

SYNOPSIS OF PLANNING NEEDS AND ISSUES

Dismal Swamp National Wildlife Refuge Master Plan

January, 1982

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I. General Character of the Refuge¹

The Great Dismal Swamp is a vast, geological phenomenon straddling the Virginia-North Carolina border about 25 miles west of the Atlantic Ocean. The Swamp is situated south of Portsmouth, Virginia, east of Suffolk, Virginia, and northwest of Elizabeth City, North Carolina. It is contained within the Suffolk Scarp on the west and Deep Creek Swale on the east. The eastern boundary is generally delineated by the Dismal Swamp Canal which parallels U.S. Highway 17.

About 210,000 acres of the original swamp remain somewhat intact, although criss-crossed by a diverse pattern of ditches, roads and waterways. The refuge encompasses 101,992 acres in the cities of Suffolk and Chesapeake, Virginia and Gates, Camden, and Pasquotank counties in North Carolina. An additional 8,000 acres have been recommended for federal ownership. With the exception of 3100-acre Lake Drummond and approximately 350 acres of roads, virtually the entire refuge is forested.

The swamp is recognized as a complex ecosystem of water, vegetation and wildlife. While designated as a swamp, its actual character is best described as a palustrine forested wetland.

Seven distinct vegetational associations are found within the swamp. These include cypress-gum, maple-gum, Atlantic white cedar, pine, mesic hardwoods, persistent emergent wetlands, and broad-leaved evergreen shrub-scrub (hereafter referred to as evergreen shrub).

Over 32 different species of mammals are reported in the swamp. Of particular interest are the black bear, white-tailed deer, otter, Dismal Swamp short-tailed shrew, southern bog lemming, bobcats, and marsh rabbit. The Dismal Swamp supports virtually all the breeding population of black bear in eastern Virginia. This population is thought to be a marginal remnant of a population that spanned the state prior to urbanization. The white-tailed deer is an important game species in both Virginia and North Carolina. Historically, sport hunting in the Dismal Swamp has concentrated on deer.

Over 200 species of birds reportedly utilize the swamp. As a result of its dense forest cover, the swamp provides considerable song bird habitat. While the swamp is limited to a few specialized habitats, many species are seasonally abundant. The Dismal Swamp is known for its support of large wintering concentrations of robins, ~~the swamp is a wintering ground for~~. The area supports one nesting waterfowl species - the wood duck - and contains ^{one} great blue heron rookery.

Fifty-eight species of reptiles are reported to inhabit the swamp. Snake population are generally low. The only poisonous snake encountered with any regularity is the copperhead. The cane brake rattlesnake and cotton-mouth moccasin are sometimes observed. Spotted, painted, mud, and yellow-bellied turtles are often observed basking on logs in the ditches.

Twenty-six species of fish are reported in Lake Drummond and adjacent ditches, three of which provide some angling. The organic soils of the swamp account for the highly pigmented and acidic waters associated with ~~the swamp is a wintering ground for~~ Lake Drummond and adjacent waters. Acidic water, reduced light penetration, and wind turbulence encouraged by the shallowness of the lake discourage growth of plants and organisms which form the base of the aquatic food chain

In general swamps are fed by tributary overflow and runoff. The Great Dismal Swamp sits perched on a shelf with only two surface inflows of any consequence which drain from the west. Several streams originate from within and flow out of the swamp, contrary to most swamps in which the reverse water flow is true. Shingle Creek and Northwest Rivers head within the Virginia portion of the Dismal Swamp. Indian Town Creek, Pasquotank River, Little River, and Perquimans River originate within the North Carolina portion of the Dismal Swamp. Artesian water sources are believed to contribute to the outflows. George Washington described the area as saying, "The Dismal Swamp is neither a plain or hollow, but a hillside with its lake at the top of its slope."

The Great Dismal Swamp has played an important role in the economic and social history of tidewater Virginia and North Carolina. In 1763, William Byrd suggested the construction of a canal through the swamp connecting the Elizabeth River near Norfolk, Virginia, with the North Carolina-Albemarle Sound. Excavation began in 1791 using slave labor under the direction of Virginia Governor Patrick Henry. The 22-mile canal was completed and opened to traffic in 1828. The Dismal Swamp Canal is one of the oldest surviving artificial waterways existing in the country today.

The swamp is an easy drive from seven major cities and in reach of other large urban concentrations, putting it in proximity of over a million people. The heaviest population density is northeast of the refuge, while the area immediately surrounding the swamp is low-density rural. Most user groups come from the Tidewater area.

The economic base of the region is dominated by the military/defense and manufacturing industries in the urban areas, with agriculture and forestry predominating in the outlying areas. Land uses adjacent to the refuge consist primarily of forestry, agriculture, and suburban/rural development.

There is substantial demand from the public for wildlife oriented recreation and interpretive activities in Dismal Swamp. These demands are currently only minimally being met.

Numerous efforts have been pursued in recent years to preserve and protect the Great Dismal Swamp. The vastness of the area, its location within two states, much regional and national interest, and continual loss of water from the swamp along with other environmentally degrading factors have collectively precipitated federal legislation directed toward swamp preservation.

1. Part of this information was derived from P.L. 92-478 (Dismal Swamp Study), Appendix II. "Abbreviated Environmental Quality Plan".

II. Refuge Status

Great Dismal Swamp NWR, established by Congress in 1974, is relatively new and acquisition is still not complete. Approximately 8,000 acres of private land remain within proposed refuge boundaries, although funding contingencies, unwilling sellers, and ongoing research make it difficult to predict if and when all these lands will be acquired.

The status of peripheral swamp lands is continually in question, involving cooperation between several federal and state agencies as well as concerns voiced by affected adjacent landowners. Questions regarding title, proper location of the boundary on the western perimeter, and possible cooperative agreements will all require resolution before the status of the remaining portion of refuge lands will be clear.

Dismal Swamp was established as a "unique ecosystem". It is one of the very few refuges mandated to preserve the ecosystem without management emphasis on endangered species, migratory waterfowl, or a pristine environment. The swamp's status as a unique ecosystem provides a somewhat different set of planning/management constraints and opportunities than most other refuges.

Since its establishment mandate specifies protection and perpetuation of the ecosystem, including a diversity of animals and plants, emphasis is given to maintaining a balance of habitat diversity rather than targeting particular species for specific habitat management.

Because of Dismal Swamp's ecosystem status, equal values must be given to the wide variety of ecosystem components during planning to assure that particular aspects of the environment are not managed to the detriment of others.

III. Refuge Management

Dismal Swamp is currently operating under public use development and fire management plans, with water management and forest management plans underway. No comprehensive management and development plan has ever been developed, and the need exists to integrate the various special plans. In the absence of specific, quantified long-range objectives, the management of Dismal Swamp depends on the broad and open-ended guidance found in the following documents:

16 recommendations for acquisition, management, and development in P.L. 92-478 Study

11 sub-study reports in P.L. 92-478

(The above are used to formulate annual work plans, refuge program scheduling, ZBB, AND BLHP PDW's.)

Policy updates

FEIS for Operation of the NWRS

Draft Refuge Manual

From 1974 to 1981, the refuge was essentially in a start-up phase. Its management activities focused on:

Land acquisition - from 49,000 to 102,000 acres

Identifying maintenance needs

Wildlife protection

Limited Public Use, including hunting

Current management emphases include:

Development of forest management plan and water management plan

Forest management, including prescribed burning of 170 acres of loblolly pine and five acres of marsh

Construction ~~or~~ rehabilitation of ^{some} water control structures

Custodial maintenance

Ongoing acquisition

Identification and protection of changing boundaries

Public use access, particularly the road to the boardwalk parking lot

Law enforcement - protection of wildlife and refuge integrity

Removal of cabins on Lake Drummond

Wildfire suppression

The primary impetus for initiating master planning at this time for Great Dismal Swamp is the necessity to resolve the complex and potentially controversial questions surrounding refuge management. Specific management issues are discussed in subsequent sections of this report.

Major management programs include water management, forest/wildlife habitat management, and public use management. Emphasis is on protecting the resource:

"The area...will be managed as a unit of the NWRs for the primary purpose of protecting and preserving a unique and outstanding ecosystem, as well as protecting and perpetuating the diversity of animal and plant life therein..."

Secondary emphasis is given to promoting public use:

"...secondary management will be to promote a public use program when not in conflict with the primary objectives of the Refuge."

In looking to the future, it is anticipated that all three programs will be encouraged and enhanced. A period of experimentation with water and forest management techniques will be necessary to test untried proposals. As patterns of change in the swamp become clearer, more full-scale management efforts will be launched (depending on FWS funding ~~and~~ commitment). Along with resource management, a variety of public uses will be implemented and monitored to determine a proper balance between preservation and utilization of Dismal Swamp land and water resources.

IV. Refuge Complexity

A. Acreage

Great Dismal Swamp is the largest refuge in Region 5 at 101,992 acres, with 8,000 more proposed for acquisition. Detailed analysis and decision-making are not feasible for all elements within existing and proposed refuge, so preliminary judgments must be made regarding which elements should have management priority within the swamp. The swamp is physically divided into discrete polygons by roads and ditches, providing the opportunity to consider options for specific areas, i.e., management units, although ultimately the swamp must be treated as a whole system.

B. Programs/Outputs

Dismal Swamp falls under three refuge programs: Migratory Birds, Mammals and Non-Migratory Birds, and Interpretation and Recreation. The refuge has a full range of outputs, but these wildlife and public use outputs are extremely low on a per acre basis compared to other refuges.

In addition to its natural resources, the refuge is responsible for:

140

■ miles of unimproved roads

approximately 120 miles of boundary lines, many of which have not been surveyed or are in dispute

more than 70 water control structures, with 15 scheduled for rehab and 55 more in need of rehab

12 wooden bridges

16 entry points with gates

forest and peat soil conditions that can create extreme wildfire potential

3/4 mile of boardwalk trail

a cabin currently being developed for environmental education and interpretation programs

Current management efforts are directed at developments which may provide future opportunities for more active management programs: water control activities, prescribed burning, and public use management.

C. Adjacent Land Use or Ownership

Analysis of what is occurring in land and water areas adjacent to the refuge will be a critical aspect of planning for Dismal Swamp. Since the primary determinant in maintaining the swamp ecosystem is the water regime of the area, the refuge is highly dependent on surrounding areas for its own well-being. Because of its large perimeter, the refuge has many adjacent small landholders, especially along the critical western (upstream) boundary. In regard to adjacent land uses, the refuge is primarily concerned with acquisition necessary to maintain the integrity of the swamp ecosystem, although broader-reaching agricultural, forestry, and residential development practices also have the potential of affecting the swamp's delicate balance. The ability to mitigate outside impacts from within the refuge must be reviewed.

Acquisition concerns are numerous and complex. A summary of the most pressing problems includes:

The 4500-acre Hitch tract. The FWS owns 2/3 and Mr. Hitch owns 1/3. Questions have arisen regarding hunting rights, firewood cutting, and other problems.

The 525-acre Cherry tract. There is confusion regarding current title.

The Edge and Jarvis property. This land is being cleared for agriculture. It is a top acquisition priority to purchase the remaining forested land to prevent its conversion to agriculture.

The western boundary. The Suffolk escarpment is an important ground water discharge supplying most of the swamp's inflow. Control of this inflow and an associated buffer zone are necessary to preserve the ecosystem.

D. Cooperative Agreements

In addition to private landowners, the refuge interacts with other state and federal agencies and educational institutions which have direct interest in the area. It presently maintains cooperative agreements with: the North Carolina Division of Forest Resources for fire detection and suppression, Old Dominion University to achieve mutual objectives and responsibilities in research, environmental education, and interpretation of natural resources; and the Corps of Engineers for public use facilities on the Dismal Swamp Canal and Feeder Ditch.

E. Habitat Diversity

The determination of how the swamp as an ecosystem will be treated during planning in a practical yet meaningful manner is a complex problem. It appears that along with the suitability analysis necessary for refuges with targeted uses, identification of species and resource composition of the habitat types in the swamp will be necessary in order to adequately depict ecosystem dynamics.

There are 5 major forest types (subdivided into 13) and 2 nonforested types in the refuge, based on composition, ecological relationships, and associated vegetation.

A. Mesic hardwoods (1% of the total refuge area)

1. Swamp chestnut oak-cherrybark oak

2. Willow oak-water oak-laurel oak
3. Yellow poplar
4. Sweetgum-yellow poplar
- B. Pine (16%)
 5. Loblolly pine
 6. Loblolly pine-hardwood
 7. Pond pine
- C. Maple-blackgum (56%)
 8. Red maple
 9. Sweetbay-swamp tupelo-redbay
- D. Cypress-gum (12%)
 10. Baldcypress
 11. Baldcypress-tupelo
 12. Water tupelo-swamp tupelo
- E. 13. Atlantic white cedar (10%)

Other habitat types include persistent emergent wetlands (marsh and bog) and the broad-leaved evergreen shrub-scrub community (2%).

Dismal Swamp can generally be considered an area of considerable diversity in forest communities, containing extensive areas of both coniferous and deciduous forest cover types, albeit forests cover 96% of the refuge with less than 4% in marshes, lake, roadbeds, and other open areas.

Refuge habitat diversity must consider both diversity between habitats and diversity within a given community or cover type.

Interhabitat: Dismal Swamp has a good variety of habitats, although some types occupy a disproportionate share of the acreage. Dispersal of types is more than would occur without disturbance, but less than ideal for wildlife.

Most studies indicate that interhabitat diversity will continue to lessen in the swamp, as red maple invades earlier successional stages or adapts to changing water regimes better than competing species.

Intrahabitat: Diversity within a habitat type can be related to species composition, understory development, and age class distribution.

1. Species composition: Most of the plant communities have a rather limited number of commonly recurring species; only the mesic hardwoods can be considered species rich. Species composition patterns in the swamp tend to be uniform within a given stand or community.
2. Understory development: Dense understories are typical of many forest types in the swamp, with cypress-gum having the least understory development. Ditching and draining have decreased the impact of flooding, resulting in more understory growth in the hydric communities. A predominance of young or intermediate age and size classes has allowed light penetration and consequent understory development. Lack of regeneration or old growth areas within nearly all habitat types has limited the corresponding variations in understory development.
3. Age-class distribution: Most forests on the refuge are now in the 30-50 year age classes. A forest managed for maximum wildlife benefits and self-perpetuation should contain a balance of young regeneration areas, intermediate and mature stands, and old growth areas.

F. Environmental Concerns

Environmental concerns relating to the management of Dismal Swamp as an inland wetland ecosystem raise complex questions which will be addressed during the planning process. Given the time constraints for master planning, preliminary decisions regarding the level at which these questions can be dealt with will be necessary. In general, great losses in inland wetland ecosystems are occurring nationally due to development, land use conversion, and regional water regime changes, although they have recently become protected by 404 legislation. The swamp is dominated by pioneer species, with only a small acreage of historical communities; it is critical to maintain the gene pools of these communities. State-of-the-art knowledge and management experience for inland wetland ecosystems is extremely limited, making a period of experimentation and monitoring a necessary phase of management.

Management priorities for the Dismal Swamp ecosystem include:

- Maintain diversity and improve quality of diversity of plant communities

- Emphasize habitats of national and state endangered or threatened species

- Specific wildlife management is secondary to habitat management

Dismal Swamp is undergoing both changes in the direction of natural succession and accelerated rates of succession.

Physical changes affecting the state of the swamp ecosystem include:

- Water regime, the most critical controlling factor in wetland stability

The swamp's water regime has been radically altered in recent decades.

Topography affects water regimes in the swamp. Elevations are changing due to oxidation of organic soils, resulting in stress to forests.

Ditch and road construction cause changes in the water budgets of the resulting segregated polygons.

Timbering - with the release of understory shade-tolerant species, it has become difficult to anticipate successional trends or plan for restoration

Fire suppression has limited regeneration of fire dependent species.

G. Historic Land Use

Changes in the use of the swamp reflect its successional development.

Aboriginal uses included hunting, fishing, and foraging. This use declined greatly when the swamp became forested about 3500 years ago. After European settlers arrived, the swamp was timbered and a tough, harsh existence was derived from the surrounding lands as they were cleared and drained for farming. Ditches and canals were dug within the swamp for draining land and transporting timber.

Although agricultural development was historically confined to sandy soils around the swamp periphery, recently those swamplands not proposed for acquisition have been cleared and drained for farming or pine reforestation. Since the 1700's the principal use of the swamp has been harvesting of forest products, particularly cedar and cypress shingles. The early 1900's were the era of large lumbering companies; railroads were constructed to remove timber and virtually the entire swamp was logged. Most ditches were constructed in the mid 1900's to aid in reducing water levels while logging, and in North Carolina to provide fill material for logging roads. The last large scale timbering occurred in the 1950's, although cedar was harvested in the North Carolina portion of the swamp as recently as 1976.

The patterns of land use in the swamp are not complex, but they are indicative of attitudes and desires which have had important environmental and social ramifications. The general public has only recently become sensitive to the vital role swamps and wetlands play in the environment; evolving from an exploitative to a protective stance has required a sustained effort on the part of many individuals and organizations, and even now, swamplands which are not protected are being cleared at a rapid rate. Historic land uses are continuing to have their effects in the Dismal Swamp.

H. Public Visitation and Visibility

Hunting and fishing were the most popular pre-refuge recreational activities. In the mid-1940's, 19 cabins were constructed around Lake Drummond by sportsmen. Most hunting has been for white-tailed deer, although bear and a variety of small game animals have also been taken. Fishing and boating have been popular long-time activities on Lake Drummond. Trapping was conducted on a limited basis. Prior to the establishment of the refuge, 30-40 tours of the swamp per year were conducted by Union Camp, who owned much of the swamp. Since 1972, Old Dominion University and a number of boat tour operators have conducted tours into the swamp.

Research activities have been part of recent swamp uses; Union Camp, local colleges and universities and other federal agencies and individuals have conducted studies.

An interesting but peripheral use was the survival training conducted by the military in the 1960's.

Refuge visitation has been recorded since 1974, when there were 2000 visits. In 1981, 9000 visits were made to the refuge. Average visitation between these years was 5800 visits. Use is generally heaviest during Spring (due to the prime songbird migration) and lowest during winter.

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Limited (controlled) access and lack of facilities are the chief deterrents to more public use. Use during summer months is also limited by hot humid conditions and insects. Most visits consist of guided tours, fishing, hunting, and boating. General weekend visitors are limited to foot or bicycle, making most of the refuge, particularly Lake Drummond, inaccessible to a large segment of the refuge visitors.

Besides lack of access and facilities, lack of signing and services and the distant location of refuge headquarters from the swamp discourage public use of the refuge. Use will most likely continue at present levels until facilities are provided. The Public Use Development Plan proposes the following facilities:

Wildlife Interpretive Center/Refuge Headquarters

Visitor Contact Stations

Visitor Contact Points

Observation Tower

Piers

Photographic Blinds

Restrooms

Expansion of COE campground and picnic area

Shuttle Buses - Tour Routes

Boat Tours

Interpretive and Hiking Trails

The disparity between proposed uses and present use is significant, with present use falling under wildlife trails - conducted, nonmotorized, environmental education - teachers and students, big game deer hunting, warmwater fishing, wildlife/wildlands observation - foot, land vehicle, boat, and photography. These uses resulted in 16,135 total visits in 1981. Proposed uses compiled by Presnell - Kidd Associates while preparing the Public Use Development Plan in 1977 planned for use to occur under wildlife trails - conducted and self guided, wildlife tours/canoes - self guided, wildlife tours/conducted interpretive center, visitor contact station, interpretive exhibits - conducted and self guided, other on-refuge programs, environmental education - teachers and students, hunting, big game deer, warmwater fishing, wildlife/wildlands observation - foot, bike and boat, and photography. These uses will result in an estimated 283,000 visits (based on a 6 year mid range plan).

I. Adequacy of Funding and Staff

Current funding and staffing at the refuge are not providing the basic custodial level of maintenance necessary to maintain structures and improvements; the list of cyclical maintenance projects grows each year. Development of public use facilities requires time and expense; investments in forest management particularly in inventory and operations on organic soils will also be required, and increased staff time will need to be devoted to water management. The YACC program will be phased out in FY 82 and the future of YCC is also in question. These youth groups have assisted in many refuge projects. Increases in staff and funds will be required if the refuge is to be properly maintained and managed.

Public interest in the swamp exists apart from the economic and recreation use people have made of it. Public meetings were held during the Public

Law 92-478 Study, and members of a technical advisory group contributed their time during development of the Public Use Development Plan. Public interests generally fall into two segments: the scientific interests and the traditional local use interests. The local use interests can be further subdivided into a Virginia public and a North Carolina public. The public has not hesitated to become involved in past issues of acquisition and land management, and the different segments of the public are thought to be in some conflict with each other over their interests in the swamp, e.g., some of the local user groups view the access privileges researchers have had in the swamp as preferential treatment. The need exists to channel public input so that all opinions are represented adequately, and to educate the public about refuge constraints and opportunities during planning. The opportunity to develop a rapport between refuge management and the public exists as a major value of master planning.

V. Refuge Stability

A gauge of ecological stability is the rate of successional change. In this respect, Dismal Swamp as a whole can be considered unstable. There are several factors contributing to this situation: 1) almost the entire swamp has been selectively timbered, and as a result the natural successional patterns are in early and intermediate stages; 2) water regimes have been altered because of ditches and roads; and 3) fire suppression policies have hindered regeneration of fire-dependent communities.

Specific problems are posed by these factors. Extensive timbering up through the mid 1900's has caused a dearth of old growth areas which provide a species rich wildlife community and promote intrahabitat diversity. The absence of extensive timbering since the 1950's has also resulted in a scarcity of young regeneration areas. Altering of water regimes by uncontrolled ditches and roads is threatening the stability of the water-dependent cypress-gum subclimax by allowing invasion of maple. Fire exclusion is threatening fire dependent associations such as the pines, Atlantic white cedar, evergreen shrub, and the remnant marsh.

Although Dismal Swamp Refuge's mandate is to preserve and perpetuate the ecosystem, this does not connote passive management for the entire swamp. Custodial maintenance is presently the predominant mode of management, but active, intensive resource management such as burning, cutting, and flooding should be prescribed for particular areas of the swamp. Maintenance of ecotypes through water conservation is the most passive management measure anticipated for the future, but even this may be ineffective without some form of vegetation manipulation. Site conversion and habitat manipulation will be necessary for many areas to accomplish objectives of improved habitat diversity, dispersal, and

quality, and to promote regeneration of sensitive species such as cedar and cypress. These operations may require large investments in staff and funding.

Public use management is not presently intensive, although the refuge conducts several tours and hunting programs. Vehicular access to the refuge is completely controlled, thereby limiting visitation. As facilities and services are developed, public use management will become much more active; the proposals in the Public Use Development Plan are extensive.

Present public use management includes:

- Conducted tours and interpretive programs

- Hunting programs

- Environmental education

- Law enforcement

- Fishing program

Potential programs include:

- Self-guided trails and tour routes

- Boat tours

- Several public use facilities

- Increased hunting, etc.

WATER MANAGEMENT ISSUES

Issue: Water Conservation

Problem: The Dismal Swamp ecosystem is being affected by alterations in the swamp and regional water regimes.

Situation Statement: The water regime maintaining the swamp has been, and is being, radically altered by developments inside the swamp as well as developments affecting the watershed feeding the swamp. Water in the swamp ~~has been~~ ^{should be} conserved to maintain the balance of surface and ground water needed to preserve and perpetuate the ecosystem. Water conservation is a high priority issue for Dismal Swamp. Documents relating to this issue include:

- * Water Management EA
- * Draft Water Management Plan
- * Dredge spoil test (ditch dredging justification, water storage importance, dredge test results, 404 considerations. Water storage is important for Norfolk aquifer recharge (the only in-swamp mitigation option for ground-water recharge losses), fire suppression and prevention, and maintenance of specific aquatic habitat).
- * Solicitor's Recommendation in shunting water across state lines

The primary cause for changes in the water regime within the swamp has been the deterioration of some 58 old water control structures and outlets. Current efforts in water conservation include 15 constructed and scheduled water control structures. No water control structures or ditch rehabilitation are scheduled under BLHP or in the refuge program schedules, although only two management units are partially secured out of six. The need exists to continue gathering hydrologic data as well as more information on the swamp's water budget. Mitigation potentials exist within the swamp via increased storage and ground water recharge capabilities resulting from water conservation. Mitigation of water

losses because of actions upstream from the swamp include coordination and subsidy potentials with landowners.

Additional Considerations Regarding Water Conservation:

- * Impacts resulting from continued loss of water at the other 43 water control structure sites
- * The seasonal operation of these 15 structures and the need to prevent flooding of cropland within the swamp's watershed
- * Priorities of maintenance of vegetation communities or wildlife habitats affected by the presence or absence of functional water control structures
- * Fire suppression and prevention activities could be enhanced by conservation of surface water
- * Environmental education and interpretation could be enhanced, but we need to identify and prevent potential conflicts between water management and public use management

Options:

Issue: Maintenance of Ditches

Problem: Ditch maintenance is expensive and reduces the aesthetic quality of the swamp for the public. In addition, the impacts of the presence of ditches is still being questioned.

Situation Statement: It is presently thought that the 158 miles of ditches in the swamp are the primary means of mitigating the negative impacts of roads as well as changes in the amounts of water entering the swamp from the ground water and surface water inflows. The ditches, when equipped with functioning

water control structures, are not responsible for water losses in the swamp but are simply a series of water reservoirs. The elevated, compacted roads have obstructed the surface sheet flow of water as well as the lateral movement of ground water. The ditches can be used to direct water around these road barriers and insure maximum storage of water throughout the swamp.

Developments outside the swamp have reduced the quantity of water entering the ground water aquifer. Some of those ditches capable of conserving water may also serve as locations for ground water recharge during late summer and fall. When the level of surface water conserved in the ditches is above the ground water level, conditions for ground water recharge exist. The water may move through the bottom of the ditches into the surrounding aquifer sands resulting in a net increase of stored water for the swamp ecosystem.

Additional Considerations Regarding Ditch Maintenance:

- * Difficulty in understanding the complex hydrology and geology of the swamp, and the role of manmade facilities to mitigate other man-induced impacts
- * Since maintenance of the ditches will require periodic cleaning to insure maximum storage capacity, issues will arise regarding the disposal of dredged material

Options:

Issue: Water Manipulation

Problem: Hydric vegetation communities in the swamp are being replaced by upland plant species.

Situation Statement: Maple-gum communities constitute approximately 60% of the forest cover of the Dismal Swamp at the expense of other swamp communities. The maple-gum type has expanded as a result of previous timbering techniques, road construction, uncontrolled water loss in the ditches, and wildfire suppression. Water manipulation, i.e. the seasonal impounding of water or periodic drawdown of water in conjunction with forest management may be used as a management tool to enhance the vitality of other vegetation communities and reduce the dominance of the maple-gum.

Additional Considerations Regarding Water Manipulation:

- * The need for more information on interrelationships between surface water and ground water regimes. It may not be possible to manipulate surface water independently of the existing ground water head.
- * The need for more information on each vegetation community, the successional trends within these communities, soil types, and current water regimes.
- * The seasonal timing and potential impact of water manipulation on adjacent landowners.

Options:

Issue: Dismal Swamp Canal

Problem: Potential impacts on ground water discharge may be attributed to reduction of water levels in the canal below the potentiometric surface or head of the ground water system.

Situation Statement: The Dismal Swamp Canal is operated by the U.S. Army Corps of Engineers as part of the inland waterway system. The waters of the canal are mandated to be used for navigation and 1.2 million gallons of water are required to lock one boat through the waterway. The canal forms the eastern boundary of the Dismal Swamp Refuge and is topographically the lowest feature associated with the swamp. The channel of the canal was dug into the Norfolk Aquifer and during the seasonal drawdown period of late summer and fall the canal may be a location of excessive ground water discharge. This discharge may occur when the demand for water to operate the locks lowers the water level in the canal below the level of ground water, thus permitting discharge of ground water into the canal from the aquifer underlying refuge lands.

Additional Considerations Regarding the Dismal Swamp Canal:

- * The need to determine if this discharge condition exists and to quantify the losses if it does exist
- * Attempting to mitigate water loss without negatively impacting commercial or recreational uses of the canal

Options (if negative impacts are observed):

- * Reduce quantity of water lost during locking operations (as per P.L. 92-478)
- * Reduce use of the canal to prevent drawdown

Issue: Water Quality and Mineral Sediments

Problem: Water quality is important to the aquatic environments as well as the associated forest communities. Qualitative and quantitative assessment of the surface inflow has not been conducted for either pollutants or mineral sediments.

Situation Statement: Increased use of agricultural chemicals and the proximity of the Suffolk landfill may be sources of dissolved pollutants. The sediment load has recently increased from erosion of agricultural fields and timbered areas.

Additional Considerations Regarding Water Quality and Mineral Sediments:

- * Plan for removal of mineral sediments within the swamp
- * Evaluate effects of agricultural runoff. If found to be negative, insure that inflows are restricted to existing channels and pollutants are diluted
- * Insure that all existing state and federal laws and regulations regarding water quality are enforced

Options:

Issue: Demands for Water Outside the Swamp

Problem: Regional needs for potable water are increasing annually. The management of water within the swamp may be in conflict with public needs.

Situation Statement:

1) Inflows

Both ground water and surface water resources are altered before reaching the swamp by activities of adjacent landowners. These activities include domestic wells, crop irrigation, field tiling, and ditching. The net loss of water to the swamp is presently thought to be minimal; however, the impacts may be in the form of seasonal timing of water availability and increasing

the quantity of surface water at the expense of ground water.

2) Outflows

The water flowing out of the swamp presently is being used for irrigation and navigation; however, it has been considered for city and industrial water supplies. The water management program may alter seasonal timing and quantity of water available for other uses.

Additional Considerations Regarding Demands for Water Outside the Swamp:

nothing to report

Options: nothing to report

FOREST/WILDLIFE HABITAT MANAGEMENT ISSUES

see pg 33

Issue: Compatibility between Forest and Wildlife Habitat Management

Problem: Measures taken to manage forest types may conflict with ^{short term} wildlife uses of the forests. *Forest mgmt is critical to maintenance of wildlife habitats - conflict with wildlife will be only temporary during the specific forest mgmt activities*

Situation Statement: The purposes and goals of forest management at Dismal

Swamp are to:

support wildlife management

provide diversity of successional stages and forest types

provide habitat and protection for threatened or endangered plants

and animals

provide habitat for waterfowl and other migratory birds

provide appropriate conditions for wildlife-oriented recreational, EE, and interpretation

preserve natural diversity and abundance of mammals and nonmigratory birds

protect and preserve the unique and perpetuate plant and animal life

While ecosystem maintenance and habitat diversity will benefit overall wildlife abundance and diversity, it may not serve to maximize particular wildlife outputs. Also, there may be possible short-term damage to wildlife from habitat manipulation: it will be necessary to balance long-run wildlife benefits with potential short-term impacts. Most impacts can be avoided through proper timing and site selection of management actions.

Issue: Wildlife habitats

Problem: Wildlife habitats are restricted

AS per

Options: ~~XXXXXXXXXX~~

Issue: Road Upgrading

Problem: Many of the roads in the swamp are in very bad condition - overgrown, settling, and eroding.

*ORIGINAL CONDITION OF ROADS WAS FOR TEMPORARY USE WHILE CONSIDERING SPECIAL PROBLEMS. THE ROADS ARE NOTHING MORE THAN
ROADS COVERED WITH 6" TO 24" OF SOFT MUD*

Situation Statement: Road upgrading is not a serious public issue at this

time except for research access, but it has been a persistent and growing problem for refuge management. Passable roads are necessary for fire suppression, ^{WATER MGMT} forest management, research access and law enforcement.

Some roads are not passable at the current time, and a number of bridges need to be replaced. The degree to which the various roads in the swamp need to be maintained is somewhat flexible.

Options: 1) Allow grasses to grow on infrequently used roads, with occasional mowing. Roads: Sycamore, Persimmon, Paw-paw, Laurel, Myrtle, Western Boundary, Weyerhauser, South, Short, etc. 2) Grade, fill, cut brush, and/or mow more heavily used roads.

Issue: Fire Management - Prescribed Burning and Control of Wildfires

Problem: Prescribed burning is necessary to maintain or restore certain forest types; conversely, the swamp has an extreme wildfire potential which needs to be suppressed. Public reaction to prescribed burning may be adverse.

Situation Statement: Fire has always played an important role in shaping the Dismal Swamp ecosystem. Evidence suggests that pine, Atlantic White Cedar, evergreen shrub, and possibly pockets of cypress and gum may have originated from deep peat burns. Because of this, some people feel that wildfires should be allowed to burn uncontrolled. However, because of the potential for tremendous resource loss due to altered water regimes and the fact that total fire suppression has been in effect and accepted

at Dismal Swamp since 1942, a "let burn" policy for the refuge seems ill-advised. There would be adverse public reaction and political pressure. Further, peat fires release very large amounts of smoke, creating visibility and air pollution problems. The Great Dismal Swamp Fire Management Plan, approved in 1980, deals with impacts, prescribed burning, and wildfire suppression. Prescribed fire maintains the pioneer forest communities such as pine and cedar and retards forest succession (and the consequent decline in habitat quality and diversity). It also provides wildlife food and reduces wildfire hazard. Prescribed burning will be attempted for the first time in 1982, in the loblolly pine type and the remnant marsh. Site conversion from maple back to cedar, pine, or cypress, as well as cedar regeneration are also potential roles of prescribed burning. The public may be nervous about prescribed burning; it may become an important issue during the master planning process.

Proper safety equipment and training is essential for successful wildfire control and prescribed fire management. This has been done effectively for present staff and will need to be continued.

Options:

Issue: Fire Management - Cooperative Fire Detection and Suppression Agreements

Problem: It is to the interest of both the federal and state governments to contain and control fires in the Dismal Swamp. Currently, a cooperative agreement exists only with North Carolina.

Situation Statement: After a series of unsuccessful negotiations, no cooperative agreement with Virginia exists at this time. Fiscal disagreements were the main reason negotiations with Virginia failed. A cooperative agreement is still desirable to improve relations between FWS and Virginia and to provide suppression support and backup for refuge firefighting activities.

A cooperative agreement for fire protection with North Carolina became effective in 1976. To date there have been no problems with this agreement, although North Carolina is considering changes.

Assistance is available to the refuge through the Boise Interagency Fire Center for suppression.

Issue: Timbering

Problem: Some adverse public reaction to using cutting as a forest management tool is anticipated, although there is no past record of strong support or opposition.

Situation Statement: Recommendations of the Secretary of the Interior stressed the importance of timber management for Great Dismal Swamp. Active timbering is required at this time due to the past total disturbance of the entire swamp area. Initial activities will concentrate on preserving and perpetuating non-shade tolerant species requiring disturbance for their survival, and reducing over-abundant species. It should be emphasized that cutting is a management tool to perpetuate desired forest types and benefit wildlife and is not done for commercial purposes (although sales may be the most practical means for removing trees). Test plots will be cut prior to making timber cutting operational.

Options:

Issue: State of Habitat Maintenance and Conversion

Problem: Maintenance as used here implies perpetuating a habitat in its current species type and on the same area. The basic problem, other than a need for information on pertinent silvicultural methods, is the necessity of determining the optimum area and dispersal of types for refuge objectives. Hopefully this can be resolved during the master planning process. Using the computers as a tool, habitat projections can be refined and clarified as more data becomes available.

Situation Statement: Currently all habitat types are threatened by red maple, a disturbance species. Maple-gum already occupies 56 percent of the refuge and this proportion will increase without management. The remaining six types must be maintained at least at their current levels to prevent further loss of diversity and wildlife benefits. In some cases acreages will be increased through conversion to improve the balance of types.

Once objectives are set for habitat area and dispersal, cover types and individual stands can be ranked for management priority considering such criteria as potential immediate loss, percent of refuge area, wildlife values, and impact on overall refuge diversity.

Issue: Firewood Cutting

Problem: The level and intensity at which this program will be carried out in the future needs to be determined.

Situation Statement: Firewood has been available to the public since 1980 in the spring and fall. Initially, the program was minimal, with the cutting of only dead and downed trees. It was expanded in 1981, with the cutting of a wildlife opening and cutting along the roads; also, it was publicized

The refuge was deluged with requests for permits, and 87 were issued. Control, enforcement, and administrative problems were encountered.

The primary objective of firewood cutting is to serve as an economical management tool, to clear roadsides or wildlife openings. A secondary objective is to provide a public service. To avoid the 1981 problems, a contract might be the most efficient means of accomplishing the first objective, but would eliminate the second objective.

- Options:
- 1) continue issuing individual permits
 - 2) charging fees
 - 3) decreasing wood allotments
 - 4) not publicizing
 - 5) allowing cutting of dead and down trees only

ISSUE: HUNTING

PROBLEM: HUNTING A VARIETY OF GAME SPECIES, HUNTING WITH DOGS, AND HUNTING BY CLUBS WITH UNLIMITED ACCESS HAS BEEN THE ESTABLISHED TRADITION IN THE DISTAL SWAMP AND SURROUNDING COUNTIES.

SITUATION STATEMENT: SINCE THE ESTABLISHMENT OF THE REFUGE IN 1973, THERE HAVE BEEN 4 CONTROLLED HUNTS FOR WHITE TAILED DEER. THE REFUGE HUNTS ARE STRUCTURED TO SPECIFIC DATES, SPECIFIC LOCATIONS, LIMITED NUMBER OF HUNTERS BY PERMIT AND PROHIBITION OF DOGS. THE REFUGE DEER HUNTS ARE IN ACCORDANCE WITH FWS POLICY AND RESPOND TO THE INCREASING NEED FOR PUBLIC HUNTING OPPORTUNITIES FOR NON-CLUB AFFILIATED INDIVIDUALS. THE OBJECTIVES OF THE HUNT ARE TO:

- 1) PROVIDE QUALITY RECREATIONAL OPPORTUNITIES
- 2) UTILIZE RENEWABLE RESOURCES
- AND 3) REGULATE WILDLIFE POPULATIONS WITHIN THE CARRYING CAPACITY OF THE RESOURCE.

DATA COLLECTED BY THE SOUTHEASTERN DISEASE LAB AND A REVIEW OF DATA FROM THE DEER TAKEN DURING THE HUNTS IN '79, '80 & '81 SHOW THAT THE HERD IS ^{still} OVER POPULATED AND STRESSED. CROD DEGRADATION ALONG THE PERIPHERY OF THE SWAMP IS AN ADDITIONAL REASON FOR THE REFUGE TO FURTHER REDUCE THE DEER HERD.

OPTIONS:

1. INCREASE HUNTER SUCCESS WITH THE USE OF DOGS. (THE TRADITIONAL METHOD FOR MOVING DEER THROUGH DENSE COVER)
- 2) INCREASE HUNTER DENSITY - CLOSE MORE OF THE REFUGE TO OTHER ACTIVITIES
- 3) INCREASE HUNTER DATES - ESTIMATED COST TO REFUGE \$3000 / DAY
- 4) TRAP & TRANSPLANT DEER - NO DEER ARE NEEDED WITHIN REGION
- 5) SELECT & KILL DEER WITH EXPERT MATRIMON - COST TO REFUGE AND REDUCE PUBLIC RECREATIONAL ACTIVITY.

PUBLIC USE MANAGEMENT ISSUES

Issue: Hunting

Problem: Questions concerning hunting with dogs, hunting for species other than deer, and hunting limitations are expected to surface during the master planning process.

Situation Statement: Hunting in the swamp is a firmly established tradition, especially through hunt clubs. Deer has always been the primary species hunted, although many other birds and mammals have also been taken over the years. Prior to refuge establishment, dogs were used to locate and move deer. Hunting was halted when the refuge was established in 1973. It was re-initiated in 1975 with a controlled deer hunt. There was a second hunt in 1979, and ^{demand} it has been growing ^{since that time} up to the present. The refuge deer hunt accords with FWS policy and responds to the need for increased public hunting areas in Tidewater. Its purposes are to: 1) provide recreational opportunities, 2) utilize renewable resources, and 3) regulate wildlife populations. The carrying capacity for deer on the refuge is relatively low. Therefore, parasite and disease problems may occur even if there are relatively few deer per land unit. Another purpose of the hunt is therefore to increase the health of the herd. ^{HUNTING} This issue has the potential to become one of the most frequently commented upon during the master planning process.

THIS
SWAMP
AS #3
NOT 100%
PURPOSE

Options: 1) To better control the deer herd, use dogs in hunting. This is the most emotional hunting issue. Although it is a tradition in the Southern U.S., dogs have never been used on a National Wildlife Refuge for deer hunt. If Dismal Swamp is unable to increase its annual kill, use of dogs may become viable. ^{ALTERNATIVE} 2) Use expert marksmen, transplantation, or increased hunting pressure to control the herd.

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Issue: Fishing

Problem: There are concerns over limited numbers and diversity of fish, and access to Lake Drummond for fishing.

Situation Statement: Fishing has always occurred in Dismal Swamp, for both food and recreation. Before the refuge was established, fishing occurred on Lake Drummond and in the ditches; since 1973, access has been via Feeder Ditch only, and all other ditches are closed to fishing. Fishing is allowed during daylight hours; no bank fishing or commercial fishing are allowed. The last stocking of fish in the lake occurred in 1972. Today, prime sportfish are showing limited reproduction, with the yellow bullhead constituting approximately 85% of the fish population in the lake.

Prior to 1973, otter trapping helped maintain ditch fish populations. Since then, untrapped otter populations have increased, impacting fish populations in the ditch. Eagles and ospreys have been known to nest on Lake Drummond's banks, but have not been seen recently; this may be due in part to the depleted stock of fish. Swamp waters are very acidic and are a dark brown color -- this may be reason enough for limitation of most ^{fish} ~~gene~~ populations. Concerns have been expressed by local individuals, and inquiries have been made regarding stocking and revitalization of the lake. Another concern has been expressed regarding increased access for fishing on the Suffolk side of the swamp. During the past season, a number of day permits were requested and issued. Daily limits on vehicles were never reached, reflecting a small demand at this time.

Options:

1. Stock the lake
2. Terminate fishing program
3. Let program continue as is - subquality program

Issue: Vehicular Access

Problem: A large portion of the swamp, especially Lake Drummond, is still inaccessible to most visitors, even though demand exists for wildlife oriented recreation and interpretation.

Situation Statement: Historically, vehicular access to the swamp has always been restricted. Current restrictions are due to hazardous road conditions, the potential for vandalism and illegal activities, the need for parking areas, increased patrol needs, and increased maintenance. Permits for vehicular access are issued to special groups or individuals such as researchers and educators, the handicapped and elderly, and hunters and fishers. The general public is encouraged to enter the swamp by foot, bicycle, or boat, but this hinders most lake users. Past users, e.g., hunt club members, are the most critical opponents of the restriction. Access will be improved with the development of future facilities and increased services proposed by the Public Use Development Plan. This includes a Wildlife Interpretive Center and refuge headquarters near the swamp entrance, a shuttle tour bus between the WIC and Lake Drummond, a conducted boat tour of Lake Drummond, and those visitor contact stations.

Options: Immediate actions that could possibly be taken include increased publicity about presently available means of access, more refuge tours (if staffing were increased), more on-site programs and events, and better signing.

Issue: Boating

Problem: The public has concerns about horsepower restrictions and access for boating on Lake Drummond. AND SURROUNDING DITCHES.

Situation Statement: Boating on Lake Drummond has always been a popular activity. It is presently permitted by the refuge and is viewed as a compatible means of access, causing the least possible impact to swamp resources. Access to the lake is via Feeder Ditch only, and because of access limitations of the ^{TRAMWAY} ditch, boats must be less than 16' and weigh less than 1000 lbs. The only restriction being considered by the refuge is a limitation on horsepower, as recommended in the Public Use Development Plan. The intent of this is to: 1) keep wildlife disturbance to a minimum; 2) control unauthorized use, e.g. waterskiing; and 3) reduce general racing.

Long-time users may maintain that additional horsepower doesn't impact the swamp or its wildlife, and they may raise questions about using additional horsepower to escape adverse weather. Canoeing is encouraged, and is enjoyed by many visitors. The possibility of opening the ditches or establishing a canoe trail may become an issue during the planning process.

Options:

Issue: Trapping

Problem: There is a potential for trapping on the refuge which needs to be examined.

Situation Statement: Prior to establishment of the refuge, trapping was not extensive or permitted, but it did occur;

trapping has not been permitted since the refuge was established. The potential exists, and perhaps the need, for population control by trapping of nutria (if they establish themselves in the swamp), muskrat, raccoon, otter, and snapping turtles. State wildlife officials and adjacent residents favor raccoon trapping because of crop degradation. Still, public demand is low and trapping poses a potential problem of injury to hunting dogs.

Options: 1) Trial season for trapping in low use areas.
2) No trapping.
3) Permit unlimited trapping for trial period.

Issue: Long-distance Hiking Trails

Problem: A large demand exists for hiking trails in the swamp. Various trails are being advocated which may cause resource problems. The need exists to compare the suitability of the stronger proposals.

Situation Statement: P.L. 92-478 recommended public-oriented developments to provide access and encourage responsible use and understanding of the swamp, including hiking and interpretive trails. Several trails were proposed during the study process:
1) The Great Dismal Swamp State Park Master Plan prepared by North Carolina proposed hiking, nature interpretation, and wilderness camping in the swamp. It emphasized the use of logging roads to connect three or more camps; proposed a trail from the state park to Lake Drummond; proposed the Chesapeake develop a hiking and bike trail along the Dismal Swamp Canal on the COE right-of-way; and proposed that the COE establish

a trail along the Feeder Ditch to Lake Drummond. 2) The 1974 Virginia Outdoor Recreation Plan proposed an east-west cross-state trail, "Southside Trail", a portion of which would traverse the swamp from the Feeder Ditch to the northwest corner of the swamp. 3) The Dismal Swamp Committee of the Appalachian Trail Club proposed a trail to traverse the swamp from NE to SW, and a loop trail going east to the Dismal Swamp Canal and west to rejoin the main trail. They are now collecting data to determine the suitability of the trail. 4) All the above proposals were examined during the Public Use Development planning process; two trails were subsequently proposed: Feeder Ditch to Lake Drummond (2.5 miles), and a loop trail south of Feeder Ditch (6 miles). A possible extension of the second trail traversing the Dismal Swamp may be a long-range option.

Criticism of the PUDP proposals stems mainly from the Tidewater ATC; they maintain that the PUDP trails neglect natural features and incorporate established roads and monotonous paths. The PUDP, however, was primarily concerned with resource problems: compaction of organic soils, peat fires, controlling vandalism and illegal activities, increased maintenance, controlling camping, and expense. The compatibility between trails and resources must be established. Documents on hand regarding this issue are:

- * P.L. 92-478 Study
- * NC Dismal Swamp State Park MP
- * VA Outdoor Recreation Plan
- * Public Use Development Plan
- * PUDP Environmental Assessment

Options:

Issue: Horseback Riding

Problem: Horseback riding is not currently permitted on the refuge; future policy regarding this use needs to be determined.

Situation Statement: The horse and mule have played a traditional role in the swamp for transportation, hauling, and more recently recreation. There are currently few requests for use, and there are potential problems associated with it: road damage, animal wastes, possible illegal activities, and visitor safety. Currently demand is low for this activity, but it does offer certain potential benefits if it were to be permitted: another means of access to the refuge, an additional mode of transportation to Lake Drummond, and an increase in the variety of activities in the swamp.

- Options:
- 1) Open only a few rarely used road for riding.
 - 2) Permit riding over a six month period and analyze results.
 - 3) Open refuge to riding.

ACQUISITION ISSUES

Issue: Western Boundary of Refuge

Problem: Questions and controversies surround the delineation of the proposed western boundary and the acquisition of private landholdings within the boundary.

Situation Statement: According to P.L. 92-478, the boundary is to be delineated along the Suffolk escarpment. Precise delineation is difficult because the escarpment itself is over 2000feet wide. In 1977 the FWS proposed acquisition of the forest lands east of White Marsh Road, Desert Road, and Highway 32 to the treeline at fields' edge; this was considered to be desirable from a management and administrative standpoint. A majority of landowners were opposed, and the problem was compounded by an erroneous acquisition map in a local newspaper. Public reaction to acquisition was vehement - vocal, petitions, and resolutions. Options proposed by the public included preservation of the Dismal Swamp without destruction of the valuable farmland; special zoning; implementation of a hydro-logic study for boundary determination; proper funding for maintenance and operations of the existing refuge before further acquisition was proposed; and exchange of the power of eminent domain for flowage easements.

The FWS countered with five alternatives:

- 1) Fee title to edge of timber (original proposal)
- 2) Fee title to revised western boundary
- 3) Fee title to revised western boundary with landowner

reservations

- 4) Combined fee title and easement acquisition
- 5) Easement acquisition to revised western boundary

The FWS agreed that there was no immediate urgency within the next year to acquire land along the western boundary unless there were willing sellers. Other items tentatively agreed to in 1978 include:

- * original proposed boundaries could be changed
- * redraw boundaries to include only acreage necessary to preserve Dismal Swamp proper
- * conduct biologic and hydrologic studies to draw "biologic" boundary
- * negotiate on a continuing basis to set satisfactory boundaries and resolve controversies
- * pursue non-fee purchase alternatives such as water and scenic easements, life tenancies, etc. whenever possible
- * condemnation procedures would not be used except to clear title of lands of willing sellers

In 1980 a cooperative research program was established between the FWS, the USGS, and the COE to analyze the vegetation, soils, and hydrology of the western boundary. It is expected that an average contour lying on top of the groundwater discharge aquifer will be determined as a result of this study. Establishing boundaries at this contour would promote control of the inflow and maintain Dismal Swamp's integrity.

The importance of resolving this issue is great because the refuge needs control of groundwater inflows, and peripheral mesic hardwood areas containing important mast producing species are at stake. This issue affects all outputs since the entire ecosystem is involved. ^{WG SNOLP} [Howard Rybolt should be contacted to] determine

if a Solicitor's opinion is needed for any questions raised by this issue.

Options:

Issue: Highway 58 Bypass

Problem: In 1974, the Virginia Dept. of Highways (VDH) proposed a bypass around Suffolk which would cut through the northwest corner of the swamp. They wanted a land exchange with the refuge in order to do this. The proposal raised many questions which have not been resolved.

Situation Statement: This is a complex issue involving several federal, state, and local agencies, businesses, and meetings and correspondence. The Suffolk Planning Commission, as well as other city and state people, wanted the bypass to ease heavy downtown traffic and attract business. The FWS became concerned that the bypass would conflict with FWS wetland guidelines. An EA was done by the VDH; the FWS expressed the following concerns with the proposed bypass:

- * Changes in surface drainage could have far-reaching impacts on the refuge.
- * There were potential administrative and management problems associated with the severed portion of Dismal Swamp.
- * The rare dwarf trillium exists in or near the proposed ROW
- * The FWS needs consent from The Nature Conservancy for any changes in land use in that portion of the swamp.

The FWS subsequently found wetland areas in the proposed ROW requiring a 404 permit. The EA was found to be unsatisfactory

because it didn't adequately describe fish and wildlife resources or impacts on those resources, didn't mention the ramifications of altering hydrology, and didn't discuss alternatives. FWS then urged consideration of Alternative E as the least disruptive, and sought a Solicitor's Opinion regarding the necessity of VDH doing an EIS rather than an EA. Solicitor's Opinions are also needed to determine FWS responsibilities in regard to the National Natural Landmark Program and the Department of Transportation Act of 1976. The bypass subject is currently in limbo because Virginia has no present funding for the project.

Options:

OTHER ISSUES

Issue: Crop Depredation

Problem: Depredation of crops, primarily by bears and raccoons, on lands adjacent to the refuge is becoming an ongoing problem.

Situation Statement: Virginia and North Carolina receive complaints and issue all permits for removal of animals causing crop damage. Letters are in draft to each of the states requesting information on the historical trends of crop depredation, and areas of present and future concern. This relates to current hunting and trapping situations on the refuge.

Options:

Issue: Sensitive Species Management

Problem: State and federally listed endangered or threatened species need attention during the master planning process.

Situation Statement: The following species have been identified as endangered (E), extirpated-reintroduced (EX-R), or threatened (T) by Virginia and North Carolina.

<u>Plants</u>	<u>NC</u>	<u>VA</u>
Spinulose woodfern	T	
Crested Shield Fern	T	
Log Fern	T	

MammalsNCVA

Dismal Swamp Southeastern

Shrew

T

Beaver

EX-R

EX-R

Black Rat

E

River Otter

E

Birds

Turkey Vulture

T

Black Vulture

T

Cooper's Hawk

T

Sharp-shinned Hawk

T

T

Red-shouldered Hawk

T

Brown Creeper

T

Warbling Vireo

T

Osprey

T

Merlin

T

American Kestrel

T

T

Black-capped Chickadee

T

The states have many other listings with Special Concern or Undetermined status. The southern lemming vole (bog lemming) is currently being reviewed for federal listing, with state proposed listings to include the southern shrew (T), the river otter (E), and others. Due to destruction of black bear habitat in eastern Virginia and North Carolina, it should also be included in any sensitive species management considerations. Other species which are of special concern to the refuge are the dwarf trillium, the southern bald eagle, and the red-cockaded woodpecker, AND THE HYBRID POPULATION OF THE 105 FEARS (ORYZOPTERIS SM)

Options:

Issue: Wilderness and Natural Area Designation

Problem: Some interest has been expressed by organizations and several individuals for wilderness designation within the swamp, but this is countered by the fact that the swamp is not pristine

Situation Statement: The following statement was modified from the P.L. 92-478 Study.

In reviewing the Wilderness Act, several provisions need to be examined. Section 2.(a) defines the objective of this Act is to insure "preservation and protection" of some lands "in their natural condition" in a time of "expanded settlement" and "growing mechanization." Section 2.(c) defines wilderness as areas "where the earth and its community of life are untrammelled by man"... "retaining its primeval character and influences"... "with the imprint of man's work substantially unnoticeable." In accordance with Section 3.(c) of the Act, wilderness studies are initiated to review roadless areas of 5,000 contiguous acres or more, or roadless islands.

No appreciable parcel of land in the Dismal Swamp remains untimbered, and only a few small parcels of land have more than 40 years of growth. The pristine character of the swamp is no longer present as a result of the physical alterations and cutting practices. It does not appear that any areas meeting either the definition or criteria for review established by Sections 2 and 3 exist within the refuge.

Probably of greatest concern are the provisions of Section 4.(c) which prohibit the use of motor vehicles or equipment. Natural ecological processes are once again operating freely within the swamp; however, the ultimate results of the altered direction so effectively induced by human activities cannot be presently evaluated. Important decisions must be made regarding the new vegetation dominants and compatibility with the surrounding eco-

system. If the results of proposed research dictate the need for extensive management of large areas within the Great Dismal Swamp, the aforementioned prohibition would substantially reduce the capability of effective restoration. The ability to restore the Dismal Swamp as aggressively as it was altered must be retained.

An Act of Congress is required to establish a wilderness area, and thus maximum protection is afforded those lands so designated. Generally, National Wildlife Refuges are established by the Secretary of the Interior under the power vested in him through the Fish and Wildlife Act of 1956, Land and Water Conservation Fund Act, Fish and Wildlife Coordination Act, Migratory Bird Conservation Act, Endangered Species Conservation Act, and other legislation. The Great Dismal Swamp NWR is one of the few refuges to have received direct Congressional designation under Public Law 93-402 signed by the President in 1974. This Act provides further protection against future developmental pressure and exploitation in the refuge.

The physical and biological integrity of the Dismal Swamp NWR is being protected and the area constantly monitored by FWS personnel. If, during master planning, sections of the refuge appear to require wilderness protection, appropriate steps should be taken to initiate such action.

Options:

VII. Other Existing or Anticipated Problems or Opportunities

Army Corps of Engineers

An agreement exists with the Corps of Engineers whereby they will retain water in Lake Drummond at a minimum level of 3.6 feet by closing the locks on the Feeder Ditch. Conservation of water in Lake Drummond is to have priority over release of water to the Canal for navigation purposes. This agreement has not yet been officially signed and approved but ^{IT HAS BEEN} ~~was in fact~~ implemented ^{SINCE 1976} during the 1980 drought.

A memorandum of understanding between the Fish and Wildlife Service, Old Dominion University, and the Corps of Engineers provides that the captain's cabin at the Feeder Ditch campground can be used for environmental education programs in the event that regular boat tours are initiated by the refuge or university. This has not yet been initiated.

The Corps of Engineers owns a 100' wide right of way immediately west of and bordering the Dismal Swamp Canal. The spoil bank adjacent to the Canal supports many large, mature pines which provide some of the best potential red-cockaded woodpecker habitat in the Dismal Swamp. Conceivably an agreement could be negotiated with the Corps to manage this corridor for wildlife benefits.

North Carolina State Park Property

The refuge now has permission of the Division of Parks to maintain Forest Line Road and a portion of Corapeake Road on their property since it is advantageous for access to portions of the refuge. Of critical importance to water management is negotiation

of an agreement with North Carolina permitting us to rehabilitate Corapeake Ditch and remove trees larger than six inches diameter along the Ditch for equipment access. There is no agreement at this time.

Since the Division of Parks has approached the refuge about acquiring their property and the possibility of mowing and grading as necessary the other roads on their 14,300 acres for fire control and other access purposes, it would be worth exploring the feasibility of the Service obtaining secondary management rights.

VIII. Refuge Trends

The following trends have been extrapolated from the foregoing sections of this report. Other trends pertinent to master planning will need to be identified and substantiated during the master planning process.

Natural resource trends:

- * Interhabitat diversity is lessening
- * Inundation of the swamp is decreasing
- * Understory growth may be increasing in hydric communities
- * Inland wetland ecosystems are decreasing nationally
- * Regional changes in water regimes are altering the majority of inland wetlands, including the Dismal Swamp
- * Clearing and timbering of the swamp outside refuge boundaries for agriculture and forestry are proceeding rapidly
- * Successional rates in the swamp are accelerating, and directional changes in natural succession are occurring

- * If there is a regional drying trend, organic soils in the swamp may drop 6"-15" over the next 10-20 years
- * Regeneration of fire dependent communities is decreasing due to fire suppression policies
- * Nonforested habitats in the swamp are disappearing and being invaded by woody species, particularly maple

Socio-economic trends:

- * Population in the area is increasing by 6-10% per year
- * There is a substantial demand deficit for interpretive facilities and wildlife recreation uses
- * Acquisition is ongoing; a major portion of remaining acquisition is forecast for 1983-1985
- * Industrial, agricultural, and forestry land uses in the region are increasing
- * Public interest and use are expected to increase as facilities and services are developed
- * The short term staff and funding of the refuge is not expected to keep pace with growing maintenance and development needs
- * Water demands for municipal, agriculture, and industrial uses are growing

IX. Information Needs

Natural Resource Management

Necessary data for managing habitat types includes the vegetative cover map, hydrologic data, soils information, and wildlife information. Environmental factors controlling the ecosystem must be identified, magnitudes quantified, interactions between factors determined, and management potentials established. To establish management actions for affecting the swamp ecosystem, habitat types should be ranked considering such criteria as potential immediate loss, percent of refuge acreage, wildlife values, and impact on overall refuge diversity. After priorities have been determined, objectives must be developed and test plots established to experiment with habitat manipulation aimed at achieving these objectives. As methods for management are established, habitat maintenance, enhancement, or conversion can begin.

Elements of a data base necessary to realize the above management decision making include vegetative cover, hydrology, soils, silviculture, and wildlife information.

A. Vegetative Cover Map

This map depicts the spatial distribution and acreages of habitats, and acts as a base for overlaying other controlling factors such as topography, soils, and water regimes. The map can also act as a planning base for locating necessary changes, elements which can be altered, and predictive modelling of management objectives. Problems with the present map are that it is only 30-50% usable for management decisions, it shows only qualified photo-

interpretation of dominant canopy elements, it shows no understory under evergreen communities, and it shows no understory species composition. Its values are that its mapping units are at a reasonable scale and level of precision, the vegetative designations permit identification of areas for further study, and it acts as a good base for further refinement according to specific needs.

Information needs for vegetative communities should be ranked by community according to percent of remaining acres, stability, age class, and wildlife value. A quantitative evaluation of the community would include dominance, density, and frequency of species in canopy, shrub, and herb layers, and age and size class of canopy layers. Data interpretation of this evaluation would include correction and expansion of information on the cover map, and the projection of successional trends for specific communities.

B. Hydrology Data

The water regime is the primary controlling factor in wetland stability, and water is a potential tool for direct management of the ecosystem. Available data and information needs will be provided later.

C. Soils Data

Soils are an important secondary controlling factor. The presence and depths of organic soils reflect historic water regimes and are important in calculating fuel loads; organic soils are extremely dynamic.

Available information includes the Suffolk SCS map, the Otte Organic Soils Survey (depth, channels, water holding capacity, and percent ash). An overall soils map is needed for planning Dismal Swamp.

D. Silviculture Information

Complicating forest management at Dismal Swamp is the prevalence of deep organic soils and the necessity of managing species such as cedar and cypress which have received very little attention from forest researchers. Information is needed on 1) conducting operations such as natural and artificial regeneration, prescribed burning, and site preparation on organic soils, 2) natural regeneration of Atlantic white cedar, 3) regeneration of cypress and managing water levels for cypress, 4) safe and cost effective methods of reducing unwanted species competition, 5) hardwood mast species enhancement and site conversion, and 6) silvicultural guidelines for featured wildlife species habitat. To proceed with data collection and planning, priorities for initial forest management must be set by cover type or stand according to percent of remaining acres, potential loss, age class distribution, wildlife values, and impact on overall refuge diversity. Test plots and methods will then be developed; after the success of the test plots has been evaluated, successful methods will be applied generally.

E. Wildlife Information

The refuge is mandated to preserve indigenous wildlife species; wildlife maintenance is therefore a critical factor in ranking habitat and forest management needs. Wildlife is a measure of success of forest management. Available information for wildlife maintenance includes species lists, limited species composition and relative densities in habitat types (found in the literature), limited food preference, habitat preference, and population vitality information. Information is needed for species with national, regional, and/or local significance.

Refuge Fact Sheet

Date 12/3/81 Reviser: _____

Refuge: Great Dismal Swamp National
Wildlife Refuge

Date Established: 8/30/74

Acreage: 101,992@

Legislative District: VA - 4, NC - 1

Location: P.O. Box 349
Suffolk, VA 23434
(804) 539-7479

Counties: Virginia - City of Suffolk,
City of Chesapeake

North Carolina - Gates, Camden, Pasquotank

Mandates:

Public Law 93-402, established the refuge and authorized the Secretary of Interior to acquire the refuge for the "primary purpose of protecting & preserving a unique ecosystem & promoting public use not in conflict with the primary purpose."

Land Status:

- ② - deed reservations/by TNC on Tract 10 & 10B
- ② - 2/3 interest in Tract 14, 14B and 14C
- ② - questions concerning clear title on Tract 18, and adjacent Tracts 12 and 13.
- ② - various rights-of-way for utilities, railroads and roadways

Policy Direction:

- ③ - protect, preserve and restore unique ecosystem of plants and animals
- ③ - provide nature - oriented public use
- ④ - preserve the natural diversity and abundance of mammals and nonmigratory birds

Landscape Characteristics:

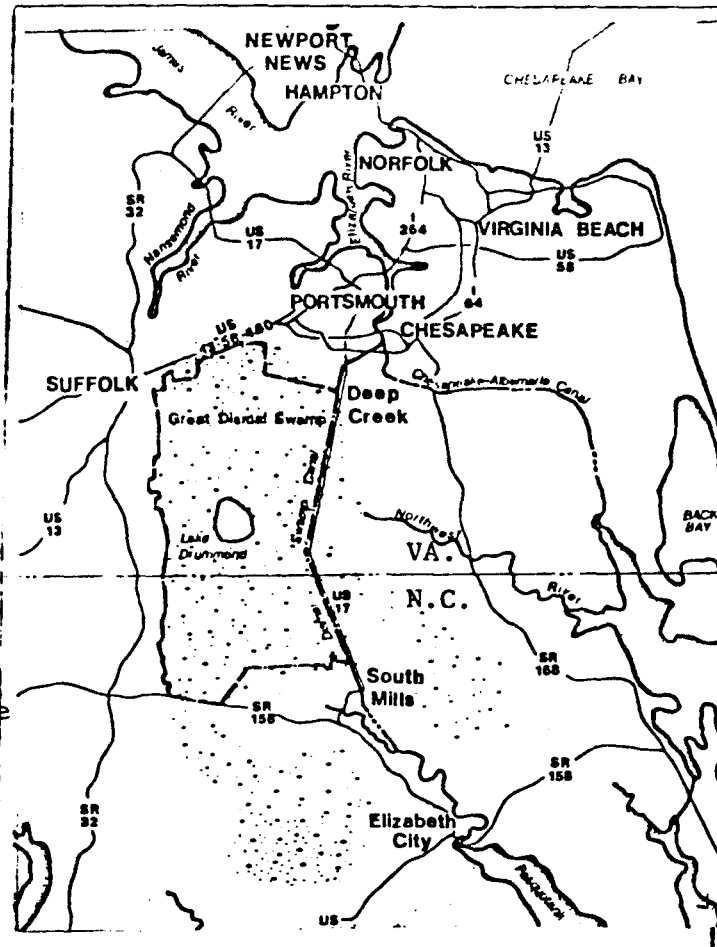
- ⑧ The Dismal Swamp is a palustrine forested wetland on the flat coastal plain of southeastern Virginia and northeastern North Carolina. Elevation declines from 25' on the western boundary to 17' on the Dismal Swamp Canal, with mean annual precipitation of 46". Originally dominated by extensive forests of baldcypress - tupelo and Atlantic white cedar, the nature of the swamps vegetation has been highly altered by human activity.

Wildlife:

- ⑤ - 203 species of birds including the bald eagle, osprey and a great number and variety of warblers
- ⑥ - 37 species of reptiles and amphibians
- ⑥ - 32 species of mammals

Public Use:

- ⑦ - environmental education (student & teacher)
 - interpretation (conducted)
 - wildland observation
 - hunting(deer)
 - fishing in Lake Drummond
 - photography
 - research



References for Fact Sheet, 12/3/81

- ① Realty, Boston, RO. on 12/2/81
- ② Refuge Tract files
- ③ Public Law Study, P.L. ~~92-478~~ 92-478
- ④ Final Environmental Statement on operations of the NWR system, November 1976
- ⑤ New refuge bird leaflet in preparation
- ⑥ The Great Dismal Swamp, by Brooke Meanley (1973)
- ⑦ P.P.B.E. output reports
- ⑧ Draft of Water Mgt Plan, refuge file