81	0.05	0.00-0.15	0.05
16"	58	137.50	8.06-266.94	64.72	0.00	na	na	0.00	na	na	8.26	0.00-24.78	8.26	0.00	na	na
18"	58	57.84	0.00-128.90	35.53	0.00	na	na	0.02	0.00-0.06	0.02	6.07	0.00-18.21	6.07	0.00	na	na
20"	58	46.52	0.00-97.68	25.58	0.00	na	na	0.00	na	na	17.69	0.00-43.10	12.71	0.00	na	na
22"	58	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
24"+	58	7.14	0.00-21.42	7.14	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na

Appendix III-K-1-A. (continued)

Forest Management Block C04

		Pine									Hardwood					
		Sawtimber			Chip-n-saw			Pulpwood			Sawtimber			Pulpwood		
DBH class	n (# plots)	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE
6"	11	0.00	na	na	0.00	na	na	0.53	0.00-1.59	0.53	0.00	na	na	0.28	0.00-0.67	0.20
8"	11	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.61	0.00-1.26	0.32
10"	11	0.00	na	na	0.57	0.00-1.36	0.39	0.00	na	na	0.00	na	na	0.67	0.00-1.59	0.47
12"	11	0.00	na	na	0.42	0.00-1.03	0.31	0.00	na	na	0.00	na	na	0.00	na	na
14"	11	226.18	0.00-678.54	226.18	0.00	na	na	0.00	na	na	0.00	na	na	0.13	0.00-0.39	0.13
16"	11	325.55	0.00-797.47	235.95	0.00	na	na	0.00	na	na	43.55	0.00-130.65	43.55	0.00	na	na
18"	11	386.73	0.00-995.98	304.62	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
20"	11	131.91	0.00-395.73	131.91	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
22"	11	365.00	0.00-894.58	264.79	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
24"+	11	96.55	0.00-289.65	96.55	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na

Appendix III-K-1-A. (continued)

Forest Management Block FP01

		Pine									Hardwood					
		Sawtimber			Chip-n-saw			Pulpwood			Sawtimber			Pulpwood		
DBH class	n (# plots)	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE
6"	47	0.00	na	na	0.00	na	na	0.44	0.13-0.75	0.15	0.00	na	na	0.47	0.16-0.78	0.16
8"	47	0.00	na	na	0.00	na	na	0.91	0.16-1.66	0.38	0.00	na	na	0.16	0.03-0.29	0.07
10"	47	0.00	na	na	0.60	0.14-1.06	0.23	0.21	0.05-0.37	0.08	0.00	na	na	0.13	0.00-0.27	0.07
12"	47	0.00	na	na	0.95	0.29-1.61	0.33	0.07	0.00-0.17	0.05	0.00	na	na	0.06	0.00-0.14	0.04
14"	47	192.28	75.78-308.78	58.25	0.04	0.00-0.12	0.04	0.18	0.02-0.34	0.08	0.00	na	na	0.00	na	na
16"	47	73.06	0.00-180.94	53.94	0.00	na	na	0.00	na	na	0.00	na	na	0.12	0.00-0.36	0.12
18"	47	7.85	0.00-23.55	7.85	0.00	na	na	0.00	na	na	0.00	na	na	0.06	0.00-0.18	0.06
20"	47	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
22"	47	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
24"+	47	27.40	0.00-82.20	27.40	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na

Appendix III-K-1-A. (continued)

Forest Management Block FP02

		Pine									Hardwood					
		Sawtimber			Chip-n-saw			Pulpwood			Sawtimber			Pulpwood		
DBH class	n (# plots)	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE
6"	30	0.00	na	na	0.00	na	na	0.39	0.07-0.71	0.16	0.00	na	na	0.20	0.00-0.53	0.16
8"	30	0.00	na	na	0.00	na	na	0.43	0.14-0.72	0.14	0.00	na	na	0.12	0.00-0.29	0.09
10"	30	0.00	na	na	0.85	0.44-1.26	0.20	0.25	0.00-0.53	0.14	0.00	na	na	0.07	0.00-0.21	0.07
12"	30	31.60	0.00-94.80	31.60	0.79	0.42-1.16	0.18	0.18	0.00-0.36	0.09	0.00	na	na	0.00	na	na
14"	30	69.83	7.97-131.69	30.93	0.05	0.00-0.15	0.05	0.03	0.00-0.09	0.03	0.00	na	na	0.00	na	na
16"	30	200.60	0.00-556.04	177.72	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
18"	30	31.43	0.00-94.29	31.43	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
20"	30	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
22"	30	23.83	0.00-71.49	23.83	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
24"+	30	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na

Appendix III-K-1-A. (continued)

Forest Management Block FT01

		Pine									Hardwood					
		Sawtimber			Chip-n-saw			Pulpwood			Sawtimber			Pulpwood		
DBH class	n (# plots)	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE
6"	6	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	1.20	1.19-1.21	0.01
8"	6	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	1.63	0.42-2.84	0.60
10"	6	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.25	0.00-0.75	0.25
12"	6	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
14"	6	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
16"	6	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
18"	6	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
20"	6	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
22"	6	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
24"+	6	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na

Appendix III-K-1-A. (continued)

Forest Management Block FT02

		Pine									Hardwood					
		Sawtimber			Chip-n-saw			Pulpwood			Sawtimber			Pulpwood		
DBH class	n (# plots)	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE
6"	6	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	1.00	0.60-1.40	0.20
8"	6	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.51	0.05-0.97	0.23
10"	6	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.64	0.00-1.48	0.42
12"	6	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
14"	6	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
16"	6	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
18"	6	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
20"	6	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
22"	6	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
24"+	6	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na

Appendix III-K-1-A. (continued)

Forest Management Block K01

		Pine									Hardwood					
		Sawtimber			Chip-n-saw			Pulpwood			Sawtimber			Pulpwood		
DBH class	n (# plots)	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE
6"	22	0.00	na	na	0.00	na	na	0.43	0.00-0.89	0.23	0.00	na	na	0.64	0.16-1.12	0.24
8"	22	0.00	na	na	0.00	na	na	0.48	0.00-1.00	0.26	0.00	na	na	0.55	0.05-1.05	0.25
10"	22	0.00	na	na	0.22	0.00-0.66	0.22	0.00	na	na	0.00	na	na	0.16	0.00-0.39	0.11
12"	22	0.00	na	na	1.17	0.22-2.12	0.47	0.34	0.00-0.81	0.24	0.00	na	na	0.56	0.00-1.22	0.33
14"	22	778.07	147.91-1408.23	315.06	0.00	na	na	0.00	na	na	123.73	0.00-257.05	66.66	0.60	0.00-1.39	0.40
16"	22	524.80	44.45-1005.15	240.17	0.00	na	na	0.00	na	na	52.33	0.00-125.61	36.64	0.40	0.00-0.92	0.26
18"	22	142.93	9.45-276.41	66.74	0.00	na	na	0.00	na	na	0.00	na	na	0.58	0.03-1.13	0.28
20"	22	75.53	0.00-184.20	54.34	0.00	na	na	0.00	na	na	41.73	0.00-125.19	41.73	0.00	na	na
22"	22	57.87	0.00-136.97	39.55	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
24"+	22	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na

Appendix III-K-1-A. (continued)

Forest Management Block K02

		Pine									Hardwood					
		Sawtimber			Chip-n-saw			Pulpwood			Sawtimber			Pulpwood		
DBH class	n (# plots)	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE
6"	42	0.00	na	na	0.00	na	na	0.24	0.00-0.56	0.16	0.00	na	na	0.84	0.24-1.44	0.30
8"	42	0.00	na	na	0.00	na	na	0.14	0.00-0.34	0.10	0.00	na	na	1.53	0.69-2.37	0.42
10"	42	0.00	na	na	0.89	0.15-1.63	0.37	0.19	0.00-0.57	0.19	0.00	na	na	1.04	0.54-1.54	0.25
12"	42	0.00	na	na	1.05	0.15-1.95	0.45	0.05	0.00-0.15	0.05	11.30	0.00-33.90	11.30	0.35	0.03-0.67	0.16
14"	42	602.90	276.61-929.19	163.14	0.00	na	na	0.00	na	na	111.83	26.20-197.46	42.82	0.35	0.00-0.74	0.20
16"	42	429.83	173.18-686.48	128.33	0.00	na	na	0.09	0.00-0.27	0.09	81.53	0.00-188.17	53.32	0.27	0.00-0.56	0.14
18"	42	299.23	82.80-515.66	108.22	0.00	na	na	0.00	na	na	36.80	0.00-87.94	25.57	0.00	na	na
20"	42	48.03	0.00-114.82	33.39	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
22"	42	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.07	0.00-0.21	0.07
24"+	42	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.10	0.00-0.30	0.10

Appendix III-K-1-A. (continued)

Forest Management Block K03

		Pine									Hardwood					
		Sawtimber			Chip-n-saw			Pulpwood			Sawtimber			Pulpwood		
DBH class	n (# plots)	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE
6"	51	0.00	na	na	0.00	na	na	0.15	0.00-0.37	0.11	0.00	na	na	0.60	0.18-1.02	0.21
8"	51	0.00	na	na	0.00	na	na	0.47	0.02-0.92	0.23	0.00	na	na	0.67	0.28-1.06	0.19
10"	51	0.00	na	na	0.36	0.08-0.64	0.14	0.10	0.00-0.30	0.10	0.00	na	na	0.38	0.05-0.71	0.17
12"	51	0.00	na	na	0.46	0.11-0.81	0.18	0.00	na	na	0.00	na	na	0.28	0.03-0.53	0.13
14"	51	255.60	0.61-510.59	127.49	0.03	0.00-0.09	0.03	0.00	na	na	99.33	28.55-170.11	35.39	0.11	0.00-0.26	0.08
16"	51	223.05	50.21-395.89	86.42	0.03	0.00-0.09	0.03	0.09	0.00-0.22	0.06	51.93	0.00-125.03	36.55	0.17	0.00-0.37	0.10
18"	51	178.17	45.77-310.57	66.20	0.00	na	na	0.00	na	na	108.57	2.54-214.60	53.01	0.00	na	na
20"	51	29.19	0.00-87.57	29.19	0.00	na	na	0.00	na	na	40.00	0.00-96.17	28.08	0.03	0.00-0.09	0.03
22"	51	23.81	0.00-71.43	23.81	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
24"+	51	19.10	0.00-57.30	19.10	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na

Appendix III-K-1-A. (continued)

Forest Management Block K04

		Pine									Hardwood					
		Sawtimber			Chip-n-saw			Pulpwood			Sawtimber			Pulpwood		
DBH class	n (# plots)	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE
6"	53	0.00	na	na	0.00	na	na	0.19	0.00-0.39	0.10	0.00	na	na	0.78	0.33-1.23	0.22
8"	53	0.00	na	na	0.00	na	na	0.30	0.02-0.58	0.14	0.00	na	na	0.54	0.25-0.83	0.14
10"	53	0.00	na	na	0.12	0.02-0.22	0.05	0.23	0.03-0.43	0.10	0.00	na	na	0.28	0.08-0.48	0.10
12"	53	0.00	na	na	0.29	0.09-0.49	0.10	0.09	0.00-0.19	0.05	0.00	na	na	0.13	0.00-0.26	0.06
14"	53	192.49	40.65-344.33	75.92	0.00	na	na	0.12	0.00-0.27	0.07	0.00	na	na	0.04	0.00-0.12	0.04
16"	53	100.28	10.77-189.79	44.76	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
18"	53	28.28	0.00-84.84	28.28	0.00	na	na	0.08	0.00-0.19	0.06	0.00	na	na	0.00	na	na
20"	53	26.26	0.00-78.78	26.26	0.00	na	na	0.03	0.00-0.09	0.03	0.00	na	na	0.00	na	na
22"	53	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
24"+	53	0.60	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na

Appendix III-K-1-A. (continued)

Forest Management Block K05

		Pine									Hardwood					
		Sawtimber			Chip-n-saw			Pulpwood			Sawtimber			Pulpwood		
DBH class	n (# plots)	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE
6"	17	0.00	na	na	0.00	na	na	0.31	0.00-0.93	0.31	0.00	na	na	0.77	0.00-1.67	0.45
8"	17	0.00	na	na	0.00	na	na	0.40	0.00-0.94	0.27	0.00	na	na	1.10	0.00-2.44	0.67
10"	17	0.00	na	na	0.09	0.00-0.27	0.09	0.37	0.00-0.87	0.25	0.00	na	na	1.46	0.52-2.40	0.47
12"	17	0.00	na	na	0.18	0.00-0.42	0.12	0.16	0.00-0.48	0.16	0.00	na	na	0.52	0.00-1.05	0.27
14"	17	269.56	0.00-580.66	155.55	0.00	na	na	0.00	na	na	144.44	18.52-270.36	62.96	0.21	0.00-0.63	0.21
16"	17	177.56	0.00-385.43	103.93	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
18"	17	452.89	0.00-1205.41	376.25	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
20"	17	141.67	0.00-425.01	141.67	0.00	na	na	0.09	0.00-0.27	0.09	0.00	na	na	0.00	na	na
22"	17	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
24"+	17	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na

Appendix III-K-1-A. (continued)

Forest Management Block L01

		Pine									Hardwood					
		Sawtimber			Chip-n-saw			Pulpwood			Sawtimber			Pulpwood		
DBH class	n (# plots)	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE
6"	43	0.00	na	na	0.00	na	na	0.78	0.28-1.28	0.25	0.00	na	na	0.67	0.32-1.02	0.18
8"	43	0.00	na	na	0.00	na	na	0.96	0.35-1.57	0.31	0.00	na	na	0.81	0.45-1.17	0.18
10"	43	0.00	na	na	1.25	0.61-1.89	0.32	0.05	0.00-0.15	0.05	0.00	na	na	0.86	0.39-1.33	0.23
12"	43	0.00	na	na	1.28	0.77-1.79	0.25	0.00	na	na	0.00	na	na	0.32	0.06-0.58	0.13
14"	43	998.92	671.57-1326.27	163.68	0.00	na	na	0.09	0.00-0.22	0.06	96.28	19.04-173.52	38.62	0.16	0.00-0.32	0.08
16"	43	1084.02	615.94-1552.10	234.05	0.00	na	0.04	0.00	na	na	64.13	7.31-120.95	28.41	0.00	na	na
18"	43	1089.96	698.34-1481.58	195.81	0.00	na	na	0.00	na	na	12.89	0.00-38.67	12.89	0.00	na	na
20"	43	687.17	375.54-998.80	155.83	0.00	na	na	0.00	na	na	17.43	0.00-52.29	17.43	0.00	na	na
22"	43	279.34	49.89-508.79	114.72	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
24"+	43	337.71	96.21-579.21	120.80	0.00	na	na	0.00	na	na	114.30	0.00-248.31	61.14	0.00	na	na

Appendix III-K-1-A. (continued)

Forest Management Block L02

		Pine									Hardwood					
		Sawtimber			Chip-n-saw			Pulpwood			Sawtimber			Pulpwood		
DBH class	n (# plots)	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE
6"	43	0.00	na	na	0.00	na	na	1.33	0.74-1.92	0.30	0.00	na	na	0.38	0.10-0.66	0.14
8"	43	0.00	na	na	0.00	na	na	2.60	1.67-3.53	0.47	0.00	na	na	0.43	0.08-0.78	0.18
10"	43	0.00	na	na	3.34	2.05-4.63	0.65	0.07	0.00-0.21	0.07	0.00	na	na	0.17	0.00-0.34	0.09
12"	43	0.00	na	na	5.39	3.88-6.90	0.76	0.12	0.00-0.29	0.08	0.00	na	na	0.10	0.00-0.22	0.06
14"	43	1178.07	761.86-1594.28	208.10	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
16"	43	698.60	264.91-1132.29	216.83	0.04	0.00-0.12	0.04	0.00	na	na	0.00	na	na	0.00	na	na
18"	43	369.00	141.33-596.67	113.84	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
20"	43	28.51	0.00-85.53	28.51	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
22"	43	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
24"+	43	28.51	0.00-68.59	38.01	0.00	na	na	0.00	na	na	19.95	0.00-59.85	19.95	0.00	na	na

Appendix III-K-1-A. (continued)

Forest Management Block L03

		Pine									Hardwood					
		Sawtimber			Chip-n-saw			Pulpwood			Sawtimber			Pulpwood		
DBH class	n (# plots)	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE
6"	39	5.91	0.00-17.73	5.91	0.00	na	na	0.91	0.24-1.58	0.34	0.00	na	na	0.75	0.25-1.25	0.25
8"	39	0.00	na	na	0.00	na	na	1.43	0.52-2.34	0.46	0.00	na	na	0.51	0.04-0.98	0.23
10"	39	0.00	na	na	1.22	0.43-2.01	0.39	0.06	0.00-0.18	0.06	0.00	na	na	0.15	0.00-0.36	0.11
12"	39	0.00	na	na	3.50	2.07-4.93	0.71	0.08	0.00-0.24	0.08	27.33	0.00-66.60	19.64	0.17	0.00-0.36	0.10
14"	39	1595.15	1118.68-2071.62	238.22	0.00	na	na	0.00	na	na	12.36	0.00-37.08	12.36	0.12	0.00-0.36	0.12
16"	39	2153.03	1245.53-3060.53	453.74	0.17	0.00-0.51	0.17	0.00	na	na	0.00	na	na	0.00	na	na
18"	39	774.52	329.09-1219.95	222.73	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
20"	39	425.45	148.31-702.59	138.58	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
22"	39	103.94	0.00-250.72	73.39	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
24"+	39	45.52	0.00-136.56	45.51	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na

Appendix III-K-1-A. (concluded)

Forest Management Block L04

		Pine									Hardwood					
		Sawtimber			Chip-n-saw			Pulpwood			Sawtimber			Pulpwood		
DBH class	n (# plots)	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE
6"	41	0.00	na	na	0.00	na	na	1.30	0.74-1.86	0.28	0.00	na	na	0.21	0.01-0.41	0.10
8"	41	0.00	na	na	0.00	na	na	2.13	1.29-2.97	0.42	0.00	na	na	0.09	0.00-0.22	0.06
10"	41	0.00	na	na	1.42	0.62-2.22	0.40	0.87	0.42-1.32	0.22	0.00	na	na	0.16	0.00-0.35	0.09
12"	41	38.77	0.00-116.31	38.77	2.63	1.03-4.23	0.80	0.25	0.01-0.49	0.12	0.00	na	na	0.00	na	na
14"	41	428.44	153.51-703.37	137.46	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
16"	41	355.59	62.16-649.02	146.72	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
18"	41	95.18	0.00-202.37	53.59	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
20"	41	37.21	0.00-111.63	37.21	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
22"	41	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
24"+	41	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na

Appendix III-K-1-B. Current (1998) Volumes and Weights of Pine Sawtimber, Chip-n-saw, and Pulpwood and Hardwood Sawtimber and Pulpwood by Diameter Class and Forest Management Block

Forest Management Block A01

DBH class	Pine						Hardwood			
	Sawtimber		Chip-n-saw		Pulpwood		Sawtimber		Pulpwood	
	BF/ac	tons/ac	cds/ac	tons/ac	cds/ac	tons/ac	BF/ac	tons/ac	cds/ac	tons/ac
6"	0.00	0.00	0.00	0.00	0.41	1.11	0.00	0.00	0.56	1.52
8"	0.00	0.00	0.00	0.00	0.97	2.62	0.00	0.00	0.27	0.73
10"	0.00	0.00	2.35	6.36	0.00	0.00	0.00	0.00	0.15	0.41
12"	0.00	0.00	2.68	7.25	0.00	0.00	0.00	0.00	0.00	0.00
14"	221.50	1.61	0.00	0.00	0.09	0.24	0.00	0.00	0.13	0.35
16"	234.27	1.70	0.00	0.00	0.00	0.00	21.77	0.16	0.00	0.00
18"	33.55	0.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20"	17.64	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22"	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.27
24"+	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Totals[a]	506.95	3.68	5.03	13.61	1.46	3.95	21.77	0.16	1.20	3.25

Forest Management Block A01A

DBH class	Pine						Hardwood			
	Sawtimber		Chip-n-saw		Pulpwood		Sawtimber		Pulpwood	
	BF/ac	tons/ac	cds/ac	tons/ac	cds/ac	tons/ac	BF/ac	tons/ac	cds/ac	tons/ac
6"	0.00	0.00	0.00	0.00	1.02	2.76	0.00	0.00	0.73	1.98
8"	0.00	0.00	0.00	0.00	1.91	5.17	0.00	0.00	0.11	0.30
10"	0.00	0.00	2.91	7.87	0.00	0.00	0.00	0.00	0.00	0.00
12"	0.00	0.00	3.08	8.33	0.13	0.35	0.00	0.00	0.00	0.00
14"	996.80	7.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16"	215.80	1.56	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18"	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20"	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22"	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24"+	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Totals[a]	1,212.59	8.79	5.98	16.18	3.05	8.25	0.00	0.00	0.84	2.27

Appendix III-K-1-B. (continued)

Forest Management Block A02

DBH class	Pine						Hardwood			
	Sawtimber		Chip-n-saw		Pulpwood		Sawtimber		Pulpwood	
	BF/ac	tons/ac	cds/ac	tons/ac	cds/ac	tons/ac	BF/ac	tons/ac	cds/ac	tons/ac
6"	0.00	0.00	0.00	0.00	1.26	3.41	0.00	0.00	0.28	0.76
8"	0.00	0.00	0.00	0.00	1.94	5.25	0.00	0.00	0.46	1.24
10"	0.00	0.00	2.60	7.03	0.22	0.60	0.00	0.00	0.13	0.35
12"	0.00	0.00	5.60	15.15	0.00	0.00	0.00	0.00	0.37	1.00
14"	1,654.73	12.00	0.00	0.00	0.00	0.00	60.73	0.44	0.00	0.00
16"	596.82	4.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18"	290.45	2.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20"	131.91	0.96	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22"	155.18	1.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24"+	139.27	1.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Totals[a]	2,968.36	21.52	8.19	22.16	3.42	9.25	60.71	0.44	1.24	3.35

Forest Management Block A03

DBH class	Pine						Hardwood			
	Sawtimber		Chip-n-saw		Pulpwood		Sawtimber		Pulpwood	
	BF/ac	tons/ac	cds/ac	tons/ac	cds/ac	tons/ac	BF/ac	tons/ac	cds/ac	tons/ac
6"	0.00	0.00	0.00	0.00	1.50	4.06	0.00	0.00	0.11	0.30
8"	0.00	0.00	0.00	0.00	2.30	6.22	0.00	0.00	0.05	0.14
10"	0.00	0.00	2.97	8.04	0.42	1.14	0.00	0.00	0.02	0.05
12"	0.00	0.00	2.18	5.90	0.05	0.14	0.00	0.00	0.08	0.22
14"	816.06	5.92	0.04	0.11	0.00	0.00	11.33	0.08	0.00	0.00
16"	465.42	3.37	0.00	0.00	0.05	0.14	21.81	0.16	0.00	0.00
18"	121.64	0.88	0.00	0.00	0.00	0.00	9.78	0.07	0.09	0.24
20"	147.08	1.07	0.00	0.00	0.09	0.24	33.33	0.24	0.00	0.00
22"	35.00	0.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24"+	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Totals[a]	1,585.19	11.49	5.19	14.04	4.41	11.93	76.25	0.55	0.35	0.95

Forest Management Block A04

DBH class	Pine						Hardwood			
	Sawtimber		Chip-n-saw		Pulpwood		Sawtimber		Pulpwood	
	BF/ac	tons/ac	cds/ac	tons/ac	Cds/ac	tons/ac	BF/ac	tons/ac	cds/ac	tons/ac
6"	0.00	0.00	0.00	0.00	1.94	5.25	0.00	0.00	0.03	0.08
8"	0.00	0.00	0.00	0.00	1.92	5.19	0.00	0.00	0.02	0.05
10"	0.00	0.00	1.57	4.25	0.10	0.27	0.00	0.00	0.00	0.00
12"	0.00	0.00	0.64	1.73	0.00	0.00	0.00	0.00	0.00	0.00
14"	91.23	0.66	0.03	0.08	0.10	0.27	0.00	0.00	0.00	0.00
16"	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18"	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20"	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22"	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24"+	0.00	0.00	0.00	0.00	0.03	0.08	0.00	0.00	0.00	0.00
Totals[a]	91.23	0.66	2.24	6.06	4.09	11.07	0.00	0.00	0.05	0.14

Forest Management Block A05

DBH class	Pine						Hardwood			
	Sawtimber		Chip-n-saw		Pulpwood		Sawtimber		Pulpwood	
	BF/ac	tons/ac	cds/ac	tons/ac	cds/ac	tons/ac	BF/ac	tons/ac	cds/ac	tons/ac
6"	0.00	0.00	0.04	0.11	0.80	2.16	0.00	0.00	0.37	1.00
8"	0.00	0.00	0.00	0.00	0.93	2.52	0.00	0.00	0.50	1.35
10"	0.00	0.00	1.74	4.71	0.04	0.11	0.00	0.00	0.51	1.38
12"	0.00	0.00	1.79	4.84	0.00	0.00	26.87	0.19	0.16	0.43
14"	1,173.45	8.51	0.00	0.00	0.00	0.00	61.65	0.45	0.07	0.19
16"	941.00	6.82	0.00	0.00	0.00	0.00	39.56	0.29	0.04	0.11
18"	310.78	2.25	0.00	0.00	0.00	0.00	28.85	0.21	0.00	0.00
20"	248.35	1.80	0.00	0.00	0.00	0.00	14.55	0.11	0.15	0.41
22"	107.89	0.78	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24"+	23.42	0.17	0.00	0.00	0.00	0.00	32.00	0.23	0.00	0.00
Totals[a]	2,804.89	20.34	3.57	9.66	1.77	4.79	203.49	1.48	1.78	4.82

Forest Management Block A06

DBH class	Pine						Hardwood			
	Sawtimber		Chip-n-saw		Pulpwood		Sawtimber		Pulpwood	
	BF/ac	tons/ac	cds/ac	tons/ac	Cds/ac	tons/ac	BF/ac	tons/ac	cds/ac	tons/ac
6"	0.00	0.00	0.00	0.00	1.34	3.63	0.00	0.00	0.44	1.19
8"	0.00	0.00	0.00	0.00	2.75	7.44	0.00	0.00	0.24	0.65
10"	0.00	0.00	2.95	7.98	0.00	0.00	0.00	0.00	0.03	0.08
12"	0.00	0.00	5.15	13.93	0.00	0.00	0.00	0.00	0.00	0.00
14"	1,348.20	9.77	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16"	352.00	2.55	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18"	111.27	0.81	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20"	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22"	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24"+	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Totals[a]	1,811.47	13.13	8.10	21.91	4.10	11.09	0.00	0.00	0.71	1.92

Forest Management Block A07

DBH class	Pine						Hardwood			
	Sawtimber		Chip-n-saw		Pulpwood		Sawtimber		Pulpwood	
	BF/ac	tons/ac	cds/ac	tons/ac	Cds/ac	tons/ac	BF/ac	tons/ac	cds/ac	tons/ac
6"	0.00	0.00	0.00	0.00	0.95	2.57	0.00	0.00	0.78	2.11
8"	0.00	0.00	0.00	0.00	3.31	8.96	0.00	0.00	0.56	1.52
10"	0.00	0.00	5.57	15.07	0.09	0.24	0.00	0.00	0.29	0.78
12"	0.00	0.00	4.29	11.61	0.00	0.00	0.00	0.00	0.00	0.00
14"	1,103.42	8.00	0.00	0.00	0.00	0.00	66.00	0.48	0.00	0.00
16"	255.58	1.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18"	25.85	0.19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20"	37.50	0.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22"	48.46	0.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24"+	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Totals[a]	1,470.80	10.66	9.85	26.65	4.35	11.77	66.00	0.48	1.62	4.38

Appendix III-K-1-B. (continued)

Forest Management Block A08

DBH class	Pine						Hardwood			
	Sawtimber		Chip-n-saw		Pulpwood		Sawtimber		Pulpwood	
	BF/ac	tons/ac	cds/ac	tons/ac	cds/ac	tons/ac	BF/ac	tons/ac	cds/ac	tons/ac
6"	0.00	0.00	0.00	0.00	0.92	2.49	0.00	0.00	1.07	2.89
8"	0.00	0.00	0.00	0.00	1.81	4.90	0.00	0.00	0.70	1.89
10"	0.00	0.00	1.63	4.41	0.00	0.00	0.00	0.00	0.84	2.27
12"	0.00	0.00	3.73	10.09	0.00	0.00	0.00	0.00	0.47	1.27
14"	1,872.91	13.58	0.00	0.00	0.00	0.00	44.97	0.33	0.12	0.32
16"	1,639.36	11.89	0.00	0.00	0.00	0.00	32.97	0.24	0.00	0.00
18"	629.27	4.56	0.00	0.00	0.00	0.00	38.06	0.28	0.00	0.00
20"	60.00	0.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22"	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24"+	0.00	0.00	0.00	0.00	0.00	0.00	27.33	0.20	0.00	0.00
Totals[a]	4,201.54	30.46	5.36	14.50	2.74	7.41	164.66	1.19	3.20	8.66

Forest Management Block A09

DBH class	Pine						Hardwood			
	Sawtimber		Chip-n-saw		Pulpwood		Sawtimber		Pulpwood	
	BF/ac	tons/ac	cds/ac	tons/ac	cds/ac	tons/ac	BF/ac	tons/ac	cds/ac	tons/ac
6"	0.00	0.00	0.00	0.00	0.94	2.54	0.00	0.00	0.29	0.78
8"	0.00	0.00	0.00	0.00	1.74	4.71	0.00	0.00	0.52	1.41
10"	0.00	0.00	1.46	3.95	0.24	0.65	0.00	0.00	0.65	1.76
12"	0.00	0.00	1.81	4.90	0.09	0.24	0.00	0.00	0.75	2.03
14"	1,237.88	8.97	0.00	0.00	0.00	0.00	109.00	0.79	0.00	0.00
16"	1,145.13	8.30	0.00	0.00	0.00	0.00	19.13	0.14	0.00	0.00
18"	275.88	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20"	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22"	62.50	0.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24"+	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Totals[a]	2,721.37	19.73	3.27	8.85	3.00	8.12	128.11	0.93	2.21	5.98

Appendix III-K-1-B. (continued)

Forest Management Block A10

DBH class	Pine						Hardwood			
	Sawtimber		Chip-n-saw		Pulpwood		Sawtimber		Pulpwood	
	BF/ac	tons/ac	cds/ac	tons/ac	Cds/ac	tons/ac	BF/ac	tons/ac	cds/ac	tons/ac
6"	0.00	0.00	0.00	0.00	1.50	4.06	0.00	0.00	0.49	1.33
8"	0.00	0.00	0.00	0.00	2.84	7.68	0.00	0.00	0.86	2.33
10"	0.00	0.00	6.05	16.37	0.00	0.00	0.00	0.00	0.33	0.89
12"	0.00	0.00	8.96	24.24	0.00	0.00	0.00	0.00	0.00	0.00
14"	1,697.50	12.31	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.19
16"	1,147.00	8.32	0.08	0.22	0.00	0.00	0.00	0.00	0.00	0.00
18"	199.05	1.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20"	329.55	2.39	0.00	0.00	0.00	0.00	28.45	0.21	0.00	0.00
22"	0.00	0.00	0.00	0.00	0.00	0.00	37.68	0.27	0.00	0.00
24"+	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Totals[a]	3,373.08	24.45	15.09	40.83	4.34	11.74	66.13	0.48	1.74	4.71

Forest Management Block A11

DBH class	Pine						Hardwood			
	Sawtimber		Chip-n-saw		Pulpwood		Sawtimber		Pulpwood	
	BF/ac	tons/ac	cds/ac	tons/ac	cds/ac	tons/ac	BF/ac	tons/ac	cds/ac	tons/ac
6"	0.00	0.00	0.00	0.00	0.52	1.41	0.00	0.00	0.47	1.27
8"	0.00	0.00	0.00	0.00	1.15	3.11	0.00	0.00	0.69	1.87
10"	0.00	0.00	0.78	2.11	0.14	0.38	0.00	0.00	0.39	1.06
12"	0.00	0.00	1.67	4.52	0.00	0.00	0.00	0.00	0.00	0.00
14"	927.07	6.72	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16"	1,204.86	8.74	0.17	0.46	0.00	0.00	0.00	0.00	0.00	0.00
18"	789.79	5.73	0.25	0.68	0.00	0.00	0.00	0.00	0.00	0.00
20"	278.79	2.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22"	157.86	1.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24"+	92.00	0.67	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Totals[a]	3,450.34	25.01	2.87	7.76	1.81	4.90	0.00	0.00	1.55	4.19

Appendix III-K-1-B. (continued)

Forest Management Block A12

DBH class	Pine						Hardwood			
	Sawtimber		Chip-n-saw		Pulpwood		Sawtimber		Pulpwood	
	BF/ac	tons/ac	cds/ac	tons/ac	cds/ac	tons/ac	BF/ac	tons/ac	cds/ac	tons/ac
6"	0.00	0.00	0.00	0.00	2.06	5.57	0.00	0.00	0.32	0.87
8"	0.00	0.00	0.00	0.00	2.94	7.95	0.00	0.00	1.43	3.87
10"	0.00	0.00	2.73	7.39	0.06	0.16	0.00	0.00	0.52	1.41
12"	33.39	0.24	2.36	6.38	0.00	0.00	0.00	0.00	0.21	0.57
14"	1,078.97	7.82	0.00	0.00	0.00	0.00	32.61	0.24	0.14	0.38
16"	1,355.79	9.83	0.00	0.00	0.00	0.00	23.79	0.17	0.04	0.11
18"	459.12	3.33	0.00	0.00	0.00	0.00	10.67	0.08	0.00	0.00
20"	354.03	2.57	0.00	0.00	0.00	0.00	28.00	0.20	0.00	0.00
22"	38.18	0.28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24"+	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Totals[a]	3,319.48	24.07	5.09	13.77	5.05	13.66	95.06	0.69	2.66	7.20

Forest Management Block A13

DBH class	Pine						Hardwood			
	Sawtimber		Chip-n-saw		Pulpwood		Sawtimber		Pulpwood	
	BF/ac	tons/ac	cds/ac	tons/ac	Cds/ac	tons/ac	BF/ac	tons/ac	cds/ac	tons/ac
6"	0.00	0.00	0.00	0.00	1.05	2.84	0.00	0.00	0.57	1.54
8"	0.00	0.00	0.00	0.00	2.32	6.28	0.00	0.00	0.54	1.46
10"	0.00	0.00	1.28	3.46	0.00	0.00	0.00	0.00	0.29	0.78
12"	0.00	0.00	1.86	5.03	0.00	0.00	12.56	0.09	0.12	0.32
14"	1,319.96	9.57	0.00	0.00	0.00	0.00	48.96	0.35	0.16	0.43
16"	801.85	5.81	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.24
18"	281.30	2.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20"	81.52	0.59	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22"	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24"+	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Totals[a]	2,484.63	18.01	3.14	8.50	3.37	9.12	61.51	0.45	1.78	4.82

Appendix III-K-1-B. (continued)

Forest Management Block A14

DBH class	Pine						Hardwood			
	Sawtimber		Chip-n-saw		Pulpwood		Sawtimber		Pulpwood	
	BF/ac	tons/ac	cds/ac	tons/ac	Cds/ac	tons/ac	BF/ac	tons/ac	cds/ac	tons/ac
6"	0.00	0.00	0.00	0.00	1.55	4.19	0.00	0.00	0.20	0.54
8"	0.00	0.00	0.00	0.00	2.84	7.68	0.00	0.00	0.08	0.22
10"	0.00	0.00	4.16	11.25	0.11	0.30	0.00	0.00	0.13	0.35
12"	0.00	0.00	3.00	8.12	0.00	0.00	0.00	0.00	0.00	0.00
14"	649.23	4.71	0.13	0.35	0.00	0.00	0.00	0.00	0.22	0.60
16"	432.55	3.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18"	157.36	1.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20"	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22"	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24"+	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Totals[a]	1,239.12	8.98	7.28	19.70	4.51	12.20	0.00	0.00	0.62	1.68

Forest Management Block A15

DBH class	Pine						Hardwood			
	Sawtimber		Chip-n-saw		Pulpwood		Sawtimber		Pulpwood	
	BF/ac	tons/ac	cds/ac	tons/ac	Cds/ac	tons/ac	BF/ac	tons/ac	cds/ac	tons/ac
6"	0.00	0.00	0.00	0.00	2.33	6.30	0.00	0.00	0.92	2.49
8"	0.00	0.00	0.00	0.00	2.19	5.93	0.00	0.00	0.98	2.65
10"	0.00	0.00	4.30	11.63	0.00	0.00	0.00	0.00	0.49	1.33
12"	0.00	0.00	4.22	11.42	0.10	0.27	0.00	0.00	0.06	0.16
14"	1,942.09	14.08	0.00	0.00	0.00	0.00	41.00	0.30	0.06	0.16
16"	1,724.65	12.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18"	652.57	4.73	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20"	271.70	1.97	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22"	313.78	2.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24"+	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Totals[a]	4,904.78	35.56	8.52	23.05	4.62	12.50	41.00	0.30	2.51	6.79

Appendix III-K-1-B. (continued)

Forest Management Block A16

DBH class	Pine						Hardwood			
	Sawtimber		Chip-n-saw		Pulpwood		Sawtimber		Pulpwood	
	BF/ac	tons/ac	cds/ac	tons/ac	Cds/ac	tons/ac	BF/ac	tons/ac	cds/ac	tons/ac
6"	0.00	0.00	0.00	0.00	1.85	5.01	0.00	0.00	0.44	1.19
8"	0.00	0.00	0.00	0.00	2.54	6.87	0.00	0.00	0.56	1.52
10"	0.00	0.00	2.91	7.87	0.18	0.49	0.00	0.00	0.33	0.89
12"	0.00	0.00	3.84	10.39	0.00	0.00	0.00	0.00	0.10	0.27
14"	1,502.31	10.89	0.00	0.00	0.00	0.00	22.71	0.16	0.00	0.00
16"	948.34	6.88	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18"	776.26	5.63	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.08
20"	90.74	0.66	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22"	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24"+	29.17	0.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Totals[a]	3,346.83	24.26	6.76	18.29	4.58	12.39	22.71	0.16	1.44	3.90

Forest Management Block A17

DBH class	Pine						Hardwood			
	Sawtimber		Chip-n-saw		Pulpwood		Sawtimber		Pulpwood	
	BF/ac	tons/ac	cds/ac	tons/ac	Cds/ac	tons/ac	BF/ac	tons/ac	cds/ac	tons/ac
6"	0.00	0.00	0.00	0.00	1.37	3.71	0.00	0.00	1.20	3.25
8"	0.00	0.00	0.00	0.00	3.61	9.77	0.00	0.00	0.89	2.41
10"	0.00	0.00	4.42	11.96	0.00	0.00	0.00	0.00	0.92	2.49
12"	0.00	0.00	1.98	5.36	0.00	0.00	0.00	0.00	0.46	1.24
14"	148.25	1.07	0.00	0.00	0.00	0.00	32.50	0.24	0.00	0.00
16"	0.00	0.00	0.00	0.00	0.00	0.00	119.75	0.87	0.00	0.00
18"	46.13	0.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20"	0.00	0.00	0.00	0.00	0.00	0.00	50.00	0.36	0.40	1.08
22"	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24"+	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Totals[a]	194.35	1.41	6.40	17.32	4.98	13.47	202.22	1.47	3.88	10.50

Appendix III-K-1-B. (continued)

Forest Management Block A18

DBH class	Pine						Hardwood			
	Sawtimber		Chip-n-saw		Pulpwood		Sawtimber		Pulpwood	
	BF/ac	tons/ac	cds/ac	tons/ac	Cds/ac	tons/ac	BF/ac	tons/ac	cds/ac	tons/ac
6"	0.00	0.00	0.00	0.00	0.65	1.76	0.00	0.00	0.19	0.51
8"	0.00	0.00	0.00	0.00	1.00	2.71	0.00	0.00	0.73	1.98
10"	0.00	0.00	2.26	6.11	0.11	0.30	0.00	0.00	0.43	1.16
12"	0.00	0.00	1.91	5.17	0.14	0.38	0.00	0.00	0.39	1.06
14"	915.18	6.64	0.11	0.30	0.00	0.00	0.00	0.00	0.11	0.30
16"	903.59	6.55	0.00	0.00	0.19	0.51	0.00	0.00	0.00	0.00
18"	669.88	4.86	0.23	0.62	0.00	0.00	32.47	0.24	0.00	0.00
20"	144.24	1.05	0.00	0.00	0.00	0.00	36.82	0.27	0.00	0.00
22"	384.41	2.79	0.00	0.00	0.00	0.00	82.59	0.60	0.00	0.00
24"+	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Totals[a]	3,017.29	21.88	4.51	12.20	0.00	5.65	151.88	1.10	1.84	4.98

Forest Management Block A19

DBH class	Pine						Hardwood			
	Sawtimber		Chip-n-saw		Pulpwood		Sawtimber		Pulpwood	
	BF/ac	tons/ac	cds/ac	tons/ac	Cds/ac	tons/ac	BF/ac	tons/ac	cds/ac	tons/ac
6"	0.00	0.00	0.00	0.00	0.21	0.57	0.00	0.00	0.77	2.08
8"	0.00	0.00	0.00	0.00	0.45	1.22	0.00	0.00	0.61	1.65
10"	0.00	0.00	0.72	1.95	0.56	1.52	0.00	0.00	0.65	1.76
12"	0.00	0.00	1.50	4.06	0.15	0.41	0.00	0.00	1.05	2.84
14"	1,010.80	7.33	0.00	0.00	0.00	0.00	32.64	0.24	0.74	2.00
16"	263.80	1.91	0.00	0.00	0.00	0.00	12.24	0.09	0.05	0.14
18"	103.16	0.75	0.00	0.00	0.00	0.00	38.96	0.28	0.13	0.35
20"	124.04	0.90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22"	59.80	0.43	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24"+	183.84	1.33	0.00	0.00	0.00	0.00	44.08	0.32	0.08	0.22
Totals[a]	1,665.51	12.07	2.22	6.01	1.36	3.68	127.91	0.93	4.08	11.04

Appendix III-K-1-B. (continued)

Forest Management Block A20

DBH class	Pine						Hardwood			
	Sawtimber		Chip-n-saw		Pulpwood		Sawtimber		Pulpwood	
	BF/ac	tons/ac	cds/ac	tons/ac	cds/ac	tons/ac	BF/ac	tons/ac	cds/ac	tons/ac
6"	0.00	0.00	0.00	0.00	1.25	3.38	0.00	0.00	0.84	2.27
8"	0.00	0.00	0.22	0.60	1.59	4.30	0.00	0.00	0.77	2.08
10"	34.30	0.25	1.78	4.82	0.12	0.32	0.00	0.00	0.68	1.84
12"	0.00	0.00	3.54	9.58	0.06	0.16	0.00	0.00	0.00	0.00
14"	977.43	7.09	0.08	0.22	0.04	0.11	33.91	0.25	0.08	0.22
16"	979.70	7.10	0.00	0.00	0.00	0.00	41.65	0.30	0.00	0.00
18"	489.39	3.55	0.10	0.27	0.00	0.00	54.61	0.40	0.00	0.00
20"	42.39	0.31	0.00	0.00	0.00	0.00	27.22	0.20	0.00	0.00
22"	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24"+	0.00	0.00	0.00	0.00	0.00	0.00	39.22	0.28	0.00	0.00
Totals[a]	2,523.22	18.29	5.72	15.48	3.06	8.28	196.60	1.43	2.38	6.44

Forest Management Block A21A

DBH class	Pine						Hardwood			
	Sawtimber		Chip-n-saw		Pulpwood		Sawtimber		Pulpwood	
	BF/ac	tons/ac	cds/ac	tons/ac	cds/ac	tons/ac	BF/ac	tons/ac	cds/ac	tons/ac
6"	0.00	0.00	0.00	0.00	0.92	2.49	0.00	0.00	0.08	0.22
8"	0.00	0.00	0.00	0.00	0.98	2.65	0.00	0.00	0.12	0.32
10"	0.00	0.00	1.80	4.87	0.00	0.00	0.00	0.00	0.25	0.68
12"	0.00	0.00	2.18	5.90	0.00	0.00	0.00	0.00	0.00	0.00
14"	544.43	3.95	0.00	0.00	0.00	0.00	67.36	0.49	0.10	0.27
16"	668.29	4.85	0.00	0.00	0.00	0.00	77.71	0.56	0.34	0.92
18"	524.64	3.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20"	382.43	2.77	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22"	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.14	0.38
24"+	92.00	0.67	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Totals[a]	2,211.77	16.04	3.98	10.77	1.90	5.14	145.05	1.05	1.04	2.81

Appendix III-K-1-B. (continued)

Forest Management Block A21B

DBH class	Pine						Hardwood			
	Sawtimber		Chip-n-saw		Pulpwood		Sawtimber		Pulpwood	
	BF/ac	tons/ac	cds/ac	tons/ac	Cds/ac	tons/ac	BF/ac	tons/ac	cds/ac	tons/ac
6"	0.00	0.00	0.00	0.00	0.35	0.95	0.00	0.00	1.44	3.90
8"	0.00	0.00	0.00	0.00	1.59	4.30	0.00	0.00	0.73	1.98
10"	0.00	0.00	0.38	1.03	0.00	0.00	0.00	0.00	0.65	1.76
12"	0.00	0.00	1.83	4.95	0.19	0.51	0.00	0.00	0.14	0.38
14"	812.20	5.89	0.00	0.00	0.00	0.00	0.00	0.00	0.19	0.51
16"	1,459.90	10.58	0.00	0.00	0.00	0.00	30.60	0.22	0.00	0.00
18"	67.20	0.49	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20"	245.20	1.78	0.00	0.00	0.00	0.00	138.20	1.00	0.00	0.00
22"	71.50	0.52	0.00	0.00	0.00	0.00	82.90	0.60	0.00	0.00
24"+	0.00	0.00	0.00	0.00	0.00	0.00	77.90	0.56	0.00	0.00
Totals[a]	2,655.99	19.26	2.22	6.01	2.13	5.76	329.58	2.39	3.16	8.55

Forest Management Block A22

DBH class	Pine						Hardwood			
	Sawtimber		Chip-n-saw		Pulpwood		Sawtimber		Pulpwood	
	BF/ac	tons/ac	cds/ac	tons/ac	Cds/ac	tons/ac	BF/ac	tons/ac	cds/ac	tons/ac
6"	0.00	0.00	0.19	0.51	2.20	5.95	0.00	0.00	0.92	2.49
8"	0.00	0.00	0.13	0.35	2.31	6.25	0.00	0.00	1.00	2.71
10"	0.00	0.00	2.29	6.20	0.00	0.00	0.00	0.00	0.08	0.22
12"	0.00	0.00	2.56	6.93	0.00	0.00	0.00	0.00	0.16	0.43
14"	1,406.63	10.20	0.00	0.00	0.00	0.00	131.58	0.95	0.00	0.00
16"	908.25	6.58	0.00	0.00	0.00	0.00	109.04	0.79	0.00	0.00
18"	533.88	3.87	0.00	0.00	0.00	0.00	69.00	0.50	0.00	0.00
20"	160.17	1.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22"	52.50	0.38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24"+	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Totals[a]	3,061.41	22.20	5.16	13.96	4.51	12.20	309.61	2.24	2.17	5.87

Forest Management Block A23

DBH class	Pine						Hardwood			
	Sawtimber		Chip-n-saw		Pulpwood		Sawtimber		Pulpwood	
	BF/ac	tons/ac	cds/ac	tons/ac	Cds/ac	tons/ac	BF/ac	tons/ac	cds/ac	tons/ac
6"	0.00	0.00	0.12	0.32	4.24	11.47	0.00	0.00	0.50	1.35
8"	0.00	0.00	0.09	0.24	4.33	11.71	0.00	0.00	0.15	0.41
10"	0.00	0.00	5.30	14.34	0.81	2.19	0.00	0.00	0.00	0.00
12"	0.00	0.00	5.75	15.56	0.00	0.00	0.00	0.00	0.00	0.00
14"	119.37	0.87	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16"	90.00	0.65	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18"	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20"	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22"	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24"+	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Totals[a]	209.37	1.52	11.26	30.46	9.38	25.38	0.00	0.00	0.65	1.76

Forest Management Block A24

DBH class	Pine						Hardwood			
	Sawtimber		Chip-n-saw		Pulpwood		Sawtimber		Pulpwood	
	BF/ac	tons/ac	cds/ac	tons/ac	cds/ac	tons/ac	BF/ac	tons/ac	cds/ac	tons/ac
6"	0.00	0.00	0.00	0.00	1.87	5.06	0.00	0.00	0.04	0.11
8"	0.00	0.00	0.00	0.00	2.69	7.28	0.00	0.00	0.11	0.30
10"	0.00	0.00	3.92	10.61	0.44	1.19	0.00	0.00	0.05	0.14
12"	0.00	0.00	1.64	4.44	0.13	0.35	0.00	0.00	0.00	0.00
14"	230.27	1.67	0.00	0.00	0.00	0.00	5.00	0.04	0.00	0.00
16"	112.04	0.81	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18"	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20"	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22"	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24"+	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Totals[a]	342.30	2.48	5.56	15.04	5.12	13.85	5.00	0.04	0.19	0.51

Appendix III-K-1-B. (continued)

Forest Management Block A25

DBH class	Pine						Hardwood			
	Sawtimber		Chip-n-saw		Pulpwood		Sawtimber		Pulpwood	
	BF/ac	tons/ac	cds/ac	tons/ac	Cds/ac	tons/ac	BF/ac	tons/ac	cds/ac	tons/ac
6"	0.00	0.00	0.00	0.00	0.19	0.51	0.00	0.00	0.48	1.30
8"	0.00	0.00	0.00	0.00	0.49	1.33	0.00	0.00	0.48	1.30
10"	0.00	0.00	0.77	2.08	0.15	0.41	0.00	0.00	1.19	3.22
12"	0.00	0.00	2.00	5.41	0.09	0.24	0.00	0.00	0.58	1.57
14"	675.21	4.90	0.00	0.00	0.07	0.19	10.74	0.08	0.27	0.73
16"	927.42	6.72	0.00	0.00	0.00	0.00	12.61	0.09	0.12	0.32
18"	617.71	4.48	0.10	0.27	0.00	0.00	32.50	0.24	0.06	0.16
20"	266.61	1.93	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22"	66.32	0.48	0.00	0.00	0.00	0.00	18.47	0.13	0.00	0.00
24"+	0.00	0.00	0.00	0.00	0.00	0.00	33.68	0.24	0.00	0.00
Totals[a]	2,553.26	18.51	2.87	7.76	0.99	2.68	107.99	0.78	3.19	8.63

Forest Management Block A26

DBH class	Pine						Hardwood			
	Sawtimber		Chip-n-saw		Pulpwood		Sawtimber		Pulpwood	
	BF/ac	tons/ac	cds/ac	tons/ac	Cds/ac	tons/ac	BF/ac	tons/ac	cds/ac	tons/ac
6"	8.31	0.06	0.00	0.00	0.62	1.68	0.00	0.00	0.45	1.22
8"	0.00	0.00	0.00	0.00	0.91	2.46	0.00	0.00	0.75	2.03
10"	0.00	0.00	0.94	2.54	0.14	0.38	0.00	0.00	0.36	0.97
12"	38.69	0.28	2.08	5.63	0.08	0.22	0.00	0.00	0.41	1.11
14"	1,390.24	10.08	0.00	0.00	0.00	0.00	8.33	0.06	0.21	0.57
16"	1,138.37	8.25	0.00	0.00	0.00	0.00	45.35	0.33	0.17	0.46
18"	747.18	5.42	0.00	0.00	0.00	0.00	11.27	0.08	0.08	0.22
20"	456.76	3.31	0.00	0.00	0.00	0.00	8.16	0.06	0.08	0.22
22"	151.43	1.10	0.00	0.00	0.00	0.00	14.33	0.10	0.00	0.00
24"+	52.10	0.38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Totals[a]	3,966.47	28.76	3.01	8.14	1.75	4.73	87.43	0.63	2.51	6.79

Appendix III-K-1-B. (continued)

Forest Management Block A27

DBH class	Pine						Hardwood			
	Sawtimber		Chip-n-saw		Pulpwood		Sawtimber		Pulpwood	
	BF/ac	tons/ac	cds/ac	tons/ac	Cds/ac	tons/ac	BF/ac	tons/ac	cds/ac	tons/ac
6"	0.00	0.00	0.00	0.00	0.21	0.57	0.00	0.00	0.34	0.92
8"	0.00	0.00	0.00	0.00	0.16	0.43	0.00	0.00	0.48	1.30
10"	0.00	0.00	1.61	4.36	0.72	1.95	0.00	0.00	0.46	1.24
12"	0.00	0.00	1.68	4.55	0.00	0.00	0.00	0.00	0.15	0.41
14"	1,078.54	7.82	0.00	0.00	0.00	0.00	72.54	0.53	0.15	0.41
16"	1,076.15	7.80	0.00	0.00	0.00	0.00	93.69	0.68	0.00	0.00
18"	850.54	6.17	0.00	0.00	0.00	0.00	74.92	0.54	0.00	0.00
20"	263.62	1.91	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22"	0.00	0.00	0.00	0.00	0.00	0.00	127.54	0.92	0.00	0.00
24"+	1,114.16	8.08	0.00	0.00	0.00	0.00	202.46	1.46	0.00	0.00
Totals[a]	3,647.44	26.44	3.29	8.90	1.09	2.95	438.05	3.18	1.56	4.22

Appendix III-K-1-B. (continued)

Forest Management Block B01

DBH class	Pine						Hardwood			
	Sawtimber		Chip-n-saw		Pulpwood		Sawtimber		Pulpwood	
	BF/ac	tons/ac	cds/ac	tons/ac	cds/ac	tons/ac	BF/ac	tons/ac	cds/ac	tons/ac
6"	0.00	0.00	0.00	0.00	0.59	1.60	0.00	0.00	0.97	2.62
8"	0.00	0.00	0.00	0.00	1.72	4.65	0.00	0.00	1.07	2.89
10"	0.00	0.00	1.82	4.92	0.25	0.68	0.00	0.00	0.77	2.08
12"	0.00	0.00	2.29	6.20	0.00	0.00	6.97	0.05	0.36	0.97
14"	1,247.74	9.05	0.24	0.65	0.00	0.00	68.97	0.50	0.76	2.06
16"	1,002.45	7.27	0.00	0.00	0.06	0.16	136.19	0.99	0.05	0.14
18"	537.39	3.90	0.00	0.00	0.00	0.00	82.58	0.60	0.00	0.00
20"	385.29	2.79	0.00	0.00	0.00	0.00	104.19	0.76	0.05	0.14
22"	150.77	1.09	0.00	0.00	0.00	0.00	63.84	0.46	0.00	0.00
24"+	536.06	3.88	0.00	0.00	0.00	0.00	168.03	1.22	0.05	0.14
Totals[a]	3,462.99	25.11	4.35	11.77	2.62	7.09	487.87	3.54	4.05	10.96

Forest Management Block B02

DBH class	Pine						Hardwood			
	Sawtimber		Chip-n-saw		Pulpwood		Sawtimber		Pulpwood	
	BF/ac	tons/ac	cds/ac	tons/ac	cds/ac	tons/ac	BF/ac	tons/ac	cds/ac	tons/ac
6"	0.00	0.00	0.00	0.00	0.29	0.78	0.00	0.00	0.68	1.84
8"	0.00	0.00	0.00	0.00	0.46	1.24	0.00	0.00	0.64	1.73
10"	0.00	0.00	1.31	3.54	0.24	0.65	0.00	0.00	1.23	3.33
12"	91.83	0.67	3.22	8.71	0.00	0.00	0.00	0.00	0.28	0.76
14"	1,056.42	7.66	0.00	0.00	0.00	0.00	146.58	1.06	0.12	0.32
16"	199.33	1.45	0.00	0.00	0.00	0.00	167.17	1.21	0.31	0.84
18"	270.92	1.96	0.00	0.00	0.00	0.00	46.00	0.33	0.00	0.00
20"	139.25	1.01	0.00	0.00	0.00	0.00	0.00	0.00	0.24	0.65
22"	105.00	0.76	0.00	0.00	0.00	0.00	37.33	0.27	0.00	0.00
24"+	0.00	0.00	0.00	0.00	0.00	0.00	46.00	0.33	0.00	0.00
Totals[a]	1,862.73	13.50	4.53	12.26	0.99	2.68	658.75	4.78	3.50	9.47

Appendix III-K-1-B. (continued)

Forest Management Block B03

DBH class	Pine						Hardwood			
	Sawtimber		Chip-n-saw		Pulpwood		Sawtimber		Pulpwood	
	BF/ac	tons/ac	cds/ac	tons/ac	cds/ac	tons/ac	BF/ac	tons/ac	cds/ac	tons/ac
6"	0.00	0.00	0.00	0.00	1.04	2.81	0.00	0.00	0.50	1.35
8"	0.00	0.00	0.00	0.00	2.34	6.33	0.00	0.00	1.00	2.71
10"	0.00	0.00	3.55	9.60	0.07	0.19	0.00	0.00	0.89	2.41
12"	37.80	0.27	1.59	4.30	0.00	0.00	0.00	0.00	0.94	2.54
14"	1,374.20	9.96	0.00	0.00	0.00	0.00	134.70	0.98	0.07	0.19
16"	746.75	5.41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18"	198.70	1.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20"	82.50	0.60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22"	94.85	0.69	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24"+	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Totals[a]	2,534.80	18.38	5.14	13.91	3.45	9.33	134.69	0.98	3.40	9.20

Forest Management Block B04

DBH class	Pine						Hardwood			
	Sawtimber		Chip-n-saw		Pulpwood		Sawtimber		Pulpwood	
	BF/ac	tons/ac	cds/ac	tons/ac	cds/ac	tons/ac	BF/ac	tons/ac	cds/ac	tons/ac
6"	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8"	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10"	0.00	0.00	0.93	2.52	0.00	0.00	0.00	0.00	0.00	0.00
12"	0.00	0.00	3.19	8.63	0.00	0.00	0.00	0.00	0.00	0.00
14"	1,970.00	14.28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16"	1,306.80	9.47	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18"	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20"	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22"	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24"+	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Totals[a]	3,276.79	23.76	4.13	11.17	0.00	0.00	0.00	0.00	0.00	0.00

Appendix III-K-1-B. (continued)

Forest Management Block B05

DBH class	Pine						Hardwood			
	Sawtimber		Chip-n-saw		Pulpwood		Sawtimber		Pulpwood	
	BF/ac	tons/ac	cds/ac	tons/ac	cds/ac	tons/ac	BF/ac	tons/ac	cds/ac	tons/ac
6"	0.00	0.00	0.00	0.00	1.01	2.73	0.00	0.00	0.73	1.98
8"	0.00	0.00	0.16	0.43	1.12	3.03	0.00	0.00	0.59	1.60
10"	0.00	0.00	1.44	3.90	0.00	0.00	0.00	0.00	0.28	0.76
12"	0.00	0.00	2.02	5.47	0.00	0.00	0.00	0.00	0.00	0.00
14"	765.19	5.55	0.00	0.00	0.00	0.00	41.75	0.30	0.00	0.00
16"	1,077.94	7.82	0.00	0.00	0.00	0.00	68.00	0.49	0.00	0.00
18"	793.88	5.76	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20"	154.75	1.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22"	0.00	0.00	0.00	0.00	0.00	0.00	28.00	0.20	0.00	0.00
24"+	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Totals[a]	2,791.74	20.24	3.61	9.77	2.13	5.76	137.73	1.00	1.60	4.33

Forest Management Block B06

DBH class	Pine						Hardwood			
	Sawtimber		Chip-n-saw		Pulpwood		Sawtimber		Pulpwood	
	BF/ac	tons/ac	cds/ac	tons/ac	cds/ac	tons/ac	BF/ac	tons/ac	cds/ac	tons/ac
6"	0.00	0.00	0.00	0.00	2.78	7.52	0.00	0.00	0.05	0.14
8"	0.00	0.00	0.38	1.03	5.09	13.77	0.00	0.00	0.32	0.87
10"	0.00	0.00	6.81	18.42	0.00	0.00	0.00	0.00	0.04	0.11
12"	0.00	0.00	3.10	8.39	0.00	0.00	0.00	0.00	0.00	0.00
14"	587.30	4.26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16"	504.52	3.66	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18"	45.26	0.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20"	30.26	0.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22"	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24"+	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Totals[a]	1,167.34	8.46	10.29	27.84	7.87	21.29	0.00	0.00	0.41	1.11

Appendix III-K-1-B. (continued)

Forest Management Block B07

DBH class	Pine						Hardwood			
	Sawtimber		Chip-n-saw		Pulpwood		Sawtimber		Pulpwood	
	BF/ac	tons/ac	cds/ac	tons/ac	cds/ac	tons/ac	BF/ac	tons/ac	cds/ac	tons/ac
6"	0.00	0.00	0.30	0.81	6.58	17.80	0.00	0.00	0.00	0.00
8"	0.00	0.00	0.00	0.00	9.80	26.51	0.00	0.00	0.00	0.00
10"	0.00	0.00	7.96	21.54	0.00	0.00	0.00	0.00	0.00	0.00
12"	0.00	0.00	2.76	7.47	0.00	0.00	0.00	0.00	0.00	0.00
14"	283.20	2.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16"	63.90	0.46	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18"	67.20	0.49	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20"	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22"	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24"+	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Totals[a]	414.28	3.00	11.01	29.79	16.38	44.32	0.00	0.00	0.00	0.00

Forest Management Block B08

DBH class	Pine						Hardwood			
	Sawtimber		Chip-n-saw		Pulpwood		Sawtimber		Pulpwood	
	BF/ac	tons/ac	cds/ac	tons/ac	cds/ac	tons/ac	BF/ac	tons/ac	cds/ac	tons/ac
6"	0.00	0.00	0.00	0.00	2.07	5.60	0.00	0.00	0.07	0.19
8"	0.00	0.00	0.18	0.49	3.95	10.69	0.00	0.00	0.26	0.70
10"	0.00	0.00	9.84	26.62	0.08	0.22	0.00	0.00	0.14	0.38
12"	0.00	0.00	7.42	20.07	0.11	0.30	0.00	0.00	0.00	0.00
14"	955.88	6.93	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16"	352.06	2.55	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18"	148.71	1.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20"	81.88	0.59	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22"	58.82	0.43	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24"+	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Totals[a]	1,597.33	11.58	17.45	47.21	6.21	16.80	0.00	0.00	0.47	1.27

Appendix III-K-1-B. (continued)

Forest Management Block B09

DBH class	Pine						Hardwood			
	Sawtimber		Chip-n-saw		Pulpwood		Sawtimber		Pulpwood	
	BF/ac	tons/ac	cds/ac	tons/ac	cds/ac	tons/ac	BF/ac	tons/ac	cds/ac	tons/ac
6"	0.00	0.00	0.00	0.00	1.08	2.92	0.00	0.00	0.39	1.06
8"	0.00	0.00	0.00	0.00	1.76	4.76	0.00	0.00	0.41	1.11
10"	0.00	0.00	4.24	11.47	0.00	0.00	0.00	0.00	0.03	0.08
12"	0.00	0.00	5.50	14.88	0.00	0.00	0.00	0.00	0.10	0.27
14"	1,053.31	7.64	0.20	0.54	0.04	0.11	0.00	0.00	0.04	0.11
16"	384.47	2.79	0.00	0.00	0.00	0.00	14.97	0.11	0.00	0.00
18"	203.00	1.47	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20"	120.88	0.88	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.08
22"	67.03	0.49	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24"+	187.91	1.37	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.08
Totals[a]	1,893.56	13.73	9.95	26.92	2.89	7.82	14.97	0.11	1.08	2.92

Forest Management Block B10

DBH class	Pine						Hardwood			
	Sawtimber		Chip-n-saw		Pulpwood		Sawtimber		Pulpwood	
	BF/ac	tons/ac	cds/ac	tons/ac	cds/ac	tons/ac	BF/ac	tons/ac	cds/ac	tons/ac
6"	9.25	0.07	0.00	0.00	0.99	2.68	0.00	0.00	0.16	0.43
8"	0.00	0.00	0.00	0.00	1.54	4.17	0.00	0.00	0.25	0.68
10"	0.00	0.00	2.15	5.82	0.21	0.57	0.00	0.00	0.24	0.65
12"	0.00	0.00	1.37	3.71	0.28	0.76	0.00	0.00	0.34	0.92
14"	574.57	4.17	0.12	0.32	0.06	0.16	27.02	0.20	0.07	0.19
16"	234.18	1.70	0.00	0.00	0.00	0.00	70.25	0.51	0.00	0.00
18"	183.18	1.33	0.00	0.00	0.00	0.00	66.18	0.48	0.00	0.00
20"	37.50	0.27	0.00	0.00	0.00	0.00	27.84	0.20	0.07	0.19
22"	0.00	0.00	0.00	0.00	0.00	0.00	15.95	0.12	0.00	0.00
24"+	37.50	0.27	0.00	0.00	0.00	0.00	43.79	0.32	0.07	0.19
Totals[a]	1,020.18	7.40	3.64	9.85	3.08	8.33	332.08	2.41	1.13	3.06

Appendix III-K-1-B. (continued)

Forest Management Block B11

DBH class	Pine						Hardwood			
	Sawtimber		Chip-n-saw		Pulpwood		Sawtimber		Pulpwood	
	BF/ac	tons/ac	cds/ac	tons/ac	cds/ac	tons/ac	BF/ac	tons/ac	cds/ac	tons/ac
6"	0.00	0.00	0.00	0.00	0.98	2.65	0.00	0.00	0.00	0.00
8"	0.00	0.00	0.08	0.22	2.72	7.36	0.00	0.00	0.09	0.24
10"	0.00	0.00	1.98	5.36	0.50	1.35	0.00	0.00	0.03	0.08
12"	0.00	0.00	2.64	7.14	0.09	0.24	0.00	0.00	0.00	0.00
14"	506.88	3.67	0.32	0.87	0.00	0.00	0.00	0.00	0.00	0.00
16"	477.00	3.46	0.05	0.14	0.00	0.00	52.15	0.38	0.00	0.00
18"	119.54	0.87	0.00	0.00	0.00	0.00	26.27	0.19	0.00	0.00
20"	178.77	1.30	0.00	0.00	0.00	0.00	29.08	0.21	0.00	0.00
22"	27.50	0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24"+	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Totals[a]	1,309.69	9.50	5.07	13.72	4.29	11.61	107.49	0.78	0.12	0.32

Forest Management Block B12

DBH class	Pine						Hardwood			
	Sawtimber		Chip-n-saw		Pulpwood		Sawtimber		Pulpwood	
	BF/ac	tons/ac	cds/ac	tons/ac	cds/ac	tons/ac	BF/ac	tons/ac	cds/ac	tons/ac
6"	0.00	0.00	0.00	0.00	1.43	3.87	0.00	0.00	0.00	0.00
8"	0.00	0.00	0.00	0.00	1.53	4.14	0.00	0.00	0.07	0.19
10"	0.00	0.00	0.47	1.27	0.04	0.11	0.00	0.00	0.05	0.14
12"	0.00	0.00	0.44	1.19	0.00	0.00	0.00	0.00	0.00	0.00
14"	134.53	0.98	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16"	10.69	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18"	50.47	0.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20"	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22"	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24"+	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Totals[a]	195.69	1.42	0.91	2.46	3.00	8.12	0.00	0.00	0.12	0.32

Forest Management Block B13

(This forest management block was not inventoried because of its current use as a disposal area.)

Forest Management Block B14

(This forest management block was not inventoried because of its current use as a disposal area.)

Appendix III-K-1-B. (continued)

Forest Management Block B15

DBH class	Pine						Hardwood			
	Sawtimber		Chip-n-saw		Pulpwood		Sawtimber		Pulpwood	
	BF/ac	tons/ac	cds/ac	tons/ac	cds/ac	tons/ac	BF/ac	tons/ac	cds/ac	tons/ac
6"	0.00	0.00	0.00	0.00	0.83	2.25	0.00	0.00	0.02	0.05
8"	0.00	0.00	0.00	0.00	1.89	5.11	0.00	0.00	0.07	0.19
10"	0.00	0.00	1.90	5.14	0.21	0.57	0.00	0.00	0.03	0.08
12"	0.00	0.00	1.55	4.19	0.20	0.54	0.00	0.00	0.00	0.00
14"	330.88	2.40	0.00	0.00	0.09	0.24	0.00	0.00	0.02	0.05
16"	162.25	1.18	0.00	0.00	0.04	0.11	0.00	0.00	0.00	0.00
18"	118.37	0.86	0.00	0.00	0.05	0.14	0.00	0.00	0.00	0.00
20"	102.13	0.74	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22"	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24"+	12.17	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Totals[a]	725.79	5.26	3.44	9.31	3.29	8.90	0.00	0.00	0.14	0.38

Forest Management Block B16

DBH class	Pine						Hardwood			
	Sawtimber		Chip-n-saw		Pulpwood		Sawtimber		Pulpwood	
	BF/ac	tons/ac	cds/ac	tons/ac	cds/ac	tons/ac	BF/ac	tons/ac	cds/ac	tons/ac
6"	0.00	0.00	0.00	0.00	1.67	4.52	0.00	0.00	0.05	0.14
8"	0.00	0.00	0.00	0.00	2.41	6.52	0.00	0.00	0.09	0.24
10"	0.00	0.00	2.07	5.60	0.22	0.60	0.00	0.00	0.12	0.32
12"	0.00	0.00	1.20	3.25	0.00	0.00	0.00	0.00	0.00	0.00
14"	412.28	2.99	0.03	0.08	0.04	0.11	0.00	0.00	0.00	0.00
16"	21.33	0.15	0.00	0.00	0.05	0.14	0.00	0.00	0.00	0.00
18"	81.11	0.59	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20"	56.91	0.41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22"	15.54	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24"+	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Totals[a]	587.17	4.26	3.30	8.93	4.38	11.85	0.00	0.00	0.26	0.70

Appendix III-K-1-B. (continued)

Forest Management Block B17

DBH class	Pine						Hardwood			
	Sawtimber		Chip-n-saw		Pulpwood		Sawtimber		Pulpwood	
	BF/ac	tons/ac	cds/ac	tons/ac	cds/ac	tons/ac	BF/ac	tons/ac	cds/ac	tons/ac
6"	0.00	0.00	0.00	0.00	1.73	4.68	0.00	0.00	0.12	0.32
8"	0.00	0.00	0.03	0.08	2.12	5.74	0.00	0.00	0.06	0.16
10"	0.00	0.00	1.76	4.76	0.15	0.41	0.00	0.00	0.02	0.05
12"	3.21	0.02	0.67	1.81	0.00	0.00	0.00	0.00	0.15	0.41
14"	85.07	0.62	0.00	0.00	0.04	0.11	0.00	0.00	0.04	0.11
16"	8.41	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18"	31.16	0.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20"	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22"	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24"+	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Totals[a]	127.84	0.93	2.47	6.68	4.04	10.93	0.00	0.00	0.39	1.06

Forest Management Block B18

DBH class	Pine						Hardwood			
	Sawtimber		Chip-n-saw		Pulpwood		Sawtimber		Pulpwood	
	BF/ac	tons/ac	cds/ac	tons/ac	cds/ac	tons/ac	BF/ac	tons/ac	cds/ac	tons/ac
6"	0.00	0.00	0.02	0.05	2.19	5.93	0.00	0.00	0.36	0.97
8"	0.00	0.00	0.04	0.11	2.36	6.38	0.00	0.00	0.11	0.30
10"	0.00	0.00	1.62	4.38	0.29	0.78	0.00	0.00	0.03	0.08
12"	5.91	0.04	0.80	2.16	0.10	0.27	0.00	0.00	0.00	0.00
14"	209.40	1.52	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16"	29.91	0.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18"	7.37	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20"	15.23	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22"	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24"+	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Totals[a]	267.81	1.94	2.47	6.68	4.93	13.34	0.00	0.00	0.50	1.35

Appendix III-K-1-B. (continued)

Forest Management Block B19

DBH class	Pine						Hardwood			
	Sawtimber		Chip-n-saw		Pulpwood		Sawtimber		Pulpwood	
	BF/ac	tons/ac	cds/ac	tons/ac	cds/ac	tons/ac	BF/ac	tons/ac	cds/ac	tons/ac
6"	0.00	0.00	0.00	0.00	1.92	5.19	0.00	0.00	0.47	1.27
8"	0.00	0.00	0.00	0.00	4.30	11.63	0.00	0.00	0.29	0.78
10"	0.00	0.00	4.97	13.45	0.12	0.32	0.00	0.00	0.11	0.30
12"	0.00	0.00	2.82	7.63	0.04	0.11	0.00	0.00	0.00	0.00
14"	370.27	2.68	0.25	0.68	0.00	0.00	0.00	0.00	0.00	0.00
16"	120.15	0.87	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18"	73.85	0.54	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20"	32.13	0.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22"	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24"+	19.63	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Totals[a]	616.03	4.47	8.04	21.75	6.37	17.23	0.00	0.00	0.87	2.35

Forest Management Block B20

DBH class	Pine						Hardwood			
	Sawtimber		Chip-n-saw		Pulpwood		Sawtimber		Pulpwood	
	BF/ac	tons/ac	cds/ac	tons/ac	cds/ac	tons/ac	BF/ac	tons/ac	cds/ac	tons/ac
6"	0.00	0.00	0.00	0.00	1.76	4.76	0.00	0.00	0.40	1.08
8"	0.00	0.00	0.06	0.16	1.89	5.11	0.00	0.00	0.43	1.16
10"	0.00	0.00	3.82	10.34	0.13	0.35	0.00	0.00	0.02	0.05
12"	28.42	0.21	6.39	17.29	0.00	0.00	0.00	0.00	0.00	0.00
14"	1,218.53	8.83	0.05	0.14	0.00	0.00	0.00	0.00	0.00	0.00
16"	513.77	3.72	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18"	240.51	1.74	0.15	0.41	0.00	0.00	0.00	0.00	0.00	0.00
20"	70.56	0.51	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22"	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24"+	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Totals[a]	2,071.79	15.02	10.47	28.33	3.78	10.23	0.00	0.00	0.85	2.30

Appendix III-K-1-B. (continued)

Forest Management Block B21

DBH class	Pine						Hardwood			
	Sawtimber		Chip-n-saw		Pulpwood		Sawtimber		Pulpwood	
	BF/ac	tons/ac	cds/ac	tons/ac	cds/ac	tons/ac	BF/ac	tons/ac	cds/ac	tons/ac
6"	0.00	0.00	0.00	0.00	1.88	5.09	0.00	0.00	0.00	0.00
8"	0.00	0.00	0.00	0.00	2.31	6.25	0.00	0.00	0.00	0.00
10"	0.00	0.00	2.90	7.85	0.20	0.54	0.00	0.00	0.00	0.00
12"	0.00	0.00	1.27	3.44	0.00	0.00	0.00	0.00	0.00	0.00
14"	39.69	0.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16"	22.63	0.16	0.04	0.11	0.00	0.00	0.00	0.00	0.00	0.00
18"	9.88	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20"	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22"	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24"+	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Totals[a]	72.20	0.52	4.22	11.42	4.39	11.88	0.00	0.00	0.00	0.00

Forest Management Block B22

DBH class	Pine						Hardwood			
	Sawtimber		Chip-n-saw		Pulpwood		Sawtimber		Pulpwood	
	BF/ac	tons/ac	cds/ac	tons/ac	cds/ac	tons/ac	BF/ac	tons/ac	cds/ac	tons/ac
6"	0.00	0.00	0.00	0.00	1.14	3.08	0.00	0.00	0.22	0.60
8"	0.00	0.00	0.00	0.00	2.09	5.65	0.00	0.00	0.18	0.49
10"	0.00	0.00	2.01	5.44	0.40	1.08	0.00	0.00	0.21	0.57
12"	0.00	0.00	1.25	3.38	0.07	0.19	0.00	0.00	0.00	0.00
14"	434.12	3.15	0.02	0.05	0.00	0.00	0.00	0.00	0.00	0.00
16"	235.76	1.71	0.00	0.00	0.05	0.14	0.00	0.00	0.08	0.22
18"	109.08	0.79	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20"	19.12	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22"	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24"+	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Totals[a]	798.08	5.79	3.28	8.87	3.76	10.17	0.00	0.00	0.69	1.87

Appendix III-K-1-B. (continued)

Forest Management Block B23

DBH class	Pine						Hardwood			
	Sawtimber		Chip-n-saw		Pulpwood		Sawtimber		Pulpwood	
	BF/ac	tons/ac	cds/ac	tons/ac	cds/ac	tons/ac	BF/ac	tons/ac	cds/ac	tons/ac
6"	0.00	0.00	0.00	0.00	1.97	5.33	0.00	0.00	0.95	2.57
8"	0.00	0.00	0.00	0.00	1.70	4.60	0.00	0.00	0.11	0.30
10"	0.00	0.00	7.93	21.45	0.66	1.79	0.00	0.00	0.20	0.54
12"	81.47	0.59	5.45	14.74	0.00	0.00	0.00	0.00	0.00	0.00
14"	892.00	6.47	0.13	0.35	0.00	0.00	185.07	1.34	0.00	0.00
16"	967.73	7.02	0.00	0.00	0.00	0.00	119.60	0.87	0.19	0.51
18"	436.87	3.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20"	206.73	1.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22"	66.67	0.48	0.00	0.00	0.00	0.00	55.27	0.40	0.00	0.00
24"+	273.40	1.98	0.00	0.00	0.00	0.00	55.27	0.40	0.00	0.00
Totals[a]	2,700.13	19.58	13.51	36.55	4.33	11.71	417.13	3.02	1.45	3.92

Forest Management Block B24

DBH class	Pine						Hardwood			
	Sawtimber		Chip-n-saw		Pulpwood		Sawtimber		Pulpwood	
	BF/ac	tons/ac	cds/ac	tons/ac	cds/ac	tons/ac	BF/ac	tons/ac	cds/ac	tons/ac
6"	0.00	0.00	0.00	0.00	1.32	3.57	0.00	0.00	0.12	0.32
8"	0.00	0.00	0.00	0.00	2.17	5.87	0.00	0.00	0.31	0.84
10"	0.00	0.00	1.71	4.63	0.35	0.95	0.00	0.00	0.07	0.19
12"	0.00	0.00	1.04	2.81	0.24	0.65	0.00	0.00	0.07	0.19
14"	237.61	1.72	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.24
16"	46.32	0.34	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18"	20.97	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20"	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22"	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24"+	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Totals[a]	304.91	2.21	2.74	7.41	4.08	11.04	0.00	0.00	0.67	1.81

Appendix III-K-1-B. (continued)

Forest Management Block B25

DBH class	Pine						Hardwood			
	Sawtimber		Chip-n-saw		Pulpwood		Sawtimber		Pulpwood	
	BF/ac	tons/ac	cds/ac	tons/ac	cds/ac	tons/ac	BF/ac	tons/ac	cds/ac	tons/ac
6"	0.00	0.00	0.00	0.00	1.45	3.92	0.00	0.00	0.00	0.00
8"	0.00	0.00	0.00	0.00	2.44	6.60	0.00	0.00	0.00	0.00
10"	0.00	0.00	1.61	4.36	0.31	0.84	0.00	0.00	0.07	0.19
12"	0.00	0.00	1.04	2.81	0.07	0.19	0.00	0.00	0.07	0.19
14"	302.47	2.19	0.00	0.00	0.00	0.00	7.65	0.06	0.00	0.00
16"	92.82	0.67	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18"	34.82	0.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20"	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22"	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24"+	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Totals[a]	430.12	3.12	2.65	7.17	4.27	11.55	7.64	0.06	0.14	0.38

Appendix III-K-1-B. (continued)

Forest Management Block C01

DBH class	Pine						Hardwood			
	Sawtimber		Chip-n-saw		Pulpwood		Sawtimber		Pulpwood	
	BF/ac	tons/ac	cds/ac	tons/ac	cds/ac	tons/ac	BF/ac	tons/ac	cds/ac	tons/ac
6"	0.00	0.00	0.00	0.00	0.17	0.46	0.00	0.00	1.13	3.06
8"	0.00	0.00	0.00	0.00	0.38	1.03	0.00	0.00	0.74	2.00
10"	0.00	0.00	0.48	1.30	0.22	0.60	0.00	0.00	0.49	1.33
12"	0.00	0.00	0.49	1.33	0.03	0.08	6.65	0.05	0.15	0.41
14"	236.35	1.71	0.05	0.14	0.05	0.14	23.29	0.17	0.20	0.54
16"	226.73	1.64	0.00	0.00	0.03	0.08	40.18	0.29	0.16	0.43
18"	195.06	1.41	0.00	0.00	0.00	0.00	0.00	0.00	0.14	0.38
20"	88.51	0.64	0.00	0.00	0.00	0.00	20.12	0.15	0.00	0.00
22"	28.04	0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24"+	36.75	0.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Totals[a]	811.43	5.88	1.03	2.79	0.88	2.38	90.23	0.65	3.00	8.12

Forest Management Block C02

DBH class	Pine						Hardwood			
	Sawtimber		Chip-n-saw		Pulpwood		Sawtimber		Pulpwood	
	BF/ac	tons/ac	cds/ac	tons/ac	cds/ac	tons/ac	BF/ac	tons/ac	cds/ac	tons/ac
6"	0.00	0.00	0.00	0.00	1.15	3.11	0.00	0.00	1.30	3.52
8"	0.00	0.00	0.00	0.00	1.22	3.30	0.00	0.00	0.81	2.19
10"	0.00	0.00	1.25	3.38	0.22	0.60	0.00	0.00	1.77	4.79
12"	0.00	0.00	0.92	2.49	0.00	0.00	23.36	0.17	0.64	1.73
14"	415.15	3.01	0.00	0.00	0.00	0.00	153.91	1.12	0.30	0.81
16"	197.64	1.43	0.04	0.11	0.07	0.19	174.27	1.26	0.17	0.46
18"	48.94	0.35	0.04	0.11	0.07	0.19	25.27	0.18	0.00	0.00
20"	32.85	0.24	0.00	0.00	0.00	0.00	18.97	0.14	0.07	0.19
22"	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24"+	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.19
Totals[a]	694.57	5.04	2.25	6.09	2.73	7.39	395.78	2.87	5.21	14.10

Appendix III-K-1-B. (continued)

Forest Management Block C03

DBH class	Pine						Hardwood			
	Sawtimber		Chip-n-saw		Pulpwood		Sawtimber		Pulpwood	
	BF/ac	tons/ac	cds/ac	tons/ac	cds/ac	tons/ac	BF/ac	tons/ac	cds/ac	tons/ac
6"	0.00	0.00	0.00	0.00	0.77	2.08	0.00	0.00	0.71	1.92
8"	0.00	0.00	0.00	0.00	1.15	3.11	0.00	0.00	0.56	1.52
10"	0.00	0.00	1.37	3.71	0.16	0.43	0.00	0.00	0.15	0.41
12"	0.00	0.00	1.07	2.89	0.13	0.35	0.00	0.00	0.02	0.05
14"	389.59	2.82	0.00	0.00	0.06	0.16	20.19	0.15	0.05	0.14
16"	137.50	1.00	0.00	0.00	0.00	0.00	8.26	0.06	0.00	0.00
18"	57.84	0.42	0.00	0.00	0.02	0.05	6.07	0.04	0.00	0.00
20"	46.52	0.34	0.00	0.00	0.00	0.00	17.69	0.13	0.00	0.00
22"	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24"+	7.14	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Totals[a]	638.58	4.63	2.44	6.60	2.29	6.20	52.21	0.38	1.49	4.03

Forest Management Block C04

DBH class	Pine						Hardwood			
	Sawtimber		Chip-n-saw		Pulpwood		Sawtimber		Pulpwood	
	BF/ac	tons/ac	cds/ac	tons/ac	cds/ac	tons/ac	BF/ac	tons/ac	cds/ac	tons/ac
6"	0.00	0.00	0.00	0.00	0.53	1.43	0.00	0.00	0.28	0.76
8"	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.61	1.65
10"	0.00	0.00	0.57	1.54	0.00	0.00	0.00	0.00	0.67	1.81
12"	0.00	0.00	0.42	1.14	0.00	0.00	0.00	0.00	0.00	0.00
14"	226.18	1.64	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.35
16"	325.55	2.36	0.00	0.00	0.00	0.00	43.55	0.32	0.00	0.00
18"	386.73	2.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20"	131.91	0.96	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22"	365.00	2.65	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24"+	96.55	0.70	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Totals[a]	1,531.90	11.11	0.99	2.68	0.53	1.43	43.54	0.32	1.69	4.57

Appendix III-K-1-B. (continued)

Forest Management Block FP01

DBH class	Pine						Hardwood			
	Sawtimber		Chip-n-saw		Pulpwood		Sawtimber		Pulpwood	
	BF/ac	tons/ac	cds/ac	tons/ac	cds/ac	tons/ac	BF/ac	tons/ac	cds/ac	tons/ac
6"	0.00	0.00	0.00	0.00	0.44	1.19	0.00	0.00	0.47	1.27
8"	0.00	0.00	0.00	0.00	0.91	2.46	0.00	0.00	0.16	0.43
10"	0.00	0.00	0.60	1.62	0.21	0.57	0.00	0.00	0.13	0.35
12"	0.00	0.00	0.95	2.57	0.07	0.19	0.00	0.00	0.06	0.16
14"	192.28	1.39	0.04	0.11	0.18	0.49	0.00	0.00	0.00	0.00
16"	73.06	0.53	0.00	0.00	0.00	0.00	0.00	0.00	0.12	0.32
18"	7.85	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.16
20"	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22"	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24"+	27.40	0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Totals[a]	300.59	2.18	1.59	4.30	1.81	4.90	0.00	0.00	1.01	2.73

Forest Management Block FP02

DBH class	Pine						Hardwood			
	Sawtimber		Chip-n-saw		Pulpwood		Sawtimber		Pulpwood	
	BF/ac	tons/ac	cds/ac	tons/ac	cds/ac	tons/ac	BF/ac	tons/ac	cds/ac	tons/ac
6"	0.00	0.00	0.00	0.00	0.39	1.06	0.00	0.00	0.20	0.54
8"	0.00	0.00	0.00	0.00	0.43	1.16	0.00	0.00	0.12	0.32
10"	0.00	0.00	0.85	2.30	0.25	0.68	0.00	0.00	0.07	0.19
12"	31.60	0.23	0.79	2.14	0.18	0.49	0.00	0.00	0.00	0.00
14"	69.83	0.51	0.05	0.14	0.03	0.08	0.00	0.00	0.00	0.00
16"	200.60	1.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18"	31.43	0.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20"	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22"	23.83	0.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24"+	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Totals[a]	357.30	2.59	1.69	4.57	1.29	3.49	0.00	0.00	0.39	1.06

Appendix III-K-1-B. (continued)

Forest Management Block FT01

DBH class	Pine						Hardwood			
	Sawtimber		Chip-n-saw		Pulpwood		Sawtimber		Pulpwood	
	BF/ac	tons/ac	cds/ac	tons/ac	cds/ac	tons/ac	BF/ac	tons/ac	cds/ac	tons/ac
6"	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.20	3.25
8"	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.63	4.41
10"	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.68
12"	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14"	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16"	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18"	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20"	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22"	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24"+	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Totals[a]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.08	8.33

Forest Management Block FT02

DBH class	Pine						Hardwood			
	Sawtimber		Chip-n-saw		Pulpwood		Sawtimber		Pulpwood	
	BF/ac	tons/ac	cds/ac	tons/ac	cds/ac	tons/ac	BF/ac	tons/ac	cds/ac	tons/ac
6"	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	2.71
8"	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.51	1.38
10"	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.64	1.73
12"	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14"	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16"	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18"	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20"	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22"	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24"+	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Totals[a]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.16	5.84

Appendix III-K-1-B. (continued)

Forest Management Block K01

DBH class	Pine						Hardwood			
	Sawtimber		Chip-n-saw		Pulpwood		Sawtimber		Pulpwood	
	BF/ac	tons/ac	cds/ac	tons/ac	cds/ac	tons/ac	BF/ac	tons/ac	cds/ac	tons/ac
6"	0.00	0.00	0.00	0.00	0.43	1.16	0.00	0.00	0.64	1.73
8"	0.00	0.00	0.00	0.00	0.48	1.30	0.00	0.00	0.55	1.49
10"	0.00	0.00	0.22	0.60	0.00	0.00	0.00	0.00	0.16	0.43
12"	0.00	0.00	1.17	3.17	0.34	0.92	0.00	0.00	0.56	1.52
14"	778.07	5.64	0.00	0.00	0.00	0.00	123.73	0.90	0.60	1.62
16"	524.80	3.80	0.00	0.00	0.00	0.00	52.33	0.38	0.40	1.08
18"	142.93	1.04	0.00	0.00	0.00	0.00	0.00	0.00	0.58	1.57
20"	75.53	0.55	0.00	0.00	0.00	0.00	41.73	0.30	0.00	0.00
22"	57.87	0.42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24"+	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Totals[a]	1,579.20	11.45	1.39	3.76	1.25	3.38	217.79	1.58	3.50	9.47

Forest Management Block K02

DBH class	Pine						Hardwood			
	Sawtimber		Chip-n-saw		Pulpwood		Sawtimber		Pulpwood	
	BF/ac	tons/ac	cds/ac	tons/ac	cds/ac	tons/ac	BF/ac	tons/ac	cds/ac	tons/ac
6"	0.00	0.00	0.00	0.00	0.24	0.65	0.00	0.00	0.84	2.27
8"	0.00	0.00	0.00	0.00	0.14	0.38	0.00	0.00	1.53	4.14
10"	0.00	0.00	0.89	2.41	0.19	0.51	0.00	0.00	1.04	2.81
12"	0.00	0.00	1.05	2.84	0.05	0.14	11.30	0.08	0.35	0.95
14"	602.90	4.37	0.00	0.00	0.00	0.00	111.83	0.81	0.35	0.95
16"	429.83	3.12	0.00	0.00	0.09	0.24	81.53	0.59	0.27	0.73
18"	299.23	2.17	0.00	0.00	0.00	0.00	36.80	0.27	0.00	0.00
20"	48.03	0.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22"	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.19
24"+	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.27
Totals[a]	1,380.00	10.01	1.94	5.25	0.70	1.89	241.46	1.75	4.53	12.26

Appendix III-K-1-B. (continued)

Forest Management Block K03

DBH class	Pine						Hardwood			
	Sawtimber		Chip-n-saw		Pulpwood		Sawtimber		Pulpwood	
	BF/ac	tons/ac	cds/ac	tons/ac	cds/ac	tons/ac	BF/ac	tons/ac	cds/ac	tons/ac
6"	0.00	0.00	0.00	0.00	0.15	0.41	0.00	0.00	0.60	1.62
8"	0.00	0.00	0.00	0.00	0.47	1.27	0.00	0.00	0.67	1.81
10"	0.00	0.00	0.36	0.97	0.10	0.27	0.00	0.00	0.38	1.03
12"	0.00	0.00	0.46	1.24	0.00	0.00	0.00	0.00	0.28	0.76
14"	255.60	1.85	0.03	0.08	0.00	0.00	99.33	0.72	0.11	0.30
16"	223.05	1.62	0.03	0.08	0.09	0.24	51.93	0.38	0.17	0.46
18"	178.17	1.29	0.00	0.00	0.00	0.00	108.57	0.79	0.00	0.00
20"	29.19	0.21	0.00	0.00	0.00	0.00	40.00	0.29	0.03	0.08
22"	23.81	0.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24"+	19.10	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Totals[a]	728.90	5.28	0.89	2.41	0.81	2.19	299.83	2.17	2.24	6.06

Forest Management Block K04

DBH class	Pine						Hardwood			
	Sawtimber		Chip-n-saw		Pulpwood		Sawtimber		Pulpwood	
	BF/ac	tons/ac	cds/ac	tons/ac	cds/ac	tons/ac	BF/ac	tons/ac	cds/ac	tons/ac
6"	0.00	0.00	0.00	0.00	0.19	0.51	0.00	0.00	0.78	2.11
8"	0.00	0.00	0.00	0.00	0.30	0.81	0.00	0.00	0.54	1.46
10"	0.00	0.00	0.12	0.32	0.23	0.62	0.00	0.00	0.28	0.76
12"	0.00	0.00	0.29	0.78	0.09	0.24	0.00	0.00	0.13	0.35
14"	192.49	1.40	0.00	0.00	0.12	0.32	0.00	0.00	0.04	0.11
16"	100.28	0.73	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18"	28.28	0.21	0.00	0.00	0.08	0.22	0.00	0.00	0.00	0.00
20"	26.26	0.19	0.00	0.00	0.03	0.08	0.00	0.00	0.00	0.00
22"	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24"+	0.60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Totals[a]	0.67	2.52	0.41	1.11	1.05	2.84	0.00	0.00	1.77	4.79

Appendix III-K-1-B. (continued)

Forest Management Block K05

DBH class	Pine						Hardwood			
	Sawtimber		Chip-n-saw		Pulpwood		Sawtimber		Pulpwood	
	BF/ac	tons/ac	cds/ac	tons/ac	cds/ac	tons/ac	BF/ac	tons/ac	cds/ac	tons/ac
6"	0.00	0.00	0.00	0.00	0.31	0.84	0.00	0.00	0.77	2.08
8"	0.00	0.00	0.00	0.00	0.40	1.08	0.00	0.00	1.10	2.98
10"	0.00	0.00	0.09	0.24	0.37	1.00	0.00	0.00	1.46	3.95
12"	0.00	0.00	0.18	0.49	0.16	0.43	0.00	0.00	0.52	1.41
14"	269.56	1.95	0.00	0.00	0.00	0.00	144.44	1.05	0.21	0.57
16"	177.56	1.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18"	452.89	3.28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20"	141.67	1.03	0.00	0.00	0.09	0.24	0.00	0.00	0.00	0.00
22"	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24"+	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Totals[a]	1,041.66	7.55	0.28	0.76	1.32	3.57	144.44	1.05	4.07	11.01

Appendix III-K-1-B. (continued)

Forest Management Block L01

DBH class	Pine						Hardwood			
	Sawtimber		Chip-n-saw		Pulpwood		Sawtimber		Pulpwood	
	BF/ac	tons/ac	cds/ac	tons/ac	cds/ac	tons/ac	BF/ac	tons/ac	cds/ac	tons/ac
6"	0.00	0.00	0.00	0.00	0.78	2.11	0.00	0.00	0.67	1.81
8"	0.00	0.00	0.00	0.00	0.96	2.60	0.00	0.00	0.81	2.19
10"	0.00	0.00	1.25	3.38	0.05	0.14	0.00	0.00	0.86	2.33
12"	0.00	0.00	1.28	3.46	0.00	0.00	0.00	0.00	0.32	0.87
14"	998.92	7.24	0.00	0.00	0.09	0.24	96.28	0.70	0.16	0.43
16"	1,084.02	7.86	0.00	0.00	0.00	0.00	64.13	0.46	0.00	0.00
18"	1,089.96	7.90	0.00	0.00	0.00	0.00	12.89	0.09	0.00	0.00
20"	687.17	4.98	0.00	0.00	0.00	0.00	17.43	0.13	0.00	0.00
22"	279.34	2.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24"+	4,139.41	30.01	0.00	0.00	0.00	0.00	190.73	1.38	0.00	0.00
Totals[a]	4,477.13	32.46	2.54	6.87	1.88	5.09	295.03	2.14	2.82	7.63

Forest Management Block L02

DBH class	Pine						Hardwood			
	Sawtimber		Chip-n-saw		Pulpwood		Sawtimber		Pulpwood	
	BF/ac	tons/ac	cds/ac	tons/ac	cds/ac	tons/ac	BF/ac	tons/ac	cds/ac	tons/ac
6"	0.00	0.00	0.00	0.00	1.33	3.60	0.00	0.00	0.38	1.03
8"	0.00	0.00	0.00	0.00	2.60	7.03	0.00	0.00	0.43	1.16
10"	0.00	0.00	3.34	9.04	0.07	0.19	0.00	0.00	0.17	0.46
12"	0.00	0.00	5.39	14.58	0.12	0.32	0.00	0.00	0.10	0.27
14"	1,178.07	8.54	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16"	698.60	5.06	0.04	0.11	0.00	0.00	0.00	0.00	0.00	0.00
18"	369.00	2.68	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20"	28.51	0.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22"	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24"+	28.51	0.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Totals[a]	2,328.26	16.88	8.77	23.73	4.12	11.15	19.95	0.14	1.08	2.92

Appendix III-K-1-B. (concluded)

Forest Management Block L03

DBH class	Pine						Hardwood			
	Sawtimber		Chip-n-saw		Pulpwood		Sawtimber		Pulpwood	
	BF/ac	tons/ac	cds/ac	tons/ac	cds/ac	tons/ac	BF/ac	tons/ac	cds/ac	tons/ac
6"	0.00	0.00	0.00	0.00	0.91	2.46	0.00	0.00	0.75	2.03
8"	0.00	0.00	0.00	0.00	1.43	3.87	0.00	0.00	0.51	1.38
10"	0.00	0.00	1.22	3.30	0.06	0.16	0.00	0.00	0.15	0.41
12"	0.00	0.00	3.50	9.47	0.08	0.22	27.33	0.20	0.17	0.46
14"	1,595.15	11.56	0.00	0.00	0.00	0.00	12.36	0.09	0.12	0.32
16"	2,153.03	15.61	0.17	0.46	0.00	0.00	0.00	0.00	0.00	0.00
18"	774.52	5.62	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20"	425.45	3.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22"	103.94	0.75	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24"+	45.52	0.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Totals[a]	5,091.69	36.91	4.89	13.23	2.48	6.71	39.69	0.29	1.70	4.60

Forest Management Block L04

DBH class	Pine						Hardwood			
	Sawtimber		Chip-n-saw		Pulpwood		Sawtimber		Pulpwood	
	BF/ac	tons/ac	cds/ac	tons/ac	cds/ac	tons/ac	BF/ac	tons/ac	cds/ac	tons/ac
6"	0.00	0.00	0.00	0.00	1.30	3.52	0.00	0.00	0.21	0.57
8"	0.00	0.00	0.00	0.00	2.13	5.76	0.00	0.00	0.09	0.24
10"	0.00	0.00	1.42	3.84	0.87	2.35	0.00	0.00	0.16	0.43
12"	38.77	0.28	2.63	7.12	0.25	0.68	0.00	0.00	0.00	0.00
14"	428.44	3.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16"	355.59	2.58	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18"	95.18	0.69	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20"	37.21	0.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22"	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24"+	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Totals[a]	955.17	6.92	4.06	10.98	4.55	12.31	0.00	0.00	0.46	1.24

[a] Total may reflect slight rounding differences.

APPENDIX III-L

SAMPLE SIZES (n), 95% CONFIDENCE INTERVALS (CI), AND STANDARD ERRORS (SE) FOR THE CURRENT VOLUMES AND WEIGHTS OF PINE SAWTIMBER, CHIP-N-SAW, AND PULPWOOD, AND HARDWOOD SAWTIMBER AND PULPWOOD BY CUTTING UNIT, FOREST MANAGEMENT BLOCK, AND STAND TYPE

(using data from 1997/1998 inventory)

Appendix III-L-1-A. Sample sizes (n), confidence intervals (CI), and standard errors (SE) for the current mean volumes of pine sawtimber, chip-n-saw, and pulpwood, and hardwood sawtimber and pulpwood by Cutting Unit

Cutting Unit (post-1998)	n (# plots)	Pine									Hardwood					
		Sawtimber			Chip-n-saw			Pulpwood			Sawtimber			Pulpwood		
		Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE
I	127	968.38	672.15-1264.61	148.13	4.52	3.59-5.45	0.47	3.54	2.67-4.41	0.43	30.64	2.18-59.10	14.23	0.53	0.28-0.78	0.13
II	201	2697.02	2311.89-3082.15	192.59	6.99	5.80-8.18	0.59	3.19	2.57-3.81	0.31	111.46	54.94-167.98	28.26	1.79	1.33-2.25	0.23
III	200	3063.81	2655.10-3472.52	204.43	5.72	4.79-6.65	0.47	4.08	3.23-4.93	0.42	120.92	61.87-179.97	29.52	1.92	1.50-2.34	0.21
IV	102	3232.43	2593.06-3871.80	316.54	3.68	2.59-4.77	0.54	2.11	1.24-2.98	0.43	104.11	41.41-166.81	31.04	2.19	1.34-3.04	0.42
V	119	2630.90	2044.21-3217.59	293.33	4.41	3.10-5.72	0.65	2.01	1.30-2.72	0.35	268.73	147.05-390.41	60.84	3.38	2.46-4.30	0.46
VI	268	349.27	232.96-465.58	58.16	5.38	4.13-6.63	0.63	5.31	4.58-6.04	0.36	2.07	0.00-4.99	1.46	0.32	0.16-0.48	0.08
VII	205	281.75	186.24-377.26	47.76	2.58	2.09-3.07	0.24	4.61	4.04-5.18	0.28	0.00	na	na	0.57	0.20-0.94	0.18
VIII	228	849.53	668.92-1030.14	90.30	5.39	4.51-6.27	0.44	4.24	3.61-4.87	0.31	0.00	na	na	0.45	0.27-0.63	0.09
IX	176	838.48	606.05-1070.91	116.21	4.48	3.59-5.37	0.44	3.63	2.99-4.27	0.32	100.48	49.51-163.59	53.53	0.66	0.34-0.98	0.16
X	103	1866.48	1453.43-2279.53	205.99	8.53	6.44-10.62	1.05	5.49	4.02-6.96	0.74	124.30	39.33-97.51	42.52	1.49	0.91-2.07	0.29
XI	12	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	2.62	1.69-3.55	0.46
XII	185	878.68	625.62-1131.74	126.53	1.00	0.58-1.42	0.21	0.94	0.61-1.27	0.16	180.77	98.47-263.07	41.15	2.87	2.23-3.51	0.32
XIII	176	772.50	558.52-986.48	106.99	1.82	1.33-2.31	0.24	1.79	1.27-2.31	0.26	138.36	77.27-199.45	30.55	2.81	2.00-3.62	0.40
XIV	77	322.69	115.17-530.21	103.76	1.63	1.01-2.25	0.31	1.61	0.98-2.24	0.31	0.00	na	na	0.77	0.35-1.19	0.21
XV	178	3230.24	2715.34-3745.14	257.49	4.95	3.97-5.93	0.49	3.19	2.57-3.81	0.31	105.98	31.93-180.03	37.02	1.60	1.20-2.00	0.20

Appendix III-L-1-B. Current (1998) volumes and weights of pine sawtimber, chip-n-saw, and pulpwood and hardwood sawtimber and pulpwood by Cutting Unit

Cutting Unit (post-1998)	Pine						Hardwood			
	Sawtimber		Chip-n-saw		Pulpwood		Sawtimber		Pulpwood	
	BF/ac	tons/ac	cds/ac	tons/ac	cds/ac	tons/ac	BF/ac	tons/ac	cds/ac	tons/ac
I	968.38	7.02	4.52	12.23	3.54	9.58	30.64	0.22	0.53	1.43
II	2,697.02	19.55	6.99	18.91	3.19	8.63	111.46	0.81	1.79	4.84
III	3,063.81	22.21	5.72	15.48	4.08	11.04	120.92	0.88	1.92	5.19
IV	3,232.43	23.44	3.68	9.96	2.11	5.71	104.11	0.75	2.19	5.93
V	2,630.90	19.07	4.41	11.93	2.01	5.44	268.73	1.95	3.38	9.14
VI	349.27	2.53	5.38	14.56	5.31	14.37	2.07	0.02	0.32	0.87
VII	281.75	2.04	2.58	6.98	4.61	12.47	0.00	0.00	0.57	1.54
VIII	849.53	6.16	5.39	14.58	4.24	11.47	0.00	0.00	0.45	1.22
IX	838.48	6.08	4.48	12.12	3.63	9.82	100.48	0.73	0.66	1.79
X	1,866.48	13.53	8.53	23.08	5.49	14.85	124.30	0.90	1.49	4.03
XI	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.62	7.09
XII	878.68	6.37	1.00	2.71	0.94	2.54	180.77	1.31	2.87	7.76
XIII	772.50	5.60	1.82	4.92	1.79	4.84	138.36	1.00	2.81	7.60
XIV	322.69	2.34	1.63	4.41	1.61	4.36	0.00	0.00	0.77	2.08
XV	3,230.24	23.42	4.95	13.39	3.19	8.63	105.98	0.77	1.60	4.33

Appendix III-L-2-A. Sample sizes (n), confidence intervals (CI), and standard errors (SE) for the current (1998) mean volumes of pine sawtimber, chip-n-saw, and pulpwood, and hardwood sawtimber and pulpwood by forest management block.

FMB	n (# plots)	Pine									Hardwood					
		Sawtimber			Chip-n-saw			Pulpwood			Sawtimber			Pulpwood		
		Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE
A01	22	506.95	219.51-794.39	143.73	5.03	2.36-7.70	1.34	1.46	0.55-2.37	0.46	21.77	0.00-65.31	21.77	1.20	0.17-2.23	0.52
A01A	15	1212.59	465.51-1959.67	373.52	5.98	2.94-9.02	1.52	3.05	1.24-4.86	0.91	0.00	na	na	0.84	0.05-1.63	0.40
A02	11	2968.36	1449.75-4486.97	759.36	8.19	5.35-11.03	1.42	3.42	2.07-4.77	0.67	60.71	0.00-144.57	41.94	1.24	0.00-2.52	0.64
A03	36	1585.19	915.13-2255.25	335.01	5.19	3.41-6.97	0.89	4.41	1.95-6.87	1.23	76.25	0.00-168.64	46.20	0.35	0.08-0.62	0.13
A04	43	91.23	0.00-247.90	78.34	2.24	1.16-3.32	0.54	4.09	2.89-5.29	0.60	0.00	na	na	0.05	0.00-0.12	0.04
A05	55	2804.89	2020.92-3588.86	392.04	3.57	2.39-4.75	0.59	1.77	1.05-2.49	0.36	203.49	44.93-362.05	79.28	1.78	0.95-2.61	0.42
A06	44	1811.47	1257.34-2365.60	277.03	8.10	6.36-9.84	0.87	4.10	2.62-5.58	0.74	0.00	na	na	0.71	0.06-1.36	0.32
A07	26	1470.80	811.15-2130.45	329.82	9.85	5.11-14.59	2.37	4.35	1.94-6.76	1.21	66.00	0.00-198.00	66.00	1.62	0.02-3.22	0.80
A08	33	4201.54	3249.05-5154.03	476.20	5.36	3.78-6.94	0.79	2.74	1.23-4.25	0.75	164.66	29.23-300.09	67.72	3.20	1.88-4.52	0.66
A09	16	2721.37	1099.71-4343.03	810.83	3.27	0.14-6.40	1.56	3.00	1.11-4.89	0.94	128.11	1.79-254.43	63.17	2.21	0.52-3.90	0.85
A10	27	3373.08	2094.01-4652.15	639.51	15.09	9.64-20.54	2.72	4.34	2.86-5.82	0.74	66.13	0.00-198.39	66.14	1.74	0.58-2.90	0.58
A11	14	3450.34	1740.01-5160.67	855.16	2.87	0.82-4.92	1.02	1.81	0.00-3.74	0.96	0.00	na	na	1.55	0.34-2.76	0.61
A12	33	3319.48	2383.05-4255.91	468.18	5.09	2.43-7.75	1.33	5.05	2.24-7.86	1.41	95.06	0.00-202.11	53.52	2.66	1.41-3.91	0.63
A13	27	2484.63	1320.33-3648.93	582.09	3.14	1.69-4.59	0.73	3.37	1.29-5.45	1.04	61.51	0.00-137.53	38.02	1.78	0.51-3.05	0.64
A14	22	1239.12	333.57-2144.67	452.81	7.28	3.77-10.79	1.76	4.51	1.53-7.49	1.49	0.00	na	na	0.62	0.19-1.05	0.21
A15	23	4904.78	3069.90-6739.66	917.48	8.52	4.99-12.05	1.76	4.62	1.54-7.70	1.54	41.00	0.00-98.21	28.60	2.51	1.24-3.78	0.64
A16	35	3346.83	2488.37-4205.29	429.24	6.76	4.68-8.84	1.04	4.58	3.11-6.05	0.74	22.71	0.00-56.30	16.80	1.44	0.65-2.23	0.40
A17	8	194.35	0.00-491.98	148.84	6.40	0.00-13.79	3.70	4.98	0.00-12.31	3.66	202.22	0.00-538.59	168.21	3.88	0.00-7.99	2.06
A18	17	3017.29	1865.89-4168.69	575.63	4.51	2.16-6.86	1.18	2.09	0.60-3.58	0.74	151.88	0.00-383.09	115.60	1.84	0.66-3.02	0.59
A19	23	1665.51	661.71-2669.31	501.90	2.22	0.26-4.18	0.98	1.36	0.24-2.48	0.56	127.91	0.00-271.19	71.64	4.08	1.98-6.18	1.05
A20	25	2523.22	1762.72-3283.72	380.22	5.72	3.89-7.55	0.92	3.06	1.15-4.97	0.95	196.60	81.84-311.36	57.38	2.38	1.46-3.30	0.46
A21A	14	2211.77	591.87-3831.67	809.91	3.98	0.69-7.27	1.64	1.90	0.10-3.70	0.90	145.05	0.00-312.15	83.56	1.04	0.34-1.74	0.35
A21B	10	2655.99	993.07-4318.91	831.44	2.22	0.89-3.55	0.66	2.13	0.63-3.63	0.75	329.58	0.00-780.21	225.33	3.16	0.40-5.92	1.38

Appendix III-L-2-A. (continued)

FMB	n (# plots)	Pine									Hardwood					
		Sawtimber			Chip-n-saw			Pulpwood			Sawtimber			Pulpwood		
		Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE
A22	24	3061.41	2015.94-4106.88	522.74	5.16	2.73-7.59	1.22	4.51	2.37-6.65	1.07	309.61	0.00-672.10	181.26	2.17	0.44-3.90	0.86
A23	61	209.37	22.80-395.94	93.29	11.26	5.72-16.80	2.77	9.38	6.87-11.89	1.25	0.00	na	na	0.65	0.05-1.25	0.30
A24	54	342.30	128.53-556.07	106.88	5.56	3.91-7.21	0.83	5.12	3.68-6.56	0.72	5.00	0.00-15.00	5.00	0.19	0.00-0.46	0.14
A25	38	2553.26	1382.59-3723.93	585.33	2.87	1.46-4.28	0.70	0.99	0.33-1.65	0.33	107.99	0.00-252.68	72.35	3.19	1.23-5.15	0.98
A26	49	3966.47	2980.01-4952.93	493.24	3.01	1.66-4.36	0.68	1.75	0.71-2.79	0.52	87.43	14.48-160.38	36.47	2.51	0.99-4.03	0.76
A27	13	3647.44	2474.06-4820.82	586.66	3.29	0.38-6.20	1.46	1.09	0.00-2.95	0.93	438.05	18.14-857.96	209.98	1.56	0.15-2.97	0.70
B01	31	3462.99	2183.42-4742.56	639.73	4.35	2.23-6.47	1.06	2.62	1.20-4.04	0.71	487.87	146.56-829.18	170.65	4.05	2.40-5.70	0.83
B02	12	1862.73	535.72-3189.74	663.50	4.53	1.45-7.61	1.54	0.99	0.02-1.96	0.48	658.75	57.31-1260.19	300.72	3.50	1.16-5.84	1.17
B03	20	2534.80	1390.34-3679.26	572.22	5.14	1.76-8.52	1.69	3.45	1.50-5.40	0.97	134.69	20.90-248.48	56.90	3.40	1.43-5.37	0.98
B04	5	3276.79	688.13-5865.45	1294.35	4.13	0.56-7.70	1.79	0.00	na	na	0.00	na	na	0.00	na	na
B05	16	2791.74	1696.82-3886.66	547.46	3.61	1.67-5.55	0.97	2.13	0.47-3.79	0.83	137.73	0.00-298.32	80.31	1.60	0.75-2.45	0.42
B06	23	1167.34	598.85-1735.83	278.64	10.29	7.35-13.23	1.47	7.87	4.43-11.31	1.72	0.00	na	na	0.41	0.00-1.15	0.37
B07	10	414.28	0.00-922.31	254.03	11.01	5.25-16.77	2.88	16.38	10.83-21.93	2.78	0.00	na	na	0.00	na	na
B08	17	1597.33	776.46-2418.20	410.41	17.45	8.39-26.51	4.53	6.21	2.44-9.98	1.89	0.00	na	na	0.47	0.00-1.14	0.33
B09	32	1893.56	1277.58-2509.54	307.96	9.95	7.02-12.88	1.47	2.89	1.59-4.19	0.65	14.97	0.00-44.91	14.97	1.08	0.37-1.79	0.36
B10	45	1020.18	384.91-1655.45	317.62	3.64	2.44-4.84	0.60	3.08	1.96-4.20	0.56	332.08	0.00-748.08	208.01	1.13	0.07-2.19	0.53
B11	24	1309.69	805.20-1814.18	252.26	5.07	2.94-7.20	1.07	4.29	2.02-6.56	1.14	107.49	0.00-280.05	86.29	0.12	0.00-0.30	0.09
B12	27	195.69	0.00-433.30	118.80	0.91	0.07-1.75	0.42	3.00	1.89-4.11	0.56	0.00	na	na	0.12	0.00-0.29	0.08
B13[a]	-	--	-	-	--	-	-	--	-	-	--	-	-	--	-	-
B14[a]	-	--	-	-	--	-	-	--	-	-	--	-	-	--	-	-
B15	60	725.79	382.93-1068.65	171.43	3.44	2.24-4.64	0.60	3.29	2.27-4.31	0.51	0.00	na	na	0.14	0.02-0.26	0.06
B16	46	587.17	354.77-819.57	116.20	3.30	2.05-4.55	0.63	4.38	2.80-5.96	0.79	0.00	na	na	0.26	0.04-0.48	0.11
B17	75	127.84	15.58-240.10	56.13	2.47	1.49-3.45	0.49	4.04	3.09-4.99	0.48	0.00	na	na	0.39	0.10-0.68	0.14

Appendix III-L-2-A. (continued)

FMB	n (# plots)	Pine									Hardwood					
		Sawtimber			Chip-n-saw			Pulpwood			Sawtimber			Pulpwood		
		Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE
B18	128	267.81	161.57-374.05	53.12	2.47	1.87-3.07	0.30	4.93	4.18-5.68	0.38	0.00	na	na	0.50	0.00-1.02	0.26
B19	52	616.03	350.83-881.23	132.61	8.04	5.98-10.10	1.03	6.37	4.78-7.96	0.79	0.00	na	na	0.87	0.32-1.42	0.28
B20	43	2071.79	1470.35-2673.23	300.72	10.47	7.93-13.01	1.27	3.78	2.49-5.07	0.64	0.00	na	na	0.85	0.22-1.48	0.32
B21	68	72.20	0.00-147.45	37.63	4.22	2.43-6.01	0.90	4.39	3.28-5.50	0.55	0.00	na	na	0.00	na	na
B22	51	798.08	410.29-1185.87	193.90	3.28	2.17-4.39	0.56	3.76	2.67-4.85	0.54	0.00	na	na	0.69	0.26-1.12	0.22
B23	15	2700.13	1409.47-3990.79	645.38	13.51	7.10-19.92	3.20	4.33	0.57-8.09	1.88	417.13	63.90-770.36	176.61	1.45	0.49-2.41	0.48
B24	77	304.91	121.08-488.74	91.91	2.74	1.90-3.58	0.42	4.08	3.25-4.91	0.42	0.00	na	na	0.67	0.21-1.13	0.23
B25	34	430.12	29.59-830.65	200.27	2.65	1.66-3.64	0.49	4.27	2.82-5.72	0.72	7.64	0.00-22.92	7.65	0.14	0.00-0.33	0.10
C01	66	811.43	431.68-1191.18	189.88	1.03	0.31-1.75	0.36	0.88	0.37-1.39	0.26	90.23	12.48-167.98	38.88	3.00	1.72-4.28	0.64
C02	41	694.57	280.05-1109.09	207.26	2.25	1.10-3.40	0.57	2.73	1.18-4.28	0.77	395.78	176.40-615.16	109.69	5.21	2.63-7.79	1.29
C03	58	638.58	323.82-953.34	157.37	2.44	1.60-3.28	0.42	2.29	1.40-3.18	0.45	52.21	1.85-102.57	25.18	1.49	0.62-2.36	0.43
C04	11	1531.90	335.33-2728.47	598.29	0.99	0.00-2.39	0.70	0.53	0.00-1.59	0.53	43.54	0.00-130.62	43.55	1.69	0.13-3.25	0.78
FP01	47	300.59	71.66-529.52	114.46	1.59	0.63-2.55	0.48	1.81	0.89-2.73	0.46	0.00	na	na	1.01	0.41-1.61	0.30
FP02	30	357.30	0.00-756.23	199.47	1.69	1.16-2.22	0.27	1.29	0.55-2.03	0.37	0.00	na	na	0.39	0.00-0.90	0.25
FT01	6	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	3.08	1.63-4.53	0.72
FT02	6	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	2.16	1.01-3.31	0.57
K01	22	1579.20	622.20-2536.20	478.52	1.39	0.06-2.72	0.67	1.25	0.17-2.33	0.54	217.79	0.00-487.41	134.82	3.50	1.25-5.75	1.13
K02	42	1380.00	835.45-1924.55	272.24	1.94	0.42-3.46	0.76	0.70	0.01-1.39	0.35	241.46	75.31-407.61	83.08	4.53	2.86-6.20	0.83
K03	51	728.90	201.47-1256.33	263.72	0.89	0.31-1.47	0.29	0.81	0.22-1.40	0.30	299.83	92.44-507.22	103.70	2.24	1.19-3.29	0.53
K04	53	347.30	113.01-581.59	117.15	0.41	0.17-0.65	0.12	1.05	0.45-1.65	0.30	0.00	na	na	1.77	1.01-2.53	0.38
K05	17	1041.66	301.35-1781.97	370.15	0.28	0.00-0.56	0.14	1.32	0.02-2.62	0.65	144.44	18.52-270.36	62.96	4.07	1.11-7.03	1.48
L01	55	4477.13	3561.11-5393.15	458.08	2.54	1.68-3.40	0.43	1.88	0.91-2.85	0.49	295.03	71.60-518.46	111.72	2.82	1.89-3.75	0.46
L02	43	2328.26	1596.26-3060.26	365.95	8.77	6.39-11.15	1.19	4.12	2.74-5.50	0.69	19.95	0.00-59.85	19.95	1.08	0.47-1.69	0.30

Appendix III-L-2-A. (concluded)

FMB	n (# plots)	Pine									Hardwood					
		Sawtimber			Chip-n-saw			Pulpwood			Sawtimber			Pulpwood		
		Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE
L03	39	5091.69	3764.80-6418.58	663.52	4.89	2.93-6.85	0.98	2.48	1.19-3.77	0.64	39.69	0.00-85.17	22.75	1.70	0.80-2.60	0.45
L04	41	955.17	337.18-1573.16	309.00	4.06	1.90-6.22	1.08	4.55	3.31-5.79	0.62	0.00	na	na	0.46	0.13-0.79	0.16

[a] FMBs B13 and B14 were not inventoried since, as impounded dredge spoil areas, they support no trees.

Appendix III-L-2-B. Current (1998) volumes and weights of pine sawtimber, chip-n-saw, and pulpwood and hardwood sawtimber and pulpwood by forest management block.

Forest Management Block	Pine						Hardwood			
	Sawtimber		Chip-n-saw		Pulpwood		Sawtimber		Pulpwood	
	BF/ac	tons/ac	cds/ac	tons/ac	cds/ac	tons/ac	BF/ac	tons/ac	cds/ac	tons/ac
A01	506.95	3.68	5.03	13.61	1.46	3.95	21.77	0.16	1.20	3.25
A01A	1,212.59	8.79	5.98	16.18	3.05	8.25	0.00	0.00	0.84	2.27
A02	2,968.36	21.52	8.19	22.16	3.42	9.25	60.71	0.44	1.24	3.35
A03	1,585.19	11.49	5.19	14.04	4.41	11.93	76.25	0.55	0.35	0.95
A04	91.23	0.66	2.24	6.06	4.09	11.07	0.00	0.00	0.05	0.14
A05	2,804.89	20.34	3.57	9.66	1.77	4.79	203.49	1.48	1.78	4.82
A06	1,811.47	13.13	8.10	21.91	4.10	11.09	0.00	0.00	0.71	1.92
A07	1,470.80	10.66	9.85	26.65	4.35	11.77	66.00	0.48	1.62	4.38
A08	4,201.54	30.46	5.36	14.50	2.74	7.41	164.66	1.19	3.20	8.66
A09	2,721.37	19.73	3.27	8.85	3.00	8.12	128.11	0.93	2.21	5.98
A10	3,373.08	24.45	15.09	40.83	4.34	11.74	66.13	0.48	1.74	4.71
A11	3,450.34	25.01	2.87	7.76	1.81	4.90	0.00	0.00	1.55	4.19
A12	3,319.48	24.07	5.09	13.77	5.05	13.66	95.06	0.69	2.66	7.20
A13	2,484.63	18.01	3.14	8.50	3.37	9.12	61.51	0.45	1.78	4.82
A14	1,239.12	8.98	7.28	19.70	4.51	12.20	0.00	0.00	0.62	1.68
A15	4,904.78	35.56	8.52	23.05	4.62	12.50	41.00	0.30	2.51	6.79

Appendix III-L-2-B. (continued)

Forest Management Block	Pine						Hardwood			
	Sawtimber		Chip-n-saw		Pulpwood		Sawtimber		Pulpwood	
	BF/ac	tons/ac	cds/ac	tons/ac	cds/ac	tons/ac	BF/ac	tons/ac	cds/ac	tons/ac
A16	3,346.83	24.26	6.76	18.29	4.58	12.39	22.71	0.16	1.44	3.90
A17	194.35	1.41	6.40	17.32	4.98	13.47	202.22	1.47	3.88	10.50
A18	3,017.29	21.88	4.51	12.20	2.09	5.65	151.88	1.10	1.84	4.98
A19	1,665.51	12.07	2.22	6.01	1.36	3.68	127.91	0.93	4.08	11.04
A20	2,523.22	18.29	5.72	15.48	3.06	8.28	196.60	1.43	2.38	6.44
A21A	2,211.77	16.04	3.98	10.77	1.90	5.14	145.05	1.05	1.04	2.81
A21B	2,655.99	19.26	2.22	6.01	2.13	5.76	329.58	2.39	3.16	8.55
A22	3,061.41	22.20	5.16	13.96	4.51	12.20	309.61	2.24	2.17	5.87
A23	209.37	1.52	11.26	30.46	9.38	25.38	0.00	0.00	0.65	1.76
A24	342.30	2.48	5.56	15.04	5.12	13.85	5.00	0.04	0.19	0.51
A25	2,553.26	18.51	2.87	7.76	0.99	2.68	107.99	0.78	3.19	8.63
A26	3,966.47	28.76	3.01	8.14	1.75	4.73	87.43	0.63	2.51	6.79
A27	3,647.44	26.44	3.29	8.90	1.09	2.95	438.05	3.18	1.56	4.22
B01	3,462.99	25.11	4.35	11.77	2.62	7.09	487.87	3.54	4.05	10.96
B02	1,862.73	13.50	4.53	12.26	0.99	2.68	658.75	4.78	3.50	9.47
B03	2,534.80	18.38	5.14	13.91	3.45	9.33	134.69	0.98	3.40	9.20

Appendix III-L-2-B. (continued)

Forest Management Block	Pine						Hardwood			
	Sawtimber		Chip-n-saw		Pulpwood		Sawtimber		Pulpwood	
	BF/ac	tons/ac	cds/ac	tons/ac	cds/ac	tons/ac	BF/ac	tons/ac	cds/ac	tons/ac
B04	3,276.79	23.76	4.13	11.17	0.00	0.00	0.00	0.00	0.00	0.00
B05	2,791.74	20.24	3.61	9.77	2.13	5.76	137.73	1.00	1.60	4.33
B06	1,167.34	8.46	10.29	27.84	7.87	21.29	0.00	0.00	0.41	1.11
B07	414.28	3.00	11.01	29.79	16.38	44.32	0.00	0.00	0.00	0.00
B08	1,597.33	11.58	17.45	47.21	6.21	16.80	0.00	0.00	0.47	1.27
B09	1,893.56	13.73	9.95	26.92	2.89	7.82	14.97	0.11	1.08	2.92
B10	1,020.18	7.40	3.64	9.85	3.08	8.33	332.08	2.41	1.13	3.06
B11	1,309.69	9.50	5.07	13.72	4.29	11.61	107.49	0.78	0.12	0.32
B12	195.69	1.42	0.91	2.46	3.00	8.12	0.00	0.00	0.12	0.32
B13[a]	--	--	--	--	--	--	--	--	--	--
B14[a]	--	--	--	--	--	--	--	--	--	--
B15	725.79	5.26	3.44	9.31	3.29	8.90	0.00	0.00	0.14	0.38
B16	587.17	4.26	3.30	8.93	4.38	11.85	0.00	0.00	0.26	0.70
B17	127.84	0.93	2.47	6.68	4.04	10.93	0.00	0.00	0.39	1.06
B18	267.81	1.94	2.47	6.68	4.93	13.34	0.00	0.00	0.50	1.35
B19	616.03	4.47	8.04	21.75	6.37	17.23	0.00	0.00	0.87	2.35

Appendix III-L-2-B. (continued)

Forest Management Block	Pine						Hardwood			
	Sawtimber		Chip-n-saw		Pulpwood		Sawtimber		Pulpwood	
	BF/ac	tons/ac	cds/ac	tons/ac	cds/ac	tons/ac	BF/ac	tons/ac	cds/ac	tons/ac
B20	2,071.79	15.02	10.47	28.33	3.78	10.23	0.00	0.00	0.85	2.30
B21	72.20	0.52	4.22	11.42	4.39	11.88	0.00	0.00	0.00	0.00
B22	798.08	5.79	3.28	8.87	3.76	10.17	0.00	0.00	0.69	1.87
B23	2,700.13	19.58	13.51	36.55	4.33	11.71	417.13	3.02	1.45	3.92
B24	304.91	2.21	2.74	7.41	4.08	11.04	0.00	0.00	0.67	1.81
B25	430.12	3.12	2.65	7.17	4.27	11.55	7.64	0.06	0.14	0.38
C01	811.43	5.88	1.03	2.79	0.88	2.38	90.23	0.65	3.00	8.12
C02	694.57	5.04	2.25	6.09	2.73	7.39	395.78	2.87	5.21	14.10
C03	638.58	4.63	2.44	6.60	2.29	6.20	52.21	0.38	1.49	4.03
C04	1,531.90	11.11	0.99	2.68	0.53	1.43	43.54	0.32	1.69	4.57
FP01	300.59	2.18	1.59	4.30	1.81	4.90	0.00	0.00	1.01	2.73
FP02	357.30	2.59	1.69	4.57	1.29	3.49	0.00	0.00	0.39	1.06
FT01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.08	8.33
FT02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.16	5.84
K01	1,579.20	11.45	1.39	3.76	1.25	3.38	217.79	1.58	3.50	9.47
K02	1,380.00	10.01	1.94	5.25	0.70	1.89	241.46	1.75	4.53	12.26

Appendix III-L-B-2. (concluded)

Forest Management Block	Pine						Hardwood			
	Sawtimber		Chip-n-saw		Pulpwood		Sawtimber		Pulpwood	
	BF/ac	tons/ac	cds/ac	tons/ac	cds/ac	tons/ac	BF/ac	tons/ac	cds/ac	tons/ac
K03	728.90	5.28	0.89	2.41	0.81	2.19	299.83	2.17	2.24	6.06
K04	347.30	2.52	0.41	1.11	1.05	2.84	0.00	0.00	1.77	4.79
K05	1,041.66	7.55	0.28	0.76	1.32	3.57	144.44	1.05	4.07	11.01
L01	4,477.13	32.46	2.54	6.87	1.88	5.09	295.03	2.14	2.82	7.63
L02	2,328.26	16.88	8.77	23.73	4.12	11.15	19.95	0.14	1.08	2.92
L03	5,091.69	36.91	4.89	13.23	2.48	6.71	39.69	0.29	1.70	4.60
L04	955.17	6.92	4.06	10.98	4.55	12.31	0.00	0.00	0.46	1.24

[a] FMBs B13 and B14 were not inventoried since, as impounded dredge spoil areas, they support no trees.

Appendix III-L-3-A. Sample sizes (n), 95% confidence intervals (CI), and standard errors (SE) for the current mean volumes of pine sawtimber, chip-n-saw, and pulpwood and hardwood sawtimber and pulpwood by stand type.

Stand type	n (# plots)	Pine									Hardwood					
		Sawtimber			Chip-n-saw			Pulpwood			Sawtimber			Pulpwood		
		Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE
Loblolly Pine Plantation (LYP)	71	1018.10	531.65-1504.55	243.21	7.04	4.44-9.64	1.30	4.65	2.97-6.33	0.84	81.95	2.47-161.43	39.74	0.94	0.10-1.78	0.42
Longleaf Pine Plantation (LLYP)	23	113.48	0.00-289.42	87.98	2.10	0.38-3.82	0.86	3.37	2.09-4.65	0.64	20.92	0.00-62.76	20.93	0.15	0.00-0.33	0.09
Slash Pine Plantation (SYP)	86	251.94	72.58-431.30	89.68	10.66	6.93-14.39	1.86	10.85	8.79-12.91	1.03	0.00	na	na	0.42	0.03-0.81	0.20
Loblolly and Slash Pine Plantation (LYP/SYP)	8	1380.60	465.40-2295.80	457.61	29.34	15.09-43.59	7.13	9.41	2.38-16.44	3.52	0.00	na	na	0.00	na	na
Loblolly Pine (L)	542	3421.68	3145.21-3698.15	138.20	4.56	4.06-5.06	0.25	2.82	2.40-3.24	0.21	127.97	93.61-162.33	17.18	2.06	1.79-2.33	0.13
Longleaf Pine (LL)	445	745.59	605.79-885.39	69.89	5.09	4.47-5.71	0.31	3.91	3.48-4.34	0.22	2.34	0.00-5.16	1.41	0.43	0.30-0.56	0.07
Pond Pine (PP)	300	587.82	455.44-720.20	66.19	3.44	2.94-3.94	0.25	4.27	3.79-4.75	0.24	0.87	0.00-2.61	0.87	0.67	0.46-0.88	0.10
Loblolly and Longleaf Pine (L, LL)	198	2372.73	2041.02-2704.44	165.91	7.93	6.81-9.05	0.56	3.62	3.04-4.20	0.29	45.78	18.25-73.31	13.76	1.25	0.89-1.61	0.18
Loblolly and Pond Pine (L, PP)	36	121.44	0.80-242.08	60.32	0.16	0.00-0.38	0.11	2.80	1.63-3.97	0.59	0.00	na	na	0.11	0.00-0.27	0.08
Longleaf and Pond Pine (LL, PP)	181	436.38	309.83-562.93	63.27	4.07	3.22-4.92	0.43	4.46	3.76-5.16	0.35	14.95	0.00-39.17	12.11	0.12	0.05-0.19	0.04
Mixed Pine-Loblolly, Longleaf, and Pond Pine (MP)	49	1773.59	1056.35-2490.83	358.66	5.41	3.76-7.06	0.83	3.50	2.35-4.65	0.58	123.04	1.00-245.08	61.02	1.82	0.27-3.37	0.78
Lowland Hardwood (LH)	32	240.81	2.14-479.48	119.34	0.04	0.00-0.12	0.04	0.00	na	na	794.88	465.24-1124.52	164.82	7.62	4.71-10.53	1.45
Live Oak (LO)	6	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	3.88	3.02-4.74	0.43
Mixed Pine and Live Oak (MPLO)	62	328.53	108.02-549.04	110.25	1.04	0.31-1.77	0.36	1.12	0.44-1.80	0.34	7.42	0.00-22.26	7.42	1.67	1.00-2.34	0.34

Appendix III-L-3-A. (concluded)

Stand type	n (# plots)	Pine									Hardwood					
		Sawtimber			Chip-n-saw			Pulpwood			Sawtimber			Pulpwood		
		Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE	Average	95% CI	SE
Longleaf and Live Oak (LLLO)	7	0.00	na	na	0.60	0.00-1.44	0.42	0.32	0.00-0.75	0.21	0.00	na	na	0.34	0.00-0.78	0.22
Loblolly and Lowland Hardwood (LLH)	250	1515.54	1220.01-1811.07	147.75	1.81	1.30-2.32	0.25	1.22	0.88-1.56	0.17	281.91	186.23-377.59	47.85	3.86	3.19-4.53	0.33
Loblolly and Upland Hardwood (LUH)	3	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na	0.00	na	na
Pond Pine and Lowland Hardwood (PPLH)	21	0.00	na	na	0.20	0.00-0.42	0.11	0.40	0.00-0.88	0.24	0.00	na	na	0.29	0.00-0.59	0.15
Mixed Pine and Lowland Hardwood (MPLH)	35	1236.77	669.71-1803.83	283.52	0.75	0.14-1.36	0.31	1.16	0.21-2.11	0.48	86.33	0.00-189.95	51.81	3.30	1.53-5.07	0.88
Cypress (C)	2	824.90	0.00-2474.70	825.01	0.00	na	na	0.00	na	na	4,414.44	0.00-13243.32	4,414.54	6.75	0.00-20.25	6.76

Appendix III-L-3-B. Current (1998) volumes and weights of pine sawtimber, chip-n-saw, and pulpwood and hardwood sawtimber and pulpwood by stand type.

Stand type	Pine						Hardwood			
	Sawtimber		Chip-n-saw		Pulpwood		Sawtimber		Pulpwood	
	BF/ac	tons/ac	cds/ac	tons/ac	cds/ac	tons/ac	BF/ac	tons/ac	cds/ac	tons/ac
Loblolly Pine Plantation (LYP)	1,018.10	7.38	7.04	19.05	4.65	12.58	81.95	0.59	0.94	2.54
Longleaf Pine Plantation (LLYP)	113.48	0.82	2.10	5.68	3.37	9.12	20.92	0.15	0.15	0.41
Slash Pine Plantation (SYP)	251.94	1.83	10.66	28.84	10.85	29.35	0.00	0.00	0.42	1.14
Loblolly and Slash Pine Plantation (LYP/SYP)	1,380.60	10.01	29.34	79.38	9.41	25.46	0.00	0.00	0.00	0.00
Loblolly Pine (L)	3,421.68	24.81	4.56	12.34	2.82	7.63	127.97	0.93	2.06	5.57
Longleaf Pine (LL)	745.59	5.41	5.09	13.77	3.91	10.58	2.34	0.02	0.43	1.16
Pond Pine (PP)	587.82	4.26	3.44	9.31	4.27	11.55	0.87	0.01	0.67	1.81
Loblolly and Longleaf Pine (L, LL)	2,372.73	17.20	7.93	21.45	3.62	9.79	45.78	0.33	1.25	3.38
Loblolly and Pond Pine (L, PP)	121.44	0.88	0.16	0.43	2.80	7.58	0.00	0.00	0.11	0.30
Longleaf and Pond Pine (LL, PP)	436.38	3.16	4.07	11.01	4.46	12.07	14.95	0.11	0.12	0.32
Mixed Pine-Loblolly, Longleaf, and Pond Pine (MP)	1,773.59	12.86	5.41	14.64	3.50	9.47	123.04	0.89	1.82	4.92

Appendix III-L-3-B. (concluded)

Stand type	Pine						Hardwood			
	Sawtimber		Chip-n-saw		Pulpwood		Sawtimber		Pulpwood	
	BF/ac	tons/ac	cds/ac	tons/ac	cds/ac	tons/ac	BF/ac	tons/ac	cds/ac	tons/ac
Lowland Hardwood (LH)	240.81	1.75	0.04	0.11	0.00	0.00	794.88	5.76	7.62	20.62
Live Oak (LO)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.88	10.50
Mixed Pine and Live Oak (MPLO)	328.53	2.38	1.04	2.81	1.12	3.03	7.42	0.05	1.67	4.52
Longleaf and Live Oak (LLLO)	0.00	0.00	0.60	1.62	0.32	0.87	0.00	0.00	0.34	0.92
Loblolly and Lowland Hardwood (LLH)	1,515.54	10.99	1.81	4.90	1.22	3.30	281.91	2.04	3.86	10.44
Loblolly and Upland Hardwood (LUH)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pond Pine and Lowland Hardwood (PPLH)	0.00	0.00	0.20	0.54	0.40	1.08	0.00	0.00	0.29	0.78
Mixed Pine and Lowland Hardwood (MPLH)	1,236.77	8.97	0.75	2.03	1.16	3.14	86.33	0.63	3.30	8.93
Cypress (C)	824.90	5.98	0.00	0.00	0.00	0.00	4,414.44	32.00	6.75	18.26

APPENDIX III-M

TEN-YEAR PROJECTED VOLUMES AND WEIGHTS OF PINE SAWTIMBER, CHIP-N-SAW, AND PULPWOOD, AND HARDWOOD SAWTIMBER AND PULPWOOD BY CUTTING UNIT, FOREST MANAGEMENT BLOCK, AND STAND TYPE

(using data from 1997/1998 inventory)

Table III-M-1. 10-year projected volumes and weights of pine sawtimber, chip-n-saw, and pulpwood and hardwood sawtimber and pulpwood by Cutting Unit

Cutting Unit (post-1998)	Pine						Hardwood			
	Sawtimber		Chip-n-saw		Pulpwood		Sawtimber		Pulpwood	
	BF/ac	tons/ac	cds/ac	tons/ac	cds/ac	tons/ac	BF/ac	tons/ac	cds/ac	tons/ac
I	1,187.08	8.61	5.54	14.99	4.34	11.74	32.37	0.23	0.56	1.51
II	3,306.11	23.97	8.57	23.18	3.91	10.58	117.75	0.85	1.89	5.11
III	3,755.74	27.23	7.01	18.98	5.00	13.53	127.75	0.93	2.03	5.48
IV	3,962.44	28.73	4.51	12.21	2.59	7.00	109.99	0.80	2.31	6.26
V	3,225.06	23.38	5.41	14.62	2.46	6.67	283.90	2.06	3.57	9.66
VI	428.15	3.10	6.60	17.85	6.51	17.62	2.19	0.02	0.34	0.92
VII	345.38	2.50	3.16	8.56	5.65	15.29	0.00	0.00	0.60	1.63
VIII	1,041.39	7.55	6.61	17.87	5.20	14.06	0.00	0.00	0.48	1.29
IX	1,027.84	7.45	5.49	14.86	4.45	12.04	106.15	0.77	0.70	1.89
X	2,288.01	16.59	10.46	28.29	6.73	18.20	131.32	0.95	1.57	4.26
XI	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.77	7.49
XII	1,077.12	7.81	1.23	3.32	1.15	3.11	190.98	1.38	3.03	8.20
XIII	946.96	6.86	2.23	6.03	2.19	5.93	146.17	1.06	2.97	8.03
XIV	395.57	2.87	2.00	5.41	1.97	5.34	0.00	0.00	0.81	2.20
XV	3,959.76	28.71	6.07	16.41	3.91	10.58	111.96	0.81	1.69	4.57

Table III-M-2. 10-year projected volumes and weights of pine sawtimber, chip-n-saw, and pulpwood and hardwood sawtimber and pulpwood by forest management block.

Forest Management Block	Pine						Hardwood			
	Sawtimber		Chip-n-saw		Pulpwood		Sawtimber		Pulpwood	
	BF/ac	tons/ac	cds/ac	tons/ac	cds/ac	tons/ac	BF/ac	tons/ac	cds/ac	tons/ac
A01	639.11	4.64	6.34	17.16	1.84	4.98	23.19	0.17	1.28	3.46
A01A	1,470.87	10.66	7.25	19.63	3.70	10.01	0.00	0.00	0.88	2.39
A02	3,718.76	26.96	10.26	27.76	4.28	11.59	64.55	0.47	1.32	3.56
A03	2,199.13	15.94	7.20	19.48	6.12	16.55	83.63	0.61	0.38	1.04
A04	143.71	1.04	3.53	9.55	6.44	17.44	0.00	0.00	0.06	0.16
A05	3,382.70	24.53	4.31	11.65	2.13	5.78	213.97	1.55	1.87	5.07
A06	2,438.24	17.67	10.90	29.49	5.52	14.93	0.00	0.00	0.77	2.09
A07	1,779.82	12.90	11.92	32.25	5.26	14.24	69.47	0.50	1.71	4.61
A08	5,001.51	36.26	6.38	17.26	3.26	8.82	172.50	1.25	3.35	9.07
A09	3,370.14	24.43	4.05	10.96	3.72	10.06	135.75	0.98	2.34	6.34
A10	4,336.09	31.43	19.40	52.49	5.58	15.09	70.85	0.51	1.86	5.05
A11	4,315.00	31.28	3.59	9.70	2.26	6.13	0.00	0.00	1.65	4.45
A12	4,689.43	34.00	7.19	19.45	7.13	19.30	104.87	0.76	2.93	7.94
A13	3,550.78	25.74	4.49	12.15	4.82	13.03	68.11	0.49	1.97	5.34
A14	1,577.15	11.43	9.27	25.07	5.74	15.53	0.00	0.00	0.66	1.79
A15	5,931.35	43.00	10.30	27.87	5.59	15.12	43.15	0.31	2.64	7.15

Table III-M-2. (continued)

Forest Management Block	Pine						Hardwood			
	Sawtimber		Chip-n-saw		Pulpwood		Sawtimber		Pulpwood	
	BF/ac	tons/ac	cds/ac	tons/ac	cds/ac	tons/ac	BF/ac	tons/ac	cds/ac	tons/ac
A16	4,270.89	30.96	8.63	23.34	5.84	15.81	24.28	0.18	1.54	4.17
A17	395.70	2.87	13.03	35.26	10.14	27.42	254.59	1.85	4.88	13.22
A18	4,181.96	30.33	6.25	16.91	2.90	7.83	166.54	1.21	2.02	5.46
A19	2,332.05	16.90	3.11	8.42	1.90	5.15	140.71	1.02	4.49	12.14
A20	3,164.12	22.94	7.17	19.41	3.84	10.38	209.08	1.52	2.53	6.85
A21A	3,191.81	23.15	5.74	15.54	2.74	7.42	161.12	1.17	1.16	3.12
A21B	3,127.69	22.68	2.61	7.08	2.51	6.78	344.21	2.50	3.30	8.93
A22	4,163.21	30.19	7.02	18.98	6.13	16.59	337.47	2.45	2.37	6.40
A23	339.16	2.46	18.24	49.34	15.19	41.11	0.00	0.00	0.75	2.03
A24	468.57	3.39	7.61	20.59	7.01	18.96	5.46	0.04	0.21	0.56
A25	3,370.56	24.44	3.79	10.24	1.31	3.54	116.63	0.85	3.45	9.32
A26	5,947.33	43.12	4.51	12.21	2.62	7.09	98.35	0.71	2.82	7.64
A27	4,522.10	32.78	4.08	11.03	1.35	3.66	464.31	3.37	1.65	4.47
B01	4,231.77	30.68	5.32	14.38	3.20	8.66	514.95	3.73	4.27	11.57
B02	2,532.01	18.35	6.16	16.67	1.35	3.64	717.92	5.20	3.81	10.32
B03	3,313.49	24.03	6.72	18.18	4.51	12.20	145.03	1.05	3.66	9.91

Table III-M-2. (continued)

Forest Management Block	Pine						Hardwood			
	Sawtimber		Chip-n-saw		Pulpwood		Sawtimber		Pulpwood	
	BF/ac	tons/ac	cds/ac	tons/ac	cds/ac	tons/ac	BF/ac	tons/ac	cds/ac	tons/ac
B04	3,631.01	26.33	4.58	12.38	0.00	0.00	0.00	0.00	0.00	0.00
B05	3,573.43	25.91	4.62	12.51	2.73	7.37	147.37	1.07	1.71	4.63
B06	1,535.64	11.13	13.54	36.62	10.35	28.01	0.00	0.00	0.44	1.20
B07	570.01	4.13	15.15	40.99	22.54	60.98	0.00	0.00	0.00	0.00
B08	2,194.09	15.91	23.97	64.85	8.53	23.08	0.00	0.00	0.51	1.39
B09	3,124.75	22.66	16.42	44.42	4.77	12.90	17.40	0.13	1.26	3.39
B10	1,586.99	11.51	5.66	15.32	4.79	12.96	378.21	2.74	1.29	3.49
B11	1,657.28	12.02	6.42	17.36	5.43	14.69	114.62	0.83	0.13	0.34
B12	288.31	2.09	1.34	3.62	4.42	11.96	0.00	0.00	0.13	0.36
B13[a]	--	--	--	--	--	--	--	--	--	--
B14[a]	--	--	--	--	--	--	--	--	--	--
B15	1,036.57	7.51	4.91	13.30	4.70	12.71	0.00	0.00	0.15	0.42
B16	836.54	6.07	4.70	12.72	6.24	16.88	0.00	0.00	0.29	0.77
B17	205.64	1.50	3.97	10.75	6.50	17.58	0.00	0.00	0.45	1.22
B18	357.26	2.59	3.29	8.91	6.58	17.80	0.00	0.00	0.54	1.46
B19	790.80	5.74	10.32	27.92	8.18	22.12	0.00	0.00	0.93	2.52

Table III-M-2. (continued)

Forest Management Block	Pine						Hardwood			
	Sawtimber		Chip-n-saw		Pulpwood		Sawtimber		Pulpwood	
	BF/ac	tons/ac	cds/ac	tons/ac	cds/ac	tons/ac	BF/ac	tons/ac	cds/ac	tons/ac
B20	3,022.53	21.91	15.27	41.33	5.51	14.92	0.00	0.00	0.95	2.56
B21	101.46	0.73	5.93	16.05	6.17	16.69	0.00	0.00	0.00	0.00
B22	1,127.37	8.18	4.63	12.53	5.31	14.37	0.00	0.00	0.76	2.06
B23	3,508.55	25.44	17.55	47.49	5.63	15.22	448.35	3.25	1.56	4.21
B24	412.06	2.99	3.70	10.01	5.51	14.92	0.00	0.00	0.73	1.97
B25	560.45	4.07	3.45	9.34	5.56	15.05	8.22	0.06	0.15	0.41
C01	1,022.40	7.41	1.30	3.52	1.11	3.00	96.09	0.70	3.20	8.65
C02	840.36	6.10	2.72	7.37	3.30	8.94	416.55	3.02	5.48	14.84
C03	824.28	5.98	3.15	8.52	2.96	8.00	56.01	0.41	1.60	4.32
C04	2,537.29	18.40	1.64	4.44	0.88	2.37	50.68	0.37	1.97	5.32
FP01	428.97	3.11	2.27	6.14	2.58	6.99	0.00	0.00	1.12	3.02
FP02	474.46	3.44	2.24	6.07	1.71	4.63	0.00	0.00	0.42	1.15
FT01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.08	8.33
FT02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.16	5.84
K01	2,053.75	14.89	1.81	4.89	1.63	4.40	234.15	1.70	3.76	10.18
K02	1,733.69	12.58	2.44	6.60	0.88	2.37	256.93	1.86	4.82	13.05

Table III-M-2. (concluded)

Forest Management Block	Pine						Hardwood			
	Sawtimber		Chip-n-saw		Pulpwood		Sawtimber		Pulpwood	
	BF/ac	tons/ac	cds/ac	tons/ac	cds/ac	tons/ac	BF/ac	tons/ac	cds/ac	tons/ac
K03	964.48	6.99	1.18	3.19	1.07	2.90	324.06	2.35	2.42	6.55
K04	446.14	3.24	0.53	1.43	1.35	3.65	0.00	0.00	1.90	5.13
K05	1,386.35	10.05	0.37	1.01	1.76	4.75	156.39	1.13	4.41	11.92
L01	6,196.35	44.92	3.52	9.51	2.60	7.04	323.35	2.34	3.09	8.36
L02	3,350.83	24.29	12.62	34.15	5.93	16.05	22.14	0.16	1.20	3.24
L03	6,453.72	46.78	6.20	16.77	3.14	8.50	42.34	0.31	1.81	4.91
L04	1,512.89	10.96	6.43	17.39	7.21	19.50	0.00	0.00	0.53	1.42

[a] FMBs B13 and B14 were not inventoried since, as impounded dredge spoil areas, they support no trees.

Table III-M-3. 10-year projected volumes and weights of pine sawtimber, chip-n-saw, and pulpwood and hardwood sawtimber and pulpwood by stand type.

Stand type	Pine						Hardwood			
	Sawtimber		Chip-n-saw		Pulpwood		Sawtimber		Pulpwood	
	BF/ac	tons/ac	cds/ac	tons/ac	cds/ac	tons/ac	BF/ac	tons/ac	cds/ac	tons/ac
Loblolly Pine Plantation (LYP)	1,652.07	11.98	11.42	30.91	7.55	20.41	94.72	0.69	1.09	2.94
Longleaf Pine Plantation (LLYP)	178.44	1.29	3.30	8.93	5.30	14.34	23.91	0.17	0.17	0.47
Slash Pine Plantation (SYP)	387.21	2.81	16.38	44.32	16.68	45.11	0.00	0.00	0.48	1.29
Loblolly and Slash Pine Plantation (LYP/SYP)	2,181.07	15.81	46.35	125.40	14.87	40.22	0.00	0.00	0.00	0.00
Loblolly Pine (L)	4,648.69	33.71	6.20	16.77	3.83	10.67	139.44	1.01	2.24	6.07
Longleaf Pine (LL)	970.46	7.04	6.63	17.92	5.09	13.77	2.52	0.02	0.46	1.25
Pond Pine (PP)	821.83	5.96	4.81	13.02	5.97	16.15	0.96	0.01	0.74	1.99
Loblolly and Longleaf Pine (L, LL)	3,097.84	22.46	10.35	28.01	4.73	12.78	49.28	0.36	1.35	3.64
Loblolly and Pond Pine (L, PP)	206.24	1.49	0.27	0.73	4.76	12.87	0.00	0.00	0.13	0.35
Longleaf and Pond Pine (LL, PP)	645.49	4.67	6.02	16.29	6.60	17.85	16.74	0.12	0.13	0.36
Mixed Pine-Loblolly, Longleaf, and Pond Pine (MP)	2,311.52	16.76	7.05	19.08	4.56	12.34	132.37	0.96	1.96	5.29

Table III-M-3. (concluded)

Stand type	Pine						Hardwood			
	Sawtimber		Chip-n-saw		Pulpwood		Sawtimber		Pulpwood	
	BF/ac	tons/ac	cds/ac	tons/ac	cds/ac	tons/ac	BF/ac	tons/ac	cds/ac	tons/ac
Lowland Hardwood (LH)	316.52	2.30	0.05	0.14	0.00	0.00	857.36	6.22	8.22	22.24
Live Oak (LO)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.11	11.13
Mixed Pine and Live Oak (MPLO)	457.54	3.31	1.45	3.91	1.56	4.22	8.15	0.06	1.83	4.96
Longleaf and Live Oak (LLLO)	0.00	0.00	0.78	2.11	0.42	1.13	0.00	0.00	0.37	0.99
Loblolly and Lowland Hardwood (LLH)	1,958.68	14.20	2.34	6.33	1.58	4.26	302.51	2.19	4.14	11.20
Loblolly and Upland Hardwood (LUH)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pond Pine and Lowland Hardwood (PPLH)	0.00	0.00	0.27	0.74	0.54	1.47	0.00	0.00	0.32	0.85
Mixed Pine and Lowland Hardwood (MPLH)	1,717.13	12.45	1.04	2.82	1.61	4.36	94.71	0.69	3.62	9.80
Cypress (C)	1,022.30	7.41	0.00	0.00	0.00	0.00	4,678.53	33.92	7.15	19.35

APPENDIX III-N

TWENTY-YEAR PROJECTED VOLUMES AND WEIGHTS OF PINE SAWTIMBER, CHIP-N-SAW, AND PULPWOOD, AND HARDWOOD SAWTIMBER AND PULPWOOD BY CUTTING UNIT, FOREST MANAGEMENT BLOCK, AND STAND TYPE

(using data from 1997/1998 inventory)

Table III-N-1. 20-Year projected volumes and weights of pine and hardwood per acre by Cutting Unit

Cutting Unit (post-1998)	Pine						Hardwood			
	Sawtimber		Chip-n-saw		Pulpwood		Sawtimber		Pulpwood	
	BF/ac	tons/ac	cds/ac	tons/ac	cds/ac	tons/ac	BF/ac	tons/ac	cds/ac	tons/ac
I	1,405.78	10.19	6.56	17.75	5.14	13.91	34.10	0.25	0.59	1.59
II	3,915.21	28.38	10.15	27.45	4.63	12.53	124.05	0.90	1.99	5.39
III	4,447.67	32.24	8.30	22.47	5.92	16.03	134.57	0.98	2.14	5.78
IV	4,692.45	34.03	5.34	14.46	3.06	8.29	115.87	0.84	2.44	6.60
V	3,819.22	27.68	6.40	17.32	2.92	7.90	299.07	2.17	3.76	10.17
VI	507.03	3.67	7.81	21.14	7.71	20.86	2.30	0.02	0.36	0.97
VII	409.01	2.96	3.75	10.13	6.69	18.10	0.00	0.00	0.63	1.71
VIII	1,233.25	8.94	7.82	21.17	6.16	16.65	0.00	0.00	0.50	1.36
IX	1,217.20	8.83	6.50	17.59	5.27	14.26	111.83	0.81	0.73	1.99
X	2,709.53	19.64	12.38	33.50	7.97	21.56	138.34	1.00	1.66	4.49
XI	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.92	7.89
XII	1,275.56	9.25	1.45	3.93	1.36	3.69	201.18	1.46	3.19	8.64
XIII	1,121.42	8.13	2.64	7.14	2.60	7.03	153.98	1.12	3.13	8.46
XIV	468.44	3.40	2.37	6.40	2.34	6.33	0.00	0.00	0.86	2.31
XV	4,689.27	34.00	7.19	19.44	4.63	12.53	117.95	0.86	1.78	4.82

Table III-N-2. 20-Year projected volumes and weights of pine and hardwood per acre by forest management block.

Forest Management Block	Pine						Hardwood			
	Sawtimber		Chip-n-saw		Pulpwood		Sawtimber		Pulpwood	
	BF/ac	tons/ac	cds/ac	tons/ac	cds/ac	tons/ac	BF/ac	tons/ac	cds/ac	tons/ac
A01	771.27	5.60	7.65	20.71	2.22	6.01	24.61	0.18	1.36	3.67
A01A	1,729.15	12.53	8.53	23.07	4.35	11.76	0.00	0.00	0.93	2.51
A02	4,469.16	32.40	12.33	33.36	5.15	13.93	68.38	0.50	1.40	3.77
A03	2,813.08	20.39	9.21	24.92	7.83	21.17	91.02	0.66	0.42	1.13
A04	196.18	1.42	4.82	13.03	8.80	23.80	0.00	0.00	0.06	0.18
A05	3,960.50	28.72	5.04	13.64	2.50	6.76	224.45	1.63	1.96	5.32
A06	3,065.01	22.22	13.71	37.07	6.94	18.76	0.00	0.00	0.83	2.25
A07	2,088.83	15.14	13.99	37.85	6.18	16.72	72.93	0.53	1.79	4.84
A08	5,801.49	42.06	7.40	20.02	3.78	10.23	180.34	1.31	3.50	9.48
A09	4,018.92	29.14	4.83	13.07	4.43	11.99	143.38	1.04	2.47	6.69
A10	5,299.11	38.41	23.71	64.14	6.82	18.44	75.57	0.55	1.99	5.38
A11	5,179.65	37.55	4.31	11.65	2.72	7.36	0.00	0.00	1.74	4.72
A12	6,059.38	43.94	9.29	25.14	9.22	24.93	114.68	0.83	3.21	8.69
A13	4,616.94	33.47	5.83	15.79	6.26	16.95	74.71	0.54	2.16	5.85
A14	1,915.18	13.88	11.25	30.45	6.97	18.86	0.00	0.00	0.70	1.91
A15	6,957.92	50.45	12.09	32.70	6.55	17.73	45.29	0.33	2.77	7.50

Table III-N-2. (continued)

Forest Management Block	Pine						Hardwood			
	Sawtimber		Chip-n-saw		Pulpwood		Sawtimber		Pulpwood	
	BF/ac	tons/ac	cds/ac	tons/ac	cds/ac	tons/ac	BF/ac	tons/ac	cds/ac	tons/ac
A16	5,194.95	37.66	10.49	28.39	7.11	19.23	25.85	0.19	1.64	4.44
A17	597.04	4.33	19.66	53.21	15.30	41.38	306.97	2.23	5.89	15.94
A18	5,346.64	38.77	7.99	21.62	3.70	10.01	181.19	1.31	2.20	5.94
A19	2,998.58	21.73	4.00	10.82	2.45	6.63	153.50	1.11	4.90	13.25
A20	3,805.02	27.58	8.63	23.34	4.61	12.49	221.57	1.61	2.68	7.26
A21A	4,171.84	30.25	7.51	20.31	3.58	9.70	177.19	1.28	1.27	3.43
A21B	3,599.40	26.10	3.01	8.14	2.89	7.81	358.85	2.60	3.44	9.31
A22	5,265.01	38.18	8.87	24.01	7.76	20.98	365.32	2.65	2.56	6.93
A23	468.95	3.40	25.22	68.22	21.01	56.85	0.00	0.00	0.85	2.31
A24	594.85	4.31	9.66	26.14	8.90	24.07	5.92	0.04	0.23	0.60
A25	4,187.86	30.36	4.71	12.73	1.62	4.40	125.27	0.91	3.70	10.01
A26	7,928.18	57.49	6.02	16.27	3.50	9.45	109.26	0.79	3.14	8.49
A27	5,396.75	39.12	4.87	13.17	1.61	4.36	490.57	3.56	1.75	4.73
B01	5,000.56	36.26	6.28	17.00	3.78	10.24	542.02	3.93	4.50	12.18
B02	3,201.29	23.20	7.79	21.07	1.70	4.61	777.09	5.63	4.13	11.17
B03	4,092.18	29.67	8.30	22.46	5.57	15.06	155.38	1.13	3.92	10.61

Table III-N-2. (continued)

Forest Management Block	Pine						Hardwood			
	Sawtimber		Chip-n-saw		Pulpwood		Sawtimber		Pulpwood	
	BF/ac	tons/ac	cds/ac	tons/ac	cds/ac	tons/ac	BF/ac	tons/ac	cds/ac	tons/ac
B04	3,985.23	28.90	5.02	13.58	0.00	0.00	0.00	0.00	0.00	0.00
B05	4,355.11	31.57	5.63	15.24	3.32	8.99	157.01	1.14	1.82	4.94
B06	1,903.93	13.80	16.78	45.41	12.84	34.72	0.00	0.00	0.47	1.29
B07	725.74	5.26	19.29	52.19	28.69	77.64	0.00	0.00	0.00	0.00
B08	2,790.85	20.23	30.49	82.49	10.85	29.35	0.00	0.00	0.56	1.51
B09	4,355.95	31.58	22.89	61.93	6.65	17.99	19.84	0.14	1.43	3.87
B10	2,153.80	15.62	7.68	20.80	6.50	17.59	424.33	3.08	1.44	3.91
B11	2,004.87	14.54	7.76	21.00	6.57	17.77	121.75	0.88	0.14	0.36
B12	380.93	2.76	1.77	4.79	5.84	15.81	0.00	0.00	0.15	0.40
B13[a]	--	--	--	--	--	--	--	--	--	--
B14[a]	--	--	--	--	--	--	--	--	--	--
B15	1,347.36	9.76	6.39	17.28	6.11	16.52	0.00	0.00	0.17	0.46
B16	1,085.91	7.88	6.10	16.52	8.10	21.92	0.00	0.00	0.32	0.85
B17	283.45	2.06	5.48	14.81	8.96	24.23	0.00	0.00	0.51	1.38
B18	446.71	3.24	4.12	11.14	8.22	22.25	0.00	0.00	0.58	1.58
B19	965.57	7.01	12.60	34.09	9.98	27.01	0.00	0.00	0.99	2.68

Table III-N-2. (continued)

Forest Management Block	Pine						Hardwood			
	Sawtimber		Chip-n-saw		Pulpwood		Sawtimber		Pulpwood	
	BF/ac	tons/ac	cds/ac	tons/ac	cds/ac	tons/ac	BF/ac	tons/ac	cds/ac	tons/ac
B20	3,973.28	28.81	20.08	54.33	7.25	19.62	0.00	0.00	1.05	2.83
B21	130.73	0.94	7.64	20.68	7.95	21.51	0.00	0.00	0.00	0.00
B22	1,456.66	10.57	5.99	16.19	6.86	18.56	0.00	0.00	0.83	2.26
B23	4,316.97	31.30	21.60	58.44	6.92	18.72	479.57	3.48	1.67	4.51
B24	519.20	3.76	4.67	12.62	6.95	18.80	0.00	0.00	0.79	2.13
B25	690.77	5.01	4.26	11.52	6.86	18.55	8.80	0.60	0.16	0.44
C01	1,233.37	8.94	1.57	4.24	1.34	3.62	101.96	0.74	3.39	9.18
C02	986.15	7.16	3.19	8.65	3.88	10.49	437.32	3.17	5.76	15.58
C03	1,009.98	7.32	3.86	10.44	3.62	9.81	59.80	0.43	1.71	4.62
C04	3,542.67	25.69	2.29	6.20	1.23	3.31	57.83	0.42	2.24	6.07
FP01	557.35	4.04	2.95	7.97	3.36	9.09	0.00	0.00	1.23	3.31
FP02	591.62	4.29	2.80	7.57	2.14	5.78	0.00	0.00	0.45	1.23
FT01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.08	8.33
FT02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.16	5.84
K01	2,528.30	18.33	2.23	6.02	2.00	5.41	250.51	1.82	4.03	10.89
K02	2,087.39	15.14	2.93	7.94	1.06	2.86	272.40	1.97	5.11	13.83

Table III-N-2. (concluded).

Forest Management Block	Pine						Hardwood			
	Sawtimber		Chip-n-saw		Pulpwood		Sawtimber		Pulpwood	
	BF/ac	tons/ac	cds/ac	tons/ac	cds/ac	tons/ac	BF/ac	tons/ac	cds/ac	tons/ac
K03	1,200.06	8.69	1.47	3.97	1.33	3.61	348.28	2.53	2.60	7.04
K04	544.98	3.95	0.64	1.74	1.65	4.46	0.00	0.00	2.02	5.47
K05	1,731.03	12.55	0.47	1.26	2.19	5.93	168.34	1.22	4.74	12.83
L01	7,915.57	57.39	4.49	12.15	3.32	9.00	351.68	2.55	3.36	9.09
L02	4,373.40	31.71	16.47	44.57	7.74	20.94	24.33	0.18	1.32	3.56
L03	7,815.74	56.66	7.51	20.31	3.81	10.30	45.00	0.33	1.93	5.22
L04	2,070.62	15.00	8.80	23.80	9.86	26.69	0.00	0.00	0.59	1.60

[a] FMBs B13 and B14 were not inventoried since, as impounded dredge spoil areas, they support no trees.

Table III-N-3. 20-Year projected volumes and weights of pine and hardwood per acre by stand type.

Stand type	Pine						Hardwood			
	Sawtimber		Chip-n-saw		Pulpwood		Sawtimber		Pulpwood	
	BF/ac	tons/ac	cds/ac	tons/ac	cds/ac	tons/ac	BF/ac	tons/ac	cds/ac	tons/ac
Loblolly Pine Plantation (LYP)	2,286.04	16.57	15.81	42.77	10.44	28.25	107.48	0.78	1.23	3.33
Longleaf Pine Plantation (LLYP)	243.39	1.76	4.50	12.18	7.23	19.56	26.91	0.20	0.19	0.53
Slash Pine Plantation (SYP)	522.47	3.80	22.11	59.81	22.50	60.87	0.00	0.00	0.53	1.45
Loblolly and Slash Pine Plantation (LYP/SYP)	2,981.54	21.62	63.36	171.43	20.32	54.98	0.00	0.00	0.00	0.00
Loblolly Pine (L)	5,875.71	42.60	7.83	21.19	4.84	13.10	150.92	1.09	2.43	6.57
Longleaf Pine (LL)	1,195.33	8.67	8.16	22.08	6.27	16.96	2.69	0.02	0.49	1.33
Pond Pine (PP)	1,055.84	7.65	6.18	16.72	7.67	20.75	1.04	0.01	0.80	2.17
Loblolly and Longleaf Pine (L, LL)	3,822.94	27.71	12.78	34.56	5.83	15.77	52.78	0.38	1.44	3.90
Loblolly and Pond Pine (L, PP)	291.04	2.11	0.38	1.03	6.71	18.17	0.00	0.00	0.15	0.40
Longleaf and Pond Pine (LL, PP)	854.61	6.19	7.97	21.56	8.73	23.64	18.53	0.13	0.15	0.40
Mixed Pine-Loblolly, Longleaf, and Pond Pine (MP)	2,849.45	20.66	8.69	23.52	5.62	15.21	141.70	1.03	2.10	5.67
Lowland Hardwood (LH)	392.23	2.85	0.07	0.18	0.00	0.00	919.84	6.67	8.82	23.86

Table III-N-3. (concluded)

Stand type	Pine						Hardwood			
	Sawtimber		Chip-n-saw		Pulpwood		Sawtimber		Pulpwood	
	BF/ac	tons/ac	cds/ac	tons/ac	cds/ac	tons/ac	BF/ac	tons/ac	cds/ac	tons/ac
Live Oak (LO)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.34	11.76
Mixed Pine and Live Oak (MPLO)	586.56	4.25	1.86	5.02	2.00	5.41	8.88	0.06	2.00	5.41
Longleaf and Live Oak (LLLO)	0.00	0.00	0.96	2.60	0.51	1.40	0.00	0.00	0.39	1.06
Loblolly and Lowland Hardwood (LLH)	2,401.83	17.42	2.87	7.77	1.93	5.23	323.11	2.34	4.42	11.97
Loblolly and Upland Hardwood (LUH)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pond Pine and Lowland Hardwood (PPLH)	0.00	0.00	0.34	0.93	0.69	1.86	0.00	0.00	0.34	0.92
Mixed Pine and Lowland Hardwood (MPLH)	2,197.49	15.94	1.33	3.61	2.06	5.58	103.10	0.75	3.94	10.66
Cypress (C)	1,219.70	8.84	0.00	0.00	0.00	0.00	4,942.63	35.83	7.56	20.44

APPENDIX III-O

LIST OF ABBREVIATIONS AND SPECIES COMPOSITIONS FOR FOREST STAND AND LAND CLASS TYPES

Appendix III-O. List of abbreviations for forest stand and land class types

Abbreviation	Forest stand/land class type	Forest stand/land class composition
LYP	Loblolly pine plantation	Planted loblolly pine
LLYP	Longleaf pine plantation	Planted longleaf pine
SYP	Slash pine plantation	Planted slash pine
LYP/SYP	Loblolly and slash pine plantations	Planted loblolly and slash pines
L	Loblolly pine (natural)	≥ 60 % loblolly pine
LL	Longleaf pine (natural)	≥ 60 % longleaf pine
PP	Pond pine (natural)	≥ 60 % pond pine
L, LL	Loblolly and longleaf pines (natural)	40% to 60% loblolly pine 60% to 40% longleaf pine
L, PP	Loblolly and pond pines (natural)	40% to 60% loblolly pine 60% to 40% pond pine
LL, PP	Longleaf and pond pines (natural)	40% to 60% longleaf pine 60% to 40% pond pine
MP	Mixed pine (natural)	Roughly equal parts loblolly, longleaf, and pond pines
LH	Lowland hardwood	Presence of sweet gum, yellow poplar, maple, black gum, swamp tupelo, and water oak < 20% pine
LO	Live oak	≥ 60% live oak
MPLO	Mixed pine and live oak	40% to 60% mixed pine 60% to 40% live oak
LLLO	Longleaf pine and live oak	40% to 60% longleaf pine 60% to 40% live oak
LLH	Loblolly and lowland hardwood	20% ≤ loblolly pine < 60% 80% > lowland hardwoods ≥ 40%
LUH	Loblolly and upland hardwood	20% ≤ loblolly pine < 60% 80% > white oak, hickory, cedar ≥ 40%
PPLH	Pond pine and lowland hardwood	20% ≤ pond pine < 60% 80% > lowland hardwoods ≥ 40%
MPLH	Mixed pine and lowland hardwood	20% ≤ mixed pine < 60% 80% > lowland hardwoods ≥ 40%

Appendix III-O. (concluded)

Abbreviation	Forest stand/land class type	Forest stand/land class composition
C	Cypress	≥ 60% cypress
M	Marsh	Marshes
P	Pond	Open water
NP	Non-productive	Firebreaks, roads, road rights-of-way, railroad rights-of-way, lagoons, dykes, and cargo storage areas

APPENDIX III-P

COMMERCIAL FOREST ACREAGE BY CUTTING UNIT

(using data from 1997/1998 inventory)

Appendix III-P. Commercial Forest Acreage by Cutting Unit

Cutting Unit (post-1998)	Pine	Pine/ hardwood	Hardwood	Cypress	Total forest acres[a]
I	442	16	0	0	458
II	595	42	7	0	644
III	581	0	10	0	591
IV	331	0	0	4	335
V	167	201	10	0	379
VI	786	0	0	0	786
VII	684	0	0	0	684
VIII	672	0	0	0	672
IX	587	5	0	3	595
X	327	0	0	0	327
XI	0	0	108	0	108
XII	64	385	9	0	458
XIII	344	286	38	0	668
XIV	219	80	0	0	299
XV	542	45	0	0	587
Totals[a]	6,340	1,059	183	7	7,590

[a] Totals may reflect slight rounding differences.

APPENDIX III-Q

PRODUCTIVE ACREAGES AND PRE-MERCHANTABLE PINE PLANTATION ACREAGES BY CUTTING UNIT

(using data from 1997/1998 inventory)

Appendix III-Q. Productive Acreages and Pre-Merchantable Pine Plantation Acreages by Cutting Unit

Cutting Unit (post-1998)	Productive acres[a]		Pre-merchantable pine plantation acres[b]			Total forested acres[c]
	Pine	Hardwood, pine/hardwood, and cypress	Loblolly	Longleaf	Slash	
I	416	16	18	8	0	458
II	589	49	6	0	0	644
III	528	60	3	0	0	591
IV	263	60	12	0	0	335
V	145	234	0	0	0	379
VI	786	0	0	0	0	786
VII	652	32	0	0	0	684
VIII	663	0	9	0	0	672
IX	563	8	17	0	7	595
X	258	61	8	0	0	327
XI	0	108	0	0	0	108
XII	0	458	0	0	0	458
XIII	23	494	139	12	0	668
XIV	251	48	0	0	0	299
XV	525	62	0	0	0	587
Totals[c]	5,669	1,690	212	21	7	7,590

[a] Productive acres are defined as total forest acreage less pre-merchantable acreage.
[b] Pre-merchantable pine is defined as pine plantations which have an average dbh of 8 inches or less.
[c] Totals may reflect slight rounding differences.

APPENDIX III-R

MANAGEMENT GUIDELINES FOR RED-COCKADED WOODPECKER ON ARMY INSTALLATIONS

DEPARTMENT OF THE ARMY
ASSISTANT CHIEF OF STAFF FOR INSTALLATION MANAGEMENT
600 ARMY PENTAGON
WASHINGTON DC 20310-0600

REPLY TO
ATTENTION OF

DAIM-ED-N

8 NOV 1996

MEMORANDUM FOR SEE DISTRIBUTION

SUBJECT: 1996 Management Guidelines for the Red-cockaded Woodpecker (RCW) on Army Installations

1. References:

a. 1996 Management Guidelines for the Red-cockaded Woodpecker on Army Installations, 30 Oct 96 (Encl).

b. 1996 Management Guidelines for the Red-cockaded Woodpecker on Army Installations, 17 May 1996.

c. 1994 Management Guidelines for the Red-cockaded Woodpecker on Army Installations, 21 Jun 94.

2. Reference 1a is approved and forwarded for immediate implementation at all installations that manage RCW habitat. Reference 1a replaces reference 1b and contains minor editorial changes made in consultation with the U.S Fish and Wildlife Service (FWS). These changes are reflected in paragraphs V.B.3.a and V.C.1.c., pages 12 and 14, respectively.

3. These guidelines replace the 1994 guidelines, reference 1c, and establish baseline standards for Army installations in managing the RCW and its habitat. Installations will incorporate these guidelines into their RCW Endangered Species Management Plans pursuant to chapter 11, AR 200-3, Natural Resources -- Land, Forest and Wildlife Management, 28 Feb 95.

4. Installations are encouraged to enter into early consultation with the FWS so that the benefits of these guidelines can be realized at the earliest possible date.

5. Point of contact for this matter is Mr. Phillip C. Pierce, DAIM-ED-N, (703) 693-0678, FAX 697-0338.

Encl

FRANK L. MILLER JR.
Major General, GS
Assistant Chief of Staff
for Installation Management

DAIM-ED-N
SUBJECT: 1996 Management Guidelines for the Red-cockaded Woodpecker (RCW) on the Army Installations

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"Management Guidelines for the Red-cockaded Woodpecker on Army Installations"

30 October 1996

Management Guidelines for the Red-cockaded Woodpecker on Army Installations

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I. General.

A. Purpose. The purpose of these guidelines is to provide standard RCW management guidance to Army installations for developing installation endangered species management plans (ESMPs) for the Red-cockaded Woodpecker (RCW). Installation RCW ESMPs will be prepared according to these guidelines and chapter 11, AR 200-3, Natural Resources - Land, Forest, and Wildlife Management. These guidelines establish the baseline standards for Army installations in managing the RCW and its habitat. Installation RCW ESMPs will supplement these guidelines with detailed measures to meet installation-specific RCW conservation needs. The requirements in RCW ESMPs will apply to all activities on the installation.

B. Applicability. The guidelines are applicable to Army installations where the RCW is present and to installations with inactive clusters that the installation, in consultation with the U.S. Fish and Wildlife Service (FWS), continues to manage in an effort to promote reactivation.

C. Revision. These guidelines will be revised as necessary to be consistent with the latest RCW recovery plan and to incorporate the latest and best scientific data available.

D. Goal. The Army's goal is to implement management guidelines which will allow the Army to train for assigned combat and other missions while concurrently developing and implementing methods to assist in the recovery and delisting of the RCW.

E. Existing Biological Opinions. Installations will continue to comply with the requirements of existing biological opinions until RCW ESMPs are prepared in accordance with these management guidelines and chapter 11, AR 200-3 and are approved through consultation with the FWS. RCW ESMPs should be drafted to incorporate the requirements of existing biological opinions, as modified to conform to these management guidelines through consultation with the FWS.

II. Consultation.

A. In preparing RCW ESMPs and taking action that may affect the RCW, installations will comply with the consultation requirements of section 7 of the Endangered Species Act (ESA); the implementing FWS regulations at 50 CFR part 402; and chapter 11, AR 200-3.

B. Early entry into informal consultation with the FWS is key to resolving potential problems and establishing the foundation to address issues in a proactive and positive manner. If, through informal consultation, the FWS concurs in writing that the RCW ESMP or other action is not likely to adversely affect any endangered or threatened species, formal consultation

is not required. Issue resolution through informal consultation is the preferred method of consultation.

C. When consulting with the FWS on RCW ESMPs and other actions that may affect the RCW, the opinions of the FWS will normally be consistent with these guidelines. In exceptional cases, however, FWS opinions may require installations to take measures inconsistent with these guidelines. After every effort has been made at the installation and MACOM levels to resolve inconsistencies, installations will report, through MACOM channels, to the Office of the Director of Environmental Programs (ODEP), Headquarters, Department of the Army, FWS opinions that are not consistent with these guidelines. ODEP will expeditiously review these reports and determine if HQDA-level action is necessary. If feasible, installations should delay implementation of measures recommended by the FWS that are inconsistent with these guidelines until after the ODEP review is completed.

III. Army Policies Applicable to RCW Management.

A. *Conservation*. Implementation of RCW ESMPs, prepared in accordance with these guidelines, will meet the Army's responsibility under the ESA to assist in conservation of the RCW. Conservation, as defined by the ESA, means the use of all methods and procedures which are necessary for endangered and threatened species survival and to bring such species to the point of recovery where measures provided by the ESA are no longer necessary.

B. *Mission Requirements*. Installation and tenant unit mission requirements do not justify violating the ESA. Mission considerations are necessary in determining the installation management and recovery goals. The keys to successfully balancing mission and conservation requirements are long-term planning and effective RCW management to prevent conflicts between these interests. In consultations with the FWS, installations will preserve the ability to maintain training readiness, while meeting ESA conservation requirements.

C. *Cooperation with U.S. Fish and Wildlife Service*. The Army will work closely and cooperatively with the FWS on RCW conservation. Installations should routinely engage in informal consultation with the FWS to ensure that proposed actions are consistent with the ESA requirements.

D. *Ecosystem Management*. Conservation of the RCW and other species is part of a broader goal to conserve biological diversity on Army lands consistent with the Army's mission. Biological diversity and the long-term survival of individual species, such as the RCW, ultimately depend upon the health of the sustaining ecosystem. Therefore, RCW ESMPs should promote ecosystem integrity. Maintenance of ecosystem integrity and health also benefit the Army by preserving and restoring training lands for long-term use.

E. *Staffing and Funding*. Installation commanders are responsible for ensuring that adequate professional personnel and funds are provided for the conservation measures prescribed by these guidelines and RCW ESMPs. Commanders are responsible for accurately identifying the funding needed to meet the requirements of these guidelines. RCW conservation projects are funded through environmental channels and will be identified in the Environmental, Pollution Prevention, Control and Abatement Report (RCS 1383).

F. *Conservation on Adjacent Lands*. Necessary habitat for the RCW includes nesting and foraging areas. Both of these RCW habitat components may be located entirely on installation lands. There may be instances, however, where one of these components is located on installation land, while a portion of the other is located on adjacent or nearby non-Army land. The FWS and installations should initiate cooperative management efforts with these landowners, if such efforts would compliment installation RCW conservation initiatives.

G. *Regional Conservation*. The interests of the Army and the RCW are best served by encouraging conservation measures in areas off the installation. The FWS and installations should participate in promoting cooperative RCW conservation plans, solutions, and efforts with other federal, state, and private landowners in the surrounding area.

H. *Management Strategy*. These guidelines require installations to adopt a long-term approach to RCW management consistent with the military mission and the Endangered Species Act. First, installations are required to establish installation RCW population goals in consultation with the FWS using the methodology described in para V.B below. Once established, the installation must designate sufficient nesting and foraging habitat to attain and sustain the goals. The goals will also dictate the required management intensity level. Next, installations must develop an ESMP to attain and sustain the installation RCW population goals in accordance with chapter 11, AR 200-3. Fourth, installations are required to ensure that all units and personnel that conduct training and other activities at the installation comply with the requirements of the installation RCW ESMP.

IV. **Definitions.**

Augmentation - Relocation of an RCW, normally a juvenile female, from one active cluster to another active cluster.

Basal area (BA) - The cross-sectional area (in square feet) of trees per acre measured at approximately four and one-half feet from the ground.

Biological diversity - The variety of life and its processes. It includes the variety of living organisms, the genetic differences among them, and the communities and ecosystems in which they occur.

Buffer zone - The zone extending outward 200 feet from a cavity tree or cavity start tree in an active or primary recruitment cluster.

Cavity - An excavation in a tree made, or artificially created, for roosting and nesting by RCWs.

Cavity restrictor - A metal plate that is placed around an RCW cavity to prevent access by larger species. A restrictor also prevents a cavity from being enlarged, or if already enlarged, shrinks the cavity entrance diameter to a size that prevents access by larger competing species.

Cavity start - An incomplete cavity excavated by, or artificially created for, RCWs.

Cavity tree - A tree containing one or more active or inactive RCW cavities or cavity starts.

Cluster - (formerly called "colony") - The aggregate area encompassing cavity trees occupied or formerly occupied by an RCW group plus a 200 foot buffer area.

Effective breeding pairs - Groups that successfully fledge young.

Group - (formerly called "clan") - A social unit of one or more RCWs that inhabits a cluster. A group may include a solitary, territorial male; a mated pair; or a pair with helpers (offspring from previous years).

Habitat Management Unit (HMU) - Designated area(s) managed for RCW nesting and foraging, including clusters and areas determined to be appropriate for recruitment and replacement stands.

Impact areas - The ground within the training complex used to contain fired or launched ammunition or explosives and the resulting fragments, debris, and components from various weapons systems.

Population - A RCW population is the aggregate of groups which are close enough together so that the dispersal of individuals maintains genetic diversity and all the groups are capable of genetic interchange. Population delineations should be made irrespective of land ownership.

Population goals - A desired RCW population. For purposes of these guidelines, terms for three types of population goals may be relevant to developing an installation's ESMP:

1. Recovery population goal - The number of groups required in a physiographic region to ensure recovery of the RCW in that region.

2. Installation Regional Recovery Goal - The number of groups which FWS identifies as the installation's potential contribution toward meeting the recovery population goal.

3. Installation Mission Compatible Goal - The number of training-restricted clusters which the installation identifies as currently compatible with the installation's on-going operations, suitable habitat, and missions considering its conservation responsibilities.

Provisioning - The artificial construction of cavities or cavity starts.

Recovery population - A total of 250 or more effective breeding pairs annually, for a five year period.

Recruitment - The designation and management of habitat for the purpose of attracting a new breeding group to that habitat.

Recruitment stand - A stand of trees, minimum of 10 acres in size, with sufficient suitable RCW nesting habitat identified to support a new RCW group. Stand and supporting foraging area should be located 3/8 mile to 3/4 mile from a cluster or other recruitment stand.

Recruitment cluster - A cluster site designated and managed for the purpose of attracting a new breeding group to that habitat. Installations may have two types of recruitment clusters:

1. Primary recruitment cluster - A recruitment cluster managed for the purpose of attracting the growth of additional RCW groups toward meeting the Installation Mission Compatible Goal; generally applicable training restrictions will apply to recruitment clusters.

2. Supplemental recruitment cluster - A recruitment cluster managed for the purpose of attracting the growth of additional RCW groups over and above the Mission Compatible Goal needed for the installation to reach the Installation Regional Recovery Goal; training restrictions will never apply to supplemental recruitment clusters.

Relict tree - a pine tree usually more than 100 years old having characteristics making it attractive to the RCW for cavity excavation.

Replacement stand - a stand of trees, minimum of 10 acres in size, identified to provide suitable nesting habitat for colonization when the current cluster becomes unsuitable. The stand should be approximately 20 - 30 years younger than the active cluster. While it is preferable for replacement stands to be contiguous to the active colony, at no time should they be more than 1/4 mile from the cluster, unless there is no suitable alternative.

Stand - an aggregation of trees occupying a specific area and sufficiently uniform in species composition, age, arrangement, and condition so as to be distinguishable from the forest on adjoining areas.

Sub-population - the aggregate of groups which are close enough together to allow for demographic interchange between groups. A sub-population does not have a significant demographic influence on adjacent sub-populations, but there is sufficient genetic interchange between the sub-populations to be considered one population.

Suitable acreage - installation acreage determined to be currently suitable for occupation by RCWs based upon vegetation and dominant land uses and acreage potentially suitable for occupation by RCWs through reasonable and practicable management practices - for example, acreage with severe mid-story encroachment would be considered as potentially suitable acreage and therefore suitable acreage; however, urban-type areas, the cantonment, impact areas, or areas free of vegetation, such as drop-zones, field landing strips, or gun positions, would not be considered suitable or potentially suitable acreage.

Translocation - the relocation of one or more RCWs from an active cluster to an inactive cluster or recruitment stand that contains artificially constructed cavities.

V. Guidelines for Installation RCW ESMPs.

Installations will prepare RCW ESMPs and manage RCW populations according to the following guidelines. Installations will update ESMPs every five years or when circumstances dictate.

A. *RCW ESMP Development Process.*

Preparation of installation RCW ESMPs requires a systematic, step-by-step approach. RCW populations (current and goal), RCW habitat (current and potential), and training and other mission requirements (present and future) must be identified. Detailed analysis of these factors and their interrelated impacts are required as a first step in the development of an ESMP. Installations should use the following or a similar methodology in conducting this analysis:

1. Identify the current RCW population and its distribution on the installation.

2. Identify areas on the installation currently and potentially suitable for RCW nesting and foraging habitat.

3. Establish the installation RCW population goal(s) with the FWS according to the guidance in B below.

4. Identify installation and tenant unit mission requirements. Overlay these requirements on the RCW distribution scheme.

5. Identify mission requirements that are incompatible with the conservation of RCW habitat.

6. Identify areas on the installation where conflicting mission requirements could be relocated to avoid RCW habitat.

7. Identify critical mission areas where activities cannot reasonably be relocated.

8. Identify areas which could support RCW augmentation or translocation.

9. Identify areas suitable for RCW habitat and free of conflicting present and projected mission activities. These are prime areas for designation as recruitment stands.

10. Analyze the information developed above using the guidance contained in these guidelines.

11. Prepare the RCW ESMP to implement the best combination of options, consistent with meeting the established RCW population goals, while minimizing adverse impacts to training readiness and other mission requirements.

B. *RCW Population Goals.*

1. The first step in RCW management is to determine the Installation Regional Recovery Goal and Installation Mission Compatible Goal in accordance with paragraph V.B.2 below. Once the goals are established, they will be used to designate the amount of land needed for RCW HMUs and the appropriate level of management intensity. Goals should be considered long-term but are subject to change, through consultation with the FWS, based upon changing circumstances, changing missions, or new scientific information. In conjunction with the 5 year review of ESMPs, installations will reexamine population goals to reflect changing conditions.

2. ESMPs must clearly state the installation RCW population goals. The goals will be established through informal or formal consultation with FWS using the following methodology:

a. Installation Regional Recovery Goal. Through consultation with FWS determine the installation "share" of the recovery population goal.

(1) Determine the number of active clusters required in the population to achieve recovery.

(2) Count RCW groups on other federal, state or private lands that are demographically functioning as part of the regional population as contributing to the overall regional recovery goal.

(3) Determine the installation's carrying capacity to support RCWs based upon suitable acreage and known ecosystem attributes..

(4) Any deficit between steps (1) and (2), considering the limitations of step (3), will be considered the installation's potential contribution toward the overall recovery goal and will be termed, for ESMP purposes, the Installation Regional Recovery Goal.

b. Installation Mission Compatible Goal. The installation will determine its known capacity to integrate RCW management with on-going and planned mission requirements and dominant land uses. During this process, the installation will seek input from FWS.

(1) Determine suitable acreage.

(2) Determine the installation carrying capacity to support RCWs , the calculation of suitable acreage, known ecosystem attributes, and acreage required as exempt for critical and essential mission requirements: Installations may only exempt acreage as essential for mission requirements when, considering their conservation responsibilities under the Endangered Species Act, they determine that imposing generally applicable training restrictions upon such certain specific lands would unacceptably hinder mission accomplishment. The Mission Compatible Goal should be carefully calculated considering the current and future installation and tenant unit missions, the amount and distribution of suitable habitat on the installation, the quality of the habitat, the distribution of clusters, the configuration of sub-populations, the recovery potential and the RCW Recovery Plan objectives, etc. The Installation Mission Compatible Goal should strike a reasonable balance between the present and future installation and tenant unit missions and the installation's duty to conserve the endangered species.

c. ESMP goals. If the Installation Regional Recovery Goal is less than the Installation Mission Compatible Goal, then the installation will use the Installation Regional Recovery Goal as the ESMP Goal. If the Installation Regional Recovery Goal is greater than the Installation Mission Compatible Goal, then the installation will use both goals in the ESMP. The installation ESMP will include maps for planning and future reference which show the configuration of all active clusters and primary recruitment clusters required to reach the Installation Regional Recovery Goal. These maps will also show the supplemental recruitment

clusters scheduled for management in the 5-year planning period. These maps will be updated during the 5-year revision process. If the number of recruitment sites identified in the initial 5-year plan falls short of the Installation Regional Recovery Goal, the installation will also identify the additional habitat management areas where supplemental recruitment clusters will be added to meet this goal. Installations will identify and manage a minimum of 200 acres of suitable habitat for each identified recruitment cluster.

d. Maintenance of ESMP goals. A population that has achieved the Installation Regional Recovery Goal need only be maintained at that level; however, installations should continue to encourage population growth where feasible and compatible with the military mission. A maintenance strategy is also appropriate for populations which have attained the maximum population that can be supported by available suitable habitat, irrespective of population size. Maintenance activities will, however, also vary according to the population size. For example, smaller, nonviable populations may require occasional augmentation, predator control, etc.

3. The population goal established for an installation will dictate the required RCW management intensity level. An installation which has not achieved its population goals requires an active recruitment/augmentation strategy. Annually, the installation will determine the number of recruitment clusters to provision with artificial cavities, cavity restrictors, etc., and concurrently manage those recruitment clusters using the following methodology:

a. Primary recruitment clusters. In order to increase the current population, the installation will annually add,recruitment clusters within the limitations of available nesting and foraging habitat of at least the optimum rate of growth of the RCW to meet the Mission Compatible Goal (or the Installation Regional Recovery Goal if it is less than the Mission Compatible Goal). The optimum rate of growth of an installation's RCW population will be determined by the installation's population size and population distribution and will be detailed in the installation's ESMP.

b. Supplemental recruitment clusters. If the Installation Regional Recovery Goal is greater than the Installation Mission Compatible Goal, the installation will annually add supplemental recruitment clusters within the limitations of available nesting and foraging habitat. These supplemental will be added over and above the recruitment clusters described in paragraph V.B.3.a above, at the rate of at least one-half of the rate of growth to attain the Installation Regional Recovery Goal. The installation will identify and subsequently manage these supplemental recruitment clusters in areas not already selected by the installation as a recruitment cluster in paragraph V.B.3.a above. Installations will manage these supplemental clusters concurrently and in addition to recruitment clusters managed for the purpose of meeting the Installation Mission Compatible Goal.

(1) Management of these supplemental recruitment clusters will be closely coordinated with FWS. FWS will provide incidental take provisions for supplemental recruitment clusters occupied as part of the authorized program to exceed the Mission Compatible Goal in order to reach the Installation Regional Recovery Goal. Training or other land use restrictions will never apply to recruitment clusters managed under this approach; however, this does not authorize installations to engage in non-training related construction activities in occupied supplemental recruitment clusters absent consultation with FWS.

(2) The installation will separately manage and track the supplemental recruitment clusters as contributing to the Installation Regional Recovery Goal. As with other recruitment clusters, the supplemental recruitment clusters will be provisioned and managed in woodpecker-suitable habitat. The installation will give priority to adding supplemental recruitment clusters in training area acreage previously exempted from consideration as RCW habitat because of critical or essential mission requirements under paragraph V.B.2.b. Installations may elect to count as either supplemental recruitment clusters or primary recruitment clusters, those clusters where RCWs voluntarily move into a stand which has not been designated previously as a recruitment cluster.

c. During the development of the installation's ESMP, and at the 5-year review, if a cluster or recruitment cluster identified previously as active has no RCW activity for a period of five consecutive years, the installation may cease actively managing that cluster.

C. *Surveys, Inspections, Monitoring and Reporting Programs.*

1. Installations will conduct the following surveys and monitoring programs.

a. Five-Year installation-wide RCW surveys. Effective management of the RCW requires an accurate survey of installation land for RCW cavity and cavity-start trees. The survey must document the location of RCW cavity and cavity-start trees as accurately and precisely as possible (using Global Positioning System and Geographic Information System, if available) and the activity within all clusters. An installation-wide survey will be conducted every five years. Installations may conduct the survey over the five year period, annually surveying one-fifth of the installation.

b. Project surveys. Prior to any timber harvesting operations, construction, or other significant land-disturbing activities, excluding burning, a 100-percent survey of the affected area will be conducted by natural resources personnel trained and experienced in RCW survey techniques and supervised by a RCW biologist, if such survey has not occurred within the preceding year. Installations will conduct project surveys in accordance with the survey guidance in V. Henry, Guidelines for Preparation of Biological Assessments and Evaluations for the Red-cockaded Woodpecker, U.S. Fish and Wildlife Service, Southeast Region, Atlanta, Georgia (September 1989). When conducting project assessments, installations

may, through informal consultation with FWS, reduce the forage habitat requirements from the Henry guidelines by one-third, or as specified in paragraph V.D.2.d below. In the case of range construction, the survey will also include the surface danger zone for the weapons to be used on that range except for new ranges which use existing dedicated impact areas.

c. Inspections. Clusters that have not been deleted from management in accordance with paragraph V.D.2.b below must be inspected annually (consistent with safety considerations at paragraph V.E.5.a). Recruitment clusters must be inspected twice per year (fall and pre-breeding dispersal periods) to document RCWs occupancy; once occupied, use monitoring criteria in paragraph V.C.1.e. These are prescriptive inspections, used to develop treatments and modifications of treatments to maintain suitable nesting habitat. At a minimum, installations will inspect and record data for:

(1) density and height of hardwood encroachment;

(2) height of RCW cavities;

(3) condition of cavity trees and cavities;

(4) a description of damage from training (to include: damage to cavity and cavity start trees requiring remedial measures if any, soil disturbance adjacent to cavity and cavity start trees requiring remedial measures if any, and general condition of the forage habitat of the cluster being monitored if impacted by training activities), fires (prescribed or wild), etc.; and

(5) evidence of RCW activity for each cavity tree (includes each cavity in the tree) within the cluster. See 2a below for guidance on the maintenance of survey and monitoring records.

d. Ten-year forest survey. In addition to the RCW survey required in 1a above, installations will conduct, as required by AR 200-3, an installation-wide forest survey at least every ten years. In conducting the forest survey, data will be gathered to determine accurately the quantity and quality of available foraging and nesting habitat for the RCW. Alternately, installations may survey over the 10 year period, e.g., ten percent of the installation annually. Forest surveys will be conducted using a recognized plot sampling technique, such as the random line plot cruise, the random point sample cruise, or the line strip cruise method. Forest surveys in impact areas may be conducted using scientifically accepted, aerial photography interpretation methods.

e. Monitoring. Installations will conduct monitoring programs to scientifically determine demographic trends within the population as a whole. Sample sizes will be determined by the number of clusters and their dispersion on the installation by habitat

category (*e.g.*, longleaf pine/scrub oak, pine flatwoods, pine mixed hardwoods) and by category of use (*e.g.*, non-dud producing ranges, mounted and dismounted training areas, cantonment areas, bivouac areas, etc.). Sample sizes will be of sufficient size to have statistical validity and to ensure that population trends and important biological information can be determined for the entire installation. Monitoring activities will be done annually to acquire data to determine the number of adults and fledglings per site, sex of birds, number of breeding groups, number of nests, and number of cavity trees. Monitoring will include color banding of birds. Installations will coordinate with FWS to determine if additional monitoring, in other than impact areas, may be required to address installation specific issues, e.g., fragmented populations or on-going translocation programs. In addition to the monitoring outlined in this paragraph, installations with supplemental recruitment clusters will monitor and record the following information of military training and activities occurring within all training areas containing monitored active clusters and recruitment clusters during the five-year period, whether or not the clusters become active: a) type of training that took place, b) duration of training, c) date of training, d) units and approximate numbers of soldiers involved in the training, e) approximate number and types of vehicles and equipment involved in the training, and f) other relevant information that would contribute to an understanding of the effects of military training upon RCW habitat.

(1) Active Clusters. Installations with 25 active clusters or fewer will monitor all sites annually. Installations with more than 25 active clusters will annually monitor sample sizes based on the following: 25 percent of the RCW active clusters located in each habitat and usage category on the installation, with a minimum of three RCW clusters per habitat type or a total of 25 clusters, whichever is greater.

(2) Recruitment Clusters. Installations with recruitment clusters designed to attain either the Mission Compatible Goal or the Installation Regional Recovery Goal will monitor all recruitment clusters for at least five years after they become occupied by RCWs. If, after the five-year period, a recruitment cluster is still active, monitoring will be integrated into the active cluster monitoring program outlined in paragraph V.C.1.e.(1).

2. Results from surveys and monitoring will be recorded and reported as follows:

a. Survey/monitoring records. Survey and monitoring results for all clusters will be recorded and retained permanently allowing for trend analysis.

b. Research on compatibility of military training with RCWs. ODEP will ensure that monitoring of population data gathered from all installations with primary recruitment clusters and supplemental recruitment clusters is evaluated for trend analysis and will share this analysis with FWS. Research data will be analyzed at least once every five years for population trends. In consultation with FWS, trend analysis from paragraphs a and b above, and other outside 5 year research programs, will dictate the revision, continuation, or cancellation of

military training restrictions for all clusters considered part of the mission compatible goal. Trend analysis will not effect supplemental recruitment clusters.

c. Annual Reporting. Installations will annually report RCW population data to FWS. Along with the population data, installations will report all actions taken to recruit RCWs or improve RCW habitat (see Appendix 2 for content and format of report). A copy of this report will be furnished through command channels to ODEP. The Army will host an annual meeting with FWS and the installations to discuss installation RCW population data. During these meetings, if it becomes clear that an installation is accomplishing less than 50% of its ESMP growth goals over a period of several years, then the installation will informally consult with the FWS to determine if reinitiating formal consultation is desirable.

d. Notification. The installation will immediately notify FWS and their MACOM in the event of incidental take. The installation will notify FWS and their MACOM, and reinitiate consultation with FWS, within 30 days of discovering a 5% population decrease. MACOMs will report either of these occurrences to ODEP. In the event of an incidental take, the installation will also comply with AR 200-3, paragraph 11-9. Upon discovery of a 5% population decrease, the installation will continue to abide by these guidelines and will conduct a systematic review of available data including regional trends to determine the cause of the decrease within 90 days. If the cause is training related, within 150 days the installation in consultation with FWS will develop and implement a plan to prevent further population decline.

e. RCW maps. Survey data will be used to generate installation RCW maps accurately depicting the location of RCW clusters, RCW-related training restricted areas, HMUs, cavity trees, etc. A copy of these maps will be included in the ESMP. The initial ESMP produced according to these guidelines will identify the clusters where the area subject to training restrictions have changed as a result of implementation of these guidelines as opposed to the 21 June 1994 guidelines. Relevant maps will be widely distributed for use by those conducting land use activities on the installation, including military training, construction projects, range maintenance, etc. Maps will be updated at least every five years to coincide with the installation-wide RCW survey or when a 20 percent change in the number of clusters occurs, whichever is sooner.

D. *RCW Habitat Management Units.*

1. Designation of habitat management units (HMUs). Installation RCW ESMPs will provide for the designation of nesting and foraging areas within HMUs sufficient to attain and sustain the installation RCW population goals. Determination of the installation's population goals is a prerequisite to HMU designation. HMU delineation is an important step in the planning process because it defines the future geographic configuration of the installation RCW population. Areas designated as HMUs for all active and recruitment clusters must be managed according to these guidelines.

2. Areas included within HMUs.

a. HMUs will encompass all clusters, areas designated for recruitment and replacement, and adequate foraging areas as specified in d below.

b. During the development of the installation's ESMP, and at the 5-year review, in consultation with the FWS, clusters that have been documented as continuously inactive for a period of five consecutive years or more may be deleted from HMUs. Designated recruitment clusters that have not been occupied for a period of five consecutive years may also be deleted from HMUs. Once deletion of a cluster from management is approved by the FWS, existing cavities may be covered to discourage reactivation.

c. In designating HMUs, fragmentation of nesting habitat will be avoided. Installations will attempt to link HMUs with HMU corridors, allowing for demographic interchange throughout the installation population.

d. Adequate foraging habitat, in size, quality, and location, must be provided within HMUs. The foraging habitat needed to support active clusters will be calculated and designated according to the range-wide guidelines in V. Henry, Guidelines for Preparation of Biological Assessments and Evaluations for the Red-cockaded Woodpecker, U.S. Fish and Wildlife Service, Southeast Region, Atlanta, Georgia (September 1989) or other physiographic-specific guidelines approved by the FWS. While the Henry guidelines are used to establish minimum forage acreage requirements, some installations may have data to support forage habitat minima below the Henry standard. If installations can provide data to support forage habitat requirements different from the Henry guidelines, the installation, in consultation with FWS, may establish installation specific forage minima for recruitment sites, project assessments, and habitat management. These forage requirements will apply to all active sites and recruitment sites identified for management in the ESMP. Recruitment sites identified to meet long-term population goals will be evaluated with the same criteria used in the goal setting procedure. A minimum of 200 acres of potential/suitable habitat will be identified and managed for recruitment sites to meet the Installation Mission Compatible Goal and the Installation Regional Recovery Goal. The underlying strategy is to identify and actively manage RCW habitat in the short to mid-term with the long-term population goal always in sight. Adhering strictly to the Henry guidelines, or applying forage habitat requirements to areas presently lacking RCW groups, may preclude long-term habitat management. This could increase the time required to reach installation RCW population goals.

3. Minimization of RCW management impacts on the installation's mission. To the extent consistent with RCW biological opinions, HMUs should be located where there will

be a minimum impact upon current and planned installation missions/operations and should be consistent with land usage requirements in the Real Property Master Plan.

4. Demographic and genetic interchange. Installations should delineate HMUs to maximize the linkage between sub-populations on and off the installations and with populations off the installation. Where fragmentation exists, installations should develop plans to link sub-populations on the installation by designating habitat corridors where practical.

E. *HMU Management Practices*. All HMU management activities and practices will be consistent with the conservation of other candidate and federally listed species.

1. Clusters and recruitment stands within HMUs.

a. Due to RCW biological needs, clusters require a higher management intensity level than other areas within HMUs. Within HMUs, maintenance priority will be given to active clusters over both inactive clusters and recruitment stands.

b. Clusters and recruitment stands will be kept clear of dense midstory. An open, park-like pine stand is optimal. All midstory within 50 feet of cavity trees will be eliminated. Beyond 50 feet, some pine midstory will be retained for regeneration and some selected hardwoods may be retained for foraging by species other than the RCW. Hardwoods will not exceed 10 percent of the area of the canopy cover nor 10 percent of the below canopy cover within the cluster or recruitment stand. Hardwood stocking will be kept below 10 square feet per acre.

c. The priority of forest management in cluster sites and recruitment stands is to maintain and produce potential cavity trees greater than 100 years of age. For this reason, no rotation age shall be set in these areas. In thinning clusters and recruitment stands, dead, dying, or inactive cavity trees will be left for use by competitor species. Thinning should occur only when pine species basal area (BA) exceeds 80 and should not exceed the removal of more than 30 BA to avoid habitat disruption (timber prescriptions within clusters should normally be on a 10 year cycle). Pine species basal areas should be kept within the range of approximately 50 to 80 square feet, maintaining average spacing of 20 to 25 feet between trees, but retaining clumps of trees.

d. Trees within HMUs affected by beetle (e.g., Ips beetle, southern pine beetle) infestation should be evaluated and treated appropriately. Treatment options will be developed in consultation with the FWS. Possible treatments include the use of pheromones or cutting and leaving, cutting and removing, or cutting and burning infected trees. Cavity trees may be cut only with the approval of the FWS. Prior to cutting an infected cavity tree, a suitable replacement cavity tree will be identified and provisioned.

e. Timber cutting, pine straw harvesting, and habitat maintenance activities, with the exception of burning activities. will not be conducted in active sites during the nesting season, occurring from April through July depending upon the installation's location. If a biologist, experienced in RCW management practices, determines that habitat maintenance activities, exclusive of timber cutting and pine straw harvesting, will have no effect on nesting activities, they may be conducted at anytime.

2. Other areas within HMUs. While not requiring the same level of intense management for clusters and recruitment stands, the quality of foraging and replacement stands should be maintained by a prescribed burning program sufficient to control hardwood growth and ground fuel buildup and to eliminate dense midstory. Improving the quality of foraging habitat will reduce the quantity (acreage) required to maintain the installation RCW population.

3. Midstory control. Prescribed burning is normally the most effective means of midstory control and is recommended as the best means of maintaining a healthy ecosystem. Prescribed burning will be conducted at least every three years in longleaf, loblolly, slash pine, and shortleaf pine systems. Burning must be conducted in accordance with applicable Federal, state, and local air quality laws and regulations. With the agreement of the FWS, the burn interval may be increased to no more than five years after the hardwood midstory has been brought under control. Mechanical and chemical alternatives should only be used when burning is not feasible or is insufficient to control a well- advanced hardwood midstory. Application of herbicide must be consistent with applicable Federal, state, and local laws and regulations. Cavity trees will be protected from fire damage during burning. Burning should normally be conducted in the growing season since the full benefits of fire are not achieved from non-growing season burns. Winter burns may be appropriate to reduce high fuel loads. Use of fire plows in clusters will be used only in emergency situations.

4. Erosion control. Installations will control excessive erosion and sedimentation in all HMUs. Erosion control measures within clusters will be given priority over other areas within HMUs.

5. Impact and direct fire areas.

a. Impact areas.

(1) Impact areas that contain or likely contain unexploded ordnance or other immediate hazardous materials (radiological or toxic chemicals) can pose danger to personnel. Natural resources conservation benefits to be gained by intensive management in high risk areas generally are not justified. Certain installations may have impact areas or other areas that have been contaminated with improved conventional munitions or submunitions where entry by personnel is forbidden.

(2) Designation of impact areas, safety restrictions on human access to impact areas, range operations in impact areas, and the associated effects of these actions on RCW management activities may adversely affect the RCW and other federally listed species within impact areas. These actions may lead to the possibility and necessity of incidental take. FWS will provide incidental take provisions for impact areas where it is not feasible or economical to either relocate or protect the RCW.

(3) To the degree practicable, clusters and surrounding foraging area should be designated as "no fire areas" to protect clusters from projectile damage.

b. Direct fire areas.

(1) Direct fire, non-dud producing impact areas that do not contain unexploded ordnance or other immediate hazardous materials may be included within HMUs, subject to the guidelines set forth below.

(2) In HMUs which are not impacted upon by weapons firing, RCW management will be the same as for HMUs outside of impact areas. In HMUs where there is a significant risk of projectile damage to foraging or nesting habitat, the following guidelines apply:

(a) Range layout will be modified/shielded where practical and economically feasible to protect HMUs from projectile damage. Protective measures that will be considered include reorienting the direction of weapons fire, shifting target arrays, establishing "no fire areas" around RCW clusters or HMUs, revising maneuver lanes, constructing berms, etc.

(b) Installations should develop alternate HMUs near existing HMUs but outside the affected range complex. Augmentation and translocation should be considered as a means of removing RCWs from high risk areas.

F. *Timber Harvesting and Management in HMUs.*

1. Timber harvesting in HMUs will be permitted if consistent with the conservation of the RCW. If permitted, a harvest method will be implemented that maintains or regenerates the historical pine ecosystem. In most ecosystems inhabited by the RCW, historical conditions are characterized by old-growth longleaf pines in an uneven-age forest, with small (1/4 to 2 acres) even-age patches varying in size. Timber harvesting methods must be carefully designed to achieve and maintain historical conditions through emulation of natural processes.

2. Longleaf sites will not be regenerated to other pine species. Where other species have either replaced longleaf pine (due to fire suppression) or been artificially established

on sites historically forested with longleaf, forest management should be directed toward regeneration back to longleaf by natural or artificial methods.

3. At a minimum, sufficient old-growth pine stands will be maintained by: lengthening rotations to 120 years for longleaf pine and 100 years for other species of pine; indefinitely retaining snags, six to ten relict and/or residual trees per acre when doing a seedtree cut, or shelterwood cut; and indefinitely retaining snags, all relicts, and residuals in thinning cuts. No rotation age will be established for cluster sites or replacement stands. The above rotation ages and retention rates do not apply to off-site stands of sand pine, loblolly pine, or slash pine that will be converted back to longleaf.

G. *Pine Straw Harvesting within HMUs.* Sufficient pine straw must be left in HMUs to allow for effective burning and to maintain soils and herbaceous vegetation. Areas within HMUs will not be raked more than once every three to six years. Baling machinery will not be used or parked within clusters.

H. *Restoration and Construction of Cavities.*

1. Restoration. Active and inactive cavities found to be in poor condition during periodic inspections will be repaired whenever feasible to prolong their use. Cavity restrictors can be installed on enlarged RCW cavity entrance holes (greater than two inches in diameter) to optimize the availability of suitable cavities. They also may be installed to protect properly-sized cavities where suitable cavities are limited, the threat of enlargement is great, or where another species is occupying a cavity. Priorities for the installation of restrictors, in descending order, will be: (a) active single tree clusters, (b) single bird groups, (c) clusters with less than four suitable cavities, and (d) others. Restrictors will be installed according to scientific procedures accepted by the FWS. Restrictors will be closely monitored, especially in active clusters. Adjustments to the positioning of the restrictors will be made to ensure competitors are excluded and RCW access is unimpeded.

2. Construction. Artificial cavities will be constructed in areas designated for recruitment or translocation and in active clusters where the number of suitable cavities is limiting. The objective is to provide at least four suitable cavities per active cluster and two cavities plus three advanced starts for each recruitment stand. Priorities for installation of artificial cavities in descending order will be: (a) single cavity tree active clusters, (b) active clusters with insufficient cavities to support a breeding group, (c) inactive clusters designated as and managed for replacement or recruitment stands with an insufficient number of usable cavities within one mile of an active cluster, (d) new replacement/recruitment stands within one mile of an active cluster, (e) inactive clusters designated as and managed for replacement or recruitment stands within three miles of an active cluster, (f) recruitment or potential habitat within three miles of an active cluster, and (g) replacement/recruitment stands beyond three miles of an active cluster. Cavity construction may be by either the drilling or insert techniques. Construction

must be according to scientific procedures accepted by the FWS and accomplished by fully trained personnel.

I. *Protection of Clusters.*

1. Markings. Installations will implement the following marking guidance by 1 Jan 1998.

a. Cavity and cavity-start trees in active and primary recruitment clusters. These trees will be marked with two white bands, approximately four to six inches wide and one foot apart. The bands will be centered approximately four to six feet from the base of the tree. Warning signs (e below) may be posted on or immediately adjacent to the cavity and cavity start trees. A uniquely numbered small metal tag will be affixed to the cavity tree for monitoring and identification purposes.

b. Cavity and cavity-start trees in supplemental recruitment clusters. These trees may be marked with one white band approximately one inch wide. The band will be centered approximately four to six feet from the base of the tree. Warning signs (e below) will not normally be posted. A uniquely numbered small metal tag will be affixed to the cavity tree for monitoring and identification purposes.

c. Buffer zone for cavity and cavity start trees within active clusters and primary recruitment clusters. Warning signs (e below) will be posted at reasonable intervals along the 200 foot perimeter of cavity trees facing to the outside of the buffer zone and along roads, trails, firebreaks, and other likely entry points into the buffer zone.

d. The installation will mark all cavity and cavity start trees in a managed cluster in accordance with paragraph V.I.1.a and b, above. At a minimum, four suitable cavity or cavity start trees will be marked and protected within each cluster (see paragraph V.H.2). Based on the installation biologist's determination, if more than four cavity trees are required to support the cluster, the required number of trees will be protected.

e. Warning sign. Signs will be posted and will be constructed of durable material, ten inches square (oriented as a diamond), white or yellow in color, and of the design in Figure 1. The RCW graphic and the lettering "Endangered Species Site" and "Red-cockaded Woodpecker" will be printed in black. The lettering "Do Not Disturb" and "Restricted Activity" will be printed in red. All lettering will be 3/8 inches in height.

f. Training on non-Army lands. Installations conducting long-term training on private, state, or other federal lands with RCW habitat will attempt to obtain agreement from the landowners on compliance with these markings guidelines. If a landowner does not agree to comply with these guidelines, even with the installation paying the costs

associated with compliance, installations will educate troops training on such lands to help them recognize the markings used by the landowner.

2. Training within RCW clusters.

a. RCW and RCW habitat will be managed biologically by clusters. Training restrictions will apply to marked buffer zones around cavity trees.

b. The training restrictions in this section apply to buffer zones within marked active clusters and primary recruitment clusters. RCW-related training restrictions do not apply to supplemental recruitment clusters, inactive clusters and foraging areas.

c. Standard training guidelines within active clusters and primary recruitment clusters:

(1) Military training within marked cavity tree buffer zones is limited to military activities of a transient nature (less than 2 hours occupation) . A list of prohibited and permitted training activities within buffer zones is contained at Appendix 1.

(2) Military vehicles are prohibited from occupying a position or traversing within 50 feet of a marked cavity tree, unless on an existing road, trail, or firebreak.

3. Training throughout the installation. Installations will give priority to maintaining and improving the habitat of RCW clusters; however, in addition to the HMU management practices at para. V.E, installations will observe the following measures to maintain and improve potentially suitable habitat for the RCW throughout the installation

a. Military personnel are prohibited from cutting down or intentionally destroying pine trees unless the activity is approved previously by the installation biologist and/or forester and is authorized for tree removal. Hardwoods may be cut and used for camouflage or other military purposes.

b. Units will immediately report to range control known damage to any marked cavity or cavity start tree and/or any known extensive soil disturbance in and around RCW clusters .

c. The installation will immediately (within 48 hours) reprovision a cavity tree if one is destroyed.

d. Installations will as soon as practicable (normally within 72 hours) repair damage to training land within a cluster to prevent degradation of habitat.

e. All digging for military training activities in suitable acreage will be filled within a reasonable time after the completion of training

f. Training guidelines will be actively enforced through installation training and natural resources enforcement programs, prescribed in chapters 1 and 11, AR 200-3, and installation range regulations.

J. *Augmentation and Translocation.*

1. Augmentation can be a useful tool to expand and disperse the RCW population into designated HMUs. Augmentation also provides a means to maintain genetic viability in populations with fewer than 250 effective breeding pairs. Installation plans will provide for the augmentation of single-bird groups. Clusters will be made suitable in accordance with the requirements/procedures outlined in paragraph V.H. above before augmentation is attempted.

2. In exceptional situations, installations may translocate RCWs from active clusters to inactive clusters or recruitment/replacement stands where cavities have been artificially constructed. For example, translocation could be used to move RCWs from live fire areas where there is a significant risk of harm to the birds. The current scientific literature indicates serious limitations in successfully translocating adult RCWs, in particular, adult territorial males. Translocation will be accompanied by an intensive monitoring program.

3. In areas to receive RCW, habitat designation and improvement work ensuring that nesting and foraging habitat meet the standards established by these guidelines (V.E.1.b and c, V.E.2, V.D.2.d) must be completed before augmentation or translocation is attempted.

4. Neither augmentation nor translocation will be undertaken without the approval of and close coordination with the FWS. Installations must obtain an ESA section 10 permit (scientific purposes) or an incidental take statement under ESA section 7 and all applicable marking, banding, and handling permits prior to moving any RCW through augmentation or translocation.

APPENDIX 1

TRAINING ACTIVITY WITHIN MARKED BUFFER ZONES	
YES means that activity may be conducted within 200 feet of a marked cavity tree NO means the activity may not be conducted within 200 feet of a marked cavity tree	
MANEUVER AND BIVOUAC	
HASTY DEFENSE, LIGHT INFANTRY, HAND DIGGING ONLY (2 HOURS MAXIMUM)	YES
HASTY DEFENSE, MECHANIZED INFANTRY/ARMOR	NO
DELIBERATE DEFENSE, LIGHT INFANTRY	NO
DELIBERATE DEFENSE, MECHANIZED INFANTRY/ARMOR	NO
ESTABLISH COMMAND POST, LIGHT INFANTRY	NO
ESTABLISH COMMAND POST, MECHANIZED INFANTRY/ARMOR	NO
ASSEMBLY AREA OPERATIONS, LIGHT INFANTRY/MECH INFANTRY/ARMOR	NO
ESTABLISH CS/CSS SITES	NO
ESTABLISH SIGNAL SITES	NO
FOOT TRANSIT THRU THE COLONY	YES
WHEELED VEHICLE TRANSIT THRU THE COLONY (1)	YES
ARMORED VEHICLE TRANSIT THRU THE COLONY (1)	YES
CUTTING NATURAL CAMOUFLAGE, HARD WOOD ONLY	YES
ESTABLISH CAMOUFLAGE NETTING	NO
VEHICLE MAINTENANCE FOR NO MORE THAN 2 HOURS	YES
WEAPONS FIRING:	
7.62mm AND BELOW BLANK FIRING	YES
.50 CAL BLANK FIRING	YES
ARTILLERY FIRING POINT/POSITION	NO
MLRS FIRING POSITION	NO
ALL OTHERS	NO
NOISE:	
GENERATORS	NO
ARTILLERY/HAND GRENADE SIMULATORS	YES
HOFFMAN TYPE DEVICES	YES
PYROTECHNICS/SMOKE:	
CS/RIOT AGENTS	NO
SMOKE, HAZE OPERATIONS ONLY, GENERATORS OR POTS (2)	YES
SMOKE GRENADES	YES
INCENDIARY DEVICES TO INCLUDE TRIP FLARES	NO
STAR CLUSTERS/PARACHUTE FLARES	YES
HC SMOKE OF ANY TYPE	NO

DIGGING:	
TANK DITCHES	NO
HASTY INDIVIDUAL FIGHTING POSITIONS, HAND DIGGING ONLY, FILLED AFTER USE	YES
DELIBERATE INDIVIDUAL FIGHTING POSITIONS	NO
CREW-SERVED WEAPONS FIGHTING POSITIONS	NO
VEHICLE FIGHTING POSITIONS	NO
OTHER SURVIVABILITY / FORCE PROTECTION POSITIONS	NO
VEHICLE SURVIVABILITY POSITIONS	NO

NOTES:

1. Vehicles will not get any closer than 50 feet of a marked cavity tree unless on existing roads, trails or firebreaks.

2. Smoke generators and smoke pots will not be set up within 200 feet of a marked cavity tree, but the smoke may drift through the 200 feet circle around a cavity tree.

NOTE: The above training restrictions apply to RCW cavity trees in training areas but not to cavity trees located in dedicated impact areas.

APPENDIX 2

Red-Cockaded Woodpecker (RCW) Data Update - FY ___

INSTALLATION: _____ DATE: _____

RCW Population: _____ POC: _____

DSN #: _____

A. RCW Cluster Survey and Inspection Results.

1. Number of clusters managed _____

2. Number of active clusters _____
   a. Number of active supplemental recruitment clusters _____
   b. Number of active clusters with training restrictions _____

3. Total acres of suitable acreage _____

4. Acres 100% surveyed for "new" RCW clusters in this FY _____

5. Number clusters inspected once per year for training impacts _____
   a. Number of clusters checked with damage to cavity trees _____
   b. Number of clusters checked with soil disturbance requiring remedial measures _____
   c. Number of clusters checked with habitat disturbance requiring remedial measures _____

6. Number recruitment clusters inspected twice per year for training impacts _____
   a. Number of clusters checked with damage to cavity trees _____
   b. Number of clusters checked with soil disturbance requiring remedial measures _____
   c. Number of clusters checked with other habitat disturbance requiring remedial measures _____

B. Monitoring Results

	Active	Primary Recruitment	Supplemental Recruitment	Total
1. Number of clusters where monitoring was completed	_____	_____	_____	_____
1a. Number found active	_____	_____	_____	_____
1b. Number of breeding groups	_____	_____	_____	_____
1c. Number of nests found	_____	_____	_____	_____
1d. Number of cavity tress	_____	_____	_____	_____

C. Unit Reports

1. Number of unit reports to range control of tree damage _____
1a. Number of reprovisioning actions taken in response (synopsis enclosed) _____

2. Number of unit reports of extensive soil disturbance _____
2a. Number of remedial actions taken in response (synopsis enclosed) _____

D. Affirmative RCW Habitat Improvement Measures Carried Out This FY

	Active	Primary Recruitment	Supplemental Recruitment	Total
1. Number of clusters sites needing burning this year	_____	_____	_____	_____
1a. Number burned	_____	_____	_____	_____
2. Number of cluster sites needing midstory treatment	_____	_____	_____	_____
2a. Number treated	_____	_____	_____	_____
3. Number of foraging acres needing burned	_____	_____	_____	_____
3a. Number acres burned	_____	_____	_____	_____
4. Number of foraging acres needing midstory treatment	_____	_____	_____	_____
4a. Number acres treated	_____	_____	_____	_____
5. Number of cluster sites needing cavity restrictors	_____	_____	_____	_____

D. Affirmative RCW Habitat Improvement Measures Carried Out This FY (Cont'd)

	Active	Primary Recruitment	Supplemental Recruitment	Total
5a. Number clusters receiving restrictors	____	____	____	____
5b. Number of cavity trees receiving restrictors	____	____	____	____
6. Number of cavity trees needing marked	____	____	____	____
6a. Number marked	____	____	____	____
7. Number of buffer zones needing marked	____	____	0	____
7a. Number marked	____	____	0	____
8. Number of translocations scheduled	____	____	____	____
8a. Number of translocations received	____	____	____	____
9. Number of clusters needing artificial cavities	____	____	____	____
9a. Number receiving inserts	____	____	____	____
9b. Number receiving drilled cavities	____	____	____	____
9c. Number receiving drilled starts	____	____	____	____
9d. Total number of cavities treated	____	____	____	____
9e. Number treated cavities with RCW use	____	____	____	____
(1) ocular sign of use	____	____	____	____
(2) confirmed roosting	____	____	____	____
(3) nesting attempted	____	____	____	____
(4) young fledged	____	____	____	____

APPENDIX 2a

Recruitment Cluster Inspection, Monitoring & Training Data

Type Recruitment Cluster: _____ Cluster Number: _____
(Primary or Supplemental)

A. Results of inspections and monitoring. Yes/No

Spring inspection and monitoring:

1. Visual, from ground, sign of use _____
2. Cavity inspected confirmed roosting _____
3. Nesting attempted _____
4. Fledged young _____
5. Habitat assessment/general condition:
   - 5a. Damage to cavity or cavity start tree _____
   - 5b. Soil disturbance requiring remedial measures _____
   - 5c. Other habitat disturbance requiring remedial measures _____
6. Number of adults: _____
7. Number of fledglings: _____
8. Sex of birds: _____

Fall inspection:

1. Visual, from ground, sign of use _____
2. Cavity inspected confirmed roosting _____
3. Nesting attempted _____
4. Fledged young _____
5. Habitat assessment/general condition:
   - 5a. Damage to cavity or cavity start tree _____
   - 5b. Soil disturbance requiring remedial measures _____
   - 5c. Other habitat disturbance requiring remedial measures _____

B. Training Data:

Number of Unit Training Events
(Recorded at Range Control/Conducted at Recruitment Cluster location) _____

For each training event:

1. Date of training

2. Approximate duration of training
3. Type of training
4. Training activities (list activities conducted contained in Appendix 1)
5. Approximate number of soldiers involved
6. Approximate number and type of vehicles involved
7. Misc.

APPENDIX 2b

Active Cluster Inspection, & Monitoring Data

Cluster Number: _____

A. Results of inspection and monitoring. Yes/No

1. Visual, from ground, sign of use _____
2. Cavity inspected confirmed roosting _____
3. Nesting attempted _____
4. Fledged young _____
5. Habitat assessment/general condition:
   - 5a. Damage to cavity or cavity start tree _____
   - 5b. Soil disturbance requiring remedial measures _____
   - 5c. Other habitat disturbance requiring remedial measures _____
6. Number of adults: _____
7. Number of fledglings: _____
8. Sex of birds: _____

B. Training Data (if the installation has recruitment clusters):

Number of Unit Training Events
(Recorded at Range Control/Conducted at Recruitment Cluster location) _____

For each training event:

1. Date of training
2. Approximate duration of training
3. Type of training
4. Training activities (list activities conducted contained in Appendix 1)
5. Approximate number of soldiers involved
6. Approximate number and type of vehicles involved
7. Misc.

APPENDIX III-S

1997 FOREST INVENTORY MAPS

MOTSU FOREST MANAGEMENT BLOCKS

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LEGEND

B-3	FOREST MANAGEMENT BLOCK
LLH	FOREST STAND/LAND CLASS
	AREA NOT INCLUDED (ROADS, FACILITIES, INTERCHANGE YARDS, WHARFS, ETC.)

FOREST STANDS AND LAND CLASS TYPES

LYP	LOBLOLLY PINE PLANTATION
LLYP	LONGLEAF PINE PLANTATION
SYP	SLASH PINE PLANTATION
L	LOBLOLLY PINE
LL	LONGLEAF PINE
PP	POND PINE
MP	MIXED PINE: LOBLOLLY, LONGLEAF AND POND PINE
LH	LOWLAND HARDWOOD
LO	LIVE OAK
MPLO	MIXED PINE AND LIVE OAK
LLLO	LONGLEAF PINE AND LIVE OAK
LLH	LOBLOLLY PINE AND LOWLAND HARDWOOD
LUH	LOBLOLLY PINE AND UPLAND HARDWOOD
PPLH	POND PINE AND LOWLAND HARDWOOD
MPLH	MIXED PINE AND LOWLAND HARDWOOD
C	CYPRESS
M	MARSH
P	POND
NP	NON-PRODUCTIVE (INCLUDES SOME FIRE BREAKS, ROADS, ROAD RIGHTS-OF-WAY, AND RAILROAD RIGHTS-OF-WAY, LAGOONS, DYKES, AND CARGO STORAGE AREAS)

LEGEND FOR FOREST INVENTORY MAPS

MILITARY OCEAN TERMINAL SUNNY POINT

FILE: MAINTERX	DRAWN BY: JEJ	NOT TO SCALE
DATE: 4/13/98	APPROVED BY: JC	

CZR INCORPORATED ENVIRONMENTAL CONSULTANTS
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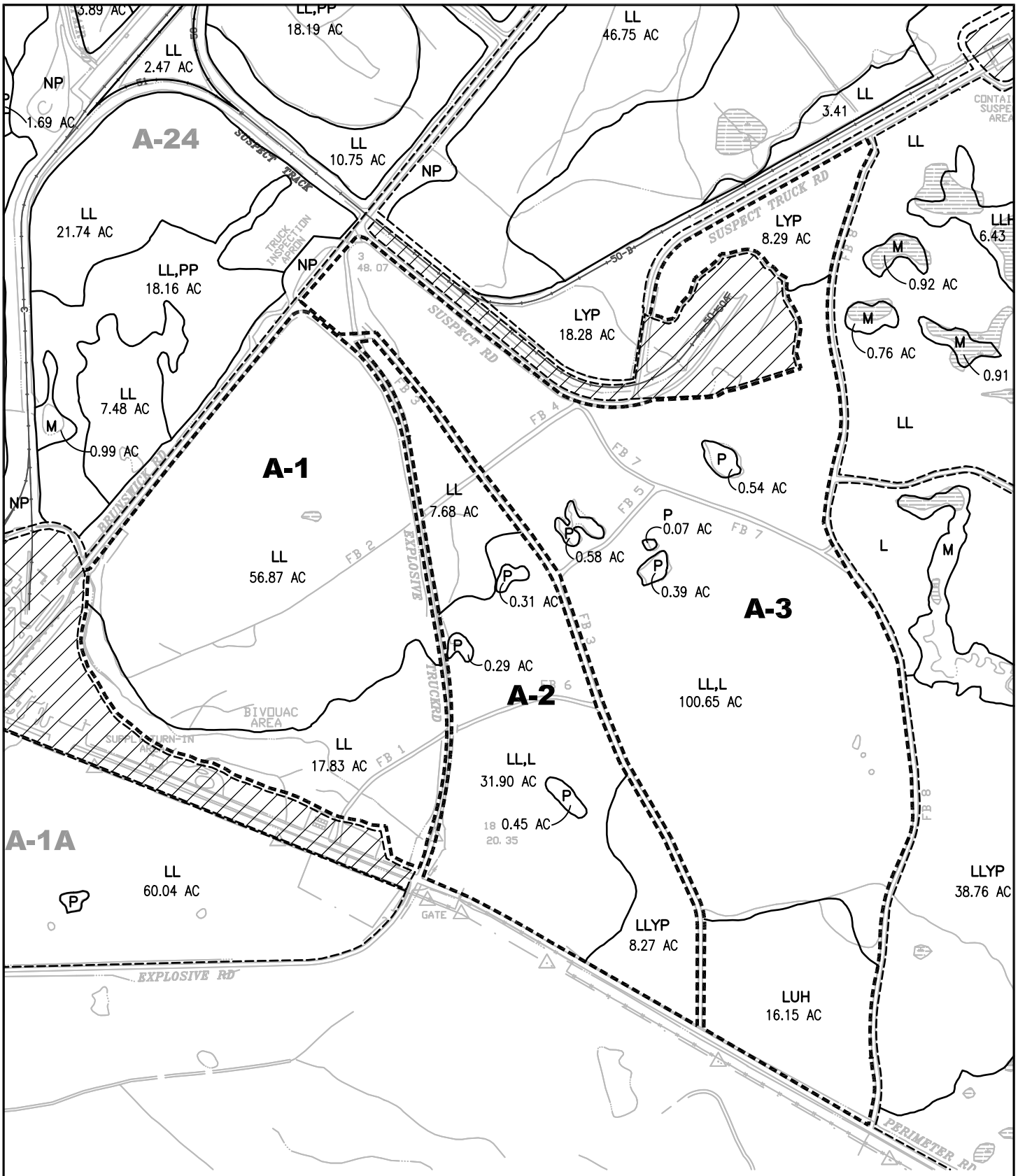
FAX 910/392-9139

CP#1627.03



A-1		A-2		A-3	
LL	17.83 AC	LL,L	31.90 AC	LL,L	100.65 AC
LL	56.87 AC	LL	7.68 AC	LUH	16.15 AC
		LLYP	8.27 AC	LYP	8.29 AC
		P/M	1.05 AC	P/M	1.58 AC
TOTAL	74.70 AC	TOTAL	48.90 AC	TOTAL	126.67 AC

III–S–1

MAIN TERMINAL – FOREST MANAGEMENT BLOCKS
FOREST INVENTORY MAPS – A–1, A–2, & A–3

MILITARY OCEAN TERMINAL
SUNNY POINT

FILE: A1A2A3	DRAWN BY: JEJ	0 660'
DATE: 4/13/98	APPROVED BY: SC	

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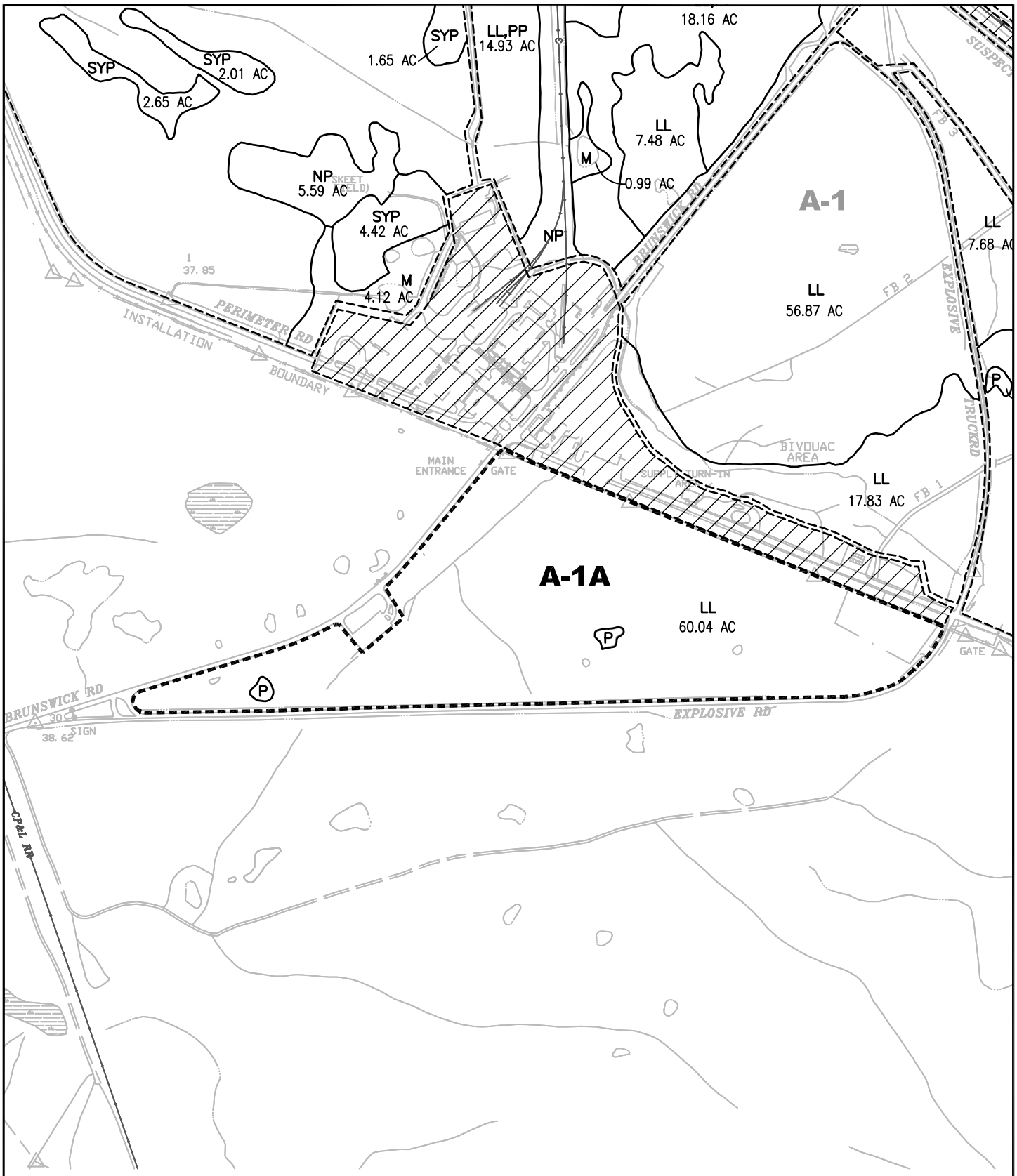
FIGURE III–S–1



MAIN TERMINAL – FOREST MANAGEMENT BLOCKS
FOREST INVENTORY MAPS – A–1A

MILITARY OCEAN TERMINAL
SUNNY POINT

FILE: A1A	DRAWN BY: JEJ	0 660'
DATE: 4/13/98	APPROVED BY: SC	

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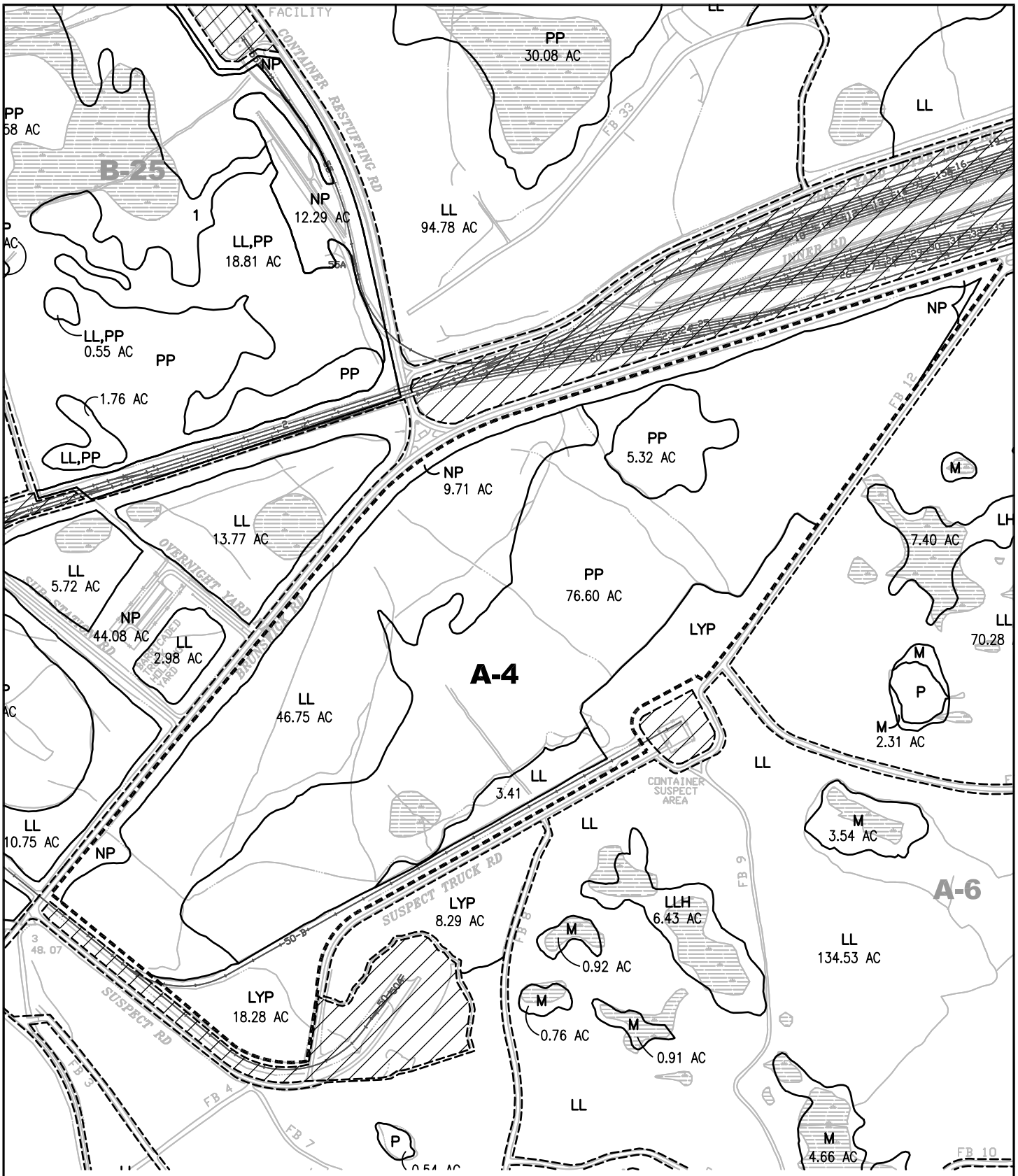
FIGURE III–S–2

A-1A

LL	60.04 AC
TOTAL	60.04 AC



A-4	
LL	50.16 AC
PP	76.60 AC
LYP	18.28 AC
PP	5.32 AC
NP	9.71 AC
TOTAL	160.07 AC

III-S-3

MAIN TERMINAL – FOREST MANAGEMENT BLOCKS
FOREST INVENTORY MAPS – A-4

MILITARY OCEAN TERMINAL
SUNNY POINT

FILE: A4	DRAWN BY: JEJ	0 660'
DATE: 4/13/98	APPROVED BY: SC	

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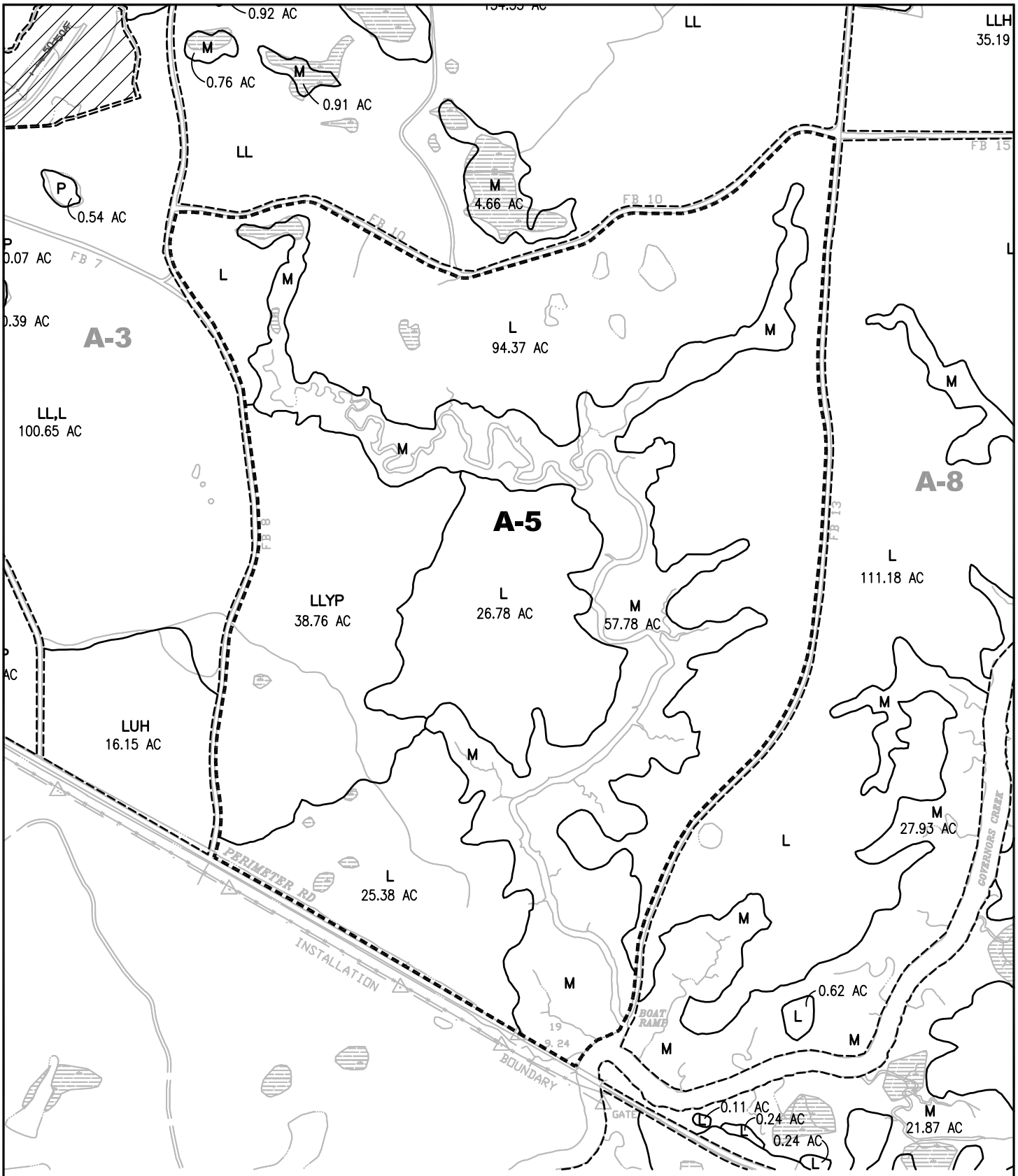
FIGURE III-S-3



MAIN TERMINAL – FOREST MANAGEMENT BLOCKS
FOREST INVENTORY MAPS – A–5

MILITARY OCEAN TERMINAL
SUNNY POINT

FILE: A5	DRAWN BY: JEJ	0 660'
DATE: 4/13/98	APPROVED BY: SC	

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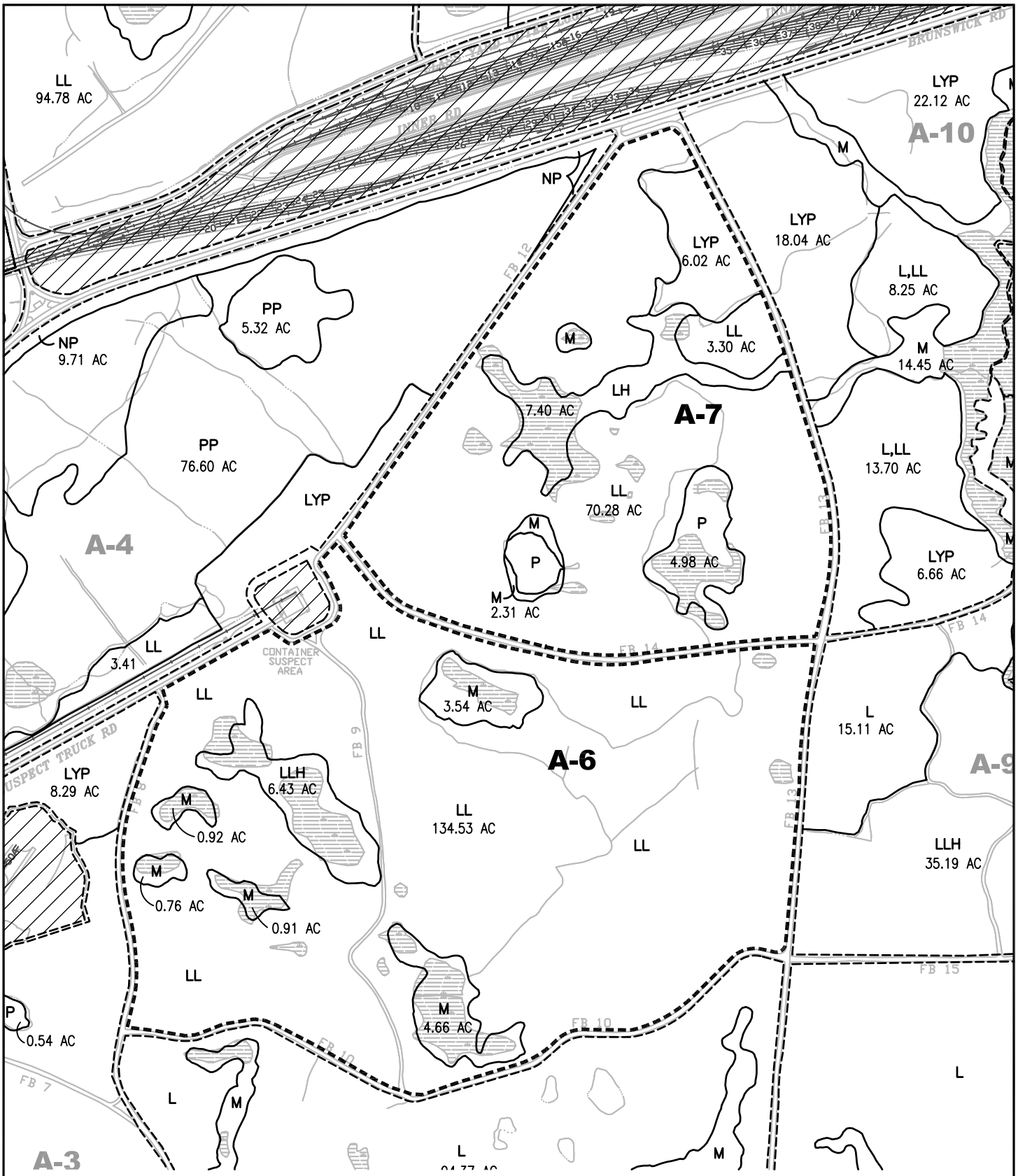
FIGURE III–S–4

A-5

L	146.53 AC
LLYP	38.76 AC
P/M	57.78 AC
TOTAL	243.07 AC



A-6		A-7	
LL	134.53 AC	LL	73.58 AC
LLH	6.43 AC	LYP	6.02 AC
		LH	7.40 AC
P/M	10.79 AC	P/M	7.29 AC
TOTAL	151.75 AC	TOTAL	94.29 AC

III–S–5

MAIN TERMINAL – FOREST MANAGEMENT BLOCKS
FOREST INVENTORY MAPS – A–6 & A–7

MILITARY OCEAN TERMINAL
SUNNY POINT

FILE: A6A7	DRAWN BY: JEJ	0 660'
DATE: 4/13/98	APPROVED BY: SC	

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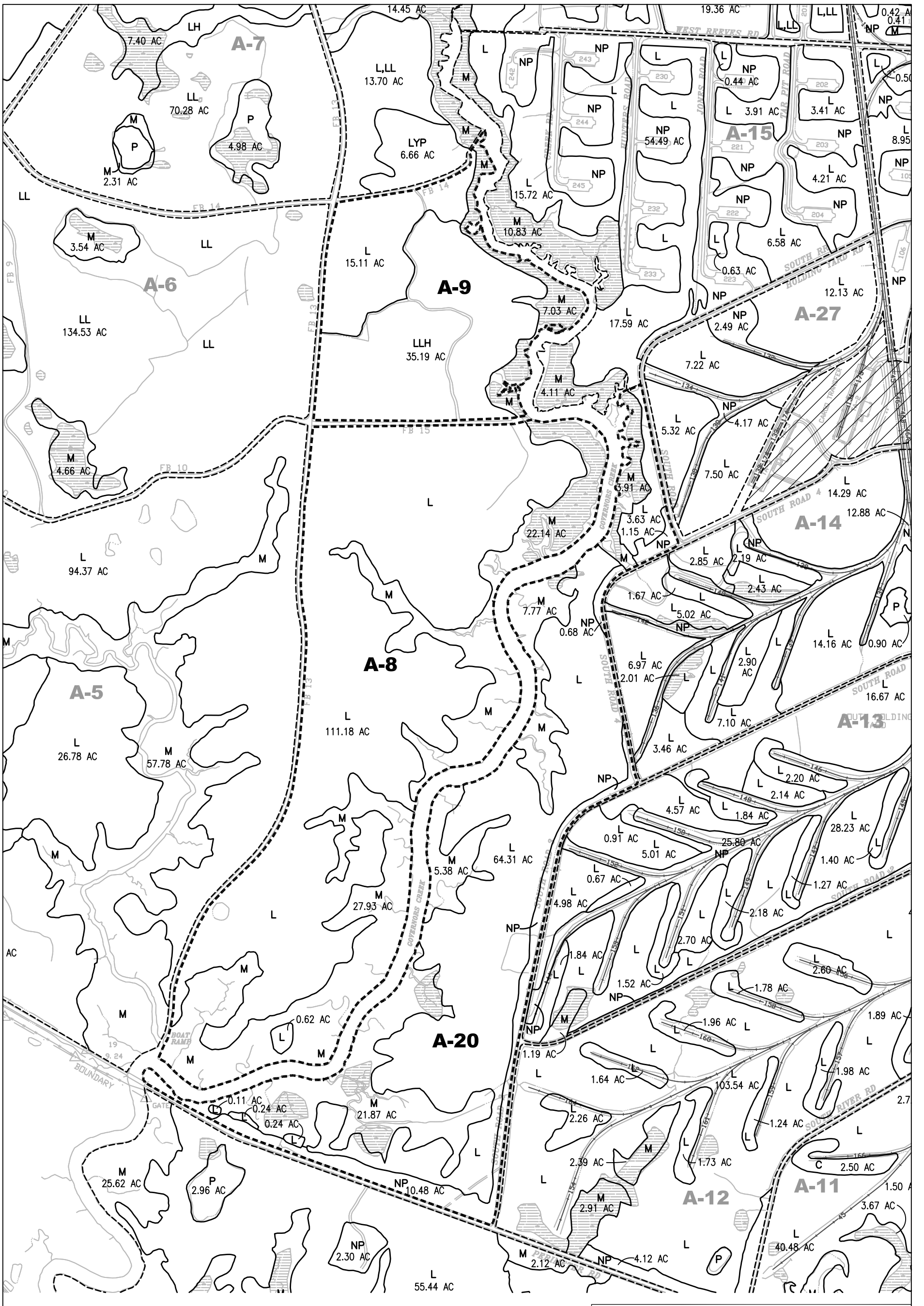
FIGURE III–S–5



A-8		A-9		A-20	
L	111.80 AC	LLH L	35.19 AC 15.11 AC	L	68.53 AC
P/M	50.07 AC	P/M	7.03 AC	P/M NP	38.93 AC 12.31 AC
TOTAL	161.87 AC	TOTAL	57.33 AC	TOTAL	119.77 AC

MAIN TERMINAL – FOREST MANAGEMENT BLOCKS
FOREST INVENTORY MAPS – A–8, A–9, & A–20

MILITARY OCEAN TERMINAL
SUNNY POINT

FILE: A8A9A20	DRAWN BY: JEJ	0 660'
DATE: 4/13/98	APPROVED BY: SC	

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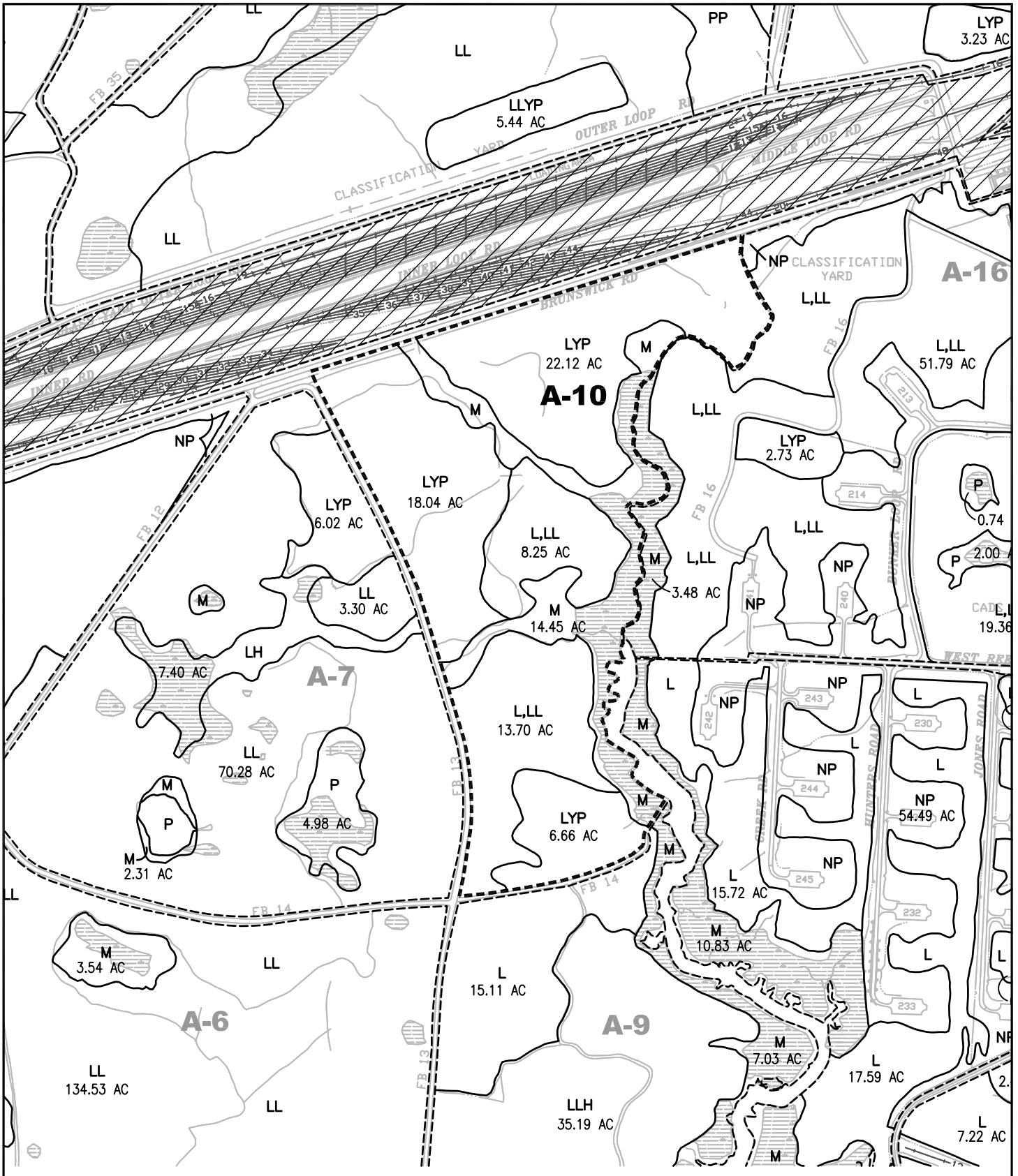
FIGURE III–S–6



A-10

L,LL	21.95 AC
LYP	46.82 AC
P/M	14.45 AC
TOTAL	83.22 AC

MAIN TERMINAL – FOREST MANAGEMENT BLOCKS
FOREST INVENTORY MAPS – A–10

MILITARY OCEAN TERMINAL
SUNNY POINT

FILE: A10	DRAWN BY: JEJ	0 660'
DATE: 4/13/98	APPROVED BY: SC	

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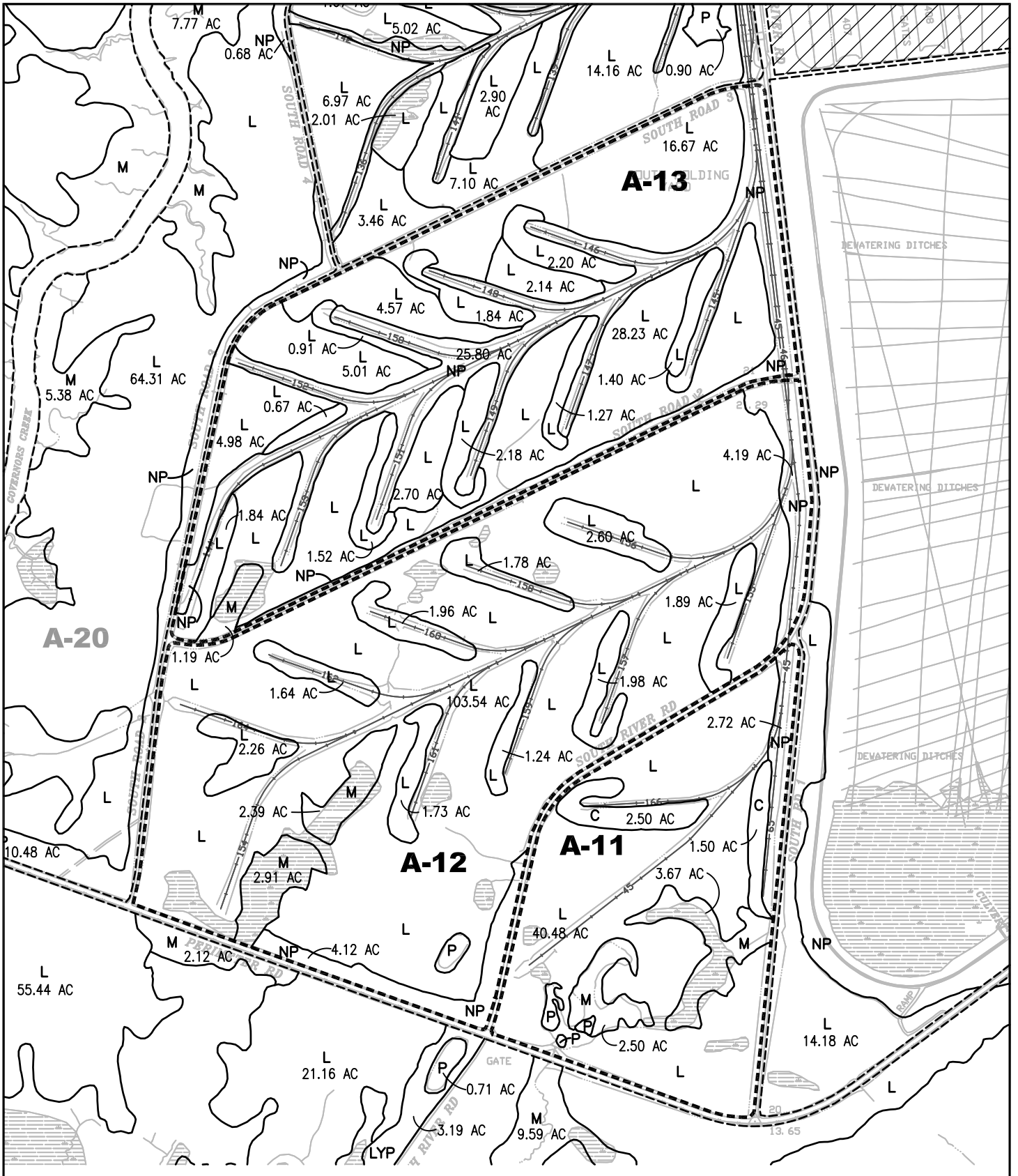
FIGURE III–S–7



A-11		A-12		A-13	
L	40.48 AC	L	103.54 AC	L	13.83 AC
C	4.00 AC	L	17.08 AC	L	54.89 AC
				L	9.41 AC
P/M	6.17 AC	P/M	5.30 AC	P/M	1.19 AC
NP	2.72 AC	NP	8.31 AC	NP	25.80 AC
TOTAL	53.37 AC	TOTAL	134.23 AC	TOTAL	105.12 AC

III–S–8

MAIN TERMINAL – FOREST MANAGEMENT BLOCKS
FOREST INVENTORY MAPS – A–11, A–12, & A–13

MILITARY OCEAN TERMINAL
SUNNY POINT

FILE: A11A12A13	DRAWN BY: JEJ	0 660'
DATE: 4/13/98	APPROVED BY: SC	

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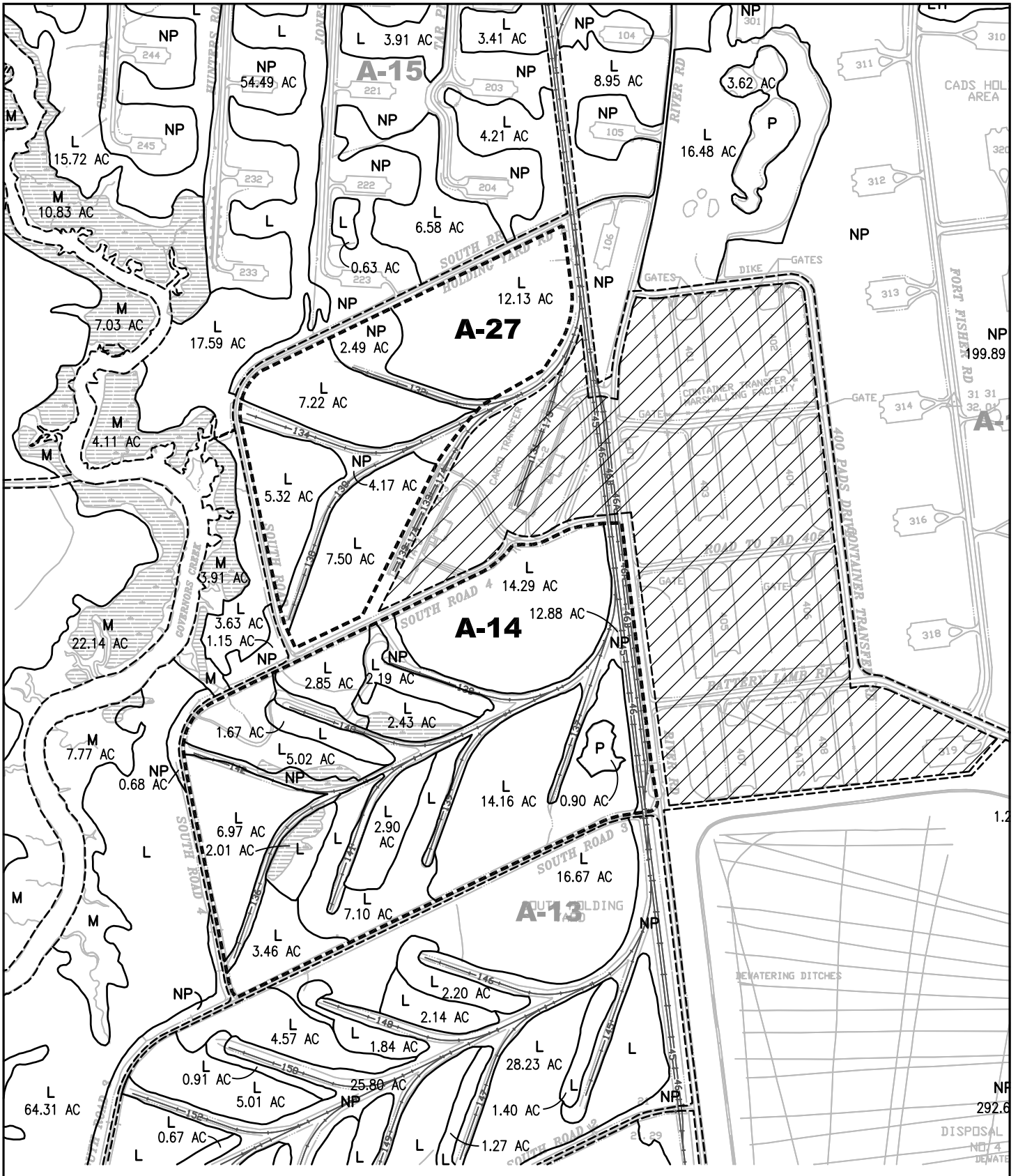
CP#1627.03

FIGURE III–S–8



A-14		A-27	
L	16.59 AC	L	19.35 AC
L	14.29 AC	L	12.82 AC
L	10.96 AC		
L	4.91 AC		
L	18.30 AC		
P/M	0.90 AC		
NP	12.88 AC	NP	6.66 AC
TOTAL	78.83 AC	TOTAL	38.83 AC

III–S–9

MAIN TERMINAL – FOREST MANAGEMENT BLOCKS
FOREST INVENTORY MAPS – A–14 & A–27

MILITARY OCEAN TERMINAL
SUNNY POINT

FILE: A14A27	DRAWN BY: JEJ	0 660'
DATE: 4/13/98	APPROVED BY: SC	

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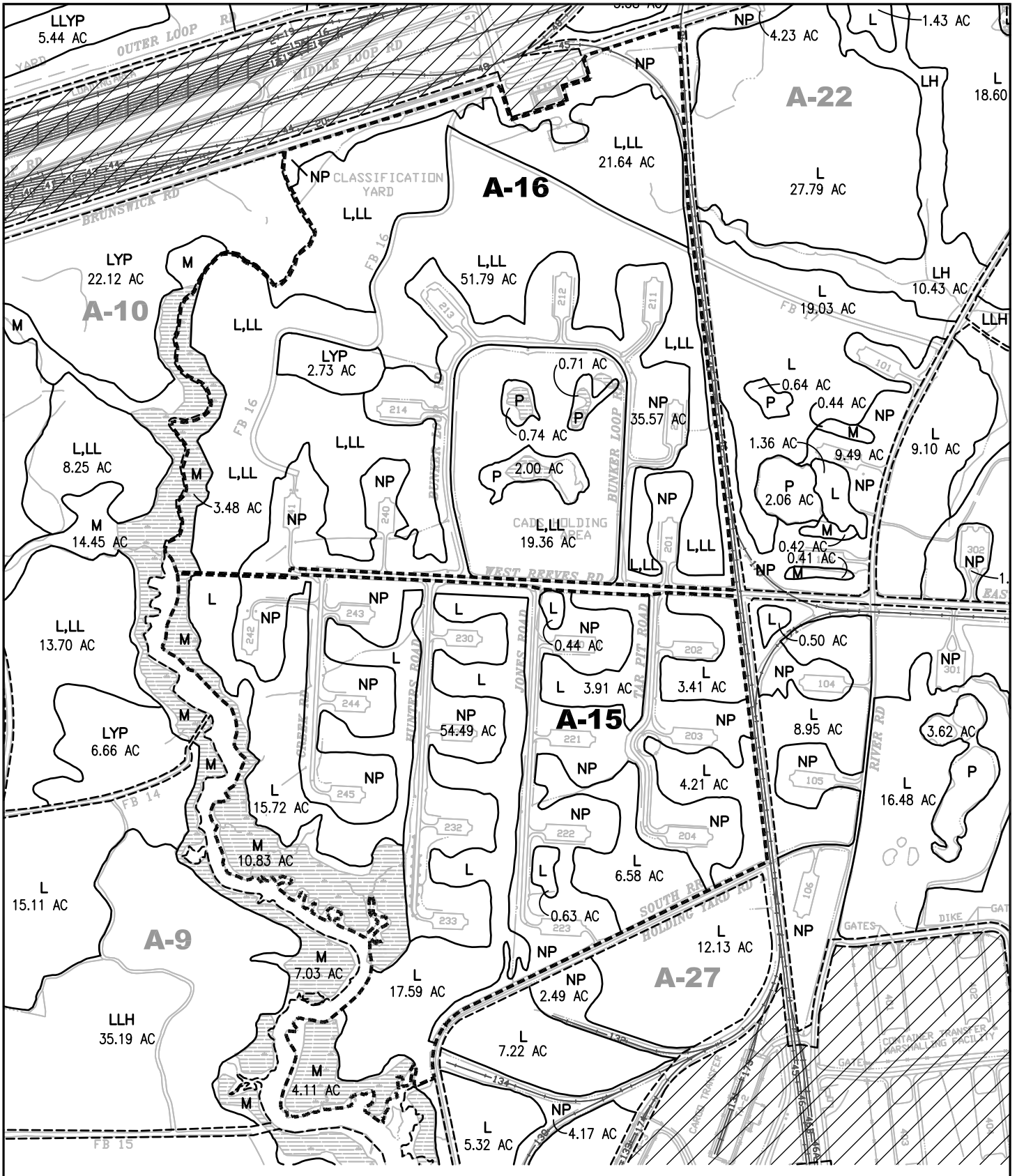
CP#1627.03

FIGURE III–S–9



A-15		A-16	
L	52.49 AC	L,LL	71.15 AC
		L,LL	21.64 AC
		LYP	2.73 AC
P/M	14.94 AC	P/M	6.93 AC
NP	54.49 AC	NP	35.57 AC
TOTAL	121.92 AC	TOTAL	138.02 AC

III-S-10

MAIN TERMINAL – FOREST MANAGEMENT BLOCKS
FOREST INVENTORY MAPS – A-15 & A-16

MILITARY OCEAN TERMINAL
SUNNY POINT

FILE: A15A16	DRAWN BY: JEJ	0 660'
DATE: 4/13/98	APPROVED BY: SC	

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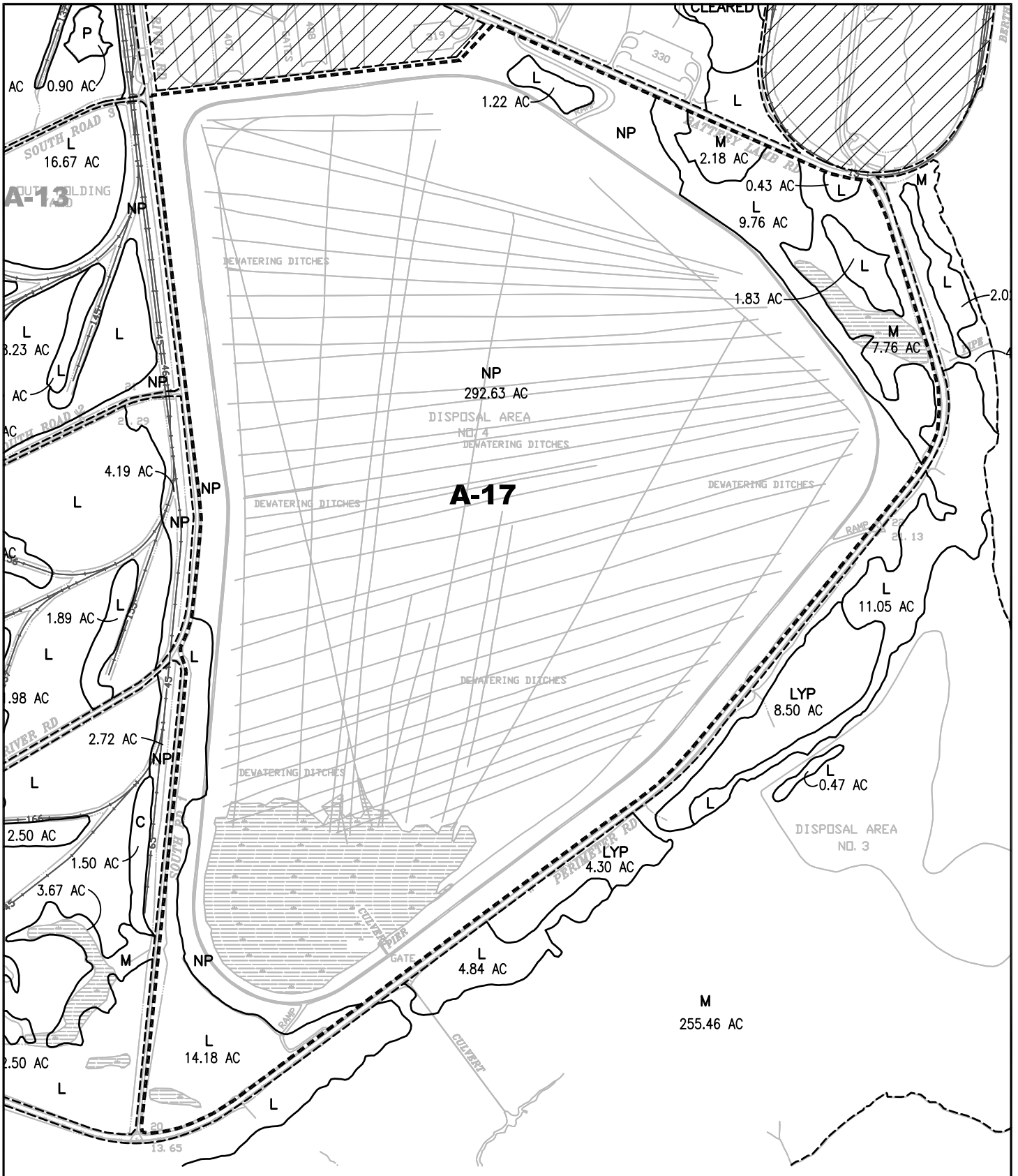
FIGURE III-S-10



A-17	
L	27.42 AC
P/M	9.94 AC
NP	292.63 AC
TOTAL	329.99 AC

MAIN TERMINAL – FOREST MANAGEMENT BLOCKS
FOREST INVENTORY MAPS – A–17

MILITARY OCEAN TERMINAL
SUNNY POINT

FILE: A17	DRAWN BY: JEJ	0 660'
DATE: 4/13/98	APPROVED BY: SC	

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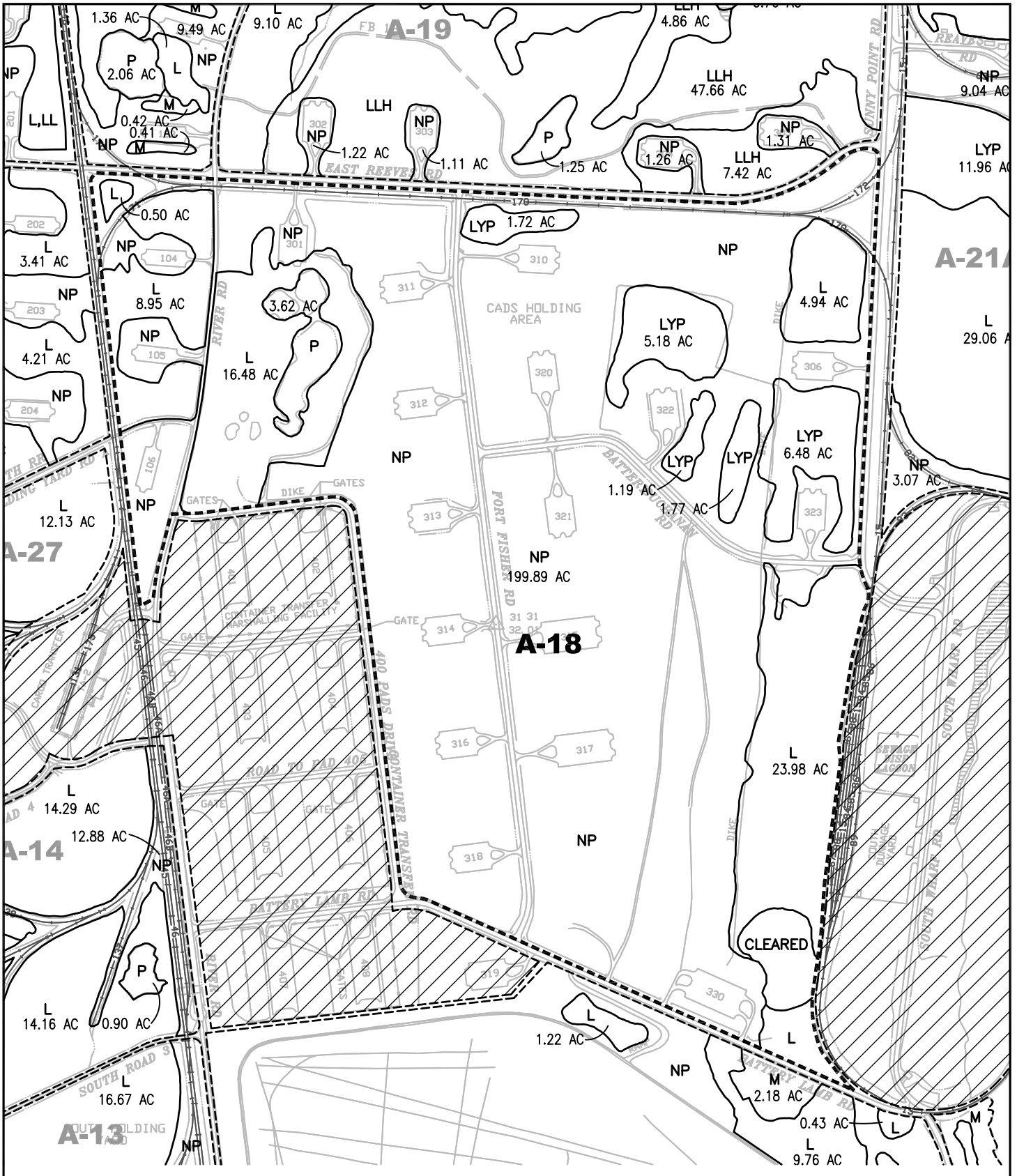
FIGURE III–S–11



A-18	
L	23.98 AC
L	4.94 AC
LYP	16.34 AC
L	25.93 AC
P/M	3.62 AC
NP	199.89 AC
TOTAL	274.70 AC

MAIN TERMINAL – FOREST MANAGEMENT BLOCKS
FOREST INVENTORY MAPS – A–18

MILITARY OCEAN TERMINAL SUNNY POINT

FILE: A18	DRAWN BY: JEJ	0 660'
DATE: 4/13/98	APPROVED BY: SC	

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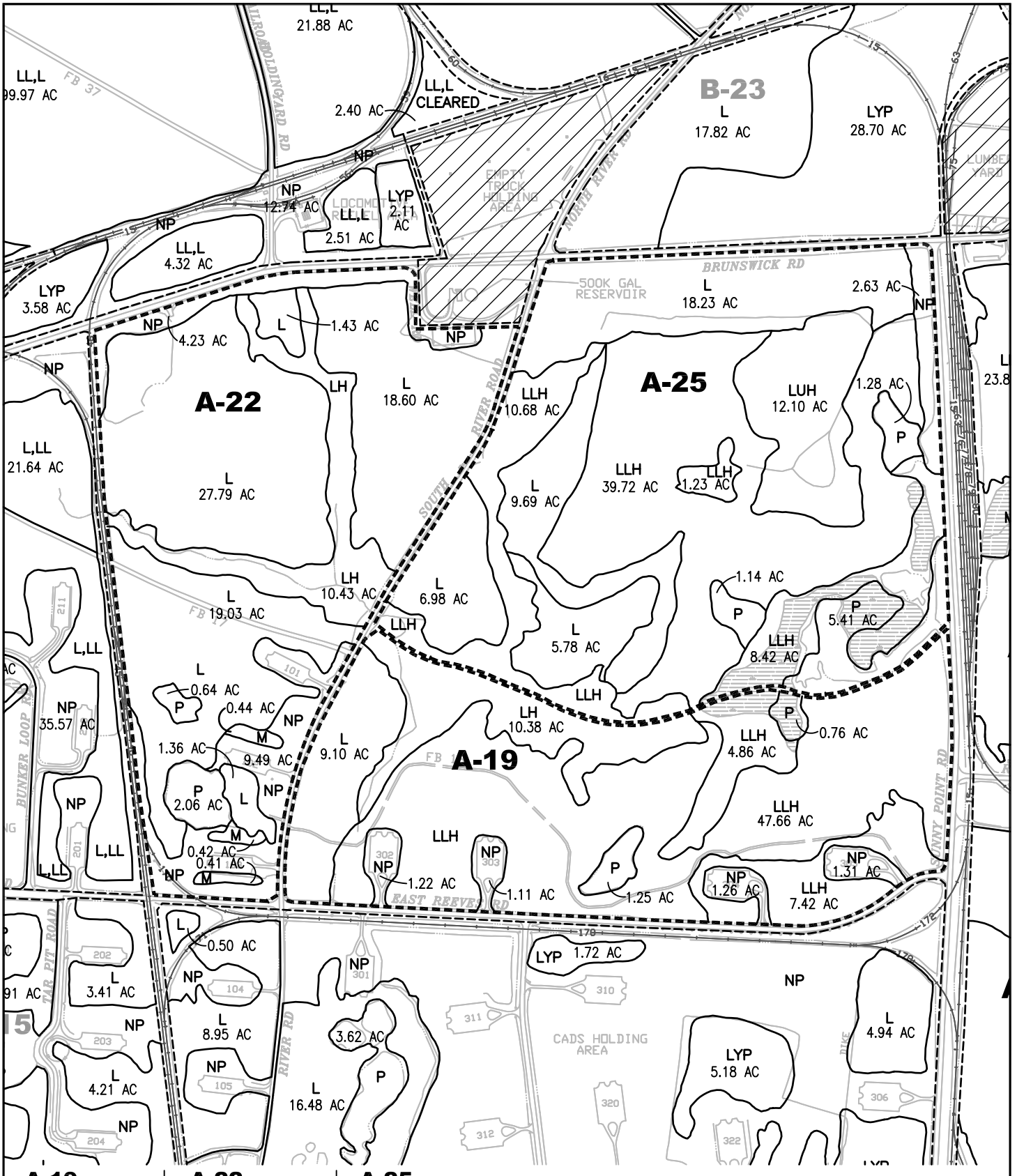
FIGURE III–S–12



A-19		A-22		A-25	
L	9.10 AC	L	68.21 AC	L	18.23 AC
LLH	47.66 AC	LH	10.43 AC	LUH	12.10 AC
LH	10.38 AC			LLH	39.72 AC
LLH	4.86 AC			L	9.69 AC
LLH	7.42 AC			LLH	10.68 AC
				L	6.98 AC
				LLH	1.23 AC
				L	5.78 AC
				LLH	8.42 AC
P/M	2.01 AC	P/M	3.97 AC	P/M	7.83 AC
NP	4.90 AC	NP	13.72 AC	NP	2.63 AC
TOTAL	86.33 AC	TOTAL	96.33 AC	TOTAL	123.29 AC

III-S-13

MAIN TERMINAL – FOREST MANAGEMENT BLOCKS
FOREST INVENTORY MAPS – A-19, A-22, & A-25

MILITARY OCEAN TERMINAL
SUNNY POINT

FILE: A19A22A25	DRAWN BY: JEJ	0 660'
DATE: 4/13/98	APPROVED BY: SC	

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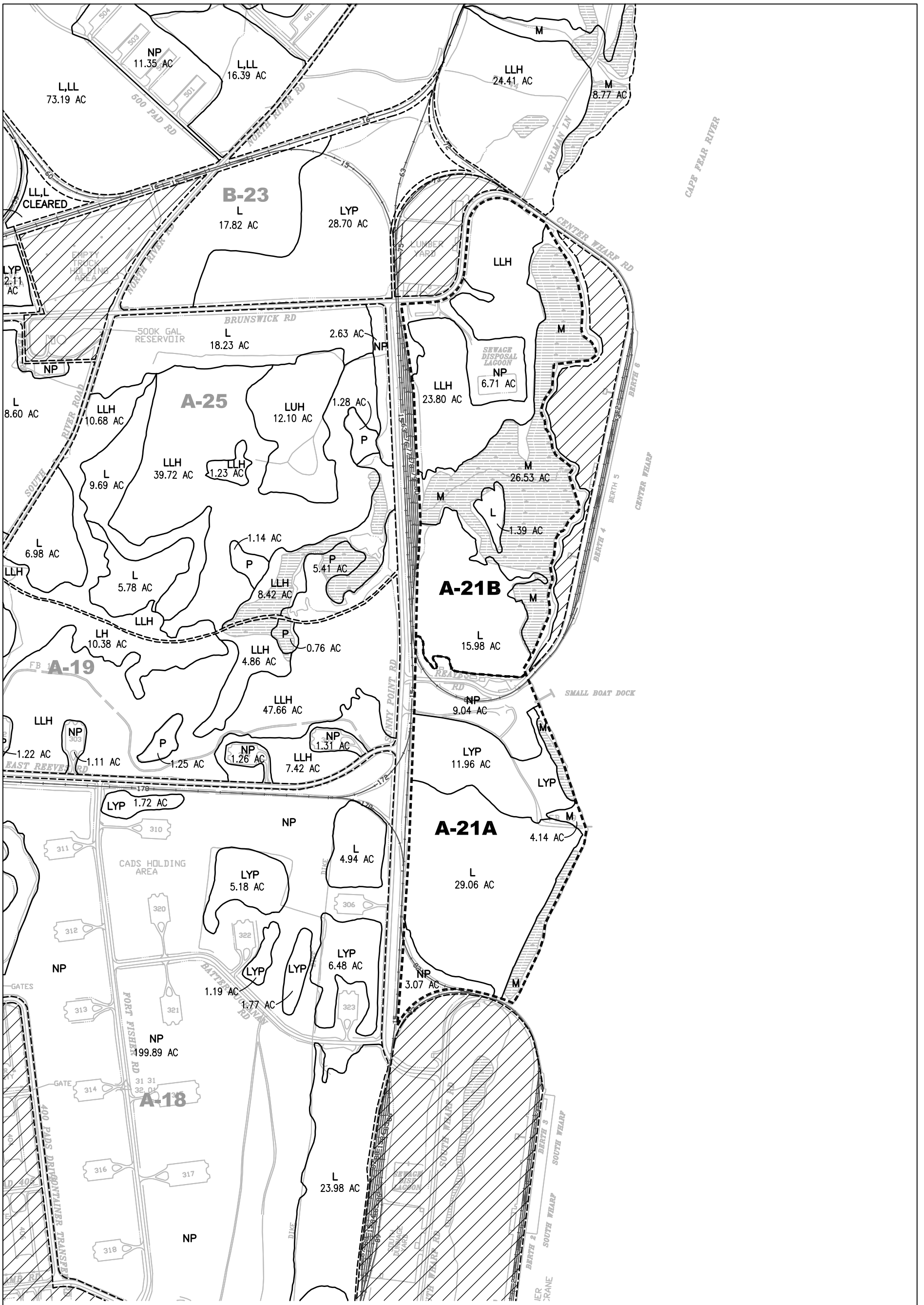
FIGURE III-S-13



A-21A		A-21B	
L	29.06 AC	L	17.37 AC
LYP	11.96 AC	LLH	23.80 AC
P/M	4.14 AC	P/M	26.53 AC
NP	12.11 AC	NP	6.71 AC
TOTAL	57.27 AC	TOTAL	74.41 AC

MAIN TERMINAL – FOREST MANAGEMENT BLOCKS
FOREST INVENTORY MAPS – A–21A & A–21B

MILITARY OCEAN TERMINAL
SUNNY POINT

FILE: A21	DRAWN BY: JEJ	0 660'
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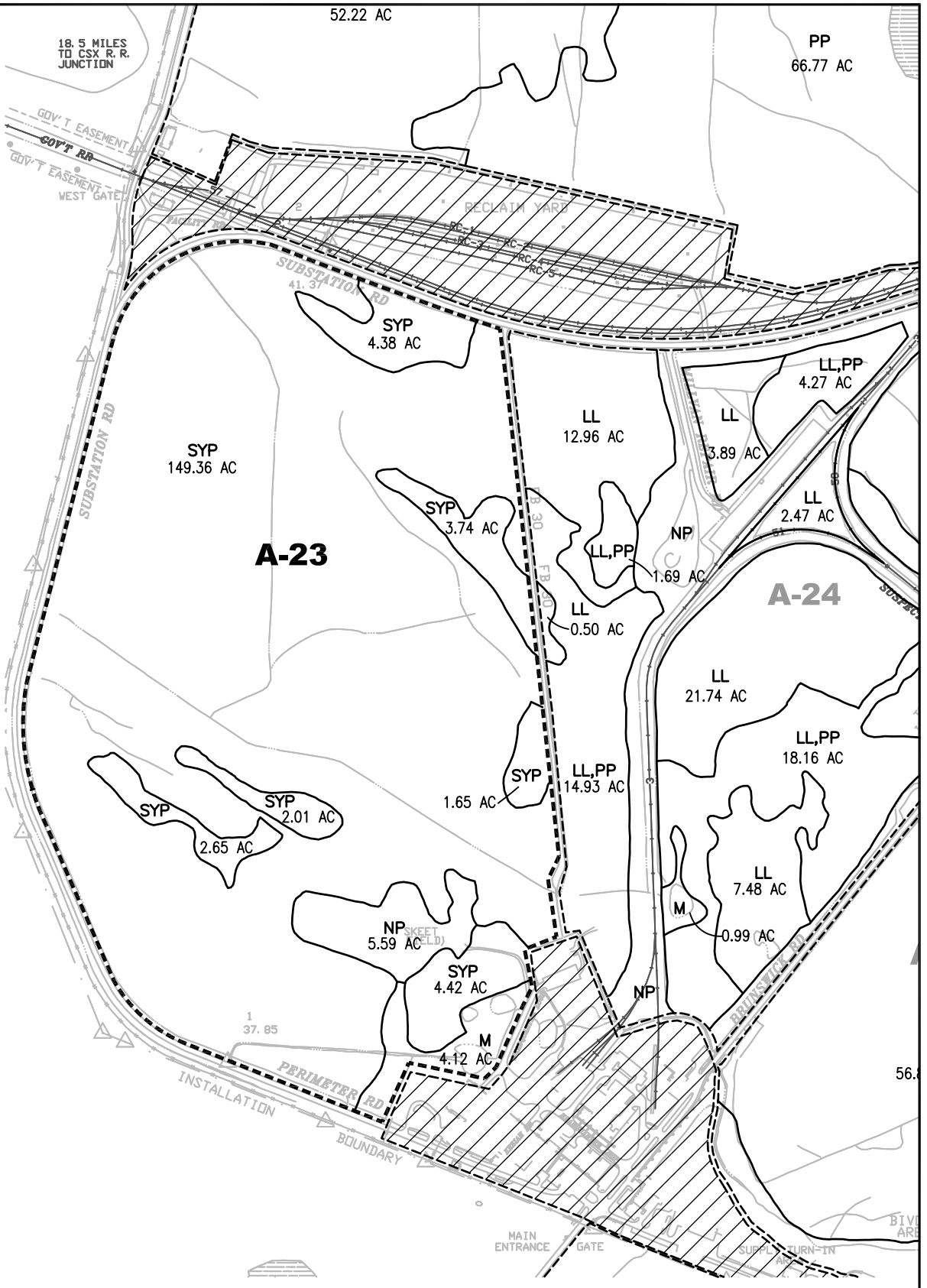
FIGURE III–S–14



A-23	
SYP	149.36 AC
SYP	18.85 AC
P/M	4.12 AC
NP	5.59 AC
TOTAL	177.92 AC

MAIN TERMINAL – FOREST MANAGEMENT BLOCKS
FOREST INVENTORY MAPS – A–23

MILITARY OCEAN TERMINAL
SUNNY POINT

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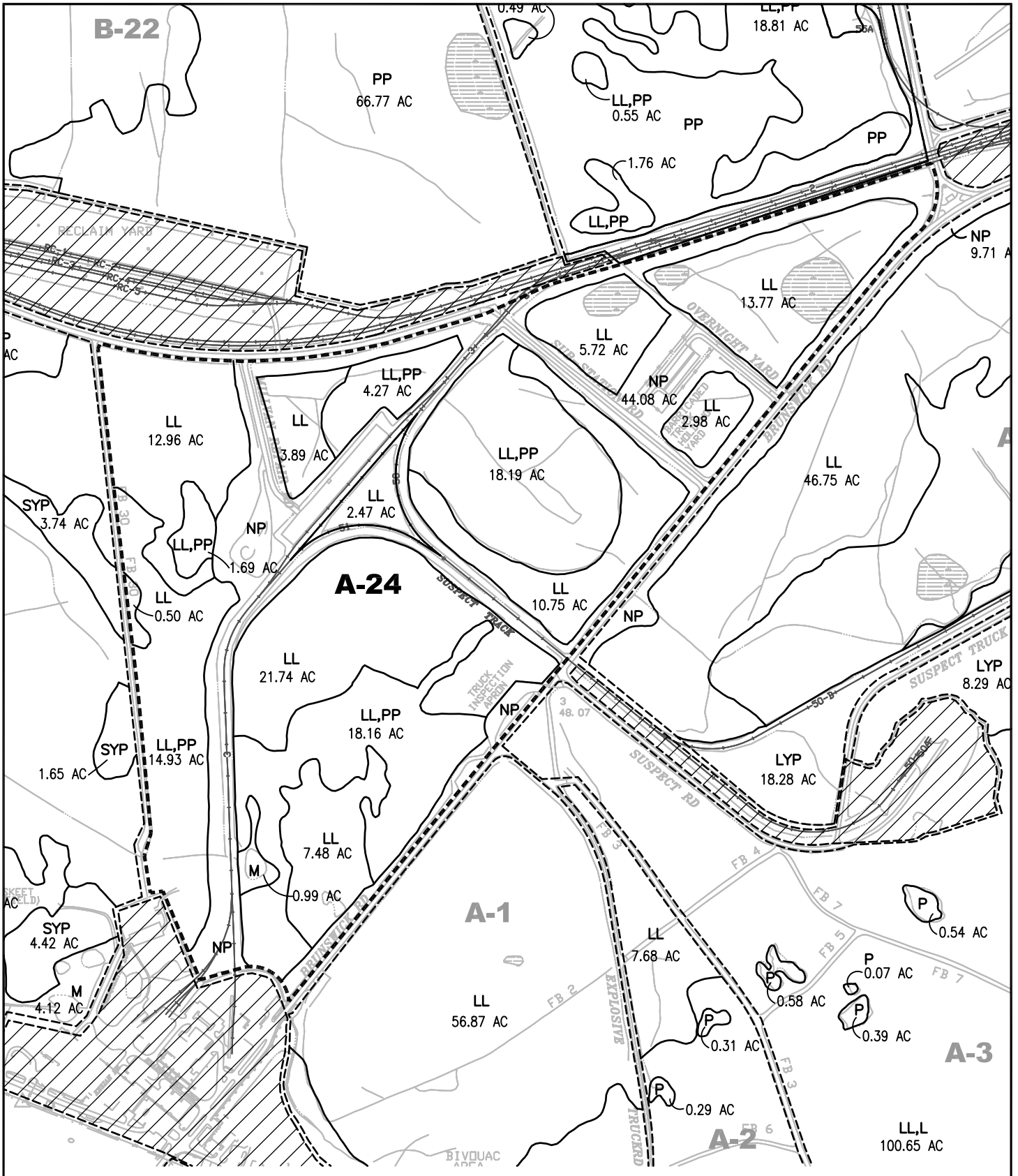
FIGURE III–S–15



A-24

LL,PP	39.05 AC
LL	82.26 AC
LL,PP	18.19 AC
P/M	0.99 AC
NP	44.08 AC
TOTAL	184.57 AC

III–S–16

MAIN TERMINAL – FOREST MANAGEMENT BLOCKS
FOREST INVENTORY MAPS – A–24

MILITARY OCEAN TERMINAL
SUNNY POINT

FILE: A24	DRAWN BY: JEJ	0 660'
DATE: 4/13/98	APPROVED BY: SC	

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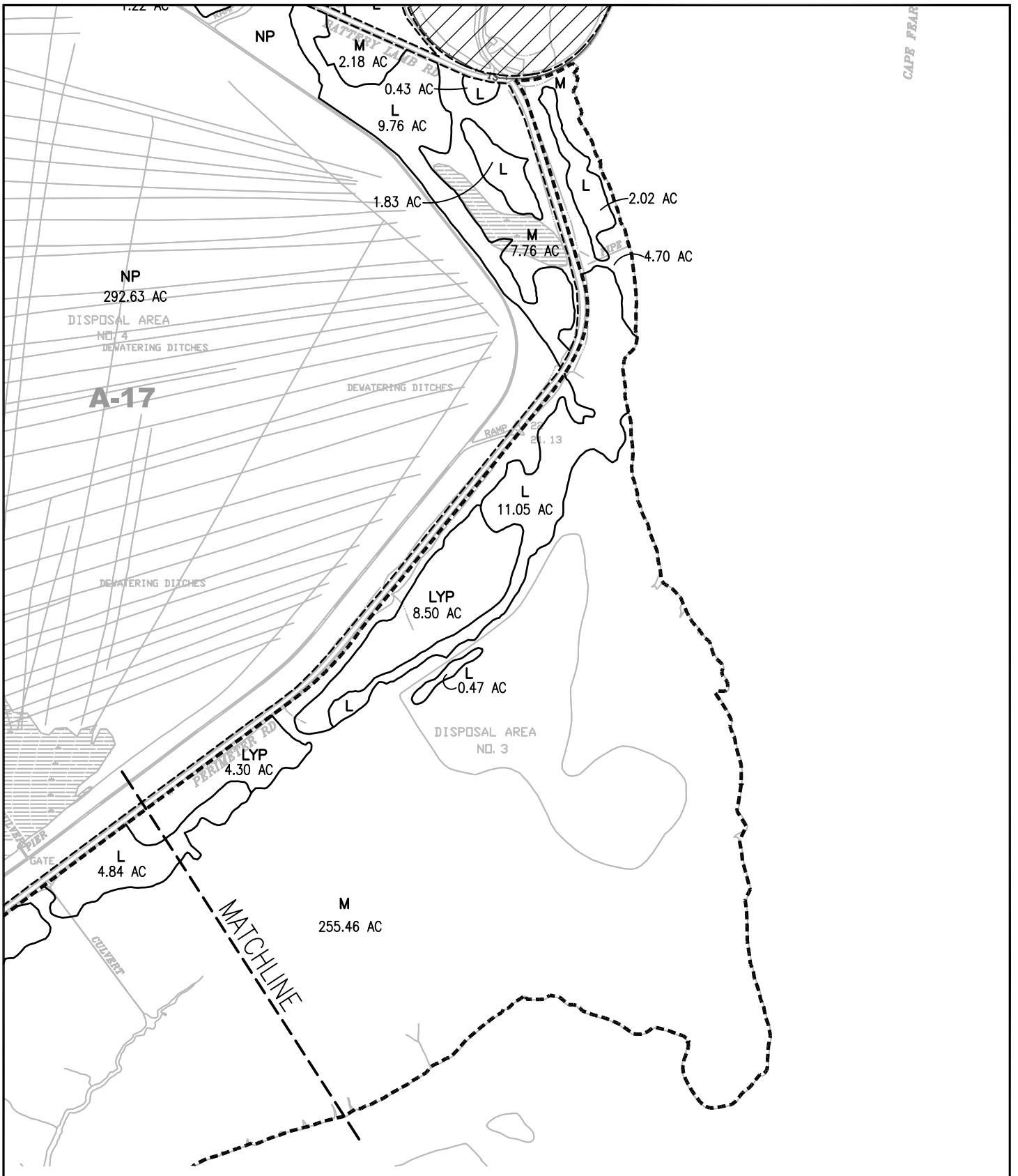
FIGURE III–S–16



MAIN TERMINAL – FOREST MANAGEMENT BLOCKS
FOREST INVENTORY MAPS – A–26

MILITARY OCEAN TERMINAL
SUNNY POINT

FILE: A26	DRAWN BY: JEJ	0 660'
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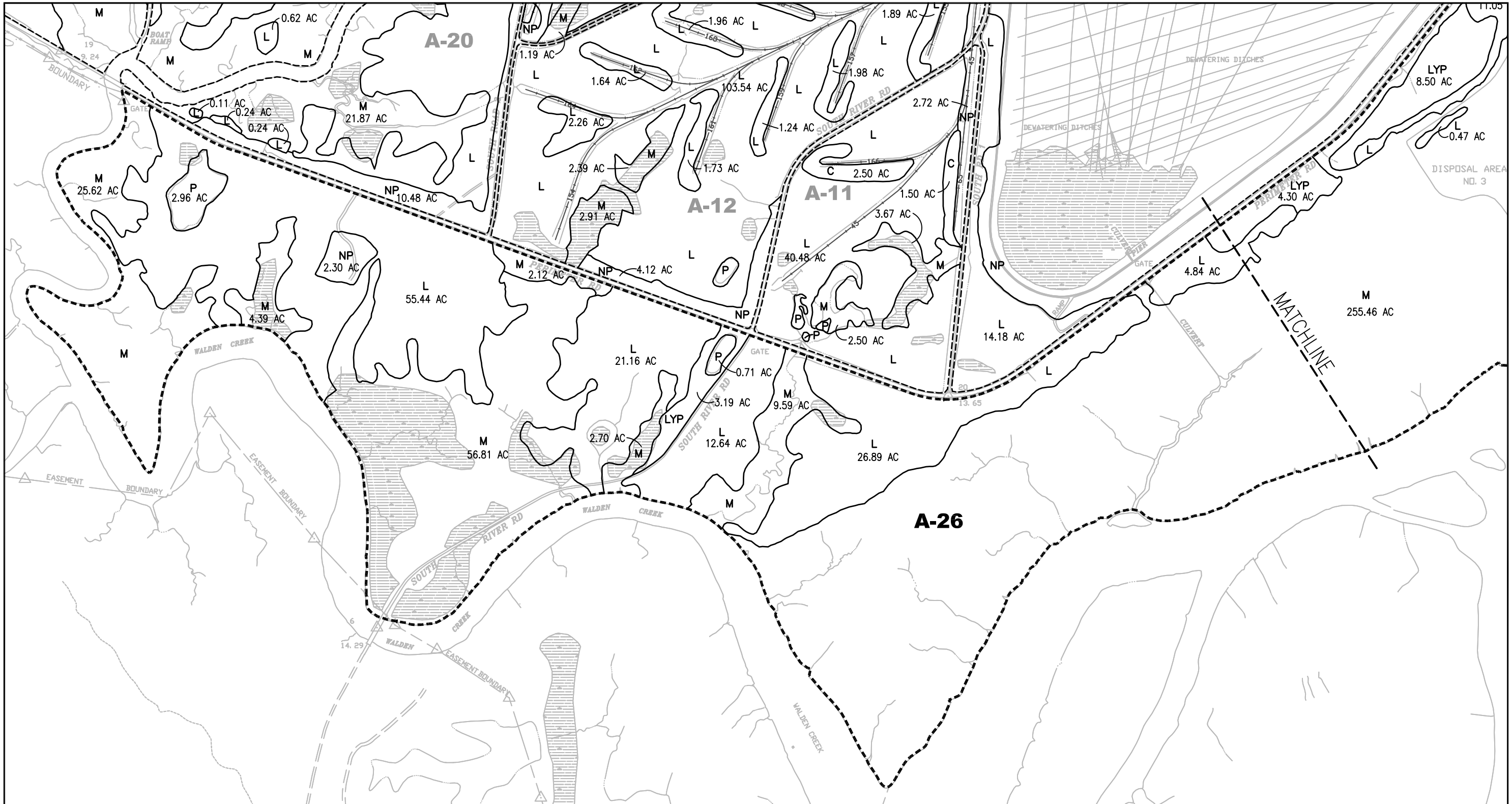
FIGURE III–S–17A



A-26	
L	134.51 AC
LYP	15.99 AC
P/M	365.06 AC
NP	2.30 AC
TOTAL	517.86 AC

MAIN TERMINAL – FOREST MANAGEMENT BLOCKS
FOREST INVENTORY MAPS – A–26

MILITARY OCEAN TERMINAL
SUNNY POINT

FILE: A26	DRAWN BY: JEJ	0 660'
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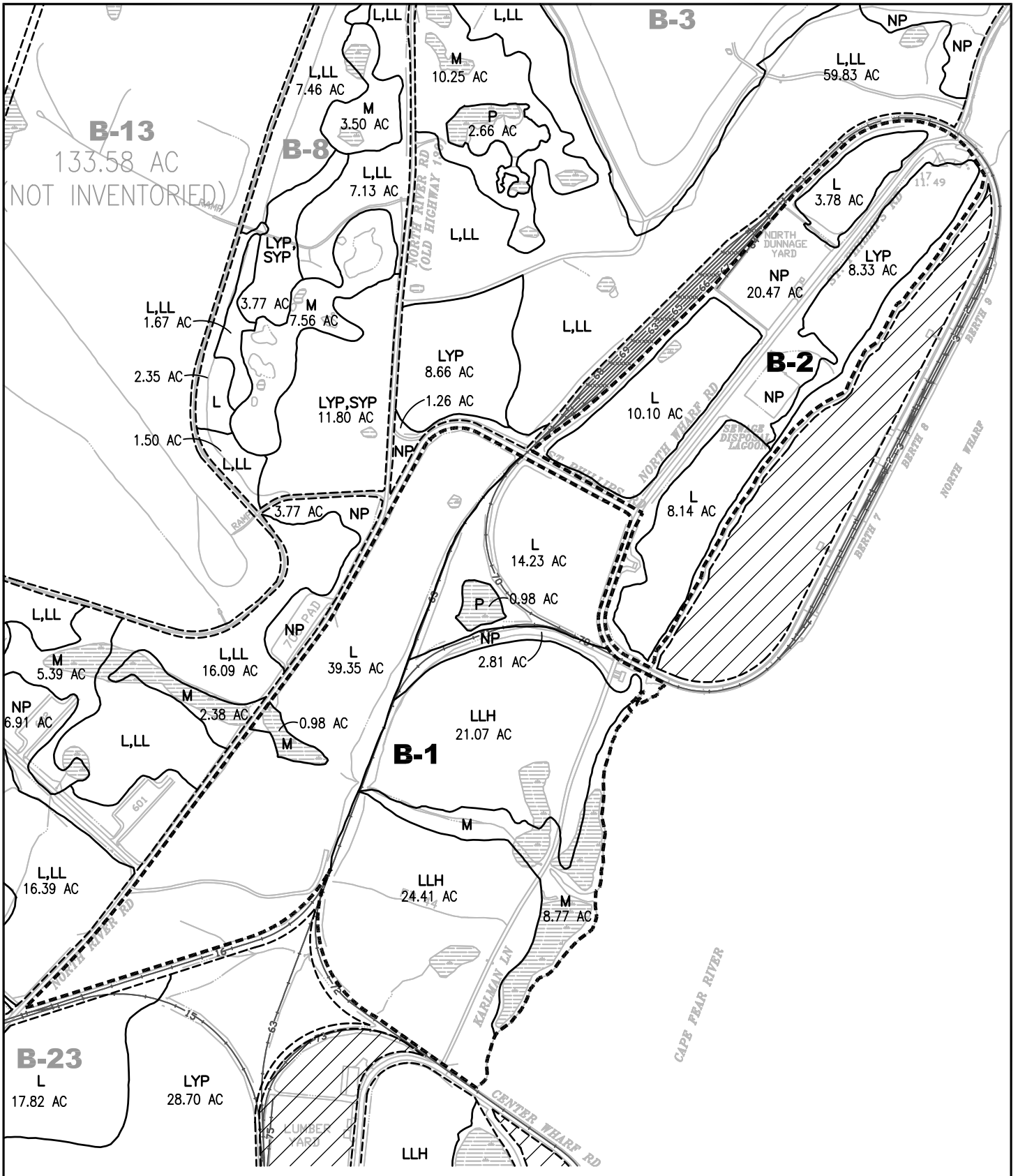
FIGURE III–S–17B



B-1		B-2	
L	39.35 AC	L	22.02 AC
LLH	45.48 AC	LYP	8.33 AC
L	14.23 AC		
P/M	10.73 AC		
NP	2.81 AC	NP	20.47 AC
TOTAL	112.60 AC	TOTAL	50.82 AC

III–S–19

MAIN TERMINAL – FOREST MANAGEMENT BLOCKS
FOREST INVENTORY MAPS – B–1 & B–2

MILITARY OCEAN TERMINAL
SUNNY POINT

FILE: B1B2	DRAWN BY: JEJ	0 660'
DATE: 4/13/98	APPROVED BY: SC	

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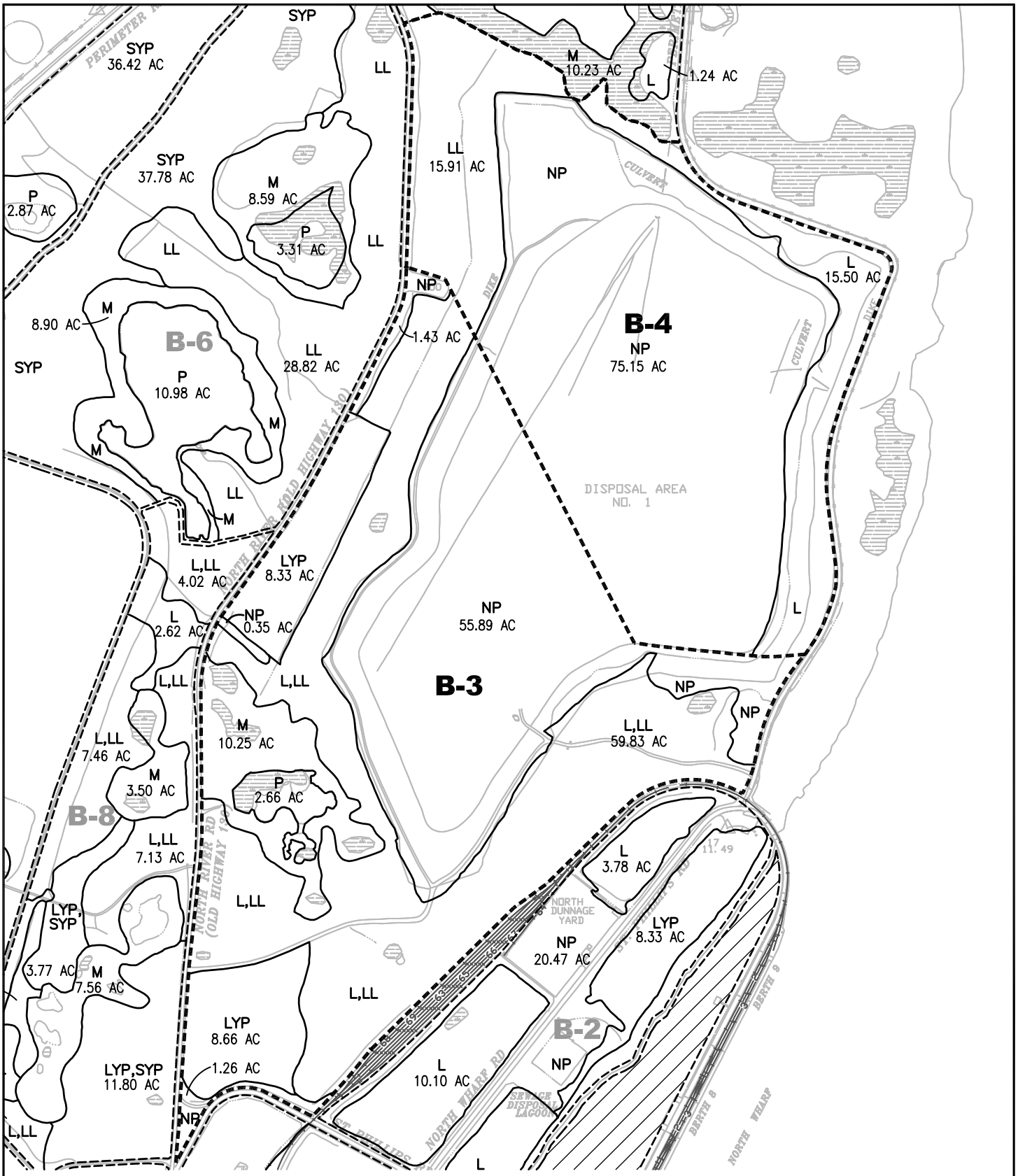
FIGURE III–S–18



B-3		B-4	
LYP	8.66 AC	LL	15.91 AC
L,LL	59.83 AC	L	15.50 AC
LYP	8.33 AC		
P/M	13.26 AC		
NP	58.58 AC	NP	75.15 AC
TOTAL	148.66 AC	TOTAL	106.56 AC

III-S-20

MAIN TERMINAL – FOREST MANAGEMENT BLO
FOREST INVENTORY MAPS – B-3 & B-4

MILITARY OCEAN TERMINAL
SUNNY POINT

FILE: B3B4	DRAWN BY: JEJ	0 660'
DATE: 4/13/98	APPROVED BY: SC	

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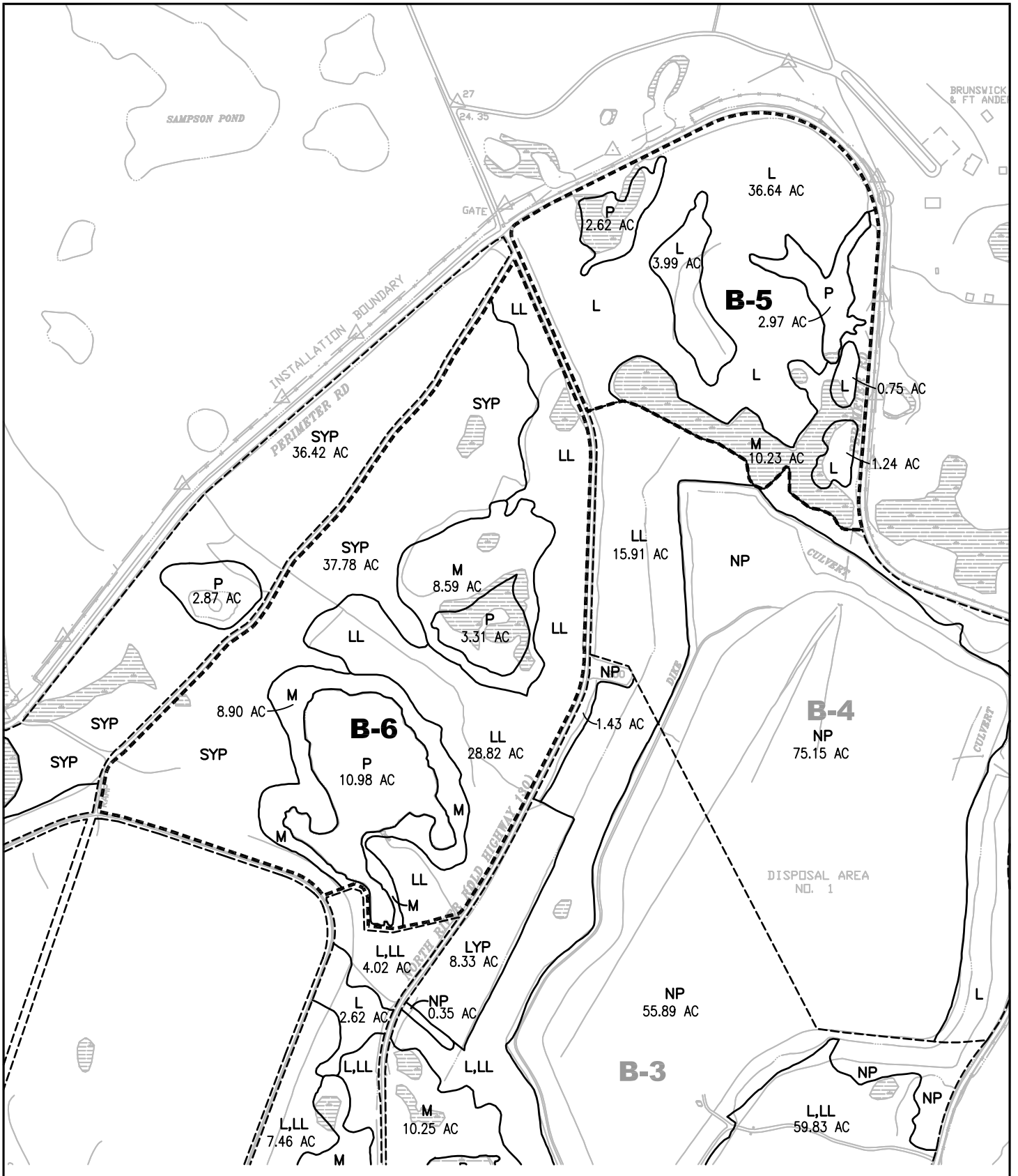
FIGURE III-S-19



B-5		B-6	
L	3.99 AC	LL	28.82 AC
L	38.63 AC	SYP	37.78 AC
P/M	15.82 AC	P/M	31.78 AC
TOTAL	58.44 AC	TOTAL	98.38 AC

III–S–21

MAIN TERMINAL – FOREST MANAGEMENT BLOCKS
FOREST INVENTORY MAPS – B–5 & B–6

MILITARY OCEAN TERMINAL
SUNNY POINT

FILE: B5B6	DRAWN BY: JEJ	0 660'
DATE: 4/13/98	APPROVED BY: SC	

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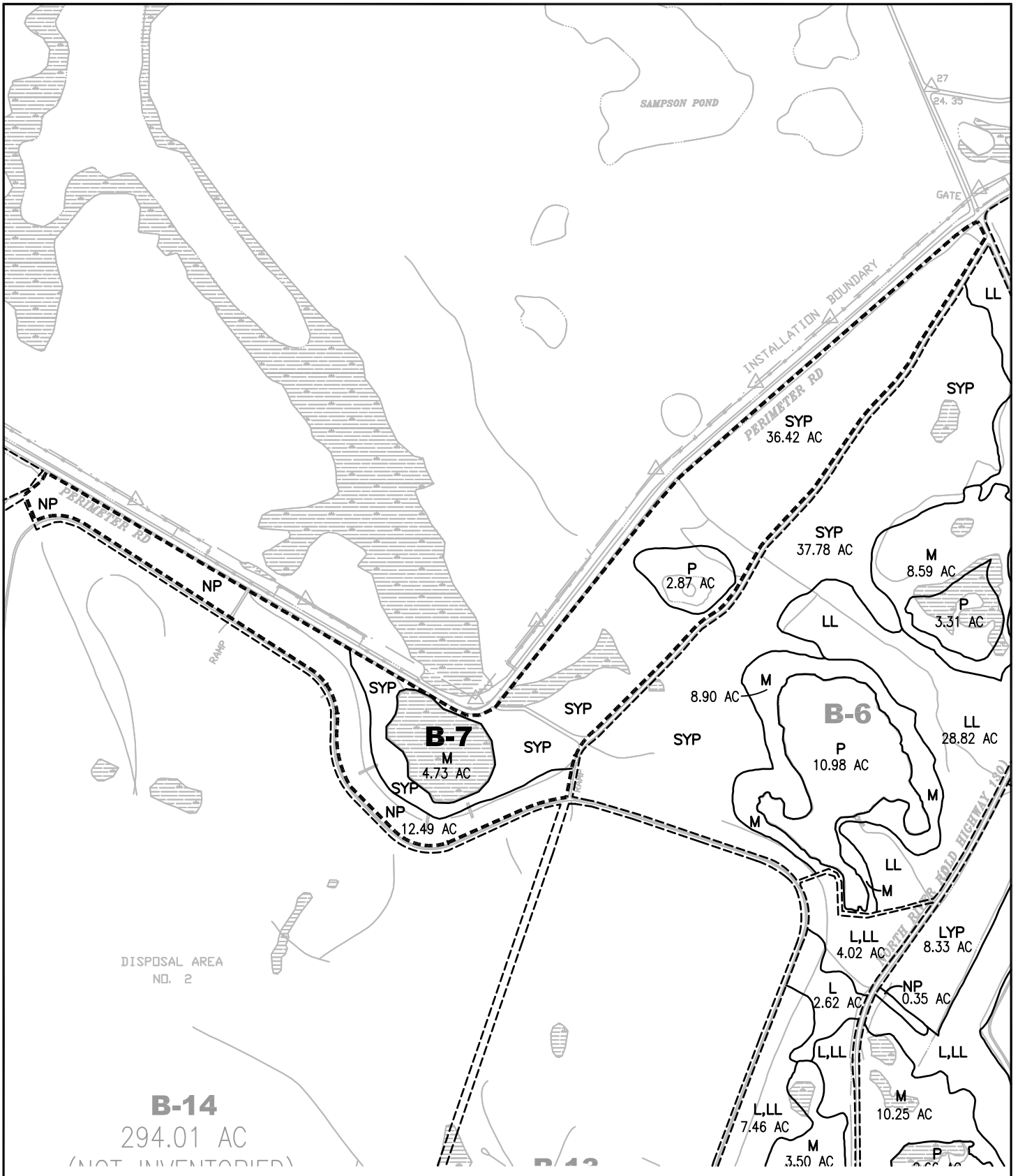
FIGURE III–S–20



B-7

SYP	36.42 AC
P/M	7.60 AC
NP	12.49 AC
TOTAL	56.51 AC

MAIN TERMINAL – FOREST MANAGEMENT BLOCKS
FOREST INVENTORY MAPS – B-7

MILITARY OCEAN TERMINAL
SUNNY POINT

FILE: B7	DRAWN BY: JEJ	0 660'
DATE: 4/13/98	APPROVED BY: SC	

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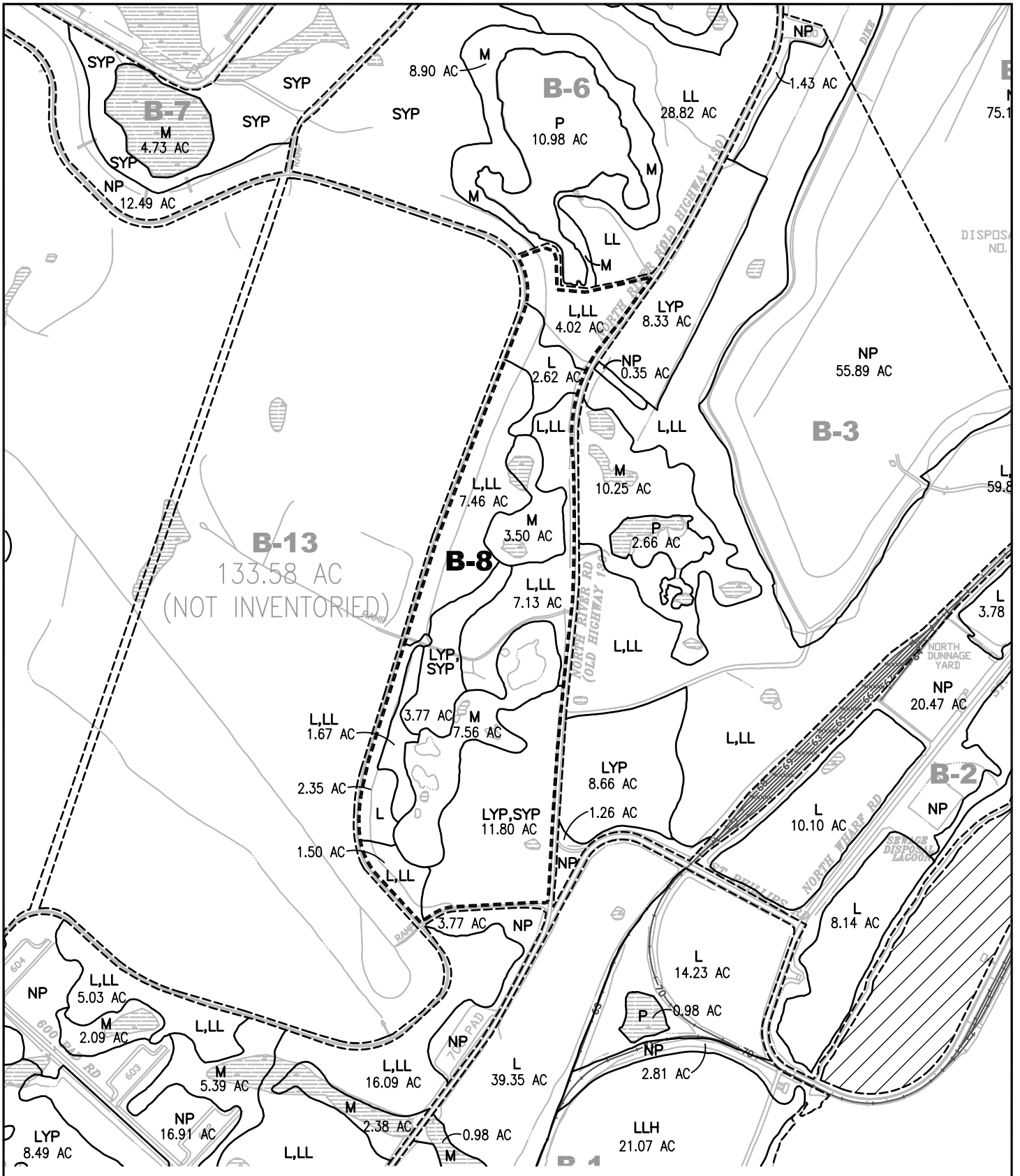
FIGURE III-S-21



B-8	
LYP,SYP	15.57 AC
L,LL	21.78 AC
L	4.97 AC
P/M	11.06 AC
TOTAL	53.38 AC

MAIN TERMINAL – FOREST MANAGEMENT BLOCKS
FOREST INVENTORY MAPS – B-8

MILITARY OCEAN TERMINAL
SUNNY POINT

FILE: B8	DRAWN BY: JEJ	0 660'
DATE: 4/13/98	APPROVED BY: SC	

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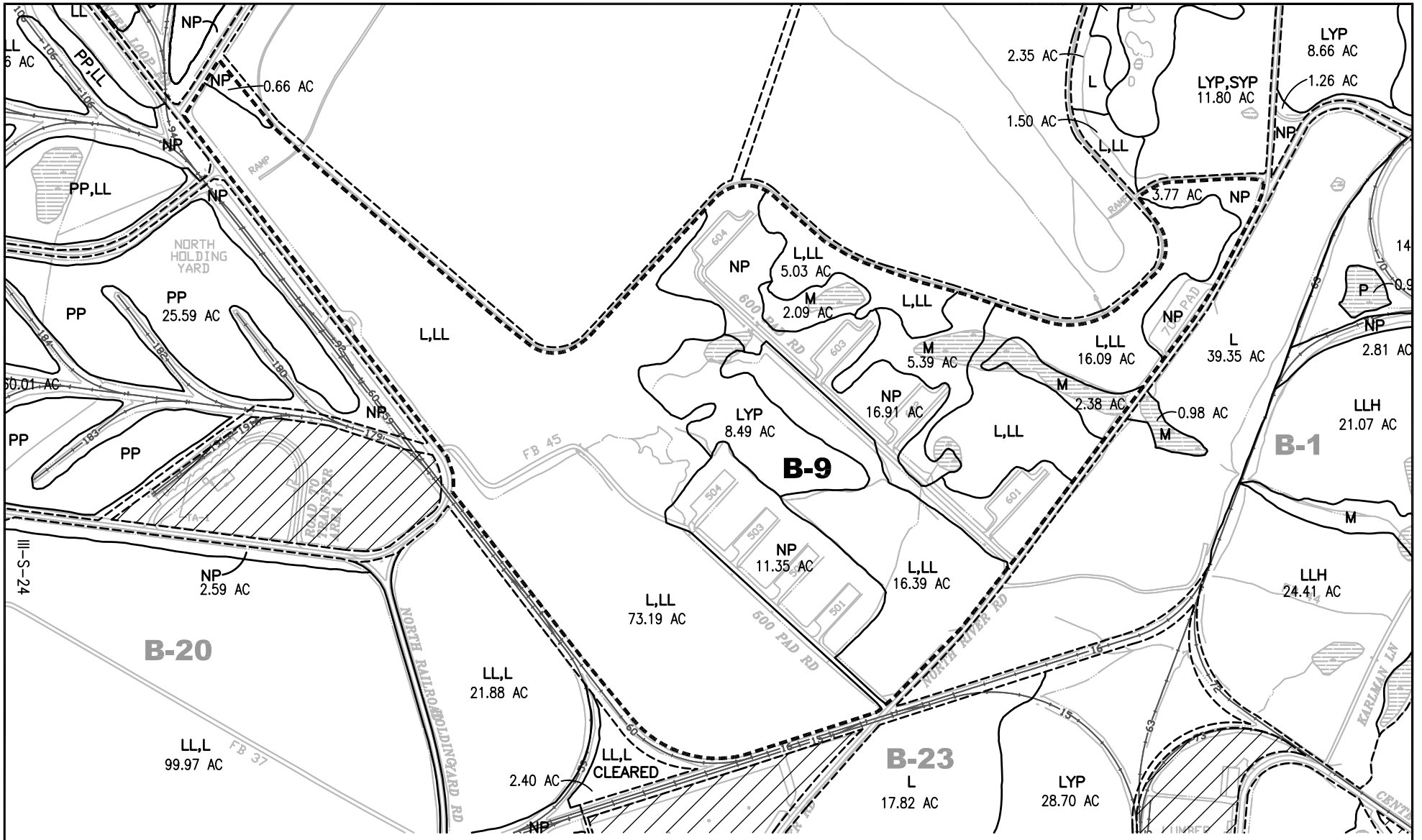
FIGURE III-S-22



B-9

L,LL	110.70 AC
LYP	8.49 AC
P/M	9.86 AC
NP	32.69 AC
TOTAL	161.74 AC

MAIN TERMINAL – FOREST MANAGEMENT BLOCKS
FOREST INVENTORY MAPS – B–9

MILITARY OCEAN TERMINAL
SUNNY POINT

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DATE: 4/13/98	APPROVED BY: SC	

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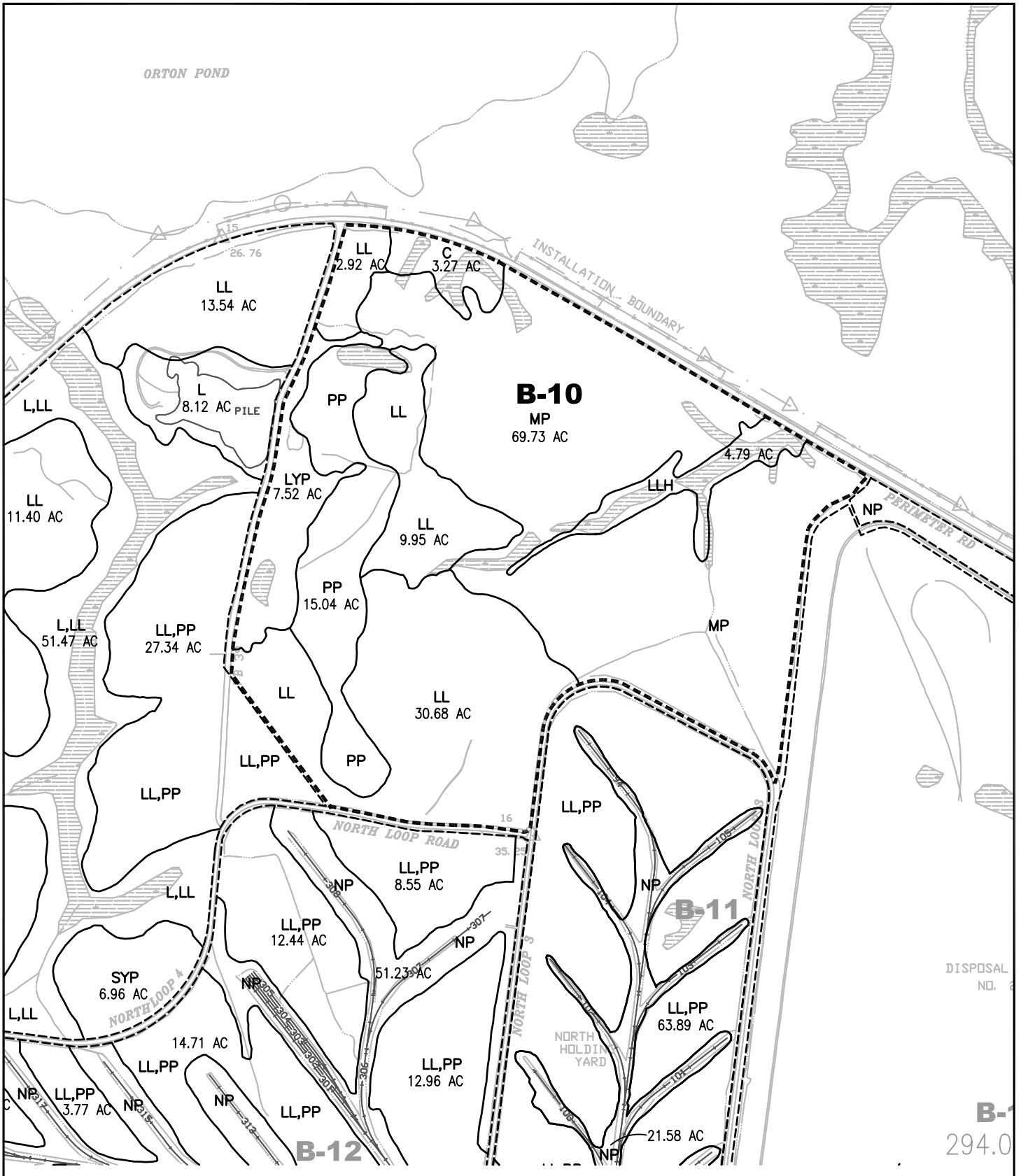
FIGURE III–S–23



B-10

LL	2.92 AC
C	3.27 AC
PP	15.04 AC
LL	9.95 AC
LL	30.68 AC
MP	69.73 AC
LLH	4.79 AC
LYP	7.52 AC
TOTAL	143.90 AC

MAIN TERMINAL – FOREST MANAGEMENT BLOCKS
FOREST INVENTORY MAPS – B–10

MILITARY OCEAN TERMINAL
SUNNY POINT

FILE: B10	DRAWN BY: JEJ	0 660'
DATE: 4/13/98	APPROVED BY: SC	

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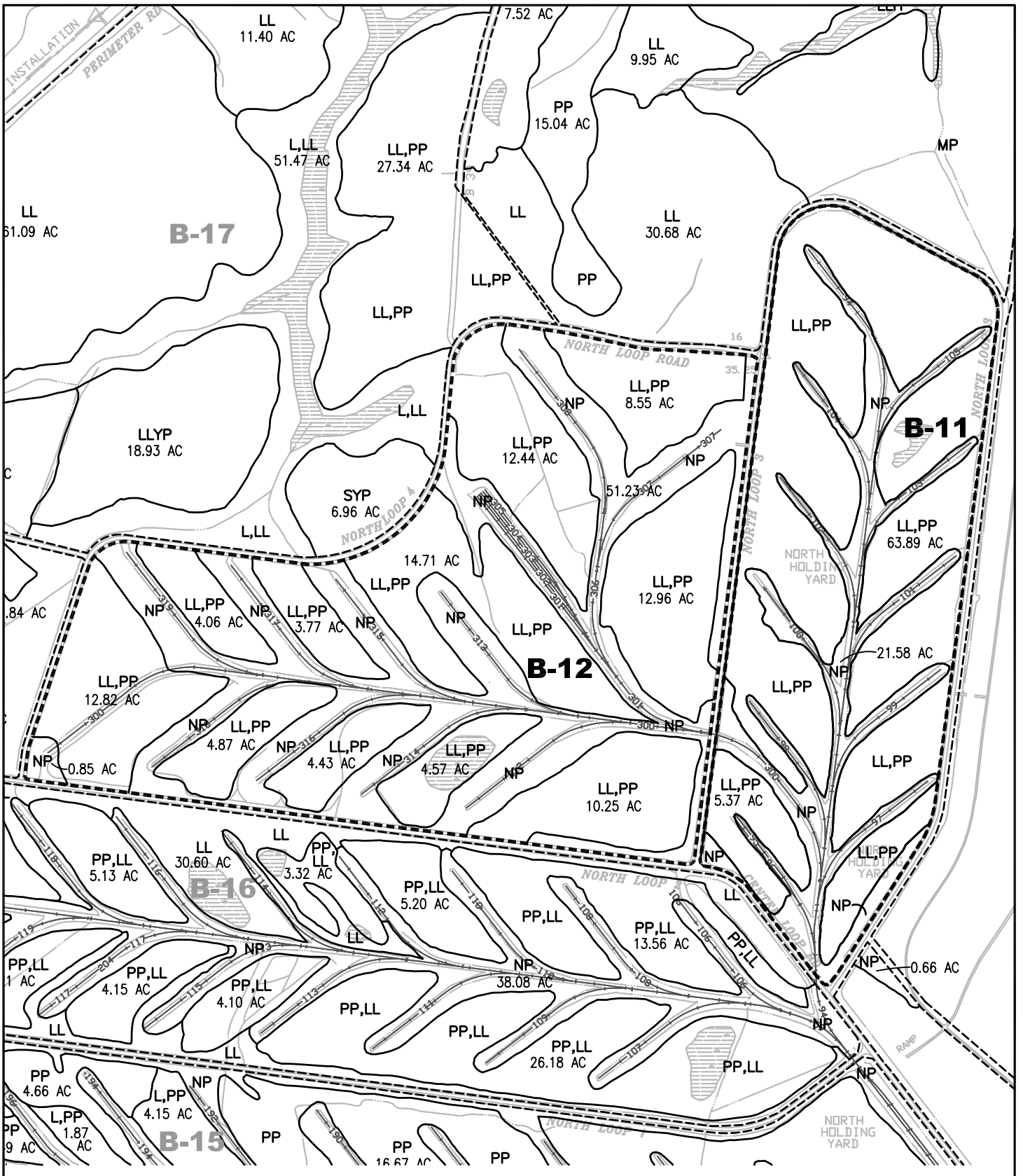
FIGURE III–S–24



B-11		B-12	
LL,PP	69.26 AC	LL,PP	93.43 AC
NP	21.58 AC	NP	52.08 AC
TOTAL	90.84 AC	TOTAL	145.51 AC

MAIN TERMINAL – FOREST MANAGEMENT BLOCKS
FOREST INVENTORY MAPS – B–11 & B–12

MILITARY OCEAN TERMINAL
SUNNY POINT

FILE: B11B12	DRAWN BY: JEJ	0 660'
DATE: 4/13/98	APPROVED BY: SC	

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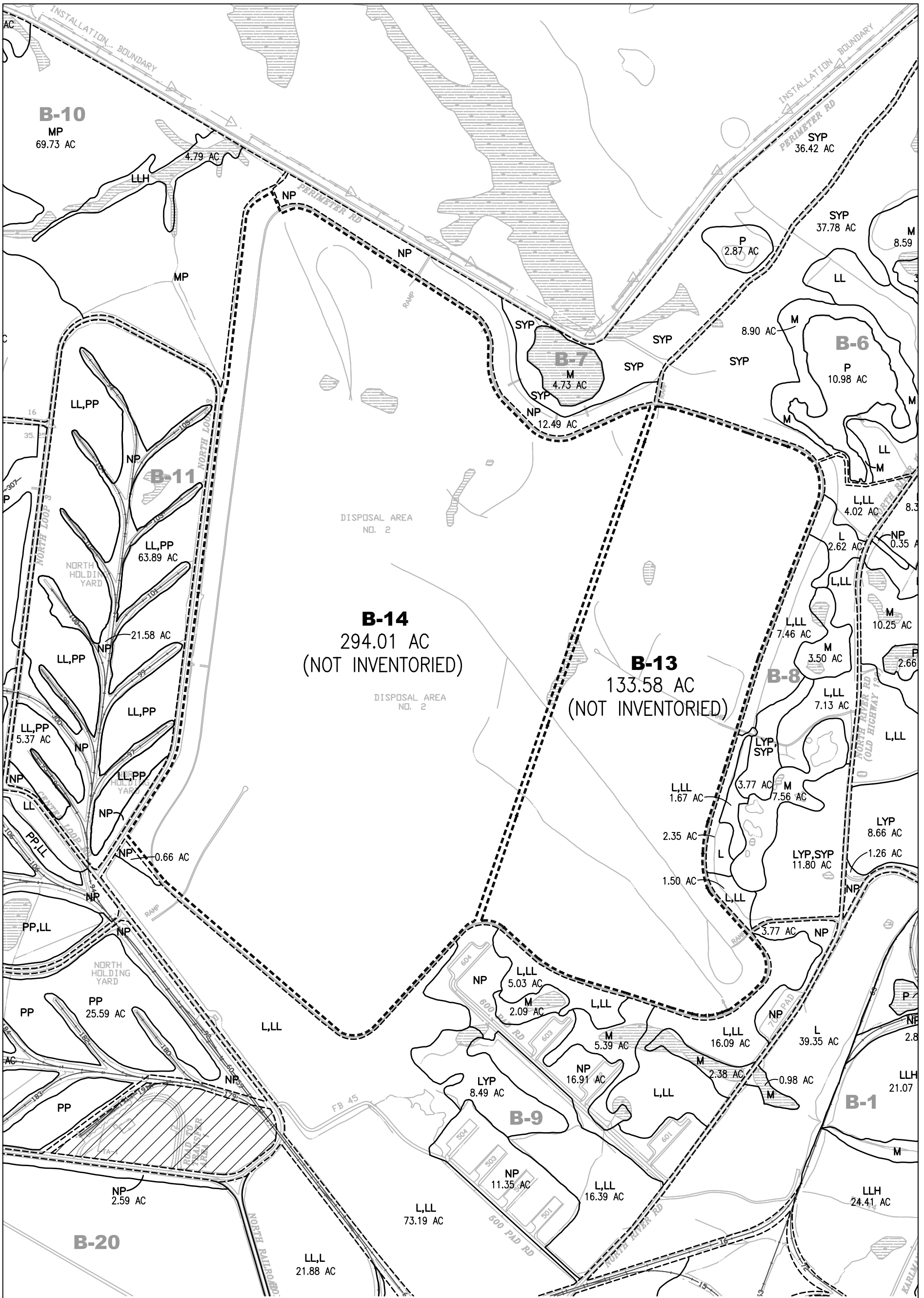
FIGURE III–S–25



B-13		B-14	
NP	133.58 AC	NP	294.01 AC
TOTAL	133.58 AC	TOTAL	294.01 AC

MAIN TERMINAL – FOREST MANAGEMENT BLOCKS
FOREST INVENTORY MAPS – B–13 & B–14

MILITARY OCEAN TERMINAL SUNNY POINT

FILE: B13B14	DRAWN BY: JEJ	0 660'
DATE: 4/13/98	APPROVED BY: SC	

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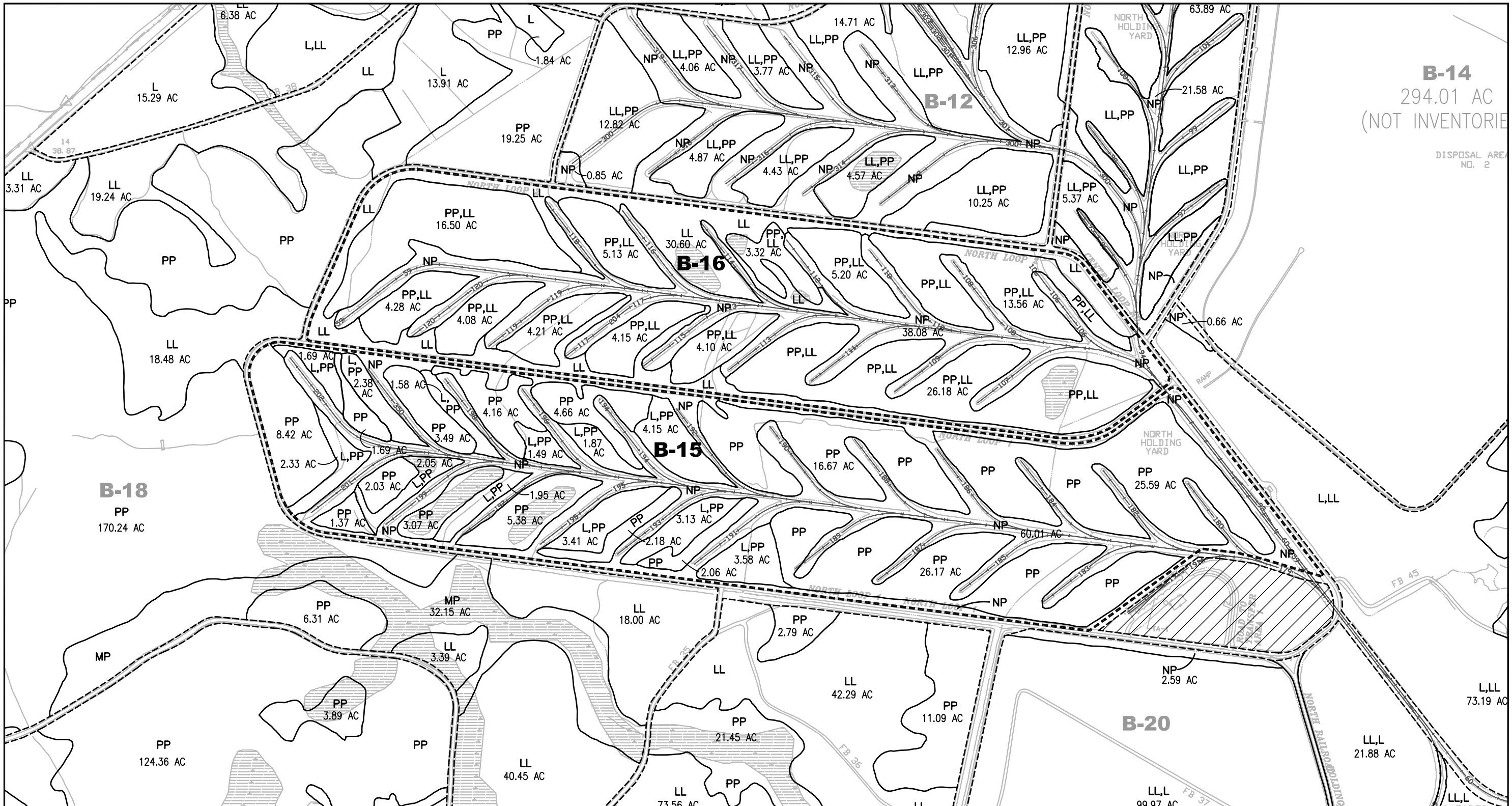
FIGURE III–S–26



B-15		B-16	
PP	106.94 AC	PP,LL	90.71 AC
L,PP	29.61 AC	LL	30.
NP	60.01 AC	NP	38.08 AC
TOTAL	196.56 AC	TOTAL	159.39 AC

MAIN TERMINAL – FOREST MANAGEMENT BLOCKS
FOREST INVENTORY MAPS – B–15 & B–16

MILITARY OCEAN TERMINAL
SUNNY POINT

FILE: B15B16	DRAWN BY: JEJ	0 660'
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FIGURE III–S–27

B-17

L	15.29 AC	SYP	6.96 AC
LL	6.38 AC	L,LL	51.47 AC
L,LL	16.51 AC	LL	11.40 AC
PP	16.09 AC	LL	13.54 AC
LL	61.09 AC	L	8.12 AC
LYP	9.28 AC		
LLYP	18.93 AC		
LL,PP	27.34 AC		

TOTAL 262.40 AC

MAIN TERMINAL – FOREST MANAGEMENT BLOCKS
FOREST INVENTORY MAPS – B–17

MILITARY OCEAN TERMINAL
SUNNY POINT

FILE: B17 | DRAWN BY: JEJ | 0 660'
DATE: 4/13/98 | APPROVED BY: SC

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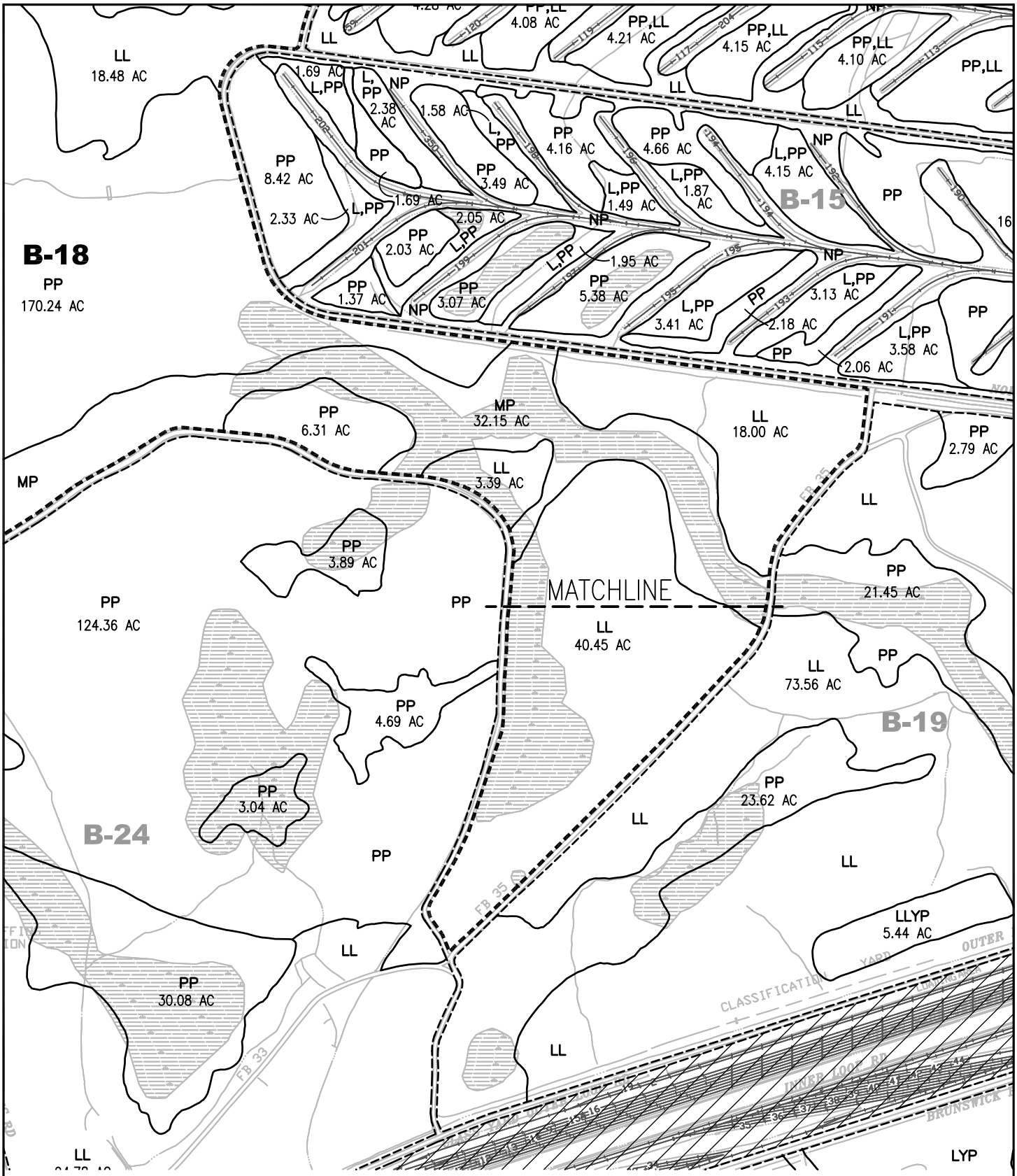
FIGURE III–S–28



MAIN TERMINAL – FOREST MANAGEMENT BLOCKS
FOREST INVENTORY MAPS – B–18

MILITARY OCEAN TERMINAL
SUNNY POINT

FILE: B18	DRAWN BY: JEJ	0 660'
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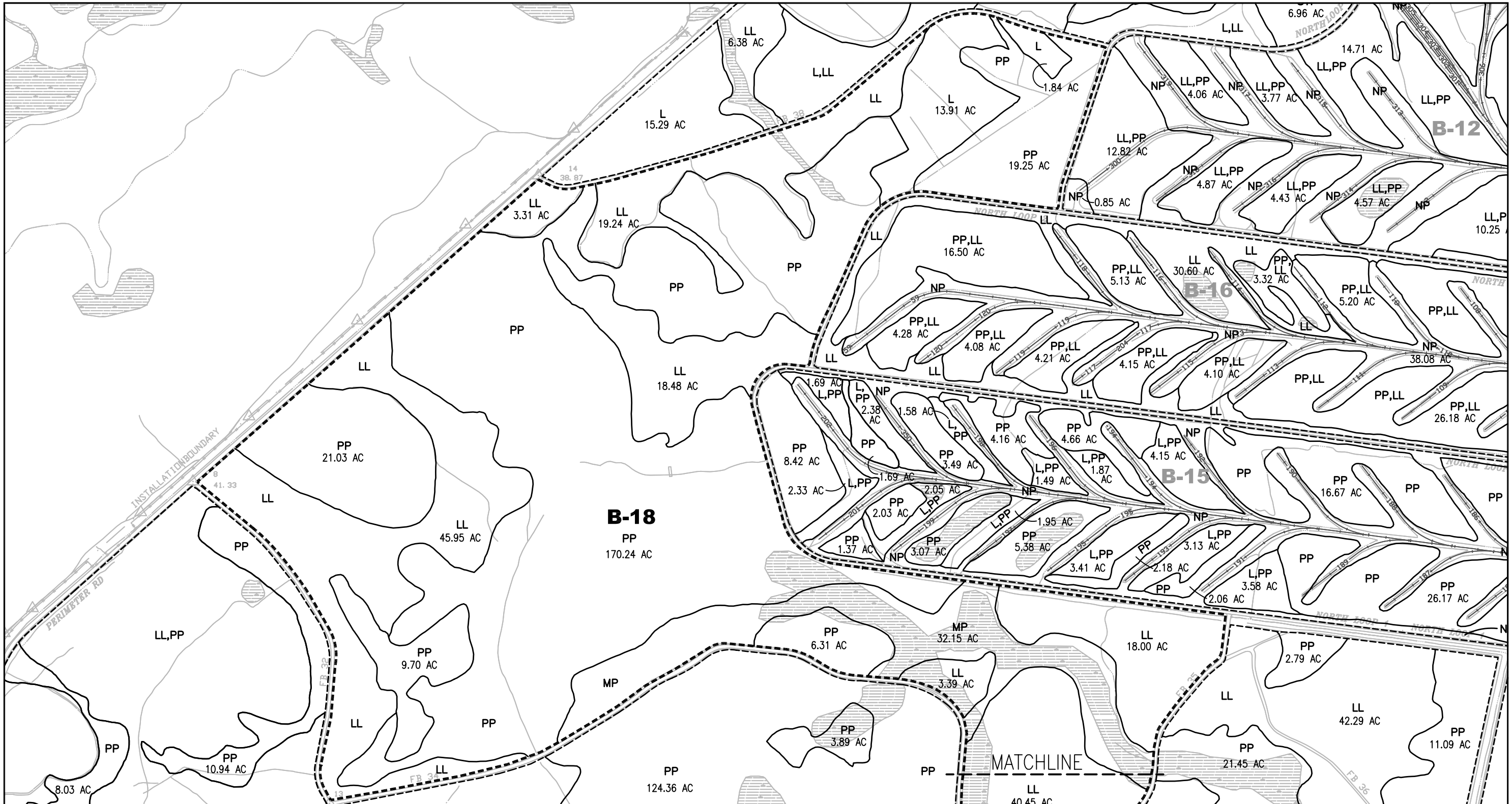
FIGURE III–S–29A



B-18

PP	195.80 AC
LL	148.82 AC
MP	32.15 AC
PP	30.73 AC
L	15.75 AC
TOTAL	423.25 AC

MAIN TERMINAL – FOREST MANAGEMENT BLOCKS
FOREST INVENTORY MAPS – B–18

MILITARY OCEAN TERMINAL
SUNNY POINT

FILE: B18	DRAWN BY: JEJ	0 660'
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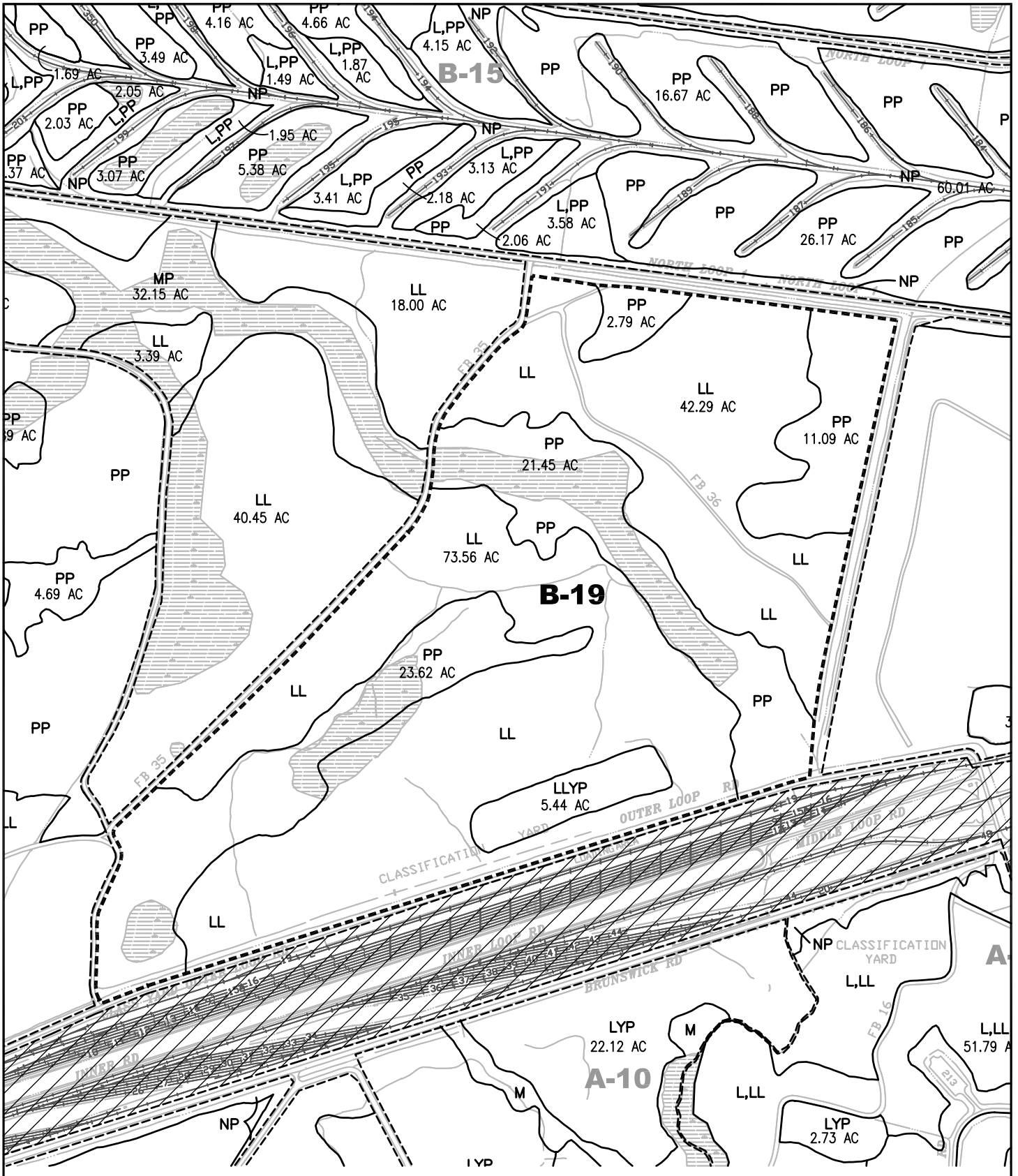
FIGURE III–S–29B



B-19	
LL	115.85 AC
LLYP	5.44 AC
PP	58.95 AC
TOTAL	180.24 AC

III-S-32

MAIN TERMINAL – FOREST MANAGEMENT BLOCKS
FOREST INVENTORY MAPS – B-19

MILITARY OCEAN TERMINAL
SUNNY POINT

FILE: B19	DRAWN BY: JEJ	0 660'
DATE: 4/13/98	APPROVED BY: SC	

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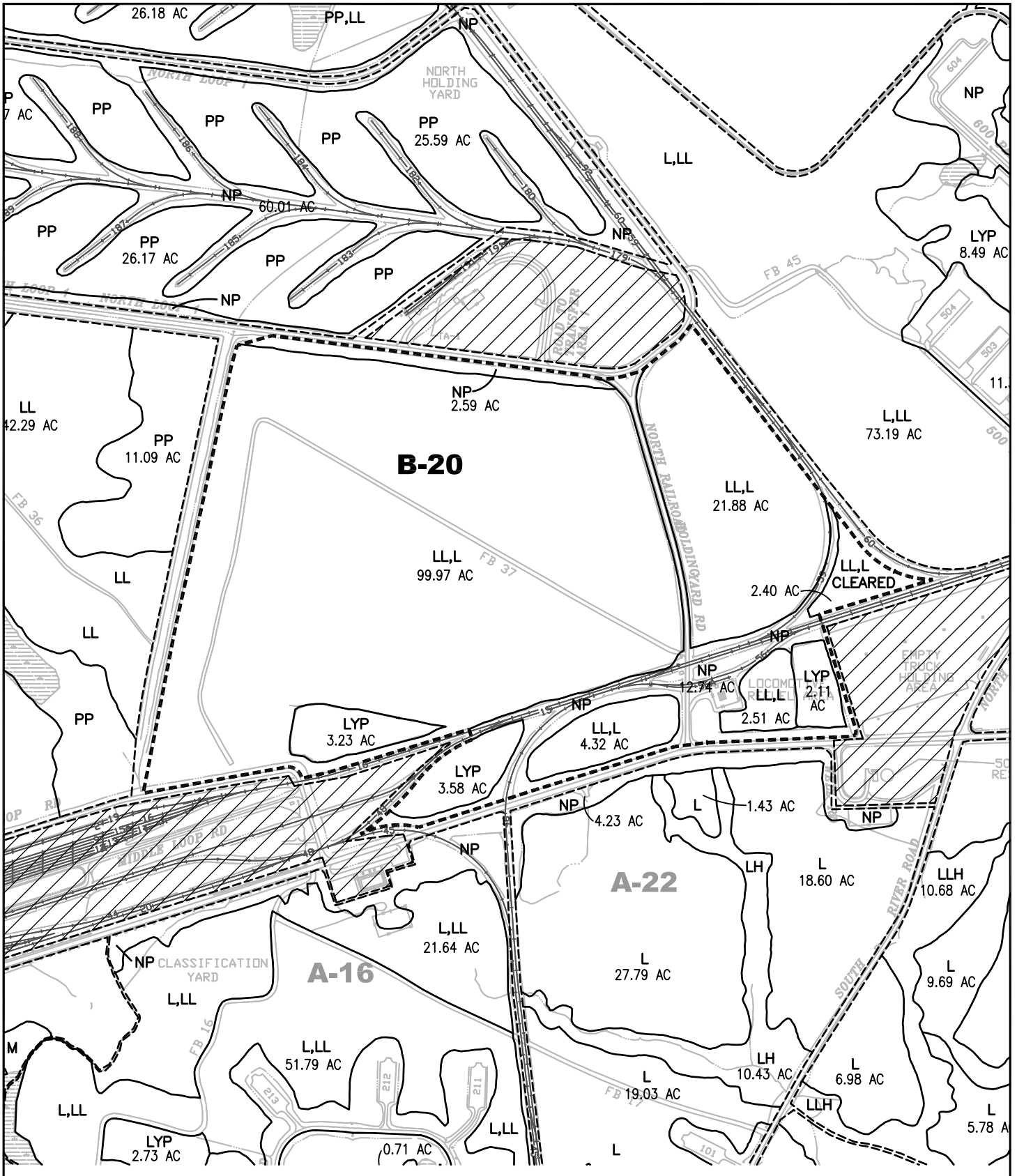
FIGURE III-S-30



MAIN TERMINAL – FOREST MANAGEMENT BLOCKS
FOREST INVENTORY MAPS – B–20

MILITARY OCEAN TERMINAL
SUNNY POINT

FILE: B20	DRAWN BY: JEJ	0 660'
DATE: 4/13/98	APPROVED BY: SC	

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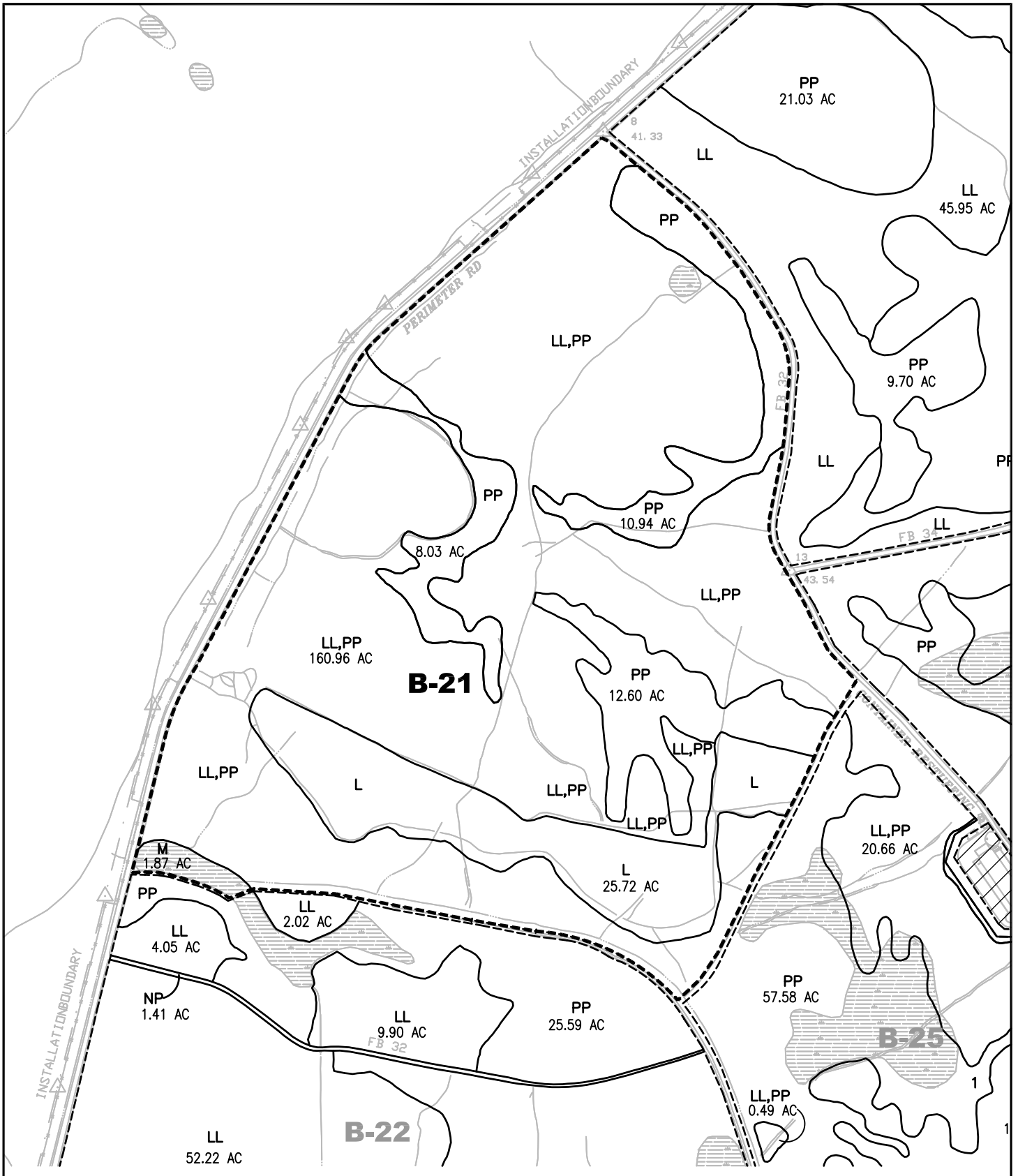
FIGURE III–S–31

B-20

LL,L	131.08 AC
LYP	8.92 AC
NP	15.33 AC
TOTAL	155.33 AC



B-21

LL,PP	160.96 AC
L	25.72 AC
PP	31.57 AC
P/M	1.87 AC
TOTAL	220.12 AC

III-S-34

MAIN TERMINAL – FOREST MANAGEMENT BLOCKS
FOREST INVENTORY MAPS – B-21

MILITARY OCEAN TERMINAL
SUNNY POINT

FILE: B21	DRAWN BY: JEJ	0 660'
DATE: 4/13/98	APPROVED BY: SC	

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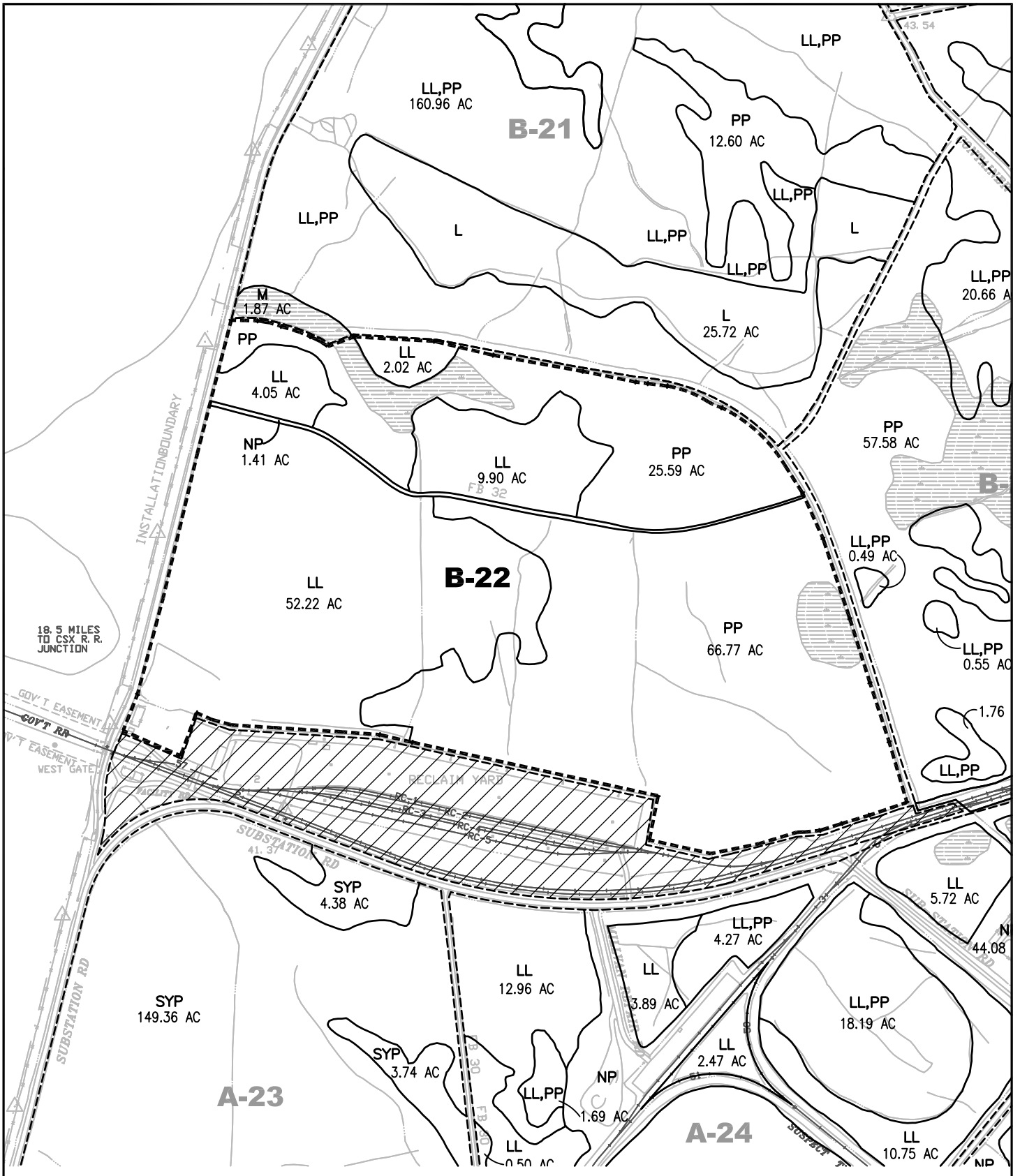
FIGURE III-S-32



B-22	
PP	92.36 AC
LL	68.19 AC
NP	1.41 AC
TOTAL	161.96 AC

III-S-35

MAIN TERMINAL – FOREST MANAGEMENT BLOCKS
FOREST INVENTORY MAPS – B-22

MILITARY OCEAN TERMINAL
SUNNY POINT

FILE: B22	DRAWN BY: JEJ	0 660'
DATE: 4/13/98	APPROVED BY: SC	

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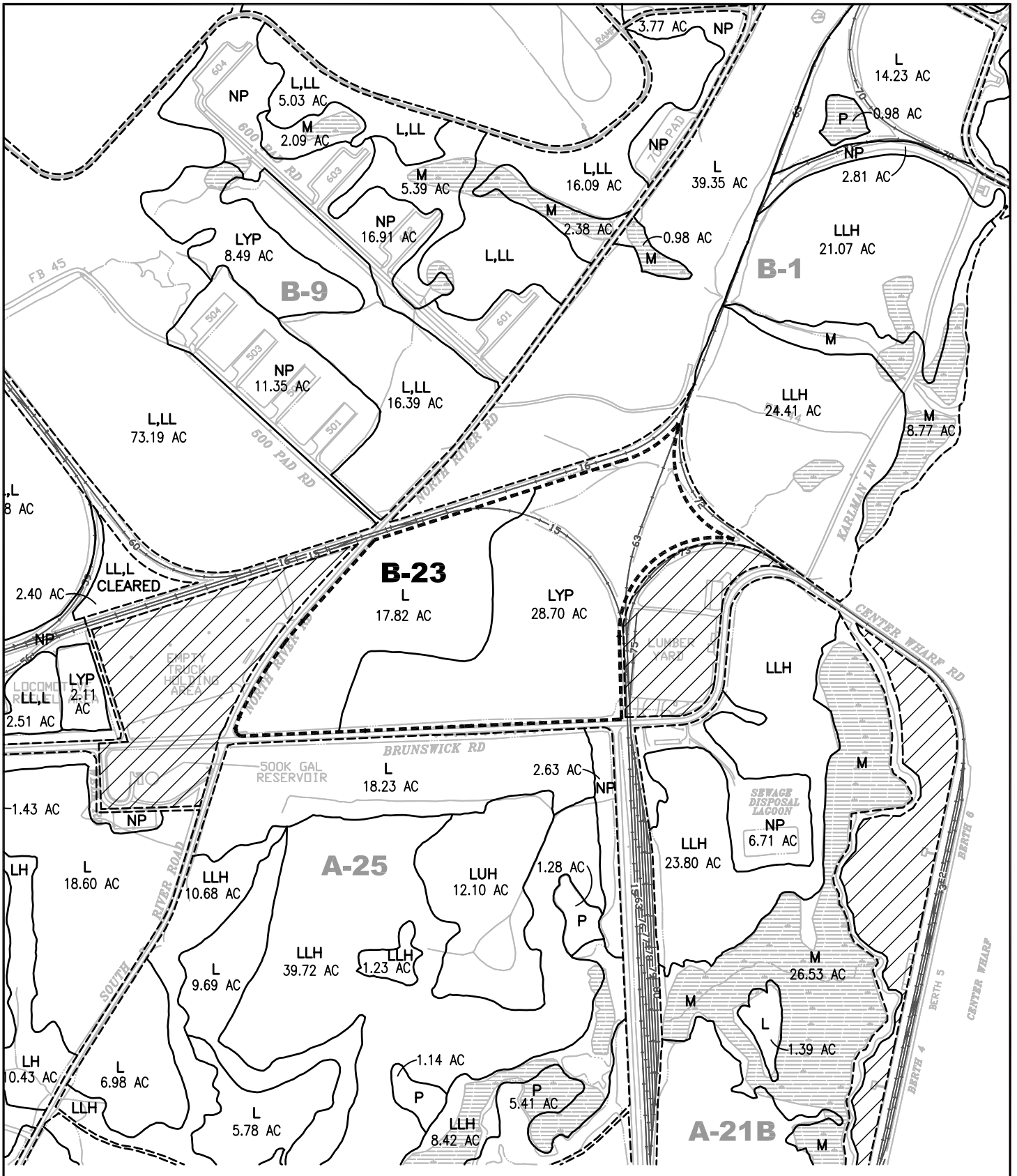
FIGURE III-S-33



MAIN TERMINAL – FOREST MANAGEMENT BLOCKS
FOREST INVENTORY MAPS – B–23

MILITARY OCEAN TERMINAL
SUNNY POINT

FILE: B23	DRAWN BY: JEJ	0 660'
DATE: 4/13/98	APPROVED BY: SC	

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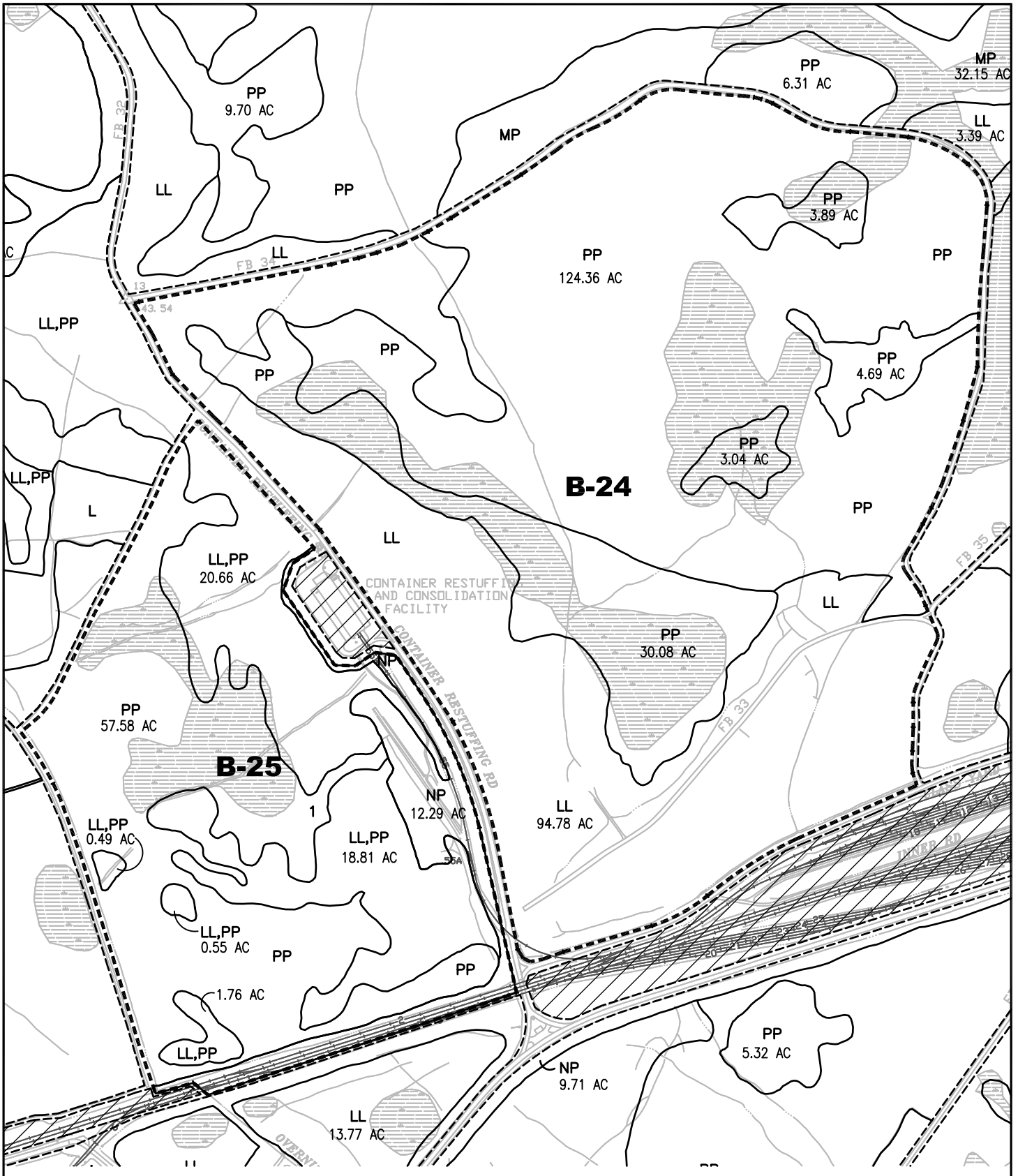
FIGURE III–S–34

B-23

LYP	28.70 AC
L	17.82 AC
TOTAL	46.52 AC



B-24		B-25	
PP	124.36 AC	PP	57.58 AC
LL	94.78 AC	LL,PP	42.27 AC
PP	41.70 AC	NP	12.29 AC
TOTAL	260.84 AC	TOTAL	112.14 AC

MAIN TERMINAL – FOREST MANAGEMENT BLOCKS
FOREST INVENTORY MAPS – B–24 & B–25

MILITARY OCEAN TERMINAL
SUNNY POINT

FILE: B24B25	DRAWN BY: JEJ	0 660'
DATE: 4/13/98	APPROVED BY: SC	

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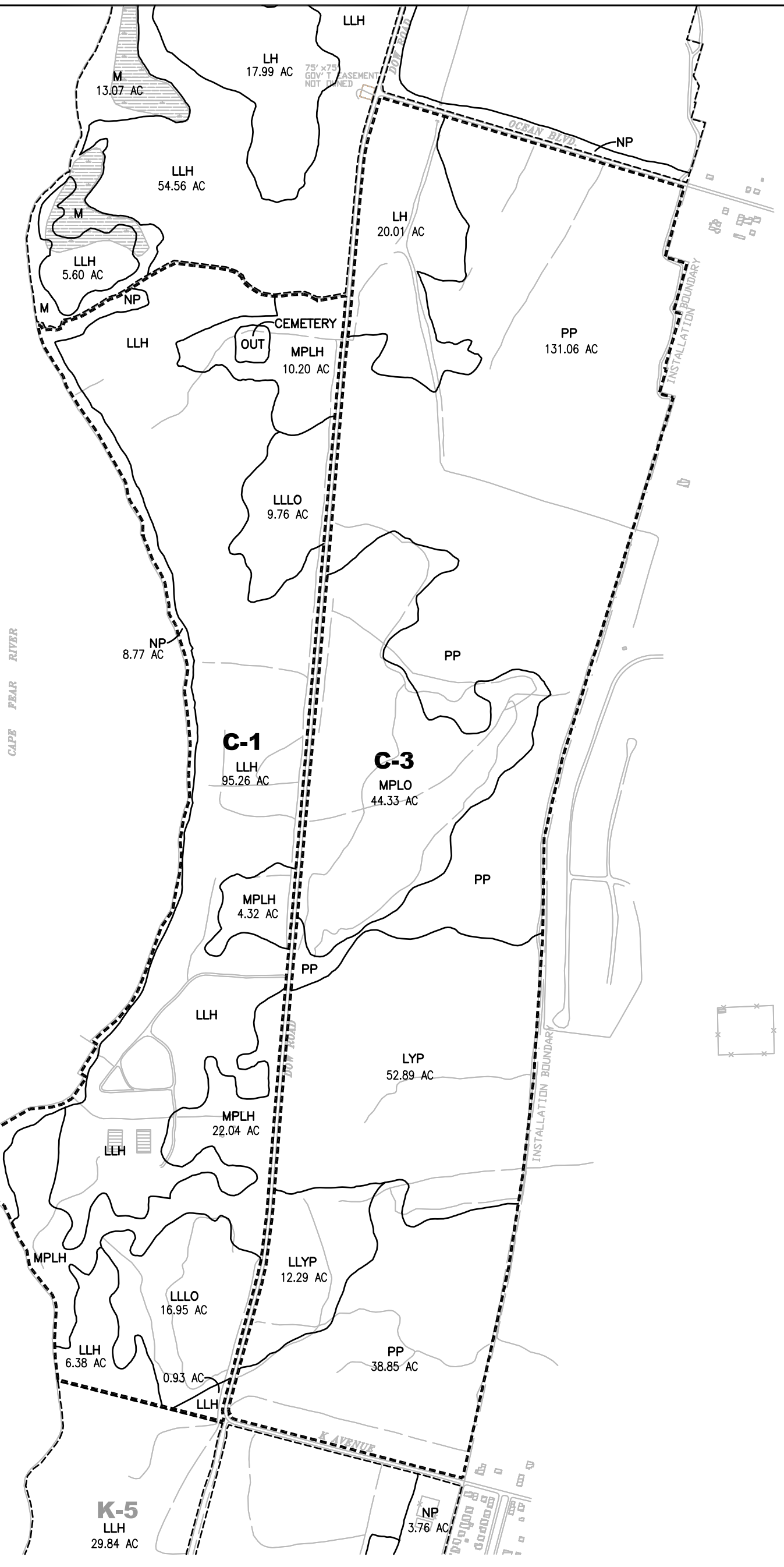
FIGURE III–S–35



C-1		C-3	
LLH	102.57 AC	PP	169.91 AC
LLLO	26.71 AC	LH	20.01 AC
MPLH	36.56 AC	MPLO	44.33 AC
NP	8.77 AC	LYP	52.89 AC
		LLYP	12.29 AC
TOTAL	174.61 AC	TOTAL	299.43 AC

CAROLINA BEACH BLAST SAFETY ZONE
FOREST MANAGEMENT BLOCKS
FOREST INVENTORY MAPS – C-1 & C-3

MILITARY OCEAN TERMINAL
SUNNY POINT

FILE: C1C3	DRAWN BY: JEJ	0 660'
DATE: 4/13/98	APPROVED BY: SC	

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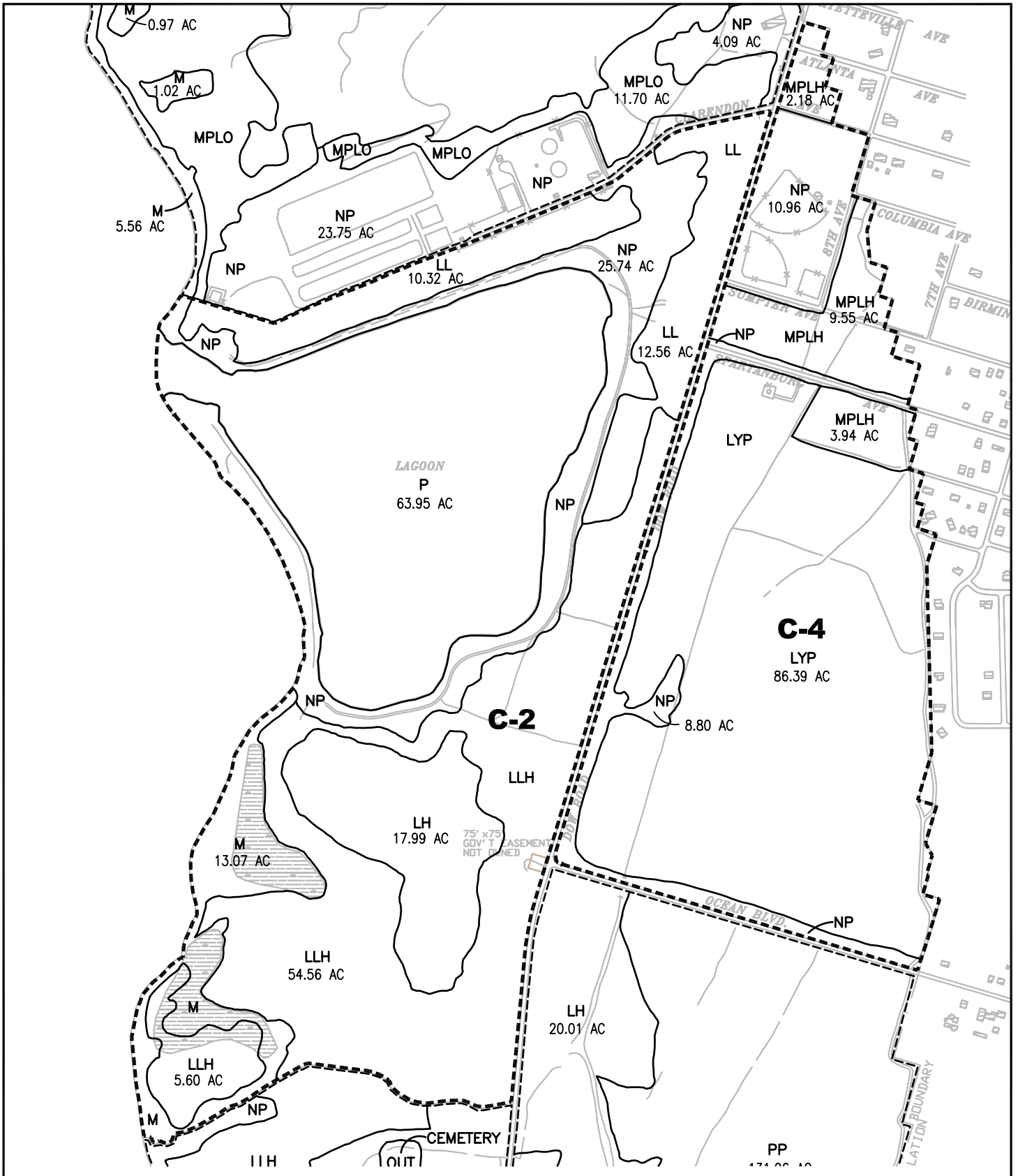
FIGURE III-S-36



C-2		C-4	
LLH	60.16 AC	MPLH	15.67 AC
LL	22.88 AC	LYP	86.39 AC
LH	17.99 AC		
P/M	77.02 AC		
NP	25.74 AC	NP	19.76 AC
TOTAL	203.79 AC	TOTAL	121.82 AC

CAROLINA BEACH BLAST SAFETY ZONE
FOREST MANAGEMENT BLOCKS
FOREST INVENTORY MAPS – C-2 & C-4

MILITARY OCEAN TERMINAL
SUNNY POINT

FILE: C2C4	DRAWN BY: JEJ	0 660'
DATE: 4/13/98	APPROVED BY: SC	

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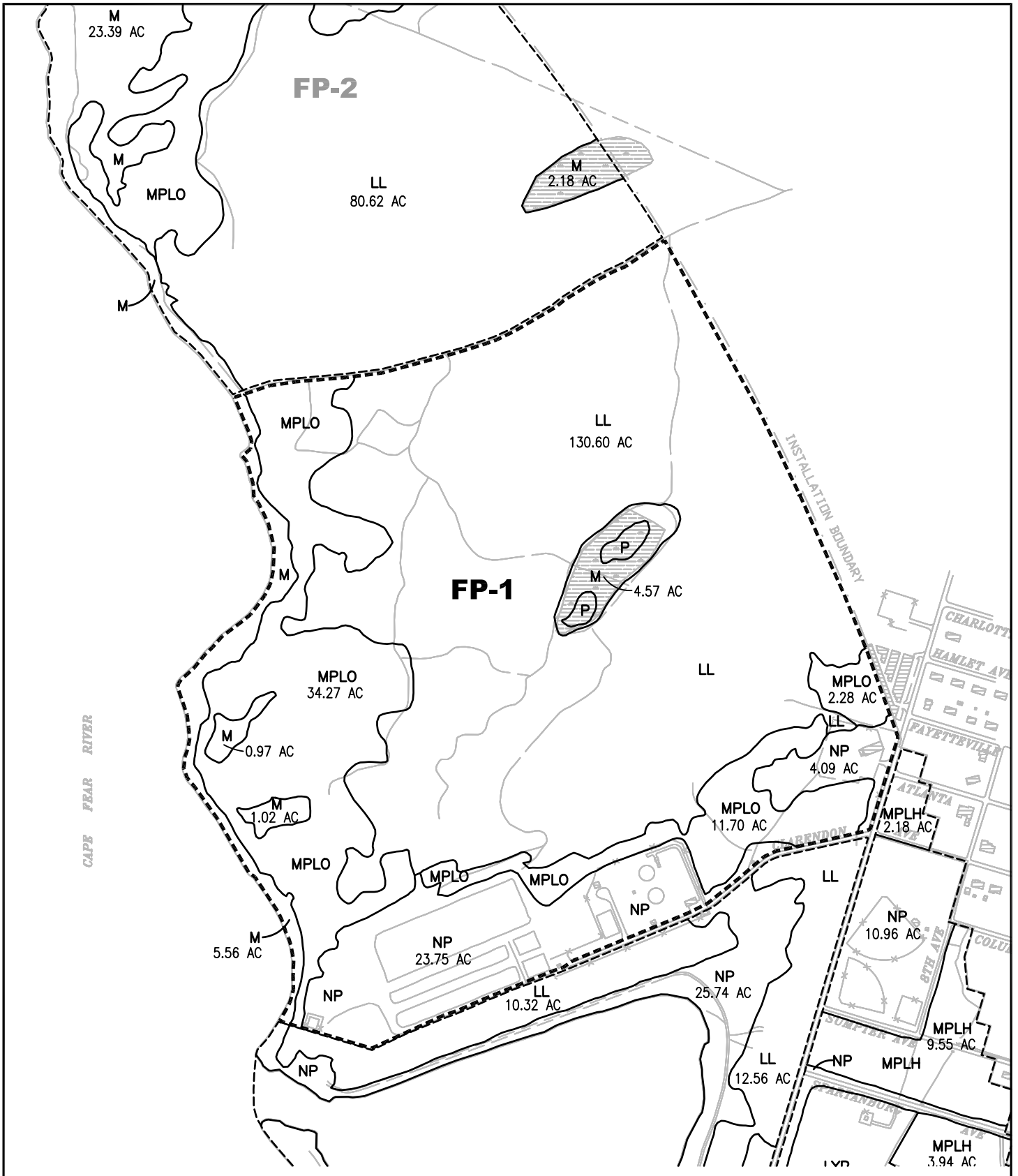
FIGURE III-S-37



FP-1	
MPLO	48.25 AC
LL	130.60 AC
P/M	12.12 AC
NP	27.84 AC
TOTAL	218.81 AC

CAROLINA BEACH BLAST SAFETY ZONE
FOREST MANAGEMENT BLOCKS
FOREST INVENTORY MAPS – FP–1

MILITARY OCEAN TERMINAL
SUNNY POINT

FILE: FP1	DRAWN BY: JEJ	0 660'
DATE: 4/13/98	APPROVED BY: SC	

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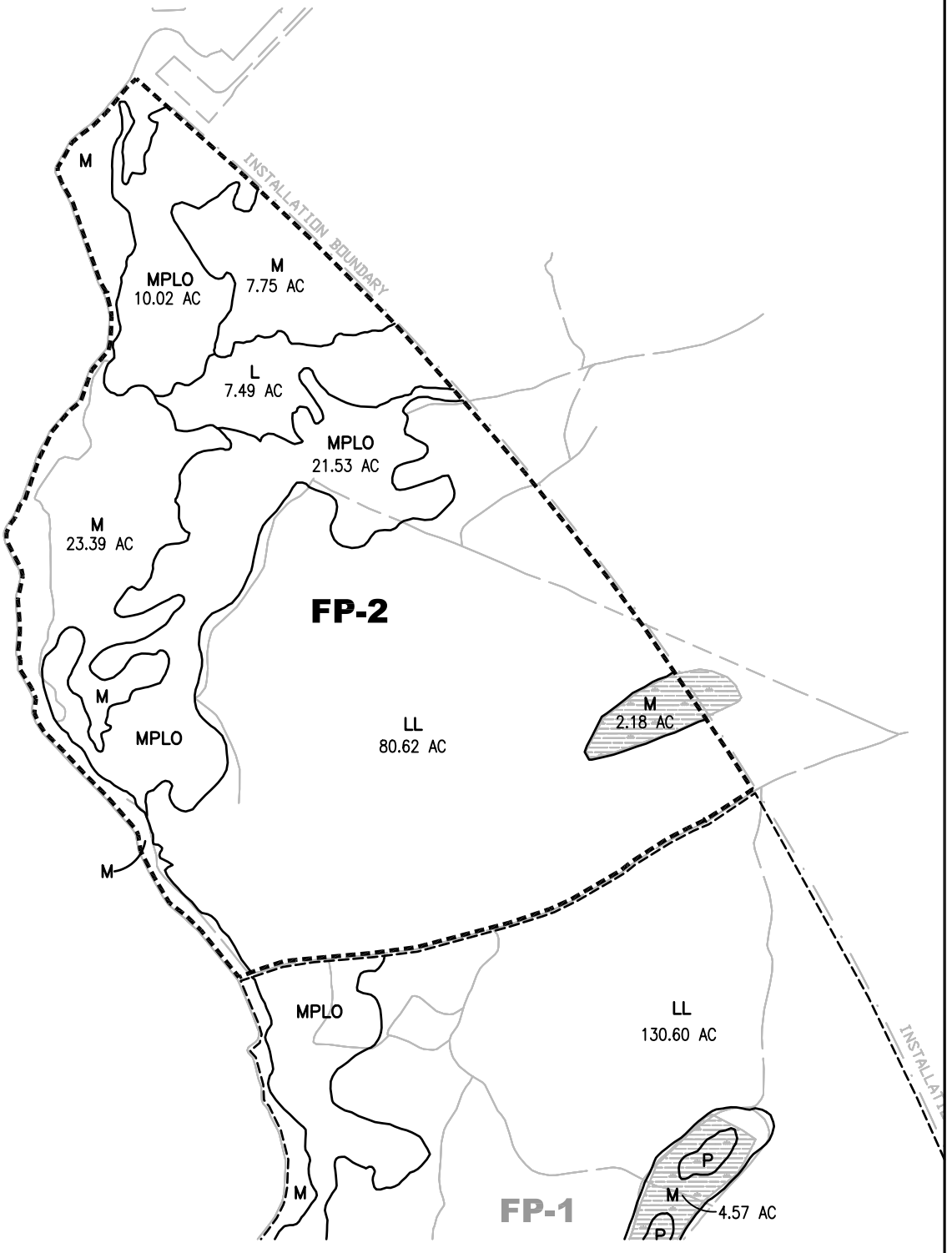
FIGURE III–S–38



FP-2

MPLO	31.55 AC
LL	80.62 AC
L	7.49 AC
P/M	33.32 AC
TOTAL	152.98 AC

CAROLINA BEACH BLAST SAFETY ZONE
FOREST MANAGEMENT BLOCKS
FOREST INVENTORY MAPS – FP–2

MILITARY OCEAN TERMINAL SUNNY POINT

FILE: FP2	DRAWN BY: JEJ	0 660'
DATE: 4/13/98	APPROVED BY: SC	

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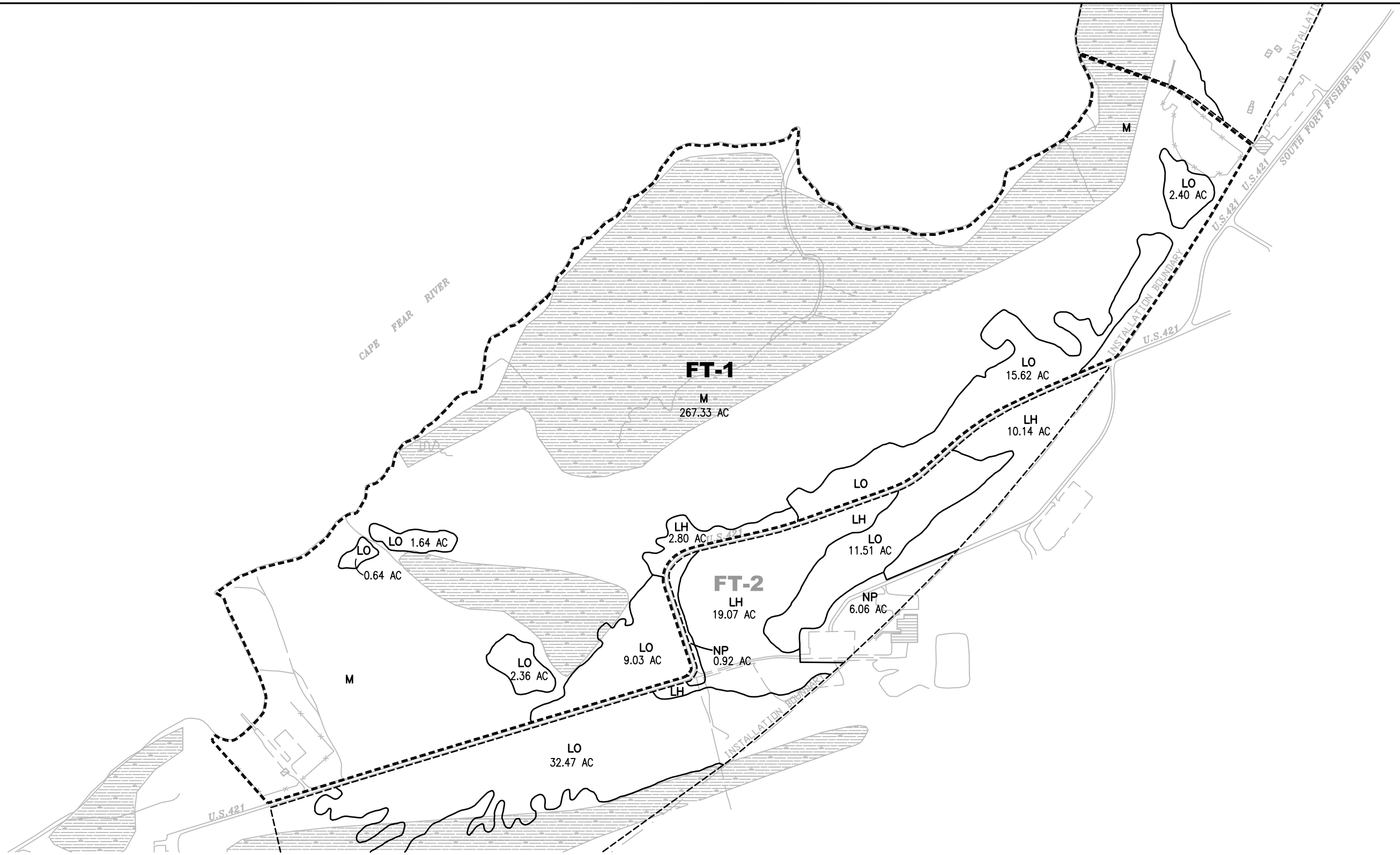
FIGURE III–S–39



FT-1

LO	31.69 AC
LH	2.80 AC
P/M	267.33 AC
TOTAL	301.82 AC

CAROLINA BEACH BLAST SAFETY ZONE
FOREST MANAGEMENT BLOCKS
FOREST INVENTORY MAPS – FT-1

MILITARY OCEAN TERMINAL
SUNNY POINT

FILE: FT1	DRAWN BY: JEJ	0 660'
DATE: 2/27/98	APPROVED BY: SC	

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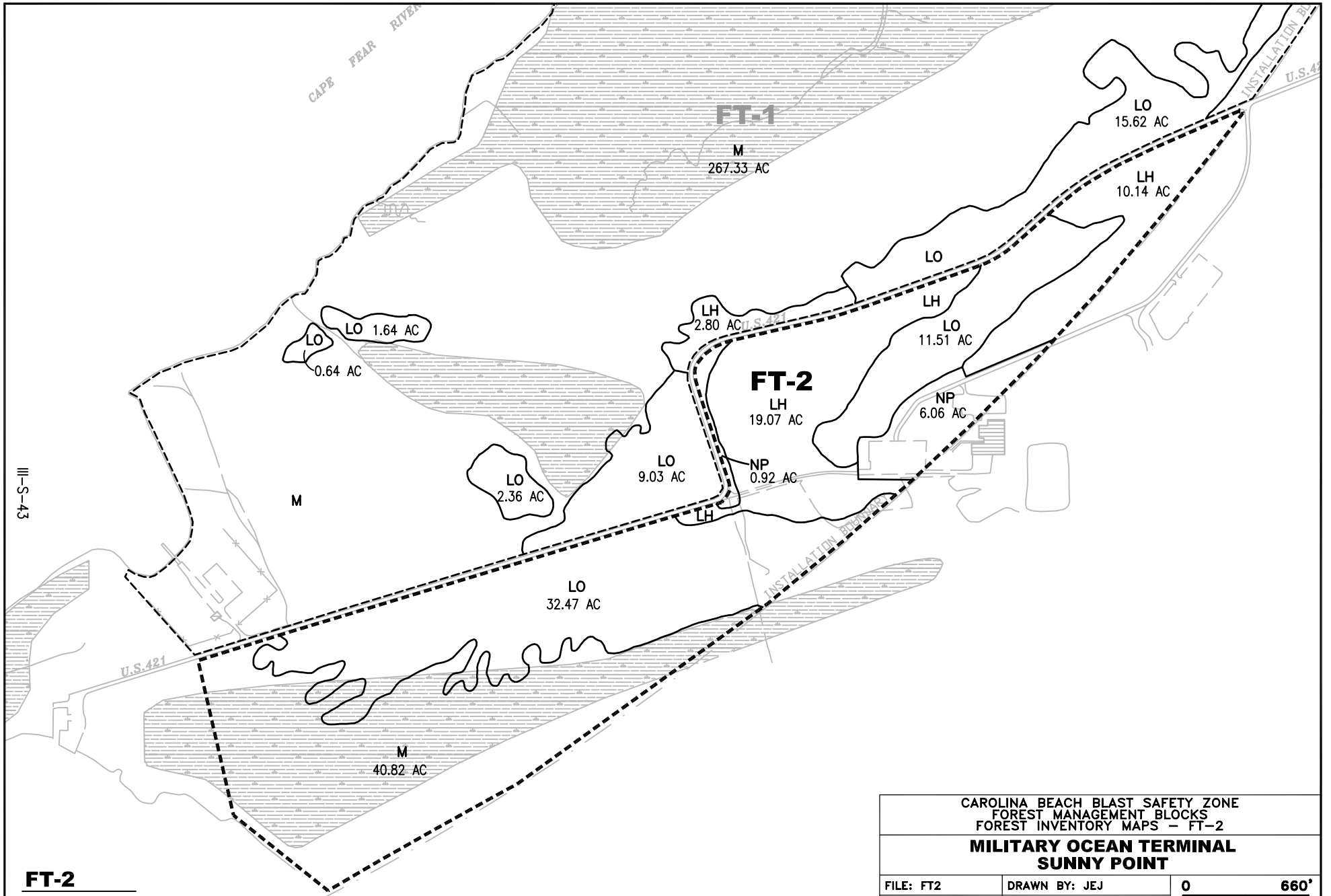
FIGURE III-S-40



III-S-43

FT-2

LO	43.98 AC
LH	29.21 AC
P/M	40.82 AC
NP	6.98 AC
TOTAL	120.99 AC

CAROLINA BEACH BLAST SAFETY ZONE
FOREST MANAGEMENT BLOCKS
FOREST INVENTORY MAPS – FT-2

MILITARY OCEAN TERMINAL
SUNNY POINT

FILE: FT2	DRAWN BY: JEJ	0 660'
DATE: 2/27/98	APPROVED BY: SC	

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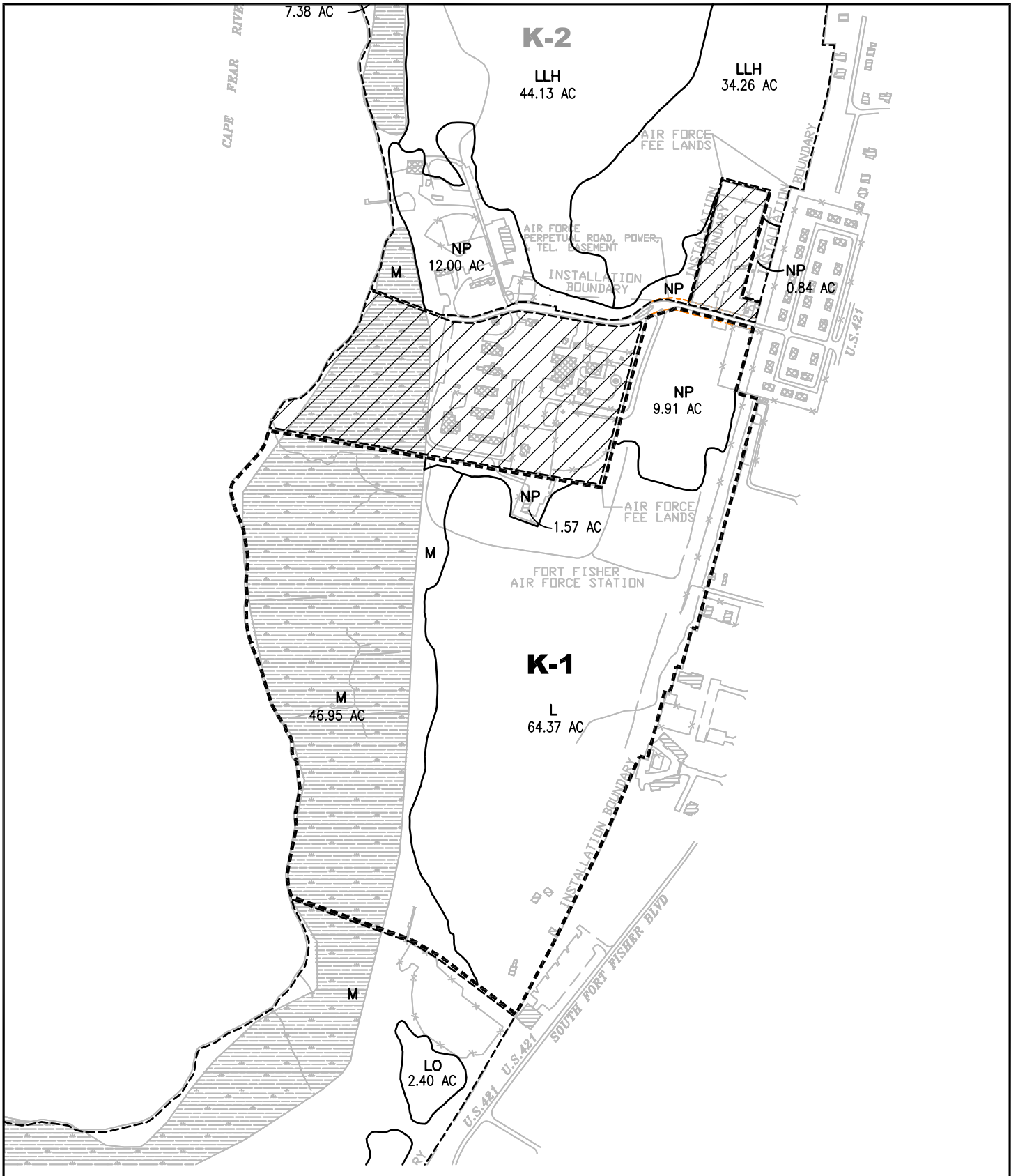
CP#1627.03

FIGURE III-S-41



K-1

L	64.37 AC
P/M	46.95 AC
NP	11.48 AC
TOTAL	122.80 AC

CAROLINA BEACH BLAST SAFETY ZONE
FOREST MANAGEMENT BLOCKS
FOREST INVENTORY MAPS – K–1

MILITARY OCEAN TERMINAL
SUNNY POINT

FILE: K1	DRAWN BY: JEJ	0 660'
DATE: 4/13/98	APPROVED BY: SC	

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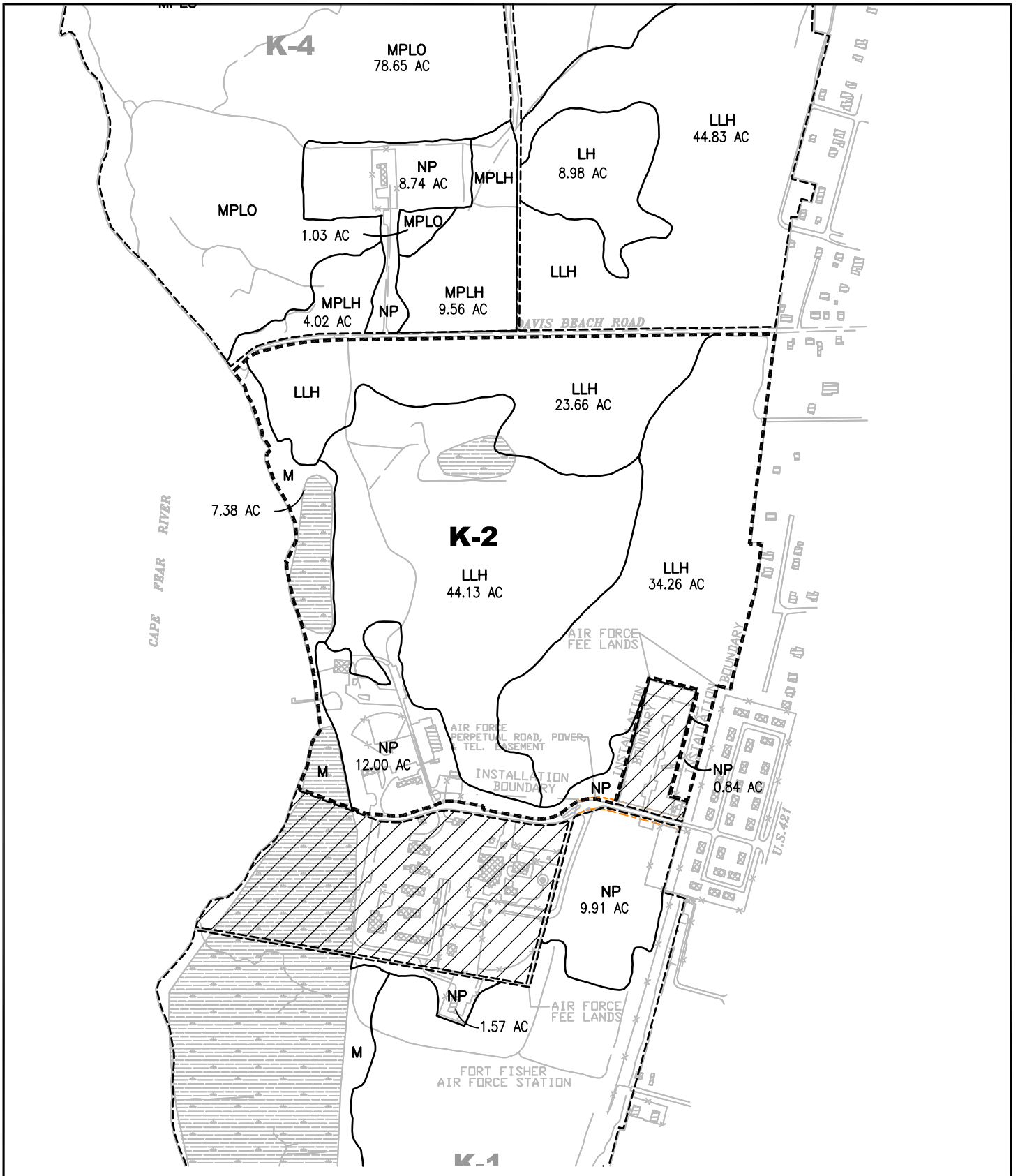
FIGURE III–S–42



K-2

LLH	34.26 AC
LLH	44.13 AC
LLH	23.66 AC
P/M	7.38 AC
NP	12.84 AC
TOTAL	122.27 AC

CAROLINA BEACH BLAST SAFETY ZONE
FOREST MANAGEMENT BLOCKS
FOREST INVENTORY MAPS – K–2

MILITARY OCEAN TERMINAL
SUNNY POINT

FILE: K2	DRAWN BY: JEJ	0 660'
DATE: 4/13/98	APPROVED BY: SC	

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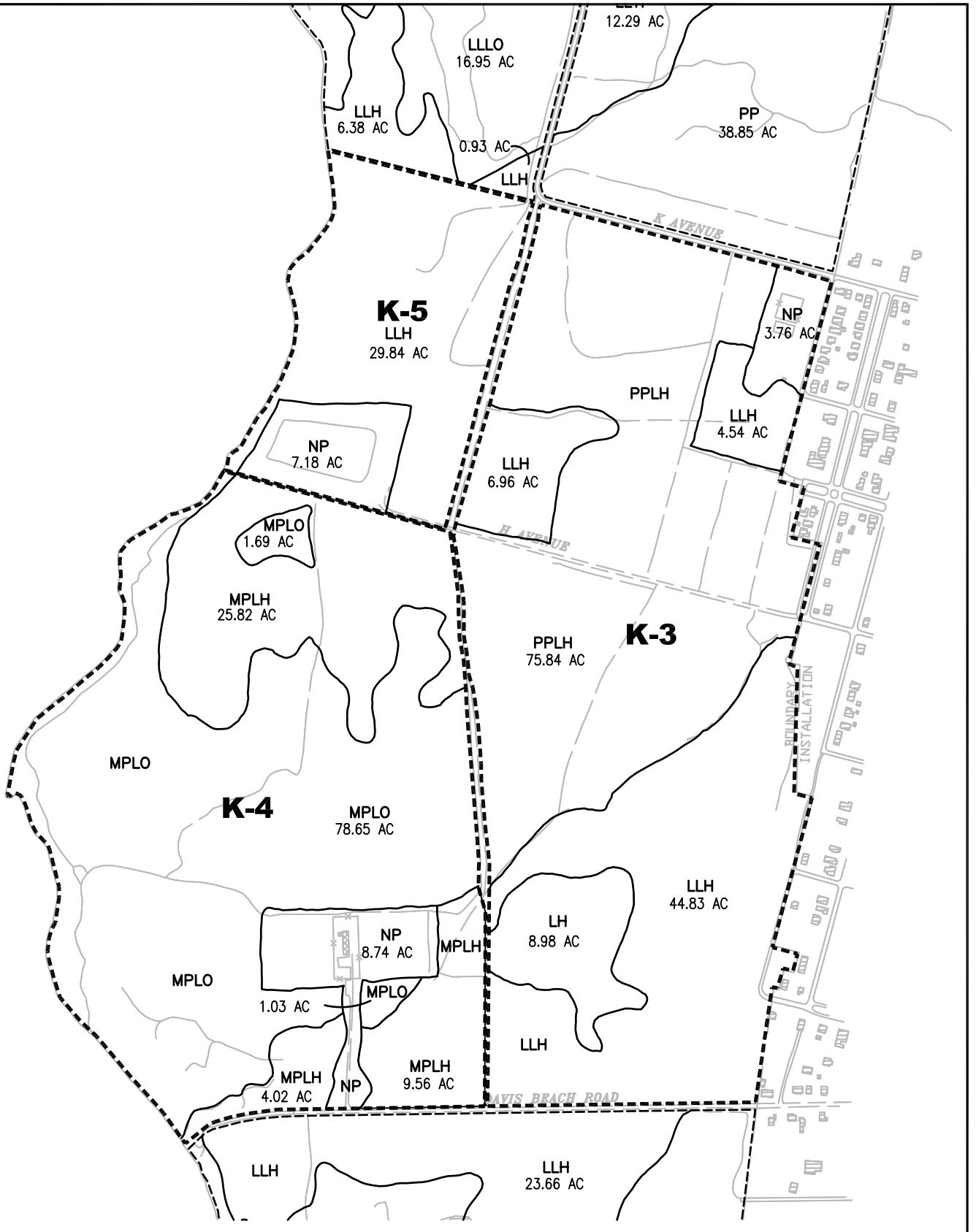
CP#1627.03

FIGURE III–S–43



K-3		K-4		K-5	
LLH	56.33 AC	MPLH	39.40 AC	LLH	29.84 AC
PPLH	75.84 AC	MPLO	81.37 AC		
LH	8.98 AC				
NP	3.76 AC	NP	8.74 AC	NP	7.18 AC
TOTAL	144.91 AC	TOTAL	129.51 AC	TOTAL	37.02 AC

CAROLINA BEACH BLAST SAFETY ZONE
FOREST MANAGEMENT BLOCKS
FOREST INVENTORY MAPS – K-3, K-4, & K-5

MILITARY OCEAN TERMINAL
SUNNY POINT

FILE: K3K4K5	DRAWN BY: JEJ	0 660'
DATE: 4/13/98	APPROVED BY: SC	

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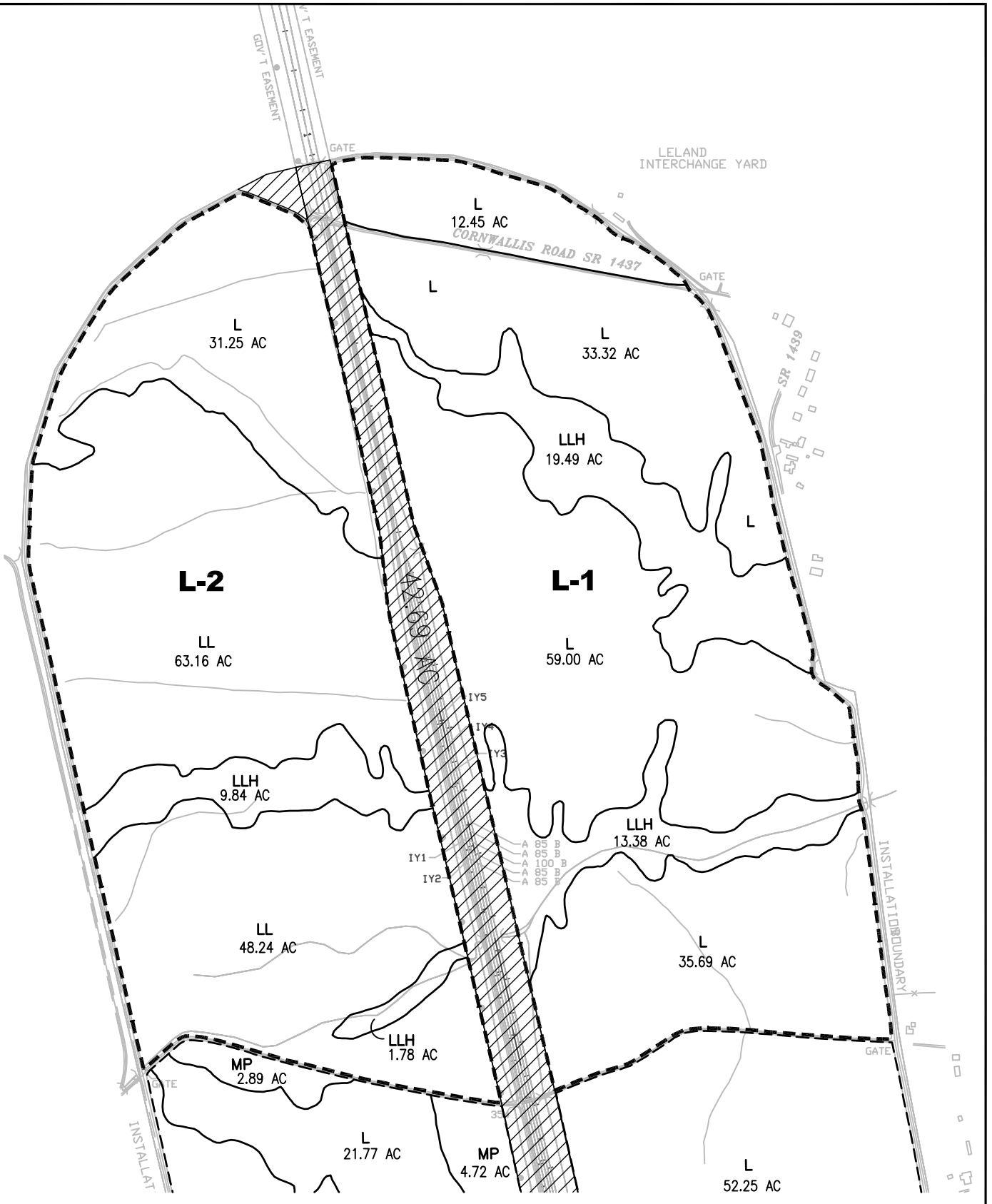
FIGURE III-S-44



L-1		L-2	
L	128.01 AC	LL	111.40 AC
L	12.45 AC	L	31.25 AC
LLH	32.87 AC	LLH	11.62 AC
TOTAL	173.33 AC	TOTAL	154.27 AC

III–S–47

LELAND INTERCHANGE YARD
FOREST MANAGEMENT BLOCKS
FOREST INVENTORY MAPS – L–1 & L–2

MILITARY OCEAN TERMINAL
SUNNY POINT

FILE: L1L2	DRAWN BY: JEJ	0 660'
DATE: 4/13/98	APPROVED BY: SC	

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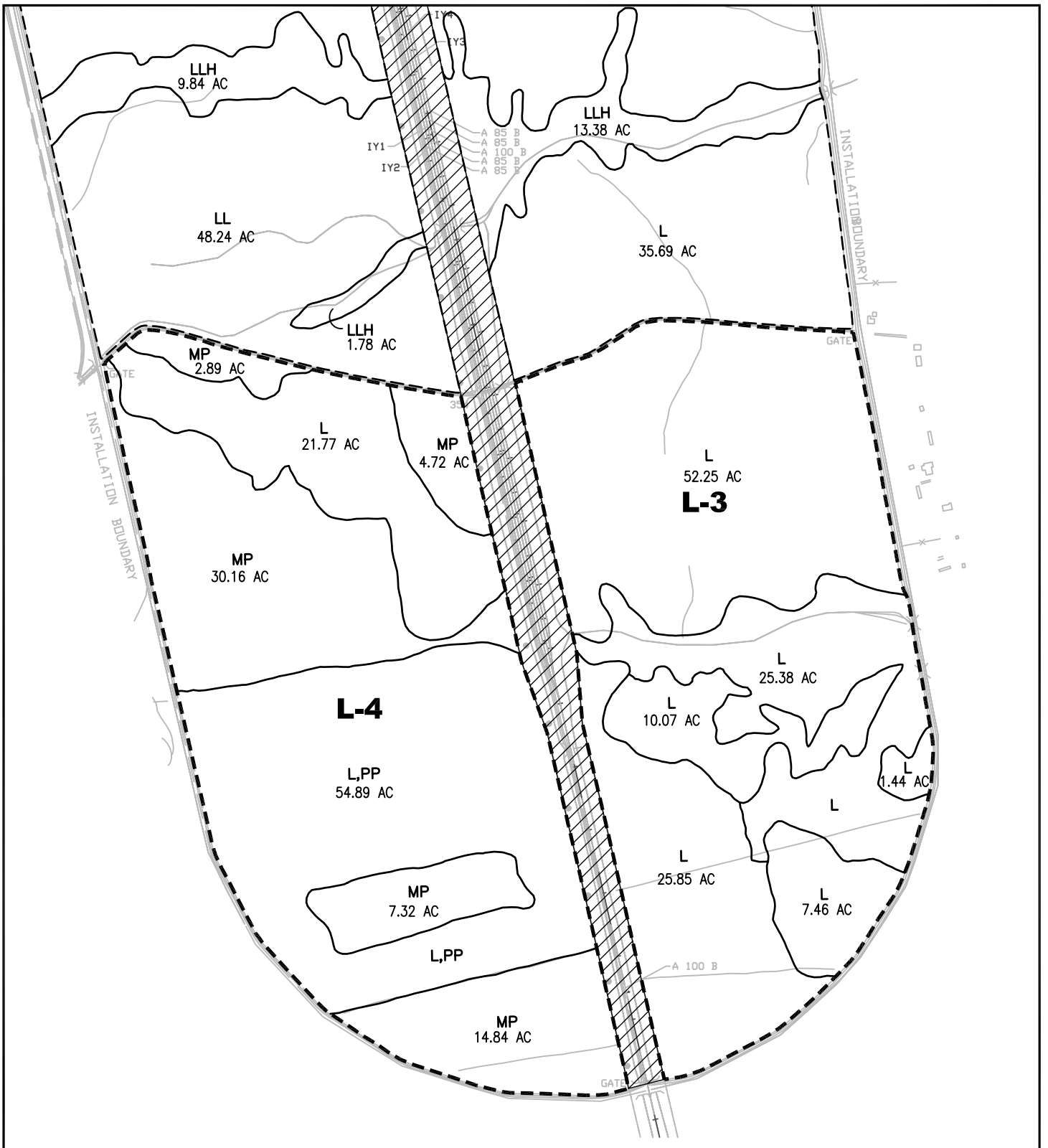
FIGURE III–S–45



L-3		L-4	
L	79.54 AC	MP	59.93 AC
L	17.53 AC	L	21.77 AC
L	25.38 AC	L,PP	54.89 AC
TOTAL	122.45 AC	TOTAL	136.59 AC

III-S-48

LELAND INTERCHANGE YARD
FOREST MANAGEMENT BLOCKS
FOREST INVENTORY MAPS – L-3 & L-4

MILITARY OCEAN TERMINAL
SUNNY POINT

FILE: L3L4	DRAWN BY: JEJ	0 660'
DATE: 4/13/98	APPROVED BY: SC	

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FIGURE III-S-46

APPENDIX III-T

PINE STOCK AND STAND TABLE PLANNING CHARTS BY DIAMETER CLASS, CUTTING UNIT, AND FOREST MANAGEMENT BLOCK

(using data from 1997-1998 inventory)

Table III-T-1. Pine stand and stock table planning charts by diameter class and Cutting Unit.

Cutting Unit I

DBH class (inches)	1998 Stand table (tons/acre)	1998 Stock table (stems/acre)	Trees marked for removal (%)	Volume removed (tons/acre)	Volume remaining (tons/acre)
6	3.73	38.50			
8	5.03	24.36			
10	6.82	22.52			
12	5.90	13.13			
14	4.26	0.59			
16	1.84	0.23			
18	0.47	0.04			
20	0.46	0.15			
22	0.17	0.06			
24 +	0.12	0.05			
Totals	28.80	99.63			

Cutting Unit II

DBH class (inches)	1998 Stand table (tons/acre)	1998 Stock table (stems/acre)	Trees marked for removal (%)	Volume removed (tons/acre)	Volume remaining (tons/acre)
6	2.87	27.54			
8	5.63	25.14			
10	8.12	21.60			
12	10.88	19.87			
14	10.04	0.95			
16	6.38	0.30			
18	1.93	0.17			
20	0.88	0.44			
22	0.30	0.02			
24 +	0.05	0.05			
Totals	47.08	96.08			

Table III-T-1. (continued)

Cutting Unit III

DBH class (inches)	1997 Stand table (tons/acre)	1997 Stock table (stems/acre)	Trees marked for removal (%)	Volume removed (tons/acre)	Volume remaining (tons/acre)
6	4.57	42.01			
8	6.28	28.36			
10	7.55	22.36			
12	8.07	15.85			
14	9.22	1.17			
16	7.51	0.39			
18	3.78	0.26			
20	1.14	0.05			
22	0.35	0.04			
24 +	0.22	0.05			
Totals	48.69	110.54			

Cutting Unit IV

DBH class (inches)	1997 Stand table (tons/acre)	1997 Stock table (stems/acre)	Trees marked for removal (%)	Volume removed (tons/acre)	Volume remaining (tons/acre)
6	1.95	22.18			
8	3.22	15.03			
10	4.44	12.89			
12	5.77	10.71			
14	7.62	0.46			
16	7.12	0.78			
18	4.98	0.22			
20	2.45	0.14			
22	1.16	0.11			
24 +	0.37	0.13			
Totals	39.08	62.65			

Table III-T-1. (continued)

Cutting Unit V

DBH class (inches)	1997 Stand table (tons/acre)	1997 Stock table (stems/acre)	Trees marked for removal (%)	Volume removed (tons/acre)	Volume remaining (tons/acre)
6	1.43	14.55			
8	2.84	12.52			
10	6.01	13.40			
12	6.76	10.92			
14	7.04	1.41			
16	6.27	0.90			
18	3.12	1.86			
20	1.87	0.23			
22	0.63	0.19			
24 +	0.46	0.12			
Totals	36.43	56.10			

Cutting Unit VI

DBH class (inches)	1997 Stand table (tons/acre)	1997 Stock table (stems/acre)	Trees marked for removal (%)	Volume removed (tons/acre)	Volume remaining (tons/acre)
6	5.73	60.87			
8	7.44	38.81			
10	9.80	22.56			
12	5.93	8.97			
14	1.52	0.11			
16	0.83	1.00			
18	0.21	0.16			
20	0.03	0.02			
22	0.00	0.00			
24 +	0.00	0.00			
Totals	31.49	132.50			

Table III-T-1. (continued)

Cutting Unit VII

DBH class (inches)	1997 Stand table (tons/acre)	1997 Stock table (stems/acre)	Trees marked for removal (%)	Volume removed (tons/acre)	Volume remaining (tons/acre)
6	5.06	51.92			
8	6.25	32.28			
10	5.30	19.31			
12	2.85	7.01			
14	1.60	2.65			
16	0.26	0.28			
18	0.09	0.08			
20	0.07	0.04			
22	0.00	0.00			
24 +	0.00	0.00			
Totals	21.48	113.57			

Cutting Unit VIII

DBH class (inches)	1997 Stand table (tons/acre)	1997 Stock table (stems/acre)	Trees marked for removal (%)	Volume removed (tons/acre)	Volume remaining (tons/acre)
6	4.03	41.31			
8	6.74	31.60			
10	7.93	24.23			
12	6.96	13.21			
14	3.84	6.78			
16	1.28	1.60			
18	0.94	1.01			
20	0.42	0.31			
22	0.02	0.02			
24 +	0.05	0.03			
Totals	32.21	120.1			

Table III-T-1. (continued)

Cutting Unit IX

DBH class (inches)	1997 Stand table (tons/acre)	1997 Stock table (stems/acre)	Trees marked for removal (%)	Volume removed (tons/acre)	Volume remaining (tons/acre)
6	3.57	39.20			
8	5.49	28.00			
10	6.84	21.62			
12	5.64	11.08			
14	3.61	0.74			
16	1.48	0.44			
18	0.82	0.16			
20	0.41	0.05			
22	0.12	0.02			
24 +	0.08	0.09			
Totals	28.06	101.40			

Cutting Unit X

DBH class (inches)	1997 Stand table (tons/acre)	1997 Stock table (stems/acre)	Trees marked for removal (%)	Volume removed (tons/acre)	Volume remaining (tons/acre)
6	5.46	51.91			
8	9.63	42.28			
10	13.77	26.16			
12	9.22	13.72			
14	6.68	9.99			
16	4.18	4.45			
18	1.70	0.05			
20	0.55	0.44			
22	0.29	0.07			
24 +	0.00	0.06			
Totals	51.48	149.13			

Table III-T-1. (continued)

Cutting Unit XI

DBH class (inches)	1997 Stand table (tons/acre)	1997 Stock table (stems/acre)	Trees marked for removal (%)	Volume removed (tons/acre)	Volume remaining (tons/acre)
6	0.00	0.00			
8	0.00	0.00			
10	0.00	0.00			
12	0.00	0.00			
14	0.00	0.00			
16	0.00	0.00			
18	0.00	0.00			
20	0.00	0.00			
22	0.00	0.00			
24 +	0.00	0.00			
Totals	0.00	0.00			

Cutting Unit XII

DBH class (inches)	1997 Stand table (tons/acre)	1997 Stock table (stems/acre)	Trees marked for removal (%)	Volume removed (tons/acre)	Volume remaining (tons/acre)
6	0.62	9.05			
8	0.92	7.43			
10	1.46	7.47			
12	1.86	7.25			
14	2.82	3.67			
16	2.08	1.06			
18	1.33	0.80			
20	0.38	0.47			
22	0.10	0.11			
24 +	0.04	0.05			
Totals	11.61	37.36			

Table III-T-1. (continued)

Cutting Unit XIII

DBH class (inches)	1997 Stand table (tons/acre)	1997 Stock table (stems/acre)	Trees marked for removal (%)	Volume removed (tons/acre)	Volume remaining (tons/acre)
6	1.70	19.31			
8	2.25	12.36			
10	3.17	13.06			
12	2.32	6.82			
14	2.57	1.71			
16	1.48	1.87			
18	0.99	0.18			
20	0.46	0.18			
22	0.26	0.12			
24 +	0.16	0.09			
Totals	15.36	55.70			

Cutting Unit XIV

DBH class (inches)	1997 Stand table (tons/acre)	1997 Stock table (stems/acre)	Trees marked for removal (%)	Volume removed (tons/acre)	Volume remaining (tons/acre)
6	1.14	13.89			
8	1.98	11.91			
10	2.51	12.62			
12	2.80	8.76			
14	1.48	3.52			
16	0.89	1.12			
18	0.12	0.15			
20	0.00	0.00			
22	0.07	0.05			
24 +	0.12	0.04			
Totals	11.11	52.06			

Table III-T-1. (concluded)

Cutting Unit XV

DBH class (inches)	1997 Stand table (tons/acre)	1997 Stock table (stems/acre)	Trees marked for removal (%)	Volume removed (tons/acre)	Volume remaining (tons/acre)
6	2.90	28.19			
8	4.71	20.81			
10	5.60	18.11			
12	8.70	17.65			
14	7.54	0.83			
16	7.55	0.39			
18	4.44	0.03			
20	2.29	0.03			
22	0.79	0.29			
24 +	0.93	0.25			
Totals	45.45	86.58			

Table III-T-2. 1998 pine stand and stock table planning charts by diameter class and forest management block.

Forest Management Block A01

DBH class (inches)	1998 Stand table (tons/acre)	1998 Stock table (stems/acre)	Trees marked for removal (%)	Volume removed (tons/acre)	Volume remaining (tons/acre)
6	1.11	13.89			
8	2.62	14.33			
10	6.36	22.50			
12	7.25	16.78			
14	1.85	3.83			
16	1.70	0.33			
18	0.24	0.51			
20	0.13	0.21			
22	0.00	0.00			
24 +	0.00	0.00			
Totals	21.26	72.38			

Forest Management Block A01A

DBH class (inches)	1998 Stand table (tons/acre)	1998 Stock table (stems/acre)	Trees marked for removal (%)	Volume removed (tons/acre)	Volume remaining (tons/acre)
6	2.76	23.77			
8	5.17	22.92			
10	7.87	24.44			
12	8.68	18.67			
14	7.23	9.97			
16	1.56	1.91			
18	0.00	0.00			
20	0.00	0.00			
22	0.00	0.00			
24 +	0.00	0.00			
Totals	33.27	101.68			

Table III-T-2. (continued)

Forest Management Block A02

DBH class (inches)	1997 Stand table (tons/acre)	1997 Stock table (stems/acre)	Trees marked for removal (%)	Volume removed (tons/acre)	Volume remaining (tons/acre)
6	3.41	32.41			
8	5.25	23.44			
10	7.63	23.33			
12	15.15	32.40			
14	12.00	1.70			
16	4.33	4.56			
18	2.11	1.54			
20	0.96	0.42			
22	1.13	0.34			
24 +	1.01	0.29			
Totals	52.98	120.43			

Forest Management Block A03

DBH class (inches)	1997 Stand table (tons/acre)	1997 Stock table (stems/acre)	Trees marked for removal (%)	Volume removed (tons/acre)	Volume remaining (tons/acre)
6	4.06	38.20			
8	6.22	27.85			
10	9.18	30.05			
12	6.04	13.79			
14	6.03	0.52			
16	3.51	0.60			
18	0.88	0.16			
20	1.31	0.51			
22	0.25	0.11			
24 +	0.00	0.00			
Totals	37.48	111.79			

Table III-T-2. (continued)

Forest Management Block A04

DBH class (inches)	1997 Stand table (tons/acre)	1997 Stock table (stems/acre)	Trees marked for removal (%)	Volume removed (tons/acre)	Volume remaining (tons/acre)
6	5.25	58.04			
8	5.19	27.32			
10	4.52	15.34			
12	1.73	3.85			
14	1.01	1.74			
16	0.00	0.00			
18	0.00	0.00			
20	0.00	0.00			
22	0.00	0.00			
24 +	0.08	0.05			
Totals	17.78	106.34			

Forest Management Block A05

DBH class (inches)	1997 Stand table (tons/acre)	1997 Stock table (stems/acre)	Trees marked for removal (%)	Volume removed (tons/acre)	Volume remaining (tons/acre)
6	2.27	21.30			
8	2.52	11.98			
10	4.82	15.33			
12	4.84	11.11			
14	8.51	1.36			
16	6.82	0.52			
18	2.25	0.31			
20	1.80	0.92			
22	0.78	0.28			
24 +	0.17	0.11			
Totals	34.78	63.22			

Table III-T-2. (continued)

Forest Management Block A06

DBH class (inches)	1997 Stand table (tons/acre)	1997 Stock table (stems/acre)	Trees marked for removal (%)	Volume removed (tons/acre)	Volume remaining (tons/acre)
6	3.63	31.25			
8	7.44	31.25			
10	7.98	22.91			
12	13.93	26.91			
14	9.77	12.75			
16	2.55	2.44			
18	0.81	0.64			
20	0.00	0.00			
22	0.00	0.00			
24 +	0.00	0.00			
Totals	46.11	128.15			

Forest Management Block A07

DBH class (inches)	1997 Stand table (tons/acre)	1997 Stock table (stems/acre)	Trees marked for removal (%)	Volume removed (tons/acre)	Volume remaining (tons/acre)
6	2.57	21.55			
8	8.96	40.77			
10	15.31	38.08			
12	11.61	22.03			
14	8.00	1.08			
16	1.85	2.20			
18	0.19	0.22			
20	0.27	0.18			
22	0.35	0.15			
24 +	0.00	0.00			
Totals	49.11	126.26			

Table III-T-2. (continued)

Forest Management Block A08

DBH class (inches)	1997 Stand table (tons/acre)	1997 Stock table (stems/acre)	Trees marked for removal (%)	Volume removed (tons/acre)	Volume remaining (tons/acre)
6	2.49	26.24			
8	4.90	20.84			
10	4.41	13.89			
12	10.09	18.13			
14	13.58	1.13			
16	11.89	0.43			
18	4.56	0.51			
20	0.44	0.14			
22	0.00	0.00			
24 +	0.00	0.15			
Totals	52.36	81.46			

Forest Management Block A09

DBH class (inches)	1997 Stand table (tons/acre)	1997 Stock table (stems/acre)	Trees marked for removal (%)	Volume removed (tons/acre)	Volume remaining (tons/acre)
6	2.54	25.47			
8	4.71	21.49			
10	4.60	14.89			
12	5.14	11.14			
14	8.97	2.92			
16	8.30	0.45			
18	2.00	1.77			
20	0.00	0.24			
22	0.45	0.00			
24 +	0.00	0.00			
Totals	36.71	78.37			

Table III-T-2. (continued)

Forest Management Block A10

DBH class (inches)	1997 Stand table (tons/acre)	1997 Stock table (stems/acre)	Trees marked for removal (%)	Volume removed (tons/acre)	Volume remaining (tons/acre)
6	4.06	46.30			
8	7.68	36.46			
10	16.37	31.66			
12	24.24	34.14			
14	12.31	16.15			
16	8.54	8.79			
18	1.44	1.03			
20	2.39	0.21			
22	0.00	0.17			
24 +	0.00	0.00			
Totals	77.03	174.91			

Forest Management Block A11

DBH class (inches)	1997 Stand table (tons/acre)	1997 Stock table (stems/acre)	Trees marked for removal (%)	Volume removed (tons/acre)	Volume remaining (tons/acre)
6	1.41	18.19			
8	3.11	12.28			
10	2.49	9.17			
12	4.52	9.09			
14	6.72	9.35			
16	9.20	8.18			
18	6.41	4.44			
20	2.02	0.98			
22	1.14	0.54			
24 +	0.67	0.23			
Totals	37.69	72.45			

Table III-T-2. (continued)

Forest Management Block A12

DBH class (inches)	1997 Stand table (tons/acre)	1997 Stock table (stems/acre)	Trees marked for removal (%)	Volume removed (tons/acre)	Volume remaining (tons/acre)
6	5.57	44.75			
8	7.95	30.39			
10	7.55	22.22			
12	6.62	11.58			
14	7.82	0.85			
16	9.83	0.43			
18	3.33	0.17			
20	2.57	0.14			
22	0.28	0.11			
24 +	0.00	0.00			
Totals	51.52	110.64			

Forest Management Block A13

DBH class (inches)	1997 Stand table (tons/acre)	1997 Stock table (stems/acre)	Trees marked for removal (%)	Volume removed (tons/acre)	Volume remaining (tons/acre)
6	2.84	33.95			
8	6.28	28.65			
10	3.46	10.86			
12	5.03	11.79			
14	9.57	1.04			
16	5.81	5.04			
18	2.04	1.26			
20	0.59	0.34			
22	0.00	0.00			
24 +	0.00	0.00			
Totals	35.62	92.93			

Table III-T-2. (continued)

Forest Management Block A14

DBH class (inches)	1997 Stand table (tons/acre)	1997 Stock table (stems/acre)	Trees marked for removal (%)	Volume removed (tons/acre)	Volume remaining (tons/acre)
6	4.19	41.67			
8	7.68	35.16			
10	11.55	33.32			
12	8.12	14.47			
14	5.06	6.81			
16	3.14	3.25			
18	1.14	0.77			
20	0.00	0.00			
22	0.00	0.00			
24 +	0.00	0.00			
Totals	40.88	135.45			

Forest Management Block A15

DBH class (inches)	1997 Stand table (tons/acre)	1997 Stock table (stems/acre)	Trees marked for removal (%)	Volume removed (tons/acre)	Volume remaining (tons/acre)
6	6.30	48.71			
8	5.93	24.91			
10	11.63	27.10			
12	11.69	18.81			
14	14.08	0.81			
16	12.50	9.96			
18	4.73	2.46			
20	1.97	1.00			
22	2.27	0.82			
24 +	0.00	0.00			
Totals	71.10	134.58			

Table III-T-2. (continued)

Forest Management Block A16

DBH class (inches)	1997 Stand table (tons/acre)	1997 Stock table (stems/acre)	Trees marked for removal (%)	Volume removed (tons/acre)	Volume remaining (tons/acre)
6	5.01	52.38			
8	6.87	35.20			
10	8.36	28.80			
12	10.39	22.91			
14	10.89	0.53			
16	6.88	6.75			
18	5.63	4.04			
20	0.66	0.39			
22	0.00	0.00			
24 +	0.21	0.09			
Totals	54.90	151.09			

Forest Management Block A17

DBH class (inches)	1997 Stand table (tons/acre)	1997 Stock table (stems/acre)	Trees marked for removal (%)	Volume removed (tons/acre)	Volume remaining (tons/acre)
6	3.71	31.83			
8	9.77	32.23			
10	11.96	32.08			
12	5.36	9.55			
14	1.07	2.34			
16	0.00	1.79			
18	0.33	0.71			
20	0.00	0.57			
22	0.00	0.00			
24 +	0.00	0.00			
Totals	32.20	111.10			

Table III-T-2. (continued)

Forest Management Block A18

DBH class (inches)	1997 Stand table (tons/acre)	1997 Stock table (stems/acre)	Trees marked for removal (%)	Volume removed (tons/acre)	Volume remaining (tons/acre)
6	1.76	23.97			
8	2.71	15.17			
10	6.41	19.41			
12	5.55	9.74			
14	6.94	10.45			
16	7.06	5.90			
18	5.48	0.66			
20	1.05	0.27			
22	2.79	0.45			
24 +	0.00	0.00			
Totals	39.75	86.02			

Forest Management Block A19

DBH class (inches)	1997 Stand table (tons/acre)	1997 Stock table (stems/acre)	Trees marked for removal (%)	Volume removed (tons/acre)	Volume remaining (tons/acre)
6	0.57	6.11			
8	1.22	5.73			
10	3.47	11.00			
12	4.47	8.15			
14	7.33	0.75			
16	1.91	0.29			
18	0.75	0.45			
20	0.90	0.37			
22	0.43	0.15			
24 +	0.75	0.24			
Totals	21.80	33.24			

Table III-T-2. (continued)

Forest Management Block A20

DBH class (inches)	1997 Stand table (tons/acre)	1997 Stock table (stems/acre)	Trees marked for removal (%)	Volume removed (tons/acre)	Volume remaining (tons/acre)
6	3.38	35.43			
8	4.90	26.16			
10	5.39	18.33			
12	9.74	21.03			
14	7.42	2.04			
16	7.10	0.62			
18	3.82	0.99			
20	0.31	0.20			
22	0.00	0.00			
24 +	0.00	0.14			
Totals	42.06	104.94			

Forest Management Block A21A

DBH class (inches)	1997 Stand table (tons/acre)	1997 Stock table (stems/acre)	Trees marked for removal (%)	Volume removed (tons/acre)	Volume remaining (tons/acre)
6	2.49	29.10			
8	2.65	12.28			
10	4.87	11.78			
12	5.90	9.09			
14	3.95	1.34			
16	4.85	1.02			
18	3.80	2.02			
20	2.77	1.31			
22	0.00	0.00			
24 +	0.67	0.23			
Totals	31.95	68.17			

Table III-T-2. (continued)

Forest Management Block A21B

DBH class (inches)	1997 Stand table (tons/acre)	1997 Stock table (stems/acre)	Trees marked for removal (%)	Volume removed (tons/acre)	Volume remaining (tons/acre)
6	0.95	10.19			
8	4.30	20.06			
10	1.03	3.67			
12	5.46	11.45			
14	5.89	8.41			
16	10.58	0.72			
18	0.49	0.57			
20	1.78	0.92			
22	0.52	0.38			
24 +	0.00	0.32			
Totals	31.00	56.69			

Forest Management Block A22

DBH class (inches)	1997 Stand table (tons/acre)	1997 Stock table (stems/acre)	Trees marked for removal (%)	Volume removed (tons/acre)	Volume remaining (tons/acre)
6	6.46	50.93			
8	6.60	28.65			
10	6.20	18.33			
12	6.93	14.32			
14	10.20	2.73			
16	6.58	1.49			
18	3.87	0.71			
20	1.16	0.76			
22	0.38	0.16			
24 +	0.00	0.00			
Totals	48.38	118.08			

Table III-T-2. (continued)

Forest Management Block A23

DBH class (inches)	1997 Stand table (tons/acre)	1997 Stock table (stems/acre)	Trees marked for removal (%)	Volume removed (tons/acre)	Volume remaining (tons/acre)
6	11.79	133.97			
8	11.95	65.40			
10	16.53	26.30			
12	15.56	15.50			
14	0.87	1.63			
16	0.65	1.09			
18	0.00	0.00			
20	0.00	0.00			
22	0.00	0.00			
24 +	0.00	0.00			
Totals	57.35	243.89			

Forest Management Block A24

DBH class (inches)	1997 Stand table (tons/acre)	1997 Stock table (stems/acre)	Trees marked for removal (%)	Volume removed (tons/acre)	Volume remaining (tons/acre)
6	5.06	53.87			
8	7.28	39.67			
10	11.80	27.85			
12	4.79	8.81			
14	1.67	0.18			
16	0.81	1.10			
18	0.00	0.00			
20	0.00	0.00			
22	0.00	0.00			
24 +	0.00	0.00			
Totals	31.41	131.48			

Table III-T-2. (continued)

Forest Management Block A25

DBH class (inches)	1997 Stand table (tons/acre)	1997 Stock table (stems/acre)	Trees marked for removal (%)	Volume removed (tons/acre)	Volume remaining (tons/acre)
6	0.51	4.02			
8	1.33	5.28			
10	2.49	6.27			
12	5.65	9.72			
14	5.09	0.50			
16	6.72	0.19			
18	4.75	0.45			
20	1.93	0.84			
22	0.48	0.10			
24 +	0.00	0.06			
Totals	28.95	27.43			

Forest Management Block A26

DBH class (inches)	1997 Stand table (tons/acre)	1997 Stock table (stems/acre)	Trees marked for removal (%)	Volume removed (tons/acre)	Volume remaining (tons/acre)
6	1.68	18.71			
8	2.46	13.45			
10	2.92	8.61			
12	6.13	11.95			
14	10.08	0.19			
16	8.25	0.73			
18	5.42	0.12			
20	3.31	0.09			
22	1.10	0.08			
24 +	0.38	0.13			
Totals	41.73	54.06			

Table III-T-2. (continued)

Forest Management Block A27

DBH class (inches)	1997 Stand table (tons/acre)	1997 Stock table (stems/acre)	Trees marked for removal (%)	Volume removed (tons/acre)	Volume remaining (tons/acre)
6	0.57	7.84			
8	0.43	2.20			
10	6.31	16.92			
12	4.55	7.83			
14	7.82	9.35			
16	7.80	7.16			
18	6.17	0.44			
20	1.91	1.06			
22	0.00	0.58			
24 +	2.74	0.63			
Totals	38.30	54.01			

Table III-T-2. (continued)

Forest Management Block B01

DBH class (inches)	1997 Stand table (tons/acre)	1997 Stock table (stems/acre)	Trees marked for removal (%)	Volume removed (tons/acre)	Volume remaining (tons/acre)
6	1.60	18.07			
8	4.65	21.26			
10	5.60	16.56			
12	6.20	11.50			
14	9.70	2.41			
16	7.43	2.08			
18	3.90	2.37			
20	2.79	1.48			
22	1.09	0.37			
24 +	1.01	0.19			
Totals	43.97	76.29			

Forest Management Block B02

DBH class (inches)	1997 Stand table (tons/acre)	1997 Stock table (stems/acre)	Trees marked for removal (%)	Volume removed (tons/acre)	Volume remaining (tons/acre)
6	0.78	8.49			
8	1.24	4.77			
10	4.19	12.22			
12	9.38	15.91			
14	7.66	9.35			
16	1.45	1.19			
18	1.96	0.47			
20	1.01	0.76			
22	0.76	0.32			
24 +	0.00	0.49			
Totals	28.43	53.97			

Table III-T-2. (continued)

Forest Management Block B03

DBH class (inches)	1997 Stand table (tons/acre)	1997 Stock table (stems/acre)	Trees marked for removal (%)	Volume removed (tons/acre)	Volume remaining (tons/acre)
6	2.81	28.01			
8	6.33	31.52			
10	9.79	20.17			
12	4.57	7.01			
14	9.96	2.81			
16	5.41	4.65			
18	1.44	0.85			
20	0.60	0.23			
22	0.69	0.19			
24 +	0.00	0.00			
Totals	41.60	95.44			

Forest Management Block B04

DBH class (inches)	1997 Stand table (tons/acre)	1997 Stock table (stems/acre)	Trees marked for removal (%)	Volume removed (tons/acre)	Volume remaining (tons/acre)
6	0.00	0.00			
8	0.00	0.00			
10	2.52	7.33			
12	8.63	17.82			
14	14.28	28.05			
16	9.47	12.89			
18	0.00	0.00			
20	0.00	0.00			
22	0.00	0.00			
24 +	0.00	0.00			
Totals	34.90	66.09			

Table III-T-2. (continued)

Forest Management Block B05

DBH class (inches)	1997 Stand table (tons/acre)	1997 Stock table (stems/acre)	Trees marked for removal (%)	Volume removed (tons/acre)	Volume remaining (tons/acre)
6	2.73	28.65			
8	3.46	17.91			
10	3.90	12.60			
12	5.47	10.34			
14	5.55	1.17			
16	7.82	0.90			
18	5.76	3.89			
20	1.12	1.15			
22	0.00	0.24			
24 +	0.00	0.00			
Totals	35.81	76.85			

Forest Management Block B06

DBH class (inches)	1997 Stand table (tons/acre)	1997 Stock table (stems/acre)	Trees marked for removal (%)	Volume removed (tons/acre)	Volume remaining (tons/acre)
6	7.52	75.29			
8	14.80	68.51			
10	18.42	39.05			
12	8.39	15.50			
14	4.26	7.72			
16	3.66	4.67			
18	0.33	0.49			
20	0.22	0.20			
22	0.00	0.00			
24 +	0.00	0.00			
Totals	57.60	211.43			

Table III-T-2. (continued)

Forest Management Block B07

DBH class (inches)	1997 Stand table (tons/acre)	1997 Stock table (stems/acre)	Trees marked for removal (%)	Volume removed (tons/acre)	Volume remaining (tons/acre)
6	18.61	173.15			
8	26.51	106.01			
10	21.54	31.16			
12	7.47	7.64			
14	2.05	3.74			
16	0.46	0.72			
18	0.49	0.57			
20	0.00	0.00			
22	0.00	0.00			
24 +	0.00	0.00			
Totals	77.13	322.99			

Forest Management Block B08

DBH class (inches)	1997 Stand table (tons/acre)	1997 Stock table (stems/acre)	Trees marked for removal (%)	Volume removed (tons/acre)	Volume remaining (tons/acre)
6	5.60	44.94			
8	11.18	43.82			
10	26.84	40.97			
12	20.37	23.21			
14	6.93	10.45			
16	2.55	3.37			
18	1.08	1.00			
20	0.59	0.54			
22	0.43	0.22			
24 +	0.00	0.00			
Totals	75.57	168.52			

Table III-T-2. (continued)

Forest Management Block B09

DBH class (inches)	1997 Stand table (tons/acre)	1997 Stock table (stems/acre)	Trees marked for removal (%)	Volume removed (tons/acre)	Volume remaining (tons/acre)
6	2.92	36.60			
8	4.76	28.65			
10	11.47	36.66			
12	14.88	28.64			
14	8.29	13.44			
16	2.79	0.22			
18	1.47	1.59			
20	0.88	0.86			
22	0.49	0.36			
24 +	0.47	0.16			
Totals	48.42	147.18			

Forest Management Block B10

DBH class (inches)	1997 Stand table (tons/acre)	1997 Stock table (stems/acre)	Trees marked for removal (%)	Volume removed (tons/acre)	Volume remaining (tons/acre)
6	2.68	28.94			
8	4.17	20.19			
10	6.39	21.66			
12	4.47	8.10			
14	4.65	1.28			
16	1.70	1.46			
18	1.33	0.64			
20	0.27	0.10			
22	0.00	0.09			
24 +	0.00	0.34			
Totals	25.66	82.80			

Table III-T-2. (continued)

Forest Management Block B11

DBH class (inches)	1997 Stand table (tons/acre)	1997 Stock table (stems/acre)	Trees marked for removal (%)	Volume removed (tons/acre)	Volume remaining (tons/acre)
6	2.65	27.42			
8	7.58	34.16			
10	6.71	21.16			
12	7.38	16.16			
14	4.54	7.55			
16	3.60	1.11			
18	0.87	0.87			
20	1.30	1.06			
22	0.20	0.15			
24 +	0.00	0.00			
Totals	34.83	109.64			

Forest Management Block B12

DBH class (inches)	1997 Stand table (tons/acre)	1997 Stock table (stems/acre)	Trees marked for removal (%)	Volume removed (tons/acre)	Volume remaining (tons/acre)
6	3.87	42.97			
8	4.14	23.28			
10	1.38	5.73			
12	1.19	3.18			
14	0.98	1.75			
16	0.08	0.22			
18	0.37	0.35			
20	0.00	0.00			
22	0.00	0.00			
24 +	0.00	0.00			
Totals	12.01	77.48			

Table III-T-2. (continued)

Forest Management Block B13

(This forest management block was not inventoried because of its current use as a disposal area.)

Forest Management Block B14

(This forest management block was not inventoried because of its current use as a disposal area.)

Table III-T-2. (continued)

Forest Management Block B15

DBH class (inches)	1997 Stand table (tons/acre)	1997 Stock table (stems/acre)	Trees marked for removal (%)	Volume removed (tons/acre)	Volume remaining (tons/acre)
6	2.25	24.62			
8	5.11	25.31			
10	5.71	19.55			
12	4.73	10.39			
14	2.64	4.67			
16	1.29	1.43			
18	1.00	0.94			
20	0.74	0.53			
22	0.00	0.00			
24 +	0.09	0.05			
Totals	23.56	87.49			

Forest Management Block B16

DBH class (inches)	1997 Stand table (tons/acre)	1997 Stock table (stems/acre)	Trees marked for removal (%)	Volume removed (tons/acre)	Volume remaining (tons/acre)
6	4.52	43.18			
8	6.52	31.76			
10	6.20	21.12			
12	3.25	7.47			
14	3.18	6.50			
16	0.29	0.47			
18	0.59	0.86			
20	0.41	0.30			
22	0.11	0.08			
24 +	0.00	0.00			
Totals	25.07	111.74			

Table III-T-2. (continued)

Forest Management Block B17

DBH class (inches)	1997 Stand table (tons/acre)	1997 Stock table (stems/acre)	Trees marked for removal (%)	Volume removed (tons/acre)	Volume remaining (tons/acre)
6	4.68	50.26			
8	5.82	30.16			
10	5.17	15.44			
12	1.83	3.69			
14	0.73	1.23			
16	0.06	0.09			
18	0.23	0.15			
20	0.00	0.00			
22	0.00	0.00			
24 +	0.00	0.00			
Totals	18.52	101.02			

Forest Management Block B18

DBH class (inches)	1997 Stand table (tons/acre)	1997 Stock table (stems/acre)	Trees marked for removal (%)	Volume removed (tons/acre)	Volume remaining (tons/acre)
6	5.98	60.48			
8	6.49	33.35			
10	5.16	18.76			
12	2.47	5.97			
14	1.52	2.63			
16	0.22	0.22			
18	0.05	0.04			
20	0.11	0.07			
22	0.00	0.00			
24 +	0.00	0.00			
Totals	22.00	121.52			

Table III-T-2. (continued)

Forest Management Block B19

DBH class (inches)	1997 Stand table (tons/acre)	1997 Stock table (stems/acre)	Trees marked for removal (%)	Volume removed (tons/acre)	Volume remaining (tons/acre)
6	5.19	50.93			
8	11.63	50.14			
10	13.77	40.54			
12	7.74	14.19			
14	3.36	4.86			
16	0.87	0.83			
18	0.54	0.54			
20	0.23	0.18			
22	0.00	0.00			
24 +	0.14	0.06			
Totals	43.47	162.27			

Forest Management Block B20

DBH class (inches)	1997 Stand table (tons/acre)	1997 Stock table (stems/acre)	Trees marked for removal (%)	Volume removed (tons/acre)	Volume remaining (tons/acre)
6	4.76	49.74			
8	5.27	23.99			
10	10.69	28.13			
12	17.50	29.61			
14	8.97	16.09			
16	3.72	5.00			
18	2.15	2.36			
20	0.51	0.43			
22	0.00	0.00			
24 +	0.00	0.00			
Totals	53.57	155.35			

Table III-T-2. (continued)

Forest Management Block B21

DBH class (inches)	1997 Stand table (tons/acre)	1997 Stock table (stems/acre)	Trees marked for removal (%)	Volume removed (tons/acre)	Volume remaining (tons/acre)
6	5.09	49.43			
8	6.25	31.60			
10	8.39	16.18			
12	3.44	5.43			
14	0.29	0.41			
16	0.27	0.32			
18	0.07	0.08			
20	0.00	0.00			
22	0.00	0.00			
24 +	0.00	0.00			
Totals	23.80	103.45			

Forest Management Block B22

DBH class (inches)	1997 Stand table (tons/acre)	1997 Stock table (stems/acre)	Trees marked for removal (%)	Volume removed (tons/acre)	Volume remaining (tons/acre)
6	3.08	31.95			
8	5.65	27.53			
10	6.52	24.08			
12	3.57	8.99			
14	3.20	5.13			
16	1.85	1.97			
18	0.79	0.55			
20	0.14	0.09			
22	0.00	0.00			
24 +	0.00	0.00			
Totals	24.80	100.29			

Table III-T-2. (continued)

Forest Management Block B23

DBH class (inches)	1997 Stand table (tons/acre)	1997 Stock table (stems/acre)	Trees marked for removal (%)	Volume removed (tons/acre)	Volume remaining (tons/acre)
6	5.33	50.93			
8	4.60	19.10			
10	23.24	35.43			
12	15.33	17.82			
14	6.82	3.74			
16	7.02	1.43			
18	3.17	1.89			
20	1.50	0.61			
22	0.48	0.25			
24 +	0.35	0.39			
Totals	67.84	131.59			

Forest Management Block B24

DBH class (inches)	1997 Stand table (tons/acre)	1997 Stock table (stems/acre)	Trees marked for removal (%)	Volume removed (tons/acre)	Volume remaining (tons/acre)
6	3.57	37.70			
8	5.87	30.51			
10	5.58	20.23			
12	3.46	8.76			
14	1.72	2.67			
16	0.34	0.37			
18	0.15	0.15			
20	0.00	0.00			
22	0.00	0.00			
24 +	0.00	0.00			
Totals	20.69	100.39			

Table III-T-2. (continued)

Forest Management Block B25

DBH class (inches)	1997 Stand table (tons/acre)	1997 Stock table (stems/acre)	Trees marked for removal (%)	Volume removed (tons/acre)	Volume remaining (tons/acre)
6	3.92	38.94			
8	6.60	32.86			
10	5.20	19.95			
12	3.00	7.48			
14	2.19	3.03			
16	0.67	0.63			
18	0.25	0.17			
20	0.00	0.00			
22	0.00	0.00			
24 +	0.00	0.00			
Totals	21.83	103.06			

Table III-T-2. (continued)

Forest Management Block C01

DBH class (inches)	1997 Stand table (tons/acre)	1997 Stock table (stems/acre)	Trees marked for removal (%)	Volume removed (tons/acre)	Volume remaining (tons/acre)
6	0.46	9.99			
8	1.03	9.55			
10	1.90	10.06			
12	1.41	5.24			
14	1.99	1.65			
16	1.72	2.53			
18	1.41	1.22			
20	0.64	0.18			
22	0.20	0.15			
24 +	0.27	0.19			
Totals	11.03	40.76			

Forest Management Block C02

DBH class (inches)	1997 Stand table (tons/acre)	1997 Stock table (stems/acre)	Trees marked for removal (%)	Volume removed (tons/acre)	Volume remaining (tons/acre)
6	3.11	33.95			
8	3.30	15.63			
10	3.98	18.33			
12	2.49	9.65			
14	3.01	4.25			
16	1.73	3.48			
18	0.65	0.51			
20	0.24	0.28			
22	0.00	0.00			
24 +	0.00	0.00			
Totals	18.51	86.08			

Table III-T-2. (continued)

Forest Management Block C03

DBH class (inches)	1997 Stand table (tons/acre)	1997 Stock table (stems/acre)	Trees marked for removal (%)	Volume removed (tons/acre)	Volume remaining (tons/acre)
6	2.08	20.20			
8	3.11	15.31			
10	4.14	14.23			
12	3.24	7.46			
14	2.98	0.64			
16	1.00	0.12			
18	0.47	0.20			
20	0.34	0.16			
22	0.00	0.00			
24 +	0.05	0.05			
Totals	17.41	58.37			

Forest Management Block C04

DBH class (inches)	1997 Stand table (tons/acre)	1997 Stock table (stems/acre)	Trees marked for removal (%)	Volume removed (tons/acre)	Volume remaining (tons/acre)
6	1.43	13.89			
8	0.00	0.00			
10	1.54	5.00			
12	1.14	2.31			
14	1.64	2.55			
16	2.36	0.65			
18	2.80	2.06			
20	0.96	0.42			
22	2.65	1.03			
24 +	0.70	0.19			
Totals	15.22	28.10			

Table III-T-2. (continued)

Forest Management Block FP01

DBH class (inches)	1997 Stand table (tons/acre)	1997 Stock table (stems/acre)	Trees marked for removal (%)	Volume removed (tons/acre)	Volume remaining (tons/acre)
6	1.19	14.09			
8	2.46	14.02			
10	2.19	9.75			
12	2.76	7.85			
14	1.99	4.37			
16	0.53	0.61			
18	0.06	0.12			
20	0.00	0.00			
22	0.00	0.00			
24 +	0.20	0.07			
Totals	11.38	50.88			

Forest Management Block FP02

DBH class (inches)	1997 Stand table (tons/acre)	1997 Stock table (stems/acre)	Trees marked for removal (%)	Volume removed (tons/acre)	Volume remaining (tons/acre)
6	1.06	13.58			
8	1.16	8.59			
10	2.98	17.11			
12	2.86	10.18			
14	0.73	2.18			
16	1.45	1.91			
18	0.23	0.19			
20	0.00	0.00			
22	0.17	0.13			
24 +	0.00	0.00			
Totals	10.64	53.87			

Table III-T-2. (continued)

Forest Management Block FT01

DBH class (inches)	1997 Stand table (tons/acre)	1997 Stock table (stems/acre)	Trees marked for removal (%)	Volume removed (tons/acre)	Volume remaining (tons/acre)
6	0.00	0.00			
8	0.00	0.00			
10	0.00	0.00			
12	0.00	0.00			
14	0.00	0.00			
16	0.00	0.00			
18	0.00	0.00			
20	0.00	0.00			
22	0.00	0.00			
24 +	0.00	0.00			
Totals	0.00	0.00			

Forest Management Block FT02

DBH class (inches)	1997 Stand table (tons/acre)	1997 Stock table (stems/acre)	Trees marked for removal (%)	Volume removed (tons/acre)	Volume remaining (tons/acre)
6	0.00	0.00			
8	0.00	0.00			
10	0.00	0.00			
12	0.00	0.00			
14	0.00	0.00			
16	0.00	0.00			
18	0.00	0.00			
20	0.00	0.00			
22	0.00	0.00			
24 +	0.00	0.00			
Totals	0.00	0.00			

Table III-T-2. (continued)

Forest Management Block K01

DBH class (inches)	1997 Stand table (tons/acre)	1997 Stock table (stems/acre)	Trees marked for removal (%)	Volume removed (tons/acre)	Volume remaining (tons/acre)
6	1.16	13.58			
8	1.30	9.55			
10	0.60	2.44			
12	4.09	12.73			
14	5.64	6.86			
16	3.80	1.91			
18	1.04	2.64			
20	0.55	0.92			
22	0.42	0.76			
24 +	0.00	0.00			
Totals	18.60	51.39			

Forest Management Block K02

DBH class (inches)	1997 Stand table (tons/acre)	1997 Stock table (stems/acre)	Trees marked for removal (%)	Volume removed (tons/acre)	Volume remaining (tons/acre)
6	0.65	10.19			
8	0.38	2.87			
10	2.92	14.05			
12	2.98	9.33			
14	4.37	4.36			
16	3.36	1.67			
18	2.17	0.57			
20	0.35	0.46			
22	0.00	0.00			
24 +	0.00	0.00			
Totals	17.18	43.50			

Table III-T-2. (continued)

Forest Management Block K03

DBH class (inches)	1997 Stand table (tons/acre)	1997 Stock table (stems/acre)	Trees marked for removal (%)	Volume removed (tons/acre)	Volume remaining (tons/acre)
6	0.41	3.64			
8	1.27	8.19			
10	1.24	4.80			
12	1.24	3.94			
14	1.93	3.56			
16	1.94	1.53			
18	1.29	1.62			
20	0.21	0.11			
22	0.17	0.09			
24 +	0.14	0.15			
Totals	9.84	27.63			

Forest Management Block K04

DBH class (inches)	1997 Stand table (tons/acre)	1997 Stock table (stems/acre)	Trees marked for removal (%)	Volume removed (tons/acre)	Volume remaining (tons/acre)
6	0.51	9.14			
8	0.81	8.08			
10	0.94	6.11			
12	1.02	6.86			
14	1.72	6.23			
16	0.73	1.65			
18	0.43	1.02			
20	0.27	0.35			
22	0.00	0.00			
24 +	0.00	0.00			
Totals	6.43	39.44			

Table III-T-2. (continued)

Forest Management Block K05

DBH class (inches)	1997 Stand table (tons/acre)	1997 Stock table (stems/acre)	Trees marked for removal (%)	Volume removed (tons/acre)	Volume remaining (tons/acre)
6	0.84	22.64			
8	1.08	12.73			
10	1.24	12.22			
12	0.92	8.49			
14	1.95	9.35			
16	1.29	3.98			
18	3.28	4.40			
20	1.27	2.04			
22	0.00	0.00			
24 +	0.00	0.00			
Totals	11.87	75.85			

Table III-T-2. (continued)

Forest Management Block L01

DBH class (inches)	1997 Stand table (tons/acre)	1997 Stock table (stems/acre)	Trees marked for removal (%)	Volume removed (tons/acre)	Volume remaining (tons/acre)
6	2.11	20.18			
8	2.60	11.89			
10	3.52	12.11			
12	3.46	6.97			
14	7.48	2.47			
16	7.86	0.81			
18	7.90	0.11			
20	4.98	0.09			
22	2.03	0.64			
24 +	2.45	0.80			
Totals	44.39	56.07			

Forest Management Block L02

DBH class (inches)	1997 Stand table (tons/acre)	1997 Stock table (stems/acre)	Trees marked for removal (%)	Volume removed (tons/acre)	Volume remaining (tons/acre)
6	3.60	35.53			
8	7.03	31.32			
10	9.23	27.29			
12	14.90	29.90			
14	8.54	11.74			
16	5.17	4.67			
18	2.68	1.97			
20	0.21	0.11			
22	0.00	0.00			
24 +	0.39	0.13			
Totals	51.75	142.66			

Table III-T-2. (concluded)

Forest Management Block L03

DBH class (inches)	1997 Stand table (tons/acre)	1997 Stock table (stems/acre)	Trees marked for removal (%)	Volume removed (tons/acre)	Volume remaining (tons/acre)
6	2.46	23.15			
8	3.87	15.63			
10	3.46	12.22			
12	9.69	20.83			
14	11.56	0.28			
16	16.07	13.23			
18	5.62	4.12			
20	3.08	1.67			
22	0.75	0.46			
24 +	0.33	0.14			
Totals	56.89	91.73			

Forest Management Block L04

DBH class (inches)	1997 Stand table (tons/acre)	1997 Stock table (stems/acre)	Trees marked for removal (%)	Volume removed (tons/acre)	Volume remaining (tons/acre)
6	3.52	35.26			
8	5.76	25.71			
10	6.19	21.15			
12	8.08	16.65			
14	3.11	4.08			
16	2.58	2.20			
18	0.69	0.58			
20	0.27	0.12			
22	0.00	0.00			
24 +	0.00	0.00			
Totals	30.20	105.75			

APPENDIX III-U

TIMBER HARVEST SUMMARY FOR FISCAL YEARS 1977-1997

Appendix III-U. Timber Harvest Summary for Fiscal Years 1977 - 1997

Fiscal year (FY)	Contract number	Contractor	Forest product	Volume (tons)	Returns per product	Total returns for the FY[a]
1977	DACA21-7-77-1065	Squires Lumber Co.	Pine Trees[b]	5,392.89	$24,530.92	$10,915.90
	DACA21-7-77-1063	Atlantic Timber Co.	Pine PW	1,807.99		
1978	DACA21-7-78-1532	Carolina Creosoting Corp.	Pine PW	57.00	$420.00	$18,412.38
1979	DACA21-7-79-2526	New River Wood Corp.	Pine Trees	2,791.39	$26,957.97	$15,480.00
1980	DACA21-7-80-0655	Southern Wood Piedmont	Pine Poles	1,081.66	$20,551.54	$11,527.47
	DACA21-7-80-0656	Acme Wood Co.	Pine & Hdwd Trees	7,832.23		
1981	DACA21-7-81-1093	New River Wood Corp.	Pine Trees	365.86	$676.86	$65,645.00
1982	DACA21-7-81-1093	New River Wood Corp.	Pine Trees & Pine PW	84.95	$157.15	$11,078.86
	DACA21-7-82-1231	New River Wood Corp.	Pine Trees	1,411.31	$9,874.93	
1983	DACA2 1-7-83-1502	Squires Timber Company	Pine Trees & Pine PW	1,274.41	$10,284.49	$24,419.17
	DACA2 1-7-83-1470	Southern Coastal Timber Corp.	Pine Trees & Pine PW	658.87	6,338.64	
	DACA2 1-7-83-0640	Squires Timber Company	Pine Trees & Pine PW	1,401.99	7,796.04	
1984	DACA2 1-7-84-0669	Squires Timber Company	Pine Trees & Pine PW (salvage)	300.00	$900.00	$900.00
1985	DACA2 1-7-85-1248	Squires Timber Company	Pine Trees & Pine PW	875.78	$9,035.12	$10,253.12
			Hardwood Trees & Hardwood PW	203.08	$1,218.00	
1986	DACA2 1-7-86-0452	Mock-Bunting Forest Products	Pine Trees and Pine PW	2,027.00	$24,332.17	$24,332.17
1987	DACA2 1-7-87-1678	Public Sale	Hardwood Firewood	40.00	$344.01	$14,127.46
	DACA2 1-7-86-1248	Squires Timber Company	Pine Trees & Pine PW	1,875.00	$6,723.85	
	DACA2 1-7-86-1712	Terry Bryant	Pine Straw	400.00	$500.00	
	DACA2 1-7-87-1618	Misc. Contract	Pine Trees & Pine PW	15,745.00	$1,259.60	
	DACA2 1-7-87-1617	Acme Wood Company	Pine & Hardwood Trees	261.00	$5,300.00	
1988	DAC2 1-7-88-0112	Longleaf Wood Products Inc.	Pine Trees & Pine PW	259.00	$10,000.00	$10,000.00

Appendix III-U. (continued)

Fiscal year (FY)	Contract number	Contractor	Forest product	Volume (tons)	Returns per product	Total returns for the FY[a]
1989	DAC2 1-7-89-1896	Mitchell Simpson	Pine Straw	44.80	$1,050.02	$16,631.49
	DAC2 1-7-89-1871	Canal Wood Corp.	Pine Trees	107.00	$11,265.00	
			Hardwood Trees	21.00	$2,434.00	
			Pine & Hardwood PW	459.71	$1,156.00	
	DAC2 1-7-89-1912	Brunswick Timber Company	Pine Trees	29.00	$726.47	
1990	Minor Sales Contract	Public Sale	Hardwood Trees	15.00	$150.00	$6,524.97
	DAC2 1-7-89-1912	Brunswick Timber Company	Pine PW	148.80	$726.44	
			Pine Trees	143.55	$5,648.53	
1991	Minor Sales Contract	Public Sale	Hardwood Trees	14.00	$140.00	$10,036.00
	DACA2 1-7-91-1380	Wayne Murchison	Pine Straw	735.00	$5,210.00	
	DACA2 1-7-91-1306	Mitchell Simpson	Pine Straw	225.00	$3,186.00	
	DACA2 1-7-92-0107	Mitchell Simpson	Pine Straw	210.00	$1,500.00	
1992	DACA2 1-7-92-0106	Brunswick Timber Company	Pine & Hardwood	2,217.89	$31,784.56	$49,460.00
			Trees	1,174.18	$9,393.44	
			Pine PW	294.00	$882.00	
	DACA2 1-7-92-0106	Mitchell Simpson	Hardwood PW	200.00	$7,400.00	
			Pine Straw			
1993	Minor Sales Contract	Public Sale	Hardwood Trees	14.00	$140.00	$13,640.00
	DACA2 1-7-95-931402	Ronnie Ring, Inc.	Pine Straw	400.00	$13,500.00	
1994	DACA2 1-7-95-1811	Better Bales	Pine Straw	150.00	$1,120.00	$1,120.00
1995	DACA2 1-7-95-1821	Slash Industries, Inc.	Pine Trees	1,332.55	$51,400.16	$69,076.00
			Pine PW	271.98	$2,175.84	
	DACA2 1-7-95-1839	Better Bales	Pine Straw	1,725.00	$15,500	
1996	DACA2 1-7-96-1404	Lumber River Timber	Pine PW	6,080.44	$92,698.36	$98,848.36
	Minor Sales Contract	Company	Hardwood Trees	15.00	$150.00	
	DACA2 1-7-96-1423	Public Sale	Pine Straw	400.00	$6,000.00	
		Pine Star Farms, Inc.				

Appendix III-U. (concluded)

Fiscal year (FY)	Contract number	Contractor	Forest product	Volume (tons)	Returns per product	Total returns for the FY[a]
1997	DACA2 1-7-96-1404	Lumber River Timber	Pine PW	212.99	$2,129.90	$134,342.57
	DACA2 1-7-97-1000	Company	Pine & Hardwood	11,235.15	$126,142.83	
		Longleaf Wood Products	Trees	324.00	$6,069.84	
			Pine PW			

[a] Returns are as of the end of the fiscal year, so there are some discrepancies between returns per product and returns per fiscal year, since some contracts may cross fiscal years.

[b] Pine trees include pine sawtimber and pine chip-n-saw trees.

APPENDIX III-V

GUIDE FOR TIMBER MARKING

Appendix III-V. Guide for timber marking

TIMBER MARKING FOR SALE

1. Purpose of Scope. The purpose of this Appendix is to describe the procedures to be used for marking timber for declaration and sale.

2. Applicability. This Appendix is applicable to any person or persons that participate in the marking of timber on Military Ocean Terminal, Sunny Point.

3. Responsibility. The Chief, Facilities Engineer Division is responsible for the implementation of and compliance with the provisions of this Appendix with management assistance from the U.S. Army Engineer District, Savannah.

4. Policy. Marking of timber for disposal will be accomplished in the most economical manner possible that will result in an accurate estimate for disposal purposes, and will clearly indicate areas of individual trees to be cut.

5. Procedures.
   a. Timber marking will usually be done by the Installation Forester who will mark, measure, and tally trees to be removed.
   b. When selectively thinning, all trees to be removed will be spot marked at ground level and approximately 4.5 feet (dbh) above ground level. All marking will face the same direction to aid the timber markers and the producers in locating trees to be harvested.
   c. Clearcut areas will be designated by natural landmarks whenever possible. Where natural landmarks do not exist, trees will be marked with a spot of paint at ground level and three stripes of paint at dbh facing toward the area to be clearcut. These trees will not be cut during harvesting.

6. Merchantability.
   a. A merchantable sawtimber tree is defined as containing at least one merchantable sawlog:
      (1) Hardwood - Minimum of one 16-foot log, 9 inches at the small end, or 33 percent merchantable with a minimum net scale of 17 board feet.
      (2) Pine - Minimum of one 15-foot log, 6 inches at the small end, or 33 percent merchantable with a minimum net scale of 10 board feet.
   b. A merchantable pulpwood tree must produce at least two 5-foot 3-inch sticks and be a minimum of 3.5 inches at the small end.

APPENDIX III-W

SAMPLE LETTER OF TIMBER AVAILABILITY REQUESTING HARVEST APPROVAL

Appendix III-W. Sample letter of timber availability requesting harvest approval

MTE-SU-ISF (date)

SUBJECT: Timber Available for Disposal at Military Ocean Terminal, Sunny Point

Commander
MTMC Eastern Area
ATTN: MTE-EN
Bayonne, NJ 07002

1. The following estimated volume of timber has been designated for disposal at Military Ocean Terminal, Sunny Point (MOTSU), in accordance with AR 200-3 and the Forest Management Plan for MOTSU: Pine Sawtimber - ____ MBF, Pine Pulpwood - ____ cds.

2. The timber is located in portions of Cutting Units ___, ___, and ___, specifically, Forest Management Blocks ___, ___, and ___. The harvest area totals ____ acres. Title to land and timber is owned in fee by the United States Government.

3. Circumstances prompting removal are that stands of timber must be thinned due to overcrowding conditions and the need to remove timber from understocked areas for conversion purposes.

4. The estimate is not considered sufficient for a lump-sum, thus a per unit sale is recommended.

5. The following specifications should be included in any contracts awarded, or modified only after complete concurrence by the Installation Commander:

a. All trees to be harvested have been marked at dbh and ground level, except alternate row thinning in plantations which have been designated with yellow paint marks.

b. Cut stumps as low as possible and in no case more than 10 inches above ground on the highest side, except when ingrown stones or metal, or excessive root-swell make the low height impractical.

c. Remove all logs and boles within 24 hours after they have been cut, unless authorized by the Resident Inspector to allow them to remain.

d. The location of all logging roads, landings, and skid loads must be approved by the Chief, Facilities Engineer Branch. All fire lanes, streams, trails, ditches, and maintained road shoulders must be kept free of tops, slash, structures, and unused equipment.

e. After the harvest is completed, the contractor will be responsible for returning any damaged firebreaks and roads to good useable condition, grading, seeding, and mulching where necessary.

f. Sawmills will not be permitted on the installation.

g. The contractor will be held liable for all damage to Government property and for all Government expenditures resulting from fire caused by his negligence of his employees, agents, and subcontractors.

h. The contractor will comply with all pertinent provisions of the General Safety Regulations, MOTSU.

6. Recommend approval of availability.

FOR THE COMMANDER:

Chief, Facilities Engineer Division

Enclosure: Timber Location Map

APPENDIX III-X

SAMPLE ANNUAL WORK PLAN FOR FOREST MANAGEMENT ACTIVITIES

Appendix III-X. Sample annual work plan for forest management activities

To: Jason Hauck, Chief DPW

From: Tony Gaw Forester

WORK PLAN FY 1997

Timber Management

- selectively harvest 80 acres of timber, including the salvaging of the hurricane damaged timber (Bertha and Fran).
- site preparation 10 acres on harvested sites.
- maintain 60 miles of firebreaks
- plant 20 acres (17,000 seedlings) to tree seedlings, if any harvested sites need reforesting by hand planting.
- cut hardwood firewood in areas needing site preparation for pine seedling release and in sites that will benefit the RCW colony sites.
- coordinate and provide guidance for the Contractor and Corps of Engineers to aid in the completion of the MOTSU Natural Resources Management Plans
- coordinate the marking of the endangered plant (Rough-leaved loosestrife) for compliance with USFWS guidelines
- control burn 3,000 acres from January through July (winter and growing season burns) and may include the interchange and buffer zone.

Game Management

- annual Audubon bird count on first part of January
- fall and spring deer track count
- coordinate the planting of 20 acres of food plots for wildlife
- coordinate the chemical treating of the colonels pond and one other pond for aquatic vegetation
- provide guidance and information to the contractor and the Corps of Engineers for the completion of the revision of the WILDLIFE MANAGEMENT and the ENDANGERED SPECIES PLANS
- work with state wildlife biologist on turkey management
- complete pest control plan and get approved.

Railroad

- replace 12,000 cross ties
- control burn railroad right of way
- clean up all old ties, spikes, rail and rail parts from access rail system
- clean out two miles of ditch line
- continue track inspection program
- continue to resurface access rail line
- inspect all spiked off inactive track to have it operable for PREP OPERATIONS
- continue to write and compile the track maintenance SOP
- continue to work on getting track inspectors position filled.

Custodial

- provide adequate custodial service to all buildings
- insure that daily, weekly, and monthly cleaning schedules are met.

Heavy Equipment

- complete ditch dredging in interchange yard to help with storm water drainage ditch that enters our property from the city of Leland. Per agreement with Brunswick County water division
- complete ditch dredging in buffer zone for the City of Kure Beach
- assist other divisions needing heavy equipment to complete an operation stage.

Personnel Management

- counseling, management of personnel problems, awards, work performance plans, and troubling shooting complaints
- providing support services for other MOTSU divisions.

*Maintain HR #9

Miscellaneous

- handling many other daily situations, in order to help meet MOTSU mission.

APPENDIX III-Y

SOURCES OF TECHNICAL ASSISTANCE

Sources of Technical Assistance

U.S. Department of Agriculture
Natural Resources Conservation Service
P.O. Box 2890
Washington, DC 20013

U.S. Department of Interior
Fish and Wildlife Service
Public Affairs Office
18th and C Streets, N.W.

U.S. Forest Service
Office of Information
Room 3238
P.O. Box 2417
Washington, DC 20013

American Forest Institute
1619 Massachusetts Ave., N.W.
Washington, DC 20036

U.S. Department of the Interior
Bureau of Land Management
Office of Public Affairs
Room 5625 Interior Building
Washington, DC 20240

Pesticide Hot Line (Autovon 584-3773)
U.S. Army Environmental Hygiene Agency
Pest Management and Pesticide
Monitoring Division
Aberdeen Proving Ground, Maryland 21005

American Sod Producers Association, Inc.
9th and Minnesota Streets
Hastings, Nebraska 68901

U.S. Department of the Interior
Geological Survey
12201 Sunrise Valley Drive
Reston, Virginia 22092

U.S. Department of Commerce
National Climatic Center
Federal Building
Asheville, North Carolina 28801
N.C. Department of Agriculture and Consumer Services
Pesticide Section
P.O. Box 27647
Raleigh, NC 27611

N.C. Department of Health and Natural Resources
Division of Forest Resources
P.O. Box 27687
Raleigh, NC 27611

APPENDIX III-Z

REQUIRED REPORT LIST

Appendix III-Z. Required report list

Required Report List

TITLE	RCS	REFERENCE
1. Natural Resources - Land, Forest, and Wildlife Management	None	AR 200-3 TM 5-631
2. Annual Work Plan	None	TM 5-631
3. Annual Historical Summary	CSHIS-6 (R3)	AR 870-5

PART IV.

FISH AND WILDLIFE MANAGEMENT PLAN

OF THE INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN FOR THE MILITARY OCEAN TERMINAL, SUNNY POINT, NORTH CAROLINA

Prepared By:
CZR INCORPORATED
Wilmington, North Carolina

DIAL CORDY AND ASSOCIATES INC.
Wilmington, North Carolina
and
SAVANNAH DISTRICT, U.S. ARMY CORPS OF ENGINEERS
Savannah, Georgia

Prepared For:
MILITARY OCEAN TERMINAL, SUNNY POINT
Southport, North Carolina

Agency Coordination and Revisions Provided By:
DIAL CORDY AND ASSOCIATES INC.
Wilmington, North Carolina

Submitted: July 2000
Modified: March 2005
Coordination Resolution: August 2006
FINAL: June 2009

PART IV. FISH AND WILDLIFE MANAGEMENT PLAN

OF THE INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN FOR THE MILITARY OCEAN TERMINAL, SUNNY POINT, NORTH CAROLINA

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PART IV. FISH AND WILDLIFE MANAGEMENT PLAN

1.0 INTRODUCTION

Army Regulation AR 200-3 requires that all military installations prepare and implement an Integrated Natural Resources Management Plan which includes, as one of its components, a Fish and Wildlife Management Plan. The following Fish and Wildlife Management Plan has been prepared for the Department of Defense facility, Military Ocean Terminal at Sunny Point (MOTSU), Brunswick County, North Carolina. It is in compliance with AR 200-3 and in accordance with guidelines provided in "Technical Manual 5-633, Natural Resources- Fish Wildlife Management" (Departments of the Army et al. 1982).

1.1 Scope. This Fish and Wildlife Management Plan has been developed for MOTSU as part of the overall Department of Defense Fish and Wildlife Management Program and is applicable to all lands and waters under MOTSU's jurisdiction. It includes technical information which will be used by natural resources management personnel engaging in fish and wildlife management.

1.2 Purpose. The purpose of the Fish and Wildlife Management Plan is to provide guidance for the management of fish and wildlife resources at MOTSU. The plan incorporates the Army goal of 1) habitat management -- to conserve and enhance existing flora and fauna, and 2) biodiversity -- to conserve, protect, and sustain biological diversity while supporting the accomplishment of the military mission (Department of the Army 1995).

1.3 Objectives. Fish and wildlife populations at MOTSU will be managed in accordance with the management objectives set forth below (Department of the Army 1995):

1) Conserve, protect, and enhance threatened and endangered species and their habitats.

2) Maintenance of healthy, sustainable wildlife populations within the carrying capacity of the installation's habitat.

3) Prevention of health and safety hazards.

4) Provision for wildlife related recreation.

5) Animal damage control

1.4 Implementation. The Fish and Wildlife Management Plan has been developed using the topics outlined in Appendix E of TM 5-633, listed above. The information contained in this plan will require review and coordination with the installation, the United States Fish and Wildlife Service (USFWS), and the North Carolina Wildlife Resources Commission. When an agreement is reached regarding the content and application of this information, this "cooperative" plan will provide a program of planning for the development, maintenance, and coordination of wildlife, fish, and game conservation at MOTSU. The plan will be reviewed and updated annually to incorporate new findings and revised at least every five years (U. S. Department of the Army 1995).

2.0 DESCRIPTION OF FISH AND WILDLIFE AREAS

Fish and wildlife management areas are located within three individual tracts of land which include the Main Terminal (8,645 acres), Leland Interchange Yard (652 acres), and Carolina Beach Blast Safety Zone (2,267 acres) (see figures I-1, I-2, and I-3 in PART I. GENERAL PLAN). The Main Terminal is surrounded to the north, south, and west by a 4,267-acre Blast Safety Easement which is privately owned and unavailable for fish and wildlife management. The Main Terminal-Blast Safety Easement tract is bound to the east by the Cape Fear River, to the south by Governors Creek, to the north by Orton Plantation, and to the west by privately owned land. The Carolina Beach Blast Safety Zone (CBBSZ) (a.k.a. New Hanover County Bufferzone) is located directly across from the Main Terminal on the eastern bank of the Cape Fear River, and the Leland Interchange Yard is located 18 miles inland approximately 2 miles west of the town of Leland.

2.1 Areas Available for Hunting and Fishing. The Main Terminal is divided into 40 hunting compartments (Figure IV-1) which are available to employees and guests for hunting. Hunting within the Leland Interchange Yard is restricted to occasional organized hunts conducted by the Installation Forester. No hunting is allowed within the CBBSZ. Fishing is allowed within the freshwater ponds (Figure IV-1) and saltwater estuaries of the Main Terminal and within saltwater estuaries associated with the CBBSZ. No open waters suitable for fishing exist within the Leland Interchange Yard.

2.2 Vegetation. The three individual tracts which comprise MOTSU encompass a wide range of environmental conditions and contain a highly diverse assemblage of vegetation types. Each vegetation type has a unique complement of animals and plants and a unique set of environmental factors which control the occurrence and distribution of that type. Consequently, each vegetation type occurring within a management area must be evaluated separately in order to determine the best management strategy for that particular area. Evaluation of the vegetation types involves developing an understanding of the environmental factors (such as soils, hydrological regime, salinity regime, fire regime, and human disturbance) which control the occurrence and distribution of these types. In addition, the importance of each vegetation type to forestry, endangered species, recreation, natural diversity, and the military mission must also be considered in developing the best management plan.

The vegetation types occurring at MOTSU were described and mapped by the U. S. Army Corps of Engineers, Wilmington District, in 1992. These maps were subsequently digitized and incorporated into the MOTSU Geographic Information Systems database. The 1992 study identified 31 vegetation types at MOTSU. Descriptions and maps showing the distribution of these types at MOTSU are provided in PART I. GENERAL PLAN. Floristic surveys of 112 ponds occurring at MOTSU were conducted during two separate studies. Ponds 1 through 55 were surveyed from 1977 through 1980 (Military Traffic Management Command 1981 and Dumond 1981), and ponds 56 through 112 were surveyed during 1983 (Leonard 1983). Additional plant and limited animal inventories were conducted by the North Carolina Natural Heritage Program in 1997 (LeBlond et al.). A Brunswick County survey containing reference to MOTSU was also completed by the North Carolina Natural Heritage Program (LeBlond 1995). As additional survey efforts by the state or others are allowed and completed, MOTSU should acquire a report of their findings for their records. This is in addition to MOTSU's in-house survey efforts. Survey data will assist with forestry management and planning decisions at MOTSU. Environmental Overlay maps included in the Real Property Master Plan (USACE 1994) identify sensitive plant communities, wetlands, open water areas, and additional features of the MOTSU landscape.

2.3 Native Species of Wildlife Food and Cover Plants. The descriptions of the plant community types contained in PART I. GENERAL PLAN provide the common and scientific names of the dominant plant species occurring within each community. Native vegetative species providing food and cover for wildlife on MOTSU are discussed in Appendix IV-A.

2.4 Vegetation Trends. Plant communities at MOTSU are part of a fire-maintained longleaf pine-dominated ecosystem, which once occupied much of the coastal plain of the southeastern United

SOURCE: BASE INFORMATION PROVIDED BY THE CORPS OF ENGINEERS, SAVANNAH DISTRICT IN MICROSTATION (.DGN) FORMAT, NAD 1927, DATED 7 AUGUST 1995, AND RECEIVED BY CZR INCORPORATED IN SEPTEMBER 1997. BASE INFORMATION WAS CONVERTED TO AUTOCAD AND ALL DESIGNATIONS FOR HUNTING AND FISHING AREAS WERE DIGITIZED AND PRODUCED IN AUTOCAD REL. 14 (.DWG) FORMAT.

MAIN TERMINAL
HUNTING AND FISHING AREAS

MILITARY OCEAN TERMINAL SUNNY POINT

FILE: HUNTFISH	DRAWN BY: JEJ/BFC	0 2400'
DATE: 3/11/98	APPROVED BY:	

CZR INCORPORATED ENVIRONMENTAL CONSULTANTS
4709 COLLEGE ACRES DRIVE SUITE 2
WILMINGTON, NORTH CAROLINA 28403
TEL 910/392-9253
FAX 910/392-9150

CP#1627.04

FIGURE IV-1

States. MOTSU has effectively preserved a portion of this ecosystem in a relatively natural state, while surrounding lands have frequently been developed and otherwise degraded. Fire suppression has been one of the greatest contributors to the degradation of the long leaf pine-dominated ecosystem in the southeast; however, controlled burning at MOTSU has maintained and restored many of these communities on the installation. Drainage is another factor which has degraded many of the natural communities of the coastal plain. Wetland communities such as pine savannahs, pine flatwoods, and pocosins have frequently been ditched and drained throughout the southeast. Although MOTSU does have a system of drainage ditches, drainage and resulting alterations of hydrology have had less of an adverse impact than similar, more extensive activities on surrounding lands. Preservation of plant communities in a relatively natural state at MOTSU has maintained a tremendous diversity of animal and plant species, which has declined throughout much of the southeastern coastal plain. The result is a rare opportunity to manage and optimize the diverse wildlife, fish, and vegetation resources associated with a tract of relatively undisturbed land.

2.5 Estuarine Resources. Estuaries are areas in the mouths of rivers where fresh water meets and mixes with salt water from the ocean. These areas are extremely important as development areas for the juvenile stages of many important saltwater fish species. The State of North Carolina has designated areas of the estuarine system, which support juvenile populations of economically important seafood species, as primary and secondary nursery areas. Primary nursery areas are defined as areas where initial post-larval development takes place, and secondary nursery areas are those areas where later juvenile development takes place. The waters and marshes associated with the upper reaches of Governors Creek are designated as a primary nursery area, and the majority of the Cape Fear River east of the navigation channel and adjacent to the CBBSZ is designated as a secondary nursery area. In addition to providing valuable habitat for juveniles, the estuarine tidal creeks and waters of the Cape Fear River provide excellent sport-fishing for numerous popular saltwater game species.

2.6 Freshwater Ponds. Freshwater fishing areas include Colonel's Pond, Blue Pond, Stumpy Pond, Ponderosa Pond, Center Wharf Pond, 500 Pads Pond, South Gate Pond, and Round Pond (Figure IV-1). Only one of these ponds, Center Wharf Pond, is an impoundment with water level management capabilities. The remainder of the ponds is naturally occurring, isolated depressions formed by the dissolution of underlying limestone deposits.

2.7 Military Use. The primary mission of MOTSU is the receipt and transport of ammunition, explosives, and related hazardous cargo. Cargo is shipped through MOTSU via rail, truck, and ship. MOTSU is staffed and operated by 13 permanently stationed military personnel and 247 direct hire civilian employees. In addition to the primary mission, MOTSU also serves as a training area for several reserve units. All transport operations and training exercises take place within hard surfaced areas and have little impact on wildlife management areas.

3.0 HISTORY OF FISH AND WILDLIFE MANAGEMENT

Fish and wildlife management has been conducted at MOTSU since its inception in 1953. Early management efforts included establishment of food plots and sampling of ponds to determine stocking needs. Hunting and fishing were prohibited during the Vietnam War from approximately 1970 to 1977. By the time hunting resumed in 1977, the deer population had exploded and managers were concerned about the outbreak of disease within the herd. Consequently, heavy hunting pressure was exerted, including dog hunting from 1977 to 1980, in an effort to bring the herd under control. Some hunting areas were also closed in 1991 during the Gulf War, but this had little impact on hunting since it occurred near the end of the deer season. Current hunting seasons are identical to those administered by the State of North Carolina.

3.1 Cooperative Agreement. Cooperative agreements with the North Carolina Wildlife Resources Commission (NCWRC) and the United States Fish and Wildlife Service (USFWS) (Appendix

IV-B) are in place for the management of fish and wildlife game species, perpetuation of North American Waterfowl populations, and restoration of wild turkey. These agreements allow MOTSU personnel to provide useful information while in turn receiving essential support. MOTSU provides data collected on harvested deer to the NCWRC. Information, which is recorded from harvested deer, includes weight, antler beam diameter, number of antler points, kidney fat, and pregnancy status. The results of deer track counts conducted in the spring and fall are also provided to the NCWRC. Track counts are used to generate an estimate of the deer population size, which in turn is used to adjust the annual deer harvest and sex ratio quotas. MOTSU is taking part in the North Carolina Wild Turkey Restoration Program administered by the NCWRC. The results of spring and fall wild turkey track counts and poultry counts conducted in July and August are provided to the NCWRC.

3.2 Public Use. Use of the hunting and fishing areas at MOTSU is limited to military personnel, civilian employees, and guests. No guests are allowed on MOTSU for Sunday hunting. MOTSU is a maximum security area due to the transport of ammunition through the facility. The restrictions on public use are related to safety issues and the hazardous nature of the cargo which is transported through the facility. Each year at MOTSU, an average of 1,220 individuals participate in hunting, and an average of 2,800 individuals participate in fishing.

4.0 FISH AND WILDLIFE RESOURCES

4.1 Game Species. MOTSU has a great diversity of habitats which support numerous popular game species. Table IV-1 lists the game species likely to occur at MOTSU.

4.2 Game Fish Species.

4.2.1 Freshwater Fish. The freshwater ponds occurring at MOTSU support numerous species of popular game fish. Table IV-2 lists the fresh water species likely to occur at MOTSU.

4.2.2 Saltwater Fish. The saltwater estuaries of the Cape Fear River and Govenor's Creek support numerous species of popular game fish. Table IV-3 lists the saltwater species likely to occur at MOTSU.

4.3 Non-game. Appendices IV-C through IV-F contain lists of the mammals, birds, reptiles, and amphibians likely to occur at MOTSU.

4.4 Protected Species

4.4.1 Federally-listed Species. MOTSU contains populations of two federally-listed endangered species which include the red-cockaded woodpecker (*Picoides borealis*) and rough-leaved loosestrife (*Lysimachia asperulaefolia*). The management of these two species at MOTSU is covered in depth in PART VI. ENDANGERED SPECIES MANAGEMENT PLAN.

4.4.2 State-listed Species. In addition to the two federally-listed species, MOTSU contains numerous plant and animal species listed by the state of North Carolina as endangered (E), threatened (T), special concern (SC), candidate (C) or significantly rare (SR) (DEHNR 1998). E, T and SC species are protected by state law (Plant Protection and Conservation Act of 1979) and listed in Appendix IV-G. C and SR designations indicate rarity and the need for population monitoring and conservation action. Although C and SR species are not protected under state law, these species are important to the ecological integrity and natural diversity of the installation and should be properly managed to ensure their continued existence. The list included as Appendix IV-G was obtained from the North Carolina Natural Heritage Program (NCNHP). It is a combined list of species taken from both New Hanover and Brunswick counties. NCNHP updates the county lists periodically and copies of both counties can be obtained online at www.ncnhp.org. This will ensure management personnel retain the most current information.

Table IV-1. Game species of the Military Ocean Terminal, Sunny Point area.

Common name	**Scientific name**
White-tailed deer	*Odocoileus virginianus*
Black bear	*Ursus americanus*
Wild turkey	*Meleagris gallopavo*
Gray squirrel	*Sciurus carolinensis*
Fox squirrel	*Sciurus niger*
Eastern cottontail	*Sylvilagus floridanus*
Marsh rabbit	*Sylvilagus palustris*
Bobwhite	*Colinus virginianus*
Raccoon	*Procyon lotor*
Opossum	*Didelphis virginiana*
Bobcat	*Lynx rufus*
Red fox	*Vulpes vulpes*
Gray fox	*Urocyon cinereoargenteus*
Beaver	*Castor canadensis*
Coyote	*Canis latrans*
Nutria	*Myocastor coypus*
Muskrat	*Ondatra zibethicus*
Mink	*Mustela vison*
Otter	*Lutra canadensis*
Striped skunk	*Mephitis mephitis*
Long-tailed weasel	*Mustela frenata*
Woodcock	*Scolopax minor*
Snipe	*Gallinago gallinago*
Mourning dove	*Zenaida macroura*
Clapper rail	*Rallus longirostris*
King rail	*Rallus elegans*
Virginia rail	*Rallus limicola*
Sora	*Porzana carolina*
Waterfowl (ducks, geese, swan, coot)	See Appendix C for a complete list of species

Table IV-2. Freshwater game fish of the Military Ocean Terminal, Sunny Point area.

Common name	Scientific name
Bluegill	*Lepomis macrochirus*
Largemouth bass	*Micropterus salmoides*
Chain pickerel	*Esox niger*
Redbreast	*Lepomis auritus*
Redear	*Lepomis microlophus*
Warmouth	*Lepomis gulosus*
Bullhead catfish	*Ictalurus spp.*
Blue catfish	*Ictalurus furcatus*
Flier	*Centrarchus macropterus*

Table IV-3. Saltwater game fish of the Military Ocean Terminal, Sunny Point area.

Common name	Scientific name
Channel bass (red drum)	*Sciaenops ocellata*
Spotted seatrout	*Cynoscion nebulosus*
Flounder	*Paralichthys* spp.
Black drum	*Pogonias cromis*
Atlantic croaker	*Micropogonias undulatus*
Weakfish	*Cynoscion regalis*
Spot	*Leiostomus xanthurus*
Bluefish	*Pomatomous saltatrix*
Sheepshead	*Archosargus probatocephalus*
Striped bass	*Morone saxatilis*

5.0 FISH AND WILDLIFE POTENTIALS

5.1 Habitat Trends. Implementation of a controlled burning program has opened up many of the areas which had become overgrown with woody vegetation. Burning has facilitated a shift within many of these areas to a more natural vegetation structure of scattered pines with a dense low shrub or herbaceous layer. Silvicultural practices have also been altered to facilitate a shift towards a more natural vegetation structure, particularly within areas inhabited by the federally endangered red-cockaded woodpecker. Management of stands for mature saw timber production has retained more pines of cone bearing age in the canopy and thinning cuts have been implemented which open up the forest floor and provide a more natural vegetation structure. Implementation of small block clear cuts has also allowed the retention of more mature stands of timber. Increases in the relative numbers of long-leaf pine seedlings which are being planted are also facilitating a shift to a more natural vegetative structure. Mast-producing hardwood species are being retained within streamheads, along the edges of timbered tracts, and in one-quarter acre blocks within areas managed for pine production.

5.2 Population Trends

5.2.1 White-tailed Deer. During the 1970's, low doe to buck harvest ratios and the absence of hunting during the Vietnam War resulted in overpopulation within the deer herd at MOTSU. Population densities expanded well beyond the land's carrying capacity of 25 deer per square mile to a high of 65 deer per square mile in 1979. Subsequent intensified hunting pressure and increases in the number of doe harvested resulted in stabilization of the deer herd. The population density was estimated at 24 deer per square mile in 1983. The NCWRC estimated the carrying capacity for the entire base at 600 deer. Current estimates indicate that the deer herd is somewhere between 350 and 500 in number. Harvest data and track counts are used to monitor the deer population and adjust harvest and sex ratio quotas on an annual basis.

5.2.2 Wild Turkey. The last native wild turkeys were observed at MOTSU during the mid-1960's. The extirpation of turkeys from MOTSU may have been related to losses of suitable habitat and over-hunting. Changes in forest management procedures and implementation of the controlled burning program have restored areas of suitable habitat, and in 1985 the NCWRC determined that MOTSU was suitable for the reintroduction of wild turkeys. Five gobblers and ten hens were released on MOTSU lands in March of 1989 through the Wild Turkey Restoration Program administered by the NCWRC. Annual track and poult counts indicate that the population is successfully reproducing. The population has expanded its range to adjacent lands where successful reproduction has also been observed. The wild turkey population at MOTSU is currently estimated at 70 birds. No hunting of turkeys has been allowed since the initial reintroduction; however, hunting is likely to be allowed in the near future upon determination by MOTSU and the NCWRC that a sufficient population size has been attained.

5.2.3 Other Game Species. Bobwhite and eastern cottontail populations are increasing in response to implementation of the controlled burning program and the establishment of food plots. These two species are frequently sighted in areas where they were absent during the 1980's.

Fox squirrel and gray squirrel populations are increasing in response to management of forests for mast producing hardwoods and mature longleaf pines. The controlled burning program has restored much of the open nature of the longleaf pine dominated areas and consequently has benefited fox squirrels. Fox squirrels are recolonizing areas with mature stands of longleaf pine and the population has increased by approximately 60 percent.

Gray fox sightings have increased in the 1990's. This population is probably increasing as a result of increases in small game populations such as the eastern cottontail.

Coyotes have been expanding their range into areas throughout the southeast and were first sighted at MOTSU in 1995. The size of the coyote population and their effects on populations of other game species has not been evaluated.

5.3 Potential Hunting and Fishing Days. According to the North Carolina Wildlife Resources Commission, "Lawful seasons and bag limits for each species apply beginning with the first day of the listed season and continue through the last day of the listed season, with all dates being included except Sunday. Hunting seasons are closed on Sundays, except on some military installations under the exclusive jurisdiction of the Federal government." At MOTSU, hunting is allowed on Sunday for employees only.

5.4 Hunting and Fishing Regulations. All hunting and fishing activities at MOTSU are subject to State of North Carolina hunting and fishing regulations with the exceptions of Sunday hunting and the daily creel limit for blue catfish of five fish per person per day (State creel limit = 6 per day). All persons who hunt or fish at MOTSU are required to possess a valid North Carolina hunting license or fishing license (inland waters only). All waters of the Cape Fear River and its tributaries within the boundaries of MOTSU are classified as coastal fishing waters and do not require a North Carolina fishing license. All isolated freshwater ponds are classified as inland fishing waters and do require a North Carolina fishing license. MOTSU adheres to the state hunting hours beginning 30 minutes before sunrise and ending 30 minutes after sunset. Hunters may begin entering the hunting areas 90 minutes before sunrise and must depart 90 minutes after sunset. There are no time restrictions on fishing. Waterfowl hunting is subject to all federal migratory game bird regulations as administered by the U. S. Fish and Wildlife Service.

Hunters select one of the 40 hunting compartments (Figure IV-1) on a first-come first-served basis. Once a compartment has been selected, the party's hunting license is posted on a numbered base map, and no other hunters are allowed access to that compartment until it has been cleared by the first party. A post hunting permit must be completed and registered with the security guard before entering the hunting compartment. Upon leaving the hunting compartment, hunters must check out through the security gate where harvest data are recorded.

6.0 RESPONSIBILITIES

6.1 Management. The Facilities Engineer is responsible for implementing the fish and wildlife management program. The program is coordinated through the Installation Forester. Harvest quotas, sex ratio quotas, hunting dates, data studies, and creel limits are administered by the Installation Forester in coordination with the NCWRC.

6.2 Enforcement. The Chief of Security is responsible for enforcement of hunting and fishing regulations. The closure of hunting compartments for security purposes is administered through the Security Branch in coordination with the Surveillance Branch. All harvested fish and game must be checked through the guard station where appropriate data are recorded. Transportation tags for harvested deer are also issued at the guard station.

7.0 WILDLIFE HABITAT MANAGEMENT

7.1 Controlled Burning. Controlled burning is the most efficient and beneficial method for improving wildlife habitat at MOTSU. Controlled burns improve wildlife habitat by creating a greater diversity of habitat types, stimulating new growth for browse, increasing the abundance of grasses and forbs, increasing edge effect, opening up the forest floor, and producing mosaics of herbaceous and shrubby vegetation. The use of fire is also highly compatible with the objectives of endangered species management and forestry practices at MOTSU. In addition, the extensive use of fire is critical to maintaining the ecological integrity and natural diversity of the installation.

Fire suppression has been one of the greatest contributors to the degradation and loss of the longleaf pine-dominated ecosystem which once occupied much of the coastal plain of the southeastern United States. Loss and degradation of these fire-maintained habitats is one of the primary factors contributing to the threatened or endangered status of numerous federally and state-listed species and a general decrease in the natural diversity of the coastal plain. Controlled burns restore and maintain the open nature of pine-scrub oak, pine flatwoods, and pine savannah communities. Keeping these communities open and controlling hardwood encroachment is critical to the success of the red-cockaded woodpecker and game species such as the bobwhite quail and fox squirrel. Fires also maintain and expand the ecotones between pine-scrub oak communities and pocosins. These ecotones are the primary habitat of the federally endangered rough-leaved loosestrife. Controlled burns are also important to forestry as a means of reducing competition and stimulating growth in managed timber stands.

Areas which are burned include all of the vegetated areas within the Main Terminal and Leland Interchange Yard. Burning within the CBBSZ is limited to small areas within Carolina Beach State Park. The degree to which habitat is improved can be influenced by regulating the intensity, frequency, timing, and location of controlled burns. The controlled burning plan for MOTSU calls for all managed areas to be burned every 3 to 5 years. This 3 to 5 year burning schedule is somewhat dependant on weather and the number of suitable burning days which occur during a given year. Restrictions on burning at MOTSU are more stringent than normal due to the hazardous nature of the cargo which is transported through the installation. Since the number of suitable burning days may be severely limited during any given year, the frequency of burning may fluctuate substantially. The fire breaks which divide the hunting compartments also delineate the burning compartments. In general, winter burns conducted when conditions are wetter tend to be less intense than summer fires which burn hotter and longer under dry conditions. Although winter burns may be more desirable from a safety standpoint, the more extensive summer burns may provide the greatest benefits to wildlife and endangered species.

7.2 Thinning. Thinning is another management technique which has the potential to benefit wildlife, endangered species, and forest stand productivity. Harvesting of overstocked timber stands is used at MOTSU as a method of opening the forest floor and stimulating the growth of desirable browse.

7.3 Herbicides. Hardwoods occurring within some of the designated pine straw raking areas are treated with herbicides to enhance raking. Although not intended as a wildlife management strategy, the use of herbicides on hardwoods has the potential to benefit wildlife by opening the forest floor and stimulating the growth of desirable browse. The potential benefits of herbicide use within raking areas may be offset by the potential negative influence of raking on ground cover species. The use of herbicides to control hardwoods can be used as a means of restoring the ecological integrity of longleaf pine-dominated communities which have been invaded by hardwoods following long periods of fire suppression. Extensive stands of large hardwoods which have invaded fire suppressed areas may not be controlled by the reintroduction of fire and may require additional control measures such as the use of herbicides.

Herbicides are also used to control common reed (*Phragmites communis*) stands in the diked dredged material disposal areas. Following herbicide application, openings created by the die-back of common reed are planted with small grains and utilized as food plots for game animals.

7.4 Wildlife Food Plots. The main terminal contains nine wildlife food plots which are disked, fertilized, and planted on an annual basis. Food plots range in size from 0.25 to 20 acres and are planted with various combinations of rye, wheat, corn, millet, clover, and sunflowers (Table IV-4).

7.5 Water Facilities. The vast number of naturally occurring freshwater ponds, marshes, swamp forests, and streamhead pocosins, in addition to existing man-made borrow pits and drainage ditches, precludes the need for establishment of water facilities specifically for wildlife.

Table IV-4. Size and composition of wildlife food plots at Military Ocean Terminal, Sunny Point.

Food plot[a]	Area (acres)	Composition
1	20	Millet, corn
2	4.00	Sunflowers
3	1.00	Rye, sunflowers
4	1.00	Rye, wheat
5	0.25	Rye, wheat
6	0.25	Rye, wheat
7	0.25	Rye, wheat
8	0.50	Clover
9	0.5	Rye

[a] Plot locations are shown on Figure IV-1.

8.0 WILDLIFE HARVEST MANAGEMENT

8.1 Carrying Capacity. The NCWRC has estimated the carrying capacity for white-tailed deer at MOTSU to be approximately 25 deer per square mile. Carrying capacity estimates have not been generated for additional game species.

8.2 Harvest Quotas. Population estimates for white-tailed deer based on track counts are used in coordination with the NCWRC to adjust the annual deer harvest and sex ratio quotas. Information, which is recorded from harvested deer, includes sex, weight, antler beam diameter, number of antler points, kidney fat, and pregnancy status. Track counts are conducted during the spring and fall along firebreaks 3, 13, 17, 31, 38, 39, 40, and 41. The annual harvest quota has never been reached at MOTSU. Harvest quotas have not been established for other game species.

Population estimates for wild turkey are estimated in coordination with the NCWRC on the basis of spring and fall track counts and poult counts conducted in July and August. These estimates will be used to establish harvest quotas in the future when turkey hunting is opened at MOTSU.

8.3 Harvest Data. White-tailed deer harvest numbers for years 1977 through 1997 are provided in Table IV-5. An average of 40 squirrels and 10 rabbits has also been harvested on an annual basis since 1977.

8.4 Predator Control. Coyotes were first observed at MOTSU in 1995. Although their numbers are believed to be small, the population appears to be gradually increasing. Coyotes have not been implicated in any declines of desirable species, and no control measures have been implemented.

9.0 WATERFOWL AND SHOREBIRD MANAGEMENT

9.1 Waterfowl Impoundments. Four diked dredged material disposal areas exist at MOTSU (Figure IV-1). Diked area IV is kept flooded year-round to attract waterfowl. Hunting within this impoundment is limited to two groups on any given day during the waterfowl hunting season. The remaining three diked areas are filled and have been invaded by large stands of common reed.

9.2 Wood Duck Boxes. Thirteen wood duck boxes are located within the main terminal (Figure IV-1). These boxes are placed within small ponds and beaver impoundments to enhance nesting in areas of suitable brood-rearing habitat.

9.3 Dredged Material Disposal Islands. The U. S. Army Corps of Engineers owns and manages numerous dredged material disposal islands located in the Cape Fear River between the Main Terminal and the CBBSZ. Although unavailable for management and off-limits to hunting, these islands provide valuable habitat for numerous species of waterfowl which may also use the impoundments and wetlands of managed areas at MOTSU.

9.4 Rookeries. Three rookeries are present at MOTSU. Anhingas (*Anhinga anhinga*), great blue herons (*Ardea herodias*), and great egrets (*Casmerodius albus*) use these rookeries. MOTSU personnel actively manage these areas by protecting the timber resources which provide roosting and nesting opportunities for shorebirds.

Table IV-5. Annual white-tailed deer harvest at Military Ocean Terminal, Sunny Point, 1977-1997.

Year	Bucks harvested	Does harvested	Total deer harvest
1997	35	30	65
1996	39	31	70
1995	42	42	84
1994	30	18	48
1993	47	30	77
1992	46	12	58
1991	26	19	45
1990	39	28	67
1989	39	38	77
1988	26	12	38
1987	35	22	57
1986	19	15	34
1985	20	13	33
1984	22	10	32
1983	47	21	68
1982	26	12	38
1981	38	73	111
1980	35	71	106
1979	43	173	216
1977	56	0	56

10.0 WETLAND PROTECTION

A 50 to 100 foot buffer zone is maintained around wetlands during timber harvesting activities to minimize siltation and disturbance. Grassed waterways are used to filter runoff from drainage areas, and filter cloth is placed across all ditches in the vicinity of construction sites to minimize siltation. Land management activities in areas which contain wetlands are coordinated with the USFWS and U.S. Army Corps of Engineers to ensure compliance with all federal wetland regulations.

11.0 FISHERIES MANAGEMENT

11.1 Fish Attractors. Metal, clay, and corrugated pipes have been placed in Colonel's Pond in an effort to facilitate reproduction of catfish.

11.2 Aquatic Weed Control. The species of aquatic weeds which cause the majority of management problems in freshwater ponds include water hyacinth (*Eichhornia crassipes*), coontail (*Ceratophyllum demersum*), bladderworts (*Utricularia* spp.), water-lily (*Nymphaea odorata*), alligator weed (*Alternanthera philoxeroides*), and cattails (*Typha* spp.). Methods of aquatic weed control include dredging, chemical control, water level manipulation, and the introduction of grass carp.

11.2.1 Dredging. Dredging is used as a method of aquatic weed control in ponds both as a means of mechanical vegetation removal and as a means of deepening the littoral zone to a minimum depth of 3 feet to inhibit the growth of aquatic weeds.

11.2.2 Chemical Control. Herbicides are also used as a means of aquatic weed control in managed ponds. Rodeo is used on floating and emergent aquatic weeds which can be sprayed directly, and diquat is used to control submersed species. All application of herbicides is conducted in strict accordance with manufacture's recommendations, the approved pest control plan for the Terminal, and guidelines provided by the NCWRC.

11.2.3 Water-level Manipulation. Extended periods of inundation have been used successfully in Center Wharf Pond as a method of controlling cattails.

11.2.4 Grass Carp. MOTSU has received approval to introduce 300 to 400 sterile grass carp (*Ctenopharyngodon idella*) into Blue Pond and Colonel's Pond.

11.3 Stocking. Pond management studies have been conducted in cooperation with the Department of Interior, U. S. Fish and Wildlife Service, and the NCWRC. The information generated by these studies has been used in the stocking and restocking of selected ponds. Most of the ponds at MOTSU were stocked in the 1970's. Recent stockings (Table IV-6) have occurred in Round Pond (1988), Colonel's Pond (1994), and Blue Pond (1994).

11.4 Creel and Size Limits. All creel and size limits follow State of North Carolina fishing regulations with the exception of the creel limit for blue catfish which is five per person per day (state creel limit = six per day). Average annual creel survey results are summarized in Table IV-7.

11.5 Access. Pond access structures include a boat ramp and pier in Colonel's Pond. The remaining ponds are accessible by boat via earthen ramps. Salt water access areas include a walkway along the Cape Fear River just south of the South Wharf and a boat ramp in Governors Creek at the Firebreak 13 crossing (Figure IV-1).

12.0 EXPLORATION AND STUDIES IN COOPERATION WITH FEDERAL, STATE, AND LOCAL AGENCIES

In addition to the cooperative agreements for the management of deer, turkey, and fisheries, MOTSU is involved in numerous cooperative studies of non-game and endangered species. Cooperative

Table IV-6. Stocking history of managed ponds at Military Ocean Terminal, Sunny Point.

Pond [a]	Stocking date	Stocking composition	
Round Pond	1988	500	bluegill
Colonel's Pond	1994	4500	bluegill
		2500	largemouth bass
		1000	blue catfish
		500	hybrid bluegill
Blue Pond	1994	1000	bluegill

[a] Pond locations are shown in Figure IV-1.

Table IV-7. Average annual game fish harvest at Military Ocean Terminal, Sunny Point.

Species	Average annual harvest
Bluegill	4500
Flyer	1000
Shell cracker	500
Large mouth bass	1000
Catfish	30
Stripped bass	15
Spotted seatrout	400
Red drum	450
Black drum	185
Flounder	345
Croaker	1700
Spot	4000

efforts have included studies and inventories of animals and plants conducted by the North Carolina State Museum of Natural History and the North Carolina Natural Heritage Program. Studies of the endangered red-cockaded woodpecker and rough-leaved loosestrife have been conducted in coordination with the USFWS. In addition, MOTSU takes part in the annual Audubon Christmas bird count and has allowed faculty and students from Brunswick Community College to conduct a raptor flyway count. Additional plant and animal inventories were conducted by the North Carolina Natural Heritage Program in 1997. Future publication of these inventories will provide additional information pertaining to the plant communities, rare species, and overall natural diversity of MOTSU.

13.0 REFERENCES

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APPENDIX IV-A

LIST OF NATIVE VEGETATIVE SPECIES BENEFICIAL TO WILDLIFE OF THE MOTSU AREA

APPENDIX IV-A
LIST OF NATIVE VEGETATIVE SPECIES BENEFICIAL TO WILDLIFE OF THE MOTSU AREA[a]

Common name	Scientific name	Wildlife value
TREES		
Live oak	*Quercus virginiana*	Acorns, twigs, foliage
Laurel oak	*Quercus hemisphaerica*	Acorns, twigs, foliage
Swamp laurel oak	*Quercus laurifolia*	Acorns, twigs, foliage
Scrubby post oak	*Quercus margaretta*	Acorns, twigs, foliage
Blue-jack oak	*Quercus incana*	Acorns, twigs, foliage
White oak	*Quercus alba*	Acorns, twigs, foliage
Turkey oak	*Quercus laevis*	Acorns, twigs, foliage
Blackjack oak	*Quercus marilandica*	Acorns, twigs, foliage
Southern red oak	*Quercus falcata*	Acorns, twigs, foliage
Water oak	*Quercus nigra*	Acorns, twigs, foliage
Black oak	*Quercus velutina*	Acorns, twigs, foliage
Mockernut hickory	*Carya alba*	Hickory nuts, twigs, foliage
Sand hickory	*Carya pallida*	Hickory nuts, twigs, foliage
Hackberry	*Celtis laevigata*	Fruit, twigs, foliage
Green ash	*Fraxinus pensylvanica*	Seeds, twigs, foliage
Bald cypress	*Taxodium distichum*	Seeds
Pond cypress	*Taxodium ascendens*	Seeds
Swamp tupelo	*Nyssa biflora*	Fleshy fruits, twigs, foliage
Black gum	*Nyssa sylvatica*	Fleshy fruits, twigs, foliage
Red maple	*Acer rubrum*	Seeds, flowers, twigs, foliage
Sweetgum	*Liquidambar styraciflua*	Seeds
Tulip tree	*Liriodendron tulipifera*	Seeds, twigs, foliage
American holly	*Ilex opaca*	Berries
Eastern red cedar	*Juniperus virginiana*	Fleshy cones, twigs, foliage
Black cherry	*Prunus serotina*	Fleshy fruit, twigs, foliage
Dogwood	*Cornus florida*	Fleshy fruit, twigs, foliage
Persimmon	*Diospyros virginiana*	Fleshy fruit, twigs, foliage
Longleaf pine	*Pinus palustris*	Seeds, twigs, foliage
Loblolly pine	*Pinus taeda*	Seeds, twigs, foliage
Pond pine	*Pinus serotina*	Seeds, twigs, foliage

Appendix IV-A. (continued)

Common name	Scientific name	Wildlife value
SHRUBS		
Redbay	*Persea borbonia*	Fruit, twigs, foliage, cover
Sweetbay	*Magnolia virginiana*	Fruit, twigs, foliage, cover
Titi	*Cyrilla racemiflora*	Fruit, twigs, foliage, cover
Ink berry	*Ilex glabra*	Fruit, twigs, foliage, cover
Gallberry	*Ilex coriacea*	Fruit, twigs, foliage, cover
Yaupon	*Ilex vomitoria*	Fruit, twigs, foliage, cover
Blueberry	*Vaccinium* spp.	Fruit, twigs, foliage, cover
Huckleberry	*Gaylussacia* spp.	Fruit, twigs, foliage, cover
Elderberry	*Sambucus canadensis*	Fruit, twigs, foliage, cover
Winged sumac	*Rhus copallinum*	Fruit, twigs, foliage, cover
Wax myrtle	*Myrica cerifera*	Fruit, twigs, foliage, cover
Horse sugar	*Symplocus tinctoria*	Fruit, twigs, foliage, cover
Sassafras	*Sassafras albidum*	Fruit, twigs, foliage, cover
Swamp rose	*Rosa palustris*	Fruit, foliage, cover
Hawthorn	*Crataegus* sp.	Fruit, foliage, cover
Chokeberry	*Sorbus arbutifolia*	Fruit, twigs, foliage, cover
Blackberry	*Rubus* spp.	Fruit, foliage, cover
Wild plum	*Prunus angustifolia*	Fruit, twigs, foliage, cover
Buttonbush	*Cephalanthus occidentalis*	Seeds, foliage, cover
WOODY VINES		
Greenbrier	*Smilax* spp.	Fruit, stems, foliage
Grapes	*Vitis* spp.	Fleshy fruit, stems, foliage
Virginia creeper	*Parthenocissus quinquefolia*	Fruit, foliage
Poison ivy	*Toxicodendron radicans*	Fruit
Trumpet vine	*Campsis radicans*	Flowers, fruit, foliage
HERBS		
Rattlebox	*Crotolaria* spp.	Fruit, foliage
Samson snakeroot	*Psoralea psoralioides*	Fruit, foliage
Pencil flower	*Stylosanthes biflora*	Fruit, foliage
Beggar lice	*Desmodium* spp.	Fruit, foliage

Appendix IV-A. (concluded)

Common name	Scientific name	Wildlife value
Vetch	*Vicia* spp.	Fruit, foliage
Bush clover	*Lespedeza* spp.	Fruit, foliage
Butterfly pea	*Clitoria mariana*	Fruit, foliage
Ragweed	*Ambrosia artemisiifolia*	Seeds, foliage
Lamb's quarters	*Chenopodium album*	Seeds, foliage
Beggar ticks	*Bidens* spp.	Seeds, foliage
Smartweed	*Polygonu*m spp.	Seeds, foliage
Pokeweed	*Phytolacca americana*	Fruit, foliage
Panic grass	*Panicum* spp.	Seeds, foliage
Wire grass	*Aristida stricta*	Seeds, foliage
Cutgrass	*Leersia* spp.	Seeds, rootstocks
Johnson grass	*Sorghum halepense*	Seeds, foliage
Foxtail	*Setaria* spp.	Seeds, foliage
Cordgrass	*Spartina* spp.	Seeds, rootstocks
Sedge	*Carex* spp.	Nutlets, tubers
Nutgrass	*Cyperus* spp.	Nutlets, tubers
Bulrush	*Scirpus* spp.	Nutlets, tubers
Beakrush	*Rhynchospora* spp.	Nutlets, tubers
Spikerush	*Eleocharis* spp.	Nutlets, tubers
Pondweed	*Potamogeton* spp.	Fruits, foliage
Arrowhead	*Saggitaria* spp.	Seeds, tubers
Cattail	*Typha* spp.	Seeds, rootstock
Duckweed	*Spirodela* spp. / *Lemna* spp.	Foliage

[a] Source: Martin, A. C., H. S. Zim, and A. L. Nelson. 1951. American Wildlife and Plants. A Guide to Wildlife Food Habits. Dover Publications, Inc., New York.

APPENDIX IV-B

COOPERATIVE PLAN AGREEMENTS

COOPERATIVE PLAN AGREEMENT
FOR THE CONSERVATION AND DEVELOPMENT OF THE
FISH AND WILDLIFE RESOURCES
MILITARY OCEAN TERMINAL, SUNNY POINT

1. Purpose. To provide a cooperative plan and tri-partite agreement between the Department of Defense, State of North Carolina and the Department of the Interior for the conservation and development of wildlife resources on Military Ocean Terminal, Sunny Point (MOTSU).

2. Authority. In accordance with the authority contained in Title 10, U.S. Code, Section 2671 and Title 16, U.S. Code, Section 670 the Department of Defense, the Department of Interior and the State of North Carolina, through their duly designated representatives whose signatures appear on this copy, approve the following cooperative plan for the protection, development and management of fish and wildlife resources on Military Ocean Terminal, Sunny Point.

3. Limitations. This agreement covers approximately 9,000 acres owned in Fee by the U.S. Army. Some 25 percent (2,000 acres plus) of this land area is made up of administrative and operational areas. The remaining acreage is pine, cypress, and mixed hardwood woodland and is well suited for fish and wildlife development. This agreement is for game and fish management purposes only. The military mission of Military Ocean Terminal, Sunny Point, supersedes fish and wildlife management and associated recreational activities; and, such activities must in all instances be compatible with the military mission.

However, where there is conflict between the military mission and provisions of the endangered species act or other applicable statutes, such conflicts will be resolved according to statutory requirements.

4. Fish and Wildlife Inventory. A general inventory review of fish and wildlife resources will be made with all signatory agencies participating. When such inventory is completed, it will become a part of this agreement.

5. Wildlife Management Plans. A Wildlife Management Plan (AR 420-74) has been prepared and submitted to MTMC by the Facilities Engineer Division. The final plan will be coordinated with the Installation Commander and the U.S. Army Forces Command. This plan provides long range guidance for implementation of the program that will be compatible with the military mission. The following will be specifically addressed:

a. Long range plans of work for fish and wildlife habitat development and maintenance.

b. Integration of fish and wildlife management practices with forestry and other natural resources management work.

c. Development and preservation of wetland habitats, where feasible, for waterfowl, other wildlife and water quality.

d. Protection and management of existing important fish and wildlife species.

e. Protection and preservation of endangered species.

This plan will be attached to this agreement upon its approval.

6. Interagency Cooperation

a. Law Enforcement: Game and fish law enforcement will be a responsibility of the Army Installation. Security and safety consideration will limit fishing and hunting privileges to individuals authorized access to the terminal, which includes members of the general public under controlled conditions. Detailed procedures to control fishermen and hunters are published in Installation Regulation number 28-1. Local fees will not be assessed by the Commanding Officer for the issue of installation fishing and hunting permits. Sunny Point Army Terminal is an installation where the U.S. Government exercises "exclusive" legislative jurisdiction. The State of NOrth Carolina has no land upon which the Terminal is situated. It shall be the policy of Sunny Point Army Terminal in furthering the public interest between Federal and State authorities and their respective laws governing wildlife to abide by such laws jointly and that the State game and fish laws as well as Federal Laws will apply. License requirements will be those of the State of North Carolina. Fishermen will be required to have a valid State of North Carolina license in their possession when such license would be required to fish in waters located in Brunswick County, NOrth Carolina. Official Federal, State, and County agents, as deemed necessary, will be allowed to enter the installation area for the purpose of inspection of game and fish activities. These Agents will coordinate their visits with the Chief of Security Division of the Sunny Point Army Terminal to insure coordination of all agencies involved. The game seasons established for Brunswick County, North Carolina, shall apply within the terminal area.

b. Technical Assistance.

(1) Wildlife Management. The participating agencies will provide technical advice and assistance on the wildlife management program, with the understanding that the Fish and Wildlife Service may provide assistance only when the North Carolina Wildlife Resources Commission cannot accommodate the requested assistance. Visits to Military Ocean Terminal, Sunny Point will be made by personnel as requested by the Commander so as to maintain a sound wildlife management program. It is understood, however, that assistance provided by the Fish and Wildlife Service will be on cost-reimbursement basis, except the following:

(a) Activities required of the Service by the Endangered Species Act, in particular Section 7 consultations, and other federal laws; and,

(b) Assistance for the purpose of reducing migratory bird/animal damage problems affecting human health and safety (for example: rabies outbreak, blackbird/starling roosts).

(2) Fish Management. The participating agencies will provide technical assistance on the fishery management program, with the understanding that the Fish and Wildlife Service may provide assistance only if the North Carolina Wildlife Resources Commission cannot accommodate the requested assistance. Visits to Military Ocean Terminal, Sunny Point will be made by personnel as requested so as to maintain a sound fishery management program. Visiting personnel may provide advice and assistance on all phases of the program to

include: inventory, renovation, stocking, weed control, and other manipulation of aquatic habitat as required. It is understood, however, that assistance provided by the Fish and Wildlife Service will be on a cost-reimbursement basis, with the exception that fish for stocking reservation waters may be supplied without cost, subject to availability.

7. Adoption. This Cooperative Plan will be in full force upon its adoption as determined and witnessed by the last signature appearing hereon and may be amended or revised upon the consent of all parties represented. Request for an amendment or change to this plan may originate with any of the Departments represented by the signatory party appearing herein:

NORTH CAROLINA

BRUNSWICK _____ COUNTY

COOPERATIVE AGREEMENT

WILD TURKEY RESTORATION PROGRAM

This Agreement is made and entered into this ____ day of _____, 1988, by and between the North Carolina Wildlife Resources Commission, hereinafter called the Commission, and Commander, Military Ocean Terminal, Sunny Point __, hereinafter called the Landowner, who owns _ 10,000 _ acres of land in Smithfield Township, _Brunswick _ County.

WITNESSETH:

That in consideration of the obligations assumed by the respective parties to this agreement, and for the purpose of restocking and restoring a resident native wild turkey population on the said lands and of utilizing the same as a nucleus for the further spread of such population into the surrounding territory and providing wild stock for additional introductions of the species into other suitable areas of the State, the said parties agree as follows:

The Commission agrees:

1. To release on the lands included herein live-trapped wild turkeys in numbers and in areas as deemed suitable by the Commission for a successful transplant.

2. To make periodic surveys to monitor and evaluate the success of the restoration effort and to provide technical assistance and guidance to the Landowner with regard to ways in which the habitat of the area and conditions favorable to the establishment and spread of the restocked wild turkeys can be improved.

3. To provide careful protection of the restocked flock through its law enforcement staff.

The Landowner agrees:

1. To protect, to the fullest extent possible, the wild turkeys restocked from illegal or decimating factors particularly during the spring nesting season; and from any other disruptive or decimating factors over which control may be exercised that may retard the successful establishment or spread of the restocked turkey.

2. To carefully consider all recommendations of the Commission pertaining to improving conditions conducive to the successful establishment of the restocked wild turkeys and to implement those recommendations that are compatible with primary management plans for the land and that are economically feasible.

3. To be considerate of actions that would render the lands unsuitable or that would substantially reduce the suitability of the area for habitation by the restocked wild turkeys.

4. To support and abide by all laws and regulations pertaining to the restoration, protection, and management of the wild turkey in North Carolina.

5. To allow the Commission to live-trap wild turkeys from said lands for release elsewhere, with the time and location of trapping, the number of birds trapped, and the area to be stocked being within the discretion of the Commission.

This agreement shall run with the land and shall be binding on the parties hereto and their successors and assigns for a period of twelve (12) years from the date hereof.

In Witness Whereof, the said parties have executed and sealed this agreement in duplicate originals, one of which is retained by each of said parties, the day and year first above written.

Charles N Bullard (SEAL)

Landowner
Charles N. Bullard, Colonel, U.S. Army, Commanding

Chl R Pollard

Executive Director
N.C. Wildlife Resources Commission

Landowner's address: Military Ocean Terminal,

Sunny Point

Southport, NC 28461-5000

JOINT AGREEMENT OF COOPERATION TO PERPETUATE NORTH AMERICAN WATERFOWL POPULATIONS

I. PURPOSE:

To provide a plan of coordination, development, and implementation for the management of waterfowl and associated wetland species on lands controlled by the Department of the Defense.

II. AUTHORITY:

This effort conforms with the Sikes Act (PL 86-797), as amended, and the Memorandum of Understanding (April 7, 1978) between the Department of the Interior and the Department of Defense for the Conservation and Management of Fish and Wildlife Resources on Military Installations.

III. DISCUSSION:

Waterfowl managers in the United States, in cooperation with their counterparts in Canada, are undertaking a cooperative effort to meet the present and future needs of North America's waterfowl resources. They have reached an agreement in principle, the North American Waterfowl Management Plan (Plan), that recognizes the value of North America's waterfowl and provides a blueprint for action. The Plan places primary emphasis on the protection and enhancement of waterfowl habitat in the two countries by identifying 34 major habitat areas involving approximately 6 million acres. It also focuses on the need to restore duck populations from their current all-time low to a 1970's target of 62 million breeding birds and a fall flight in excess of 100 million birds.

To accomplish this task, both the Canadian and U.S. wildlife services realize they cannot work alone. In the Plan, this has been identified as the "Joint Venture" approach. It provides the framework for a combination of wetland protection and habitat enhancement to benefit breeding, migrating, and wintering waterfowl. It is in this spirit of cooperation that the Fish and Wildlife Service and the Department of Defense agree to participate in a joint effort to enhance waterfowl habitat on our nation's military lands.

IV. SCOPE OF WORK:

A. The Department of Defense will:

1. Provide a list of installations in or near joint venture areas of major concern, and participate with the Fish and Wildlife Service in selecting and prioritizing installations. Installations will be selected for subsequent cooperative work on the basis of an intent to enhance, protect, or develop habitat for waterfowl and associated wetland species. Accomplish by December 31, 1988.

2. Identify and implement specific projects described in cooperative fish and wildlife plans as desirable for waterfowl and wetland habitat enhancement, protection, or development. Projects funded will be determined by availability of funds. Accomplish in FY 1990-1992.

B. The Fish and Wildlife Service will:

1. Coordinate with State Fish and Game Agencies for assessments to determine waterfowl and wetland management potentials on selected Defense lands. Accomplish by November 18, 1988.

2. Participate with the Department of Defense in the selection of installations for subsequent cooperative wetlands and wildlife management planning. Accomplish by December 31, 1988.

3. Participate, at its own expense, in the development of cooperative fish and wildlife plans for selected installations, insuring identification of specific waterfowl and wetland management projects. Accomplish by September 30, 1989.

V. PERIOD OF PERFORMANCE:

This agreement is effective through FY 1992. Costs and benefits will be evaluated by March 30, 1993, to determine future efforts.

VI. LIAISON OFFICERS:

A. Department of Defense - Deputy Director, Environmental Planning, Pentagon Building, Washington, D.C. 20301-8000

B. U.S. Fish and Wildlife Service - Sikes Act Coordinator, Washington, D.C. 20240

Signature/Approval Blocks

U.S. Fish and Wildlife Service

Name [signature]

Title Director

Date 8/11/88

Department of Defense

Name [signature]

Title Deputy Assistant Secretary of Def

Date 8/11/88

APPENDIX IV-C

LIST OF THE MAMMALS OF THE MOTSU AREA

APPENDIX IV-C
LIST OF THE MAMMALS OF THE MOTSU AREA[a]

Common name	Scientific name
White-tailed deer	*Odocoileus virginianus*
Opossum	*Didelphis virginiana*
Southeastern shrew	*Sorex longirostris*
Short-tailed shrew	*Blarina brevicauda*
Carolina short-tailed shrew	*Blarina carolinensis*
Least shrew	*Cryptotis parva*
Eastern mole	*Scalopus aquaticus*
Star-nosed mole	*Condylura cristata*
Silver-haired bat	*Lasionycteris noctivagens*
Eastern pipistrelle	*Pipistrellus subflavus*
Big brown bat	*Eptesicus fuscus*
Red bat	*Lasiurus borealis*
Seminole bat	*Lasiurus seminolus*
Hoary bat	*Lasiurus cinereus*
Evening bat	*Nycticeius humeralis*
Rafinesque's big-eared bat	*Plecotus rafinesqueii*
Brazilian free-tailed bat	*Tadarida brasiliensis*
Eastern cottontail	*Sylvilagus floridanus*
Marsh rabbit	*Sylvilagus palustris*
Southern flying squirrel	*Glaucomys volans*
Gray squirrel	*Sciurus carolinensis*
Fox squirrel	*Sciurus niger*
Beaver	*Castor canadensis*
Rice rat	*Oryzomys palustris*
Eastern harvest mouse	*Reithrodontomys humulis*
Cotton mouse	*Peromyscus gossypinus*
Golden mouse	*Ochrotomys nuttalli*
Hispid cotton rat	*Sigmodon hispidus*

Appendix IV-C. (concluded)

Common name	Scientific name
Eastern wood rat	*Neotoma floridana*
Pine vole	*Microtus pinetorum*
Muskrat	*Ondatra zibethicus*
Black Rat	*Rattus rattus*
Norway rat	*Rattus norvegicus*
House mouse	*Mus musculus*
Nutria	*Myocastor coypus*
Coyote	*Canis latrans*
Red fox	*Vulpes vulpes*
Gray fox	*Urocyon cinereoargenteus*
Black bear	*Ursus americanus*
Raccoon	*Procyon lotor*
Long-tailed weasel	*Mustela frenata*
Mink	*Mustela vison*
Striped skunk	*Mephitis mephitis*
Otter	*Lutra canadensis*
Bobcat	*Lynx rufus*
Manatee	*Trichechus manatus*

[a] Source: Webster, D., J. F. Parnell, and W. C. Biggs. 1985. Mammals of the Carolinas, Virginia, and Maryland. The University of North Carolina Press.
Note: Common and scientific names have been updated as of April 2009 to reflect changes shown by the American Society of Mammalogists (last updated 2001).

APPENDIX IV-D

LIST OF THE BIRDS OF THE MOTSU AREA

APPENDIX IV-D
LIST OF THE BIRDS OF THE MOTSU AREA[a]

Common name	Scientific name
Red-throated loon	*Gavia stellata*
Common loon	*Gavia immer*
Pied-billed grebe	*Podilymbus podiceps*
Red-necked grebe	*Podiceps grisegena*
Horned grebe	*Podiceps auritus*
White pelican	*Pelecanus erythrorhynchos*
Brown pelican	*Pelecanus occidentalis*
Great cormorant	*Phalacrocorax carbo*
Double-crested cormorant	*Phalacrocorax auritus*
Anhinga	*Anhinga anhinga*
Magnificent frigatebird	*Fregata magnificens*
American bittern	*Botaurus lentiginosus*
Least bittern	*Ixobrychus exilis*
Great blue heron	*Ardea herodias*
Great egret	*Ardea alba*
Snowy egret	*Egretta thula*
Little blue heron	*Egretta caerulea*
Tricolored heron	*Egretta tricolor*
Reddish egret	*Egretta rufescens*
Cattle egret	*Bubulcus ibis*
Green heron	*Butorides virescens*
Black-crowned night heron	*Nycticorax nycticorax*
Yellow-crowned night heron	*Nyctinassa violacea*
White ibis	*Eudocimus albus*
Glossy ibis	*Plegadis falcinellus*
Wood stork	*Mycteria americana*
Fulvous whistling-duck	*Dendrocygna bicolor*
Mute swan	*Cygnus olor*

Appendix IV-D. (continued)

Common name	Scientific name
Tundra swan	*Cygnus columbianus*
Snow goose	*Chen caerulescens*
Brant	*Branta bernicla*
Canada goose	*Branta canadensis*
Wood duck	*Aix sponsa*
Green-winged teal	*Anas crecca*
American black duck	*Anas rubripes*
Mallard	*Anas platyrhynchos*
Northern pintail	*Anas acuta*
Blue-winged teal	*Anas discors*
Northern shoveler	*Anas clypeata*
Gadwall	*Anas strepera*
American wigeon	*Anas americana*
Canvasback	*Aythya valisineria*
Redhead	*Aythya americana*
Ring-necked duck	*Aythya collaris*
Greater scaup	*Aythya marila*
Lesser scaup	*Aythya affinis*
Common eider	*Somateria mollissima*
King eider	*Somateria spectabilis*
Harlequin duck	*Histrionicus histrionicus*
Long-tailed duck	*Clangula hyemalis*
Black scoter	*Melanitta nigra*
Surf scoter	*Melanitta perspicillata*
White-winged scoter	*Melanitta fusca*
Common goldeneye	*Bucephala clangula*
Bufflehead	*Bucephala albeola*
Hooded merganser	*Lophodytes cucullatus*
Common merganser	*Mergus merganser*

Appendix IV-D. (continued)

Common name	Scientific name
Red-breasted merganser	*Mergus serrator*
Ruddy duck	*Oxyura jamaicensis*
Black vulture	*Coragyps atratus*
Turkey vulture	*Cathartes aura*
Osprey	*Pandion haliaetus*
American swallow-tailed kite	*Elanoides forficatus*
Mississippi kite	*Ictinia mississippiensis*
Bald eagle	*Haliaeetus leucocephalus*
Northern harrier	*Circus cyaneus*
Sharp-shinned hawk	*Accipiter striatus*
Cooper's hawk	*Accipiter cooperii*
Red-shouldered hawk	*Buteo lineatus*
Broad-winged hawk	*Buteo platypterus*
Red-tailed hawk	*Buteo jamaicensis*
Merlin	*Falco columbarius*
Peregrine falcon	*Falco peregrinus*
Wild turkey	*Meleagris gallopavo*
Northern bobwhite	*Colinus virginianus*
Clapper rail	*Rallus longirostris*
King rail	*Rallus elegans*
Virginia rail	*Rallus limicola*
Sora	*Porzana carolina*
Purple gallinule	*Porphyrula martinica*
Common moorhen	*Gallinula chloropus*
American coot	*Fulica americana*
Black-bellied plover	*Pluvialis squatarola*
American golden plover	*Pluvialis dominica*
Wilson's plover	*Charadrius wilsonia*
Semipalmated plover	*Charadrius semipalmatus*

Appendix IV-D. (continued)

Common name	Scientific name
Piping plover	*Charadrius melodus*
Killdeer	*Charadrius vociferus*
American oystercatcher	*Haematopus palliatus*
Black-necked stilt	*Himantopus mexicanus*
American avocet	*Recurvirostra americana*
Greater yellowlegs	*Tringa melanoleuca*
Lesser yellowlegs	*Tringa flavipes*
Solitary sandpiper	*Tringa solitaria*
Willet	*Tringa semipalmata*
Spotted sandpiper	*Actitis macularus*
Upland sandpiper	*Bartramia longicauda*
Whimbrel	*Numenius phaeopus*
Long-billed curlew	*Numenius americanus*
Marbled godwit	*Limosa fedoa*
Ruddy turnstone	*Arenaria interpres*
Red knot	*Calidris canutus*
Sanderling	*Calidris alba*
Semipalmated sandpiper	*Calidris pusilla*
Western sandpiper	*Calidris mauri*
Least sandpiper	*Calidris minutilla*
White-rumped sandpiper	*Calidris fuscicollis*
Baird's sandpiper	*Calidris bairdii*
Pectoral sandpiper	*Calidris melanotos*
Purple sandpiper	*Calidris maritima*
Dunlin	*Calidris alpina*
Curlew sandpiper	*Calidris ferruginea*
Stilt sandpiper	*Calidris himantopus*
Buff-breasted sandpiper	*Tryngites subruficollis*
Ruff	*Philomachus pugnax*

Appendix IV-D. (continued)

Common name	Scientific name
Short-billed dowitcher	*Limnodromus griseus*
Long-billed dowitcher	*Limnodromus scolopaceus*
Common snipe	*Gallinago gallinago*
American woodcock	*Scolopax minor*
Wilson's phalarope	*Phalaropus tricolor*
Red-necked phalarope	*Phalaropus lobatus*
Red phalarope	*Phalaropus fulicarius*
Pomarine jaeger	*Stercorarius pomarinus*
Black-headed gull	*Larus ridibundus*
Bonaparte's gull	*Larus philadelphia*
Ring-billed gull	*Larus delawarensis*
Herring gull	*Larus argentatus*
Iceland gull	*Larus glaucoides*
Lesser black-backed gull	*Larus fuscus*
Glaucous gull	*Larus hyperboreus*
Great black-backed gull	*Larus marinus*
Gull-billed tern	*Gelochelidon nilotica*
Caspian tern	*Hydropogne caspia*
Royal tern	*Thalasseus maximus*
Sandwich tern	*Thalasseus sandvicensis*
Roseate tern	*Sterna dougallii*
Common tern	*Sterna hirundo*
Forster's tern	*Sterna forsteri*
Least tern	*Sternula antillarum*
Sooty tern	*Onychoprion fuscatus*
Black tern	*Chlidonias niger*
Black skimmer	*Rynchops niger*
Rock dove	*Columba livia*
Mourning dove	*Zenaida macroura*

Appendix IV-D. (continued)

Common name	Scientific name
Common ground dove	*Columbina passerina*
Black-billed cuckoo	*Coccyzus erythropthalmus*
Yellow-billed cuckoo	*Coccyzus americanus*
Barn owl	*Tyto alba*
Eastern screech-owl	*Megascops asio*
Great horned owl	*Bubo virginianus*
Barred owl	*Strix varia*
Short-eared owl	*Asio flammeus*
Common nighthawk	*Chordeiles minor*
Chuck-will's-widow	*Caprimulgus carolinensis*
Whip-poor-will	*Caprimulgus vociferus*
Chimney swift	*Chaetura pelagica*
Ruby-throated hummingbird	*Archilochus colubris*
Belted kingfisher	*Megaceryle alcyon*
Red-headed woodpecker	*Melanerpes erythrocephalus*
Red-bellied woodpecker	*Melanerpes carolinus*
Yellow-bellied sapsucker	*Sphyrapicus varius*
Downy woodpecker	*Picoides pubescens*
Hairy woodpecker	*Picoides villosus*
Red-cockaded woodpecker	*Picoides borealis*
Northern flicker	*Colaptes auratus*
Pileated woodpecker	*Dryocopus pileatus*
Eastern wood pewee	*Contopus virens*
Yellow-bellied flycatcher	*Empidonax flaviventris*
Acadian flycatcher	*Empidonax virescens*
Alder flycatcher	*Empidonax alnorum*
Willow flycatcher	*Empidonax traillii*
Least flycatcher	*Empidonax minimus*

Appendix IV-D. (continued)

Common name	Scientific name
Eastern phoebe	*Sayornis phoebe*
Great crested flycatcher	*Myiarchus crinitus*
Western kingbird	*Tyrannus verticalis*
Eastern kingbird	*Tyrannus tyrannus*
Gray kingbird	*Tyrannus dominicensis*
Horned lark	*Eremophila alpestris*
Purple martin	*Progne subis*
Tree swallow	*Tachycineta bicolor*
Southern rough-winged swallow	*Stelgidopteryx ruficollis*
Bank swallow	*Riparia riparia*
Cliff swallow	*Petrochelidon pyrrhonota*
Barn swallow	*Hirundo rustica*
Blue jay	*Cyanocitta cristata*
American crow	*Corvus brachyrhynchos*
Fish crow	*Corvus ossifragus*
Carolina chickadee	*Poecile carolinensis*
Tufted titmouse	*Baeolophus bicolor*
Red-breasted nuthatch	*Sitta canadensis*
White-breasted nuthatch	*Sitta carolinensis*
Brown-headed nuthatch	*Sitta pusilla*
Brown creeper	*Certhia americana*
Carolina wren	*Thryothorus ludovicianus*
House wren	*Troglodytes aedon*
Winter wren	*Troglodytes troglodytes*
Sedge wren	*Cistothorus platensis*
Marsh wren	*Cistothorus palustris*
Golden-crowned kinglet	*Regulus satrapa*
Ruby-crowned kinglet	*Regulus calendula*
Blue-gray gnatcatcher	*Polioptila caerulea*

Appendix IV-D. (continued)

Common name	Scientific name
Eastern bluebird	*Sialia sialis*
Veery	*Catharus fuscescens*
Gray-cheeked thrush	*Catharus minimus*
Swainson's thrush	*Catharus ustulatus*
Hermit thrush	*Catharus guttatus*
Wood thrush	*Hylocichla mustelina*
American robin	*Turdus migratorius*
Gray catbird	*Dumetella carolinensis*
Northern mockingbird	*Mimus polyglottos*
Brown thrasher	*Toxostoma rufum*
American pipit	*Anthus rubescens*
Cedar waxwing	*Bombycilla cedrorum*
Loggerhead shrike	*Lanius ludivicianus*
European starling	*Sturnus vulgaris*
White-eyed vireo	*Vireo griseus*
Blue-headed vireo	*Vireo solitarius*
Warbling vireo	*Vireo gilvus*
Yellow-throated vireo	*Vireo flavifrons*
Philadelphia vireo	*Vireo philadelphicus*
Red-eyed vireo	*Vireo olivaceus*
Blue-winged warbler	*Vermivora pinus*
Golden-winged warbler	*Vermivora chrysoptera*
Tennessee warbler	*Vermivora peregrina*
Orange-crowned warbler	*Vermivora celata*
Nashville warbler	*Vermivora ruficapilla*
Northern parula	*Parula americana*
Yellow warbler	*Dendroica petechia*
Chestnut-sided warbler	*Dendroica pensylvanica*

Appendix IV-D. (continued)

Common name	Scientific name
Magnolia warbler	*Dendroica magnolia*
Cape may warbler	*Dendroica tigrina*
Black-throated blue warbler	*Dendroica caerulescens*
Yellow-rumped warbler	*Dendroica coronata*
Black-throated green warbler	*Dendroica virens*
Blackburnian warbler	*Dendroica fusca*
Yellow-throated warbler	*Dendroica dominica*
Pine warbler	*Dendroica pinus*
Prairie warbler	*Dendroica discolor*
Palm warbler	*Dendroica palmarum*
Bay-breasted warbler	*Dendroica castanea*
Blackpoll warbler	*Dendroica striata*
Cerulean warbler	*Dendroica cerulea*
Black-and-white warbler	*Mniotilta varia*
American redstart	*Setophaga ruticilla*
Prothonotary warbler	*Protonotaria citrea*
Worm-eating warbler	*Helmitheros vermivorus*
Swainson's warbler	*Limnothlypis swainsonii*
Ovenbird	*Seiurus aurocapilla*
Northern waterthrush	*Seiurus noveboracensis*
Louisiana waterthrush	*Seiurus motacilla*
Kentucky warbler	*Oporornis formosus*
Conneticut warbler	*Oporornis agilis*
Mourning warbler	*Oporornis philadelphia*
Common yellowthroat	*Geothlypis trichas*
Hooded warbler	*Wilsonia citrina*
Wilson's warbler	*Wilsonia pusilla*
Canada warbler	*Wilsonia canadensis*
Yellow-breasted chat	*Icteria virens*

Appendix IV-D. (continued)

Common name	Scientific name
Summer tanager	*Piranga rubra*
Scarlet tanager	*Piranga olivacea*
Northern cardinal	*Cardinalis cardinalis*
Rose-breasted grosbeak	*Pheucticus ludovicianus*
Blue grosbeak	*Passerina caerulea*
Indigo bunting	*Passerina cyanea*
Painted bunting	*Passerina ciris*
Dickcissel	*Spiza americana*
Eastern towhee	*Pipilo erythrophthalmus*
Bachman's sparrow	*Aimophila aestivalis*
Chipping sparrow	*Spizella passerina*
Clay-colored sparrow	*Spizella pallida*
Field sparrow	*Spizella pusilla*
Vesper sparrow	*Pooecetes gramineus*
Lark sparrow	*Chondestes grammacus*
Savannah sparrow	*Passerculus sandwichensis*
Grasshopper sparrow	*Ammodramus savannarum*
Henslow's sparrow	*Ammodramus henslowii*
LeConte's sparrow	*Ammodramus leconteii*
Saltmarsh sharp-tailed sparrow	*Ammodramus caudacuta*
Nelson's sharp-tailed sparrow	*Ammodramus nelsoni*
Seaside sparrow	*Ammodramus maritimus*
Fox sparrow	*Passerella iliaca*
Song sparrow	*Melospiza melodia*
Lincoln's sparrow	*Melospiza lincolnii*
Swamp sparrow	*Melospiza georgiana*
White-throated sparrow	*Zonotrichia albicollis*
White-crowned sparrow	*Zonotrichia leucophrys*
Dark-eyed junco	*Junco hyemalis*

Appendix IV-D. (concluded)

Common name	Scientific name
Lapland longspur	*Calcarius lapponicus*
Snow bunting	*Plectrophenax nivalis*
Bobolink	*Dolichonyx oryzivorus*
Red-winged blackbird	*Agelaius phoeniceus*
Eastern meadowlark	*Sturnella magna*
Rusty blackbird	*Euphagus carolinus*
Boat-tailed grackle	*Quiscalus major*
Common grackle	*Quiscalus quiscula*
Brown-headed cowbird	*Molothrus ater*
Orchard oriole	*Icterus spurius*
Baltimore oriole	*Icterus galbula*
Purple finch	*Carpodacus purpureus*
House finch	*Carpodacus mexicanus*
Red crossbill	*Loxia curvirostra*
Pine siskin	*Carduelis pinus*
American goldfinch	*Carduelis tristis*
Evening grosbeak	*Coccothraustes vespertinus*
House sparrow	*Passer domesticus*

[a] Source: Adapted from: Massey, A. G. and J. F. Nance. 1989. Birds of Southeastern North Carolina.
Note: Common and scientific names have been updated to reflect name changes by the American Ornithologists' Union as of April 2009.

APPENDIX IV-E

LIST OF THE REPTILES OF THE MOTSU AREA

APPENDIX IV-E
LIST OF THE REPTILES OF THE MOTSU AREA[a]

Common name	***Scientific name***
American alligator	*Alligator mississippiensis*
Common snapping turtle	*Chelydra serpentina*
Striped mud turtle	*Kinosternon baurii*
Eastern mud turtle	*Kinosternon subrubrum*
Common musk turtle	*Sternotherus odoratus*
Spotted turtle	*Clemmys guttata*
Chicken turtle	*Deirochelys reticularia*
Carolina diamondback terrapin	*Malaclemys terrapin centrata*
Florida cooter	*Pseudemys floridana*
Yellowbelly slider	*Trachemys scripta*
Eastern box turtle	*Terrapene carolina*
Loggerhead sea turtle	*Caretta caretta*
Green sea turtle	*Chelonia mydas*
Atlantic hawksbill	*Eretmochelys imbricata*
Atlantic ridley	*Lepidochelys kempi*
Green anole	*Anolis carolinensis*
Eastern fence lizard	*Sceloporus undulatus*
Five-lined skink	*Eumeces fasciatus*
Southeastern five-lined skink	*Eumeces inexpectatus*
Broadhead skink	*Eumeces laticeps*
Ground skink	*Scincella lateralis*
Six-lined racerunner	*Cnemidophorus sexlineatus*
Slender glass lizard	*Ophisaurus attenuatus*
Mimic glass lizard	*Ophisaurus mimicus*
Eastern glass lizard	*Ophisaurus ventralis*
Worm snake	*Carphophis amoenus*
Scarlet snake	*Cemophora coccinea*
Racer	*Coluber constrictor*

Appendix IV-E. (continued)

Common name	*Scientific name*
Ringneck snake	*Diadophis punctatus*
Corn snake	*Elaphe guttata*
Rat snake	*Elaphe obsoleta*
Mud snake	*Farancia abacura*
Rainbow snake	*Farancia erytrogramma*
Eastern hognose snake	*Heterodon platirhinos*
Southern hognose snake	*Heterodon simus*
Mole kingsnake	*Lampropeltis calligaster*
Eastern kingsnake	*Lampropeltis getula*
Scarlet kingsnake	*Lampropeltis triangulum*
Coachwhip	*Masticophis flagellum*
Redbelly water snake	*Nerodia erythrogaster*
Banded water snake	*Nerodia fasciata*
Brown water snake	*Nerodia taxispilota*
Rough green snake	*Opheodrys aestivus*
Northern pine snake	*Pituophis melanoleucus melanoleucus*
Glossy crayfish snake	*Regina rigida rigida*
Pine woods snake	*Rhadinaea flavilata*
Carolina swamp snake	*Seminatrix pygaea*
Brown snake	*Storeria dekayi*
Redbelly snake	*Storeria occipitomaculata*
Southeastern crowned snake	*Tantilla coronata*
Eastern ribbon snake	*Thamnophis sauritus*
Eastern garter snake	*Thamophis sirtalis*
Rough earth snake	*Virginia striatula*
Smooth earth snake	*Virginia valeriae*
Eastern coral snake	*Micrurus fulvius*
Copperhead	*Agkistrodon contortrix*
Cottonmouth	*Agkistrodon piscivorus*

Appendix IV-E. (concluded)

Common name	*Scientific name*
Eastern diamondback rattlesnake	*Crotalus adamanteus*
Timber rattlesnake	*Crotalus horridus*
Pigmy rattlesnake	*Sistrurus miliarius*

[a] Source: Braswell, A. L. and J. M. Youmans. 1995. A Survey for the Carolina Gopher Frog, *Rana capito capito* on Military Ocean Terminal, Sunny Point. Report to the U. S. Army Corps of Engineers.

Note: Common and scientific names updated to reflect changes as of April 2009 (www.herpsofnc.org).

APPENDIX IV-F

LIST OF THE AMPHIBIANS OF THE MOTSU AREA

APPENDIX IV-F
LIST OF THE AMPHIBIANS OF THE MOTSU AREA[a]

Common name	Scientific name
Two-toed amphiuma	*Amphiuma means*
Dwarf waterdog	*Necturus punctatus*
Lesser siren	*Siren intermedia*
Greater siren	*Siren lacertina*
Broken-striped newt	*Notopthalmus viridescens dorsalis*
Mabee's salamander	*Ambystoma mabeei*
Marbled salamander	*Ambystoma opacum*
Southern dusky salamander	*Desmognathus auriculatus*
Southern two-lined salamander	*Eurycea cirrigera*
Three-lined salamander	*Eurycea guttolineata*
Dwarf salamander	*Eurycea quadridigitata*
Slimy salamander	*Plethodon glutinosus*
Eastern mud salamander	*Pseudotriton monatnus*
Many-lined salamander	*Stereochilus marginatus*
Eastern spadefoot	*Scaphiopus holbrookii*
Oak toad	*Bufo quercicus*
Southern toad	*Bufo terrestris*
Southern cricket frog	*Acris gryllus*
Gray treefrog	*Hyla chrysoscelis*
Green treefrog	*Hyla cinerea*
Pine woods treefrog	*Hyla femoralis*
Barking treefrog	*Hyla gratiosa*
Squirrel treefrog	*Hyla squirella*
Brimley's chorus frog	*Pseudacris brimleyi*
Spring peeper	*Pseudacris crucifer*
Southern chorus frog	*Pseudacris nigrita*
Little grass frog	*Pseudacris ocularis*
Ornate chorus frog	*Pseudacris ornata*

Appendix IV-F. (concluded)

Common name	Scientific name
Eastern narrowmouth toad	*Gastrophryne carolinensis*
Carolina gopher frog	*Rana capito*
Bullfrog	*Rana catesbeiana*
Bronze frog	*Rana clamitans*
Southern leopard frog	*Rana sphenocephala*
Carpenter frog	*Rana virgatipes*

[a] Source: Braswell, A. L. and J. M. Youmans. 1995. A Survey for the Carolina Gopher Frog, *Rana capito capito* on Military Ocean Terminal, Sunny Point. Report to the U. S. Army Corps of Engineers.

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APPENDIX IV-G

STATE AND FEDERAL LISTED SPECIES

APPENDIX IV-G. STATE AND FEDERAL LISTED SPECIES

Scientific Name	Common Name	State Status	Federal Status	County
VERTEBRATES				
Acipenser brevirostrum	Shortnose Sturgeon	E	E	Brunswick, New Hanover
Aimophila aestivalis	Bachman's Sparrow	SC	FSC	Brunswick
Alligator mississippiensis	American Alligator	T	T (S/A)	Brunswick, New Hanover
Ambystoma mabeei	Mabee's Salamander	SR[a]	_	Brunswick, New Hanover[c]
Ammodramus henslowii susurrans	Eastern Henslow's Sparrow	SC	FSC	Brunswick
Caretta caretta	Loggerhead Sea Turtle	T	T	Brunswick, New Hanover
Charadrius melodus	Piping Plover	T	T	Brunswick, New Hanover
Charadrius wilsonia	Wilson's Plover	SC	_	Brunswick, New Hanover
Chelonia mydas	Green Sea Turtle	T	T	Brunswick, New Hanover
Columbina passerina	Common Ground-dove	SR[a]	_	Brunswick, New Hanover
Condylura cristata pop. 1	Star-nosed Mole - Coastal Plain Population	SC	_	Brunswick, New Hanover
Corynorhinus rafinesquii macrotis	Rafinesque's Big-eared Bat	SC	FSC	Brunswick, New Hanover[b]
Coturnicops noveboracensis	Yellow Rail	SR[a]	_	New Hanover
Crotalus adamanteus	Eastern Diamondback Rattlesnake	E	_	Brunswick, New Hanover
Crotalus horridus	Timber Rattlesnake	SC	_	Brunswick[b], New Hanover
Deirochelys reticularia	Chicken Turtle	SR[a]	_	Brunswick, New Hanover
Dendroica virens waynei	Black-throated Green Warbler – Coastal Plain Population	SR[a]	FSC	Brunswick
Dermochelys coriacea	Leatherback Sea Turtle	E	E	Brunswick
Egretta caerulea	Little Blue Heron	SC	_	Brunswick, New Hanover

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APPENDIX IV-G. (continued)

Scientific Name	Common Name	State Status	Federal Status	County
Egretta thula	Snowy Egret	SC	_	Brunswick, New Hanover
Egretta tricolor	Tricolored Heron	SC	_	Brunswick, New Hanover
Elassoma boehlkei	Carolina Pygmy Sunfish	T	FSC	Brunswick
Falco peregrinus	Peregrine Falcon	E	_	Brunswick
Fundulus luciae	Spotfin Killifish	SR[a]	_	Brunswick, New Hanover
Gelochelidon nilotica	Gull-billed Tern	T	_	Brunswick
Haematopus palliatus	American Oystercatcher	SC	_	Brunswick, New Hanover
Haliaeetus leucocephalus	Bald Eagle	T	_	Brunswick
Heterandria formosa	Least Killifish	SC	_	Brunswick, New Hanover
Heterodon simus	Southern Hognose Snake	SR[a]	FSC	Brunswick, New Hanover
Himantopus mexicanus	Black-necked Stilt	SR[a]	_	Brunswick
Ixobrychus exilis	Least Bittern	SC	_	Brunswick, New Hanover
Lanius ludovicianus	Loggerhead Shrike	SC	_	Brunswick, New Hanover
Lasiurus intermedius	Northern Yellow Bat	SC	_	Brunswick, New Hanover
Laterallus jamaicensis	Black Rail	SC	FSC	New Hanover
Lepidochelys kempii	Kemp's Ridley Sea Turtle	E	E	Brunswick
Malaclemys terrapin centrata	Carolina Diamondback Terrapin	SC	_	Brunswick, New Hanover
Masticophis flagellum	Coachwhip	SR[a]	_	Brunswick, New Hanover
Micrurus fulvius	Eastern Coral Snake	E	_	Brunswick, New Hanover
Mycteria americana	Wood Stork	E	E	Brunswick

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APPENDIX IV-G. (continued)

Scientific Name	Common Name	State Status	Federal Status	County
Myotis austroriparius	Southeastern Myotis	SC	FSC	New Hanover
Neotoma floridana floridana	Eastern woodrat	T	_	Brunswick[c], New Hanover
Noturus sp. 2	Broadtail madtom	SC	FSC	Brunswick
Ophisaurus mimicus	Mimic Glass Lizard	SC	FSC	Brunswick, New Hanover[c]
Passerina ciris ciris	Eastern Painted Bunting	SC	FSC	Brunswick, New Hanover
Pelecanus occidentalis	Brown Pelican	SR[a]	_	Brunswick, New Hanover
Picoides borealis	Red-cockaded Woodpecker	E	E	Brunswick, New Hanover
Pituophis melanoleucus melanoleucus	Northern Pine Snake	SC	FSC	Brunswick, New Hanover
Plegadis falcinellus	Glossy Ibis	SC	_	Brunswick, New Hanover
Porphyrula martinica	Purple Gallinule	SR[a]	_	Brunswick
Pseudacris ornata	Ornate Chorus Frog	SR[a]	_	Brunswick, New Hanover[c]
Puma concolor couguar	Eastern Cougar	E	E	Brunswick[c]
Rana capito	Carolina Gopher Frog	T	FSC	Brunswick, New Hanover
Regina rigida	Glossy Crayfish Snake	SR[a]	_	Brunswick, New Hanover[c]
Rynchops niger	Black Skimmer	SC	_	Brunswick, New Hanover
Sciurus niger	Eastern Fox Squirrel	SR[a]	_	Brunswick, New Hanover
Seminatrix pygaea	Black Swamp Snake	SR[a]	_	Brunswick, New Hanover
Sistrurus miliarius	Pigmy Rattlesnake	SC	_	Brunswick, New Hanover
Sterna hirundo	Common Tern	SC	_	New Hanover
Sternula antillarum	Least Tern	SC	_	Brunswick, New Hanover

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APPENDIX IV-G. (continued)

Scientific Name	Common Name	State Status	Federal Status	County
Trichechus manatus	West Indian Manatee	E	E	Brunswick, New Hanover
INVERTEBRATES				
Acronicta sinescripta	A Dagger Moth	SR[a]	_	Brunswick
Agrotis carolina	A Dart Moth	SR[a]	FSC	Brunswick
Amblyscirtes alternata	Dusky Roadside Skipper	SR[a]	_	Brunswick, New Hanover[b]
Amblyscirtes reversa	Reversed Roadside Skipper	SR[a]	_	Brunswick
Anacamptodes cypressaria	An Inchworm Moth	SR[a]	_	Brunswick
Anodonta couperiana	Barrel Floater	E	_	New Hanover[c]
Apantesis sp.1 nr. carlotta	A Tiger Moth	SR[a]	_	Brunswick
Atrytone arogos arogos	Arogos Skipper	SR[a]	FSC	Brunswick[b], New Hanover[b]
Atrytonopsis loammi	Loammi Skipper	SR[a]	FSC	Brunswick[c], New Hanover[b]
Calephellis virginiensis	Little Metalmark	SR[a]	_	Brunswick, New Hanover
Callophrys hesseli	Hessel's Hairstreak	SR[a]	_	Brunswick
Callophrys irus	Frosted Elfin	SR[a]	_	Brunswick
Callosamia securifera	Sweetbay Silkmoth	SR[a]	_	Brunswick[b]
Catocala amestris	Three-staff Underwing	SR[a]	_	New Hanover[b]
Catocala jair	Jair Underwing	SR[a]	_	New Hanover[b]
Catocala lincolnana	Lincoln Underwing	SR[a]	_	Brunswick[b]
Catocala marmorata	Marbled Underwing	SR[a]	_	Brunswick[b], New Hanover[b]

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APPENDIX IV-G. (continued)

Scientific Name	Common Name	State Status	Federal Status	County
Catocala messsalina	Messalina Underwing	SR[a]	_	New Hanover[b]
Cerma cora	A Bird-dropping Moth	SR[a]	_	New Hanover[b]
Chaetaglaea fergusoni	A Noctuid Moth	SR[a]	_	Brunswick[b], New Hanover[b]
Choroterpes basalis	A Mayfly	SR[a]	_	Brunswick
Cyclophora sp.1 (culicaria of authors)	Sand-myrtle Geometer	SR[a]	_	Brunswick, New Hanover[b]
Drasteria graphica	Graphic Moth	SR[a]	_	Brunswick[b], New Hanover[b]
Dysgonia similis	An Owlet Moth	SR[a]	_	Brunswick[b]
Elliptio folliculata	Pod Lance	SC	_	Brunswick
Elliptio marsupiobesa	Cape Fear Spike	SC	_	New Hanover
Elliptio waccamawensis	Waccamaw Spike	E	FSC	Brunswick
Erynnis martialis	Mottled Duskywing	SR[a]	_	Brunswick[b]
Eubaphe meridiana	The Little Beggar	SR[a]	_	Brunswick
Euphyes bimacula	Two-spotted Skipper	SR[a]	_	Brunswick
Euphyes dukesi dukesi	Dukes' Skipper	SR[a]	_	Brunswick
Eupithecia peckorum	An Inchworm Moth	SR[a]	_	Brunswick, New Hanover[b]
Exyra semicrocea	A Pitcher Plant Moth	SR[a]	_	Brunswick
Gabara sp. 1	A Noctuid Moth	SR[a]	_	Brunswick[b]
Gomphus australis	Clearlake Clubtail	SR[a]	_	Brunswick[b], New Hanover[c]
Gomphus cavillaris brimleyi	Brimley's Clubtail	SR[a]	_	Brunswick[b]
Helisoma eucosmium	Greenfield Rams-horn	E	FSC	Brunswick, New Hanover[c]

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APPENDIX IV-G. (continued)

Scientific Name	Common Name	State Status	Federal Status	County
Hemipachnobia subporphyrea	Venus Flytrap Cutworm Moth	SR[a]	FSC	Brunswick
Hesperia attalus slossonae	Dotted Skipper	SR[a]	_	Brunswick[b]
Hesperia meskei	Meske's Skipper	SR[a]	_	Brunswick
Hypagyrtis brendae	Brenda's Hypagyrtis	SR[a]	_	Brunswick
Lagoa pyxidifera	Yellow Flannel Moth	SR[a]	_	Brunswick
Ligumia nasuta	Eastern Pondmussel	T	_	Brunswick
Lithophane laceyi	A Pinion Moth	SR[a]	_	Brunswick[b], New Hanover[b]
Lynceus gracilicornis	Graceful Clam Shrimp	SC	_	New Hanover
Macrochilo louisiana	Louisiana Owlet Moth	SR[a]	_	Brunswick[b], New Hanover[b]
Melanoplus nubilus	A Short-winged Melanoplus	SR[a]	_	Brunswick
Meropleon diversicolor sullivani	An Owlet moth	SR[a]	_	Brunswick[b]
Metarranthis lateritiaria	An Inchworm Moth	SR[a]	_	Brunswick
Metarranthis sp. 1	A New Inchworm Moth	SR[a]	_	Brunswick[b], New Hanover[b]
Nematocampa baggetaria	Baggett's Nematocampa	SR[a]	_	Brunswick
Orgyia detrita	A Tussock Moth	SR[a]	_	Brunswick
Papaipema appassionata	Pitcher Plant Borer Moth	SR[a]	_	Brunswick
Papilio cresphontes	Giant Swallowtail	SR[a]	_	Brunswick, New Hanover
Planorbella magnifica	Magnificent Rams-horn	E	FSC	Brunswick, New Hanover[c]
Problema bulenta	Rare Skipper	SR[a]	FSC	Brunswick[c], New Hanover
Procambarus braswelli	Waccamaw Crayfish	SC	_	Brunswick

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APPENDIX IV-G. (continued)

Scientific Name	Common Name	State Status	Federal Status	County
Procambarus plumimanus	Croatan Crayfish	SR[a]	_	New Hanover
Ptichodis bistrigata	Southern Ptichodis	SR[a]	_	Brunswick, New Hanover[b]
Pygarctia abdominalis	Yellow-edged Pygarctia	SR[a]	_	Brunswick[b]
Satyrium favonius ontario	Northern Oak Hairstreak	SR[a]	_	Brunswick, New Hanover
Schinia septentrionalis	A Flower Moth	SR[a]	_	Brunswick[b]
Schizura sp. 1	A New Prominent Moth	SR[a]	_	Brunswick[b]
Spartiniphaga carterae	Carter's Noctuid Moth	SR[a]	FSC	Brunswick
Stethophyma celatum	Broad-winged Sedge Grasshopper	SR[a]	_	Brunswick
Trichosilia manifesta	An Owlet Moth	SR[a]	_	Brunswick[b], New Hanover[b]
Triodopsis soelneri	Cape Fear Threetooth	T	FSC	Brunswick, New Hanover
Villosa delumbis	Eastern Creekshell	SR[a]	_	Brunswick
Zale declarans	An Owlet Moth	SR[a]	_	Brunswick[b], New Hanover[b]
VASCULAR PLANTS				
Agalinis virgata	Branched Gerardia	SR[a]	_	Brunswick, New Hanover
Agrostis altissima	Tall Bentgrass	SR[a]	_	Brunswick
Allium sp. 1	Savanna Onion	SR[a]	_	Brunswick
Amaranthus pumilus	Seabeach Amaranth	T	T	Brunswick, New Hanover
Amorpha georgiana var. confusa	Savanna Indigo-Bush (Carolina Leadplant)	T	FSC	Brunswick, New Hanover[c]
Andropogon mohrii	Bog Bluestem	SR[a]	_	Brunswick

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APPENDIX IV-G. (continued)

Scientific Name	Common Name	State Status	Federal Status	County
Arenaria lanuginosa var. lanuginosa	Spreading Sandwort	SR[a]	_	Brunswick[c]
Aristida condensata	Big Three-awn Grass	SR[a]	_	New Hanover
Aristida simpliciflora	Chapman's Three-awn	SR[a]	_	Brunswick
Aristida tenuispica	Hillsboro Three-awn Grass	SR[a]	_	New Hanover
Arnoglossum ovatum	Savanna Indian-plantain	SR[a]	_	Brunswick
Asclepias pedicellata	Savanna Milkweed	SR[a]	_	Brunswick, New Hanover
Astragalus michauxii	Sandhills Milkvetch	T	FSC	New Hanover[c]
Baccharis glomeruliflora	Silverling	SR[a]	_	Brunswick[c]
Bacopa caroliniana	Blue Water-hyssop	SR[a]	_	Brunswick, New Hanover[c]
Bacopa innominata	Tropical Water-hyssop	SR[a]	_	New Hanover[c]
Balduina atropurpurea	Purple-disk Honeycomb-head	SR[a]	FSC	Brunswick[c]
Boltonia asteroides	White Doll's-daisy	SR[a]	_	Brunswick, New Hanover
Bulbostylis warei	Ware's Hair Sedge	SR[a]	_	Brunswick[c]
Cardamine longii	Long's Bittercress	SR[a]	_	New Hanover
Carex calcifugens	Calcium-fleeing Sedge	SR[a]	_	Brunswick
Carex decomposita	Cypress Knee Sedge	SR[a]	_	Brunswick, New Hanover[c]
Carex lupuliformis	Hop-like Sedge	SR[a]	_	Brunswick
Cares sp. 4	Canebrake Sedge	SR[a]	_	Brunswick
Carex verrucosa	Warty Sedge	SR[a]	_	Brunswick, New Hanover[c]
Carya myristiciformis	Nutmeg Hickory	E	_	Brunswick

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APPENDIX IV-G. (continued)

Scientific Name	Common Name	State Status	Federal Status	County
Cirsium lecontei	LeConte's Thistle	SR[a]	_	Brunswick
Cladium mariscoides	Twig-rush	SR[a]	_	New Hanover
Clinopodium georgianum	Georgia Calamint	SR[a]	_	Brunswick
Coreopsis helianthoides	Beadle's Coreopsis	SR[a]	_	Brunswick
Corallorhiza Wisteriana	Spring Coral-root	SR[a]	_	New Hanover[c]
Crinum americanum	Swamp-lily	SR[a]	_	New Hanover[c]
Crocanthemum carolinianum	Carolina Sunrose	SR[a]	_	Brunswick, New Hanover
Crocanthemum corymbosum	Pinebarren Sunrose	SR[a]	_	Brunswick
Crocanthemum georgianum	Georgia Sunrose	SR[a]	_	Brunswick, New Hanover
Crocanthemum nashii	Florida Scrub Frostweed	E	_	Brunswick, New Hanover
Cyperus dentatus	Toothed Flatsedge	SR[a]	_	Brunswick[c]
Cyperus lecontei	Leconte's Flatsedge	SR[a]	_	Brunswick, New Hanover[c]
Cyperus tetragonus	Four-angled Flatsedge	SR[a]	_	Brunswick, New Hanover[b]
Desmodium fernaldii	Fernald's Tick-trefoil	SR[a]	_	Brunswick[c]
Dichanthelium aciculare ssp. neuranthum	Nerved Witch Grass	SR[a]	_	Brunswick[c], New Hanover[c]
Dichanthelium caerulescens	Blue Witch Grass	E	_	Brunswick[c]
Dichanthelium fusiforme	Spindle-fruited Witch Grass	SR[a]	_	Brunswick
Dichanthelium sp. 9	A Witch Grass	SR[a]	_	Brunswick, New Hanover[c]
Dionaea muscipula	Venus Flytrap	SR[a], SC	FSC	Brunswick, New Hanover
Ditrysinia fruticosa	Sebatian-bush	SR[a]	_	Brunswick

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APPENDIX IV-G. (continued)

Scientific Name	Common Name	State Status	Federal Status	County
Drosera filiformis	Threadleaf Sundew	SR[a]	_	Brunswick[c]
Echinodorus tenellus	Dwarf Burhead	SR[a]	_	Brunswick
Eleocharis elongata	Florida Spikerush	SR[a]	_	Brunswick
Eleocharis parvula	Little-spike Spikerush	SR[a]	_	Brunswick
Eleocharis robbinsii	Robbins's Spikerush	SR[a]	_	Brunswick, New Hanover
Eleocharis rostellata	Beaked Spikerush	SR[a]	_	Brunswick
Eleocharis vivipara	Viviparous Spikerush	SR[a]	_	New Hanover
Epidendrum magnoliae	Green Fly Orchid	SR[a]	_	Brunswick, New Hanover
Eriocaulon aquaticum	Seven-angled Pipewort	SR[a]	_	Brunswick[c]
Erythrina herbacea	Coralbean	SR[a]	_	Brunswick, New Hanover
Eupatorium leptophyllum	Limesink Dog-fennel	SR[a]	_	Brunswick, New Hanover
Fimbristylis perpusilla	Harper's Fimbry	E	FSC	Brunswick
Galactia mollis	Soft Milk-pea	SR[a]	_	Brunswick[c]
Gaylussacia nana	Confederate Huckleberry	E	_	New Hanover
Gelsemium rankinii	Swamp Jessamine	SR[a]	_	Brunswick, New Hanover
Gratiola aurea	Golden Hedge-hyssop	SR[a]	_	Brunswick
Helenium brevifolium	Littleleaf Sneezeweed	E	_	Brunswick[c]
Helenium pinnatifidum	Dissected sneezeweed	SR[a]	_	Brunswick, New Hanover[c]
Helenium vernale	Spring Sneezeweed	E	_	Brunswick
Helianthus floridanus	Florida Sunflower	E	_	Brunswick[b]

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APPENDIX IV-G. (continued)

Scientific Name	Common Name	State Status	Federal Status	County
Hibiscus aculeatus	Comfortroot	SR[a]	_	New Hanover
Hypericum brachyphyllum	Coastal Plain St. John's Wort	SR[a]	_	Brunswick
Hymenocallis pygmaea	Waccamaw River Spiderlily	SR[a]	_	Brunswick
Hypericum fasciculatum	Peelbark St. John's-wort	SR[a]	_	New Hanover[c]
Hypoxis rigida	Stiff-leaved Yellow Stargrass	SR[a]	_	Brunswick
Ilex amelanchier	Sarvis Holly	SR[a]	_	Brunswick
Ipomoea imperati	Beach Morning-glory	SR[a]	_	Brunswick
Isoetes microvela	Thin-wall Quillwort	E	FSC	Brunswick
Lachnocaulon minus	Brown Bogbutton	SR[a]	_	Brunswick, New Hanover
Lechea torreyi	Torrey's Pinweed	SR[a]	_	Brunswick
Leptochloa fascicularis var. maritima	Long-awned Spangletop	SR[a]	_	Brunswick
Lilaeopsis carolinensis	Carolina Grasswort	T	_	Brunswick, New Hanover
Linum floridanum var. chrysocarpum	Yellow-fruited Flax	SR[a]	_	Brunswick
Litsea aestivalis	Pondspice	SR[a]	FSC	Brunswick, New Hanover
Lophiola aurea	Golden Crest	E	_	Brunswick, New Hanover
Ludwigia alata	Winged Seedbox	SR[a]	_	Brunswick[c], New Hanover[c]
Ludwigia brevipes	Long Beach Seedbox	SR[a]	_	Brunswick
Ludwigia lanceolata	Lanceleaf Seedbox	SR[a]	_	Brunswick[c], New Hanover
Ludwigia linifolia	Flaxleaf Seedbox	SR[a]	_	Brunswick, New Hanover
Ludwigia ravenii	Raven's Seedbox	SR[a]	FSC	Brunswick[c], New Hanover[c]

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APPENDIX IV-G. (continued)

Scientific Name	Common Name	State Status	Federal Status	County
Ludwigia sphaerocarpa	Globe-fruit Seedbox	SR[a]	_	New Hanover
Ludwigia suffruticosa	Shrubby Seedbox	SR[a]	_	Brunswick, New Hanover
Lysimachia asperulifolia	Rough-leaved loosestrife	E	E	Brunswick, New Hanover
Macbridea caroliniana	Carolina Bogmint	T	FSC	Brunswick
Malaxis spicata	Florida Adder's-mouth	SR[a]	_	Brunswick
Muhlenbergia torreyana	Pinebarren Smokegrass	E	_	Brunswick
Myriophyllum laxum	Loose Water-milfoil	T	FSC	Brunswick
Myriophyllum pinnatum	Cutleaf Water-milfoil	SR[a]	_	Brunswick
Oldenlandia boscii	Bosc's Bluet	SR[a]	_	Brunswick
Parietaria praetermissa	Large-seed Pellitory	SR[a]	_	Brunswick[c], New Hanover[c]
Parnassia caroliniana	Carolina Grass-of-parnassus	E	FSC	Brunswick
Parnassia grandifolia	Large-leaved Grass-of-parnassus	T	FSC	Brunswick
Paspalum dissectum	Mudbank Crown Grass	SR[a]	_	Brunswick
Peltandra sagittifolia	Spoonflower	SR[a]	_	Brunswick, New Hanover
Persicaria hirsuta	Hairy Smartweed	SR[a]	_	Brunswick
Pinguicula lutea	Yellow Butterwort	SR[a]	_	New Hanover
Pityopsis graminifolia var. graminifolia	A Silkgrass	SR[a]	_	Brunswick
Plantago sparsiflora	Pineland Plantain	E	FSC	Brunswick
Platanthera integra	Yellow Fringeless Orchid	T	_	Brunswick
Platanthera nivea	Snowy Orchid	T	_	Brunswick, New Hanover[c]

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APPENDIX IV-G. (continued)

Scientific Name	Common Name	State Status	Federal Status	County
Polygala hookeri	Hooker's milkwort	SR[a]	_	Brunswick, New Hanover
Polygonum glaucum	Seabeach Knotweed	SR[a]	_	Brunswick, New Hanover[c]
Ponthieva racemosa	Shadow-witch	SR[a]	_	Brunswick
Potamogeton amplifolius	Largeleaf Pondweed	SR[a]	_	Brunswick
Potamogeton illinoensis	Illinois Pondweed	SR[a]	_	Brunswick[c]
Pteroglossaspis ecristata	Spiked Medusa	E	FSC	New Hanover[c]
Ptilimnium ahlesii	Carolina Bishop-weed	SR[a]	FSC	Brunswick, New Hanover
Ptilimnium costatum	Ribbed Bishop-weed	SR[a]	_	Brunswick[c], New Hanover
Pycnanthemum virginianum	Virginia Mountain-mint	SR[a]	_	Brunswick
Pyxidanthera brevifolia	Sandhills Pyxie-moss	E	FSC	Brunswick[c]
Rhexia aristosa	Awned Meadow-beauty	T	FSC	Brunswick[c]
Rhynchospora alba	Northern White Beaksedge	SR[a]	_	Brunswick
Rhynchospora breviseta	Short-bristled Beaksedge	SR[a]	_	Brunswick
Rhynchospora decurrens	Swamp Forest Beaksedge	SR[a]	FSC	Brunswick
Rhynchospora divergens	White-seeded Beaksedge	SR[a]	_	Brunswick
Rhynchospora harperi	Harper's Beaksedge	SR[a]	_	Brunswick
Rhynchospora odorata	Fragrant Beaksedge	E	_	Brunswick[c]
Rhynchospora pinetorum	Small's Beaksedge	SR[a]	_	Brunswick
Rhynchospora pleiantha	Coastal Beaksedge	T	FSC	Brunswick, New Hanover
Rhynchospora thornei	Thorne's Beaksedge	E	FSC	Brunswick

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APPENDIX IV-G. (continued)

Scientific Name	Common Name	State Status	Federal Status	County
Rhynchospora tracyi	Tracy's Beaksedge	SR[a]	_	Brunswick, New Hanover
Sabal palmetto	Cabbage Palm	SR[a]	_	Brunswick
Sabatia kennedyana	Plymouth Gentian	T-SC	_	Brunswick
Sagittaria isoetiformis	Quillwort Arrowhead	SR[a]	_	Brunswick[c], New Hanover
Sagittaria weatherbiana	Grassleaf Arrowhead	SR[a]		Brunswick[c], New Hanover
Salvia azurea	Azure Sage	SR[a]	_	New Hanover[c]
Sarracenia minor	Hooded Pitcher Plant	T	_	Brunswick
Schoenoplectus etuberculatus	Canby's Bulrush	SR[a]	_	Brunswick
Scirpus lineatus	Drooping Bulrush	SR[a]	_	Brunswick, New Hanover
Scleria baldwinii	Baldwin's Nutrush	SR[a]	_	Brunswick
Scleria reticularis	Netted Nutrush	SR[a]	_	Brunswick, New Hanover
Scleria verticillata	Savanna Nutrush	SR[a]	_	Brunswick[c]
Sesuvium maritimum	Slender Sea-purslane	SR[a]	_	Brunswick, New Hanover
Seymeria pectinata	Sticky Afzelia	SR[a]	_	Brunswick[c]
Sideroxylon tenax	Tough Bumelia	SR[a]	_	Brunswick, New Hanover[c]
Solanum pseudogracile	Graceful Nightshade	SR[a]	_	Brunswick, New Hanover[c]
Solidago tortifolia	Twisted-leaf Goldenrod	SR[a]	_	Brunswick[c], New Hanover[c]
Solidago verna	Spring-flowering Goldenrod	T	FSC	Brunswick, New Hanover
Solidago villosicarpa	Coastal Goldenrod	E	FSC	Brunswick, New Hanover[c]
Spiranthes eatonii	Eaton's Ladies'-tresses	SR[a]	_	Brunswick[c]

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APPENDIX IV-G. (continued)

Scientific Name	Common Name	State Status	Federal Status	County
Spiranthes laciniata	Lace-lip Ladies'-tresses	SR[a]	_	Brunswick, New Hanover
Spiranthes longilabris	Giant Spiral Orchid	T	_	Brunswick
Sporobolus teretifolius	Wireleaf Dropseed	T	FSC	Brunswick
Sporobolus virginicus	Saltmarsh Dropseed	SR[a]	_	Brunswick
Stylisma aquatica	Water Dawnflower	SR[a]	_	Brunswick
Stylisma pickeringii var. pickeringii	Pickering's Dawnflower	E	FSC	Brunswick[c], New Hanover
Thalictrum cooleyi	Cooley's Meadowrue	E	E	Brunswick
Thalictrum macrostylum	Small-leaved Meadowrue	SR[a]	FSC	New Hanover
Trichostema sp. 1	Dune Bluecurls	SR[a]	FSC	Brunswick, New Hanover
Trifolium carolinianum	Carolina Clover	SR[a]	_	New Hanover[c]
Utricularia cornutea	Horned Bladderwort	SR[a]	_	Brunswick, New Hanover[c]
Utricularia olivacea	Dwarf Bladderwort	T	_	Brunswick, New Hanover
Vaccinium macrocarpon	Cranberry	SR[a]	_	Brunswick
Vaccinium virgatum	Small-flower Blueberry	SR[a]	_	Brunswick
Xyris stricta	Pineland Yellow-eyed-grass	SR[a]	_	Brunswick
Yucca gloriosa	Moundlily Yucca	SR[a]	_	Brunswick, New Hanover
Zephyranthes simpsonii	Rain Lily	E	FSC	Brunswick
NONVASCULAR PLANTS				
Campylopus carolinae	Savanna Campylopus	SR[a]	FSC	Brunswick

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Scientific Name	Common Name	State Status	Federal Status	County
Cephalozia connivens var. bifida	A Liverwort	SR[a]	_	New Hanover[c]
Cheilolejeunea rigidula	A Liverwort	SR[a]	_	Brunswick
Lejeunea bermudiana	A Liverwort	SR[a]	_	Brunswick[c]
Plagiochila dubia	A Liverwort	SR[a]	_	Brunswick
Plagiochila ludoviciana	A Liverwort	SR[a]	_	Brunswick[c]
Sphagnum fallax	Pretty Peatmoss	SR[a]	_	Brunswick[c]
Syrrhopodon incompletus	Cuban Schliessmund	SR[a]	_	Brunswick
Teloschistes flavicans	Sunrise Lichen	SR[a]	_	Brunswick

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PART V.

OUTDOOR RECREATION PLAN

OF THE INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN FOR THE MILITARY OCEAN TERMINAL, SUNNY POINT, NORTH CAROLINA

Prepared By:
SAVANNAH DISTRICT, U.S. ARMY CORPS OF ENGINEERS
Savannah, Georgia

Prepared For:
MILITARY OCEAN TERMINAL, SUNNY POINT
Southport, North Carolina

Agency Coordination and Revisions Provided By:
DIAL CORDY AND ASSOCIATES INC.
Wilmington, North Carolina

Submitted: July 2000
Coordination Resolution: July 2005
FINAL: June 2009

PART V. OUTDOOR RECREATION PLAN

OF THE INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN FOR THE MILITARY OCEAN TERMINAL, SUNNY POINT, NORTH CAROLINA

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PART V. OUTDOOR RECREATION PLAN

1.0 INTRODUCTION

1.1 Purpose of the Plan. This Outdoor Recreation Plan describes existing outdoor recreation activities at the Military Ocean Terminal, Sunny Point (MOTSU); assists MOTSU staff to plan for maintenance of these activities; and integrates outdoor recreation with other component plans of the Integrated Natural Resources Management Plan (INRMP). This plan is required by Chapter 7 of Army Regulation (AR) 200-3, Natural Resources - Land, Forest and Wildlife Management. Additional guidance is provided by Technical Manual (TM) 5-635 and TM 5-803-12.

1.2 Objectives. The objectives of the outdoor recreation program at MOTSU are:

- to support the military mission by providing MOTSU personnel with recreational opportunities to enhance quality of life,
- to provide outdoor recreation opportunities that do not conflict with the requirements of the MOTSU mission,
- to promote conservation and wise use of renewable natural resources,
- to protect the natural environment, and
- to promote a healthy awareness and understanding of the natural environment.

1.3 MOTSU Overview. MOTSU is comprised of four separate properties. The 8,645-acre Main Terminal is located along the west side of the Cape Fear River approximately 25 miles south of Wilmington. The 2,267-acre CBBSZ (a.k.a. New Hanover County Bufferzone) is located on the east side of the Cape Fear River, directly across from the Main Terminal. The 652-acre Leland Interchange Yard is 19 miles north of the Main Terminal.

MOTSU's mission is the transshipment of munitions and related hazardous cargo between land-based rail and truck transporters and ocean-going ships. Additional details and description of the mission are in the General Plan of this INRMP and in the Real Property Master Plan (USACE 1994).

1.4 Outdoor Recreation Definition. Outdoor recreation is a recreational program, activity, or opportunity that is dependent on the natural environment (AR 200-3, TM 5-635). Examples are hunting, fishing, trapping, picnicking, bird-watching, off-road vehicle use, hiking and interpretive trails use, wild and scenic river use, and underdeveloped camping areas. Developed or constructed activities such as ball fields, golf courses, lodging facilities, boat launching ramps, and marinas are not included as outdoor recreation activities.

Outdoor recreation provides a link between our cultural and natural environments. It also contributes to and enhances personal physical and mental health.

2.0 CLASSIFICATION OF RECREATION AREAS AT MOTSU

The following three classes and the subclasses of areas potentially available for outdoor recreation activities are defined in TM 5-635.

2.1 Class I -- General Outdoor Recreation Areas. These are existing recreation areas and areas with suitable characteristics to accommodate intensive recreation activities such as camping and various winter and water sports. MOTSU does not contain any resources in Class I.

2.2 Class II -- Natural Environment Areas. These areas are capable of supporting dispersed recreation activities in conjunction with other uses such as hunting, fishing, boating, off-road vehicle activities, bicycling, cross-country skiing, bird watching, hiking, sight-seeing, climbing, riding, and nature study. The majority of MOTSU property is Class II. The natural vegetation, wildlife, streams and ponds, and the system of roads directly or indirectly support outdoor recreation activities.

Vegetation -- MOTSU contains a wide variety of upland and wetland vegetation types. The General Plan of this INRMP lists and gives details on the natural vegetation of MOTSU. Major vegetation types include pocosin, pine savannah, and longleaf pine flatwoods. The diverse habitats are of direct interest for nature study and also support diverse wildlife.

Wildlife -- The Fish and Wildlife Management Plan of this INRMP gives details on fish and wildlife resources, both game and non-game species. White-tailed deer is the major species that is hunted at MOTSU. Squirrels, rabbits, quail, and ducks are also hunted.

Streams and Ponds -- The Fish and Wildlife Management Plan of this INRMP gives details on the streams and ponds. There are 112 freshwater ponds at MOTSU. Approximately 20 of these ponds are frequently used for fishing. Most of the streams are considered part of the Wilmington River saltwater estuary system. These resources are primarily used for fishing, boating, and waterfowl hunting.

Roads and Fire Breaks -- The main terminal of MOTSU contains 51 miles of paved and approximately 35 miles of unpaved roads, and the Leland Interchange Yard contains 6.6 miles of unpaved roads. All of these roads are used for access of fire control equipment and as fire breaks to help control prescribed burns. The roads and fire breaks also allow access to the interior of MOTSU to people participating in hunting, fishing, boating, sight-seeing, and nature study. They directly support hiking, bicycling, and riding.

2.3 Class III -- Special Interest Areas. These areas contain man-made or natural features of special importance and may provide passive recreation opportunities. They are managed exclusively for the preservation and protection of the value identified.

Archeological -- Sites containing remains of past societies or early settlement of present societies. Several sites are known and are identified in the Historic Preservation Plan (Envirosphere 1987). Their specific locations are not presented in this plan because disclosure of their locations would compromise their security and integrity.

Historical -- Areas containing interesting details of the life and activities of early settlers in America. They may commemorate a specific historic event or a period in history. They may be a building, structure, object, site, or district. Several sites are known and are identified in the Historic Preservation Plan (Envirosphere 1987). Major historical sites include the old Fort Johnston earthen barricade and the Civil War Battery Buchanan on the Main Terminal, Fort Fisher on the CBBSZ, and Fort Johnston in Southport (no longer MOTSU property).

Geological -- Areas of outstanding formation or significant features of the earth's development. MOTSU has no specifically identified geological areas.

Botanical -- Sites containing individual specimens, groups, or communities of plants which are significant because of form, color, occurrence, location, life history, rarity, or other characteristic.

MOTSU contains one of the largest known populations of rough-leaved loosestrife (*Lysimachia asperulaefolia*). This rare species is listed as Endangered by the U.S. Fish and Wildlife Service. It is found in very few locations in the country. The eight sites on MOTSU are managed for enhancement rather than merely preservation and protection of the population. Additional details on the location and management of rough-leaved loosestrife are presented in PART VI. ENDANGERED SPECIES MANAGEMENT PLAN. MOTSU also contains populations of pitcher plants (*Sarracenia* spp.), venus' flytraps (*Dionaea muscipula*), and sundews (*Drosera* sp.). These plants are of special interest because they are insectivorous. They are found throughout large sections of the installation and are frequently found near the drainage ditches at the edges of roads and fire breaks.

Scenic -- Areas of outstanding natural beauty and scenic splendor which require special management to preserve these qualities. MOTSU has no specifically identified scenic areas.

Some lands of MOTSU are not within any of the three Classes of outdoor recreation areas because they are restricted from access by recreational users or are too developed to offer outdoor recreation opportunities. These areas include the administration area, the rail yard and lines, and the wharf areas.

3.0 CONSTRAINTS ON OUTDOOR RECREATION

AR 200-3 requires allowing public access to Army properties to the extent that is compatible with public safety and mission activities. The primary mission of MOTSU is the transshipment of munitions between rail / truck vehicles and ocean vessels (refer to PART I. GENERAL PLAN). Shipments may be incoming from or outgoing to overseas destinations. Many of the materials are potentially hazardous or explosive.

MOTSU has imposed constraints and limitations on the outdoor recreation activities which could otherwise be supported by the natural resources of the installation. This is done so that outdoor recreation does not compromise the installation's mission or security and public safety concerns.

MOTSU is a restricted base and maintains strict control on who enters the installation. All visitors must be escorted by a government employee or military personnel while on the installation. Outdoor recreation opportunities are limited to MOTSU military and civilian employees and their guests. Special arrangements can be made for other groups to enter the installation. At times, the entire installation may be closed to all nonemployees. Additional constraints include:

- No fires, open flames, or even sources of open flames such as matches or cigarette lighters.
- No gasoline engines on boats (except at Governors Creek).
- Strict controls on cameras and what facilities may be photographed.
- No high-powered rifles for hunting.
- No off-road vehicles.
- No night activities, including camping.

Some locations in MOTSU are not available for outdoor recreation activities at any time, such as railroad lines and yards, wharves, and administration areas.

4.0 DEVELOPMENT AND MANAGEMENT OF RECREATION RESOURCES

4.1 Existing Outdoor Recreation. Even though constraints have been imposed which limit the types of allowable outdoor recreation and the population allowed to participate in outdoor recreation at MOTSU, several opportunities for outdoor recreation exist.

The hunting program is discussed in detail in the Fish and Wildlife Management Plan and in MOTSU Regulation 200-5. The white-tailed deer is the major game species, with squirrels, rabbits, and waterfowl also taken. All hunting is subject to State of North Carolina regulations and additional MOTSU regulations. An average of 1,220 persons per year participate in hunting.

The fishing program is discussed in detail in the Fish and Wildlife Management Plan. All fishing is subject to State of North Carolina regulations and additional MOTSU regulations. An average of 2,800 persons per year participate in fishing.

The hunting and fishing programs are the responsibility of the Public Works Division and are coordinated by the Division's Installation Forester who works for the Public Works Divison. Enforcement of hunting and fishing regulations is the responsibility of the Chief of Security, through the Security Branch and the Surveillance Branch.

MOTSU provides educational tours for a variety of groups. Examples of groups are public school and community college classes, garden clubs, and 4H clubs. Subjects of the tours include insectivorous plants, deer management, small game management, endangered species management, and woodland management. Some tours combine several of these subjects. Tours are not performed on a regular schedule, but are arranged when requested by an outside group. Tours range from short (1 hour) to long (2 to 3 hour) duration. All tours are guided by the Installation Forester. MOTSU hosts an average of 12 tours per year, and the average size of the tours is 15 persons.

The MOTSU Historic Preservation Plan (Envirosphere 1987) and subsequent surveys contain details of the types and locations of archeological and historical resources. These resources include prehistoric sites, 18th and 19th century domestic and industrial sites, and civil war period features. Most sites have not been intensively studied. These sites are managed to minimize disturbance and to maintain their information content until they can be studied more thoroughly. These sites are not available to the public.

Two historic sites, Fort Fisher and Fort Johnston (no longer MOTSU property), have received significant study. The Fort Fisher National Historic Landmark is located on the Carolina Beach Blast Safety Zone on the east side of the Cape Fear River. Fort Johnston, in Southport, was a 1860s era Confederate Garrison. About 0.75 acre on the river-side of the garrison is open to the public. Two interpretive markers in this location are available for public viewing.

MOTSU hosts several research efforts, or nature studies, on a variety of natural resources. The Public Works Division Installation Forester, contractors working for the Army, and federal agencies such as the U.S. Fish and Wildlife Service all participate in the study of the red-cockaded woodpecker and rough-leaved loosestrife. The Nature Conservancy is permitted to study seed dispersal and propagation in pitcher plants and venus flytraps. The North Carolina Natural Heritage Program has performed two surveys at MOTSU for small plant communities. The Audubon Society uses MOTSU as an observation site during its Christmas Bird Count.

4.2 Potential Expansion of Outdoor Recreation. Public use of educational opportunities at MOTSU could be increased. Educational tours could be held more frequently. The Public Affairs office would be involved to announce the availability of tours to general and targeted audiences. Additional

educational tours would require increased time from the Installation Forester to conduct the tours, or other MOTSU staff to lead some of the tours in place of the Installation Forester. Research activities could be increased by targeted notices. Increased research activity on MOTSU would significantly increase the workload of the Installation Forester.

A long-term goal of the cultural resources management program is to increase public knowledge of the resources present at MOTSU. This goal would be approached in phases. Work would include detailed excavation, study, and preservation of sites that have been previously identified. These phases of work would be performed by archeologists, anthropologists, and other experts in archeological and historical resources.

4.3 Planned Outdoor Recreation Program for 1999-2004. The current outdoor recreation program is not expected to change significantly in the next five years. Hunting, fishing, and educational activities will continue. Expansion of educational tours is not planned, and any increase is contingent on the available time of the Installation Forester. Additional studies of archeological and historical resources is contingent on the availablility of additional funds to contract with companies to perform the specialized work. Table 1 summarizes the time and funds required to accomplish the planned outdoor recreation program.

Table 1. Summary of the Outdoor Recreation Program for 1999 through 2004.

Activity	Frequency of activity	Man-days/ year	Other costs/year (specify)
Continue hunting program	1200-1400	1200	
Continue fishing program	2000	1800	
Continue tours	12 per year		
Expand tours	None	None	None
Further study of CR sites			
Public information on CR sites			
Continue research activities			
Expand research activities			

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PART VI.

ENDANGERED SPECIES MANAGEMENT PLAN

FOR THE ROUGH-LEAVED LOOSESTRIFE AND RED-COCKADED WOODPECKER

OF THE INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN FOR THE MILITARY OCEAN TERMINAL, SUNNY POINT, NORTH CAROLINA

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FINAL: June 2009

PART VI. ENDANGERED SPECIES MANAGEMENT PLAN
FOR THE ROUGH-LEAVED LOOSESTRIFE AND RED-COCKADED WOODPECKER

OF THE INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN FOR THE MILITARY OCEAN TERMINAL, SUNNY POINT, NORTH CAROLINA

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PART VI. ENDANGERED SPECIES MANAGEMENT PLAN

1.0 INTRODUCTION

The objectives of this Endangered Species Management Plan (ESMP) are to: (1) present information on rough-leaved loosestrife (RLL) (*Lysimachia asperulaefolia*) and red-cockaded woodpecker (RCW) (*Picoides borealis*) on Military Ocean Terminal, Sunny Point (MOTSU), Brunswick County, North Carolina; (2) discuss the threats they face on the installation; (3) define conservation goals; and (4) outline a plan for the management of the species and their habitat that will enable achievement of the conservation goals. These objectives are consistent with the United States Fish and Wildlife Service (USFWS) recovery plans for RLL and RCW.

The RLL is a perennial, rhizomatous herb usually found at the boundaries between pine uplands and a variety of wetland types. It is distributed in a total of 59 sites in nine population centers in the Coastal Plain and Sandhills of North Carolina and South Carolina. The RLL is listed because of population decline due to habitat loss. Habitat has been drained for agriculture, pine plantations, residential and industrial development. Fire suppression also resulted in loss of habitat.

The RCW is a medium-sized woodpecker that feeds primarily on insects in mature pine stands and nests in mature pine trees that have decaying heartwood. The species is distributed primarily in the Piedmont and Coastal Plain of the southeastern United States. RCW was listed as endangered because of population decline. Logging or clearing of suitable nesting trees, decline of pine stands from infestations of beetles, and fire suppression have resulted in the habitat loss that is considered the cause of the decline. Appropriate management of the species and its habitat has reversed the declining rangewide trend since the early 1990s.

This ESMP is based on and is consistent with the following laws, regulations, and guidelines: the Endangered Species Act of 1973 (ESA); Army Regulation (AR) 200-3; the USFWS Rough-leaved Loosestrife Recovery Plan; Headquarters, Department of the Army Endangered Species Management Guidelines for the Red-cockaded Woodpecker; and the 2003 USFWS Red-cockaded Woodpecker Recovery Plan. Other components of the INRMP have been coordinated with the ESMP. Where activities required by MOTSU to meet its Section 7 obligations conflict with other management goals, the Section 7 activities will take precedence.

1.1 Background

Army Regulation (AR) 200-3 requires the preparation of Endangered Species Management Plans for listed and proposed threatened and endangered species and critical habitat present on Army installations. Compliance with Chapter 11 of AR 200-3 requires coordination with other federal and state agencies responsible for protection of these species.

1.1.1 Military Ocean Terminal, Sunny Point

MOTSU comprises approximately 16,000 acres. The Main Terminal consists of 8,645 acres on the west bank of the Cape Fear River in Brunswick County, 25 miles south of Wilmington, North Carolina, and 10 miles north of the mouth of the river (Figure 1). The Main Terminal accommodates all administrative, operational, storage, and waterfront facilities. Surrounding the terminal to the north, west, and south is a 4,267-acre blast safety easement. The Cape Fear River is located to the east. The combined area of the terminal and easement is 12,912 acres. Other properties of MOTSU consist of the 652-acre Leland Interchange Yard, the 400-acre easement along the rail corridor, and the 2,267-acre Carolina Beach Blast Safety Zone (CBBSZ) (a.k.a. New Hanover County Bufferzone)(Figure 1).

Leland Interchange Yard

Wilmington

Brunswick County

New Hanover County

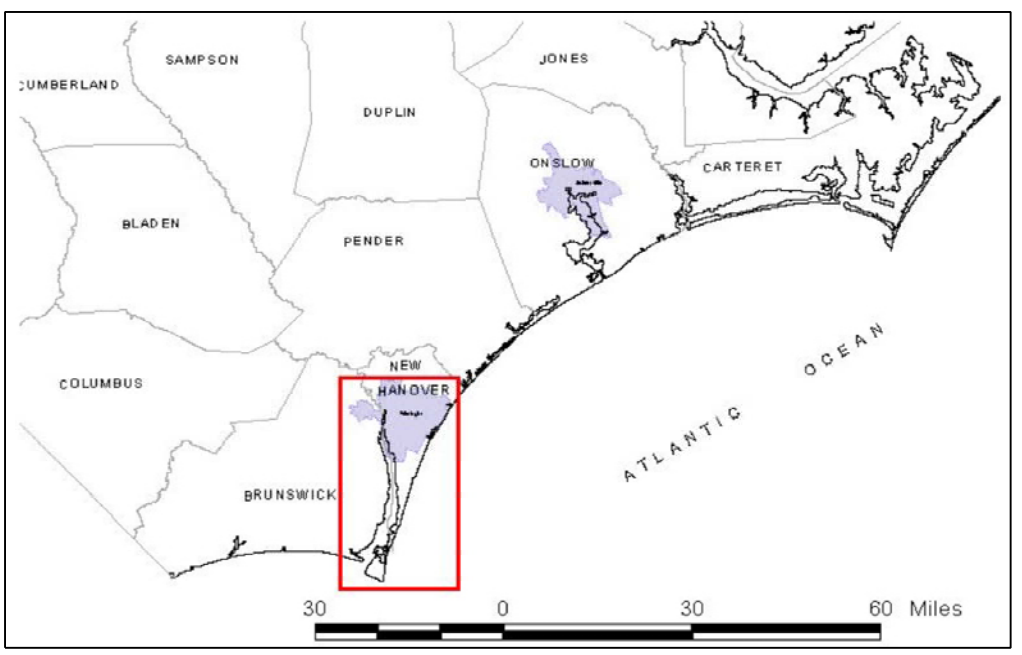
MOTSU Main Terminal

Carolina Beach Blast Safety Zone

Cape Fear River

US-74
Andrew Jackson Hwy NE
Enterprise Dr NE
Maco Rd NE
US-17
US-421 N
Sandy Ln
N College Rd
I-40
Market St
Eastwood Rd
Military Cutoff Rd
Channel Walk Dr
N Lumina Ave
S Lumina Ave
Oleander Dr
S College Rd
N Front St
N 3rd St
S 3rd St
Dunn St
River Rd SE
Carolina Beach Rd
Riggs Trl
Friendly Ln
Ocean Hwy E
Green Hill Rd NE
George II Hwy
Old Ocean Hwy
Atlanta Ave
General Winning Blvd
Southport-Supply Rd SE
N Howe St
13th St
Fodale Ave

3 0 3 6 Miles



MOTSU
PARCEL LOCATION MAP

MILITARY OCEAN TERMINAL
SUNNY POINT

	DRAWN BY: MR	
DATE: NOV. 2008	APPROVED BY: SD	

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FIGURE 1

The primary mission of MOTSU is to plan, coordinate, and execute the safe movement of defense munitions, hazardous materials, and other general cargo. These materials are transferred between land vehicles, such as rail cars or trucks, and ocean-going ships. The installation is the primary ammunition terminal supporting the European theater and southwest Asia, and plays an essential role in the Army Strategic Mobility Program. However, MOTSU is not a storage depot and accommodates only short-term storage associated with transshipment operations (USACE 1994).

1.1.2 Endangered Species Act

The Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531 *et seq.*) requires all federal agencies to conserve federally-listed endangered and threatened plants and wildlife. The ESA defines an endangered species as one that is in danger of extinction within the foreseeable future throughout all or a significant portion of its range. The threatened status applies to species that are likely to become endangered within the foreseeable future throughout all or a significant portion of their range (16 U.S.C. 1532). Army policy relating to ESA compliance and management of listed species on Army installations is contained in Chapter 11 of AR 200-3. The Army is required to consult with the USFWS and/or the National Marine Fisheries Service (NMFS) on any Army actions that may affect federally-listed threatened and endangered species or their designated critical habitat. In addition, it is the Army's policy to use its authority to further programs for the conservation of threatened and endangered species. Installations that support federally-listed species are required to prepare ESMPs. Upon approval by the installation commander, the ESMP becomes a part of the installation's Integrated Natural Resources Management Plan (INRMP).

1.1.3 Consultation History

MOTSU has periodically initiated informal and formal consultations with the USFWS regarding the potential effects of proposed military construction projects. USFWS has also been consulted over various aspects in the preparation of this ESMP.

Consultation with the USFWS at MOTSU has been in relation to the RCW. See Table 1 for a formal consultation history (Carter 1990). Four of the consultations resulted in the issuance of biological opinions, all resulting in findings of “no jeopardy.”

Table 1. Formal consultation history for the RCW at MOTSU, NC.

Year	Subject	Result
1980	1980-81 Military Construction Army Program	No jeopardy
1980	MOTSU Forest Management Plan	Not completed
1986	Road improvements and construction of an equipment maintenance shed	No jeopardy
1986-87	New rail side line at the container restuffing facility	No jeopardy
1986-87	Construction of a small weapons firing range	No jeopardy

2.0 SPECIES INFORMATION

2.1 Rough-leaved Loosestrife

2.1.1 Current Status

Rough-leaved loosestrife was listed as an endangered species under the ESA on 12 June 1987 (52 FR 22585-22589). It is currently known from nine population centers, eight in North Carolina and one in South Carolina (USFWS 1995). No critical habitat has been designated for this species.

2.1.2 Description

Rough-leaved loosestrife is a perennial, rhizomatous, herb with simple (rarely branched), erect stems 30 to 60 centimeters (cm) tall and sessile leaves in whorls of three to four (Figure 2). Leaves are two to four centimeters long, widest at the base (0.8 to 2 cm wide) and acute; with three prominent veins and entire, slightly revolute margins. Leaves are commonly in whorls of three to four. The upper leaf surfaces are deep yellow-green or blue-green. The lower leaf surfaces are much paler, and both surfaces are minutely glandular punctate. The upper stem and inflorescence are minutely stipitate-glandular. The inflorescence is a terminal raceme three to ten cm long bearing bisexual flowers. Sepals are green, 3 to 6 millimeters (mm) long, narrowly triangular, and united at the base. The corolla is yellow and five-lobed, with lobes approximately one cm long. Stamens are five with filaments attached to the corolla tube below. The fruit is a five-valved, ovoid or globose capsule. Flowering occurs from late May through early June. Seeds are formed by August, but capsules do not dehisce until October. Natural seed set is low. Many populations are highly clonal, growing by rhizome spreading (USFWS 1995).

2.1.3 Distribution

Rough-leaved loosestrife is currently known from 12 counties in the southern Coastal Plain and Sandhills of North Carolina (Beaufort, Bladen, Brunswick, Carteret, Cumberland, Harnett, Hoke, New Hanover, Onslow, Pamlico, Pender, and Scotland Counties) and one county (Richland County) in the Sandhills region of South Carolina. This consists of 58 sites in North Carolina and one site in South Carolina. The sites are primarily on publicly-owned land, with the majority of these on federally-owned property. Of the 59 sites, 33 sites are located on military installations. Rough-leaved loosestrife has apparently been extirpated from Columbus and Richmond Counties, North Carolina, and Darlington County, South Carolina (USFWS 1995). The Brunswick County, NC, population center contains RLL sites at MOTSU, Green Swamp Nature Reserve, Waccamaw Island Savanna, Orton Plantation, Boiling Springs Lake, and along NC 133. MOTSU has eight sites that are located on the Main Terminal.

2.1.4 Habitat

Rough-leaved loosestrife is found most often in the ecotone between longleaf pine (*Pinus palustris*) uplands and wetter areas such as low pocosins, high pocosins, wet pine flatwoods, pine savannas, streamhead pocosins, and sandhill seeps (USFWS 1995). RLL is found where the fires of the dry, upland habitats interact with the moist soil of the wetland habitats.

SOURCE: PROVIDED BY ANNETTE TAYLOR

ROUGH–LEAVED LOOSESTRIFE

MILITARY OCEAN TERMINAL
SUNNY POINT

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FIGURE 2

Rough-leaved loosestrife typically occurs in the ecotone between longleaf pine uplands and pocosin communities. Longleaf pine communities occurring upslope of these ecotones include pine savannas, pine flatwoods, and pine-scrub oak sandhill communities. The downslope pocosin communities include pond pine woodland, low and high pocosin, and streamhead pocosin. Additional downslope wet areas can include wet pine flatwoods and sandhill seeps. The soils in these areas are seasonally saturated. Fires that burn through the ecotone and into the pocosin create a mosaic of low shrub and herb dominated patches. The ecotone vegetation is dominated by a combination of pocosin shrubs and savanna herbs. Frequent associated shrubs include sweet pepperbush (*Clethra alnifolia*), titi (*Cyrilla racemiflora*), inkberry (*Ilex glabra*), gallberry (*Ilex coriacea*), fetterbush (*Lyonia lucida*), sweetbay (*Magnolia virginiana*), swamp red bay (*Persea palustris*), and zenobia (*Zenobia pulverulenta*). Frequent associate herbs include wiregrass (*Aristida stricta*), Walter's sedge (*Carex striata*), Venus flytrap (*Dionaea muscipula*), sundew (*Drosera* spp.), redroot (*Lachnanthes caroliniana*), cinnamon fern (*Osmunda cinnamomea*), savanna cowbane (*Oxypolis ternata*), rush-featherling (*Pleea tenuifolia*), orange milkwort (*Polygala lutea*), savanna meadow-beauty (*Rhexia alifanus*), yellow pitcher plant (*Sarracenia flava*), purple pitcher plant (*S. purpurea*), Carolina asphodel (*Tofieldia glabra*), yellow-eyed grass (*Xyris* spp.), and sandbog death camas (*Zigadenus glaberrimus*). Sphagnum moss (*Sphagnum* spp.) often forms dense mats at the base of the herbaceous stratum.

The majority of RLL sites on MOTSU occur in transitional areas between Leon and Murville soils. Rough-leaved loosestrife also occurs in disturbed habitats such as power line right-of-ways, roadside depressions, and fire plow lines, where periodic mowing or other artificial disturbances maintain a low vegetation stature on wet mucky mineral or organic soils.

2.1.5 Life History/Ecology

Rough-leaved loosestrife is a clonal species that apparently relies heavily on vegetative growth for reproduction. A single rhizome may produce numerous shoots. Spring shoots appear in late March or early April. Flowering begins in late May and continues through mid to late June. Rough-leaved loosestrife is an obligate out-crossing species that is insect-pollinated. Fruit and seed set are low, with an average of 3.2 capsules per stem and less than two seeds per capsule. Fruits are visible within three weeks of fertilization, but are not dehiscent until October (USFWS 1995).

Rough-leaved loosestrife requires open conditions and is dependent on frequent burning for survival and maintenance of optimal habitat conditions. Fires that typically burn up to the edge of or into the pocosin communities maintain the open conditions and low stature of ecotone shrubs that are required for survival and optimal growth.

2.1.6 Threats and Limiting Factors

Survival of RLL is threatened primarily by the degradation, loss, and conversion of its habitat. Activities that negatively impact RLL habitat include fire suppression, ditching and draining, insertion of fire plow lines, use of heavy equipment, mechanical site prep and timber-harvesting practices, vehicular traffic, excessive foot traffic, and conversion to agricultural, silvicultural, or urban land uses.

Rough-leaved loosestrife habitat was historically maintained by frequent fires that created openings in the ecotonal shrub stratum. In the absence of fire, RLL is quickly suppressed and eliminated by encroaching shrubs. RLL is shade intolerant and requires a regular fire regime in its habitat to control the abundance and height of adjacent vegetation. Plants may persist for several years in overgrown areas but will not grow vigorously. The Nature Conservancy investigated the effects of fire frequencies on RLL and determined that the species increased in flowering and vigor each year following a burn until the fourth year, after which it declined (USFWS 1995).

Rough-leaved loosestrife also occupies a distinct hydrological zone characterized by seasonally saturated soils. Site hydrology also plays an important role in shaping community composition, and when altered by ditching and drainage, can degrade RLL habitat and alter community composition. Fire plow lines that are inserted in the ecotones can have both direct and indirect negative effects on RLL and its habitat. Fire plow lines in ecotones may result in direct injury to plants and can degrade habitat by preventing burning across the ecotone and into the adjacent pocosin communities. Fire plow lines that are placed upslope of ecotones result in exclusion of fire from the ecotones, proliferation of the ecotone shrub stratum, and the elimination of RLL habitat. In extreme cases, plow lines may impact site hydrology by partially draining the ecotone soils. Plow lines can also provide some benefits for RLL by artificially creating openings in the shrub stratum. In many cases where fire suppression has eliminated the majority of suitable habitat, RLL is persisting in the openings created by plow lines. Plow lines placed in the ecotone may provide a short-term benefit by creating an open area where sunlight reaches the herbaceous stratum; however, ecotone plow lines may exclude fire from the remainder of the ecotone between the plow line and the adjacent pocosin (Dial Cordy and Associates Inc. 2002a).

Activities such as heavy equipment use, vehicular traffic, and mechanical timber harvest and site preparation can have damaging effects on vegetation, soils, and hydrology. In addition to direct injury to vegetation, these activities can cause severe rutting of wet soils, with resulting negative effects on microtopography, hydrology, and community composition. Soil disturbing activities that take place outside of rare plant sites can also cause erosion and subsequent sedimentation within rare plant sites. Rutting and bedding may also impede fire, with resulting negative effects on RLL habitat. The establishment of dense pine plantations can eliminate RLL and its habitat by shading, suppressing, and eliminating the herbaceous stratum. Conversions to urban land uses eliminate RLL and its habitat altogether. In addition, the proximity of urban areas to RLL habitat may limit the ability to conduct prescribed burns. Low rates of fruit and seed production may limit rapid expansion into adjacent suitable habitat. Habitat fragmentation and isolation may limit its ability to expand into adjacent areas of suitable habitat.

2.2 Red-cockaded Woodpecker

2.2.1 Current Status

The RCW was listed as endangered by the USFWS 13 October 1970 (35 FR 16047) and protected by the Endangered Species Act in 1973. It was listed due to perceived rarity, documented declines in local populations, and almost complete loss of nesting and foraging habitat. Even though the RCW was granted protection, all monitored populations except for one declined in size throughout the 1970s and into the 1980s. During the 1990s, intensive management stabilized most populations, with many showing increases in numbers. Numbers are currently estimated at 14,500 individuals living in 5,800 known active clusters across 11 states (USFWS 2003). This represents less than three percent of the estimated abundance at the time of European settlement (Conner et al. 2001, Costa 2001). No critical habitat has been designated for the RCW (Costa and Jordan 2003).

2.2.2 Description

The RCW is a medium-sized bird, approximately eight inches tall, with a black cap and nape, a large white cheek patch, and black and white horizontal bars on its back (Figure 3). Adult males have a red patch above the eye, but this patch is rarely visible in the field. The RCW is similar in appearance to the hairy woodpecker (*Picoides villosus*) except that the RCW has a larger white cheek patch, a narrower band of black running from the eye to the crown, and a shorter bill than the hairy woodpecker. The adult male hairy woodpecker has

SOURCE: JAMES F. PARNELL AS PROVIDED TO MOTSU

RED-COCKADED WOODPECKER

MILITARY OCEAN TERMINAL SUNNY POINT

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J01-0524

FIGURE 3

clearly visible red patches on each side of its head. The RCW is also similar in appearance to the downy woodpecker (*Picoides pubescens*) except that the RCW is larger (eight inches versus five to six inches) and does not have a prominent vertical white streak on its back (USFWS 1985).

2.2.3 Distribution

The RCW is a non-migratory species that was formerly found in mature pine forests throughout the southeast United States and had a range as far west as Texas and Missouri and as far north as Kentucky and Maryland (Hooper et al. 1980). Currently, the species is restricted to the remaining fragments of suitable pine forests in the 11 southeastern states and is extirpated in New Jersey, Maryland, Missouri, Tennessee, and Kentucky. Presently, the majority of the largest RCW populations occur in the longleaf pine forests of the Sandhills of North and South Carolina, and the Coastal Plain longleaf pine forests of North and South Carolina, Georgia, Florida, and Louisiana; and the loblolly/shortleaf forests of eastern Texas. Smaller populations occur in southeastern Oklahoma, southern Arkansas, and southeastern Virginia (Costa and Jordan 2003).

2.2.4 Habitat

The RCW occurs in mature pine or mixed pine-hardwood forests primarily in the Coastal Plain and Piedmont of the southeastern United States. The preferred pine is the longleaf pine (*Pinus palustris*); however, other species of pine are also utilized. The RCW is the only woodpecker that excavates cavities exclusively in living pine trees. Older pines often suffer from a fungus called red heart disease (*Phellinus pini*), which causes the heartwood to become soft and enables the RCW to excavate cavities in living pine trees.

Older, larger pine trees with a higher incidence of the heartwood decay also enable the RCW to excavate the cavity within an interior that remains free from resin that can entrap the birds. Cavities can take from one to three years to excavate (USFWS 2003). Red-cockaded woodpeckers generally prefer mature trees greater than 60 years old for cavity excavation (Hooper and Harlow 1986). Most active clusters occur in open stands of pine with a scarce midstory. Suitable foraging habitat consists of mature pines with an open canopy, low densities of small pines, little or no hardwood or pine midstory, few or no overstory hardwoods, and abundant native bunchgrass and forb groundcovers (USFWS 2003).

RCWs typically forage in pine dominated stands greater than 50 percent pine with trees ten inches or larger diameter at breast height (dbh) (Hooper et al. 1980). However, considerable geographic variation in foraging habitat types exists. Habitat types used for foraging consist of longleaf pine savannahs, flatwoods, sandhills, and clayhills; slash pine (*Pinus elliottii*) savannahs and flatwoods; pond and/or slash pine pocosins; shortleaf pine (*P. echinata*) savannahs and forests, and shortleaf/loblolly pine (*P. taeda*) savannahs and forests. Pines are the RCW's primary foraging substrate with hardwoods a minor component of the foraging substrate. Dying and recently dead pine trees are also an important foraging resource for the RCW, especially those infested with southern pine beetles (USFWS 2003).

Fires, both natural and man-made, maintain the ecosystem as an open forest with widely spaced trees, grass and herbaceous ground cover, and few shrubs and other woody understory vegetation. Absence of fire reduces pine regeneration and favors shrubs and hardwood growth. Hardwood encroachment as a result of fire suppression is a well-known cause of cluster abandonment (Costa and Escano 1989, Loeb et al. 1992).

2.2.5 Life History/Ecology

The RCW is territorial and non-migratory. It is a cooperative breeder, which lives in social units that consist of a breeding pair and zero to four helpers; usually male offspring from previous years. A group is the social unit of birds. A cluster is an area that includes the cavity trees used by an RCW group and a 200-foot radius buffer (U.S. Army 1996).

RCWs nest only in living mature pine trees, preferring those that have been infected by heartwood fungus. The birds excavate cavities in the trees, and this infection softens the heartwood and makes excavation easier. RCWs forage for food primarily on pine trees and their diet consists primarily of arthropods. Fruits and seeds make up a small portion of the adult diet (USFWS 2003). They may cover more than one-half mile during their foraging. The birds prefer an open forest, and will abandon or avoid a location if the midstory vegetation gets too tall or thick.

There is usually only one nest per group. Eggs are laid in the nest cavity typically in clutches of four. Incubation is about 12 days. Fledging occurs approximately 26 days after hatching (USFWS 1985). At MOTSU, eggs are usually laid in May. A group may produce a second clutch of eggs if the first nest fails early in the season.

2.2.6 Threats and Limiting Factors

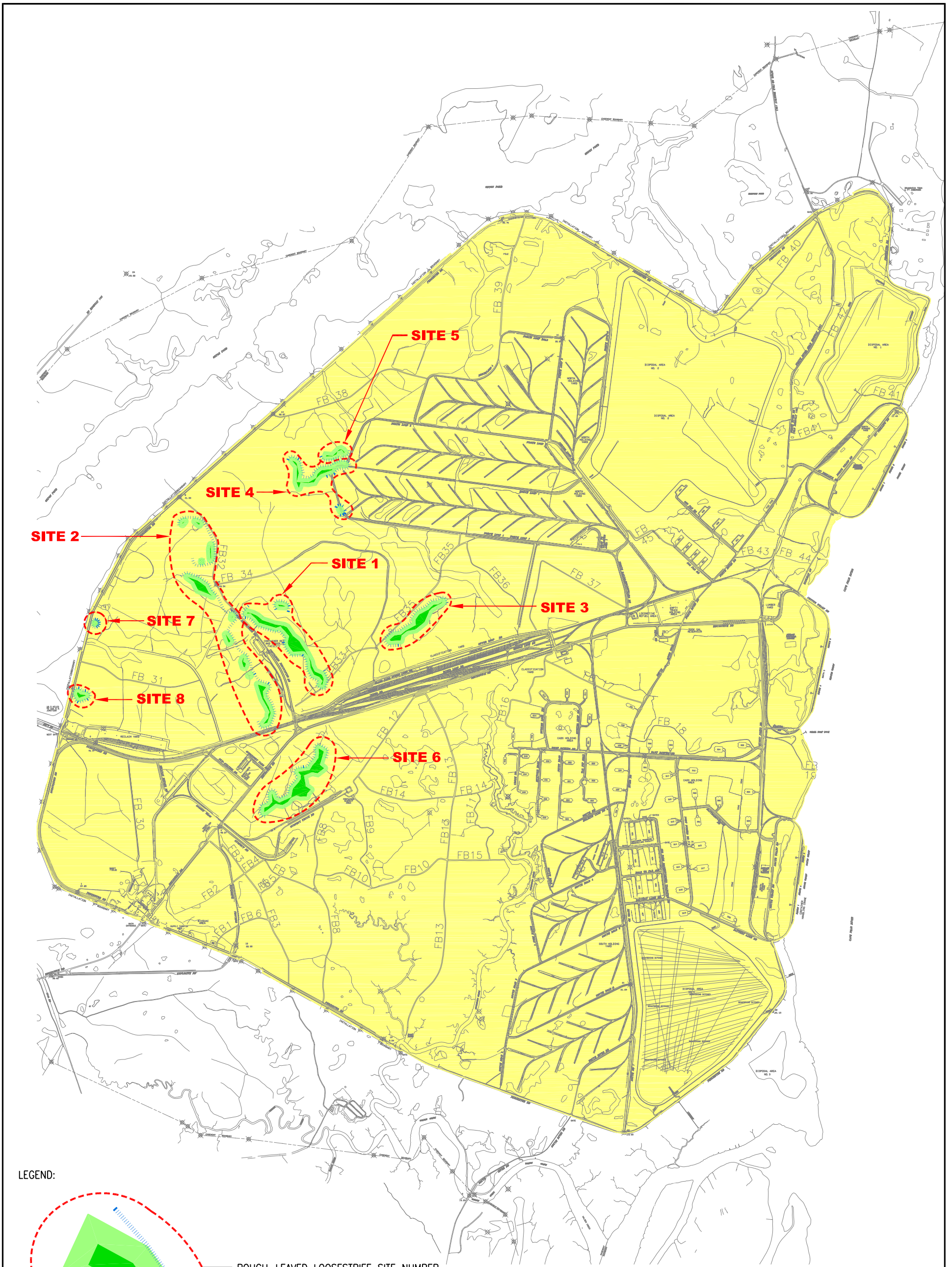
Primary limiting factors for the RCW are those that limit suitable nesting habitat, namely fire suppression and lack of cavity trees (USFWS 2003). These limiting factors directly affect the number of potential breeding groups. With fire suppression has come hardwood encroachment that affects the openness of the preferred habitat of the RCW. The availability of suitable nesting trees, especially old-growth longleaf pine, can limit the number of breeding groups that can occur within a population. The lack of suitable habitat is the basic cause that affects species viability. Both the quantity and quality of RCW habitat are impacted by past and current fire suppression and detrimental silvicultural practices (Costa and Jordan 2003).

Habitat fragmentation and the consequent isolation of groups, degradation of foraging habitat through fire suppression and loss of mature trees, and loss of valuable genetic resources because of small size and isolation of populations are other threats to the existence and recovery of the species.

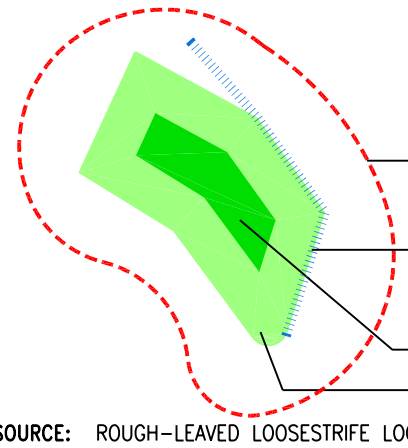
3.0 EXISTING POPULATION, LOCATION, AND TRENDS AT MOTSU

3.1 Rough-leaved Loosestrife

Intensive surveys of MOTSU for RLL were performed in 1988 (MOTSU 1988) and 1997 (CZR 1998). The two surveys identified the same eight sites and only minor differences in the boundaries of some of the individual sites. The 1998 survey also identified subsites within Sites 1, 2, and 4. These subsites are separated sometimes by apparently suitable habitat and sometimes by relatively small sections of unsuitable habitat such as roads or sand ridges or incompatible soil conditions. In general, subsites are closer to the other subsites within the site than they are to other sites. The locations and boundaries marked in the 1997 survey are shown on Figure 4. All known MOTSU RLL sites are on the Main Terminal; there are no known RLL sites on the Leland Interchange Yard and CBBSZ. Table 2 presents a summary of characteristics of the RLL sites and subsites at MOTSU. Detailed descriptions of the methods used to obtain these data are contained in the final report of the 1997 endangered species survey (CZR 1998).



LEGEND:



ROUGH-LEAVED LOOSESTRIFE SITE NUMBER

APPROXIMATE AREA OF BUFFER/MANAGEMENT BOUNDARY IDENTIFIED IN THE FIELD WITH SIGNS AND ORANGE PAINTED TREES

ROUGH-LEAVED LOOSESTRIFE LOCATION

100' REQUIRED BUFFER AREA FOR ROUGH-LEAVED LOOSESTRIFE

SOURCE: ROUGH-LEAVED LOOSESTRIFE LOCATIONS WERE ENTERED WITH A C.M.T. GPS UNIT (PCGPS VERSION 3.2), NAD 1927, BY CZR INCORPORATED, WILMINGTON, NORTH CAROLINA IN 1997 (CZR INCORPORATED 1998). BASE INFORMATION PROVIDED BY THE CORPS OF ENGINEERS, SAVANNAH DISTRICT IN MICROSTATION (.DGN) FORMAT, NAD 1927, DATED 7 AUGUST 1995, AND RECEIVED BY CZR INCORPORATED IN SEPTEMBER 1997 AND PROVIDED TO DIAL CORDY AND ASSOCIATES INC. IN NOVEMBER 2001. LOOSESTRIFE DATA AND BASE INFORMATION WERE CONVERTED TO AUTOCAD, AND ALL MAPS AND ACREAGE CALCULATIONS WERE PRODUCED IN AUTOCAD REL. 14 (.DWG) FORMAT BY CZR INCORPORATED PRIOR TO BEING RECEIVED BY DIAL CORDY AND ASSOCIATES INC. IN NOVEMBER 2001.

LOCATIONS AND BUFFERS OF ROUGH-LEAVED LOOSESTRIFE SITES AT THE MAIN TERMINAL

MILITARY OCEAN TERMINAL SUNNY POINT

FILE: RCWFORIN	DRAWN BY: MR	0 — 2400'
DATE: MAY 2004	APPROVED BY: SD	

DIAL CORDY AND ASSOCIATES INC
Environmental Consultants
201 NORTH FRONT STREET
SUITE 601
WILMINGTON, NC 28401
TEL 910/251-9790
FAX 910/251-9409

J01-0524

FIGURE 4

These sites have been monitored since 2001 by Dial Cordy and Associates Inc. (DC&A) based on the state monitoring program established by the North Carolina Plant Conservation Program (NCPCP) and originally administered by Moni Bates of NCPCP. This data is now administered by USFWS (see Section 6.1). See Appendix A for the North Carolina Conservation Program RLL Monitoring Protocol. Monitoring protocol currently established at MOTSU is discussed in Sections 5.1.3 and 6.1. DC&A performed surveys outside of the known RLL sites in 2007/2008. Two additional areas have been identified and will be incorporated into MOTSU's GIS files after further examination during the 2009 monitoring season.

Table 2. Characteristics of rough-leaved loosestrife sites at Military Ocean Terminal, Sunny Point, Brunswick County, North Carolina. Data were collected in 1997 by CZR (1998).

RLL Site Number	Total Area of Site (acres)	Area of Subsites (acres)	Area of Subsites (square feet)	Stems per Square foot	Percent of Stems Reproductive
1	5.985	0.121	5,251.6	0.020	40
		5.864	255,449.0	0.171	6
2	3.713	0.025	1,101.1	-	-
		0.072	3,115.6	-	-
		0.161	7,007.7	0.0118	0
		0.001	43.6	-	-
		1.633	71,116.2	0.300	53
		0.014	630.4	-	-
		0.180	7,845.5	-	-
		0.252	10,973.5	0.221	19
		0.006	283.1	-	-
		1.369	59,622.1	0.224	36
3	3.479	3.479	151,560.3	0.038	0
4	1.548	1.519	66,171.1	0.061	33
		0.005	228.2	0.202	10
5	0.286	0.286	12,440.2	0.027	34
6	7.795	7.795	339,531.3	0.064	20
7	0.002	0.002	100.0	0.280	0
8	0.332	0.332	14,459.0	0.055	4

Source: data collected in 1997 by CZR (1998)

3.2 Red-cockaded Woodpecker

3.2.1 The MOTSU Population

The RCW population at MOTSU was studied from 1980 to 1988 (Carter 1990), in 1997 (CZR 1998), and from 2001 through the current 2008 monitoring (includes breeding, late season checks, and observations of movement throughout the year) season (Dial Cordy and Associates Inc. 2002b, 2002c, 2004, 2005, 2006a, 2007, 2008a, 2009 – to be submitted). Reproductive monitoring was conducted by DC&A for 2002, 2004, 2005, 2006, 2007, and the current year 2008. Tables 3 and 4, and the following narrative briefly summarizes the detailed information contained in the previous reports and more recent records from DC&A's annual monitoring. No monitoring was conducted from 1998 through 2000. Carter (1990) identified nine clusters on MOTSU property and three clusters on the Orton property between Orton Pond and the northwest perimeter of MOTSU (Figure 5). These birds were observed to frequently cross into the installation to forage and to date can still be observed crossing back and forth between the two properties. The manager of the Orton Plantation property, adjacent to MOTSU, has prohibited access to monitor RCWs since 1986.

Table 3. Summary of RCW monitoring for years 1980 through 1988, 1997, and 2001 through 2008.

Year	MOTSU				Orton Easement			
	Active Sites (n = 9)	Sites w/ nests	Fledg-lings	Adults	Active Sites (n=3)	Sites w/ nests	Fledg-lings	Adults
1980	6	5	8	17	-	-	-	-
1981	7	7	12	19	3	3	5	6
1982	8	6	11	20	3	3	5	7
1983	7	5	8	16	3	3	5	8
1984	6	3	4	13	3	3	3	8
1985	5	4	5	9	3	2	7	8
1986	6	4	8	10	3[a]			
1987	6	4	10	14				
1988	6	4	8	15				
1997	6	5	8	16				
2001[a]	6			16				
2002	6	5	8	17				
2003[a]	6			19				
2004	6	6	8	19				
2005	6	3	4	17				
2006	6	6	13	17				
2007	6	5	11	21				
2008	8[b]	7[c]	14[d]	20[e]				

[a] no reproductive monitoring
[b] result of bud at MOTSU 3 and reactivation of MOTSU 7
[c] evidence of nesting in bud of MOTSU 3 during late season evaluation
[d] one fledgling found in bud of MOTSU 3 outside breeding season monitoring is included in this total
[e] includes adults from bud of MOTSU 3

Note: Monitoring by Carter (1990) for 1980-1988, CZR Inc. (1998) for 1997, and Dial Cordy and Associates Inc. (2002b, 2002c, 2004, 2005, 2006a, 2007, 2008a, 2009 – to be submitted) for 2001 through 2008

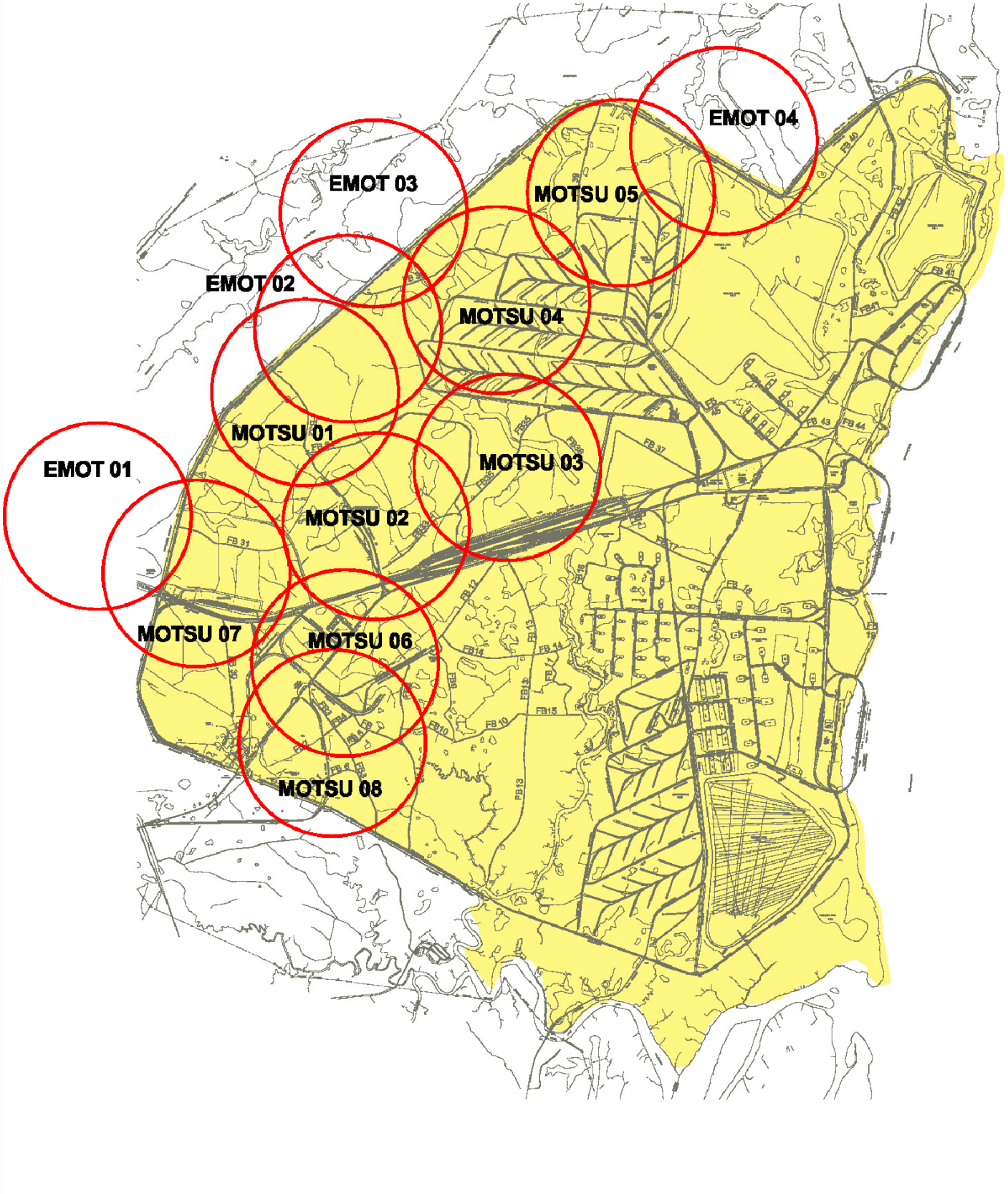
Carter (1990) monitored five to eight active clusters on MOTSU and 9 to 20 adult birds per year. Sites with nests ranged from seven in 1981 to a low of three in 1984. Fledglings ranged from a high of 12 in 1981 to a low of four in 1984. CZR (1998) monitored six clusters and 16 birds on MOTSU property during 1997 (Figure 6). DC&A monitored the same six active clusters from 2001 through the current 2008 monitoring season. Adults monitored ranged from 16 (2001) to a high of 21 (2007). Sites with nests ranged from three (2005) to seven (2008). Eight fledglings were found in both 2002 and 2004, with four fledglings observed in 2005 and 11 in 2007. The 2006 and the current 2008 monitoring seasons have had the highest numbers of fledglings observed since monitoring began in 1981 at 13 and 14, respectively. It should be noted that the 14 fledglings for 2008 include

Table 4. Summary of RCW cluster status for years 1980 through 1988, 1997, and 2001 through 2008. (A = active, I = inactive, N = nest, - = no nest)

	YEAR																	
Cluster	**1980**	**1981**	**1982**	**1983**	**1984**	**1985**	**1986**	**1987**	**1988**	**1997**	**2001***	**2002**	**2003***	**2004**	**2005**	**2006**	**2007**	**2008**
MOTSU 1	A/N	A/N	A/N	A/N	A/N	A/N	A/N	A/N	A/N	A/N	A	A/N	A	A/N	A/N	A/N	A/N	A/N
MOTSU 2	A/N	A/N	A/-	A/N	I	I	A/-	A/-	A/-	A/-	A	A/N	A	A/N	A/-	A/N	A/N	A/N
MOTSU 3	A/N	A/N	A/N	A/N	A/-	A/-	A/-	A/-	A/-	A/N	A	A/-	A	A/N	A/-	A/N	A/N	A/N
MOTSU 3A																		A/N
MOTSU 4	A/-	A/N	A/N	A/N	A/N	I	I	I	I	I	I	I	I	I	I	I	I	I
MOTSU 5	A/N	A/N	A/N	***	A/-	A/N	A/N	A/N	A/N	A/N	A	A/N	A	A/N	A/-	A/N	A/N	A/N
MOTSU 6	A/N	A/N	A/N	A/-	A/-	A/N	A/N	A/N	A/N	A/N	A	A/N	A	A/N	A/N	A/N	A/-	A/N
MOTSU 7	I	I	A/N	A/-	I	I	I	I	I	I	I	I	I	I	I	I	I	A/-
MOTSU 8	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I
EASE 2	**	A/N	A/-	A/N	A/N	A/N	A/N	A/N	A/N	A/N	A	A/N	A	A/N	A/N	A/N	A/N	A/N

*No reproductive monitoring
**No data
***Inconclusive

Note: Monitoring by Carter (1990) for 1980-1988, CZR Inc. (1998) for 1997, and Dial Cordy and Associates Inc. (2002b, 2002c, 2004, 2005, 2006a, 2007, 2008a, 2009 – to be submitted) for 2001 through 2008



NOTE: FORAGING PARTITIONS TAKEN FROM CARTER'S REPORT DATED 10 APRIL 1990. PARTITIONS ARE CENTERED AROUND THE APPROXIMATE MIDDLE OF EACH COLONY SITE. PARTITION BOUNDARIES ARE APPROXIMATE DUE TO LARGE MAP SCALE. BASE INFORMATION PROVIDED BY THE CORPS OF ENGINEERS, SAVANNAH DISTRICT IN MICROSTATION (.DGN) FORMAT, NAD 1927, DATED 7 AUGUST 1995, AND RECEIVED BY CZR INCORPORATED IN SEPTEMBER 1997 AND PROVIDED TO DIAL CORDY AND ASSOCIATES INC. IN NOVEMBER 2001. BASE INFORMATION WAS CONVERTED TO AUTOCAD, AND ALL MAPS AND ACREAGE CALCULATIONS WERE PRODUCED IN AUTOCAD REL. 14 (.DWG) FORMAT BY CZR INCORPORATED PRIOR TO BEING RECEIVED BY DIAL CORDY AND ASSOCIATES INC. IN NOVEMBER 2001.

LOCATION OF RED-COCKADED WOODPECKER CLUSTERS AND THEIR FORAGING PARTITIONS

MILITARY OCEAN TERMINAL SUNNY POINT

FILE: RCWFORIN	DRAWN BY: MR	0 4800'
DATE: MAY 2004	APPROVED BY: SD	

DIAL CORDY AND ASSOCIATES INC
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201 NORTH FRONT STREET
SUITE 601
WILMINGTON, NC 28401
TEL 910/251-9790
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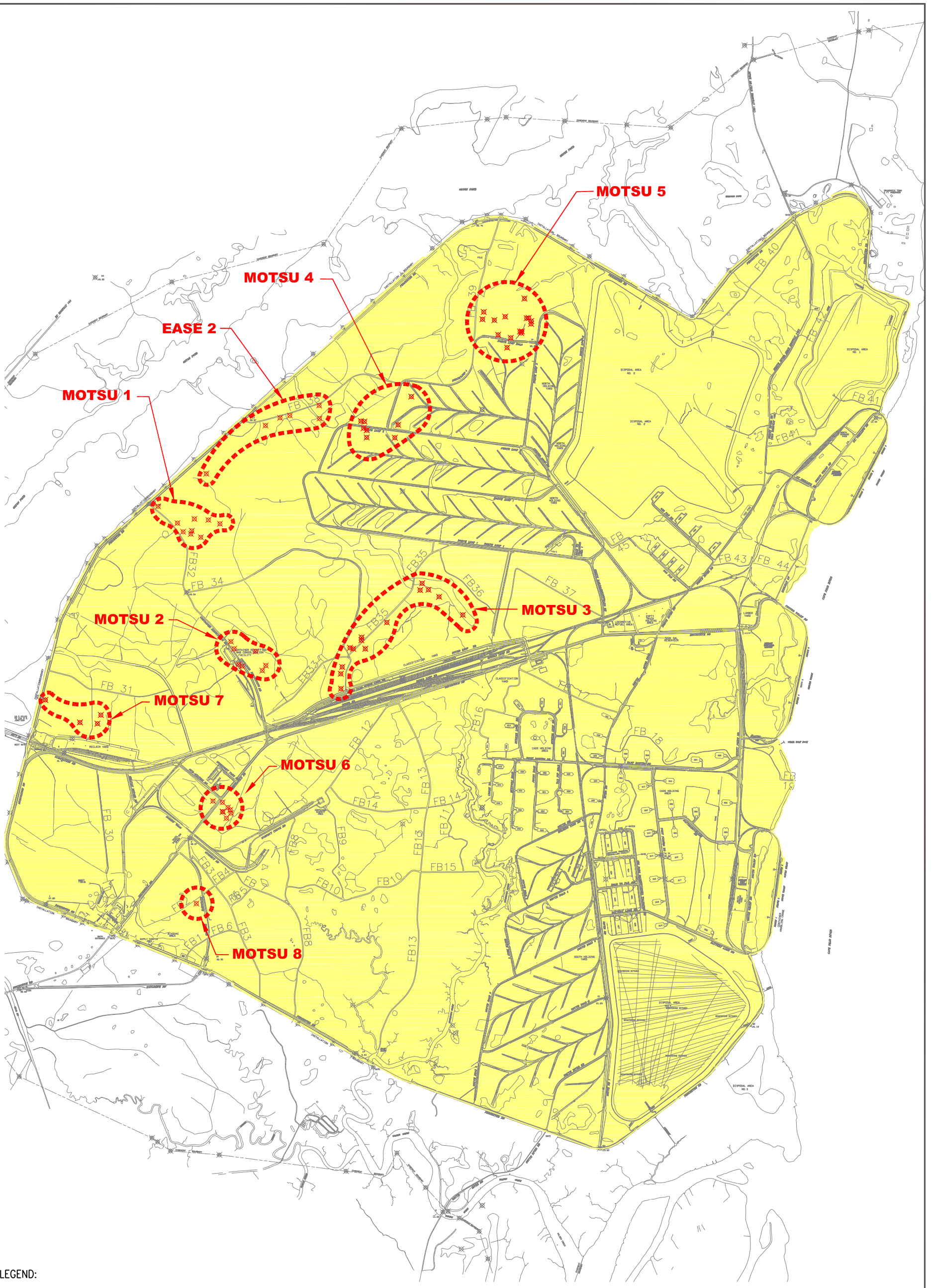
J01-0524

FIGURE 5



LEGEND:

RED-COCKADED WOODPECKER CLUSTER NUMBER

RED-COCKADED WOODPECKER TREE

SOURCE: RED-COCKADED WOODPECKER LOCATIONS WERE ENTERED WITH A C.M.T. GPS UNIT (PCGPS VERSION 3.2), NAD 1927, BY CZR INCORPORATED, WILMINGTON, NORTH CAROLINA IN 1997 (CZR INCORPORATED 1998). BASE INFORMATION PROVIDED BY THE CORPS OF ENGINEERS, SAVANNAH DISTRICT IN MICROSTATION (.DGN) FORMAT, NAD 1927, DATED 7 AUGUST 1995, AND RECEIVED BY CZR INCORPORATED IN SEPTEMBER 1997 AND PROVIDED TO DIAL CORDY AND ASSOCIATES INC. IN NOVEMBER 2001. WOODPECKER DATA AND BASE INFORMATION WERE CONVERTED TO AUTOCAD, AND ALL MAPS AND ACREAGE CALCULATIONS WERE PRODUCED IN AUTOCAD REL. 14 (.DWG) FORMAT BY CZR INCORPORATED PRIOR TO BEING RECEIVED BY DIAL CORDY AND ASSOCIATES INC. IN NOVEMBER 2001.

CLUSTER LOCATIONS OF RED-COCKADED WOODPECKERS AT THE MAIN TERMINAL

MILITARY OCEAN TERMINAL SUNNY POINT

FILE: RCWFORIN	DRAWN BY: MR	0 2400'
DATE: MAY 2004	APPROVED BY: SD	

DIAL CORDY AND ASSOCIATES INC.
Environmental Consultants
201 NORTH FRONT STREET
SUITE 601
WILMINGTON, NC 28401
TEL 910/251-9790
FAX 910/251-9409

J01-0524

FIGURE 6

one fledgling observed in the bud of MOTSU 3 (designated as 3A at this time) during the late season evaluation.

The data in Tables 3 and 4 suggest that the population has been stable since 1980 and particularly stable since 1986. Up to 2008, no new clusters had appeared during the period of time that the population has been studied. Due to a pro-active plan of installing artificial cavity inserts within cavity-limited clusters, which began in 2006, positive results were gained in 2008 with the budding of MOTSU 3 and the reactivation of MOTSU 7. The MOTSU 7 cluster had been inactive every year except 1982 up until 2008, when reactivation occurred. The MOTSU 8 cluster has been inactive every year that the population has been studied, including the original studies by Carter. The MOTSU 4 cluster was active from 1980 to 1984 and has been inactive since. The location (footprint) of the EASE 2 cluster moved between 1982 and 1983, and the location of the MOTSU 3 cluster moved slightly between 1988 and 1997. The same six clusters (MOTSU 1, 2, 3, 5, 6, and EASE 2) were active from 1986 to 1988, 1997, and from 2001 through the current 2008 monitoring season. The same four clusters (MOTSU 1, 5, 6, and EASE 2) had nests and fledged young from 1985 to 1988, 1997, and 2002. The MOTSU 3 cluster also had a nest in 1997 and 2002, but failed to fledge young. For 2004, six clusters (MOTSU 1, 2, 3, 5, 6, and EASE 2) had nests; however, two were disrupted (MOTSU 2 and 6). MOTSU 1, 3, and EASE 2 fledged young. The monitoring season for 2005 saw a decline in the number of sites with nests (three sites: MOTSU 1, 6, and EASE 2) and a decline in the number of fledglings (4). Nesting activity levels were back to normal in 2006. As stated previously, the current 2008 monitoring season has had the highest number of fledglings (14) observed since records have been kept for MOTSU, with all six clusters (MOTSU 1, 2, 3, 5, 6, and EASE 2) and the newly formed bud of MOTSU 3 (currently designated as MOTSU 3A) having nesting activity. To date, the only years that all current active clusters (excluding MOTSU 3A and the newly reactivated MOTSU 7) have all had nesting activity within a given year are 1982, 2004, 2006, and 2008.

3.2.2 Nearby Properties and Populations

Orton Plantation is located immediately adjacent to the north and northwest boundary of the MOTSU Main Terminal. Three active clusters on the southern section of this property were studied in early 1980s. Access to the property was denied after 1985 (Personal communication, J.H. Carter), as indicated in Table 3. In 1997, up to four unmarked birds were sighted on MOTSU near the northwestern boundary, between firebreaks 38 and 39 (CZR 1998). Unmarked birds were also observed in the same area during 2001 and 2002 by personnel of DC&A. These birds are believed to be from the EASE 3 cluster. At least two clusters on the Main Terminal (MOTSU 1 and EASE 2) forage on the Orton property. The RCWs of MOTSU and the southern portion of Orton Plantation interact regularly and are considered one population.

In the 1980s, there were approximately ten clusters located north of Orton Pond at Orton Plantation. The City of Boiling Spring Lakes, located approximately five miles west of MOTSU, contains 19 groups (Dial Cordy and Associates Inc. 2008b). Some birds banded at MOTSU in the 1980s were later found at Boiling Spring Lakes (Personal communication, Jay Carter). The birds from the northern portion of Orton Plantation and Boiling Spring Lakes are not expected to interact regularly with the MOTSU birds. Through an USFWS grant, along with contributions from the city and special interest groups; a Habitat Conservation Plan (HCP) for the City of Boiling Spring Lakes is presently being prepared by Dial Cordy and Associates. In-kind support in the preparation of the HCP is also being provided by the state and The Nature Conservancy (TNC). With more studies being completed, a clearer picture of the interaction of the RCWs among these locations may be provided.

The Cape Fear River, immediately east of MOTSU, is unsuitable for RCWs. The land immediately to the south and southwest of MOTSU does not contain RCWs (Personal communication, J.H. Carter).

Nearby "populations" are important to the RCWs at MOTSU, and the several small "populations" in the area are important to the species' recovery. Some nearby groups are biologically continuous with the groups on MOTSU and comprise a single population that interacts regularly. The groups are sometimes analyzed separately only because of the different land ownership. The RCWs of other, more distant populations may not interact regularly with the MOTSU RCWs, but the birds may occasionally receive emigrants from MOTSU or immigrate into MOTSU. A captured RCW at Myrtle Beach, South Carolina, had been banded at MOTSU (Personal communication, J.H. Carter). The bird had traveled over 50 miles generally west.

Dispersal among small populations, particularly if assisted by humans (i.e., translocation), may help sustain the separate populations as a larger metapopulation. The small populations may be used as a source of genetic diversity to other, distant populations. Larger populations are more resistant and are better able to survive random and/or catastrophic events than are smaller populations.

3.2.3 Potential Foraging Habitat (1997 Forest Inventory) at MOTSU

Potential foraging habitat was coordinated by Brad Foster, USACE, Savannah District, with Ralph Costa, RCW Recovery Coordinator, USFWS, based on previous guidelines (USFWS 1985, Henry 1989) that emphasized the number of pines greater than 10 inches in dbh that should be provided each group of woodpeckers, in stands meeting criteria such as overstory hardwoods 50 percent or less of canopy tree basal area, and pines 30 years in age or greater. This information, in part, formed the basis of the informal consultation between Brad Foster (USACE, Savannah District) and Ralph Costa (USFWS) in February 1999/December 1999 for the purpose of establishing the population goal for the installation. Concurrence of the established population goal was recommended by Costa in January 2000, which is further discussed in Section 5.2. The analysis of potential foraging habitat presented in this section was concurred with at that time. It should be noted that MOTSU will initiate management of foraging habitat according to the new guidelines or recovery standards for increasing population size (USFWS 2003); but for the purposes of this report, the installation is relying upon the methods and analysis completed and approved in 2000.

The Main Terminal contains a total of 8,645 acres, which includes 5,470 forested acres in 145 stands (MOTSU 1998). Essentially all forested stands are at least 50 percent pine. Suitable and potentially suitable foraging habitat for RCW is pine and pine-hardwood (greater than 50 percent pine) stands. Thus, nearly all forested stands on the Main Terminal are suitable or potentially suitable foraging habitat based on the old guidelines. Appendix B contains a table of the forested stands at the Main Terminal.

Suitable foraging habitat, as defined by the old guidelines, is the subset of potentially suitable foraging habitat with average age greater than or equal to 30 years and pine basal area greater than or equal to 30 square feet (Henry 1989). There are 4,335 acres in 84 stands that meet these criteria. Most of the stands that do not meet the age and basal area criteria are very young stands, planted in the 1980s or 1990s. Appendix C contains a table of stands on the MOTSU Main Terminal that meet the age and basal area criteria for suitable RCW foraging habitat.

With the second revision of the RCW Recovery Plan (USFWS 2003), a change in what defined adequate foraging habitat occurred. It shifted from quantity of foraging habitat, as defined by number of medium and large trees to habitat quality, as defined by habitat

structure, in addition to the use of area metrics to address quality. Foraging habitat for RCW must be suitable in both quantity and quality. The intent of MOTSU is to manage according to the new guidelines or recovery standards for increasing population size (USFWS 2003). For low site productivity systems, as occurs at MOTSU, the goal is to provide each group of woodpeckers 200 to 300 acres of good foraging habitat. However, within MOTSU's HMUs, a MOTSU-specific requirement of 300 acres per group was approved versus 200 acres per group (see Section 5.2.1.5). This was due to some of the major habitat types at MOTSU not being of high quality and unable to support one group per 200 acres. Good quality habitat, as defined in the recovery plan, has some large old pines, a low density of medium and small pines, sparse or minimal hardwoods, and a forb and bunchgrass groundcover. It is recognized by USFWS that some aspects of the definition of good quality habitat may not be achievable on extremely dry or wet sites. It is also recognized that within southeastern NC that 8" dbh pine trees are used by RCWs for foraging and therefore should be used instead of 10" dbh for foraging analyses (Costa 2007). Good quality foraging habitat meets all of the following characteristics:

a) There are 18 or more stems per acre of pines that are greater than or equal to 60 years of age and greater than or equal to 14 in dbh.
b) Basal area of pines 10" (8" in southeastern NC) to 14" in dbh is between 0 and 40 square feet per acre.
c) Basal area of pines less than 10" dbh (8" in southeastern NC) is below 10 square feet per acre and below 20 stems per acre.
d) Basal area of all pines greater than 10" dbh (8" in southeastern NC) is at least 40 square feet per acre, which applies to categories (a) and (b) above.
e) Groundcover of native fire tolerant or fire dependent herbs total 40 percent or more of ground and midstory plants, and can carry a growing season fire of once every five years.
f) Canopy hardwoods are absent or less than 30 percent of the total number of canopy trees in loblolly forest. Naturally occurring xeric oak inclusions may be retained, but can not be counted in the total area assigned to foraging habitat.
g) All of the foraging habitat is within 0.5 mile of the cluster center, and preferably, 50 percent or more is within 0.25 mile of the cluster center.
h) Foraging habitat should not be separated by 200' or more of non-foraging areas, which include (1) predominantly hardwood forest, (2) pines stands less than 30 years in age, (3) cleared or clearcut land, (4) roads, (5)utility right-of ways, and (6) bodies of water.

For the next five-year update of the ESMP, the above guidelines will be used to reassess the foraging habitat at MOTSU.

Frequent fires can facilitate the restoration and maintenance of foraging habitat, and increase the availability of nutrients; however, to ensure that mature and old pines are protected, appropriate silvicultural methods must be used to protect the mature and old pine trees on which RCWs depend. Specifically, thinning of timber and fire will lead to the desired foraging habitat. General guidelines for silviculture are given in Section 8J of the RCW recovery plan (USFWS 2003).

From a quality aspect, longleaf pine savannahs are the preferred habitat; however, other pine forest habitats are also utilized. One of these is pocosins. Pocosins are identified as pond pine (*Pinus serotina*), longleaf-pond pine, loblolly-pond pine, and mixed pine stands in the 1997 MOTSU forest inventory. Pocosins make up a significant proportion of the suitable and potentially suitable RCW habitat at MOTSU (Table 5). While pocosins can support RCW populations, they are generally less suitable as RCW habitat than many other pine forests (Carter 1988, Personal communication between Brad Foster and Ralph Costa). Most of the pocosin habitat is located in the northwest section of the Main Terminal.

Assessment of foraging habitat based on the 2003 guidelines provided in Section 8I of the RCW recovery plan will be implemented in future forestry inventory and ESMP updates.

Table 5. Pocosins at MOTSU.

	Potentially Suitable Habitat		Current Habitat	
Habitat Type	Acres (%)	Stands	Acres (%)	Stands
Pocosin	1,525 (28)	24	1,296 (30)	18
Non-pocosin	3,945 (72)	122	3,039 (70)	66
Total	5,470	146	4,335	84

Source: 1997 forest inventory data

3.2.4 Foraging Habitat within One-half Mile of Nest Trees

As described in the previous section, the analysis of potential foraging habitat performed by Brad Foster (USACE, Savannah District) was agreed to by Ralph Costa (USFWS) in 2000. For the purposes of this report and the following discussion, the installation is relying upon the methods and analysis completed and approved at that time for habitat partitioning, which was based on the old guidelines. The installation will utilize the foraging habitat allocation guidelines defined in the RCW Recovery Plan (USFWS 2003) and the new Army Guidelines (U.S. Army 2007) for the next 5-year update of the ESMP.

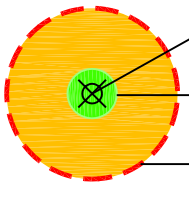
Forest stand data from 1997 (CZR 1999) and maps of the locations of RCW clusters in 1997 (CZR 1998) were used to estimate the acres of RCW foraging habitat within a one-half mile radius circle of each of the six RCW clusters (Figure 7). Double counting of areas of overlap was avoided by using the "territorial partitioning" method of Carter and Costa (Carter 1994) to divide the overlapping area among the clusters based on the distance to the nearest cavity tree. The two groups (EASE 2 and MOTSU 1) whose one-half mile radius circle extended beyond the MOTSU boundary are assessed separately because the forestry data were unavailable for land outside of MOTSU and inclusion of these two groups would bias the averages downward. At the time of the analysis, habitat as defined by the old guidelines was pine stands with an average age greater than 30 years and pine basal area greater than 30 square feet. It includes all community types that meet these criteria, such as the highly used pine savannahs and pine flatwoods to the much less used pocosins at MOTSU. The area of unforested land within one-half mile was not included. The averages for the non-overlap condition for the four groups with complete data are 243 acres of habitat; 13,733 square feet basal area; and 7,606 stems greater than 10 inches diameter at breast height (Table 6).

Table 6. Pine forest habitat on MOTSU within one-half mile radius circle of each nest tree, based on 1997 data.

The circles for groups labeled with "*" extend beyond the installation boundaries and thus the entries in the table are an underestimate of the habitat used by MOTSU RCWs.

	Only stands with age ≥ 30 and BA per acre ≥ 30			All stands within polygon		
Group	Area (acres)	BA (sq. ft.)	Stems >10"	Area (Acres)	BA (sq. ft)	Stems >10"
EASE 2 *	201	9,513	4,813	292	11,685	5,751
MOTSU 1 *	271	11,502	4,855	303	12,114	4,966
MOTSU 2	218	8,955	4,701	264	9,492	5,021
MOTSU 3	251	13,467	7,830	293	14,380	8,438
MOTSU 5	180	8,715	5,749	452	13,326	7,409
MOTSU 6	326	15,923	8,968	409	17,737	9,556
Average of 6 groups	241	11,764	6,152	335	13,122	6,856
Average of 4 groups	243	11,345	6,812	354	13,733	7,606

LEGEND:



RED-COCKADED WOODPECKER TREE

200' BUFFER FOR TREES ASSOCIATED WITH ACTIVE CLUSTERS

FORAGING AREA (ONE-HALF MILE RADIUS FROM IDENTIFIED TREE)

SOURCE: RED-COCKADED WOODPECKER LOCATIONS WERE ENTERED WITH A C.M.T. GPS UNIT (PCGPS VERSION 3.2), NAD 1927, BY CZR INCORPORATED, WILMINGTON, NORTH CAROLINA IN 1997 (CZR INCORPORATED 1998). BASE INFORMATION PROVIDED BY THE CORPS OF ENGINEERS, SAVANNAH DISTRICT IN MICROSTATION (.DGN) FORMAT, NAD 1927, DATED 7 AUGUST 1995, AND RECEIVED BY CZR INCORPORATED IN SEPTEMBER 1997 AND PROVIDED TO DIAL CORDY AND ASSOCIATES INC. IN NOVEMBER 2001. WOODPECKER DATA AND BASE INFORMATION WERE CONVERTED TO AUTOCAD, AND ALL MAPS AND ACREAGE CALCULATIONS WERE PRODUCED IN AUTOCAD REL. 14 (.DWG) FORMAT BY CZR INCORPORATED PRIOR TO BEING RECEIVED BY DIAL CORDY AND ASSOCIATES INC. IN NOVEMBER 2001.

LOCATIONS OF RED-COCKADED WOODPECKER TREES, BUFFER AREAS, AND FORAGING AREAS AT THE MAIN TERMINAL

MILITARY OCEAN TERMINAL SUNNY POINT

FILE: RCWFORIN	DRAWN BY: MR	0 — 2400'
DATE: MAY 2004	APPROVED BY: SD	

DIAL CORDY AND ASSOCIATES INC.
Environmental Consultants
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SUITE 601
WILMINGTON, NC 28401
TEL 910/251-9790
FAX 910/251-9409

J01-0524

FIGURE 7

Upon acceptance of this document by USFWS and in preparation for future foraging habitat analyses as presented in the RCW Recovery Plan (USFWS 2003) and as required by the new U.S. Army Guidelines (2007), 0.25-mile and 0.5-mile foraging partitions have been prepared (Figure 8). These foraging partitions were prepared in Arc GIS using applications of the foraging matrix software program.

3.2.5 Habitat within Home Ranges

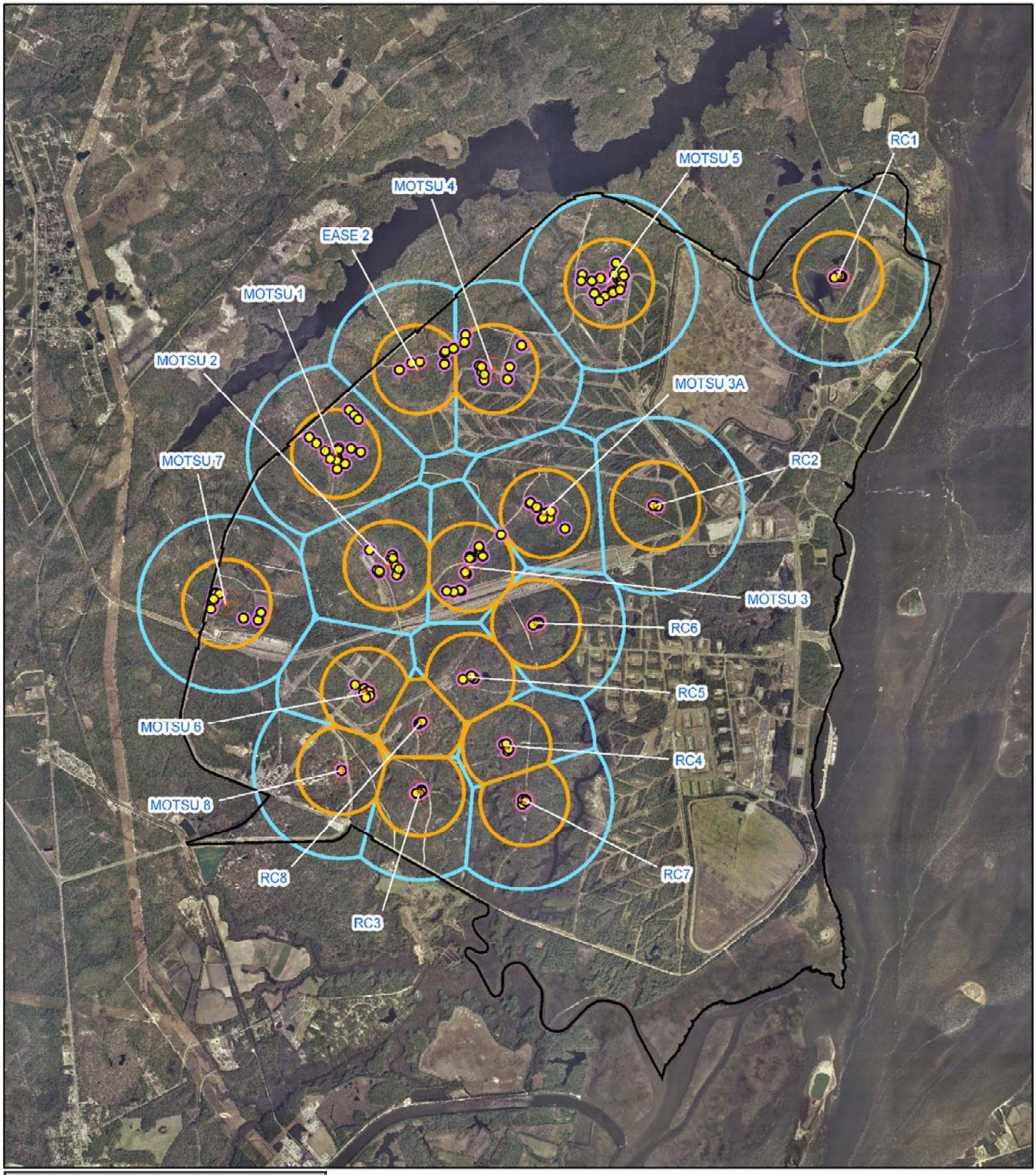
Carter (1990) studied the home range for eight RCW groups at MOTSU. Home range was identified as the area that a group regularly traveled over. It included both suitable habitat and unusable lands such as unforested or developed lands. Figure 9 shows the approximate locations of the home ranges of the clusters studied. Carter presented the percent of each home range that was unusable for RCWs (Table 7). The average home range was 422 acres and the average usable habitat was 319 acres. Forest stand data (basal area, stem size distribution) were not available during Carter's study home range study. Usable habitat at MOTSU includes all community types used by RCWs, including the highly used pine savannahs and pine flatwoods to the much less used pocosins.

Table 7. Home range for RCW groups at MOTSU.

Group	Acres of land	Percent unusable	Acres of usable habitat
MOTSU 1	432	5.7	407
MOSTU 2	414	15.1	352
MOTSU 4	479	47.1	253
MOTSU 5	483	36.8	305
MOTSU 6	332	25.5	247
EASE 1	491	16.5	410
EASE 2	385	12.8	336
EASE 4	357	31.0	246
Sum	3,373		2,556
N	8		8
Average	422		319

3.2.6 Spatial Distribution of Existing Groups on MOTSU

Visual inspection and subsequent mapping of the RCW groups' nesting on MOTSU suggest that the distances between nest trees are nearly uniform (Figures 5 and 6). The distance between groups is based on the birds' territorial behavior and their need to maintain sufficient distance between groups, as well as the quality of the habitat. Based on the area around their nest trees and clusters, the home ranges of the groups have little overlap (Figures 7 and 9). The distances between nests (Table 8) do not include distances to groups that may be nesting beyond the MOTSU boundary, but are close enough to forage on MOTSU. The EASE 3 cluster on the Orton property may be less than 6,000 feet from MOTSU 5, the distance between EASE 2 and MOTSU 5. Figure 9 also suggests that there is little open, unoccupied habitat between existing clusters when the data in the figure were collected in the 1980s. The locations of clusters have not changed significantly between 1988 and 1997, and from 2001 to the current 2008 season, when monitoring occurred.



Legend

- MOTSU Boundary
- MOTSU RCW Cluster Center
- MOTSU RCW Cavity Tree
- MOTSU RCW Cavity Tree 200 ft. Buffer
- MOTSU RCW Quarter-Mile Partition
- MOTSU RCW Half-Mile Partition

RC = Recruitment Cluster

0 0.25 0.5 1 1.5 Miles

FORAGING PARTITIONS FOR RED-COCKADED WOODPECKERS AT THE MAIN TERMINAL

MILITARY OCEAN TERMINAL SUNNY POINT

	DRAWN BY: MR	0 4800'
DATE: OCT. 2008	APPROVED BY: SD	

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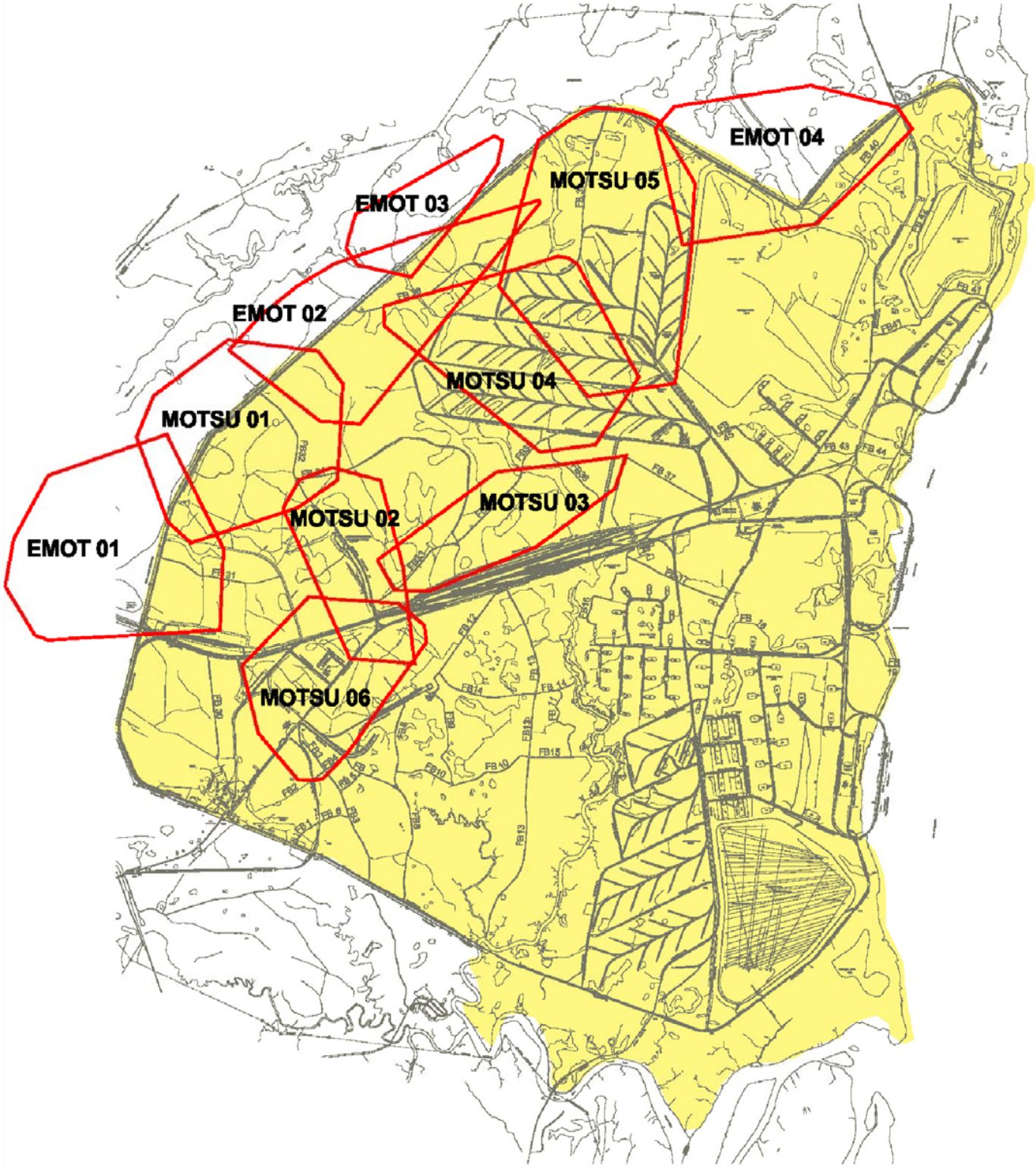
J01-0524

FIGURE 8



NOTE: SOURCE FOR PLACEMENT OF HOME RANGE POLYGONS ADAPTED FROM CARTER'S REPORT DATED 10 APRIL 1990. EXTRATERRITORIAL RANGES HAVE BEEN OMITTED FROM THIS FIGURE. RANGE BOUNDARIES ARE APPROXIMATE DUE TO LARGE MAP SCALE. BASE INFORMATION PROVIDED BY THE CORPS OF ENGINEERS, SAVANNAH DISTRICT IN MICROSTATION (.DGN) FORMAT, NAD 1927, DATED 7 AUGUST 1995, AND RECEIVED BY CZR INCORPORATED IN SEPTEMBER 1997 AND PROVIDED TO DIAL CORDY AND ASSOCIATES INC. IN NOVEMBER 2001. BASE INFORMATION WAS CONVERTED TO AUTOCAD, AND ALL MAPS AND ACREAGE CALCULATIONS WERE PRODUCED IN AUTOCAD REL. 14 (.DWG) FORMAT BY CZR INCORPORATED PRIOR TO BEING RECEIVED BY DIAL CORDY AND ASSOCIATES INC. IN NOVEMBER 2001.

HOME RANGES OF RED-COCKADED WOODPECKER AT THE MAIN TERMINAL

MILITARY OCEAN TERMINAL SUNNY POINT

FILE: RCWFORIN	DRAWN BY: MR	0 4800'
DATE: NOV. 2004	APPROVED BY: SD	

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J01-0524

FIGURE 9

Table 8. Approximate distances between RCW nest trees on MOTSU, based on 1997 data.

Group	Approximate Distance to Nearest Nest Trees (feet)
MOSTU 5 – EASE 2	6,000
EASE 2 – MOTSU 1	4,000
MOTSU 1 – MOTSU 2	4,000
MOTSU 2 – MOTSU 6	3,500
MOTSU 2 – MOTSU 3	2,200
MOTSU 3 – MOTSU 6	4,500
Mean	4,033
Median	4,000 – 4,500

4.0 CONSERVATION MEASURES

Restrictions are placed on military training activities within the buffer zones that surround federally-listed species. All construction and vegetation management projects are subject to comprehensive environmental reviews. Protected species surveys are just one component of the project approval process. If protected species are located within an action area, the project would be modified to avoid impacts, or appropriate consultation with the USFWS would be initiated.

5.0 MANAGEMENT PRESCRIPTIONS AND ACTIONS

This section describes the specific actions that would be performed to enable MOTSU to attain each of the goals for RLL and RCW. The overall goal of the MOTSU endangered species program is to promote stable and expanding populations of listed species. For the RCW, the goal is to manage the foraging habitat to provide 200 to 300 acres of good quality foraging habitat for each group. MOTSU will manage and preserve the ecosystems that the populations of endangered and threatened species depend on for existence. Both listed species at MOTSU, RLL and RCW, depend on healthy longleaf pine ecosystems. Frequent prescribed fires are the most effective and cost-efficient method of maintaining and improving longleaf pine ecosystems. Specific goals for each species are listed below.

Ecosystem management of the longleaf and pocosin forests will be implemented through thinning, selective harvesting, and prescribed burning. Prescribed fire on an approximate 3-year cycle is the principle management action by MOTSU to benefit RLL and RCW. The Installation's Mission involving the handling of large quantities of munition places extra restrictions on the planning of prescribed burns, thus the 3-year cycle at times (e.g. 9/11) may be affected. MOTSU will also limit disturbances of known populations of listed species. The forestry program will continue selective timber harvesting and pine straw harvesting. MOTSU will replant timbered areas with longleaf pine within their HMUs. These areas consist of HMU1 and HMU2, and are located at the Main Terminal of MOTSU. Areas outside of the HMUs will be allowed to regenerate naturally or with tree species best adapted to site conditions. Longleaf pine will be used where practicable. MOTSU will also implement the additional species-specific items described below.

5.1 Rough-leaved Loosestrife

Although the RLL recovery plan includes references to “stable” and “self-sustaining” populations, the plan does not define the number of individuals, quality or quantity of habitat, or other requirements for meeting these criteria. In fact, the RLL Recovery Plan (USFWS 1995) identifies the development of methodology for assessing stability as a recovery criterion. Little information is available regarding long-term population trends, seedling recruitment, genetic diversity, population dynamics, or re-establishment techniques for RLL. The lack of research and scientific data precludes the establishment of specific recovery goals for individual populations and establishment of recruitment populations at this time; however, the following goals are proposed to manage and maintain the sites currently located on MOTSU.

5.1.1 Goal 1: Manage Habitat for Rough-leaved Loosestrife

Periodic prescribed fire will be the primary tool to manage habitat for RLL. The fires for RLL will also be used for RCW habitat management. The MOTSU Main Terminal will be on a 3-year cycle for controlled burns, with approximately one third of the area burned each year. Most fires in the RLL areas will occur during the winter, so that the fires will not disrupt any flowering and/or fruiting stems. Prescribed fire will reduce the growth of shrubs that compete with RLL for light. Without periodic fire, the competing vegetation becomes thick and suppresses RLL growth. The 3-year cycle for controlled burns is subject to change based on further research on the biology and life history of RLL.

5.1.2 Goal 2: Protect RLL Sites from Human Induced Damage

MOTSU has painted trees with single orange bands to identify a l00-foot wide buffer area around each RLL site and the adjacent suitable habitat. The distance between painted trees varies depending upon the density of the vegetation. Consecutive painted buffer trees and signs are visible from one another. In addition, permanent white signs indicating “ENDANGERED SPECIES SITE, ROUGH-LEAVED LOOSESTRIFE, DO NOT DISTURB, NO FIXED ACTIVITY” were nailed to many of the painted buffer trees. Buffer area trees will be repainted, as needed, and signs replaced when damaged.

There are three exceptions to the l00-foot buffer. The first is that the buffer is only 50 feet wide along certain locations where the RLL site follows a small draw away from the main part of the site and extends into the upland pine forest. This 50-foot buffer occurs in parts of RLL Sites l, 2, and 6. Only 12 percent of the total RLL buffer perimeter is 50 feet wide. The second exception is that the buffer may be narrower where painted trees and signs would be located across a road. When the RLL site is less than 100 feet from a road, then the buffer signs are placed along the edge of the road. The third exception is that no buffer marks were placed in thick pocosin where no one would see the marks and where no one would approach the RLL site.

Certain activities will be prohibited within the buffer areas, including constructing new fire plow lines, roads, or buildings, raking pine straw, or harvesting timber.

MOTSU maintains many fire plow lines to support the prescribed fire program. Long-standing fire plow lines go through two RLL sites, yet the two sites are surviving. MOTSU will continue to maintain the fire plow lines perpendicular to RLL Site 6. RLL was found growing along the soil cast from the plow. MOTSU will also continue to maintain the fire plow line parallel to the ecotone near RLL Site 3. RLL is found growing on both sides of this line and growing on the spoil cast from the plow. Abandoning or filling these fire plow lines would make fire management more difficult in these areas of MOTSU and may disrupt the local hydrology. The presence and growth of the RLL at these locations suggests that the

hydrology is acceptable. A change to the hydrology may be detrimental to RLL in these locations.

5.1.3 Goal 3: Monitor the RLL Population

Populations of RLL will be monitored annually in accordance with the NCPCP rough-leaved loosestrife monitoring protocol (Appendix A). Monitoring was initiated at seven RLL sites in 2000, two of which that have two transects/site. Monitoring was continued at these sites in 2001 with one additional Level 1 site being added. During 2002, previous sites were again monitored with two sites being moved up from a Level 1 to a Level 3 survey and one site being moved up from a Level 1 to a Level 2 survey. These levels have been continued to date. Additional details of the monitoring program at MOTSU are in Section 6 of this ESMP.

The buffer boundary areas for RLL have been surveyed (DGPS) and will be incorporated into the GIS database. This facilitates future comparisons with monitoring results and assists with project planning on the installation. GPS data will be updated when an obvious significant change in distribution is observed.

The NCPCP has plans to develop standardized monitoring protocol for all federally-listed plant species occurring in North Carolina. If additional federally-listed plant species are discovered at MOTSU, annual monitoring will be implemented in accordance with these established criteria. If additional federally-listed plant species are discovered prior to development of monitoring criteria, then the NCPCP shall be consulted regarding the implementation of an appropriate monitoring program. In order to maintain current information on the status and trends of the RLL population, MOTSU will develop and implement a long term monitoring plan for RLL. The plan will enable MOTSU to measure plant presence/absence, number of stems, site coverage, presence of flowering and fruiting stems, fire frequency, habitat quality, and the success of protection and management actions.

5.1.4 Goal 4: Support Research

MOTSU will allow qualified researchers (NCPCP, USFWS, and universities) to study the genetics, biology, and ecology of its RLL populations in order to better understand the species and improve management decisions. Individuals proposing to perform research using MOTSU RLL populations will have to obtain permission and possibly permits from the USFWS. Additional coordination between MOTSU and USFWS may also be required. An issue of particular interest to MOTSU is the optimal timing for prescribed fires to best benefit RLL.

5.2 Red-cockaded Woodpecker

5.2.1 Establishment of Population Goal

One of the major tasks in preparing a management plan for RCW is to establish a goal for the size of the population. Section 3.2 provided a full review of the RCW population size, location, trends, potentially suitable foraging habitat, habitat within home ranges, and spatial distribution on MOTSU. This information (Sections 3.2 and 5.2), in part, formed the basis of the informal consultation between Brad Foster (USACE, Savannah District) and Ralph Costa (USFWS) in February 1999/December 1999 for the purpose of establishing the population goal for the installation. Concurrence of this population goal was recommended by Costa in January 2000. This section summarizes the population data and trends, forest resources, potentially suitable and potentially affected habitat at MOTSU, and fully shows the development of the rationale for the proposed population goal using appropriate standard methods established in coordination between Savannah USACE and USFWS.

Recommended management actions to reach the population goal are provided in Section 5.2.2, with specific actions being established through further coordination with USFWS and included as future updates of the ESMP or separate coordination documentation.

5.2.1.1 Summary of existing population, habitat, and forest resources data

As presented in Section 3.2.1 and Tables 3 and 4, the RCW population on MOTSU has been stable since 1980 and particularly stable since 1986. No new clusters had appeared during the period the population has been studied until 2008, when a bud occurred at MOTSU 3 (currently designated as MOTSU 3A). As discussed in Section 3.2.2, the RCWs of MOTSU and those within the southern portion of the Orton Plantation, located immediately adjacent to the north and northwest boundary of the Main Terminal, interact regularly and are considered one population. However, since 1987 only the MOTSU clusters have been monitored, which has included six active clusters. MOTSU 4 and 7 have been inactive since the early 1980s, and MOTSU 8 has had only one relic cavity tree since Carter's studies began in 1981. The same six clusters (MOTSU 1,2,3,5,6 and EASE 2) appear to have been active since 1986, with nests and fledgling occurrences varying from year to year (Tables 3 and 4). It should be noted that there were breaks in monitoring between 1988 and 1997, and 1997 and 2001. However, the same six groups that Carter found to be active from 1986 to 1988 were the same six groups that were found to be active in 1997 and again from 2001 to 2007. In 2008, with a bud occurrence at MOTSU 3 and a reactivation of MOTSU 7, the number of active clusters increased to eight. The groups studied in the 1980s and that continue there today are found on the sand ridges and the associated longleaf pine savannahs and pine flatwoods that are located between the extensive pocosins in the northwest section of MOTSU. Carter (1990) noted that the birds spent 72.7 percent of their foraging time in longleaf pine flatwoods, pine savannahs, and longleaf pine/turkey oak forests; the communities widely recognized as preferred habitats for RCWs. These communities made up only 44.3 percent of the available habitat. Only 19.9 percent of the RCWs' foraging time was spent in pocosins even though pocosins made up 42.7 percent of the available habitat. Most of the foraging in pocosin habitat occurred during May, June, and July.

All of the active cavities and active starts in 1997 were in longleaf pine. No active cavities or starts were in pond pine, even though this species makes-up a high proportion of the trees in the pocosins. When monitoring was resumed in 2001 by DC&A, all active cavities and active starts were again in longleaf pine only (Table 9). However, in 2002 there was one active cavity in pond pine and by 2003/2004 there were three active cavities in pond pine (one in EASE 2 and two in MOTSU 1). In 2005 through 2007, only the two in MOTSU 1 remained active cavities. Active starts were primarily observed in longleaf pine; however, in 2004 an active start was observed in pond pine at MOTSU 1 and remained an active start through 2007. In 2008, the active cavities and active start became inactive. The following average diameters at breast height (dbh) were calculated from the data in the report of the 1997 survey (CZR 1998). The five nest trees had an average dbh of 10.6 inches with a minimum dbh of 7.5 inches and a maximum dbh of 13.5 inches. For the 18 active cavity trees (including the five nest trees), the average dbh was 10.8 inches, range 7.5 to 13. For the 28 active start trees, the average dbh was 9.6 inches, range 6.5 to 12.5. The cavity and start trees were not cored in 1997 to determine their ages. Based on 2007 data, the average dbh of the 41 active cavity trees (includes trees with active artificial cavity inserts) was 13.9, range 9.1 to 19.0. Whereas, the six active start trees containing seven active starts had an average dbh of 14.4, range 10.9 to 17.6.

Table 9. Number of active cavities (AC) and active starts (AS) per pine species by RCW from 2001 through 2008 at MOTSU.

	2001	2002	2003	2004	2005	2006	2007	2008
Longleaf pine								
AC	25	30	30	28	25	36	30	24
AS	1	5	8	8	5	7	6	5
Pond pine								
AC	0	1	3	3	2	2	2	0
AS	0	0	0	1	1	1	1	0

Note: Does not include trees containing artificial cavity inserts.

Carter (1990) measured cavity trees in 1980. The 23 longleaf pine cavity trees had an average dbh of 13.3 inches, range 8.7 to 16.8 inches. These trees had an average age of 166 years, within a range 65 to 206 years. He also measured several young longleaf pine trees in a stand that was healthy and not suppressed by overstory. The average dbh of 17 trees was 5.1 inches, and their average age was 38.7 years. This example of slow growth of trees is typical of tree growth at MOTSU.

As presented in Section 3.2.4, forest stand data from 1997 (CZR 1999) and maps of the locations of RCW clusters in 1997 (CZR 1998) were used to estimate the acres of RCW foraging habitat within a half-mile radius circle of each of the six RCW clusters. Based on the analysis assumptions presented, the averages for the non-overlap condition for four groups with complete data are 243 acres of habitat; 13,733 square feet basal area; and 7,606 stems greater than 10 inches diameter at breast height (Table 5). In addition, the average home range established by Carter (1990) was 422 acres and the average usable habitat was 319 acres. Forest stand data (basal area, stem size distribution) were not available during Carter's study home range study. Usable habitat includes all community types used by RCWs, including the highly used pine savannahs and pine flatwoods through the much less used pocosins.

5.2.1.2 Potentially Suitable Habitat (1997 Data)

As previously discussed, the establishment of population goals for the installation was based on analysis of data in accordance with the old guidelines (Henry 1989). The analysis was performed by Brad Foster (USACE, Savannah District) and agreed to by Ralph Costa (USFWS) in 2000. For the purposes of this report, the installation is relying upon the methods and analysis completed and approved at that time. The installation will utilize the foraging habitat allocation guidelines defined in the RCW Recovery Plan (USFWS 2003) and the new Army Guidelines (U.S. Army 2007) for the next 5-year update of the ESMP.

Of the 145 stands and 5,470 forested acres within the 8,645-acre Main Terminal of MOTSU, there are 84 stands and 4,335 acres that meet the criteria for potentially suitable habitat (see Section 3.2.). Suitable habitat for RCW is defined to be pine and pine-hardwood (greater than 50 percent pine) stands with average age greater than or equal to 30 years and pine basal area greater than or equal to 30 square feet (Henry 1989). Appendix B contains a table of the forested stands at the MOTSU Main Terminal and Appendix C contains a table of stands on the MOTSU Main Terminal that meet the criteria for suitable RCW habitat.

MOTSU has made two types of adjustments to the initial calculated quantity of potentially suitable habitat for RCWs. First, the estimate developed from forest inventory data does not recognize that some stands are isolated from other stands and are not readily available

to RCWs. Secondly, the analysis does not take into account the small number of areas identified by MOTSU for critical construction projects. Isolated stands are defined as stands that are separated from RCW habitat by 300 feet of unsuitable habitat (Henry 1989). A total of 200 acres in 10 stands were identified and removed from further analysis because the stands were isolated from other potential habitat during coordination between Costa (USFWS) and Foster (USACE, Savannah District).

5.2.1.3 Potentially Affected Habitat

The analysis of habitat that could be potentially affected by proposed construction activities at MOTSU that was coordinated between Costa (USFWS) and Foster (USACE, Savannah District) is provided in this section. The seven proposed construction projects, totaling 57.5 acres of potentially affected habitat are briefly described below.

- "Reclaim yard" site at the western edge of MOTSU where the rail line enters the installation. This area is unforested and use of the area would not affect RCW habitat. Adjacent to Forest Management Block (FMB) B-22; unforested, 0.0 acres
- Ammunition maintenance facility located west of the large disposal area at the northern end of MOTSU. This area is forested but not within any existing RCW one-half mile circle. FMB B-11 (in part), stand 001; longleaf/pond pine forest, 3.5 acres (project completed) (Personal communication, David von Kolnitz, Public Works Division, MOTSU)
- Reserved new construction site located between the reclaim area and the existing administration buildings. The area contains planted loblolly pines that are 30 years old and recently thinned. This area is not currently used by RCWs. FMB A-23(in part), stands 001 and 002, slash pine plantation, 7 acres; FMB A-24(in part), stands 001 and 002, longleaf/pond pine and longleaf, 12 acres
- New construction site located west of North River Road and southeast of diked disposal Area 2. FMB B-9(in part), stand 001; loblolly-longleaf forest, 28 acres (project scheduled for completion by spring 2005) (Personal communication, David von Kolnitz)
- New construction site located east and west side of North River Road and southeast of diked disposal Area 2. FMB B-3(in part), stand 001; loblolly plantation, 2 acres; FMB Block B-8 (in part), stand 001; loblolly and slash pine plantation, 2 acres (project scheduled for completion by spring 2005) (Personal communication, David von Kolnitz)
- New construction site located east of North River Road and north of diked disposal Area 1. FMB B-3 (in part), stand 001; loblolly and slash pine plantation, 1 acre (project scheduled for completion by spring 2005) (Personal communication, David von Kolnitz)
- Fire station located on the north side of the road between the administration area and the western end of the rail switching yard. FMB A24 (in part), stand 001; longleaf and pond pine, 2 acres (project completed) (Personal communication, David von Kolnitz)

Based on the coordination between Ralph Costa (USFWS) and Brad Foster (USACE), 200 acres were removed because of isolation and 57.5 acres were removed for mission requirements. The total reduction in suitable habitat agreed to was 257 acres, with a total of 5,200 acres of potentially suitable habitat remaining on the MOTSU Main Terminal.

There are two additional projects since the coordination above that are not on the previous list: 1) Re-Stuff Facility Intrusion Detection System and 2) Railroad Reconfiguration and Rail Improvements (Personal communication, Rich Lockwood, Division of Environmental and Land Management Division). The Re-Stuff Facility Intrusion Detection System project has since been constructed and through coordination with USFWS, an Artificial Cavity Provisioning Plan (Dial Cordy and Associates Inc. 2006b) was provided to USFWS, as requested, in addition to the installation of three artificial cavity inserts in MOTSU 2. USFWS had only requested one artificial cavity insert, but MOTSU decided to install three to further assist the cavity-limited cluster. The three artificial cavity inserts installed in March of 2006 became active that year. In 2005, this cluster had only a solitary female present. With the installation of the artificial cavity inserts, two males moved in and a breeding group was formed, which resulted in fledged young that year. USFWS coordination is currently in process for the second project.

Should other proposed actions in the future involve loss or alteration in foraging habitat, further coordination will be required as to its overall affect on available and suitable foraging habitat. Additional impacts to foraging habitat as a result of new construction projects and/or planned timber cuts will be analyzed using the new foraging matrix and procedures. Any additional coordination with USFWS will be conducted if impacts do occur as a result of new construction projects to meet mission requirements.

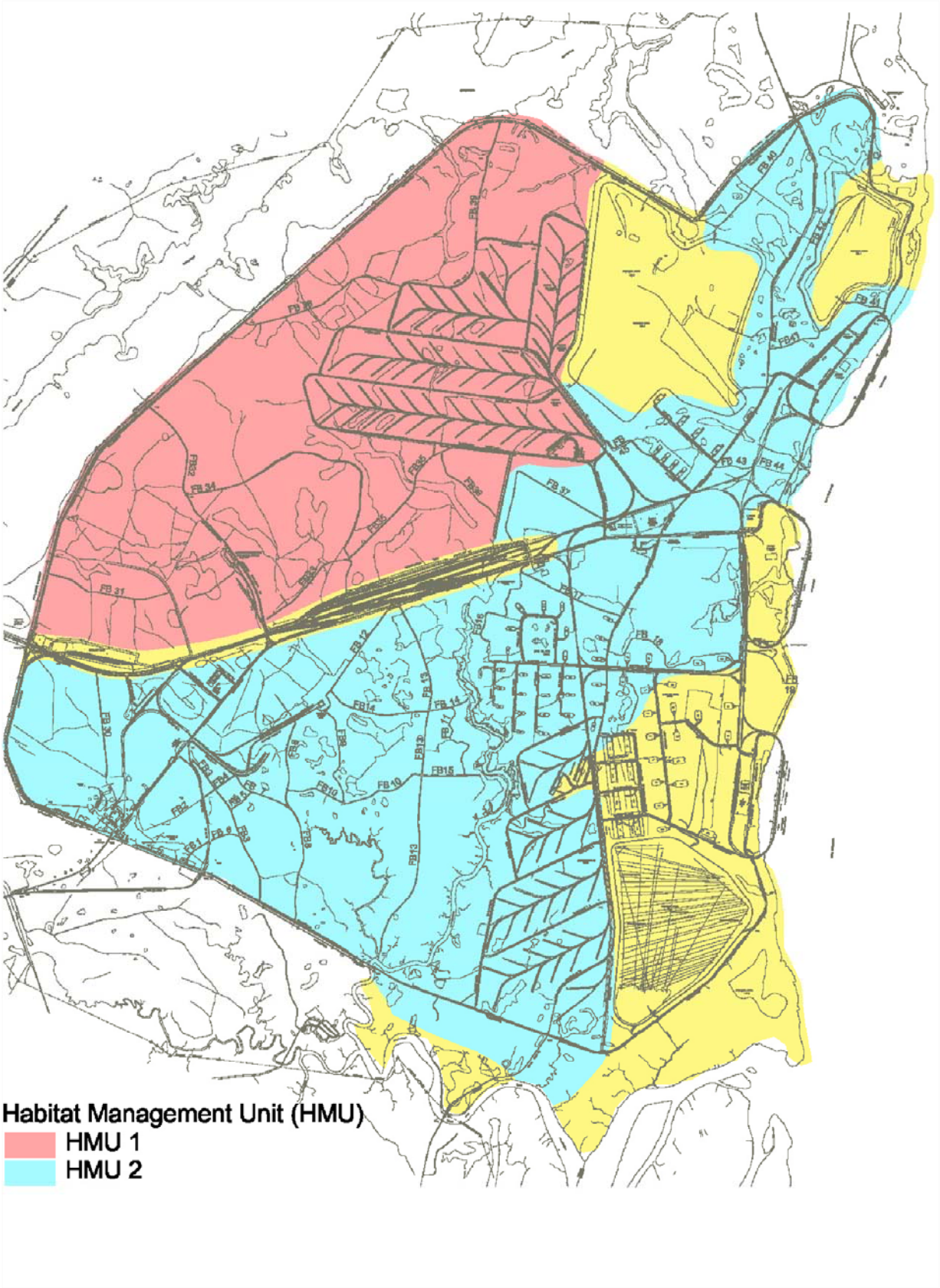
5.2.1.4 Habitat Management Units

MOTSU will manage its RCW population using two habitat management units (HMU) as depicted in Figure 10. HMUs are designated areas managed for RCW nesting and foraging (U.S. Army 1996). The principle features used to develop the HMUs are the different characteristics of the habitats. Because the two HMUs at MOTSU have different characteristics, they would receive potentially different management actions.

HMU1 is located in the north and northwest section of the Main Terminal. It is bounded on the south by the switching yard, but does not contain all of the land north of the switching yard. It is bounded on the east by Dredged Disposal Area 2. HMU1 is composed primarily of pocosin and the associated narrow sand ridges. The narrow ridges contain longleaf pine flatwoods and pine savannah habitat. HMU1 contains 2,166 acres.

HMU2 contains all of the land south of the rail line and rail car switching yard. It also contains the forests immediately north of the switching yard but not contained in HMU1. HMU2 also extends northeast between the dredged material disposal areas and the Cape Fear River. HMU2 is bounded on the southeast by Dredged Disposal Area 4. HMU2 contains 3,034 acres. HMU2 is composed of pine plantations, pine savannah, longleaf pine flatwoods, longleaf pine and loblolly pine forests, pine-turkey oak forests, pocosins, and marshes. Pocosins are a relatively small proportion of the vegetation in HMU2. The forest inventory data emphasize pine species and potential commercial harvests, and contain relatively little information on hardwood species. The data do not describe the substantial evergreen hardwoods, such as live oak and laurel oak, that have a significant presence (but less than 50 percent basal area) in many stands in the southern half of MOTSU, particularly in the southeast. HMU2 contains two barriers to daily foraging by RCWs. These barriers include the rail line that goes east - west across the northern half of the HMU, and secondly a stream and wide brackish marsh that drains southward into Governor's Creek.

In the eastern part of MOTSU, the two HMUs are adjacent to each other. In the central and western part of MOTSU, a rail car switching yard represents a large area of unsuitable habitat and forms part of the boundary between the HMUs.



HABITAT MANAGEMENT UNITS
AT THE MAIN TERMINAL

MILITARY OCEAN TERMINAL
SUNNY POINT

FILE: RCWFORIN	DRAWN BY: MR	0 4800'
DATE: DEC. 2004	APPROVED BY: SD	

DIAL CORDY AND ASSOCIATES INC.
Environmental Consultants
201 NORTH FRONT STREET
SUITE 601
WILMINGTON, NC 28401
TEL 910/251-9790
FAX 910/251-9409

J01-0524

FIGURE 10

NOTE: AS APPROVED DURING COORDINATION BETWEEN BRAD FOSTER (SAVANNAH DISTRICT USACOE) AND RALPH COSTA (USFWS), DECEMBER 1999.

5.2.1.5 RCW Density and Carrying Capacity

This section presents the two methods used to develop proposed density goals for the RCW population at MOTSU during coordination between Costa (USFWS) and Foster (USACE, Savannah District). They are based on the habitat available and the habitat used by RCWs on the Main Terminal. Currently, there are 5,200 acres of potentially suitable RCW habitat (see Section 5.2.1.3).

5.2.1.5.1 Standard Density

The standard density goal for RCW groups that can be supported is one group per 200 acres of potentially suitable habitat. This approach assumes that the habitat is productive, high-quality habitat. It is widely used in sandhills and upper coastal plain forests throughout the southeast.

This method does not take into account the distinct differences between two areas of the MOTSU Main Terminal or the limitations of habitat at MOTSU. This problem is particularly important because some major habitat types at MOTSU are not high quality for RCWs and do not support one group per 200 acres. The two HMUs described earlier recognize and incorporate these differences and will be used at MOTSU as coordinated between Costa (USFWS) and Foster (USACE, Savannah District).

5.2.1.5.2 Habitat Management Unit Method

HMU 1

The RCW population density goal for HMU1 is one group per 300 acres.

The MOTSU-specific requirement of 300 acres of habitat is larger than the standard 200 acres because much of the habitat is not high quality habitat. Carter (personal communication) concluded that the “Blue Book” guidelines (Henry 1989) of 8,490 square feet pine basal area and 6,350 stems greater than 10 inches diameter at breast height may be insufficient at MOTSU. Much of the habitat in HMU1 foraging areas is pocosin.

The five active clusters currently in HMU1 are associated with the relatively narrow sand ridges between the extensive pocosins. All active cavity and start trees are in longleaf pine on the ridges and edges of the pocosins. No active cavities or starts are in pond pine, even though the large areas of pocosin are comprised mostly of pond pine. In general, pocosins are not prime or high-quality habitat for RCWs; however, Carter (1990) noted that pocosin-pine hardwood foraging observations were higher than expected during the breeding season for some groups. During most of the year, the birds spend most of their foraging time in longleaf pine flatwoods, pine savannahs, and longleaf pine-turkey oak forests, the communities widely recognized as preferred habitats for RCWs but only a small proportion of the potential habitat in HMU1.

HMU1 has few large trees to support foraging and cavity construction. Based on the guidelines used at the time of the approved analysis, 6,350 stems per group were specified (Henry 1989). Forest inventory data for HMU1 show that it would take on average 283 acres to contain 6,350 stems greater than 10 inches dbh. An average 200-acre site would have only 4,482 stems greater than 10 inches dbh, 70 percent of the guidelines. This lack of large trees is generally due to slow growth rather than extensive recent timber harvesting in HMU1. Of the 2,166 acres of HMU1, only 195 acres (9 percent) have stands with average age less than 30 years. The description of cavity trees in Section 5.2.1.1 also provides evidence of the slow growth and small size of trees at MOTSU.

The density goal of 1 group per 300 acres is higher than the existing population density at MOTSU. One group per 300 acres is greater than the density of one group per 354 acres of potentially suitable habitat within 1/2 mile of existing nest trees (Table 6) and similar to the one group per 243 acres of currently suitable habitat. One per 300 acres is a greater density than the 422 acres of land per group home range for existing groups and is similar to the 319 acres of usable habitat per group (Table 7). The Dare County Bombing Range has extensive pocosins and has a goal of one group per 300 acres for its pocosin areas (Personal communication, Ralph Costa and J.H. Carter).

HMU2

The RCW population density goal for HMU2 is 1 group per 300 acres.

There is only one RCW group in HMU2. It is located on the northern edge of HMU2, adjacent to HMU1. Much of the unoccupied habitat is not as good for RCWs as the habitat currently occupied by RCWs. Many of the forests in HMU2 are a mixture of pine and maritime evergreen forests, generally poor habitat for RCW (Personal communication, J.H. Carter). Some of the broadleaf evergreen trees are live oak and laurel oak. The forests have slow growth and low productivity. One tree measured by Carter was four-inch dbh and 56 years old. Trees grow too slowly to manage for future habitat and still meet standard guidelines for a one group per 200 acres density.

The generally low habitat quality in HMU2 is not believed to be a result of insufficient prescribed fires. MOTSU forests have been on a three-year burn cycle for many years, except for periodic periods during heightened wartime activities and increased munition storage and transshipment loadings (Personal communication, Tony Gaw, Forester, Division of Public Works). This policy has been in place in order to minimize the likelihood of an uncontrolled wildfire that would threaten the potentially large quantity of munitions present on MOTSU at any given time.

5.2.1.6 RCW Goals

5.2.1.6.1 Installation Regional Recovery Goal

The installation regional recovery goal is the installation's contribution to the regional population goal, as determined by US Fish and Wildlife Service (U.S. Army 1996). It is based on carrying capacity of the habitat and the status of other regional populations. MOTSU is one of the populations contributing to the Mid-Atlantic Coastal Plain recovery unit. Although there is no specified "regional population goal" for this area of North Carolina, the term Installation Regional Recovery Goal will still be used to refer to the RCW population goal for MOTSU.

Based on the above information, the proposed installation regional recovery goal would be 17 groups, 7 for HMU1 and 10 for HMU2. The RCW population density goal for HMU1 is 1 group per 300 acres and the target number of groups for HMU1 would be 2,166 / 300 = 7. The RCW population density goal for HMU2 is 1 group per 300 acres and the target number of groups for HMU2 would be 3,034 / 300 = 10.

5.2.1.6.2 Installation Mission Compatible Goal

The mission compatible goal is developed similarly to the installation's Regional Recovery Goal except that the acres of habitat are reduced where on-going and planned mission requirements would be incompatible with RCWs (U.S. Army 1996). There is no land-intensive training performed at MOTSU. The only foreseeable conflicts with RCWs are construction projects that are not yet planned but may be proposed in the future. The

known short-term future construction projects have already been incorporated into the calculation of potentially suitable habitat. For MOTSU, the Installation Mission Compatible Goal would be 17, the same as the Installation Regional Recovery Goal.

5.2.2 Recommended Management Actions

The MOTSU RCW population is considered a significant support population according to the criteria established in the RCW Recovery Plan (USFWS 2003). Significant support populations, as defined by the recovery criteria, are those populations that contain and/or have a population goal of 10 or more active clusters and reside principally on state and federal lands. It is assumed from this criterion, that the goal of 17 clusters at MOTSU is achievable if the clusters are highly aggregated in space, and they have a good probability of persistence over a 20-year time period (Crowder et al. 1998). While management prescriptions for support populations may be the same as those applied to core populations (primary, secondary, and essential support), the support populations (significant and important) are more importantly considered an important source of immigrants for core populations and could serve as a buffer against loss of core populations. Significant support populations are populations not identified in recovery criteria (USFWS 2003).

To achieve the population goal of 17 clusters from the present eight active clusters; pro-active management actions that include management of existing cavities and clusters, installation of artificial cavity inserts and/or drilled cavities for recruitment clusters and existing cavity-limited clusters, restoration and management of foraging habitat, and translocation of birds will be required. With an aggressive translocation program, it is anticipated that the population goal for MOTSU can be achieved within the next five to six years. It is already evident at MOTSU that the initiation of these management actions has resulted in positive results. As of 2008, the total number of active clusters increased from six to eight with the budding of MOTSU 3 and the reactivation of MOTSU 7.

Recovery tasks to be employed by MOTSU for the maintenance and expansion of the RCW population are summarized below, as taken from the RCW Recovery Plan (see Section 9) and with further coordination revisions as requested by Ralph Costa (USFWS) from December 2006 through September 2007. Additional information relevant to the recovery tasks are referenced to the pertinent section of the RCW Recovery Plan at the end of each prescription, where applicable.

1. Protect existing active clusters.

    - Apply prescribed burns every 1 to 5 years, preferably during the growing season (see 8K).
    - Provide and maintain four suitable cavities per cluster, if necessary using artificial cavities and/or restrictor plates (see 8E).
    - Control midstory and overstory hardwoods using means other than prescribed fire, as necessary, while minimizing disturbance to soil and native herbaceous groundcover (see 8F, 8K).
    - Retain and protect active and inactive cavity trees and potential cavity trees (see 8F, 8K).
    - Practice integrated pest management to limit risk to damage by southern pine beetles.
    - All RCW cavity trees have been painted with two white bands and tagged with a brass, numbered tag. Trees marking a 200-foot buffer boundary around each RCW cavity tree associated with an active cluster were painted with a single white band. These trees were located a maximum of 100 to 150 feet from one another, depending upon the density of the surrounding vegetation. Permanent yellow RCW signs are installed primarily along the

buffer areas indicating "ENDANGERED SPECIES SITE, RED-COCKADED WOODPECKER, DO NOT DISTURB, RESTRICTED ACTIVITY." Trees are repainted and signs replaced, as needed.

2. Provide and maintain a sufficient number of recruitment clusters to achieve at a minimum an average increase of one group per year [based on coordination with Ralph Costa (USFWS), December 2006].

    - Choose strategic locations for recruitment clusters, to facilitate occupation and develop beneficial spatial arrangement of groups (see 8B).
    - Restore suitable habitat structure prior to the installation of artificial cavities/starts in recruitment clusters, using prescribed fire and other means as necessary to remove midstory and overstory hardwoods. Thin pines if densities are too high and minimize disturbance to soils and native groundcover (see 8B, 8E, 8F, 8K).
    - Provision at least two recruitment clusters for each pair of birds to be translocated [coordination with Ralph Costa (USFWS), September 2007]. For each recruitment cluster, provide four artificial and/or drilled cavities; whichever is appropriate for the trees under consideration. Some of the larger pine trees at MOTSU, especially on the south side of the Main Terminal, have a large and very active sapwood component. Even with a suitable heartwood component, the sapwood component of such trees would render them inappropriate for drilled cavities [coordination with Will McDearman (USFWS), 2008].
    - Apply prescribed burns to unoccupied recruitment clusters every one to five years, preferably during the growing season (see 8K).
    - When occupied, manage recruitment clusters as in 1 above.

3. Provide suitable quality and quantity of foraging habitat for each active and recruitment cluster, following recovery standards (see 8I).

    - Apply prescribed fire to foraging habitat every one to five years, preferably during the growing season, to protect and restore native groundcover and control densities of overstory and midstory hardwoods (see 8I, 8K).
    - Use means other than prescribed fire, if necessary, to control densities of midstory and overstory hardwoods and small to medium-sized pines (see 8I, 8K).
    - Protect and/or develop an old growth or mature pine component within the foraging habitat, at densities prescribed (see 8I, 8K).
    - Provide a suitable quantity of good quality foraging habitat (see 8I).
    - Practice integrated pest management to limit risk of damage by southern pine beetles.

4. Combat effects of fragmentation on demography and genetic resources.

    - Locate newly developed recruitment clusters of artificial cavities in strategic locations to enhance natural dispersal (see 8B).
    - Use within-population translocation when needed to stabilize and increase isolated sub-populations (see 8H).
    - Since population is less than 30 breeding groups, evaluate augmentation of population through enrolling in a regional translocation program (see 8H). Provide high quality nesting and foraging habitat prior to translocation (see 8B, 8E, 8F, 8I).

5. Provide additional habitat for population growth to achieve population objectives.

    - Use appropriate silvicultural techniques to produce suitable foraging and nesting habitat for future population expansion (see 8J).
    - Restore historic vegetation type (e.g., longleaf pine communities) where appropriate (see 8J).
    - Acquire adjacent lands if suitable for foraging and nesting habitat.

5.2.3 Management Prescription for Achieving Population Goal

Achieving required population goals at military installations has involved active and persistent management of foraging habitat, an aggressive campaign of maintaining at least four active cavity trees within each cluster, the preparation of new recruitment clusters to support a growing bird population, and the translocation of pairs of birds into new recruitment clusters. A combination of the above approaches, especially the latter two, has allowed some installations to meet their recovery goal in a shorter time frame than was first envisioned when the RCW Recovery Plan was written.

Use of artificial cavities has proven to be a successful approach in ensuring that cavities are available each year to support a growing bird population, to establish new recruitment clusters, and along with active management to reactivate inactive clusters (Allen 1991, Saenz et al. 2004). For cavity-limited clusters (less than four active cavities), providing new cavities is a sound approach used to maintain a healthy and viable group. Without new cavities, nearby juvenile birds may disperse from the cluster at the end of the breeding season, thereby adversely affecting the growth of the population. MOTSU 7 was reactivated during 2008 as a result of artificial cavity inserts that were installed in 2007. Budding, a process of new group formation involving the splitting of one territory into two, can also be encouraged through the installation of artificial and/or drilled cavities. This may be successful for long linear clusters, such as at MOTSU (MOTSU 3 and EASE 2), where a majority of the existing active cavities are at one end of the cluster and inactive at the opposite end. Installing artificial and/or drilled cavities at the end of the cluster, where they are limited, can serve to attract new birds and may result in the formation of a new group. Budding occurred at MOTSU 3 in 2008 as a result of using this technique with the placement of artificial cavity inserts.

Establishment of recruitment clusters is an important management tool used for maintaining and building RCW populations (Section 8 of RCW Recovery Plan). Since population dynamics of RCWs are regulated by the number of potential breeding groups, increasing the population size is best achieved through continued addition of recruitment clusters. Recruitment clusters are defined as newly created or reconditioned clusters that are suitable for RCW occupancy and less than five years has elapsed since reconditioning or creation. Suitability implies that the midstory in cluster and foraging habitat is controlled and that suitable cavities are available (Section 3B of Recovery Plan). Recruitment clusters are clusters of artificial cavities in habitat containing mature and old pines, with little or no hardwood midstory and a healthy forb and grass groundcover. The number of recruitment clusters or stands needed is generally known to be the difference between the number of actual active clusters and the desired number of clusters needed to meet the recovery goal. Current foraging guidelines limit the establishment of recruitment sites to the area or habitat that is not already partitioned as required foraging habitat for active clusters. In addition, recruitment clusters must meet the RCW Recovery Plan foraging requirements prior to being provisioned with artificial cavities. Therefore, the number of recruitment clusters that can be potentially established is limited to the area of land that can be managed to meet these requirements. Use of recruitment clusters are thoroughly described in Section 8B of the RCW Recovery Plan. As recruitment clusters become occupied, additional ones may be

installed, thus allowing the population to expand outward from currently occupied territories and to fill any gaps between existing clusters.

Selecting RCW recruitment cluster sites should involve consideration of ecological, socioeconomic, and institutional issues associated with the installation. Recruitment clusters should be prioritized using criteria such as adequate foraging habitat; adequate nesting and roosting habitat; quality stand conditions, function (disturbance regime), and species composition (canopy and midstory); stand age classes greater than 60 years; stands with BA between 40 to 80 square feet/acre; close proximity to active and breeding groups; proximity to dispersal pathways; history of cluster activity; minimal or no conflicts with military training; and minimal or no potential conflicts with the installation mission.

Translocation of birds from an off-site location is an important management tool for small populations and is used in conjunction with aggressive management of nesting and foraging habitat. Strategic recruitment is accomplished by translocating birds from outside the population to either unoccupied recruitment clusters or clusters containing solitary birds. The guidelines for translocation of birds to a site are provided in Section 8H of the RCW Recovery Plan and Section 3D contains background information on translocation efforts. A site or population can receive birds from a donor population if the receiving population contains fewer than 30 potential breeding groups, has a population goal of and habitat capacity to support at least 10 active clusters, and can comply with criteria a, b, and c listed in Subsection 1 of Section 8H of the RCW Recovery Plan. Recipient clusters must be within 3.2 km (2 miles) of an active cluster, have a minimum of four suitable cavities per cluster, no or very low midstory within the cluster, and suitable foraging habitat. In general, a minimum of two recruitment sites are required for each pair of birds translocated to a recipient site. The donor site must be able to provide the number of birds needed for the specific program required and the plan approved by USFWS. Translocations are best performed in early fall, typically no later than October, with preparation of the recruitment sites completed and artificial cavities installed no later than August of that year.

As described in Section 5.2.1, the installation's RCW population recovery goal is 17 active clusters. The Main Terminal has consistently had six active clusters since 1986 (MOTSU 1,2,3,5,6 and EASE 2), of which five are located in HMU 1 (MOTSU 1,2,3,5, and EASE 2) on the north side of the installation and one is located in HMU 2 (MOTSU 6) on the south side of the installation. It should be noted that in 2008, the number of active clusters increased from six to eight (with the addition of MOTSU 3A and the reactivation of MOTSU 7), as a result of the installation of artificial cavity inserts in 2007. This brings the total for HMU 1 to seven, which meets the population goal set for this HMU (see Section 5.2.1.6.1). To date, RCW management has focused on managing existing partitions and foraging habitat through prescribed burning on an approximate three-year rotation. Only in the past three years (beginning in 2006), have efforts been made to actively expand the population. Efforts have included installation of artificial cavities in cavity-limited clusters, inactive clusters, and linear clusters where budding could potentially occur. Efforts to date (2006 - 2008) are promising. Of the 39 artificial cavity inserts installed to date, 19 are active. Of the 20 that are still inactive, 14 were just installed this year (2008). However, it should be noted that four of the 2008 artificial cavity inserts are currently active. As pointed out previously in this section, MOTSU has also had one bud occurrence and one reactivation as a result of the installation of artificial cavity inserts. Meeting the recovery population goal of 17 active clusters within five to six years will be achieved through the addition of artificial and/or drilled cavities and/or the translocation recruitment of birds in HMU 2. As of 2008, the population goal of seven has been met for HMU 1. The goal within HMU 1 was met by the installment of artificial cavity inserts with natural recruitment resulting from the movement of birds within MOTSU and also the adjacent property into the areas (MOTSU 3A and MOTSU 7).

The overall goal for HMU1 is seven active clusters as coordinated with USFWS; however, there is a potential of possibly up to nine. Inactive clusters that may be activated by the installation of artificial and/or drilled cavities and/or translocation of birds include MOTSU 4 and MOTSU 7 (reactivated in 2008). Monitoring during 2008 at MOTSU 7 found four of the six artificial cavity inserts installed during 2007 to be active. A male and female were found residing at the cluster in September 2008 and were banded, thus reactivating the cluster. It is thought that the birds came from the adjoining property. MOTSU 7 was last active in 1983. EASE 2 and MOTSU 3, both active, are long and linear in nature. In early 2007, artificial cavity inserts were placed in such a manner to possibly encourage budding of each of these clusters. As previously noted; in 2008, MOTSU 3 had a bud occur (MOTSU 3A). EASE 2 has yet to have a bud occur; however, three of the six artificial cavity inserts are active. Artificial cavity inserts were placed in MOTSU 4 this year (2008) in an attempt to reactivate the cluster, cavity-limited prior to this.

Within HMU 2, there are presently two clusters, one active (MOTSU 6) and one inactive (MOTSU 8). MOTSU 8, since monitoring began in 1981, has never been active and has consisted of only one cavity tree, which is now dead. It is not likely that this cluster was ever active and as such, the potential foraging habitat present within this area will be used as part of the foraging habitat to support recruitment clusters developed within HMU 2 or to activate a cluster at this site. Four artificial cavity inserts were placed in MOTSU 8 this year (2008). The overall goal for HMU 2 is potentially 10 active clusters. The approach that will be taken in HMU 2 will consist of selecting the locations for recruitment clusters with a minimum of 120 acres each of foraging habitat; preparing the habitat through selective clearing and thinning of the mid-story and canopy to create good quality foraging habitat; installing a minimum of four artificial and/or drilled cavities; and translocating birds from Fort Bragg or other sources. Following procedures recommended by Ralph Costa (Personal communication, 26 September 2007, USFWS) and utilized successfully elsewhere (Southern Range Translocation Cooperative Annual Report 2007), six recruitment clusters will be prepared annually with translocation of three pairs of birds to the new clusters each fall. It is anticipated this will result in a 60 percent success rate, based on the results of others, with a goal of achieving three new active clusters each year, which could consist of either a pair of birds or a single bird. With this estimated success rate, potentially three recruitment clusters prepared from the previous year could be reconditioned for use the following year, along with the preparation of three new recruitment clusters. This approach will be followed annually until the population recovery goal for MOTSU has been achieved. Due to unforeseen events that may occur; such as the availability of birds from Fort Bragg and/or other sources, or recruitment clusters at MOTSU, it may take up to five to six years to achieve this goal. For new recruitment clusters that are not occupied each year (three projected), the quality of the foraging habitat will be maintained through prescribed burns or mechanized thinning or clearing as part of preparing the next year's six recruitment clusters. Based on this approach, a minimum of 1,200 acres of habitat would be required for up to ten new recruitment clusters; with the translocation of a minimum of 20 birds over a five-to-six year period, depending on the annual success rate achieved.

Annual monitoring will continue to assess the degree of success in the utilization of artificial cavity inserts that have been installed to date within HMU 1 and HMU 2, with subsequent installation of additional artificial and/or drilled cavities and/or translocation of birds where needed to augment the desired goal of achieving the population goal of 17 and the number of clusters for each of the HMUs.

It should be noted that in 2008, eight recruitment clusters were provisioned (see Figure 8 for locations) on the Main Terminal, along with the refurbishing of two inactive clusters (MOTSU 4 and MOTSU 8). These areas were reviewed on-site in May by Will McDearman (RCW Recovery and Longleaf Pine Coordinator, USFWS – a new position made after Costa's retirement in September 2007). Three pairs of birds were translocated from the Francis Marion National Forest, SC. These birds were obtained through the Southern Range

Translocation Cooperative (SRTC), which were approved by the SRTC at the August 2008 annual meeting.

6.0 MONITORING PLAN

6.1 Rough-leaved Loosestrife

Populations of rough-leaved loosestrife will be monitored annually in accordance with the NCPCP rough-leaved loosestrife monitoring protocol (Appendix A). Monitoring was initiated at seven rough-leaved loosestrife locations at MOTSU in 2000 by Moni Bates of the NCPCP, two of which that have two transects/site. It should be noted that all eight of the current RLL sites at MOTSU (Figure 4) are recorded as one element occurrence number (EOR) with the North Carolina Natural Heritage Program (NCNHP), EOR# 13. Additional monitoring sites were added or raised to higher levels in 2001 and 2002. Currently, the following levels are done at RLL monitoring sites on MOTSU: Site 1 – two transects at Level 3, Site 2 – two transects at Level 3, Site 3 – one transect at Level 2, Site 4 – one transect at Level 3, Site 5 – Level 1, and Site 6 – one transect at Level 3. It should be noted that these monitoring stations are a representative subset of the overall population at MOTSU. The NCPCP has plans to develop standardized monitoring protocol for all federally-listed plant species occurring in North Carolina. If additional federally-listed plant species are discovered on MOTSU, annual monitoring will be implemented in accordance with these established criteria. If additional federally-listed plant species are discovered prior to development of monitoring criteria, then the NCPCP shall be consulted regarding the implementation of an appropriate monitoring program.

This monitoring plan is designed to describe the status and trends of the MOTSU RLL population. The monitoring plan also will provide information to allow MOTSU to assess the success of its management actions.

Data forms can be found in Appendix A. Initially, data forms were transmitted annually to Moni Bates of the North Carolina Plant Conservation Program; however, in 2005 this changed. Data forms are now transmitted annually to Dale Suiter (USFWS) at the following address:

U. S. Fish and Wildlife Service
Raleigh Field Office
ATTN: Mr. Dale Suiter
P.O. Box 33726
Raleigh, NC 27636-3726

USFWS also requests that forms be transmitted electronically to the North Carolina Natural Heritage Program to complete the records that are kept there.

6.2 Red-cockaded Woodpecker

MOTSU will combine the annual inspection of the RCW habitat with the periodic demographic monitoring of the RCW population. Since the MOTSU population is less than 25 active clusters, the Army Guidelines (U.S. Army 1996) require that the entire population be monitored every year. The detailed requirements of the inspection and the monitoring are presented in the Army Guidelines (Appendix D). As agreed to in April 2007 by Ralph Costa (USFWS) and Matt Swanson (Chief of Public Works, MOTSU) at a meeting held at MOTSU, for the purposes of the completion of this document and its approval by USFWS, the 1996 Army Guidelines will be followed.

Inspection. Every year, MOTSU will record density and height of hardwood encroachment, height of RCW cavities, condition of cavity trees and cavities, description of damage from fires, and evidence of RCW activity at each cluster. (Army Guidelines paragraph V.C. 1.c)

Monitoring. Every year, RCWs will be color banded. MOTSU will record number of adults and fledglings per site, sex of birds, number of breeding groups, number of nests, number of eggs, number of cavity trees. (Army Guidelines paragraph V.C. 1.e)

Survey. Every five years, MOTSU will be surveyed for new trees (Army Guidelines paragraph V.C. 1.a). New trees will be painted with two white bands and the locations determined using portable GPS equipment.

Data obtained during inspections and monitoring activities each year will be transmitted to USFWS annually through their data forms and transmitted as hard copies to Will McDearman at the following address:

Mr. Will McDearman
RCW Recovery and Longleaf Pine Coordinator
USFWS
6578 Dogwood View Parkway
Jackson, MS 39213

A pdf copy of the data forms will also be emailed to Nicole Edwards, as requested by USFWS, at rcwoodpecker@comcast.net. Data forms can be downloaded at http://rcwrecovery.fws.gov/annual_report.htm.

The new Army Guidelines (Appendix E), which incorporate the requirements within the RCW Recovery Plan (USFWS 2003), will be phased into management and monitoring practices at MOTSU following approval of this document. It should be noted that this has already occurred in some aspects of RCW management at the installation.

7.0 INCIDENTAL TAKE

Section 9 of the ESA and Federal regulation pursuant to section 4(d) of the ESA prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is defined by USFWS to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by USFWS as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, of sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. However under Section 7 of the ESA, provisions for incidental take can be granted when the USFWS concludes that an action and the resulting take will not violate Section 7(a)(2).

The ESA does not prohibit the incidental take of listed plant species, and the preparation of incidental take statements is not required for consultations involving only listed plants (USFWS and NMFS 1998). However, the following special provisions do apply when listed plant species are present within an action area:

"Sections 7(b)(4) and 7(o)(2) of the Act generally do not apply to listed plant species. However, limited protection of listed plants from take is provided to the extent that the Act prohibits the removal and reduction to possession of federally-listed Endangered plants or

the malicious damage of such plants on areas under Federal jurisdiction, or the destruction of Endangered plants on non-Federal areas in violation of state law or regulation or in the course of any violation of a state criminal trespass law" (USFWS and NMFS 1998).

It should be noted that there are areas on MOTSU where the occurrences of both RLL and RCW do overlap.

The current protective measures and restrictions on military activities within known RLL and RCW sites are expected to prevent the taking of RLL and RCW. However, if expansion/security needs result in a take, an incidental take statement to cover this contingency will be required.

8.0 IMPLEMENTATION SCHEDULE

An implementation schedule is shown in Table 10. The initial planning and funding period for implementation of this plan began in 2007 and ends in 2012; however, it should be noted that some tasks are shown to be on-going. With the initiation of the translocation program in 2008, it is estimated that it will take five to six years to meet the population recovery goal. This implementation schedule indicates a majority of the stages in the recovery goal process.

Table 10. Implementation Schedule and Compliance Checklist										
Objectives	**Annual Work Plan Development Year**							**Notes**	**Date Completed**	**Signature**
	1	**2**	**3**	**4**	**5**	**6**	**On-going**			
Management Plan										
Completion of ESMP	X	X								
Integrate ESMP with INRMP	X	X								
Annual review of ESMP			X	X	X		X			
5-year update of ESMP						X		**Next 5-yr update scheduled to start in 2012**		
Red-cockaded woodpecker (RCW)										
Annual monitoring of RCW (known clusters)	X	X	X	X	X	X	X			
5-yr installation wide survey (includes areas outside of known clusters	X					X				
Repainting of buffer boundary trees and cavity trees, as needed							X			
Protect existing active clusters as needed							X			
Provide and maintain recruitment clusters		X	X	X	X	X	X	**On-going until population goal is met**		
Translocate birds		X	X	X	X	X	X	**On-going until population goal is met**		

Table 10. Implementation Schedule and Compliance Checklist (continued)									
Objectives	**Annual Work Plan Development Year**							**Notes**	**Date Completed**
	1	**2**	**3**	**4**	**5**	**6**	**On-going**		
Provide suitable foraging habitat for all clusters							**X**		
Provide additional habitat/artificial cavity inserts/drilled cavities for population growth	**X**	**X**	**X**	**X**	**X**	**X**	**X**		
Cluster and foraging habitat improvements							**X**		
Combat effects of fragmentation (FY12-16)									
Consider research							**X**		
Rough-leaved loosestrife (RLL)									
Annual monitoring of RLL	**X**	**X**	**X**	**X**	**X**	**X**	**X**		
Reconfirm GPS locations for all transects			**X**		**X**			**As needed**	
Establish additional RLL transects to be monitored annually			**X**		**X**			**For consideration**	
Repainting of buffer boundary trees, as needed							**X**	**As needed**	

Table 10. Implementation Schedule and Compliance Checklist (concluded)									
Objectives	**Annual Work Plan Development Year**							**Notes**	**Date Completed**
5-yr installation-wide survey (includes areas outside of known populations)	**X**					**X**			
Consider research requests							**X**		

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APPENDIX VI-A

NORTH CAROLINA PLANT CONSERVATION PROGRAM ROUGH-LEAVED LOOSESTRIFE MONITORING PROTOCOL

TO: Land managers and botanists interested in rough-leaved loosestrife monitoring
FROM: Monitoring Protocol Committee
DATE: April 10, 2000
FROM: Moni Bates, NC Plant Conservation Program
8023 Witty Road
Summerfield, NC 27358
336-643-3344
email: rjcbates@mindspring.com

Below is the revised rough-leaved loosestrife monitoring protocol based on comments submitted by land managers. The end of April I will send out packets to the land managers listed on page seven. The packets will include the monitoring protocol, monitoring forms, and element occurrence records from the Natural Heritage Program. From these records and the suggested table on page seven we will decide which and how many populations to monitor. Below are estimates for time required to conduct each level of monitoring. Thanks for your help in developing these protocols. We are also working with the US Fish and Wildlife Service about incorporating the monitoring protocols into the Recovery Plan.

Time Estimates:

Level One: 15-30 minutes with one person (Fill out NC NHP Rare Plant Survey Form)

Level Two: 2-4 hours with two people (Direct counts in populations of less than 250 stems)

Level Three: 5-8 hours with three to four people (In populations of over 250, dependent on population size, number of plots, and density of stems within the plots)

Monitoring Protocols
for
Lysimachia asperulifolia
(Rough-leaved loosestrife)

Goal: Maintain stable and expanding populations of Rough-leaved loosestrife across its range to achieve recovery of the species. The goal is to conduct some form of management that improves the habitat for Rough-leaved loosestrife and to monitor the consequences of this management. The primary management tool is fire. Monitoring will then take place to assess the trends in abundance in response to the management regime.

Objective: To implement a consistent monitoring protocol for Rough-leaved loosestrife for identified population centers to determine stability of populations. Population centers are on Federal, state and private lands, as specified in the Rough-leaved loosestrife Recovery Plan (USFWS 1995).

Approach: Select one of three levels of monitoring for populations on public and private lands across the species' range. Populations should be selected to allow for comparisons of the species' variability across its range.

Level One Monitoring: Qualitative

Objective 1. Conduct a survey to locate occurrences of Rough-leaved loosestrife. Fill out the NC NHP Endangered and Rare Plant Field Survey Form (attached) and submit to the North Carolina Natural Heritage Program. Update the survey form every two years.

Objective 2. If possible, GPS sites and add coordinates to survey form.

Level Two Monitoring: Quantitative

Objective 1. In select populations of 250 or fewer stems, conduct a census that includes total number of stems, include total number of flowering and fruiting stems. If the land manager is unable to census during the flowering and fruiting season, then determine total number of stems only. Attempt to conduct an annual census because a minimum of ten years of data is required to perform a population viability analysis. It is possible to skip years; however, this delays data analysis beyond ten years.

Complete and return NC Plant Conservation Program (NC PCP) Monitoring Form.

Objective 2. If possible, GPS sites and add coordinates to survey form. Estimate the extent of aerial coverage or measure sides of populations. For example, population occupies an area bounded by x by x square meters.

Level Three Monitoring: Quantitative

Objective 1. In select populations of over 250 stems, count total number of stems and total number of flowering and fruiting stems for each randomly placed permanent plot on belt transects. If the land manager is unable to census during the flowering and fruiting season, then determine total number of stems only. As for level two, the goal is to perform a minimum of ten (not necessarily consecutive) annual censuses for each population. Map the approximate boundary of the population to derive population area.

Randomly place belt transects across the population running from the pocosin edge outward and into the savanna. Place enough plots to census 10% or more of the total population. Suggested plot size is 1/2 to 1 meter by 5 to 10 meters. During the first year of monitoring, check for consistency and determine amount of measurement error by conducting multiple counts in sequence (e.g., on the same day) for two or three plots per site. Repeat every two to three years.

If requested, a NC PCP botanist will meet with land managers the first year and help design and establish permanent plots. Complete and return NC Plant Conservation Program (NC PCP) Monitoring Form.

Data Collection and Analysis:

The NC PCP will send annual reminder notices to land managers to monitor their populations. **The NC PCP will collect and analyze data from Levels Two and Three, then share this information with the monitoring committee and land managers.**

Timeline:

May - July	Monitor and collect field data
September 1	Send data to NC PCP
December 1	NC PCP analyze data
January or February	Monitoring committee meet and send update to land managers

Status Survey:

Funding permitting, every ten years a state or Federal agency will coordinate a status survey that includes populations on public and private property.

Monitoring Committee:

Representatives from NC PCP, NC NHP, US FWS and land managers will review monitoring data and address the recovery progress. The monitoring committee will also prioritize research needs and encourage academic research.

Photopoint Monitoring (Optional):

Some land mangers may wish to use photo documentation in certain populations. This is a simple means of documenting the landscape condition and shrub cover over several years. Considerations for photopoint monitoring are:

1. Establish and mark a permanent point
2. For archival purposes, use either black and white prints (film: Kodak T-max 100) or Kodachrome slides with E-13 processing
3. The vertical angle of the camera maintained at 90 degrees
4. Take the photograph with the sun behind or directly above
5. Record date, time, and name of photographer
6. Store prints and slides in dark, cool, low relative humidity location in a metal file or cabinet. Place slides in plastic holders.

North Carolina Plant Conservation Program
Monitoring Form for Levels Two and Three

Species Name: Lysimachia asperulifolia (Rough-leaved loosestrife)
Census Date:
Name of Land Manager or Agency:
Name of Person(s) Conducting Census:
Name of Population or Element Occurrence Number:
Management History:

Date of Last Burn: Month Year
Notes About Burn (very hot, crown fire; cool, ground fire, etc):

Previous Burn(s) (if possible, provide first year only):
Month Year
Month Year
Month Year

Additional management information (provide if possible):

Timber Data:

1. **Pines (include species, basal area, average dbh and number of stems/acre):**

2. **Hardwoods (average diameter breast height, number of stems/acre, height):**

Description of location of plow lines for fire breaks:

If present, evergreen shrub drain:
proximity of population to drain:
condition of the vegetation within the drain:
_____% switchcane _____% grasses _____% shrubs _____% trees
_____% canopy cover in pines _____% canopy cover in hardwoods

Description of other management practices:

Level Two Data:

Total Number of Stems: _____stems

Total Number of Budding/Flowering and/or Fruiting Stems:

_____budding ____flowering _____fruiting stems

Level Three:

Total Area of Population (square meters):

Area of Each Plot (square meters):

Sketch population showing position of transects and plots:

Level Three Data:

Transect Position	Quad #	Total # of Stems	Total # of Flowering & Fruiting Stems

Return form to: N.C. Plant Conservation Program
Post Office Box 27647
Raleigh, NC 27611

NORTH CAROLINA NATURAL HERITAGE PROGRAM
ENDANGERED AND RARE PLANT FIELD SURVEY FORM

Species: Common name:

Survey date: 7.5' Quad Map:

County: Elevation:

Site location and directions: (**attach copy of map with site marked or use back of form to draw a sketch of the site**):

SPECIES INFORMATION

Number of individuals: Define individual (**stem, clump, etc.**):

Size of area in which population occurs:

Phenology:
- dormant
- leaf
- bud
- flower
- fruit

Evidence of reproduction:
- seedlings
- clonal/vegetative

Other information:

Habitat (**NC NHP natural community name and description; include quality, soils, geology, etc.**):

Topographic position:
- crest
- upper slope
- mid slope
- lower slope
- upland flat
- alluvial

Micro-relief:
- flat
- rippled
- concave
- convex
- drop-off
- other

Moisture regime:
- inundated
- saturated
- moist
- dry
- seasonally wet

Light:
- open
- filtered
- shade

Other information:

Associated species:

Protection and management needs and other comments:

Landowner(s), if known:
Person making this report: Search time:
Address:
Phone:
Other observers:

Specimens collected? Collection #: Repository:

Return form to: N.C. Natural Heritage Program; Division of Parks and Recreation
P.O. Box 27687; Raleigh, NC 27611

APPENDIX VI-B

TABLE OF ALL STANDS ON MAIN TERMINAL

(Total = 5,470 acres)

Appendix B. Table of all stands on Main Terminal, MOTSU (1997 field data).

CU	FMB	STAND #	Stand Type	Ac/Stand	Average Pine Age	Low Age	High Age	Pine BA/ac	Total Pine BA	Pines > 10"/ac	Total Pines > 10"
01	A01	001	LL	17.83	51	42	60	43.98	784.11	51.74	922..52
01	A01	002	LL	56.87	52	37	65	80.00	4,549.60	32.18	1,830.08
01	A01A	001	LL	60.04	58	46	70	54.01	3,242.76	42.77	2,567.91
01	A02	001	LLL	31.90	49	45	52	86.00	2,743.40	70.00	2,233.00
01	A02	002	LL	7.68	NA	NA	NA	80.00	614.40	40.41	310..35
01	A02	003	LLYP	8.27	NA	NA	NA	0.00	0.00	0.00	0.00
01	A03	001	LLL	100.65	53	36	63	56.47	5,683.71	43.04	4,331..98
01	A03	002	LUH	16.15	NA	NA	NA	0.00	0.00	0.00	0.00
01	A03	003	LYP	8.29	29	22	35	106.66	884.21	26.34	218.36
01	A04	001	LL	50.16	42	29	69	35.56	1,783.69	12.86	645.06
01	A04	002	PP	76.60	45	41	51	38.22	2,927.66	15.78	1,208.75
01	A04	003	LYP	18.28	16	15	16	16.67	304.73	0.00	0.00
01	A04	004	PP	5.32	26	26	26	45.00	239.40	36.51	194.23
02	A05	001	L	146.53	50	35	67	63.96	9,372.06	49.01	7,181.44
02	A05	002	LLYP	38.76	NA	NA	NA	0.00	0.00	0.00	0.00
02	A06	001	LL	134.53	57	44	69	64.37	8,659.70	47.40	6,376.72
02	A06	003	LLH	6.43	39	39	39	15.00	96.45	15.56	100.05
02	A07	001	LL	73.58	56	37	72	72.86	5,361.04	57.44	4,226.44
02	A07	002	LYP	6.02	NA	NA	NA	0.00	0.00	0.00	0.00
02	A07	003	LH	7.40	NA	NA	NA	9.99	73.93	5.91	43.73
02	A08	001	L	111.80	56	38	82	68.18	7,622.52	52.20	5,835.96
02	A09	001	LLH	35.19	53	18	61	37.00	1,302.03	24.64	867.08
02	A09	002	L	15.11	54	54	54	90.00	1,359.90	64.18	969.76
02	A10	001	LLL	21.95	58	47	64	150.00	3,292.50	130.06	2,854.82
02	A10	002	LYP	46.82	37	25	50	70.01	3,277.87	46.99	2,200.07
03	A12	001	L	103.54	47	25	77	46.25	4,788.73	33.32	3,449.95
03	A12	002	L	17.08	33	28	37	116.00	1,981.28	64.94	1,109.18
03	A13	001	L	13.83	28	24	32	65.71	908.77	35.66	493.18
03	A13	002	L	54.89	43	25	69	59.39	3,259.92	43.14	2,367.95
03	A13	003	L	9.41	24	24	24	10.00	94.10	0.00	0.00
03	A14	001	L	16.59	39	29	49	64.00	1,061.76	57.99	962.05
03	A14	002	L	14.29	52	50	54	55.00	785.95	52.55	750.94
03	A14	003	L	10.96	29	28	30	98.00	1,074.08	37.79	414.18
03	A14	004	L	4.91	NA	NA	NA	6.67	32.75	0.00	0.00
03	A14	005	L	18.30	47	43	51	68.00	1,244.00	46.78	856.07
03	A15	001	L	52.49	51	36	63	89.13	4,678.43	62.60	3,285.87
03	A16	001	LLL	71.15	54	37	71	96.67	6,878.07	68.37	4,864.53
03	A16	002	LLL	21.64	73	73	73	72.86	1,576.69	56.59	1,224.61
03	A16	003	LYP	2.73	35	35	35	70.00	191.10	18.33	50.04
03	A20	001	L	68.53	58	44	83	74.78	5,124.67	55.44	3,799.30
03	A22	001	L	68.21	42	20	61	81.00	5,525.01	52.50	3,581.03
03	A22	002	LH	10.43	NA	NA	NA	0.00	0.00	0.00	0.00
03	A27	001	L	19.35	37	28	45	42.85	829.15	32.46	628.10
03	A27	002	L	12.82	60	58	63	56.66	726.38	44.14	565.87
04	A11	002	C	40.48	48	37	73	57.70	2,335.70	40.28	1,630.53
04	A11	002	C	4.00	NA	NA	NA	0.00	0.00	0.00	0.00
04	A17	001	L	27.42	18	15	20	46.25	1,268.18	28.64	785.31
04	A18	001	L	23.98	36	30	41	58.75	1,408.83	37.59	901.41
04	A18	002	L	4.94	40	40	40	40.00	197.60	23.49	116.04
04	A18	003	LYP	16.34	NA	NA	NA	10.00	163.40	9.35	152.78
04	A18	004	L	25.93	50	48	52	67.14	1,740.94	51.38	1,332.28
04	A21A	002	L	29.06	47	41	54	48.89	1,420.74	40.06	1.164.14
04	A21A	003	LYP	11.96	20	20	20	30.00	358.80	6.22	74.39
04	A26	001	L	134.51	49	25	63	63.09	8,486.24	48.08	6,467.24
04	A26	002	LYP	15.99	30	15	45	38.58	616.89	14.61	233.61
05	A19	002	L	9.10	50	50	50	65.00	591.50	59.60	542.36
05	A19	003	LLH	47.66	42	16	60	39.98	1,905.45	33.17	1,580.88
05	A19	004	LH	10.38	NA	NA	NA	10.00	103.80	11.05	114.70
05	A19	005	LLH	4.86	NA	NA	NA	9.99	48.55	5.51	26.78
05	A19	006	LLH	7.42	NA	NA	NA	0.00	0.00	0.00	0.00
05	A21B	004	L	17.37	43	35	50	62.50	1,085.63	42.58	739.61
05	A21B	005	LLH	23.80	52	52	52	33.34	793.49	24.45	581.91
05	A25	001	L	18.23	46	42	50	80.01	1,458.58	61.05	1,112.94

Appendix B. Table of all stands on Main Terminal, MOTSU (1997 field data). (continued)

CU	FMB	STAND #	Stand Type	Ac/Stand	Average Pine Age	Low Age	High Age	Pine BA/ac	Total Pine BA	Pines > 10"/ac	Total Pines > 10"
05	A25	002	LUH	12.10	NA	NA	NA	0.00	0.00	0.00	0.00
05	A25	003	LLH	39.72	43	38	48	15.71	624.00	14.72	584.68
05	A25	004	L	9.69	40	36	44	103.33	1,001.27	84.52	819.00
05	A25	005	LLH	10.68	42	42	42	23.34	249.27	23.73	253.44
05	A25	006	L	6.98	NA	NA	NA	75.00	523.50	49.38	344.67
05	A25	007	LLH	1.23	NA	NA	NA	0.00	0.00	0.00	0.00
05	A25	008	L	5.78	NA	NA	NA	45.00	260.10	33.03	190.91
05	A25	009	LLH	8.42	NA	NA	NA	0.00	0.00	0.00	0.00
05	B01	001	L	39.35	43	39	48	65.72	2,586.08	44.52	1,751.86
05	B01	002	LLH	45.48	51	33	79	51.35	2,335.40	35.81	1,628.64
05	B01	003	L	14.23	47	47	47	95.00	1,351.85	83.46	1,187.64
05	B23	001	LYP	28.70	45	26	82	78.89	2,264.14	50.15	1,439.31
05	B23	002	I	17.82	41	37	45	63.34	1,128.72	56.82	1,012.53
06	A23	001	SYP	149.36	27	21	33	79.16	11,823.34	32.08	4,791.47
06	A23	002	SYP	18.85	32	21	65	40.00	754.00	13.35	251.65
06	A24	001	LLPP	39.05	40	28	70	61.11	2,386.35	36.00	1,405.80
06	A24	002	LL	82.26	47	31	76	38.97	3,205.67	16.82	1,383.61
06	A24	003	LLPP	18.19	44	40	48	58.00	1,055.02	44.56	810.55
06	B21	001	LLPP	160.96	50	33	71	42.27	6,803.78	17.81	2,866.70
06	B21	002	L	25.72	NA	NA	NA	1.11	28.55	1.41	36.27
06	B21	003	PP	31.57	37	24	50	20.00	631.40	3.06	96.60
06	B22	001	PP	92.36	57	41	127	39.65	3,662.07	27.35	2,526.05
06	B22	002	LL	68.19	52	16	79	52.61	3,587.48	30.47	2,077.75
06	B25	001	PP	57.58	46	23	80	45.44	2,616.44	24.42	1,406.10
06	B25	002	LLPP	42.27	46	34	64	30.83	1,303.18	15.57	658.14
07	B18	001	PP	195.80	42	17	61	48.52	9,500.22	22.78	4,460.32
07	B18	002	LL	148.82	72	27	193	36.66	5,455.74	13.51	2,010.56
07	B18	003	MP	32.15	43	29	58	42.87	1,378.27	35.12	1,129.11
07	B18	004	PP	30.73	45	30	56	37.50	1,152.38	8.49	260.90
07	B18	005	L	15.75	NA	NA	NA	11.43	180.02	4.95	77.96
07	B24	001	PP	124.36	51	33	90	51.57	6,413.25	30.59	3,804.17
07	B24	002	LL	94.78	51	33	73	32.69	3,098.36	13.32	1,252.47
07	B24	003	PP	41.70	42	32	67	18.47	770.20	11.40	475.38
08	B12	001	LLPP	93.43	37	16	59	25.02	2,337.62	8.36	781.07
08	B15	001	PP	106.94	45	21	94	53.72	5,744.82	35.90	3,839.15
08	B15	002	LPP	29.61	31	24	38	14.12	418.09	7.33	217.04
08	B16	001	LLPP	90.71	52	29	145	54.98	4,987.24	32.20	2,920.86
08	B16	002	LL	30.60	28	15	40	24.16	739.30	9.40	287.64
08	B19	001	LL	115.85	51	23	73	71.34	8,264.74	41.55	4,813.57
08	B19	002	LLYP	5.44	NA	NA	NA	120.00	652.80	81.98	445.97
08	B19	003	PP	58.95	50	42	65	57.85	3,410.26	36.33	2,141.65
08	B20	001	LLL	131.08	54	17	68	88.00	11,535.04	71.29	9,344.69
08	B20	002	LYP	8.92	29	19	39	60.01	535.29	17.66	157.53
09	B09	001	LLL	110.70	44	25	64	93.09	10,305.06	72.12	7,983.68
09	B09	002	LYP	8.49	25	12	38	23.32	197.99	16.45	139.66
09	B10	001	LL	2.92	39	39	39	30.00	87.60	30.04	87.72
09	B10	002	C	3.27	47	47	47	10.00	32.70	4.58	14.98
09	B10	003	PP	15.04	46	36	55	33.34	501.43	15.41	231.77
09	B10	004	LL	9.95	NA	NA	NA	15.00	149.25	9.16	91.14
09	B10	005	LL	30.68	42	33	50	32.88	1,008.14	16.48	505.61
09	B10	006	MP	69.73	44	32	60	52.08	3,631.54	38.36	2,674.84
09	B10	007	LLH	4.79	NA	NA	NA	0.00	0.00	0.00	0.00
09	B10	008	LYP	7.52	14	14	14	15.00	112.80	0.00	0.00
09	B11	001	LLPP	69.26	46	30	73	60.38	4,181.92	39.75	2,753.09
09	B17	001	L	15.29	20	17	22	55.00	840.95	31.58	482.86
09	B17	002	LL	6.38	32	32	32	30.00	191.40	18.33	116.95
09	B17	003	LLL	16.51	26	24	27	30.00	495.30	7.33	121.02
09	B17	004	PP	16.09	49	47	51	55.00	884.95	36.29	583.91
09	B17	005	LL	61.09	42	31	53	25.00	1,527.25	8.06	492.39
09	B17	007	LYP	9.28	49	49	49	12.50	116.00	2.29	21.25
09	B17	008	LLYP	18.93	29	20	42	40.01	757.39	9.24	174.91
09	B17	010	LLPP	27.34	15	15	15	12.86	351.59	3.13	85.57
09	B17	012	SYP	6.96	26	26	26	73.33	510.38	16.46	114.56
09	B17	014	LLL	51.47	29	27	32	54.00	2.779.38	24.23	1,247.12
09	B17	015	LL	11.40	35	27	40	32.50	370.50	15.53	177.04

Appendix B. Table of all stands on Main Terminal, MOTSU (1997 field data). (concluded)

CU	FMB	STAND #	Stand Type	Ac/Stand	Average Pine Age	Low Age	High Age	Pine BA/ac	Total Pine BA	Pines > 10"/ac	Total Pines > 10"
09	B17	016	LL	13.54	39	39	39	17.50	236.95	8.66	117.26
09	B17	017	L	8.12	20	20	20	5.00	40.60	0.00	0.00
10	B02	001	L	22.02	39	33	45	52.21	1,149.66	46.75	1,029.44
10	B02	002	LYP	8.33	NA	NA	NA	0.00	0.00	0.00	0.00
10	B03	001	LYP	8.66	40	40	40	60.00	519.60	41.22	356.97
10	B03	002	LLL	59.83	44	24	65	53.16	3,180.56	36.32	2,173.03
10	B03	003	LYP	8.33	25	25	25	75.00	624.75	29.29	243.99
10	B04	001	LL	15.91	50	50	50	86.67	1,378.92	84.43	1,343.28
10	B04	002	L	15.50	NA	NA	NA	35.00	542.50	29.44	456.32
10	B05	001	L	3.99	NA	NA	NA	30.00	119.70	18.33	73.14
10	B05	002	L	38.63	44	33	53	56.01	2,163.67	37.64	1,454.03
10	B06	001	LL	28.82	62	40	95	92.74	2,672.77	73.04	2,105.01
10	B06	002	SYP	37.78	28	24	44	84.17	3,179.94	25.25	953.95
10	B07	001	SYP	36.42	32	24	43	100.00	3,642.00	28.26	1,029.23
10	B08	001	LYP/SYP	15.57	33	33	33	105.00	1,634.85	68.37	1,064.52
10	B08	002	LLL	21.78	27	19	33	80.01	1,742.62	64.05	1,395.01
10	B08	003	L	4.97	NA	NA	NA	15.00	74.55	6.37	31.66
		TOTAL		5,470.19							

FOREST STAND AND LAND CLASS TYPES

L	LOBLOLLY PINE
LL	LONGLEAF PINE
PP	POND PINE
LLL	LOBLOLLY - LONGLEAF PINE
LPP	LOBLOLLY - POND PINE
LLPP	LONGLEAF - POND PINE
MP	MIXED PINE: LOBLOLLY, LONGLEAF, AND POND PINE
LYP	LOBLOLLY PINE PLANTATION
LLYP	LONGLEAF PINE PLANTATION
SYP	SLASH PINE PLANTATION
LH	LOWLAND HARDWOOD
LLH	LOBLOLLY PINE - LOWLAND HARDWOOD
LUH	LOBLOLLY PINE - UPLAND HARDWOOD
C	CYPRESS

APPENDIX VI-C

TABLE OF ALL STANDS LOCATED ON THE MAIN TERMINAL THAT ARE 30 YEARS OR OLDER AND HAVE 30 SQUARE FEET OR MORE PINE BASAL AREA

(Total = 4,335 acres)

Appendix C. Table of all stands located on the main terminal that are 30 years or older and have 30 sq. ft. or more pine based area.

CU	FMB	STAND #	Stand Type	Ac/Stand	Average Pine Age	Low Age	High Age	Pine BA/ac	Total Pine BA	Pines >10"/ac	Total Pines > 10"
01	A01	001	LL	17.83	51	42	60	43.98	784.11	51.74	922.52
01	A01	002	LL	56.87	52	37	65	80.00	4,549.60	32.18	1,830.08
01	A01	001	LL	60.04	58	46	70	54.01	3,242.78	42.77	2,567.91
01	A02	001	LLL	31.90	49	45	52	86.00	2,743.40	70.00	2,233.00
01	A03	001	LLL	100.65	53	36	63	56.47	5,683.71	43.04	4,331.98
01	A04	001	LL	50.16	42	29	69	35.56	1,783.69	12.86	645.06
01	A04	002	PP	76.60	45	41	51	38.22	2,927.65	15.78	1,208.75
02	A05	001	L	146.53	50	35	67	63.96	9,372.06	49.01	7,181.44
02	A06	001	LL	134.53	57	44	69	64.37	8,659.70	47.40	6,376.72
02	A07	001	LL	73.58	56	37	72	72.86	5,361.04	57.44	4,226.44
02	A08	001	L	111.80	56	38	82	68.18	7,622.52	52.20	5,835.96
02	A09	001	LLH	35.19	53	18	61	37.00	1,302.03	24.64	867.08
02	A09	002	L	15.11	54	54	54	90.00	1,359.90	64.18	969.76
02	A10	001	LLL	21.95	58	47	64	150.00	3,292.50	130.06	2,854.82
02	A10	002	LYP	46.82	37	25	50	70.01	3,277.87	46.99	2,200.07
03	A12	001	L	103.54	47	25	77	46.25	4,788.73	33.32	3,449.95
03	A12	002	L	17.08	33	28	37	116.00	1,981.28	64.94	1,109.18
03	A13	002	L	54.89	43	25	69	59.39	3,259.92	43.14	2,367.95
03	A14	001	L	16.59	39	29	49	64.00	1,061.76	57.99	962.05
03	A14	002	L	14.29	52	50	54	55.00	785.95	52.55	750.94
03	A14	005	L	18.30	47	43	51	68.00	1,244.40	46.78	856.07
03	A15	001	L	52.49	51	36	63	89.13	4,678.43	62.60	3,285.87
03	A16	001	LLL	71.15	54	37	71	96.67	6,878.07	68.37	4,864.53
03	A16	002	LLL	21.64	73	73	73	72.86	1,576.69	56.59	1,224.61
03	A16	003	LYP	2.73	35	35	35	70.00	191.10	18.33	50.04
03	A20	001	L	68.53	58	44	83	74.78	5,124.67	55.44	3,799.30
03	A22	001	L	68.21	42	20	61	81.00	5,525.01	52.50	3,581.03
03	A27	001	L	19.35	37	28	45	42.85	829.15	32.46	628.10
03	A27	002	L	12.82	60	58	63	56.66	726.38	44.14	565.87
04	A11	001	L	40.48	48	37	73	57.70	2,335.70	40.28	1,630.53
04	A18	001	L	23.98	36	30	41	58.75	1,408.83	37.59	901.41
04	A18	002	L	4.94	40	40	40	40.00	197.60	23.49	116.04
04	A18	004	L	25.93	50	48	52	67.14	1,740.94	51.38	1,332.28
04	A21	002	L	29.06	47	41	54	48.89	1,420.74	40.06	1,164.14
04	A26	001	L	134.51	49	25	63	63.09	8,486.24	48.08	6,467.24
04	A26	002	LYP	15.99	30	15	45	38.58	616.89	14.61	233.61
04	A19	002	L	9.10	50	50	50	65.00	591.50	59.80	542.36
05	A19	003	LLH	47.66	42	16	60	39.98	1,905.45	33.17	1,580.88
05	A21B	004	L	17.37	43	35	50	62.50	1,085.63	42.58	739.61
05	A21B	005	LLH	23.80	52	52	52	33.34	793.49	24.45	581.91
05	A25	001	L	18.23	46	42	50	80.01	1,458.58	81.05	1,112.94
05	A25	004	L	9.69	40	36	44	103.33	1,001.27	84.52	819.00
05	B01	001	L	39.35	43	39	48	65.72	2,586.08	44.52	1,751.86
05	B01	002	LLH	45.48	51	33	79	51.35	2,335.40	35.81	1,628.64
05	B01	003	L	14.23	47	47	47	95.00	1,351.85	83.46	1,187.64
05	B23	001	LYP	28.70	45	26	82	78.89	2,264.14	50.15	1,439.31
005	B23	002	L	17.82	41	37	45	63.34	1,128.72	56.82	1,012.53
06	A23	002	SYP	18.85	32	21	65	40.00	754.00	13.35	251.65
06	A24	001	LLPP	39.05	40	28	70	61.11	2,386.35	36.00	1,405.80
06	A24	002	LL	82.26	47	31	76	38.97	3,205.67	16.82	1,383.61
06	A24	003	LLPP	18.19	44	40	48	58.00	1,055.02	44.56	810.55
06	B21	001	LLPP	160.96	50	33	71	42.27	6,803.78	17.81	2,866.70
06	B22	001	PP	92.36	57	41	127	39.65	3,662.07	27.35	2,526.05
06	B22	022	LL	68.19	52	16	79	52.61	3,587.48	30.47	2,077.75
06	B25	001	PP	57.58	46	23	80	45.44	2,616.44	24.42	1,406.10
06	B25	002	LLPP	42.27	46	34	64	30.83	1,303.18	15.57	658.14
07	B18	001	PP	195.80	42	17	61	48.52	9,500.22	22.78	4,460.32
07	B18	002	LL	148.82	72	27	193	36.66	5,455.74	13.51	2,010.56
07	B18	003	MP	32.15	43	29	58	42.87	1,378.27	35.12	1,129.11
07	B18	004	PP	30.73	45	30	56	37.50	1,152.38	8.49	260.90

Appendix C. Table of all stands located on the main terminal that are 30 years or older and have 30 sq. ft. or more pine based area. (concluded)

CU	FMB	STAND #	Stand Type	Ac/Stand	Average Pine Age	Low Age	High Age	Pine BA/ac	Total Pine BA	Pines > 10"/ac	Total Pines > 10"
07	B24	001	PP	124.36	51	33	90	51.57	6,413.25	30.59	3,804.17
07	B24	002	LL	94.78	51	33	73	32.69	3,098.36	13.32	1,262.47
08	B15	001	PP	106.94	45	21	94	53.72	5,744.82	35.90	3,839.15
08	B16	001	LLPP	90.71	52	29	145	54.98	4,987.24	32.20	2,920.86
08	B19	001	LKL	115.85	51	23	73	71.34	8,264.74	41.55	4,813.57
08	B19	003	PP	58.95	50	42	65	57.85	3,410.26	36.33	2,141.65
08	B20	001	LLL	131.08	54	17	68	88.00	11,535.04	71.29	9,344.69
09	B09	001	LLL	110.70	44	25	64	93.09	10,305.05	72.12	7,983.68
09	B10	001	LL	2.92	39	39	39	30.00	87.60	30.04	87.72
09	B10	003	PP	15.04	46	36	55	33.34	501.43	15.41	231.77
09	B10	005	LL	30.68	42	33	50	32.86	1,008.14	16.48	505.61
09	B10	006	MP	69.73	44	32	60	52.08	3,631.54	38.36	2,674.84
09	B11	001	LLPP	69.26	46	30	73	60.38	4,181.92	39.75	2,753.09
09	B17	002	LL	6.38	32	32	32	30.00	191.40	18.33	116.95
09	B17	004	PP	16.09	49	47	51	55.00	884.95	36.29	583.91
09	B17	015	LL	11.40	35	27	40	32.50	370.50	15.53	177.04
10	B02	001	L	22.02	39	33	45	52.21	1,149.66	46.75	1,029.44
10	B03	001	LYP	8.66	40	40	40	60.00	519.60	41.22	356.97
10	B03	002	LLL	59.83	44	24	65	53.16	3,180.56	36.32	2,173.03
10	B04	001	LL	15.91	50	50	50	86.67	1,378.92	84.43	1,343.28
10	BO5	002	L	38.63	44	33	53	56.01	2,163.67	37.64	1,454.03
10	BO6	001	LL	28.82	62	40	95	92.74	2,672.77	73.04	2,105.01
10	BO7	001	SYP	36.42	32	24	43	100.00	3,642.00	28.26	1,029.23
10	BO8	001	LYP/SYP	15.57	33	33	33	105.00	1,634.85	68.37	1,064.52
		TOTAL		4,335.43							

FOREST STAND AND LAND CLASS TYPES

L	LOBLOLLY PINE
LL	LONGLEAF PINE
PP	POND PINE
LLL	LOBLOLLY - LONGLEAF PINE
LPP	LOBLOLLY - POND PINE
LLPP	LONGLEAF - POND PINE
MP	MIXED PINE: LOBLOLLY, LONGLEAF, AND POND PINE
LYP	LOBLOLLY PINE PLANTATION
LLYP	LONGLEAF PINE PLANTATION
SYP	SLASH PINE PLANTATION
LH	LOWLAND HARDWOOD
LLH	LOBLOLLY PINE - LOWLAND HARDWOOD
LUH	LOBLOLLY PINE - UPLAND HARDWOOD

APPENDIX VI-D

U. S. ARMY GUIDELINES

1996
MANAGEMENT GUIDELINES FOR THE RED-COCKADED WOODPECKER ON ARMY INSTALLATIONS

1996
"Management Guidelines for the Red-cockaded Woodpecker on Army Installations"

30 October 1996

Management Guidelines for the Red-cockaded Woodpecker on Army Installations

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Appendix 2b - Active Cluster Inspection & Monitoring Data

I. General

A. Purpose. The purpose of these guidelines is to provide standard RCW management guidance to Army installations for developing installation endangered species management plans (ESMPs) for the Red-cockaded Woodpecker (RCW). Installation RCW ESMPs will be prepared according to these guidelines and chapter 11, AR 200-3, Natural Resources - Land, Forest, and Wildlife Management. These guidelines establish the baseline standards for Army installations in managing the RCW and its habitat. Installation RCW ESMPs will supplement these guidelines with detailed measures to meet installation-specific RCW conservation needs. The requirements in RCW ESMPs will apply to all activities on the installation.

B. Applicability. The guidelines are applicable to Army installations where the RCW is present and to installations with inactive clusters that the installation, in consultation with the U.S. Fish and Wildlife Service (FWS), continues to manage in an effort to promote reactivation.

C. Revision. These guidelines will be revised as necessary to be consistent with the latest RCW recovery plan and to incorporate the latest and best scientific data available.

D. Goal. The Army's goal is to implement management guidelines which will allow the Army to train for assigned combat and other missions while concurrently developing and implementing methods to assist in the recovery and delisting of the RCW.

E. Existing Biological Opinions. Installations will continue to comply with the requirements of existing biological opinions until RCW ESMPs are prepared in accordance with these management guidelines and chapter 11, AR 200-3 and are approved through consultation with the FWS. RCW ESMPs should be drafted to incorporate the requirements of existing biological opinions, as modified to conform to these management Guidelines through consultation with the FWS.

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II. Consultation

A. In preparing RCW ESMPs and taking action that may affect the RCW, installations will comply with the consultation requirements of section 7 of the Endangered Species Act (ESA); the implementing FWS regulations at 50 CFR part 402; and chapter 11, AR 200-3.

B. Early entry into informal consultation with the FWS is key to resolving potential problems and establishing the foundation to address issues in a proactive and positive manner. If, through informal consultation, the FWS concurs in writing that the RCW ESMP or other action is not likely to adversely affect any endangered or threatened species, formal consultation is not required. Issue resolution through informal consultation is the preferred method of consultation.

C. When consulting with the FWS on RCW ESMPs and other actions that may affect the RCW, the opinions of the FWS will normally be consistent with these guidelines. In exceptional cases, however, FWS opinions may require installations to take measures inconsistent with these guidelines. After every effort has been made at the installation and MACOM levels to resolve inconsistencies, installations will report, through MACOM channels, to the Office of the Director of Environmental Programs (ODEP), Headquarters, Department of the Army, FWS opinions that are not consistent with these Guidelines. ODEP will expeditiously review these reports and determine if HQDA-level action is necessary. If feasible, installations should delay implementation of measures recommended by the FWS that are inconsistent with these guidelines until after the ODEP review is completed.

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III. Army Policies Applicable to RCW Management.

A. *Conservation.* Implementation of RCW ESMPs. prepared in accordance with these guidelines, will meet the Army's responsibility under the ESA to assist in conservation of the RCW. Conservation, as defined by the ESA, means the use of all methods and procedures which are necessary for endangered and threatened species survival and to brine, such species to the point of recovery where measures provided by the ESA are no longer necessary.

B. *Mission Requirements.* Installation and tenant unit mission requirements do not justify violating the ESA. Mission considerations are necessary in determining the installation management and recovery goals. The keys to successfully balancing mission and conservation requirements are long-term planning and effective RCW management to prevent conflicts between these interests. In consultations with the FWS, installations will preserve the ability to maintain training readiness, while meeting ESA conservation requirements.

C. *Cooperation with U.S. Fish and Wildlife Service.* The Army will work closely and cooperatively with the FWS on RCW conservation. Installations should routinely engage in informal consultation with the FWS to ensure that proposed actions are consistent with the ESA requirements.

D. *Ecosystem Management.* Conservation of the RCW and other species is part of a broader goal to conserve biological diversity on Army lands consistent with the Army's mission. Biological diversity and the long-term survival of individual species, such as the RCW, ultimately depend upon the health of the sustaining ecosystem. Therefore, RCW ESMPs should promote ecosystem integrity. Maintenance of ecosystem integrity and health also benefit the Army by preserving and restoring training lands for long-term use.

E. *Staffing and Funding.* Installation commanders are responsible for ensuring that adequate professional personnel and funds are provided for the conservation measures prescribed by these Guidelines and RCW ESMPs. Commanders are responsible for accurately identifying the funding needed to meet the requirements of these Guidelines. RCW conservation projects are funded through environmental channels and will be identified in the Environmental, Pollution Prevention, Control and Abatement Report (RCS 1383).

F. *Conservation on Adjacent Lands.* Necessary habitat for the RCW includes nesting and foraging areas. Both of these RCW habitat components may be located entirely on installation lands. There may be instances, however, where one of these components is located on installation land, while a portion of the other is located on adjacent or nearby non-Army land. The FWS and installations should initiate cooperative management efforts with these landowners, if such efforts would compliment installation RCW conservation initiatives.

G. *Regional Conservation.* The interests of the Army and the RCW are best served by encouraging conservation measures in areas off the installation. The FWS and installations should participate in promoting cooperative RCW conservation plans, solutions, and efforts with other federal, state, and private landowners in the surrounding area.

H. *Management Strategy.* These guidelines require installations to adopt a long-term approach to RCW management consistent with the military mission and the Endangered Species Act. First, installations are required to establish installation RCW population goals in consultation with the FWS using the methodology described in para V.B below. Once established, the installation must designate sufficient nesting and foraging habitat to attain and sustain the goals. The goals will also dictate the required management intensity level. Next, installations must develop an ESMP to attain and sustain the installation RCW population goals in accordance with chapter 11, AR 200-3. Fourth, installations are required to ensure that all units and personnel that conduct training and other activities at the installation comply with the requirements of the installation RCW ESMP.

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IV. Definitions

Augmentation - Relocation of an RCW, normally a juvenile female, from one active cluster to another active cluster.

Basal area (BA) - The cross-sectional area (in square feet) of trees per acre measured at approximately four and one-half feet from the ground.

Biological diversity - The variety of life and its processes. It includes the variety of living organisms, the genetic differences among them, and the communities and ecosystems in which they occur.

Buffer zone - The zone extending outward 200 feet from a cavity tree or cavity start tree in an active or primary recruitment cluster.

Cavity - An excavation in a tree made, or artificially created, for roosting and nesting by RCWs.

Cavity restrictor - A metal plate that is placed around an RCW cavity to prevent access by larger species. A restrictor also prevents a cavity from being enlarged, or if already enlarged, shrinks the cavity entrance diameter to a size that prevents access by larger competing species.

Cavity start - An incomplete cavity excavated by, or artificially created for, RCWs.

Cavity tree - A tree containing one or more active or inactive RCW cavities or cavity starts.

Cluster - (formerly called "colony") - The aggregate area encompassing cavity trees occupied or formerly occupied by an RCW group plus a 200 foot buffer area.

Effective breeding pairs - Groups that successfully fledge young.

Group - (formerly called "clan") - A social unit of one or more RCWs that inhabits a cluster. A group may include a solitary, territorial male; a mated pair; or a pair with helpers (offspring from previous years).

Habitat Management Unit (HMU) - Designated area(s) managed for RCW nesting and foraging, including clusters and areas determined to be appropriate for recruitment and replacement stands.

Impact areas - The ground within the training complex used to contain fired or launched ammunition or explosives and the resulting fragments, debris, and components from various weapons systems.

Population - A RCW population is the aggregate of groups which are close enough together so that the dispersal of individuals maintains genetic diversity and all the groups are capable of genetic interchange. Population delineations should be made irrespective of land ownership.

Population goals - A desired RCW population. For purposes of these guidelines, terms for three types of population goals may be relevant to developing an installation's ESMP:

1. Recovery population goal - The number of groups required in a physiographic region to ensure recovery of the RCW in that region.
2. Installation Regional Recovery Goal - The number of groups which FWS identifies as the installation's potential contribution toward meeting the recovery population goal.
3. Installation Mission Compatible Goal - The number of training-restricted clusters which the installation identifies as currently compatible with the installation's on-going operations, suitable habitat, and missions considering its conservation responsibilities.

Provisioning - The artificial construction of cavities or cavity starts.

Recovery population - A total of 250 or more effective breeding pairs annually, for a five year period.

Recruitment - The designation and management of habitat for the purpose of attracting a new breeding group to that habitat.

Recruitment stand - A stand of trees, minimum of 10 acres in size, with sufficient suitable RCW nesting habitat identified to support a new RCW group. Stand and supporting foraging area should be located 3/8 mile to 3/4 mile from a cluster or other recruitment stand.

Recruitment cluster - A cluster site designated and managed for the purpose of attracting a new breeding group to that habitat. Installations may have two types of recruitment clusters:

1. Primary recruitment cluster - A recruitment cluster managed for the purpose of attracting the growth of additional RCW groups toward meeting the Installation Mission Compatible Goal; generally applicable training restrictions will apply to recruitment clusters.
2. Supplemental recruitment cluster - A recruitment cluster managed for the purpose of attracting the growth of additional RCW groups over and above the Mission Compatible Goal needed for the installation to reach the Installation Regional Recovery Goal; training restrictions will never apply to supplemental recruitment clusters.

Relict tree - a pine tree usually more than 100 years old having characteristics making it attractive to the RCW for cavity excavation.

Replacement stand - a stand of trees, minimum of 10 acres in size, identified to provide suitable nesting habitat for colonization when the current cluster becomes unsuitable. The stand should be approximately 20 - 30 years younger than the active cluster. While it is preferable for replacement stands to be contiguous to the active colony, at no time should they be more than 1/4 mile from the cluster, unless there is no suitable alternative.

Stand- an aggregation of trees occupying a specific area and sufficiently uniform in species composition, age, arrangement, and condition so as to be distinguishable from the forest on adjoining areas.

Sub-population - the aggregate of groups which are close enough together to allow for demographic interchange between groups. A sub-population does not have a significant demographic influence on adjacent sub-populations, but there is sufficient genetic interchange between the sub-populations to be considered one population.

Suitable acreage - installation acreage determined to be currently suitable for occupation by RCWs based upon vegetation and dominant land uses and acreage potentially suitable for occupation by RCWs through reasonable and practicable management practices - for example, acreage with severe mid-story encroachment would be considered as potentially suitable acreage and therefore suitable acreage; however, urban-type areas, the cantonment, impact areas, or areas free of vegetation, such as drop-zones, field landing strips, or gun positions, would not be considered suitable or potentially suitable acreage.

Translocation - the relocation of one or more RCWs from an active cluster to an inactive cluster or recruitment stand that contains artificially constructed cavities.

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V. Guidelines for Installation RCW ESMPs.

Installations will prepare RCW ESMPs and manage RCW populations according to the following Guidelines. Installations will update ESMPs every five years or when circumstances dictate.

A. *RCW ESMP Development Process.*

Preparation of installation RCW ESMPs requires a systematic, step-by-step approach. RCW populations (current and goal), RCW habitat (current and potential), and training and other mission requirements (present and future) must be identified. Detailed analysis of these factors and their interrelated impacts are required as a first step in the development of an ESMP. Installations should use the following or a similar methodology in conducting this analysis:

1. Identify the current RCW population and its distribution on the installation.
2. Identify areas on the installation currently and potentially suitable for RCW nesting and foraging habitat.
3. Establish the installation RCW population goal(s) with the FWS according to the guidance in B below.
4. Identify installation and tenant unit mission requirements. Overlay these requirements on the RCW distribution scheme.
5. Identify mission requirements that are incompatible with the conservation of RCW habitat.
6. Identify areas on the installation where conflicting mission requirements could be relocated to avoid RCW habitat.
7. Identify critical mission areas where activities cannot reasonably be relocated.
8. Identify areas which could support RCW augmentation or translocation.
9. Identify areas suitable for RCW habitat and free of conflicting present and projected mission activities. These are prime areas for designation as recruitment stands.
10. Analyze the information developed above using the guidance contained in these guidelines.
11. Prepare the RCW ESMP to implement the best combination of options, consistent with meeting the established RCW population goals, while minimizing adverse impacts to training readiness and other mission requirements.

B. *RCW Population Goals.*

1. The first step in RCW management is to determine the Installation Regional Recovery Goal and Installation Mission Compatible Goal in accordance with paragraph V.B.2 below. Once the goals are established, they will be used to designate the amount of land needed for RCW HMUs and the appropriate level of management intensity. Goals should be considered long-term but are subject to change, through consultation with the FWS, based upon changing circumstances, changing missions, or new scientific information. In

conjunction with the 5 year review of ESMPs, installations will reexamine population goals to reflect changing conditions.

2. ESMPs must clearly state the installation RCW population goals. The goals will be established through informal or formal consultation with FWS using the following methodology:

a. Installation Regional Recovery Goal. Through consultation with FWS determine the installation "share" of the recovery population goal.

1. Determine the number of active clusters required in the population to achieve recovery.
2. Count RCW groups on other federal, state or private lands that are demographically functioning as part of the regional population as contributing to the overall regional recovery goal.
3. Determine the installation's carrying capacity to support RCWs based upon suitable acreage and known ecosystem attributes.
4. Any deficit between steps (1) and (2), considering the limitations of step (3), will be considered the installation's potential contribution toward the overall recovery goal and will be termed, for ESMP purposes, the Installation Regional Recovery Goal.

b. Installation Mission Compatible Goal. The installation will determine its known capacity to integrate RCW management with on-going and planned mission requirements and dominant land uses. During this process, the installation will seek input from FWS.

1. Determine suitable acreage.
2. Determine the installation carrying capacity to support RCWs the calculation of suitable acreage, known ecosystem attributes, and acreage required as exempt for critical and essential mission requirements. Installations may only exempt acreage as essential for mission requirements when, considering their conservation responsibilities under the Endangered Species Act, they determine that imposing Generally applicable training restrictions upon such certain specific lands would unacceptably hinder mission accomplishment. The Mission Compatible Goal should be carefully calculated considering the current and future installation and tenant unit missions, the amount and distribution of suitable habitat on the installation, the quality of the habitat, the distribution of clusters, the configuration of subpopulations, the recovery potential and the RCW Recovery Plan objectives, etc. The Installation Mission Compatible Goal should strike a reasonable balance between the present and future installation and tenant unit missions and the installation's duty to conserve the endangered species.

c. ESMP goals. If the Installation Regional Recovery Goal is less than the Installation Mission Compatible Goal, then the installation will use the Installation Regional Recovery Goal as the ESMP Goal. If the Installation Regional Recovery Goal is greater than the Installation Mission Compatible Goal, then the installation will use both goals in

the ESMP. The installation ESMP will include maps for planning and future reference which show the configuration of all active clusters and primary recruitment clusters required to reach the Installation Regional Recovery Goal. These maps will also show the supplemental recruitment clusters scheduled for management in the 5-year planning period. These maps will be updated during the 5-year revision process. If the number of recruitment sites identified in the initial 5 year plan falls short of the Installation Regional Recovery Goal, the installation will also identify the additional habitat management areas where supplemental recruitment clusters will be added to meet this goal. Installations will identify and manage a minimum of 200 acres of suitable habitat for each identified recruitment cluster.

d. Maintenance of ESMP goals. A population that has achieved the Installation Regional Recovery Goal need only be maintained at that level; however, installations should continue to encourage population growth where feasible and compatible with the military mission. A maintenance strategy is also appropriate for populations which have attained the maximum population that can be supported by available suitable habitat, irrespective of population size. Maintenance activities will, however, also vary according to the population size. For example, smaller, nonviable populations may require occasional augmentation, predator control, etc.

3. The population goal established for an installation will dictate the required RCW management intensity level. An installation which has not achieved its population goals requires an active recruitment/augmentation strategy. Annually, the installation will determine the number of recruitment clusters to provision with artificial cavities, cavity restrictors, etc., and concurrently manage those recruitment clusters using the following methodology:

a. Primary recruitment clusters. In order to increase the current population, the installation will annually add recruitment clusters within the limitations of available nesting and foraging habitat of at least the optimum rate of growth of the RCW to meet the Mission Compatible Goal (or the Installation Regional Recovery Goal if it is less than the Mission Compatible Goal). The optimum rate of growth of an installation's RCW population will be determined by the installation's population size and population distribution and will be detailed in the installation's ESMP.

b. Supplemental recruitment clusters. If the Installation Regional Recovery Goal is greater than the Installation Mission Compatible Goal, the installation will annually add supplemental recruitment clusters within the limitations of available nesting and foraging habitat. These supplemental will be added over and above the recruitment clusters described in paragraph V.B.3.a above, at the rate of at least one-half of the rate of growth to attain the Installation Regional Recovery Goal. The installation will identify and subsequently manage these supplemental recruitment clusters in areas not already selected by the installation as a recruitment cluster in paragraph V.B.S.a above. Installations will manage these supplemental clusters concurrently and in addition to recruitment clusters managed for the purpose of meeting the Installation Mission Compatible Goal.

1. Management of these supplemental recruitment clusters will be closely coordinated with FWS. FWS will provide incidental take provisions for supplemental recruitment clusters occupied as part of the authorized program to exceed the Mission Compatible Goal in order to reach the Installation Regional Recovery Goal. Training or other land use restrictions will never apply to recruitment clusters managed under this approach; however, this does not authorize installations to engage in non-training related construction activities in occupied supplemental recruitment clusters absent consultation with FWS.
2. The installation will separately manage and track the supplemental recruitment clusters as contributing to the Installation Regional Recovery Goal. As with other recruitment clusters, the supplemental recruitment clusters will be provisioned and managed in woodpecker-suitable habitat. The installation will give priority to adding supplemental recruitment clusters in training area acreage previously exempted from consideration as RCW habitat because of critical or essential mission requirements under paragraph V.B.2.b. Installations may elect to count as either supplemental recruitment clusters or primary recruitment clusters, those clusters where RCWs voluntarily move into a stand which has not been designated previously as a recruitment cluster.

c. During the development of the installation's ESMP, and at the 5-year review, if a cluster or recruitment cluster identified previously as active has no RCW activity for a period of five consecutive years, the installation may cease actively managing that cluster.

C. *Surveys, Inspections, Monitoring and Reporting Programs.*

1. Installations will conduct the following surveys and monitoring programs.

a. Five-Year installation-wide RCW surveys. Effective management of the RCW requires an accurate survey of installation land for RCW cavity and cavity-start trees. The survey must document the location of RCW cavity and cavity-start trees as accurately and precisely as possible (using Global Positioning System and Geographic Information System, if available) and the activity within all clusters. An installation-wide survey will be conducted every five years. Installations may conduct the survey over the five year period, annually surveying one-fifth of the installation.

b. Project surveys. Prior to any timber harvesting operations, construction, or other significant land-disturbing activities, excluding burning, a 100-percent survey of the affected area will be conducted by natural resources personnel trained and experienced in RCW survey techniques and supervised by a RCW biologist, if such survey has not occurred within the preceding year. Installations will conduct project surveys in accordance with the survey guidance in V. Henry, Guidelines for Preparation of Biological Assessments and Evaluations for the Red-cockaded Woodpecker, U.S. Fish and Wildlife Service, Southeast Region, Atlanta, Georgia (September 1989). When conducting project assessments, installations may, through informal consultation with FWS, reduce the forage habitat requirements from the Henry guidelines by one-third, or

as specified in paragraph V.D.2.d below. In the case of range construction, the survey will also include the surface danger zone for the weapons to be used on that range except for new ranges which use existing dedicated impact areas.

c. Inspections. Clusters that have not been deleted from management in accordance with paragraph V.D.2.b below must be inspected annually (consistent with safety considerations at paragraph V.E.S.a). Recruitment clusters must be inspected twice per year (fall and pre-breeding dispersal periods) to document RCWs occupancy; once occupied, use monitoring criteria in paragraph V.C.l.e. These are prescriptive inspections, used to develop treatments and modifications of treatments to maintain suitable nesting habitat. At a minimum, installations will inspect and record data for:

1. density and height of hardwood encroachment;
2. height of RCW cavities;
3. condition of cavity trees and cavities;
4. a description of damage from training (to include: damage to cavity and cavity start trees requiring remedial measures if any, soil disturbance adjacent to cavity and cavity start trees requiring remedial measures if any, and general condition of the forage habitat of the cluster being monitored if impacted by training activities), fires (prescribed or wild), etc.; and
5. evidence of RCW activity for each cavity tree (includes each cavity in the tree) within the cluster. See 2a below for guidance on the maintenance of survey and monitoring records.

d. Ten-year forest survey. In addition to the RCW survey required in la above, installations will conduct, as required by AR 200-3, an installation-wide forest survey at least every ten years. In conducting the forest survey, data will be gathered to determine accurately the quantity and quality of available foraging and nesting habitat for the RCW. Alternately, installations may survey over the 10 year period, e.g., ten percent of the installation annually. Forest surveys will be conducted using a recognized plot sampling technique, such as the random line plot cruise, the random point sample cruise, or the line strip cruise method. Forest surveys in impact areas may be conducted using scientifically accepted, aerial photography interpretation methods.

e. Monitoring. Installations will conduct monitoring programs to scientifically determine demographic trends within the population as a whole. Sample sizes will be determined by the number of clusters and their dispersion on the installation by habitat category (e.g., longleaf pine/scrub oak, pine flatwoods, pine mixed hardwoods) and by category of use (e.g., non-dud producing ranges, mounted and dismounted training areas, cantonment areas, bivouac areas, etc.). Sample sizes will be of sufficient size to have statistical validity and to ensure that population trends and important biological information can be determined for the entire installation. Monitoring activities will be done annually to acquire data to determine the number of adults and fledglings per site, sex of birds, number of breeding groups, number of nests, and number of cavity trees. Monitoring will include color banding of birds. Installations will coordinate with FWS to determine if additional monitoring, in other than impact areas, may be required to address installation

specific issues, e.g., fragmented populations or on-going translocation programs. In addition to the monitoring outlined in this paragraph, installations with supplemental recruitment clusters will monitor and record the following information of military training and activities occurring within all training areas containing monitored active clusters and recruitment clusters during the five-year period, whether or not the clusters become active: a) type of training that took place, b) duration of training, c) date of training, d) units and approximate numbers of soldiers involved in the training, e) approximate number and types of vehicles and equipment involved in the training, and f) other relevant information that would contribute to an understanding of the effects of military training upon RCW habitat.

1. Active Clusters. Installations with 25 active clusters or fewer will monitor all sites annually. Installations with more than 25 active clusters will annually monitor sample sizes based on the following: 25 percent of the RCW active clusters located in each habitat and usage category on the installation, with a minimum of three RCW clusters per habitat type or a total of 25 clusters, whichever is greater.
2. Recruitment Clusters. Installations with recruitment clusters designed to attain either the Mission Compatible Goal or the Installation Regional Recovery Goal will monitor all recruitment clusters for at least five years after they become occupied by RCWs. If, after the five-year period, a recruitment cluster is still active, monitoring will be integrated into the active cluster monitoring program outlined in paragraph V.C. 1 .e.(1).

2. Results from surveys and monitoring will be recorded and reported as follows:

a. Survey/monitoring records. Survey and monitoring results for all clusters will be recorded and retained permanently allowing for trend analysis.

b. Research on compatibility of military training with RCWs. ODEP will ensure that monitoring of population data gathered from all installations with primary recruitment clusters and supplemental recruitment clusters is evaluated for trend analysis and will share this analysis with FWS. Research data will be analyzed at least once every five years for population trends. In consultation with FWS, trend analysis from paragraphs a and b above, and other outside 5 year research programs, will dictate the revision, continuation, or cancellation of military training restrictions for all clusters considered part of the mission compatible goal. Trend analysis will not effect supplemental recruitment clusters.

c. Annual Reporting. Installations will annually report RCW population data to FWS. Along with the population data, installations will report all actions taken to recruit RCWs or improve RCW habitat (see Appendix 2 for content and format of report). A copy of this report will be furnished through command channels to ODEP. The Army will host an annual meeting with FWS and the installations to discuss installation RCW population data. During these meetings, if it becomes clear that an installation is accomplishing less than 50% of its ESMP growth goals over a period of several years, then the installation

will informally consult with the FWS to determine if reinitiating formal consultation is desirable.

d. Notification. The installation will immediately notify FWS and their MACOM in the event of incidental take. The installation will notify FWS and their MACOM, and reinitiate consultation with FWS, within 30 days of discovering a 5% population decrease. MACOMs will report either of these occurrences to ODEP. In the event of an incidental take, the installation will also comply with AR 200-3, paragraph 11-9. Upon discovery of a 5% population decrease, the installation will continue to abide by these Guidelines and will conduct a systematic review of available data including regional trends to determine the cause of the decrease within 90 days. If the cause is training related, within 150 days the installation in consultation with FWS will develop and implement a plan to prevent further population decline.

e. RCW maps. Survey data will be used to generate installation RCW maps accurately depicting the location of RCW clusters. RCW-related training restricted areas, HMUs, cavity trees, etc. A copy of these maps will be included in the ESMP. The initial ESMP produced according to these Guidelines will identify the clusters where the area subject to training restrictions have changed as a result of implementation of these guidelines as opposed to the 21 June 1994 Guidelines. Relevant maps will be widely distributed for use by those conducting land use activities on the installation, including military training, construction projects, range maintenance, etc. Maps will be updated at least every five years to coincide with the installation-wide RCW survey or when a 20 percent change in the number of clusters occurs, whichever is sooner.

D. *RCW Habitat Management Units.*

1. Designation of habitat management units (HMUs). Installation RCW ESMPs will provide for the designation of nesting and foraging areas within HMUs sufficient to attain and sustain the installation RCW population goals. Determination of the installation's population goals is a prerequisite to HMU designation. HMU delineation is an important step in the planning process because it defines the future geographic configuration of the installation RCW population. Areas designated as HMUs for all active and recruitment clusters must be managed according to these Guidelines.

2. Areas included within HMUs.

a. HMUs will encompass all clusters, areas designated for recruitment and replacement, and adequate foraging areas as specified in d below.

b. During the development of the installation's ESMP, and at the 5-year review, in consultation with the FWS, clusters that have been documented as continuously inactive for a period of five consecutive years or more may be deleted from HMUs. Designated recruitment clusters that have not been occupied for a period of five consecutive years may also be deleted from HMUs. Once deletion of a cluster from management is approved by the FWS, existing cavities may be covered to discourage reactivation.

c. In designating HMUs, fragmentation of nesting habitat will be avoided. Installations will attempt to link HMUs with HMU corridors, allowing for demographic interchange throughout the installation population.

d. Adequate foraging habitat, in size, quality, and location, must be within HMUs. The foraging habitat needed to support active clusters will be calculated and designated according to the range-wide Guidelines in V. Henry, Guidelines for Preparation of Biological Assessments and Evaluations for the Red-cockaded Woodpecker, U.S. Fish and Wildlife Service, Southeast Re-Ion, Atlanta, Georgia (September 1989) or other physiographic specific guidelines approved by the FWS. While the Henry Guidelines are used to establish minimum forage acreage requirements, some installations may have data to support forage habitat minima below the Henry standard. If installations can provide data to support forage habitat requirements different from the Henry Guidelines the installation, in consultation with FWS, may establish installation specific forage minima for recruitment sites, project assessments, and habitat management. These forage requirements will apply to all active sites and recruitment sites identified for management in the ESIVIP. Recruitment sites identified to meet long-term population goals will be evaluated with the same criteria used in the goal setting procedure. A minimum of 200 acres of potential/suitable habitat will be identified and managed for recruitment sites to meet the Installation Mission Compatible Goal and the Installation Regional Recovery Goal. The underlying strategy is to identify and actively manage RCW habitat in the short to mid-term with the long-term population goal always in sight. Adhering strictly to the Henry Guidelines or applying forage habitat requirements to areas presently lacking RCW groups, may preclude long-term habitat management. This could increase the time required to reach installation RCW population goals..

3. Minimization of RCW management impacts on the installation's mission. To the extent consistent with RCW biological opinions. HMUs should be located where there will be a minimum impact upon current and planned installation missions/operations and should be consistent with land usage requirements in the Real Property Master Plan.

4. Demographic and genetic interchange. Installations should delineate HMUs to maximize the linkage between sub-populations on and off the installations and with populations off the installation. Where fragmentation exists, installations should develop plans to link sub-populations on the installation by designating habitat corridors where practical.

E. *HMU Management Practices.* All HMU management activities and practices will be consistent with the conservation of other candidate and federally listed species.

1. Clusters and recruitment stands within HMUs.

a. Due to RCW biological needs, clusters require a higher management intensity level than other areas within HMUs. Within HMUs, maintenance priority will be given to active clusters over both inactive clusters and recruitment stands.

b. Clusters and recruitment stands will be kept clear of dense midstory. An open, park-like pine stand is optimal. All midstory within 50 feet of cavity trees will be eliminated. Beyond 50 feet, some pine midstory will be retained for regeneration and some selected hardwoods may be retained for foraging by species other than the RCW. Hardwoods will not exceed 10 percent .of the area of the canopy cover nor 10 percent of the below canopy cover within the cluster or recruitment stand. Hardwood stocking will be kept below 10 square feet per acre.

c. The priority of forest management in cluster sites and recruitment stands is to maintain and produce potential cavity trees greater than 100 years of age. For this reason, no rotation age shall be set in these areas. In thinning clusters and recruitment stands, dead, dying, or inactive cavity trees will be left for use by competitor species. Thinning should occur only when pine species basal area (BA) exceeds 80 and should not exceed the removal of more than 30 BA to avoid habitat disruption (timber prescriptions within clusters should normally be on a 10 year cycle). Pine species basal areas should be kept within the range of approximately 50 to 80 square feet, maintaining average spacing of 20 to 25 feet between trees, but retaining clumps of trees.

d. Trees within HMUs affected by beetle (e.g., Ips beetle, southern pine beetle) infestation should be evaluated and treated appropriately. Treatment options will be developed in consultation with the FWS. Possible treatments include the use of pheromones or cutting and leaving, cutting and removing, or cutting and burning infected trees. Cavity trees may be cut only with the approval of the FWS. Prior to cutting an infected cavity tree, a suitable replacement cavity tree will be identified and provisioned.

e. Timber cutting, pine straw harvesting, and habitat maintenance activities, with the exception of burning activities, will not be conducted in active sites during the nesting season, occurring from April through July depending upon the installation's location. If a biologist, experienced in RCW management practices, determines that habitat maintenance activities, exclusive of timber cutting and pine straw harvesting, will have no effect on nesting activities, they may be conducted at anytime.

2. Other areas within HMUs. While not requiring the same level of intense management for clusters and recruitment stands, the quality of foraging and replacement stands should be maintained by a prescribed burning program sufficient to control hardwood growth and ground fuel buildup and to eliminate dense midstory. Improving the quality of foraging habitat will reduce the quantity (acreage) required to maintain the installation RCW population.

3. Midstory control. Prescribed burning is normally the most effective means of midstory control and is recommended as the best means of maintaining a healthy ecosystem. Prescribed burning will be conducted at least every three years in longleaf. loblolly, slash pine, and shortleaf pine systems. Burning must be conducted in accordance with applicable Federal, state, and local air quality laws and regulations. With the agreement of the FWS, the bum interval may be increased to no more than five years after the hardwood midstory has been brought under control. Mechanical and chemical

alternatives should only be used when burning is not feasible or is insufficient to control a well- advanced hardwood midstory. Application of herbicide must be consistent with applicable Federal, state, and local laws and regulations. Cavity trees will be protected from fire damage during burning. Burning should normally be conducted in the growing season since the full benefits of fire are not achieved from non-growing season bums. Winter burns may be appropriate to reduce high fuel loads. Use of fire plows in clusters will be used only in emergency situations.

4. Erosion control. Installations will control excessive erosion and sedimentation in all HMUs. Erosion control measures within clusters will be given priority over other areas within HMUs.

5. Impact and direct fire areas, a.

Impact areas.

1. Impact areas that contain or likely contain unexploded ordnance or other immediate hazardous materials (radiological or toxic chemicals) can pose danger to personnel. Natural resources conservation benefits to be gained by intensive management in high risk areas generally are not justified. Certain installations may have impact areas or other areas that have been contaminated with improved conventional munitions or submunitions where entry by personnel is forbidden.
2. Designation of impact areas, safety restrictions on human access to impact areas, range operations in impact areas, and the associated effects of these actions on RCW management activities may adversely affect the RCW and other federally listed species within impact areas. These actions may lead to the possibility and necessity of incidental take. FWS will provide incidental take provisions for impact areas where it is not feasible or economical to either relocate or protect the RCW.
3. To the degree practicable, clusters and surrounding foraging area should be designated as "no fire areas" to protect clusters from projectile damage.

b. Direct fire areas.

1. Direct fire, non-dud producing impact areas that do not contain unexploded ordnance or other immediate hazardous materials may be included within HMUs, subject to the guidelines set forth below.
2. In HMUs which are not impacted upon by weapons firing, RCW management will be the same as for HMUs outside of impact areas. In HMUs where there is a significant risk of projectile damage to foraging or nesting habitat, the following Guidelines apply:

    1. Range layout will be modified/shielded where practical and economically feasible to protect HMUs from projectile damage. Protective measures that will be considered include reorienting the direction of weapons fire, shifting target arrays, establishing

"no fire areas" around RCW clusters or HMUs. revising maneuver lanes, constructing berms, etc. 2. Installations should develop alternate HMUs near existing HN4Us but outside the affected range complex. Augmentation and translocation should be considered as a means of removing RCWs from high risk areas.

F. *Timber Harvesting and Management in HMUs.*

1. Timber harvesting in HMUs will be permitted if consistent with the conservation of the RCW. If permitted, a harvest method will be implemented that maintains or regenerates the historical pine ecosystem. In most ecosystems inhabited by the RCW, historical conditions are characterized by old-growth longleaf pines in an uneven-age forest, with small (1/4 to 2 acres) even-age patches varying in size. Timber harvesting methods must be carefully designed to achieve and maintain historical conditions through emulation of natural processes.

2. Longleaf sites will not be regenerated to other pine species. Where other species have either replaced longleaf pine (due to fire suppression) or been artificially established on sites historically forested with longleaf, forest management should be directed toward regeneration back to longleaf by natural or artificial methods.

3. At a minimum, sufficient old-growth pine stands will be maintained by: lengthening rotations to 120 years for longleaf pine and 100 years for other species of pine; indefinitely retaining snags, six to ten relict and/or residual trees per acre when doing a seedtree cut, or shelterwood cut; and indefinitely retaining snags, all relicts, and residuals in thinning cuts. No rotation age will be established for cluster sites or replacement stands. The above rotation ages and retention rates do not apply to off-site stands of sand pine, loblolly pine, or slash pine that will be converted back to longleaf.

G. *Pine Straw Harvesting within HMUs.* Sufficient pine straw must be left in HMUs to allow for effective burning and to maintain soils and herbaceous vegetation. Areas within HMUs will not be raked more than once every three to six years. Baling machinery will not be used or parked within clusters.

H. *Restoration and Construction of Cavities,*

1. Restoration. Active and inactive cavities found to be in poor condition during periodic inspections will be repaired whenever feasible to prolong their use. Cavity restrictors can be installed on enlarged RCW cavity entrance holes (greater than two inches in diameter) to optimize the availability of suitable cavities. They also may be installed to protect properly-sized cavities where suitable cavities are limited the threat of enlargement is great, or where another species is occupying a cavity. Priorities for the installation of restrictors, in descending order, will be: (a) active single tree clusters, (b) single bird groups, (c) clusters with less than four suitable cavities, and (d) others. Restrictors will be

installed according to scientific procedures accepted by the FWS. Restrictors will be closely monitored, especially in active clusters. Adjustments to the positioning of the restrictors will be made to ensure competitors are excluded and RCW access is unimpeded.

2. Construction. Artificial cavities will be constructed in areas designated for recruitment or translocation and in active clusters where the number of suitable cavities is limiting. The objective is to provide at least four suitable cavities per active cluster and two cavities plus three advanced starts for each recruitment stand. Priorities for installation of artificial cavities in descending order will be: (a) single cavity tree active clusters, (b) active clusters with insufficient cavities to support a breeding group (c) inactive clusters designated as and managed for replacement or recruitment stands with an insufficient number of usable cavities within one mile of an active cluster, (d) new replacement/recruitment stands within one mile of an active cluster, (e) inactive clusters designated as and managed for replacement or recruitment stands within three miles of an active cluster, (f) recruitment or potential habitat within three miles of an active cluster, and (g) replacement/recruitment stands beyond three miles of an active cluster. Cavity construction may be by either the drilling or insert techniques. Construction must be according to scientific procedures accepted by the FWS and accomplished by fully trained personnel.

I. *Protection of Clusters.*

1. Markings. Installations will implement the following marking guidance by 1 Jan 1998.

a. Cavity and cavity-start trees in active and primary recruitment clusters. These trees will be marked with two white bands, approximately four to six inches wide and one foot apart. The bands will be centered approximately four to six feet from the base of the tree. Warning signs (e below) may be posted on or immediately adjacent to the cavity and cavity start trees. A uniquely numbered small metal tag will be affixed to the cavity tree for monitoring and identification purposes.

b. Cavity and cavity-start trees in supplemental recruitment clusters. These trees may be marked with one white band approximately one inch wide. The band will be centered approximately four to six feet from the base of the tree. Warning signs (e below) will not normally be posted. A uniquely numbered small metal tag will be affixed to the cavity tree for monitoring and identification purposes.

c. Buffer zone for cavity and cavity start trees within active clusters and primary recruitment clusters. Warning signs (e below) will be posted at reasonable intervals along the 200 foot perimeter of cavity trees facing to the outside of the buffer zone and along roads, trails, firebreaks, and other likely entry points into the buffer zone.

d. The installation will mark all cavity and cavity start trees in a managed cluster in accordance with paragraph V.I. La and b, above. At a minimum, four suitable cavity or cavity start trees will be marked and protected within each cluster (see paragraph V.H.2).

Based on the installation biologist's determination, if more than four cavity trees are required to support the cluster, the required number of trees will be protected.

e. Warning sign. Signs will be posted and will be constructed of durable material, ten inches square (oriented as a diamond), white or yellow in color, and of the design in Figure 1. The RCW graphic and the lettering "Endangered Species Site" and "Red-cockaded Woodpecker" will be printed in black. The lettering "Do Not Disturb" and "Restricted Activity" will be printed in red. All lettering will be 3/8 inches in height.

f. Training on non-Army lands. Installations conducting long-term training on private, state, or other federal lands with RCW habitat will attempt to obtain agreement from the landowners on compliance with these markings guidelines. If a landowner does not agree to comply with these guidelines, even with the installation paying the costs associated with compliance, installations will educate troops training on such lands to help them recognize the markings used by the landowner.

2. Training within RCW clusters.

a. RCW and RCW habitat will be managed biologically by clusters. Training restrictions will apply to marked buffer zones around cavity trees.

b. The training restrictions in this section apply to buffer zones within marked active clusters and primary recruitment clusters. RCW-related training restrictions do not apply to supplemental recruitment clusters, inactive clusters and foraging areas.

c. Standard training guidelines within active clusters and primary recruitment clusters:

1. Military training within marked cavity tree buffer zones is limited to military activities of a transient nature (less than 2 hours occupation). A list of prohibited and permitted training activities within buffer zones is contained at Appendix 1.
2. Military vehicles are prohibited from occupying a position or traversing within 50 feet of a marked cavity tree, unless on an existing road, trail, or firebreak.

3. Training throughout the installation. Installations will give priority to maintaining and improving the habitat of RCW clusters: however, in addition to the HMU management practices at para. V.E, installations will observe the following measures to maintain and improve potentially suitable habitat for the RCW throughout the installation

a. Military personnel are prohibited from cutting down or intentionally destroying pine trees unless the activity is approved previously by the installation biologist and/or forester and is authorized for tree removal. Hardwoods may be cut and used for camouflage or other military purposes.

b. Units will immediately report to range control known damage to any marked cavity or cavity start tree and/or any known extensive soil disturbance in and around RCW clusters.

c. The installation will immediately (within 48 hours) reprovision a cavity tree if one is destroyed.

d. Installations will as soon as practicable (normally within 72 hours) repair damage to training land within a cluster to prevent degradation of habitat.

e. All digging for military training activities in suitable acreage will be filled within a reasonable time after the completion of training

f. Training Guidelines will be actively enforced through installation training and natural resources enforcement programs, prescribed in chapters 1 and 11, AR 200-3, and installation range regulations.

J. *Augmentation and Translocation.*

1. Augmentation can be a useful tool to expand and disperse the RCW population into designated HMUs. Augmentation also provides a means to maintain genetic viability in populations with fewer than 250 effective breeding pairs. Installation plans will provide for the augmentation of single-bird groups. Clusters will be made suitable in accordance with the requirements/procedures outlined in paragraph V.H. above before augmentation is attempted.

2. In exceptional situations, installations may translocate RCWs from active clusters to inactive clusters or recruitment/replacement stands where cavities have been artificially constructed. For example, translocation could be used to move RCWs from live fire areas where there is a significant risk of harm to the birds. The current scientific literature indicates serious limitations in successfully translocating adult RCWs, in particular, adult territorial males. Translocation will be accompanied by an intensive monitoring program.

3. In areas to receive RCW, habitat designation and improvement work ensuring that nesting and foraging habitat meet the standards established by these Guidelines (V.E. 1 .b and c, V.E.2, V.D.2.d) must be completed before augmentation or translocation is attempted.

4. Neither augmentation nor translocation will be undertaken without the approval of and close coordination with the FWS. Installations must obtain an ESA section 10 permit (scientific purposes) or an incidental take statement under ESA section 7 and all applicable marking, banding, and handling permits prior to moving any RCW through augmentation or translocation.

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APPENDIX 1

TRAINING ACTIVITY WITHIN MARKED BUFFER ZONES

YES means that activity may be conducted within 200 feet of a marked cavity tree
NO means the activity may not be conducted within 200 feet of a marked cavity tree

MANEUVER AND BIVOUAC

HASTY DEFENSE, LIGHT INFANTRY, HAND DIGGING ONLY (2 HOURS MAXIMUM)	YES
HASTY DEFENSE, MECHANIZED INFANTRY/ARMOR	NO
DELIBERATE DEFENSE, LIGHT INFANTRY	NO
DELIBERATE DEFENSE, MECHANIZED INFANTRY/ARMOR	NO
ESTABLISH COMMAND POST, LIGHT INFANTRY	NO
ESTABLISH COMMAND POST, MECHANIZED INFANTRY/ARMOR	NO
ASSEMBLY AREA OPERATIONS, LIGHT INFANTRY/MECH INFANTRY/ARMOR	NO
ESTABLISH CSICSS SITES	NO
ESTABLISH SIGNAL SITES	NO
FOOT TRANSIT THRU THE COLONY	YES
WHEELED VEHICLE TRANSIT THRU THE COLONY (1)	YES
ARMORED VEHICLE TRANSIT THRU THE COLONY (1)	YES
CUTTING NATURAL CAMOUFLAGE, HARD WOOD ONLY	YES
ESTABLISH CAMOUFLAGE NETTING	NO
VEHICLE MAINTENANCE FOR NO MORE THAN 2 HOURS	YES

WEAPONS FIRING:

7.62mm AND BELOW BLANK FIRING	YES
.50 CAL BLANK FIRING	YES
ARTILLERY FIRING POINT/POSITION	NO
MLRS FIRING POSITION	NO
ALL OTHERS	NO

NOISE:

GENERATORS	NO
ARTILLERY/HAND GRENADE SIMULATORS	YES
HOFFMAN TYPE DEVICES	YES

PYROTECHNICS/SMOKE:

CS/RIOT AGENTS	NO
SMOKE, HAZE OPERATIONS ONLY, GENERATORS OR POTS (2)	YES
SMOKE GRENADES	YES
INCENDIARY DEVICES TO INCLUDE TRIP FLARES	NO
STAR CLUSTERS/PARACHUTE FLARES	YES
HC SMOKE OF ANY TYPE	NO

DIGGING:

TANK DITCHES	NO
HASTY INDIVIDUAL FIGHTING POSITIONS, HAND DIGGING ONLY, FILLED AFTER USE	YES
DELIBERATE INDIVIDUAL FIGHTING POSITIONS	NO
CREW-SERVED WEAPONS FIGHTING POSITIONS	NO
VEHICLE FIGHTING POSITIONS	NO
OTHER SURVIVABILITY / FORCE PROTECTION POSITIONS	NO
VEHICLE SURVIVABILITY POSITIONS	NO

NOTES:

1. Vehicles will not get any closer than 50 feet of a marked cavity tree unless on existing roads, trails or firebreaks.
2. Smoke generators and smoke pots will not be set up within 200 feet of a marked cavity tree, but the smoke may drift through the 200 feet circle around a cavity tree.

NOTE: The above training restrictions apply to RCW cavity trees in training areas but not to 4 cavity trees located in dedicated impact areas.

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APPENDIX 2

Red-Cockaded Woodpecker (RCW) Data Update - FY____

INSTALLATION: _____ DATE: _____

RCW Population: _____ POC: _____

DSN #: _____

A. RCW Cluster Survey and Inspection Results.

1. Number of clusters managed

2. Number of active clusters

   a. Number of active supplemental recruitment clusters
   b. Number of active clusters with training restrictions

3. Total acres of suitable acreage

4. Acres 100% surveyed for "new" RCW clusters in this FY

5. Number clusters inspected once per year for training impacts

   a. Number of clusters checked with damage to cavity trees
   b. Number of clusters checked with soil disturbance requiring remedial measures
   c. Number of clusters checked with habitat disturbance requiring remedial measures

6. Number recruitment clusters inspected twice per year for training impacts

   a. Number of clusters checked with damage to cavity trees
   b. Number of clusters checked with soil disturbance requiring remedial measures
   c. Number of clusters checked with other habitat disturbance requiring remedial measures

B. Monitoring Results

	Active	Primary Recruitment	Supplemental Recruitment	Total
1. Number of clusters where monitoring was completed	____	____	____	____
1a. Number found active	____	____	____	____
1b. Number of breeding groups	____	____	____	____
1c. Number of nests found	____	____	____	____
1d. Number of cavity tress	____	____	____	____

C. Unit Reports

1. Number of unit reports to range control of tree damage ____
1a. Number of reprovisioning actions taken in response (synopsis enclosed) ____
2. Number of unit reports of extensive soil disturbance ____
2a. Number of remedial actions taken in response (synopsis enclosed) ____

D. Affirmative RCW Habitat Improvement Measures Carried Out This FY

	Active	Primary Recruitment	Supplemental Recruitment	Total
1. Number of clusters sites needing burning this year	____	____	____	____
1a. Number burned	____	____	____	____
2. Number of cluster sites needing midstory treatment	____	____	____	____
2a. Number treated	____	____	____	____
3. Number of foraging acres needing burned	____	____	____	____
3a. Number acres burned	____	____	____	____
4. Number of foraging acres needing midstory treatment	____	____	____	____
4a. Number acres treated	____	____	____	____
5. Number of cluster sites needing cavity restrictors;	____	____	____	____
5a. Number clusters receiving restrictors	____	____	____	____
5b. Number of cavity trees receiving restrictors	____	____	____	____
6. Number of cavity trees needing marked	____	____	____	____
6a. Number marked	____	____	____	____
7. Number of buffer zones needing marked	____	____	____	____
7a. Number marked	____	____	____	____
8. Number of translocations scheduled	____	____	____	____
8a. Number of translocations received	____	____	____	____
9. Number of clusters needing artificial cavities	____	____	____	____
9a. Number receiving inserts	____	____	____	____
9b. Number receiving drilled cavities	____	____	____	____
9c. Number receiving drilled starts	____	____	____	____
9d. Total number of cavities treated	____	____	____	____
9e. Number treated cavities with RCW use	____	____	____	____
(1) ocular sign of use	____	____	____	____
(2) confirmed roosting	____	____	____	____
(3) nesting attempted	____	____	____	____
(4) young fledged	____	____	____	____

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APPENDIX 2a

Recruitment Cluster Inspection, Monitoring & Training Data

Type Recruitment Cluster:_____ Cluster Number:
(Primary or Supplemental) _____

A. Results of inspections and monitoring	**Yes/No**
Spring inspection and monitoring:	_____
1. Visual, from ground, sign of use	_____
2. Cavity inspected confirmed roosting	_____
3. Nesting attempted	_____
4. Fledged young	_____
5. Habitat assessment/general condition:	
5a. Damage to cavity or cavity start tree	_____
5b. Soil disturbance requiring remedial measures	_____
5c. Other habitat disturbance requiring remedial measures	_____
6. Number of adults:	_____
7. Number of fledglings:	_____
8. Sex of birds:	_____
Fall inspection:	
1. Visual, from around, sign of use	_____
2. Cavity inspected confirmed roosting	_____
3. Nesting attempted	_____
4. Fledged young	_____
5. Habitat assessment/general condition:	
5a. Damage to cavity or cavity start tree	_____
5b. Soil disturbance requiring remedial measures	_____
5c. Other habitat disturbance requiring remedial measures	_____

B. Training Data.

Number of Unit Training Events (Recorded at Range Control/
Conducted at Recruitment Cluster location) _____

For each training event:
1. Date of training
2. Approximate duration of training
3. Type of training
4. Training activities (list activities conducted contained in Appendix 1)
5. Approximate number of soldiers involved
6. Approximate number and type of vehicles involved
7. Misc.

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APPENDIX 2b

Active Cluster Inspection, & Monitoring Data

Cluster Number: ____

A. Results of inspection and monitoring **Yes/No**

1. Visual, from ground, sign of use
2. Cavity inspected confirmed roosting
3. Nesting attempted
4. Fledged young
5. Habitat assessment/general condition:

5a. Damage to cavity or cavity start tree
5b. Soil disturbance requiring remedial measures
5c. Other habitat disturbance requiring remedial measures

6. Number of adults:
7. Number of fledglings:
8. Sex of birds:

B. Training Data (if the installation has recruitment clusters):

Number of Unit Training Events ____
(Recorded at Range Control/Conducted at Recruitment Cluster location)

For each training event:

1. Date of training
2. Approximate duration of training
3. Type of training
4. Training activities (list activities conducted contained in Appendix 1)
5. Approximate number of soldiers involved
6. Approximate number and type of vehicles involved
7. Misc.

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APPENDIX VI-E

U. S. ARMY GUIDELINES

2007
MANAGEMENT GUIDELINES FOR THE RED-COCKADED WOODPECKER ON ARMY INSTALLATIONS

1 May 2007

Management Guidelines
For the Red-cockaded Woodpecker
On Army Installations

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1. General

A. *Purpose.* The purpose of these guidelines is to provide standard Red-cockaded Woodpecker (RCW) management guidance to Army installations for developing endangered species management components (ESMCs) for the RCW as part of an installation's integrated natural resource management plan (INRMP). Terminology has been revised from endangered species management "plans" to "components" to reflect that endangered species management on installations is an integral component of natural resource management activities on Army installations. Installation RCW ESMCs will be prepared according to these guidelines and chapter 11, AR 200-3, Natural Resources – Land, Forest, and Wildlife Management and subsequent policies and guidance published by the Army[1]. These guidelines establish the baseline standards for Army installations in managing the RCW and its habitat. Installation RCW ESMCs will supplement these guidelines with detailed measures to meet installation-specific RCW conservation needs and unique military mission needs. The requirements in RCW ESMCs will apply to all activities on the installation.

B. *Applicability.* The guidelines are applicable to Army installations where the RCW is present. These guidelines replace 1996 Management Guidelines for the Red-cockaded Woodpecker on Army Installations, 30 October 1996.

C. *Revision.* These guidelines will be revised as necessary to be consistent with the 2003 U.S. Fish and Wildlife Service (USFWS) RCW Recovery Plan and to incorporate the latest and best scientific data available. These guidelines are the third major revision. Previous guidelines were dated 30 October 1996, 21 June 1994 and 1986.

D. *Goal.* The Army's goal is to implement management guidelines which will allow the Army to accomplish military readiness missions while concurrently developing and implementing methods to assist in the conservation, downlisting, and recovery of the RCW.

E. *Existing Biological Opinions (BOs).* Installations will continue to comply with the requirements of existing BOs until RCW ESMCs are prepared in accordance with these management guidelines and are approved through consultation with USFWS. To the extent practicable RCW ESMCs should be drafted to incorporate the requirements of existing BOs, as modified to conform to these management guidelines through consultation with the USFWS.

II. Consultation

A. *Consultation Requirement.* In preparing RCW ESMCs and taking action that may affect the RCW, installations will comply with the consultation

[1] The Army will be replacing AR 200-3 with AR 200-1, Environmental Protection and Enhancement and Natural Resource Implementation Guidance for Active Installations.

requirements of section 7 of the Endangered Species Act (ESA); the implementing USFWS regulations at 50 CFR part 402; chapter 11, AR 200-3, and subsequent policies and guidance published by the Army.

B. *Informal Consultation.* Early entry into informal consultation with the USFWS is critical to resolving potential problems and establishing the foundation to address issues in a proactive and positive manner. If, through informal consultation (which may include preparation of a biological assessment or evaluation), the USFWS concurs in writing that proposed actions are not likely to adversely affect any endangered or threatened species, formal consultation is not required. Issue resolution through informal consultation is the preferred method of consultation.

C. *Formal Consultation.* If development and implementation of an installation ESMC is likely to result in adverse effects and, particularly incidental take beyond existing authorization in an installation's BO, the installation must initiate formal section 7 consultation in accordance with the procedures in 50 CFR 402.14 and Army Regulation 200-3, Chapter 11. The purpose of formal section 7 consultation is to obtain a Non-Jeopardy BO with authorization for incidental take sufficient to implement the ESMC. When consulting with the USFWS on RCW ESMCs and other actions that are likely to adversely affect the RCW, the BOs of the USFWS are expected to be consistent with these guidelines. Installations will make every effort to resolve potential inconsistencies during consultation. Installations will report USFWS guidance that is not consistent with these guidelines, through command channels, to the Office of the Director of Environmental Programs (ODEP), Headquarters, Department of the Army. ODEP will expeditiously review these reports and determine if HQDA-level action is necessary. Installations should report any inconsistencies for action by ODEP prior to USFWS issuing the final BO.

D. *Incidental Take.* Military training activities and other land use activities may affect RCWs resulting in "take" as defined under section 9 of the ESA. As part of the consultation process for revision of ESMCs, installations will estimate the potential level of take associated with military mission and prescribed burning on the installation based on historical records, long-term monitoring results, and research data. If the estimated level of take does not restrict population growth and maintenance of population goals, the USFWS normally will provide an incidental take statement allowing the conduct of military mission and prescribed burning. Potential incidental take that is not identified within the ESMC consultation will require additional project-level formal consultation. The installation will immediately notify USFWS in the event of incidental take that exceeds authorization or meets other criteria established in the consultation process.

E. *Reinitiation.* After receiving a Non–Jeopardy BO, an installation is required to re-initiate consultation if: (i) new information arises concerning effects

to the RCW not previously considered; (ii) the ESMC is modified resulting in effects on the RCW that were not considered in the BO; or (iii) implementation of the EMSC exceeds the amount or extent of take specified in the incidental take statement. The installation will notify USFWS and reinitiate consultation within 30 days of discovering a 10 percent decline in active clusters from the previous year or a 10 percent decline in active clusters over a five-year period. Upon discovery of a 10 percent decline, the installation will conduct a systematic review of available data to evaluate the potential causes of the observed decline, e.g. declines due to forest senescence, and present the results of this review to the USFWS. Consultation with USFWS will determine actions required to prevent further population decline. Unpredictable catastrophes such as significant hurricane damage may present conditions that cannot be anticipated under these guidelines. In the event of catastrophic impacts on RCW habitats and populations, installations will reevaluate population goals and management requirements in consultation with USFWS.

III. Army Policies Applicable to RCW Management.

A. *Conservation.* Implementation of RCW ESMCs, prepared in accordance with these guidelines, supports the Army's responsibility under the ESA to assist in conservation of the RCW. Conservation, as defined by the ESA, means the use of all methods and procedures which are necessary for endangered and threatened species survival and to bring such species to the point where measures provided by the ESA are no longer necessary.

B. *Mission Requirements.* Installation and tenant unit mission requirements do not justify violating the ESA. Mission considerations are necessary in determining the installation management and recovery goals. The keys to successfully balancing mission and conservation requirements are long-term planning and effective RCW management to prevent conflicts between these interests. In consultations with the USFWS, installations will preserve the ability to maintain training readiness, while meeting ESA conservation requirements. Small installations with small populations should be especially sensitive to developing innovative strategies to maintain this balance.

C. *Cooperation with U.S. Fish and Wildlife Service.* The Army will work closely and cooperatively with the USFWS on RCW conservation. Installations should routinely engage in informal consultation with the USFWS to ensure that proposed actions are consistent with ESA requirements.

D. *Ecosystem Management.* Conservation of the RCW and other species is part of a broader goal to conserve biological diversity on Army lands consistent with the Army's mission. Biological diversity and the long-term survival of individual species, such as the RCW, ultimately depend upon the health of the sustaining ecosystem. Therefore, RCW ESMCs should promote ecosystem integrity. Maintenance of ecosystem integrity and health also benefit the Army by

preserving and restoring training lands for long-term use.

E. *Staffing and Funding.* Garrison commanders are responsible for ensuring that adequate professional personnel and funds are provided for the conservation measures prescribed by these guidelines and RCW ESMCs. RCW conservation projects are critical requirements of the Army Environmental Conservation program element of Base Support.

F. *Conservation on Adjacent Lands.* Necessary habitat for the RCW includes nesting and foraging areas. Both of these RCW habitat components may be located entirely on installation lands. There may be instances, however, where one of these components is located on installation land, while a portion of the other is located on adjacent or nearby non-Army land. The USFWS and installations should initiate cooperative management efforts with adjacent landowners, if such efforts would complement installation RCW conservation initiatives.

G. *Regional Conservation.* The interests of the Army and the RCW are best served by encouraging conservation measures in areas off the installation. The USFWS and installations should participate in promoting cooperative RCW conservation plans, solutions, and efforts with other federal, state, and private organizations and landowners in the region. Examples of such programs include, but are not limited to, Safe Harbor agreements, the Army Compatible Use Buffer Program, and regional translocation cooperation.

H. *Management Strategy.* These guidelines require installations to adopt a long-term approach to RCW management consistent with the military mission and the ESA. First, installations are required to establish installation RCW population goals in consultation with the USFWS using the methodology described in paragraph V.B, below. Once established, the installation must designate sufficient nesting and foraging habitat to attain and sustain the goals. The goals will also dictate the required management intensity level. Next, installations must implement an ESMC to attain and sustain the installation RCW population goals in accordance with Chapter 11, AR 200-3. Fourth, installations are required to ensure that all units and personnel that conduct training and other activities at the installation comply with the requirements of the installation RCW ESMC.

IV. Definitions

Active Cavity - A completed cavity or start exhibiting fresh pine resin associated with cavity maintenance, cavity construction, or resin well excavation by RCWs.

Active Cavity Tree - Any tree containing one or more active cavities.

Active Cluster - A cluster containing one or more active cavity trees.

Buffer zone - The zone extending outward 200 feet from a marked cavity tree or cavity start tree in clusters with training restrictions.

Cavity - An excavation in a tree made, or artificially created, for roosting and nesting by RCWs.

Cavity restrictor - A metal plate that is placed around an RCW cavity to prevent access by larger species. A restrictor also prevents a cavity from being enlarged, or if already enlarged, shrinks the cavity entrance diameter to a size that prevents access by larger competing species.

Cavity start - An incomplete cavity excavated by, or artificially created for, RCWs.

Cavity tree - A tree containing one or more active or inactive RCW cavities or cavity starts.

Cluster - The aggregation of cavity trees previously or currently used and defended by a group of RCWs and a 200 foot wide buffer of continuous forest.

Deleted cluster - a cluster that has not been active in the last 5 years, including recruitment clusters that were established more than 5 years ago and have never activated. Deleted clusters may also include inactive clusters that have not been active and not been managed for several years and are proposed for removal from long-term management.

Group - A social unit of one or more RCWs that inhabits a cluster. A group may include a solitary territorial male or female, a mated pair, or a pair with helpers (offspring from previous years).

Habitat Management Unit (HMU) - Designated area(s) managed for RCW nesting and foraging, including clusters and areas determined to be appropriate for population maintenance and recruitment.

Impact areas - The ground within the training complex used to contain fired or launched ammunition or explosives and the resulting fragments, debris, and components from various weapons systems.

Inactive cluster - a cluster that is suitable* for RCW occupancy, has been active in the last 5 years, but has no active cavities during the breeding season of the reporting year (*suitable means midstory in cluster and foraging habitat is controlled (i.e., less than 7 feet tall) and suitable cavities are available).

Population - An aggregate of groups that function as a closed population,

demographically. Limited genetic interchange may occur between populations. Population delineations should be made irrespective of land ownership.

Potential Breeding Group (PBG) - An adult female and adult male that occupy the same cluster, with or without one or more helpers, whether or not they attempt to nest or successfully fledge young.

Population goal - A desired RCW population size. On installations the population goal will be the number of RCW PBGs that are in accordance with population goals established in the RCW Recovery Plan.

Protected Clusters - Clusters subject to training restrictions identified in Appendix 1 and paragraph V.C.5, and guidance for certain activities identified in paragraph V.C.

Recruitment cluster - A cluster designated and managed for the purpose of attracting a PBG to that territory.

Stochasticity - Random events.

Training Area - A distinct unit of land on an installation that is scheduled for training events by specific units on specific dates.

Translocation - The relocation of one or more RCWs from an active cluster to a recruitment cluster that contains both suitable cavities and foraging habitat, or the relocation of an individual to stabilize a group, e.g. a female to a solitary male cluster.

Unprotected clusters - Clusters not subject to training restrictions identified in Appendix 1 of these guidelines. These clusters are still subject to guidance for certain activities under paragraphs V.C. and V.C.5 of these guidelines, unless otherwise authorized through consultation with USFWS (preferably through the ESMC process).

V. Guidelines for Installation RCW ESMCs.

Installations will prepare RCW ESMCs and manage RCW populations according to the following guidelines. Installations will update ESMCs in conjunction with the INRMP as required by the Sikes Act and Army guidance or sooner if circumstances dictate.

A. *RCW ESMC Development Process.*

Preparation of installation RCW ESMCs requires a systematic, step-by-step approach. RCW populations (current and goal), RCW habitat (current and potential), and training and other mission requirements (present and future) must

be identified. Detailed analysis of these factors and their interrelated impacts are required as a first step in the development of an ESMC. Installations should use the following or a similar methodology in conducting this analysis:

1. Identify the current RCW population and its distribution on the installation.

2. Identify areas on the installation currently and potentially suitable for RCW nesting and foraging habitat.

3. Establish the installation RCW population goal with the USFWS according to the guidance in B. below.

4. Identify installation and tenant unit mission requirements. Overlay these requirements on the RCW distribution scheme.

5. Identify mission requirements that are incompatible with the conservation of RCW habitat.

6. Identify critical mission areas where activities cannot reasonably be relocated.

7. Identify areas which could support RCW recruitment clusters.

8. Identify areas suitable for RCW habitat and limited conflict with present and projected mission activities. These are prime areas for designation as recruitment clusters.

9. Analyze the information developed above using the guidance contained in these guidelines.

10. Identify important RCW populations, habitats, cooperators, and partnership opportunities outside the installation boundaries.

11. Prepare the RCW ESMC to implement the best combination of options, consistent with meeting the established RCW population goals, while minimizing adverse impacts to training readiness and other mission requirements.

B. *RCW Population Goals.*

1. The USFWS 2003 RCW Recovery Plan establishes Recovery Units and population goals for federal, state, and private lands within those recovery units. Installation population goals (measured as the number of “potential breeding groups”; see V.B.3, below) established under the ESMC will be in accordance with goals established under the RCW Recovery Plan. The

installation population goal should be considered long-term but is subject to change, through consultation with the USFWS, based upon changing circumstances, changing missions, or new scientific information. In conjunction with the 1-year and 5-year reviews of ESMCs, installations will reexamine population goals to reflect changing conditions. The biological significance of different population thresholds are described in paragraphs a-e, below.

a. A population size of 350 PBGs is considered highly robust to threats from environmental stochasticity as well as inbreeding and demographic stochasticity. It is the lowest current estimate of the minimum size necessary to offset losses of genetic variation through genetic drift.

b. A population size of 250 PBGs is the minimum size considered robust to environmental stochasticity, and is well above the size necessary to withstand inbreeding and demographic stochasticity.

c. A population size of 100 PBGs is considered sufficient to withstand threats from demographic stochasticity and inbreeding depression.

d. A population size of 70 PBGs is midway in estimates of sizes necessary to withstand threats from inbreeding depression and is considered robust to demographic stochasticity if territories are moderately aggregated in space.

e. A population size of 40 PBGs is at the lower end of estimates of sizes necessary to withstand inbreeding depression and is considered robust to demographic stochasticity if territories are highly aggregated in space.

2. ESMCs must clearly state the installation RCW population goal. If this goal is not provided in the RCW Recovery Plan, it will be determined by availability of suitable habitat, ecosystem attributes, and current and future mission requirements. Installations should not stop establishing recruitment clusters or conducting other proactive management actions once the population goal is reached, but should continue to manage to achieve habitat carrying capacity consistent with mission requirements.

3. Installation population goals will be established as the number of PBGs in accordance with population goal definitions of the RCW Recovery Plan. PBGs may be estimated as a percent of active clusters, using criteria established in the RCW Recovery Plan.

4. Installations that have not yet achieved their population goals will implement actions to achieve a five percent annual increase in active clusters. To achieve recommended rates of increase installations will provide a constant supply of unoccupied recruitment clusters equal to 10 percent of the current number of active clusters. Installations that do not meet this target will informally

consult with USFWS to determine whether actions are necessary to achieve this population growth rate.

5. All clusters on installations that support PBGs will count toward the installation population goal. This will include clusters where training restrictions are implemented, clusters where training restrictions are not implemented, and clusters in impact areas as long as they can be monitored in accordance with Recovery Plan criteria to determine group status (i.e., solitary bird or PBG). If the installation's estimate of population size (number of PBGs) is based on the percentage of active clusters in a sample set that support a PBG, then the number of active clusters from which the number of PBGs is estimated will only include clusters that can be accessed for management (installation of artificial cavities, midstory control, augmentation, etc.). This will help ensure validity of the assumption that the percentage of clusters that support a PBG is applicable to all active clusters from which population size is estimated. In clusters where management access is limited, PBGs may be included in the population estimate only if their presence in a specific cluster in a specific year is determined by direct observation. In addition to installation groups, clusters on state and private lands that are functioning demographically with the installation's population and are secured by an enduring covenant and are not counted as part of another agency's clusters may be counted toward the installation population goal.

C. *Training in Clusters.*

The purpose of training restrictions associated with RCW clusters is to avoid or minimize the potential for "take" as defined under section 9 under the ESA. Implementation of training restrictions on Army installations will balance support of RCW population growth to achieve installation population goals and flexibility to achieve training mission requirements. ESMCs, with appropriate consultation, may contain provisions to remove or add restrictions in HMUs.

Certain activities (refueling points, generators, smoke generators, smoke pots, and mechanical digging) are by their nature likely to disrupt the ability of RCWs to roost or nest (or conduct nesting activities; e.g., incubating, brooding, feeding) if conducted in proximity to cavity trees, or have potential for significant habitat damage. These activities will be conducted only at locations approved by Directorates of Plans, Training, and Mobilization (DPTMs) either IAW provisions of the Installation Range Regulation or by case-by-case evaluation. DPTMs must consult with the installation biologist to ensure that such activities are avoided in buffer zones and minimized elsewhere in RCW HMUs. These activities will not be approved within buffer zones of protected clusters or within 200 feet of unprotected cavity trees unless authorized through consultation with USFWS (preferably done during the ESMC process).

1. Designation of Protected Clusters.

a. Installation ESMCs currently identify the current and projected number of clusters that are subject to training restrictions. The number of these protected clusters has been established in installation-specific consultations with the USFWS and includes active clusters (solitary birds and PBGs) and currently inactive recruitment clusters. Installations will modify the current number of protected clusters in accordance with criteria established in paragraph V.C.2., below.

b. Locations of protected clusters will be determined by installation natural resources management personnel in coordination with the installation Director of Training and the Senior Mission Commander or a designee. Locations of protected clusters will be based on biologically sound principles to reduce risk of disturbance, demographic isolation, and habitat fragmentation, while minimizing effects on training operations.

2. Removal of Training Restrictions.

a. Installations with a population of ≤ 250 PBGs will maintain the currently negotiated number of protected clusters for both active clusters and recruitment clusters.

b. Installations with populations > 250 PBG may remove training restrictions from clusters according to the following schedule:

Total PBGs	Restrictions Removed*	Cumulative Total**
251-275	25 (1:1)	25
276-300	50 (2:1)	75
301-350	150 (3:1)	225
>350	Restrictions removed on all clusters***	

* Installations with 250-275 PBGs may remove restrictions from one protected cluster for each PBG over 250. Installations with 276 or more PBGs may remove restrictions from 25 protected clusters, plus two additional clusters for each PBG over 275. Installations with 301-350 PBGs may remove restrictions from 75 protected clusters plus 3 clusters for each PBG over 300. Restrictions will continue to be removed annually based on the documented growth in the installation's RCW population. For example, if the population increases from 255 to 260 PBGs, training restrictions will be removed from 5 clusters. If it increases from 275 to 285, training restrictions will be removed from 20 clusters, etc.

**These are in addition to the current and/or projected number of clusters that do not have training restrictions in populations under current installation ESMCs.

***Installations will specify in their ESMCs a schedule for removing training restrictions from all clusters upon reaching ≥ 350 PBGs. This schedule will be implemented after appropriate consultation with USFWS.

c. The number of clusters eligible for removal of training restrictions is dependent on the number of PBGs; however, clusters selected for removal of restrictions may include unoccupied recruitment clusters, solitary bird clusters, or clusters with PBGs. Removal of training restrictions according to the above schedule is dependent on growth of installation RCW populations. Restrictions will be removed incrementally. Depending on population size; 1, 2, or 3 clusters may be unprotected for each additional new PBG. If installation RCW PBGs fail to increase, the proportion of clusters without training restrictions cannot be increased. For populations >350 PBGs or populations exceeding the installation population goal, all new clusters (natural or recruitment clusters) may be unprotected, based on the best judgment of the biologists and DPTM.

d. For installations where the current population goal does not exceed 250 PBGs, the number of clusters with and without training restrictions will remain in accordance with levels under the current installation ESMC. Typically, reduction of training restrictions on installations with population goals ≤ 250 PBGs will occur when recovery goals are reached. However, prior to achieving their population goal, reduction of some restrictions may be possible as data become available from installations where training restrictions have been decreased or removed in entirety and critical population benchmarks are met. These benchmarks, in part, would be tied to population sizes (e.g., 100 PBGs) that are sufficient to withstand threats from such factors as demographic stochasticity and inbreeding depression. Determining whether training restrictions could be reduced prior to reaching population goals would be evaluated by considering factors such as the training mission, population aggregation (e.g., dispersed or highly aggregated), and results (based on monitoring and/or research) of training impacts on unprotected clusters from the subject and other installations. Installations may specify in their ESMCs a schedule for removing training restrictions upon attaining or exceeding the population goal or other population benchmarks. Removal of training restrictions is dependent on growth or maintenance of installation RCW populations. Schedules for removing training restrictions will be implemented after appropriate consultation with USFWS.

e. Once the installation has reached its population goal (or 350 PBGs, whichever is less), any and all training restrictions may be removed subject to the following guidelines and precautions.

(1) Installation staff will continue to identify clusters where training restrictions are warranted (and conversely where they are not warranted)

as described in paragraph V.C.1.b. Deliberations will weigh the risks and benefits to RCWs, habitat, and training. Data and observations of training impacts (or lack of same) during the population's growth from 250-350 PBGs will also be considered in assessing the risk of impacts from training. The installation will report annually to the USFWS the results of monitoring conducted IAW paragraph V.E.4. for protected and unprotected clusters as shown below.

	Protected Clusters	Unprotected Clusters
# Active Clusters		
# PBGs		
# Nests		
# of adult RCWs per PBG		
# of fledgling RCWs per PBG		

(2) Installation staff and USFWS staff will evaluate these data jointly to identify any trends that might indicate a need for modifications to the installation's application of training restrictions. Data from annual inspections of RCW clusters collected IAW paragraph V.D.5. will also be evaluated to assess habitat condition and trends. Factors such as adequacy of environmental awareness training should also be assessed. The goal will be to make any necessary adjustments and avoid population levels falling below 350 PBGs (or the installation population goal, whichever is less). If populations fall below this threshold for reasons that may be training related (i.e. not explained by habitat conditions, hurricane damage, disease, etc.), training restrictions will be re-implemented IAW Appendix 1 for all training areas containing inactive or single-bird clusters that supported a PBG at the time restrictions were removed, and formal consultation with the USFWS will be reinitiated. In this way, installations will be free to remove restrictions based on their determination of risk, but they will also bear the consequences of their decisions.

(3) Installations should use caution and discretion before reducing training restrictions as soon as 350 PBGs are met because falling back below 350 will require reinstitution of restrictions (see C.2.e.(2) above). Therefore, it is recommended that prior to implementing restriction reductions, installations should provide a reasonable number of “buffer” PBGs (e.g., 10 percent beyond the goal) to ensure that if some losses occur, restrictions do not

have to be re-implemented.

(4) In cases where continued protection is deemed appropriate even though the population exceeds 350 PBGs or the Installation Goal, protected cavity trees will be marked by two white bands. No military maneuver is authorized within 50 feet of marked cavity trees except for foot traffic and vehicles traveling on existing roads and trails. Additional "Off-Limits" areas may be marked with Seibert Stakes or by other means IAW the installation's established practices for protection of sensitive/hazardous areas.

(5) Once restrictions are removed, incrementally or in total at a later date, it is imperative that installations maintain both: (1) the level of habitat management required, particularly prescribe burning, to sustain recovery standard foraging habitat, and (2) an adequate level of monitoring (negotiated via consultation with the USFWS) to document that the population remains stable, or indeed, increases to a higher level.

3. Marking of Clusters

a. Cavity and cavity start trees in protected clusters will be marked for easy recognition. Trees will be marked with two white bands no more than four inches wide and no more than eight inches between them. Bark will only be scraped lightly to remove loose bark or not scraped at all. The bands will be centered approximately four to six feet from the base of the tree. A uniquely numbered small metal tag will be affixed to the cavity tree for monitoring and identification purposes.[2]

b. In protected clusters, buffers for all suitable cavity or cavity start trees will be marked. Warning signs will be posted and will be constructed of durable material, ten inches square (oriented as a diamond), white or yellow in color. The RCW graphic and the lettering “Endangered Species Site” and “Red-cockaded Woodpecker” will be printed in black. The lettering “Do Not Disturb” and “Restricted Activity” will be printed in red. All lettering will be 3/8 inches in height. Warning signs will be posted at reasonable intervals along the 200 foot perimeter of cavity trees facing to the outside of the buffer zone and along roads, maintained trails and firebreaks, and other likely entry points into the buffer zone.

c. Installations conducting long-term training on private, state, or other federal lands with RCW habitat will attempt to obtain agreement from the landowners on compliance with these marking guidelines. If a landowner does not agree to comply with these guidelines, even with the installation paying the costs associated with compliance, installations will educate troops training on

[2] Studies in community ecology are showing that rat snakes predate kleptoparasites and usually cannot overcome the resin barriers on active RCW trees. Thus rat snakes provide a net benefit to RCWs. Impediments which prevent rat snakes from climbing cavity trees (especially inactive trees) should be avoided.

such lands to help them recognize the markings used by the landowner.

d. Cavity and cavity start trees in unprotected clusters may be marked for management and monitoring purposes at the installation's discretion. Warning signs will not be posted. A uniquely numbered small metal tag will be affixed to the cavity tree for identification purposes. Marking will be distinctively different than that used for protected clusters.

4. Training in Protected Clusters

a. The training restrictions in this section apply to buffer zones within protected clusters. RCW-related training restrictions do not apply to foraging areas or unprotected clusters as designated in the first two paragraphs under V.C.

b. Standard training guidelines in protected clusters are:

(1) Military training within 200 feet of marked cavity trees is limited to military activities of a transient nature (less than two hours occupation). Appendix 1 provides a list of prohibited and permitted training activities within buffer zones.

(2) Military vehicles are prohibited from occupying a position or traversing within 50 feet of a marked cavity tree, unless on an existing road or maintained trail or firebreak.

5. Training Activities in All Habitats. In addition to training restrictions associated specifically with RCW clusters, the installation will implement the following guidelines for habitats throughout the installation to maintain and improve potentially suitable habitat for the RCW. These guidelines will remain in effect even if restrictions under paragraph V.C.4. above are discontinued upon reaching 350 PBGs or the installation population goal, whichever is less.

a. Military personnel are prohibited from cutting down or intentionally destroying pine trees unless the activity is approved previously by the installation biologist and is authorized for tree removal. Hardwoods may be cut and used for camouflage or other military purposes. If removal of hardwoods would damage a cavity tree, approval from the installation biologist would be required.

b. Units will immediately report to range control known damage to any marked cavity or cavity start tree and/or any known extensive soil disturbance in and around RCW clusters. Range control will notify installation biologists immediately.

c. The installation will immediately (within 2 working days of

notification) reprovision a cavity tree if one is destroyed due to training activity.

d. Installations will as soon as practicable (normally within 3 working days of notification) repair damage to training land within a cluster to prevent degradation of habitat.

e. All digging for military training activities in RCW habitat management units (HMU; see V.F.1., below) will be filled and inspected upon completion of training.

f. Training guidelines will be actively enforced through installation training and natural resources enforcement programs, prescribed in chapters 1 and 11, AR 200-3, and installation range regulations.

D. *Habitat Monitoring*

1. Surveys for New Cavity Trees and Clusters. Comprehensive surveys for new cavity trees and clusters have already been conducted on Army lands that may support RCWs. Normally, detection of previously unknown cavity trees or clusters will occur coincident to annual inspections of known clusters and adjacent habitat areas. Foresters and biologists will report any new activity observed during the routine process of other work. Surveys in previously unoccupied habitats should also be conducted by qualified biologists following protocols of the RCW Recovery Plan if the land has not been previously surveyed, or if the installation biologist determines that changing habitat conditions or changes in the distribution of known populations increases the likelihood of RCW occurrence.

2. Project Surveys. The installation will conduct surveys prior to timber harvesting operations, construction, or other significant land-disturbing activities, excluding prescribed fire, in accordance with recommendations of Chapter 8.I. of the RCW Recovery Plan. These surveys will be conducted by natural resources personnel trained and experienced in RCW biology, and must be conducted within a year of project initiation. The guiding principle of these surveys, as noted in the RCW Recovery Plan, is that, if the installation can demonstrate reasonable progress toward and support of installation population goals, most projects can be implemented.

3. Foraging Habitat. Installations will assess quality and quantity of installation-wide foraging habitat using the USFWS Matrix tool at a minimum of once every 10 years and midstory at a minimum frequency of once every five years in RCW HMUs. Foraging habitat will be assessed for all foraging elements identified in the RCW Recovery Plan under paragraph 8.I. The desired future condition of foraging habitat for RCW territories counted toward an installation's recovery goal is to meet criteria of the RCW Recovery Plan's foraging habitat "recovery standard". Foraging habitat data collected will be appropriate to the

forestry management practice (e.g. uneven versus even-aged management).

4. Prescribed and Wildfires. Installations will keep accurate records of the timing and extent of all prescribed and wild fires in RCW HMUs.

5. Cluster Status and Condition. Active and recruitment clusters that have not been deleted from management in accordance with paragraph V.F.2.b. below must be inspected annually. These are prescriptive inspections, used to develop treatments and modifications of treatments to maintain suitable nesting habitat. At a minimum, installations will inspect and record data for:

a. Density and height of hardwood encroachment (using Matrix standards).

b. Height of RCW cavities.

c. Condition of cavity trees and cavities.

d. A description of damage from training including: damage to cavity and cavity start trees requiring remedial measures if any, soil disturbance adjacent to cavity and cavity start trees requiring remedial measures if any, and general condition of the forage habitat of the cluster being monitored if impacted by training activities.

e. Effects of fire (prescribed or wild) on midstory and cavity trees.

f. Evidence of RCW activity for each cavity tree (includes each cavity and cavity start in the tree) within the cluster.

E. *Population Monitoring*

1. Installations will conduct monitoring programs to determine scientifically demographic trends within the population as a whole. At a minimum, installations will follow standards established in the RCW Recovery Plan for sampling schemes, sample sizes, frequency of monitoring and data parameters to be collected. To annually monitor population trend and size, the RCW Recovery Plan requires monitoring of cluster activity status and the presence/absence of PBGs. The RCW Recovery Plan recommends the following sample sizes for monitoring number of active clusters (ACT) and PBGs in red-cockaded woodpecker populations, by population size.

	Population Size (PBG)				
Parameter	**<30**	**30-99**	**100-249**	**250-349**	**>349 or at approved property goal**
ACT	100% of potentially active clusters per year	100% annually	100% annually	100% annually	Consult with USFWS
PBG	100% of potentially active clusters per year	100% annually	50% annually	33% annually	Consult with USFWS

2. To track population size relative to status of training restrictions in clusters, installations conducting < 100 percent survey of PBGs will allocate sample clusters proportional to the ratio of the number of clusters with training restrictions and the number of clusters without training restrictions. Sampling design and allocation of sample clusters will be established in consultation with USFWS.

3. All recruitment clusters, regardless of status of training restrictions, must be inspected annually for five consecutive years to document RCW occupancy. Once recruitment clusters are occupied, use monitoring criteria for active clusters.

4. To track effects of reducing training restrictions and other land use activities, installations will compare fecundity of active clusters, recruitment rates, and demographic stability between protected clusters and unprotected clusters. Input from a qualified wildlife statistician is expected at appropriate organizational levels to assure the best comparisons possible. All sampling and statistical comparisons will follow the guidance of the RCW Recovery Plan where it is applicable and will include USFWS input, especially when the RCW Recovery Plan does not provide sufficient guidance.

a. To compare fecundity between protected and unprotected clusters, installations with 30 or fewer active clusters will monitor all clusters to determine number of adults, nesting status, and number of fledglings per group. This monitoring will require color banding of birds. Installations with >30 active clusters will annually monitor these parameters in a random sample of all clusters in excess of 30, stratified by protected and unprotected clusters. Sample size in each stratum will be the greater of 25 percent of the number of clusters in the stratum, or 30 clusters. The sample should not include clusters that have been active for fewer than 3 years. Typically, recruitment clusters have a disproportionately high incidence of being occupied by a single RCW and/or low

productivity due to lack of breeder experience in their first 2 years of occupancy. Excluding recently activated clusters from the sample will help make comparisons between protected and unprotected clusters more meaningful.

b. To compare recruitment rates and demographic stability between protected clusters and unprotected clusters, installations will use monitoring data collected in accordance with paragraph V.E.1.

5. The monitoring standards established in the preceding paragraphs are the minimum requirement. Any time RCWs are banded, the RCW Recovery Plan sets the minimum data collection standards. Installations may implement additional monitoring activities or programs in support of other management and research objectives as necessary, e.g. translocations.

F. *Habitat Management*

1. Installation RCW ESMCs will identify nesting and foraging areas sufficient to attain and sustain installation RCW population goals. These areas will be designated RCW HMUs. HMU delineation is an important step in the planning process because it defines the future geographic configuration of the installation RCW population. Areas designated as HMUs for all active and recruitment clusters, regardless of training restriction status, must be managed according to these guidelines. HMUs should be large enough to enable the installation to meet or exceed its recovery goal as identified in the Recovery Plan.

2. Areas Included in HMUs

a. HMUs will encompass all clusters, areas designated for recruitment, and adequate foraging areas as specified in d., below.

b. Clusters that have been documented as continuously inactive for a period of five consecutive years or more may be deleted from RCW management requirements. Designated recruitment clusters that have not been occupied for a period of five consecutive years may also be deleted from HMUs. Once deletion of a cluster from management is approved by the USFWS, existing cavities may be covered to discourage reactivation.

c. In designating HMUs, fragmentation of nesting habitat will be avoided. Installations will attempt to link HMUs with corridors, allowing for demographic interchange throughout the installation population.

d. Adequate foraging habitat in acres, quality, and location must be provided with HMUs. Installations will determine availability of and manage for foraging habitat in accordance with guidelines established in Chapter 8.I. of the RCW Recovery Plan, i.e., the recovery standard.

e. Installations may formulate population-specific foraging guidelines in consultation with the USFWS. Population-specific guidelines must be based on site-specific study consisting of multi-year (typically 3-5 years) data on RCW group and population health and their relationships to quantity and quality of foraging habitat. Chapter 8.I.4. of the RCW Recovery Plan provides guidelines for determining population-specific foraging guidelines.

f. HMUs should be located where there will be a minimum impact upon current and planned installation missions/operations and should be consistent with land use requirements in the Real Property Master Plan.

g. Installations should delineate HMUs to maximize demographic linkage among groups on and off the installations. Where fragmentation exists, installations should develop plans to link groups on the installation by designating habitat corridors where practical.

3. Management Within Clusters.

a. Due to RCW biological needs, clusters, including the area within 200 feet of cavity trees, require a higher management intensity level than other areas within HMUs. Within HMUs, maintenance priority will be given to active clusters over both inactive and recruitment clusters (see definitions).

b. Installations will manage habitat within active and recruitment clusters in accordance with guidelines established in the RCW Recovery Plan. In general, recommended management practices in the RCW Recovery Plan include:

(1) Protection of existing cavity trees from damage due to fire, human disturbance (including erosion and sedimentation and logging activities), southern pine beetle infestations, and damage from high winds.

(2) Maintain sufficient large and old pines to serve as cavity trees.

(3) Control hardwood and pine midstory.

(4) Encourage restoration and maintenance of native grasses and forbs by using prescribed burning, minimizing soil disturbance, and implementing appropriate timber management to promote adequate light at ground level.

(5) Reduce excessive overstory hardwoods within the cluster

(6) Establish recruitment clusters in upland sites whenever

possible, consistent with demographic and habitat considerations.

(7) Retain dead and dying cavity trees and all other snags, unless they present a safety hazard.

c. Active and inactive cavities found to be in poor condition during periodic inspections will be repaired whenever feasible to prolong their use. Cavity restrictors can be installed on enlarged RCW cavities or where threat of cavity enlargement of properly-sized cavities is probable. Restrictors will be installed according to guidelines of the RCW Recovery Plan with the following priority: (a) active single tree clusters, (b) solitary bird groups, (c) clusters with less than four suitable cavities, and (d) others.

d. Artificial cavities and cavity starts will be constructed in areas designated for recruitment or translocation and in active clusters where the number of suitable cavities is limiting. Construction must be accomplished by fully trained and permitted personnel. Artificial cavities and cavity starts will be constructed using the following priorities: (a) active single tree clusters, (b) solitary bird groups, (c) clusters with less than four suitable cavities, and (d) others.

e. Avoid timber harvesting, pine straw harvesting, and habitat maintenance activities, with the exception of burning activities, during the nesting season. If a biologist, experienced in RCW management practices, determines that habitat maintenance activities are not likely to adversely affect nesting activities, they may be conducted after coordination with USFWS. Consultation on these activities may be accomplished through a programmatic consultation or on a case-by-case basis, and will typically be “informal consultation”.

4. Management in Other Areas of HMUs

a. Silviculture. Forest management and timber harvest on installations will be consistent with achieving and maintaining installation RCW population goals. In general, silvicultural practices in HMUs will have the objectives of ecosystem management including maintaining adequate old-growth pine, reducing midstory encroachment, and meeting recovery standard foraging habitat requirements. Silviculture in HMUs will include: (a) maintenance of sufficient large and old pines to serve as cavity trees; (b) control of hardwood and pine midstory, encouragement of restoration and maintenance of native grasses and forbs by using prescribed burning, minimizing soil disturbance, and implementing appropriate timber management to promote adequate light at ground level; (c) reducing excessive overstory hardwoods; and (d) retaining dead and dying trees and all other snags, unless they present a safety hazard. Installations will follow guidelines for silvicultural methods and objectives that are established in Chapters 8.J. and 8.I. of the RCW Recovery Plan.

b. Prescribed Burning. Prescribed burning is normally the most effective means of midstory control and is recommended as the best means of maintaining a healthy ecosystem. Prescribed burning will be conducted at least every three years in longleaf, loblolly, slash pine, and shortleaf pine systems. Burning must be conducted in accordance with applicable Federal, state, and local air quality laws and regulations. With the agreement of the USFWS, the burn interval may be increased to no more than five years after the hardwood midstory has been brought under control. Cavity trees will be protected from fire damage during burning. Burning should normally be conducted in the growing season because the full benefits of fire are not achieved from non-growing season burns. Winter burns may be appropriate to reduce high fuel loads. Use of fire plows in clusters will be used only in emergency situations.

5. Management in Impact and Direct Firing Areas.

a. Impact Areas

(1) Impact areas that contain or likely contain unexploded ordnance or other immediate hazardous materials (radiological or toxic chemicals) can pose danger to personnel. Natural resources conservation benefits to be gained by intensive management in high risk areas generally are not justified. Certain installations may have impact areas or other areas that have been contaminated with improved conventional munitions or submunitions where entry by personnel is forbidden.

(2) Designation of impact areas and the associated effects of these actions on RCW management activities may affect the RCW and other federally listed species within impact areas. These actions may lead to the possibility and necessity of incidental take.

(3) To the degree practicable, clusters and surrounding foraging area should be designated as “no firing areas” to protect clusters from projectile damage.

b. Direct Firing Areas.

(1) Direct fire, non-dud producing impact areas that do not contain unexploded ordnance or other immediate hazardous materials may be included within HMUs, subject to the guidelines below.

(2) In HMUs in direct fire areas that are not directly impacted by weapons firing, RCW management will be the same as for HMUs outside of impact areas. In HMUs where there is a significant risk of projectile damage to foraging or nesting habitat, the following guidelines apply:

(a) Range layout should be modified/shielded where

practical and economically feasible to protect HMUs from projectile damage. Protective measures that will be considered include reorienting the direction of weapons fire, shifting target arrays, establishing “no firing areas” around RCW clusters or HMUs, revising maneuver lanes, constructing berms, etc.

G. *Translocation*

1. Translocation can be a useful tool to expand and disperse RCW groups into unoccupied areas of designated HMUs. Translocation also provides a means to maintain genetic viability in populations with fewer than 350 PBGs. Installation plans will provide for translocation to augment solitary bird groups, where appropriate. Installations participating in translocation activities will follow guidelines established in chapter 8.H. of the RCW Recovery Plan.

2. Installations may translocate RCWs from active clusters to recruitment clusters that meet standards for translocation for strategic recruitment. This will only include translocation of subadult birds from their natal territories. Within-population translocations that do not meet these criteria must be approved on a case-by-case basis through consultation with the RCW Recovery Coordinator.

3. In areas to receive RCWs, habitat inspection and improvement work must be completed before translocation is attempted to ensure that nesting and foraging habitat meets the standards established by these guidelines.

4. Installations should support regional translocation efforts by supplying or receiving donor birds provided the installation meets criteria established in the RCW Recovery Plan for donor or recipient populations.

5. Translocation will not be undertaken without the approval of, and close coordination with, the USFWS. Installations must obtain an ESA section 10 permit (scientific purposes) or an incidental take statement under ESA section 7 and all applicable marking, banding, and handling permits prior to moving any RCW through translocation.

H. *Data Records, Reporting, and Coordination.*

1. Installations will record and retain permanently all survey, inspection and monitoring data for RCW populations and habitats for trend analysis.

2. Installation biologists and foresters will maintain close coordination and, at a minimum, will conduct an internal RCW installation progress review twice a year.

3. Installation Management Agency (IMA) Southeast Region will serve as integrator and facilitator for Army RCW management throughout all installations with RCW. IMA Southeast Region will host an annual RCW meeting for RCW

installations, USFWS, ODEP, United States Army Environmental Center, National Guard Bureau, and other organizations.

4. ODEP will provide RCW oversight. ODEP will ensure that data collected in accordance with paragraph V.E. above for protected and unprotected clusters will be evaluated for trend analysis. These data will be analyzed at least every five years, and the results will be presented to USFWS for review. Results of this trend analysis will be used to determine revision, continuation, or cancellation of military training restrictions in consultation with USFWS.

5. Installations annually will report results of RCW inventory and monitoring programs to USFWS, IMA Southeast Region, and ODEP through command channels. These data will be reported in formats agreed upon between the Army and USFWS. These data will include measures of population status and actions taken to recruit RCWs and improve habitat. These data will normally be presented to USFWS at the annual meeting hosted by IMA Southeast Region. All installations will report at the meeting in a standard format agreed upon by the USFWS and IMA Southeast Region.

6. RCW maps will be included in the ESMC using survey data to accurately depict the location of RCW clusters, RCW-related training restricted areas, HMUs, and cavity trees. Maps will be updated at least annually or when a 20 percent change in the number of active clusters occurs, whichever is sooner. Maps used internally will be tailored to the users, e.g. trainers, foresters, etc. and will be widely distributed for use by those conducting land use activities on the installation, including military training, forest management, construction projects, and range maintenance.

Appendix 1

TRAINING ACTIVITY WITHIN BUFFER ZONES (1)	
MANEUVER AND BIVOUAC:	ALLOWED
Hasty defense, light infantry, hands and hand tool digging only, no deeper than 2 feet, 2 hours MAX	Yes
Hasty defense, mechanized infantry/armor	No
Deliberate defense, light infantry	No
Deliberate Defense, mechanized infantry/armor	No
Establish command post, light infantry	No
Establish command post, mechanized infantry/armor	No
Assembly area operations, light infantry/mech infantry/armor	No
Establish CS/CSS sites	No
Establish signal sites	No
Foot transit thru the cluster	Yes
Wheeled vehicle transit thru the cluster (2)	Yes
Armored vehicle transit thru the cluster (2)	Yes
Cutting natural camouflage, hardwood only	Yes
Establish camouflage netting	No
Vehicle maintenance for no more than 2 hours	Yes
WEAPONS FIRING	
7.62mm and below blank firing	Yes
.50 cal blank firing	Yes
Artillery firing point/position	No
MLRS firing position	No
All others	No
NOISE:	
Generators	No
Artillery/hand grenade simulators	Yes
Hoffman type devices	Yes
PYROTECHNICS/SMOKE	
CS/riot agents	No
Smoke, haze operations only, generators or pots, fog oil and/or graphite flakes (3)	Yes
Smoke grenades	Yes
Incendiary devices to include trip flares	Yes
Star clusters/parachute flares	Yes
HC smoke of any type	No

Appendix 1 (continued)

DIGGING	ALLOWED
Tank ditches	No
Deliberate individual fighting positions	No
Crew-served weapons fighting positions	No
Vehicle fighting positions	No
Other survivability/force protection positions	No
Vehicle survivability positions	No
NOTES:	
(1) These training restrictions apply to RCW cavity trees in training areas but not to cavity trees located in dedicated impact areas.	
(2) Vehicles will not get any closer than 50 feet of a marked cavity tree unless on existing roads, trails or firebreaks.	
(3) Smoke generators and smoke pots will not be set up within 200 feet of a marked cavity tree, but the smoke may drift thru the 200 feet circle around a cavity tree.	