
**Final
Engineering Evaluation/
Cost Analysis
Action Memorandum
Former Ft. Pierce Naval
Amphibious Training Base
Ft. Pierce, Florida**

Prepared for:
U.S. Army Engineering and Support Center, Huntsville

Prepared by:
Environmental Science & Engineering, Inc.
Gainesville, Florida

July 1996

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List of Acronyms and Abbreviations

AR	Army Regulation
ARAR	applicable or relevant and appropriate requirement
ASR	Archive Search Report
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CFR	Code of Federal Regulations
DOD	U.S. Department of Defense
DOI	Department of Interior
EE/CA	Engineering Evaluation/Cost Analysis
EOD	Explosive Ordnance Disposal
EPA	U.S. Environmental Protection Agency
F.A.C.	Florida Administrative Code
FDEP	Florida Department of Environmental Protection
ft	foot
FUDS	Formerly Used Defense Sites
HRS	Hazard Ranking System
INPR	Inventory Project Report
NATB	U.S. Naval Amphibious Training Base
NCP	National Oil and Hazardous Substances Contingency Plan
NMFS	National Marine Fisheries Service
NPDES	National Pollutant Discharge Elimination System
OE	ordnance and explosives
OEW	ordnance and explosive waste
OEW/UXO	ordnance and explosive waste/unexploded explosive ordnance
RAC	Risk Assessment Code
RCRA	Resource Conservation and Recovery Act
SARA	Superfund Amendments and Reauthorization Act of 1986
SOP	standard operating procedure
USACE	U.S. Army Corps of Engineers
USAESCH	U.S. Army Engineering and Support Center, Huntsville
USC	United States Code
USFWS	U.S. Fish and Wildlife Service
WWII	World War II

**FINAL ENGINEERING EVALUATION/COST ANALYSIS (EE/CA)
ACTION MEMORANDUM
FORMER FT. PIERCE NAVAL AMPHIBIOUS TRAINING BASE
FT. PIERCE, FLORIDA**

The following document, EE/CA Action Memorandum, was prepared and reviewed by the following persons, technically qualified to perform the work:

William Tucker, Ph.D., Project Manager
Prasad Kuchibhotla, P.E.

PROFESSIONAL ENGINEER'S CERTIFICATION

This is to certify that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. In my professional judgment, and based upon my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and technically complete.

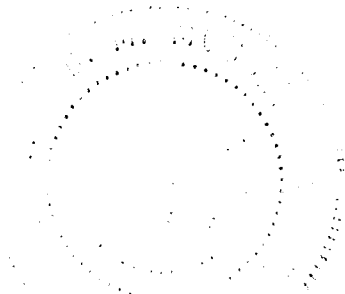
David Moccia

NAME: David Moccia, P.E.

DATE: July 12, 1996

FLORIDA REGISTRATION NUMBER: 22992

(Affix Seal)



1.0 Purpose

This document presents the determination of the risk-reduction actions that will be required at the former Ft. Pierce U.S. Naval Amphibious Training Base (NATB), which encompasses North and South Hutchinson Islands in Indian River, St. Lucie, and Martin Counties, FL. This determination was developed in general conformance with the following:

- Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA);
- 42 United States Code (USC) Section 9601 *et seq.*; and
- The National Oil and Hazardous Substances Contingency Plan (NCP) 40 Code of Federal Regulations (CFR) Part 300.

The selected actions are supported by documents contained in the Administrative Record established for this project.

2.0 Site Conditions and Background

2.1 Site Description

The former Ft. Pierce NATB consisted of approximately 19,000 acres located on North and South Hutchinson Islands, in Indian River, St. Lucie, and Martin Counties, Florida. Situated on barrier islands, the site is long and narrow, extending approximately 25 miles from north-northwest to south-southeast. The northern extent of the areas identified as likely to contain conventional ordnance and explosives (OE) is near the southeast boundary of Vero Beach, FL, and the southernmost of these areas is near Nettles Island just north of Jensen Beach, FL. Figure 2-1 shows the location of the former Ft. Pierce NATB.

The base fulfilled two primary missions during World War II (WWII). Established in 1942, its original mission was amphibious training, including training for the Naval Underwater Demolition Team. The amphibious training mission included use of bulk high explosives, high explosive rockets, bombs, anti-aircraft guns, and small arms. During 1943, the Joint Army Navy Experimental and Testing Board was established to develop and test procedures for breaching and removing beach fortifications expected to be encountered in Europe and Japan. Beaches were fortified along the northern portion of the base and a variety of ordnance was tested against these fortifications. Many of the items tested contained large quantities of high explosives.

2.1.1 Site Evaluation

2.1.1.1 History of Ordnance Exposure

In 1946, a Vero Beach resident was killed by an explosion while working with a party of civilians in coordination with military personnel to clear the North Hutchinson Island beaches of OE. A local resident who was employed by the U.S. Army Corps of Engineers (USACE) at that time told a local newspaper in 1959 that she felt the island had been thoroughly cleaned up.

In June 1989, a WWII incendiary bomb that washed up onshore exploded when a firefighter mistook it for a distress flare and struck it with a pickax. A sheriff's deputy and a firefighter were seriously injured.

In addition to these two incidents, approximately 10 findings of ordnance items of apparent WWII vintage have been discovered on land in this area during the last 40 years, and several additional sightings by divers have occurred in the Atlantic Ocean and the Indian River lagoon. Figure 2-2 presents the location of these incidents at the former Ft. Pierce NATB.

2.1.1.2 Preliminary Assessments

In 1994, USACE (1994) produced an Archive Search Report (ASR) that presents the historical records search and site inspection findings for the presence of OE at the former Ft. Pierce NATB.

2.1.1.3 Key Problem Areas

The ASR identified the following eight areas within the boundaries of the former Ft. Pierce NATB that are likely to contain ordnance or explosive waste:

- Engineer Board Area;
- Naval Demolition Research Unit;
- Swamp Area Near Demolition Research Unit;
- Suspected Burial Site, New Sands Condominiums;
- Beach Obstacles, North Hutchinson Island;
- Artillery Range Bunkers;
- South Island Bombing Range; and
- Ocean Areas, Ft. Pierce Inlet Jetties.

2.1.2 Physical Location

Barrier islands are unstable landforms subject to coastal flooding, erosion, and longshore sediment transport. These islands are surrounded by the Atlantic Ocean to the east; the Indian River, a shallow tidal lagoon to the west; and tidal inlets north and south that are maintained by jetties and dredging. From an ecological perspective, the entire area may be considered a valuable and sensitive ecological habitat, intensively used by migratory birds. The waters surrounding the islands constitute a productive marine fishery. Soils and subsoils are sandy, and the water table is within 5 to 10 feet (ft) of the land surface.

The ecosystem includes beach dune, coastal strand, coastal maritime hammock, estuarine tidal swamp, and aquatic ecosystems. Federally listed birds occurring in the immediate region include the bald eagle (endangered), piping plover (threatened), and wood stork (endangered). Also present to a lesser extent are coastal or maritime hammock and estuarine tidal swamp habitats.

Listed bird species for which potential habitat is present include the Florida scrub jay (threatened), bald eagle (endangered, proposed for down listing to threatened), and wood stork (endangered). Mammal species listed and potentially present include the aquatic West Indian Manatee (endangered) and southeastern beach mouse (threatened).

2.1.3 Site Characteristics

The property has been intensely subdivided and developed for residential use. Numerous high-rise condominiums have been built on North and South Hutchinson Islands. Tourists visit the many hotels, restaurants, and public parks. Amenities such as parking areas, restrooms, boardwalks, boat ramps, and interpretive nature trails in county and city parks facilitate beach use as well as the wetlands and fishery on the lagoon (western) side of the islands. In addition to the numerous private lots, public facilities give ready access to the beach. A private high school is situated within the area designated as the former Engineer Board Area. The barrier islands have limited office and industrial facilities and a few gasoline retail facilities. Detached single family housing occupied by permanent and seasonal residents is prevalent on the northern part of the former Ft. Pierce NATB near Vero Beach. Some of the residential subdivisions have secure gated access roads. Two golf courses are on the northern half of North Hutchinson Island. On the southern part of the former Ft. Pierce NATB, in and near Ft. Pierce, residential development is more likely to be in multifamily structures, including smaller apartment complexes and high-rise condominiums. A nuclear power plant is located on South Hutchinson Island approximately equidistant from Ft. Pierce and Jensen Beach. Residential construction activity is evident throughout the area in single- and multi-family units. Residential development tends to be clustered and more intense near Vero Beach and Ft. Pierce. Portions of the islands remain relatively undeveloped. The portion of the former Ft. Pierce NATB that was situated on North Hutchinson Island comprises 5,200 acres, of which approximately 1,300 acres have been developed for residential and commercial uses.

2.1.4 Exposure to Contamination

No known hazardous substances as defined by section 101(14) of CERCLA are known or suspected at the site. The substances of critical concern at the site include high explosives that may be contained in the warheads of rockets and various incendiary substances that may be found in practice bombs. These substances are relatively stable and unlikely to migrate any substantial distance from the warhead casing or from the bodies of the practice bombs.

The primary hazard associated with ordnance is from the accidental detonation of the item rather than any potential toxic effect of the explosive or incendiary substances. Exposure of the public or the environment to ordnance items occurs by unearthing the item either by natural forces or manual excavation by human activities. Once uncovered, contact with the explosive item may cause detonation.

During 1995, and in preparation of the Engineering Evaluation/Cost Analysis (EE/CA), USACE conducted field investigations in three areas within the former Ft. Pierce NATB. These areas were selected because they appeared to represent areas with the greatest potential for future ordnance exposure, considering (1) historical information regarding use of the various portions of the site by the military during WWII, and (2) probable future land use. Specifically, the areas selected were either known bombing targets or suspected military disposal sites. Each of these three areas was either used residentially or likely to be developed for residential use in the foreseeable future. Two of these areas were associated with the Beach Obstacles area of concern identified in the ASR, and the third was the Sands Condominiums.

Investigative procedures included remote sensing techniques (magnetometry), conducted in all three areas, and hand excavation, conducted in one of the three areas. Hand excavation could not be safely conducted in two of the three areas because of the proximity of civilian residences. Approximately 2.5 acres were surveyed by remote sensing, and 1 acre was surveyed by hand excavation.

The results of these investigations was as follows:

- WWII-era military debris was found on the surface in one area,
- No evidence of military use of the site was found in the other two areas, and
- No UXO was found in either of the three areas.

2.1.5 Site Status

The former Ft. Pierce NATB is not included in the National Priority Listing and will not be proposed to be included due to the nature and extent of contamination.

The U.S. Environmental Protection Agency (EPA) Hazard Ranking System (HRS) was not used during the screening process for this site. In its place, USACE used the Risk Assessment Procedure for Ordnance and Explosive Waste developed by the U.S. Army Engineering and Support Center, Huntsville (USAESCH) in accordance with MIL-STD 882C and Army Regulation (AR) 385-10. The Risk Assessment Code (RAC) score is used to prioritize action at Formerly Used Defense Sites (FUDS). The procedure is primarily a screening tool to determine which sites may require further study and evaluation. The ordnance and explosive waste (OEW) risk assessment is based on the best available information resulting from records searches; reports of Explosive Ordnance Disposal (EOD) detachment actions; and field observations, interviews, and measurements. However, it does not fully address the probability that the public will actually encounter and be injured by OE.

The RAC scores and the actions called for are summarized as follows:

- RAC 1 Imminent Hazard - Expedite Inventory Project Report (INPR) - immediately contact USAESCH)
- RAC 2 High priority on completion of INPR - recommend further action by USAESCH,
- RAC 3 Complete INPR - recommend further action by USAESCH,
- RAC 4 Complete INPR - recommend further action by USAESCH, and
- RAC 5 Recommend no further action.

Risk assessments have been conducted in the past for the former Ft. Pierce NATB, and the entire site was placed at RAC 1.

The investigation conducted during the EE/CA completes the necessary site characterization. No further studies are necessary.

2.1.6 Previous Actions

Available evidence indicates that the Navy conducted a thorough cleanup and disposal of OE during operations in 1946 in accordance with standard operating procedures (SOPs) effective at that time. The following supports this finding:

- Interviews with WWII-era personnel;
- The relatively low number of documented ordnance discoveries since 1946; and
- The low density of military debris found during this investigation (Section 2.1.4).

WWII-era personnel have reported that:

- Ordnance used in experimental testing was strictly accounted for, through checkout/checkin procedures and through use of spotters during experimental use. Duds were annotated, and teams were sent to safely detonate them in place after completion of bombing runs.
- Upon return of the site to civilian use, munitions from storage bunkers were removed and placed on seagoing barges for offshore disposal (15 miles offshore, 1500 ft deep).

Since 1950, local police, firefighters, and military EOD units from various Florida military bases have responded to investigate incidences of suspected ordnance discoveries. A few of these incidents appear to be related to activities of the former Ft. Pierce NATB, but many of the incidents appear to relate to post-WWII activities. Some of the post-WWII activities may be related to activities of the U.S. military conducted offshore, and others appear unrelated to U.S.

Department of Defense (DOD) actions. Available documentation indicates that, during the last 45 years, approximately 10 findings of ordnance items, that are likely to be related to activities at the former Ft. Pierce NATB, have been made on land. Most of these findings occurred during construction activities. Approximately 1,300 acres of land have been developed since WWII, and the number of items discovered during these findings suggest an ordnance density of less than 1 item per acre.

2.1.7 Current Actions

No removal actions are ongoing at the site. Military EOD units from Patrick Air Force Base and Naval Station Mayport respond to requests by local emergency management personnel for removal of ordnance from onshore or offshore areas, as needed.

During this investigation, USACE Jacksonville District has supervised community awareness activities, including the following:

- Briefings to the County Commissions of Indian River and St. Lucie Counties,
- A media day held during field investigations,
- A public workshop coordinated with the Indian River County Department of Emergency Management, and
- Briefings during two public hearings held to receive public comments on the draft-final EE/CA.

Proposed actions represent a continuation and enhancement of current actions.

2.2 Role of State and Local Authorities

2.2.1 State and Local Actions to Date

During the 1950s and early 1960s, The Indian River and St. Lucie Mosquito Control Districts constructed extensive ditches and berms. During this period, these local authorities requested assistance from the U.S. military to identify locations where ordnance may be prevalent. On one occasion, an officer previously stationed at the former Ft. Pierce NATB traveled to the area and met with Mosquito Control District personnel to explain the hazards associated with excavation at the former Ft. Pierce NATB.

The Florida Department of Environmental Protection (FDEP) and St. Lucie and Indian River Counties have cooperated with USACE during this investigation, providing valuable local and historical information and guidance on conducting investigations and removal actions with

minimal disruption to the environment. Indian River County staff assisted USACE in conducting a public workshop to inform the public of OE hazards and solicit community input on removal alternatives.

2.2.2 Potential for Continued State/Local Response

USACE expects the continued support of county and city agencies to implement the recommended alternative. Implementing the recommended alternative would require county and city agencies to:

- Distribute informational fact sheets provided by USACE with building permits; and
- Emplace and maintain informational signs, provided by USACE, in public parks within their jurisdiction.

Affected agencies have been informed of these requirements during meetings with USACE. They were also provided with copies of the draft-final EE/CA and apparently agreed to accept these responsibilities, insofar as they did not submit written comments on that document.

3.0 Threats to Public Health, Welfare, or the Environment

3.1 Threats to Public Health or Welfare

The overall threat to public health or welfare at this site is probably low. This conclusion is supported primarily by the following considerations:

- The density of ordnance items at the site is apparently low (estimated at less than one per acre). The estimate is an extrapolation across the site based on the ordnance finds within large developed areas (1,300 acres). Significant development of the land has occurred since WWII, yet few ordnance items have been discovered. In addition, none of the three areas investigated during the EE/CA yielded unexploded ordnance.
- Most remaining OE is subsurface (below land or marine waters).
- The type of ordnance used at the former Ft. Pierce NATB require direct impact or other directly applied force to initiate a reaction. Although ordnance exposed to the elements are no longer considered predictable with regard to their stability, the probability of uncontrolled detonation by incidental contact is low.
- The former Ft. Pierce NATB mission was amphibious training and breaching beach fortifications. Although training with ordnance was part of these missions, the use was probably less intensive than other WWII missions where daily activities focused more directly on ordnance training.

Public exposure would likely occur primarily as a result of three types of activities:

- Excavation associated with construction or landscaping,
- Recreational diving, and
- Use of beach areas (OE may wash up or be exposed after storms).

During the public workshop conducted to solicit community input prior to preparation of the draft EE/CA, residents expressed concern that the suspected presence of OE could adversely affect property values. There is little evidence to indicate that such an effect has occurred. No comments on this topic were received from the public after publication of the draft EE/CA.

3.2 Threats to the Environment

OE that may be present at the site poses no significant threat to the environment.

4.0 Endangerment Determination

The presence of OE at this site may present a threat to public health and welfare. However, implementation of the proposed action (Community Awareness) will reduce this threat.

5.0 Proposed Actions and Estimated Costs

This section presents the proposed and other risk-reduction alternatives, a cost estimate, a project schedule, and the rationale for choosing the proposed risk-reduction alternative.

5.1 Proposed Risk-Reduction Alternative

5.1.1 Proposed Risk-Reduction Alternative Description

Community Awareness (Alternative 2) is the proposed risk-reduction alternative at the former Ft. Pierce NATB. The Community Awareness alternative is a limited action alternative that involves one or more of the following components to minimize the probability of risk of exposure to OE:

- Notification of persons engaged in construction activities, and
- Notification of tourists and divers.

Notification of persons engaged in construction activities involves alerting home/commercial builders, real estate agents, and people involved in construction activities of the dangers associated with OE during construction activities on developed and undeveloped parcels. This notification would be accomplished through fact sheets attached through building permits.

Notification to tourists and divers involves alerting beach-going tourists and divers at the former Ft. Pierce NATB beach via fact sheets and sign posts of the dangers associated with OE.

5.1.2 Proposed Risk-Reduction Alternative Selection Rationale

The following presents a rationale for the selection of the proposed risk-reduction alternative:

- Several alternative components of Alternative 2 effectively reduce the risk of ordnance exposure to the public;
- Alternative 2 is cost effective and is less expensive to implement than Alternative 3 (Partial Clearance);
- During the short-term, the impact of this alternative on the community and the environment is far less than Alternative 3;
- Alternative 2 is easily implementable; and
- The community acceptance level of Alternative 2 is anticipated to be higher than either Alternative 1 (No Further Action) or Alternative 3.

5.1.3 Description of Other Risk Reduction Alternatives

The following risk-reduction alternatives were considered to address OE at the former Ft. Pierce NATB.

- Alternative 1: No Further Action,
- Alternative 2: Community Awareness, and
- Alternative 3: Partial Clearance.

The No Further Action alternative would mean that no action would be implemented to reduce risk of public exposure. As previously stated, Community Awareness would reduce risk by informing the public of the dangers associated with contacting OE. Partial Clearance would involve community awareness and the following removal action technologies that are most commonly used and appropriately applicable to OE remediation:

- Detection by imaging magnetometer,
- Recovery by excavation, and
- Disposal by detonation.

5.1.4 EE/CA

An EE/CA has been performed and has been included in the Administrative Record for this project. Copies of the draft document were placed on file at repositories established at the St. Lucie County Library, Ft. Pierce, FL, and the Indian River County Main Library, Vero Beach, FL, for the public to review existing project documentation. This repository contains all project documentation so that the public can stay informed of the investigation and remedial actions proposed for the former Ft. Pierce NATB. During several public presentations, the public was encouraged to visit the repository and examine the records placed on file at that location. During the public comment period, a public meeting was held to allow the public an opportunity to ask questions or comment on any aspect of the project.

5.1.5 Assessment of Applicable or Relevant and Appropriate Requirements (ARARs)

ARARs are "those cleanup standards, standards of control, and other substantive environmental protection requirements, criteria, or limitations promulgated under federal environmental, state environmental, or facility siting laws that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance found at a CERCLA site" (40 CFR 300.5).

ARAR selection depends on the hazardous substances present at the site, site characteristics and location, and the specific actions selected for a remedy. Therefore, these requirements may be chemical-, location-, or action-specific. Chemical-specific ARARs are health-or risk-based concentration limits set for specific hazardous substances, pollutants, or contaminants. Location-specific ARARs address circumstances such as the presence of endangered species on the site or the location of the site within a 100-year floodplain. Action-specific ARARs control or restrict particular types of remedial actions selected as alternatives for site cleanup.

No chemical-specific ARARs are applicable for remediating OE-contaminated sites. Location- and action-specific ARARs potentially applicable for the remediation of OE sites at the former Ft. Pierce NATB are presented in Table 5-1. The EE/CA has been included in the Administrative Record for this project.

5.1.6 Project Schedule

Implementation of the recommended risk-reduction alternative should proceed as soon as funds can be allocated. No significant obstacles to the full implementation of the proposed alternative is expected in the future.

5.2 Costs

Alternative 2, Community Awareness, was selected as the recommended risk-reduction alternative at the former Ft. Pierce NATB. The cost of implementing this alternative is estimated at \$32,500. Table 5-2 presents the cost estimate for Alternative 2.

6.0 Expected Change in the Situation Should Action Be Delayed or Not Taken

Delay in informing the public of the risks associated with contact with OE at the site may result in accidental detonation of an ordnance item that an area resident or visitor may have found.

7.0 Outstanding Policy Issues

No outstanding policy issues have been developed.

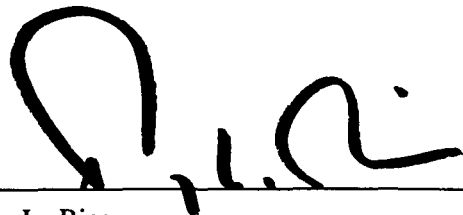
8.0 Enforcement

Not applicable.

9.0 Recommendation

This decision document presents the selected risk-reduction alternative for the former Ft. Pierce NATB, Florida. The chosen risk-reduction alternative has been developed in general conformance with CERCLA as amended and is consistent with the NCP. This decision is based on the administrative record for the site.

Site conditions meet the NCP section 300.415(b)(2) criteria for implementing risk-reduction alternatives and recommending approval of the proposed alternative.



Terry L. Rice
Colonel, U.S. Army

3 SEP 96

Date

Tables

Table 5-1. Potential ARARs for the Removal Actions

Activity	ARAR	Citation	Applicability or Relevance
<u>Action-Specific</u>			
Excavation	Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities	40 CFR 264	Establishes minimum standards that define the acceptable management of hazardous waste for owners and operators of facilities that treat, store, or dispose of hazardous waste.
	Standards Applicable to Generators of Hazardous Waste	40 CFR 262	Establishes standards for generators of hazardous waste. Applicable to remedial alternatives involving landfilling of hazardous soil and debris.
	Coastal Construction and Excavation	F.A.C. 16B-33	Establishes standards for excavation and Florida Statutes Chapter 161 construction in a coastal zone for the preservation of beaches. Applicable to alternatives involving excavation, treatment, and disposal of hazardous waste.
Waste Classification	Identification and Listing of Hazardous Waste	40 CFR 261	Provides for proper classification of wastes under guidelines for RCRA.
Treatment	National Primary and Secondary Ambient Air Quality Standards	40 CFR 50	Establishes ambient air quality standards for particulate matter, sulfur dioxides, carbon monoxide, ozone, nitrogen dioxide, and lead.
	National Emission Standards for Hazardous Air Pollutants	40 CFR 61	Provides a list of substances designated as hazardous air pollutants. Regulations apply to potential emissions from treatment, or other operations, of any hazardous air pollutant for which a standard is prescribed under this part.
Disposal of Wastes and Treatment Residues	RCRA and State of Florida Land Disposal Restrictions	40 CFR 241 40 CFR 268 and F.A.C. 62 730.183	Land disposal restrictions may be triggered if excavated soils or treatment residuals exhibit RCRA hazardous waste characteristics.

Table 5-1. Potential ARARs for the Removal Actions (Continued, Page 2 of 3)

Activity	ARAR	Citation	Applicability or Relevance
	Criteria for classification of solid waste disposal facilities and practices	40 CFR 257 F.A.C. 62-701	Establishes criteria for use in determining that solid waste disposal facilities and practices pose a reasonable probability of adverse effects on health or the environment.
Worker Safety	Occupational Safety and Health Act	29 USC ss. 651-678	Provides workers with personal protection equipment during all phases of remediation. Provides adequate protection to the community by reducing dust potentially generated during material excavation and handling activities.
Coastal Operations	Coastal and Marine Environments	43 CFR 11.41 F.A.C. 62- 600.520	Provides an assessment process involving field observation to determine injury and determine damages in coastal and marine environments resulting from a discharge or release.
Ocean Dumping	Ocean Dumping Permits	40 CFR 223 Section 104 (d), 40 CFR 221	Establishes criteria for permits, revision, revocation or limitation of ocean dumping under Section 104(d) of the Act
Ocean Dumping	USACE permit regulations for ocean dumping	33 CFR 324	Establishes regulations for issuance of permits for ocean dumping
<u>Location-Specific</u>			
Presence of endangered or threatened species or critical habitat of such species as designated in 50 CFR 17, 50 CFR 226, or 50 CFR 227	Endangered Species Act of 1973 as amended (latest amendment June 1986)	50 CFR 402 40 CFR 6.302(h) F.A.C. 62B- 41.002(16)	<p>Actions which jeopardize species/habitat must be avoided or appropriate mitigation measures taken.</p> <p>Offsite actions which affect species/habitat require consultation with DOI, USFWS, NMFS, and/or state agencies, as appropriate, to ensure that proposed actions do not jeopardize the continued existence of the species or adversely modify or destroy critical habitat.</p>
			Consultation with the responsible agency is also strongly recommended for onsite actions

Table 5-1. Potential ARARs for the Removal Actions (Continued, Page 3 of 3)

Activity	ARAR	Citation	Applicability or Relevance
Presence of State designated endangered species, threatened species, or species of special concern	Rules relating to endangered or threatened species: general prohibition; permits	F.A.C. 39-27.002	Actions should be avoided that would impair the management of protected species populations designed to increase the designated species to the point that they are no longer endangered or threatened.
Coastal Preservation	Coastal Construction and Excavation	F.A.C. 16B-33	Establishes standards for excavation and Florida Statutes Chapter 161 construction in a coastal zone for the preservation of beaches. Applicable to alternatives involving excavation, treatment, and disposal of hazardous waste.
<u>Wetlands</u>			
Delineation of the landward extent of wetlands and surface waters	Wetlands protection	40 CFR 6.302(a) F.A.C. 62-340	Actions should be avoided that have adverse impacts associated with the destruction or loss of wetlands and to avoid support of new construction in wetlands if a practicable alternative exists.

Note: Excavation and material handling operations will be conducted in accordance with the OEW/UXO safety specifications described in the U.S. Army Corps of Engineers, Huntsville Division, *Safety Concepts and Basic Considerations for Unexploded Explosive Ordnance Operations (revised 16 Dec 92)*.

CFR = Code of Federal Regulations.

DOI = Department of Interior.

F.A.C = Florida Administrative Code.

NMFS = National Marine Fisheries Service.

NPDES = National Pollutant Discharge Elimination System.

OEW/UXO = ordnance and explosive waste/unexploded explosive ordnance.

RCRA = Resource Conservation and Recovery Act.

USC = United States Code.

USFWS = U.S. Fish and Wildlife Service.

Source: ESE.

Table 5-2. Cost Estimate for the Community Awareness Alternative

Item No.	Description	No. Units	Unit Measure	Cost/Unit	Total Cost
A	Notification of Persons Engaged in Construction Activities:				
a	Fact Sheets, Production and Editing, 2-Color Copies. Additional \$0.15/copy over 500 Copies, 3,200 Residents.	1,000	ea.	\$ 7.00	\$ 7,000
B	Notification of Tourists and Divers:				
a	Fact Sheets, Production and Editing, 2-Color Copies. Additional \$0.15/Copy over 500 Copies.	1,000	ea.	7.00	7,000
b	Sign Posting	80	ea.	150.00	12,000
				Total Capital Cost	\$26,000
				Contingency, 25%	<u>6,500</u>
				Total Estimated Cost	\$32,500

Figures

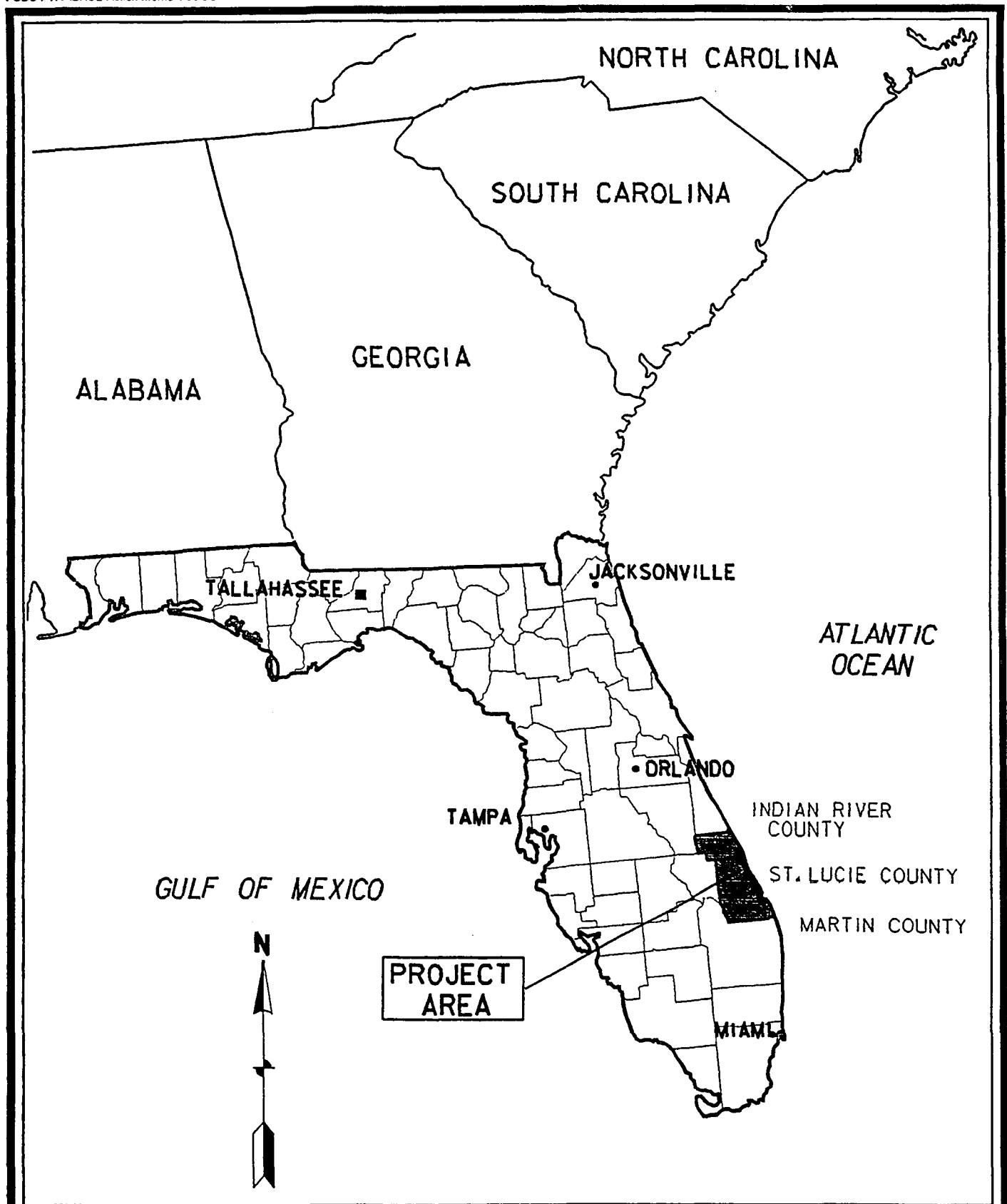


Figure 2-1
PROJECT LOCATION MAP

SOURCE: USACE, 1994.

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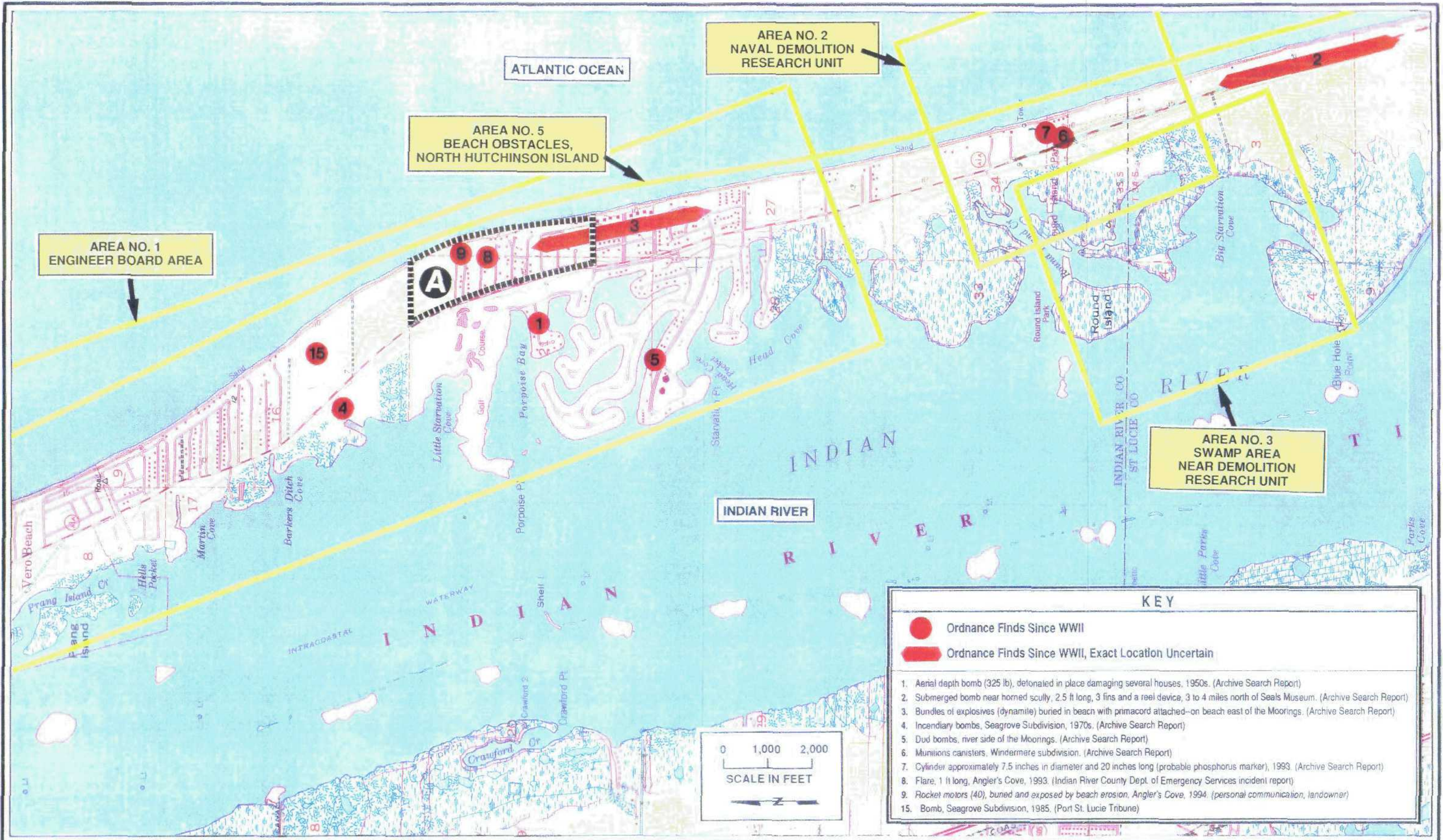


Figure 2-2
SITE LOCATION SHOWING AREAS WHERE OE
IS LIKELY TO BE PRESENT (PAGE 1 OF 5)

SOURCES: USACE, 1994; ESE.

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KEY

●	Ordnance Finds Since WWII
	Ordnance Finds Since WWII, Exact Location Uncertain

1. Aerial depth bomb (325 lb), detonated in place damaging several houses, 1950s. (Archive Search Report)
2. Submerged bomb near horned scully, 2.5 ft long, 3 fins and a reel device, 3 to 4 miles north of Seals Museum. (Archive Search Report)
3. Bundles of explosives (dynamite) buried in beach with primacord attached—on beach east of the Moorings. (Archive Search Report)
4. Incendiary bombs, Seagrove Subdivision, 1970s. (Archive Search Report)
5. Dud bombs, river side of the Moorings. (Archive Search Report)
6. Munitions canisters, Windermere subdivision. (Archive Search Report)
7. Cylinder approximately 7.5 inches in diameter and 20 inches long (probable phosphorus marker), 1993. (Archive Search Report)
8. Flare, 1 ft long, Angler's Cove, 1993. (Indian River County Dept. of Emergency Services incident report)
9. Rocket motors (40), buried and exposed by beach erosion, Angler's Cove, 1994. (personal communication, landowner)
15. Bomb, Seagrove Subdivision, 1985. (Port St. Lucie Tribune)

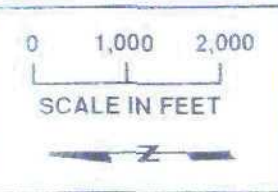


Figure 2-2
SITE LOCATION SHOWING AREAS WHERE OE
IS LIKELY TO BE PRESENT (PAGE 2 OF 5)

SOURCES: USACE, 1994; ESE.

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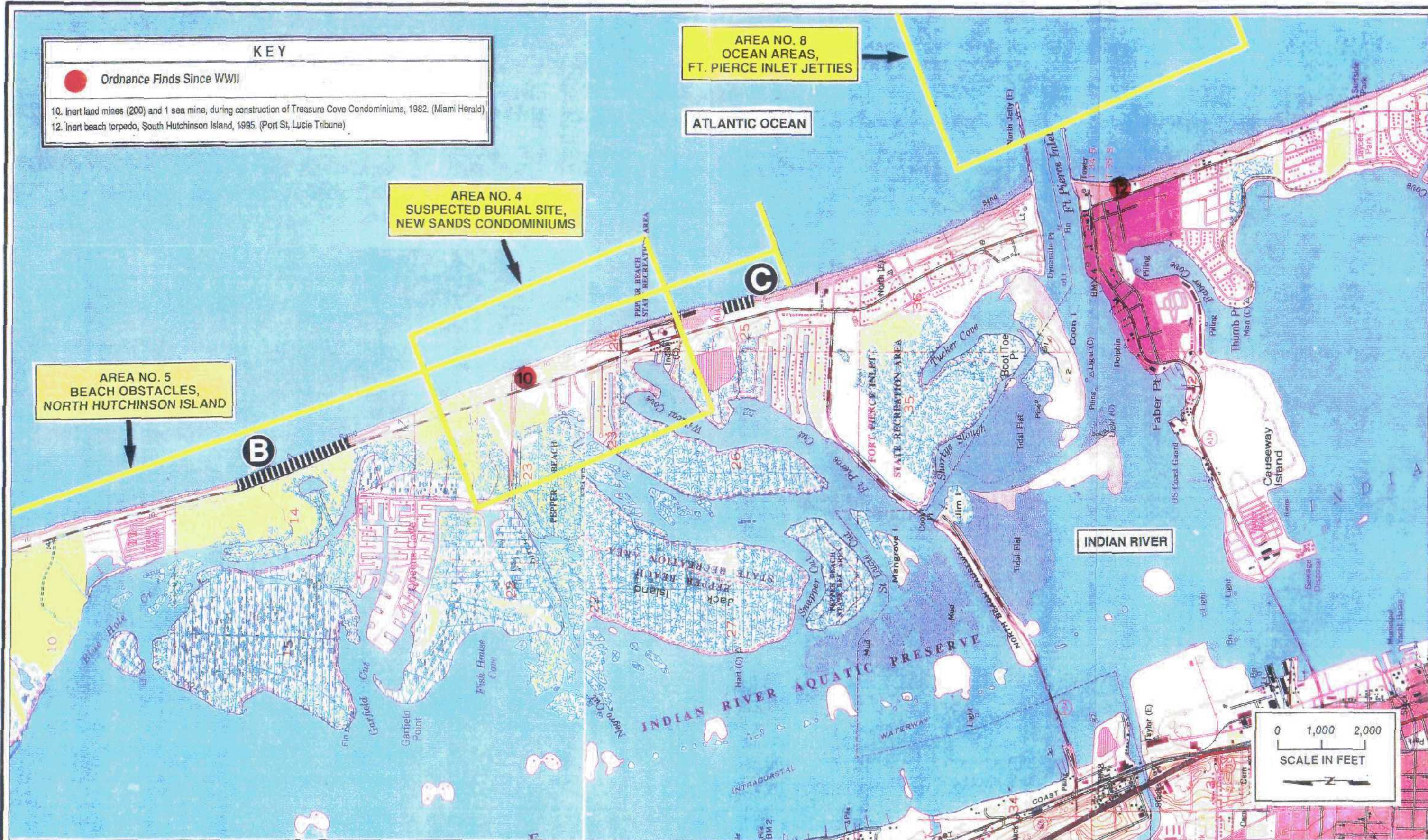


Figure 2-2
SITE LOCATION SHOWING AREAS WHERE OE
IS LIKELY TO BE PRESENT (PAGE 3 OF 5)

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Figure 2-2
SITE LOCATION SHOWING AREAS WHERE OE
IS LIKELY TO BE PRESENT (PAGE 4 OF 5)

SOURCES- USACE, 1994; ESE

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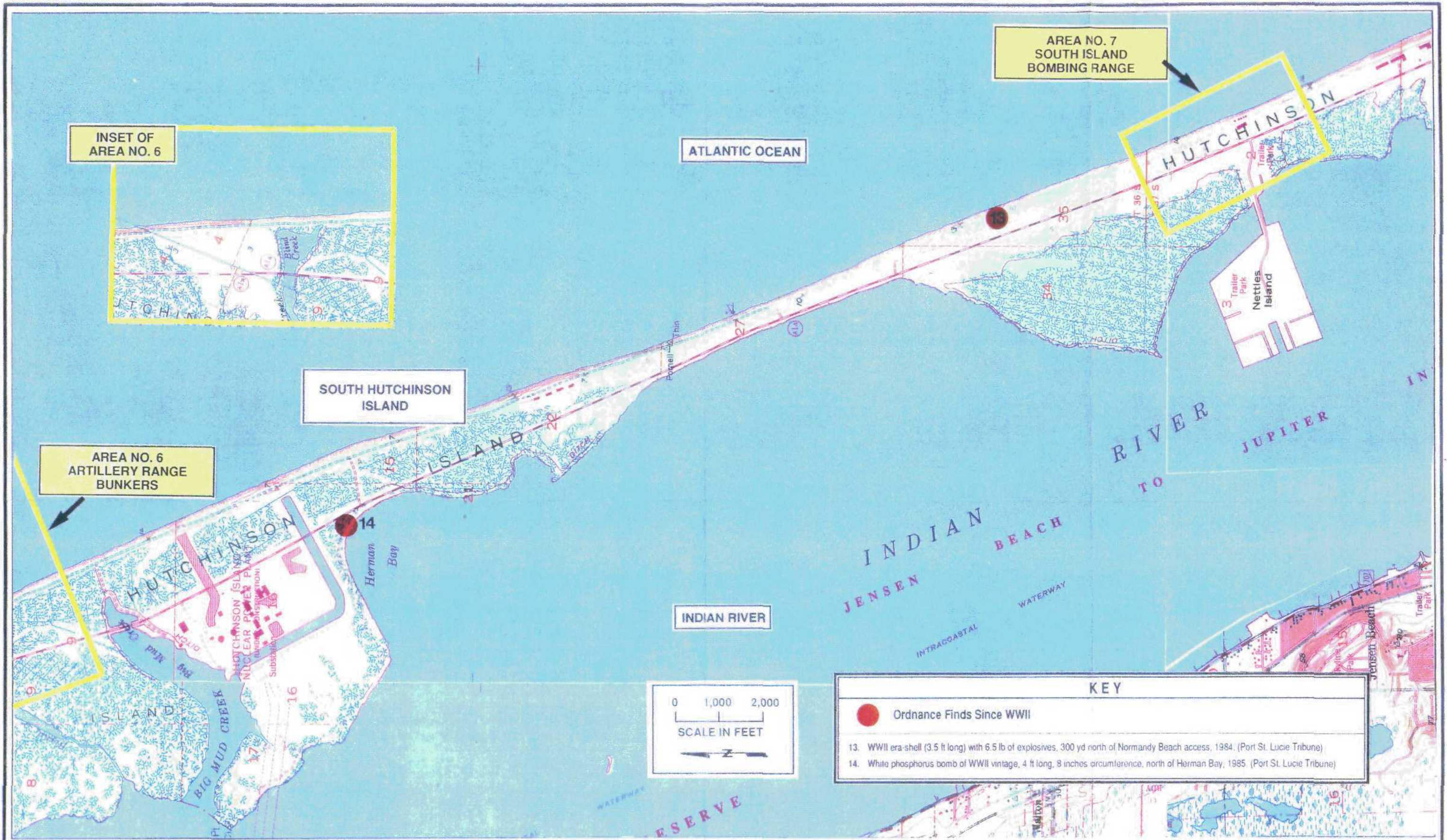


Figure 2-2
SITE LOCATION SHOWING AREAS WHERE OE
IS LIKELY TO BE PRESENT (PAGE 5 OF 5)

SOURCES: USACE, 1994, ESE

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