

FILE 9842

NATURAL RESOURCE MANAGEMENT PLAN
CAPE HATTERAS NATIONAL SEASHORE

1984

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Prepared by

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Date

RESOURCES MANAGEMENT PLAN
Natural Resources Section
Cape Hatteras National Seashore

Overview and Needs

Cape Hatteras National Seashore identified 24 threats in the 1980 "Threats to the Parks" report. The majority of these threats can be classified as resulting from pressures of adjacent land development (7) and shoreline processes or erosion (4). There is considerable overlap of these two concerns, as shoreline erosion itself would pose no threat without the concerns of existing development. Other categories include effects of off-road vehicles, vegetation trampling and hazardous spills.

The draft General Management Plan calls for several resource management activities. Foremost is the development of a vegetation map, to include major communities, endangered and exotic species. The vegetation map, will form the basis for a fire management plan. Information is needed on the natural role of fire on the islands, fire behavior and fuel models. The GMP calls for monitoring water quality, beach erosion, and ORV impacts; as well as the health and status of wildlife populations.

The Park Operations Evaluation team in 1982 recommended for natural resources a simple fire plan for Buxton Woods, and an evaluation of the Banker horse herd on Ocracoke Island. They also recommended a review of ORV access corridors; to maintain and mark those needed, and close those not needed.

The Statement for Management (1978) identified the following resource management goals:

- To manage Cape Hatteras National Seashore in ways that will enhance the natural processes of barrier island dynamics and succession of native vegetation and wildlife and will mitigate the impacts of human interference with these processes.
- To integrate planning and management for Cape Hatteras National Seashore into regional planning and economic considerations.
- To adopt an off-road vehicle management plan which would preserve the values of the National Seashore.

The Seashore is a resource in transition from a stabilized island system to more natural conditions. Heavy development pressures exist which need to be considered by management during this transition. Resource management will be guided by the enabling legislation, which calls for both recreational use and the protection of natural resources.

The goal of resource monitoring within the Seashore will be to establish zones, baselines, benchmarks, stations, etc. for the replicable, systematic study of vegetation, ORV impacts, water quality, wildlife and shoreline changes. Contracted research projects will stress methodology that can be replicated by park staff.

This plan calls for the collection of necessary baseline data, and the development of specific action plans for the protection of park resources. These action plans (ORV Management Plan, Fire Management Plan, Seashore Management Action Plan, Horse Herd Management Plan) will follow from the preliminary data gathering. Each action plan will be accompanied by alternative actions and an environmental assessment.

Cape Hatteras Natural Resource Management Priorities

<u>Priority</u>	<u>Project (Project Statement No.)</u>	<u>Base Funded</u>	<u>Partially Base Funded</u>	<u>10-238 No.</u>
1	Fire Management Plan		X	201
2	Vegetation Management		X	225
3	ORV Management		X	228
4	Shoreline Monitoring		X	
5	Sea Turtle Monitoring	X		
6	Protection of Colonial Water Birds	X	X	228
7	Banker Horse Herd Program			224
8	Wildlife Management Information			227/226
9	Monitoring of Urban Encroachment		X	
10	Pollution Abatement/Monitoring			226
11	RM Information Management	X		
12	Integrated Pest Management	X		
13	Boundary and Trails/Clearing		X	
14	Campgrounds and Walks		X	
15	Hatteras Inlet Dredging Spoil	X		

Summary of Natural Resource Management Needs

Identified in Approved Plans

<u>Plan</u>	:	<u>Calls for</u>
1. General Management Plan	-	Vegetation zone map
	-	Fuel model/Fire behavior map
	-	Survey of composition and structure of plant community: rare, threatened, exotic
	-	Assessment of ORV impacts
	-	Monitoring water quality
	-	Monitoring wildlife populations
2. Outline of Planning Requirements	-	Fire Management Plan
	-	Vegetation Management Plan
	-	Monitoring Urban Encroachment
	-	Shoreline Monitoring; Action Plan
	-	ORV Management Plan
	-	Ocracoke Horse Management Plan
	-	Wildlife, monitoring
	-	Water; ecological inventories

RESOURCE MANAGEMENT ACTION PLAN NEEDS
(Identified from GMP, OPR and RMP)

<u>Priority</u>	<u>Plan</u>	<u>Supporting Research 1984</u>	<u>Park Monitoring 1984</u>	<u>Draft 1984</u>	<u>Final 1984</u>
1	Fire Management	X	X	X	
2	ORV Management	X	X	X	-
3	Seashore Management		X		X
4	Ocracoke Horse Herd Management	X			
5	Vegetation Management		X		
6	Resource Monitoring	X	X		X

FY 84/85 Resource Management Projects (Park Responsibility)

- Install permanent benchmarks, photopoints, study plots, transects.
- Develop base map and overlays of boundaries, reference points.
- Develop standard RM maps/photos for field use.
- Develop overlays of ORV ramps and trails, establish standard numbering system for ORV trails.
- Establish shoreline monitoring system; maps and overlays of threatened facilities.
- Monitor vegetation transects and plots; species composition, shrub encroachment, fuel loadings, overwash.
- Natural history survey of Hammock Hills/Ocracoke Nature Trail.
- Develop overlays of historic vegetation from photos.
- Assess impacts and maintenance of Ocracoke Nature Trail.
- Draft Fire Management Plan.
- Map access trails in Buxton Woods, develop interim Fire Management Plan for Buxton Woods.
- Develop fire lane for Little Kinnakeet.
- Monitor prescribed burns at Pea Island.
- Establish fire weather stations at Bodie Island and Ocracoke.
- Perform vista clearing on Bodie Island.
- Survey and perform needed trail closures, revegetation areas.
- Update ORV Management Plan; perform necessary closures, establish and maintain necessary corridors.
- Develop ORV user brochure.
- Develop overlays from photos of inlet morphology trends.
- Establish standard monitoring systems and schedules: weather, water quality, shoreline, vegetation, wildlife.
- Establish RM zones or units for Seashore; develop bibliographies, overlays, data base.
- Organize RM information - library, computer applications.
- Hydrology study - Bodie Island/Buxton Woods.
- Continue data collection from contract studies; ORV impacts, deer census, pony pen vegetation, tern monitoring.
- Trash/refuse collection.

FUNDED 1984 RESEARCH

SERO Funded Fire Research:

- Fire/vegetation history; Buxton Woods
- Vegetation and fuel maps for Ocracoke and Hatteras Islands
- Fuel loadings Buxton Woods
- Fire access trail system Buxton Woods

Projected Products From \$15,000 Discretionary PRIP Funds:

<u>Product</u>	<u>Cost(\$)</u>	<u>Park Priority(s)</u>	<u>Project Statement No.</u>	<u>10-238 No.</u>
1. Inventory & mapping of rare & endangered vegetation, exotics	3200	2	N2	225
2. Aerial photos for vegetation & ORV Mgt.	610	1,2,3	N2,N3	201,225,228
3. Vegetation Assessment of Ocracoke horse pen	2200	7	N7	224
4. ORV Assessment (Vegetation/morphology Hatteras Inlet	2000-3000	3	N3	228
5. Monitoring/assessment colonial shorebird nesting	2000-3000	3,6	N6	227,228
6. Seashore Deer Census	1600	2,8	N2,N8	227,225
7. Inventory of arthropods & mollusks/Tidal creek pollution markers	1500-3000	8,9,10	N8,N9,N10	227,226
8. Ecological monitoring of freshwater ponds	500-2000	8,9,10	N8,N9,N10	226

NOTE: Funding available for Nos. 7 & 8 dependent upon final negotiations for Nos. 1-6.

SUPPORT FOR ONGOING PROGRAMS

Several research projects to begin in FY-84 are not funded to completion levels and will be phased. These projects have been assessed as high priority, and in almost all instances start up momentum would allow completion at a lower cost now than if delayed. These projects should receive highest priority for region SRP money, barrier island research funds, or the Seashore's resource management program:

1. Vegetation zone/fuel model maps for Bodie Island.
 2. Fire and vegetation history of Bodie Island; fuel loads.
 3. Water monitoring/pollution-encroachment indicators.
- The vegetation zone/fuel model digitized computer maps to be developed by North Carolina State University have great potential as resource base maps, and funds should be programmed for regular updates.
 - The water quality/pollution indicator studies can be phased and hold tremendous potential for student intern programs with limited base funding.
 - The goal for resource monitoring within the Seashore is to establish systematic, replicable programs which can be performed whenever funds and personnel allow. There is a great potential for much information development from VIPs, interns and students at a minimal cost. The key to a volunteer program will be housing support. The Seashore will support to the extent possible the provision of resource management volunteer housing.
 - The following surveys performed under contract in FY-84 should be continued on a regular basis by Park personnel or volunteers:
 1. ORV impact study
 2. Tern monitoring
 3. Deer census
 4. Vegetation surveys

FIRE MANAGEMENT PLAN (Park Priority #1)

The Buxton Woods, a 3000 acre maritime forest (1000 acres NPS owned), is probably the Seashore's most critical potential fire problem. The natural role of fire in this ecosystem, if any, has not been determined. The present fuel load in Buxton Woods is very high and a fire under the right fuel and weather conditions could result in a major loss to the ecosystem through near total fuel consumption. The present heavy fuel load with thick continuous understory presents a serious threat to property and human safety in the village of Buxton and adjacent National Park Service and Coast Guard facilities.

High fuel loads also occur in shrub thicket zones located throughout the Seashore. Numerous private developments as well as National Park Service structures are located within these high fuel areas.

The artificial dune line has prevented overwash and reduced salt spray, allowing a substantial increase in shrub cover within dune grassland and marsh areas. This is especially pronounced on Bodie Island, affecting migratory waterfowl habitat and consequently the quality of recreational hunting.

Research is needed to support the development of a Fire Management Plan. Research needs include: fire history, fire effects, and fuel model/fire behavior maps. The goals of fire management will be reduction of fire hazard in Buxton Woods, reduction of fuel loads, protection of Park and private property, and assessment of fire as a management tool (particularly for Bodie Island).

Proposed Actions

Fiscal Year 1984

- (1) Develop existing vegetation community map for the Seashore. This project will occur for Hatteras Island under SERO fire research funds. A map for Ocracoke Island was developed in 1983.
- (2) Develop fire/vegetation disturbance history for Buxton Woods. This project will occur under SERO fire research funds.
- (3) Develop a fuel model/fire behavior map from vegetation map. This project will occur under SERO fire research funds.
- (4) Develop detailed fuel loadings, vegetation cover maps, and fire access map for Buxton Woods. Project will occur under SERO fire research funds.
- (5) Work with above research team to develop interim fire management/containment plan for Buxton Woods.
- (6) Monitor (photograph) prescribed burns on Pea Island Wildlife Refuge.
- (7) Establish task force to develop draft Fire Management Plan for the Seashore.

Funding/Staffing Required*

Personnel (.10 work year GS-9, .20 work year GS-5) - \$5300
Supplies & Materials..... - 100

*Omits funding required for SERO research, numbers 1-4.

Fiscal Year 1985

- (1) Develop vegetation zone map, fuel model/fire behavior map, and vegetative history for Bodie Island.
- (2) Establish fire weather stations at Bodie Island and Ocracoke.
- (3) Establish fire management units and Fire Management Plan for the Seashore.
- (4) Continue monitoring of local wildfire or prescribed burns on Pea Island Wildlife Refuge.

Funding/Staffing Required

Personnel (.10 work year GS-9, .20 work year GS-5) - \$5300
Supplies and materials..... - 1200
Studies (not base funded)..... - 3500

Fiscal Year 1986

- (1) Assess fuel loadings on Bodie Island, develop prescription and conduct test burn for shrub reduction. Evaluate impacts to vegetation and fauna.

Funding/Staffing Required

Personnel (.05 workyear GS-9, .05 workyear GS-5) - \$5700
Supplies and materials..... - 1000

Fiscal Year 1987

- (1) Evaluate data on management burn, amend Fire Management Plan as necessary.

Funding/Staffing Required

Personnel (.05 work year GS-9) - \$1500
Supplies..... - 100

Fiscal Year 1988

- (1) Monitor burn areas, conduct and monitor necessary management burns.

Funding/Staffing Required

Personnel (.05 workyear GS-9) - \$1500
Supplies..... - 1000

VEGETATION MANAGEMENT (Park Priority #2)

The Seashore contains approximately 25,000 acres of dry and submerged land and extends for some 70 plus miles along the Outer Banks of North Carolina. These barrier islands represent a unique maritime environment protected from further development. From the oceanside to the soundside, the typical cross section of the islands consists of beach, berm, dunes, grassland flat, shrub thicket, maritime forest in wider locations, and marsh.

The existing environment is not now in a totally natural state. During the 1930s the Civilian Conservation Corp constructed an artificial primary dune line along the entire length of the National Seashore changing several natural processes including salt water overwash, salt spray, and sand migration. This unnatural dune formation has altered the ecological communities of specialized plant and animal species which have adapted to the often harsh and unstable barrier island environment. Temporarily, the washover/inlet islands have been converted into dune ridge islands (Leatherman 1979).

The distance from the ocean, prevailing winds, soil salinity, moisture, and periodic overwash are among the factors that determine the distribution of vegetation, as well as animal habitats. Shrubs have invaded some of the grasslands behind the dunes, causing a decline in the grass species adapted to overwash. Shrub thickets form where there is protection from salt spray and overwash; encroaching both interdune and marsh areas. Shrubs induced by drainage ditches limit scenic vistas along NC 12.

Many vegetated areas of the Seashore have been impacted by heavy pedestrian and off road vehicle use. The closing of the developing marsh at Oregon Inlet on Bodie Island has allowed significant recovery. Vegetation is developing on recently closed areas of Ocracoke flats. Further study is needed to determine the impacts of driving upon accreting inlet areas.

The goal of vegetation management will be to restore, to the extent feasible, natural processes, as well as a semblance of the natural mosaic of plants, on the Seashore. Vegetation monitoring is needed to assess changes and impacts. Visitor impacts need to be assessed, and areas closed and revegetated as necessary. The goal will be to funnel visitors on hardened corridors through sensitive vegetated areas to the more resilient beach. Access to marsh areas will be limited.

Research is needed to determine the historic vegetation cover, inventory and map exotic, rare and threatened species, map unique or sensitive areas, and monitor shrub encroachment and successional changes following catastrophic events (fire, storms).

Proposed Actions

(NOTE: See also ORV Mgt. and Banker Horse Herd)

Fiscal Year 84

- (1) Digitized vegetation zone maps will be developed for fire management project.
- (2) Inventory and map rare and endangered species, exotics, unique areas. (Purchase order - \$3000, funded through barrier island project).
- (3) Install permanent benchmarks, study quadrants, photopoints and transects. Begin data collection.
- (4) Survey and perform needed trail closures, revegetation areas.
- (5) Develop baseline information for Ocracoke nature trail.

Funding/Staffing Required

Personnel (.10 work year GS-9, .10 work year GS-5)	- \$3700
Supplies and materials.....	- 1000
Purchase order (funded).....	- 3000

Fiscal Year 85

- (1) Develop overlays, maps of overwash areas. Monitor vegetation changes in overwash areas.
- (2) Develop overlay maps, from historic photos, of vegetation successional changes.
- (3) Continue data collection on baselines and quadrants for species composition, overwash, and shrub encroachment.
- (4) Survey and perform needed trail closures, revegetation.

Funding/Staffing Required

Personnel (.10 work years at GS-9, .20 work years GS-5)	- \$5500
Supplies and materials.....	- 1500

Fiscal Year 866

- (1) Develop vegetation management plan.
- (2) Continue baseline surveys and photopoints.
- (3) Continue trail surveys.

Funding/Staffing Required

Personnel (.10 work yeras GS-9, .20 work years GS-5)	- \$5700
Supplies and materials.....	- 1500

Fiscal Year 87

(1) Continue monitoring and implement vegetation management plan.

Funding/Staffing Required

Personnel (.10 work years GS-9, .20 work years GS-5) - \$5700
Supplies and materials..... - 1000

Fiscal Year 88

(1) Continue monitoring and implement vegetation management plan.

Funding/Staffing Required

Personnel (.10 work years GS-9, .20 work years GS-5) - \$5700
Supplies and materials..... - 1000

OFF-ROAD VEHICLE MANAGEMENT (Park Priority #3)

In common with other Seashore areas, the use of off-road vehicles (ORV)s is a popular piece of equipment for utilization of this area. Used predominately by surf fishermen in pursuit of migrating schools of fish, ORVs are also used by surfers, swimmers, and sunbathers for access to beach areas of low use. In the past five years, Park management has gained a measure of support for an interim plan consisting of marked corridors, partial seasonal closures and temporary limited sound-side access. Almost all that can be accomplished under existing regulations has been done. Speed limits, permit system, prohibition of specific non-fishing related ORV activities (wheelies, cutting doughnuts, etc.) require special regulations.

If the interim ORV management plan is to work, improvement and upgraded maintenance of beach and sound access routes is critical.

Marked and maintained access corridors have mitigated ORV impacts in some areas; however, impacts on wildlife and vegetation needs better assessment. The interim ORV plan needs to be updated and finalized, with a review of natural resource impacts, access areas, travel corridors, and needs for closures. A study of inlet morphology would aid in corridor siting.

Proposed Actions

(NOTE: See also "Sea Turtle Monitoring" & "Protection of Colonial Waterbirds")

Fiscal Year 84

- (1) Assess vegetation and inlet morphology impacts at Hatteras Inlet (\$2500, funded through barrier island project).
- (2) Establish and maintain necessary corridors; make necessary closures.
- (3) Develop overlay of ORV ramps and ocean and sound side trails; develop standardized numbering system for all trails.
- (4) Update ORV Management Plan.

Funding/Staffing Required (Nos. 2-4)

Personnel (.10 work year at GS-9, .20 work year at GS-5)	-	\$11,000
(.20 work year for WG-8)		
Supplies and materials.....	-	3,000

Fiscal Year 85

- (1) Ongoing monitoring of visitor ORV use, posting and maintaining of ORV access routes.

Funding/Staffing Required

Personnel (1 man year at GS-5) - \$15,600
Supplies and materials..... - 6,300

- (2) Refurbishing/replacement of ramps on scheduled, life-cycle basis;
scheduled grading of sand routes: 110 ramp sections (4' x 8'), 2.4
miles of trail graded.

Funding/Staffing Required

Personnel (.2 man year for WG-8 Carpenter,
WG-8 Heavy Equipment Operator,
WG-7 Motor Vehicle Operator,
2 WG-5 Laborers) - \$4,500
Supplies and materials..... - 6,500

- (3) Determine vegetation and inlet morphology trends in heavy use areas
from photos.
- (4) Amend ORV Management Plan to reflect study findings and corridor
maintenance schedule.

Funding/Staffing Required

Personnel (.10 work years at GS-9) - \$2,400
Supplies and materials..... - 200

Fiscal Year 1986

- (1) Ongoing monitoring of visitor ORV use, posting and maintaining ORV
access routes; monitor impacts.

Funding/Staffing Required

Personnel (1 man year at GS-5) - \$17,000
Supplies and materials..... - 6,900

- (2) Refurbishing/replacement of ramps on a scheduled, life-cycle basis;
scheduled grading of sand routes: 110 ramp sections (4' x 8'), 2.4 miles
of trail graded.

Funding/Staffing Required

Personnel (.2 man years for WG-8 Carpenter,
WG-8 Heavy Equipment Operator,
WG-7 Motor Vehicle Operator,
2 WG-5 Laborers) - \$4,900
Supplies and Materials..... - 7,100

Fiscal Year 1987

- (1) Ongoing monitoring of visitor ORV use, posting and maintaining ORV
access routes; monitor impacts.

Funding/Staffing Required

Personnel (1 man year at GS-5)	- \$17,700
Supplies and materials.....	- 7,300

- (2) Refurbishing/replacement of ramps on a scheduled, life-cycle basis; scheduled grading of sand routes: 110 ramp sections, 2.4 miles graded trails.

Funding/Staffing Required

Personnel (.2 man years for WG-8 Carpenter, WG-8 Heavy Equipment Operator, WG-7 Motor Vehicle Operator, 2 WG-5 Laborers)	- \$5,100
Supplies and materials.....	- 7,400

Fiscal Year 1988

Same as FY-87

SHORELINE MONITORING (Park Priority #4)

The Cape Hatteras Lighthouse, listed on the National Register of Historic Places, has become a symbol of the Outer Banks. The erosion of nearby shoreline threatens the Lighthouse and has prompted several protection projects. The long range protection plans are outlined in the July 1982 "Environmental Assessment," with the preferred alternative being a sea-wall revetment.

Sandbags were placed as an interim protection measure in September 1982. In October 1982 the "Save Cape Hatteras Lighthouse Committee" placed 5000 units of "Seascape," an artificial seaweed offshore. In November 1982 the Wilmington District U.S. Army Corps of Engineers ran beach profiles every 500 feet for an area running from 10,000 feet north of the Lighthouse to 10,000 feet south of the Lighthouse.

"Seascape" has generated much interest nationally, including other units of the National Park System. Unfortunately, we do not have data to assess the effectiveness of Seascape as an erosion control device. SERO has contracted with the Corps of Engineers to make monthly assessments through divers of Seascape during FY 83 and 84. In addition, the State of North Carolina has expressed an interest in assessing Seascape.

The Seashore will monitor the beach configuration quarterly utilizing the Corps of Engineers baseline. In addition, we will work with the State and the Corps of Engineers to assess the effectiveness of Seascape. Our goal will be to guide our interim measure Lighthouse protection efforts, as well as provide some input for other Park units interested in Seascape.

Much information has been developed regarding erosion rates for the Seashore area, particularly by Bob Dolan, UVA, the State of North Carolina, and the Corps of Engineers. The Seashore will continue to work with these agencies for updates of their data.

Legislation is pending which would allow construction of the Oregon Inlet jetties. Should construction occur, detailed information will be needed on their impacts. Likewise, the opening of a new inlet is a potential area that would require assessment.

More specific information is needed on the condition and trends of beaches fronting the villages, threatened portions of NC 12, and NPS facilities. The Park will develop a monitoring plan for these assessments. More information is also needed on the morphology of our inlet sand flat areas.

Proposed Actions

Fiscal Year 84

- (1) Survey beach widths fronting villages, NPS facilities, and threatened areas of NC 12. Establish replicable system for future monitoring, and mosaic of beach conditions.
- (2) Develop overlays of inlet areas and shoreline trends from photographs.
- (3) Quarterly beach surveys adjacent to Cape Hatteras Lighthouse.
- (4) Monthly photos of beach conditions from ground and top of Lighthouse.

Funding/Staffing Required

Personnel (.15 work year, GS-9) - \$5400
 (.15 work year, GS-5)
Supplies and materials..... - 100

Fiscal Year 85

Same as FY 84

Fiscal Year 86

Same as FY 84

Fiscal Year 87

Same as FY 84

Fiscal Year 88

Same as FY 84

SEA TURTLE MONITORING (Park Priority #5)

Management is necessary for protection of sea turtles, because loggerhead sea turtles, a species listed as "threatened" under the Endangered Species Act of 1973, nest annually in this National Seashore. Also, loggerheads and some other listed species are occasionally stranded here dead, sick, or injured. Failure to locate and protect nests from human disturbance could result in the elimination of loggerheads as a breeding species in this National Seashore. Failure to locate stranded specimens and take data from them could result in the loss to science of some valuable data on life histories, causes of mortality, etc. Failure to dispose of stranded remains could lead to violations of the Endangered Species Act by visitors.

Personnel of this National Seashore currently cooperate with the U. S. Fish & Wildlife Service and the North Carolina Wildlife Resources Commission in their efforts to maintain sea turtles as a part of the North Carolina fauna. National Seashore personnel investigate every turtle crawl they learn of from reports by Wildlife Resources Commission pilots, by the Park pilot, or by Park visitors. They also discover some otherwise unreported crawls in the course of routine beach patrols. Annually, they investigate about 12 to 25 crawls. About 8 to 12 of these crawls have nests. Nests are marked with posts to facilitate monitoring and to prevent damage to the nest by vehicles. At laying date, plus 50 days, each nest site is posted from dune to tide with signs closing a 300 foot segment of beach to vehicle traffic to prevent loss of hatchlings in vehicle tracks. From laying date plus 60 days, each nest site is visited as often as practicable to watch for hatchings. If hatching has not occurred by laying date plus 75 days, the nest is dug up to determine the cause of failure, and posting signs are removed.

Annually, about fifteen stranded sea turtles, dead, sick or injured, are investigated by National Seashore personnel. Measurements are recorded, with any wounds and tag numbers and locations, on a form standardized by the National Marine Fisheries Service. Completed forms are forwarded to the Cape Hatteras National Seashore Resources Management Specialist, who relays them to the State coordinator at the North Carolina Natural Heritage Program, working with the North Carolina Wildlife Resources Commission. All injured turtles are reported to Pea Island Wildlife Refuge; dead turtles are then normally buried where found.

The goal of our activities in protecting sea turtle nests is to reduce to the practical minimum loss of eggs and hatchlings from human disturbance and from ocean overflow or beach erosion, and thereafter to hold this minimum. The goal of our activities in recovering data on stranded sea turtles is to cooperate with the National Marine Fisheries Service in maximum practical recovery of data on mortality factors, movements of tagged turtles, etc; also to hold to the practical minimum any taking of sea turtle parts by visitors in violation of the Endangered Species Act of 1973.

PROTECTION OF COLONIAL WATER BIRDS (Park Priority #6)

Hundreds of colonial water birds nest within the Seashore, making their protection a high management priority. Impacts on a few hundred acres of nesting sites could drastically reduce the populations or eliminate some species from breeding in the National Seashore. Ocracoke Flats, for example, provides nesting for more than 1200 terns and skimmers of five species on six sites totalling 160 acres. Parnell and Soots, 1979 rate this one of the most important beach nesting sites on the North Carolina coast. Disturbance by humans and pets, afoot or in vehicles, is believed to be among the greatest threats to nesting success. The only known nesting sites for colonial wading birds in this National Seashore are two (sometimes three) heronries located on Pea Island National Wildlife Refuge. These sites are posted annually in the nesting season by Refuge personnel. Participation by National Seashore personnel is limited to cooperation in law enforcement.

To protect nesting terns and skimmers, National Seashore personnel currently search the beaches each spring to locate nesting sites. Sites are then posted against all entry. Frequent beach patrols are made to enforce closures, count and record nests or nesting birds, monitor success in rearing young, and learn when birds have finished use of the site. When birds have ceased to use the site for nesting and rearing, the closure signs are removed and stored. During calendar 1981, nesting sites were posted as follows: Bodie Island, 1; Hatteras Island, 3; Ocracoke Island, about 6 on Ocracoke Flats. About six nesting sites for Forster's terns on small islands along Ocracoke Island soundside have never been posted since discovery. These islands are seldom visited by people. Parnell and Soots (1979) recommend no management action for them.

The goal of our protection activities for tern and skimmer nesting sites is to reduce to the practical minimum losses of eggs and young birds from human disturbance, and thereafter to hold this minimum.

Fiscal Year 1984

- (1) Continue existing activity of monitoring colonial water bird nesting, posting nesting areas, and controlling visitor impact.
- (2) Census and monitor shorebird nesting, evaluate adverse impacts. (\$2500) - funded through barrier island project.)

Funding/Staffing Required

Personnel (.33 man years GS-5) - \$4,400
Supplies and materials..... - 1,800

Fiscal Year 1985

- (1) Continue existing activity of monitoring colonial water bird nesting, posting nesting areas, and controlling visitor impact.

Funding/Staffing Required

Personnel (.33 man years at GS-5) - \$4,600
Supplies and materials..... - 1,850

Fiscal Year 1986

- (1) Continue existing activity of monitoring colonial water bird nesting, posting nesting areas, and controlling visitor impact.

Funding/Staffing Required

Personnel (.33 man years at GS-5) - \$4,800
Supplies and materials..... - 1,900

Fiscal Year 1987

Same as FY 86

Fiscal Year 1988

Same as FY 86

BANKER HORSE HERD PROGRAM (Park Priority #7)

The Park currently maintains a herd of horses in a 200 acre fenced enclosure on Ocracoke Island. This herd, believed by many to be direct descendents of stock brought to the new world by the earliest European explorers and colonists now numbers 21 and one loaned exotic stallion. Numbering 10 in 1974, the general health and appearance considerably improved with regular veterinary care, medication and attention.

The death of two foals in the Spring of 1981 from Haemolytic Anemia, a condition similar to the RH factor in humans, led local veterinarians to recommend an infusion of new blood to reduce the mutuality of the gene pool. Upon recommendation of veterinarians, an Andalusian stallion was obtained, by loan from Mr. Mel Baron of Afton, Wyoming, to breed with existing mares. Three Andalusian-Banker foals were born in 1982. Breeding has been terminated pending further study.

The Park's goal has been to increase the size and health of the herd to a point where its survivability would be insured and the interpretation of one facet of Outer Banks culture before the widespread use of motor vehicles and the advent of paved motor roads.

A recent management evaluation of all Park programs resulted in a recommendation to "Assess the wild pony program in terms of cultural value, basic operations, and political ramifications, provided the program is reduced or eliminated." Based on this recommendation, the need for research to document the cultural significance of this resource has been identified and is supported by a 10-238 Request in the Cultural Resource Management Section of the Resource Management Plan.

Corrollary to the cultural assessment of the herd and dependent upon its outcome is a need to determine the genetic significance of the herd, and to develop a breeding program which will ensure the survival of the herd and maintain genetically significant characteristics.

As early as 1900, Kearney noted exotic species introduced into the village of Ocracoke. An assessment is needed of the impact of the pony pen and management practices upon the endemic vegetation, including the possible introduction of exotic species. Assessment is also needed of the forage potential of the pony pen area.

Proposed Actions

Fiscal Year 84

- (1) Review past practices within pony pen area.
- (2) Inventory and map grasses within pony pen; monitor for exotics and forage potential. (\$2000 - funded through barrier island project.)

Funding/Staffing Required

Personnel (.02 Work years at GS-9)	- \$500
Supplies and materials.....	- 0

Fiscal Year 85

- (1) Continuation of monitoring program.

Funding/Staffing Required

Personnel (.05 Work years at GS-9)	-	\$1100
Supplies and materials.....	-	100

Fiscal Year 86

- (1) Determine genetic significance of herd.
- (2) Develop breeding plan to ensure survivability of herd.
- (3) Continuation of monitoring program.

Funding/Staffing Required

Personnel (.05 Work years at GS-9)	-	\$1100
Supplies and materials.....	-	100
Research funds for (1)&(2), Est...	-	6000

Fiscal Year 87

- (1) Develop Horse Herd and Pasture Management Plan.
- (2) Continue monitoring program.
- (3) Implement breeding plan.

Funding/Staffing Required

Personnel (.10 work years at GS-9)	-	\$2400
Supplies and materials.....	-	1000

Fiscal Year 88

- (1) Continue monitoring program.
- (2) Implement management plan.

Funding/Staffing Required

Personnel (.05 Work years at GS-9)	-	\$1200
Supplies and materials.....	-	100

WILDLIFE MANAGEMENT INFORMATION (Park Priority #8)

Several species listed as endangered or threatened under the Endangered Species Action of 1973 occur in the National Seashore. Six listed sea turtles have been recorded from the National Seashore's beaches or adjacent waters, although only the loggerhead is known to nest within the Seashore. The brown pelican is the only endangered bird known to nest in the vicinity of the National Seashore. The peregrine Falcon is a seasonal migrant through the Seashore, and occasional sightings of the bald eagle occur adjacent to and within the Seashore.

Management for sea turtles, including loggerhead nesting is discussed in sea turtle monitoring (Park Priority #5). Brown pelicans nest and winter on natural estuarine and spoil islands in the vicinity of Ocracoke Inlet. (Parnett & Soots, 1979). The inaccessibility of these islands protects the nesting area.

The last inventory of the wildlife within the Seashore was the study by Dr. Thomas L. Quay in 1959, "The Birds, Mammals, Reptiles, and Amphibians of Cape Hatteras National Seashore Recreational Area." Many changes have occurred since then, especially increases in developments within the villages along the seashore. An update is needed to detect and follow any changes in species and populations which may have occurred.

"An Atlas of the Colonial Waterbirds of North Carolina Estuaries," Parnett and Soots, 1979, listed the nesting areas, species, relative abundance and management requirements for colonial waterbirds within the Seashore. The Seashore needs to continue to monitor nesting areas, especially in regards to ORV effects and changes needed in interim ORV plan, and changes in habitat.

There has never been a census of the white-tailed deer population in Buxton Woods. This information would assist in vegetation management and law enforcement, as well as establishing baseline data. Little is known on the ecology of fresh water ponds within the Seashore, or the arthropod or mollusk populations within the Seashore. Certain organisms may be indicators of environmental health. Studies should be encouraged to acquire this baseline data.

Fiscal Years 1984, 1985, 1986

- | | | |
|---|--|------|
| * | (1) Fund an inventory of mammal, bird, amphibian and reptile populations within the Seashore | 5000 |
| * | (2) Fund a study of the freshwater ponds within the Seashore. | 2000 |
| * | (3) Fund or encourage inventories of arthropods and mollusks within the Seashore. | 2000 |
| * | (4) Perform deer census in Buxton Woods, assess census techniques. | 2000 |

NOTE: The deer census will provide replicable methodology which Park staff should regularly repeat.

MONITORING OF URBAN ENCROACHMENT (Park Priority #9)

Then enabling legislation for the Seashore excluded the eight villages along the Outer Banks (Ocracoke, Hatteras, Frisco, Buxton, Avon, Salvo, Waves and Rodanthe) from the boundaries and stated that management of the Seashore should ensure the prosperity of the villages. The boundaries of the villages purposely remained large enough for significant growth, in part to provide lodging and supplies for visitors to the Seashore.

In part due to the false security gained from the artificial dune line system, and following trends of growth adjacent to the coast, the villages grew at a rapid rate following the completion of the Bonner Bridge, across Oregon Inlet. Growth of the villages creates demands upon the Seashore for right-of-way for utilities, public services, and water development. Growth also increases demands for erosion control or protection measures for private property.

In the agreement granting a right-of-way for the Buxton to Avon water line in 1978, the Park outlined monitoring activities including participation in county planning and efforts to involve the State in monitoring ground water quality. To date, these efforts have been unproductive.

The county has recently completed its draft 1981 update of the local Land Use Plan required under the North Carolina Coastal Area Management Act. The object of our monitoring activities is to work with the county to assess the need for public service infrastructure upgradings based on growth projections. The goal will be to provide comprehensive planning to meet county needs with minimal impacts to the Seashore.

Growth also causes demands for protection of private property. The villages continually question the management policy of no dune maintenance. The Seashore needs to develop a management strategy, as a separate action plan appendix to the GMP. While we are not legally responsible for the protection of private property adjacent to the Seashore, there may be areas where we can allow private property owners to take action, such as limited native grass plantings and boardwalks, to maximize the overwash protection available from the existing dune system. The Seashore already has several private boardwalk dune crossovers by Special Use Permit, and several property owners have planted grasses on Park lands without permission. A comprehensive approach would ensure a "good neighbor policy" within Seashore goals and NPS Management Policies guidelines.

Continued growth may result in deterioration of Park resources. Baseline monitoring, particularly water quality, is needed to detect changes.

Fiscal Year 1984

- (1) The University of North Carolina has contracted with Dare County to perform a "carrying capacity" study of Hatteras Island. This study will determine the undeveloped lands and potential for growth within the villages. It will assess the limits of water, space, sewerage and utilities. We will provide information and possibly logistical support to the study team, we should gain valuable information.

- (2) North Carolina State University proposes a study of resident and visitor perception to growth within the villages.
- (3) Monitor condition (width) of beaches fronting villages through surveys and photos. This work will be accomplished chiefly through the use of volunteers. (See "Shoreline Monitoring" - Priority 4)
- (4) Determine the extent of State monitoring activities of ground water and sound waters. Secure available data for baseline.
- (5) Develop Seashore Management Strategy to outline relationship of villages to shoreline policy.
- (6) Develop water monitoring schedule. (See "Pollution Abatement," Priority 10)

Funding/Staffing Required

Personnel (.05 work years at GS-9)	- \$1200
Supplies.....	- 50

Fiscal Year 1985

- (1) Assess future demands on park resources from anticipated county growth. Develop overlays of existing rights-of-ways. Work with county for planning.
- (2) Hydrology study of S. Nags Head, Buxton Woods; drainage, effects of draw down.
- (3) Continue water and shoreline monitoring.

Funding/Staffing Required

Personnel (.10 work year at GS-9)	- \$2500
Supplies and materials.....	- 200
Funding for Hydrology Study(Est).	- 4000

Fiscal Year 1986

- (1) Continue planning cooperative efforts, growth assessment, water and shoreline monitoring.

Funding/Staffing Required

Personnel (.05 work years at GS-9)	- \$1200
Supplies and materials.....	- 100

Fiscal Years 1987 & 1988

Same as FY 86

POLLUTION ABATEMENT/MONITORING (Park Priority #10)

The Seashore took weekly water sample tests at various ocean and sound locations for 2 1/2 years during 1979 through 1981. Although these tests (DO, pH, salinity, alkalinity, hardness, N, Cl) provide a baseline, periodic updates are needed. In addition, the fresh water ponds within the Seashore were not included in the previous testing.

The county and State periodically test groundwater within the villages. This data is available as baseline, along with U.S.G.S. studies. We have working agreements with the State for test wells on Bodie Island and at Wright Brothers Memorial.

Air quality is periodically threatened locally by highway traffic; however, the generally windy climate, adjacent large bodies of water, and seasonal nature of traffic, tend to negate effects of traffic exhausts. The Seashore will work with the Environmental Protection Agency and the State to monitor the regional airshed (Class II under Clean Air Act of 1970).

An exploratory oil well is projected to begin during 1984 approximately 35 miles off Cape Hatteras. The potential exists for other leases in the area, with projected tracts of proposed OCS sale number 78 lying 17 miles off-shore. However, the current lease does not expect a greater than 2% chance of recoverable oil in the area, and even should a field be developed, the staging and landfall area will be considerably to the south (Morehead City). The main threat to the Seashore is expected to remain that of sunken tankers.

The Seashore has no formalized Oil and Hazardous Spill plan, although we are in constant contact with the Coast Guard and have reported several minor oil spills. The Seashore will formalize an Oil and Hazardous Spill Plan, in conjunction with the Coast Guard and the State.

Proposed Actions

Fiscal Year 1984

- (1) Establish stations and develop ongoing monitoring program for freshwater ponds, ocean and sound waters, and groundwater. (See Monitoring of Urban Encroachment-Park Priority #9) Include biota samples as indicators.
- (2) Collect baseline air and water monitoring data from State and EPA.

Funding/Staffing Required

Personnel (.05 work years at GS-9)	-	\$1200
Supplies and materials.....	-	200
Funding for monitoring (\$2500 from barrier island project).....	-	2500

Fiscal Year 1985

- (1) Continue monitoring program, encourage university participation.

Funding/Staffing Required

Funding for samples - \$2500

Fiscal Year 1986

Same as FY 85

Fiscal Year 1987 & 1988

(1) Continue monitoring program.

Funding/Staffing Required

Personnel (.05 work year at GS-9) - \$1300
Supplies and materials..... - 1000

RESOURCE MANAGEMENT INFORMATION MANAGEMENT (Park Priority #11)

Much current information relevant to resource management exists in scattered files, or is stored randomly and thus, hard to retrieve. A great need exists to organize information in a useful and retrievable manner.

The resource management office will review all articles in the technical files for relevance and to ensure that the card catalog and articles match. This review will also be used to develop abstracts and subject bibliographies (by project statement titles and geographic location) for all relevant entries. Resource management zones will be established for the Seashore, with map overlays and administrative histories of studies, impacts, uses and threats developed for each zone. Park files will be searched and oral interviews conducted to augment this process.

The Recreation Administration Department, School of Forestry, North Carolina State University, has developed a digitized vegetation zone map for Ocracoke Island. In FY 84 they will develop digitized vegetation/fuel model maps for Ocracoke and Hatteras Island. These maps can be labeled to include resource information (fire history, turtle crawls, overwash or erosion changes) and should be encouraged as a significant part of the Seashore resource base inventory. The process should be continued for Bodie Island as soon as possible.

The Park has acquired an IBM-PC, and should explore its potential for resource management. Possibilities include shoreline data, water quality data, and wildlife sighting information.

Proposed Actions

Fiscal Year 1984

- (1) Establish and develop overlays of Resource Management Zones. Begin data base for each zone.
- (2) Review technical file data for relevance and establish bibliographies for each RMP project statement and each resource management zone.
- (3) Develop standardized base map for field use.

Funding/Staffing Required

Personnel (.25 workyears at GS-9) - \$7000
Supplies and materials..... - 500

Fiscal Year 1985

- (1) Update and key in data base on resource computer maps generated by NC State.
- (2) Review existing files, interview employees for data base for resource management zones.

- (3) Review archival maps and drawings for data base for resource management zones.

Funding/Staffing Required

Personnel (.25 work years at GS-9) - \$7000
Supplies and materials..... - 750

Fiscal Year 1986

- (1) Continue data collection by resource management zones.

Funding/Staffing Required

Personnel (.10 work years at GS-9) - \$2700
Supplies and materials..... - 50

Fiscal Year 1987

Same as FY 86

Fiscal Year 1988

- (1) Continue data collection by resource management zones.
(2) Update and key in data base on resource computer maps generated by NC State.

Funding/Staffing Required

Personnel (.10 work years at GS-9) - \$2700
Supplies and materials..... - 750

INTEGRATED PEST MANAGEMENT (Park Priority #12)

Interim Guidelines for Pesticide Use in NPS areas (September 2, 1982), and related Director's Memorandum of February 6, 1981 have established that the National Park Service will make every effort to allow natural processes to operate unaffected by artificial substances and human activities.

During the summer of 1982 the Hyde County Health Department threatened to close Ocracoke Campground due to persistent complaints of mosquito bites and welts by campers and alleged health problem. Accordingly, a mosquito monitoring program for adults within the campground and larva within a nearby pond and marsh area was established. One application of *Baccillus thuriengensis israelensis* (BTI) was made for the pond and associated wetlands.

Although adults in campground decreased, results are inconclusive as the summer was dry and mosquitos were "light." Pressure from the county can be anticipated again in the future.

Park guidelines will continue to prohibit the use of any chemical pesticide without prior approval from the Resource Management Office. Guidelines further require pest evaluations to be conducted under IPM procedures.

Fiscal Year 1984

- (1) Development of mosquito monitoring and threshold levels for Ocracoke Campground. Mapping of larva and breeding areas. Develop feasibility of "fall-back" BTI program should public health hazard arise.

Funding/Staffing Required

Personnel (.03 man year at GS-9) - \$750
Supplies and materials..... - 100

- (2) Development of mosquito monitoring and threshold levels for Salvo Campground. Mapping of larva and breeding areas. Develop "Fall-back" BTI program should public health hazard arise.

Funding/Staffing Required

Personnel (.01 man year at GS-9) - \$250
Supplies and materials..... - 100

Fiscal Year 1985

- (1) Continue Mosquito monitoring programs for Ocracoke and Salvo Campgrounds.

Funding/Staffing Required

Personnel (.04 man year at GS-9) - \$1050
Supplies and materials..... - 100

Fiscal Year 1986

(1) Continue mosquito monitoring for Ocracoke and Salvo Campgrounds.

Funding/Staffing Required

Personnel (.04 man year at GS-9) - \$1100
Supplies and materials..... - 100

Fiscal Year 1987

(1) Mosquito monitoring for Ocracoke and Salvo Campgrounds.

Funding/Staffing Required

Personnel (.04 man years at GS-9) - \$1150
Supplies and materials..... - 100

Fiscal Year 1988

(1) Mosquito monitoring for Ocracoke and Salvo Campgrounds.

Funding/Staffing Required

Personnel (.04 man year at GS-9) - \$1200
Supplies and materials..... - 100

BOUNDARY AND TRAILS/VEGETATION CLEARING (Park Priority #13)

The boundaries along Bodie Island at South Nags Head, and throughout the Buxton Woods area exist in areas of thick, woody vegetation and high fuel loads. These areas are in need of clearing for boundary trails/fire breaks. VEPCO should be encouraged to clear the S. Nags Head boundary during negotiations for their power line corridor. The existing trail system in Buxton Woods should be mapped and assessed for its adequacy for fire control access.

Shrub thicket areas adjacent to the villages should be assessed for fire break needs. A fire lane of 30 feet should be cut and maintained around the perimeter of the Little Kinnakeet Lifesaving Service Station.

Vistas from NC12 are being obstructed, particularly on Bodie Island, by Myrica sp. thickets encouraged by drainage ditches. These thicket lines should be mechanically removed. The State of North Carolina DOT should be encouraged to mechanically remove young growth shrubs along new ditches on Hatteras Island. The Park should monitor their growth and remove, if necessary.

The new nature trail on Ocracoke will require dune crossings. Materials used and their success should be monitored to determine the best construction methods.

Proposed Actions

Fiscal Year 1984

- (1) Clear brush along NC12 on Bodie Island through use of YCC.
- (2) Establish fire lane around Little Kinnakeet.
- (3) Negotiate for VEPCO for boundary clearing in S. Nags Head.
- (4) Monitor Ocracoke Nature Trail.
- (5) Map trail system in Buxton Woods; work with fire researchers to develop access trail/fire break system.

Funding/Staffing Required

Personnel (.05 work years at GS-9)	
(.10 work years at GS-5)	
(1.0 work years YCC)	- \$8,800
Supplies and materials.....	- 1,000

Fiscal Year 1985

- (1) Establish and map fire break/trail system in Buxton Woods.
- (2) Monitor vegetation clearing needs.
- (3) Clear S. Nags Head boundary.

Funding/Staffing Required

Personnel (.05 work years at GS-9)
 (.10 work years at GS-5)
 (.05 work years at WG-7) - \$3,200
Supplies and materials..... - 1,000

Fiscal Year 1986

- (1) Monitor vegetation clearing needs.
- (2) Clear S. Nags Head boundary, fire lanes as necessary.

Funding/Staffing Required

Personnel (.05 work years at GS-5)
 (.05 work years at WG-7) - \$1,600
Supplies and materials..... - 1,000

Fiscal Year 1987 & 1988

Same as FY-86

CAMPGROUNDS AND WALKS (Park Priority #14)

Resource management assessments for the campgrounds need to be performed early in the season, and continuously, to determine visitor impacts and general conditions. Assessment checklist would include: vegetation impacts, mosquito counts and habitat survey, survey of trails and paths, rodent burrows, wasp and yellow jacket counts, clearing perimeter check, and weeds in pavement cracks. Findings will provide basis to establish injury or treatment levels and necessary actions.

Proposed Actions

Fiscal Year 1984

- (1) Monitor campgrounds for visitor impacts and pest species; establish action levels, implement as necessary.

Funding/Staffing Required

Personnel (.05 work years at GS-9) - \$1,200
Supplies and materials..... - 100

Fiscal Years 1985, 1986, 1987 and 1988

Same as FY-84

HATTERAS INLET DREDGING SPOIL (Park Priority #15)

The Corps of Engineers notified Dare County in 1976 that the county was responsible for finding a suitable spoil site for Hatteras Inlet, as open water spoil dumping was no longer environmentally acceptable. The county was issued a Special Use Permit in 1977 for pipeline spoil disposal on the ocean beach on Hatteras Island. The permit was renewed in 1983, with dredging in March 1984.

The Seashore needs to continue to work with the county, state and Corps of Engineers for dredging alternatives. It will be the policy of the Seashore that the stockpiling of dredge spoils on park lands will not occur. Disposal may occur, in lack of feasible alternative, on ORV trails or corridors, or on the beach berm. Beach disposal shall be above the high water mark and below the toe of the dune.

Dredge spoil islands are becoming increasingly important to formerly beach nesting colonial shorebirds. The recently passed non-game tax check off for the State of North Carolina may provide management funds for these islands. The Seashore shall work with the state and the Corps of Engineers to maximize the benefit of these spoil islands to wildlife.

Fiscal Year 1985

(1) Work with county, State and Corps to develop long range dredging plan.

Funding/Staffing Required

Personnel (.05 man year at GS-9) - \$1,150

1.1 CAHA-NI - FIRE MANAGEMENT PLAN

1.2 Statement of Issue or Problem

Buxton Woods, a significant natural area containing 3,000 acres of maritime forest on NPS and private lands, contains dangerously high fuel loads. The natural role of fire in the evolution of the Woods is unknown. There is no fire management plan or fire trail and break system for the Woods.

The prevention of overwash by the creation of the artificial dune line has allowed shrub encroachment within former open dune grasslands and marsh areas. Private developments adjacent to the Park and Park facilities are located within these high fuel areas. Successional changes have also reduced wildlife, especially migratory waterfowl, habitat.

Current Management Action

Wildfire control consists of full suppression. There is insufficient data on fuel loads and fire behavior. Grassland and marsh environments continue to be invaded by woody plants and fuel loads continue to build.

1.3 Alternative Actions and Their Probable Impacts

(1) Continue Present Management

Under this alternative the Park would continue to suppress all fires. There would be no fuel reduction activities, or assessment of the most environmentally sound fire confinement activities. Marsh and grassland habitat would continue to decrease.

(2) Fund a Study to Develop a Vegetation and Fire Management Plan

This alternative would provide the expertise to collect data and develop alternative strategies enabling management to decide what type and stage of vegetation should be maintained on Cape Hatteras National Seashore; determine historic role of fire in this environment and assess possible uses of fire as a tool in attaining desired ends, and develop alternatives for the preservation of Buxton Woods.

(3) Establish Park Vegetation/Fuel Load Monitoring

This alternative would establish continuing data collection to augment fire management plan, monitor shrub encroachment, and monitor wildfire or prescribed fire effects.

(4) Recommended Course of Action

Alternatives 2 and 3 are recommended. Information derived from such studies could not only result in management actions which would improve habitat for native plant and animal species, but could develop information that would be of value in interpreting the resource.

Plans developed from this study would assure the preservation of Buxton Woods, and reduce potential for loss to Federal and private structures.

2.1 CAHA-N2 - VEGETATION MANAGEMENT

2.2 Statement of Issue or Problem

During the 1930's, the Civilian Conservation Corps constructed an artificial primary dune line along the entire length of the Seashore. This dune disrupted the natural processes of ocean water overwash and the effects of salt spray and wind borne sand migration on plant life. As a result, ecological conditions were altered and plant species intolerant to an ocean barrier beach environment have increased in abundance at the expense of salt tolerant species.

Grass and freshwater marsh, once exposed to episodic salt water and spray intrusion are now becoming shrub thickets, adversely affecting migratory waterfowl habitat, impacting the quality of recreational hunting and possibly affecting the Peregrine Falcon, an endangered species known to migrate along the Outer Banks.

Buxton Woods, a primary example of a maritime forest is located on both Federal and private property in the Cape Hatteras area. Designated by the State of North Carolina as a Natural Heritage Area, this mixed pine-hardwood forest, dominated by loblolly pine, with live oak, dogwood, hornbeam, American holly and red cedar, grows on relict dunes as high as 60 feet. Wet, marshy areas between the dunes are inhabited by sedges, sawgrass and cattails.

A number of rare plant and animal species include laurel cherry and dwarf palmetto (both near the northern limits of their range) and two species of king snakes (one endemic to the Outer Banks) for which Buxton Woods is the transition zone. The dunes on which the Buxton Woods is situated are the most important sources of fresh water on Hatteras Island. This underlying fresh water lens supplies the towns of Hatteras, Frisco, Buxton and Avon from the Cape Hatteras Water Association's wellfield, adjacent to the Park's boundary. Two Park water systems, the Cape Point developed area and the Frisco Campground, are also supplied from this water source. There is some federal, in Park, development on the fringes of the Woods but private housing is developing rapidly on private lands.

The large number of pedestrian beach users and off road vehicles have severely impacted some areas, particularly Cape Point and Hatteras Inlet. More information is needed on threatened or special plant species or areas within the Seashore.

Current Management Action

Vegetation management consists of the ORV ramp and corridor system, and boardwalk use in certain areas. Boundary clearing periodically occurs in Buxton Woods and on Bodie Island.

2.3 Alternative Actions and Probable Impacts

(1) Continue Present Management

Corridors and ramps for ORVs would be maintained. No more vegetation baseline information would be obtained. More closures and improved corridors are needed.

(2) Fund Vegetation Studies

Develop vegetation zone/fire behavior map, and inventory and map rare and endangered and exotic species. Map sensitive or unique areas. Determine vegetation/disturbance history.

(3) Establish Park Vegetation Monitoring System

Establish study plots, benchmarks, transects and photopoints for the system study of successional changes, species composition, and catastrophic events (fire, overwash).

(4) Develop Vegetation Management Plan

Based on information from studies and monitoring, historical data and from fire research, determine vegetation dynamics of Seashore and man induced changes. Determine desired vegetation pattern and necessary actions to achieve and maintain.

2.4 Recommended Course of Action

Alternatives 1, 2 3 and 4 recommended. Current ORV ramp and corridor system should be improved and maintained. Studies and monitoring should lead to vegetation management plan.

3.1 CAHA-N3 - OFF ROAD VEHICLE USE

3.2 Statement of Issue or Problem

(1) Statement of Condition

Off-road vehicle (ORV) use on the beaches and soundside trails of Cape Hatteras National Seashore, either in active pursuit of fish by anglers or as a recreation in itself is a common activity. Under the authority of Chapters 2 and 4 of Title 36 of the U. S. Code of Federal Regulations, ORV use is limited to licensed drivers and vehicles, there are no requirements for permits or other restrictions. Through better communications with local and national ORV user groups, a better climate of understanding of mutual problems and fears has been developed. Currently only about 1 mile of beach, fronting the Cape Hatteras Lighthouse, is permanently closed to ORV use. Seasonal closures from prior to Memorial Day until after Labor Day close approximately 1/3 more of the beach. These seasonal closures are in effect in major pedestrian use areas fronting the villages on Hatteras Island and at Park swimming beaches.

(2) Results of Current Action

Most ORV users and non-ORV users accept current status although there is a significant minority at either end of the scale who advocate few restrictions on ORV's or complete elimination from the Seashore. Control of ORV use is a major time consuming activity of Park personnel. Twenty to twenty-five percent of all law enforcement actions involve ORVs and a considerable amount of time is required to maintain ORV trail markings. ORV activity may cause losses to colonial water birds. Impacts to vegetation have been reduced due to ramp system and interim ORV path.

3.3 Alternative Actions and Their Probable Impacts

(1) Continue Present Management Action

Both ORV users and non-users are accommodated but not to the degree that either user considers ideal. Present action has flexibility in that management can adjust programs to meet the changing conditions. Large expenditures of funds and personnel time is required to maintain dune crossings, mark ORV trails, monitor and control use, with decreasing appropriation and effects of inflation necessary funding needs have not been met causing poorly maintained and marked ORV use areas and trails.

(2) Eliminate ORV Use Completely

Funds now devoted to ORV trail maintenance and control could be re-programmed to other needs. Park short-term visitation would be reduced by 500,000 or more visits per year with a consequent loss in revenue by local businesses. Visitation would probably slowly return to pre-ORV elimination level. There would be little or no affect on natural scene or wildlife by ORVs. This is not considered a viable alternative due to the popularity of ORV use and historical use patterns.

3.4 Recommended Course of Action

Continue present action of allowing controlled ORV use as it meets the desires or needs of the majority of both ORV users and non-users.

4.1 CAHA-N4 - SHORELINE MONITORING

4.2 Statement of Issue or Problem

In response to the threat to Cape Hatteras Lighthouse from erosion, and from public responses to the threat, we have developed long range and interim protection plans for the lighthouse. The preferred long range protection alternative is a seawall revetment encircling the Lighthouse. To mitigate effect on the Lighthouse District, and in accordance with Section 106 of the National Historic Preservation Act, the Park Service has executed a Memorandum of Agreement (MOA) with the Advisory Council on Historic Preservation. The MOA states that the NPS will continue to explore alternatives to the revetment.

One part of the interim protection plan was the placement by the Save Cape Hatteras Lighthouse Committee of Seascapes, an artificial seaweed, in the nearshore adjacent to the Lighthouse. Seascapes has generated much interest nationally, including other units of the National Park Service.

The interest in Seascapes, the requirements of the MOA to explore other alternatives, and our need to guide interim measures require a knowledge of changes in our beach configuration.

Demands for the protection of private property and NC12, as well as threatened Park facilities, necessitate more information on shoreline status and trends.

Current Action

SERO has contracted with the Corps of Engineers to make monthly assessments of Seascapes with divers, and quarterly interpretation of aerial photos.

The Corps of Engineers ran an extensive baseline survey of the areas for the seawall revetment specifications.

4.3 Alternative Action and Their Probable Impacts

(1) Continue Present Management

The Corps will continue to assess Seascapes, although we will have little quantitative data on beach trends.

(2) Proposed Action

Augment Corps analysis with quarterly beach profiles from Corps baseline survey, and monthly ground photos. Develop Park monitoring system of beach fronting villages, Park facilities, critical sections of NC12, and accreting inlets.

4.4 Recommended Course of Action

Alternative 2 will broaden our knowledge of the beach trends, and help guide and time further protective efforts for the Lighthouse, private property, and other Park facilities.

5.1 CAHA-N5 - SEA TURTLE MONITORING

5.2 Statement of Issue or Problem

Statement of Condition

The loggerhead sea turtle, a species listed as threatened under the Endangered Species Act of 1973, nests within this National Seashore. Also, dead, sick or injured loggerheads and other listed species are occasionally stranded on Seashore beaches. As the Seashore is situated near the northern limit of loggerhead nesting areas, failure to locate and protect nests could result in the elimination of loggerheads as a breeding species in this National Seashore.

Current Management Action

During turtle nesting season, all turtle crawls are checked by Park personnel to determine whether or not eggs were laid. Depending on probability of egg destruction by human or natural forces, eggs are left in place or transferred to a safe hatching area.

Unrelocated nests are unobtrusively marked, and 50 days after laying date, a segment of the beach containing the nest is posted from tide to dunes to close the beach to off-road vehicle use to prevent loss of turtle hatchlings in vehicle tracks. If hatching has not occurred by laying date plus 75 days, the beach is reopened to vehicle traffic.

Result of Current Action

Most turtle nesting sites are protected, resulting in larger numbers of young turtles reaching the ocean.

5.3 Alternative Actions and Their Probable Impacts

(1) Continue Present Management

Little adverse comment or complaint has resulted from closures of necessary beach to ORV use. A larger proportion of young turtles reach the ocean than would otherwise be the case.

(2) Discontinue Present Management Actions

Under this alternative, no posting or monitoring activities would be taken. There would be no visitor inconvenience. Mortality rate of young turtles would increase.

5.4 Recommended Course of Action

Alternative 1, continue present action, is recommended, as this action balances preservation with use.

6.1 CAHA-N6 - PROTECTION OF COLONIAL WATER BIRDS

6.2 Statement of Issue or Problem

Statement of Condition

In late spring and early summer, terns and skimmers establish nesting colonies on sand flats within the Seashore. Entry of visitors or their pets into these colonies cause parent birds, attempting to drive away the intruders, to leave their nests exposing the eggs or chicks to the full heat of the sun or other environmental conditions resulting in higher than normal chick mortality. This disturbance by humans, for the most part, unintentional, results from otherwise acceptable recreational activities. Predation appears minimal from mammalian sources, occasional losses to crows have been noted by previous research.

Current Management Action

Spring beach patrols identify areas where colonial birds are beginning their nesting activities. Nesting sites are then posted against all entry and frequent perimeter patrols are made to enforce posting, and monitor bird activities. When birds have finished using the site for nesting and rearing, postings are removed and area is again made available for recreational use.

Results of Current Action

Major nesting areas of colonial water birds are identified annually and are protected from human disturbance.

6.3 Alternative Actions and Their Probable Impacts

(1) Continue Present Management

Major nesting sites would continue to receive protection, colonial birds would be protected during their nesting activities. Some visitor inconvenience results but to date there has been little or no adverse public comment.

(2) Discontinue Present Management Actions

Under this alternative, no posting or monitoring activities would be taken. There would be no visitor inconvenience. Mortality rate of young birds would increase. It is not probable that terns and skimmers would be extirpated from the Park but their numbers could be drastically reduced.

6.4 Recommended Course of Action

Alternative 1, continue present action, is recommended, as this action balances preservation with use. The present action could be improved by increased public information efforts through seasonal handouts so that more visitors would understand and perhaps more actively support preservation efforts.

7.1 CAHA-N7 - BANKER HORSE HERD PROGRAM

7.2 Statement of Issue or Problem

The Park currently maintains a herd of 21 horses in a 200 acre fenced enclosure on Ocracoke Island. Many believe this herd to be descendents of stock brought to the new world by early European explorers and colonists. Numbering 10 animals in 1974, the viability of the herd was in question. General health and appearance considerably improved with regular veterinary care, medication and attention.

Research and monitoring are needed to determine the cultural significance, genetic viability, and resource demands of the herd.

Current Management Action

For approximately 4 years, the Park's goal was to increase the size and health of the herd to a point where its survivability would be insured. Horses are maintained in a 200 acre fenced enclosure with food supplements and veterinary care.

Results of Current Action

Health of the individuals and of herd is sound. Stable area exists for supplemental feeding; 200 acres of grass and marshland is utilized for the horses.

7.3 Alternative Actions and Their Probable Impacts

(1) Manage herd as cultural resource, with supplemental feed and medical attention, as is current practice. Manage to maintain BAnker bloodline, including loaned horses for breeding. This would not change visitor use patterns, marsh would continue to absorb minor grazing impacts. Genetic viability of herd, due to inbreeding, could be a problem.

(2) Continue management practices of herd as a cultural resource; allow introduction of new bloodlines for variance in gene pool. Longrange viability of the herd may be increased; significance of registered Banker breed would diminish. Marsh would continue to absorb limited grazing effects.

(3) Eliminate the horse herd entirely through sale. This would cause the loss of a potentially significant cultural resource, with significant local and general interest. Fence and stable area could be removed.

(4) Continue current management practices pending development of Horse Management Plan. This plan will determine the cultural significance of the BAnker breed, as well as the number of individuals necessary for genetic diversity and viability. Determine the ecological impacts of grazing and carrying capacity of marsh area. The plan should lead to the management of the herd in a near-natural state within the fenced area; manage size for carrying capacity and wear from feed or medical supplements. Individual animals could suffer, genetic disease may increase.

(5) Allow horses to free range over the Seashore. This alternative is not considered viable for safety reasons (due to full speed highway) and the possibility of horse intrusion into the nearby village.

7.4 Recommended Course of Action

Alternative 4, continue present management program while developing a Horse Management Plan is recommended. Horse Management Plan, with associated Environmental Assessment, will be an appendix to a revised Resource Management Plan.

8.1 CAHA-N8 - WILDLIFE MANAGEMENT INFORMATION

8.2 Statement of Issue or Problem

Effects under interim ORV plan upon nesting birds within the Seashore are not documented. Baseline inventories of wildlife need to be updated or completed.

Current Management Action

Closures are made to ORVs in bird nesting areas under interim ORV plan; however, plan needs to be updated. Last inventory of Seashore wildlife was completed in 1959. Little information exists on ecology of fresh-water ponds in Seashore.

Results of Current Action

Disturbance of nesting areas by ORVs may be greater than that necessary for beach access. Wildlife population changes in Seashore, if any, are unknown.

8.3 Alternative Actions and Their Probable Impacts

(1) Continue Present Management

Continue with no assessment of ORV effects upon nesting bird populations. No increase in baseline inventory of wildlife populations. Opportunities may be missed to mitigate effects of ORVs, and subtle changes in wildlife populations based on environmental changes may be missed.

(2) Assess ORV Effects, Update Inventory

Information will be developed to update ORV Plan and mitigate impacts. Wildlife inventory will be improved, necessary management actions may be indicated.

8.4 Recommended Course of Action

Assess impacts of ORVs upon nesting colonial waterbirds. Develop and update needed wildlife inventories.

9.1 CAHA-N9 - MONITORING OF URBAN ENCROACHMENT

9.2 Statement of Issue or Problem

Statement of Condition

Villages within the Seashore continue to grow at a rapid rate, although growth potential is limited to available dry land. Growth brings increased demands for resources and utilities; Seashore lands are requested repeatedly for rights-of-way or special use permit. Increased development increases demands for protection from storm overwash and erosion and may increase pollution within park areas.

Current Management Action

Requests for rights-of-way are handled on a case-by-case basis. Previous attempts to work with the county have been largely unsuccessful. Limited water quality base line data has been collected.

Results of Current Action

The Seashore continues to be pressured for land use needs for utility right-of-way resulting from growth. Private residents continue to request dune stabilization activities.

9.3 Alternative Actions and Their Probable Impacts

Continue Present Management

Land use decisions will continue to be made on a case-by-case basis. Property owners demand for protection will increase.

Develop Systematic Assessment of Needs

Under this alternative, more information would be available for decisions on permit requests and their aggregate impacts. Monitoring of beaches in front of villages will be included to assess owner protection needs; water quality monitoring will assess pollution.

9.4 Recommended Course of Action

Alternative 2, develop assessment of adjacent land uses and demands. This action is needed for informed management on land use requests, and could lead to cooperation and planning efforts to minimize impacts to Seashore lands. Develop water quality monitoring system.

10.1 CAHA-N10 - POLLUTION ABATEMENT/MONITORING

10.2 Statement of Issue or Problem

Increasing development in the villages adjacent to the Seashore increases the threat of pollution to park resources, particularly tidal creeks, estuarine waters and groundwater. Increasing development in eastern North Carolina poses a long term threat to sound waters and estuarine resources.

The isolated location and climatic conditions combine to reduce the threat to air quality. Test wells and offshore oil exploration expected in the near future pose a moderate threat to Seashore resources. That threat could rise if recoverable resources are discovered.

Current Actions

The Park has performed water quality sampling at scattered sites on the ocean and sound in 1980-81. Baseline data has also been collected by the State of North Carolina.

10.3 Alternative Actions and Their Probable Impacts

- (1) Continue present efforts to secure data from State on water and air quality.
- (2) Establish systematic water monitoring stations for Seashore to be run by Park staff or student volunteers.
- (3) Fund study of water quality adjacent to villages.

10.4 Recommended Course of Action

Alternatives 1, 2 and 3 are recommended to establish baseline.

11.1 CAHA-N11 - RESOURCE MANAGEMENT INFORMATION MANAGEMENT

11.2 Statement of Issue or Problem

Much existing information is scattered or is not organized in ways helpful to management decisions. Past practices or impacts often exist only in the collective staff memory. The Park has obtained an IBM-PC which holds much potential for information storage.

11.3 Alternative Actions and Their Probable Impacts

- (1) Continue with no greater emphasis on information management; much valuable information will be lost.
- (2) Organize management zones for Seashore and geographic subject bibliographies. Develop administrative or impact history for each zone.
- (3) Explore uses in RM for IBM-PC.

11.4 Recommended Course of Action

Alternatives 2 and 3 are recommended.

12.1 CAHA - N12 - INTEGRATED PEST MANAGEMENT - MOSQUITO MONITORING

12.2 Statement of Issue or Problem

During the summer of 1982 the Hyde County Health Department threatened to close Ocracoke Campground due to persistent complaints of bites by campers and an alleged health hazard. A mosquito monitoring program was established for the campground and an adjacent pond and marsh, with one application of BTI having inconclusive results.

Salvo Campground received numerous complaints about mosquitos, with frequent refund requests.

Results of Current Action

Pressure will continue for treatment at Ocracoke Campground; however, no proven health hazard exists. Mosquitos at Salvo Campground are more a nuisance to visitors than a potential health hazard or a local issue.

12.3 Alternative Actions and Their Probable Impacts

(1) Establish monitoring programs at Salvo and Ocracoke campgrounds to include mapping of breeding sites. Develop action plan should proven health hazard arise.

12.4 Recommended Course of Action

Develop monitoring programs at Ocracoke and Salvo campgrounds, and action plan for proven health hazard.

13.1 CAHA-N13 - BOUNDARY AND TRAILS/CLEARING

13.2 Statement of Issue or Problem

The boundaries at S. Nags Head/Bodie Island and in Buxton Woods are heavily wooded. Clearing for fire lanes and better boundary demarcation is needed for all of Bodie Island/S. Nags Head and where environmentally acceptable in Buxton Woods. A fire lane is needed for the Little Kinnakeet Lifesaving Station. Drainage ditch induced shrub growth along NC12 blocks many scenic vistas of the Seashore.

13.3 Alternative Actions and Probable Impacts

- (1) Continue present conditions, with fire hazards, unclear boundaries and unnaturally impaired views.
- (2) Perform needed boundary and vista clearing.

13.4 Recommended Course of Action

Alternative 2.

14.1 CAHA-N14 - CAMPGROUNDS AND WALKS

14.2 Statement of Issue or Problem

Observations of rats adjacent to Ocracoke campground occurred in 1982-83. Yellow jackets, wasps and mosquitos frequently annoy visitors. Visitors impact vegetation around campsites.

14.3 Alternative Actions and Their Probable Impacts

- (1) Continue current system of complaint follow-up, but no systematic monitoring of visitor impacts and level of visitor pest problems.
- (2) Establish monitoring system for impacts and pests, with action levels.

14.4 Recommended Course of Action

Alternative 2.

15.1 CAHA-N15 - HATTERAS INLET DREDGING SPOIL

15.2 Statement of Issue or Problem

The Corps of Engineers notified Dare County in 1976 that the County was responsible for finding a suitable spoil site for Hatteras Inlet, as open water spoil dumping was no longer environmentally acceptable. The County was issued a permit in 1977 for pipeline spoil disposal on the ocean beach at Hatteras Island. The permit was renewed in 1983, dredging occurred again in March 1984. Dredging will be necessary every 4-7 years.

15.3 Alternative Actions and Their Probable Impact

- (1) Work on as requested, case by case basis for spoil disposition.
- (2) Seek opportunities for planning with the Corps of Engineers, the State, and county for dredge disposal which would maximize the beach fill and wildlife benefits of spoil material.

15.4 Recommended Course of Action

Alternative 2.