INTERNSHIP REPORT

Documenting work from May 1992 to August 1992
with the Division of Resource Management
at Biscayne National Park

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I. INTRODUCTION

This report documents the internship I completed at Biscayne National Park (BNP) from May 1992, to August 1992. I arranged a position at the park following a personal visit, written proposal, and two interviews. Under the auspices of the National Park Service's (NPS's) Volunteer In Park (VIP) Program, I worked under the supervision of Richard Curry, the director of the Resource Management Division. Much of my work and responsibilities was within his division, although I occasionally assisted the Interpretation staff as needed.

This report serves two functions. First, it acts as an introduction to Biscayne National Park and its marine affairs, and, as well, documents my contributions to the park in my capacity as an intern. Secondly, it closely examines BNP's obligations and policies for the protection and stewardship of submerged cultural resources and documents a project I initiated toward this aim. My report may be used heuristically as a reference for future marine affairs students considering research work at BNP, as well as for others interested in contributing to and preserving the park's submerged cultural heritage.

II. BISCAYNE NATIONAL PARK

President Lyndon B. Johnson and his Secretary of the Interior, Stuart Udall, established Biscayne National Monument in 1968 (Public Law 90-606) in response to development pressures. After expansion of boundaries in 1974 and again in 1980, the Monument became a National Park through an Act of Congress [16 U.S.C. Sec. 410(gg) et seq.] (USDOI, 1983). Today, BNP encompasses 181,500 acres from the shores of Biscayne Bay outward to a 60 foot bathymetric contour. It extends 26 miles from south of Bill Baggs State Park on Key Biscayne to the entrance of Card Sound just North of Key Largo (Landrum, 1991). The park encompasses the bulk of Biscayne Bay, 49 acres of coraline keys, and over 20 miles of patch and shoal reefs (USDOI, 1983). In addition, BNP has 47 documented submerged cultural resource sites, although not all these have been surveyed (BNP, 1991).

BNP is unique among other protected areas in the National Park System in two respects. First, it is primarily a marine park whose expanse is 95% water. Secondly, it is an urban park roughly 10 miles away from downtown Miami. These characteristics compound the severity of external threats and make resource management in the park an exceptional responsibility.

In a marine park, an onerous management task is maintaining adequate enforcement of regulations and controlling public access. In contrast to terrestrial parks where entrances can be closed and the public restricted, it is difficult to limit public access to most marine areas of BNP. The intracoastal waterway bisects the bay, and the reef tract offshore is also heavily visited. It is even difficult to limit access to small, particularly sensitive areas when they are approachable from all directions including from below the surface.

Because it is a park in a major metropolitan area, BNP naturally attracts numerous visitors, many of whom are not cognizant of their presence on protected waters. While National Parks attract many out of State and foreign tourists, Biscayne is also in "the backyard" of numerous Floridians who use it extensively (pers. obs.). The soaring population density surrounding the park exerts a direct impact by increased usage and indirectly heightens external threats caused by larger commercial, energetic, and sanitary demands.

There are a variety of user classes in the park. These include:

1) recreational boaters, divers, and fishermen who enter the park from the multitude of marinas along

Biscayne Bay,

2) commercial fishermen who fish in the park despite the ban on lobstering and sponging,

3) Homestead Air Force Base that conducts sea survival exercises within park waters, and

4) commercial shipping that is active in the intracoastal waterway and the offshore Hawks Channel.

The above is only a brief list of primary user groups which deliberately operate within BNP; it neglects the significant ancillary usage by boaters enroute to destinations beyond the boundaries.

The primary threats facing Biscayne, exacerbated by its status as an urban, marine park include the following:

1) destruction of coastal wetlands from development,

2) run off from agriculture and the South Dade landfill operations,

3) vessel groundings on grass beds and reefs,

4) commercial fishing pressures,

5) exotic species proliferation,

6) disturbance of cultural resources,

7) urban development, and

8) Turkey Point Nuclear Reactor (USDOI, 1983).

These threats are recognized by the park staff and most are included in their General Management Plan published in 1983.

This General Management Plan responded to a legislative mandate requiring a revised plan when Biscayne National Monument was expanded to a National Park (USDOI, 1983). It set forth four alternative proposals for management, selected one, and declared a "Finding of No Significant Impact" in the accompanying Environmental Assessment. The management proposal incorporated some aspects of all four alternatives, and constituted the General Management Plan itself. It divided the park into four planning units: the mainland, the bay, the barrier system and the reef tract, and established management objectives for each. The plan included separate sections on management of specific natural and cultural resources and also discused a management zoning system for the park, intended to create a standard for policy application. Additional developmental emphasis was placed on increasing public access to the park by ferries to Adams and Elliot Keys, as well as general development of Convoy Point and selected keys. Lastly, the plan considered overall costs and priorities (USDOI, 1983).

A discussion of the specifics of the management proposal is beyond the scope of this report; a basic summary suffices to introduce BNP's management objectives. Management goals are to

1) establish a public ferry system to provide access to

the keys and reef tract,

2) improve information in the interpretation programs with emphasis on Elliot Key,
3) maintain current development on the keys without significant modification,
4) return Ragged and Soldier Keys to a wilderness state and provide public access,
5) perform minimum development to establish Boca Chita as a day use area,
6) apply necessary controls to current recreational use levels to mitigate resource damage and user conflicts,
7) establish a program to reduce visitor impact on the submerged cultural resources and create a guide for the systematic monitoring and management of cultural resources, and
8) monitor air and water quality and protect endangered species and sensitive environments (USDOI, 1983).

The proposal had been slated to guide park management and utilization for five to ten years, and the original plan remains the principal guiding document for BNP's development today. However, in the absence of a new management plan, and when a change in management priorities is needed, the Superintendent can issue a compendium in accordance with

Title 16, United States Code, Section 3. The compendium establishes regulatory provisions for proper management and protection of resources such as specific site closures and public restrictions.

The General Management Plan specifies five organizational divisions within Biscayne National Park; Administration, Maintenance, Visitor Protection, Interpretation, and Resource Management. Administration is responsible for payroll, purchasing, budget, and other managerial tasks. Maintenance is charged with equipment upkeep and support. The Visitor Protection Division is the Federal law enforcement arm of the park designed to enforce NPS regulations. Interpretation serves primarily as a public outreach program to organize interpretive information for visitors and to educate the public. Lastly, the Resource Management Division monitors and ameliorates threats to the natural and cultural resources within the park. Each division, with its respective duties, should function in cooperation with the others to achieve a set of goals for each fiscal year. These goals are based on the General Management Plan, as well as on developing issues, and are ranked according to there importance.

The annual operating budget for the proposed plan is $1,024,000 in 1982 dollars (USDOI, 1983). The operating

budget in 1992, the year of my internship, was $1,421,000. Net figure base adjustments and programmatic increases increase a park's operating budget. Net figure base adjustments cover such things as uncontrollable cost during a fiscal year, and programmatic increases are allotments provided to cover expansion of programs or services. For example BNP's operating budget for 1994 is $1,634,000, $110,000 of which is a programmatic increase to increase staffing of the Resource Management Division (Giammo, 1993, pers. comm.).

Since August 1992, construction has been underway to develop a much larger park headquarters to replace the now inadequate renovations originally constructed according to the General Management Plan. In addition, a concessionaire has been operating dive tours and a sightseeing glass bottom boat cruise to the reefs since 1983. These private tours are accompanied by an Interpretation staff member. Otherwise, the basic management objectives of the proposal appear to be operational.

Resource Management had a fulltime summer staff during my internship. The staff included seven people and me. This group placed much emphasis on a sponge recruitment study in the bay, water quality monitoring and *Palythoa* degeneration on the reefs.

As a result of Hurricane Andrew, that made land fall 60 hours after the completion of my work, much of BNP remains inoperative. Archival data were also lost in the storm. The staff has since been forced to address a new set of priorities to assess and mitigate hurricane damage.

III. INTERNSHIP RESPONSIBILITIES

My request to perform my graduate internship at BNP was not an entirely unique proposal. The park already has a cooperative program with Florida International University, and occasionally supports special projects by other students interested in the park. According to the 1991 Resource Management Plan, Resource Management hoped to expand the VIP program to assist in the achievement of their yearly goals (BNP, 1991).

What was unique about my internship was that I was permitted to design and conduct my own project, rather than solely participating in established programs. I possessed the skills and training to meet the daily resource management responsibilities at BNP, and, at times, the Director asked me to analyze documents and proposals concerning potential threats to the park.

All personnel who dive for BNP must be certified NPS divers. However, by way of reciprocity with RSMAS, divers who are party to the American Academy of Underwater Sciences (AAUS), are exempt from a NPS course. I was also able to forego an elaborate training and check out procedure for park boat operators in light of prior training. These factors permitted me to spend substantially more time in the field

than otherwise would have been possible during a summer internship.

My immediate supervisor was the Director of Resource Management, Richard Curry, though he often designated this responsibility to one of his permanent staff. My duties as an intern in BNP were general and varied. Many were routine and several spanned the duration of my internship. I assisted in data collection, but not data analysis. I was an assistant to the permanent staff, and when in the field, functioned only as field work support staff.

Water quality monitoring and sponge tagging were some of the Resource Management programs with which I was involved. Together with other staff members, I took inland measurements of water quality of the canals emptying into the park. We also took measurements at various stations in Biscayne Bay such as Black Point Marina, in the vicinity of the South Dade Landfill. Additionally, we analyzed the reef tract at specific locations. The field staff collected data with a Datasonde electronic analyzer to measure such variables as water temperature, pH, and dissolved oxygen. Bottled samples were also collected for later laboratory analysis. The results of the analysis provided data which the Resource Management group could use in the development of mitigation plans.

Commercial sponge fishing has been prohibited within Biscayne since December 1, 1991. In 1982, there were three sponge boats and six fishermen working within park waters. Because a large blight in the Mediterranean Sea wiped out commercial sponges in that region, the European market fueled the demand for sponges which fostered this fishery within the park. In 1990, there were 18 registered sponge boats and 80 fishermen operating within the park (Ettman, 1991). As a result, the population of commercial yellow and sheep's wool sponges dropped precipitously. After debates before the Florida Marine Fisheries Commission, Governor and Cabinet, the harvest of commercial sponges within park waters was prohibited.

Following the ban, BNP began a study of recruitment of commercial sponge species. Other divers and I set up random grids within the bay, then tagged and recorded the position of any commercial sponge that grew inside the grid. The sponge study, as well as Biscayne's water quality monitoring, continued when I left the park in August.

While water quality monitoring and the sponge recruitment study were the most routine of my tasks, I worked on a number of other assignments. A colonial anemone of the genus *Palythoa* was dying at a number of park reefs. Because it is considered to be a good indicator of stress to the reef

system, this anemone was of great concern to Resource Management. I helped tag and photograph affected areas.

All of the Resource Management staff was involved in a survey for the National Marine Fisheries Service (NMFS) during the Federal and State lobster miniseason. Working from a park vessel in the entrance to Black Point Marina, we stopped incoming boats and measured the size and quantity of their catch, recorded its sex, damaged appendages if any, and the location and time of capture. Data collected were analyzed by NMFS to assess the effectiveness of the miniseasons on controlling the depletion of the spiny lobster in south Florida waters.

The other field work in which I participated included monitoring a pod of wounded bottlenosed dolphins, completing sighting reports for endangered and threatened species (e.g., the West Indian Manatee and Hawks Bill Turtle), escorting visitors to Elliot Key to survey the extremely rare Sergeant Palm, and measuring boat grounding scars for mitigation and billing purposes.

Out of the field, I analyzed and commented on the relevance of resource management documents to BNP. Among the documents I analyzed was a proposal to the park to install an underwater site security system for particularly sensitive ship wrecks. I also did research for the Interpretation

Division on migratory birds common to Convoy Point. With assistance from Everglades National Park personnel, I identified and drew migration charts for five species that frequently habituate BNP. Together with a brief species profile, I gathered this information to assist development of an interpretive wayside exhibit for the park.

The Interpretation Division was also involved in a special project during the summer to produce an educational, introductory film on Biscayne for distribution to area schools and the Florida Board of Tourism. The film was designed to attract visitation as well as to educate the public about the park's protected resources. In addition, the Director of Interpretation asked me to edit the script for accuracy.

These daily tasks and responsibilities provided me with a more holistic comprehension of resource management within BNP. The design, acceptance, and execution of my own project in submerged cultural resource management, however, was the most rewarding educational experience.

IV. SUBMERGED CULTURAL RESOURCE MANAGEMENT

Submerged cultural resources are "...those areas of the marine environment possessing historical, cultural, archaeological, or paleontological significance. They include sites, structures, and objects, significantly associated with, or representative of, earlier peoples, cultures and human activities or events." (Miller, 1988, p.26) These resources are by nature nonrenewable, a characteristic that distinguishes them from many natural resources such as corals and grassbeds.

Submerged cultural resources face both natural and anthropogenic threats. Environmental processes create natural interference to a submerged cultural resource site. The moment an object, such as a shipwreck, is introduced to the seabed it begins a process which may lead to relative stability with the marine environment. This state is commonly achieved through incrustation by fouling communities or coverage and burial by bottom sediments. Conditions can change however, and re-expose an object to stress and excellerated deterioration. A severe storm, for example, can shift sediments away from a site and subject it to natural scour.

While natural and anthropogenic interferences to a

submerged cultural resource site threaten its sustainability, the latter has generated the greatest controversy surrounding protective policy measures. Anthropogenic interferences are those created by human intrusion and disturbance to a site. Whether at the hands of professional treasure hunters, commercial salvors or recreational sport divers, irretrievable loss of cultural material may result from both the search for and the removal of submerged artifacts.

The conflict of interest between salvage operations and archaeology is purely economic (Miller, 1988). It is the hierarchy of laws, proclamations, orders, and regulations created as a result of these conflicts that have formed the framework for submerged cultural resource management policies (USDOI, 1991).

Regulations

Submerged cultural resources can be viewed as part of our nation's collective cultural heritage. While laws specifically addressing submerged cultural resources are few, a number of laws are directed towards the preservation of our national cultural heritage in general. The NPS policy number 28, or NPS 28, enumerates many of the important legal developments that have general application to cultural resources in Appendix B of NPS 28 (1991). Among the most

important are the:

* **Antiquities Act of 1906** [16 U.S.C. Sec. 433] which affords protection to historic features on Federal land and authorizes punishment for disturbance or theft of artifacts.
* **National Park Service Act of August 25, 1916** [16 U.S.C. Sec. 1-460 (zz)-(ll)] which established the National Park Service and our nations National Parks,
* **Historic Sites Act of 1935** [16 U.S.C. Sec. 461-467] which declared '...a national policy to preserve for public use historic sites , buildings and objects...'.
* **National Historic Preservation Act of 1966** [16 U.S.C. Sec. 470] which authorized the Secretary of the Interior to expand and maintain the National Register of Historic Places and required Federal agencies to consider the effects of undertakings on these properties.
* **National Environmental Policy Act of 1969** [42 U.S.C. Sec. 4321 et seq.] which declared a Federal policy to '...preserve historic, cultural and natural aspects of our national heritage.'.
* **Executive Order 11593, "Protection and Enhancement of the Cultural Environment," May 13, 1971** [36 F.R. 8921] which directed agencies to nominate cultural properties

to the National Register.

* **Archaeological and Historical Preservation Act of 1974** [16 U.S.C. Sec. 469-469(c)-(1)] which amended the 1960 Reservoir Salvage Act, and provided for preservation of prehistoric, historic and archaeological materials and data that might be lost due to Federal projects.
* **American Indian Religious Freedom Act, August 11, 1978** [42 U.S.C. Sec. 1996] which declared Federal policy to protect native American rights to exercise religious freedom, including access to sites.
* **Archaeological Resources Protection Act of 1979** [16 U.S.C. 470(aa)-470(11)] which required Federal permits for removal of archaeological material and set penalties for violators, provided for preservation of material integrity and site confidentiality. It was amended in 1988 to require surveys of public lands for archaeological material.
* **Abandoned Shipwreck Act of 1987** [43 U.S.C. Sec. 2101-2106] which asserts Federal title to certain ship wrecks in State waters and transfers title to the States. It requires States to manage sites to protect natural resources, permit reasonable public use, and allow scientific recovery of material.

In addition to the above, there have been a number of

regulations published in the *Code of Federal Regulations* which have been drafted to ensure their proper implementation. NPS 28 also cites Special Directives which pertain specifically to cultural resource management.

Policy Making

Prior to the Abandoned Shipwreck Act of 1987 (ASA), the United States had yet to develop specific policy guidelines for the management of submerged cultural resources (Miller, 1988). Due to this absence of policy, much valuable cultural maritime heritage has been lost in court battles with salvors by the application of maritime law principles.[1] Miller (1988), writes "...the courts have inconsistently based their decisions on the economic principles of maritime salvage law..." (p. 26)

After many notorious court battles with salvors over shipwrecks such as the *Atocha*[2] and the *DeBraak*,[3] which permitted recovery of submerged material culture for private economic gain, positive steps towards submerged cultural resource protection have occurred (Miller, 1988). Most importantly perhaps was the passage of the ASA.

The ASA protects only three categories of shipwrecks: (1) wrecks embedded on a State's submerged lands, (2) wrecks embedded in coralline formation of a State, and (3) wrecks

suitable for inclusion in the National Register of Historic Places (Collins, 1989).

Not only does the act claim Federal ownership of certain ship wrecks in State waters, but it also transfers title to the State as trustees to create marine parks and allow recreation [43 U.S.C. Sec. 2105(a), 2105(c)]. It also declares the law of salvage and the law of finds moot for application to historic shipwrecks [43 U.S.C. Sec. 2106]. The statute specifies that States rather than courts, have managerial powers over shipwrecks located on State submerged lands [43 U.S.C Sec. 2101]. Additionally, since the expansion of the boundaries of the Federal territorial seas to 12 miles, the ASA requires the Federal government to manage conflicts over title of shipwrecks on the new submerged lands (Collins, 1989).

The NPS has played an important role in the legislative evolution of submerged cultural resource management. It has also developed comprehensive procedural guidelines for their protection. In accordance with section five of the ASA, the NPS published advisory guidelines to assist States and Federal agencies in fulfilling their obligations under the act. The guidelines recommend, among other things, that States preserve shipwrecks according to principles of underwater archaeology, create marine parks, and encourage

input from interest groups when drafting State management guidelines for submerged cultural resources (Collins, 1989).

The NPS has a dual mission to protect resources, while at the same time providing for their use. This obligation is clearly expressed in the National Park Service Act of 1916. According to NPS 28, NPS' mandate for cultural resources calls for "...ongoing research, planning, and stewardship...[and that]...only natural resource protection and visitor experience can claim equal standing with cultural resource issues." (USDOI, 1991, p. 18) This balance between visitor use and resource protection is crucial and makes the task of preservation within the National Park system particularly challenging.

Two documents highlight and direct the NPS' mission for cultural resource management. Chapter 5 of the National Park Service's *Management Policies* (1988) states the basic Park Service principles for governing submerged cultural resources. The more comprehensive NPS 28 elaborates on these policies and guides their application. According to the document itself, it is "...written for managers, staff, and cultural resource specialists, [and] tells what is needed to establish, maintain, and refine a park's cultural resource program. " (USDOI, 1991, p. 21) Its sections cover the NPS mandates for protection, procedures for research, planning

and stewardship of five major cultural resource types, and the procedures for compliance with section 106 of the National Historic Preservation Act. It is the baseline document used by all parks within the system as an official guideline for cultural resource management. Comprehensive park management plans and specific resource management plans are drafted from NPS 28.

BNP General Management Plan

The General Management Plan for BNP states that any area affected by human use must have a complete inventory of cultural resources. Additionally, least impact management alternatives must be developed for that area. NPS officials must monitor, document, and evaluate the conditions of cultural resources for preservation or mitigation. The Plan also mandates a detailed guide for the management of cultural resources in daily operations. It also states that when funds are available resource managers should complete systematic research and surveys of submerged cultural resources. The Superintendent may also close selected sensitive sites to public access (USDOI, 1983).

Resource Management Plan

Resource Management Plans are drawn up and updated to

direct the goals and mission of the Resource Management Division. Resource Management Plan (1991) was effective during my internship. One of the most severe threats to submerged cultural resource management identified therein is the lack of archaeological data. The Plan clearly asserts that without a comprehensive survey of BNP, information needed to assess the threats and their potential impacts is not available. Surveys of the old section of the park (Biscayne National Monument) have been minimal, and no surveys exist of lands gained since BNP's establishment (71,000 acres). The next step for BNP, following a comprehensive survey, would be to analyze data for site significance so that staff can prioritize resource management efforts. The document also asserts that no site can be deemed insignificant until a finding of "No Significant Impact" is reached. Until such time, park management should prevent impact to these resources.

The plan continues to highlight major issues and concerns, among them "...illicit plunder, vandalism, disturbance, and theft of artifacts from historical shipwrecks..." (BNP, 1991, p. 112) A clear set of objectives was also listed, including,

* management of cultural resources according to legislative mandates,

* surveys to locate and record sites within the park,
* monitoring and documentation to achieve preservation and/or mitigation,
* preparation of a parkwide preservation guide for submerged cultural resources,
* identification of areas for closure to the public as well as those areas suitable for heavy usage,
* training staff in management of submerged cultural resources and the methods of illicit salvage for law enforcement
* installation of signs for interpretation (BNP, 1991).

To achieve these goals, the plan states that the Resource Management Division will develop an annual work calendar, with two primary projects and two alternative projects identified for foul weather. These projects are to be completed in addition to the routine responsibilities of data collection on weather, water quality, and fish catch. The document also explicitly conveys that staffing is insufficient for the Resource Management Division (BNP, 1991).

V. INTERNSHIP PROJECT

I proposed to develop a design for photographically monitoring BNP's submerged cultural resources in keeping with Biscayne's Goal 18A of 1992, and in recognition of the management objectives for cultural resources outlined in the General Management Plan of 1983. [See Appendix] My goal was to develop a monitoring protocol for all of BNP's submerged cultural resources and test it on a specific site.

Given the limited time available for this project, I decided to experiment with the design of a Standard Operating Procedure (SOP). My aim was to create a system to establish specific, relocatable photopoints on a wreck. The system would require reproducing a 35 mm image from each photopoint on a yearly basis so that each years data could be compared and contrasted with those from previous years. By experimenting with and developing this technique on one wreck, it could be adapted to others with a minimal degree of change in design. Ultimately, it would be possible to establish specific management plans for each submerged cultural resource based on any documented natural and/or anthropogenic changes revealed by the comparison of the photographic data. One would look for such signs as replicability of the exact image, the accretion and reliction

of sediments, and the relation of objects to one another over time (Dean and Ferrari, 1992). Based on the nature and rate of change documented by the photographs, resource managers could formulate plans of action to mitigate the situation. Mitigation options may include:

1) more comprehensive documentation of sites,
2) more frequent documentation of sites,
3) introduction, removal, and rotation of mooring buoys,
4) posting of interpretive signs at underwater locations.

With the assistance of Christopher Burton, a British student, I drafted a project proposal and received approval from the Chief Ranger. [See Appendix C] I was permitted to devote a significant portion of my time to the execution of my proposal, and to have access to the equipment requested. My project was understandably handicapped as a result of an understaffed Resource Management staff and the need for my assistance in the completion of other projects of higher priority.

I spent at least three weeks developing the project design. Project parameters were clear; the design had to be precise enough to expose change accurately, but also practical enough to be reproducible. The latter fact seemed to be a major obstacle, given the park's limited budget and

manpower. As long as it was possible to document where change was occurring, and the rate of that change, simple steps could be taken to help slow down the pace. Taking this guiding principal into account, I researched work already begun on the documentation of the park's cultural resources, requested technical support and ideas from Larry Murphy of the NPS's Submerged Cultural Resources Unit, and reviewed my design with Richard Curry.

I dedicated another week to cleaning out, restocking and making the park's dark room operational. Christopher Burton and I also spent another week diving and experimenting with photography and measuring devices at the "Schooner Wreck" off Elliot Key and the "Corsair Wreck" off Pelican Bank . We decided that our work should concentrate on the "Corsair", a U.S. Army Air Corps plane that went down in the bay shortly after the Second World War. This wreck was heavily used by visitors, given its accessibility and location, and was also a stopping point for the park concessionaire's glass bottom boat tour. In addition, it was readily accessible in half day expeditions, leaving sufficient time for our other responsibilities.

Christopher Burton and I spent our final weeks diving at the "Corsair" site and developing our guidelines. Although lacking enough time to complete an ideal photographic file

for the "Corsair", I completed enough work to write a draft SOP based on our work. [See Appendix E] I spent the last day of my internship finishing the draft SOP to present to Richard Curry. Two days later Hurricane Andrew swept across the bay, damaging much of the "Corsair wreck", including the Resource Management trailer and all of the film and drawings pertaining to the project.

VI. SUMMARY

My internship at Biscayne was an excellent compliment to the curriculum at the University of Miami, both as an undergraduate and graduate student. The work I did in the park often paralleled themes underlying course work in such classes as Environmental Analysis, Environmental Law, Marine Archaeology, and Social Economy of Marine Resources. The practical application of academic knowledge led me to comprehend more fully the scope of marine affairs. Additionally, my B.A. in anthropology and experience at Little Salt Spring were invaluable tools that increased my productivity and the educational value of my internship.

The NPS contributes significantly toward sound submerged cultural resource policies and environmental awareness by balancing resource protection with visitor use. In my capacity as intern, I contributed not only to a broad daily spectrum of resource management responsibilities at BNP, but also to help address the issue of submerged cultural resource management. Despite the difficulties inherent in prioritizing resource protection, and those entailed in bridging the gap between mandates and their actual realization, increased funding and staff size would greatly improve the management of cultural resources within the park.

The goals and guidelines set forth by the Director of Resource Management are clear in their orientation, progressive in their design, and coordinated with legislative mandates.

Without a permanent position within BNP, I have limited means to follow up on the project that I initiated. I sincerely hope that the Resource Management Division will have the resources to apply the work I have begun as a stepping stone toward future preservation and understanding of submerged cultural resources.

VII. NOTES

1. The law of salvage and the law of finds are principles of maritime law. The law of salvage states that the voluntary act of salvage of a ship in peril, and its cargo, creates a lien on the property saved. It is the reward for an act of voluntariness, with the absence of a contractual agreement, that distinguishes maritime law from common law (Norris, 1958.) The size of the reward is determined by the courts after submitting a salvage claim, and is based on the value of the cargo. According to the law of finds, a vessel without assertion of prior ownership is considered abandoned, and salvors with claims filed can be declared the rightful owners of the wreck.

2. The *Atocha* was a 17th-Century Spanish galleon found off the Florida Keys by Mel Fisher of Treasure Salvors, Inc., in 1971. The company filed a salvage claim in Federal court contesting the authority of both the Federal and State governments over the site. The court found that Federal control over the outer continental shelf extended only to mineral and natural resources, not submerged cultural resources. The court then applied salvage law and awarded title to Treasure Salvors (Miller, 1988).

3. The *DeBraak* was a British colonial vessel found by divers off the coast of Delaware. Commercial salvors were granted a contract by the State of Delaware to excavate the site. According to State law, Delaware received 25% of the recovered materials. Despite close observation by the Advisory Council on Historic Preservation, and the archaeological community, cooperation between commercial and scientific interests was poor. As a result, salvors displayed little effort to conserve recovered materials, and damaged the wreck by hasty excavation.

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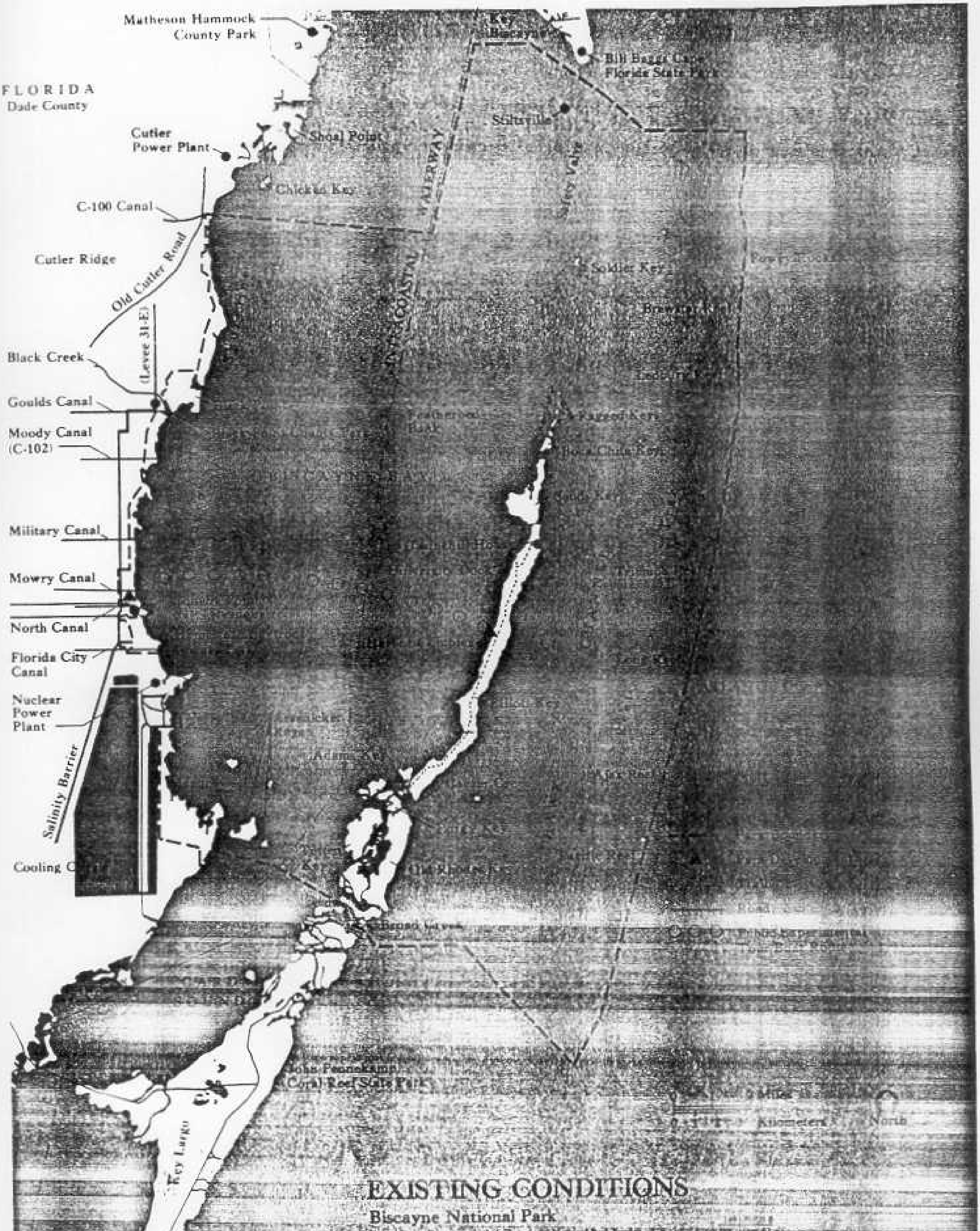
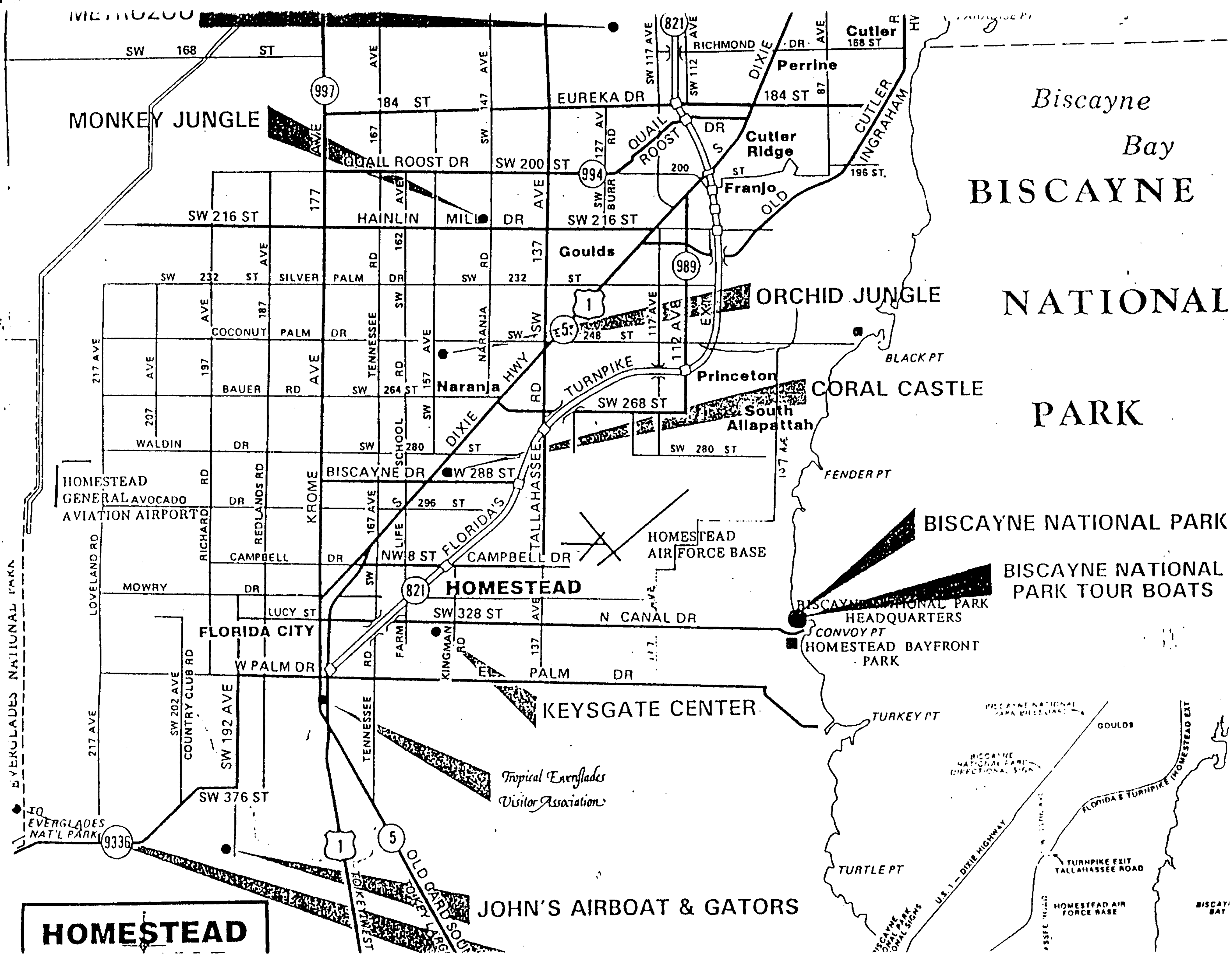
IX. ACKNOWLEDGMENTS

I will take this opportunity to thank the Anthropology Department and the Marine Affairs Division at RSMAS, that together developed and fostered my interest in submerged cultural resources management. More specifically I thank Dr. Linda Taylor for her exceptional devotion to my education, guidance in archaeology, cultural and physical anthropology, and support of my various interests, Dr. Daniel Suman and Professor Fernando Moreno for inspiring me to examine the importance of law towards environmental sustainability, Dr. Sarah Meltzoff for maintaining my multi-cultural perspective on marine environmental issues, and Dr. John Gifford for introducing me to the science of marine archaeology and affording me the opportunity for field work at Little Salt Spring.

I would also like to thank the staff at Biscayne National Park for their assistance during my internship, and especially Richard Curry for entrusting me with his confidence to initiate a project on submerged cultural resources, and offering me his support for its execution.

*** APPENDIX A ***


Matheson Hammock
County Park
Key Biscayne
Bill Baggs Cape Florida State Park
FLORIDA
Dade County
Stiltsville
Cutler
Power Plant
Shoal Point
Chicken Key
INTRACOASTAL WATERWAY
C-100 Canal
Cutler Ridge
Old Cutler Road
Soldier Key
Black Creek
(Levee 31-E)
Goulds Canal
Moody Canal
(C-102)
Military Canal
Mowry Canal
North Canal
Florida City
Canal
Nuclear
Power
Plant
Salinity Barrier
Cooling Canal
John Pennekamp
Coral Reef State Park
Kilometers
North
Key Largo
EXISTING CONDITIONS
Biscayne National Park


METROZOO
MONKEY JUNGLE
ORCHID JUNGLE
CORAL CASTLE
BISCAYNE NATIONAL PARK
BISCAYNE NATIONAL PARK TOUR BOATS
BISCAYNE NATIONAL PARK HEADQUARTERS
HOMESTEAD BAYFRONT PARK
KEYSGATE CENTER
Tropical Everglades Visitor Association
JOHN'S AIRBOAT & GATORS
HOMESTEAD AIR FORCE BASE
HOMESTEAD GENERAL AVIATION AIRPORT
Biscayne Bay
Perrine
Cutler Ridge
Franjo
Goulds
Princeton
Naranja
South Allapattah
HOMESTEAD
FLORIDA CITY
BLACK PT
FENDER PT
CONVOY PT
TURKEY PT
TURTLE PT
TO EVERGLADES NAT'L PARK
EVERGLADES NATIONAL PARK
SW 168 ST
184 ST
EUREKA DR
QUAIL ROOST DR
SW 200 ST
SW 216 ST
HAINLIN MILL DR
SW 232 ST
SILVER PALM DR
COCONUT PALM DR
SW 248 ST
BAUER RD
SW 264 ST
SW 268 ST
WALDIN DR
SW 280 ST
BISCAYNE DR
SW 288 ST
AVOCADO DR
SW 296 ST
CAMPBELL DR
NW 8 ST
MOWRY DR
LUCY ST
SW 328 ST
N CANAL DR
W PALM DR
PALM DR
SW 376 ST
RICHMOND DR
OLD CUTLER RD
INGRAHAM HWY
DIXIE HWY
FLORIDA'S TURNPIKE
KROME AVE
TALLAHASSEE RD
TENNESSEE RD
REDLANDS RD
LOVELAND RD
COUNTRY CLUB RD
SW 192 AVE
SW 202 AVE
217 AVE
SW 117 AVE
SW 112 AVE
SW 127 AV
BURR RD
SCHOOL RD
FARM LIFE RD
KINGMAN RD
RICHARD RD
NARANJA AVE
997
821
994
989
9336
1
5
TURNPIKE EXIT TALLAHASSEE ROAD
HOMESTEAD AIR FORCE BASE
GOULDS
FLORIDA'S TURNPIKE (HOMESTEAD EXT)
U.S. 1 — DIXIE HIGHWAY
BISCAYNE BAY

HOMESTEAD

*** APPENDIX B ***

April 6, 1992

Richard Curry
Biscayne National Park
P.O. Box 1369
Homestead, Florida 33030

Dear Mr. Curry:

Thank you for the time you afforded me on Friday. I have been concerned about the external threats facing the park, and our meeting has further inspired me to apply my internship credits toward there mitigation.

You introduced some recently pressing issues of importance to Biscayne National Park, including the writing of management plans for cultural resources and artificial reefs. As per our conversation last week, I would like to devote my time to cultural resource management. I understand that you may find other issues more pertinent this summer, in which case I would not hesitate to engage myself in another area. Other topics of personal interest to me are artificial reefs and bobcat reintroduction.

Please find enclosed a copy of my resume. I have done work in the past that parallel my current interests, such as underwater excavation in Little Salt Spring, and a research paper on Florida panther reintroduction. A summer internship with Biscayne National Park would broaden my education in the above related fields, and hopefully help to address the concerns of the Park Service. Thank you for your consideration, and I hope this can be the beginning of a more fruitful relationship with RSMAS.

Sincerely,

York Flik

*** APPENDIX C ***

June 30, 1992

MONITORING PROPOSAL FOR SUBMERGED CULTURAL RESOURCES

1. Purpose: To design a static and dynamic photographic monitoring system to assess the impacts of recreational/salvage diving activities on the submerged cultural resources within Biscayne National Park.

2. Methodology and Design:

   Phase 1 - Collect existing data on present site conditions as compiled by past research and monitoring.

   Phase 2 - Visit sites and establish static photo points for each area of particular concern, i.e., points of degradation, instability or specific cultural interests. Use video to collect a dynamic image of the site via circuit and straightline transect.

   Phase 3 - Interpret images and critically assess present and predicted human impacts on site.

   Phase 4 - Propose mitigation plans for sites where significant damage has been recorded.

3. Scope of Project:

   To provide a workable foundation to assess the rate and degree of degradation to submerged cultural resources within Biscayne National Park. This information should be used toward a more detailed project for establishing individual management plans and to provide a securely stored photo point documentation of each individual resource site, therefore providing a secure set of photographic data on which to base future analysis. Properly secure and care for the information--make it easily retrievable.

4. Material Request:

   - One (1) Underwater video camera
   - One (1) Underwater SLR
   - One (1) Vessel
   - One (1) GPS Unit
   - Tags and Transect Lines

Submitted by: York Flik
Chris Burton

United States Department of the Interior

NATIONAL PARK SERVICE

BISCAYNE NATIONAL PARK
POST OFFICE BOX 1369
HOMESTEAD, FLORIDA 33090-1369

IN REPLY REFER TO:

July 1, 1992

Memorandum

To: Richard Curry

From: Wayne

Subject: Submerged Cultural Resources SOP

I have given permission to Chris Burton and York Flik to work on subject project. Their assistance will serve to complete your Goal No. 18A. If you have any questions, see me.

L. Wayne Landrum

L. Wayne Landrum

" 16. Natural and cultural Resource Management Plan objectives. Pending action--need to work with you on this. Ongoing.

" 17. VIP mooring project. Pending action. This program was started but fell through when Susan Berryman left the Wilderness Society. This goal should be dropped for this fiscal year due to insufficient staffing.

" 17A. Mooring buoy installation. Pending action. This goal will be completed during the last quarter of the fiscal year.

" 18. Develop a documentation SOP for both terrestrial and underwater archaeological sites. Pending action. This goal could be completed during the last quarter of the fiscal year with the cooperation of the Visitor Protection staff (Hudson).

" 18A. Photo documentation SOP for archaeological sites. Pending action. This goal could be completed during the last quarter of the fiscal year with the cooperation of the Visitor Protection staff (Hudson) and the availability of Terry Helmers.

" 18B. Locate all terrestrial and documented shipwreck sites. This goal should be dropped because in a very short time the terrestrial areas will be difficult to reach due to high mosquito numbers. With the assistance of Hudson and Helmers the completion of the latter part of this goal may be possible. I recommend we put this as a goal next year once the SOP (18A) is completed.

" 18C. Locate photo points for archaeological sites. Pending action. Based on the time of year and present staffing levels, recommend this goal be dropped.

" 18D. Locate sites by latitude and longitude. Pending action. See comments above. Terrestrial sites are no longer reachable due to increasing mosquito numbers. This goal should be dropped or moved to some future time.

" 18E. SOP for long term storage of historical and archaeological data and reports. Pending action. This goal is really addressed in the development of the museum collection and Park administrative history at the Everglades Regional Collection Center. Reports and field notes are required to be archived in the accession folder of all artifacts collected. We should drop it as a goal.

*** APPENDIX D ***

-1ICK BURTON: ONLY

Bug Light Wreck
25 feet

Arakanapka
15-20 feet

Ledbury
15 feet

HMS Fowey
30 feet

Airplane
10 feet

Cement Barge
10 feet

Brick Wreck
10 feet

Lugana
25' feet

Mandalay
10 feet

Erl King
20 feet

Alicia
22 feet

Hubbard
12 feet

Morgans Wreck
35 feet

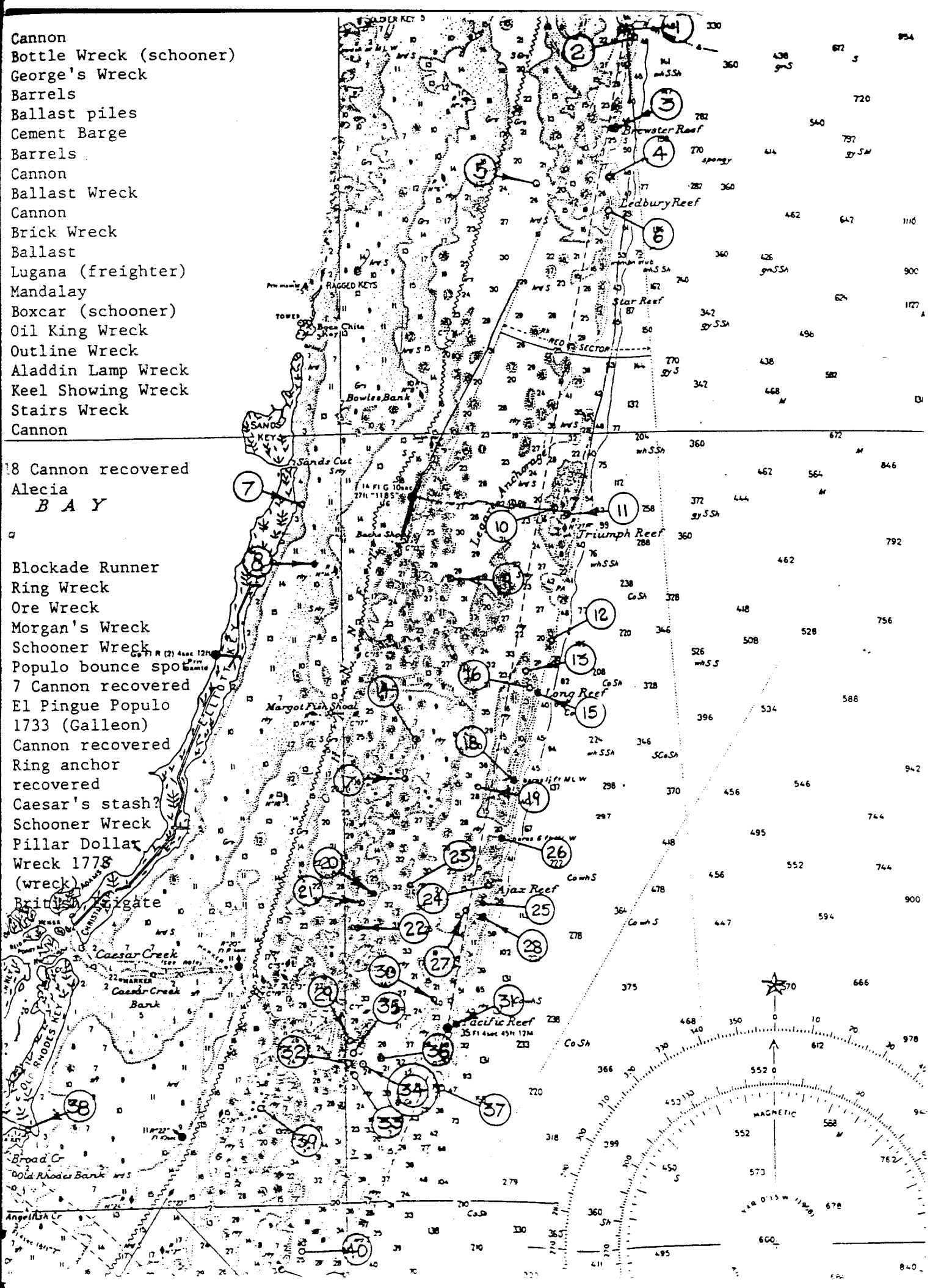
Pacific Reef
15 feet

Black Wreck
5-20 feet

"Corsair" Wreck
7 feet

** Coordinates withheld for site security **

two features--
minutes/seconds
not 10ths of minutes


Cannon
Bottle Wreck (schooner)
George's Wreck
Barrels
Ballast piles
Cement Barge
Barrels
Cannon
Ballast Wreck
Cannon
Brick Wreck
Ballast
Lugana (freighter)
Mandalay
Boxcar (schooner)
Oil King Wreck
Outline Wreck
Aladdin Lamp Wreck
Keel Showing Wreck
Stairs Wreck
Cannon
18 Cannon recovered
Alecia
B A Y
Blockade Runner
Ring Wreck
Ore Wreck
Morgan's Wreck
Schooner Wreck
Populo bounce spot
7 Cannon recovered
El Pingue Populo
1733 (Galleon)
Cannon recovered
Ring anchor
recovered
Caesar's stash?
Schooner Wreck
Pillar Dollar
Wreck 1778
(wreck)
British Frigate
Brewster Reef
Ledbury Reef
Star Reef
Triumph Reef
Long Reef
Ajax Reef
Pacific Reef
Bowles Bank
Sands Cut
Legare Anchorage
Marjot Flats Shoal
Caesar Creek
Caesar Creek Bank
Old Rhodes Bank
Broad Cr
RED SECTOR
RAGGED KEYS
SANDS KEY
MAGNETIC

*** APPENDIX E ***

Biscayne National Park
Ranger Activities Division

Draft SOP-RAD #
DSCRSOP

York Flik
Date 8/21/92

Draft SOP: Submereged Cultural Resources Static Photomonitoring System

Objective:

To provide a photomonitoring system to assess the rate and degree of degradation and destablization to the submerged cultural resources within Biscayne National Park. Said system, if employed as directed, should direct management and mitigation schemes to those cultural areas whose relative stasis has been disturbed through anthropogenic interference or environmental processes.

DSOP Background Facts:

Incorporated within Biscayne National Park's boundaries are over 40 submerged cultural resource sites with varying degrees of documentation and recorded research accessible to Park staff. A project was designed to establish a photomonitoring system for comparing the integrity of each site on a yearly basis. The results of the 8 week project formed the basis of this draft blanket SOP.

Project Scope:

It was clear from the start that the rate and degree of change on any one site will be determined by a number of factors such as site type, publicity/accessibility, and substrate environmental dynamics. Different monitoring approaches will be necessary for different sites. Due to temporal restrictions, the scope of the project had to be limited to the popular Corsair wreck site, between Caesar's Creek and Pelican Bank.

Project Background:

The Corsair lies scattered in a large debris field in approx. 2 meters of water on a sandy substrate. After a brief survey, the project focused on the section of greatest relief and intact expanse.

Under normal meteorological conditions the site is in a low energy zone. In the event of a storm, however, the shallow nature of the site can increase the depositional properties of the substrate significantly to permit accretion and reliction of sand over normally exposed wreckage. Of more important concern is the

site's easy accessibility to divers and fisherman, who visit the site for it's relief and novelty. The combination of both factors threatening the Corsair wreck, coupled with it's proximity to BNP, made this site an ideal subject.

Project Methodology:

The coordinates were recorded and maintained on GPS which had an acceptable maximum deviation of .062 seconds. Three dives were made on the site, the first by snorkel to survey, and the last two by SCUBA to photograph and record data for the experimental documentation. During each dive a rough site sketch was made, artifact clusters of significant importance were identified, photographs were taken, and all distances, angles and compass bearings were measured. Back at Convoy Point the film was developed in the dark room, prints were made, and the data was interpreted for the formation of this draft, blanket, Standard Operating Procedure. Suggestions will follow.

DSOP Suggested Materials:

Dive vessel
SCUBA gear
GPS unit
Site coordinates
Slates and pencils
Compasses
10" PVC graded ring
(2) 100 meter tape measures
Inclinometer
Secci disc
Nikonos V underwater cammera
15mm lens
28mm lens
High Contrast Black and White Film
Submersible site sketch and data
Submersible tripod

DSOP Scope:

The suggested methodology of this blanket SOP is general in scope, leaving room for the requisite flexibility needed to adjust the SOP to individual sites. It should be applied toward the development of site specific SOPs.

DSOP Initial Site Documentation:

Once on location, check the GPS coordinates for consistency. Rerecord them, as well as the number of satellites received. Place the secci disk to set visibility standard. Super clarity is ideal, but only if it will be consistent enough to be reproduced near schedule the following year. A minimum visibility standard should be recorded. The site should then be dived in it's entirety and the breadth of the wreckage measured and recorded. There are two

important elements of this survey:

(1) Determine what artifacts or artifact clusters on the wreck, or isolated from it, should be of particular interest to establish location of photopoints. Once determined, a perspective must be established that will reveal the greatest change over time threatening that particular object. An aluminum object on a sandy substrate for instance is best shot from a low oblique angle to capture the movements of shifting sand. The choice of photopoints should be made by the person most competent to determine what areas are becoming destablized, or likely to lose their provenience. This could be anything from exposed timbers, to an artifact that may be tempting for a treasure hunter to acquire. As a general rule, the edges of a wreck site are of greater concern, especially where it meets the substrate. Objects that are already out of situ are not to be ignored.

(2) Determine where and how the photo bench marks are to be established. Benchmarks can be of two types; (a) a single secure physical object, or (b) an angle measured out from two type (a) benchmarks. Benchmarks have to permit a photograph that will capture the greatest contrast on the object of concern, be readily located, and stable enough so that it's structural integrity remains in perpetuity. Bench mark type (a) will always be preferable to (b) but often less practical. It functions well only if the artifact of concern is close, and facing the desired direction. When shooting small objects isolated from the main body, or when shooting an edge of the main wreckage from a desired spot outside, type (b) is acceptable.

After the photopoints and benchmarks are established, a reasonably accurate sketch should be drawn of the site, with all photo points and benchmarks detailed. If it is a scattered wreck site, isolated artifact clusters, distant from the bulk of the wreckage, should also be included. The extent of the wreckage should be measured and recorded, and a compass rose drawn to establish direction. Watch for magnetic deviation, and measure away if necessary.

Once the site sketch is complete and all photopoints and benchmarks have been identified, all measurements should be made and recorded onto the sketch. From a type (a) bench mark, measure the distance to the object, the direction of the object, the height of the camera from the substrate, and the angle of the shot. From a type (b) benchmark, triangulate out from the two benchmarks until the tapes meet. Measure the length of each, the direction of the object, the height of the camera, and the angle of the shot.

Capturing high contrast is of greatest importance. Remember, sharpness is sacrificed at the expense of a larger field of view. When shooting a smaller object use a high shutter speed upwards of 500, but be sure that you accurately adjust the lens to your measured distance. If shooting an entire debris field of significance, a lower shutter speed should be used. Refer to the

Nikonos manual to completely familiarize yourself.

Before shooting, place the PVC ring in each frame to be shot for scale. Number and record each photograph on the slate. There is no suggested number of photographs to be taken. Let the size of the wreck be the limiting factor.

When all on site documentation is complete, photographs should be developed in the dark room on glossy 8.5 X 10 paper. Each photograph should be labeled on the back with appropriate figures and artifact identification. When using the enlarger, a ring should be drawn on a sheet of mylar so that every photograph taken can be printed back to scale. High field of view photographs may require a different sheet of mylar with a smaller so that to much of the picture is not cut out when enlarging. Mylar sheets should be saved with the sites file so that the scale is consistent from year to year.

DSOP Data Analysis:

The final product of the documentation should be a file available for comparison with future years, in the same format as the year before, if previous files exist. The new photographs should be analyzed next to the previous year's to assess what kind of change is occurring, what the degree of change is, and what the rate is if possible. The criteria for determining change will be slightly different for each site. If there was significant change, evident in the photographs should be variations in the spatial relationship of objects to one another, as well as fluctuations in sedimentation or growth of fouling and encrusting communities.

Reports of change and a general summary of comparisons should be added to the file. In addition, an individual SOP based on this suggested one should be developed as this blanket SOP is amended to incorporate any of the site's unique complexities. A file's yearly conclusions should be analyzed by the director of Resource Management for the formation of mitigation plans to halt the rate of destablization.

DSOP Repetitive Site Documentation:

Each site should be visited yearly. All figures will be cataloged in a computer file, and print outs of data analysis, photographs, and site sketches along with site specific SOP, will be filed in a cabinet designated for the annual execution of this blanket SOP. All data for each visit, each year, will be organized on file for ease of analysis and consultation before next trip.

To initiate the next yearly documentation, the file including the individual SOP should be consulted for site idiosyncracies. Bring a copy of the wreck sketch and data on location, and transfer to dive slate or waterproof paper. Continue with documentation as described above and amended in individual SOP. If, when attempting to reproduce the photographs, an artifact cluster has moved or

appears moved, rerecord the altered measurements on the slate or sketch.

*** APPENDIX F ***

*** APPENDIX G ***

10-418
(1/88)

UNITED STATES DEPARTMENT OF INTERIOR
NATIONAL PARK SERVICE

DIVING LOG

DIVER	AREA	YEAR
York Flik	BNP	19 9?

DATE	DIVE SITE	DEPTH	BOTTOM TIME	TOTAL TIME	PARTNER	PURPOSE
6/1	Pacific Reef	20'		40"	Mark	Hydrolab
6/3	Alina Reef	15'		45"	Mark/Brian	Tag Coral
6/3	Elkhorn Reef	5'		45"	DAN	Photo Palythoa
6/10	Bay: W of Elliot	6'		120"	Mark	Tag Sponges
6/17	Bay: V of Elliot	10'		45"	Paul	Check Out
7/8	In God We Trust S of Pacific Reef	25'		55"	Chris	Check Out Sue + Chris
7/8	E of Elliot	10'		15"	Chris	Remove Debris
7/10	Triumph	25'		20"	Chris	Debris Search
7/16	Schooner Wreck	6'		45"	Chris	Archeology
7/23	Corsair	10'		60"	Brother DIVERS	PHOTO DOC
7/24	Corsair	10'		60"	BROTHER DIVERS	PHOTO DOC
7/31	West of Elliot	10'		150"	BRIAN	SPONGE

COMMENTS:

8/11	WEST OF ELLIOT	10'	•	120"	SUE	SPONGE

DIVES FOR THIS SHEET	0' - 30'	31' - 60'	61' - 100'	101' - 130'	130' -

VERIFYING OFFICIAL	DATE	DIVER'S SIGNATURE	DATE

Month: August

DATE	HOURS WORKED	DESCRIPTION OF WORK PERFORMED
1		
2		
3	8	Wreck - Corsair / Am Photo LAB
4	8	water quality / photo lab
5	8	Corsair, Elliot
6	8	Corsair
7	8	LAB
8		
9		
10	8	Sponge
11	8	sponge, dolphin - lab
12	8	wreck / photo lab
13	8	Wreck / photo lab
14	8	Where's Chris?
15		
16		
17	8	LAB - edgmonts
18	8	LAB, Sponge
19	8	Unit up
20	8	Sponge
21	8	Unit Up - PARTY!!
22		
23		
24		
25		
26		
27		
28		
29		
30		
31		