

**LAND MANAGEMENT PLAN
FOR THE
FOR
SALT WETLAND MITIGATION SITE
MOORE COUNTY, NORTH CAROLINA**

Prepared by:

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LAND MANAGEMENT PLAN FOR THE FOR SALT WETLAND MITIGATION SITE

INTRODUCTION

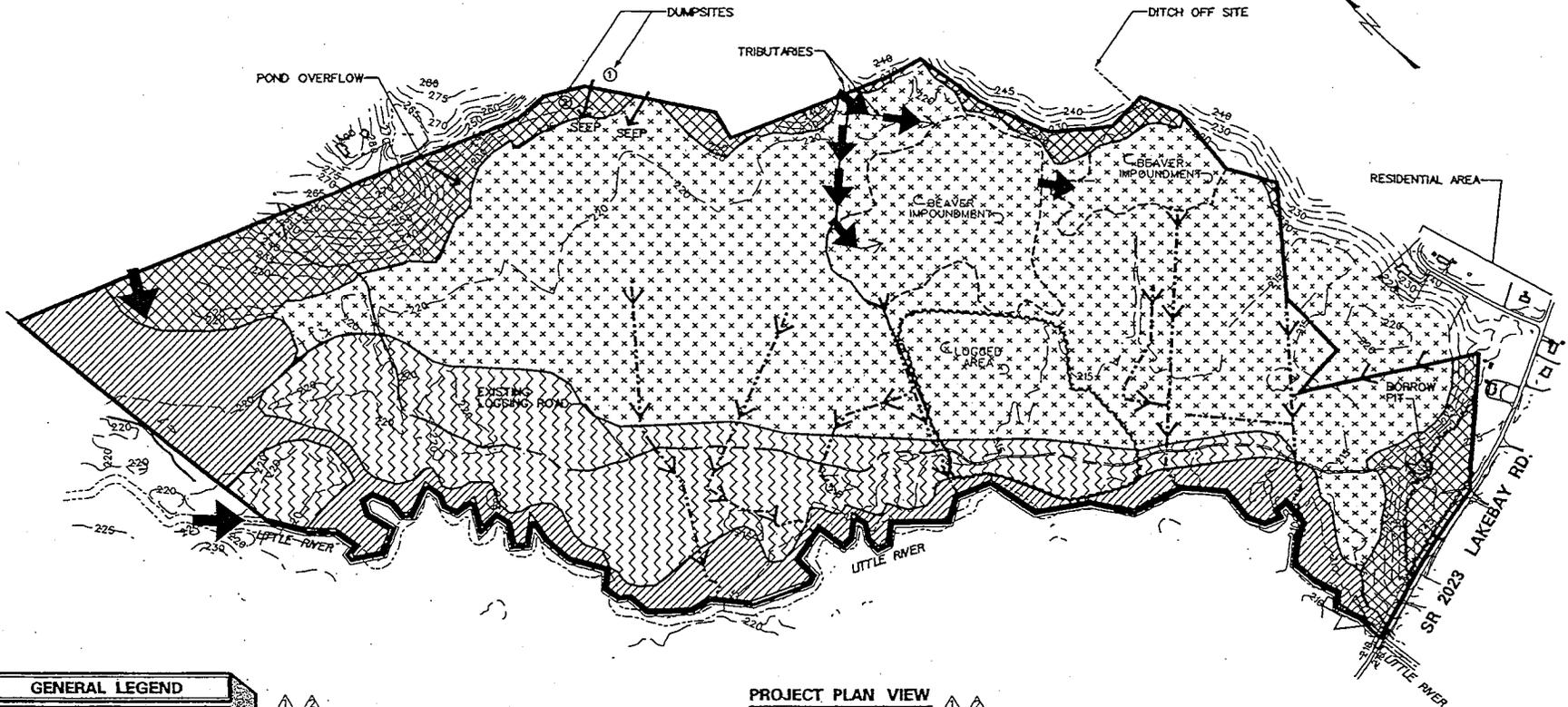
At one time, longleaf pine forests stretched from southern Virginia to Texas, around the Coastal Plain. Due to logging, fire suppression and conversion to other uses, less than 3% of the original longleaf pine forest remains, making it one of the three most endangered ecosystems in the United States. Other associated community types, such as Atlantic White Cedar Forests, are similarly threatened. Many of these increasingly rare communities can still be found in the Sandhills. The Sandhills Area Land Trust (SALT) is dedicated to preserving the native plants and animals of the Sandhills region.

The Sandhills were maintained by fire before European settlement. As frequent ground level fires traveled through upland landscapes they typically penetrated wetland areas to varying degrees, and all the native natural communities are adapted to fire. Fire frequency has been estimated at every 2-7 years before European settlement. Fire suppression throughout most of the Southeast over the last 50-100 years has resulted in considerable changes in character of even relatively undisturbed woodlands. In fact, well-preserved examples of many fire dependent ecosystems, such as Wet Pine Flatwoods and Streamhead Pocosins, have become rare. Along with restoration of wetland hydrology, reintroduction of fire through prescribed burning is essential to restore these lands to their natural condition.

SALT's 327 acre Wetland Mitigation Site on the Little River in Moore County provides a unique opportunity to restore and preserve a great diversity of native habitats on one site. It includes remnants of at least 15 different community types. Similar sites on nearby Fort Bragg, where prescribed fire is a regular part of the management program, have displayed a remarkable diversity of plant and animal species, including several State-listed species of concern, which could also occur on this site. Although the site has been much degraded over the years, it has excellent potential for regaining its original high species diversity. This can be accomplished through a partnership between the North Carolina Department of Transportation (NCDOT) and SALT, with NCDOT providing initial restoration of wetland hydrology and replanting of clearcut areas, and SALT providing long term management.

OVERVIEW

The SALT Wetland Mitigation Site (Figure 1), also known as the Taylor Tract, is a 327 acre parcel located along Little River near Lobelia in Moore County. It was acquired in 1998. SALT owns the land and NCDOT holds a conservation easement on this property for use as a wetland mitigation site for improvements to U.S. Highway I (R-210) from the existing 4 lane terminus southwest of Sanford in Lee County to the existing 4 lane terminus just south of Vass in Moore County. A portion of the project involves adding 2 lanes beside the existing 2 lane right-of-way in southern Lee County. However, much



PROJECT PLAN VIEW

GENERAL LEGEND

- INFLOW
- OUTFLOW
- DIRECTION OF FLOW
- MAJOR CONTOURS
- LOGGED AREA
- APPROX. MITIGATION SITE BOUNDARY
- EXISTING ROAD
- EXISTING BUILDING
- EXISTING FENCE
- EXISTING DITCH

LAND TYPES

- PRIMARY RIVER FLOODPLAIN
- SANDY TERRACE RIDGE
- RIVER TERRACE
- GROUNDWATER SLOPE

NO.	REVISIONS	DATE
△	REVISIONS PER NCDOT	SEPT 1999
△	REVISIONS PER NCDOT	FEB 2000

Plan No. AUG 2000
 Scale 1" = 600'
 Date: JUN 1999
 Drawn by: JWN
 Checked by: MAF
 Project No. 98-024.06

MAP FROM
NCDOT WETLAND MITIGATION PLAN
 SALT TRACT MITIGATION SITE
 MOORE COUNTY, NORTH CAROLINA

NC DEPARTMENT OF TRANSPORTATION
 P.O. BOX 26201
 RALEIGH, NORTH CAROLINA 27611



of the project will be constructed on new right-of-way and will involve unavoidable impacts to jurisdictional waters, including wetlands.

The tract is flat except for a bluff and hillside around the northern and eastern boundaries. Elevations range from 220 to 250 feet above mean sea level. The predominant soil type is Bibb loam, with Kalmia sandy loam on the large terrace that runs northwest to southeast through the center of the property. Ailey loamy sand and Vauclose loamy sand occur on the hillsides on the northern and eastern boundaries. There are small amounts of Johns fine sandy loam, Kenansville loamy sand, Gilead loamy sand and Candor sand on the site.

Little River follows a winding course along the western property boundary, averaging approximately 30 feet wide and ranging in depth from 1 to 3+ feet. The banks are generally 2-3 feet high. There are numerous overflow channels, sloughs and oxbows. Most of the property is subject to flooding.

At least 15 distinct vegetative community types occurred on the site historically and are still recognizable. They are listed below.

- Coastal Plain Levee Forest (Blackwater Subtype)
- Coastal Plain Heath Bluff
- Coastal Plain Semipermanent Impoundment
- Coastal Plain Small Stream Swamp (Blackwater Subtype)
- Cypress-Gum Swamp (Blackwater Subtype)
- Dry Oak-Hickory Forest (Coastal Plain sand variant)
- Mesic Pine Flatwoods (Little River terrace variant)
- Peatland Atlantic White Cedar Forest
- Pine/Scrub Oak Sandhill (Blackjack-mixed oak variant and Mesic transition variant) Sandhill Seep
- Streamhead Atlantic)White Cedar Forest Streamhead Pocosin
- Vernal Pool
- Wet Pine Flatwoods
- Xeric Sandhill Scrub

Most vegetative communities were dependent on periodic fire to maintain their integrity and all non-aquatic communities burned at least occasionally. The natural fire regime has been disrupted for several decades and there was no evidence of recent fire.

A network of drainage ditches was excavated during the early to mid 1930s, apparently to facilitate drainage for agricultural use. The ditches have not been maintained. Small sand and gravel exploration pits are scattered about the site.

Currently, most of the tract is forested. Timber on the tract appears to have been cut repeatedly over the last 100 years, most recently in 1997 when approximately 20 acres was clearcut. An old trail that begins on SR 2023 and runs through the property was improved for this latter logging operation. A borrow pit was excavated in the hillside near SR 2023 and the old trail bed was filled and stabilized. Pipes were placed beneath the roadbed where it crossed the old ditches.

Beginning in 2001 NCDOT will restore the natural wetland hydrology by filling the drainage ditches and removing the fill used for road construction. Native vegetation will be planted and managed for the recovery of natural wetland and upland communities. (See NCDOT's Wetland Mitigation Plan, SALT Mitigation Site, Moore County, NC for a detailed description.) Following completion of NCDOT's wetland mitigation project (within 7 years) the management of the land will be turned over to SALT for permanent protection and stewardship.

The goal of SALT's land management program is to maintain and further the restoration efforts begun by NCDOT to return the native plant communities to as natural (pre-settlement) a state as possible. Remaining indicators of historic vegetative communities will provide guidelines for re-establishment of viable and diverse assemblages of native flora. The management plans described herein will provide the guiding methodology for the restoration program.

A protected species reconnaissance and wetland delineation were conducted by Dr. J. H. Carter III between mid-December 1997 and early May 1998, before acquisition of this site by NCDOT and SALT. Dr. Carter's *Biological and Wetlands Assessment for the Proposed Wetlands Mitigation Site* is included as Appendix A in NCDOT's *SALT Wetland Mitigation Plan*. Much of the information presented in this Management Plan, including the descriptions of vegetative community types and recommendations for restoration, is excerpted from the *Assessment*.

GOALS

The site will be managed for the following goals:

1. To restore and maintain in perpetuity native plant and animal communities utilizing natural processes.
2. To provide habitat for indigenous wildlife with emphasis on threatened and endangered species.
3. To provide research and educational opportunities.
4. To provide recreational opportunities for the local horse community and eventually transfer the land to private ownership, thus integrating conservation goals with those of the local community, while SALT continues to hold a conservation easement and manage the property for the above goals.

The SALT Mitigation Site represents a remarkable cross-section of the community types found in the North Carolina Sandhills. At least 15 distinct vegetative community types occurred on the project site historically and can still be identified. Existing plant community types are described below. The site contains outstanding examples of riverine and Atlantic white cedar vegetative communities. However, most wetlands onsite have been degraded or eliminated by drainage and past logging that removed dominant canopy species, and by prolonged fire exclusion. Upland vegetative communities have been severely degraded by past logging and prolonged fire exclusion. Each community description includes a recommendation for prescribed treatment. There are 3 factors that are crucial to restoring and

maintaining natural Sandhills vegetation on this site: ditch-filling to restore wetland function to wetlands drained by past ditch construction; replanting of appropriate vegetation; and, especially in the upland areas, the need for restoration of growing season fires.

Vegetative Communities

(From *Biological and Wetlands Assessment for the Proposed Wetlands Mitigation Site*
by Dr. J. H. Carter III)

At least 15 distinct vegetative community types occurred on the project site historically and can still be identified. These are discussed below (see TNC 1993 for detailed community descriptions). Acreages of the community types given below are rough estimates. No detailed floral survey was conducted, but such an inventory should be completed prior to the initiation of restoration activities.

The entire project site has been subject to prolonged fire exclusion and past timber harvesting. Approximately 20 acres were clear-cut in 1997 and a road was constructed through wetlands for access. Ditches were constructed in the early to mid 1930s in order to drain the wetlands onsite and approximately 20 acres were cleared for farming. All wetlands onsite, other than those immediately adjacent to Little River, were subjected to some degree of adverse hydrologic modification (drainage) due to the extensive ditching and some wetlands were effectively drained. Following ditching and logging, large areas were revegetated with species with drier site affinities than those originally present. The lack of ditch maintenance and the construction activities of beavers have converted some formerly drained areas back to wetlands. However, natural hydrology and vegetative communities cannot be reestablished without active management, such as the plugging of ditches, plantings and prescribed burning.

Wetland Communities

Coastal Plain Levee Forest (Blackwater Subtype) 5 acres (estimated)

This palustrine community type occurs on narrow, sandy terraces immediately adjacent to Little River. Sweetgum, red maple and river birch (*Betula nigra*) dominate the overstory, along with occasional loblolly pine, pond cypress and swamp black gum. American holly, red maple and ironwood (*Carpinus caroliniana*) dominate the understory. Switch cane (*Arundinaria tecta*) and greenbriers (*Smilax* spp.) compose most of the ground cover. The soil is Bibb loam.

It is relatively undisturbed and no specific management other than an occasional low intensity prescribed burn is recommended.

Coastal Plain Small Stream Swamp (Blackwater Subtype) 40 acres (estimated)

This intermittently flooded, palustrine community type occurs in low-lying areas along Little River and in some portions of drainages elsewhere on the property. Swamp black gum and red maple dominate the overstory, but pond cypress, loblolly pine, sweetgum and Atlantic white cedar also occur. The understory contains swamp black gum, red maple and ironwood (near the river). Dog-hobble (*Leucothoe axillaris*) and switch cane often dominate the ground cover. The soil is Bibb loam.

No specific management, other than occasional low intensity prescribed burning, is recommended where this community type occurs along Little River. The plugging of ditches will enhance the recovery of the Small Stream Swamp community in drainages away from the river.

Cypress-Gum Swamp (Blackwater Subtype) 20 acres (estimated)

This seasonally flooded, palustrine community type occurs in sloughs near Little River and in sloughs along drainages elsewhere on the property. Swamp black gum alone or in combination with pond cypress dominate the overstory. The understory is usually open, but large titi (*Cyrilla racemiflora*) are common. The ground cover is often dominated by Virginia chain-fem (*Woodwardia virginica*). Some drained sites have been captured by sweet gum and loblolly pine, but the sweet gum is now stressed and dying, and is being replaced by swamp black gum. The soil is Bibb loam.

The plugging of drainage ditches (where necessary) will restore natural hydrology to this habitat type. Removal of the sweetgum overstory would speed the recovery process. No other management is recommended other than occasional low intensity prescribed burns.

Peatland Atlantic White Cedar Forest 30 acres (estimated)

This rare palustrine community type occurs in the northern and eastern portions of the property in the flats below a steep hillside. The hydrology originates from groundwater seepage from the base of the adjacent bluff. Flooding is rare. The overstory consists of pure stands of large (12-24+ inches diameter at breast height) Atlantic white cedar or mixed stands of cedar, loblolly pine, swamp black gum and red maple. There are some stands of the latter species where cedar has been almost eradicated. Many canopy gaps are filled with cedar saplings. The understory may be relatively open in the denser cedar stands or dense with cedar regeneration, sweet gallberry (*Ilex coriacea*) and fetterbush (*Lyonia lucida*). The ground cover is often dense with netted chain-fern (*Woodwardia areolata*) and *Sphagnum* moss, but there are patches of unvegetated muck and pools of water. The soil is mapped as Bibb loam, but is a saturated, organic muck.

Drainage ditches exist within this community type and have undoubtedly had an adverse hydrological effect on some areas. Plugging the ditches will restore the natural hydrology. The larger red maples should be killed by the application of a systemic herbicide. Stands with hardwood dominance should be cleared and planted with white cedar. The ecotones around this community type should be periodically prescribed burned during the growing season. It is unlikely that fire will penetrate the denser cedar stands.

Streamhead Atlantic White Cedar Forest 3 acres (estimated)

This palustrine community type occurs at the head of drainages where there is some topographic relief. Such sites occur along the northeastern and eastern boundaries of the property. These sites are seasonally to permanently saturated by groundwater and are not subject to flooding. Atlantic white cedar is the dominant overstory species, but may be mixed with pond pine, swamp black gum, red maple and tulip poplar. The understory is dense and consists of red maple, sweet bay, titi, sweet gallberry, fetterbush, other shrubs, and laurel-leaf greenbrier (*Smilax laurifolia*). The ground cover is often sparse due to shading and consists of fems and *Sphagnum* mosses. Floristic diversity is usually low due to infrequent fire and dense shading. This community type is essentially a Streamhead Pocosin that is locally dominated by white cedar. The soil is Bibb loam.

Natural hydrology is intact or nearly so. This community should be treated with infrequent growing season prescribed fire. No other management is necessary.

Streamhead Pocosin 96 acres (estimated)

This community is found at the head of drainages with some topographic relief, along sluggish drains and on some poorly drained flats. These types of sites are scattered throughout the property away

from the river. The primary source of hydrology is from groundwater, however, the flat areas are subject to occasional flooding. Part of this community type was clear-cut within the last year. The overstory is normally dominated by pond pine, often mixed with swamp black gum, tulip poplar, red maple, loblolly pine and/or Atlantic white cedar. Due to the past removal of pines and prolonged fire exclusion, hardwoods dominate many Streamhead Pocosins onsite. Loblolly pine, sweetgum and red maple have captured some sites. The understory is dense with species such as red maple, sweet bay, red bay, titi, sweet gallberry, fetterbush and laurel-leaf greenbrier. The ground cover is often sparse due to dense shading. Cinnamon fern (*Osmunda cinnamomea*) is the most common ground cover species. This community type can exhibit high floristic diversity following intense or repeated fires, however, the diversity onsite is severely degraded due to prolonged fire exclusion. The soil is Bibb loam.

Streamhead Pocosins on drain heads are relatively intact hydrologically. No specific management is recommended for these sites except for periodic growing season prescribed fire. Streamhead Pocosins on poorly drained flats will require active restoration. The plugging of drainage ditches will restore the natural hydrology. Loblolly pine, sweetgum and red maple will require removal. These sites should be prescribed burned with growing season fire and planted with pond pine. Some sites may require roller chopping to control hardwood sprouts and shrubs prior to planting. Fire will need to be excluded until the planted pond pines are well established, although light intensity burning is desirable.

Coastal Plain Semipermanent Impoundment 15 acres (estimated)

This palustrine community type is found in 2 large beaver ponds that occur near the northeastern boundary of the property. The community is characterized by expanses of water with a very open overstory of swamp black gum. Denser stands of swamp black gum, sometimes mixed with red maple, occur around the pond margin. Clumps of wetland shrubs and herbs occur on hummocks around some gum trees. There is an abundance of aquatic and emergent species, with water lily (*Nymphaea odorata*) being most prevalent. There is a high likelihood of occurrence for plant species of concern. The underlying soil is Bibb loam.

These ponds should be left intact because they provide high quality aquatic and wetland habitats. No specific management is recommended. Other beaver impoundments occur in woodlands along some ditches, but have not yet caused a dramatic shift in vegetation.

Sandhill Seep 0.25 acre (estimated)

This palustrine community type is restricted to a portion of the steep bluff on the northeastern boundary of the property. Soils are seasonally saturated by groundwater. It is dominated by an Atlantic white cedar overstory and a shrub (sweet gallberry, fetterbush) understory. There is no ground cover. Prolonged fire exclusion has severely degraded the floristic diversity of this community. The soil is Vaucluse loamy sand. This community type grades into Coastal Plain Heath Bluff, Pine/Scrub Oak Sandhill, Streamhead Atlantic White Cedar Forest and Streamhead Pocosin.

It needs to be treated with growing season prescribed fire, but its location on the property boundary may prevent such management.

Vernal Pool 0.25 acre (estimated)

The only natural example of this palustrine community type is found at the north end of the large terrace in the north-central part of the property. Borrow pits and gravel exploration pits that may function like Vernal Pools are also found onsite. Most are quite small, being little more than a hole in

the ground. Rainwater ponds in these sites and may remain several inches to 1 foot or more deep all winter. There is little to no hydrologic input from groundwater or surface water. Vernal Pools may provide important breeding habitat for amphibians, but may dry up during the growing season.

The natural Vernal Pool onsite is forested with loblolly pine, sweetgum, red maple and swamp black gum. There is little understory or ground cover. The soil is mapped as Kenansville loamy sand. The human-excavated pits are non-forested. No specific management is recommended other than periodic prescribed burning during the dry (growing) season.

Mesic Pine Flatwoods (Little River terrace variant) 35 acres (estimated)

This mesic, terrestrial vegetative community type is found on the large sandy terrace in the center of the property (away from Little River). The Little River terrace variant is unique to Little River and has high potential for plant species of concern. Flooding is rare to absent. Historically, the overstory was dominated by longleaf pine, but no longleaf remains. Some sites have a loblolly pine overstory, others are dominated by hardwoods such as sweetgum, water oak (*Quercus nigra*) and sand post oak (*Quercus margaretta*). The hardwoods listed above, highbush blueberry (*Vaccinium fuscatum*) and sparkleberry (*Vaccinium arboreum*) dominate the understory. Ground cover may be essentially absent or be dominated by dwarf blueberry (*Vaccinium tenellum*), bracken fern (*Pteridium aquilinum*) or remnant Carolina wiregrass. This community type can exhibit high floristic diversity following repeated or intense fires, however, the diversity onsite is severely degraded due to prolonged fire exclusion. The soils are Kalmia sandy loam and Kenansville loamy sand.

These sites should be converted back to longleaf pine dominance. The larger hardwoods should be cut and the stumps treated with a systemic herbicide. The smaller hardwoods should be killed with a soil-applied herbicide such as hexazinone. After the hardwoods are adequately controlled, the site should be treated with a growing season prescribed burn and planted with longleaf pine, then prescribed burned every 2-4 years during the growing season. The plugging of drainage ditches may convert some of this community type to Wet Pine Flatwoods.

Wet Pine Flatwoods 50 acres (estimated)

This palustrine community type occurs on poorly drained flats around the high terrace in the center of the property. The primary source of hydrology is groundwater, though flooding may occur occasionally. Part of this community type was clear-cut within the last year. Historically, pond pine and longleaf pine dominated the overstory. Understory composition differed dramatically with fire frequency. Where fire was infrequent, the understory was a dense tangle of shrubs dominated by species such as inkberry (*Ilex glabra*), sweet gallberry, sweet pepperbush (*Clethra alnifolia*), fetterbush, dangleberry and switch cane. Herbaceous species, including several grasses, were prevalent where fire was frequent or intense.

Currently, loblolly pine or hardwoods such as sweetgum and red maple dominate this community type, except in the clear-cut area. The understory is dominated by the shrub species listed above. There is little to no ground cover due to shading and shrub competition. This community type can exhibit high floristic diversity following high intensity or repeated fires, however, diversity onsite is severely degraded due to prolonged fire exclusion. Soils are mapped as Bibb loam and Kalmia sandy loam.

This community will require active restoration including the plugging of drainage ditches, suppression of hardwoods (particularly sweet gum and red maple) and shrubs (possibly with herbicides and/or roller chopping), removal of loblolly pines, planting of pond and longleaf pines, and frequent prescribed burning during the growing season. Care must be taken not to kill the planted pines with fire.

Pine/Scrub Oak Sandhill (Blackjack-mixed oak variant and Mesic transition variant) 15 acres (estimated)

This terrestrial community type occurs on portions of the hillsides along the northern, southern and eastern property boundaries (Blackjack-mixed oak variant) and on portions of the larger terraces in the interior of the property (Mesic transition variant). Flooding is absent on the hillsides and rare on the terraces. It was formerly dominated by longleaf pine, but almost no longleaf remains. The area on the southern property boundary along SR 2023 was clear-cut approximately 2 years ago and was subject to severe soil disturbance. The overstory within the Blackjack-mixed oak variant on the northern and eastern hillsides is dominated by blackjack oak (*Quercus marilandica*), sand post oak, hickories, other oaks and loblolly pine. The understory contains the above species, flowering dogwood and sourwood (*Oxydendrum arboreum*). The ground cover is generally sparse with bracken fern, dwarf blueberry, and remnant Carolina wiregrass and herbs. Prolonged fire exclusion has severely degraded the floristic diversity. The soils are Ailey, Gilead and Vacluse loamy sands.

The Mesic transition variant on the terraces is similar with the exception that sweetgum is present in the overstory and understory. Dangleberry (*Gaylussacia ftondosa*) may be common in the ground cover. This variant grades into Mesic Pine Flatwoods. The soil is Kenansville loamy sand.

Hardwoods on these sites should be controlled through a soil-applied herbicide such as hexazinone, then prescribed burned during the growing season and planted with longleaf pine. The sites should be prescribed burned during the growing season every 2-4 years thereafter.

Xeric Sandhill Scrub Approximately 3 acres

This terrestrial community type occurs on deep, xeric sands on ridges and may also occur on some river terraces. The river terraces may be briefly subjected to flooding during extraordinary flood events. The natural overstory is longleaf pine, with an understory of turkey oak, possibly mixed with sand post oak and/or bluejack oak (*Quercus incana*). The native ground cover is dominated of Carolina wiregrass and dwarf huckleberry (*Gaylussacia dumosa*). A small area of Xeric Sandhill Scrub occurs on Candor sand along SR 2023 on the southern property boundary. This site was clearcut within the last 2 years and suffered severe soil disturbance. There is little native ground cover. There may be minor occurrences of this community type on the highest terraces in the center of the property, but no longleaf pine remains. This community can exhibit moderate floristic diversity when burned repeatedly, however, prolonged fire exclusion has severely degraded diversity. There is fair potential for the occurrence of plant species of concern.

Hardwood sprouts should be controlled with a soil-applied herbicide such as hexazinone. The site should be burned a year after the herbicide application and planted with longleaf pine. Carolina wiregrass should also be reestablished through plantings. Once the pines are established, the site should be prescribed burned every 2-4 years during the growing season.

Dry Oak-Hickory Forest (Coastal Plain sand variant) 7 acres (estimated)

This terrestrial community type probably was of very restricted occurrence on the property historically and may not have occurred at all. It occurs today on the hillside along the northeastern and eastern property boundary. Hardwoods such as southern red oak, post oak (*Quercus stellata*), black oak (*Quercus velutina*) and hickories (*Carya spp.*) dominate the overstory. Flowering dogwood (*Cornus florida*) is common in the understory. The ground cover is normally sparse. This community type represents a long fire suppressed Pine-Scrub Oak Sandhill community where most or all pines have been

removed. The prolonged fire exclusion has severely degraded floristic diversity. It occurs on Vaucluse loamy sand.

It could be converted back to a longleaf pine community by treating the hardwoods with herbicide, planting longleaf pine and the repeated application of growing season prescribed fire. However, the location of this community type along the property boundary would make such management difficult. As a result, no specific management other than occasional growing season prescribed burning is recommended.

Coastal Plain Heath Bluff 0.5 acre (estimated)

This terrestrial community type occurs in a very restricted zone on a steep, southeast facing, bluff on the northern property boundary. The overstory is dominated by off-site Atlantic white cedar. The understory is dominated by a variety of ericaceous shrubs, especially mountain laurel (*Kalmia latifolia*) and sheep-kill (*Kalmia carolina*). The soil is Vaucluse loamy sand.

It is relatively undisturbed, though white cedar is probably not the native overstory type. Prescribed burning is the only management recommended.

ORGANIZATION:

GOALS: Provide a structure for implementation of the land management plan.

With consultation with knowledgeable professionals, SALT's Director of Land Protection or Administrator will develop a series of management plans to be reviewed by the Stewardship Committee and approved by the SALT Board of Directors. These plans will cover the following subjects:

- A. Organization
- B. Fire Management
- C. Management of Rare Species and Wildlife
- D. Road Maintenance and Monitoring

FIRE MANAGEMENT

GOALS:

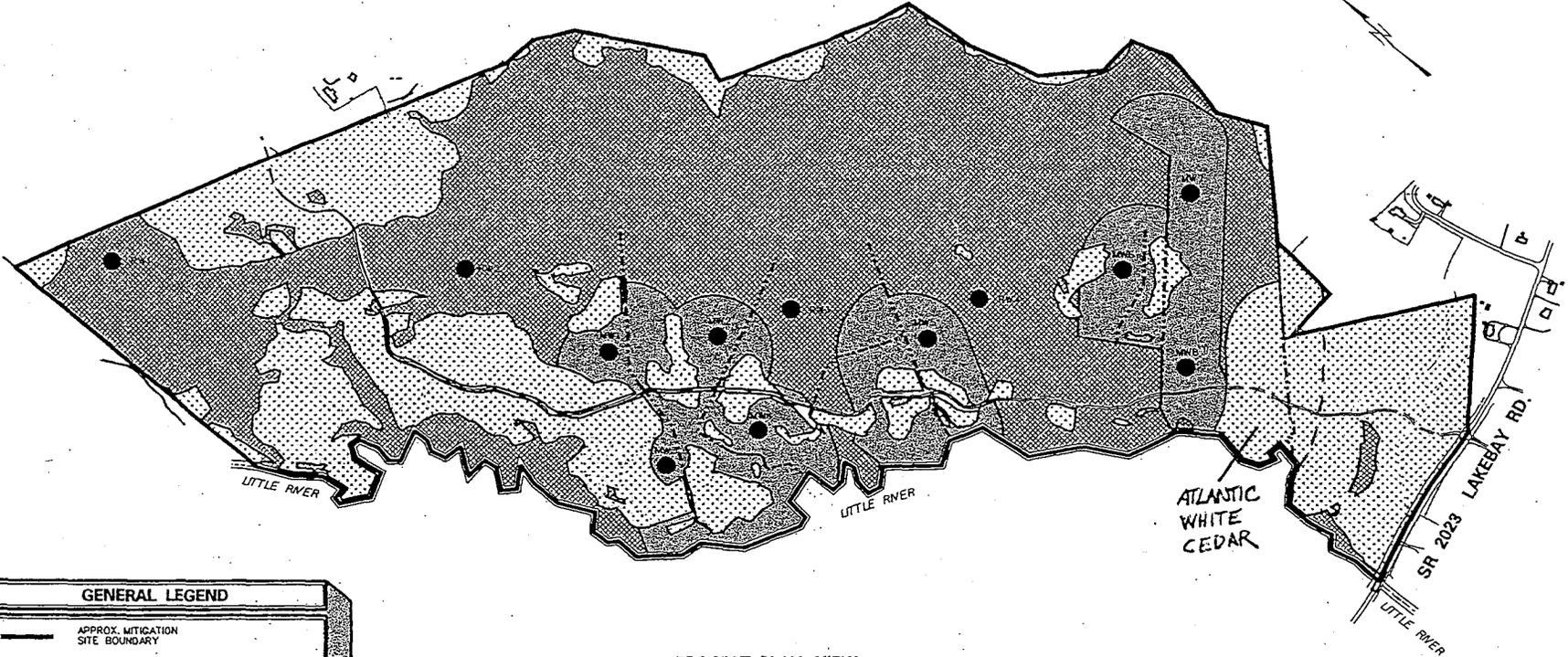
To restore the native pyric plant communities on site through the use of fire, and to minimize the likelihood of damaging wildfire.

CURRENT STATUS:

This site has been successfully fire protected for at least 50 years. In combination with repeated logging this has resulted in a dramatic shift in plant community composition. A systematic burning program needs to be introduced for upland areas with occasional opportunities for fire to penetrate the wetlands.

MANAGEMENT PLAN:

1. Burn all uplands (see Figure 2) on a 2-year rotation. Some variation may be required because of local conditions or weather limitations. If an area is missed in the assigned year, it will be rescheduled the next year.
2. Most fires will be conducted between March and September, with emphasis between April and August. Exact timing will be determined according to weather conditions and other burning obligations.
3. The type of fire used (strip-head, flank, back) will be determined by safety conditions and desired results.
4. Winter fires will be used only for critical fuel reduction and black-lining. No burning will be done from October through December, unless specially authorized.
5. A burn plan will be prepared by a qualified Fire Boss for each area and will include the following:
 - A. Area delineation or other identifying features.
 - B. Desired burning conditions.
 - C. Desired results.
 - D. Special considerations or limitations.
6. Each fire will be supervised by a Fire Boss, who will have absolute authority over all aspects of the burn.
7. Burns will be carried out only after the following conditions have been satisfied.
 - A. A burning permit has been secured from the local N. C. Forest Service Office.
 - B. The Southern Pines Fire Department, Moore County Emergency Services Office, and the SALT office have been notified.
 - C. The burning conditions in the burn plan have been met.
 - D. The Fire Boss and at least 1 experienced technician must be present.
 - E. At least 2 vehicles must be at the burn site.
 - F. All burn personnel must have operable radios.
 - G. All fire lines must be inspected and found to be adequately cleared.
 - H. A small (< 1 / 10 acre) test burn has behaved in a predictable and safe manner.
 - I. Smoke dispersion will not impact highways or developed areas.
8. Burning will not be done if --
 - A. Ambient air temperature exceeds 95 degrees F.
 - B. Relative humidity is lower than 40%.
 - C. Sustained winds exceed 10 mph or gusts exceed 15 mph.
 - D. There has been no measurable rain in the preceding 7 days.
 - E. The organic litter layer is completely dry, or lacks sufficient moisture to retard smoulder fires.
 - F. Smoke dispersion patterns are likely to adversely impact developed areas or highways.



PROJECT PLAN VIEW

UPLAND AREAS WHERE PRESCRIBED BURNING
WILL BE EMPHASIZED

GENERAL LEGEND			
	APPROX. MITIGATION SITE BOUNDARY		
	EXISTING ROAD		
	EXISTING BUILDING		
	EXISTING FENCE		
	EXISTING DITCH		
24" MONITORING WELLS			
	RW1 REFERENCE WETLAND (4)		
	MW1 RESTORATION AREAS (8)		
	WETLAND ENHANCEMENT / PROTECTION	71±	176±
	UPLAND REFORESTATION / PROTECTION	41±	102±
	WETLAND RESTORATION	20±	49±
	TOTAL	132±	327±

Drawn by:	MAF	Date:	AUG 2000
Check by:	JWR	Scale:	1" = 600'
ESC Project No: 98-02405			

Project: **MAP FROM NCDOT WETLAND MITIGATION PLAN SALT TRACT MITIGATION SITE MOORE COUNTY, NORTH CAROLINA**

Client: **NC DEPARTMENT OF TRANSPORTATION P.O. BOX 26201 RALEIGH, NORTH CAROLINA 27611**



2

- G. Burning cannot be initiated prior to 2000 hours or concluded by 2400 hours.
9. All fire lines must be rechecked before leaving a burn site.
 10. All burn sites will be rechecked within 24 hours and mopped up as necessary.
 11. Pre-burn and post-burn air temperature, relative humidity, fuel moisture, cloud cover, wind direction, and wind speed will be documented.
 12. A written post-burn evaluation will be conducted within 2 weeks by the Fire Boss. This report shall include the following:
 - A. Fuel consumption.
 - B. Crown scorch.
 - C. Projected understory kill.
 - D. Objectives obtained.
 13. Changes to the burn plan must be approved by SALT's Stewardship Chairman.
 14. Document effects of the burning program

SUPPLEMENTAL VEGETATION MANAGEMENT:

Forest vegetation may be managed by fire, herbicides or hand-clearing. Herbicides may be used periodically to suppress and thin unwanted hardwood trees, especially scrub oaks and sweet gum.

1. Herbicides will be applied only by a licensed applicator according to a plan approved by the Stewardship Committee.
2. Only approved herbicides will be used.
3. Herbicides will be used in areas where conditions limit the utility of fire as a vegetation management tool. This limitation may be a lack of fuel, placement close to the property line or the unwanted trees may be too large to kill with fire.
4. Generally, herbicides will be used in a given area only once.
5. No herbicides will be applied within 25 feet of any stream.
6. Records of areas treated, type of treatment, and results will be maintained.

MANAGEMENT OF RARE SPECIES & WILDLIFE

Objectives:

To perpetuate and where possible restore rare native plant and animal species and wildlife in appropriate habitats on the Site.

Current Status:

Decades of fire suppression and exclusion have seriously degraded habitat for rare species, resulting in reduced or extirpated populations. Currently only 1 rare species is known on the Site. A single population of nestronia (*Nestronia umbellula*) (State Significantly Rare) is located along the

northern property boundary. Several other rare species probably occurred on the site and a few may still persist in much reduced populations.

Protected Species:

According to the *Assessment*, a reconnaissance for species listed as threatened or endangered, or proposed for such listing, by the U.S. Fish and Wildlife Service (USFWS) or the State of North Carolina was conducted on the tract between December 1997 and May 1998. Representative transects were traversed on foot by biologists familiar with the species of concern but no detailed floristic, faunal or aquatic surveys were conducted. The protected species surveys did not detect any species listed as threatened or endangered. There are several species of concern that could occur on the project site. The proposed restoration and management activities would enhance habitats for most species of concern.

Animal Communities:

According to the *Assessment*, "No specific surveys were conducted for animal species. However, the high diversity of vegetative community types strongly suggests that animal diversity is also high, particularly for amphibians, reptiles and birds. Neotropical migrant songbirds are common and 14 species of wood warblers are believed to breed onsite. These latter species include the uncommon Kentucky warbler (*Oporornis formosus*) and the rare Swainson's warbler (*Limnothlypis swainsonii*). Both resident and migratory waterfowl frequently utilize the semipermanent impoundments. Several species of raptors were seen during the surveys including resident red-shouldered hawks (*Buteo lineatus*) and the summer resident broad-winged hawks (*Buteo platypterus*)."

Management Plan:

1. Known rare plant sites will be protected from all soil disturbing activities. If necessary for protection, rare plant sites will be marked in a manner approved by the Stewardship Committee.
2. Known and potential rare plant sites will be managed to restore and perpetuate the natural characteristics of such habitats. Such management will normally consist of periodic growing season burns as outlined in the Fire Management Plan. It may also include controlling hardwoods with herbicide and roller-chopping.
3. With the approval of the Stewardship Committee, SALT members and volunteers will reintroduce native rare plant species that have been extirpated as well as other appropriate species, for example wiregrass. Restoration techniques will include direct seeding and transplanting. The Stewardship Chairman or designated appointee will establish working relationships with professionals familiar with reintroduction techniques and will solicit their advice if necessary to facilitate the restoration program.
4. Nest boxes will be provided as appropriate for native species such as wood ducks.

ROAD MANAGEMENT

GOALS:

To restore historic drainage patterns where road fill has caused obstruction, to stabilize the existing road to prevent siltation from road from impacting adjacent wetland and upland communities and to minimize maintenance requirements.

CURRENT STATUS:

The existing road was improved in 1997 for logging. Fill came from a borrow pit on the property and areas immediately adjacent to the road. 7 culverts were also installed. These culverts are partially operational and contribute to drainage of former wetlands. Currently erosion is a major problem on the incline where the road descends to the wetlands, and also occurs in lesser amounts at other spots along the road, resulting in unacceptable adverse impacts to wetland plant communities.

All culverts will be removed following ditch-filling and plugging. Fords will be installed in 4 places where the channel historically supported perennial flow or in places where the roadway has obstructed historical drainage patterns. The bed elevation of the ford will be equal to the bed elevation of the natural stream channel above and below the ford. Fords will be periodically monitored at periods of high and low water to ensure they are functioning as designed.

The existing road will function as a main firebreak and provide seasonal vehicular access for management purposes.

MANAGEMENT PLAN:

1. In certain areas a firebreak system will need to be created. The Little River and the existing road will provide much of the needed firelines. During high water, saturation of surrounding lands and standing water will provide additional protection for the upland ridge in the center of the property. Firebreaks will be needed for the uplands along the road and for the uplands at the north end of the property. The firebreaks and the existing road should be stabilized and maintained by implementing the following steps:
 - A. Repair existing damage to the road bed by grading and shaping.
 - B. Install side ditches where needed, then place stone rip-rap in ditches to slow drainage velocity and prevent erosion.
 - C. Place crushed stone on road bed where it exceeds 10% slope.
 - D. Stabilize roadsides by planting an approved vegetation.
 - E. Inspect the main firebreak system quarterly and make necessary adjustments. Inspect all fords at least once annually.
2. The road will be maintained as follows:
 - A. Mow annually, if warranted.
 - B. Restrict vehicular use to that necessary for approved management purposes.
 - C. Reseeding with approved vegetation will be used if deemed necessary.

LITERATURE CITED

- Carter, J. H. 1998. *Biological and Wetland Assessment for Proposed Wetland Mitigation Site (Taylor Tract), Lobelia, Moore County, North Carolina*. NCDOT.
- Carter, J. H. 1994. *Land Management Plan for the Walthour Moss Foundation*. Dr. J. H. Carter III & Associates, Environmental Consultants, Southern Pines, NC.
- Hippensteel, Tracy E. & J. H. Carter III. 1995. *Forest Stewardship Plan for the David Drexel Property*. Dr. J. H. Carter III & Associates, Environmental Consultants, Southern Pines, NC.
- North Carolina Department of Transportation (NCDOT) 2000. *Wetland Mitigation Plan, SALT Mitigation Site, Moore County, North Carolina*. NCDOT.
- Radford, A.E., H.E. Ahles and C.R. Bell. 1987. *Manual of the Vascular Flora of the Carolinas*. The University of North Carolina Press, Chapel Hill, NC.
- The Nature Conservancy. 1993. *Rare and Endangered Plant Survey and Natural Area Inventory for Fort Bragg and Camp Mackall Military Reservations, North Carolina*. North Carolina Chapter TNC, Carrboro, NC.