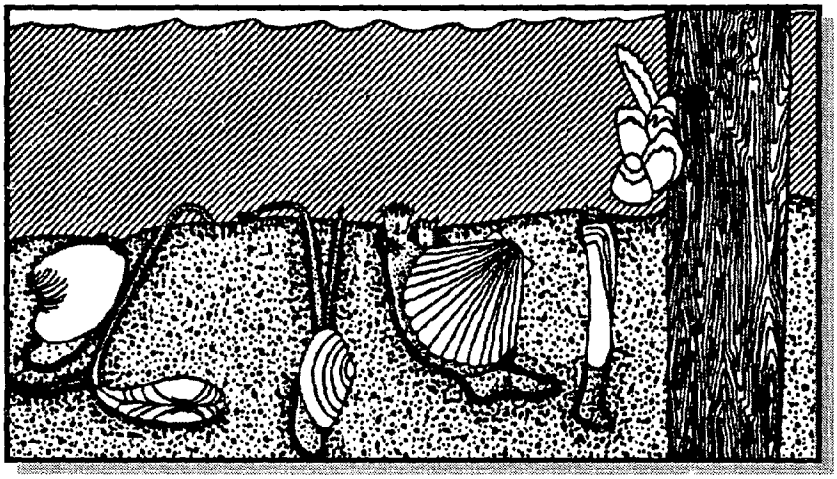
NOAA STATUS AND TRENDS
Mussel Watch Project
Field Sampling & Logistics
Year IX

The Geochemical and Environmental Research Group
Texas A&M Research Foundation



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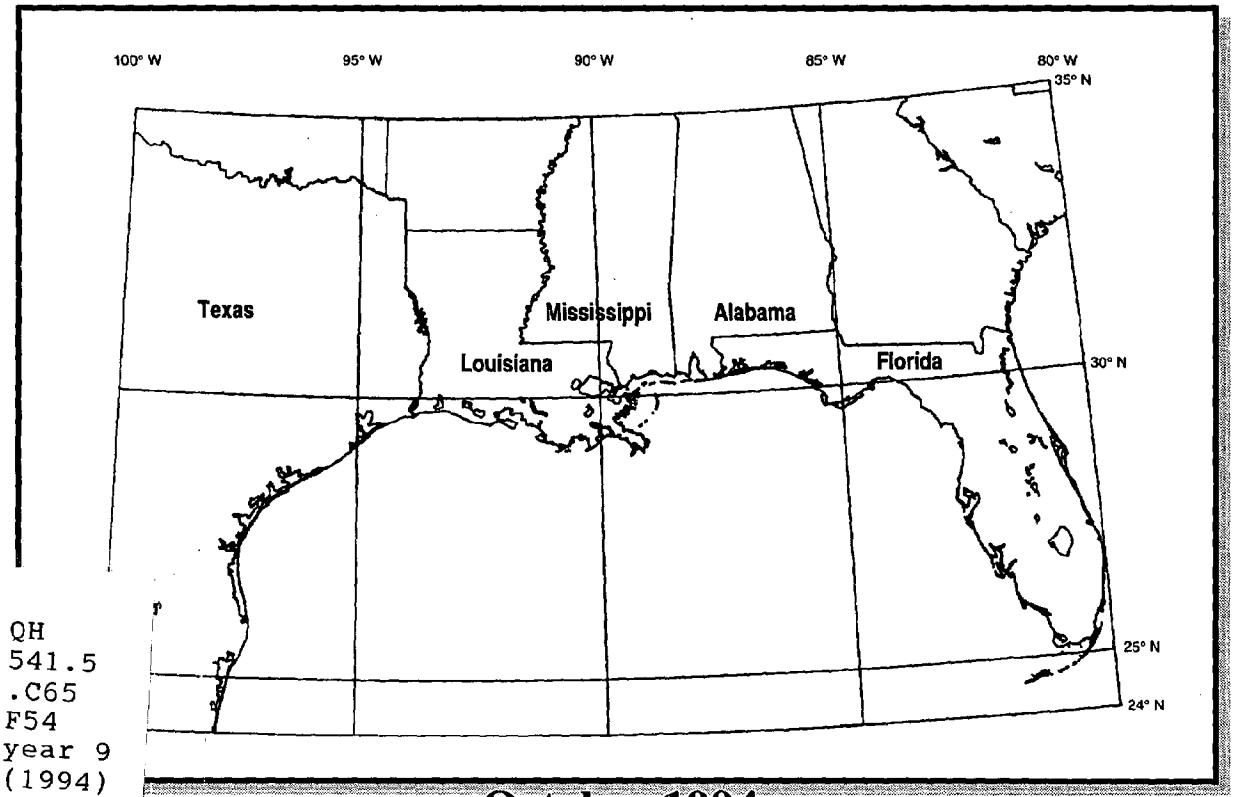

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NOAA
NATIONAL STATUS AND TRENDS

Mussel Watch Program
Field Sampling and Logistics Report

Year IX

Prepared by

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43	CKBP	Black Point, Cedar Key, FL	473
70	TBOT	Old Tampa Bay, Tampa Bay, FL	481
44	TBPB	Papys Bayou, Tampa Bay, FL	487
45	TBHB	Hillsborough Bay, Tampa Bay, FL	493
46	TBCB	Cockroach Bay, Tampa Bay, FL	499
47	TBMK	Mullet Key Bayou, Tampa Bay, FL	505
77	TBKA	Knight Airport, Tampa Bay, FL	511
76	TBNP	Navarez Park, Tampa Bay, FL	517
48	CBBI	Bird Island, Charlotte Harbor, FL	523
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FIELD SAMPLING AND LOGISTICS

This document provides a detailed description of the sampling sites in the Gulf of Mexico and Caribbean for the NOAA National Status and Trends (NS&T) Mussel Watch Program for Year IX (Period 2, Phase 4). The report contains detailed maps and site descriptions for all sites that have been sampled during the first nine years of the program. Locations (Nominal Site Centers) provided are the most recent available for a specific site and are based on chart data and Global Positioning System (GPS) positions, when available. GPS positions have been obtained for approximately 75% of the sites sampled. Loran C positions are not available for the Caribbean, therefore only GPS positions are provided. GPS and Loran C data are provided in Appendix A.

Sampling History

In 1986, GERG undertook the first NS&T Mussel Watch site sampling in the Gulf of Mexico. GERG's efficiency in field sampling is attested to by the fact that during the course of the past eight years of the project, the Gulf Coast field collection effort increased from an initial 50 sites in Year 1 to 88 sites by Year IX. The days in the field which were required to complete the sampling decreased from 48 days in Year I to 26 days in Year IV, despite the 40% increase in sampling effort. Years II and III sampling showed similar efficiencies, requiring 31 and 30 days, respectively. The sampling dates established in Year V dictate a time frame during which all subsequent sampling will be completed: Texas and western Louisiana sampling is done in December, and sites in eastern Louisiana, Alabama, Mississippi, and Florida are sampled in January. In Year VII we added Puerto Rico, which is sampled in February. No new sites were added in Year VIII. Two new sites were added in Florida in Year IX. A total of 32 days were spent in the field, sampling the 51 Year IX sites, eleven of which were travel days.

The sites from which we have collected oysters in the Gulf of Mexico have not been limited to the coastal embayments, but have included a number of sites which face the open Gulf and can only be reached by long boat transits. Stretching from Port Isabel in the lower Laguna Madre of Texas to Bahia Honda Key in Florida, the study area encompasses over 1500 straight line coastal miles. The actual distance to be traversed is appreciably longer since access to many

remote areas within the embayments is by circuitous route. A single field crew sampling half of the Gulf sites would travel over 8000 miles during a field season. This limited access to the shoreline combined with the very shallow waters of most of the bays (63% of all maintenance dredging in the continental U.S. is done in the Gulf of Mexico) has supported our original contention that the Gulf of Mexico sites are the most difficult U.S. coastal sites to sample.

Bivalve Distributional Patterns in the Gulf of Mexico

Distributional patterns of molluscan assemblages are dependent on water depth, substrate type, turbidity, salinity, and wave energy. Parker (1960) defined molluscan assemblages along the Gulf coast based on salinity and substrate type. The important inshore, estuarine, and lagunal assemblages are as follows:

I. River Influenced, Low-Salinity Assemblage - The largest and most abundant bivalves in this assemblage are:

Rangia cuneata - Common in beds all along the Gulf coast, large;
Rangia flexuosa - Less abundant than *R. cuneata*;
Polymesoda carolinensis - Missing from Mobile, Alabama, east and Matagorda Bay, west and south and
Macoma mitchelli - common in most low salinity lagoons and estuaries; small.

This assemblage is characteristic of soft-bottom areas surrounding river mouths, where the salinity is usually less than 10‰. Typically, the numerically dominant mollusk in this zone is *Rangia cuneata*. *Rangia cuneata, flexuosa,* and *Polymesado carolinensis* have life spans of several years whereas *Macoma mitchelli* is an annual species. Of the longer-lived species, *Rangia cuneata* is also the biomass dominant in this assemblage.

II. Delta - Front Distributary and Interdisciplinary Assemblage - The largest and most dominant bivalves in these assemblages are:

Rangia cuneata - not as abundant as in river influence assemblage;
Rangia flexuosa - more abundant in interdistributary bays;

Macoma mitchelli - rare;
Crassostrea virginica - very abundant in higher salinity interdistributary bays; and
Petricolar pholadiformis - common, but small.

III. Low Salinity Oyster Assemblage - The largest and most dominant bivalves in this assemblage are:

Crassostrea virginica - predominates in this zone; and
Brachidontes recurvus - at times very abundant.

Oyster reefs are abundant where salinities range from 10-30‰. Most oyster reefs are found in relatively shallow waters. Typically, large reefal structures are formed at right angles to the dominant current flow. These reefs are easily located and are a major geologic feature in most of the bays along the Gulf Coast that were included in this study. *Crassostrea virginica* is the biomass dominant as well as the most numerically-abundant large bivalve in the assemblage. The mytilid *Brachidontes recurvus* is usually found associated with oyster reefs. However, it is not as abundant nor as large, and it has no previous baseline established in the Mussel Watch programs. Furthermore, it rarely occurs in other assemblages where *C. virginica* is an important component.

IV. High Salinity Oyster Assemblage - The largest and most abundant bivalves in this assemblage are:

Anomia simplex - common, but small;
Brachidontes exustus - common, attached to oyster valves; small;
Diplothyra smithii - rare; and
Ostrea equestris - abundant, long lived species.

High salinity reefs form near inlets where relatively high salinity water (34-36%) is constantly renewed by tides. The substrate is old shell. *Ostrea equestris* is generally abundant and replaces *C. virginica* when salinities rise above 30‰. Over the long-term, drought cycles frequently result in the replacement of *C. virginica* with *O. equestris* (and vice versa in wet years) along most of the Gulf coast (Parker, 1960). Thus, this assemblage is effectively identical to the Low

Salinity Oyster Assemblage except where salinity causes the replacement of species with other closely related species. In this assemblage, *O. equestris* typically is the biomass dominant.

V. Hypersaline Lagoon Assemblage - The largest and most abundant bivalves in this assemblage are:

Mulinia lateralis - abundant but small;
Tellina tampaensis - moderately abundant; and
Anomalocardia auberiana - very abundant

Hypersaline lagoons and estuaries are common along the lower Texas coast and have salinities ranging from 40-80‰. The species in this assemblage are very abundant but are short-lived and small. The numerical dominant in this zone is *Anomalocardia auberiana.*

In the previous EPA Mussel Watch Program, genera from the family Mytilidae (the mussels) were used as the organisms of choice for portions of the geographic range of the mussel watch program. Along the Gulf coast, however, mussels that do occur (i.e., the genera *Brachidontes, Lioberus, Lithophaga, Modiolus, Geukensia,* and others) are often too small and frequently not abundant or widespread enough to be considered as target organisms. Previous baseline organisms along the Gulf Coast for the EPA Mussel Watch Program were all species in the family Ostreidae (viz. *Crassostrea virginica* and *Ostrea equestris*). These two species are frequently biomass dominants, abundant and easily resampled from their respective habitats.

The American oyster, *C. virginica,* occurs in intertidal and sub-tidal habitats all along the Gulf coast (Scott and Lawrence, 1982). *C. virginica* is sufficiently widespread so that it has been able to be collected at the majority of the designated sites. *C. virginica* typically inhabits coastal and lagunal environments with salinity levels normally varying between 20-30‰, although populations at both lower and high salinities are known. Moreover, as shown above, it is one single species common to nearly all the Gulf Coast and is usually biomass dominant where it occurs. The oyster reefs produced by *C. virginica,* which make up the bulk of the sites selected for this portion of the NOAA Mussel Watch Program, are permanent and for the most part large features which are easily located for sampling and resampling. In addition, living oysters usually

are abundant on these features and are recruited yearly to the reefs; thus, these areas will be able to sustain repeated sampling over a ten year plus period with minimum impact on the population structure of the reef. Clearly, due to the previous baseline established for this species, its abundance, large size, and ubiquitous occurrence along the Gulf coast, *C. virginica* is the target organism of choice.

Although *C. virginica* has a particularly wide salinity tolerance, a few areas that have been designated as sites are outside its range. In areas of low salinity which do not support *C. virginica*, *Rangia cuneata* is the dominant bivalve. *R. cuneata* is relatively large and abundant. It is the characteristic organism of the low salinity assemblage and it occurs in most low salinity habitats along the Gulf Coast. *R. cuneata* is usually found in abundance at the sediment-water interface on soft bottoms.

We have attempted to find *C. virginica* in the high salinity bays in the lower Laguna Madre between Corpus Christi and Port Isabel with limited success. *O. equestris,* an ecological equivalent, usually replaces *C. virginica* in these areas. *O. equestris* is usually associated with hard bottoms or mangrove roots and is abundant and large. It has an established baseline for comparison because it previously was used in the EPA Mussel Watch program. In addition, it belongs to the same mollusk family (Oestreidae) as *C. virginica.* In most habitats which usually do not support *C. virginica, O. equestris* can be collected and is the organism of choice.

In hypersaline lagoons (i.e., Baffin Bay, Texas) where *C. virginica* and *O. equestris* are absent, *Anomalocarida auberiana* could be sampled. This species is small, yet it is very abundant, reaching population levels of ~2000 per m^2 in some instances.

Because of the concerns about species effects, none of the alternate species at the sites which do not support *C. virginica* have been collected to date.

Field Logistics

Collection and field processing of oyster and sediment samples was conducted by GERG utilizing small boats and a portable self-contained laboratory (used in Years I - VI) which was specifically equipped for sample processing and storage. A field collection crew consisted of two people (sometimes three, depending on the site) using a trailered outboard boat. Table 1 summarizes

collection methods and site accessibility. In Years VII through IX, the processing was not conducted in the mobile lab. Samples were collected, packed on blue ice, and shipped back to our labs in College Station by Federal Express for processing the next morning. Samples from Puerto Rico were shipped via American Airlines as perishable items and were received at the GERG laboratory in less than 48 hours.

The Gulf of Mexico field collections were made in four sampling legs. The first leg departed College Station, sampling the ~12 sites within a 200 mile radius of College Station (Brazos River, Galveston Bay, and as far east as western Louisiana) in a 5-day period. Samples were returned to College Station by Federal Express, private aircraft, and/or the returning field crews. The next sampling leg was based at Port Lavaca. During this five day period, two boat crews completed sampling the ~19 remaining Texas sites and returned to College Station. Following the Christmas holidays, sampling resumed with two boat crews who sampled from central Louisiana, through Mississippi, to Alabama. Upon completion of the ~ 20 sites as far east as Mobile, Alabama, the sample crews returned to College Station. The last leg sampled 24 sites in Florida. After completion of the Gulf sampling, the boat crews returned to College Station. In Year VII a fifth sampling leg was added in February to sample Puerto Rico, where local fishermen were employed to use their boats to take us to collection sites.

Logistic Considerations

Major logistical concerns in sampling the Gulf of Mexico oyster sites primarily involved access to the variety of sampling sites (and collection gear) and to a lesser degree permitting/politics. In the Caribbean, logistical concerns were much more complex since all collection gear had to be carried aboard airplanes and permitting and regional politics played a much larger role.

In the Gulf of Mexico, one major problem concerned accessibility to the oyster sites. Some samples were little trouble to obtain, such as from rock rubble beneath a highway bridge in Galveston, but some were difficult, such as ones that required a 35 mile drive from the nearest motel to the launch, a 15 mile boat ride through Louisiana marshes, and 10 miles alongshore in the open Gulf to a site that had to be sampled by dredging. Not only was this situation difficult, but the site was situated within a private lease which extended to all oyster bottoms in the

Table 1. Collection Methods and Site Accessibility.

Site	Designator	Collection Method	Access to Site
1	LMSB	H	S.B
52	LMPI	H	A
78	LMAC	H	B.S
2	CCNB	H	S.B
3	CCIC	H	B
53	CCBH	H	A
4	ABLR	T/H	L.B
54	ABHI	H	A.B
5	CBCR	H	B
6	MBAR	H	L.B
7	SAPP	D	L.B.O
8	SAMP	H	B
9	ESSP	H	B
10	ESBD	T/H	B
11	MBLR	H/D	B
12	MBGP	D	B.O
13	MBTP	H	L.B.O
14	MBEM	H	B
56	MBCB	H	B.S
55	MBDI	H	B.S
72	BRCL	H	B.S
57	BRFS	H	A
15	GBYC	T/D	B
16	GBTD	D/H/T	B.O
17	GBHR	D/T	L.B.O
18	GBCR	H	B
58	GBOB	H	A
59	GBSC	T	S.B
19	SLBB	H/D	B
20	CLSJ	T	B
60	CLLC	H	B
21	JHJH	H	B
22	VBSP	D	L.B.O
23	ECSP	NONE	L.B.O
24	ABOB	D/H	L.B.O
25	CLCL	D	L.B.

Table 1. Continued

Site	Designator	Collection Method	Access to Site
26	TBLB	H	B
27	TBLF	H	L.B.O
28	BBSD	H/D	B.O
29	BBMB	H	B
61	BBTB	D/T	B/L.O
65	MRTP	H	B/L
64	MRPL	T/D	B/L.O
31	BSSI	D	L.B.O
30	BSBG	H	B.O
32	LBMP	H	B
62	LBNO	H	B/L
63	LPGO	D	B/L
33	MSPC	H/T	A.B
34	MSBB	H	A.B
35	MSPB	T/D	B
36	MBCP	T	B
66	MBHI	T	B
79	MBDR	T	B.S
67	PBPH	H	B
37	PBIB	H/T/D	B
80	PBSP	H	B.S
73	CBJB	H	A
38	CBSR	H/T/D	B
82	CBBL	H	B
39	CBPP*	H	A
83	CBBB	H	B
74	PCLO	H	B
68	PCMP	H	B
40	SAWB	H	B
41	APDB	T	L.B.O
42	APCP	T	B
75	AESP	H	B
69	SRWP	H/T	B
43	CKBP	H	L.B.O
70	TBOT	H	A
44	TBPB	H	A or B

Table 1. Continued

Site	Designator	Collection Method	Access to Site
45	TBHB	H	B
46	TBCB	H	B
47	TBMK	H	A
77	TBKA	H	A
76	TBNP	H	A
48	CBBI	H	L.B.O
71	CBFM	H	A
49	NBNB	H/T	B
50	RBHC	H	B
87	FBFO	H	B.S
88	FBJB	H	B.L.O
51	EVFU	H	B
81	BHKF	H	A
84	PRBB	H	B
85	PRBM	H	A
86	PRBJ	H	B.L

* name changed from CBSP to CBPP.
H = hand sampling; T = tong sampling; D = dredge sampling
B = boat required; S = time to reach site < 1 hr; L = time to reach site >1 hr; O = site located in large open water or required to cross; A = accessible by auto by wading from shore.

bay system. It was owned by a family who initially met us at the boat launch and who were adamantly against our sampling from their lease. The site was located on what may be the most prolific oyster beds in Louisiana (and, therefore, on the entire Gulf coast), and was exposed to outflow from the entire Atchafalaya drainage basin.

Particularly in the Gulf, we had need of a relatively large, fast and seaworthy boat that had a draft shallow enough to traverse the shallows en route to the site and to get on the reef for sampling.

Proper equipment and navigational gear was needed to safely cross the Mississippi Delta area, where landforms and bayous in and around the delta showed essentially no conformity to the most recent NOAA navigational charts, as was verified by our direct experience in the field and from very recent aerial photographs.

The other sampling extremes were typified by sites such as Cockroach Bay, which was accessible only with a very shallow draft boat and which required a two mile ride through an uncharted mangrove swamp and across oyster bars, over which the boat had to be dragged even on a flood tide. On the other hand, sites such as Dry Bar in Apalachicola (where dredges were absolutely forbidden) required about a 7 mile run across the open bay in the Boston whaler to a site so shallow that it was collected by hand while wading.

The distance between the Gulf sites measured 1500 nautical miles when the straight line distances between nearest sites were totalled. However, a single boat crew completing half the sites over the range from Laguna Madre to Naples drove over 8000 miles in a sampling season because of the limited and circuitous routes to launching ramps and sites.

In the Caribbean, transportation on land and on the water had to be arranged on each island and at each collection site. There were few commercial or recreational boat rental sources; therefore, local fishermen had to be located at each collection site for which boats were needed. Local fishermen were sometimes hesitant to take scientists to their oyster harvesting areas since they believed that there could be some interference with their livelihood.

Permits

Collection of oysters in all the affected states was regulated by state agencies. A scientific collecting permit was required prior to collection in Texas,

Louisiana, Alabama, Florida and the Virgin Islands. Prior written permission was required in Mississippi. Collections in Puerto Rico were made under the University of Puerto Rico permit. Additionally, the preponderance of privately leased oyster beds in Louisiana required that we obtain permission from the individual lease holders for those instances where the site was (or was thought to be) located in a leased area.

Permit applications were submitted to and obtained from the following:

Texas - Mr. Steve Schwelling
Permits Branch, Resource Protection Division
Texas Parks and Wildlife Department
4200 Smith School Rd.
Austin, Texas 78744

Louisiana - Ms. Karen Foote
Louisiana Department of Wildlife and Fisheries
P.O. Box 98000
Baton Rouge, LA 70898

Mississippi - Mr. Joe I. Gill, Jr.
Miss. Dept. of Wildlife, Fisheries and Parks
Deputy Director, Coastal Operations
2620 Beach Blvd.
Biloxi, Ms 39531

Alabama - Mr. Charles Grimsley
Game and Fish Division
Department of Conservation and Natural Resources
64 North Union Street
Montgomery, AL 36130

Florida - Ms. Kat Ethridge
Florida Dept. of Natural Resources
3900 Commonwealth Blvd., Room 813
Tallahassee, Florida 32303

Florida - Everglades National Park
Dan Foxon
Everglades national Park
P.O. Box 279
Homestead, Fl 33030

Virgin Islands - Dr. Lawrence Benjamin
Assistant Commissioner
Department of Planning and Natural Resources
45 Estate Nisky
Charlotte Amalie, St. Thomas, V.I., 00802

Puerto Rico - Mr. Javier Velez Arocho
University of Puerto Rico
Sea Grant Program
P.O. Box 5000 RUM-UPR
Mayaguez, Puerto Rico 00681-5000

Sampling Gear

Boats

Two boats were used during the course of collection. A 17' Boston Whaler with an 88 hp engine and electric tilt/trim and a 16' Whaler with an 88 hp engine provided the greatest versatility and utility in sampling. Each boat was equipped with dual fuel tanks, a VHF radio, Raytheon Loran C, a fathometer, and emergency/safety equipment. A handheld GPS receiver was used on one of the boats during Year VII and later years. The boats were trailered to a launch site near the sampling site. Due to the remote location of several sites, running times of up to 3 hours were required to get from the launch site to sampling sites.

Radio Communications

All vessels were equipped with CB/VHF marine radios. This allowed us to coordinate sampling activities between both boats when they worked simultaneously and kept us in contact with the Coast Guard and other vessels operating in the area if emergencies or difficulties arose. It also kept us abreast of coastal weather conditions which were broadcasted continuously on the VHF weather frequencies.

Safety Considerations

All boats were equipped with Coast Guard-required safety and emergency equipment (life jackets, lights, reserve fuel, first aid kit, etc.). Our group conducts extensive field activities, approximately 120 man months on oceanographic cruises per year, including over 40 weeks on chartered boats that we fully equip and rig out; thus, we were well aware of applicable safety considerations and the consequences of failure to prepare for these contingencies on a field such as the NS&T program.

Sample Collection

Oyster Collections

Oysters were collected by hand, with tongs, or by using a dredge (Table 1). Collection by hand was the method of choice and was used at intertidal and shallow subtidal sites. Loose oysters were simply picked from the reef and were separated from attached shell debris or other oysters by using an oyster knife or chipping hammer. In some areas where the use of a dredge was prohibited (e.g. Apalachicola Bay), subtidal sites were sampled using oyster tongs. The oysters were separated from one another by using oyster knives or chipping hammers. At the deeper subtidal sites and where oysters were obtained directly from commercial oyster fishermen at their privately leased sites, the oysters were collected with steel or stainless steel oyster dredges. Clumps of oysters and shell were separated to individual oysters as before.

Sediment Collections

Where water depth permitted, sediments were sampled by hand using a Teflon-coated scoop. Prior to each use the scoop was cleaned and rinsed with acetone and then methylene chloride to remove any trace of residual organics. Spent solvent was collected and returned to GERG for proper disposal. The upper 1 cm of sediment was removed by the scoop and was placed into the appropriate container. In water depths where direct sampling was not possible, a stainless steel box corer mounted on a long pole or on a rope with a messenger was used to bring a sample of the substrate on board the boat and the Teflon-coated scoop was used to remove the top 1 cm subsamples for analysis.

Field Processing

Salinity and Temperature

At every site, the temperature of the surface water was recorded. Salinity was measured either at the site with a temperature compensating refractometer or a sample was collected and returned to the mobile field laboratory where

salinities from a number of sites were measured at constant temperature with a calibrated refractometer.

Oyster Processing

Oysters were processed in GERG's sample processing laboratory. Rapid processing of oysters was required because of the coincident collection of histopathological data after collection and prior to freezing. In addition, the histopathological procedure required follow-up handling and immediate cultures which could be achieved only under laboratory conditions. We used this opportunity not only to provide the histopathological data but to provide additional data on relevant bivalve parameters. This process allowed the field collections to proceed efficiently while separating the collection activities from the processing functions.

As samples were collected on the boat, they were segregated and labeled according to station and replicated. Efforts were made to retain organisms in the same size range for sampling so that organisms pooled for analysis at a site and the replicates were of similar age or maturity. Samples were stored in ice chests aboard the boat until the day's sampling was complete. At that time they were transferred to Freez-Safe insulated containers which were packed with frozen blue ice for shipping. The samples were driven to the nearest Federal Express office for next-day delivery to GERG. The processing protocols for oysters are shown in Figure 1.

Cleaning and Shucking - Oysters were scrubbed free of mud and debris while at the collection site. Pure bristle brushes and water from the collecting site were used for cleaning. Oysters destined for organic and histopathological analyses were measured for length and displacement volume and were opened and processed in the GERG laboratory.

Dissecting and Gonadal Preservation - Twenty oysters from each of three sampling stations at every site were processed for histopathological and gonadal development study. After the initial displacement volume of the washed oysters was determined, they were arranged on a stainless steel tray. Each oyster was measured (axial length) and was opened with a solvent-washed stainless steel oyster knife. A complete cross section of gonadal tissue was excised from each oyster and was placed into an individual tube of Bouins solution. A small snip of mantle tissue was also removed and was placed into individual tubes of fluid

Sample Processing Protocol
Oyster Sites

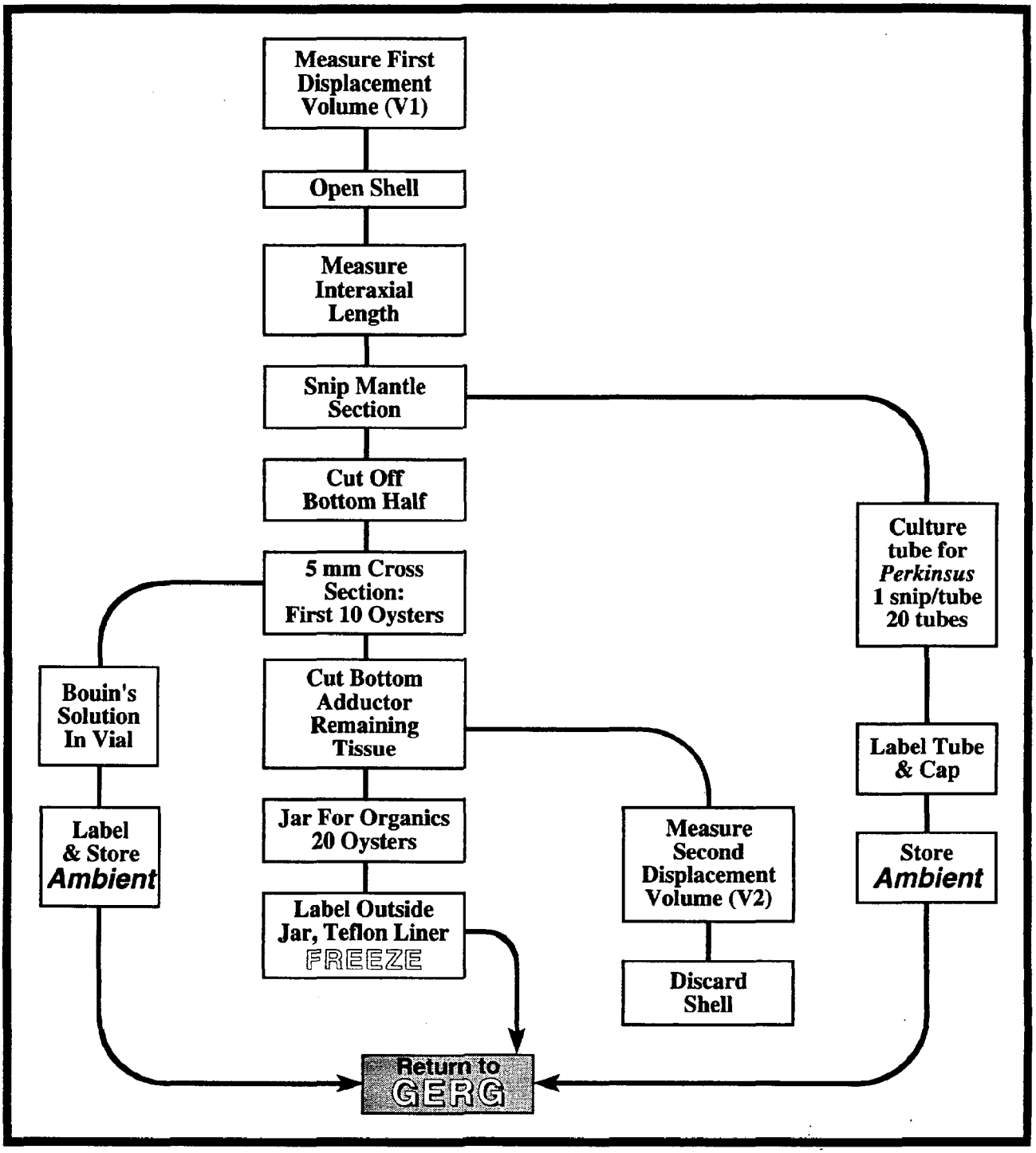


Figure 1. Sample processing protocol for oyster sites.

thiglycolate medium (FTM) for the determination of the incidence of the oyster parasite *Perkinsus marinums.*

Trace Organic Processing - The remaining oyster tissue was excised from the shell and was placed into a pint mason jar which had been combusted in a muffle furnace to completely remove trace organics. The tare and gross weight of the jar and contents (20 oysters) were recorded on the lab form with the individual lengths of the oysters. A Teflon liner was placed under the jar seal, and the labeled sample jar (one for each of three stations in a site) were frozen in laboratory deep freezers.

Trace Metal Processing - A separate 20 oysters from each of three stations within a site were washed as above and were set aside in plastic trays for metal analyses. The oysters were collectively measured for the initial displacement volume. Because of their sharp edges and the need to ensure that they remained closed prior to processing, the oysters had to be individually wrapped in singlefold paper towel and bound with rubber bands before they were double bagged in plastic trash bags, labeled and stored in the freezers. All opening and further processing of oysters (measurement of shell length and second displacement volume) was done at the analytical laboratories under clean room conditions.

National Biomonitoring Specimen Bank (NBSB) - Bivalves from five sites on each coast were sent to the NBSB. The NBSB archives were housed at the National Institute of Standards and Technology (NIST, formerly National Bureau of Standards). Processing of these samples was conducted in the GERG facilities. The processing protocol is depicted in Figure 2. A and B replicates were comprised of 10 bivalves each from the three stations at a site (30 individual specimens in A and B).

The composite sample of 10 oysters from each station was scrubbed clean of mud and debris by using the pure bristle brush. The bivalves were placed into a teflon bag and care was taken to keep the inside of the bag at the point of sealing dry. Air was evacuated from the bag as much as was practical, and the bag opening was sealed with the heat sealer. Air-tightness of the first seal was checked by depressing the bag and listening for escaping air. The bag was resealed as necessary and a second seal was then made about 1/2" out from the first.

The sealed bag was then placed into another teflon bag with the sample label between the two bags. The sealing process was repeated on the outer bag, and the resultant double-bagged sample was placed on dry ice for shipment to

Sample Processing Protocol

NIST Bivalve Sites

(10 Sites only per Year per Coast)

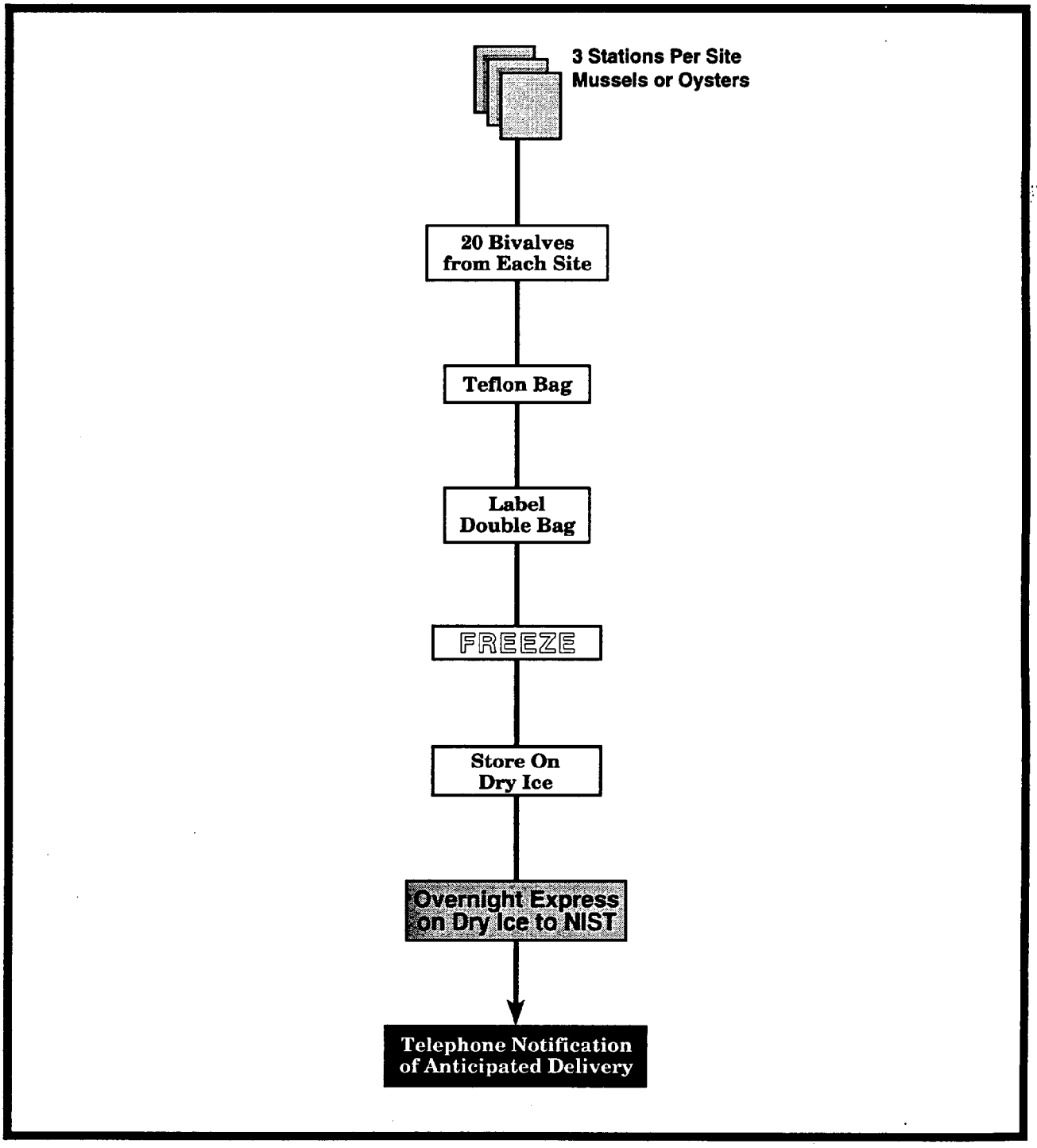


Figure 2. Sample processing protocol for mussel sites.

NBSB. A data form provided by NBSB was completed for each site and sent along with the samples.

Shell Preservation - Oyster shells that were processed and opened in the laboratory (the sets of 20 for histo, gonadal, and organic analyses) were retained and archived for possible future study. This set from each site already had the most complete data set (length, wet weight, mantle cavity volume, as well as contaminant, histo, and gonadal index) and would be of greater value than a set taken separately or for only one parameter. The shell pairs were placed into cloth bags (soil sample bags), labeled, and stored in 5 gallon plastic buckets with ethanol as a preservative.

Sediment Processing

Sediment processing was essentially completed at the site, whether on the boat or on the shore in the case of shore-accessed sites. The processing protocols for sediment samples, including those for NBSB archival, are shown in Figure 3.

Trace Organics and Trace Metals - The separate samples for organics and trace metals, contained in a pre-combusted half pint glass jar and a heavy duty pint zip-lock bag, respectively, were labeled and assigned a unique identifier code. They were shipped to GERG and stored in the freezers until analyzed.

Grain Size - Sediments collected for grain size analysis were stored in zip-lock or whirl-pack bags at ambient (above freezing) temperatures. As with the previous samples they were labeled with collection and site information and given a discrete identifier code.

Sediment Ancillary Measurement - Sediment ancillary measurements were run on aliquots of the samples taken for organic analyses; thus, no additional sampling or processing was required in the field.

National Biomonitoring Specimen Bank - At five sites per coast, sediments from all three sites were composited into two replicates (A and B) for NBSB archival. The procedure is illustrated in Figure 3.

Subsamples from all three stations at a site were combined into a composited sample. The subsamples were placed in teflon jars. The jars were filled only to within 1/2" to 1/4" of the top to allow for expansion during freezing. The label was taped to the outside of the jar, and the sediment samples were stored on dry ice for air shipment to NBSB. The NBSB data form was completed and sent with the samples.

Sample Processing Protocols

Sediments

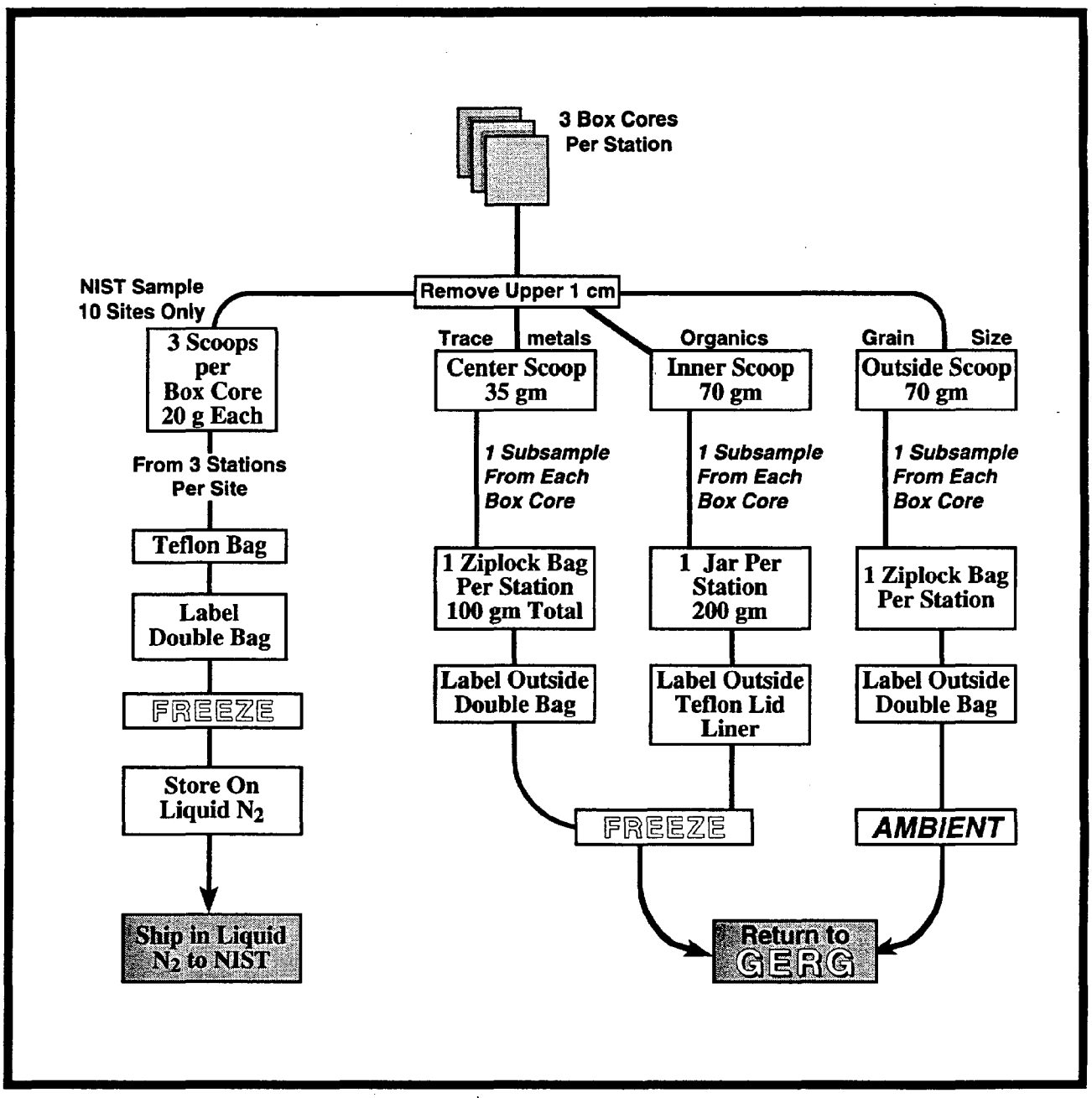


Figure 3. Sample processing protocol for sediment sites.

Sample Handling and Chain-of-Custody

Sample collection was under the supervision of the field party chief who recorded the data and checked off the samples that were acquired against a prepared station list. Samples and copies of the data sheets were shipped to the laboratory manager at GERG. The lab manager supervised the processing of samples in the lab, the labelling, and the storing. The manager also prepared an inventory list of samples that were collected and were to be transferred. All samples and records were transferred to the Quality Control Manager who checked the samples against the prepared station list and stored the samples for subsequent disbursement to the different analytical groups and final storage.

NBSB samples were shipped directly with sample documentation and transfer forms that were provided by NIST. A critical part of this transfer process was arranging shipment so that the samples did not arrive on a weekend and notifying the NBSB contact by telephone of the expected arrival time.

Field Sampling Criteria

Definition of Stations and Sites

A site, the smallest geographic unit sampled, was selected to be representative of a target area, general location, or bay system. Once selected, the site was sampled at the same location each year. Within each site, three independent stations were sampled in order to characterize the site. Offshore subtidal sites were ~400 m radius circles. Latitude and longitude of the site was measured at the center of the circle. Shoreline intertidal sites were defined as 100 m linear areas along the tidal horizon to either side of the site center. Sediment sites were generally coincident with the bivalve sites. However, when subtidal bivalve sites did not meet the sampling criteria, separate sediment sites were selected. If at all possible, these sites were located within 2 km of and exposed to the same water mass as the bivalve site. The sequence of events in selection of new sites is shown in Figure 4.

Eighty-five (85) sites were established in the Gulf of Mexico and three (3) sites in the Caribbean during the first nine (9) years of the NS&T program. For the first six years of the study three stations at each site were sampled and each station was characterized by three replicate composited samples taken for

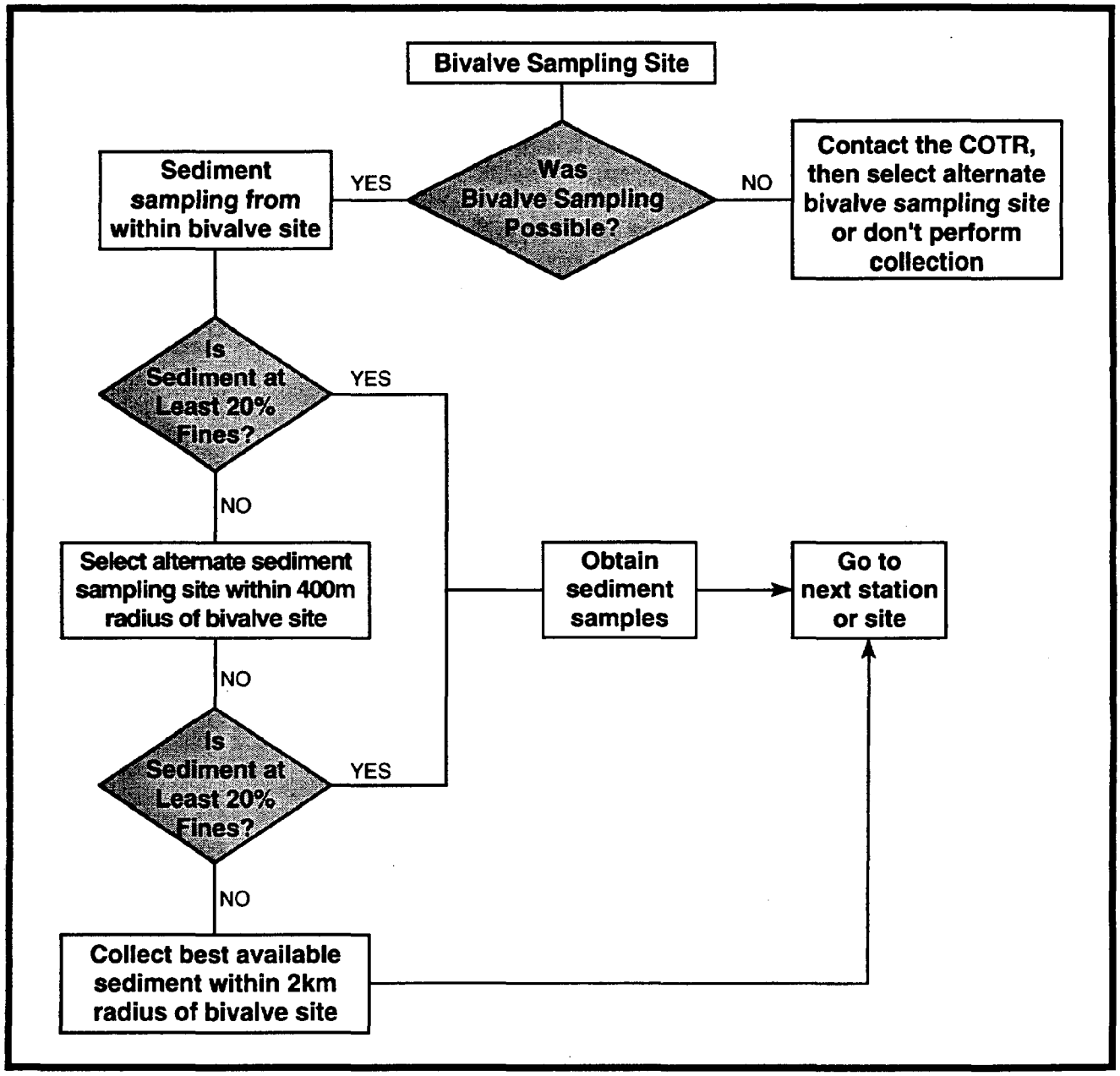


Figure 4. Decision criteria for sediment sites.

sediment analysis and a composite bivalve sample made up of 20 oysters. Selection of the three sampling stations was based on the historical locations as described for each individual site in this report. In Year VII the number of oysters collected at each of the previously sampled stations was reduced to 20 from 22 oysters. The composite bivalve sample was made up of 7 to 8 oysters from each of the three stations.

Bivalve Site Selection Criteria

Bivalve sites were initially established according to the following criteria:

- The site shall have indigenous oysters of a suitable size (7-10 cm for *C. virginica or C. rhizophore*) which are available for collection annually.
- The site shall integrate contaminant accumulation from nearby or surrounding areas and shall be outside the zone of initial dilution of a dumpsite or point-source discharge.
- The site should have sufficient bivalves, such that repeated annual harvesting of 250-400 bivalves will not seriously deplete the resource.
- The site should be suitable for follow-up sampling (e.g., not anticipated to be be physically disrupted by development activities or dredging).
- Sampling substrates will be limited to rock (including rip-rap), and or mud (or mangrove roots in the case of *C. rhizophorae*). Artificial structure such as pilings, and navigation aids will be avoided if possible in order to avoid potential contamination.
- Provided other criteria are met and where feasible, the bivalve sites should coincide with historical monitoring sites (e.g., USEPA Mussel Watch monitoring sites).

Each year the field sampling effort has reoccupied as many of the historical sites as possible. It has become necessary to relocate or abandon a few of the established oyster sites over the years due to one or more of the following circumstances:

- Bivalve populations were no longer present.
- A construction project or dredging activity precluded sampling.
- Collection of bivalves was logistically impossible or would endanger the field personnel.

- Permission to sample a site or gain access to a site was denied by a landowner or a leaseholder.

When another location was chosen for sampling, a determination was made by the COTR as to whether the new location was considered a minor "relocation" of the site or whether the new site was significantly different and should have been considered a newly established site. Newly established sites were assigned a new site name and unique site codes. Sites minimally relocated could retain the same name or could be renamed if the new name better signified the relocated site.

Sediment Site Selection Criteria

In most cases sediment sampling coincides closely to the bivalve stations. Because of the affinity of the target species for and the ubiquitous distribution of depositional zones in Gulf of Mexico estuaries, coincident sediment and bivalve sampling was generally not difficult. The specific criteria for sediment sites were:

- The site shall be subtidal (never exposed at lowest tides),
- The site shall be exposed to the same water mass as the corresponding bivalve site,
- The site should be located as near as possible to and preferably not more than 2 km from the bivalve site,
- The site shall integrate contaminants from multiple sources in the surrounding area but shall not reflect inputs from an individual point source of contamination.
- Previously sampled or historical Mussel Watch locations (e.g., EPA sites) should be included/reoccupied where possible.

Field personnel were responsible for determining the suitability of the sediment sample. Only sites which were minimally (40 percent) fine sediment (silt and clay) were sampled for sediments. Samples that did not meet this grain-size criteria were not analyzed for the trace elements and trace organics. Therefore, grain size determinations were made prior to the chemical analysis.

Sampling Summary

Sampling Problems

It has been our intent to sample the locations prescribed by NOAA during Years I through IX of the program. However, in the field we have found that at a few sites, many factors worked against this both in the initial first year sampling and then again in the subsequent years when we returned to resample the same sites or new sites. Some of the prescribed locations could not be used because when we examined them in the field, they did not meet the most basic site selection criteria. For example, Bill Days Reef in Espiritu Santo Bay was a dead reef in Year I and II and an alternate site at another location was substituted. A similar substitution was made for the Hillsborough Bay site in Tampa Bay. South Point at East Cote Blanche was completely devoid of living oysters. Since there was no alternate location which supported oysters in the East Cote Blanche area, this site had to be deleted and no alternate was substituted.

Minor shifts in sampling sites have been required between sampling years to accommodate yearly fluctuations in the abundance and availability of oyster populations at chosen sites. When these minor changes were required, we attempted to maintain the sampling stations as near the original location as possible. We expect this practice to continue over the course of the study as we anticipate recurring problems such as dredge material burying the entire reef (CCIC), our inability to relocate our sampling stations on submerged reefs in the absence of navigational references or aids in close proximity, the near total depletion of public oyster beds by harvesting, disease, and predators (MBLR), and the depletion of available oysters attributable to sampling for this study (SAWB and TBHB). Thus, in some instances, it has not been possible to return to the precise site locations sampled in the previous year. Ensuring continued sampling at the same stations for all sites will require the relocation of some of the prescribed sites perhaps some distance from the original selected location.

The sediment sites were to coincide with oyster sampling sites, inasmuch as fine grained depositional sediments may be co-located with the oyster reefs. The primary determining factor in sediment sampling was that the sediment contain less than 80% sand or coarser fraction. While we have been unable to devise a method which would confirm this compliance in the field, every effort was made to obtain sediments of as fine a texture as we could subjectively

determine. In most cases, this was not a problem, as sediments adjacent to the reef were indeed of fine texture. However, in some cases, it was difficult (e.g., Bird Island in Charlotte Harbor, Mullet Key Bayou in Tampa Bay or the Naples Bay site). These sites, as well as others, were characterized by broad expanses of sand and carbonate sediments. Fine grained silts and muds were either completely absent or confined to dredged canals used for recreational boating quite distant from the oyster collection site. Thus, sediments from some areas will not meet the requirement for being more than 20% silt and clay, or they will be so far removed from the oyster site that they will not represent the integrated contaminant accumulations to which the oysters have been exposed.

Comprehensive sediment sampling was undertaken in Years I, II and III of the study. However, no sediments were analyzed in Year III. In Year IV sediment samples from new Years III and IV sites were analyzed. In Year V, only 13 sediment sites were sampled. In Year VI, the two new sites were sampled for sediment. Sediment collections in Year VII was confined to five newly established sites and PBPH. Sediments were not collected in Year VIII. In Year IX, the two new sites, FBFO and FBJB, were sampled for sediments. Table 2 depicts the sediment and oyster sampling at each site during the nine sampling years.

Years I and II Sampling Summary

Two sites (ECSP and ESBD) were completely devoid of oysters. ECSP was dropped from further consideration due to the lack of a nearby alternate and no chance of oyster populations being restored at the site. CCIC was substituted for ESBD, although ESBD was re-checked again in Year II. CCIC's oyster population was buried by dredged material in Year II; thus, it too was a non-producing site in Year II.

The sites at which we had collected oysters in Years I and II, but which may not sustain long term collection due to their sparse populations, included MBLR, TBHB, CBSR, and SAWB.

Obtaining sediments with less than 80% sand was a problem at a number of sites. This was rectified for some sites in Year II by moving further from the oyster site and through more diligent searching. Those sites which were unlikely to provide sufficiently fine sediments with environmental relevance to the oyster site included CBBI, SAWB, NBNB, TBHB, TBMK, TBPB, APCP, and APDB.

Year III Sampling Summary

In Year III, twenty sites were added to the original list of 51 sampling sites, bringing the Year III site total to 71 sites. Sediments and oysters were collected from all of the additional sites, with the exception of LPGO, which had no oysters. These new sites are listed below:

MBHI - Hollinger's Island, Mobile Bay
CBFM - Fort Meyers, Charlotte Harbor
PBPH - Public Harbor, Pensacola Bay
PCMP - Municipal Pier, Panama City
SRWP - West Pass, Suwanee River
TBOT - Old Tampa, Tampa Bay
BBTB - Turtle Bay, Barataria Bay
CLLC - Calcasieu Lake, Lake Charles
LBNO - New Orleans, Lake Borgne
LPGO - Gulf Outlet, Lake Pontchartrain
MRPL - Pass A Loutre, Mississippi River
MRTP - Tiger Pass, Mississippi River
ABHI - Harbor Island, Aransas Bay
BRFS - Freeport-Surfside, Brazos River
CCBH - Boat Harbor, Corpus Christi
GBOB - Offatts Bayou, Galveston Bay
GBSC - Ship Channel, Galveston Bay
LMPI - Port Isabel, Lower Laguna Madre
MBCB - Carancahua Bay, Matagorda Bay
MBDI - Dog Island, Matagorda Bay

Four sites in the Lavaca and San Antonio Bay system had no oysters for sampling in Year III. Massive die-offs occasioned by excessive freshwater runoff into the bays the previous year resulted in no oysters being obtained from the SAPP, SAMP, ESSP and MBLR sites. The absence of oysters was confirmed in conversations with Texas Parks and Wildlife, who indicated that the die-offs were confined to the Matagorda and San Antonio Bays, but that the effects were far more widespread than our sampling would indicate. At the same time, oysters began to reappear at Bill Days Reef (ESBD), resulting in the first collection of oysters from this site.

Table 2. Sediment and Oyster Sampling Years I - IX.

Station	Oyster Year									Sediment Year								
	1	2	3	4	5	6	7	8	9	1	2	3	4	5	6	7	8	9
TEXAS SITES																		
LMSB	X	X	X	X	X	X	X	X	X	X	X	X						
LMPI			X						X			X						
LMAC					X				X					X				
CCNB	X	X	X	X	X		X	X	X	X	X	X						
CCIC	X		X	X	X	X	X			X	X	X		X				
CCBH			X		X							X						
ABLR	X	X	X	X	X	X	X	X	X	X	X	X	X					
ABHI			X									X						
CBCR	X	X	X	X	X	X	X			X	X	X		X				
MBAR	X	X	X	X	X	X	X	X	X	X	X	X						
SAPP	X	X		X	X	X	X	X	X	X	X	X						
SAMP	X	X		X		X	X			X	X	X						
ESSP	X	X		X	X	X	X		X	X	X	X						
ESBD			X	X	X		X	X	X	X	X	X						
MBLR	X	X		X	X	X	X	X		X	X	X						
MBGP	X	X	X	X		X	X	X	X	X	X	X						
MBTP	X	X	X	X	X	X	X	X		X	X	X						
MBEM	X	X	X	X	X	X	X	X		X	X	X						
MBCB			X		X			X	X			X						
MBDI			X									X						
BRCL				X	X	X	X	X	X				X	X				
BRFS			X	X	X	X	X	X				X						
GBYC	X	X	X	X	X	X	X	X		X	X	X		X				
GBTD	X	X	X	X	X	X	X	X	X	X	X	X		X				
GBHR	X	X	X	X	X	X	X	X		X	X	X						
GBCR	X	X	X	X	X	X	X	X		X	X	X		X				
GBOB			X	X	X	X	X	X	X			X						
GBSC			X	X	X	X	X	X	X			X		X				
LOUISIANA SITES																		
SLBB	X	X	X	X	X	X	X	X	X	X	X	X						
CLSJ	X	X	X	X	X	X	X	X		X	X	X						
CLLC			X	X	X	X	X	X	X			X						
JHJH	X	X	X	X	X	X	X	X		X	X	X						
VBSP	X	X	X	X	X	X	X	X	X	X	X	X						
ECSP										X	X							
ABOB	X	X	X	X	X	X	X	X		X	X	X						

Table 2. Cont.

Station	Oyster Year									Sediment Year								
	1	2	3	4	5	6	7	8	9	1	2	3	4	5	6	7	8	9
CLCL	X	X	X	X	X	X	X	X	X	X	X	X						
TBLB	X	X	X	X	X	X	X	X		X	X	X						
TBLF	X	X	X	X	X	X	X	X	X	X	X	X						
BBSD	X	X	X	X	X	X		X		X	X	X						
BBMB	X	X	X	X	X	X	X	X		X	X	X						
BBTB			X									X						
MRTP			X	X	X	X	X	X				X						
MRPL			X	X	X		X	X	X			X						
BSBG	X	X	X	X	X	X	X	X		X	X	X						
BSSI	X	X	X	X	X	X	X	X	X	X	X	X						
LBMP	X	X	X	X	X	X	X	X	X	X	X	X		X				
LBNO			X						X			X						
LPGO						X									X			
MISSISSIPPI SITES																		
MSPC	X	X	X	X	X	X		X	X	X	X	X						
MSBB	X	X	X	X	X	X		X		X	X	X						
MSPB	X	X	X	X	X	X	X	X	X	X	X	X						
ALABAMA SITES																		
MBDR					X									X				
MBCP	X	X	X	X	X	X	X	X	X	X	X	X						
MBHI			X	X	X	X	X	X	X			X		X				
FLORIDA SITES																		
PBIB	X	X	X	X		X	X	X	X	X	X	X						
PBPH			X	X	X	X	X	X	X			X				X		
PBSP					X			X						X				
CBSR	X	X	X	X	X	X	X	X		X	X	X		X				
CBBL							X		X							X		
CBPP	X	X	X	X	X	X	X	X	X	X	X	X		X				
CBBB							X		X							X		
CBJB				X	X	X	X	X	X					X				
PCLO				X	X	X	X	X	X				X	X				
PCMP			X	X	X			X			X			X				
SAWB	X	X	X	X	X	X	X	X		X	X	X		X				
APDB	X	X	X	X	X	X	X	X		X	X	X						
APCP	X	X	X	X	X	X	X	X		X	X	X						
AESP				X	X	X	X	X	X				X					
SRWP			X									X						
CKBP	X	X	X	X	X	X	X	X	X	X	X	X						

Table 2. Cont.

Station	Oyster Year									Sediment Year								
	1	2	3	4	5	6	7	8	9	1	2	3	4	5	6	7	8	9
TBOT			X	X	X	X		X	X			X						
TBPB	X	X	X	X	X	X	X	X	X	X	X	X						
TBHB	X	X	X					X	X	X	X	X						
TBCB	X	X	X	X	X	X	X	X		X	X	X						
TBMK	X	X	X	X	X	X	X	X	X	X	X	X						
TBKA				X	X	X	X	X	X				X	X				
TBNP				X	X	X	X	X	X				X					
CBBI	X	X	X	X	X	X	X	X	X	X	X	X						
CBFM			X	X	X	X	X	X				X						
NBNB	X	X	X	X	X	X	X	X		X	X	X	X	X				
RBHC	X	X	X	X	X	X	X	X	X	X	X	X						
FBFO									X									X
FBJB									X									X
EVFU	X	X	X	X	X	X	X	X		X	X	X						
BHKF						X	X		X						X			
PUERTO RICO																		
PRBB							X	X	X							X		
PRBM							X	X	X							X		
PRBJ							X	X	X							X		

The new site established in Louisiana at Lake Pontchartrain (LPNO) was totally devoid of oysters and could not be established as a site in Year III. Problems in finding sufficient oysters at the Alafia River (TBHB) site in Tampa Bay continued in Year III to the point that all oysters at the site were collected, but not enough were present for all replicates. It was recommended that this site be removed or deleted in Year IV because of the continued problem in finding sufficient oysters.

Year IV Sampling Summary

In Year IV, a total of 67 sites were sampled. The sites sampled included the original list of sites in Years I and II, some sites first sampled in Year III, and seven new sites that were sampled for the first time in Year IV. Sediments and oysters were collected from all of the new Year IV sites except one.

Those sites deleted from and added to the Year IV sampling are listed below.

Sites Deleted from Sampling

LMPI - Port Isabel, Lower Laguna Madre, Texas
CCBH - Boat Harbor, Corpus Christi, Texas
ABHI - Harbor Island, Aransas Bay, Texas
MBDI - Dog Island, Matagorda Bay, Texas
MBCB - Carancahua Bay, Matagorda Bay, Texas
ECSP - South Point, East Cote Blanche, Louisiana
BBTB - Turtle Bay, Barataria Bay, Louisiana
LPGO - Gulf Outlet, Lake Pontchartrain, Louisiana
LBNO - New Orleans, Lake Borgne, Louisiana
SRWP - West Pass, Suwanee River, Florida
TBHB - Hillsborough Bay, Tampa Bay, Florida

Sites Added to the Sampling

LMAC - Arroyo Colorado, Lower Laguna Madre, Texas
BRCL - Cedar Lakes, Brazos River, Texas
AESP - Spring Creek, Apalachee Bay, Florida
PCLO - Little Oyster Bay, Panama City, Florida
CBJB - Joe's Bayou, Choctawhatchee Bay, Florida
TBKA - Peter O'Knight Airport, Tampa Bay, Florida
TBNP - Navarez Park, Tampa Bay, Florida

Three of the Texas sites, which had no oysters in Year III due to the freshwater induced die-off, again had no oysters for collection in Year IV. These sites were in San Antonio and Espiritu Santo Bays (SAPP, SAMP, ESSP). Extensive effort was made to sample the sites, but only a few spat, too small and too few for collection, were found. Indications were good that the populations would recover sufficiently for Year V sampling. In Year III, the Lavaca River site (MBLR) also had no oysters and it was moved in Year IV to a more favorable position.

The new site designated in the lower Laguna Madre at the Arroyo Colorado also yielded no oysters. Further surveys around Port Mansfield also came up without oysters. Thus, it was not possible to sample from the new site designated in the lower Laguna Madre.

Oysters from three stations were collected at all sites where there were oysters except at the Pass a Loutre site on the Mississippi River (MRPL). Two and a half hours of dredging did not provide sufficient samples for three replicate sites of 20 individuals per site. This low productivity, adverse and worsening weather, and one total engine failure combined to result in a short site (not enough replicates for all analyses).

Year V Sampling Summary

Seventy-one sites were sampled in Year V. The original list of Years I and II sites, as well as sites established in Years III and IV, and four new sites were sampled for Year V. Sediments and oysters were collected from all of the new Year V sites.

Those sites deleted from and added to the Year V sampling are listed below.

Sites Deleted from Sampling

LMPI - Port Isabel, Lower Laguna Madre, Texas
ABHI - Harbor Island, Aransas Bay, Texas
MBDI - Dog Island, Matagorda Bay, Texas
ECSP - South Point, East Cote Blanche, Louisiana
BBTB - Turtle Bay, Barataria Bay, Louisiana
LBNO - New Orleans, Lake Borgne, Louisiana
LPGO - Gulf Outlet, Lake Pontchartrain, Louisiana
SRWP - West Pass, Suwanee River, Florida
TBHB - Hillsborough Bay, Tampa Bay, Florida
PBIB* - Indian Bayou, Pensacola Bay, Florida
MBGP* - Gallinipper Point, Matagorda Bay, Texas
SAMP* - Mosquito Point, San Antonio Bay, Texas

*no live oysters found

Sites Added to the Sampling

MBCB* - Carancahua Bay, Matagorda Bay, Texas
CCBH* - Boat Harbor, Corpus Christi, Texas
MBDR - Dog River, Mobile Bay, Alabama
MBPG - Great Point, Mobile Bay, Alabama
PBSP - Sabine Point, Pensacola Bay, Florida

*replacement sites for sites without oysters.

Two of the Texas sites had no oysters in Year V and were not collected. These sites were in San Antonio and Matagorda Bays (SAMP and MBGP). Sites sampled in place of these two sites were MBCB and CCBH. Two sites in San Antonio and Espiritu Santo Bays (SAPP and ESSP) were sampled for the first time in two years.

In Year IV, an unsuccessful attempt was made to establish a site in the Laguna Madre at the Arroyo Colorado. In Year V, oysters were located and the site was sampled.

One new site was established in Mobile Bay north of the Dog River (MBDR). An attempt was made to locate a new site on the east side of the bay at Great Point (MBPG). However, no oysters could be found, so the site was not established.

Another new site in Florida was established at Sabine Point in Pensacola Bay south of both of the existing sites. The northernmost site in Pensacola Bay at Indian Bayou (PBIB) yielded no live oysters.

Year VI Sampling Summary

Sixty-four sites were sampled in Year VI. The original list of Years I and II sites were sampled, as well as sites established in Years III and IV. Two new sites were established for Year VI. Oysters were collected from all of the new Year VI sites, but sediments were only collected at the two new sites.

Those sites deleted from and added to the Year VI sampling are listed below.

Sites Deleted from Sampling

LMPI - Port Isabel, Lower Laguna Madre, Texas
LMAC - Arroyo Colorado, Lower Laguna Madre,Texas
CCNB*- Neuces Bay, Corpus Christi,Texas
CCBH*- Boat Harbor, Corpus Christi, Texas
ABHI - Harbor Island, Aransas Bay, Texas
ESBD* - Bill Days Reef, Espiritu Santo, Texas
MBCB - Carancahua Bay, Matagorda Bay, Texas
MBDI - Dog Island, Matagorda Bay, Texas
ECSP - South Point, East Cote Blanche, Louisiana
BBTB - Turtle Bay, Barataria Bay, Louisiana
LBNO - New Orleans, Lake Borgne, Louisiana
MRPL - Pass A Loutre, Mississippi River, Louisiana
MBDR - Dog River, Mobile Bay, Alabama
PBSP - Sabine Point, Pensacola Bay, Florida
PCMP - Municipal Pier, Panama City,Florida
SRWP - West Pass, Suwanee River, Florida
TBHB - Hillsborough Bay, Tampa Bay, Florida

*no live oysters found

Sites Added to the Sampling

LPGO* - Gulf Outlet, Lake Pontchartrain, Louisiana
BHKF* - Bahia Honda Key, Florida

*replacement sites for sites without oysters.

Two of the Texas sites scheduled for collection , CCNB and ESBD, had no oysters in Year VI and were not collected. CCBH was checked as an alternate site but it was also devoid of oysters. MRPL was not collected due to sparse collections there last year and extremely high water levels in the Mississippi River during the sampling period.

Two new sites were established this year. A previous attempt to collect oysters at Lake Pontchartrain had been unsuccessful. But this year a new site in Louisiana, LPGO, was established in the lower part of Lake Pontchartrain. A second new site was established in the Florida Keys. Oysters were not present in the Keys, therefore an alternate bivalve species (Jewel Box, *Chama sinuosa*) was collected for analysis.

Year VII Sampling Summary

Sixty-seven sites were sampled in Year VII. The original list of Years I and II sites were sampled, as well as some sites established in Years III and IV. Two new sites in Florida and three new sites in Puerto Rico were established in Year VII. Oysters were collected from most of the sites that were sampled during Year VI. Sediments were collected only at the five new sites and one old station in Florida (PBPH).

Those sites deleted from and added to the Year VII sampling are listed below.

Sites Deleted from Sampling

LMPI - Port Isabel, Lower Laguna Madre, Texas
LMAC - Arroyo Colorado, Lower Laguna Madre, Texas
CCBH - Boat Harbor, Corpus Christi, Texas
ABHI - Harbor Island, Aransas Bay, Texas
MBCB - Carancahua Bay, Matagorda Bay, Texas
MBDI - Dog Island, Matagorda Bay, Texas
ECSP - South Point, East Cote Blanche, Louisiana
BBTB - Turtle Bay, Barataria Bay, Louisiana

BBSD* - Bayou St. Denis, Barataria Bay, Louisiana
LBNO - New Orleans, Lake Borgne, Louisiana
LPGO - Gulf Outlet, Lake Pontchartrain, Louisiana
MSPC* - Pass Christian, Mississippi Sound, Mississippi
MSBB* - Biloxi Bay, Mississippi Sound, Mississippi
MBDR - Dog River, Mobile Bay, Alabama
PBSP - Sabine Point, Pensacola Bay, Florida
PCMP - Municipal Pier, Panama City, Florida
SRWP - West Pass, Suwanee River, Florida
TBHB - Hillsborough Bay, Tampa Bay, Florida
TBOT - Old Tampa Bay, Tampa Bay, Florida

*no live oysters found

Sites Added to the Sampling

CBBL - Bens Lake, Choctawhatchee Bay, Florida
CBBB - Boggy Bayou, Choctawhatchee Bay, Florida
PRBB - Bahia De Boqueron, Puerto Rico
PRBM - Bahia Montalva, Puerto Rico
PRBJ - Bahia De Jobos, Puerto Rico

One of the Louisiana sites (BBSD) and two Mississippi sites (MSPC and MSBB) scheduled for collection had no oysters in Year VII and were not sampled.

Year VIII Sampling Summary

Sixty-eight sites were sampled in Year VIII. The original list of Years I and II sites were sampled, as well as sites established in Years II, IV, and VII. Most of the sites sampled in Year VII were sampled again this year. Exceptions were when oysters were not present and substitute sites were sampled. Sediments were not collected at any sites.

Those sites deleted from and added to the Year VIII sampling are listed below.

Sites Deleted from Sampling

LMPI - Port Isabel, Lower Laguna Madre, Texas
LMAC - Arroyo Colorado, Lower Laguna Madre, Texas
CCBH - Boat Harbor, Corpus Christi, Texas
CCIC* - Ingleside Cove, Corpus Christi, Texas
CBCR* - Copano Reef, Copano Bay, Texas
SAMP*- Mosquito Point, San Antonio Bay, Texas
ESSP* - South Pass Reef, Espititu Santo, Texas

ABHI - Harbor Island, Aransas Bay, Texas
MBDI - Dog Island, Matagorda Bay, Texas
ECSP - South Point, East Cote Blanche, Louisiana
BBTB - Turtle Bay, Barataria Bay, Louisiana
LBNO - New Orleans, Lake Borgne, Louisiana
LPGO - Gulf Outlet, Lake Pontchartrain, Louisiana
MBDR - Dog River, Mobile Bay, Alabama
CBBL - Ben's Lake, Choctawahatchee Bay, Florida
CBBB - Boggy Bayou, Choctawahatchee Bay, Florida
SRWP - West Pass, Suwannee River, Florida
BHKF - Bahia Honda Key, Florida

*no live oysters found

Sites Added to Sampling

MBCB - Carancahua Bay, Matagorda Bay, Texas
BBSD - Bayou St. Denis, Barataria Bay, Louisiana
MSPC - Pass Christian, Mississippi Sound, Mississippi
MSBB - Biloxi Bay, Mississippi Sound, Mississippi
MBDR - Dog River, Mobile Bay, Alabama
PBSP - Sabine Point, Pensacola Bay, Florida
PCMP - Municipal Pier, Panama City, Florida
TBHB - Hillsborough Bay, Tampa Bay, Florida
TBOT - Old Tampa Bay, Tampa Bay, Florida

Four of the Texas sites (CCIC, CBCR, SAMP, and ESSP) scheduled for collection had no oysters in Year VIII and were not sampled.

Year IX Sampling Summary

In Year IX, a total of 55 sites were visited and 51 of them successfully sampled. Four of the originally scheduled sites were devoid of any live oysters, so four alternate sites were visited and sampled. Oysters were collected from a range of sites that were originally established in Year I through Year VII. Two new sites were established for Year IX, at Flamingo in Florida Bay (FBFO), and in Joe Bay in Florida Bay (FBJB), where both sediments and oysters were collected. No other sediments samples were taken this year.

The list of sites sampled in Year IX is shown below, along with lists showing the deletions and additions to the previous year's sampling list.

Year IX Sampling Sites

LMSB - South Bay, Lower Laguna Madre, Texas
LMPI - Port Isabel, Lower Laguna Madre, Texas
LMAC - Arroyo Colorado, Lower Laguna Madre, Texas
CCNB - Nueces Bay, Corpus Christi, Texas
ABLR - Long Reef, Aransas Bay, Texas
MBAR - Ayres Reef, Mesquite Bay, Texas
SAPP - Panther Point Reef, San Antonio Bay, Texas
ESSP - South Pass Reef, Espiritu Santo, Texas
ESBD - Bill Day's Reef, Espiritu Santo, Texas
MBGP - Gallinipper Point, Matagorda Bay, Texas
MBCB - Caancahua Bay, Matagorda Bay, Texas
BRCL - Cedar Lake, Brazos River, Texas
GBTD - Todd's Dump, Galveston Bay, Texas
GBOB - Offatts Bayou, Galveston Bay, Texas
GBSC - Ship Channel, Galveston Bay, Texas
SLBB - Blue Buck Point, Sabine Lake, Louisiana
CLLC - Lake Charles, Calcasieu Lake, Louisiana
VBSP - Southwest Pass, Vermilion Bay, Louisiana
CLCL - Caillou Lake, Caillou Lake, Louisiana
TBLF - Lake Felicity, Terrebonne Bay, Louisiana
MRPL - Pass a Loutre, Mississippi River, Louisiana
BSSI - Sable Island, Breton Sound, Louisiana
LBMP - Malheureux Point, Lake Borgne, Louisiana
LBNO - New Orleans, Lake Borgne, Louisiana
MSPC - Pass Christian, Mississippi Sound, Mississippi
MSPB - Pascagoula Bay, Mississippi Sound, Mississippi
MBCP - Cedar Point Reef, Mobile Bay, Alabama
MBHI - Hollingers Island Channel, Mobile Bay, Alabama
PBPH - Public Harbor, Pensacola Bay, Florida
PBIB - Indian Bayou, Pensacola Bay, Florida
CBJB - Joe's Bay, Choctawahatchee Bay, Florida
CBBL - Ben's Lake, Choctawahatchee Bay, Florida
CBPP - Postil Point, Choctawahatchee Bay, Florida
CBBB - Boggy Bayou, Choctawahatchee Bay, Florida
PCLO - Little Oyster, Panama City, Florida
AESP - Spring Creek, Apalachee Bay, Florida
CKBP - Black Point, Cedar Key, Florida
TBOT - Old Tampa Bay, Tampa Bay, Florida
TBPB - Papys Bayou, Tampa Bay, Florida
TBHB - Hillsborough Bay, Tampa Bay, Florida
TBMK - Mullet Key Bayou, Tampa Bay, Florida
TBKA - Knight Airport, Tampa Bay, Florida
TBNP - Navarez Park, Tampa Bay, Florida
CBBI - Bird Island, Charlotte Harbor, Florida
RBHC - Henderson Creek, Rookery Bay, Florida
FBFO - Flamingo, Florida Bay, Florida
FBJB - Joe Bay, Florida Bay, Florida

BHKF - Bahia Honda Key, Florida
PRBB - Bahia de Boqueron, Puerto Rico
PRBM - Bahia Montalva, Puerto Rico
PRBJ - Bahia de Jobos, Puerto Rico

Sites deleted from the Sampling List

CCIC* - Ingleside Cove, Corpus Christi, Texas
CCBH - Boat Harbor, Corpus Christi, Texas
ABHI - Harbor Island, Aransas Bay, Texas
CBCR* Copano Reef, Copano Bay, Texas
SAMP - Mosquito Point, San Antonio Bay, Texas
MBLR - Lavaca River Mouth, Matagorda Bay, Texas
MBTP - Tres Palacios Bay, Matagorda Bay, Texas
MBEM - East Matagorda, Matagorda Bay, Texas
MBDI - Dog Island, Matagorda Bay, Texas
BRFS - Freeport Surfside, Brazos River, Texas
GBYC - Yacht Club, Galveston Bay, Texas
GBHR - Hanna's Reef, Galveston Bay, Texas
GBCR - Confederate Reef, Galveston Bay, Texas
CLSJ - St. John's Island, Calcasieu Lake, Louisiana
JHJH - Joseph Harbor Bayou, J.H. Bayou, Louisiana
ECSP - South Point, East Cote Blanche, Louisiana
ABOB - Oyster Bayou, Atchafalaya Bay, Louisiana
TBLB - Lake Barre, Terrebonne Bay, Louisiana
BBSD - Bayou St. Denis, Barataria Bay, Louisiana
BBMB - Middle Bank, Barataria Bay, Louisiana
BBTB* - Turtle Bay, Barataria Bay, Louisiana
MRTP - Tiger Pass, Mississippi River, Louisiana
BSBG - Bay Gardene, Breton Sound, Louisiana
LPGO* - Gulf Outlet, Lake Pontchartrain, Louisiana
MSBB - Biloxi Bay, Mississippi Sound, Mississippi
MBDR - Dog River, Mobile Bay, Alabama
PBSP - Sabine Point, Pensacola Bay, Florida
CBSR - Off Santa Rosa, Choctawahatchee Bay, Florida
PCMP - Municipal Pier, Panama City, Florida
SAWB - Watson Bayou, St. Andrew Bay, Florida
APDB - Dry Bar, Apalachicola Bay, Florida
APCP - Cat Point Bar, Apalachicola Bay, Florida
SRWP - West Pass, Suwanee River, Florida
TBCB - Cockroach Bay, Tampa Bay, Florida
CBFM - Fort Meyers, Charlotte Harbor, Florida
NBNB - Naples Bay, Naples Bay, Florida
EVFU - Faka Union Bay, Everglades, Florida

* no live oysters found

Sites Added to the Sampling List

LMPI - Port Isabel, Lower Laguna Madre, Texas
LMAC - Arroyo Colorado, Lower Laguna Madre, Texas
CCIC - Ingleside Cove, Corpus Christi, Texas
ABLR - Long Reef, Aransas Bay, Texas
CBCR - Copano Reef, Copano Bay, Texas
ESSP - South Pass Reef, Espiritu Santo, Texas
BBTB - Turtle Bay, Barataria Bay, Louisiana
LBNO - New Orleans, Lake Borgne, Louisiana
LPGO - Gulf Outlet, Lake Pontchartrain, Louisiana
CBBL - Ben's Lake, Choctawahatchee Bay. Florida
CBBB - Boggy Bayou, Choctawahatchee Bay. Florida
FBFO - Flamingo, Florida Bay, Florida
FBJB - Joe Bay, Florida Bay, Florida
BHKF - Bahia Honda Key, Florida

Two Texas sites (CCIC & CBCR) and two Louisiana sites (BBTB & LPGO) that were scheduled for collection in Year IX, had no live oysters and were not sampled. The two Texas sites have not had any live oysters for two years in a row now, and it may indicate that these reefs are now dead. Four alternate sites were selected and sampled; CCNB for CCIC, MBAR for CBCR, MBCP for BBTB and LBNO for LPGO.

The Galveston Bay Ship Channel site (GBSH) had very few live oysters this year. The reef has been covered with a fine layer of silt, coming from the surrounding ongoing landfill operations. The Pass a Loutre site on the Mississippi River (MRPL) only had a very small patch of live oysters. Local fishermen have commented on the declining oyster population in the area over the past few years. This could be as a result of increased fresh water from the Mississippi River flowing down Pass a Loutre and into Redfish Bay. Veteran's Pier (MSPC), at Pass Christian, was re-occupied this year as oysters on the site were once again plentiful. The oysters here are affected by the cold water and weather, and numerous frozen shells on the site supported the fact. The Pascagoula Bay site (MSPB), in the Mississippi Sound, was moved approximately half a mile to the east, to the western side of the Navy Base Island. There were no live oysters to be found at the old site, as the area has been covered by a thick layer of fine sand. There were problems in finding sufficient oysters in the Alafia River site in Tampa Bay (TBHB), and the site was moved to the western/southern side of the river where the oysters were somewhat more plentiful.

References

Parker, R.H. (1960) Ecology and distributional patterns of marine macro-invertebrates. Northern Gulf of Mexico by F.P. Shepard, F.B. Phleger, and T.H. van Andel in Recent Sediment, Northwest Gulf of Mexico. A Symposium Summarizing the Result of Work Carried on in Project 51 of the American Petroleum Institute 1951-1958. Scripps Institute of Oceanography, University of California, La Jolla, California.

Lawrence, D.R. and G.I. Scott (1982) The determination and use of condition index of oysters. *Estuaries*, 5:23-27.

Gulf of Mexico and Caribbean Site Descriptions

Location of Gulf of Mexico and Caribbean NS&T Mussel Watch sampling sites are shown in Figures 5 through 18. Detail descriptions for each individual site follow. For each site, the following components are included:

- Detailed description
- Road map to the site
- Nautical chart of the site
- Photographs of the site. Photographs, when available, are arranged in a clockwise manner starting in the upper left hand corner with an aerial view and then Stations 1, 2 and 3, respectively.

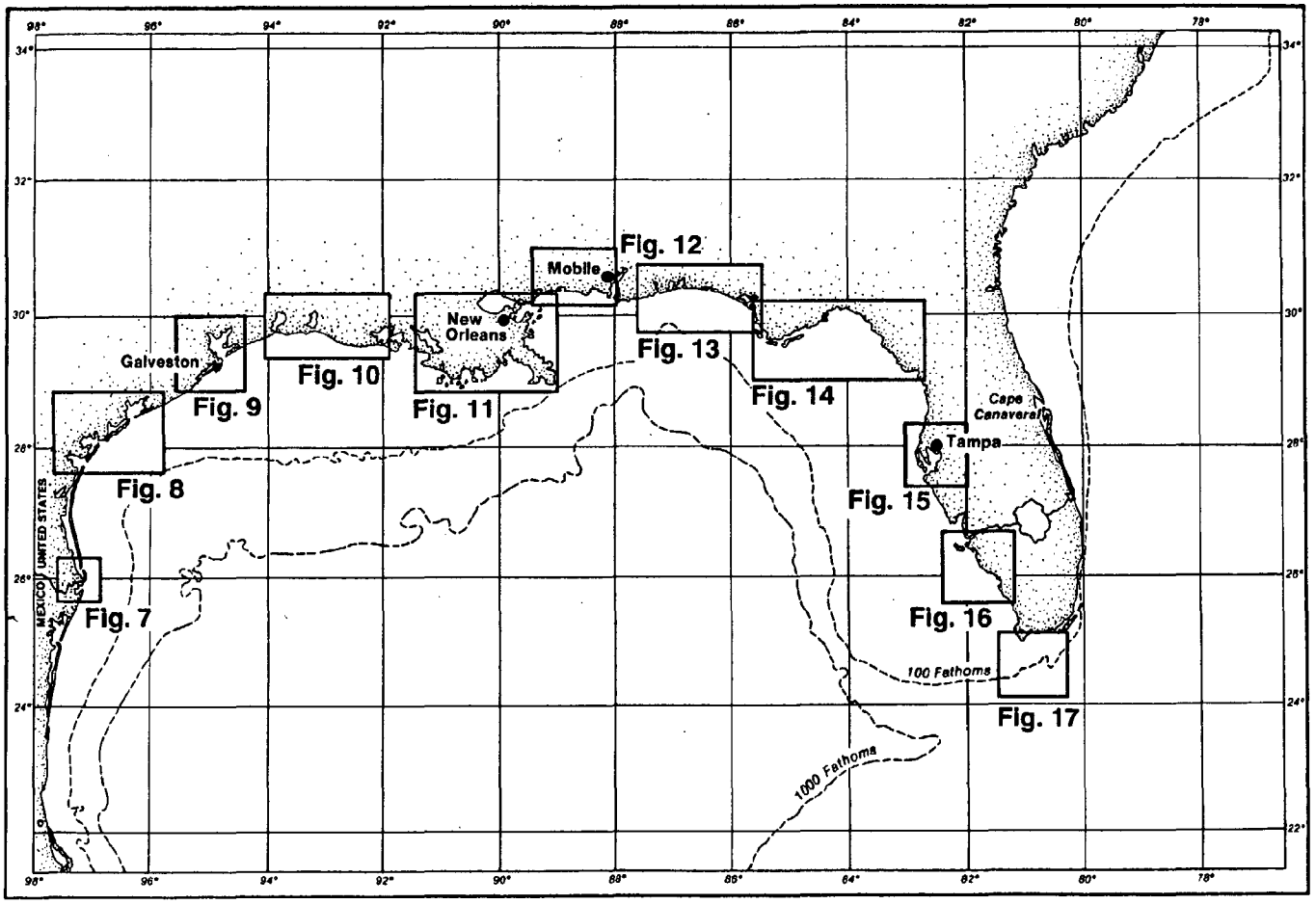


Figure 5. Location of Gulf of Mexico Sampling Sites.

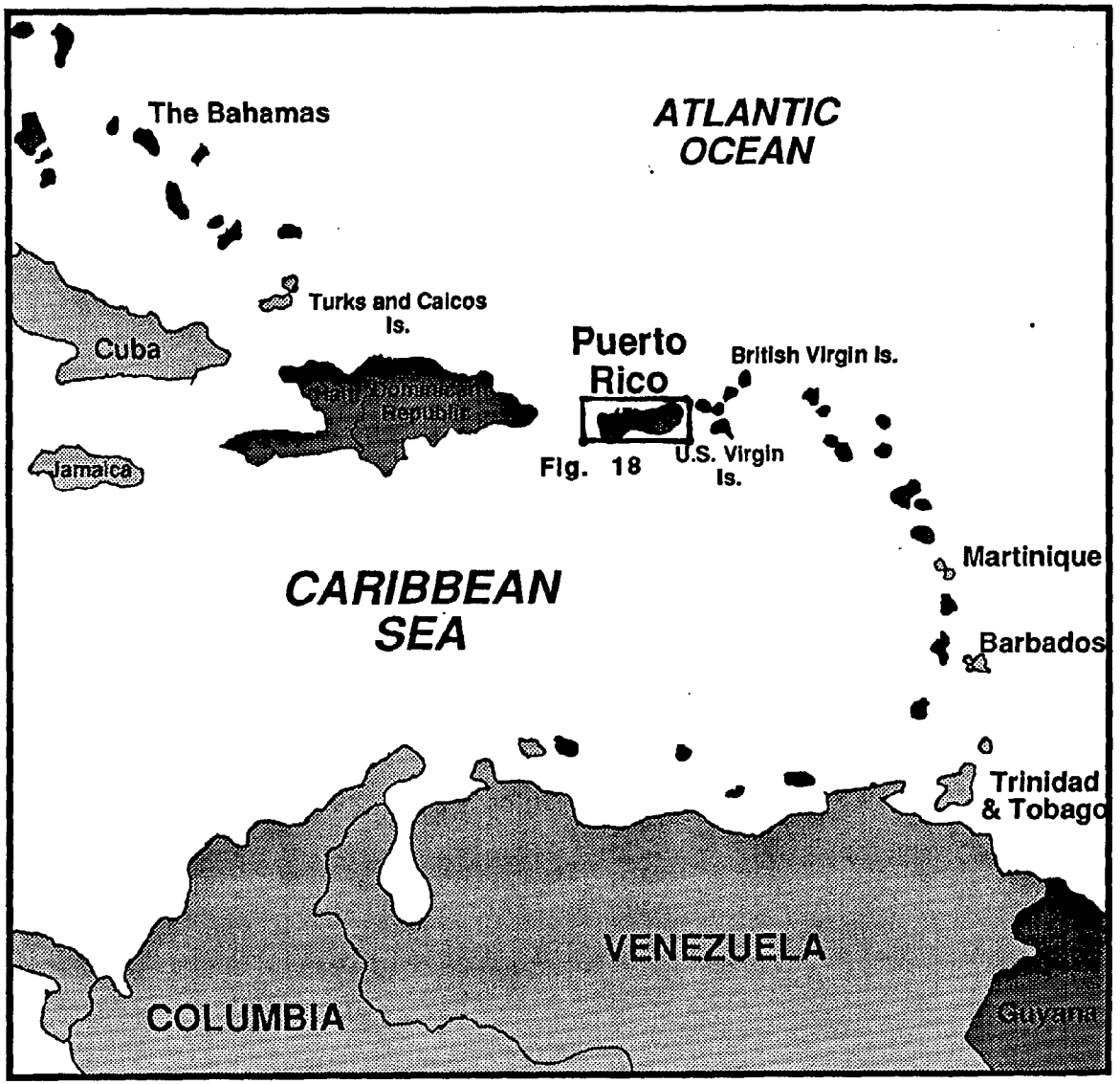


Figure 6. Location of Caribbean Sampling Sites.

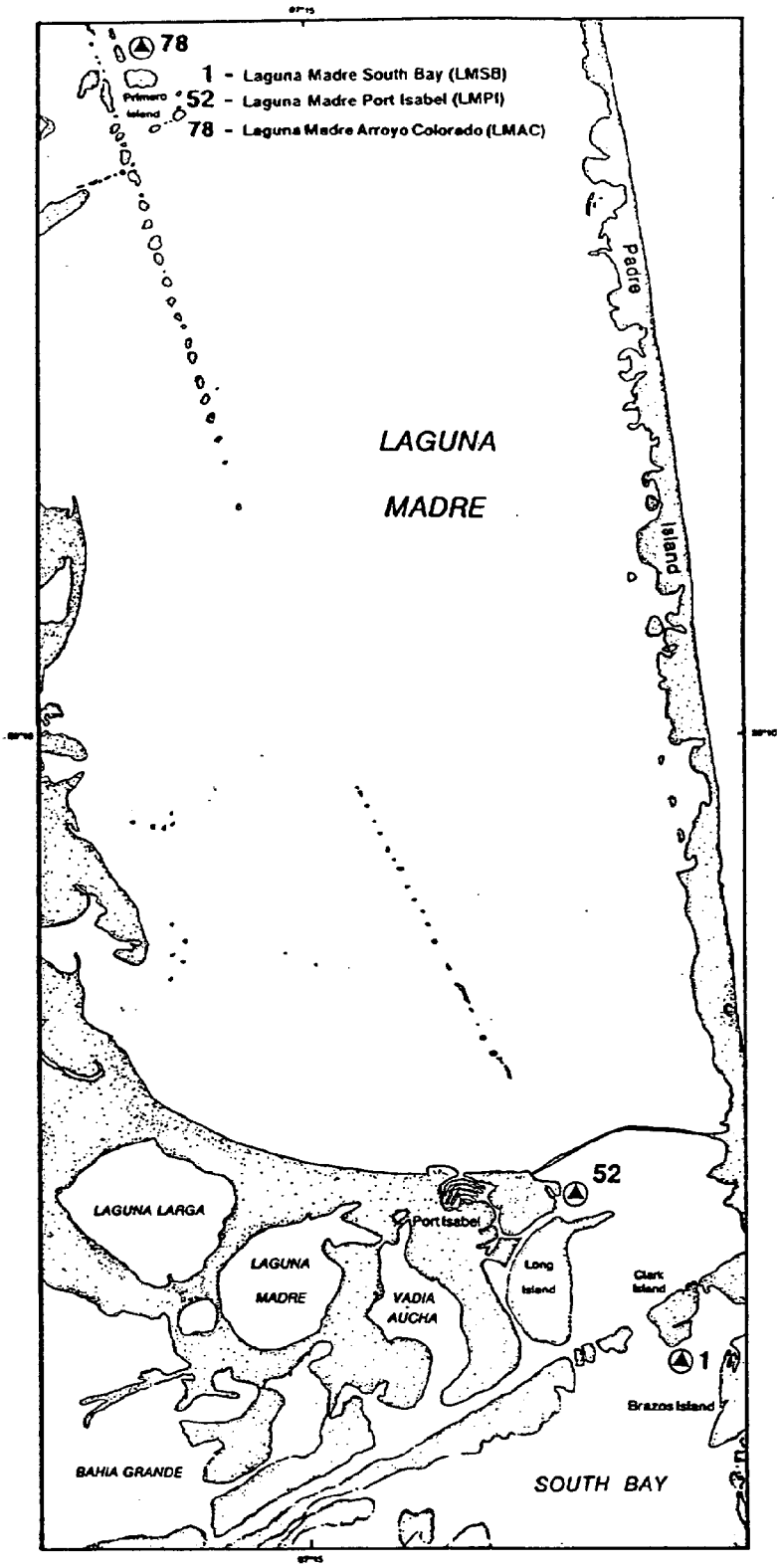


Figure 7. Location of Laguna Madre South Bay Sites (see Figure 5 for location in the Gulf of Mexico).

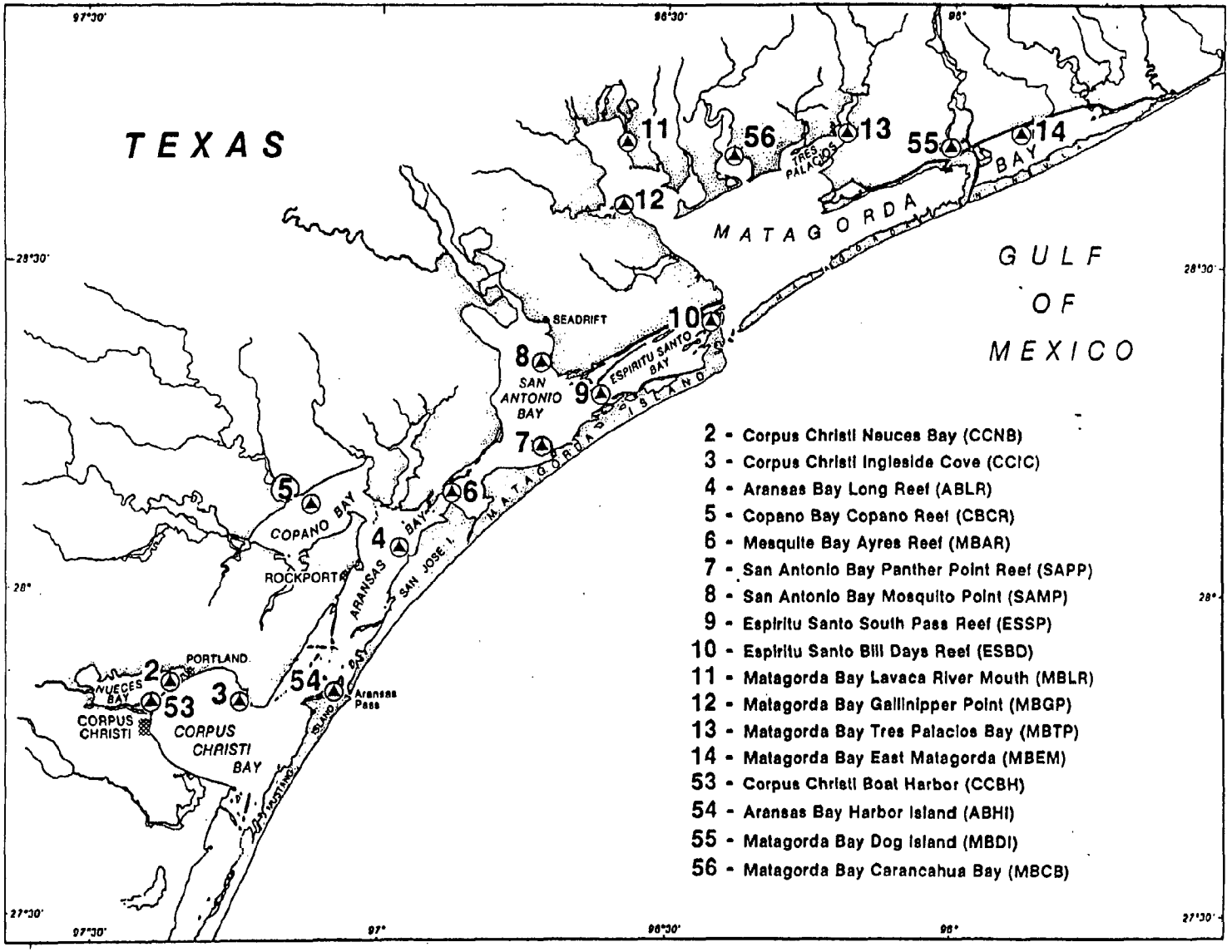


Figure 8. Location of South Texas Sites (see Figure 5 for location in the Gulf of Mexico).

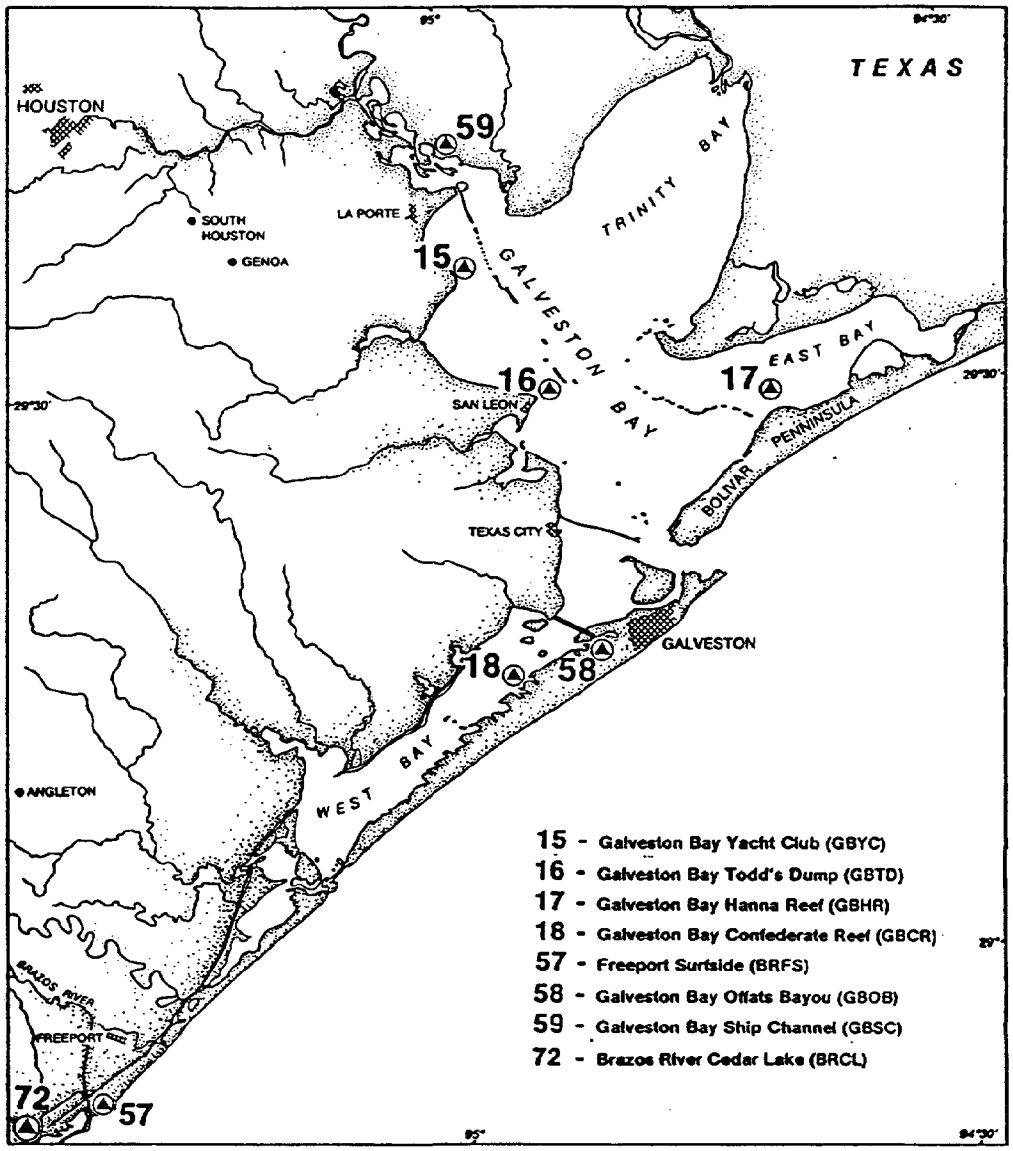


Figure 9. Location of Galveston Bay Sites (see Figure 5 for location in the Gulf of Mexico).

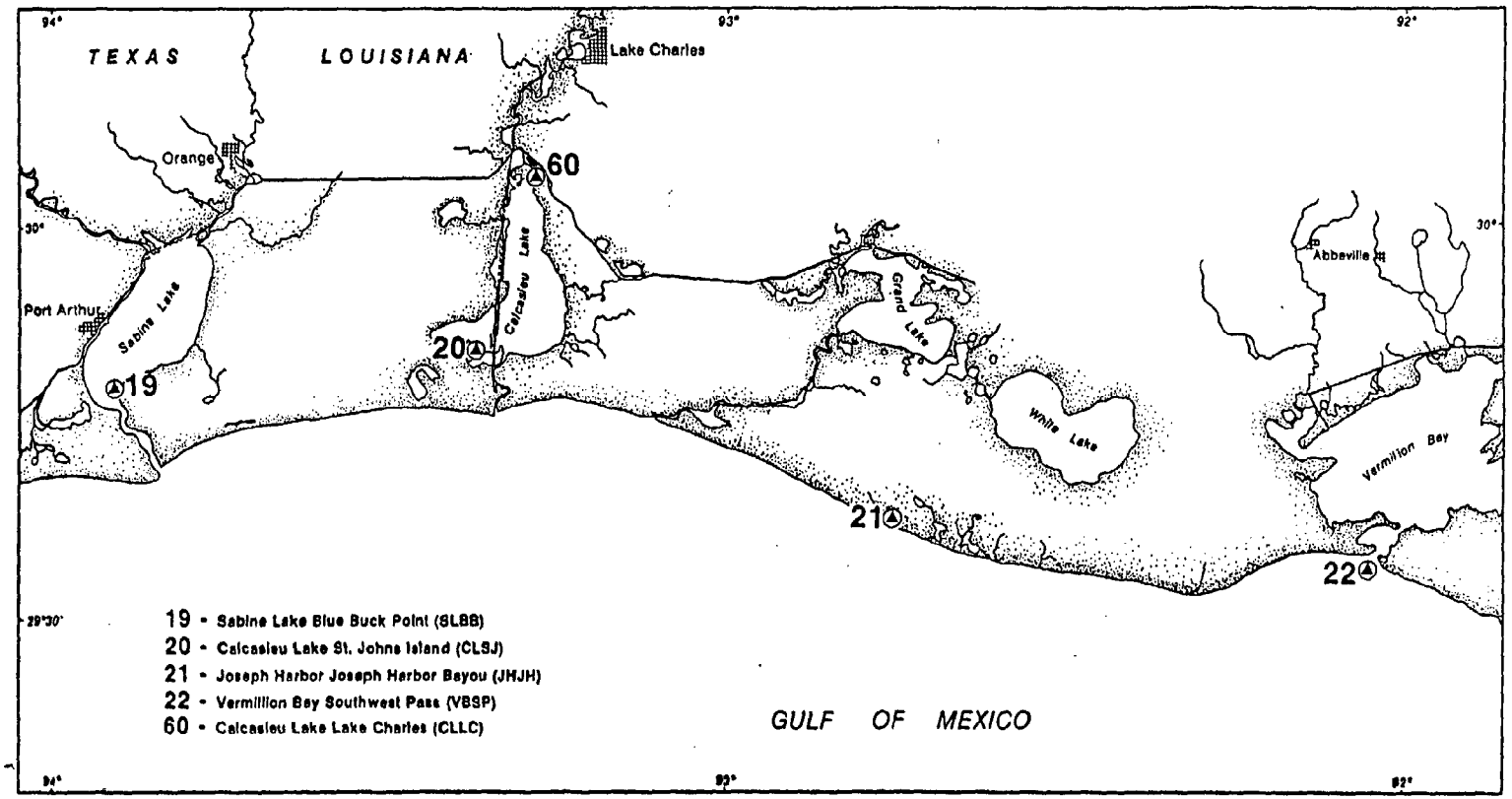


Figure 10. Location of Western Louisiana Sites (see Figure 5 for location in the Gulf of Mexico).

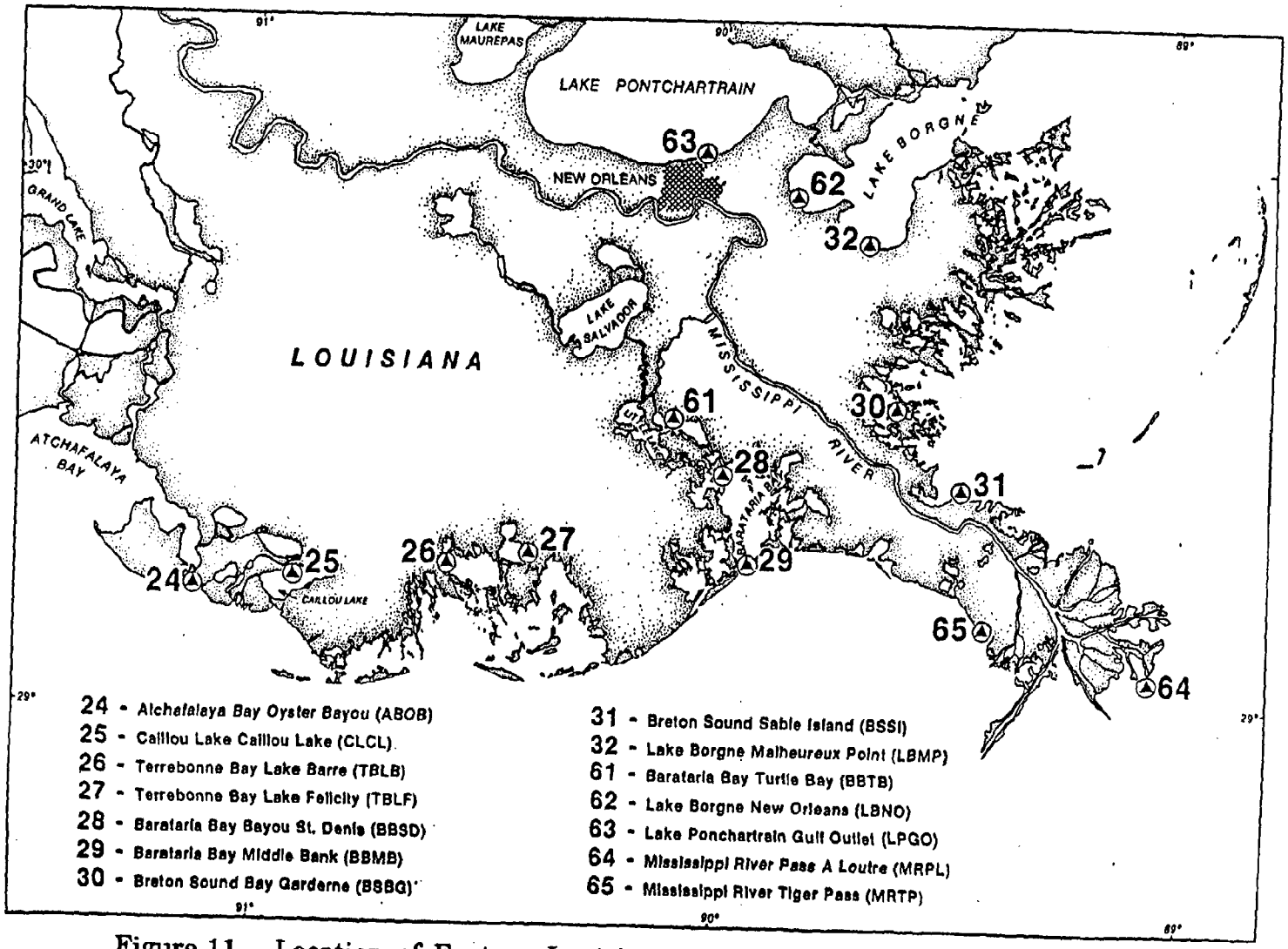


Figure 11. Location of Eastern Louisiana and Mississippi Delta Sites (see Figure 5 for location in the Gulf of Mexico).

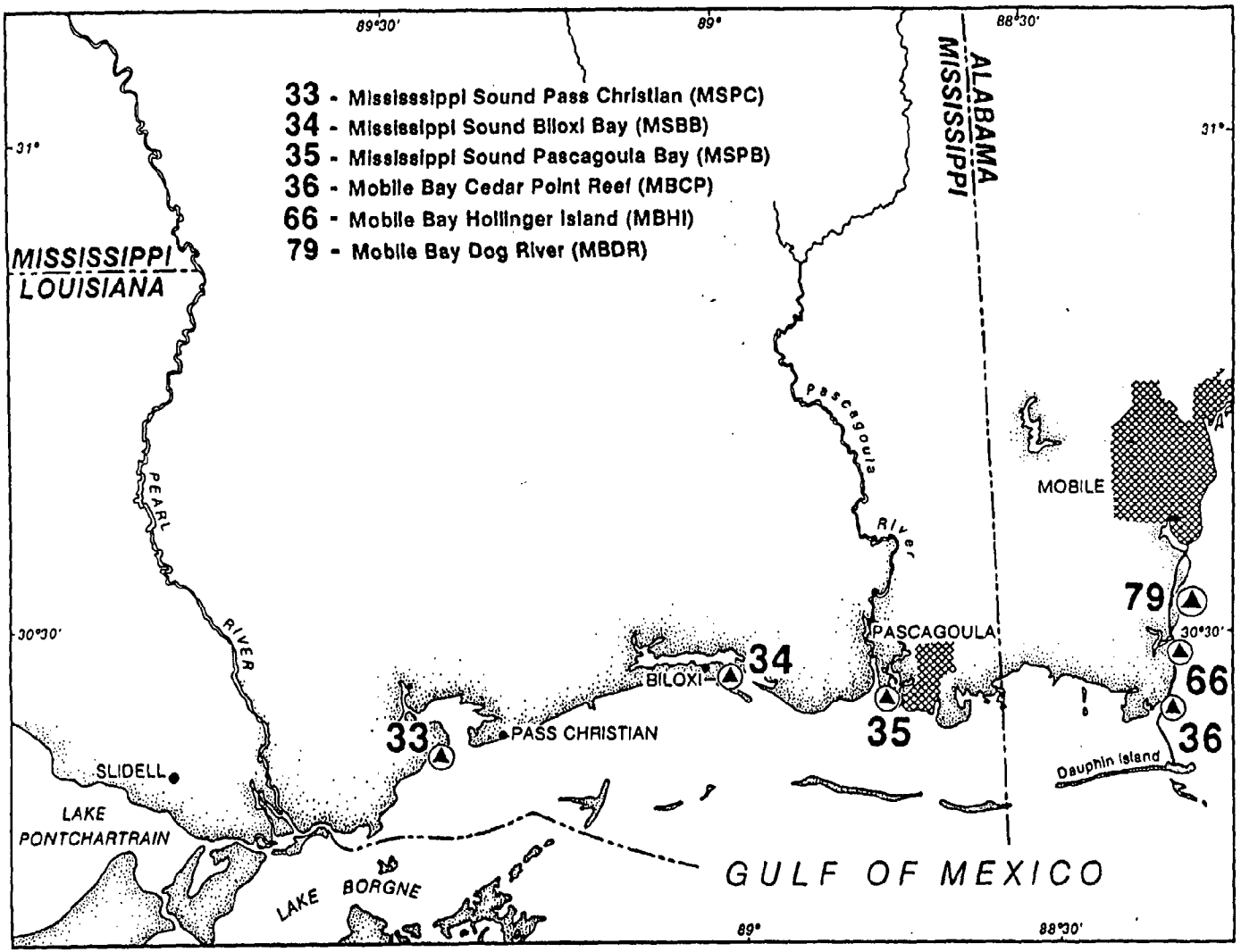


Figure 12. Location of Mississippi/Alabama Sites (see Figure 5 for location in the Gulf of Mexico).

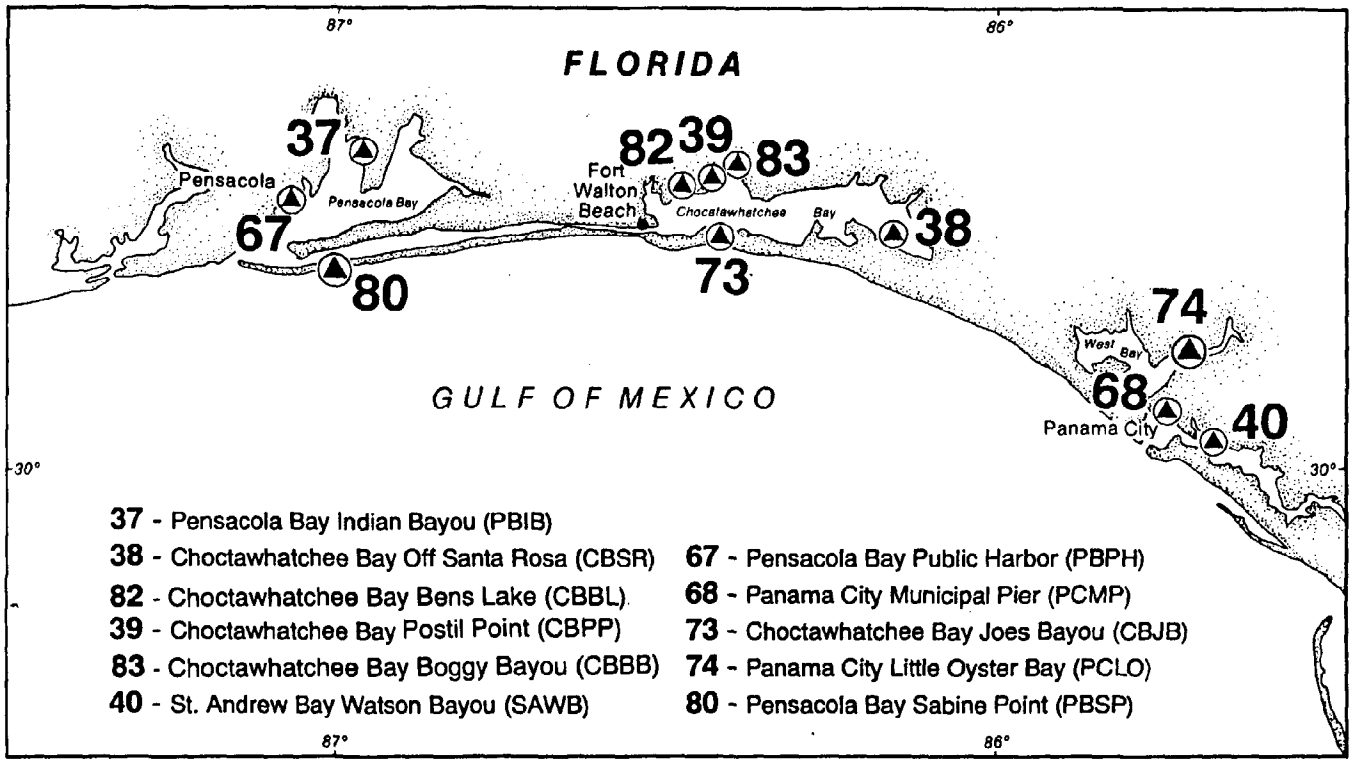


Figure 13. Location of Western Florida Sites (see Figure 5 for location in the Gulf of Mexico).

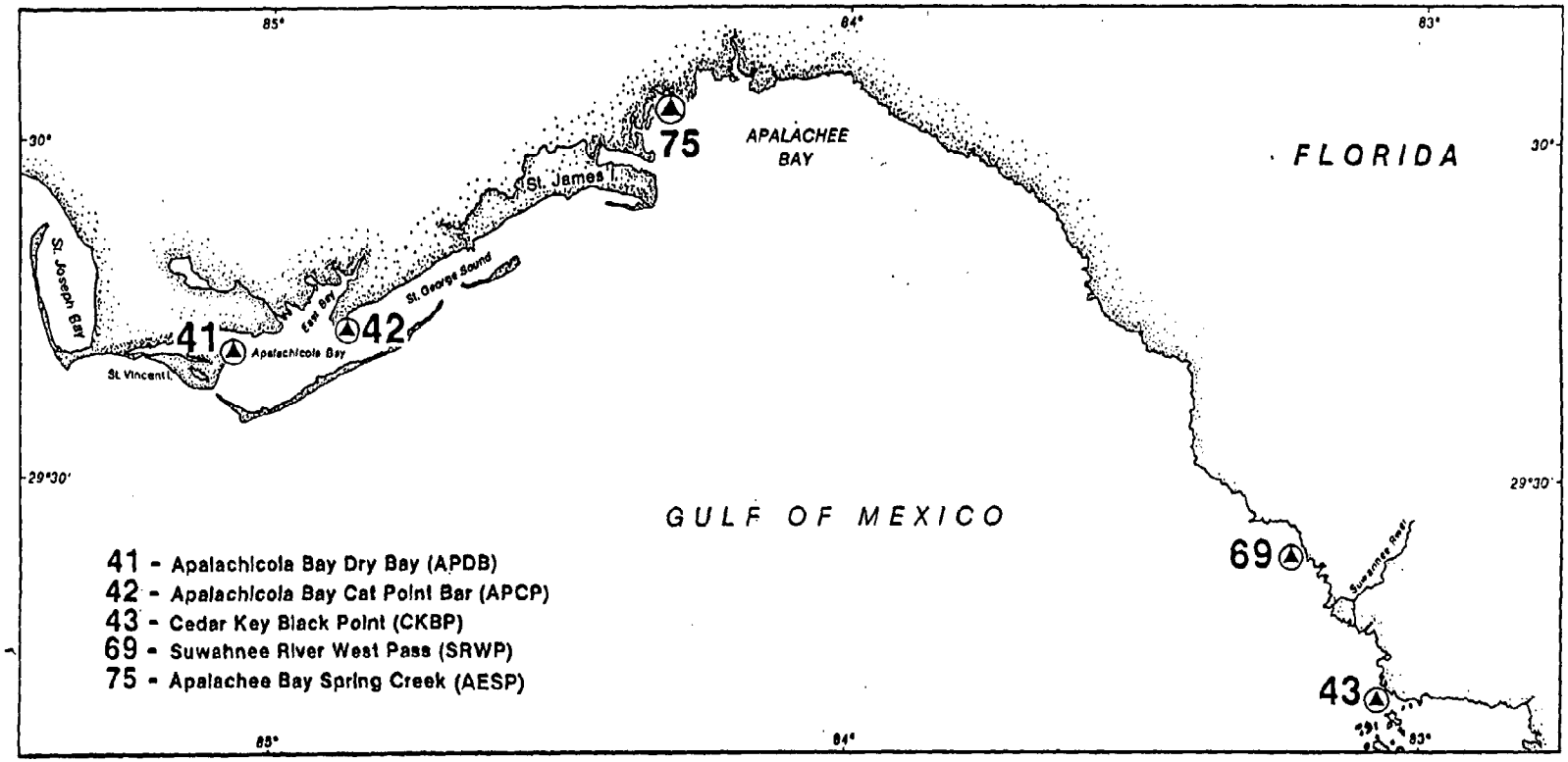


Figure 14. Location of Middle Florida Sites (see Figure 5 for location in the Gulf of Mexico). (ABSP)

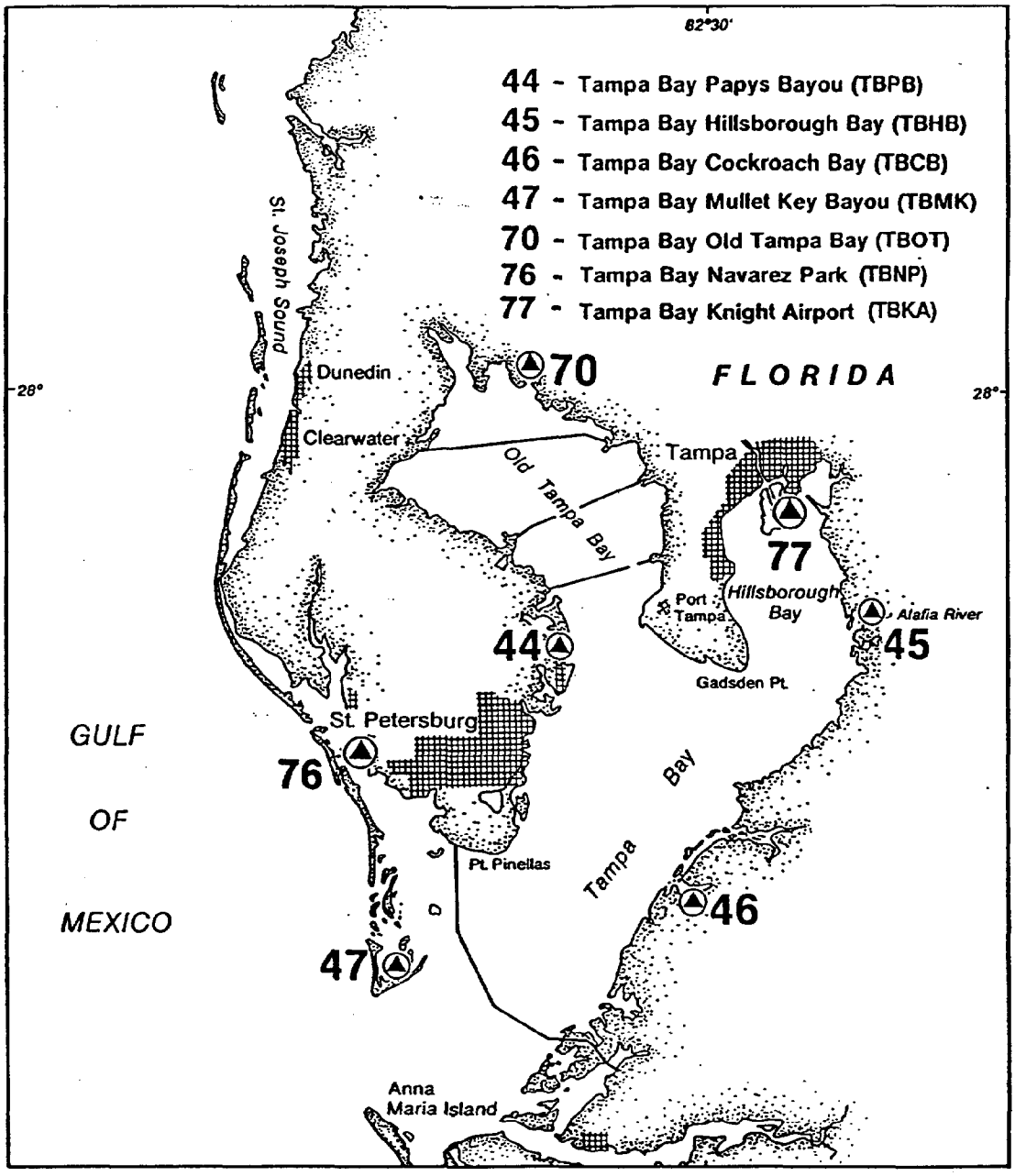


Figure 15. Location of Tampa Bay Sites (see Figure 5 for location in the Gulf of Mexico).

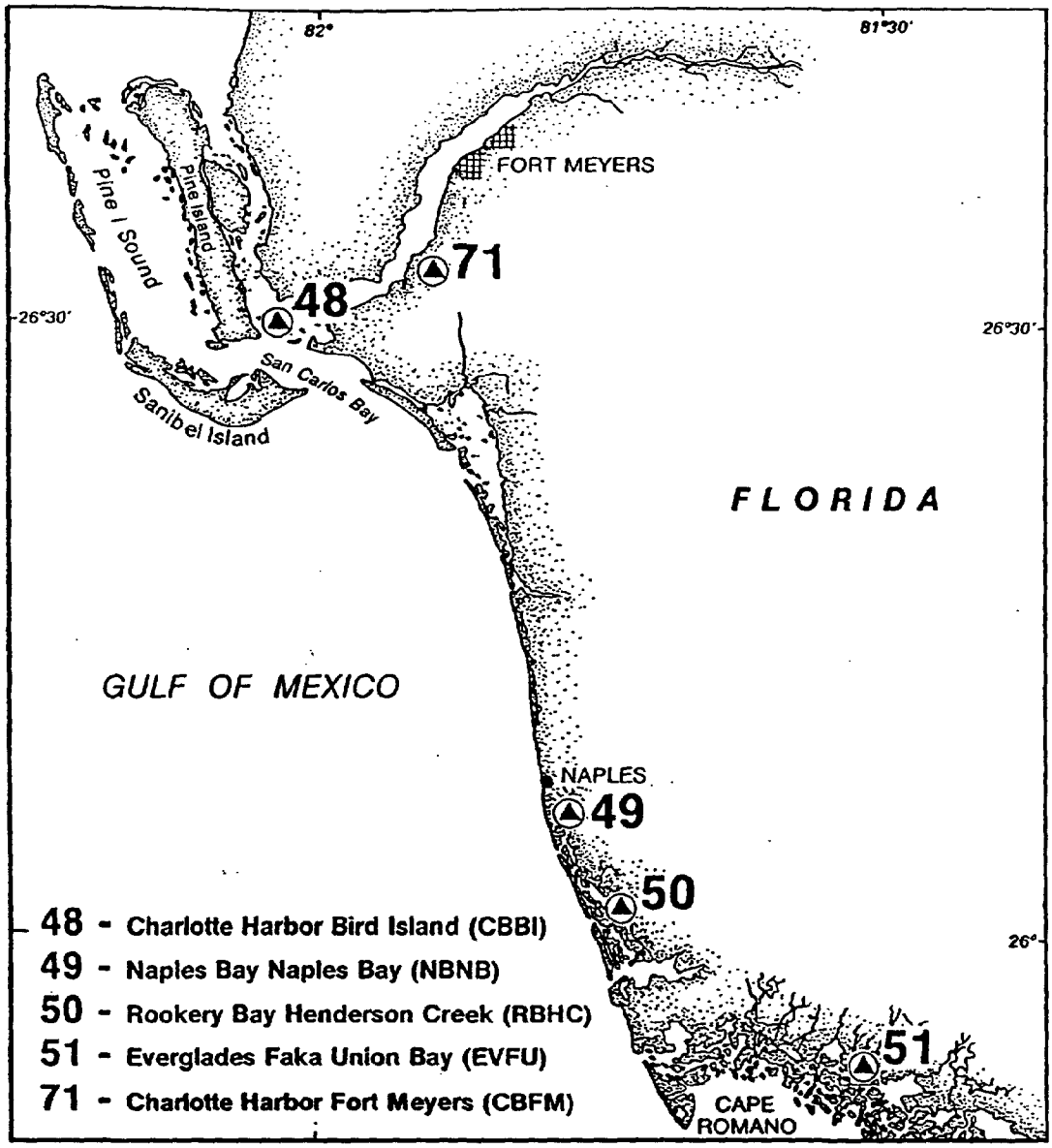


Figure 16. Location of South Florida Sites (see Figure 5 for location in the Gulf of Mexico).

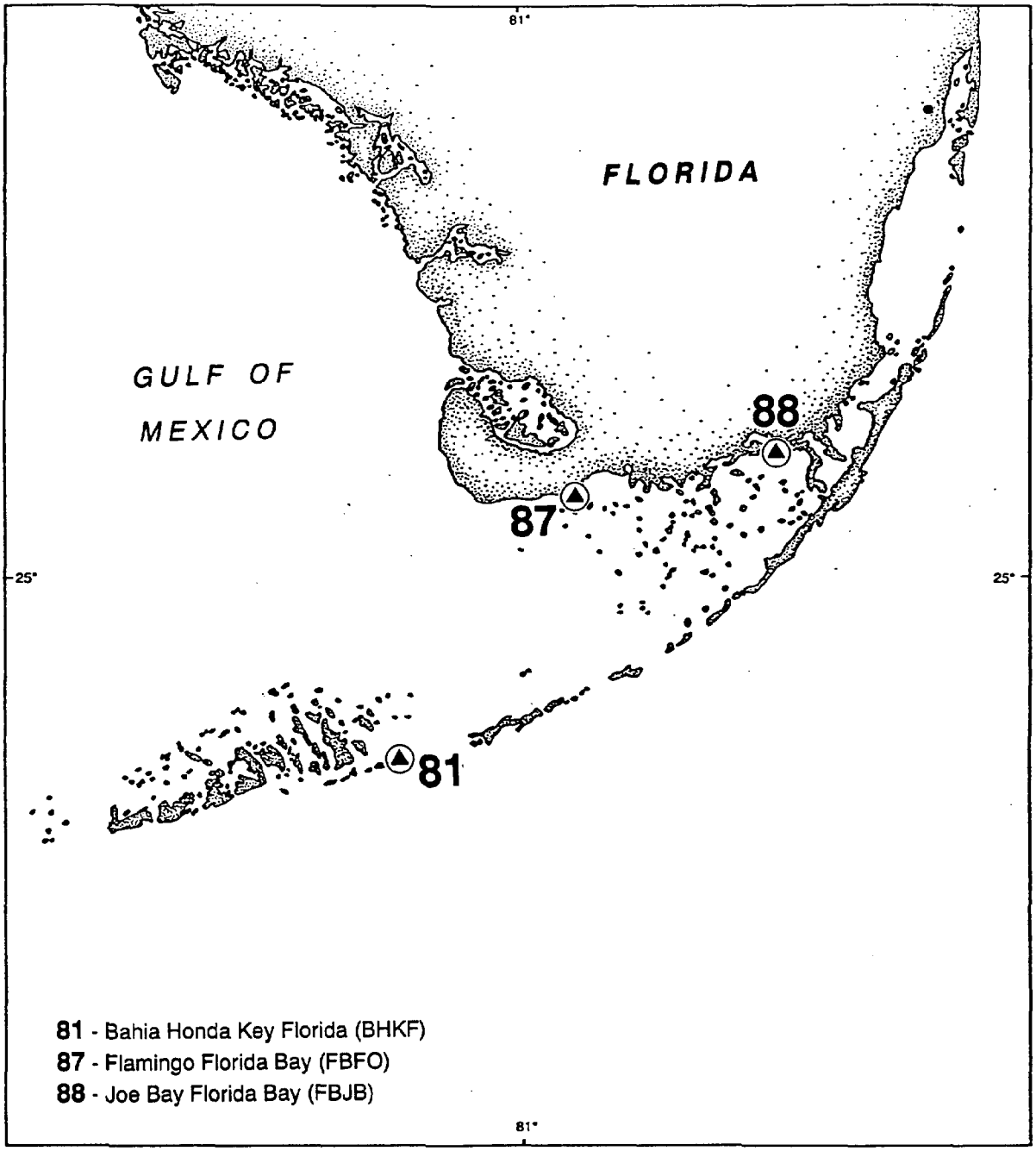


Figure 17. Location of Florida Key Site (see Figure 5 for location in the Gulf of Mexico).

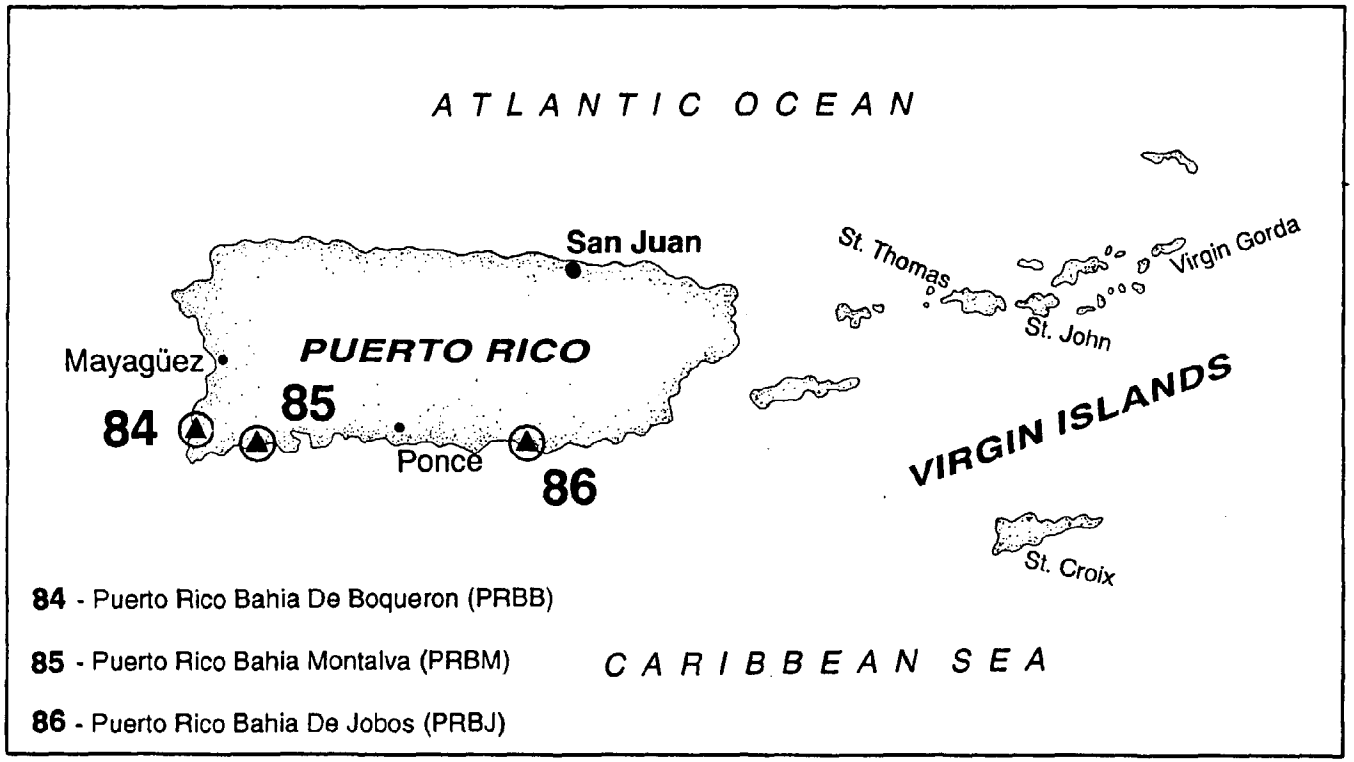


Figure 18. Location of Puerto Rico Sites.

TEXAS SITES

SITE NUMBER - 1 **DESIGNATOR** - LMSB

SITE - SOUTH BAY, LOWER LAGUNA MADRE, TX

NOMINAL SITE CENTER - 26°02.77'N 97°10.48'W

LOCATED ON NOS CHART # - 11302

SITE ACCESS - A tunnel hull outboard fishing boat and captain are generally chartered at the White Sands Marina in Port Isabel. In Year IV, a GERG boat was launched at the public boat ramp on South Padre Island at the Isla Blanca Pier. Travel time to South Bay is about 25 minutes. Landmarks used to locate the reef are 145° from the middle of the causeway bridge and 90° from the navigational range marker. The water depth is very shallow and requires the use of a shallow draft vessel.

SITE DESCRIPTION - The oysters were located in clumps on expansive intertidal mud flats south of Clark Island on the northeast side of South Bay and were fully exposed at low tide. The dense clumps were mostly conglomerations of dead shells. The few live specimens were small, thin-shelled oysters interspersed among the empty shells. The reef contained many dead shells, and collecting a sufficient number of suitably sized oysters required searching and picking through the clumps of shells.

OYSTER COLLECTIONS

Years I, II, & III - There was no significant geographic distinction in the three stations. All three stations were taken from the middle of the reef.

Year IV - Stations were collected in the same general location but were separated. Station 1 was taken at the north end of the reef just south of Clark Island and adjacent to the *Spartina alterniflora* marsh. Station 2 was approximately 75 m to the south at two small reefs about 10 m apart. Station 3 was at the south end of the reef, 100 m south of the middle part of the reef.

Year V - Oysters were much larger and more abundant than previous years' collections. Stations were on the same reef but were separated. Station 1 was on the northeast shoreline. Station 2 was 100-200 m south (toward the duck blind) from Station 1. Station 3 was another 100-200 m south.

Years VI, VII, &VIII - Oysters were collected at the same locations as sampled the previous three years.

Year IX - Oysters were sampled at the same station locations as in Years V through VIII. Oysters were abundant, large and thick shelled, in contrast

to the conditions found in Year I of the study. The reef has steadily improved.

SEDIMENT COLLECTIONS

Years I, II, & III - Sediments were collected during the first three years of the study. Sediments were taken from the middle (Station 1), west end (Station 2), and east end (Station 3) of the reef.

Years IV, V, VI, VII, VIII, & XI - No sediments were collected during these years.

SAMPLING METHODS

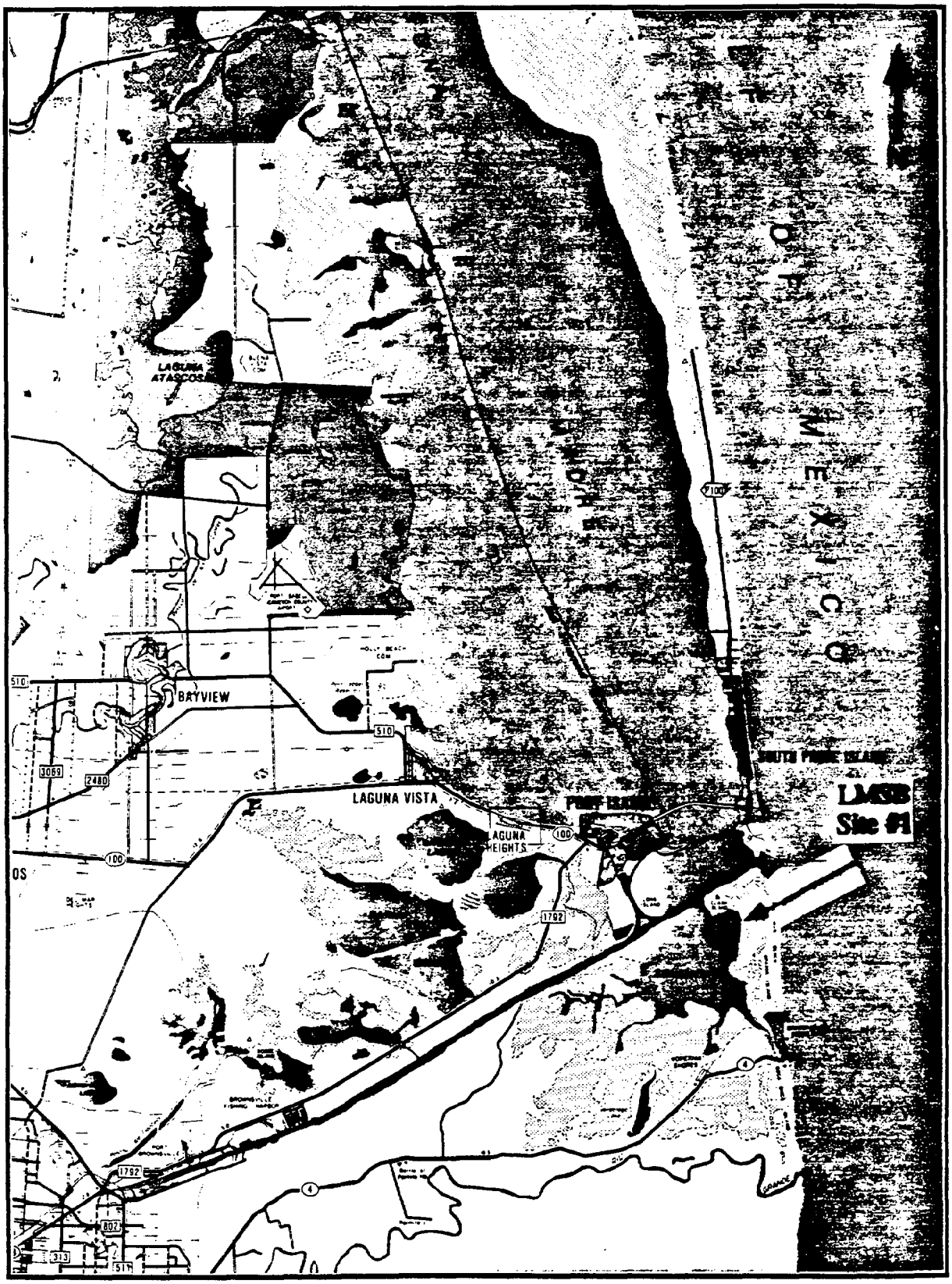
Oysters - hand
Sediment - hand

WATER DEPTH - intertidal, 0.3 m

POSSIBLE CONTAMINANTS - There were no obvious sources of contamination in the vicinity of the reef, although the salinity of the bay was high and the oysters endured exposure out of the water for a considerable period during the day.

ENVIRONMENTAL DATA

	Salinity (‰)	Temperature (°C)	Date Sampled
YEAR I	30.0	18.0	24 January 1986
YEAR II	30.0	20.0	9 December 1986
YEAR III	43.0	13.0	15 December 1987
YEAR IV	37.0	10.0	13 December 1988
YEAR V	34.0	10.0	13 December 1989
YEAR VI	40.0	21.0	12 December 1990
YEAR VII	34.0	25.0	11 December 1991
YEAR VIII	34.0	15.0	16 December 1992
YEAR IX	31.0	19.5	9 December 1993



Site #1 (LMSB), Lower Laguna Madre, South Bay.

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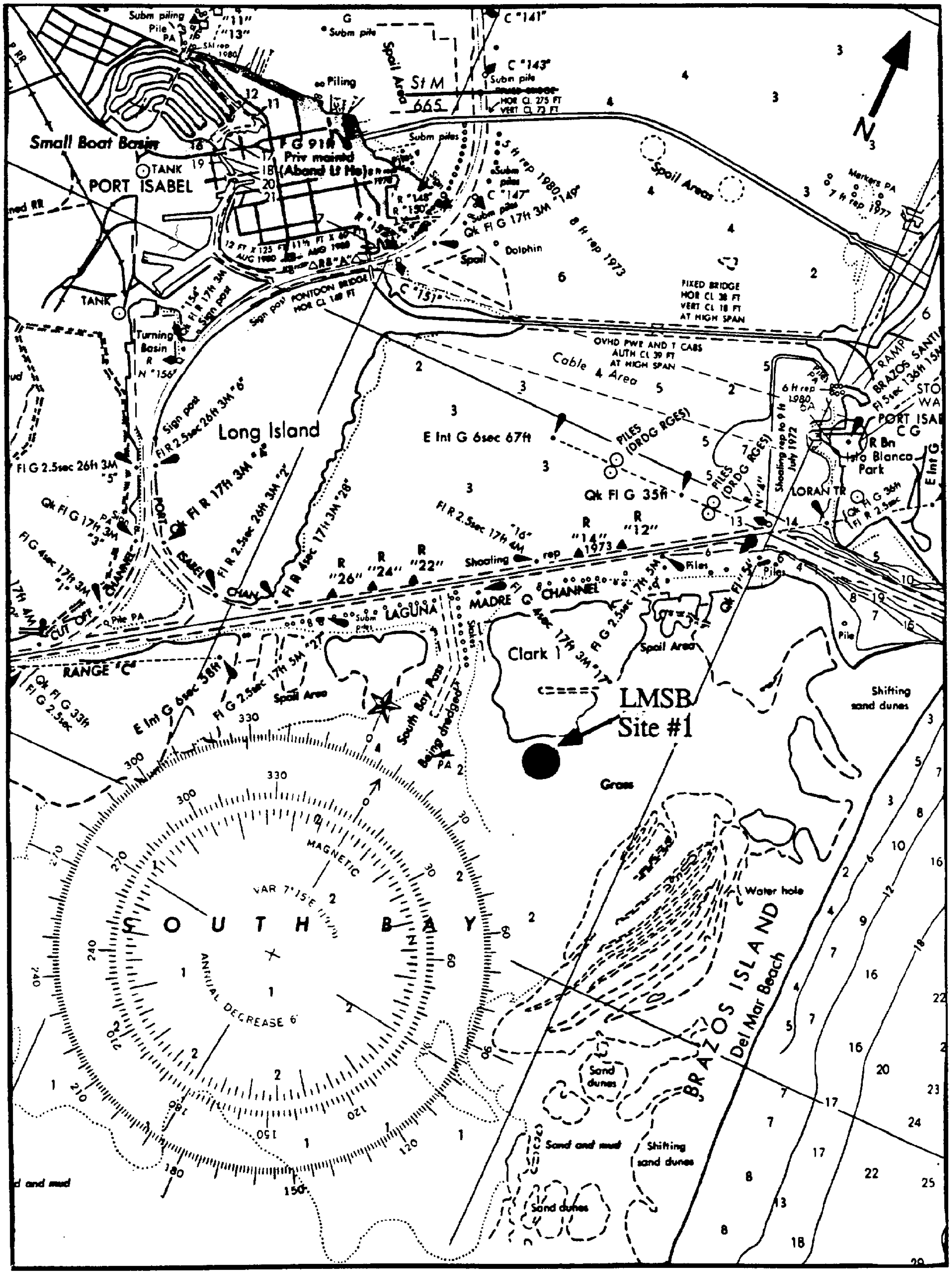
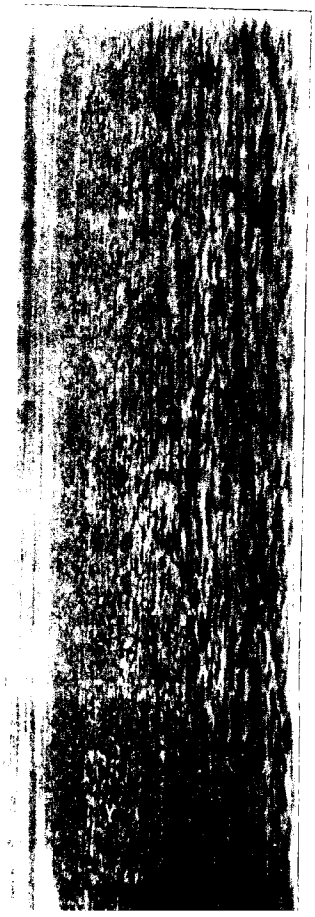


Site #1 (LMSB), Lower Laguna Madre, South Bay (from chart 11302).



SITE NUMBER - 52 **DESIGNATOR** - LMPI

SITE - PORT ISABEL, LOWER LAGUNA MADRE, TX

NOMINAL SITE CENTER - 26°04.62'N 97°12.05'W

LOCATED ON NOS CHART # - 11302

SITE ACCESS - Access to the site is by foot from the parking lot at the Queen's Point Marina in Port Isabel.

SITE DESCRIPTION - This collection site, which was established and collected only in Year III, was located along the south jetty of the Queen's Point Marina. Oysters grow attached to the concrete bulkhead and are exposed at low tide. Numerous shells are present but a high proportion of the oysters found here were dead and the live oysters were thin-shelled. Careful handling was required while collecting to avoid breaking the live oysters. Typically, salinities are high throughout the year. In Year IX, the first resampling of the site since Year III, the entire marina facility was found to be gone. All buildings and structures in the water had been removed. The concrete bulkheads, from which the oysters were collected, were all that remained.

OYSTER COLLECTIONS

Year III - Discrete stations were sampled as described below. Station 1 was located on the breakwater extending south from the marina entrance. Station 2 was along the south facing bulkhead. Station 3 was located between Stations 1 and 2 in a cove formed by the two bulkheads.

Years IV, V, VI, VII, & VIII - The site was not sampled during these years.

Year IX - The same stations were sampled as in Year III.

SEDIMENT COLLECTIONS

Year III - Sediments were collected outside the bulkheaded area opposite Station 1 on the side adjacent to the Brownsville Ship Channel.

Years IV, V, VI, VII, VIII, & XI - No sediments were sampled for during these years.

SAMPLING METHODS

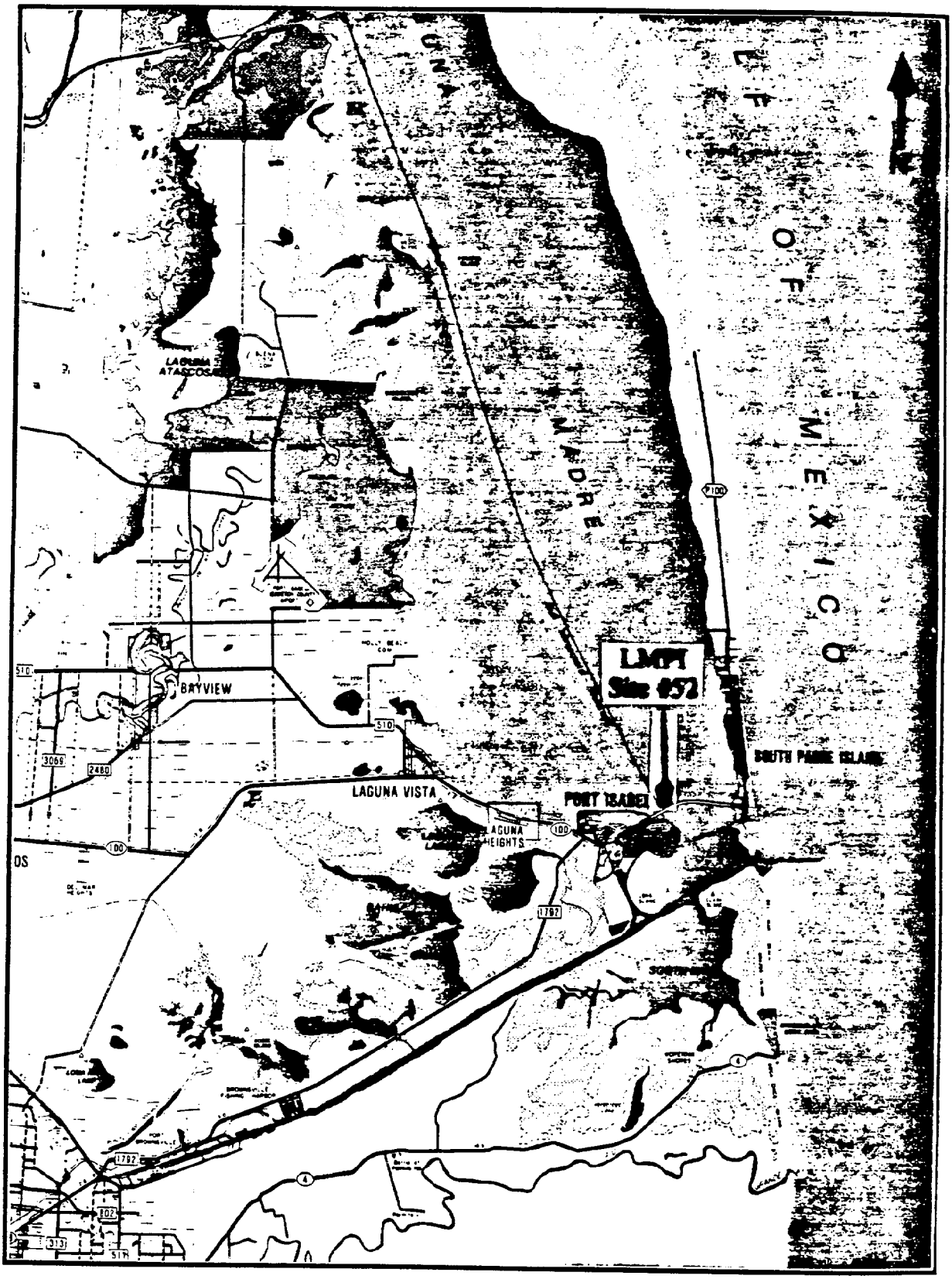
Oysters - hand
Sediments - hand

WATER DEPTH - Intertidal, 0.25 and 0.5 m.

POSSIBLE CONTAMINANTS - Contamination of the site was possible from nearby marinas, the City of Port Isabel, and the Brownsville Ship Channel.

ENVIRONMENTAL DATA

	Salinity (‰)	Temperature (°C)	Dates Sampled
YEAR III	42.0	13.0	16 December 1987
YEAR IX	29.0	21.0	8 December 1993



Site #52 (LMPI), Laguna Madre Port Isabell.

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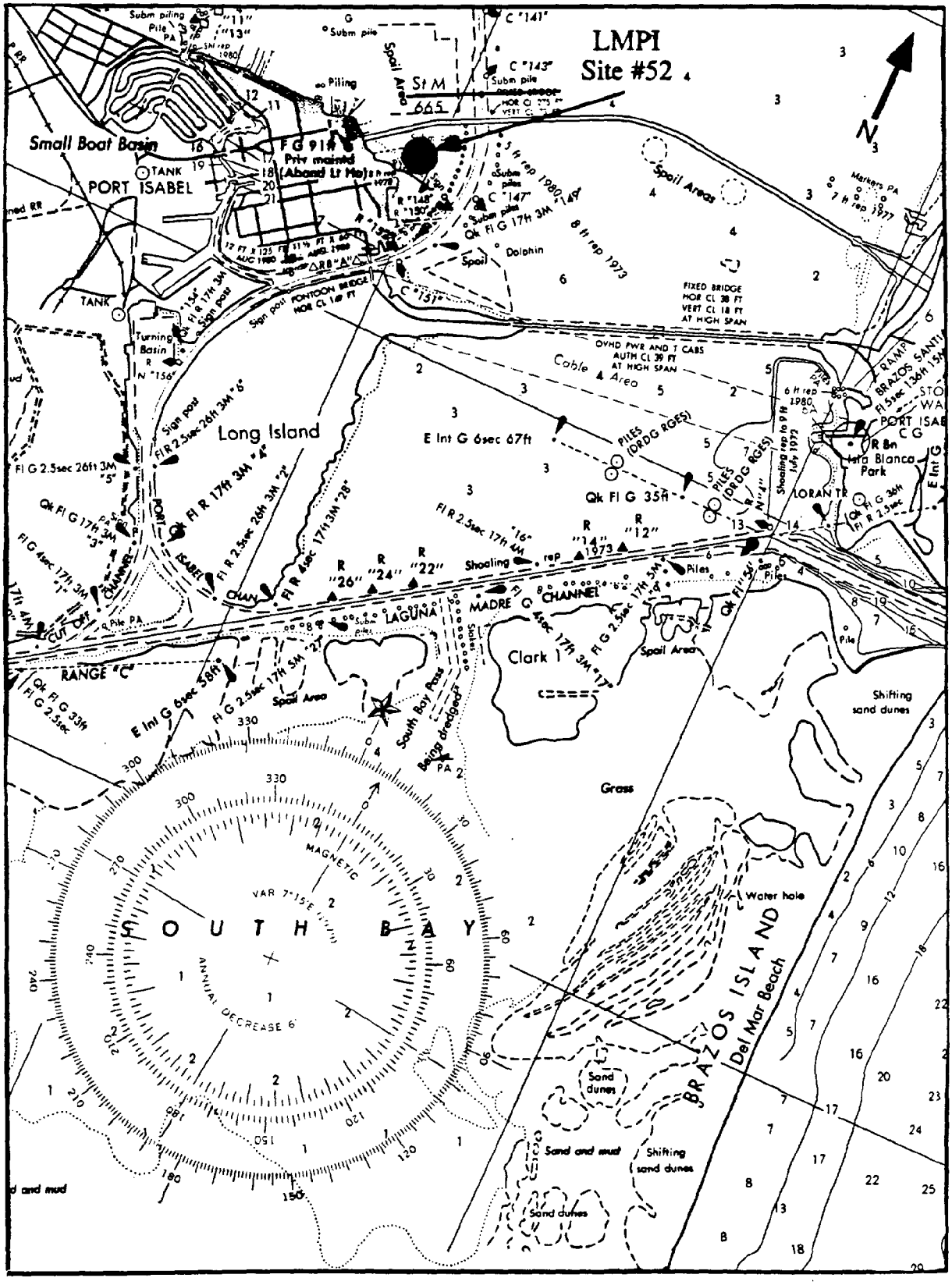


Site #52 (LMPI), Laguna Madre Port Isabell (from chart 11302).

SITE NUMBER - 78 **DESIGNATOR** - LMAC

SITE - ARROYO COLORADO, LOWER LAGUNA MADRE, TX

NOMINAL SITE CENTER - 26°16.80'N 97°17.30'W

LOCATED ON NOS CHART # - 11302

SITE ACCESS - Access to the site is by boat launched at the White Sands Marina in Port Isabel. Travel up the ICWW to the site. Travel time is 40 minutes.

SITE DESCRIPTION - This collection site, established and collected for the first time in Year V, was located at cabins along the ICWW. Oysters grow attached to the concrete pilings and on mud flats which were exposed at low tide.

OYSTER COLLECTIONS

Year V - Station 1 was located at the first cabin #1399 (tan with brown trim), which was just north of channel marker 45 and west of Primero Island. Oysters were collected from the concrete piling supporting the cabin. Station 2 was at cabin #1423. The cabin was between channel marker 41 and channel marker 43. Station 3 was located north of channel marker 41 at cabin #P1345. Oysters at this station were growing in clumps on the mudflat. Many were very large with smaller more suitably sized oysters attached.

Years VI, VII, & VIII - This site was not sampled during these years.

Year IX - The location of the stations were the same as in Year `V, Station 1 at cabin #1399, Station 2 at cabin #1423 and Station 3 at cabin #1345. The oysters were fewer on the pilings than in Year V.

SEDIMENT COLLECTIONS

Year V - Sediments were sandy silts which were tan on the surface which overlay a black layer mixed with shell fragments and sea grasses. These were collected at the cabins for Station 1 and 2. Station 3 sediments were collocated with the oysters on a subtidal mudflat.

Years VI, VII, VIII, & IX - No sediments were sampled during these years.

SAMPLING METHODS

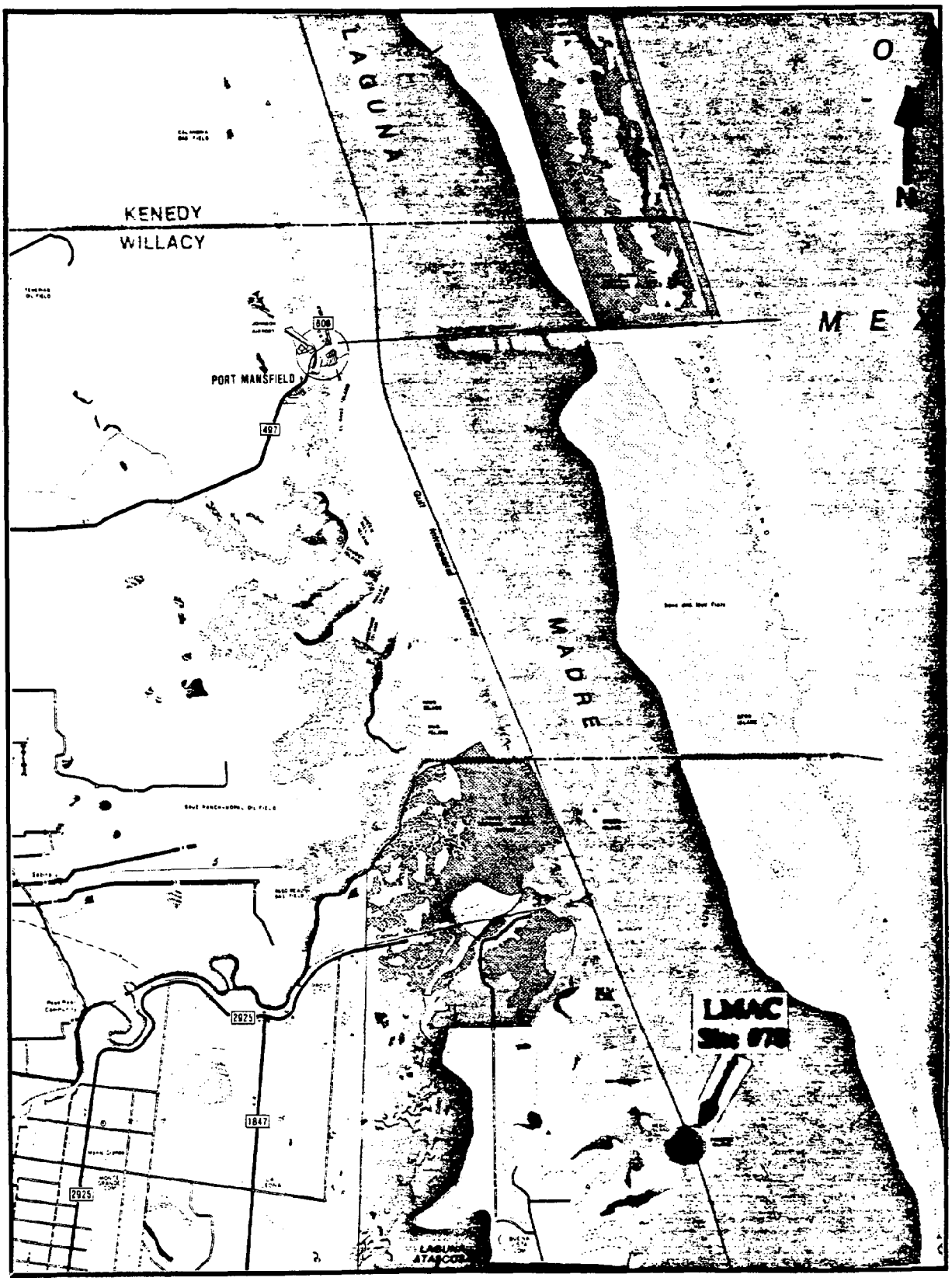
Oysters - hand
Sediments - hand

WATER DEPTH - intertidal, 0.3 m

POSSIBLE CONTAMINANTS - Contamination of the site was possible from nearby cabins, a producing gas field just to the south of the sampling area and inflow from the Arroyo Colorado.

ENVIRONMENTAL DATA

	Salinity (‰)	Temperature (°C)	Dates Sampled
YEAR V	34.0	11.0	14 December 1989
YEAR IX	30.0	22.0	8 December 1993



Site #78 (LMAC), Laguna Madre Arroyo Colorado.

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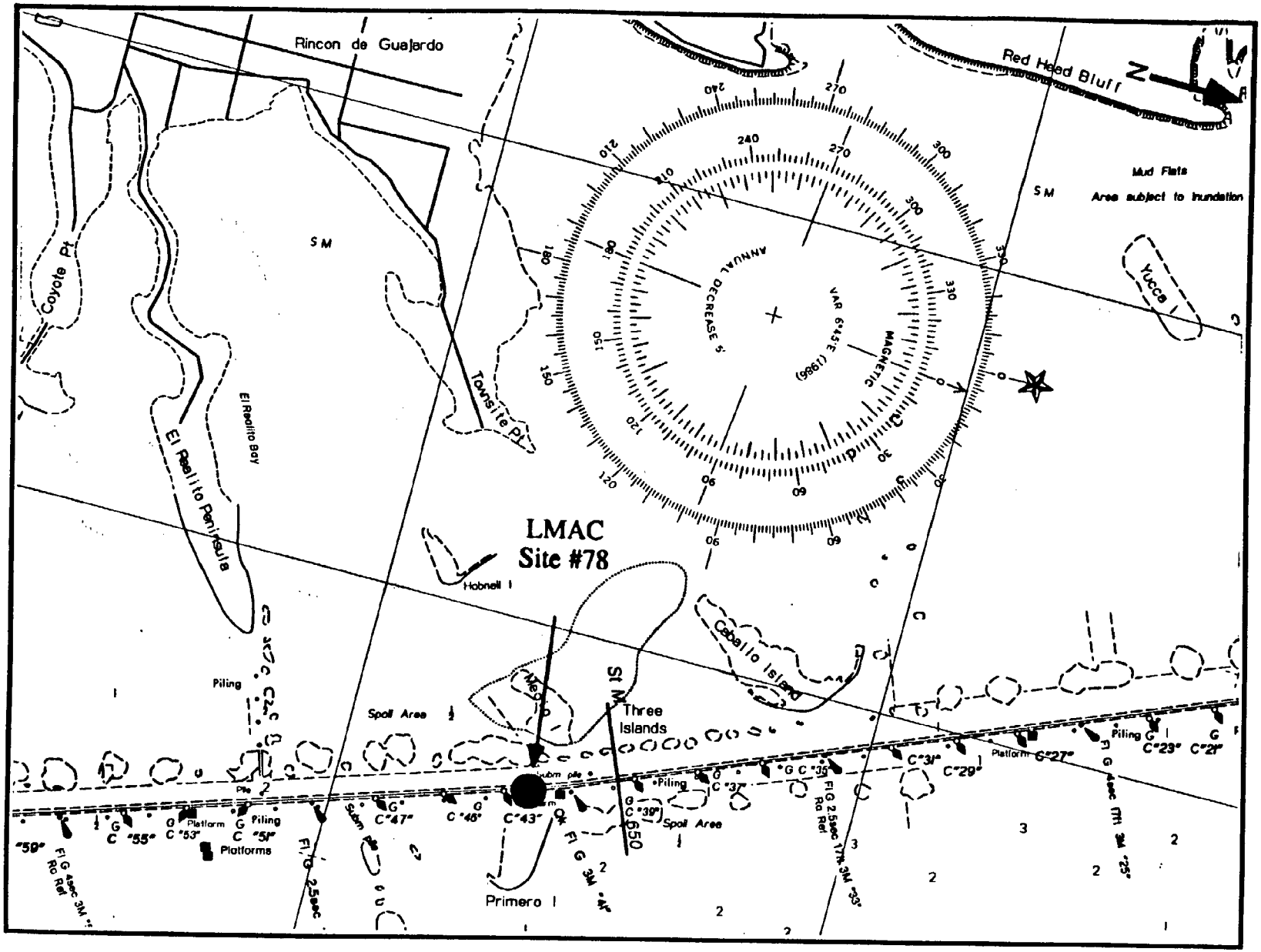
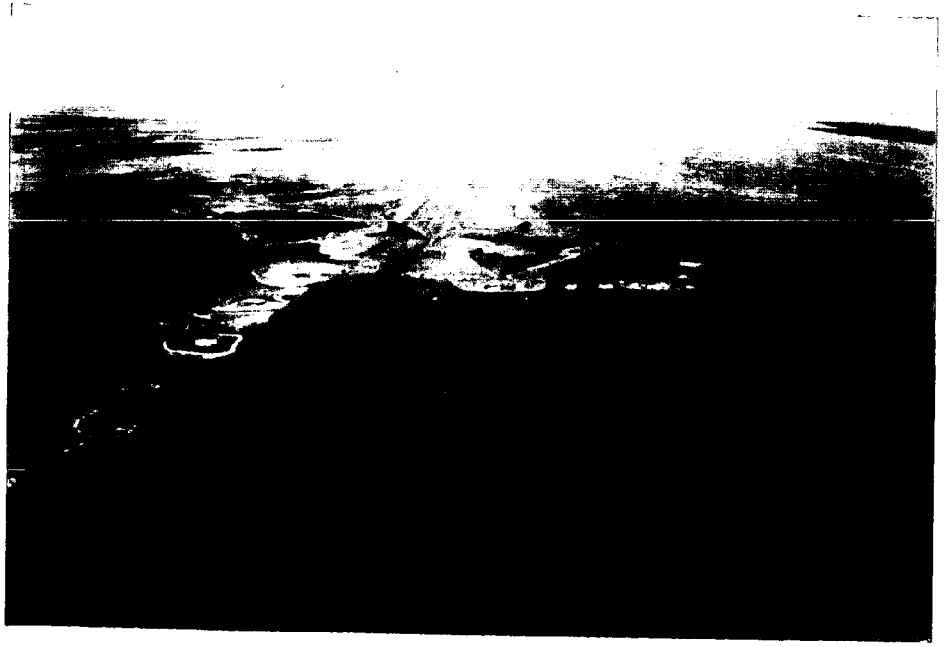
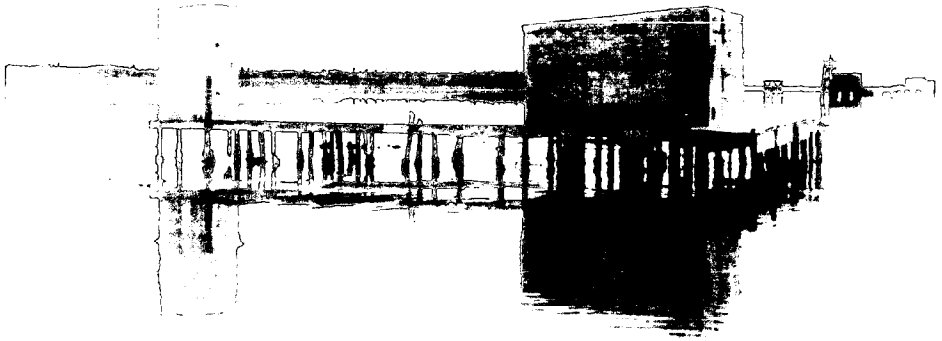
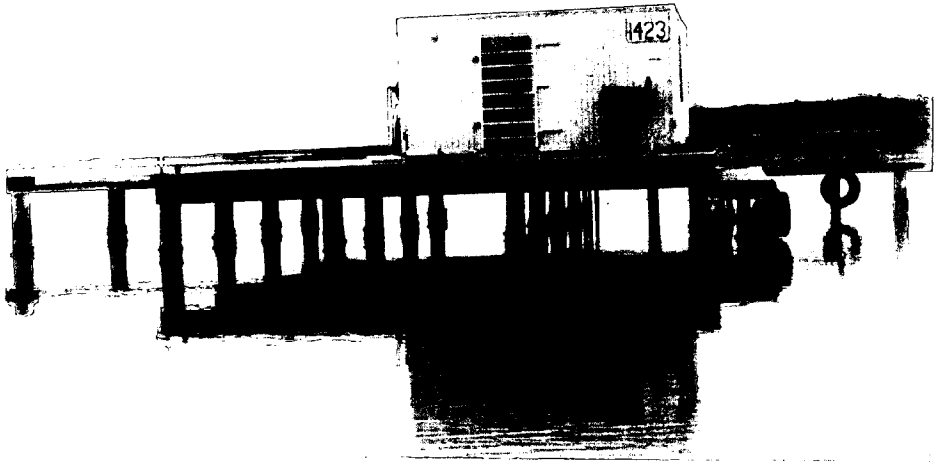


Site #78 (LMAC), Laguna Madre Arroyo Colorado (from chart 11303).



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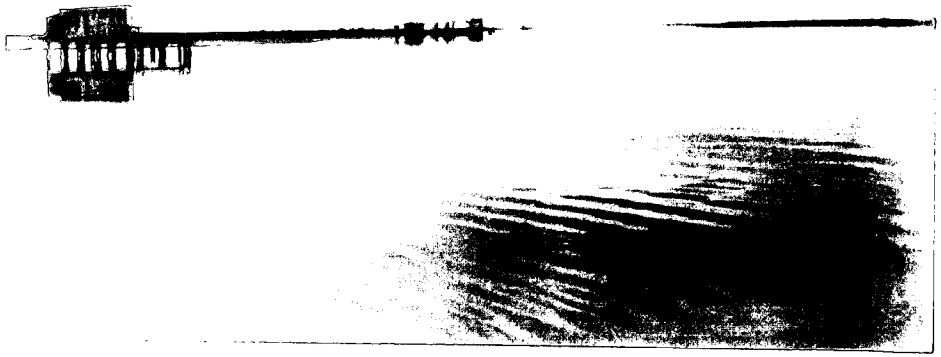


SITE NUMBER - 2 **DESIGNATOR** - CCNB

SITE - NUECES BAY, CORPUS CHRISTI, TX

NOMINAL SITE CENTER - 27°51.17'N 97°21.55'W

LOCATED ON NOS CHART # - 11309

SITE ACCESS - The site is located at Indian Point Marina on the north end of the U.S. Highway 181 bridge that crosses Nueces Bay. There is a boat launch at the Gunderlands Boatland. Collection stations are located along the shoreline on the north side of the road.

SITE DESCRIPTION - The site was located 100 m from the boat ramp at bearing 325°. The bay was very shallow with exposed reefs. These reefs had mainly dead oysters. Small thin-shelled oysters were collected along the mud shoreline or on pilings. Oysters were intertidal and seemed to be on the decline.

OYSTER COLLECTIONS

Years I, II, & III - Oyster collection stations were as follows: Station 1 - 145° to boat ramp; 213° to the top of the Corpus Christi bridge. Station 2 - 25° to Portland water tower; 208° to the top of the Corpus Christi bridge. Station 3 - 25° to Portland water tower; 115° to large pilings at Gunderlands.

Year IV - Oysters were collected in Year IV at the same location as in previous years. The three stations were 40 to 50 m apart. It was noted that the population was more abundant than had been observed in the last two years.

Year V - Oysters were collected along the shoreline at the same general locations as previous years. Station 1 was adjacent to the boat ramp. Station 2 was 50-m to the south and Station 3 was another 50 m to the south toward the bridge.

Year VI - We attempted to sample the same location, but no live oysters of collectable size were available. A few spat in the 1 to 2 cm size range were observed. No samples were collected.

Year VII - Oysters were collected along the shoreline in the same general locations as in Year V.

Year VIII - Oysters were small and extremely hard to find.

Year IX - This site was not scheduled to be sampled this year, but was used as an alternate for CCIC (Ingleside Cove, Corpus Christi) where there were no oysters to be found. The oysters (at CCNB) were more abundant and easier to find this year.

SEDIMENT COLLECTIONS

Years I, II, & III - Sediments were collected adjacent to each oyster station. Sediments for the NIST archive were also collected adjacent to the oyster stations.

Years IV, V, VI, VII, VIII, & IX - No sediments were sampled during these years.

SAMPLING METHOD

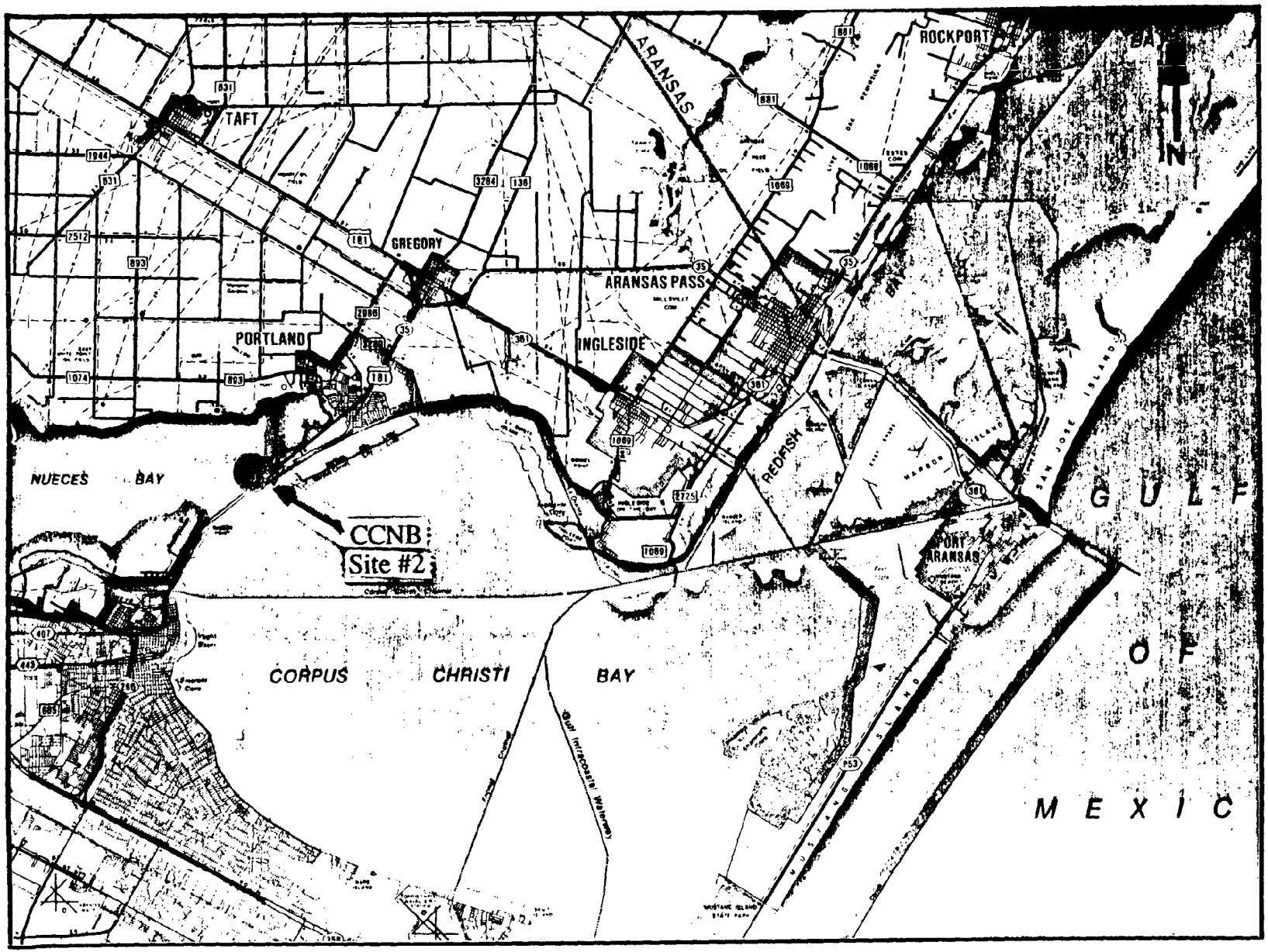
Oysters - hand
Sediment - hand

WATER DEPTH - 0.2 m

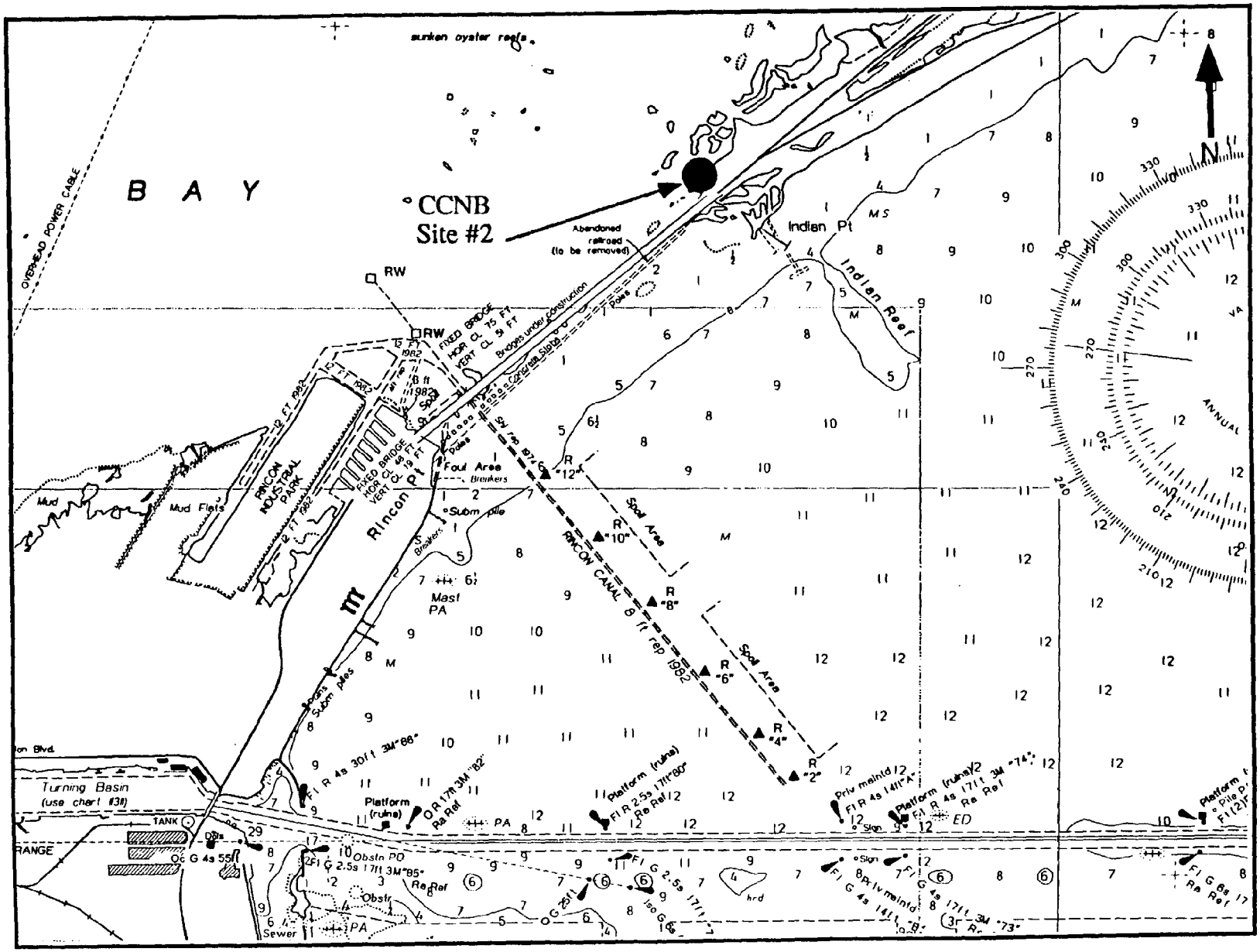
POSSIBLE CONTAMINANTS - Contamination factors included the boat ramp, marina, Rincon Industrial Park to the west, and Corpus Christi Ship Channel to the south.

ENVIRONMENTAL DATA

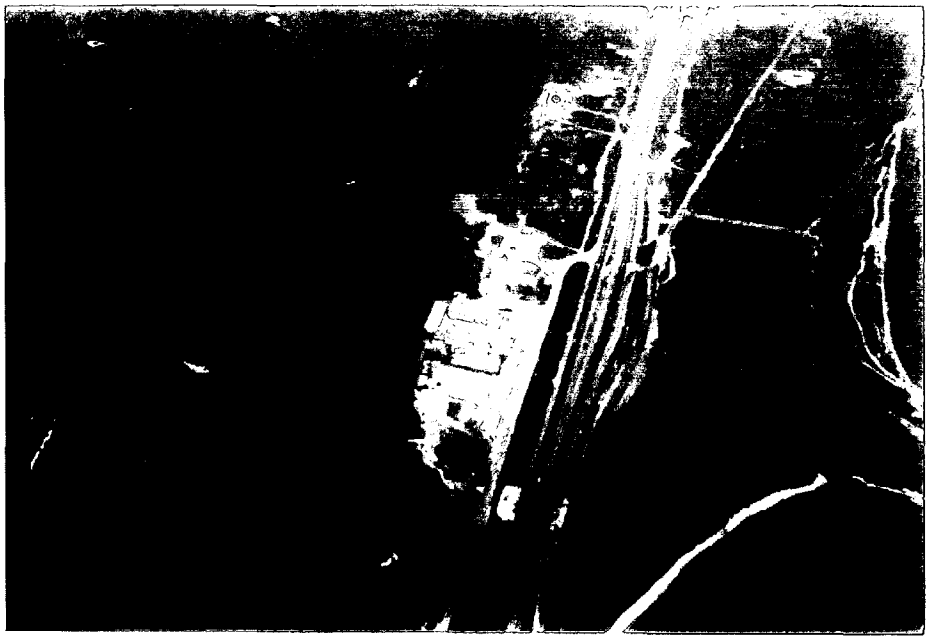
	Salinity (‰)	Temperature (°C)	Dates Sampled
YEAR I	27.3	16.0	29 January 1986
YEAR II	25.6	11.0	13 January 1987
YEAR III	40.0	11.0	12 January 1988
YEAR IV	38.0	18.0	15 December 1988
YEAR V	34.6	9.0	14 December 1989
YEAR VII	30.0	22.0	10 December 1991
YEAR VIII	27.7	11.0	15 December 1992
YEAR IX	32.0	13.0	14 December 1993



Site #2 (CCNB), Corpus Christi Neuces Bay.



Site #2 (CCNB), Corpus Christi Neuces Bay (from chart 11309).



SITE NUMBER - 3 **DESIGNATOR** - CCIC

SITE - INGLESIDE COVE, CORPUS CHRISTI, TX

NOMINAL SITE CENTER - 27°50.28'N 97°14.28'W

LOCATED ON NOS CHART # - 11309

SITE ACCESS - To reach the site a boat is launched at the public boat ramp at Ingleside-On-The-Bay. A 5 minute ride across the La Quinta Ship Channel and Ingleside Cove is required to reach the site.

SITE DESCRIPTION - The site was located along the west side of Ingleside Cove channel and north of Ingleside Point on the south tip of the spoil island. Oysters were located on an exposed reef and on a mud flat that was exposed during normal low tides. The site was surrounded by submerged seagrass beds. Landmarks to locate the site were Ingleside Point to the south and the dredge spoil island to the north.

OYSTER COLLECTIONS

Year I - The three stations sampled for oysters were located on a tidal reef and on a mud flat. Station 1 was at the center of the reef. Station 2 was from the end nearest the shore, and Station 3 was at the south end of the reef.

Year II - No oysters were found in Year II and Corps of Engineers surveyors reported that the area had been recently dredged. Oysters were either moved or buried in Year II.

Year III - There was no significant geographic distinction in the three stations. Oysters were present again during Year III. Most of the oysters present in Year III were very small and appeared to represent a population that had been newly established since the die-off during Year II.

Year IV - In Year IV the stations were the same as those sampled for Year III. Year IV oysters were small and sparsely scattered.

Years V, VI, & VII - Sampling sites were in the same locations as previous years with Station 1 in the center of the reef, Station 2 toward the shore 75 m from #1, and Station 3 was 70 m south of #2.

Year VIII - Only three small oysters were found on this reef, so no samples were taken.

Year IX - No live oysters were found this year. Oysters were collected from an alternate site - CCNB (Nueces Bay, Corpus Christi).

SEDIMENT COLLECTIONS

Years I, II, & III - Each year sediment samples were collected 30 m offshore to the west from each of the oyster collection sites. Submerged seagrasses were present in some of the sediments. Sediment samples only (no oysters) were obtained in Year II at locations sampled in Year I.

Years IV - No sediments were sampled this year.

Year V - Sediments were collected adjacent to each of the oysters stations, approximately 15-20 m offshore. Sediments were primarily sand, shell, and grass with sparse areas of mud.

Years VI, VII, VIII, & IX - No sediments were sampled during these years.

SAMPLING METHOD

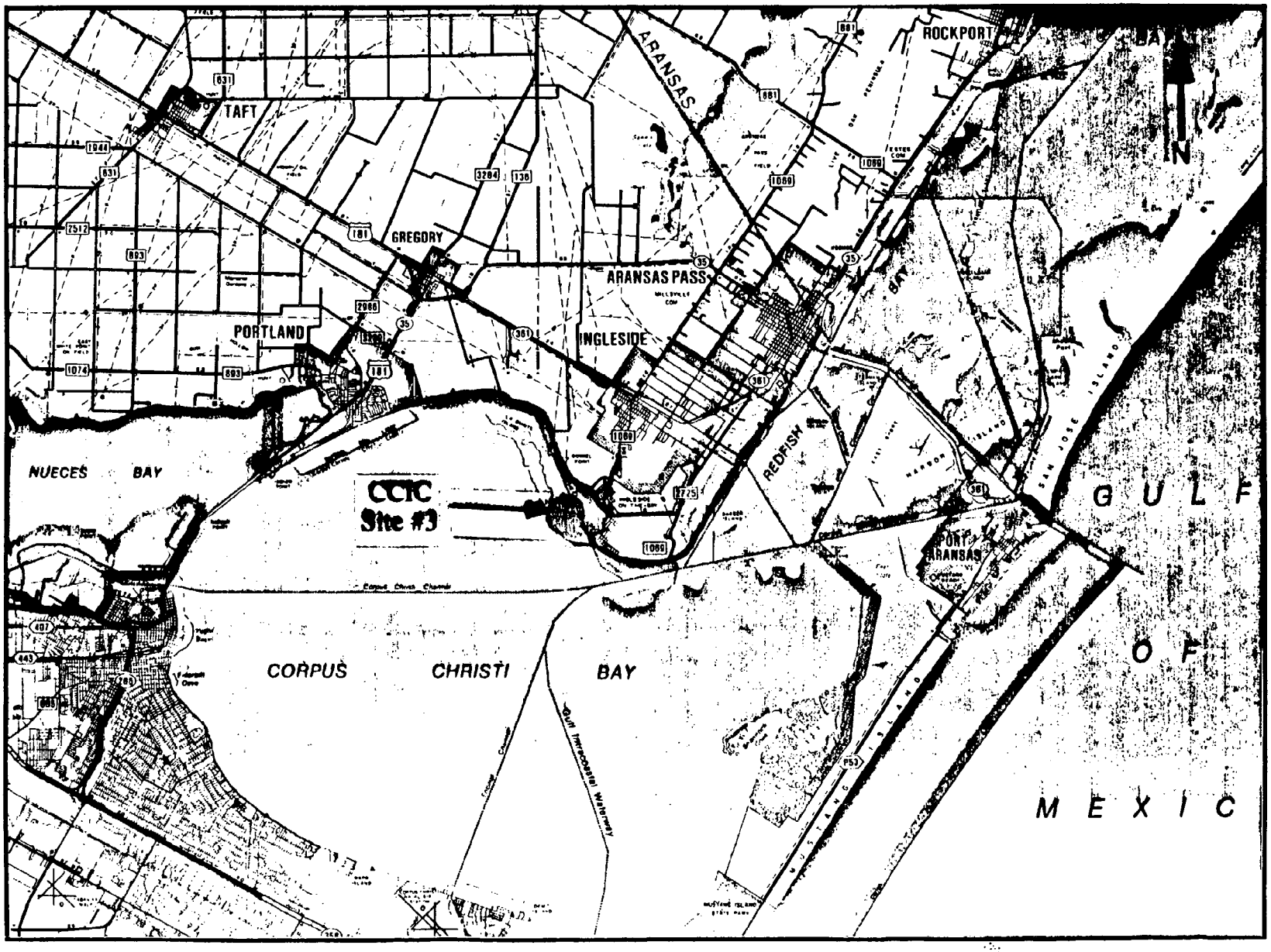
Oysters - hand
Sediment - hand and box core

WATER DEPTH - 0.3 m intertidal

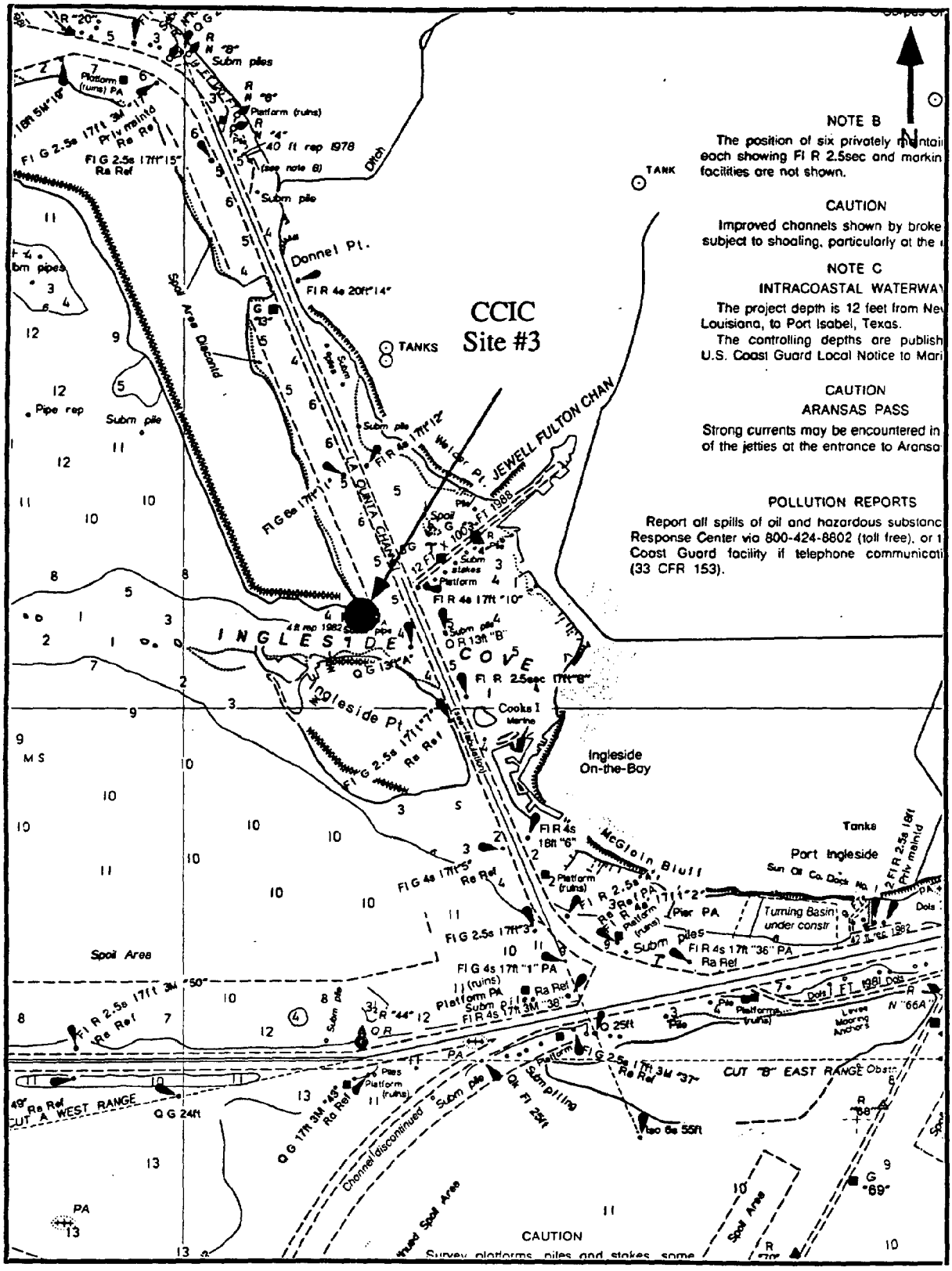
POSSIBLE CONTAMINANTS - Contamination was probable from dredging, barge traffic in the La Quinta Channel and from a nearby aluminum plant.

ENVIRONMENTAL DATA

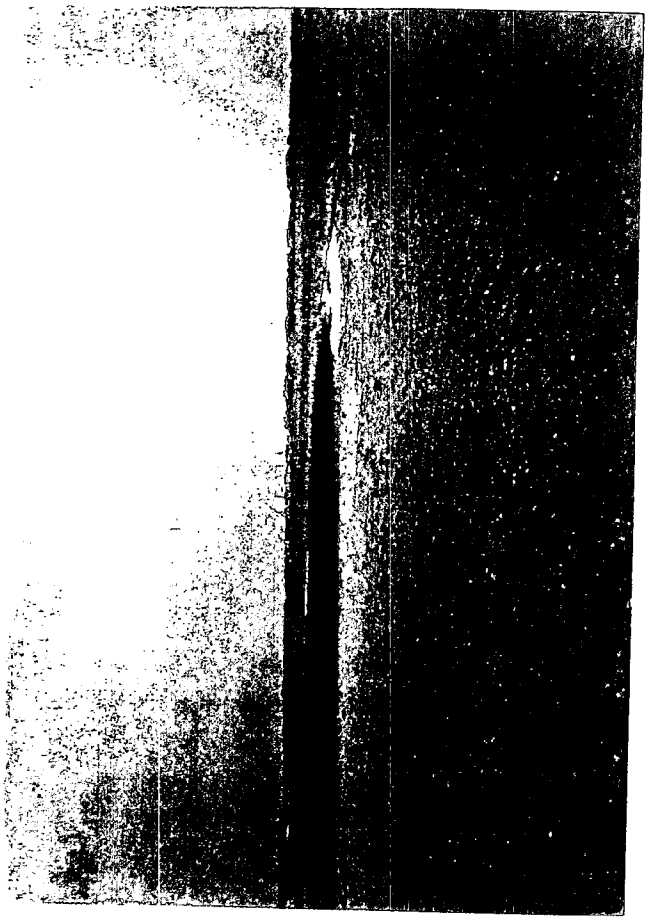
	Salinity (‰)	Temperature (°C)	Dates Sampled
YEAR I	27.0	23.0	2 February 1986
YEAR II	28.3	11.0	13 January 1987
YEAR III	37.0	10.0	12 January 1988
YEAR IV	35.0	19.0	14 December 1988
YEAR V	32.7	13.0	14 December 1989
YEAR VI	35.0	20.0	17 December 1990
YEAR VII	30.0	20.0	11 December 1991
YEAR VIII	31.3	14.0	15 December 1992
YEAR IX	33.0	17.0	14 December 1993

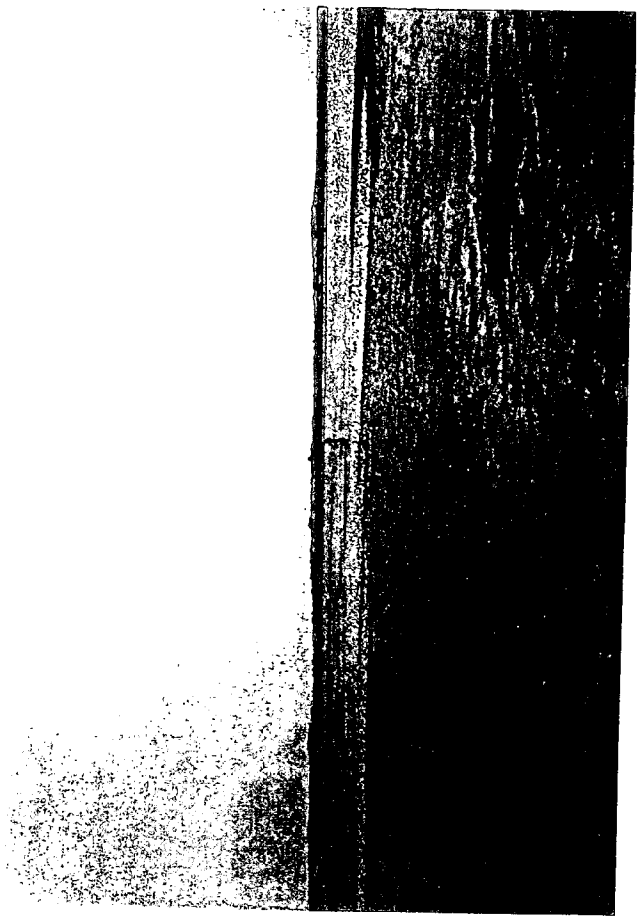


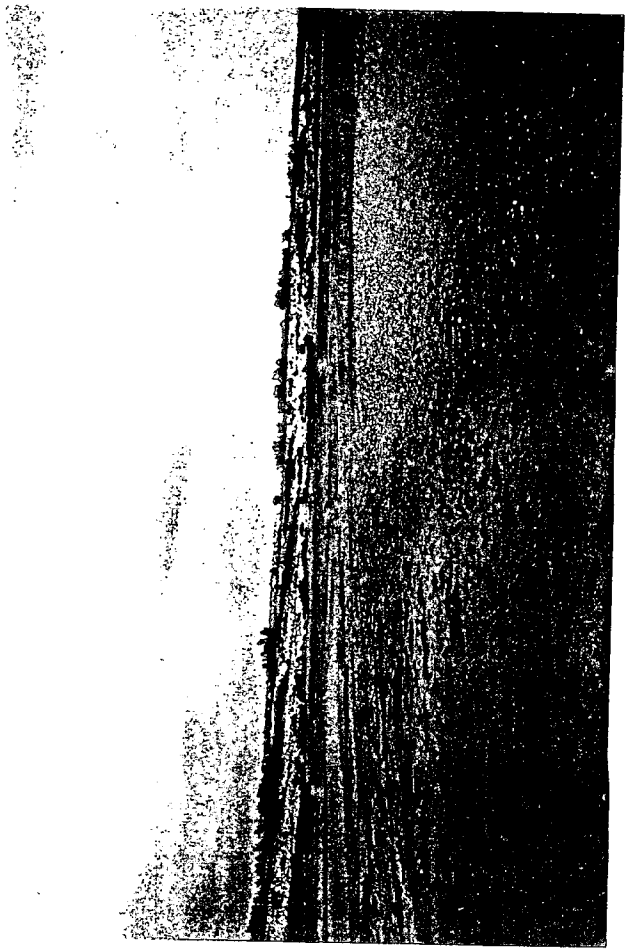
Site #3 (CCIC), Corpus Christi Ingleside Cove.



Site #3 (CCIC), Corpus Christi Ingleside Cove (from chart 11309).







SITE NUMBER - 53 **DESIGNATOR** - CCBH

SITE - BOAT HARBOR, CORPUS CHRISTI, TX

NOMINAL SITE CENTER - 27°50.17'N 97°22.72'W

LOCATED ON NOS CHART # - 11309

SITE ACCESS - This site is located on the northeast end of Rincon Point at the junction of Nueces and Corpus Christi Bays. The site is reached by exiting off of U.S. Highway 181 at Corpus Christi and driving under the bridge as if going to the boat harbor north of the Corpus Christi Ship Channel.

SITE DESCRIPTION - This collection site was established in Year III. The site was located under the bridge (Highway 181). Oysters occurred along the shoreline and were attached to concrete and brick rubble. There were both single oysters and clumps. The bottom was a mixture of sand, shell, mud, trash, and concrete rubble.

OYSTER COLLECTIONS

Year III - Station 1 was located along the shore in shallow water on the northeast end of Rincon Point directly under the Highway 181 bridge. Station 2 was located along the next 100 m section. Station 3 was located farther east along the shoreline adjacent to a trailer park.

Year IV - The site was not sampled.

Year V - Sampling stations were located at the same sites originally established in Year III. This site was collected this year as an alternate site, since oysters were unavailable at another site.

Year VI - There were no live oysters present at the site this year, therefore no collections were made.

Years VII, VIII, & IX - The site was not sampled during these years.

SEDIMENT COLLECTIONS

Year III - Sediment was collected 10 to 20 m offshore of each of the oyster collection stations.

Years IV, V, VI, VII, VIII, & IX - No sediment samples were collected at this site during these years.

SAMPLING METHODS

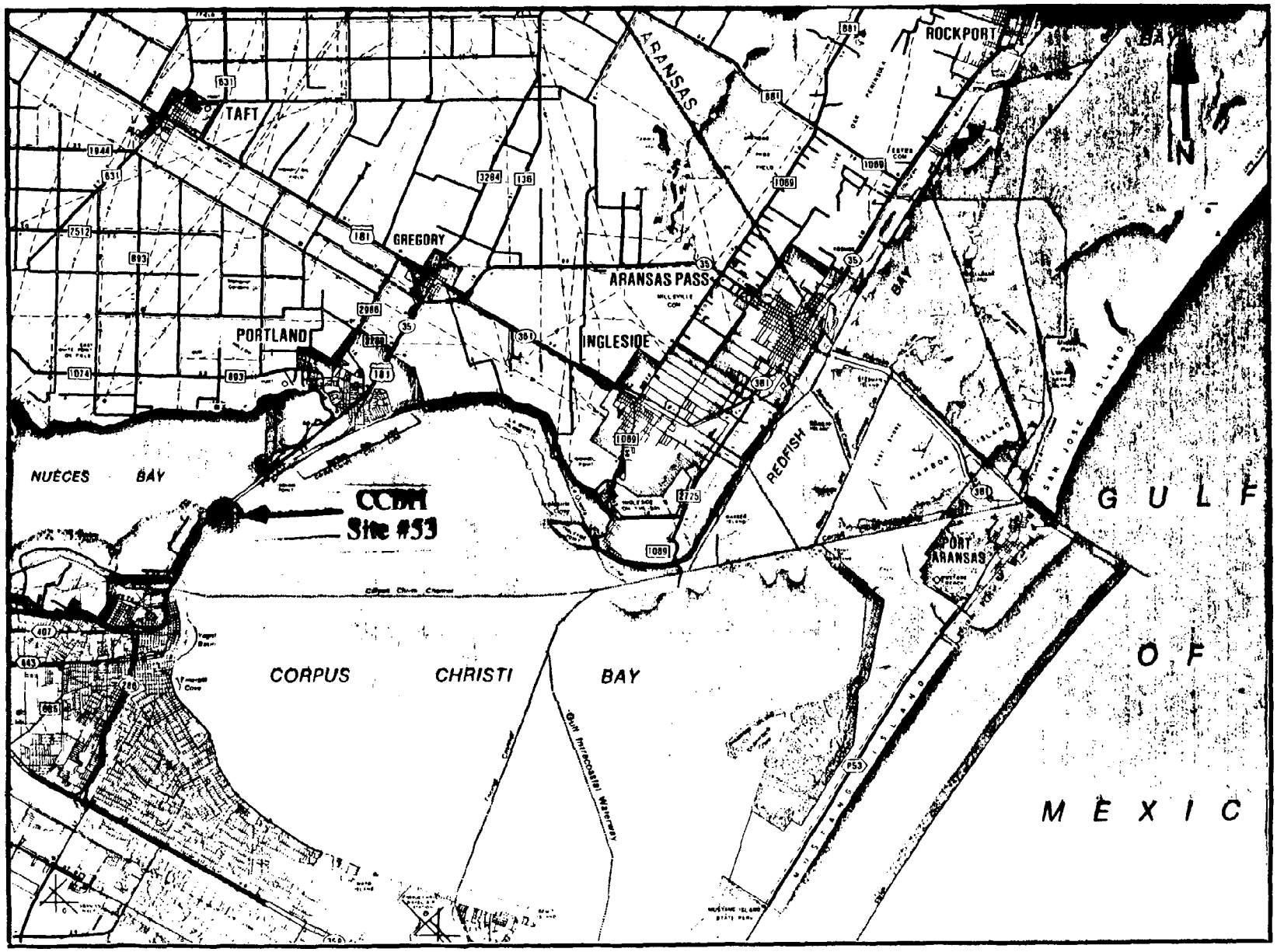
Oysters - hand
Sediment - hand

WATER DEPTH - intertidal, 0 - 0.3 m

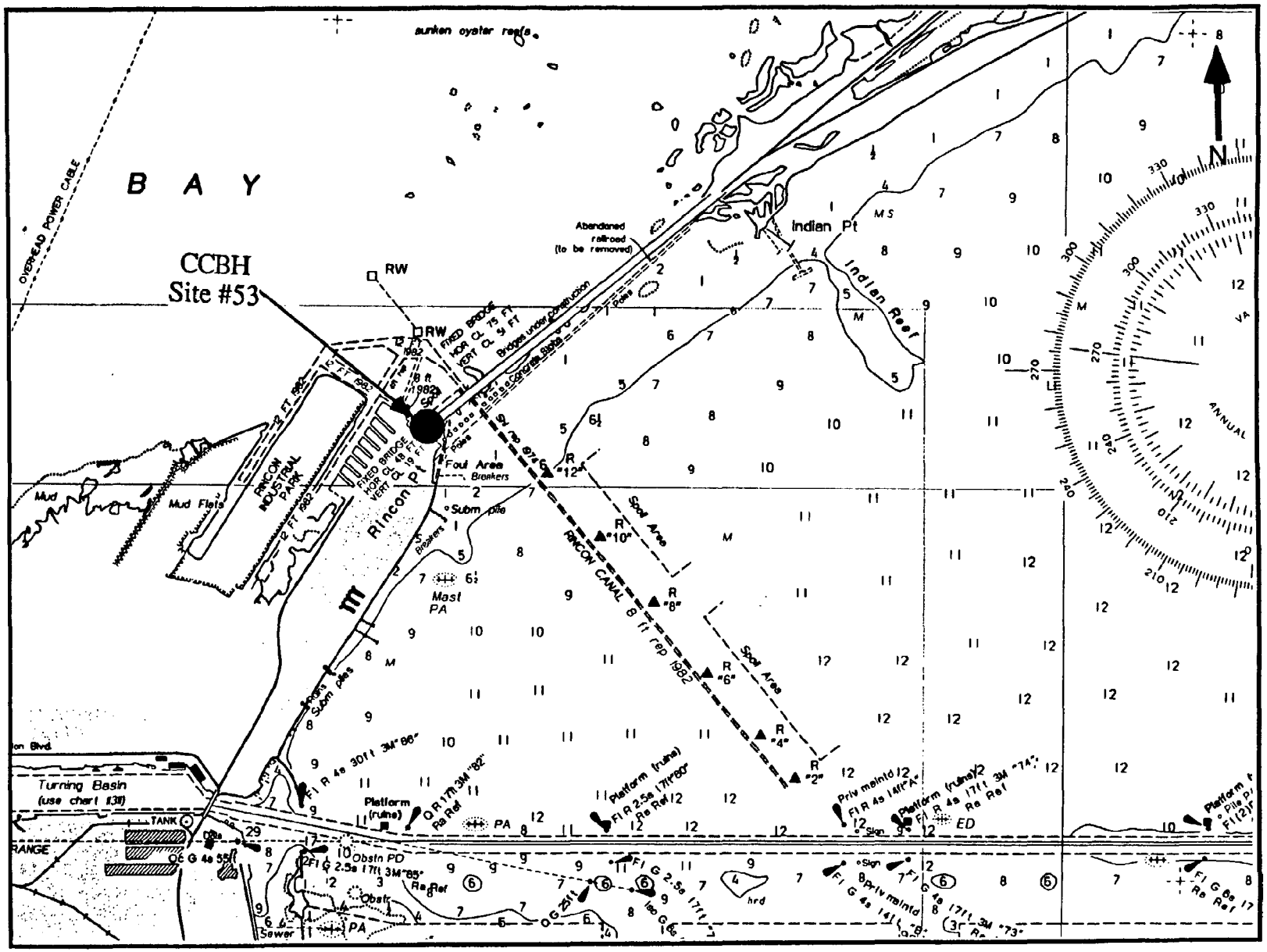
POSSIBLE CONTAMINANTS - Potential contamination was present from the rubble and trash as well as from boating activities and the Corpus Christi Harbor.

ENVIRONMENTAL DATA

	Salinity (‰)	Temperature (°C)	Dates Sampled
YEAR III	38.0	10.0	13 January 1988
YEAR V	36.3	8.0	16 December 1989



Site #53 (CCBH), Corpus Christi Boat Harbor



Site #53 (CCBH), Corpus Christi Boat Harbor (from chart 11309).

SITE NUMBER - 4 **DESIGNATOR** - ABLR

SITE - LONG REEF, ARANSAS BAY, TX

NOMINAL SITE CENTER - 28°02.96'N 96°56.77'W

LOCATED ON NOS CHART # - 11314

SITE ACCESS - The site is located across Aransas Bay almost due east from Fulton. To reach the site, launch at the public boat ramp near the harbor. Travel across the bay to the ICWW and then turn northeast until channel marker 25 is reached. The reef extends from St. Joseph Island into the bay.

SITE DESCRIPTION - During the first four years of the study, all three stations were located on the reef which extended from St. Joseph Island toward channel marker 25. Oysters were collected by hand from the exposed intertidal reef which was composed mainly of dead shell. The site was located at Lat. 28°03.88'N and Long. 96°57.80'W for the first four years. In Year V the site was moved due to a lack of oysters.

OYSTER COLLECTIONS

Years I & II - Oyster stations were located south of the ICWW. Station 1 was on the first island south of channel marker 25. Bearing to landmarks were 255° to white water tower at Rockport and 305° to the middle of the causeway bridge. Station 2 was on the next island to the south at 320° to ICWW marker 25 and 245° to white water tower. Station 2 was located on an island that was a designated bird rookery. Station 3 was on the next island south at 305° to the middle of the causeway bridge and 240° to the white water tower.

Year III - Few oysters were present in Year III and no young oysters were observed. Due to the sparse oyster population available by hand, it was recommended that future collections be made by tonging or dredging in deeper water.

Year IV - The collection stations for Year IV were the same as those of the first three years. Year IV oysters were tonged in approximately 0.5 m water on the west side of the island.

Year V - Live oysters could not be located at the previously collected locations, so the site was moved along the reef closer to the shore and approximately 1 mile to the southeast. Stations were separated by 100 m along the reef.

Years VI, VII, & VIII - The stations used to collect the oysters in Year V was reoccupied and sampled again during these years.

Year IX - Large oysters were abundant all along the west side of the reef. The collection stations for Year IX were the same as those of the first four years.

SEDIMENT COLLECTIONS

Years I & II - Sediments were collected by box core from the east side of the reef in deeper water in the same order as the oysters.

Year III - Sediments were collected on the west side of the reef approximately 200-m off the reef from each oyster station.

Year IV - Sediments (NIST) were collected on the west side of the reef approximately 200 m off the reef from each oyster station.

Years V, VI, VII, VIII, & IX - No sediments were collected these years.

SAMPLING METHOD

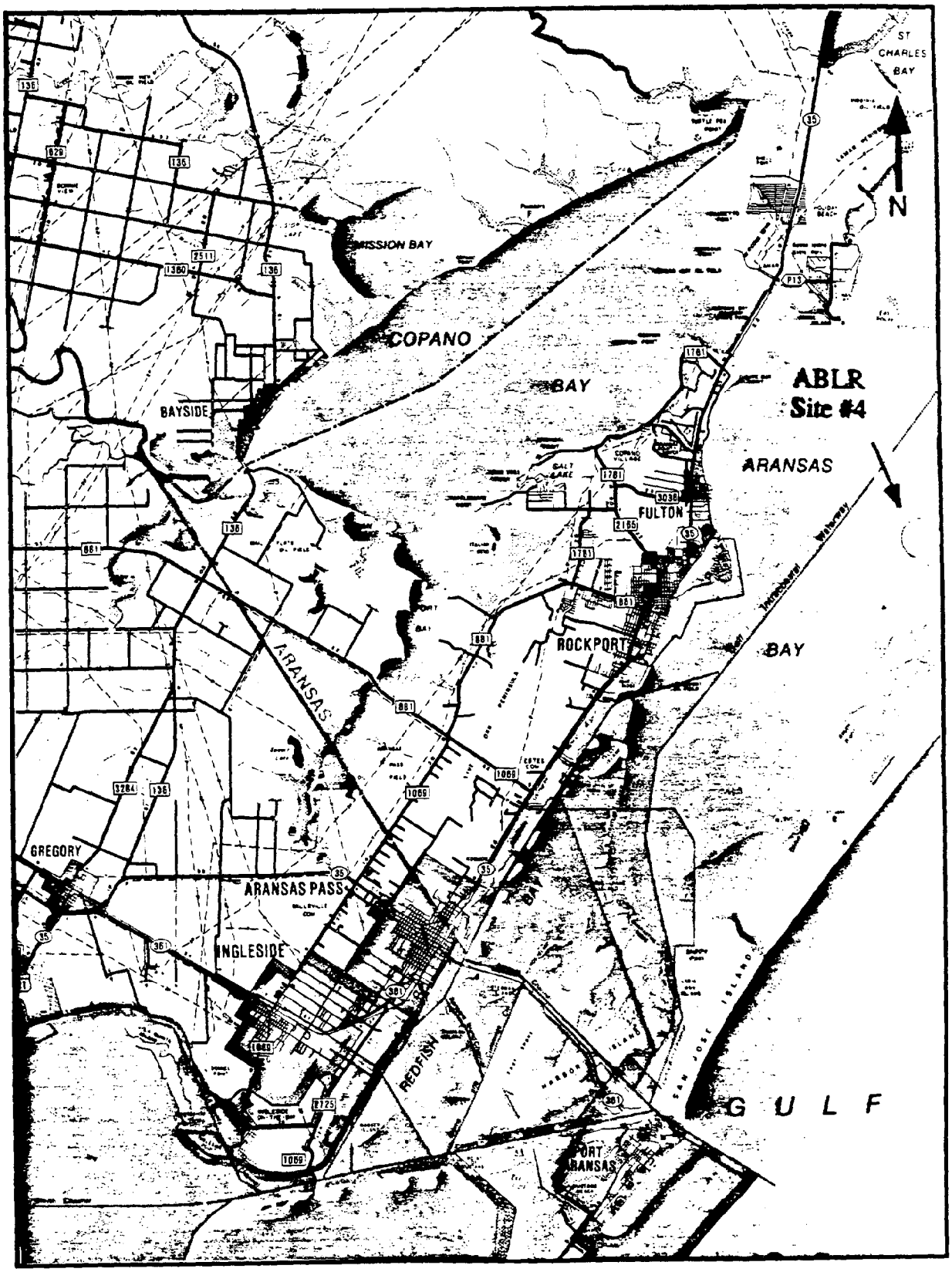
Oysters - hand and tongs
Sediment - box corer

WATER DEPTH - intertidal, 0 - 0.5 m; subtidal, 0.8 - 2 m, (Year I).

POSSIBLE CONTAMINANTS - There was possible contamination from marine traffic, oil and gas pipelines, and natural contamination from the large numbers of birds on the exposed reef.

ENVIRONMENTAL DATA

	Salinity (‰)	Temperature (°C)	Dates Sampled
YEAR I	15.0	16.0	26 January 1986
YEAR II	15.0	12.0	13 January 1987
YEAR III	22.0	9.0	13 January 1988
YEAR IV	32.0	15.0	15 December 1988
YEAR V	32.7	12.0	15 December 1989
YEAR VI	31.0	18.0	18 December 1990
YEAR VII	25.0	19.0	12 December 1991
YEAR VIII	20.0	15.0	16 December 1992
YEAR IX	23.0	16.0	16 December 1993



Site #4 (ABLR), Aransas Bay Long Reef.

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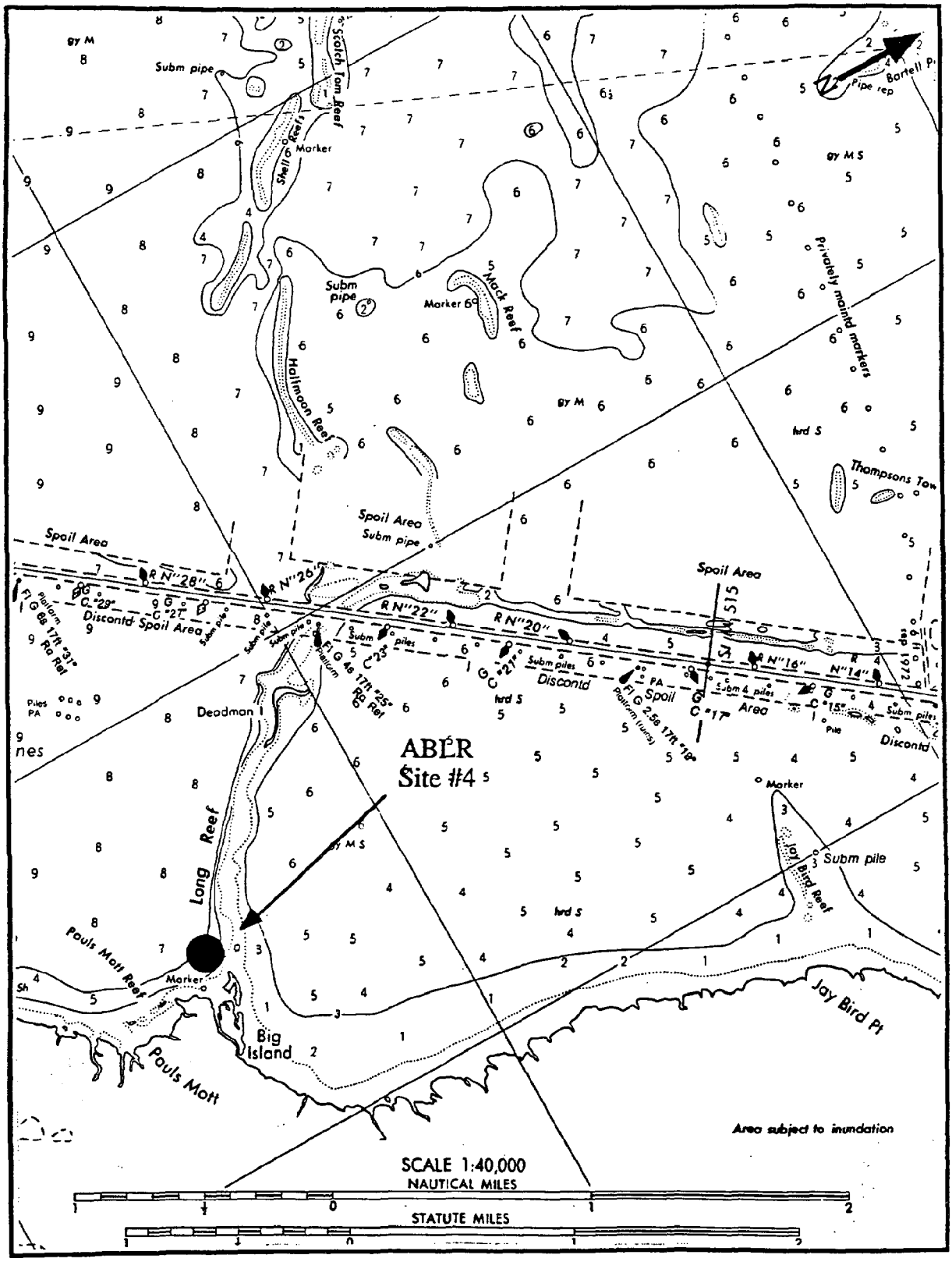
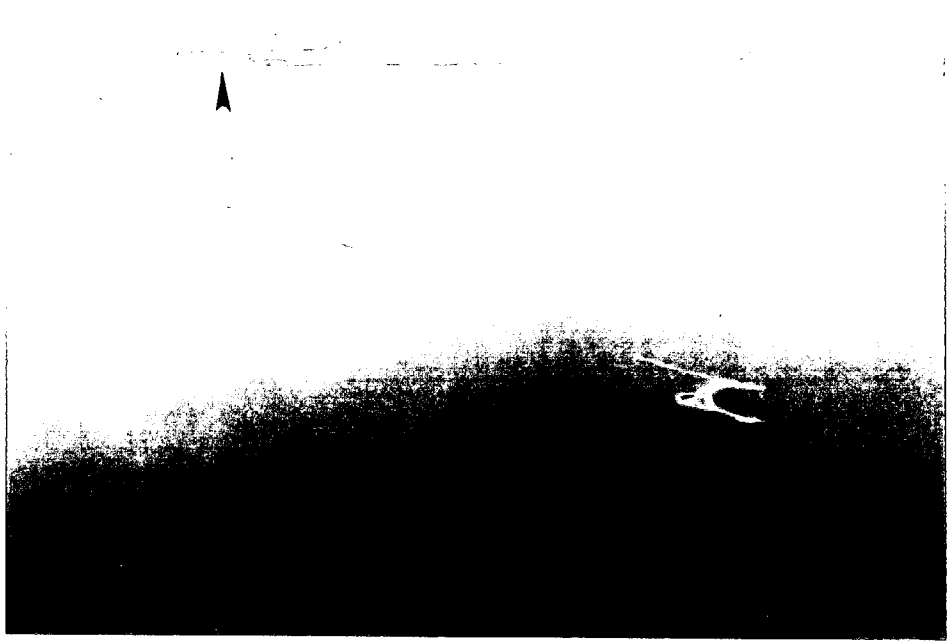
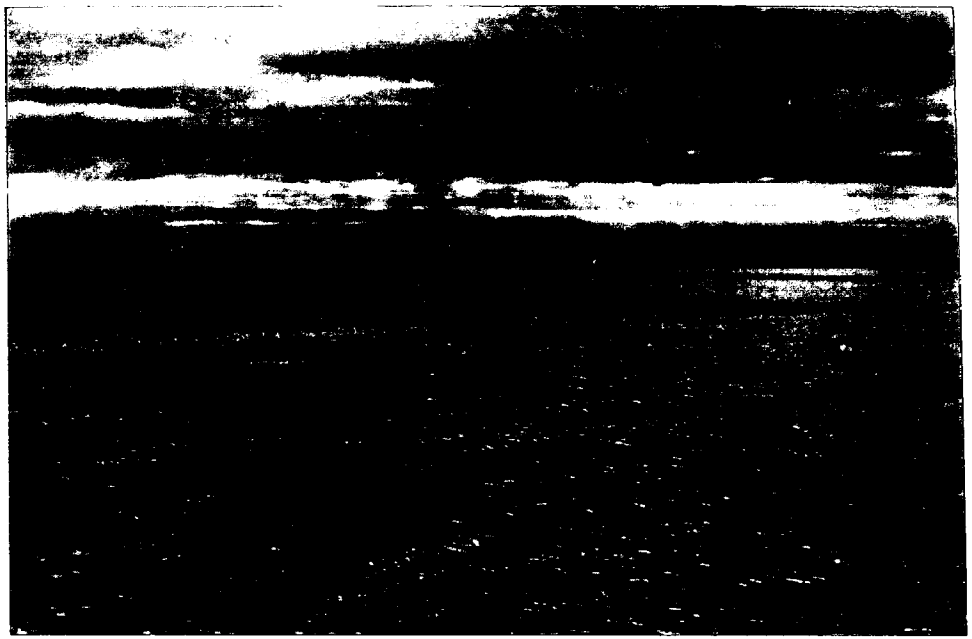
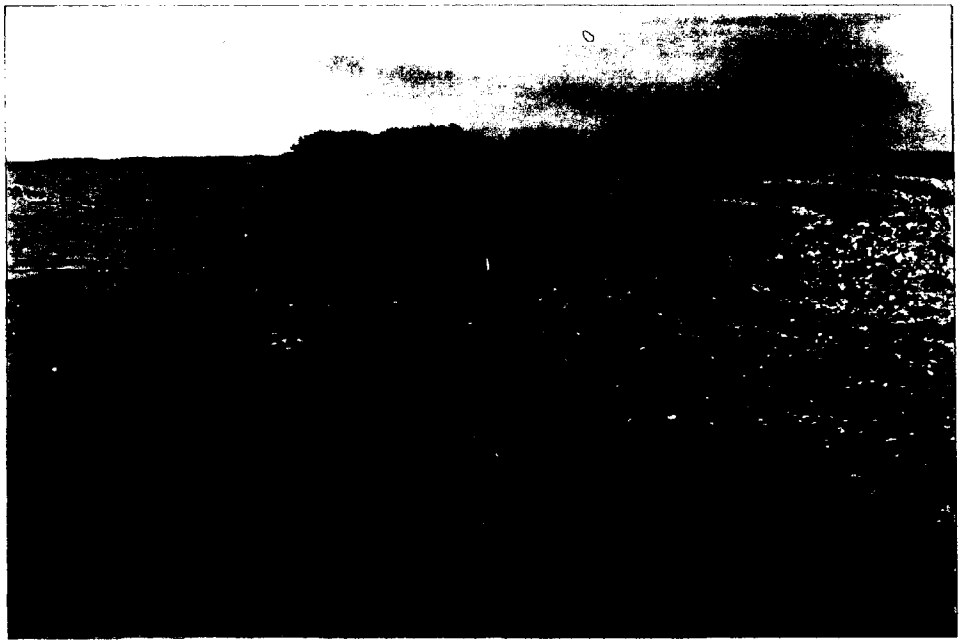


Site #4 (ABLR), Aransas Bay Long Reef (from chart 11314).







SITE NUMBER - 54 **DESIGNATOR** - ABHI

SITE - HARBOR ISLAND, ARANSAS BAY, TX

NOMINAL SITE CENTER - 27°50.33'N 96°04.52'W

LOCATED ON NOS CHART # - 11309, 11314

SITE ACCESS - The collection site established in Year III is located on Mustang Island on the south side of the ICWW directly across from Harbor Island. The site is at a public access area near fishing piers and is reached by crossing the Port Aransas ferry and traveling west past the University of Texas Marine Sciences building to the end of the paved road. The site is north of the sand parking lot.

SITE DESCRIPTION - Oysters were attached to rip rap and rubble material around the base of the piers. Oysters were generally small and not abundant; collections would be best made at low tide since the oysters were growing on bottom rubble.

OYSTER COLLECTIONS

Year III - Station 1 was located west of the wooden pier. Station 1 was located 200 m to the west. Station 2 was east of the wooden pier. Station 2 was 275 m to west. Station 3 was located 75 m east of Station 2 and west of the three concrete ship docks. Station 3 was 325 m to the west of the wooden pier.

Years IV, V, VI, VII, VIII, & IX - This site was not sampled during these years.

SEDIMENT COLLECTIONS

Year III - Sediment at the oyster site was predominantly sand; therefore, the sediment stations were established 200 m to the west of the oyster stations. Station 1 was a sand and clay bottom 200 m east of Oyster Station 1. Stations 2 and 3 were 50 and 100 m farther to the west.

Years IV, V, VI, VII, VIII, & IX - This site was not sampled during these years.

SAMPLING METHODS

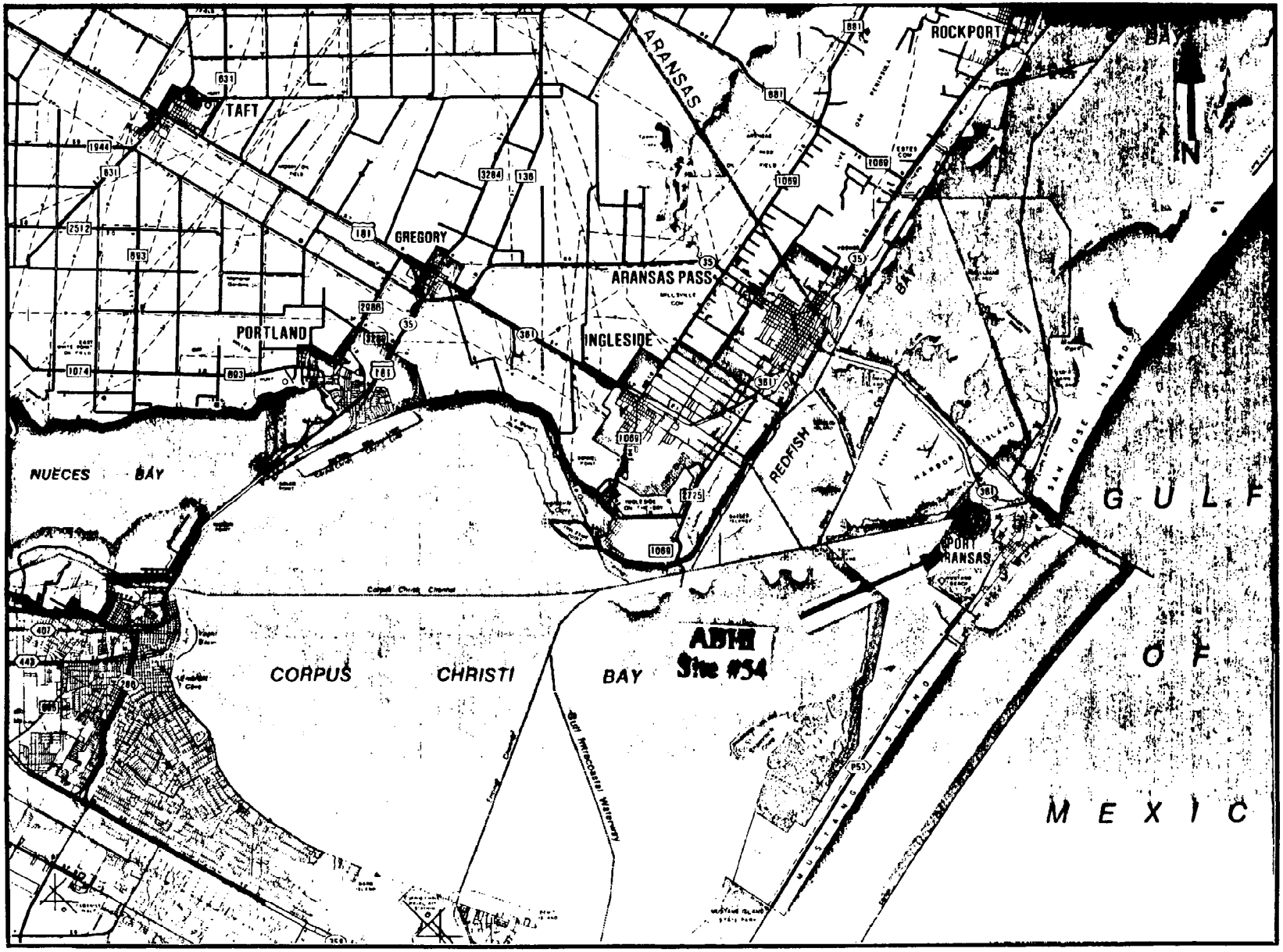
Oysters - hand
Sediment - hand

WATER DEPTH - intertidal, 0 - 0.4 m

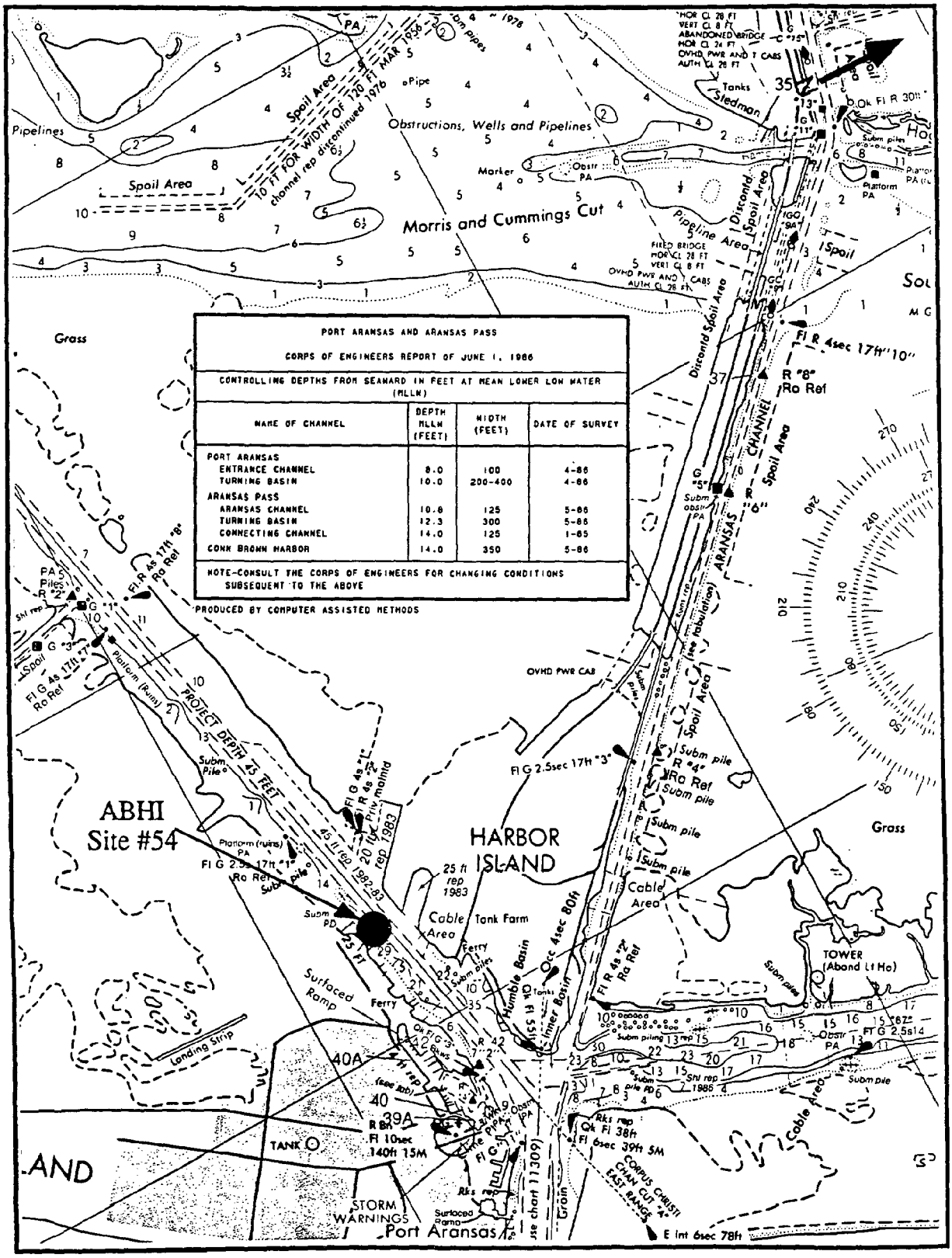
POSSIBLE CONTAMINANTS - Numerous potential sources of contamination existed at this site. Since it was located along the Corpus Christi Ship Channel, it received effluents from passing ships as well as non-point pollution from the nearby harbor at Port Aransas and industrial waste from Harbor Island.

ENVIRONMENTAL DATA

	Salinity (‰)	Temperature (°C)	Dates Sampled
YEAR III	30.0	10.0	13 January 1988



Site #54 (ABHI), Aransas Bay Harbor Island.



Site #54 (ABHI), Aransas Bay Harbor Island (from chart 11314).

SITE NUMBER - 5 **DESIGNATOR** - CBCR

SITE - COPANO REEF, COPANO BAY, TX

NOMINAL SITE CENTER - 28°08.47'N 97°07.67'W

LOCATED ON NOS CHART # - 11314

SITE ACCESS - The site is located on the north side of Copano Bay at Copano Point. A boat must be used to reach the site and is launched at Pouzee's Marina, at Lone Tree Point, Rockport. From Pouzze's, go northwest to Copano Reef, an exposed intertidal reef.

SITE DESCRIPTION - The reef ran southeast from Copano Point and was located around the white pole with Texas Parks and Wildlife marker "Copano Reef." This reef has been on the decline for the past five years. Oysters are small and sparse.

OYSTER COLLECTIONS

Years I & II - Station 1 was 100 m north of the Texas Parks and Wildlife marker, closest to the shoreline. Station 2 was adjacent to the marker. Station 3 was 100 m south of the marker. In the first two years of the project, there were abundant oysters which were collected by hand.

Year III - There were few live oysters due to prolonged freshwater conditions during the spring. Numerous oysters were present which had died during the past season, and no young oysters or spat were observed at the site in Year III.

Year IV - In Year IV, oysters were collected at the same locations as sampled the previous three years. Year IV oysters were very small and difficult to obtain.

Year V & VI - Oysters were collected along the same segment of the reef as previous years. Oysters were abundant this year.

Year VII - Oysters were collected along the same segment of the reef as in previous years. Oysters were not abundant. Most were very small and many were dead.

Year VIII - The reef was dead, so no oysters were collected.

Year IX - No live oysters were found on the reef this year. Lots of small mussels were found to be growing on all the dead oyster shells. MBAR (Ayres Reef, Mesquite Bay) was used as an alternate site for oyster sampling.

SEDIMENT COLLECTIONS

Years I, II, & III - Sediments were collected in subtidal areas in 1 to 1.5 m water and approximately 50 - 100 m west of the respective oyster sample area.

Years IV & VI - No sediments were sampled during these years.

Year V - Sediments for Station 1 were collected 50 m west of Oyster Station 1 in 1.5 m of water. Station 2 sediments were located 60 m west of the oysters. Station 3 sediments were 50 m west of station 3 in 1.5 m of water.

Years VII, VIII, & IX - No sediments were collected during these years.

SAMPLING METHOD

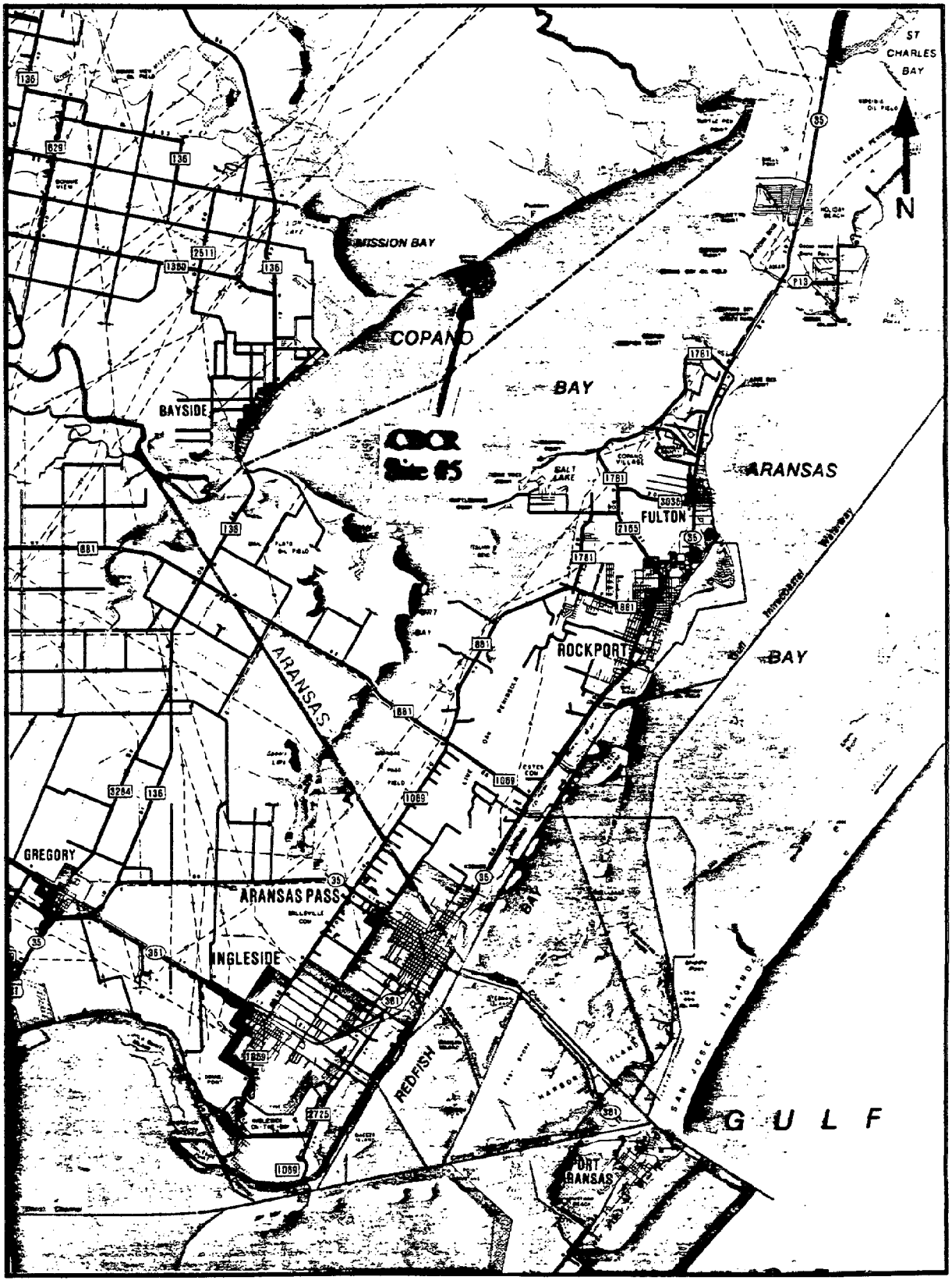
Oysters - hand
Sediment - boxcore

WATER DEPTH - intertidal, 0 to 0.5 m

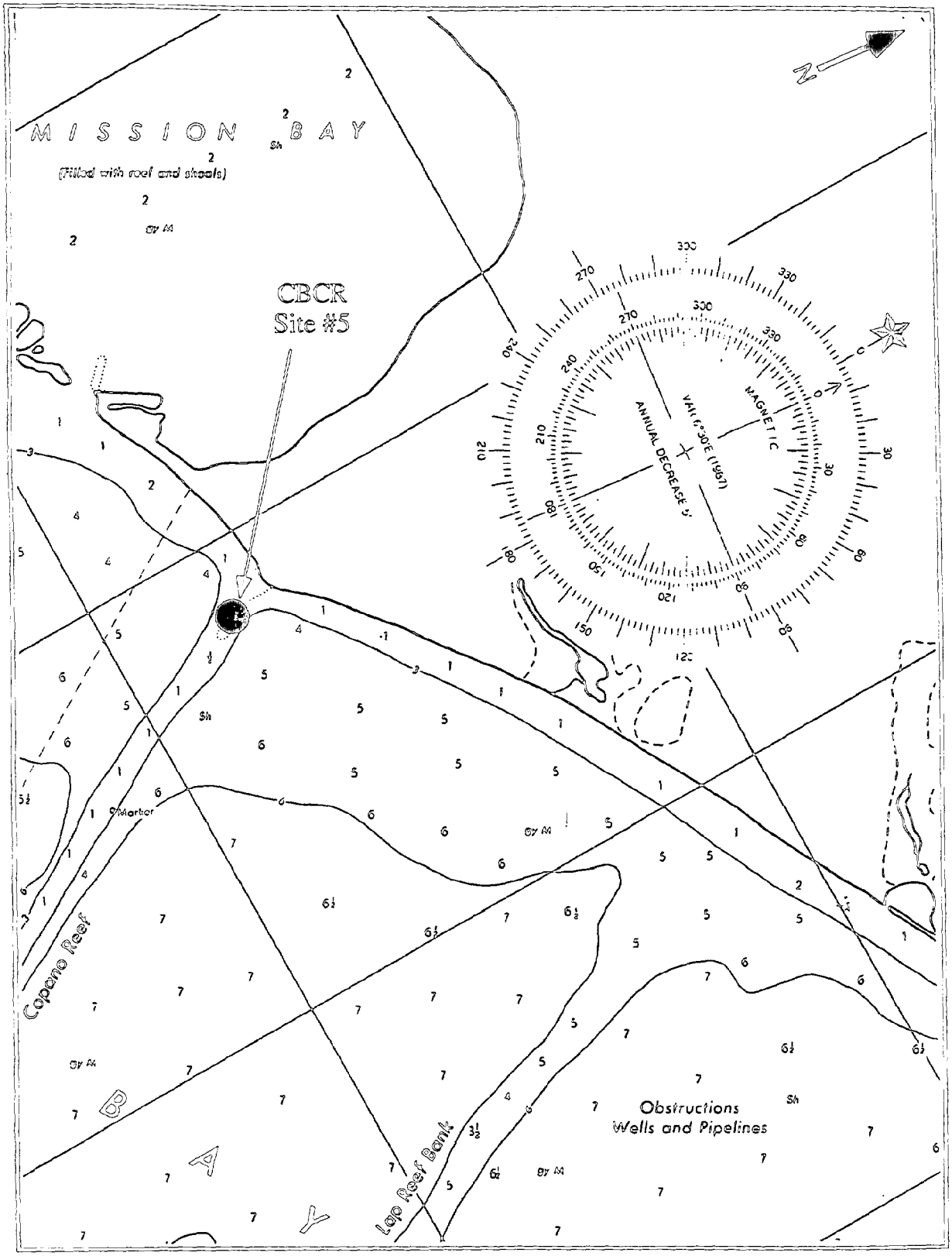
POSSIBLE CONTAMINANTS - There were no observable sources of contamination.

ENVIRONMENTAL DATA

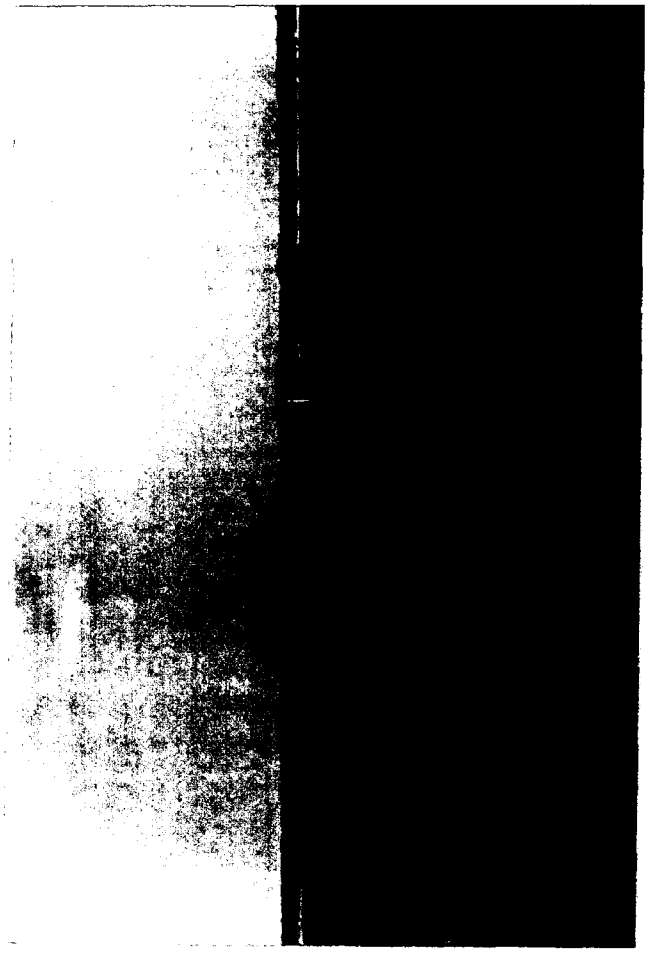
	Salinity (‰)	Temperature (°C)	Dates Sampled
YEAR I	16.2	17.0	25 January 1986
YEAR II	14.0	17.0	14 January 1987
YEAR III	20.0	9.0	13 January 1988
YEAR IV	29.0	15.0	15 December 1988
YEAR V	35.0	10.0	13 December 1989
YEAR VI	26.0	21.0	18 December 1990
YEAR VII	14.0	19.0	11 December 1991
YEAR VIII	14.0	15.0	16 December 1992
YEAR IX	16.0	18.0	15 December 1993

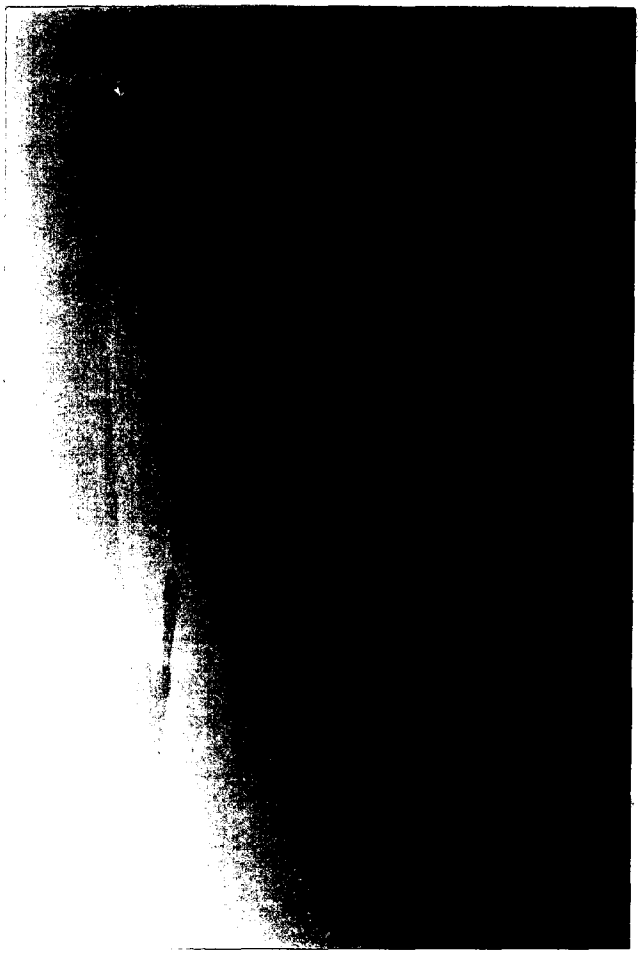


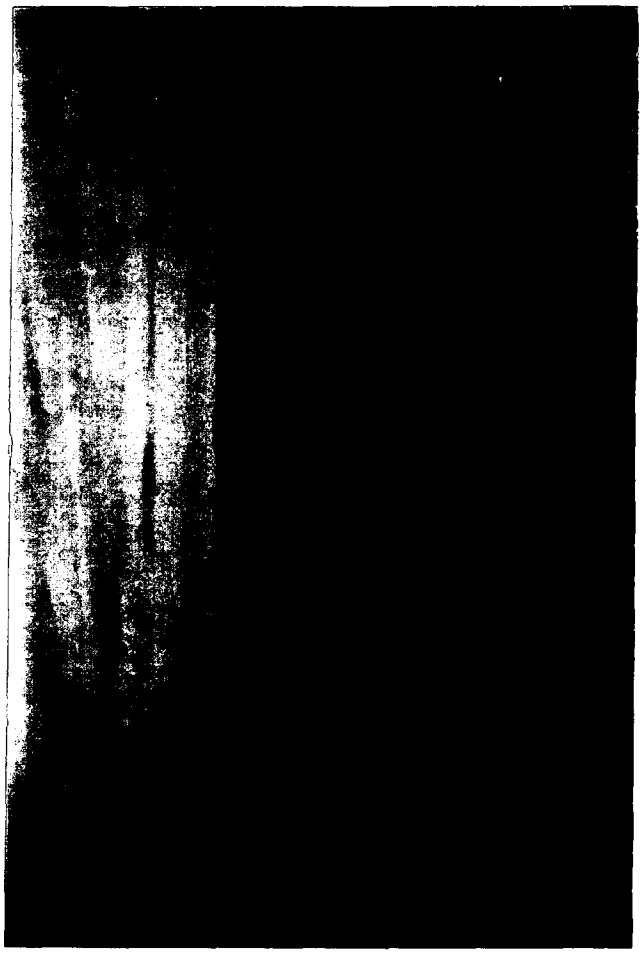
Site #5 (CBCR), Copano Bay Copano Reef.



Site #5 (CBCR), Copano Bay Copano Reef (from chart 11314).







SITE NUMBER - 6 **DESIGNATOR** - MBAR

SITE - AYRES REEF, MESQUITE BAY, TX

NOMINAL SITE CENTER - 28°10.15'N 96°49.95'W

LOCATED ON NOS CHART # - 11314

SITE ACCESS - The boat was launched at Fulton Beach, Texas, at the Sandollar Pavilion during Years I and II and the ICWW was followed northeast to channel marker 79. In Year III, the boat was launched at Goose Island State Park and in Years IV and V the boat was launched at Port O'Connor. Regardless of where the boat is launched, run time to the site is at least an hour in good weather.

SITE DESCRIPTION - This site was located on the north side of Mesquite Bay between Matagorda Island to the southeast and the Aransas National Wildlife Refuge to the north. The reef was oriented in a northwest-southeast direction and the site was located in the middle of the reef at Ayres Dugout.

OYSTER COLLECTIONS

Years I, II, III, IV, V, &VI - Oysters and sediments were collected by hand on the intertidal reef at the same stations each year. During some years, the reef silted over but oysters were still present. Station 1 was on the east end of the Dugout Cut. Station 2 was in the middle of the Dugout. Station 3 was on the west portion of the Dugout. There was an abundant supply of large oysters.

Year VII - Oysters were collected at the same stations described for previous years. This year oysters were mostly dead and there was little indication of reproduction.

Year VIII - No live oysters were found at last year's location, so the site was moved ~0.25 miles to the south. The site is located on a small brushy island with a red reflector on a post. Site coordinates (GPS) for this year's collection are Lat. 28° 09.82'N and Long. 96° 49.96'W.

Year IX - This site was not scheduled to be collected in 1993, but was used as an alternate to CBCR (Copano Reef, Copano Bay). The oysters were larger and more abundant, and were collected from the same stations as in Year VIII.

SEDIMENT COLLECTIONS

Years I, II, & III - Sediments were collected approximately 400 m to the northeast of the Dugout in Ayres Bay.

Years IV, V, VI, VII, VIII, & IX - No sediments were sampled during these years.

SAMPLING METHOD

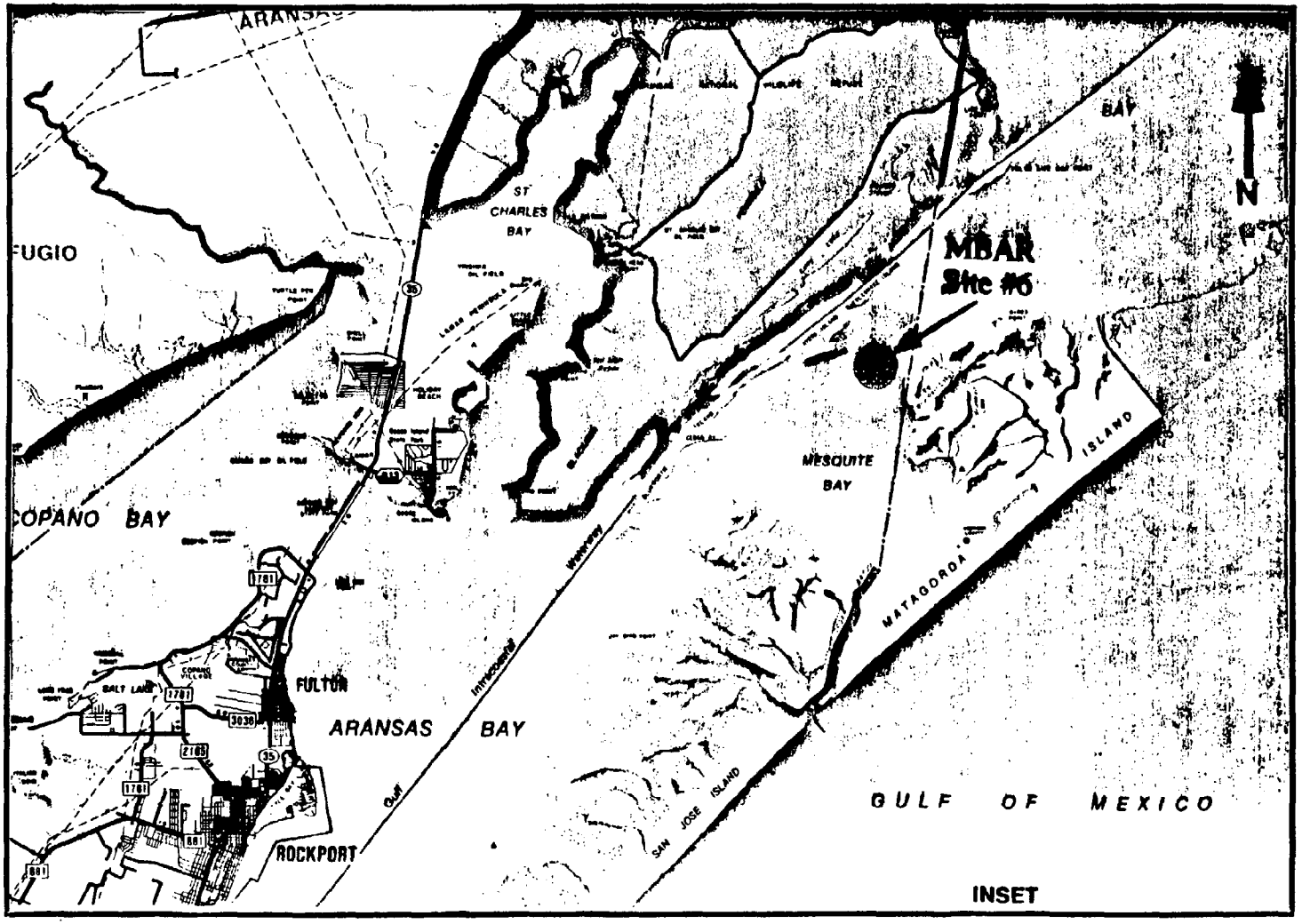
Oysters - hand
Sediment - box core

WATER DEPTH - intertidal, 0 to 1.0 m

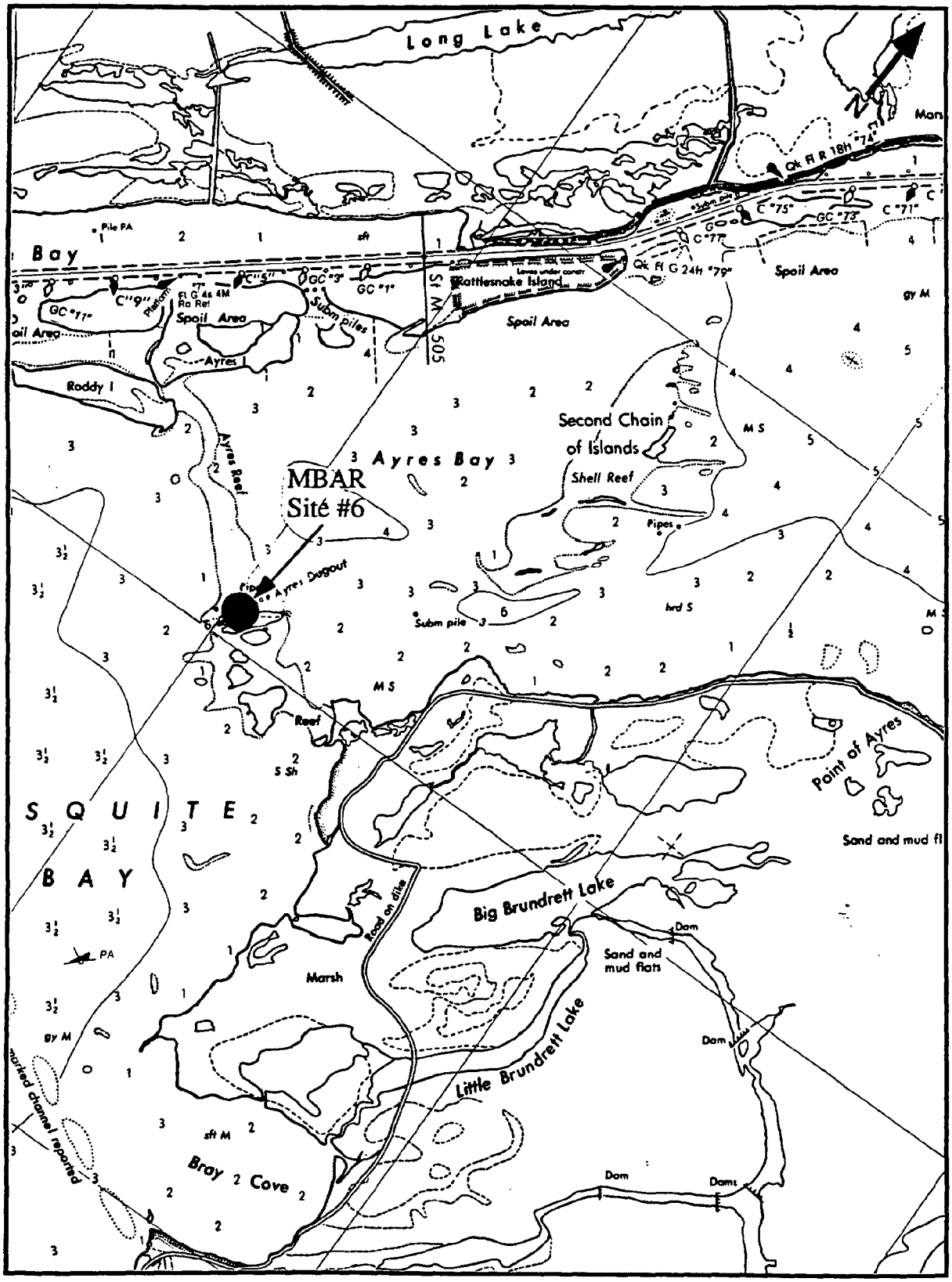
POSSIBLE CONTAMINANTS - No observable sources of contamination were present.

ENVIRONMENTAL DATA

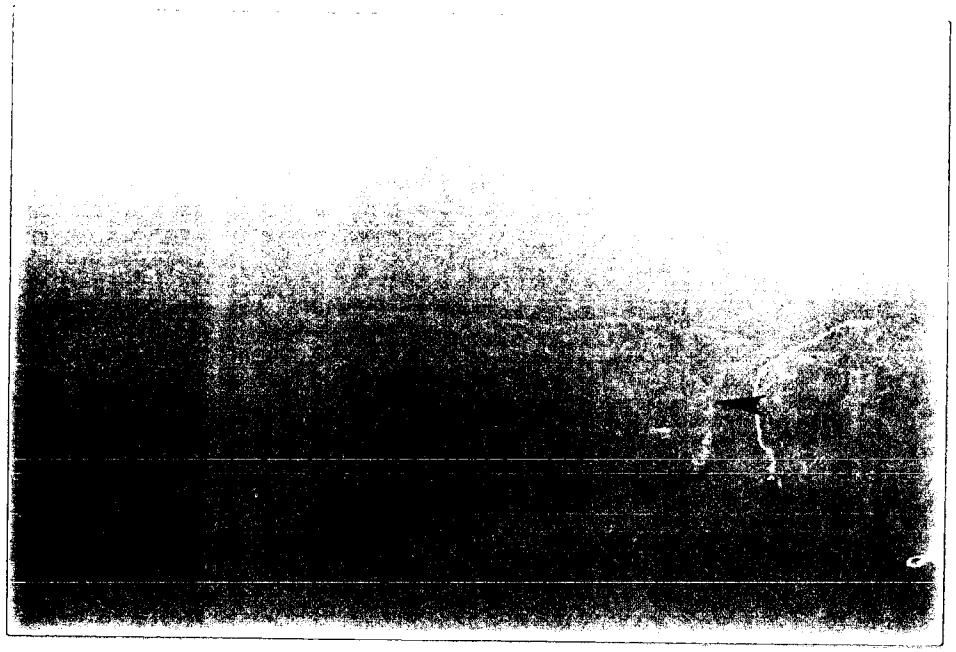
	Salinity (‰)	Temperature (°C)	Dates Sampled
YEAR I	16.0	13.0	28 January 1986
YEAR II	10.6	12.0	13 January 1987
YEAR III	27.0	8.0	14 January 1988
YEAR IV	24.0	15.0	15 December 1988
YEAR V	29.0	13.0	15 December 1989
YEAR VI	29.0	22.0	17 December 1990
YEAR VII	24.0	21.0	12 December 1991
YEAR VIII	20.0	15.0	16 December 1992
YEAR IX	24.0	13.0	15 December 1993

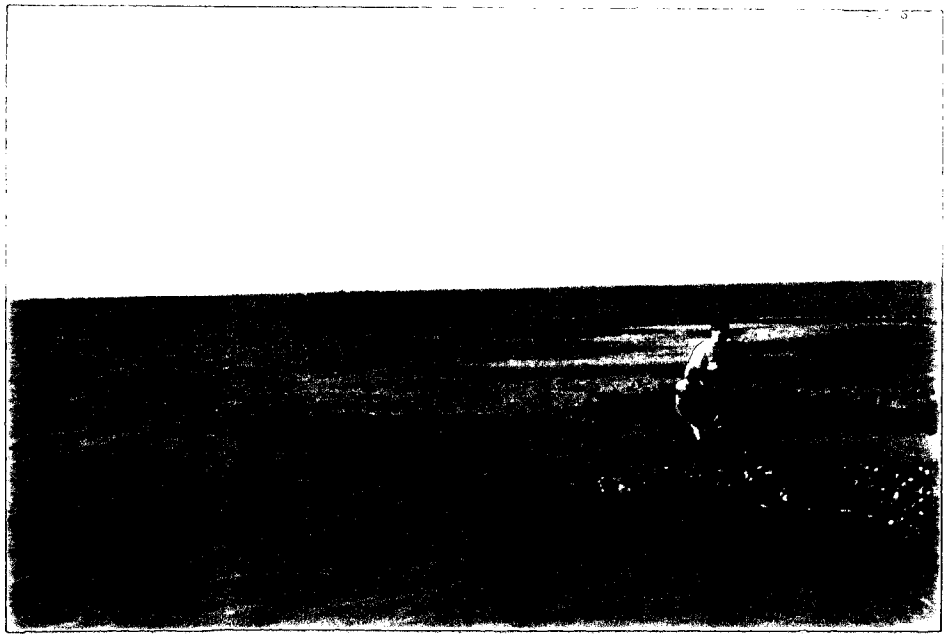


Site #6 (MBAR), Mesquite Bay Ayres Reef.



Site #6 (MBAR), Mesquite Bay Ayres Reef (from chart 11315).





SITE NUMBER - 7 **DESIGNATOR** - SAPP

SITE - PANTHER PT. REEF, SAN ANTONIO BAY, TX

NOMINAL SITE CENTER - 28°14.00'N 96°42.55'W

LOCATED ON NOS CHART # - 11315

SITE ACCESS - To reach the site a boat is launched at Seadrift (Haynies Seafood or the Public Ramp at Swan Point), Port O'Connor (Doc's Doc) or Port Lavaca. Run time by boat from Seadrift is 30 min, 2 to 3 hours from Port Lavaca, and 1 hour from Port O'Connor. Do not use the Swan Point ramp at low tide - as the area is very shallow. The site is located on the reef that extends to the northwest off of Panther Point.

SITE DESCRIPTION - This submerged reef was located 300 to 400 m from a production platform at a bearing of 260° and 100 m from the black and white PVC pole marking the top of the reef. This subtidal reef was located to the northeast and east side of the white plastic pole off the northwest end of Panther Point. Oysters and moderately dense "grass beds" were widely dispersed on the sandy bottom.

OYSTER COLLECTIONS

Years I & II - Samples during Years I and II were collected by dredge but could be collected by tongs in calm weather. Oysters were numerous in the first two years. Station distinctions were not made.

Year III - There were no oysters present at this site or any of the reefs in the nearby areas. Local and state biologists reported that all of the reefs were dead due to prolonged freshwater conditions during the spring. The submerged seagrasses and seaweeds normally present were absent.

Year IV - As in Year III, there were no collectible oysters present due to the massive die-off in the San Antonio and Lavaca Bays in the spring of 1987. Spat in the size range of 0.5 to 0.75" were observed but were not numerous. In the absence of another major physical stress, there will probably be oysters next year.

Year V - Station 1 was on the submerged reef on a bearing of 280° to the production platform. The bottom was shell with sandy silt. Oysters were tonged. Station 2 was 100 m to the southeast (bearing 150°) between the two white poles on the west side of the reef. The site was subtidal but the oysters were collected by hand in water only 0.2 m deep. Station 3 was another 200 m south (bearing 150°). Oysters were tonged at this location. Oysters at all three stations were mixed with abundant shell and marine algae.

Year VI - Oysters from all three stations were collected by hand at Year V's Station 2. All stations were collected in one location due to broken oyster tongs.

Year VII - Oysters were collected with a dredge from the top of the submerged reef. Collections were made at the same locations described for Year V. Station 1 was on the North end of the reef. Station 2 was on the midsection in shallow water. Station 3 was on the south end of the reef.

Year VIII - Oysters were very scarce at this reef. All the oysters were collected along the reef top near station 2. Stations were not distinguished due to the small number of oysters present.

Year IX - Oysters were abundant again this year and easily collected. The samples were dredged from the same stations as those in Year V.

SEDIMENT COLLECTIONS

Years I, II, & III - Sediments were collected at the same stations where oysters were located.

Years IV, V, VI, VII, VIII, & IX - No sediments were sampled during these years.

SAMPLING METHOD

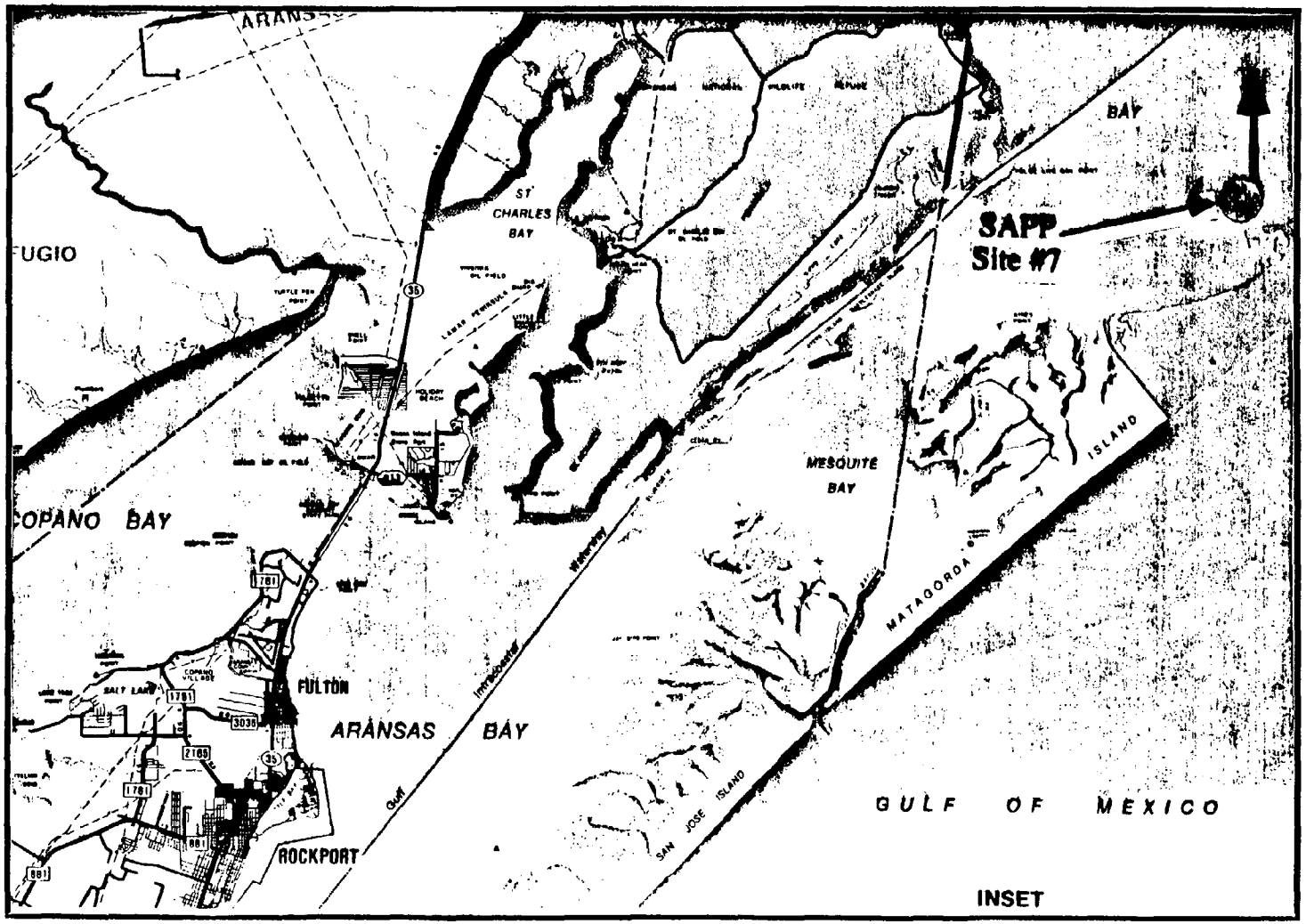
Oysters - dredge, tongs, and hand
Sediment - box core

WATER DEPTH - subtidal, 0.2 to 1.5 m.

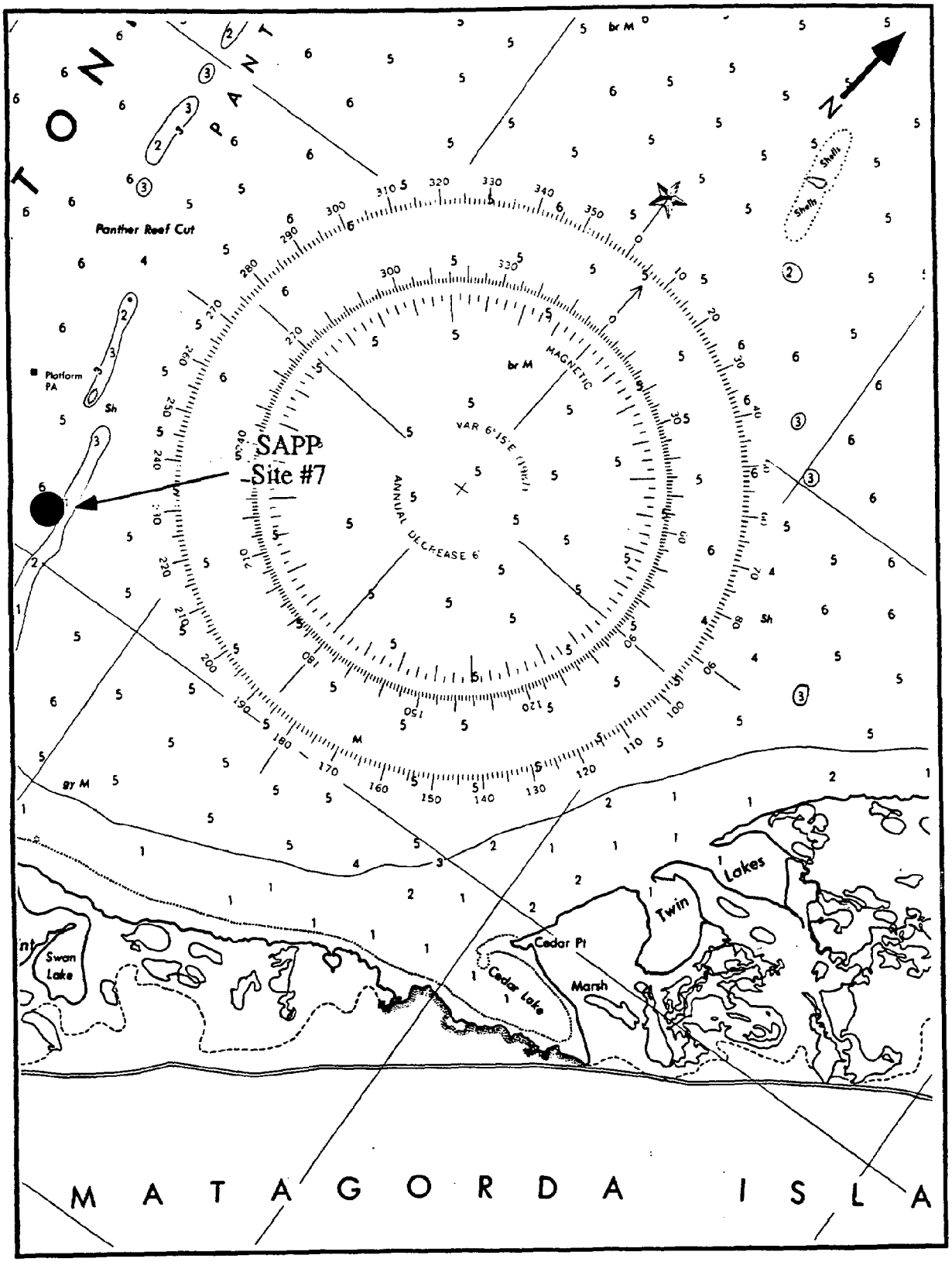
POSSIBLE CONTAMINANTS - A nearby possible source of contamination was an oil or gas platform bearing 260° from the reef, 0.25 to 0.5 mile distant.

ENVIRONMENTAL DATA

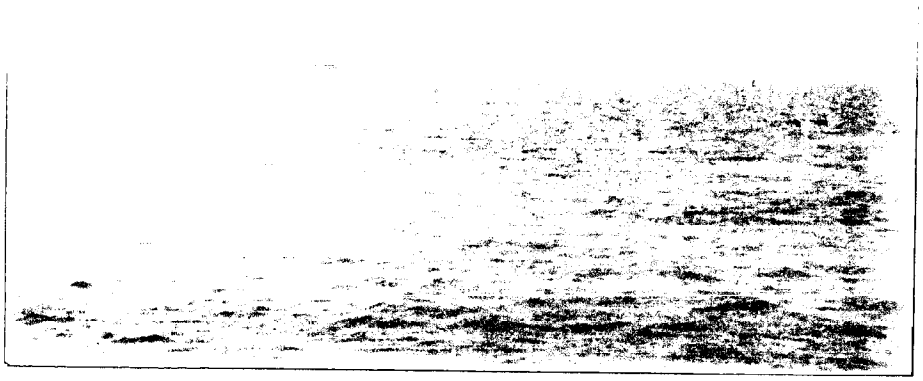
	Salinity (‰)	Temperature (°C)	Dates Sampled
YEAR I	18.6	18.0	February 1986
YEAR II	5.0	12.0	15 January 1987
YEAR III	30.0	8.0	13 January 1988
YEAR IV	21.0	12.0	15 December 1988
YEAR V	24.4	10.0	15 December 1989
YEAR VI	26.0	19.0	17 December 1990
YEAR VII	21.3	22.0	11 December 1991
YEAR VIII	20.0	14.0	16 December 1992
YEAR IX	24.0	15.0	15 December 1993

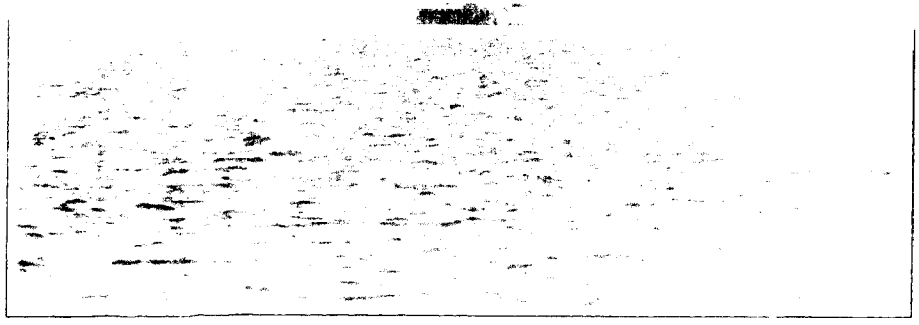


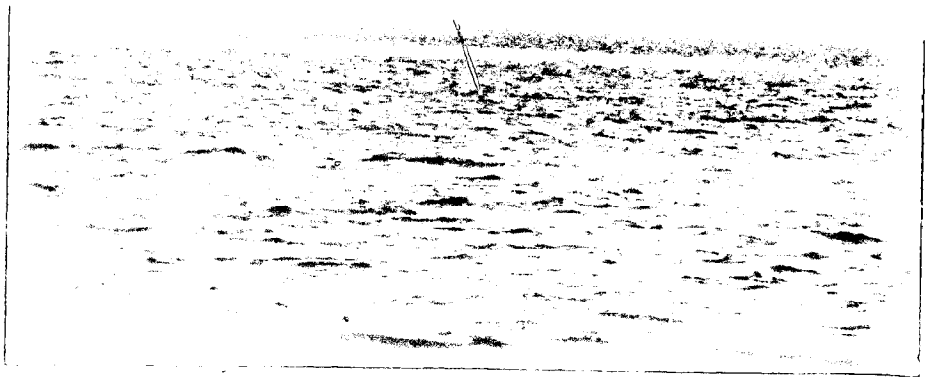
Site #7 (SAPP), San Antonio Bay Panther Point Reef .



Site #7 (SAPP), San Antonio Bay Panther Point Reef (from chart 11315).







SITE NUMBER - 8 **DESIGNATOR** - SAMP

SITE - MOSQUITO POINT, SAN ANTONIO BAY, TX

NOMINAL SITE CENTER - 28°20.65'N 96°42.78'W

LOCATED ON NOS CHART # - 11315

SITE ACCESS - Access is by boat launched at Seadrift (Haynies Seafood or the Public Ramp at Swan Point), Port O'Connor or Port Lavaca. Run time by boat from Seadrift is 30 min, 2 to 3 hours from Port Lavaca, or 1 hour from Port O'Connor. From Swan Point, near Seadrift, exit the channel which is very shallow at low tide and proceed southeast in the Victoria Barge Canal to channel marker 15. At marker 15, turn southwest to the exposed reef. There are no landmarks on shore for reference.

SITE DESCRIPTION - The site was located off Mosquito Point west of the Victoria Barge Canal and southwest of channel marker 15. Oysters were collected on the exposed intertidal reef. A six legged wooden platform was located 80 m to the southeast of the reef.

OYSTER COLLECTIONS

Years I & II - Oysters were abundant at this location during Years I and II. Station 1 was at the midpoint of the exposed reef, Station 2 was 150 yds south on the west side, and Station 3 was another 200 yds south of Station 2. In Year II, the station order was reversed with Station 1 on the west end of the reef, Station 2 was 200 ft to the east, and Station 3 was another 200 ft east.

Year III - In Year III, there were no live oysters present on the reef and no spat or young oysters were observed.

Year IV - As in Year III, there were no live oysters present due to the massive die-off in the San Antonio and Lavaca Bays in the spring of 1987.

Year V - Still no oysters alive on this reef. No samples were collected this year.

Year VI - Oysters were again present. Collections were made on the reef southeast of Mosquito Point. Station 1 was on the north end of the reef, Station 2 was on the middle part of the exposed reef, and Station 3 was on the southwest end of the reef.

Year VII - Oysters were collected at the same locations described last year. Oysters were much more abundant this year.

Year VIII - The reef was dead; therefore no oyster samples were available this year.

Year IX - The site was not sampled this year.

SEDIMENT COLLECTIONS

Years I and II - Sediments were collected in subtidal areas adjacent to the oyster stations from mud and sand bottom in Years I and II. Station 1 was on the west side 10-50 feet out. Station 2 was 50 yards south of Station 1 (intertidal) and 200 yards south was Station 3.

Year III - Sediment samples were collected from soft sandy mud bottom over shell hash approximately 100 to 200 m north of the reef in 1 to 1.5 m of water.

Years IV, V, VI, VII, VIII, & IX - No sediments were sampled during these years.

SAMPLING METHOD

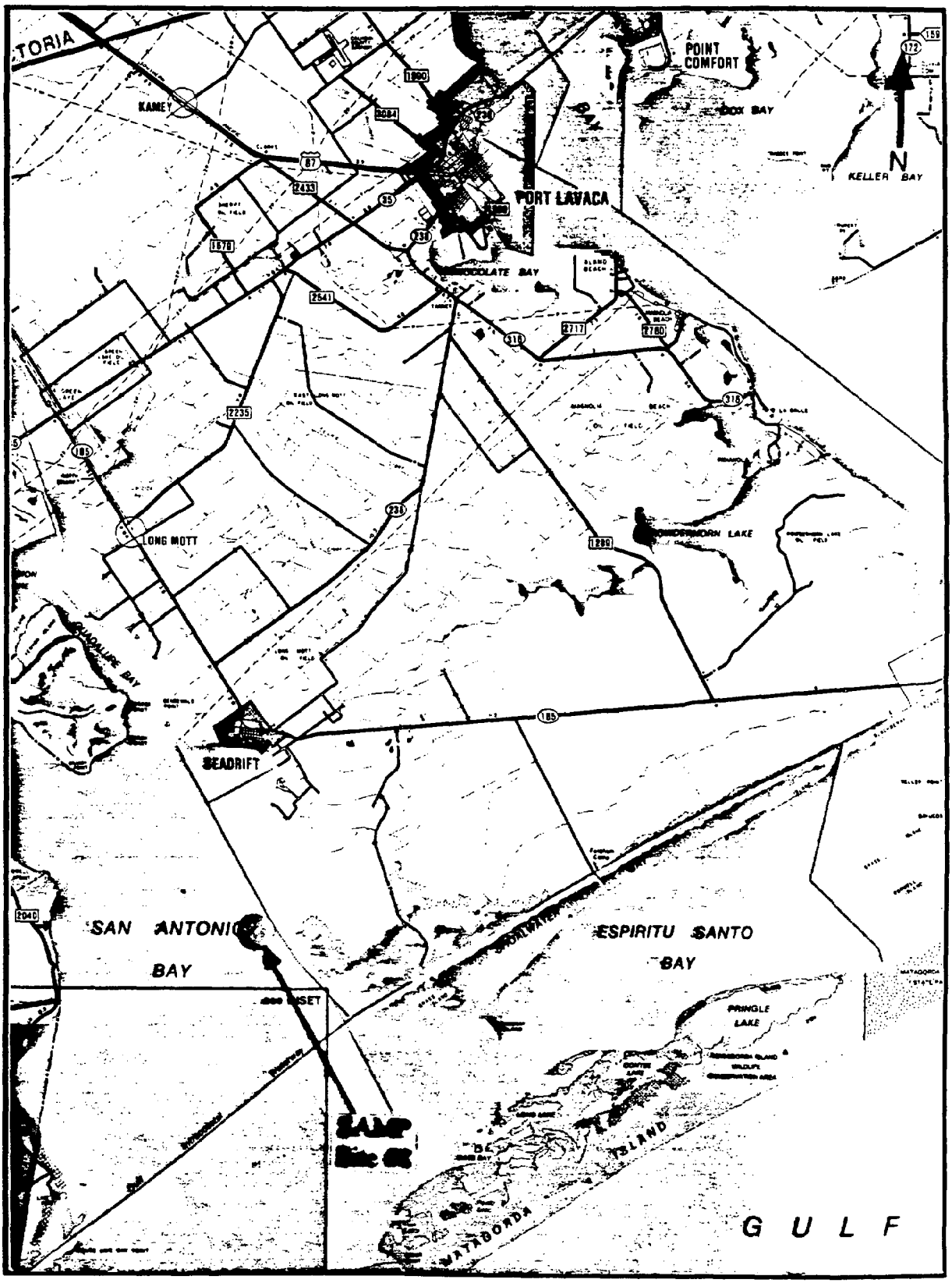
Oysters - hand
Sediment - box core

WATER DEPTH - intertidal, 0 - 0.5 m

POSSIBLE CONTAMINANTS - No contaminants were observed but the potential for contamination existed since the site was located within a half mile of the Victoria Barge Canal.

ENVIRONMENTAL DATA

	Salinity (‰)	Temperature (°C)	Dates Sampled
YEAR I	14.0	20.0	2 February 1986
YEAR II	-	12.0	14 January 1987
YEAR III	21.0	8.0	14 January 1988
YEAR IV	23.0	16.0	14 December 1988
YEAR V	24.3	10.0	15 December 1989
YEAR VI	25.0	19.0	18 December 1990
YEAR VII	18.0	20.0	11 December 1991
YEAR VIII	15.0	14.0	16 December 1992



Site #8 (SAMP), San Antonio Bay Mosquito Point.

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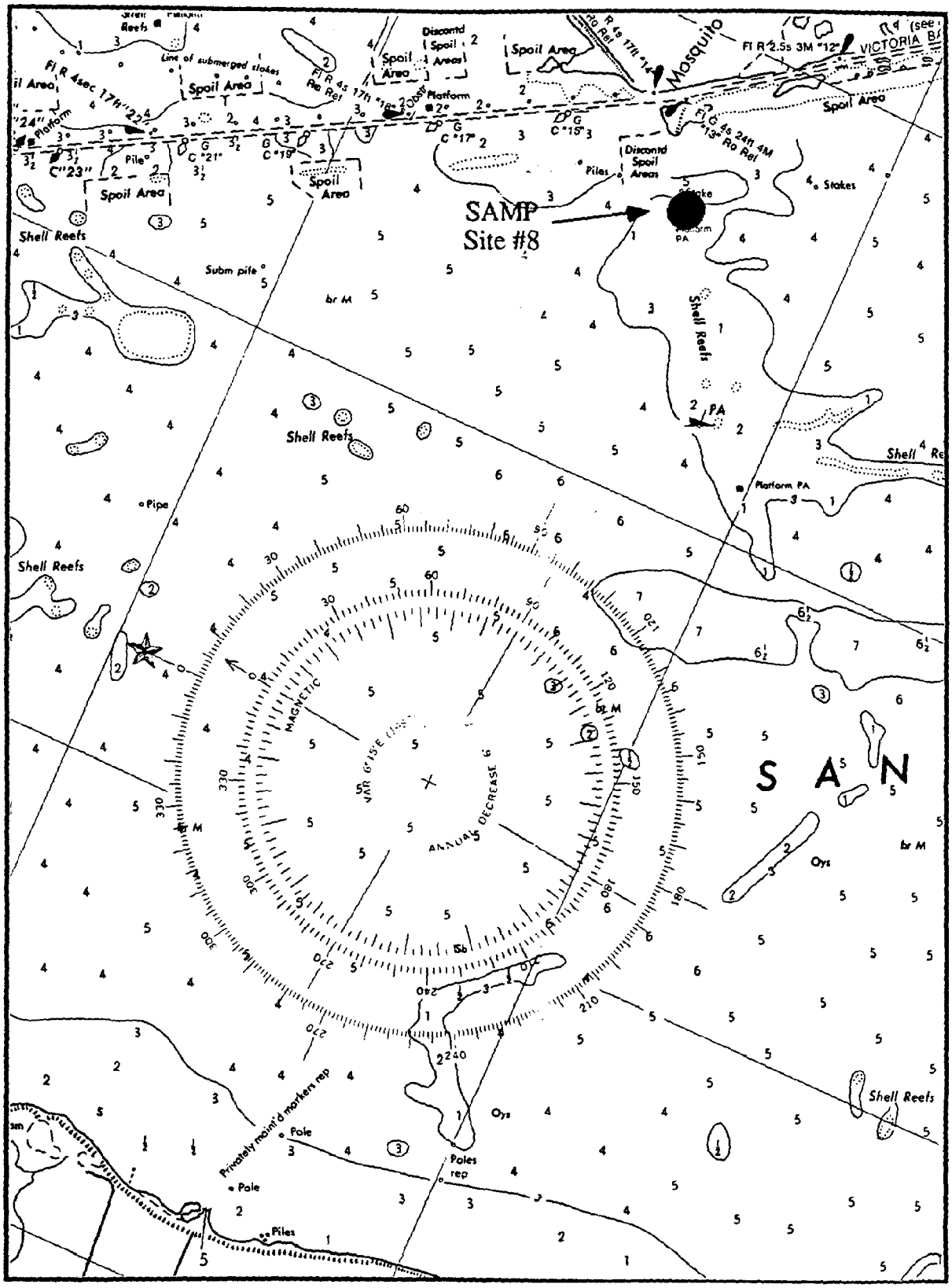
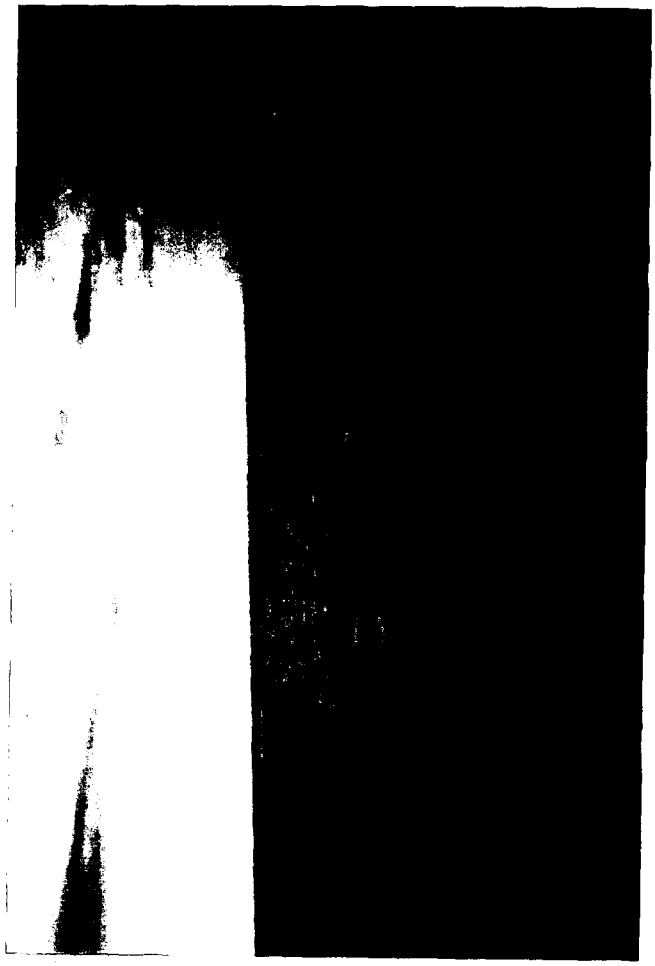
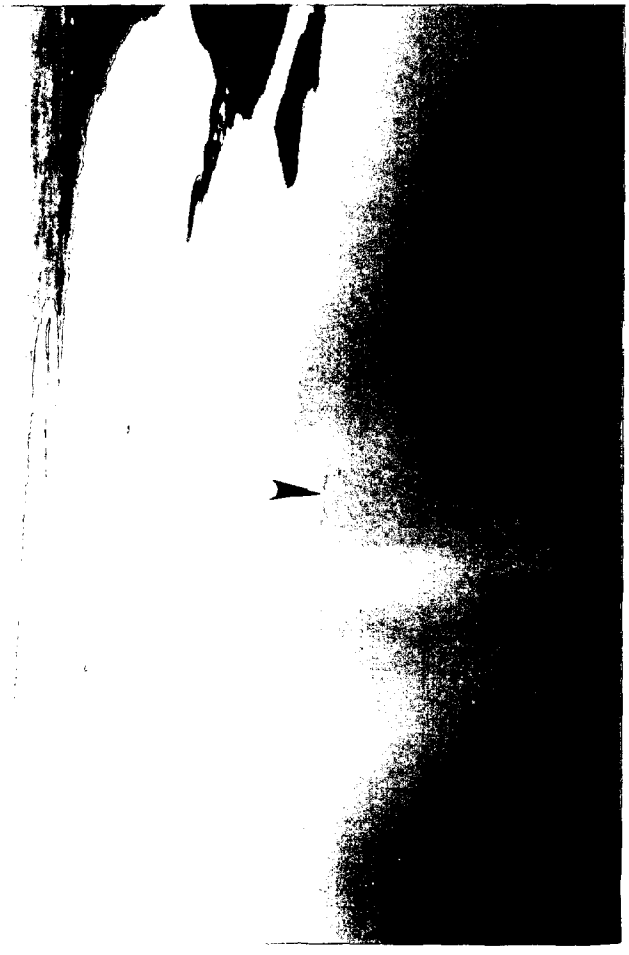


Site #8 (SAMP), San Antonio Bay Mosquito Point (from chart 11315).





SITE NUMBER - 9 **DESIGNATOR** - ESSP

SITE - SOUTH PASS REEF, ESPIRITU SANTO, TX

NOMINAL SITE CENTER - 28°17.90'N 96°37.33'W

LOCATED ON NOS CHART # - 11315, 11319

SITE ACCESS - The site is accessed by boat launched at Swan Point, near Seadrift. Proceed southeast on the Victoria Barge Canal to the ICWW and then east to the site. Alternate launch points are Snapper Snatcher dock or Doc's Doc in Port O'Connor. South Pass Island, a few hundred meters to the southeast of the site, is an oil production site and has a compressor station and buildings. Approximate time to the site is 0.75 hrs.

SITE DESCRIPTION - The site was located between Grass Island on the north and Steamboat Island on the south. The site was composed of a series of low exposed reefs at 105° from pumping station, 240° from water tower and 150° from southeastern most point of Steamboat Island. The sample area was an intertidal reef.

OYSTER COLLECTIONS

Years I & II - Oyster collection areas were 100 m apart on a north-south line along the exposed reef. Oysters were abundant during both years.

Year III - In Year III, there were no oysters present. Texas Parks and Wildlife biologists reported that the reefs in Espiritu Santo Bay had died due to excessive freshwater inflow during the spring and summer periods.

Year IV - As in Year III, there were no collectible oysters present in Year IV due to the massive die-off in the San Antonio and Lavaca Bays in the spring of 1987. Spat were observed but were not numerous. In the absence of another physical stress, there will probably be oysters next year.

Years V & VI - Oyster were present in adequate numbers. Station 1 was on the reef which was northwest of the tanks and west of the island where station 3 was located. The three tanks at the production facility were located on a bearing of 130°. Station 2 was north of the production station, to the east of Station 1 on the same island. It was 180° to the channel marker pole and the top of the small island was to the west. Station 3 was northeast of the tanks on the end of the island with the top always exposed and in line with the island with the Yuccas. There were abundant shell, shell hash, and small oysters with attached marine algae.

Year VII - Collection sites were in the same locations as the last two years.

Year VIII - The reef was dead; therefore, no oysters were collected.

Year IX - Oysters were present again this year, and collected from the same stations as used in Years V through VII.

SEDIMENT COLLECTIONS

Years I, II, & III - Sediments were taken from subtidal mud 500-1000 m to the north at three random stations in all years. Sediments were loose gray muds overlain with loose brown mud.

Years IV, V, VI, VII, VIII, & IX - No sediments were sampled during these years.

SAMPLING METHOD

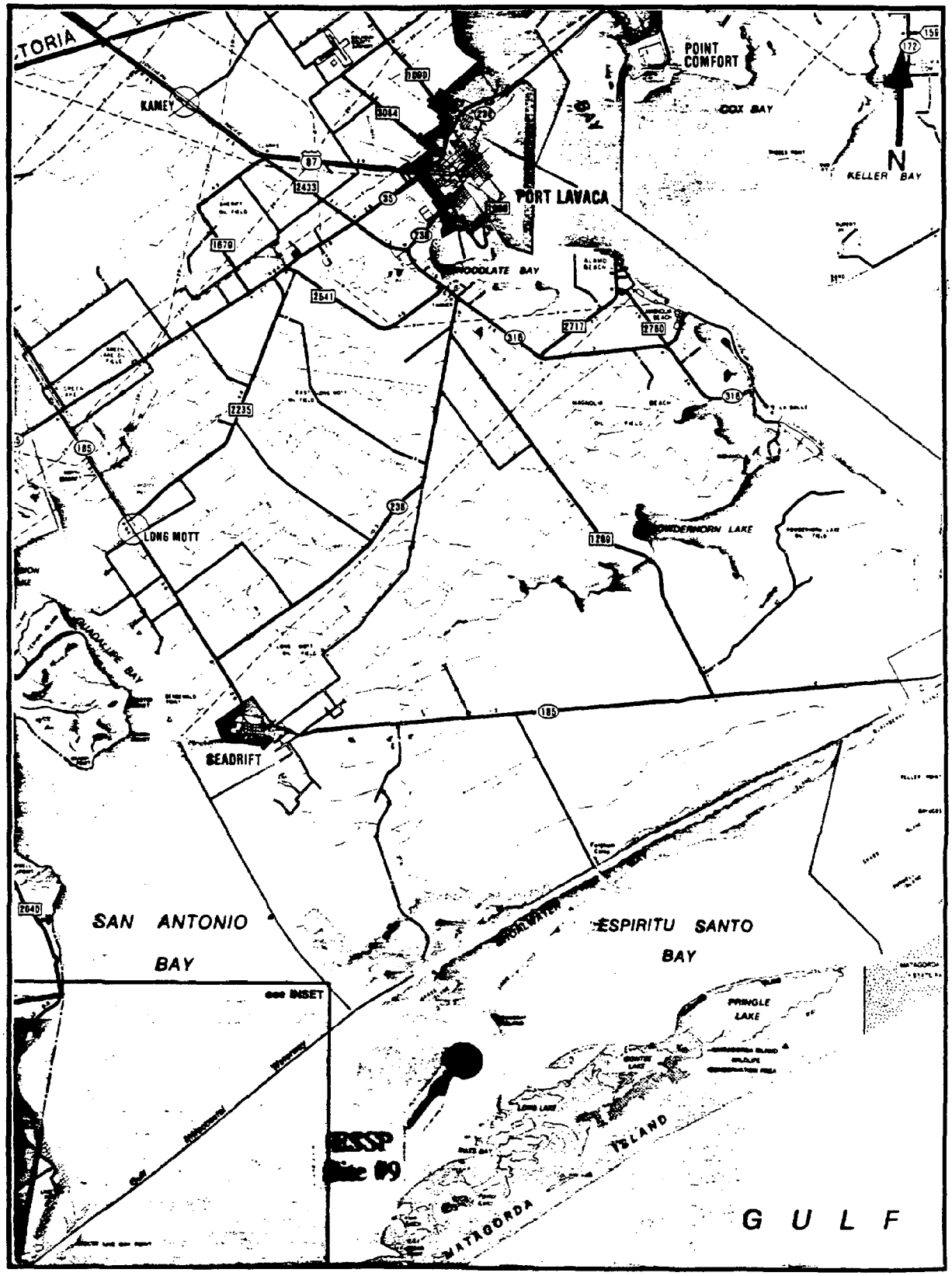
Oysters - hand
Sediment - box corer

WATER DEPTH - intertidal, 0.1 - 0.5 m

POSSIBLE CONTAMINANTS - Contamination factors included oil and gas pipelines and marine traffic.

ENVIRONMENTAL DATA

	Salinity (‰)	Temperature (°C)	Dates Sampled
YEAR I	22.0	17.0	1 February 1986
YEAR II	9.1	12.0	15 January 1987
YEAR III	37.0	10.0	13 January 1988
YEAR IV	30.0	15.0	15 December 1988
YEAR V	30.0	11.0	15 December 1989
YEAR VI	30.0	21.5	17 December 1990
YEAR VII	27.6	21.0	11 December 1991
YEAR VIII	-	14.0	16 December 1992
YEAR IX	25.0	17.0	16 December 1993



Site #9 (ESSP), Espiritu Santo South Pass Reef.

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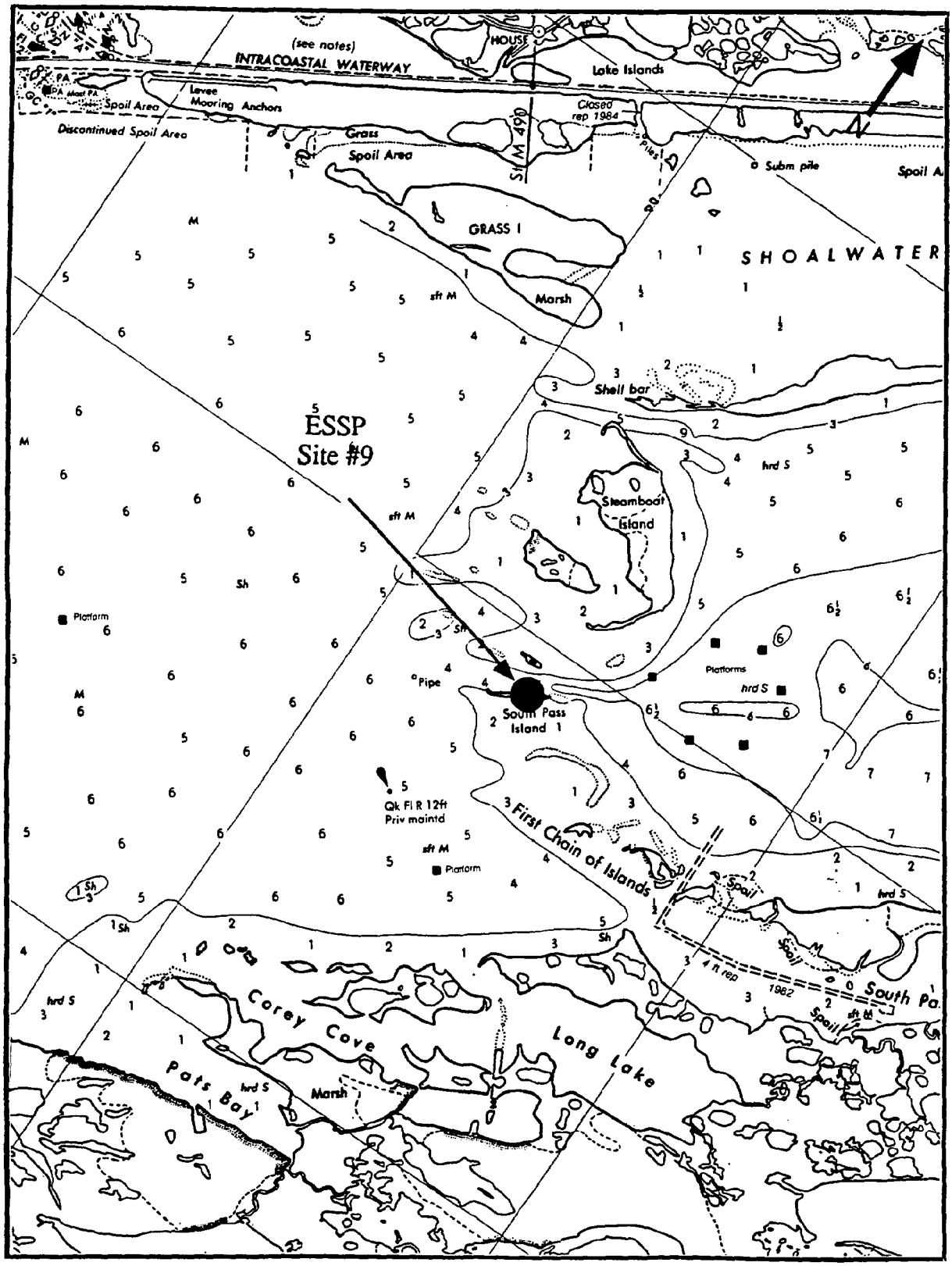
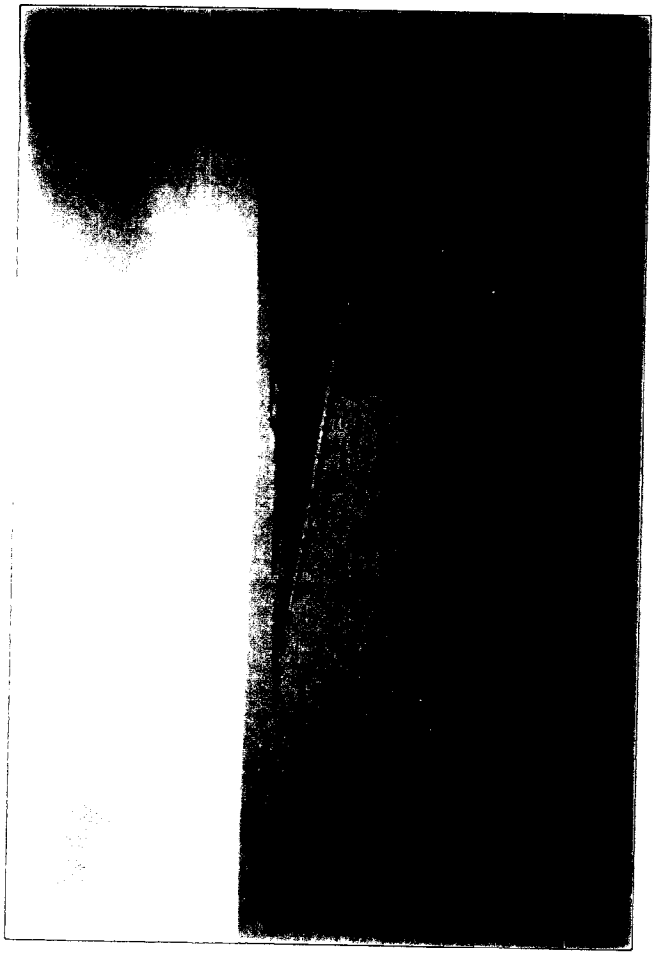
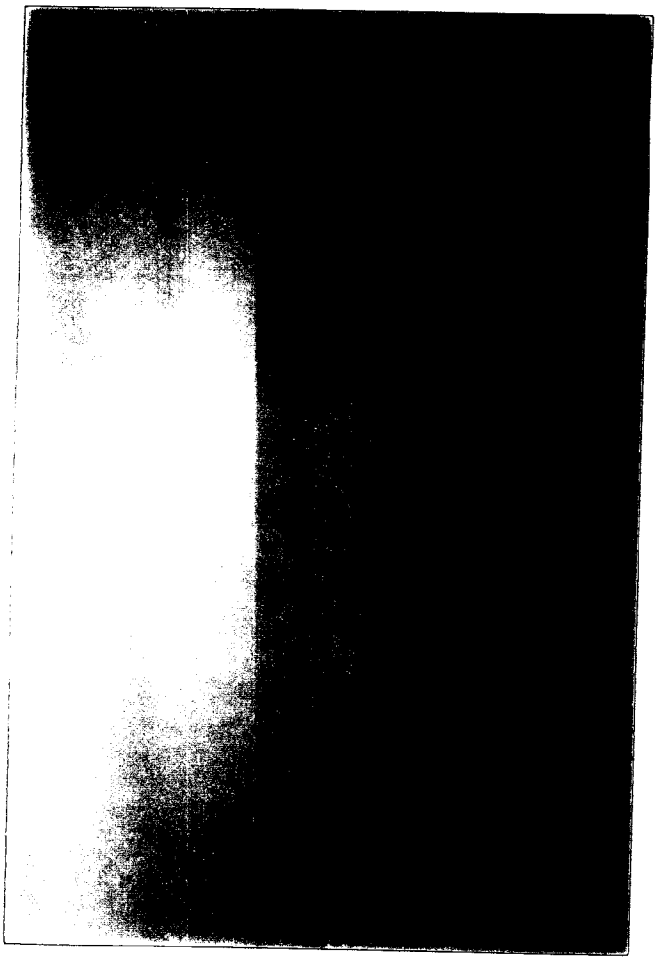
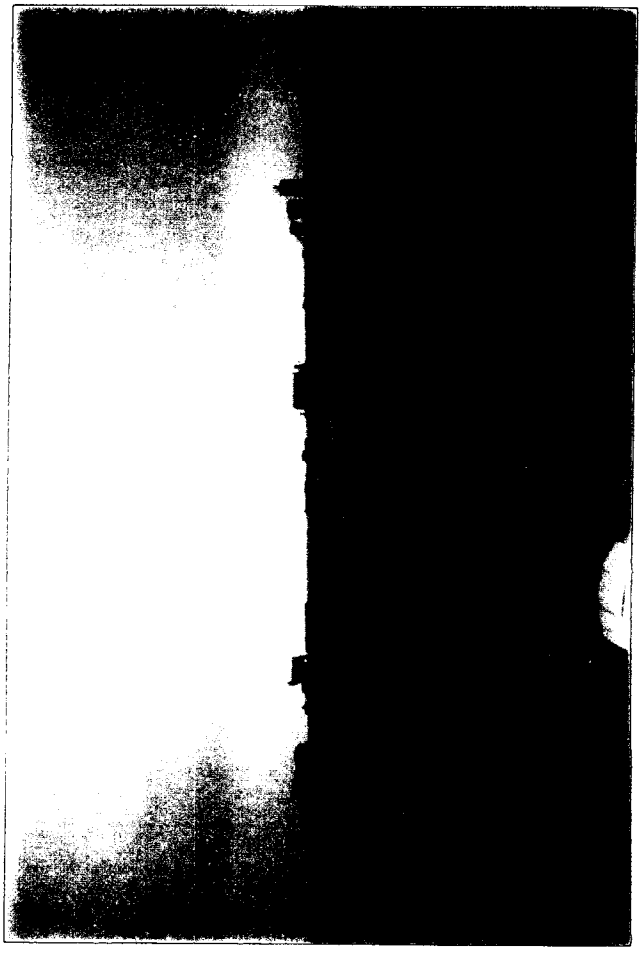


Site #9 (ESSP), Espiritu Santo South Pass Reef (from chart 11315).







SITE NUMBER - 10 **DESIGNATOR** - ESBD

SITE - BILL DAYS REEF, ESPIRITU SANTO, TX

NOMINAL SITE CENTER - 28°24.85'N 96°26.27'W

LOCATED ON NOS CHART # - 11315, 11319

SITE ACCESS - Access to the site is from Port O'Connor via the ICWW to Espiritu Santo Bay.

SITE DESCRIPTION - The site was located at Bill Days Reef which was in Barroom Bay south of Port O'Connor. The reef was oriented almost east-west. During the first two years of the study there were no live oysters.

OYSTER COLLECTIONS

Years I & II - The site was visited both in 1986 and 1987 and no living oysters were found.

Year III - During Year III, live oysters were found. Oysters were collected by hand on the exposed portion of the south side of Bill Days Reef in intertidal water near the northernmost duck blind at the east end of the reef. No distinct stations were established. Oysters were very small but were numerous. Abundant spat were present.

Year IV - Oysters were again present with small oysters in clumps on dead shells. In Year IV, stations were established. Station 1 was on the west end of the reef at bearing of 360° to Port O'Connor water tower; 340° to Milchem tanks; 250 m south of the reef; Station 2 was 100 m to the east in the center of the reef on a line with the west end of Bill Days Reef and the tall tower to the west; and Station 3 was 50 m to the east.

Year V - Stations which were established in Year IV were sampled again. Oysters were abundant but small.

Year VI - No oysters were present in the required size range but a few 1 to 2 cm oysters were present. Collections were not made at this site.

Years VII & VIII - Oysters were present in adequate numbers for sampling, but were not very abundant.

Year IX - Oysters were abundant this year, and collected from the same stations as in Years VII & VIII.

SEDIMENT COLLECTIONS

Years I, II, & III - Sediments were composed of loose gray silt over gray sandy clay and were collected adjacent to the reef each year.

Years IV, V, VI, VII, VIII, & IX - No sediments were sampled during these years.

SAMPLING METHOD

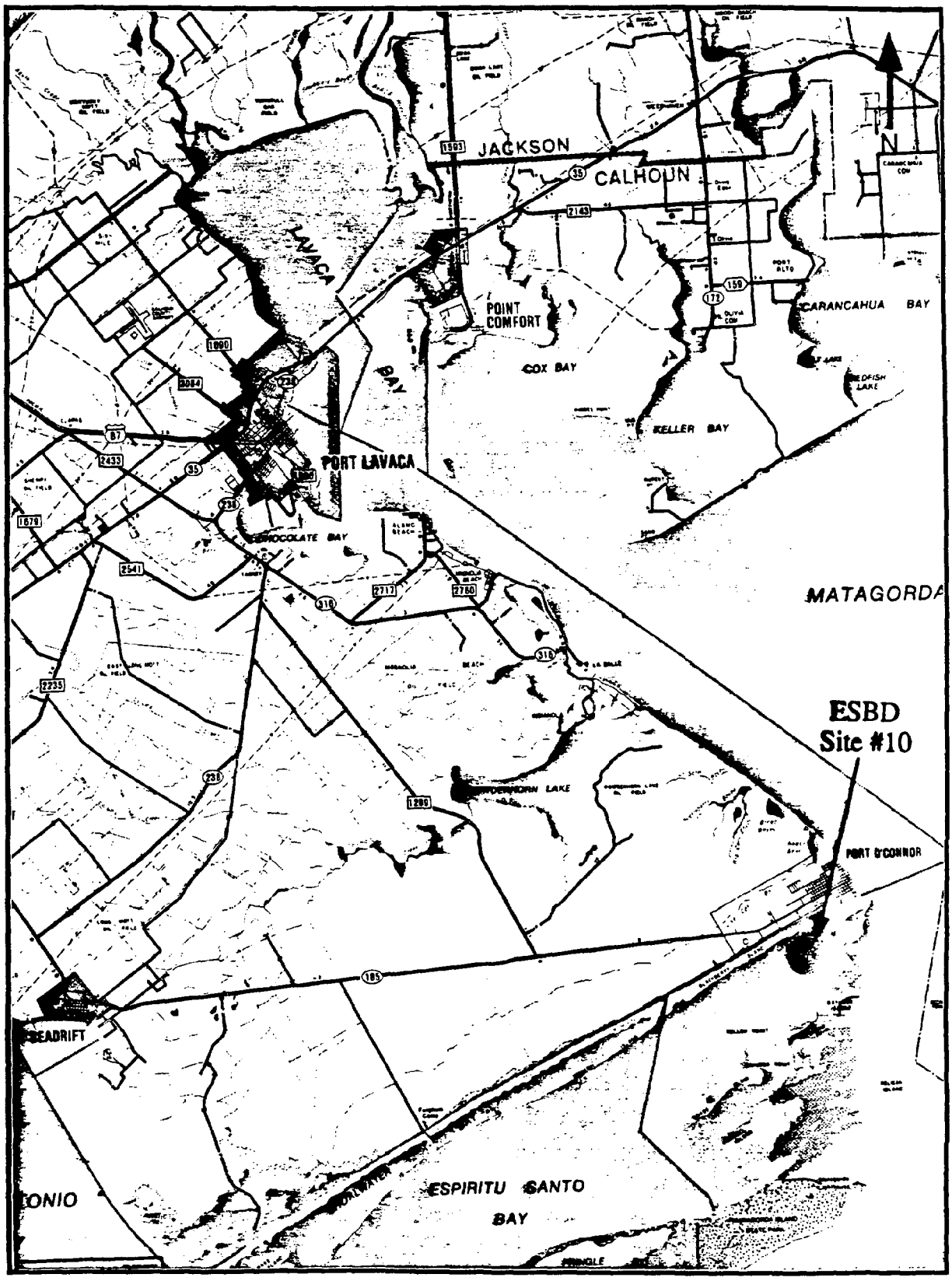
Oysters - hand
Sediment - hand

WATER DEPTH - intertidal, 0.3 m

POSSIBLE CONTAMINANTS - No observable sources of contamination were found.

ENVIRONMENTAL DATA

	Salinity (‰)	Temperature (°C)	Dates Sampled
YEAR I	28.0	21.0	1 February 1986
YEAR II	25.6	15.0	15 January 1987
YEAR III	36.0	8.0	14 January 1988
YEAR IV	34.0	16.0	14 December 1988
YEAR V	34.0	14.0	16 December 1989
YEAR VI	-	18.0	19 December 1990
YEAR VII	30.0	20.0	11 December 1991
YEAR VIII	30.0	16.0	17 December 1992
YEAR IX	30.0	16.0	16 December 1993



Site #10 (ESBD), Espiritu Santo Bill Days Reef.

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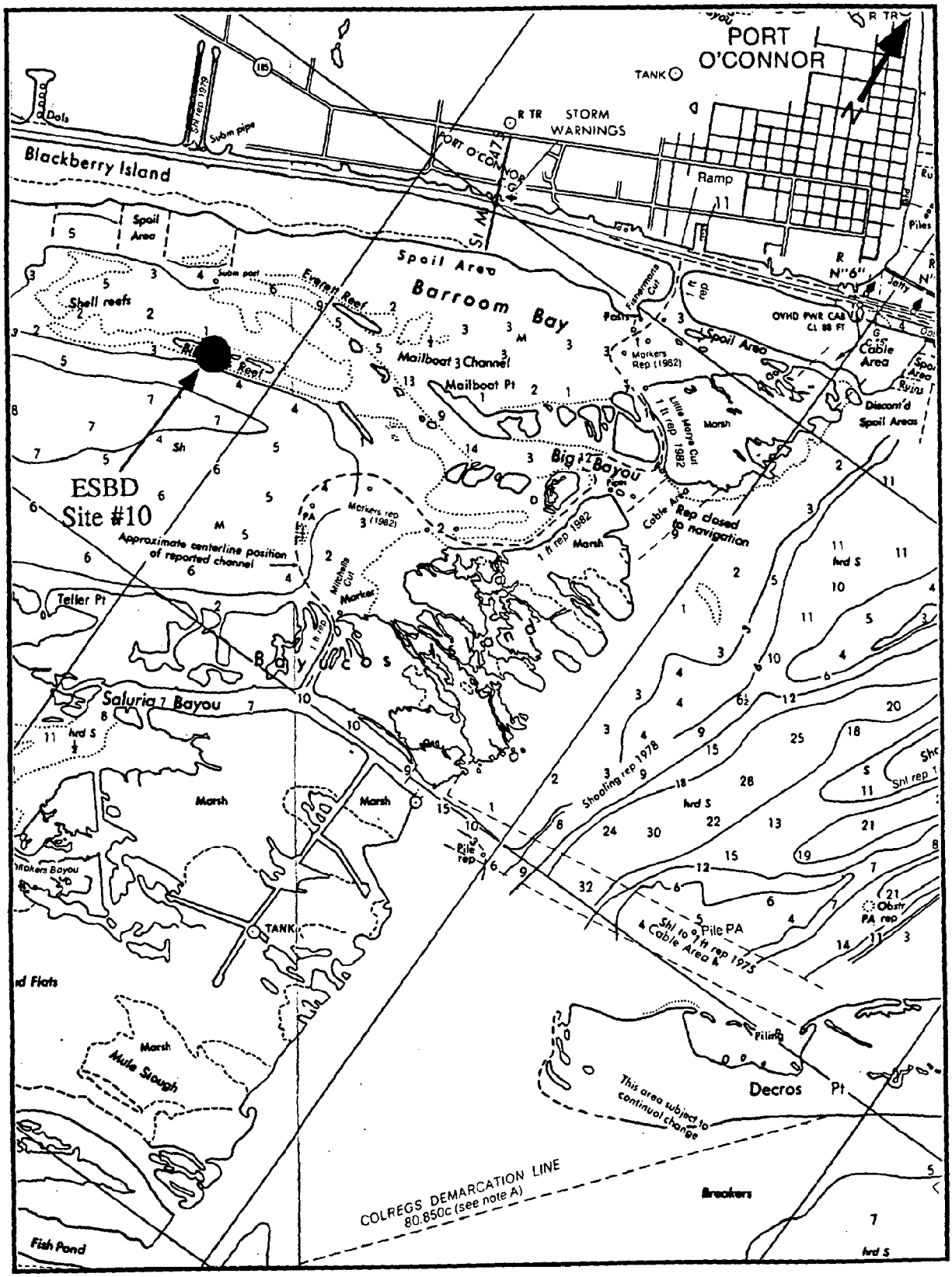
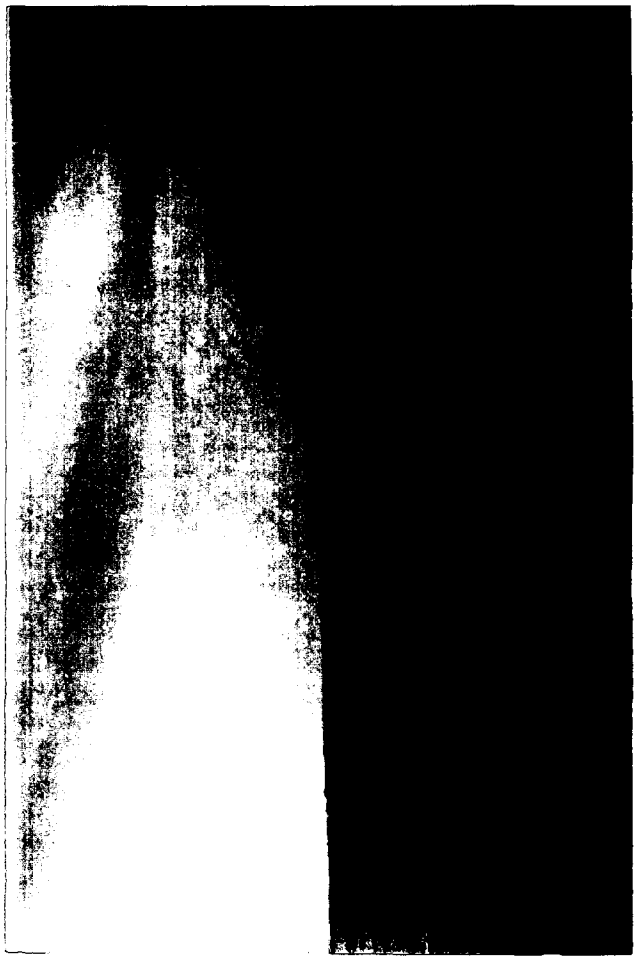
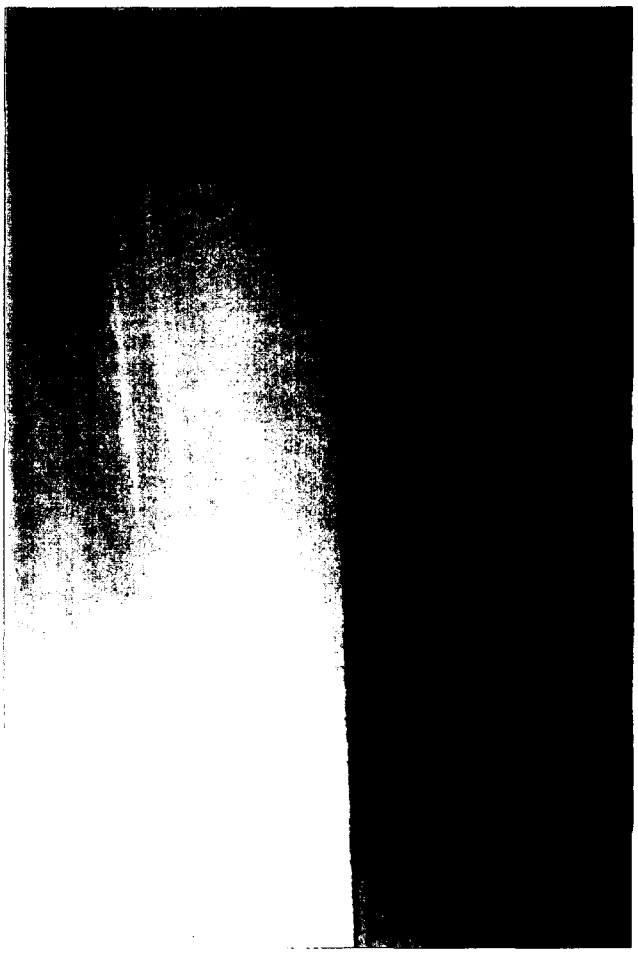


Site #10 (ESBD), Espiritu Santo Bill Days Reef (from chart 11319).





SITE NUMBER - 11 **DESIGNATOR** - MBLR

SITE - LAVACA RIVER MOUTH, MATAGORDA BAY TX

NOMINAL SITE CENTER - 28°39.80'N 96°34.83'W

LOCATED ON NOS CHART # - 11317

SITE ACCESS - This site was originally accessed by launching the boat at Port Lavaca State Park and proceeding for 0.5 hour to the mouth of the Lavaca River. The site was moved in Year IV. The new site is accessible from Highway 35 and can be sampled entirely by hand.

SITE DESCRIPTION - The original site was a submerged reef approximately 0.5 mile west of the river mouth. The highway 35 bridge was to the south and the plastics plant to the east. The site was an exposed reef on the east side of the channel entering the Lavaca River. Oysters were located only on the west side of the reef between channel marker 22 and the river mouth to the north. Most of the reef was dead and oysters were sparse. The site was originally located at Lat. 28°41.00'N and Long. 96°34.65'W. In Year IV, this site was moved because of the difficulty in finding oysters in Year III and the absence of oysters in Year IV at the original location. The site was moved to the north shore of the causeway where it joins the Highway 35 bridge.

OYSTER COLLECTIONS

Year I - In Year I the oysters were collected by tonging from a subtidal reef west of the river mouth. Station bearings were: Station 1 was 185° to the middle span of bridge; 90° to the water tower at plastics plant. Station 2 was 85° to the water tower at plastics plant; 195° to the middle span of the bridge. Station 2 is 0.25 mile south of Station 1. Station 3 was 230° to the middle span of the bridge; 70° to the water tower at the plastics plant. Station 3 was 0.25 mile south of Station 2.

Year II - No distinctions were made for Stations 1, 2, and 3 during Year II. Oysters were collected by hand. The reef could not be relocated in Year II; therefore, there was a slight difference in site location by approximately 500 to 1000 m between Years I and II.

Year III - No oysters were present in Year III. Conversations with Texas Parks and Wildlife biologists indicated that the reef die-off was due to prolonged freshwater inflow.

Year IV - Station 1 was located at the end of the causeway. Station 2 was located approximately 300 m east of Station 1, where a spit/reef extended into the bay from the shoreline. Station 3 was approximately 400 m east of Station 2. Commercial oystering was observed just north of the bridge, between the center span and the power lines to the north.

Years V, VI, VII, & VIII - Oysters were collected in the same locations as described for Year IV. Oysters were numerous each year.

Year IX - The site was not visited this year.

SEDIMENT COLLECTIONS

Years I, II, & III - Sediments were collected with a boxcorer at stations spaced equidistant and extending from channel marker 22 to the river mouth. Sediments for the NIST archive were collocated with the oysters.

Years IV, V, VI, VII, VIII, & IX - No sediments were sampled during these years.

SAMPLING METHOD

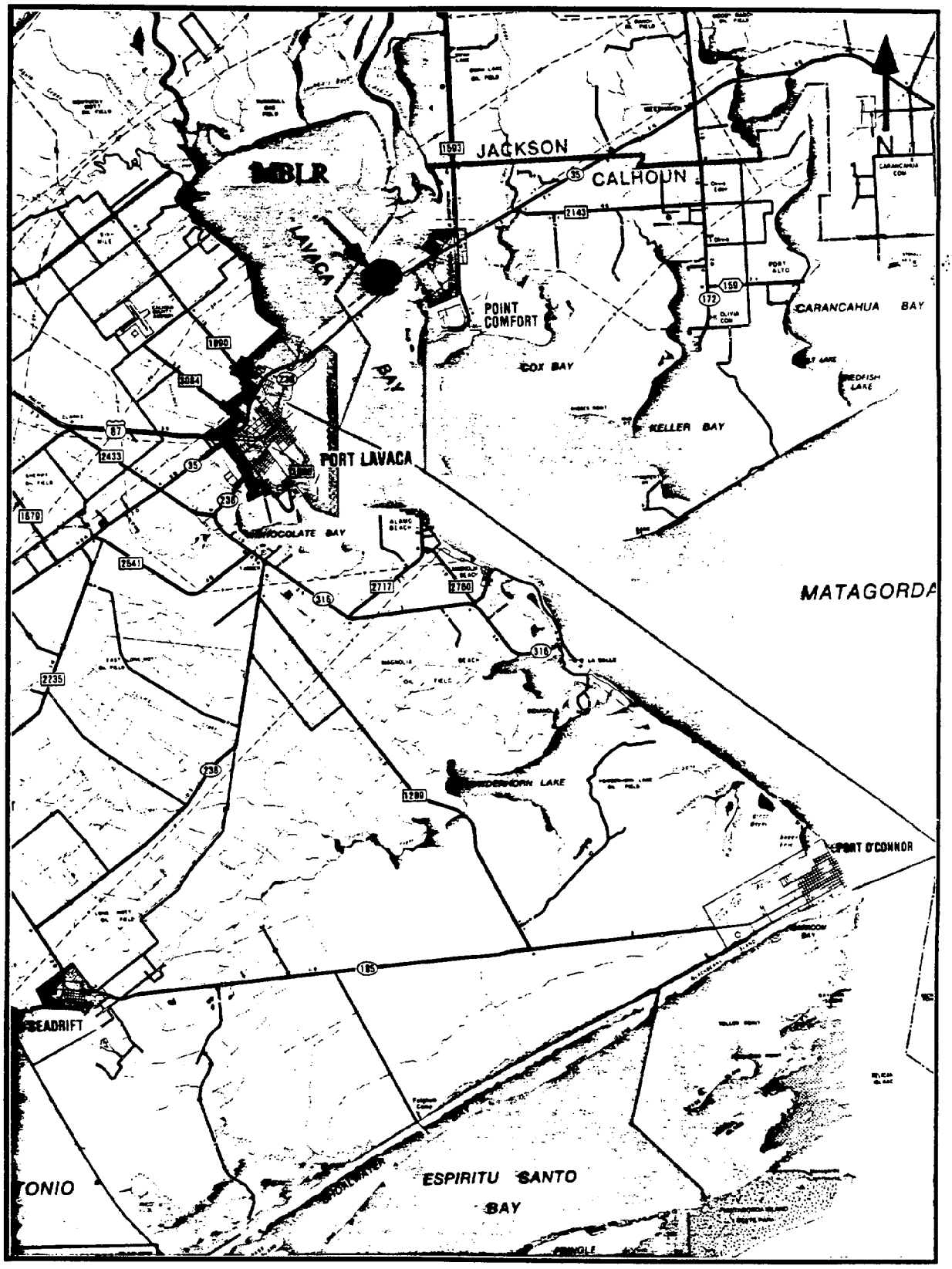
Oysters - dredge, tong or hand
Sediment - box core

WATER DEPTH - 0.2 - 2 m, subtidal (Years I & II), intertidal (subsequent years)

POSSIBLE CONTAMINANTS - Possible contamination could be from the plastics plant to the southeast of the site and the Alcoa plant some distance to the south in Lavaca Bay.

ENVIRONMENTAL DATA

	Salinity (‰)	Temperature (°C)	Dates Sampled
YEAR I	17.3	17.0	31 January 1986
YEAR II	8.0	9.0	13 January 1987
YEAR III	23.0	8.0	12 January 1988
YEAR IV	35.0	18.0	14 December 1988
YEAR V	29.0	11.0	15 December 1989
YEAR VI	30.0	20.0	18 December 1990
YEAR VII	23.0	23.0	13 December 1991
YEAR VIII	15.0	16.6	16 December 1992



Site #11 (MBLR), Matagorda Bay Lavaca River Mouth.

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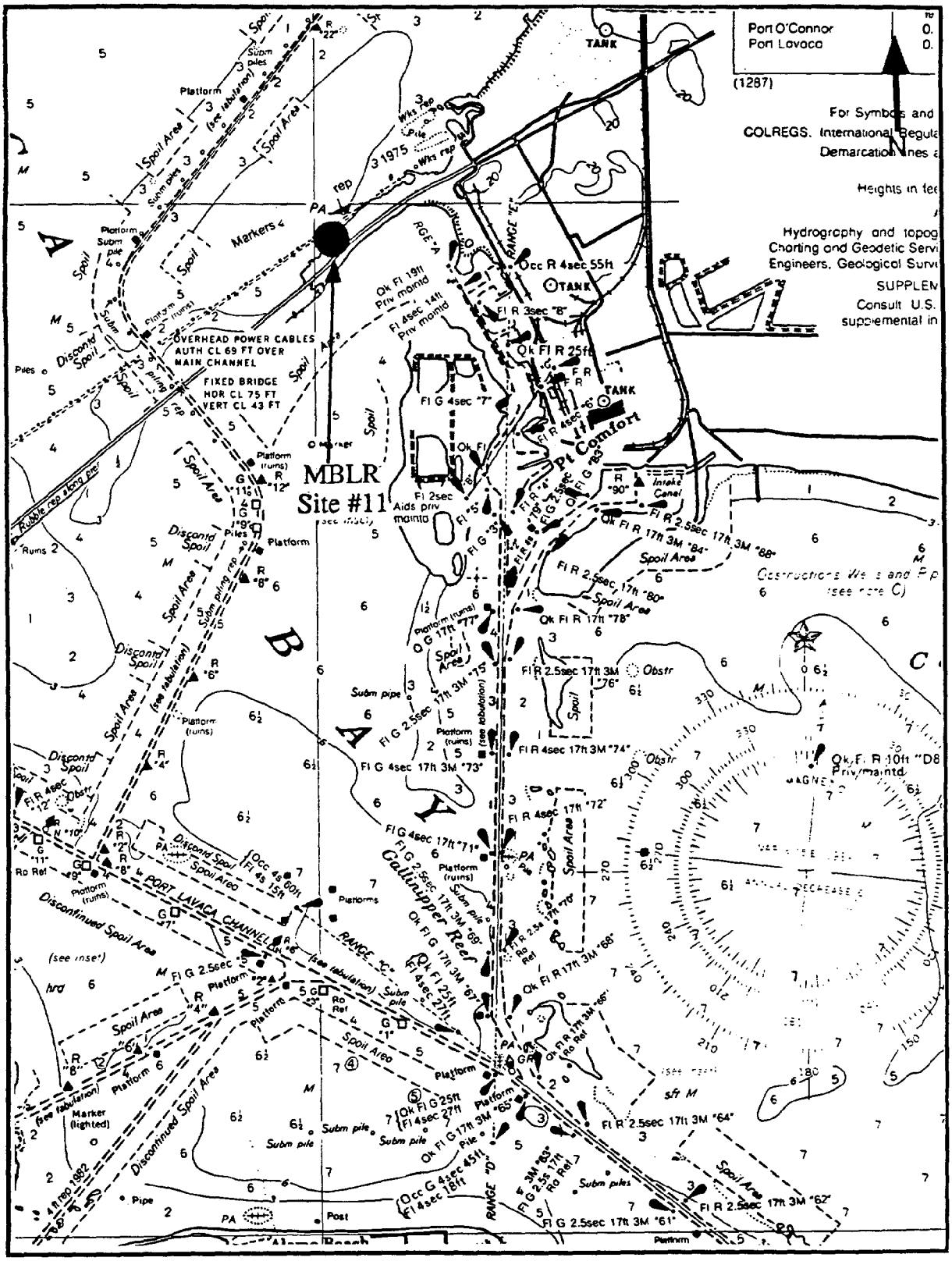
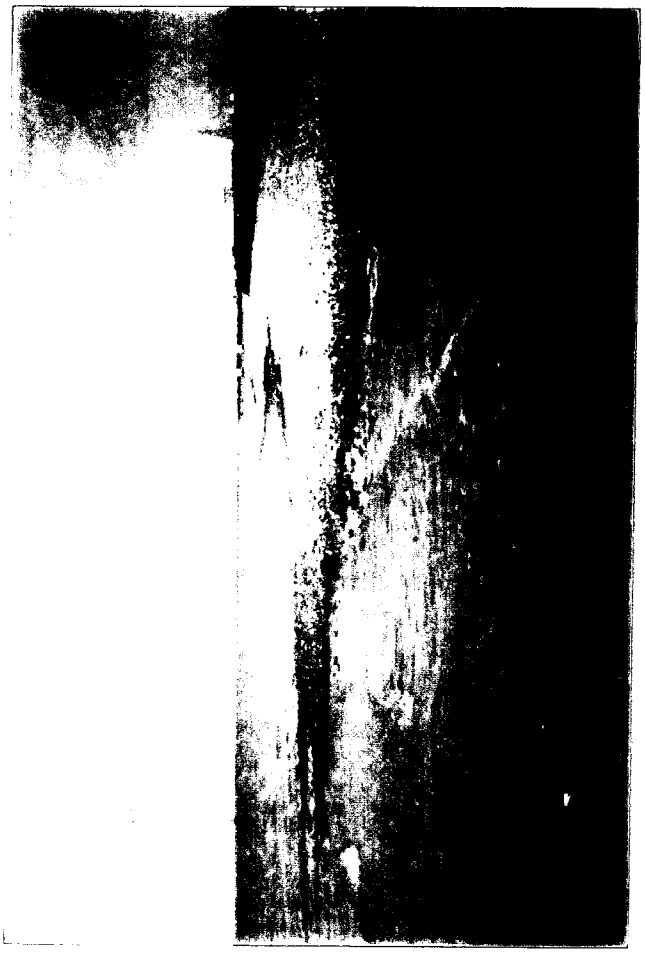


Site #11 (MBLR), Matagorda Bay Lavaca River Mouth (from chart 11317).



SITE NUMBER - 12 **DESIGNATOR** - MBGP

SITE - GALLINIPPER PT., MATAGORDA BAY, TX

NOMINAL SITE CENTER - 28°35.25'N 96°34.17'W

LOCATED ON NOS CHART # - 11317

SITE ACCESS - The boat is launched at Port Lavaca State Park and the channel is followed down to Gallinipper Point at channel marker 63. An alternate closer launch site is in the Refuge Harbour, with a marked channel leading out to Gallinipper Point.

SITE DESCRIPTION - This site was a submerged reef approximately 400 m off the north shore of Gallinipper Point. The reef ran on a line from the aluminum plant to a house on the shoreline that had an asymmetrically pitched roof and a fireplace chimney. The reef was south of channel marker 63 and was approximately 400 m offshore.

OYSTER COLLECTIONS

Years I & II - In Years I and II, the stations were distributed on the reef line at distances of 200, 300, and 400 m from shore. Station bearings were: Station 1 - 360° to the orange/white range tower; 275° to the twin radio towers. Station 1 - 50 m from the high range marker. Station 2 was 325° to tower with range light; 290° to the twin radio towers. Station 2 was 400 m from the shore. Station 3 - 30° to tower with range light; 285° to the twin radio towers. Station 3 was at the eastern end of Alamo Beach. Oysters were dredged using a commercial boat.

Year III - In Year III the oysters were purchased from commercial fishermen with Stations 1 and 2 located in approximately the same areas but Station 3 was a mix of Stations 1 and 2 oysters. The reef supported many live, good sized oysters. It was not fished commercially or privately during the first two years, since it was rumored to be a closed area due to pollution. There were numerous oyster boats dredging in Year III.

Year IV - In Year IV, the same three sites were dredged as were sampled in Year II. Oysters were dredged by a commercial oysterman at our request and direction.

Year V - The same areas and numerous adjacent sites were examined for oysters but none could be located; therefore, an alternate site, which had previously been sampled, was selected in another bay system.

Year VI - Oysters were present again this year. Oysters were collected with a clam dredge. Station 1 was 100 to 200 m from the shoreline on a line between the geodesic dome house and the range marker. Station 2 was 150

to 200 m to the north along the same line. Station 3 was another 100 m to the north, directly south of the range marker.

Years VII & VIII - Oysters were present these years and collections were made in the same location as described for Year VI.

Year IX - Oysters were not very common this year, with an abundance of fresh dead oyster shells being present on the site. The samples were collected in a line between the Geodesic dome house and the range marker; Station 1 being 100m south of the range marker, Station 2 being the midpoint, and Station 3 being 150m offshore from the house.

SEDIMENT COLLECTIONS

Years I, II, & III - Sediments in Years I, II and III were obtained by boxcore from an area northwest of the reef between the high range marker and Alamo Beach.

Years IV, V, VI, VII, VIII, & IX - No sediments were sampled during these years.

SAMPLING METHOD

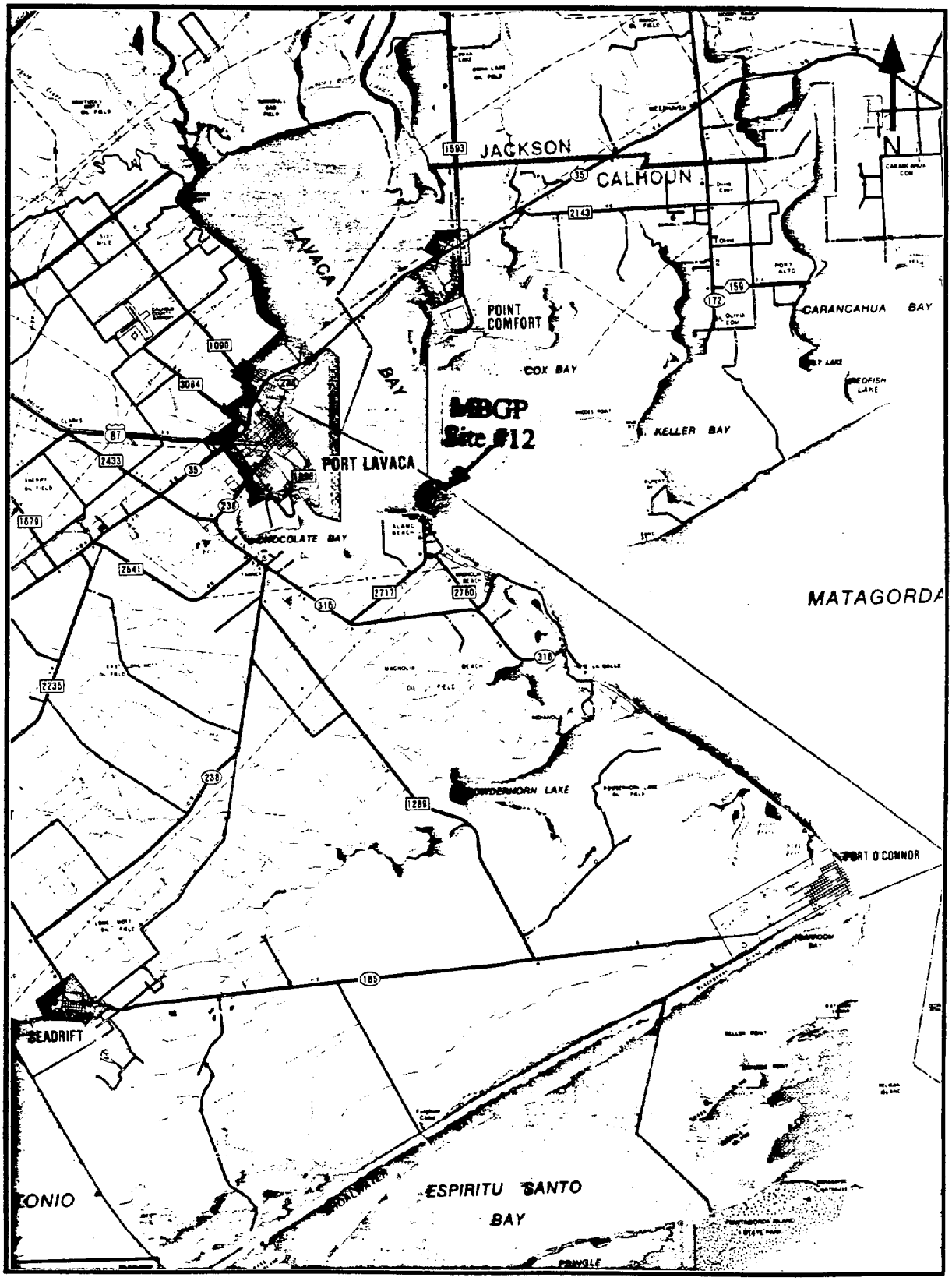
Oysters - The site required dredging on a completely subtidal reef.
Sediment - box core

WATER DEPTH - subtidal, 2 m

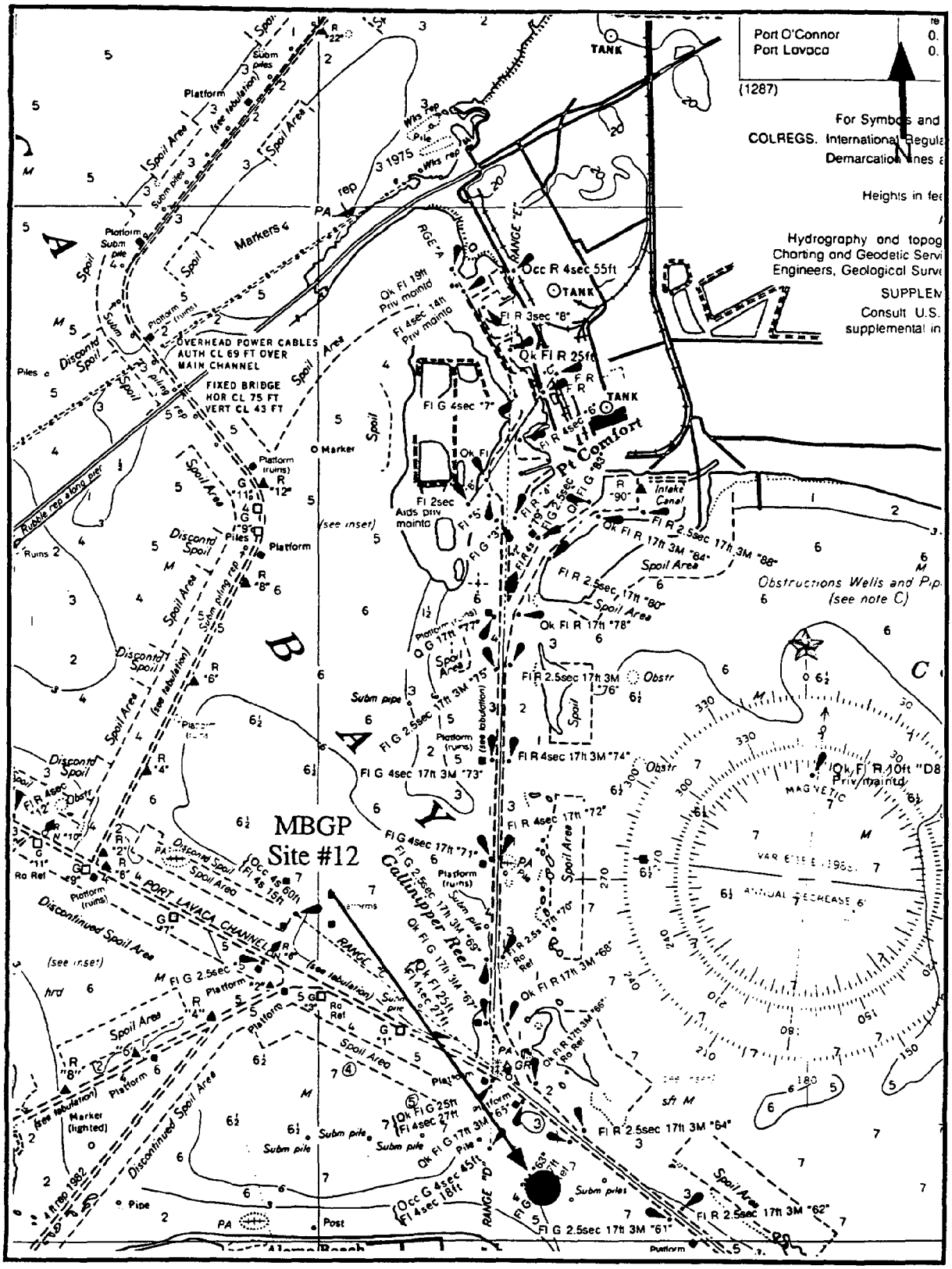
POSSIBLE CONTAMINANTS - Possible point contamination sources were the Alcoa aluminum plant directly across the bay, and the plastics plant near the Lavaca River mouth.

ENVIRONMENTAL DATA

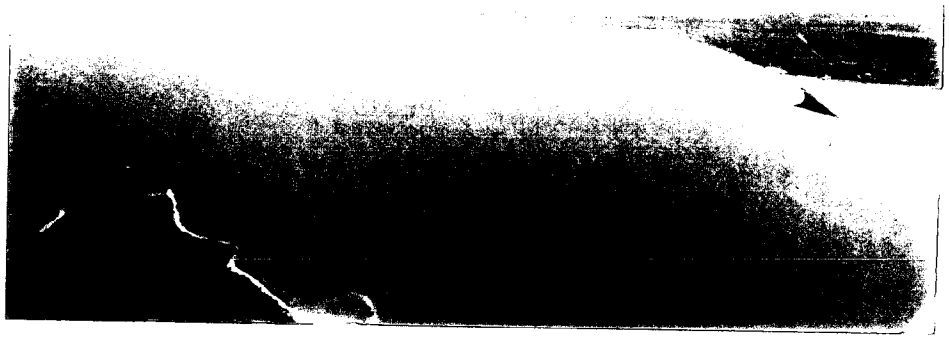
	Salinity (‰)	Temperature (°C)	Dates Sampled
YEAR I	23.0	17.0	31 January 1986
YEAR II	16.0	9.0	13 January 1987
YEAR III	29.0	7.0	12 January 1988
YEAR IV	36.0	13.0	14 December 1988
YEAR V	-	-	not sampled
YEAR VI	31.0	19.0	18 December 1990
YEAR VII	24.3	20.3	12 December 1991
YEAR VIII	20.0	13.0	17 December 1992
YEAR IX	25.0	15.0	14 December 1993

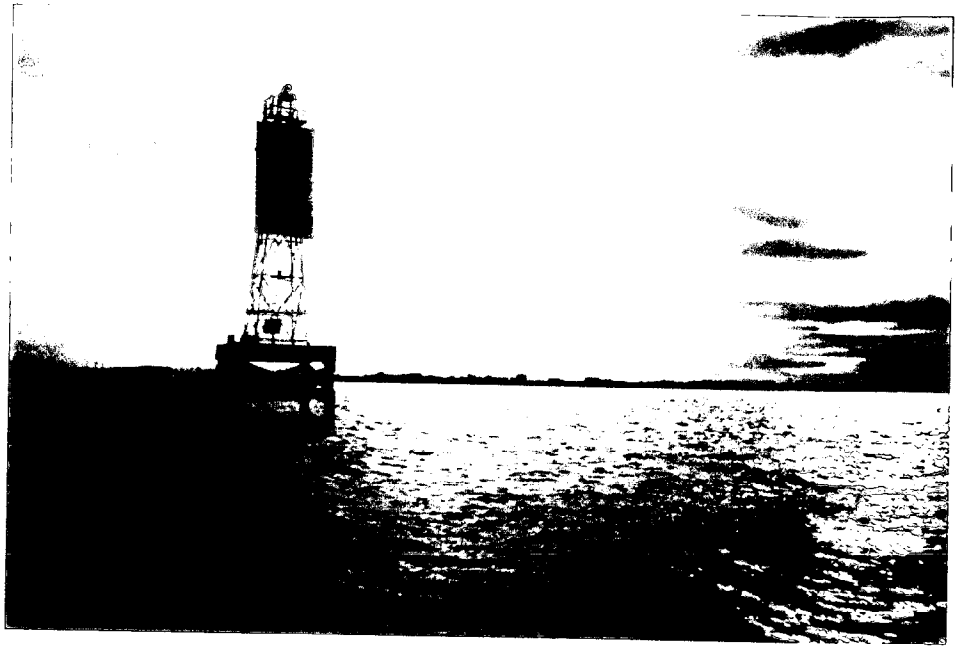


Site #12 (MBGP), Matagorda Bay Gallinipper Point.



Site #12 (MBGP), Matagorda Bay Gallinipper Point (from chart 11317).





SITE NUMBER - 13 **DESIGNATOR** - MBTP

SITE - TRES PALACIOS BAY, MATAGORDA BAY TX

NOMINAL SITE CENTER - 28°39.50'N 96°13.45'W

LOCATED ON NOS CHART # - 11317

SITE ACCESS - In Years I and II, the boat was launched at Port Lavaca State Park. The transit across Lavaca, Matagorda, and Palacios Bays takes 1.5 hours. In Year III and subsequently, the boat was launched at the public boat ramp at Palacios and then proceeded southwest out the Palacios Channel for two nautical miles to channel marker 48 and then south-southeast across the bay to the northeast end of the Coon Island Reef (15 minute run time).

SITE DESCRIPTION - The site was located on a string of reefs across the mouth of Green Island Bay. The reef extends from Coon Island to Oliver Point. Station 1 at the north end of the reefs was closest to Palacios.

OYSTER COLLECTIONS

Years I, II, III, IV, V - Oyster collection stations remained the same during each year of sampling. Station 1 was on the north side of Coon Island (the northernmost of three exposed islands/reefs running from Oliver Point to the northeast). Station 2 was taken from the westward end of the middle island, between Stations 1 and 3, and is due east of Red Chi #2. Station 3 was closest to Coon Island at the westernmost reef/island (samples from the north side and east end of this island). Station 3 was on a bearing of 150 degrees to the platform.

Year VI - Sample sites remained the same as in previous years. A new channel marker (red 2) had been installed which provided an additional reference point.

Years VII & VIII - Oyster collection stations were the same as the previous seven years. Oysters were not as abundant this year.

Year IX - The site was not visited this year.

SEDIMENT COLLECTIONS

Year I - Sediments were collected by hand in close proximity to the oyster sites.

Years II & III - Sediments were collected by boxcorer at stations located 150-200-m, southwest from the oyster stations.

Years IV, V, VI, VII, VIII, & IX - No sediments were sampled during these years.

SAMPLING METHOD

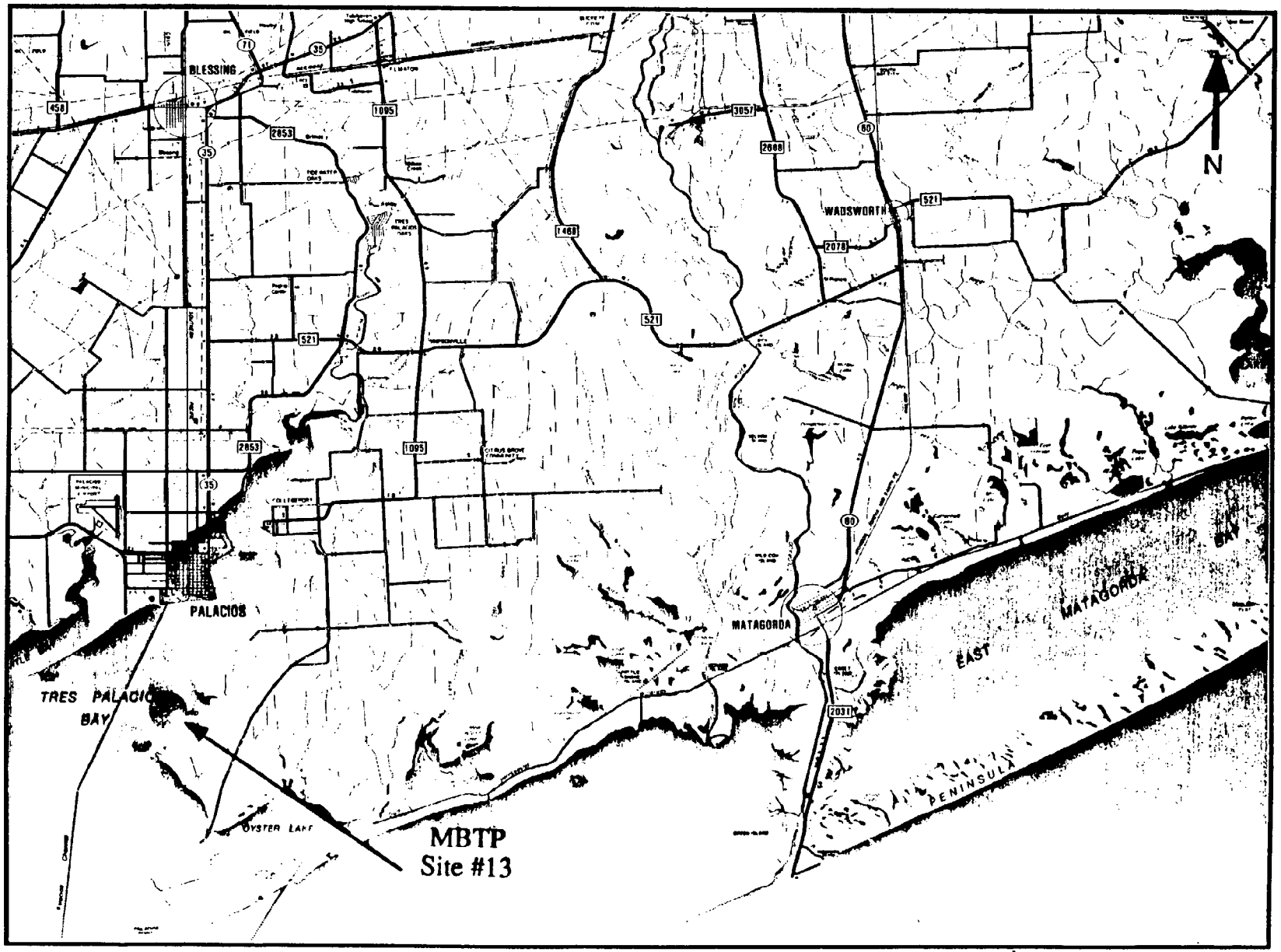
Oysters - tong and hand
Sediment - hand and box corer

WATER DEPTH - intertidal, 0 to 1 meter

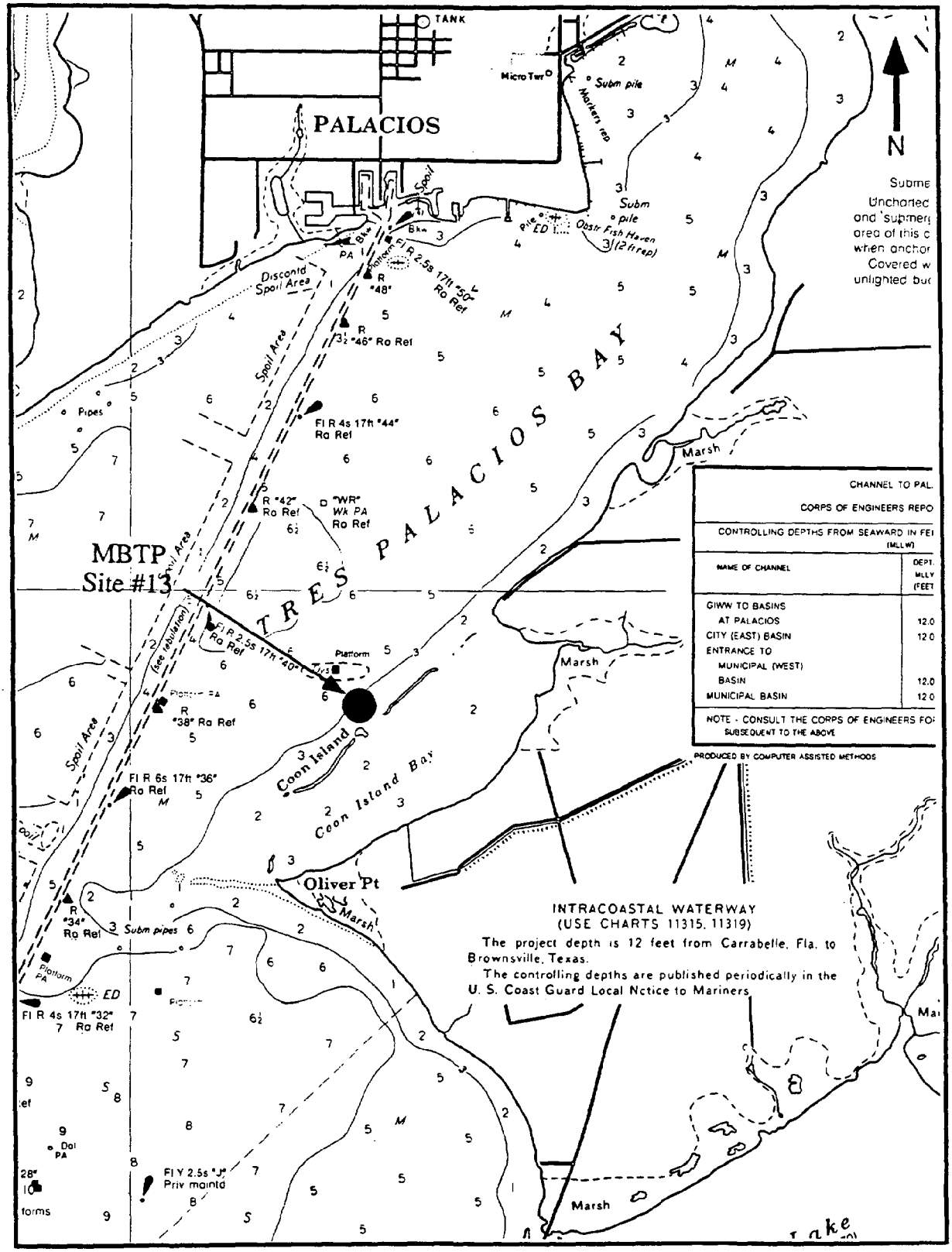
POSSIBLE CONTAMINANTS - There were no obvious sources of contamination in the vicinity except for a couple of oil or gas production platforms. Natural contamination may have been present since the entire middle island smelled of bird droppings and the waters surrounding the reef had abundant brown and green algae.

ENVIRONMENTAL DATA

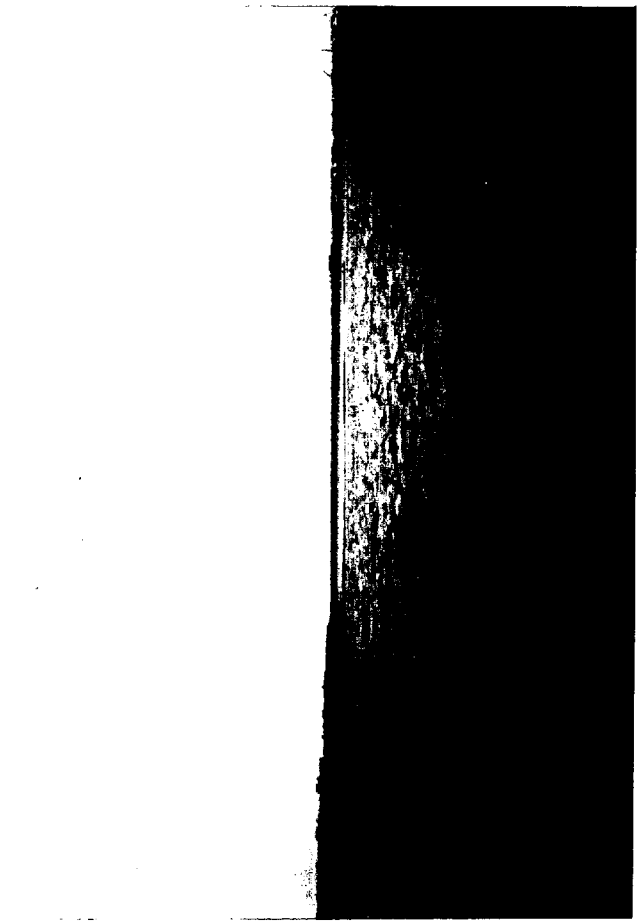
	Salinity (‰)	Temperature (°C)	Dates Sampled
YEAR I	24.0	21.0	1 February 1986
YEAR II	20.0	14.0	14 January 1987
YEAR III	35.0	7.0	12 January 1988
YEAR IV	34.0	14.0	13 December 1988
YEAR V	26.0	14.0	14 December 1989
YEAR VI	30.3	22.3	16 December 1990
YEAR VII	22.0	21.0	10 December 1991
YEAR VIII	22.0	15.0	15 December 1992

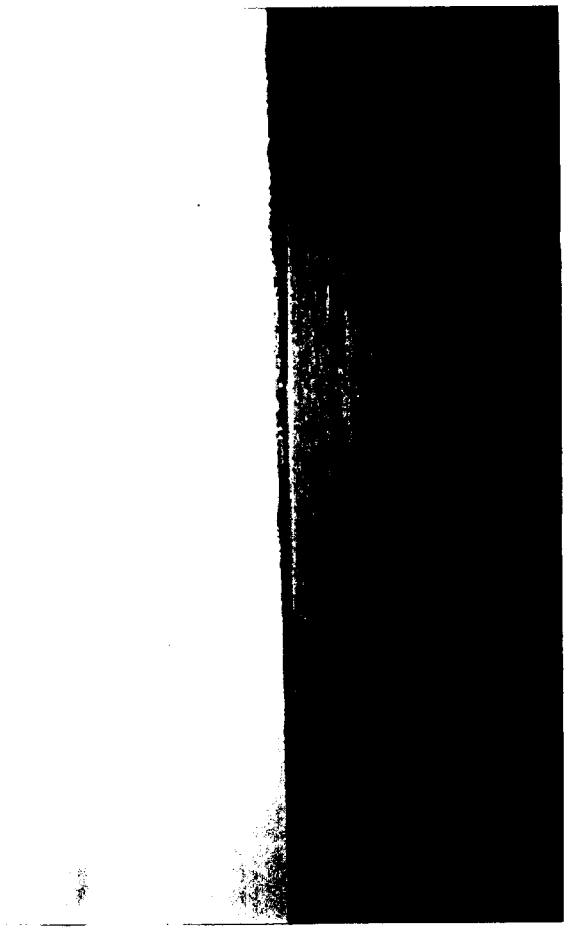


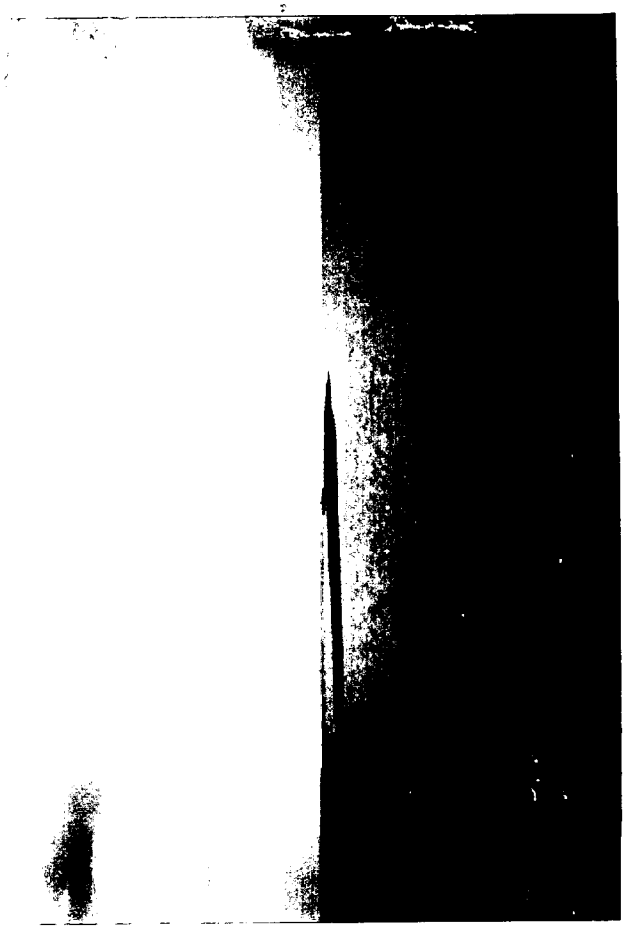
Site #13 (MBTP), Matagorda Bay Tres Palacios Bay.



Site #13 (MBTP), Matagorda Bay Tres Palacios Bay (from chart 11319).







SITE NUMBER - 14 **DESIGNATOR** - MBEM

SITE - EAST MATAGORDA, MATAGORDA BAY, TX

NOMINAL SITE CENTER - 28°42.67'N 95°53.00'W

LOCATED ON NOS CHART # - 11317

SITE ACCESS - The site is accessed via boat launched in Matagorda at C&R Marina and Bait Camp next to the Matagorda Drawbridge. Proceed east along the ICWW to the first cut to the south. Collection areas are ~100 m into East Matagorda Bay at the reefs located on either side of the channel.

SITE DESCRIPTION - The exposed reefs extended out from Old Gulf Cut into East Matagorda Bay. Oysters and sediments were collected from mainly dead reefs which had silted over. There were very few live oysters, and all were very small during the first four years of study.

OYSTER COLLECTIONS

Years I, II, III, IV, V, & VI - Oysters were collected at the same locations during all years of the study. Station 1 was directly outside the cut, with a bearing of 35° to microwave tower on the ICWW and 106° to a group of six pilings in the bay. Station 2 is 200 m south of Station 1, with bearing of 24° to microwave tower; 95° to group of six pilings. Station 3 is on the third exposed reef west of the Old Gulf Cut and was 250 m west of Station 1. Landmarks were 40° to the microwave tower and 80° to a group of six pilings.

Years VII &VIII - Oyster collection stations were at the same locations described above.

Year IX - The site was not scheduled for sampling this year.

SEDIMENT COLLECTIONS

Years I, II, & III - Sediment was collected 50 m west of each of the three oyster stations.

Years IV, V, VI, VII, VIII, & IX - No sediments were sampled during these years.

SAMPLING METHOD

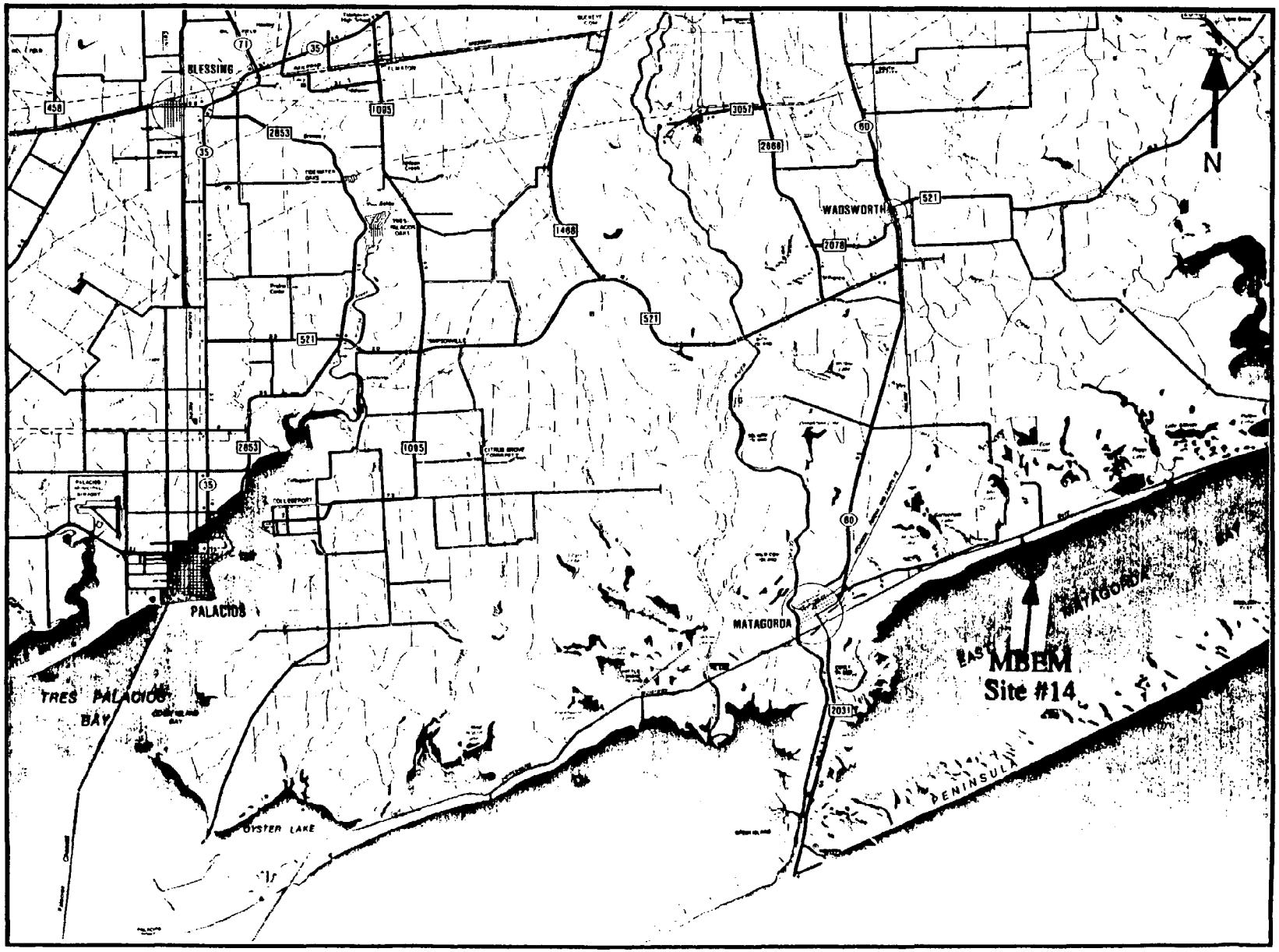
Oysters - hand
Sediment - box core

WATER DEPTH - intertidal, 0 to 0.5 m

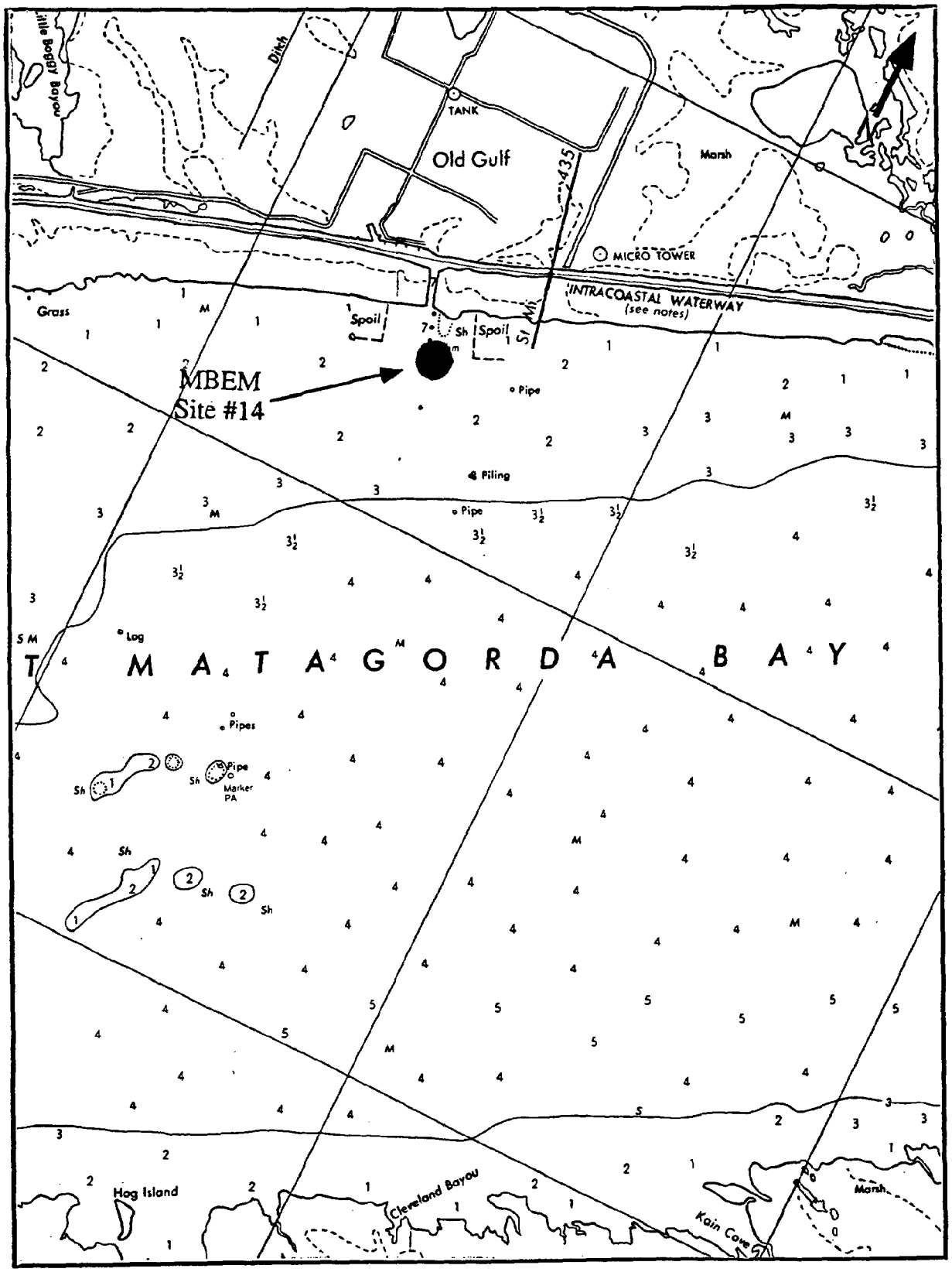
POSSIBLE CONTAMINANTS - No observable sources of contamination were evident except for silting over of the reef.

ENVIRONMENTAL DATA

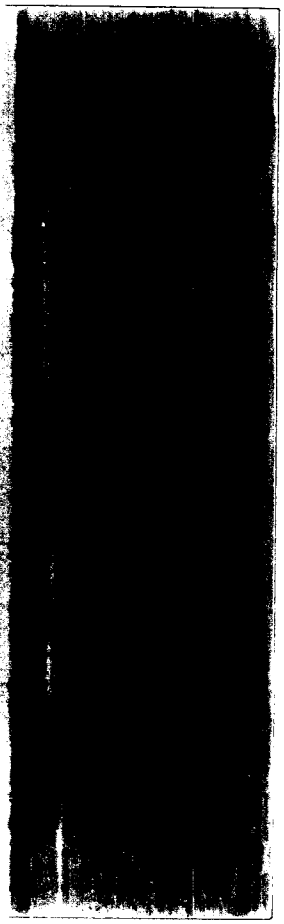
	Salinity (‰)	Temperature (°C)	Dates Sampled
YEAR I	22.6	18.0	30 January 1986
YEAR II	8.6	11.0	12 January 1987
YEAR III	30.0	6.0	11 January 1988
YEAR IV	36.0	15.0	13 December 1988
YEAR V	24.7	10.0	14 December 1989
YEAR VI	30.0	22.0	16 December 1990
YEAR VII	20.0	20.0	10 December 1991
YEAR VIII	22.3	13.0	15 December 1992

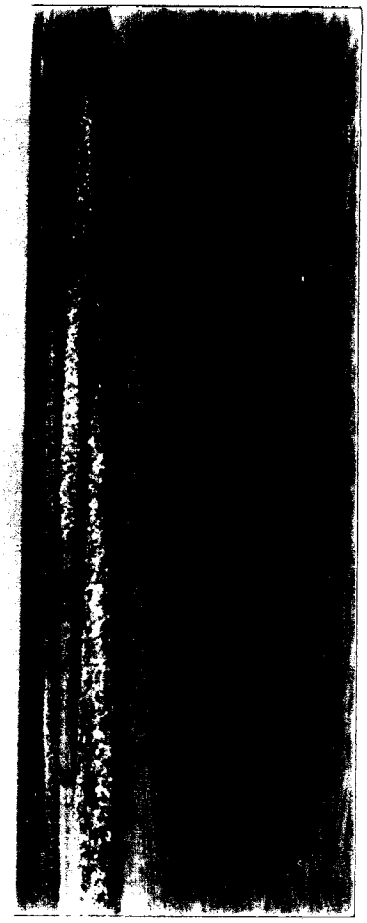


Site #14 (MBEM), Matagorda Bay East Matagorda.



Site #14 (MBEM), Matagorda Bay East Matagorda (from chart 11319).





SITE NUMBER 56 **DESIGNATOR** - MBCB

SITE - CARANCAHUA BAY, MATAGORDA BAY, TX

NOMINAL SITE CENTER - 28°39.40'N 96°23.18'W

LOCATED ON NOS CHART # - 11318

SITE ACCESS - This collection site, which was established in Year III, is accessed via boat from a launch point on Highway 35. The public boat ramp located on the highway is silted in near the mouth so that only a small boat can be launched. Proceed directly south down the bay for 4.5 nautical miles and then turn to the east toward a point with a PVC marker. The site can also be reached by land from Highway 35, by turning south at the intersection of Highway 35 & 1862, onto paved Jackson County Road 476. Then turn right onto County Road 477, and south again to Bay Avenue. Turn right onto Bay Avenue and go to the end of the road. The site is located approximately 100 to the west.

SITE DESCRIPTION - The site was located on the east side of Carancahua Bay directly across the bay from Port Alto. Several houses were located on or near this point. The site was a shoreline site and could be collected from the shore at low tide. Oysters were very abundant at Stations 2 and 3 but were less so at Station 1. No live oysters were found in the upper part of the bay, presumably due to prolonged freshwater conditions which were common during the spring of 1987.

OYSTER COLLECTIONS

Year III - Oysters were collected at this site for the first time in Year III. Station 1 was located approximately 300 m south of a green house along the shoreline. Station 1 was 10 to 20 m off the shoreline on a small reef paralleling the shore for approximately 80 m, oysters were found on the bottom or attached to shell. Station 2 was on the point which extended to the southwest. At this site the oysters were attached to concrete and brick rubble. The station extended approximately 100 m into the bay. Station 3 was located southeast of Station 2 on an intertidal reef along the shore and on an exposed reef approximately 20 m from the shore.

Year IV - Oysters were not sampled during this year.

Year V - This site was used as a substitute for MBGP. Oysters were abundant and were collected in the locations that were sampled during Year III.

Years VI & VII - This site was not sampled during these years.

Year VIII - This site was used as a substitute for dead reefs futher south. Oysters were abundant and were collected at the locations sampled during Year V.

Year IX - Oysters were sampled from the same station locations as in Year III, with Stations 2 and 3 being interchanged. Large oysters were abundant througthout the area and were easily collected by hand at low tide.

SEDIMENT COLLECTIONS

Year III - Sediment stations were located 200 m to the south and west of each oyster station.

Years IV, V, VI, VII, VIII, & IX - No sediments were sampled during these years.

SAMPLING METHODS

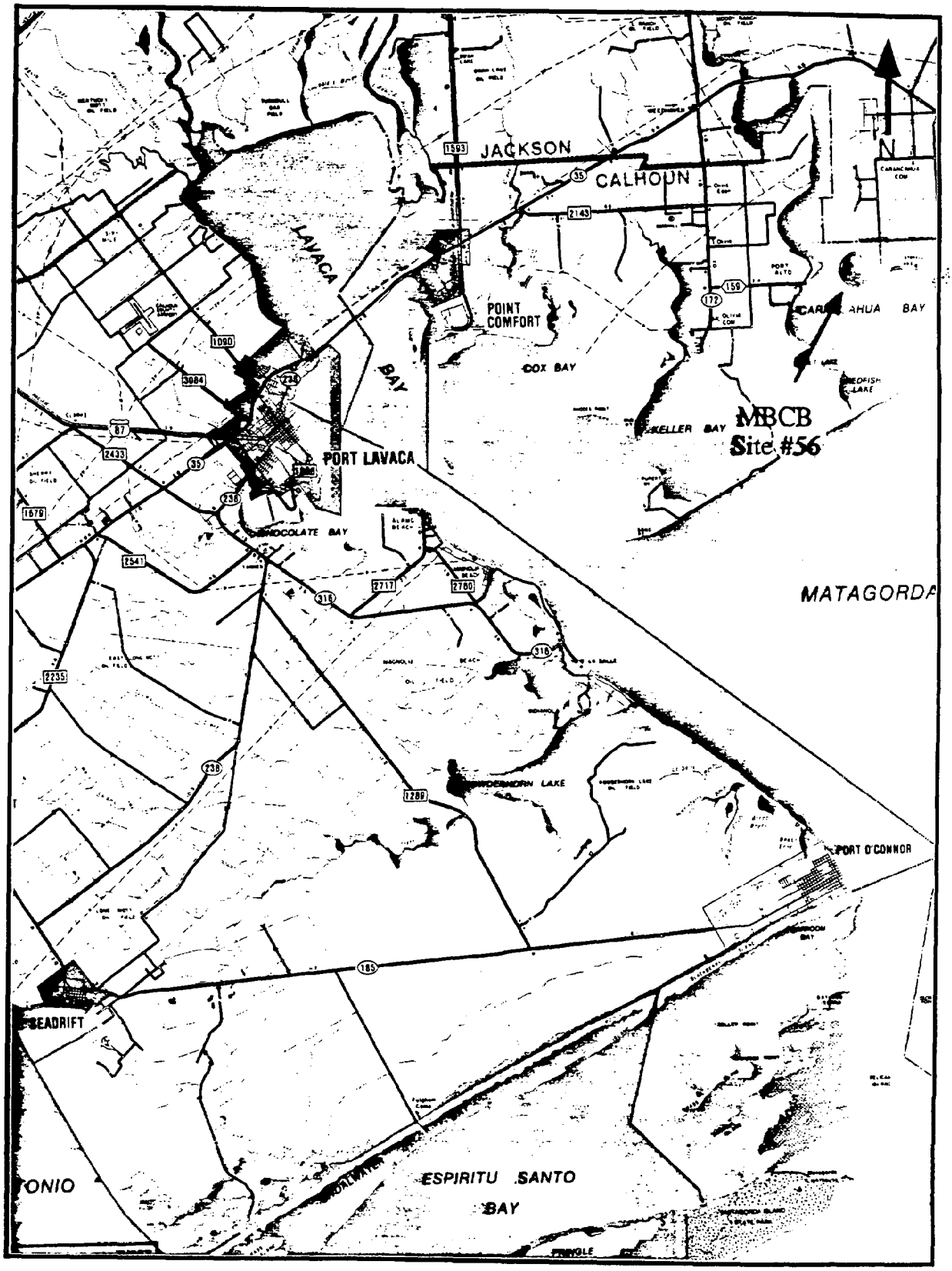
Oysters - hand
Sediment - box core

WATER DEPTH - intertidal, 0 to 0.3 m

POSSIBLE CONTAMINANTS - No sources of contamination were obvious within the bay; however, the inflow and runoff into Carancahua Bay was from the adjacent agricultural lands which were a potential non-point source for pesticides and agricultural chemicals.

ENVIRONMENTAL DATA

	Salinity (‰)	Temperature (°C)	Dates Sampled
YEAR III	32.0	11.0	12 January 1988
YEAR V	31.0	4.0	16 December 1989
YEAR VIII	20.0	16.0	17 December 1992
YEAR IX	25.0	15.0	14 December 1993



Site #56 (MBCB), Matagorda Bay Carancahua Bay.

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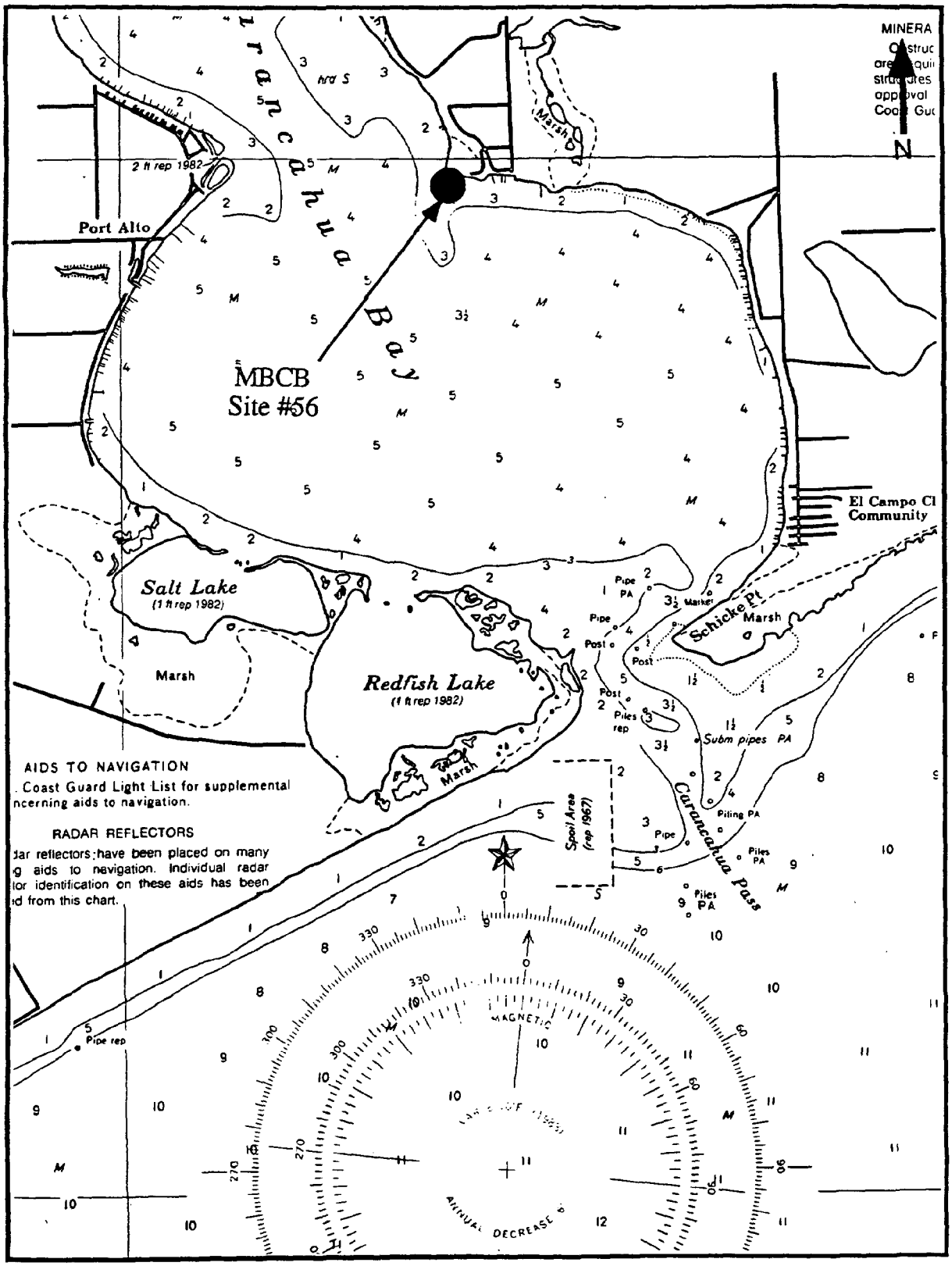
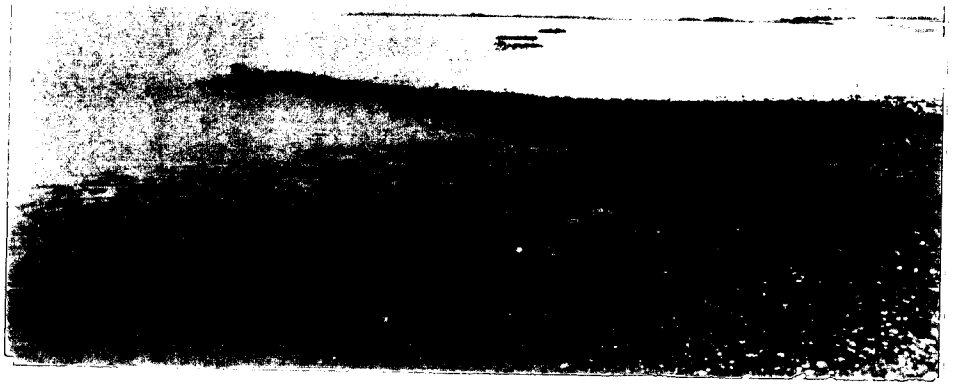


Site #56 (MBCB), Matagorda Bay Carancahua Bay (from chart 11319.



SITE NUMBER - 55 **DESIGNATOR** - MBDI

SITE - DOG ISLAND, MATAGORDA BAY, TX

NOMINAL SITE CENTER - 28°38.28'N 95°00.15'W

LOCATED ON NOS CHART # - 11319

SITE ACCESS - The launch point is at the public boat ramp on the Colorado River. Proceed northwest to the ICWW, then southwest along the ICWW to Culver Cut, go south to the first fork and then go east. Proceed to the second PVC pipe and then go south to the first iron structure which is 200 m from shore.

SITE DESCRIPTION - This site was first sampled in Year III and was located in east Matagorda Bay near Dog Island Reef.

OYSTER COLLECTIONS

Year III - The site was first established in Year III. Station 1 was an oyster shell reef located approximately 500 m north of Dog Island Reef. Station 2 was directly south of Station 1 and was located on the southeast end of Dog Island Reef. There was a well developed reef with numerous oysters in the intertidal zone. Station 3 was located 100 m to the southeast on the next exposed reef. Oysters were also abundant at this site.

Years IV, V, VI, VII, VIII, & IX - The site was not sampled during these years.

SEDIMENT COLLECTIONS

Year III - Sediments were collocated with the oysters at each station. Station 1 was 20 m north of the oyster reef. Sediment for Station 2 was collected 50 m from the reef in ~1.0 m of water. The sediment collection site at Station 3 was located 90 m to the north.

Years IV, V, VI, VII, VIII, & IX - No sediments were sampled during these years.

SAMPLING METHODS

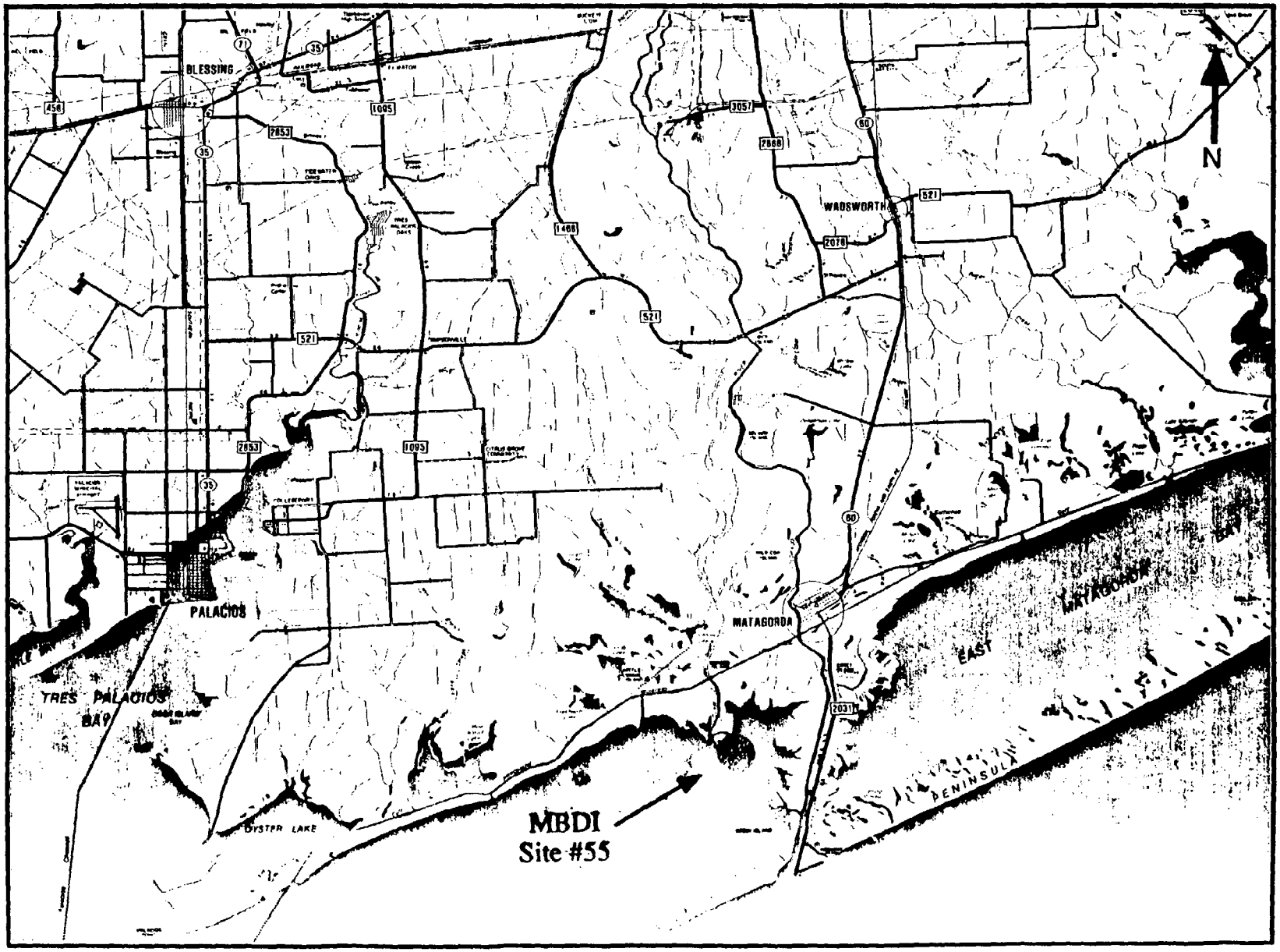
Oysters - hand
Sediment - box core

WATER DEPTH - intertidal, 0 to 0.3 m

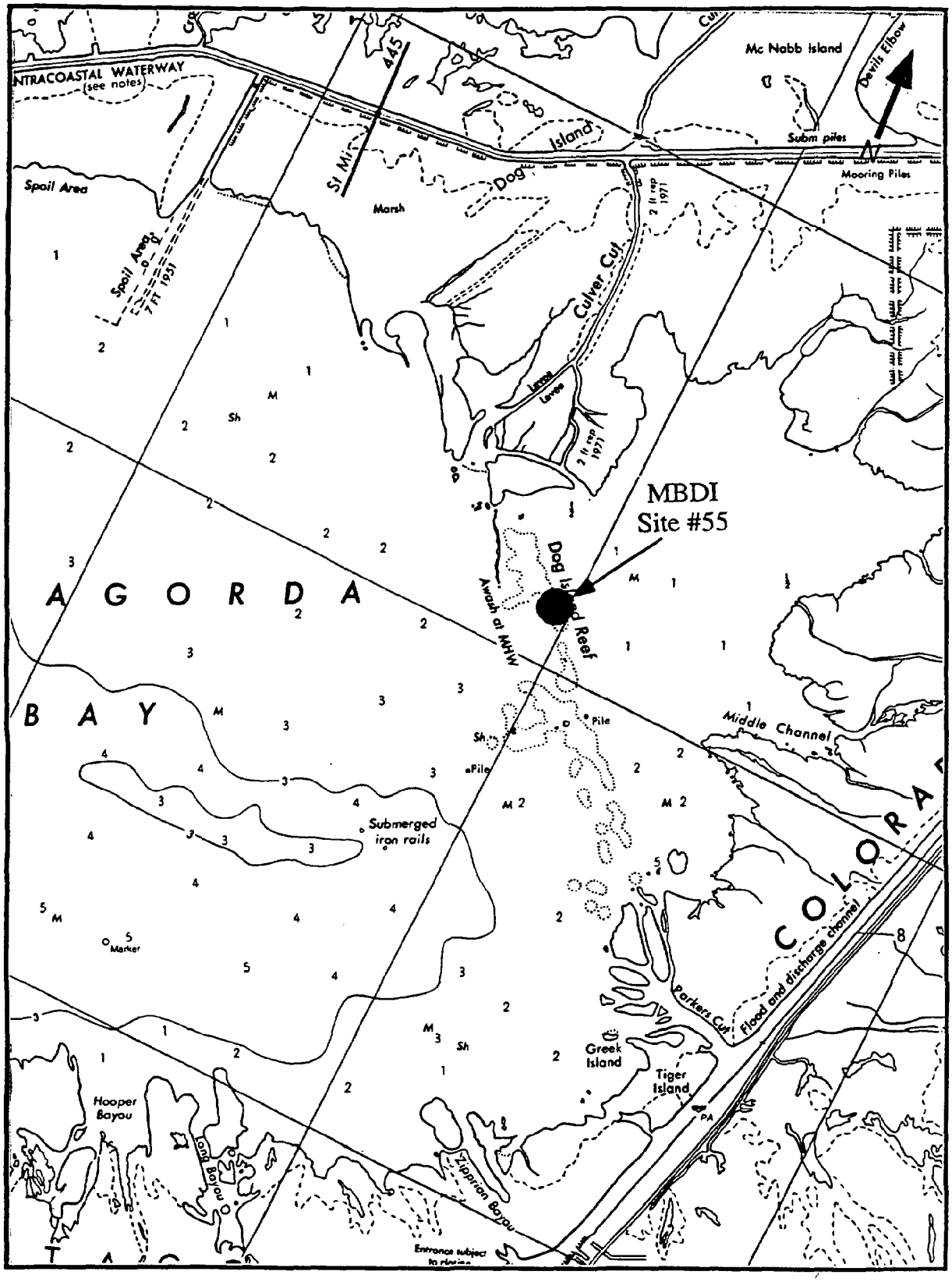
POSSIBLE CONTAMINANTS - No apparent point sources of contamination were obvious. However, this site was located near Culver Cut which received drainage from agricultural activities, primarily farming of rice and grain sorghum. The Colorado River channel is scheduled to be diverted and will empty into this bay northeast of Dog Island Reef.

ENVIRONMENTAL DATA

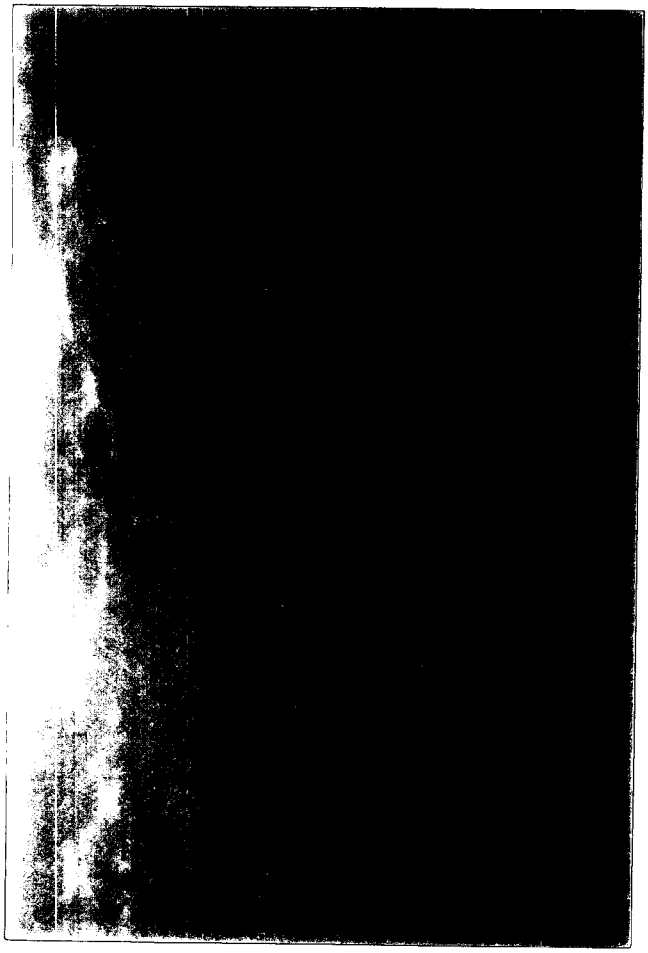
	Salinity (‰)	Temperature (°C)	Dates Sampled
YEAR III	28.0	6.0	11 January 1988

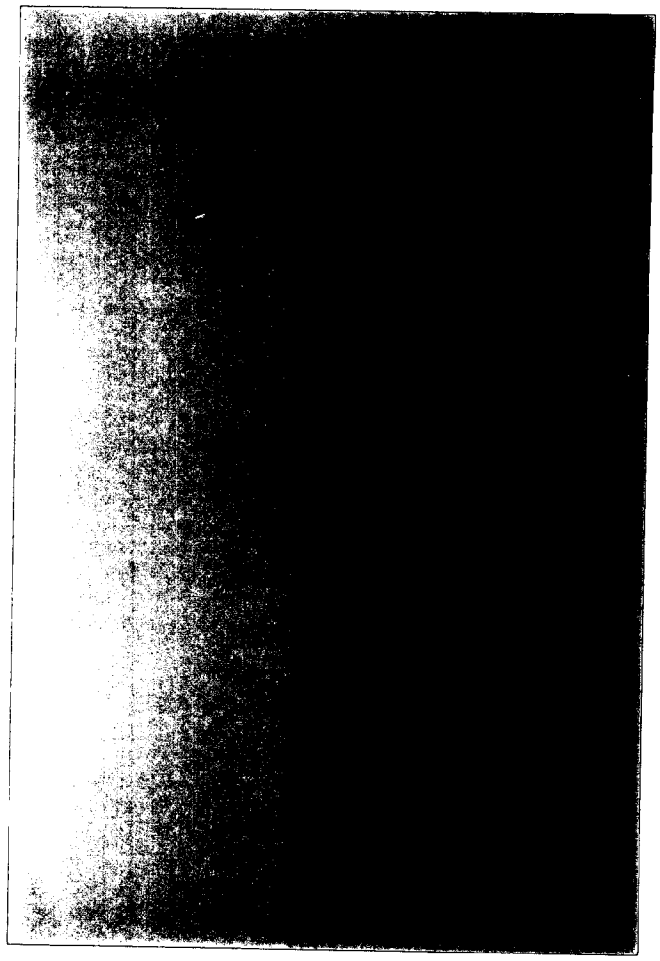


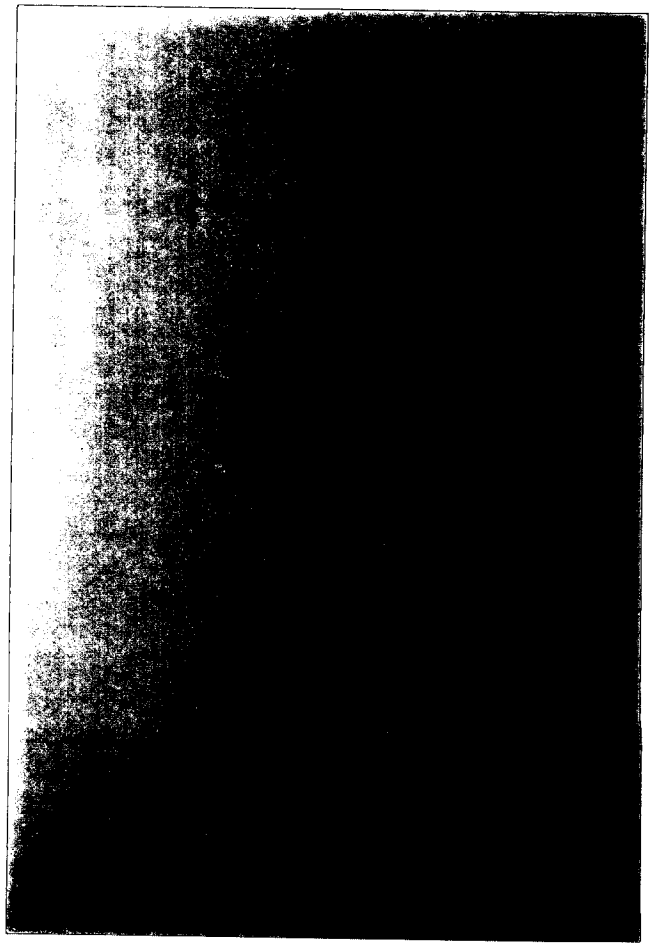
Site #55 (MBDI), Matagorda Bay Dog Island.



Site #55 (MBDI), Matagorda Bay Dog Island (from chart 11319).







SITE NUMBER - 72 **DESIGNATOR** - BRCL

SITE - CEDAR LAKE, BRAZOS RIVER, TX

NOMINAL SITE CENTER - 28°51.50'N 95°27.83'W

LOCATED ON NOS CHART # - 11322

SITE ACCESS - This intertidal site was first sampled in Year IV. A boat launch is located at the end of the road on FM 2918. From the boat ramp proceed southeast across the ICWW to the entrance at Cedar Lakes. Then proceed west-southwest down the channel for approximately 0.75 miles to where two land masses converge, one from the north and one from the south.

SITE DESCRIPTION - This site was located on the east side of the San Bernard National Wildlife Refuge near Rivers End, approximately 2 miles west of the San Bernard River. The site was south of the ICWW on the east side of Cedar Lakes. An old silted-in channel ran southwest off of the ICWW into Cedar Lakes. This area was predominated by very shallow bays with numerous oyster reefs surrounded by *Spartina alterniflora* marshland.

OYSTER COLLECTIONS

Year IV - Station 1 was located 50 m southwest of the metal casing on the west side of the small channel which turned to the south. Oysters were collected by hand from an exposed reef on the west side of the channel. Station 2 was located approximately 150 m northeast of the metal casing and 200 m from Station 1. It was on the north side of the entrance channel. Oysters were collected by hand from both sides of the land mass which protruded to the south. Station 3 was located on the exposed reef which ran east-west and paralleled the entrance channel. The actual collection site was 350 m east of the metal casing and 200 m east-southeast of Station 2. Oysters were very abundant at this location but the sediment was soft which made access to the oysters difficult.

Year V - Due to siltation of the channel leading to Station 1 it was moved 100 m to the east. The station was located on the east side of the marsh that was directly south of Station 2. Oyster collections were made on the small bay to the south. Station 2 remained at the originally established sites. Station 3 was moved 100 m to the east for better access and better quality oysters. This station was located on the west bank of the small channel which went to the south and was approximately 300 m east of Station 1.

Year VI - Oysters at Station 1 and 2 were collected in the same locations as in Year IV. Station 3 was collected at the same location as last year, along the small channel on the south side of the channel approximately 300 m east of Station 1 and 2. Oysters were located on the west side of this channel.

Year VII - Oysters were collected in the same area as last year but two stations were moved. Station 1 was moved approximately 50 m to the east toward Station 2. Station 2 was collected at the same location described for Year IV. Station 3 was moved across the channel approximately 50 m to the north of last years collection site.

Years VIII, & IX - Oysters were collected at the same locations as in Year VII.

SEDIMENT COLLECTIONS

Year IV - Sediments were collocated with the oysters and were collected by hand from within the oyster bed. The sediment was red-brown soft silty mud.

Year V - Sediments were again collocated with each of the oyster sites and were collected by hand. Sediment character was unchanged from last year.

Years VI, VII, VIII, & IX - No sediments were sampled during these years.

SAMPLING METHODS

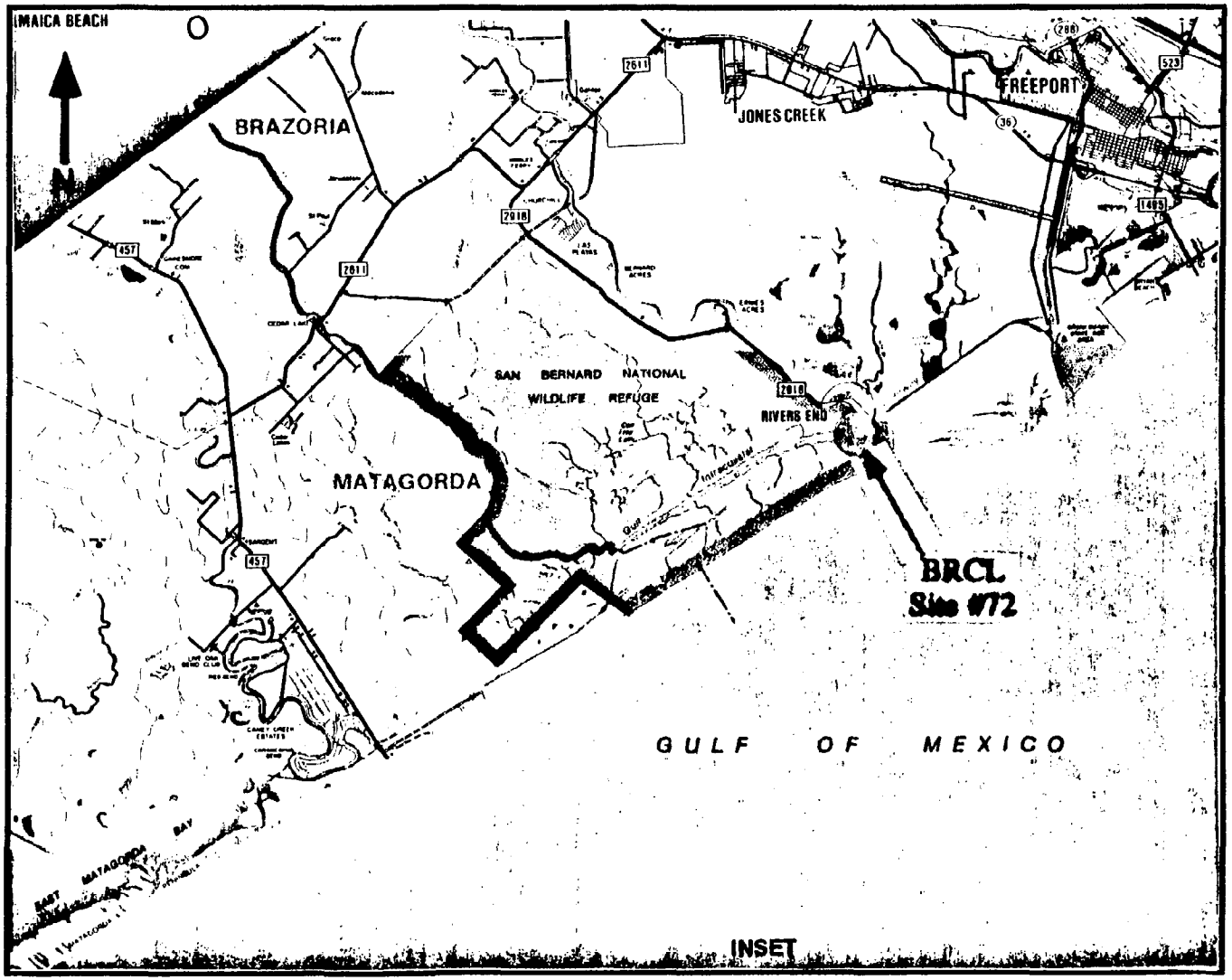
Oysters - hand
Sediment - hand

WATER DEPTH - intertidal, 0 to 0.3 m

POSSIBLE CONTAMINANTS - No obvious contaminants were observed, a potential source is marine fuel and oil from the ICWW.

ENVIRONMENTAL DATA

	Salinity (‰)	Temperature (°C)	Dates Sampled
YEAR IV	33.3	16.0	29 November 1988
YEAR V	27.0	16.0	4 December 1989
YEAR VI	30.0	12.7	5 December 1990
YEAR VII	19.0	13.7	3 December 1991
YEAR VIII	24.0	13.0	8 December 1992
YEAR IX	22.0	18.0	7 December 1993



Site #72 (BRCL), Brazos River Cedar Lakes.

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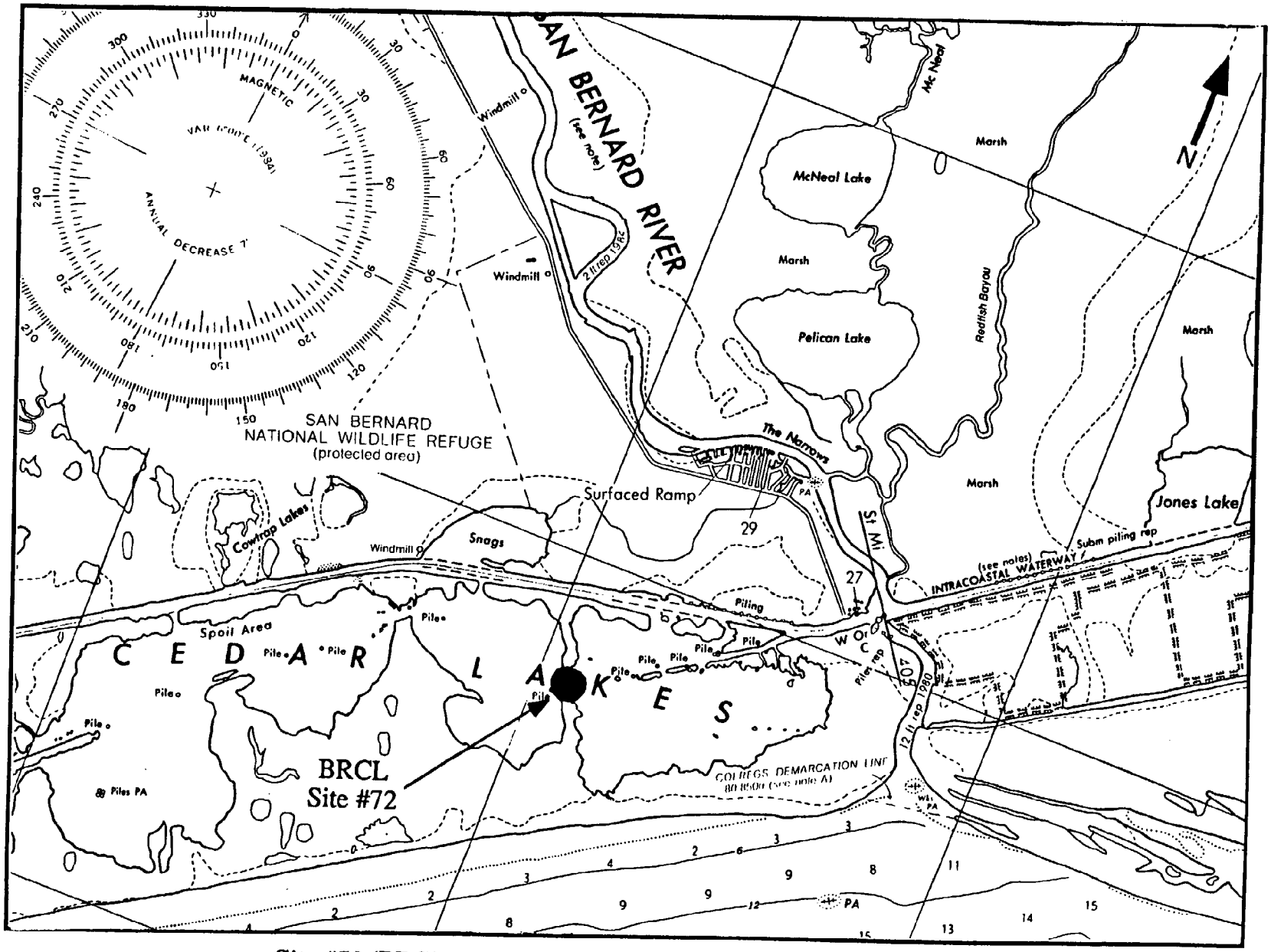
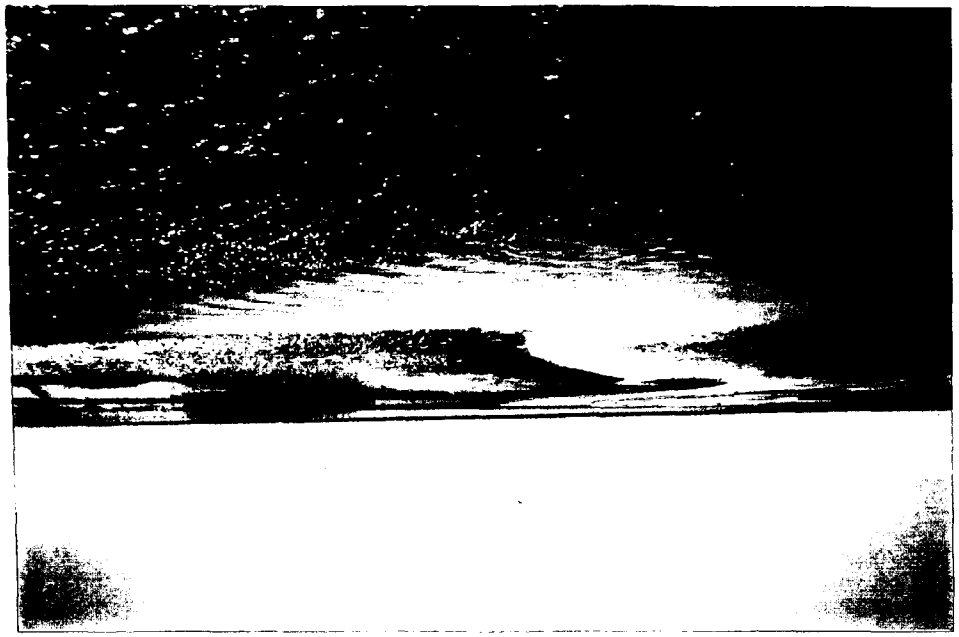


Site #72 (BRCL), Brazos River Cedar Lakes (from chart 11322).



SITE NUMBER - 57 **DESIGNATOR** - BRFS

SITE - FREEPORT SURFSIDE, BRAZOS RIVER, TX

NOMINAL SITE CENTER - 28°55.25'N 95°20.33'W

LOCATED ON NOS CHART # - 11322

SITE ACCESS - This intertidal site was established in Year III and is accessed from the shore. From the intersection of FM 288 and 1495 drive south on FM 1495 to the ICWW, cross the draw bridge and the site is located along the ICWW and in the housing development with silted-in boat basins east of FM 1495.

SITE DESCRIPTION - Oysters could be collected easily by hand at low tide, otherwise it was necessary to tong for bottom concrete rubble on which the oysters were attached. A local resident indicated that oysters were less abundant in Year III, but a moderate population existed at the three stations.

OYSTER COLLECTIONS

Year III - Year III stations were established as follows: Station 1 was directly east of the highway along the concrete rubble on the south shoreline of the ICWW and continued inside the first boat basin along the west side of the bulkhead. Oysters were collected from concrete rubble and wood pilings on the mud bottom. Station 2 was located across the boat basin along the east side of the bulkhead. The oysters were attached to the concrete bulkhead and from concrete rubble on the mud bottom. Station 3 was located in the next boat basin to the east. Oysters were collected on the east side of the channel along the bulkhead and from concrete rubble on the mud bottom.

Years IV, V, VI, VII, & VIII - Oyster stations were collected at the locations described for Year III.

Year IX - The site was not scheduled to be visited in 1993.

SEDIMENT COLLECTIONS

Year III - Sediments were collocated with the oyster stations. The bottom was soft red silty clay over black to gray mud.

Years IV, V, VI, VII, VIII, & IX - No sediments were sampled during these years.

SAMPLING METHODS

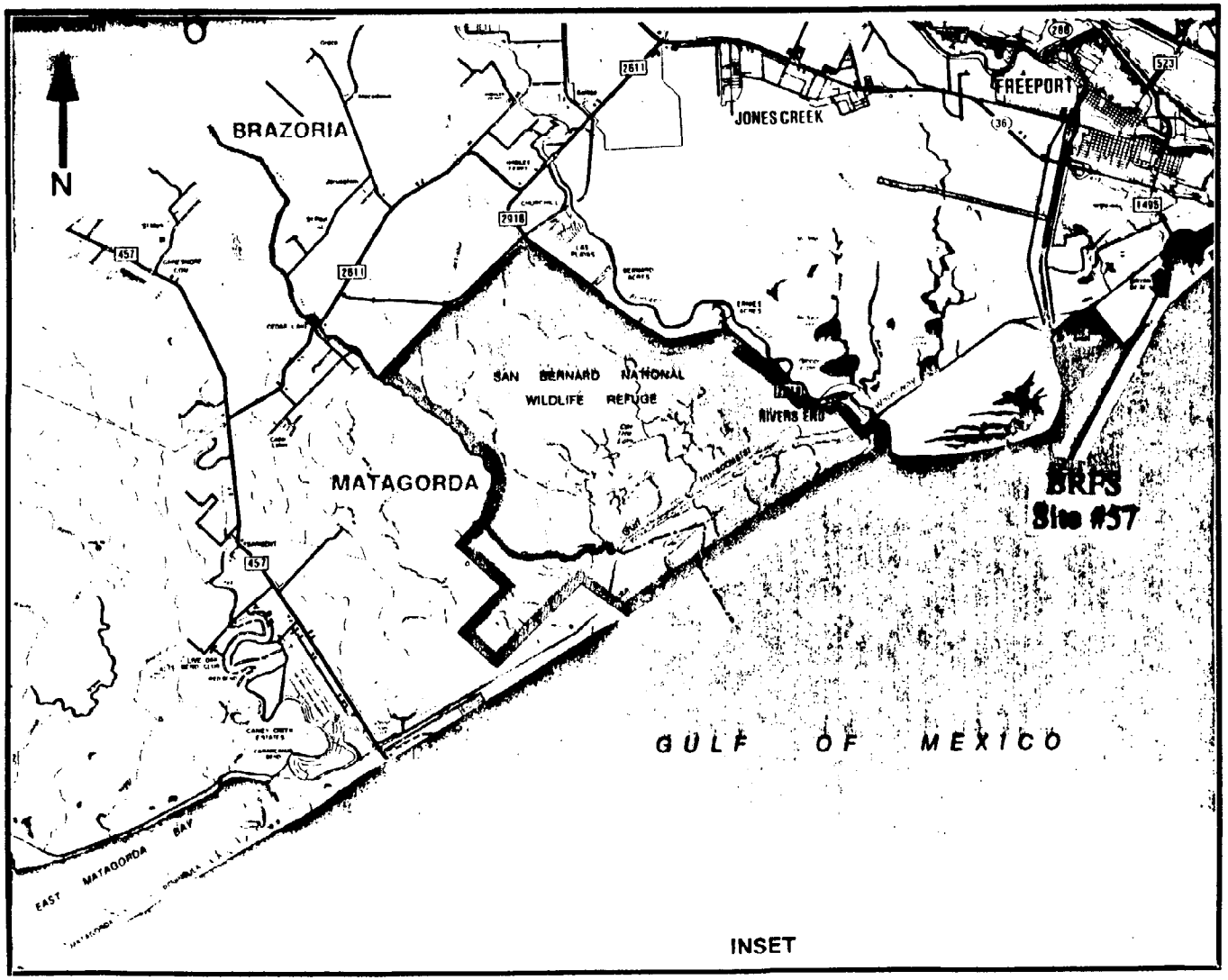
Oysters - hand and tongs
Sediment - hand scoop and box corer

WATER DEPTH - Water depth at all three stations was less than 1 m at high tide with a range of 0 to 1 m, intertidal.

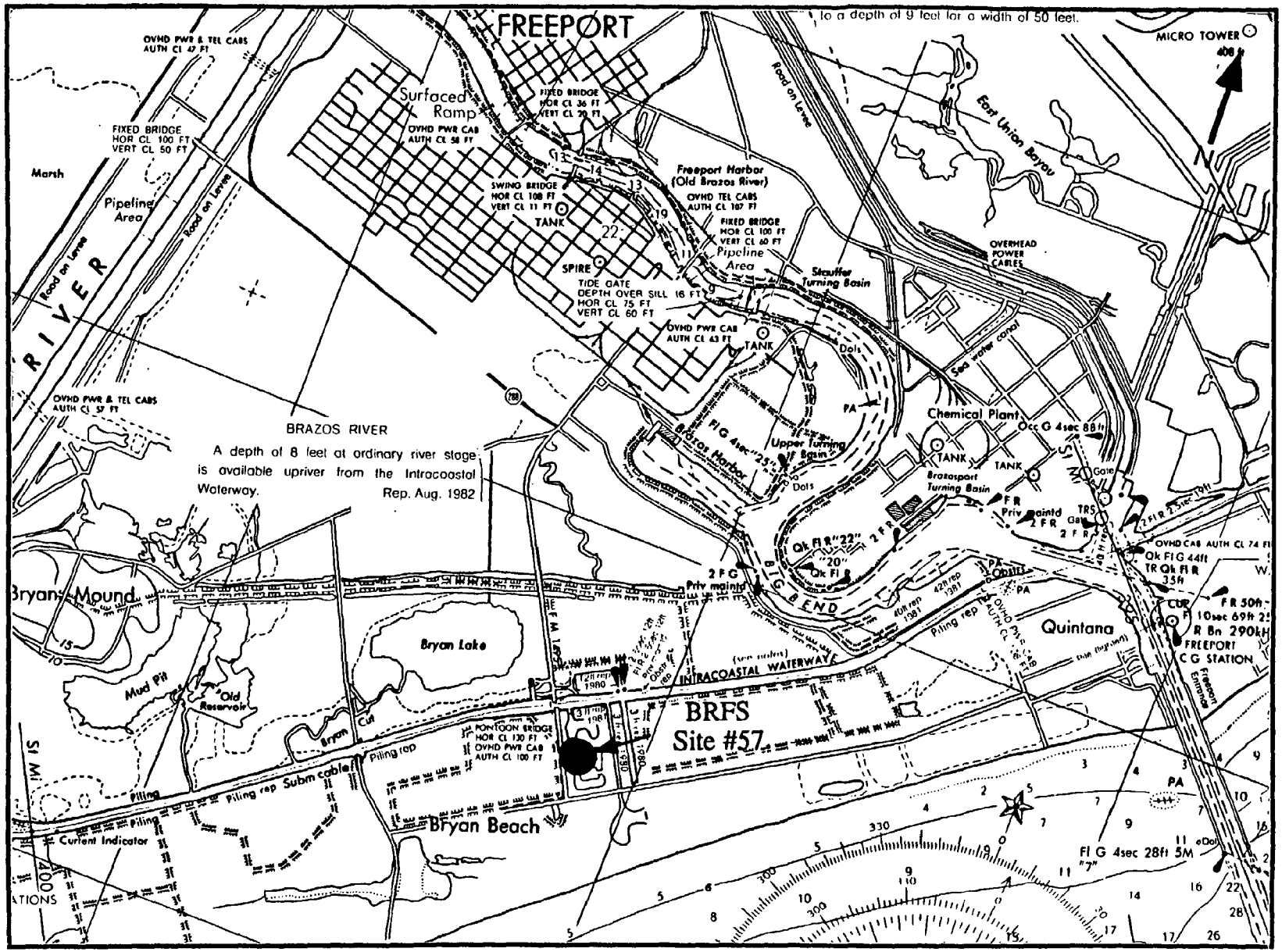
POSSIBLE CONTAMINANTS - Contamination was possible from boat traffic in the ICWW and nearby oil and chemical refineries. Effluent from an adjacent dredge disposal site was returned to the ICWW through the second boat channel where Station 3 was located.

ENVIRONMENTAL DATA

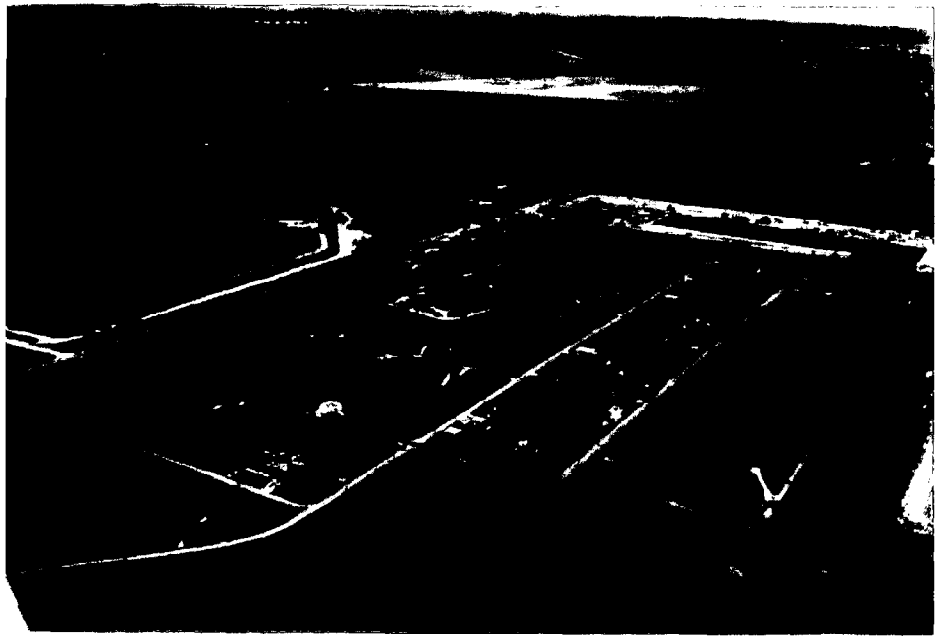
	Salinity (‰)	Temperature (°C)	Dates Sampled
YEAR III	32.0	14.0	16 December 1987
YEAR IV	30.7	18.0	29 November 1988
YEAR V	25.3	12.0	4 December 1989
YEAR VI	27.0	13.8	5 December 1990
YEAR VII	15.0	15.0	3 December 1991
YEAR VIII	-	-	-

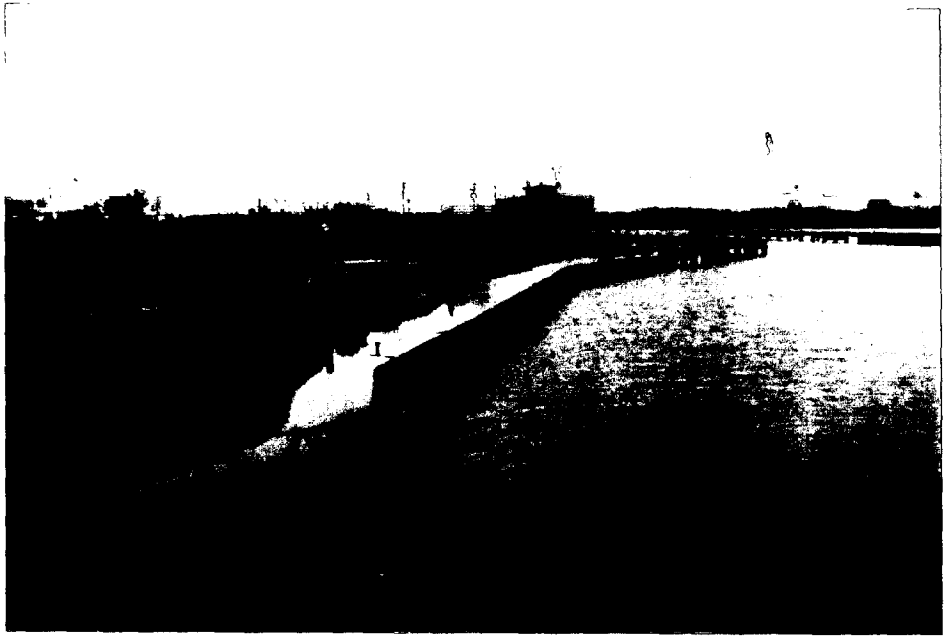


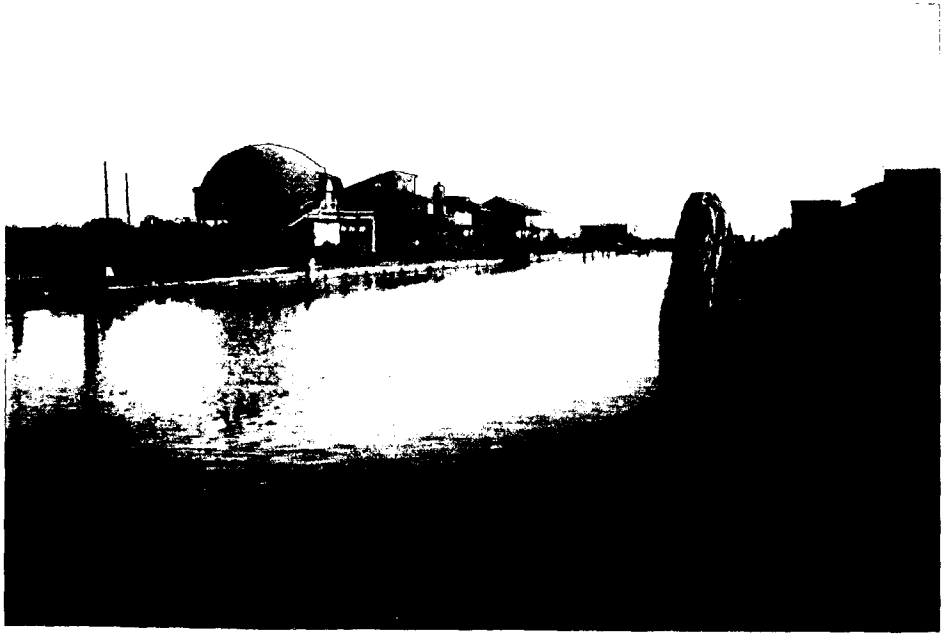
Site #57 (BRFS), Brazos River Freeport Surfside.



Site #57 (BRFS), Brazos River Freeport Surfside (from chart 11322).







SITE NUMBER - 15 **DESIGNATOR** - GBYC

SITE - YACHT CLUB, GALVESTON BAY, TX

NOMINAL SITE CENTER - 29°37.30'N 94°59.50'W

LOCATED ON NOS CHART # - 11326, 11322

SITE ACCESS - The collection site during Years I and II was a walk-up site just north of the Yacht Club. The site was moved in Year III to near the Judges Stand outside of the Houston Yacht Club. The site is accessed by boat launched at the Houston Yacht Club, Eagle Point Marina or Galley Restaurant Marina.

SITE DESCRIPTION - The site was in the middle portion of Galveston Bay near Shoreacres just north of Red Bluff. In the first two years the site was along shore in front of the third house north of the yacht club, in from the retaining wall (Lat. 29°37.20'N, Long. 95°00.10'W). Oysters were intertidal and sediments were subtidal. Sediments were collected east of the Yacht Club property. Oysters were few in number and attached to rocks. In Year III, the site was moved. The new location at the Judges Stand was subtidal and oysters were more abundant.

OYSTER COLLECTIONS

Years I & II - Years I & II shoreline stations were as follows: Station 1 was 50 m north of the Yacht Club property. Station 2 was 70 m north of Station 1. Station 3 was 80 m north of Station 2.

Year III - There were no oysters along the shoreline in Year III; therefore all three stations were moved to deeper water outside the entrance to the yacht basin. The reef was 2 to 3 m deep and runs south from the judges stand curving back to the shore. Station 1 was at the Judges Stand (a 4 piling platform 300 m outside the yacht basin entrance). Station 2 was 100 m to the south and Station 3 was another 100 m to the south.

Year IV - In Year IV all three oysters stations were collected by tong at the Judges Stand (Station 1) due to rough weather conditions and siltation of the lower end (Station 3) of the reef.

Year V - Oysters were collected from the reef around the Judges Stand.

Year VI - Oysters were again collected by tong from around the Judges Stand and were abundant despite the high volume and long duration of freshwater experienced in Galveston Bay.

Year VII - Oysters were again collected by tong from around the Judges Stand.

Year VIII - Oysters were collected by dredge from around the Judges Stand.

Year IX - The site was not visited this year.

SEDIMENT COLLECTIONS

Years I & II - Sediments were collected just offshore (100 m) from the oysters stations.

Year III & IV - No sediments were collected these years.

Year V - Sediments was also collected around the Judges Stand, with Station 1 about 50 m to the north, Station 2 was 25 m south of the stand. Station 3 was 75 m southwest of station 2.

Years VI, VII, VIII, & IX - No sediments were sampled during these years.

SAMPLING METHODS

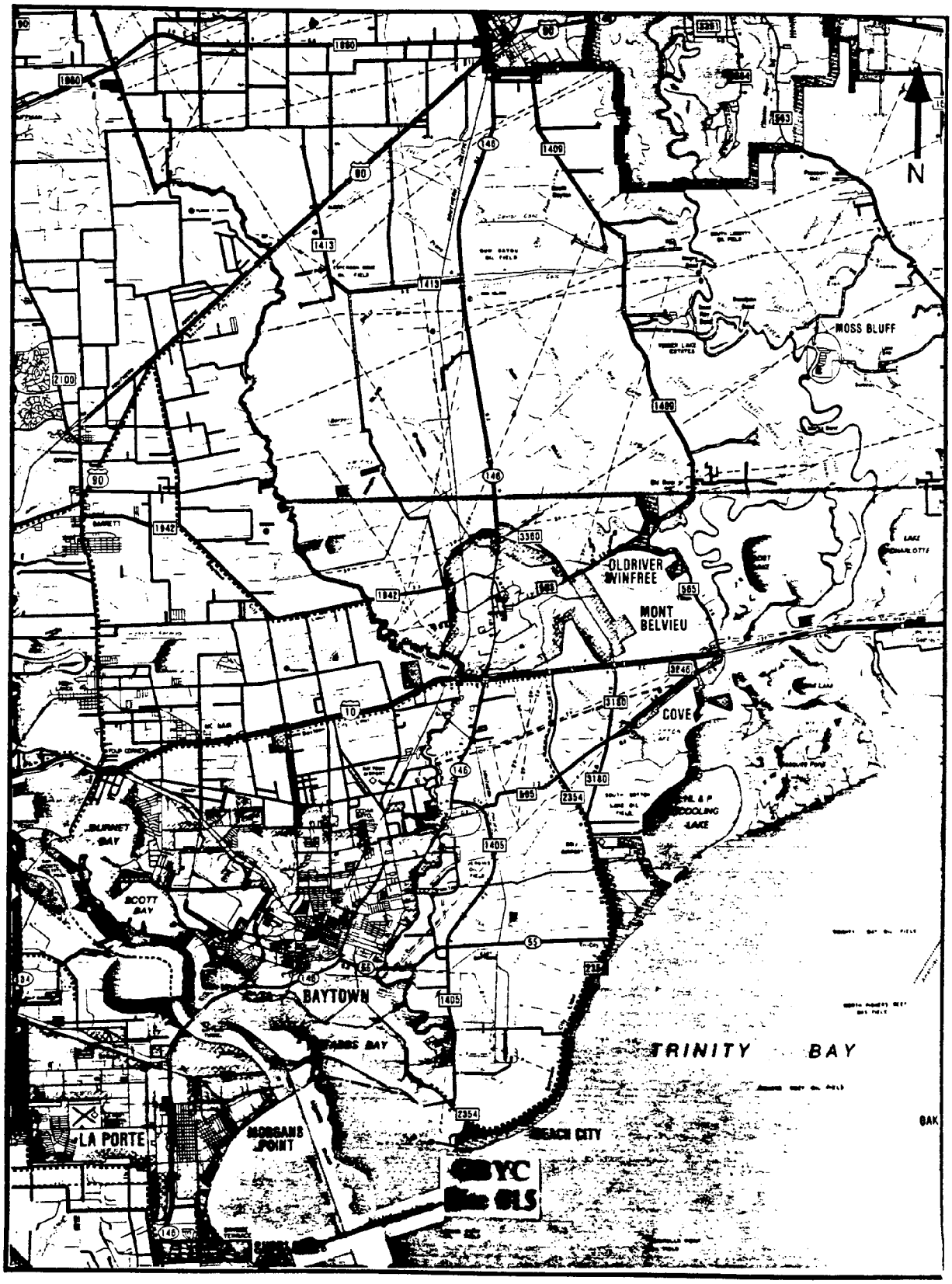
Oysters - hand, tong, or dredge
Sediment - box core

WATER DEPTH - intertidal, 0.5 m (Years I & II); subtidal, 1.5 - 2.0 m.

POSSIBLE CONTAMINANTS - Contamination factors included ship traffic, residential pesticides, heavy industry and city sewage.

ENVIRONMENTAL DATA

	Salinity (‰)	Temperature (°C)	Dates Sampled
YEAR I	15.0	12.0	12 January 1986
YEAR II	10.0	13.0	16 December 1986
YEAR III	24.0	17.0	11 December 1987
YEAR IV	22.0	16.0	30 November 1988
YEAR V	20.0	13.0	5 December 1989
YEAR VI	24.0	14.0	6 December 1990
YEAR VII	12.0	15.0	4 December 1991
YEAR VIII	17.3	13.0	9 December 1992



Site #15 (GBYC), Galveston Bay Yacht Club.

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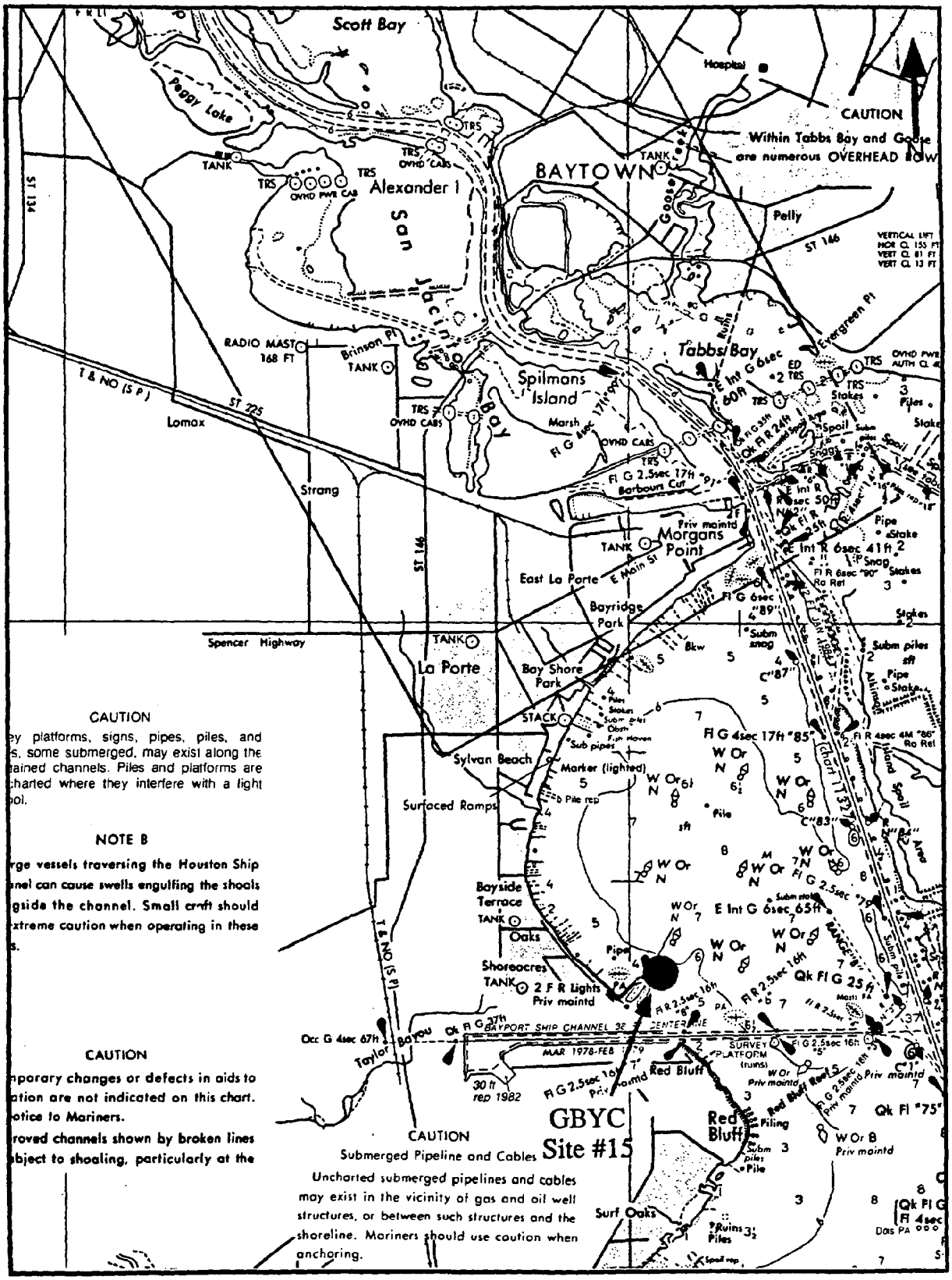


Site #15 (GBYC), Galveston Bay Yacht Club (from chart 11326).

SITE NUMBER 16 **DESIGNATOR** - GBTD

SITE - TODD'S DUMP, GALVESTON BAY, TX

NOMINAL SITE CENTER - 29°30.06'N 94°53.82'W

LOCATED ON NOS CHART # - 11326, 11322

SITE ACCESS - The boat was launched at Pelican Island (TAMU boat basin) in Years I and II and the run up the Houston ship channel to San Leon takes about 1 hour. In Year III, the boat was launched at San Leon Marine near Eagle Point where a lift was available. In subsequent years the boat was launched at the Eagle Point Marina.

SITE DESCRIPTION - The collection site was near an exposed reef midway between southeast Eagle Point and Red Fish Island at Houston Ship Channel. The reef ran from Eagle Point to Red Fish Island. This was an extensive reef with several shipwrecks. The top of the reef was exposed at low tide.

OYSTER COLLECTIONS

Years I & II - Station 1 was west-southwest of the reef between the reef and Eagle Point in 1.5 m of water. Bearing to landmarks are 85° to middle exposed reef; 180° to Railroad draw bridge. Station 2 was dredged near the exposed portion of the reef (about halfway between the marina and the ship channel dredge material islands). Station 2 landmarks were 140° to the middle of the exposed reef. Station 3 was dredged northeast of the reef at about half the distance to the island. Station 3 landmarks are 330° to the middle of exposed reef; 210° to railroad draw bridge.

Year III - Year III stations were close to those previously used. Station 1 was moved approximately 0.5 miles to the north ~50 m offshore of the exposed reef which borders the ship channel and east of the south end of the reef. Stations 2 and 3 were the same as those previously sampled.

Year IV - In Year IV the oysters were obtained from the north side of the east/west reef extending from Eagle Point marina to the exposed reef bordering the ship channel. The location corresponds to Station 2 in previous years. At the time of sampling all commercial oystering was confined to this area and the oysters were purchased.

Year V - Station 1 oysters were purchased from a lugger working on the east end of the reef. Station 3 oysters were obtained from another lugger working on the west end of the reef, approximately 200 m from the first pole at the entrance to the Eagle Point Marina. Station 2 was a combination of oysters from Stations 1 and 3.

Year VI - Station 1 oysters were collected at the high point of the reef toward the west end. Station 2 was collected at the middle of the reef near the ship

wrecked boat (29°29.70'N, 94°53.82'W). Station 3 was dredged by a commercial lugger operating slightly north of the east end of the reef in the bend of Red Fish Island.

Year VII - Station 1 oysters were collected on the northwest end of the reef approximately 200-300 m from the exposed portion of the reef. Station 2 was near the middle of the reef approximately 300 m north of the wrecked shrimp boat. Station 3 was on the east end of the reef approximately 500 m northeast of the shrimpboat. Oysters were numerous at the first two stations.

Year VIII - Oysters were collected at the same reef segments as last year.

Year IX - Large oysters were abundant all the way along the reef. Station 1 oysters were collected on the south side of the reef, next to the sunken shrimp boat. Station 2 oysters were collected 300 m west of the wreck, also on the south side of the reef. Station 3 oysters were collected 300 m east of the wreck on the south side of the reef.

SEDIMENT COLLECTIONS

Years I & II - Sediments in Years I and II were collected north and northwest of the reef. Mud bottoms were patchy in distribution.

Year III - Sediments were collected within 100 m of each of the oyster sites.

Year IV - Sediments for Year IV were collected with a box corer within 100 m of each of the oyster collection sites described for Year III.

Year V - Sediments were collected adjacent to each station. Station 1 was 100 m north of the east end of the exposed reef. Station 2 was 100 m north of the center of the reef. Station 3 was 300 m north of the oyster collection site. All the sediments were sandy-silt over black clay.

Year VI - Sediments (NIST) were collected 100 m north of each oyster station.

Years VII, VIII, & IX - No sediments were sampled during these years.

SAMPLING METHODS

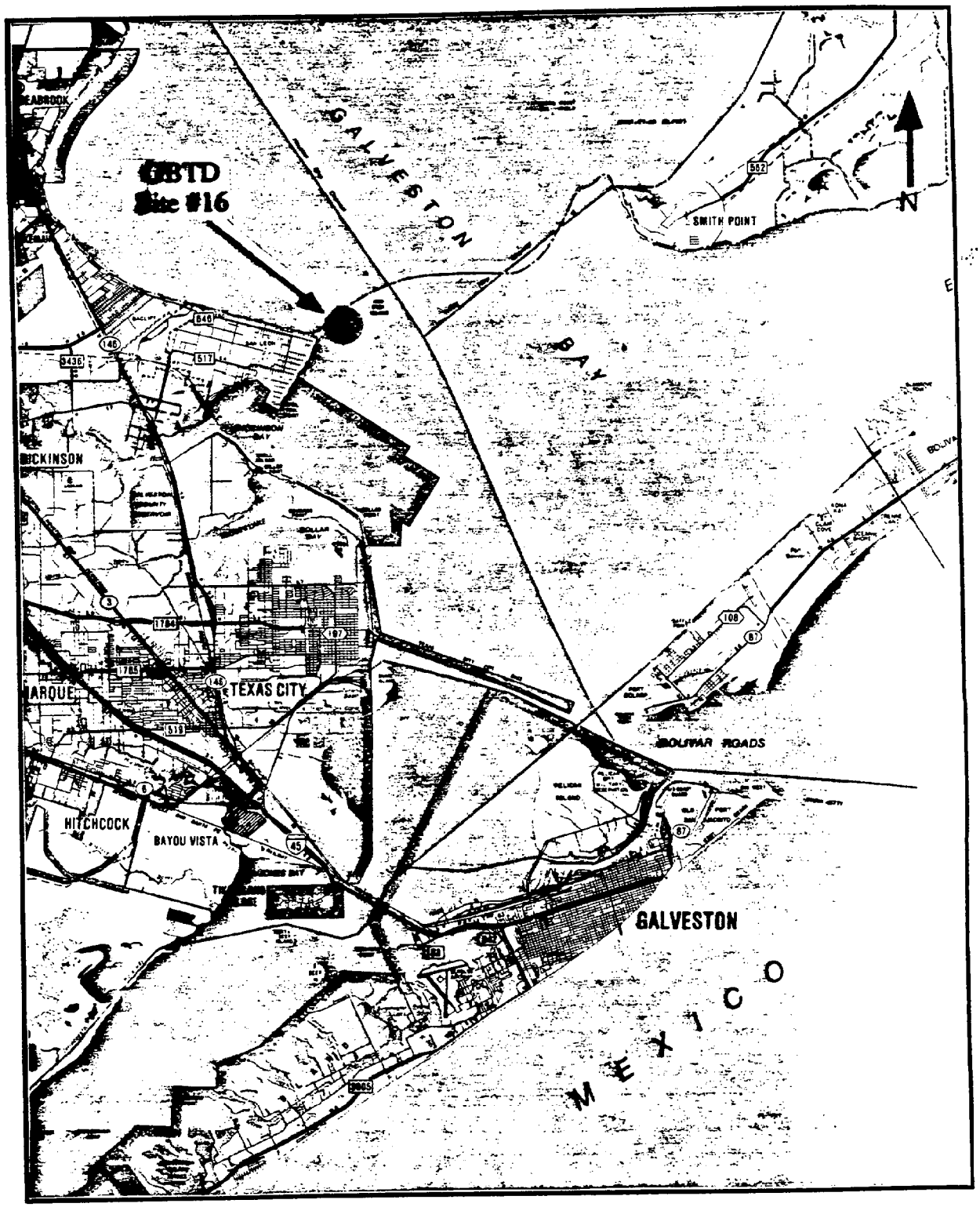
Oysters - Dredging, tonging, or by hand
Sediment - box core

WATER DEPTH - intertidal to subtidal, 0.1 to 3 m

POSSIBLE CONTAMINANTS - Sources of contamination included the dredging activities on the Houston ship channel, the Houston ship channel-Galveston Bay complex, and the petrochemical industry at Texas City.

ENVIRONMENTAL DATA

	Salinity (‰)	Temperature (°C)	Dates Sampled
YEAR I	12.0	9.0	12 January 1986
YEAR II	8.2	11.0	19 December 1986
YEAR III	30.0	18.0	9 December 1987
YEAR IV	33.0	16.0	29 November 1988
YEAR V	19.0	14.0	6 December 1989
YEAR VI	22.0	13.0	7 December 1990
YEAR VII	10.0	13.2	5 December 1991
YEAR VIII	13.3	18.0	10 December 1992
YEAR IX	13.0	16.0	8 December 1993



Site #16 (GBTD), Galveston Bay Todd's Dump.

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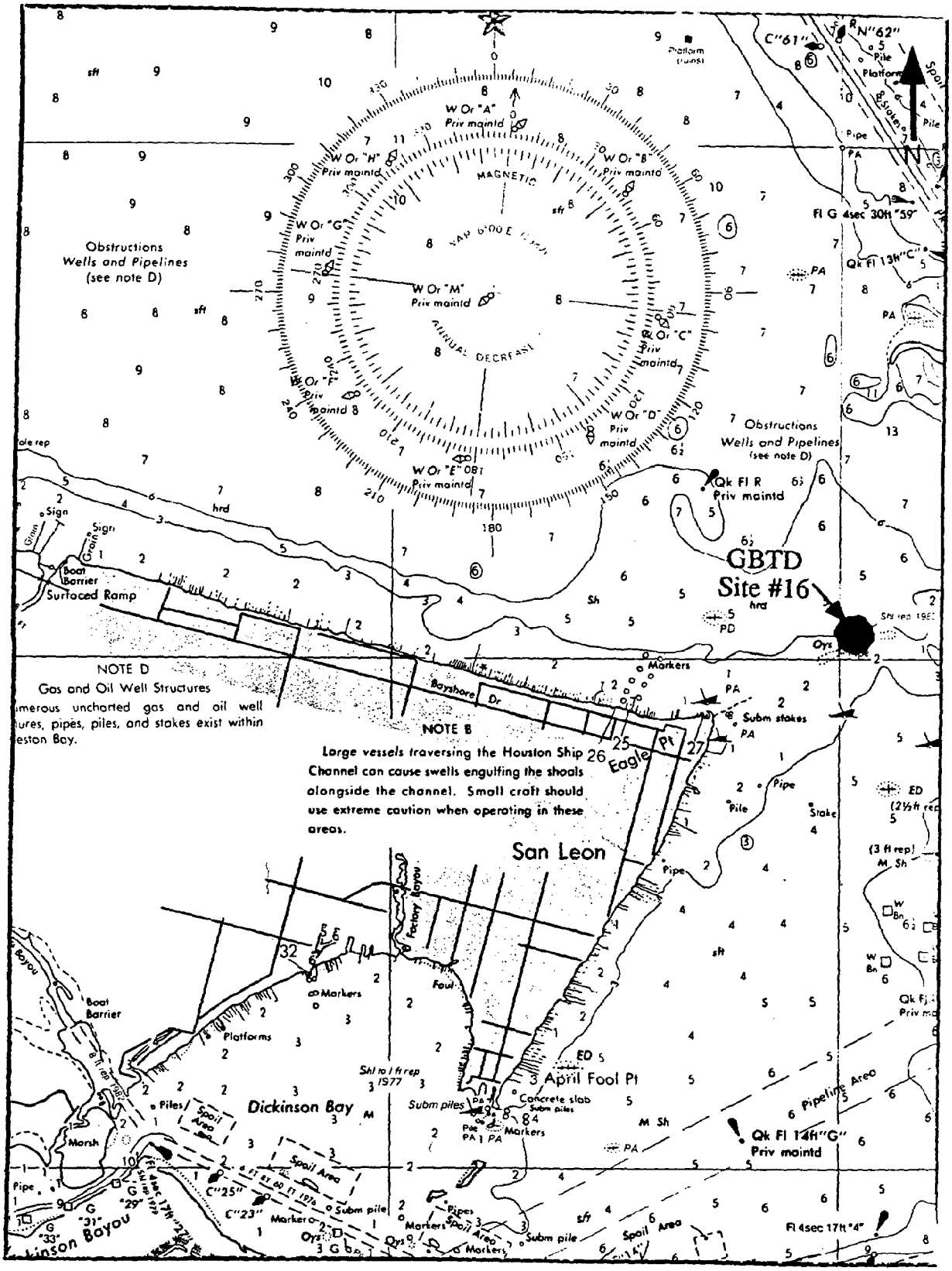
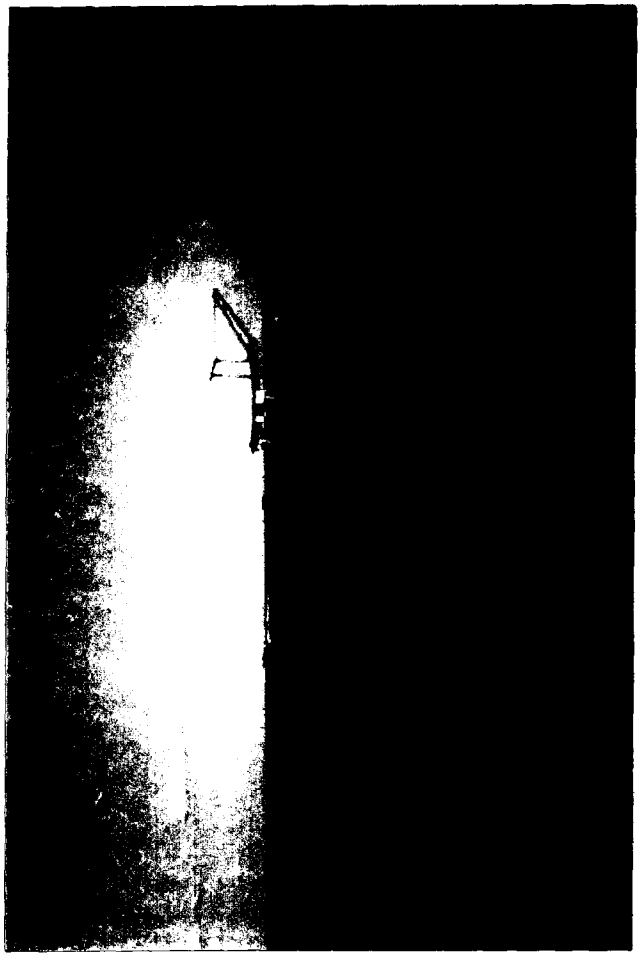
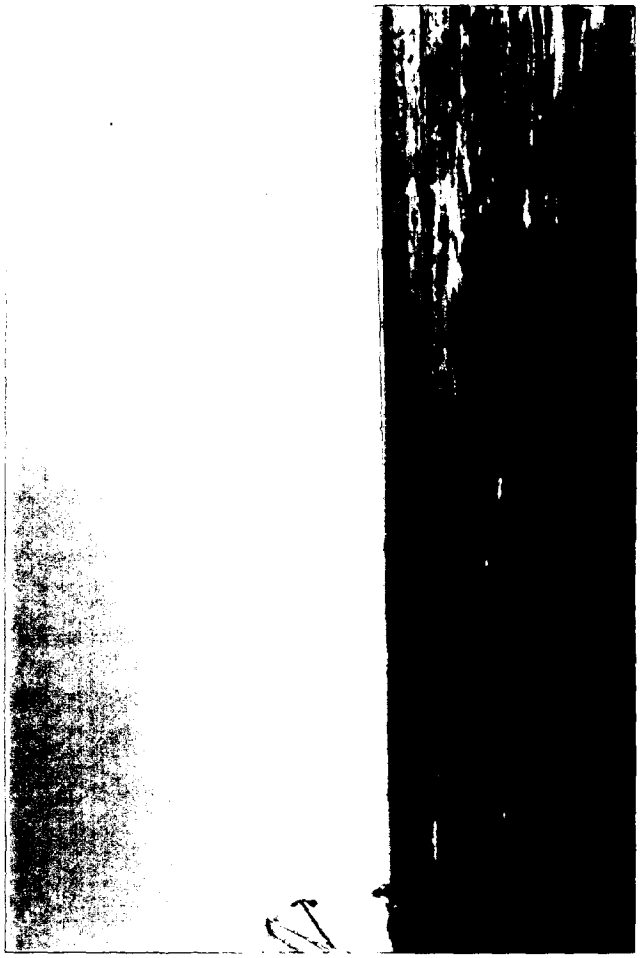
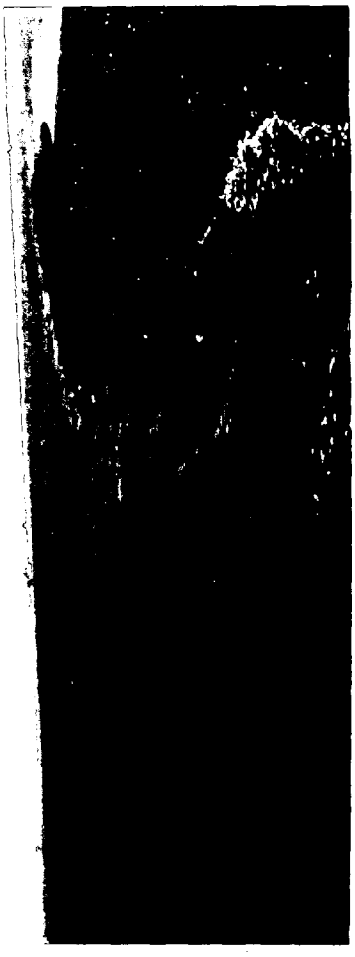


Site #16 (GBTD), Galveston Bay Todd's Dump (from chart 11326).







SITE NUMBER - 17 **DESIGNATOR** - GBHR

SITE - HANNA REEF, GALVESTON BAY, TX

NOMINAL SITE CENTER - 29°28.85'N 94°44.00'W

LOCATED ON NOS CHART # - 11326, 11322

SITE ACCESS - The boat was launched at TAMU boat basin on Pelican Island during the first two years of the study and the ICWW is traveled along Bolivar Peninsula to the first cut (Sievers Cove) through to East Bay. The reef is to the northwest. In Years III & IV, the boat was launched at the Eagle Point Marina.

SITE DESCRIPTIONS - Hanna Reef is a large subtidal reef that runs northwest to southeast and separates East Bay from Galveston Bay. The large exposed (only at low tide) portion in the middle served as the point of reference for site identification. The oyster site was the submerged reef northeast of the large exposed part (bearing 055° from) and marked by two telephone pole sized pilings. Also at mid-bay there was a solitary concrete piling and a six leg wooden platform. The area was fished commercially and marked by many temporary stakes.

OYSTER COLLECTIONS

Year I - In Year I the oysters were obtained on site from a commercial dredger and thus no station distinction was possible.

Year II - In Year II the stations were dredged from the submerged reef to the northeast of the exposed part of Hanna Reef. Station 1 was on the west side of the submerged reef, between two telephone poles. Station 2 was north of the reef. Station 3 was east of the reef.

Year III - In Year III, oysters were purchased from a commercial fisherman operating at Stations 1 and 2 and oysters were dredged from Station 3 at approximately the same location described above.

Year IV - Oysters were purchased from commercial fishermen dredging on Hanna Reef.

Year V - Oysters were tonged to the north of the exposed part of Hanna Reef on a line between the white oil platform and the six legged wood platform. Station 1 was on the west side of the reef approximately 1000 m east of the white platform. Station 2 was 150 east of Station 2 near the top of a submerged reef. Station 3 was another 200 m east toward the six legged platform. The bottom was shell and shell hash in dark brown mud.

Year VI - Oysters were purchased from a commercial fisherman dredging on Hanna Reef.

Year VII - All three stations were dredged off of the east end of the exposed portion of Hanna reef. The first station was approximately 300 m east of the reef with Stations 2 and 3 further to the east separated by approximately 50-m.

Year VIII - Oysters were dredged in the same location as Year VII.

Year IX - This site was not scheduled for collection this year.

SEDIMENT COLLECTIONS

Years I, II, & III - Sediments were obtained by boxcore adjacent to the oyster stations.

Years IV, V, VI, VII, VIII, & IX - No sediments were sampled during these years.

SAMPLING METHODS

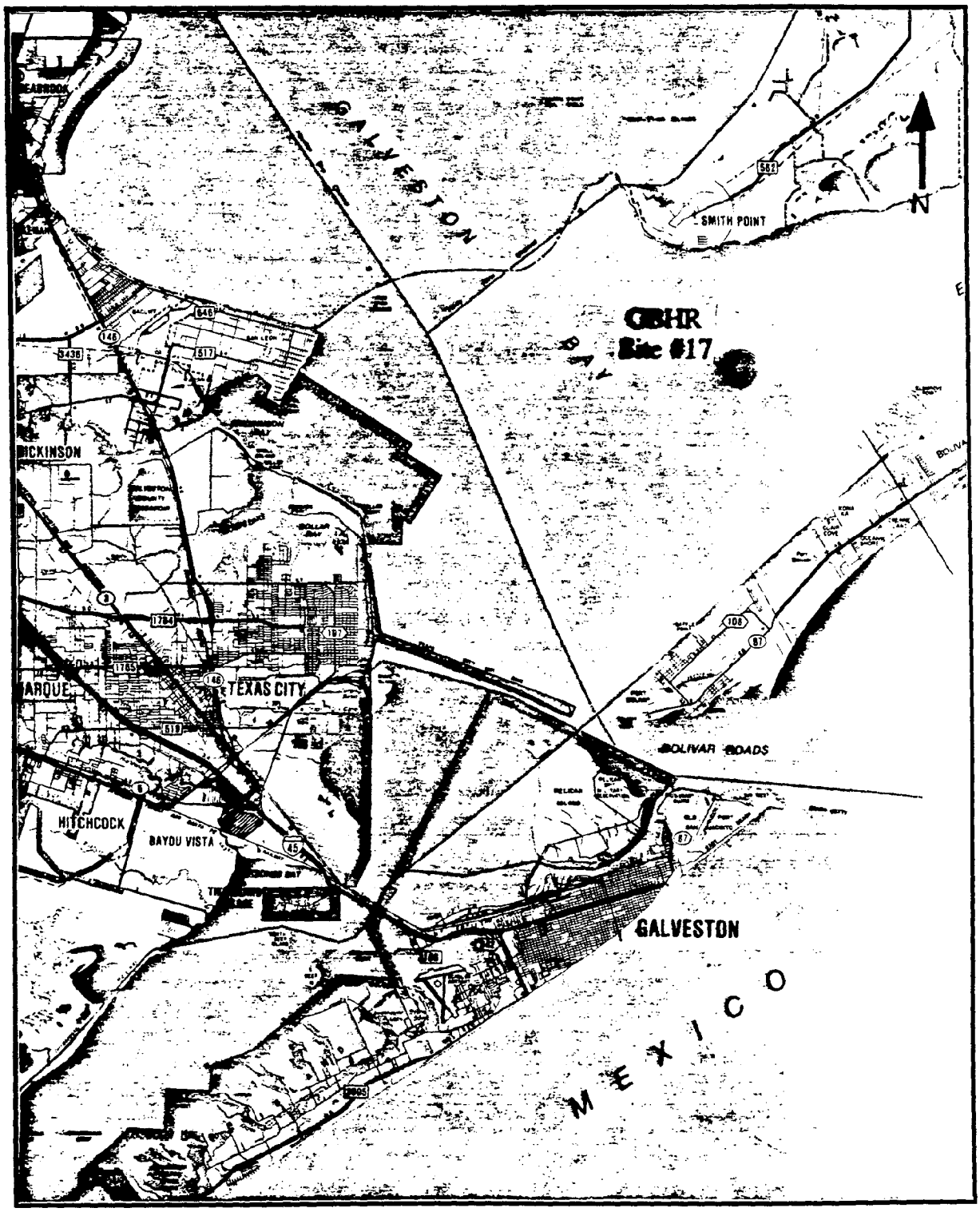
Oysters - dredge, tong, or purchase
Sediment - box core

WATER DEPTH - subtidal, 1 to 3 m

POSSIBLE CONTAMINANTS - Possible contaminant sources included oil and gas development in Galveston and East Bays and the petrochemical complex at Texas City.

ENVIRONMENTAL DATA

	Salinity (‰)	Temperature (°C)	Dates Sampled
YEAR I	10.5	7.0	11 January 1986
YEAR II	10.0	12.0	16 December 1986
YEAR III	30.0	18.0	9 December 1987
YEAR IV	34.0	16.0	29 November 1988
YEAR V	16.3	14.0	6 December 1989
YEAR VI	23.0	12.0	6 December 1990
YEAR VII	10.0	13.2	4 December 1991
YEAR VIII	18.0	13.0	10 December 1992



Site #17 (GBHR), Galveston Bay Hanna Reef.

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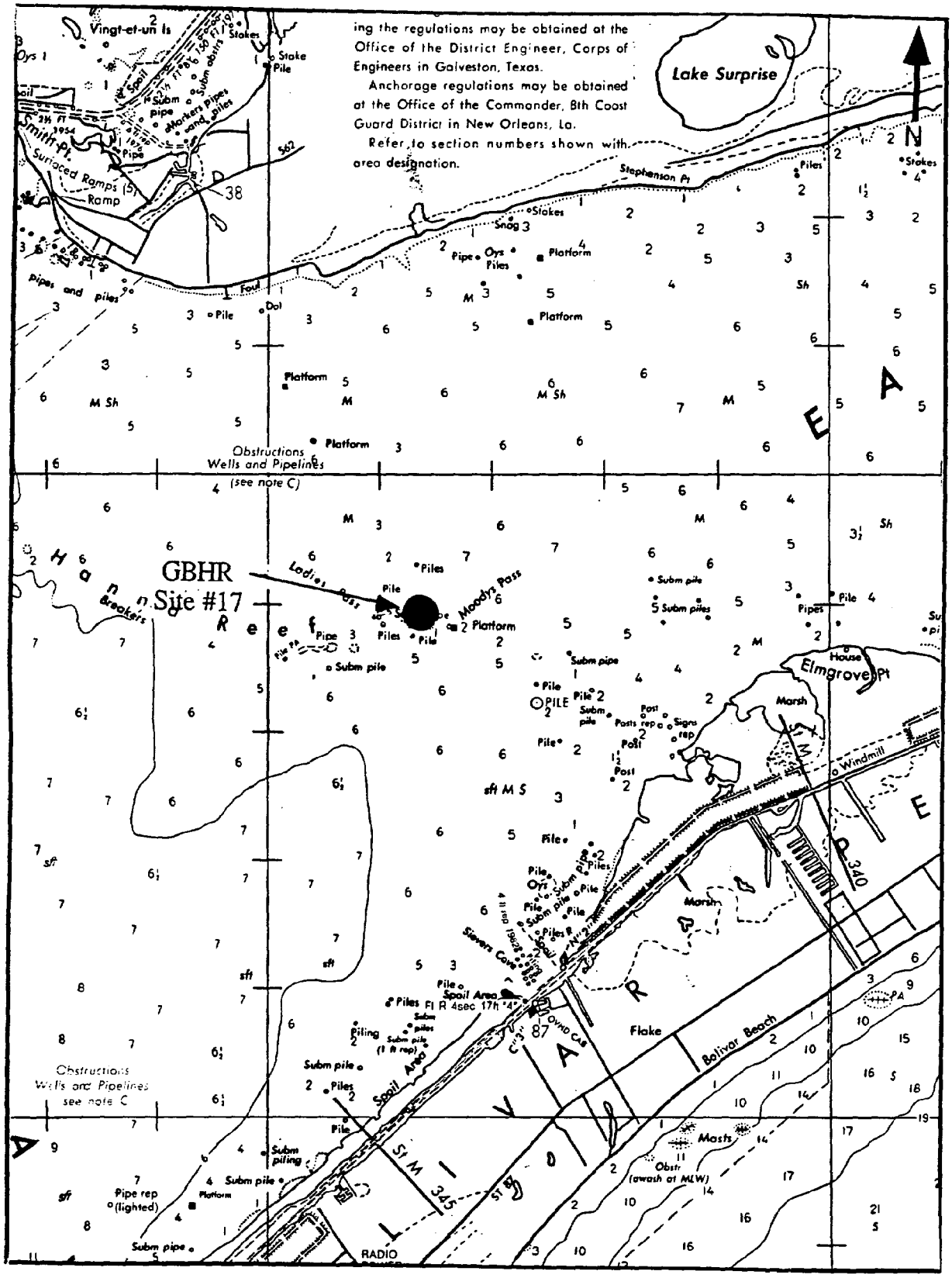
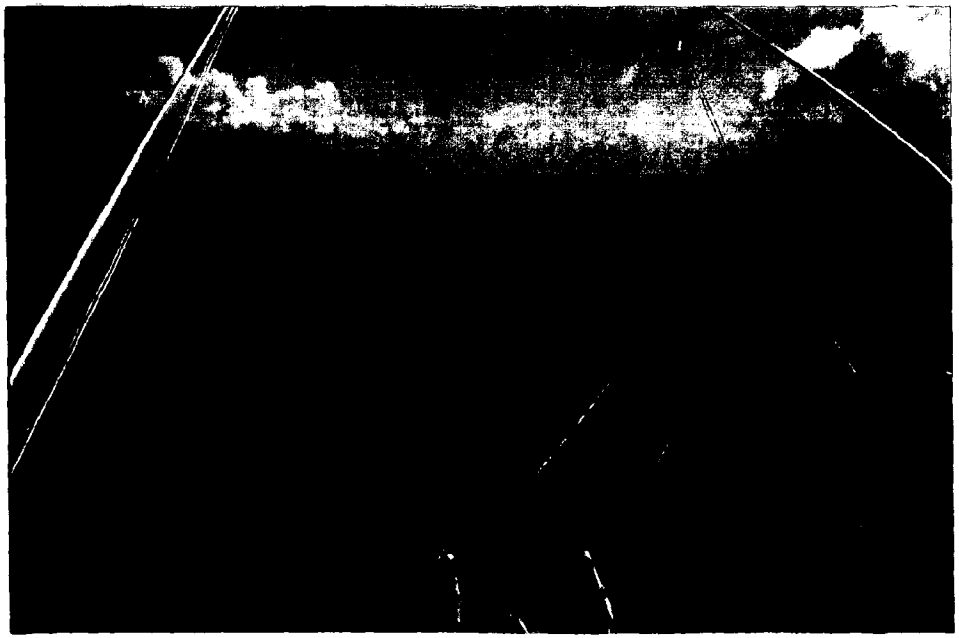


Site #17 (GBHR), Galveston Bay Hanna Reef (from chart 11326).



SITE NUMBER - 18 **DESIGNATOR** - GBCR

SITE - CONFEDERATE REEF, GALVESTON BAY, TX

NOMINAL SITE CENTER - 29°15.75'N 94°54.88'W

LOCATED ON NOS CHART # - 11326, 11322

SITE ACCESS - The site is accessed from the boat launch at TAMU boat basin or more directly by driving to a public boat ramp for launch directly south of the site. Take Seawall Blvd. west to 8 Mile Road, which joins Anderson Ways Road at Stewart Street. Continue on Anderson to the north almost to West Bay and turn left at Sportsman Road, proceed for ~1 mile. The boat ramp is on the right between two houses.

SITE DESCRIPTION - The site was a reef between Deer Island and shore, approximately 0.5 mile from the boat ramp. This large reef was exposed at low tide and was utilized by commercial and private fisherman. This was a heavily utilized reef, as was evidenced by the large number of people collecting oysters during the third year's collections.

OYSTER COLLECTIONS

Years I, II, & III - Stations were established along the edge of the reef. Station 1 was located on the eastern tip of the reef. Station 2 was in the middle of the reef and Station 3 was at the west end. Oysters were picked by hand from 0.5 m of water on both sides of the reef.

Year IV - In Year IV, the prevailing winds and tides had covered the reef completely with waves of about two feet. Thus, sampling by hand on the reef margins was not possible. Oysters were obtained from a commercial dredger operating in the area of former Station 2, between Confederate Reef and South Deer Island to the north. The site was 1.7 nautical miles to the west from the green channel marker 9 at the entrance to Offatts Bayou.

Years V, VI, VII, & VIII - Oysters were collected by hand at low tide from the exposed reef. Station 1 was located on the eastern tip of the reef where 50 m of reef was above water. Station 2 was in the middle of the reef to the west of Station 1. Station 3 was on the west end of the reef approximately 300 m west of Station 2. The entire reef was over hard bottom composed of shell and shell hash.

Year IX - The site was not scheduled for collection this year.

SEDIMENT COLLECTIONS

Years I, II, & III - Sediments were patchy and were located approximately 1 mile north of the oyster stations, between Deer Island and the reef, and

northeast from the island at a distance of ~50 m. Sediments were collected at Lat. 29°16.10'N and Long. 94°54.60'W.

Year V - Sediments were collected north of the oyster stations near Deer Island. Station 1 was on the east side of the island 200 m from shore. Station 2 was on the south shore of Deer Island near a cove approximately 60 m from shore. Station 3 was on the west side of Deer Island 60 m from the shore. Sediments were silty sand over hard sand.

Years IV, VI, VII, VIII, & IX - No sediments were sampled during these years.

SAMPLING METHODS

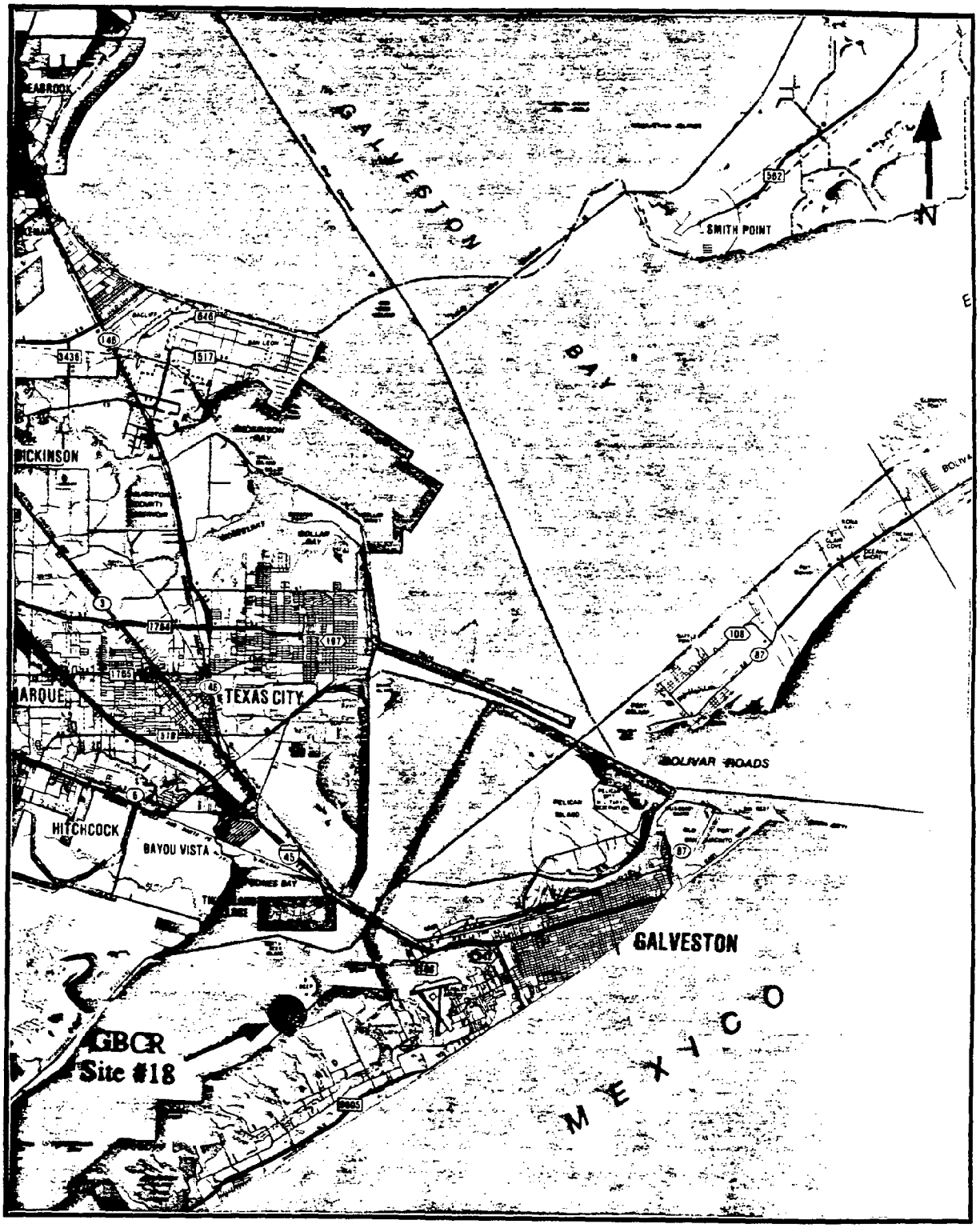
Oysters - hand
Sediment - box core

WATER DEPTH - intertidal or subtidal, 0 to 0.5 m

POSSIBLE CONTAMINANTS - There were no obvious sources of contamination in the vicinity of the reef.

ENVIRONMENTAL DATA

	Salinity (‰)	Temperature (°C)	Dates Sampled
YEAR I	20.0	7.0	10 January 1986
YEAR II	17.0	14.0	16 December 1986
YEAR III	37.0	18.0	10 December 1987
YEAR IV	40.0	12.0	30 November 1988
YEAR V	21.5	11.0	5 December 1989
YEAR VI	26.0	13.0	6 December 1990
YEAR VII	24.0	12.0	4 December 1991
YEAR VIII	23.6	13.0	9 December 1992



Site #18 (GBCR), Galveston Bay Confederate Reef.

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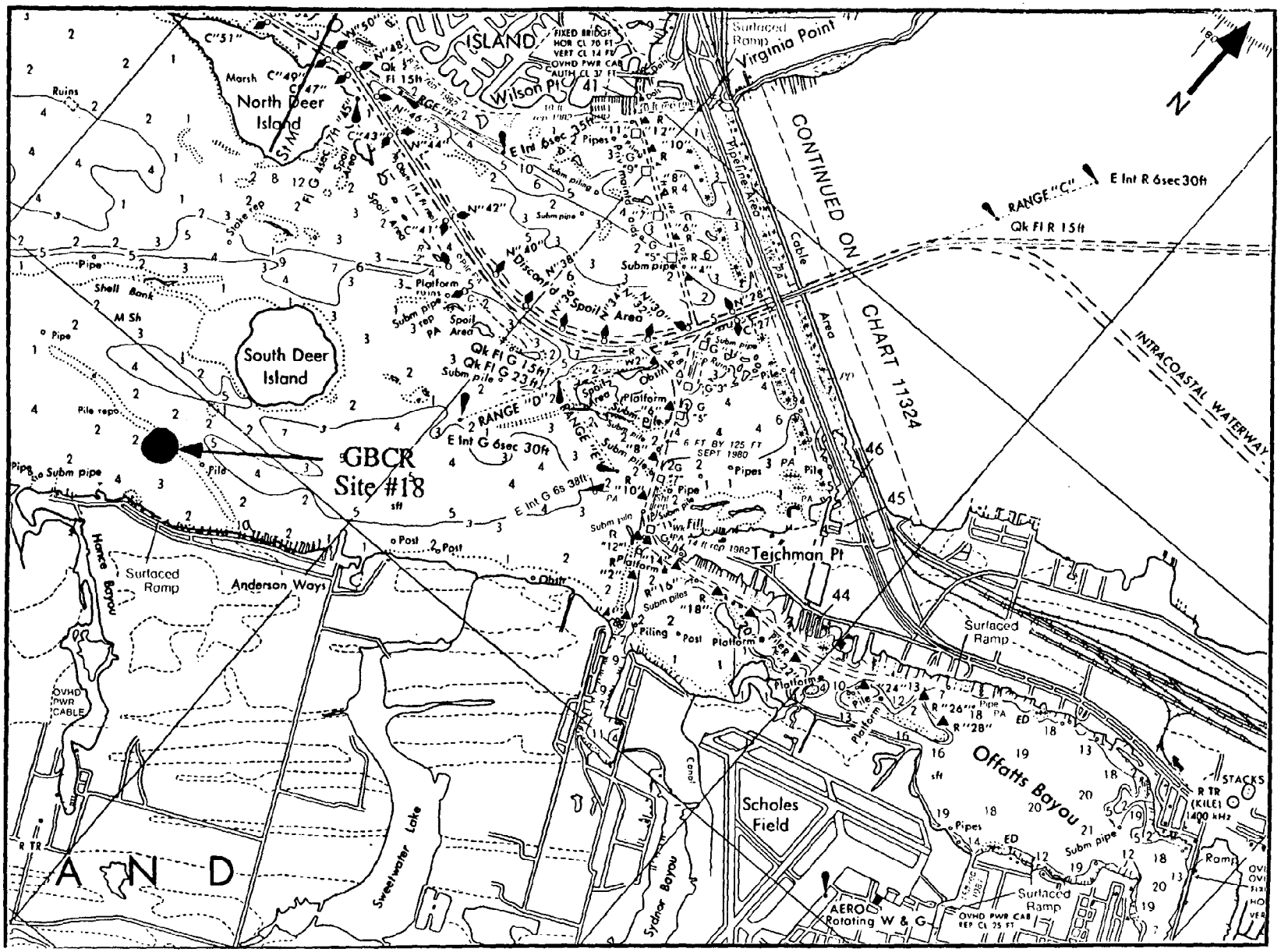
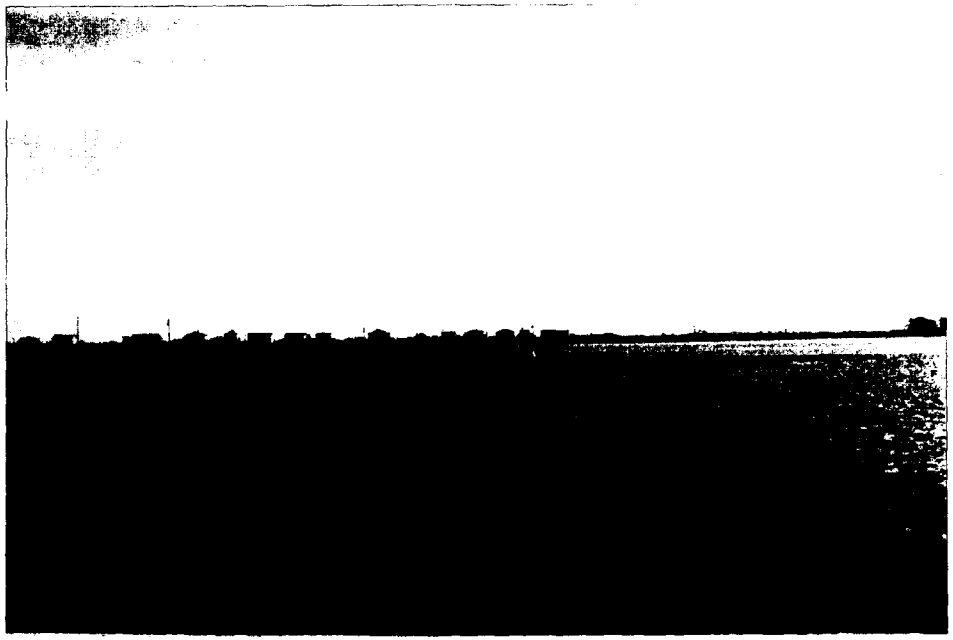


Site #18 (GBCR), Galveston Bay Confederate Reef (from chart 11322).



SITE NUMBER - 58 **DESIGNATOR** - GBOB

SITE - OFFATTS BAYOU, GALVESTON BAY, TX

NOMINAL SITE CENTER - 29°17.08'N 94°50.15'W

LOCATED ON NOS CHART # - 11322

SITE ACCESS - This collection site, established in Year III, is located in the middle of the south shore of Offatts Bayou. From Stewart Rd. Take 71st Street north to Heards Lane and then travel down Bay Drive through the apartment complex. Follow the dirt road around the turn for approximately 100 m and turn north onto private property to an open shed with a green roof. The stations were located along the shoreline north of the shed at Lat. 29°16.65'N and Long. 94°50.87'W. In Year IV, the collection site was moved to the 61st bridge at the public boat ramp.

SITE DESCRIPTION - This collection site was located in the middle of the south shore of Offatts Bayou. Oysters could be picked up along the shoreline but sediments had to be obtained in deeper water east of the oyster stations. Oysters were fairly common but not abundant and were attached to concrete and brick rubble or were loose on the bottom.

OYSTER COLLECTIONS

Year III - Year III stations were located as follows: Station 1 was located at the boat ramp and extended east to the first set of wooden pilings. Station 2 was located between the pilings and wood pier. Station 3 was located to the east of the wood fishing pier.

Years IV, V, & VI - In Year IV, the Offatts Bayou site was moved to the east end of the bayou to correspond to the location from which sediments were sampled in Year III. The new GBOB stations were located on the 61st Street causeway at the bridge which crosses the bayou. Station 1 was on the bay side of the bridge, extending from the bridge to the public launching ramp. Station 2 began under the bridge (on the south side) and extended into the enclosed basin part of the bayou. Station 3 was inside the small basin, extending south from the bridge.

Years VII, VIII, & IX - Oyster collection stations were located at the same sites described above.

SEDIMENT COLLECTIONS

Year III - Sediment was collected at the east end of Offatts Bayou near the shoreline. This was the only place in the bayou where mud was found. All other sites had sandy bottoms.

Years IV, V, VI, VII, VIII, & IX - No sediments were sampled during these years.

SAMPLING METHODS

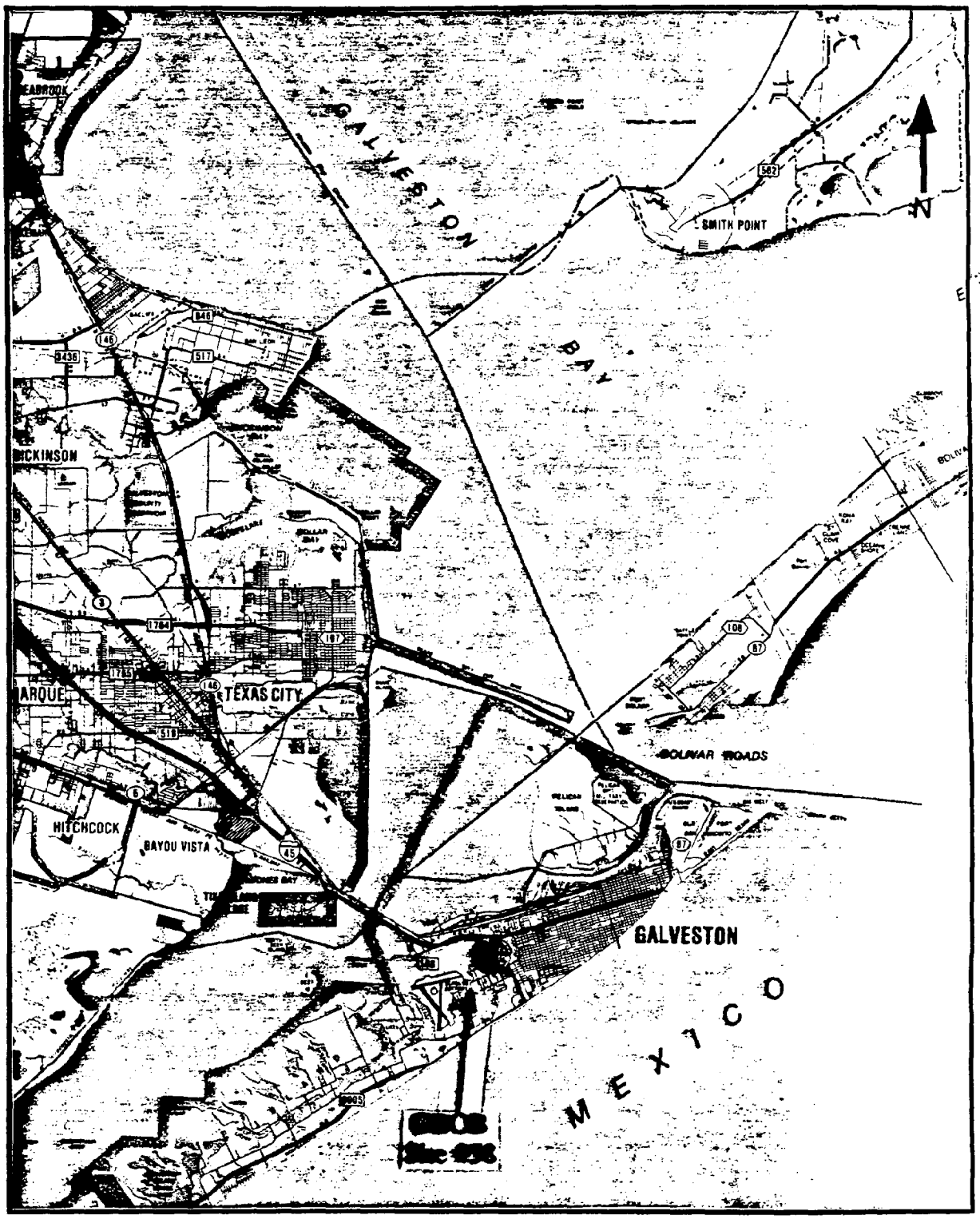
Oysters - hand
Sediment - box core

WATER DEPTH - 0 to 0.5 m.

POSSIBLE CONTAMINANTS - No obvious point sources of contamination were seen; however, this bay was surrounded by housing and residential development and had a long-term history of pollution.

ENVIRONMENTAL DATA

	Salinity (‰)	Temperature (°C)	Dates Sampled
YEAR III	35.0	18.0	8 December 1987
YEAR IV	38.6	15.0	30 November 1988
YEAR V	21.7	13.0	5 December 1989
YEAR VI	27.3	15.5	6 December 1990
YEAR VII	24.0	14.5	4 December 1991
YEAR VIII	25.0	15.0	9 December 1992
YEAR IX	21.0	17.0	8 December 1993



Site #58 (GBOB), Galveston Bay Offatts Bayou.

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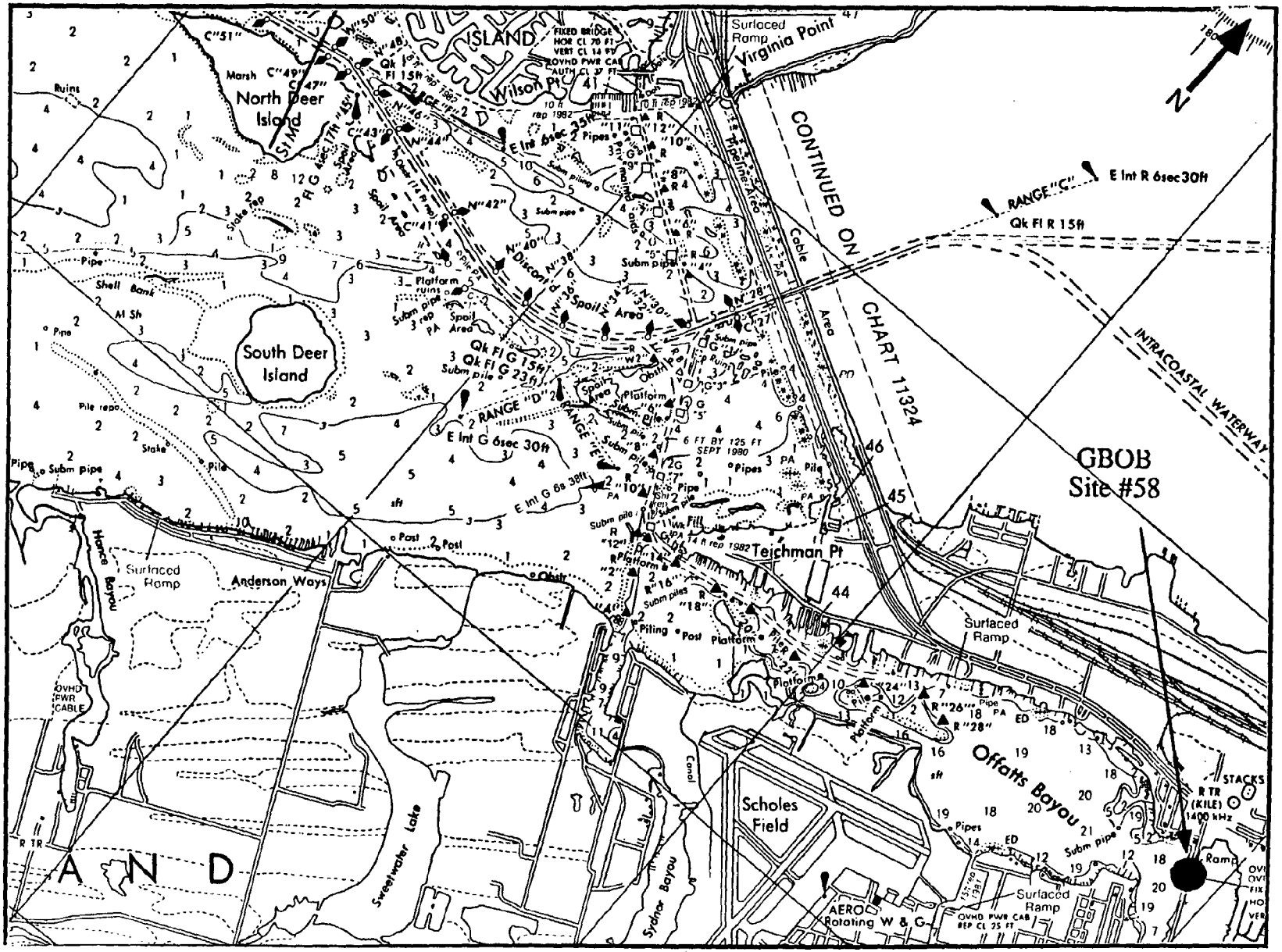


Site #58 (GBOB), Galveston Bay Offatts Bayou (from chart 11322).

SITE NUMBER - 59 **DESIGNATOR** - GBSC

SITE - SHIP CHANNEL, GALVESTON BAY, TX

NOMINAL SITE CENTER - 29°42.27'N 94°59.58'W

LOCATED ON NOS CHART # - 11326

SITE ACCESS - This collection site, which was established in Year III, is located at the mouth of Goose Creek in Tabbs Bay. Access to the site is by boat launched at The Galley Restaurant and Marina, south of U.S. Highway 146 on Black Duck Bay.

SITE DESCRIPTION - The three oyster stations were located approximately 150 m off of Tabbs Bay point in a south to north line on a submerged reef marked by concrete pilings. Oysters were collected with tongs in 1 to 1.5 m of water on the submerged reef. Numerous dead oysters were present along the reef but abundant young oysters were present.

OYSTER COLLECTIONS

Years III, IV, VI, VI, VII, & VIII - Oyster stations in all years were from south to north along the reef. Station 1 was near a group of concrete pilings. Station 2 was 50 m north and Station 3 was 50 m farther north.

Year IX - Very few live oysters were to be found in the area, as a layer of silt now covers the dead reef. Only one small sample of oysters was collected from the entire area that was originally established in Year III. The surrounding area was searched and no live oysters were found, just extensive collections of oyster shell.

SEDIMENT COLLECTIONS

Year III - Sediment stations were located east of the oyster stations. Station 1 was collocated with the first oyster station. Station 2 was located 50 m to the east and Station 3 was 50 m farther east.

Year IV - No sediments were collected this year.

Year V - Sediment samples were taken in the same locations as described in Year III.

Years VI, VII, VIII, & IX - No sediments were sampled during these years.

SAMPLING METHODS

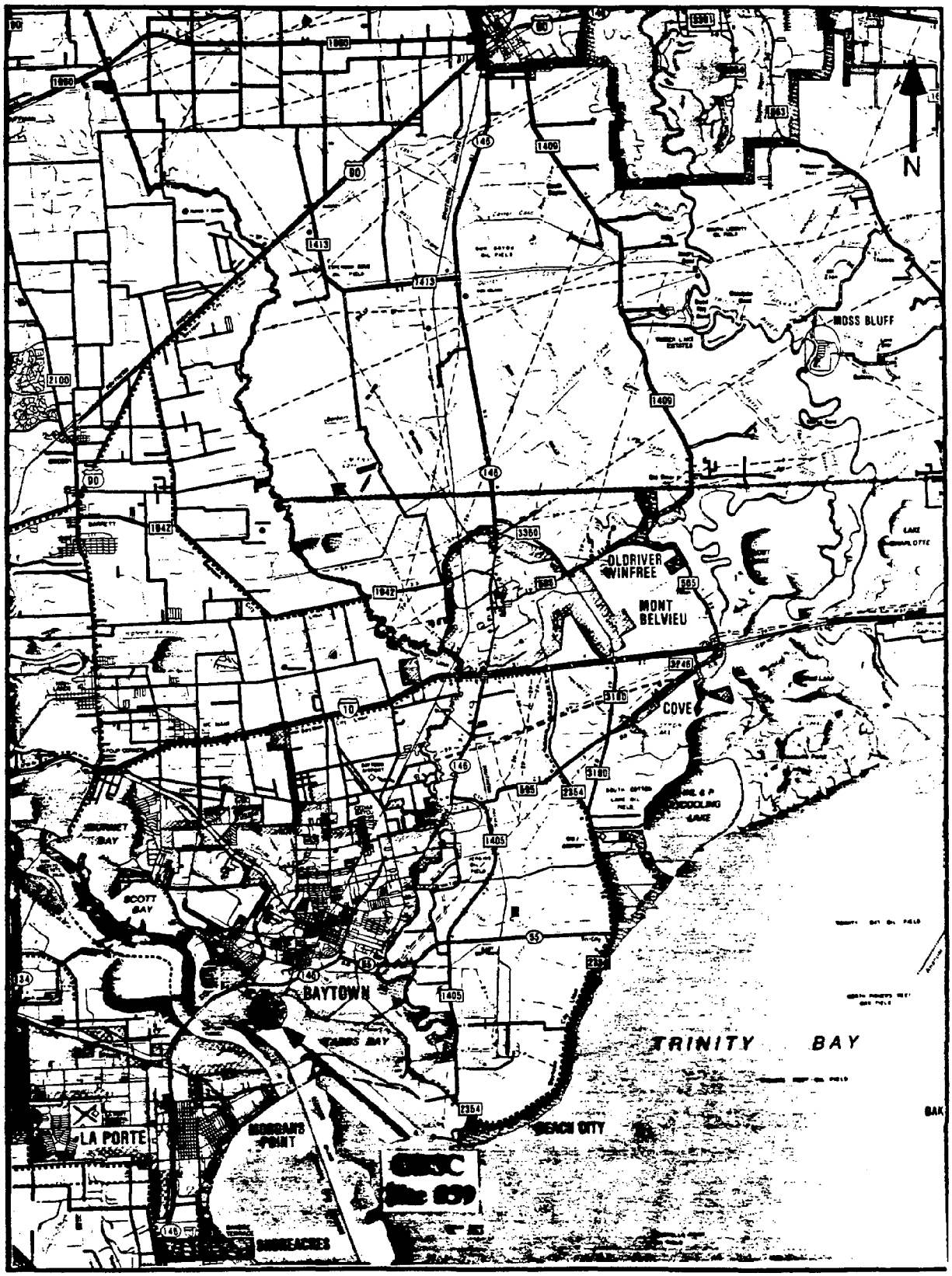
Oysters - tongs and dredge
Sediment - box core

WATER DEPTH - subtidal, 1 to 1.5 m

POSSIBLE CONTAMINANTS - Potential contamination was possible from the Houston Ship Channel to the west and from the Goose Creek watershed which drained a heavily industrialized area containing several petrochemical refineries.

ENVIRONMENTAL DATA

	Salinity (‰)	Temperature (°C)	Dates Sampled
YEAR III	22.0	18.0	12 December 1987
YEAR IV	21.0	16.0	30 November 1988
YEAR V	17.0	13.0	5 December 1989
YEAR VI	10.0	16.0	6 February 1991
YEAR VII	12.0	16.0	4 December 1991
YEAR VIII	15.0	14.0	9 December 1992
YEAR IX	12.0	16.0	7 December 1993



Site #59 (GBSC), Galveston Bay Ship Channel.

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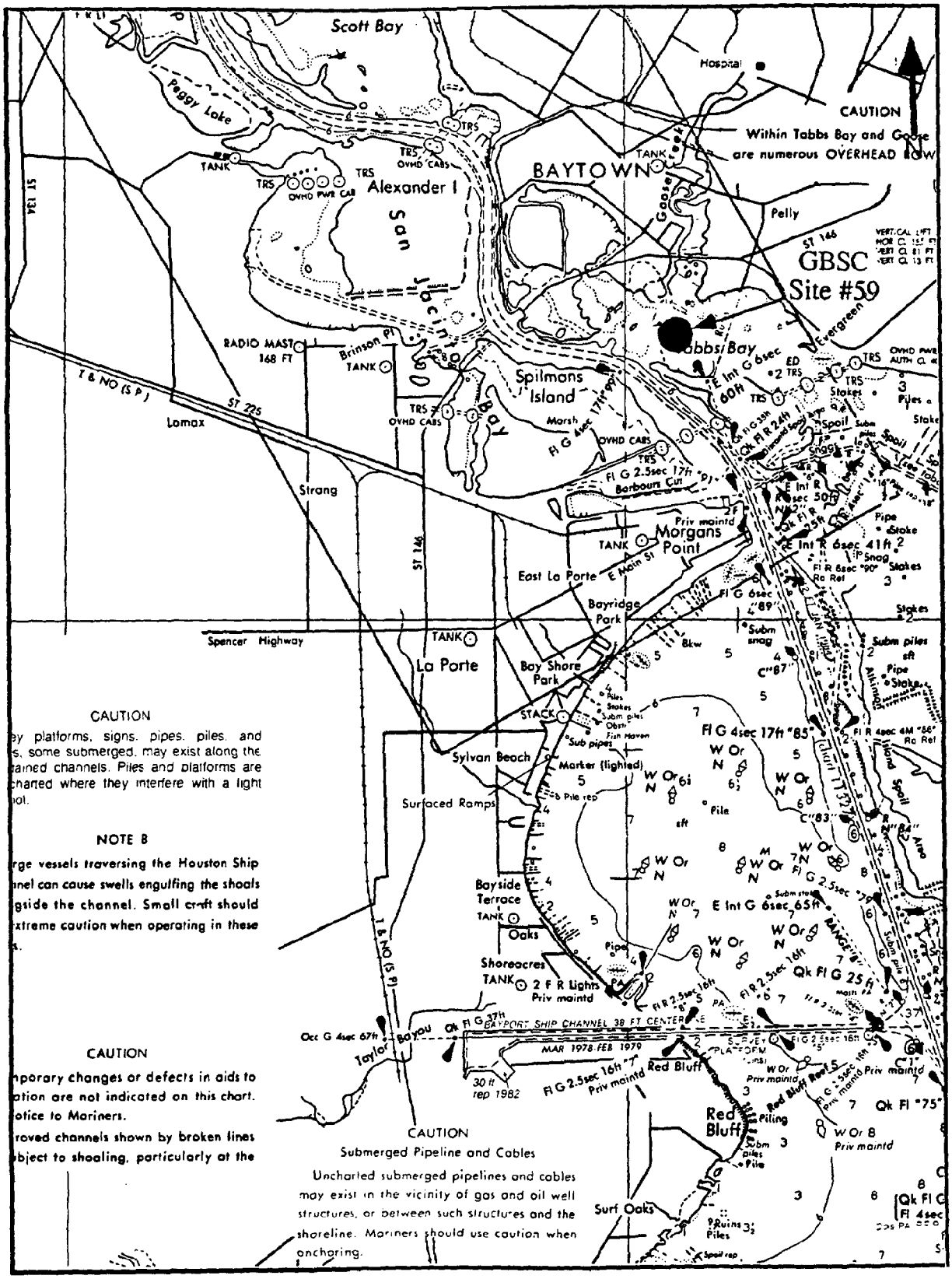
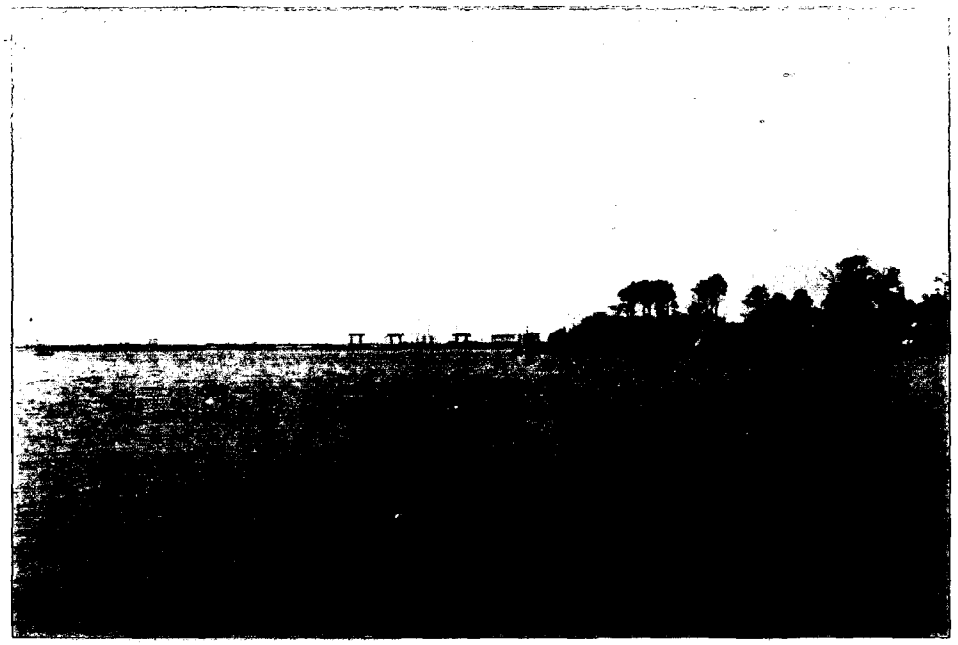
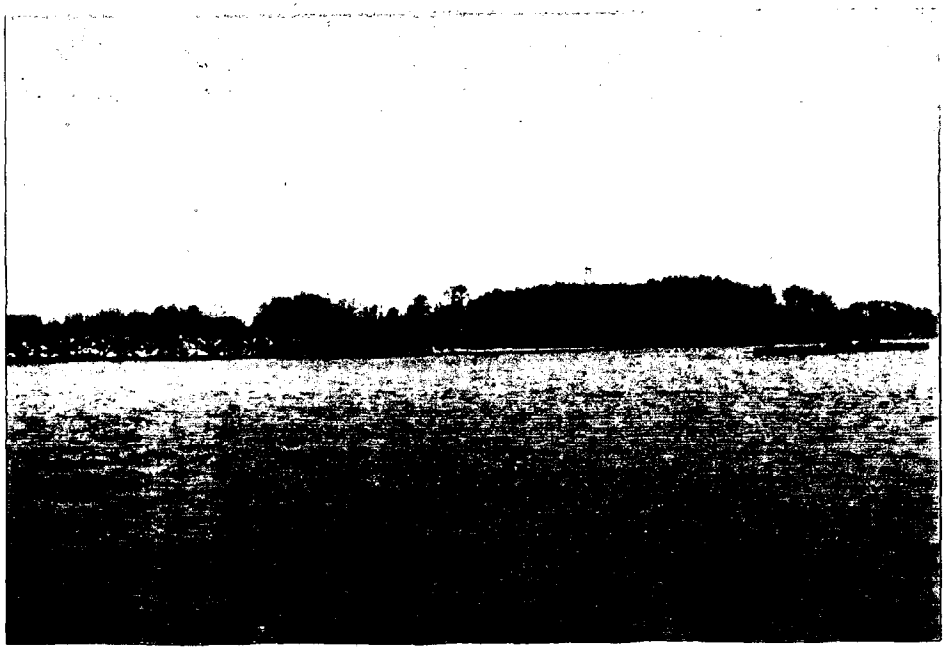
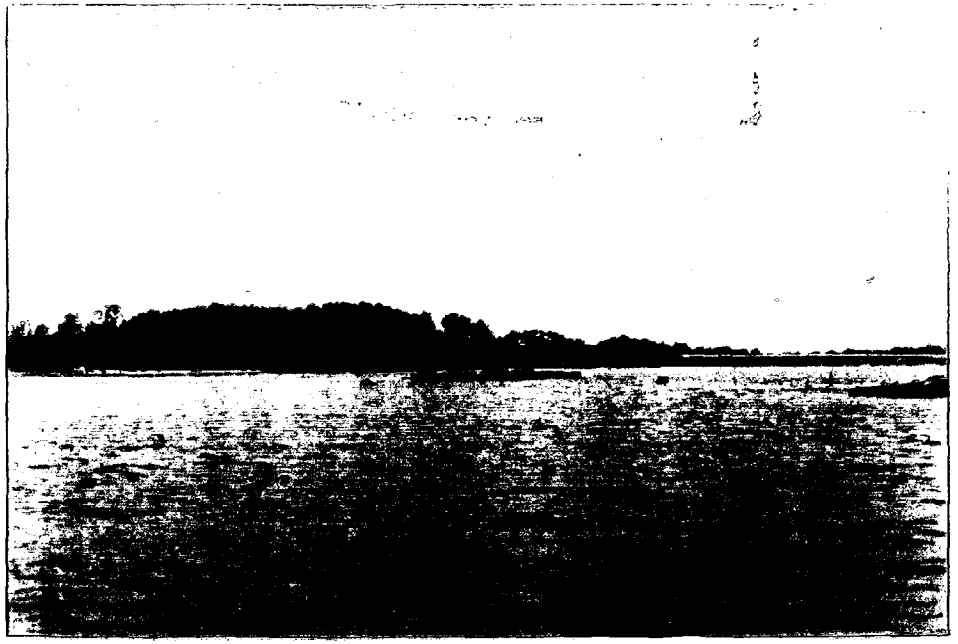


Site #59 (GBSC), Galveston Bay Ship Channel (from chart 11326).







LOUISIANA SITES

SITE NUMBER - 19 **DESIGNATOR** - SLBB

SITE - BLUE BUCK POINT, SABINE LAKE, LA

NOMINAL SITE CENTER - 29°47.50'N 93°54.42'W

LOCATED ON NOS CHART # - 11342

SITE ACCESS - The site is accessed by boat launched at the ramp on the east side of Sabine Lake at the base of the Highway 82 bridge at Mesquite Point. The ramp is on the right just after crossing into Louisiana. The site is north of the ramp at Blue Buck Point about a 10 minute run by boat. In some years, there were numerous gill nets in the area.

SITE DESCRIPTION - The site was at or adjacent to Blue Buck Point in the lower part of Sabine Lake. Oysters have been collected by hand along the shoreline and by tonging in deeper water offshore from the point. Oysters occured in clumps on the shell and mud bottom and were not overly abundant.

OYSTER COLLECTIONS

Year I - Oysters were collected by dredge and by hand the first year. Station 1 was dredged 300 m north of Blue Buck Point at a bearing of 360° from the point, 110° from the middle of the ICWW bridge, and 340° from the tall radio tower to the south. Station 2 was collected by hand just offshore approximately 80-m south of the point. Station 3 was 350 m south of Station 2 about 10 m offshore.

Year II - Collection sites were along the shoreline . Station 1 was collected along the western margin of the lake at Blue Buck Point approximately 1 to 10 m offshore. Station 1 was a composite of Stations 2 and 3 since the collectors were unable to find oysters at last years station. Station 2 was just south of the point and Station 3 was approximately 200 m farther south.

Year III - Oysters were tonged 200 m offshore with Station 1 off the western edge of Blue Buck Point. Station 2 was south of the point and Station 3 was 200 m farther south. Oysters were scatter clumps in the sandy mud bottom.

Year IV - Year IV Stations were located slightly farther offshore than previously sampled. Station 1 was 250 m south of the duck blind at Blue Buck Point. Station 2 was 400 m southeast of the duck blind and 250 m south of Station 1, located at a pole and approximately due west of several oil tanks on the shore. Station 3 was 250 m south of Station 2. Numerous oysters were dead or near death, the reef appeared to have had a partial die-off, and appeared to be recovering.

Years V & VI - Oysters were located along a narrow reef with a few live oysters attached to dead clumps. Station 1 was 300 m west of the point. Station 2 was 100 m south of the point. Station 3 was 150 m south of station 2.

Year VII - Oysters were collections were at the same stations as the previous two years. Oysters were very sparse with many recently dead.

Year VIII & IX - Oysters were collected at the same stations as in the Years V through VII.

SEDIMENT COLLECTIONS

Years I, II, & III - Each year the sediments were collected offshore in subtidal waters adjacent to the respective oyster sample stations.

Years IV & V - No sediments were collected during these years.

Year VI - Sediment sites for NIST sediments were collocated with each oyster station.

Years VII, VIII, & IX - No sediments were sampled during these years.

SAMPLING METHODS

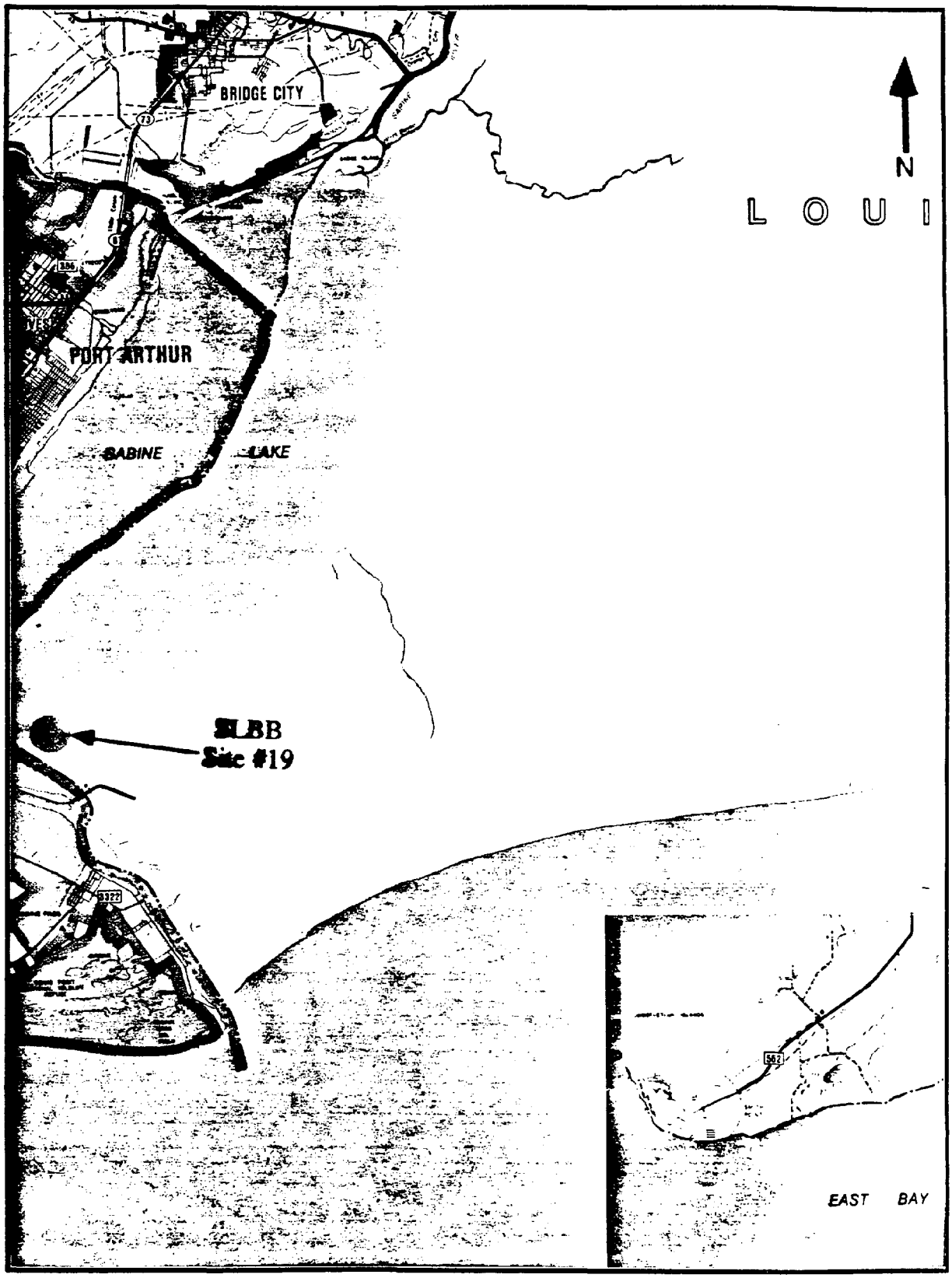
Oysters - hand, tong and dredge
Sediment - box core

WATER DEPTH - 0.0 - 1.5 meter

POSSIBLE CONTAMINANTS - Contamination factors included ship traffic, urban sewage, and heavy industrialization nearby.

ENVIRONMENTAL DATA

	Salinity (‰)	Temperature (°C)	Dates Sampled
YEAR I	17.5	7.0	26 January 1986
YEAR II	19.0	3.0	10 December 1986
YEAR III	15.0	16.0	18 December 1987
YEAR IV	16.0	27.0	6 December 1988
YEAR V	20.0	14.0	6 December 1989
YEAR VI	15.0	13.0	8 December 1990
YEAR VII	10.0	14.0	5 December 1991
YEAR VIII	16.0	12.0	10 December 1992
YEAR IX	11.0	16.0	9 December 1993



Site #19 (SLBB), **Sabine Lake Blue Buck Point .**

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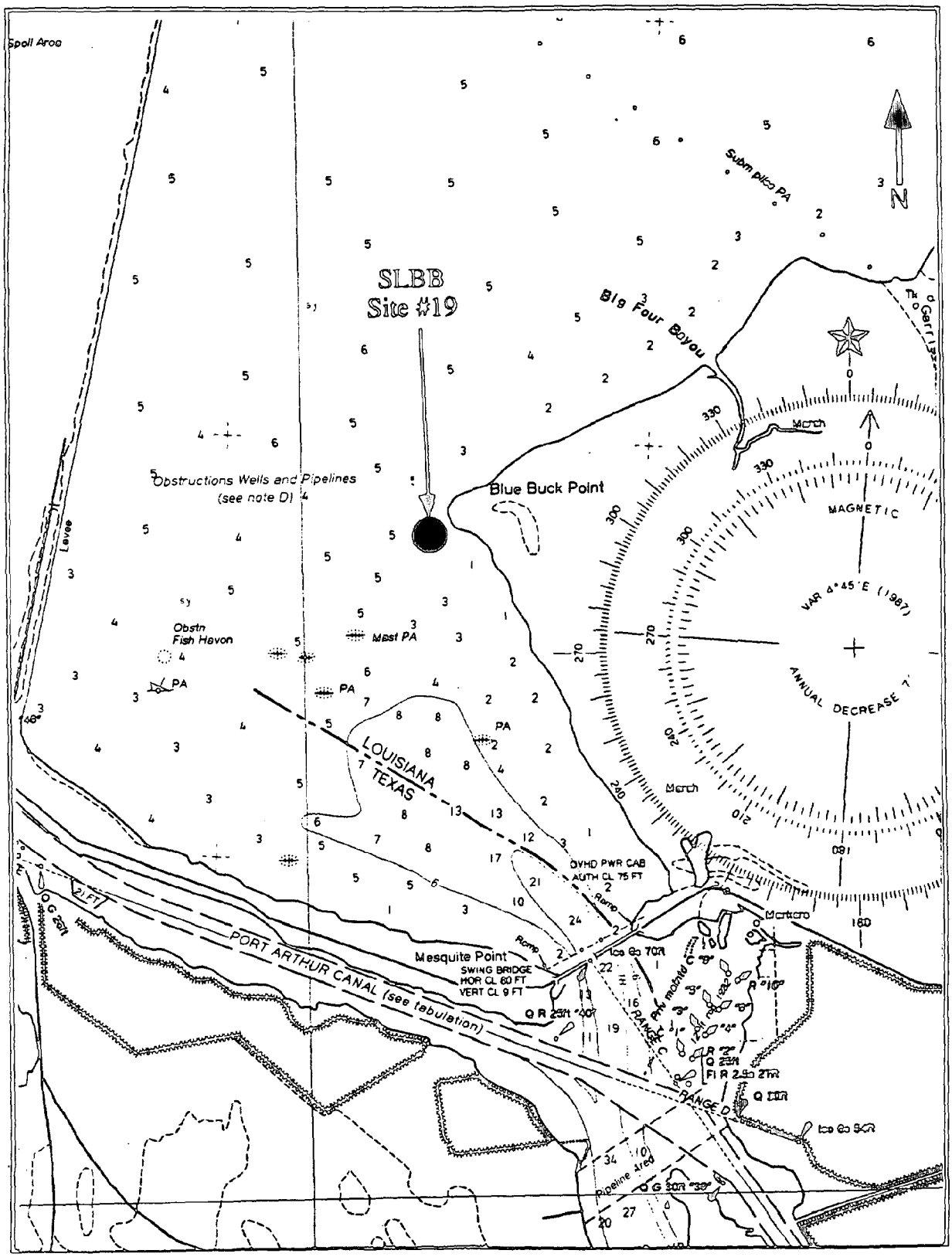
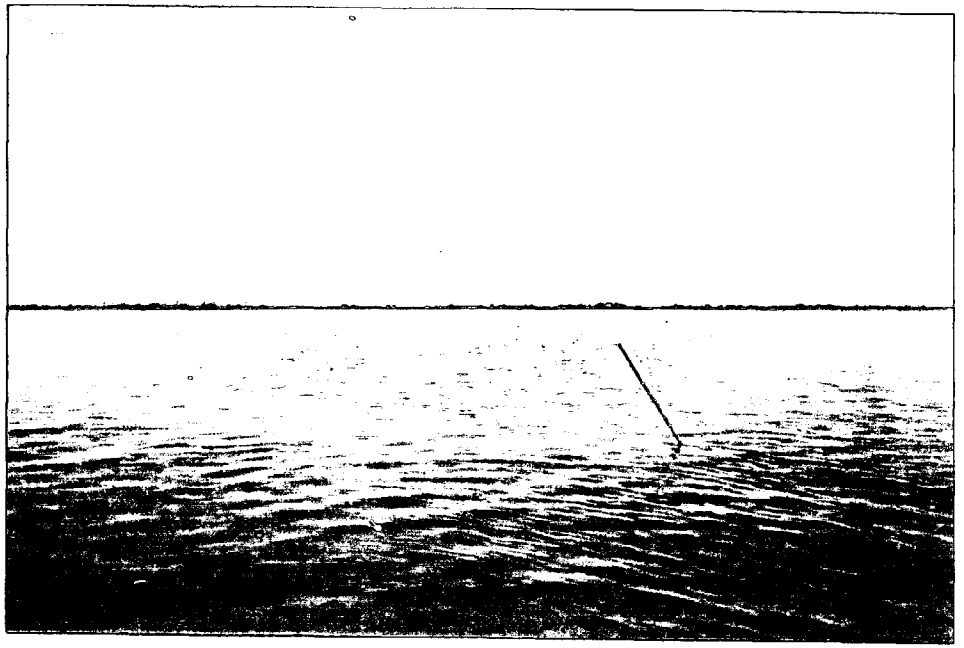
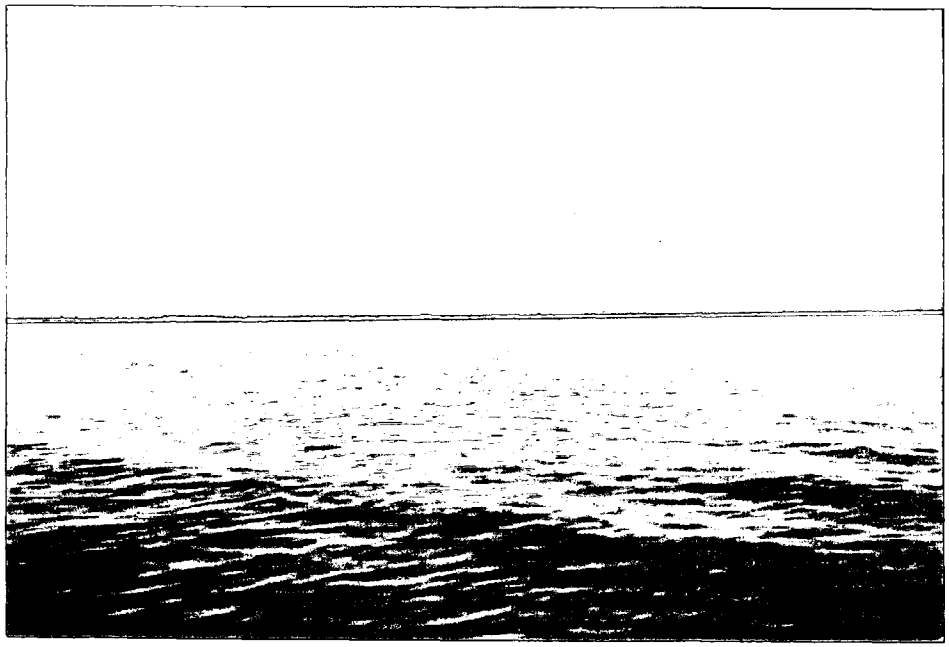
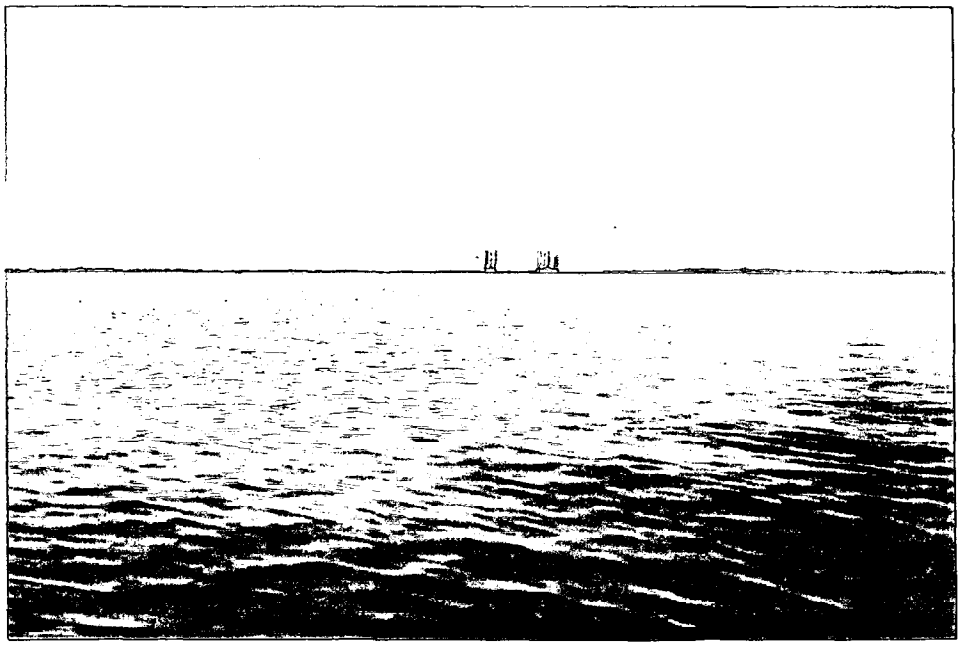


Site #19 (SLBB), Sabine Lake Blue Buck Point (from chart 11342).







SITE NUMBER - 20 **DESIGNATOR** - CLSJ

SITE - ST. JOHNS ISLAND, CALCASIEU LAKE, LA

NOMINAL SITE CENTER - 29°49.83'N 93°23.00'W

LOCATED ON NOS CHART # - 11347

SITE ACCESS - The boat is launched at the ramp in Calcasieu Channel at Cameron. The ramp is located on the west bank of the channel at the ferry. Run time to the site is 0.25 hours by water. Travel to the site by going north to West Pass and then west along West Pass until its entrance into West Cove.

SITE DESCRIPTION - The site was in West Cove near the mouth of West Pass, between the shoreline and Rabbit Island.

OYSTER COLLECTIONS

Year I - Year I oyster Station 1 was 150 m northwest of St. John's Island on the submerged reef. Bearings to Station 1 was 60° to tall channel marker; 295° to near point mainland west. Station 2 was located 55° to tall channel marker; 295° to near point of mainland to the west. Station 2 was 100 m northeast of Station 1 and 200 m from St. John's Island. Station 3 was taken 150 m west of Station 2 and 250 m east of St. John's Island. Oysters were abundant at this site.

Years II, III, & IV - Oyster stations were at the same general locations as previously sampled. In Year IV, oysters were fairly abundant at the first two stations and near the shore, but were silted over away from the shore.

Years V, VI, VII, & VIII - Oysters stations were in the same general locations all four years. Station 1 was at the north end of St. Johns Island. Station 2 was on the shoreline 250 m from station 1. Station 3 was 150 m northwest of Station 2.

Year IX - This site was not scheduled for sampling this year.

SEDIMENT COLLECTIONS

Years I, II, & III - Sediment at Station 1 was 50 m from the first oyster station on the reef. Station 2 sediments were adjacent to the reef to the northeast. Station 3 sediments were located 40 m west of the oysters.

Years IV, V, VI, VII, VIII, & IX - No sediments were sampled during these years.

SAMPLING METHOD

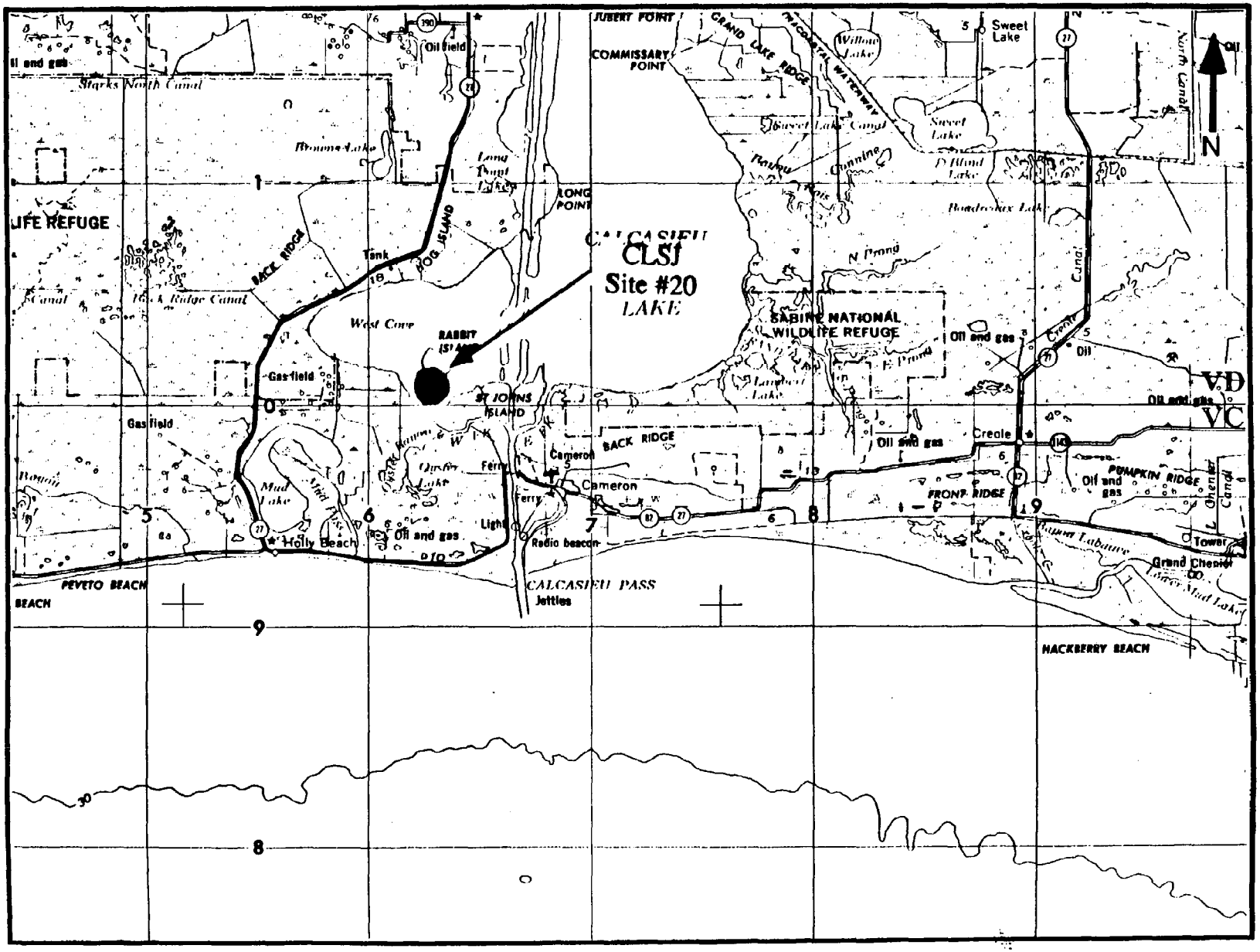
Oysters - tongs and dredge
Sediments - box corer

WATER DEPTH - 1 to 2.5 m

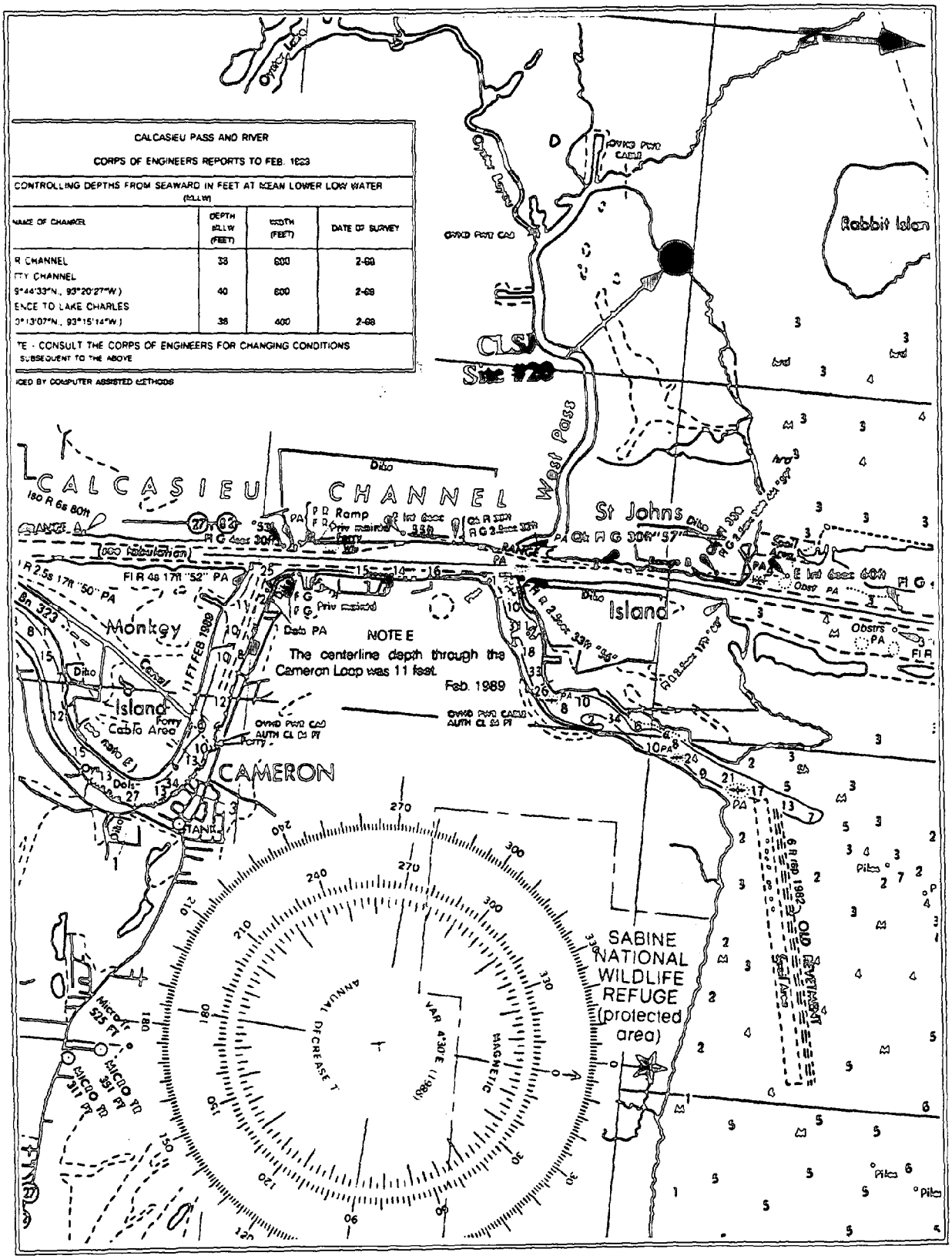
POSSIBLE CONTAMINANTS - No contamination sources were observed.

ENVIRONMENTAL DATA

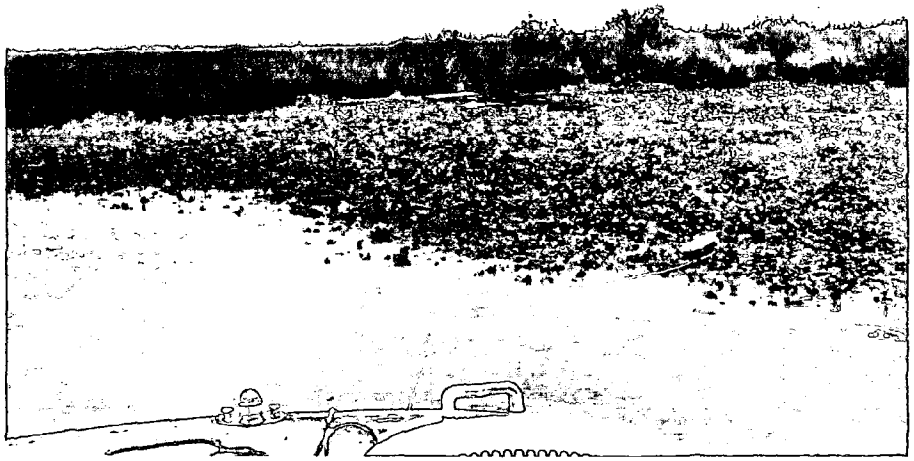
	Salinity (‰)	Temperature (°C)	Dates Sampled
YEAR I	13.3	15.0	18 January 1986
YEAR II	9.3	12.0	9 February 1987
YEAR III	23.0	16.0	15 December 1987
YEAR IV	35.0	15.0	7 December 1988
YEAR V	26.7	16.0	7 December 1989
YEAR VI	27.3	13.0	7 December 1990
YEAR VII	17.0	14.0	6 December 1991
YEAR VIII	17.0	17.0	11 December 1992

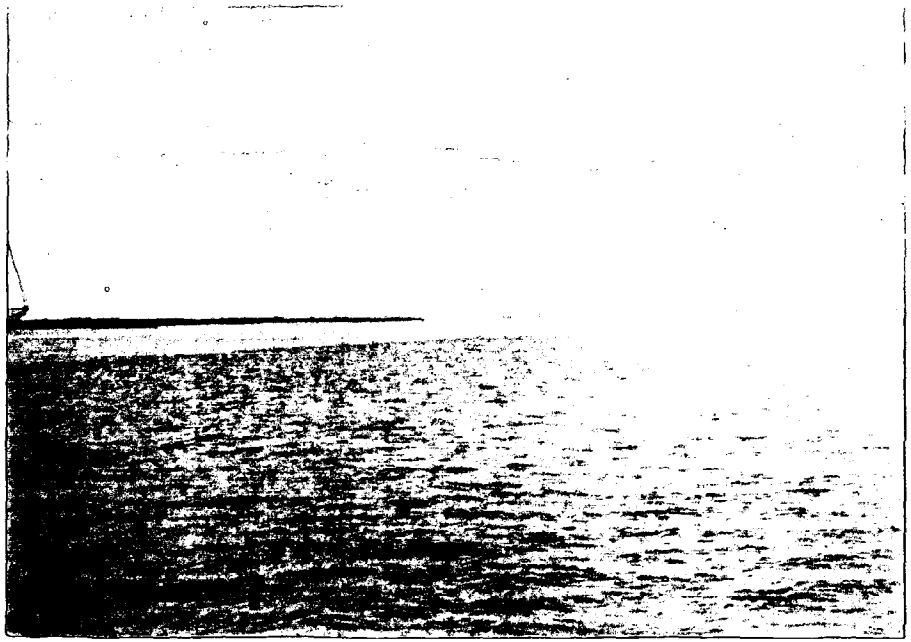


Site #20 (CLSJ) Calcasieu Lake St. Johns Island.



Site #20 (CLSJ), Calcasieu Lake St. Johns Island (from chart 11347).





SITE NUMBER - 60 **DESIGNATOR** - CLLC

SITE - LAKE CHARLES, CALCASIEU LAKE, LA

NOMINAL SITE CENTER - 30°03.42'N 93°18.42'W

LOCATED ON NOS CHART # - 11347

SITE ACCESS - Access to the site is via LA Highway 384 to Deatonville and a boat launch at the Cajun Cove Marina. The channel going out from the launch is very shallow at low tide. From the launch proceed northwest along the shoreline for ~700 m to a long pier at the Reef Restaurant. In Year V the site was moved, so after launching proceed on a bearing of 80° from the ramp to the shell island. The GIWW bridge is due west of the site. Since the site was moved it is much easier to launch the boat at the Ellender Bridge and go up the GIWW to the north end of Calcasieu Lake.

SITE DESCRIPTION - This collection site, established in Year III, was located in the north end of Calcasieu Lake at East Pass (30°03.50'N and 93°17.50W). Oysters were scattered on a submerged (0.75 to 1 m deep) muddy reef, with individual clumps of 3-10 oysters. Oysters were thin-shelled and broke easily when separated. In Year V the site was moved 1 mile to the west to an oyster shell reef and nearby *Spartina alterniflora* marshes.

OYSTER COLLECTIONS

Years III & IV - Year III oyster Station 1 was located 30 m south of the end of the Reef Restaurant Pier. Landmarks to locate this site were 270° to the twin towers of the Ellender Lift Bridge and 134° to the Cajun Cove Marina ramp. Station 2 was 75 m southeast of Station 1 approximately 30 m off of the private piers. Station 3 was another 75 m southeast, 30 m off of the last private pier.

Year V - The collection site was relocated about a mile west due to the lack of live oysters at last year's site. The new site is a oyster shell island with marsh grass nearby. Oysters can be collected by hand during low tide. Station 1 was located on the south end of the shell reef just to the north of the *Spartina* island. Station 2 was 75 m to the north and Station 3 was 100 m west of Station 2.

Years VI & VII - Oysters were collected at the same stations described in Year V. There is a new orange metal post marker on the north end of the reef. An oyster die off has occurred since last year, only small oysters were present.

Year VIII - Oysters were collected at the same stations described in Year V. Oysters were more abundant and larger than the previous two years.

Year IX - Large oysters were abundant across the reef. The same stations were used as those described in Year V.

SEDIMENT COLLECTIONS

Year III - Sediments were a light gray-brown, fine-grained clayey layer over a dark brown clay. Collection sites were collocated with each oyster site.

Years IV & V - No sediments were sampled during these years.

Years VI - NIST sediments were collected 50 m from the oyster stations in 1.5 m of water.

Years VII, VIII, & IX - No sediments were sampled during these years.

SAMPLING METHODS

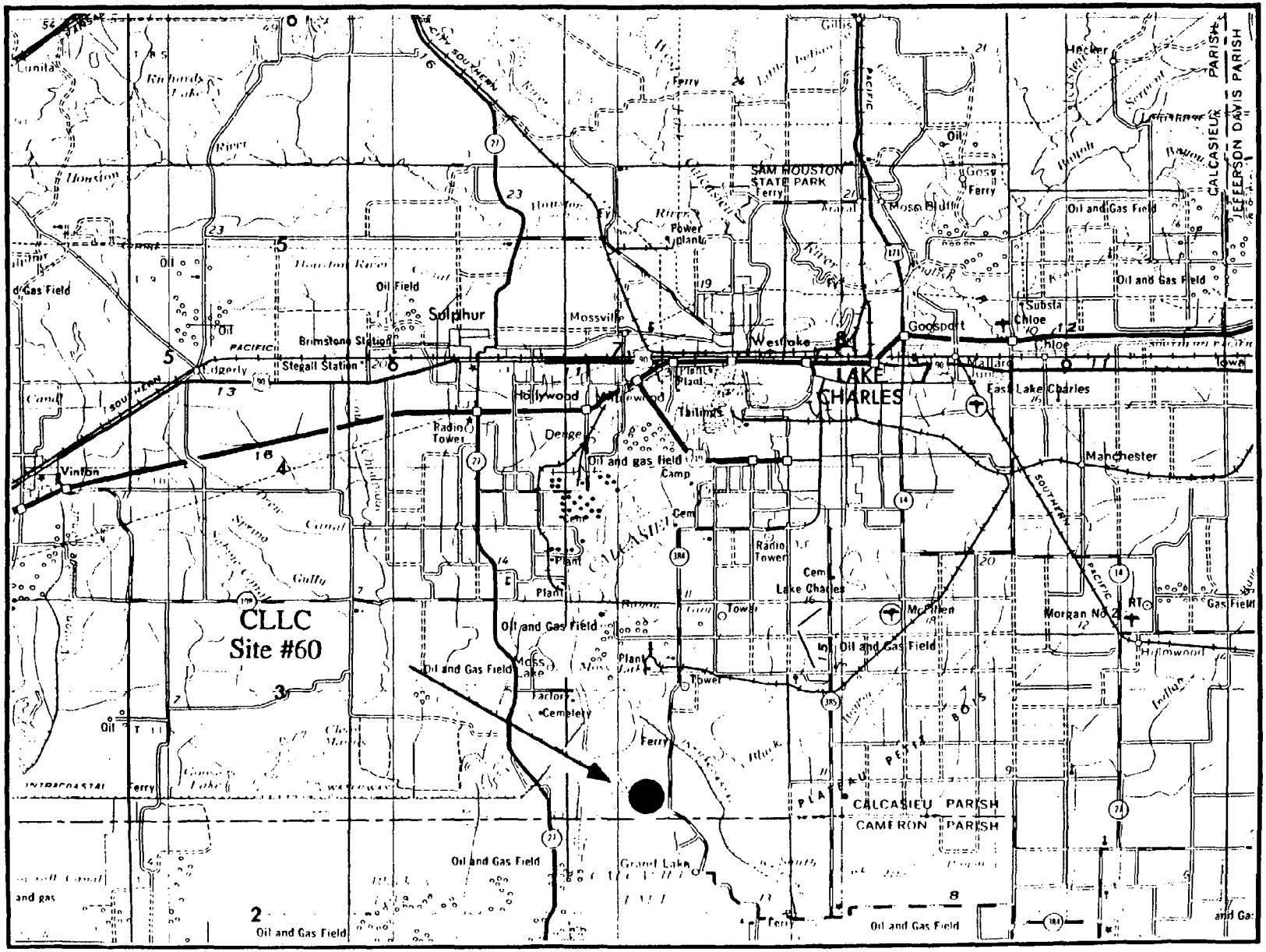
Oysters - tongs and hand
Sediment - box core

WATER DEPTH - intertidal, 0.2 to 0.5 m

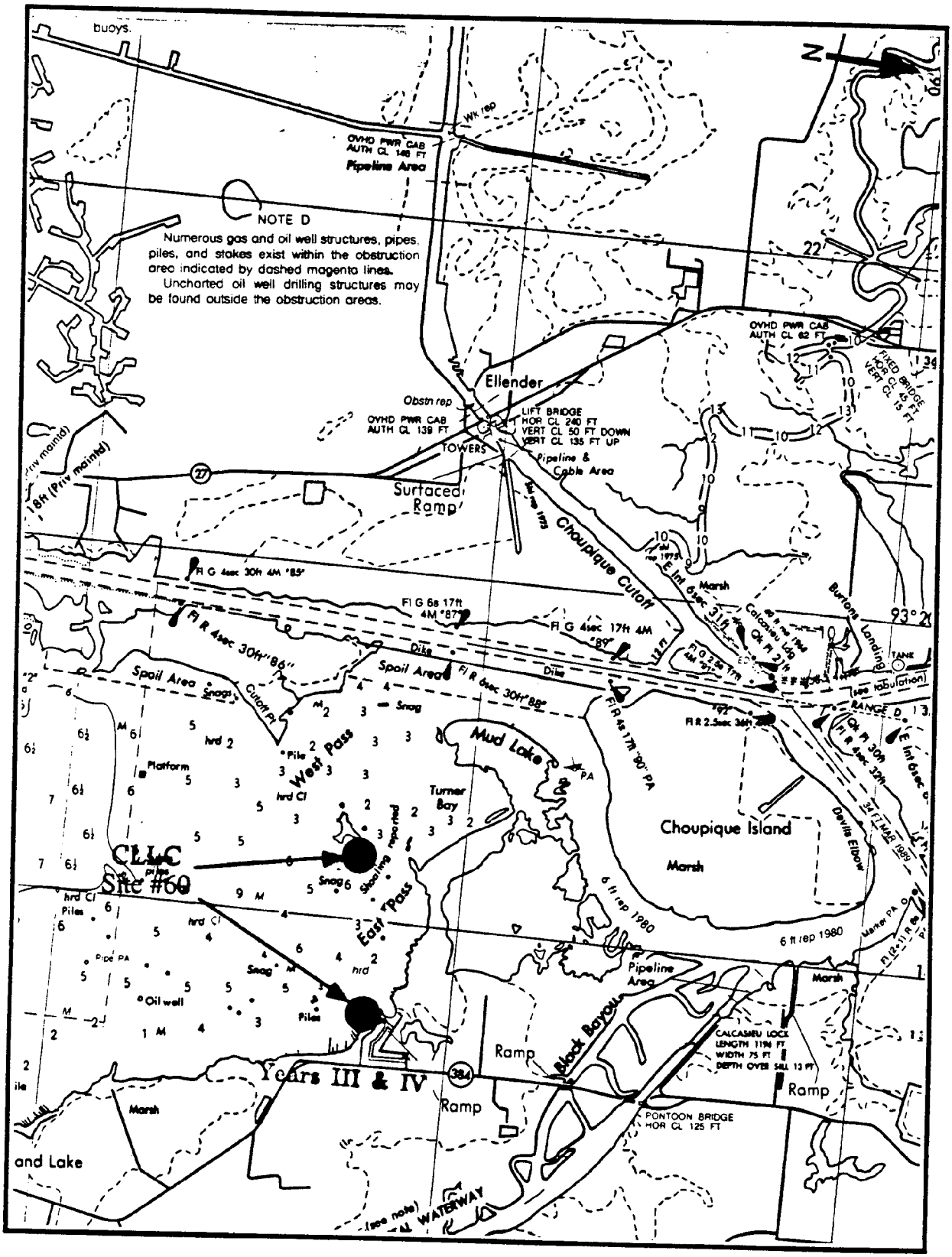
POSSIBLE CONTAMINANTS - Potential local contamination was from private piers, septic tanks, oil production, and boat traffic in the ICWW. However, since the site was located at the mouth of the Calcasieu River, there was a much greater potential for contamination from upstream discharges particularly from the Lake Charles metropolitan area.

ENVIRONMENTAL DATA

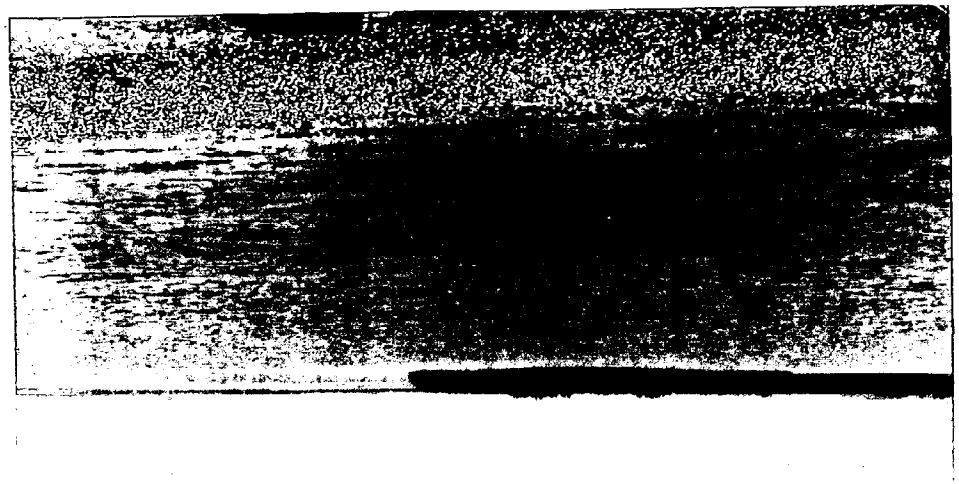
	Salinity (‰)	Temperature (°C)	Dates Sampled
YEAR III	15.0	11.0	16 December 1987
YEAR IV	28.0	16.0	7 December 1988
YEAR V	22.0	15.0	7 December 1989
YEAR VI	23.0	15.0	8 December 1990
YEAR VII	12.0	16.0	6 December 1991
YEAR VIII	14.0	13.0	10 December 1992
YEAR IX	12.0	18.0	9 December 1993

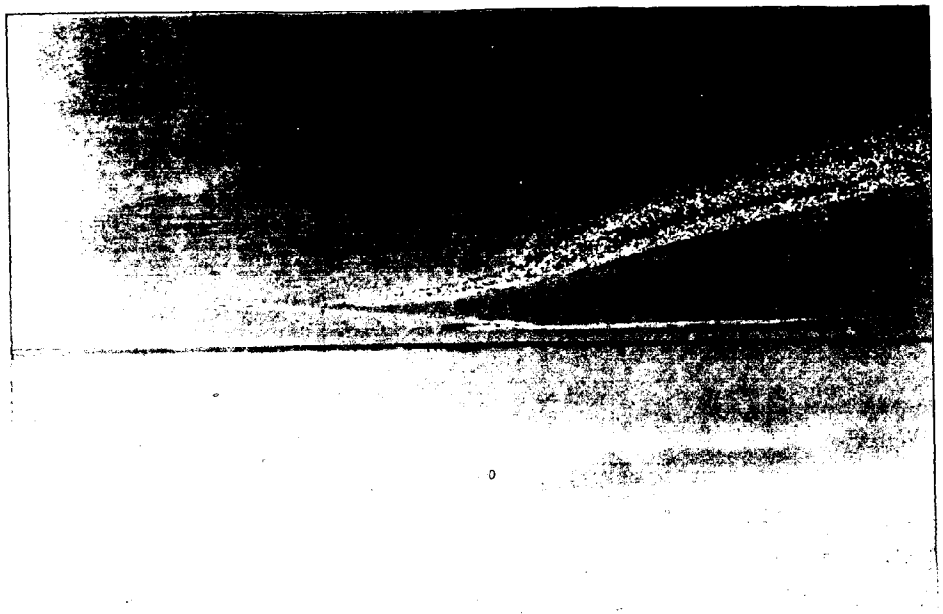


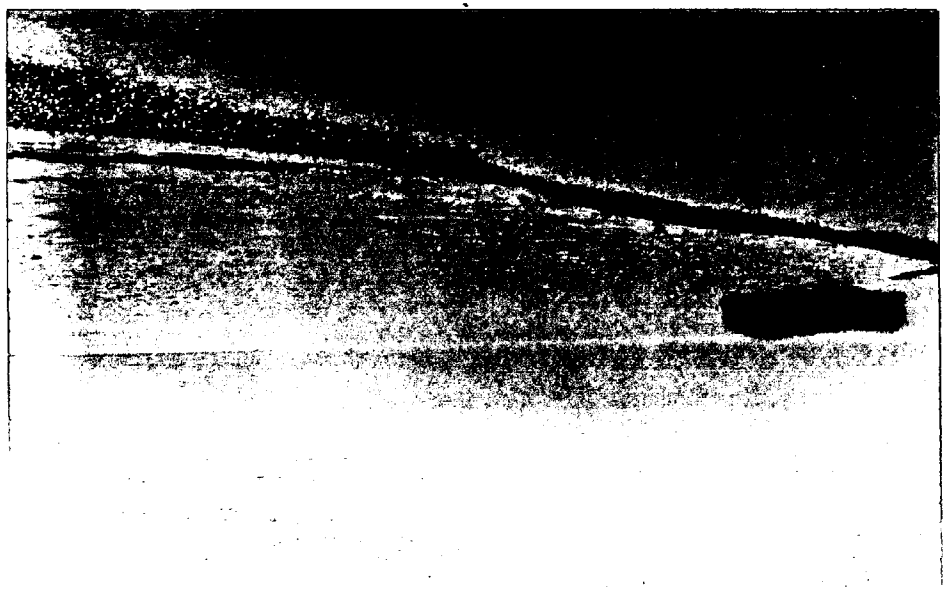
Site #60 (CLLC), Calcasieu Lake Lake Charles.



Site #60 (CLLC), Calcasieu Lake Lake Charles (from chart 11347).







SITE NUMBER - 21 **DESIGNATOR** - JHJH

SITE - JOSEPH HARBOR BAYOU, J. HARBOR BAYOU, LA

NOMINAL SITE CENTER - 29°37.75'N 92°45.75'W

LOCATED ON NOS CHART # - 11345, 11344

SITE ACCESS - Access to the site is by boat launched at the Gran Chenier Boat Ramp on Highway 82, west of North Island canal. Proceed by boat south along a man-made channel to the mouth of Joseph Harbor Bayou. Run time to the site is approximately 0.5 hrs.

SITE DESCRIPTION - The collection sites were located on both sides of the channel; 300° from the Gulf along the grassy margins of the bayou east of Miller Lake. Oysters were taken from intertidal waters from a mud and shell bottom. Low tide was the optimum collection time.

OYSTER COLLECTIONS

Year I - Year I stations were established as follows: Station 1 oysters and sediments were collected from the east bank of the bayou 200 m north of the entrance to the Gulf with a bearing of 180° to the abandoned wooden structure. There were very few oysters at Station 1. Station 2 was collected from an exposed reef on the west bank of the bayou on the second bend approximately 0.5 km upstream from the Gulf. Bearings to locate the site were 130° to abandoned structure; 320° to deer stand. Station 3 was collected from an exposed reef 60 m north of Station 2.

Year II - In Year II, the mouth of Joseph Bayou had been dredged a few days prior to collecting. This reduced the number of oysters present but the station locations were the same.

Years III, IV, & V - Oysters were collected from the same stations as described in Year I.

Years VI, VII, & VIII - Stations were located in the same areas as previous years. Oysters were more abundant and larger.

Year IX - This site was not scheduled for collection this year.

SEDIMENT COLLECTIONS

Years I, II, & III - Sediment stations were collocated with each oyster collection site.

Years IV, V, VI, VII, VIII, & IX - No sediments were sampled during these years.

SAMPLING METHOD

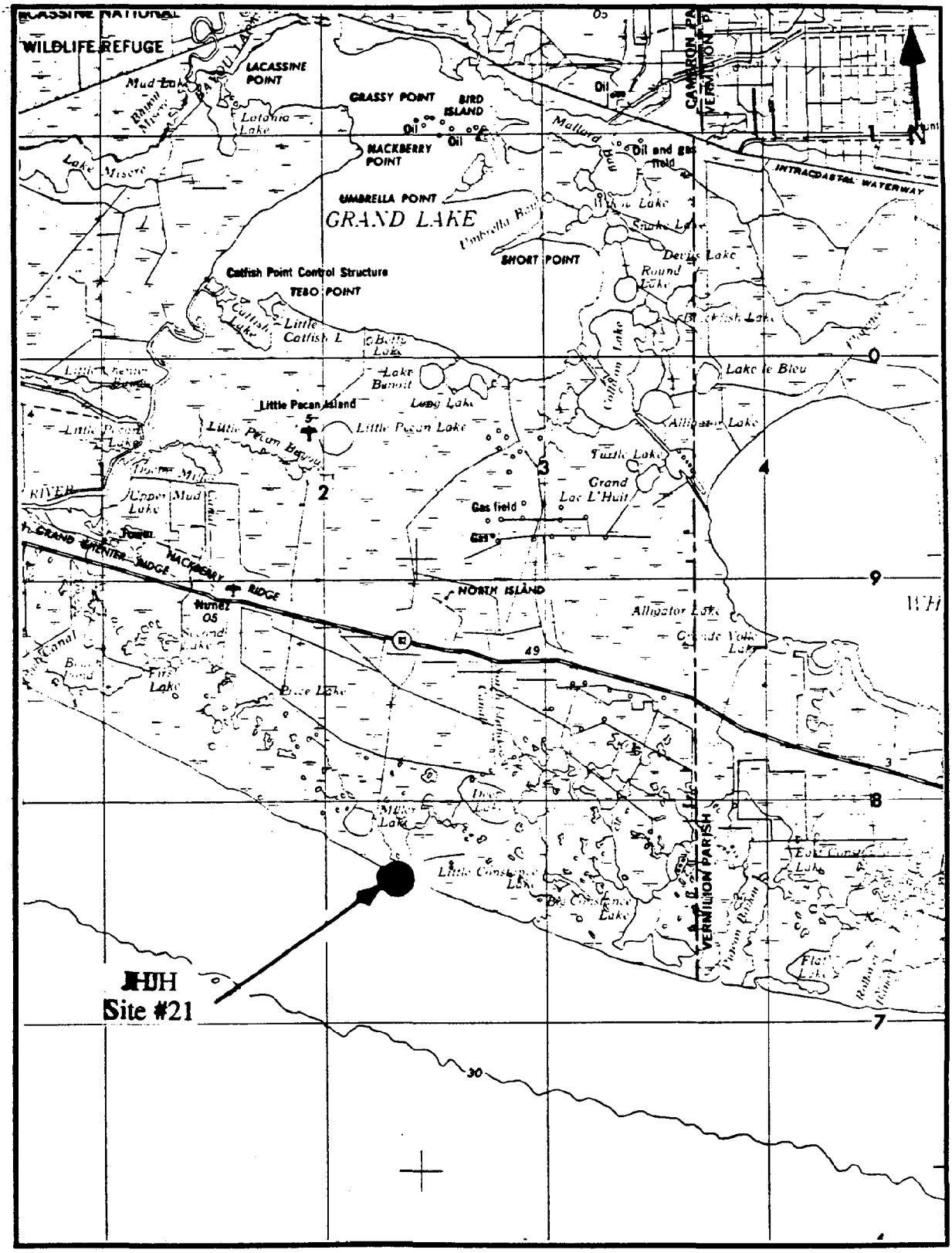
Oysters - hand
Sediment- hand

WATER DEPTH - intertidal, 0.2 m

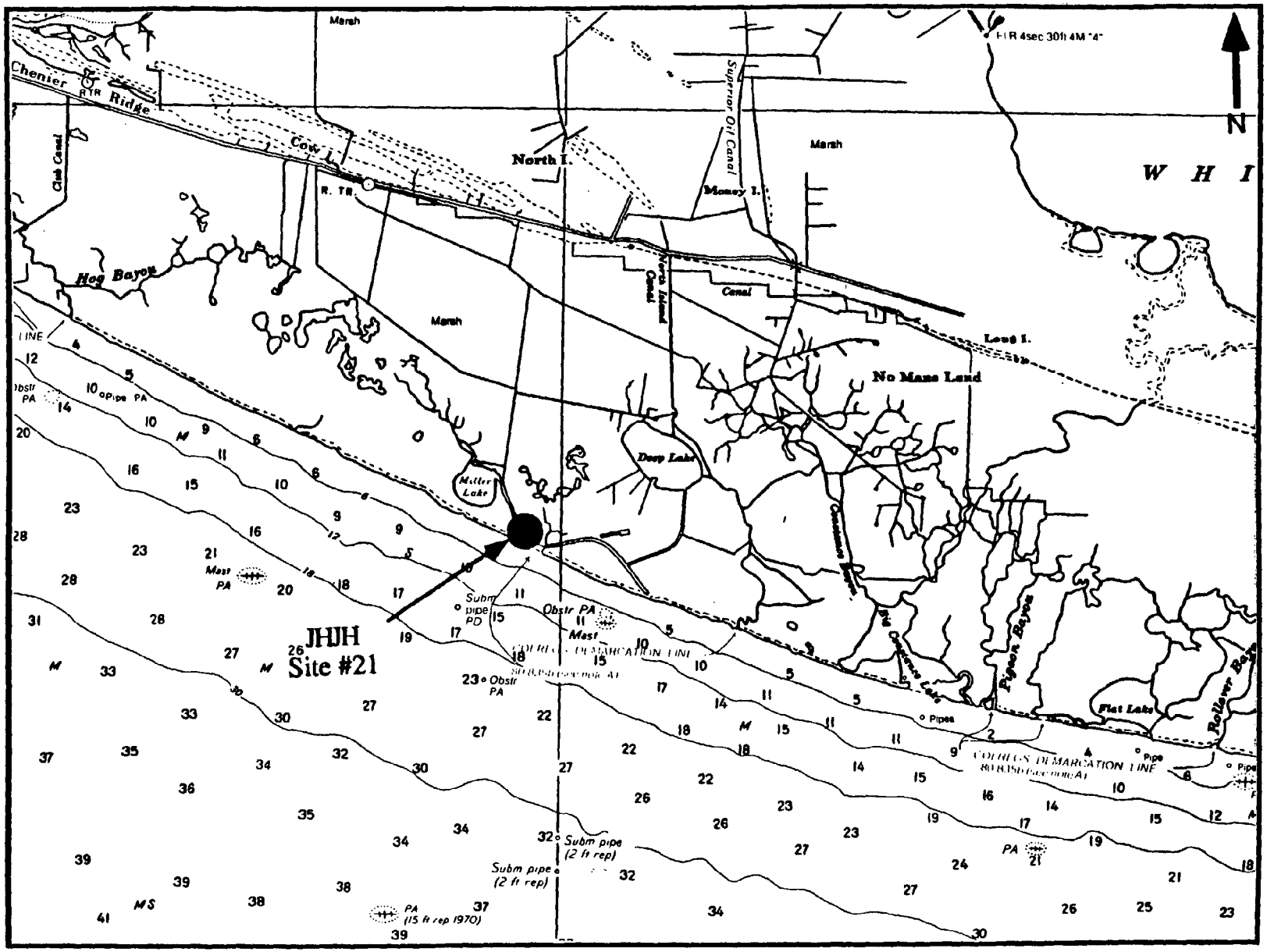
POSSIBLE CONTAMINANTS - Dredging was the only source of contamination observed at the site.

ENVIRONMENTAL DATA

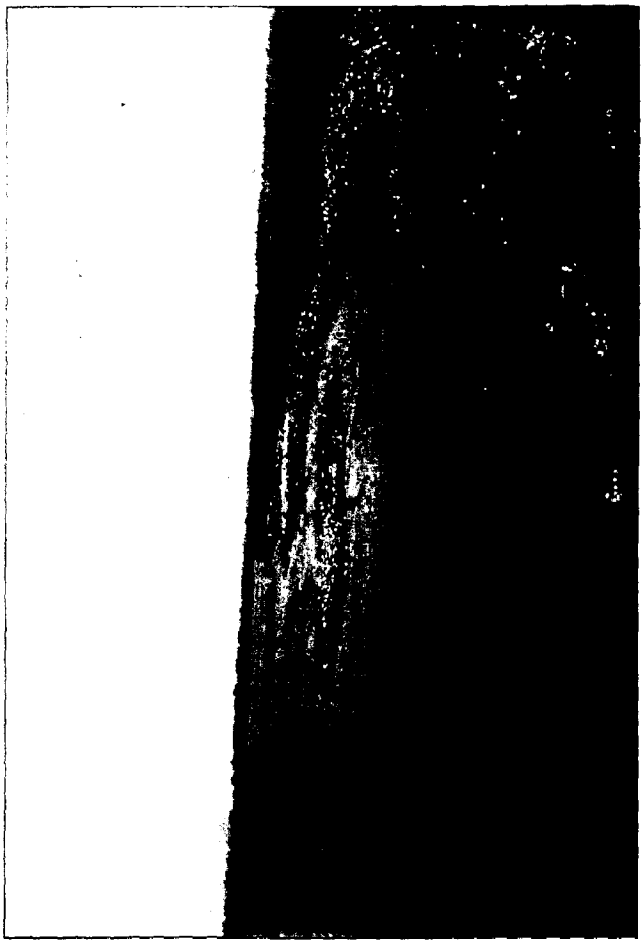
	Salinity (‰)	Temperature (°C)	Dates Sampled
YEAR I	20.0	22.0	31 March 1986
YEAR II	7.0	18.0	10 February 1987
YEAR III	37.0	13.0	17 December 1987
YEAR IV	33.0	16.0	8 December 1988
YEAR V	15.0	15.0	6 December 1989
YEAR VI	25.0	13.0	7 December 1990
YEAR VII	10.0	12.7	5 December 1991
YEAR VIII	10.0	13.0	11 December 1992



Site #21 (JHJH), J. Harbor Bayou Joseph Harbor Bayou.



Site #21 (JHJH), J. Harbor Bayou Joseph Harbor Bayou (from chart 11345).



SITE NUMBER - 22 **DESIGNATOR** - VBSP

SITE - SOUTHWEST PASS, VERMILION BAY, LA

NOMINAL SITE CENTER - 29°34.60'N 92°02.75'W

LOCATED ON NOS CHART # - 11345, 11349

SITE ACCESS - Departure point and boat launch is at Cypremort Point State Park, and run time across Vermilion Bay is about 1 hour. Shoaling is very steep and treacherous through Southwest Pass, especially on the west side of the channel opposite Marsh Island. Keep in the channel until seaward of channel marker 3 or well into Vermilion Bay.

SITE DESCRIPTION - The site was located adjacent to the channel outside of lighthouse point in lease 25918. Oysters are located at the mouth of Southwest Pass. Oyster reefs and private leases are ubiquitous in the area, but oysters are not necessarily in the same place each year. There were no significant geographic differences recognized in the oyster stations for this site.

OYSTER COLLECTIONS

Year I - Oysters were collected due east of channel marker 3 in Year I.

Years II & III - In Year II, only dead shells were found at the Year I site, so in Years II and III, oysters were purchased from a commercial dredging boat operating on private leases on the east side of channel marker 3. Therefore, no distinct stations were recognized.

Year IV - The site was the same as in Year II and III. Oysters were purchased from a commercial dredger operating to the east of the channel entrance; east of channel marker 3 and south of channel marker 5. No distinct stations were delineated.

Year V - Oysters were purchased from a commercial lugger working 200 m east of channel marker 3. Stations were not distinguished.

Year VI - Oysters were purchased from a commercial lugger working 200 m west of channel marker 3 (29°34.89'N, 92°03.14'W). Stations were not separated.

Year VII - Oysters were dredged from the edge of a private lease approximately 200 to 300 m east of channel marker 3. Large oysters were not abundant but many small oysters were present. All three stations were located along a north-south line covering 150 m.

Year VIII - Oysters were collected by dredge at the same locations sampled in Year VII.

Year IX - Oysters were dredged along the edge of a private lease about 220 m west of channel marker #3. Very few oysters were present, and all three stations were collected along a 200 m north-south line. The stations were not seperated.

SEDIMENT COLLECTIONS

Years I, II, & III - The mud was approximately 100 m from shore. Sediments at all three stations were 1-2 cm of fine-grained loose brown silt over gray clay. For all years, fine-grain sediments were located northwest from channel marker 3, less than 100 m from shore, and ~0.5 mile from the site of the oyster collections. Station 1 was 60 m offshore on a 190° bearing from the tank on shore; 185° to pair of rusty tanks; 87° to channel marker green 3. Station 2 was 50 m from shore on a line from channel marker 1 to the tanks. Landmarks and bearing were 286° to 4 tanks; 190° to oyster sampling site. Station 3 was on a line from channel marker 3 to the tanks ~100 m from the shore.

Years IV, V, VI, VII, VIII, & IX - No sediments were sampled during these years.

SAMPLING METHOD

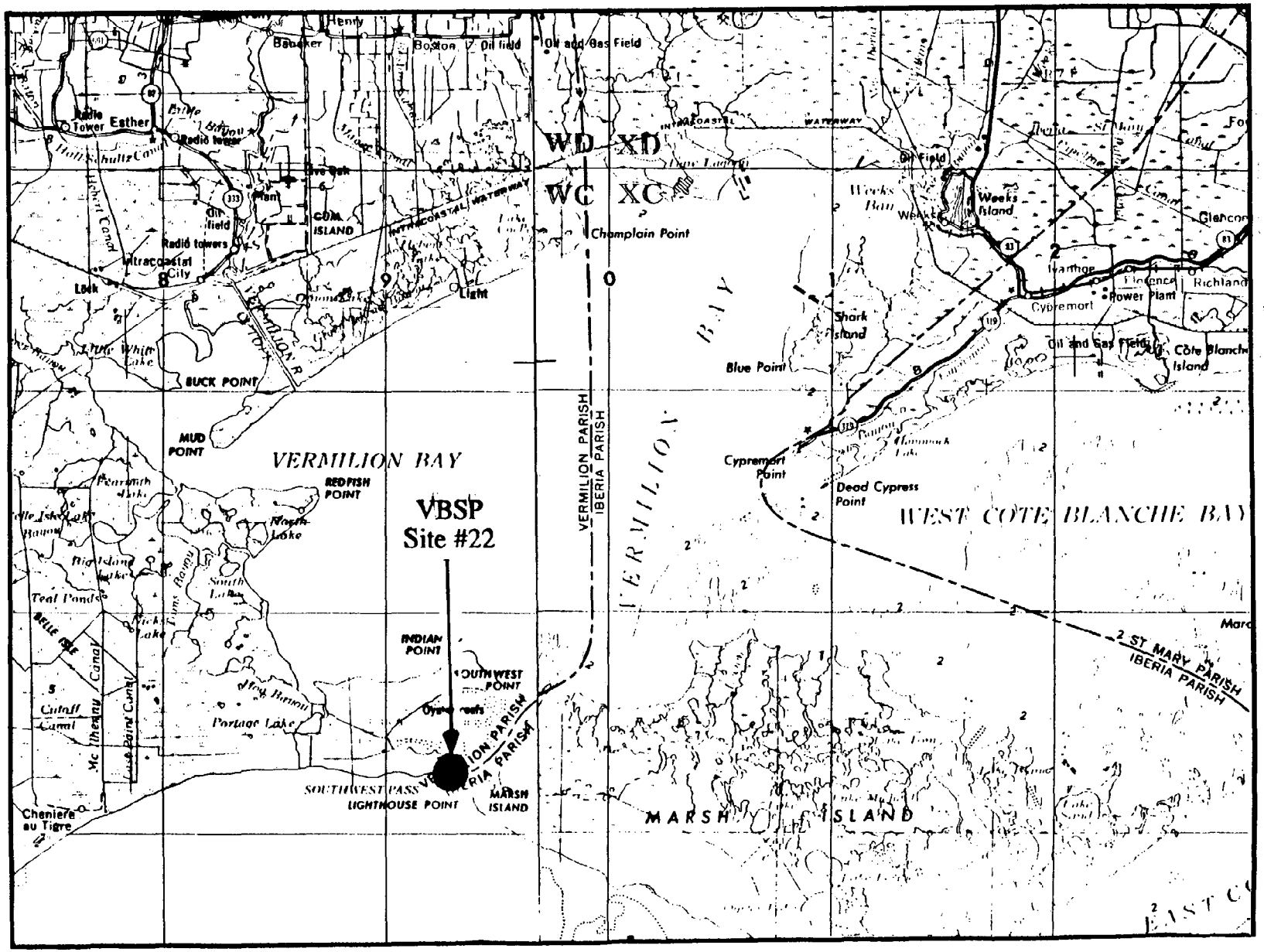
Oysters - dredge
Sediment - box core

WATER DEPTH - subtidal, 1.5 to 2 m

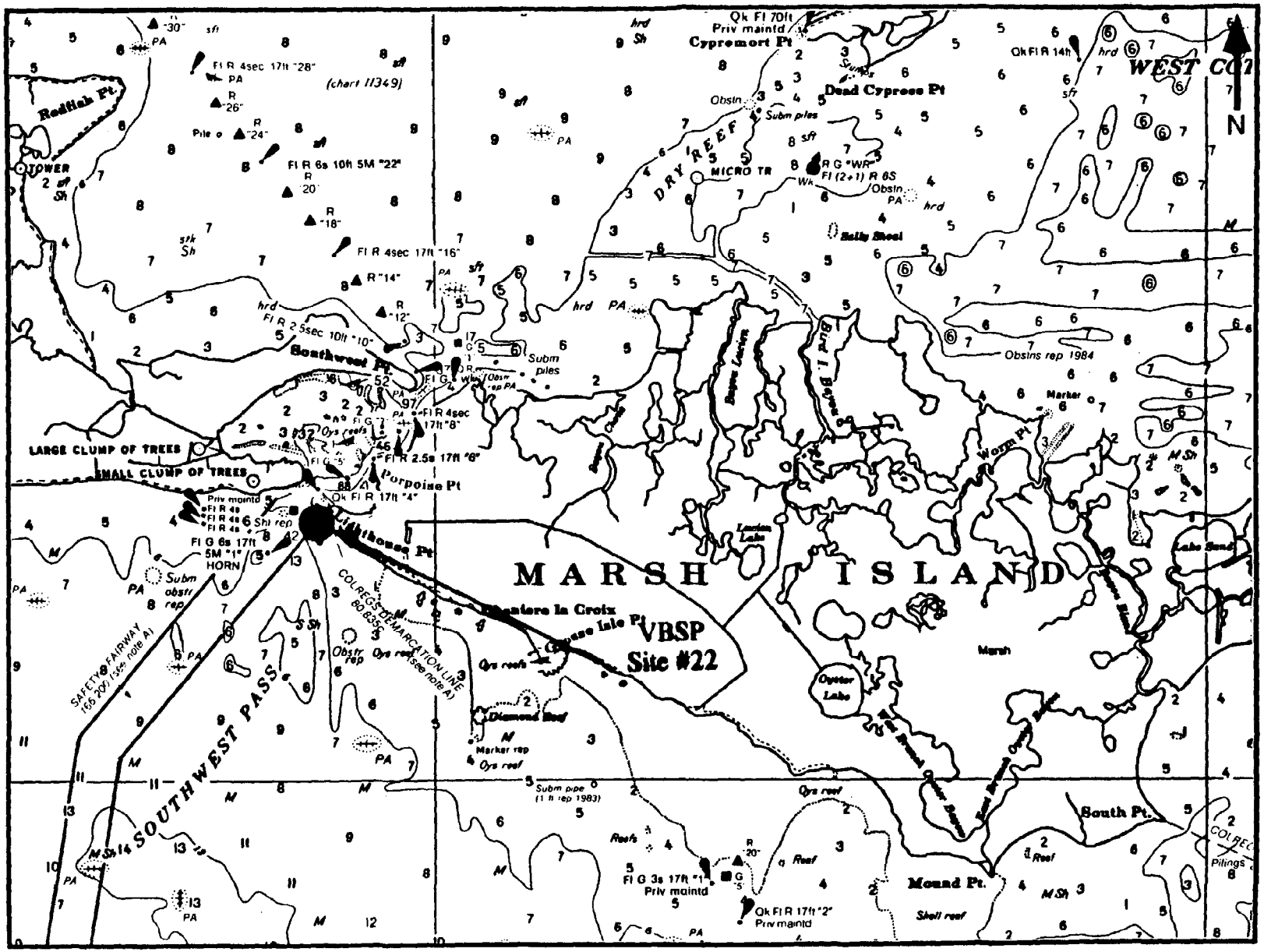
POSSIBLE CONTAMINANTS - No point sources were identified other than oil wells in Vermilion Bay.

ENVIRONMENTAL DATA

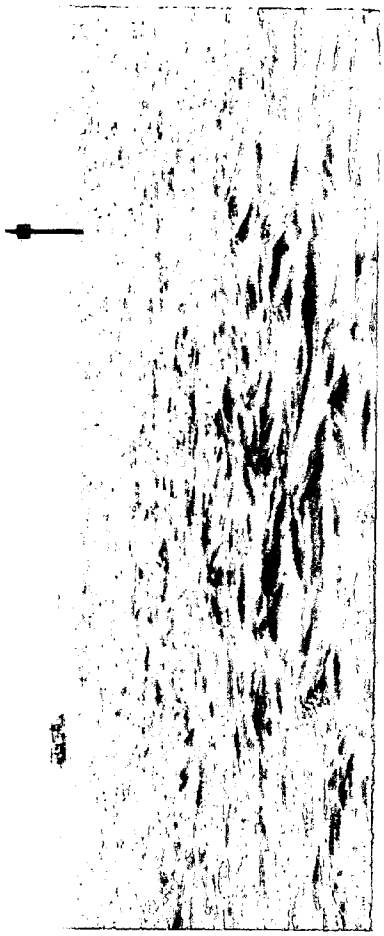
	Salinity (‰)	Temperature (°C)	Dates Sampled
YEAR I	8.0	-	31 March 1986
YEAR II	8.0	11.0	10 February 1987
YEAR III	22.0	10.0	28 January 1988
YEAR IV	10.0	-	6 January 1989
YEAR V	10.0	11.0	6 January 1990
YEAR VI	10.0	12.0	8 January 1991
YEAR VII	5.0	16.0	8 January 1992
YEAR VIII	5.0	18.0	5 January 1993
YEAR IX	3.0	8.0	11 January 1994

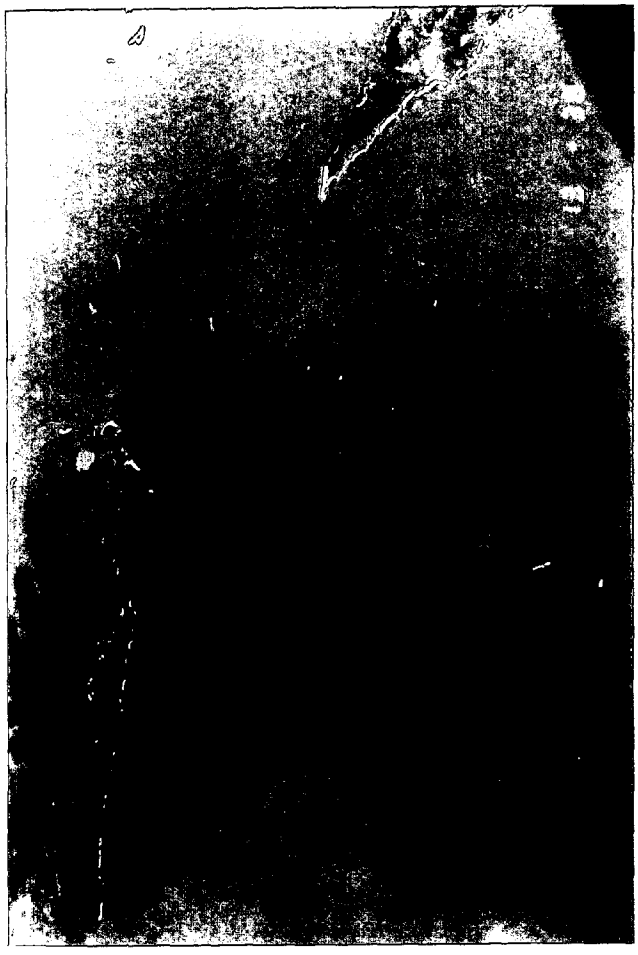


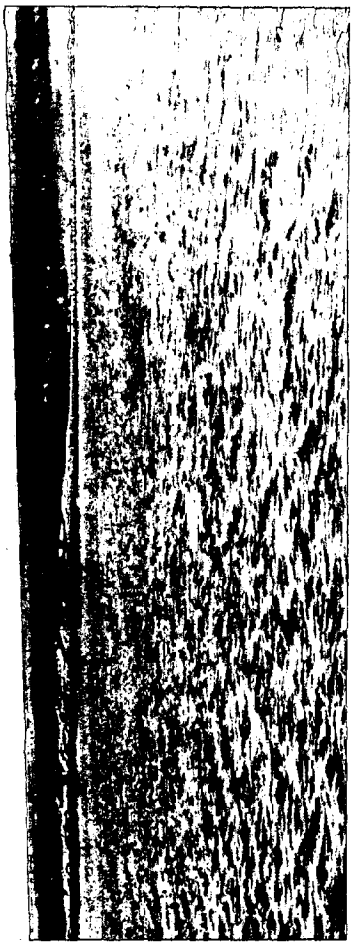
Site #22 (VBSP), Vermillion Bay South Pass.



Site #22 (VBSP), Vermillion Bay Southwest Pass (from chart 11345).







SITE NUMBER - 23 **DESIGNATOR** - ECSP

SITE - SOUTH POINT, EAST COTE BLANCHE, LA

NOMINAL SITE CENTER - 29°28.50'N 91°48.00'W

LOCATED ON NOS CHART # - 11345, 11351

SITE DESCRIPTION - The site that was originally examined is a dead oyster reef at the mouth of Oyster Bayou (through Marsh Island) adjacent to *spartina* marsh along the shoreline. No oysters were sampled/available; sediments were sampled. This site was located on the southeast side of Marsh Island. With the help of the Louisiana Fish and Wildlife Department, we found the very old shell rubble reefs but no living oysters of any size. Oystermen of the area reported no living oysters were known to be in the entire area of East Cote Blanche. The site was deleted from study as no alternate site in the geographic area was available.

	Salinity (‰)	Temperature (°C)	Dates Sampled
YEAR I	4.0	22.0	1 April 1986

SITE NUMBER - 24 **DESIGNATOR** - ABOB

SITE - OYSTER BAYOU, ATCHAFALAYA BAY, LA

NOMINAL SITE CENTER - 29°14.40'N 91°08.10'W

LOCATED ON NOS CHART # - 11351

SITE ACCESS - The only access to the site is by a 1 hour boat ride. The only launch ramp is at Dularge Sporting Goods. Proceed south on Bayou Dularge, across Caillou Lake into the open Gulf and then west along the beach front to Oyster Bayou. A more circuitous route is possible through Lake Merchant, winding through the bayou to Four Leagues Bay, then south to Oyster Bayou. However, the bayou is shallow and should not be attempted with boat draft of 2 feet or more or at low tide.

SITE DESCRIPTION - The sampling stations were located throughout the length of the Oyster Bayou which joined Four League Bay with the Gulf of Mexico on the south. Oysters were extremely abundant and were obtained either with a dredge or collected by hand along the shore. However, the *entire* area was leased by Mr. Wilson Voisin. Oysters could be obtained only with his permission or purchased by the sack from his boats when they were oystering.

OYSTER COLLECTIONS - In all years when oysters were collected by hand, dredge or purchased, the sampling stations were: Station 1 was at the mouth of the bayou, along the west bank; Station 2 on a reef paralleling the west side of the bayou ~300 m north of the shrimp drying facility; and Station 3 was a large reef in Four League Bay at the north end of Oyster Bayou. Landmarks included the channel entrance marker, an abandoned shrimp drying facility, and the ends of the bayou where it entered the bay and Gulf.

Year I - Oysters were collected by hand.

Year II - Oyster were purchased from a commercial oyster dredge.

Year III - Oyster were collected by dredge.

Year IV - The stations sampled in Year IV were the same as were sampled for all previous years. Oysters were dredged at Station 1 and collected by hand near the shore at Stations 2 and 3.

Year V - Oysters were purchased from Mr. Wilson Voisin. They were dredged by a lugger working on the north end of the bayou between Station 1 and 2. No stations were designated. A recent freeze had killed all of the oysters along the shoreline and to a depth of 1 m due to extreme low tides.

Year VI - Oysters were collected this year since the area was closed due to excessive freshwater. Station 1 was dredged at the north end of Oyster Bayou on the west side of the channel. Station 2 was collected by hand from

a reef on the west side of the channel across from the three buildings. Station 3 was also on the west bank approximately 0.5 mi north of the mouth of Oyster Bayou and 300 m south of the shrimp drying facility ruins.

Year VII - Oyster collection Stations 1 and 2 were located at the same sites as last year. Station 3 was just to the south of station 2. Oysters were abundant this year.

Year VIII - Oysters were collected at the same locations sampled in Year VII.

Year IX - The site was not scheduled for collection this year.

SEDIMENT COLLECTIONS

Years I, II, & III - Sediment Station 1 was located in a small cove on the west bank at the mouth of Oyster Bayou. Station 2 was located on the east side shoreline 0.5 miles north of Station 1 and was 300 m south of the shrimp dryer at a fringe marsh along the east shore. Station 3 was located north of Station 2 on the east shore 0.5 miles south of an abandoned shrimp drying plant. Station 3 was at the southernmost piling of the old dock at the three wooden buildings with rusty tin roofs. Sediments were variable but were generally soft gray-black mud.

Years IV, V, VI, VII, VIII, & IX - No sediments were sampled during these years.

SAMPLING METHOD

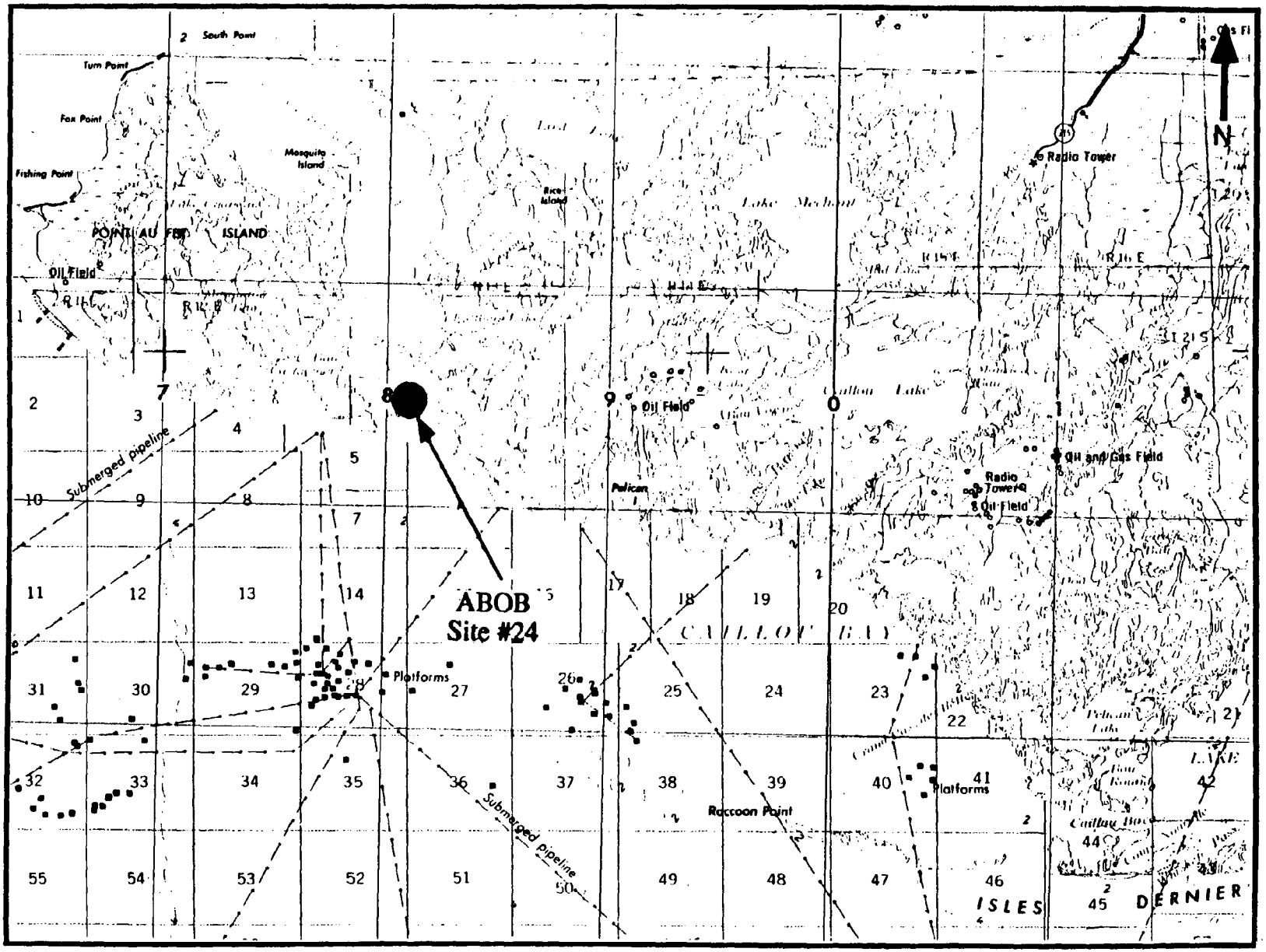
Oyster - hand, dredge or purchase
Sediment - box core

WATER DEPTH - intertidal to subtidal, 0 to 2 m

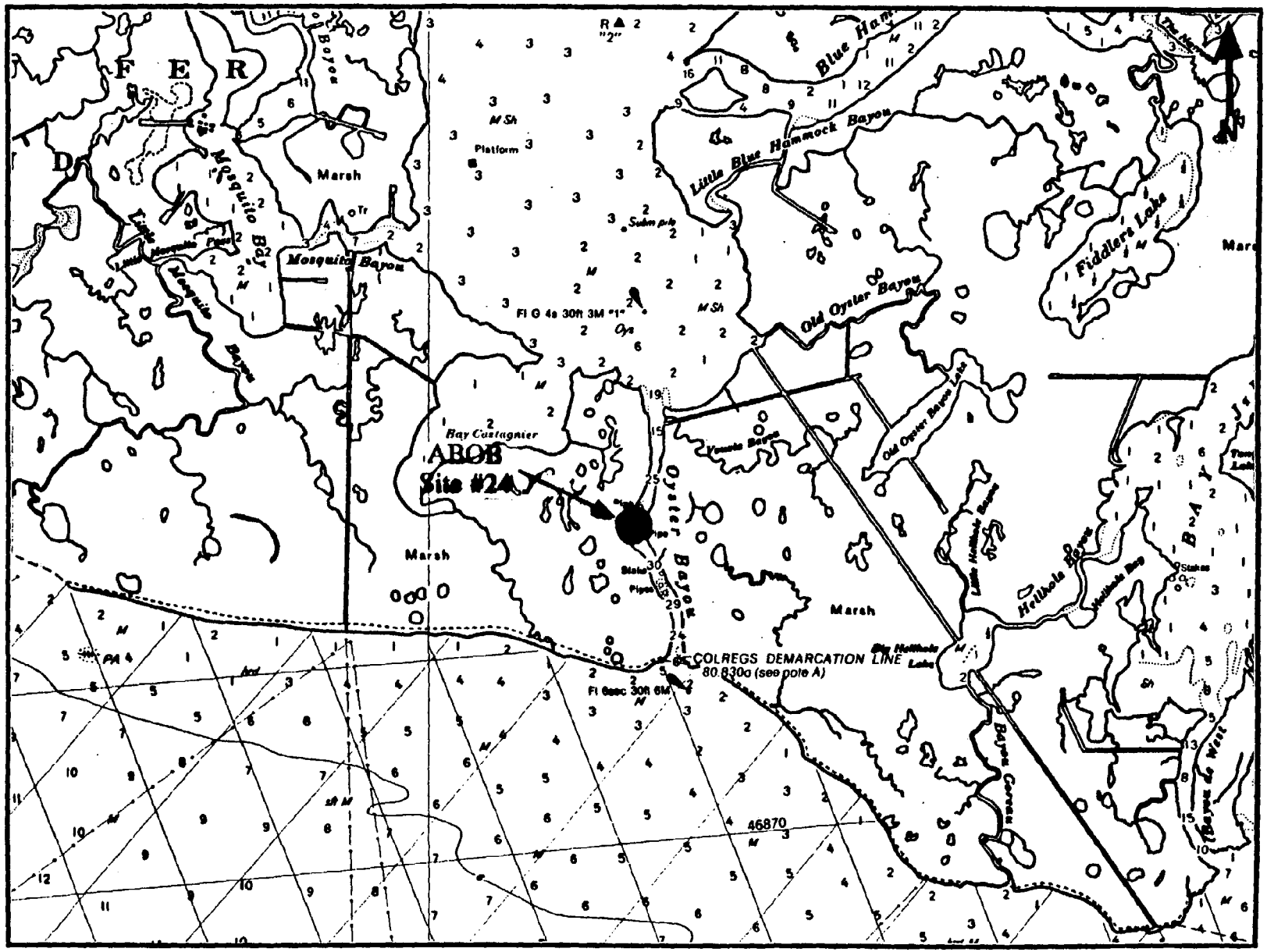
POSSIBLE CONTAMINANTS - No sources were observed.

ENVIRONMENTAL DATA

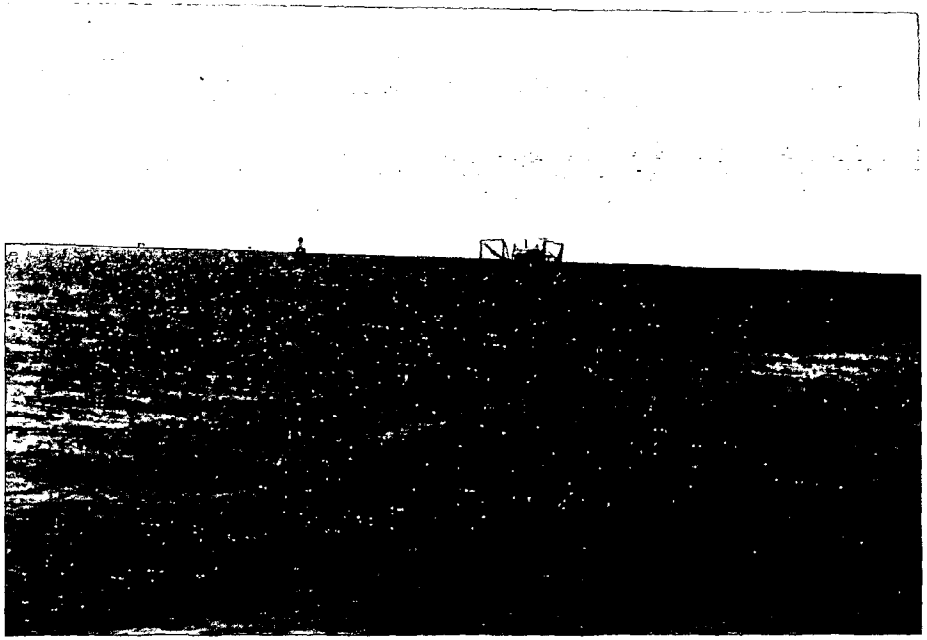
	Salinity (‰)	Temperature (°C)	Dates Sampled
YEAR I	11.0	23.0	29 March 1986
YEAR II	6.0	16.0	11 February 1987
YEAR III	11.0	12.0	29 January 1988
YEAR IV	13.0	21.0	7 January 1989
YEAR V	21.0	13.0	7 January 1990
YEAR VI	18.7	14.2	9 January 1991
YEAR VII	8.0	16.0	9 January 1992
YEAR VIII	5.0	17.0	6 January 1993



Site #24 (ABOB), Atchafalaya Bay Oyster Bayou.



Site #24 (ABOB), Atchafalaya Bay Oyster Bayou (from chart 11356).



SITE NUMBER - 25 **DESIGNATOR** - CLCL

SITE - CAILLOU LAKE, CAILLOU LAKE, LA

NOMINAL SITE CENTER - 29°15.25'N 90°55.80'W

LOCATED ON NOS CHART # - 11356

SITE ACCESS - A boat launch is at Bayou Dularge Sporting Goods at the end of LA Highway 315. Take Bayou Dularge southwest to the channel separating Lake Caillou and Lake Merchant and turn south toward the Fish and Wildlife Camp on the island. Run time to the site is 0.5 hrs.

SITE DESCRIPTION - The site was located in Lake Caillou on a submerged reef running from channel marker 16 to Fish and Wildlife Camp. The reef was usually closed to oystering, and it was necessary to notify the F&WL camp prior to sampling. Dredging or tonging was required.

OYSTER COLLECTIONS

Year I - Oysters were patchy on the bottom running on a line from the channel marker to the camp, and could only be located by feeling the bottom with a bamboo pole. No station distinctions were made at this open water subtidal site because of the sparsity of oysters.

Year II - Oysters were dredged from the same location as the first year.

Year III - Year III oysters were abundant and were easily dredged.

Year IV - In Year IV, the oysters were dredged from approximately the same location as was sampled in all previous years. The dredging was done between channel markers 14 and 16, in front of the F&WL camp, and about 150 m east.

Year V - Oysters were dredged from the same general locations as previously sampled. Station 1 oysters were collected between channel marker 16 and the F&WL camp. Stations 2 and 3 were collected 200 m south of channel marker 16 where the reef runs north-south. The bottom was soft mud and scattered shell.

Year VI - All three oyster stations were dredged from the same area as previously sampled (29°15.42'N, 90°55.91'W). Calliou Lake was opened two weeks for commercial oysters just prior to our sampling. Because of this oysters were not abundant.

Years VII & VIII - Oysters were collected in the same general locality. Several tows of the dredge were made approximately 50 to 100 m east of channel marker 14 on line to the F&WL camp. Oysters were abundant but distinct stations were not recognized due to the limited size of the reef.

Year IX - Oysters were dredged from a small reef to the east of the channel marker #14, in a line with the Fish and Wildlife camp (29°15.12'N, 90°55.85'W). Oysters were abundant but distinct stations were not recognised due to the limited size of the reef.

SEDIMENT COLLECTIONS

Years I, II, & III - Sediments were located to the north of the oyster site, along the shoreline which separated Bayou DuLarge from Lake Caillou. Sediment Station 1 (in all years) was located at the base of channel marker 18. Station 2 was located at the mouth of a small cove 300 m to the east. Station 3 was located ~100 m from the shore at a large cove which was due north of the FWL Camp. Sediments were variable, Stations 1 and 2 were dark gray silty mud with a thin brown top layer. Station 3 was stiff gray clay with a coarse sandy mud layer on top.

Years IV, V, VI, VII, VIII, & IX - No sediments were sampled during these years.

SAMPLING METHOD

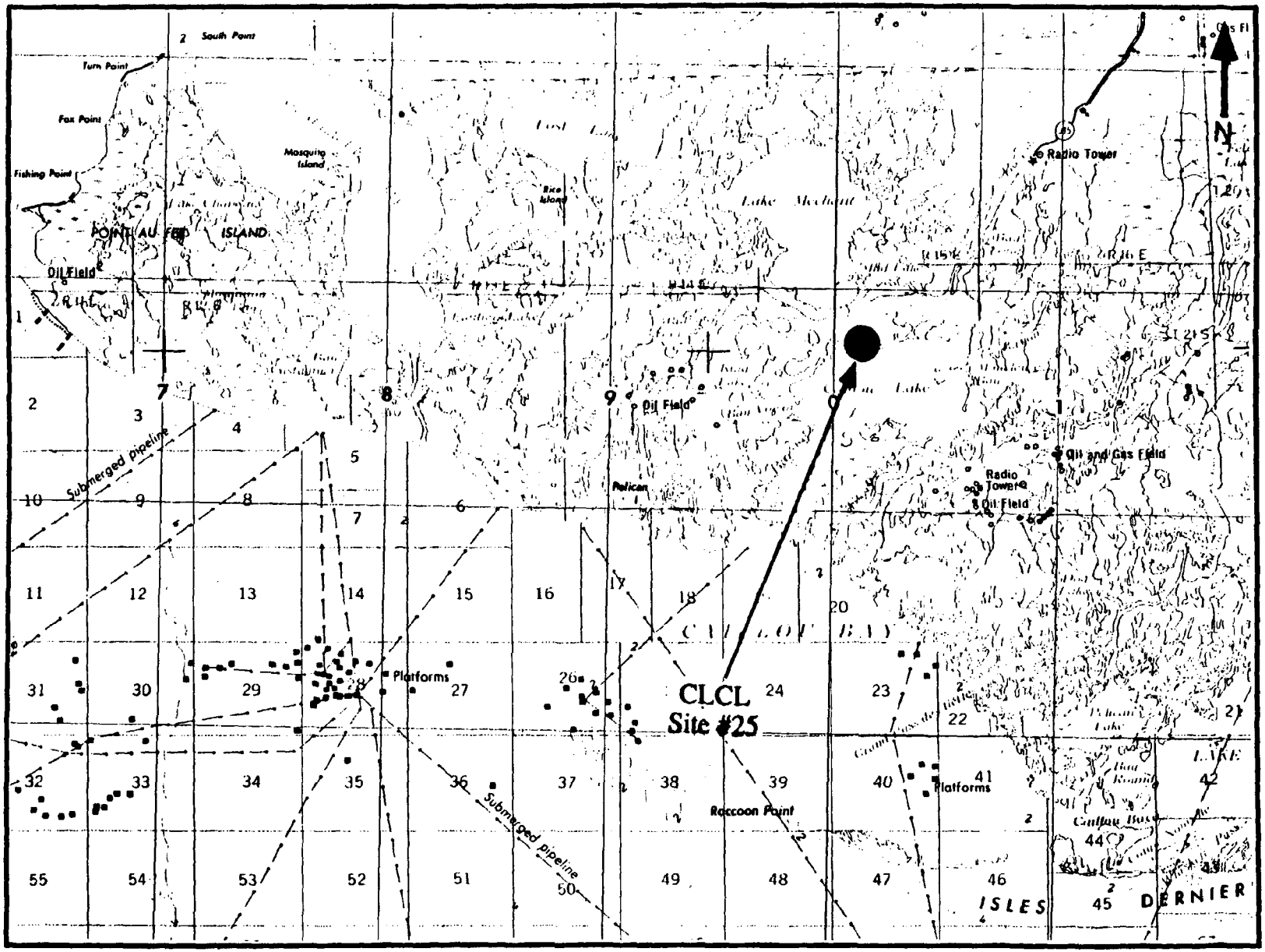
Oysters - dredge
Sediment - box core

WATER DEPTH - 2 m

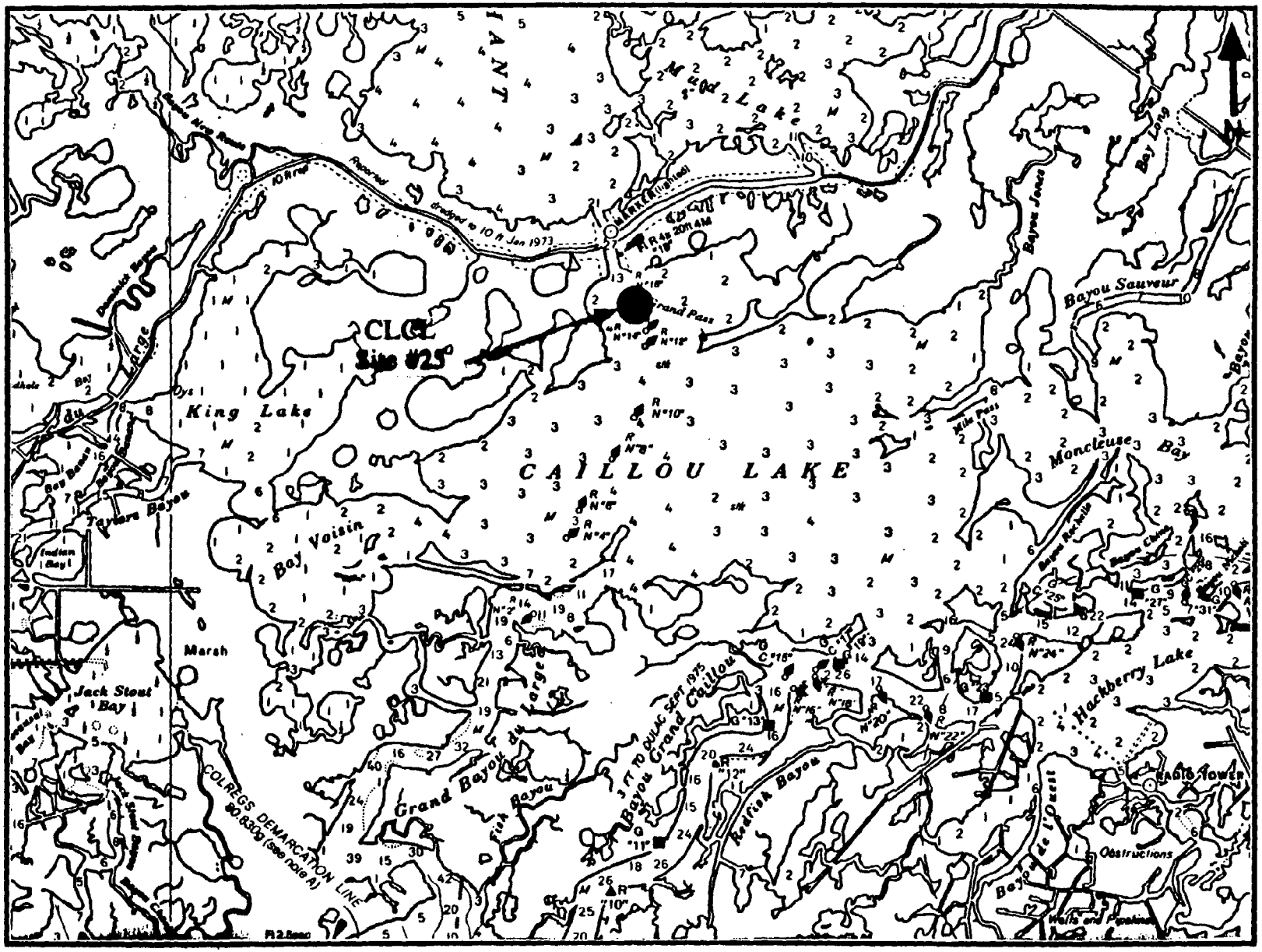
POSSIBLE CONTAMINANTS - Possible sources of contamination in the vicinity included numerous camp houses without sewer systems along Bayou DuLarge.

ENVIRONMENTAL DATA

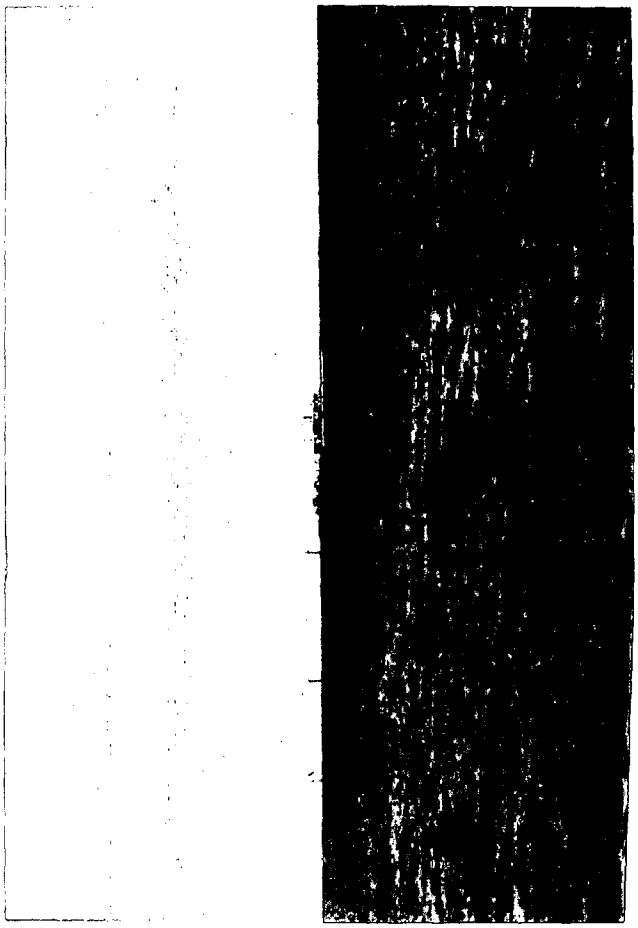
	Salinity (‰)	Temperature (°C)	Dates Sampled
YEAR I	14.0	23.0	29 March 1986
YEAR II	5.0	17.0	11 February 1987
YEAR III	15.0	13.0	29 January 1988
YEAR IV	22.0	22.0	7 January 1989
YEAR V	14.0	14.0	7 January 1990
YEAR VI	14.0	14.0	9 January 1991
YEAR VII	9.0	17.0	9 January 1992
YEAR VIII	8.0	18.0	6 January 1993
YEAR IX	5.0	10.0	12 January 1994

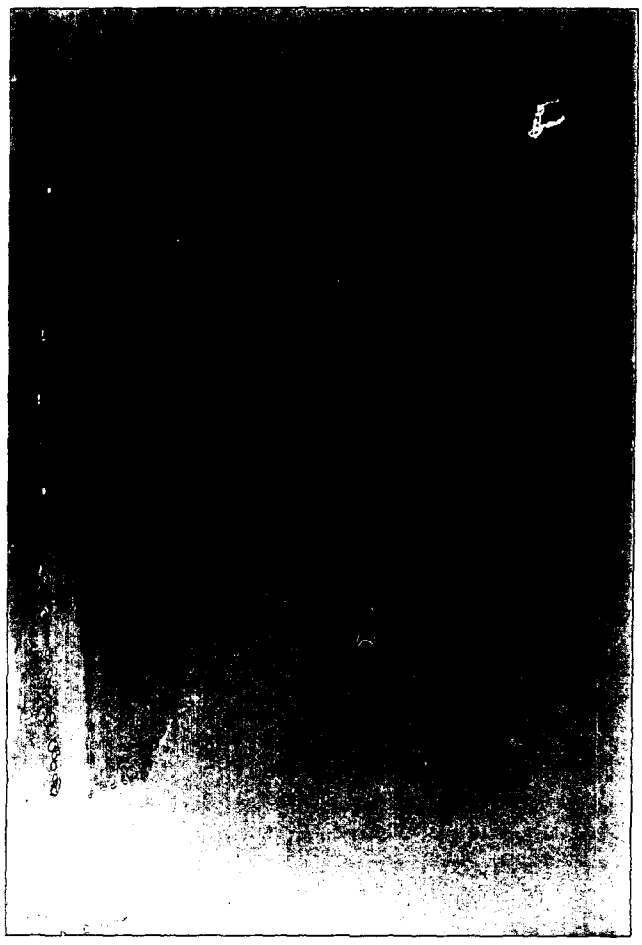


Site #25 (CLCL), Caillou Lake Caillou Lake.



Site #25 (CLCL), Caillou Lake Caillou Lake (from chart 11356).





SITE NUMBER - 26 **DESIGNATOR** - TBLB

SITE - LAKE BARRE, TERREBONNE BAY, LA

NOMINAL SITE CENTER - 29°15.60'N 90°35.70'W

LOCATED ON NOS CHART # - 11357

SITE ACCESS - Access to the site is by boat launched in Cocodrie at the Coco Marina and then north on Bayou Petit Caillou. Turn right (east) into Lapeyrouse Canal and proceed to Bayou Terrebonne, turn south and proceed to the third cut into Bay la Fleur. Run time to the site is approximately 0.5 hrs.

SITE DESCRIPTION - The three stations were located along Bayou Terrebonne. In Year I, Stations 1 and 2 were on the west side of the channel and Station 3 was on the east side. In Year II and following years, Station 1 and 3 were reversed and Station 2 remained unchanged.

OYSTER COLLECTIONS

Year I - Station 1 was off Bayou Terrebonne in a small bay on the west side of the bayou about 0.5 miles north of Lake Barre. Landmarks and bearing were 265° to LUMCON tower; 163° to green channel marker 3, and 106° to the Montegert water tower. Station 2 was located upstream at the mouth of bayou in grass near an old fishing camp on Bayou Terrebonne at the first cut to the west into Bayou Lucien. Bearings were 258° to LUMCON; 116° to the green channel marker 1. Oysters and sediments were taken near the remains of a galvanized corrugated iron shed and wood dock in intertidal waters on the northwest shore. Station 3 was farther north on Bayou Terrebonne at the next cut (Lake Barre pass) to the east which was the first cut to the east north of Seabreeze Pass. This cut connected to Bay la Fleur on the east side of Terrebonne Bayou. Oysters were from an intertidal reef on southwest shore and sediments from subtidal waters. The reef was exposed at low tide. Oysters were abundant at all three sample areas.

Years II, III, IV, V, & VI - Stations 1 and 3 were reversed these years.

Years VII & VIII - Stations were located in the same sites sampled the previous five years. Station 1 on the north, Station 2 in the middle and Station 3 was on the south end of the bayou.

Year IX - The site was not scheduled for sampling this year.

SEDIMENT COLLECTIONS

Years I, II, & III - Sediment collections were collocated with each of the oyster stations.

Years IV, V, VI, VII, VIII, & IX - No sediments were sampled during these years.

SAMPLING METHOD

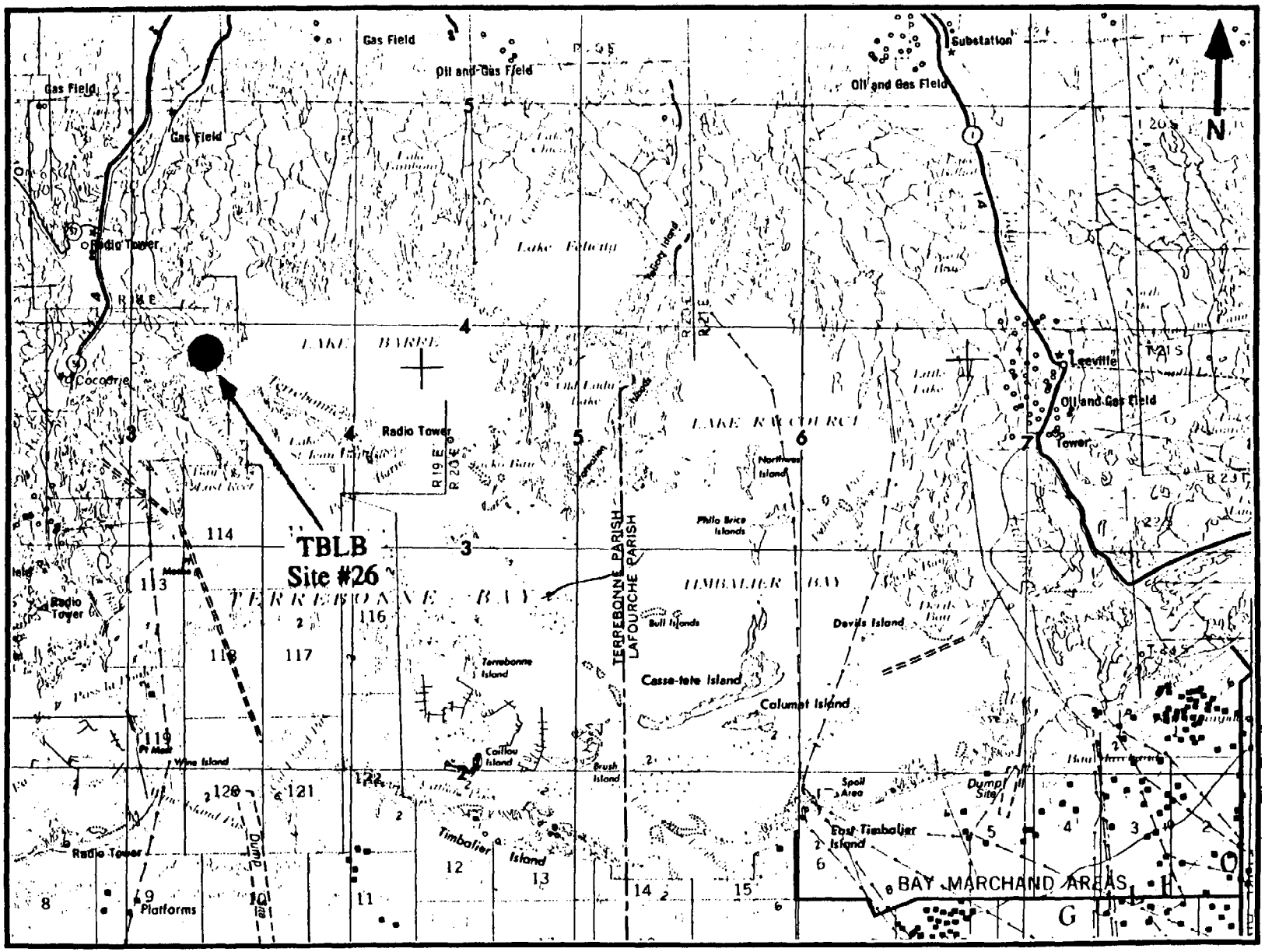
Oysters - hand
Sediment - hand

WATER DEPTH - intertidal, 0.1 - 0.5 m

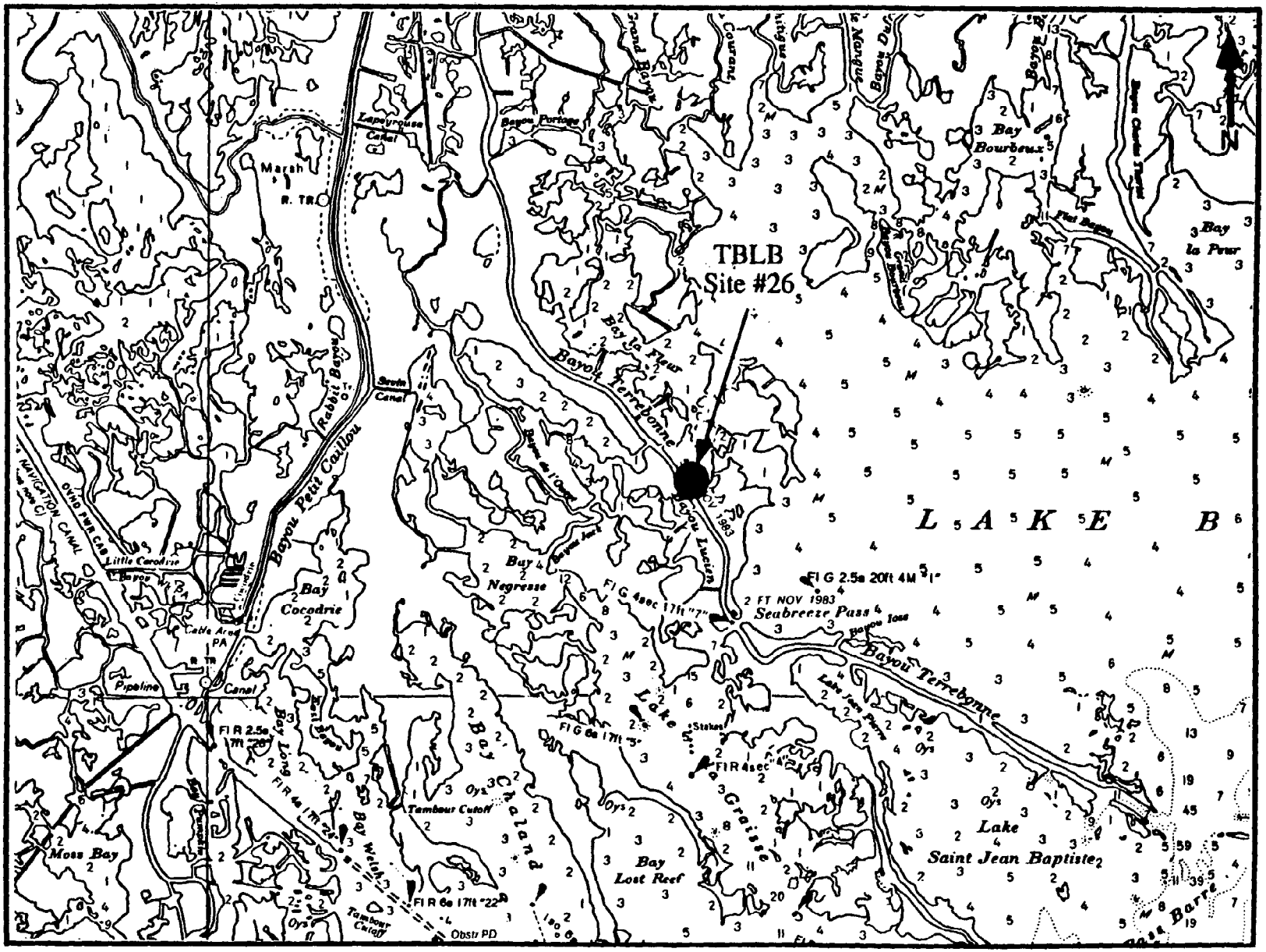
POSSIBLE CONTAMINANTS - Contamination factors included marine traffic and the fish camp ruins at Station 2.

ENVIRONMENTAL DATA

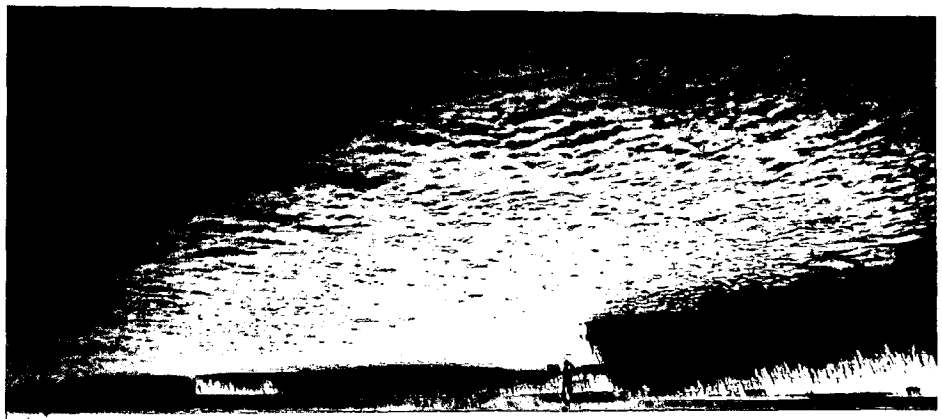
	Salinity (‰)	Temperature (°C)	Dates Sampled
YEAR I	17.6	20.0	29 March 1986
YEAR II	17.6	20.0	11 February 1987
YEAR III	18.0	11.0	29 January 1988
YEAR IV	25.0	19.0	7 January 1989
YEAR V	18.3	16.0	6 January 1990
YEAR VI	19.0	14.3	8 January 1991
YEAR VII	15.0	16.0	9 January 1992
YEAR VIII	10.0	18.0	6 January 1993

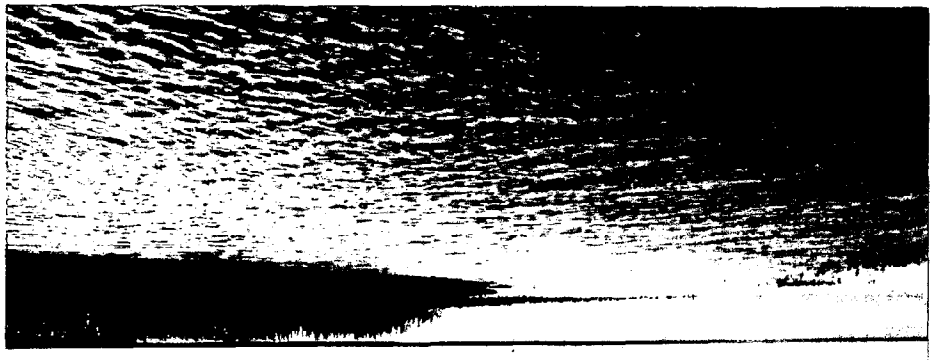


Site #26 (TBLB), Terrebonne Bay Lake Barre.



Site #26 (TBLB), Terrebonne Bay Lake Barre (from chart 11357).





SITE NUMBER - 27 **DESIGNATOR** - TBLF

SITE - LAKE FELICITY, TERREBONNE BAY, LA

NOMINAL SITE CENTER - 29°15.80'N 90°24.40'W

LOCATED ON NOS CHART # - 11357

SITE ACCESS - The launch/departure point is Coco Marina at Cocodrie or the boat ramp at LUMCON, and the run time is ~1.5 hours to the site by boat. A deep draft outboard must enter and cross Terrebonne Bay to Lake Felicity. A shallow draft outboard can shortcut up the bayou to enter and cross Lake Barre (see directions for TBLB). The site is located at an abandoned and dilapidated fish camp on the southeast side of Lake Felicity, near Bayou Point Au Chien. Landforms in the area bear little resemblance to any maps or charts of the area and navigation to the site by reference to shoreline features as depicted in charts is nearly impossible.

SITE DESCRIPTION - The oysters were intertidal and interspersed in the grass beds on the small islands surrounding the fish camp. The only landmark in locating the oyster stations was the fish camp structure, which burned down in Year III.

OYSTER COLLECTIONS

Years I, II, & III - Station 1 was located at southeast corner of bay, south of channel marker 5 for Felicity Bayou at an abandoned fish camp. Station 1 was located on the island (grass covered flat) at the abandoned fish camp. Station 2 was a subtidal *Spartina* bed across the channel on the island bearing 162° from the fish camp. Station 3 was a subtidal grass bed west of the fish camp on the island bearing 240° from the fish camp.

Years IV, & V - Prior to the Year IV sampling, the fish camp had burned to the ground. In Year IV, Stations 1 and 3 were in the same locations but Station 2 was moved due to the lack of oysters. The new Station 2 was located approximately 200 m northwest (320 bearing from Station 1) of the dock at the fish camp. Station 2 is a small reef at the edge of the *Spartina* marsh.

Years VI, VII, VIII, & IX - Oysters were collected at the same locations as in Years IV & V.

SEDIMENT COLLECTIONS

Years I, II, & III - Sediments are silty mud and collocated with the oysters. Sediments were taken from the subtidal waters adjacent to each of the oyster stations.

Years IV, V, VI, VII, VIII, & IX - No sediments were sampled during these years.

SAMPLING METHODS

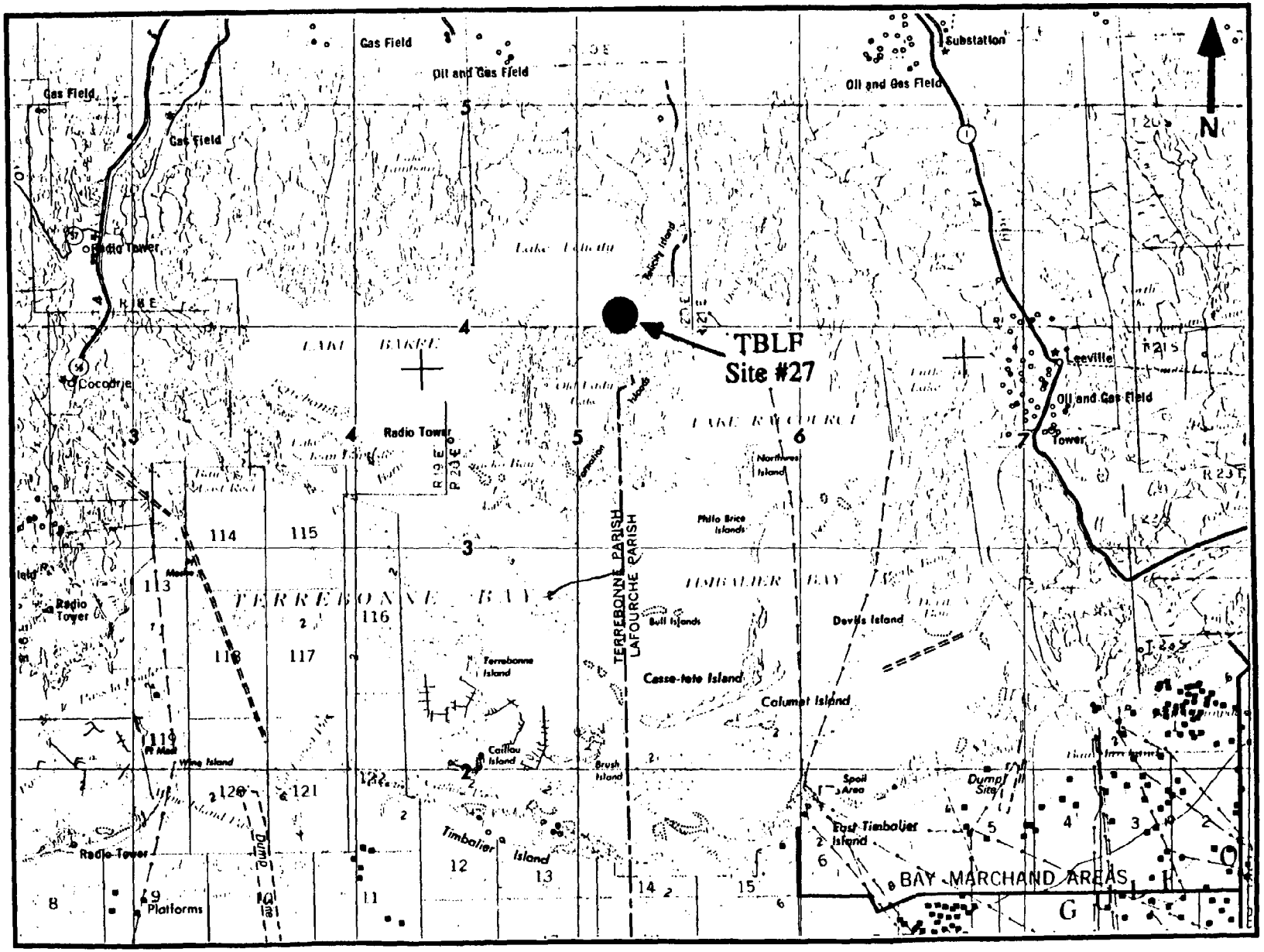
Oysters - hand
Sediment - hand

WATER DEPTH - intertidal, 0 to 0.5 m

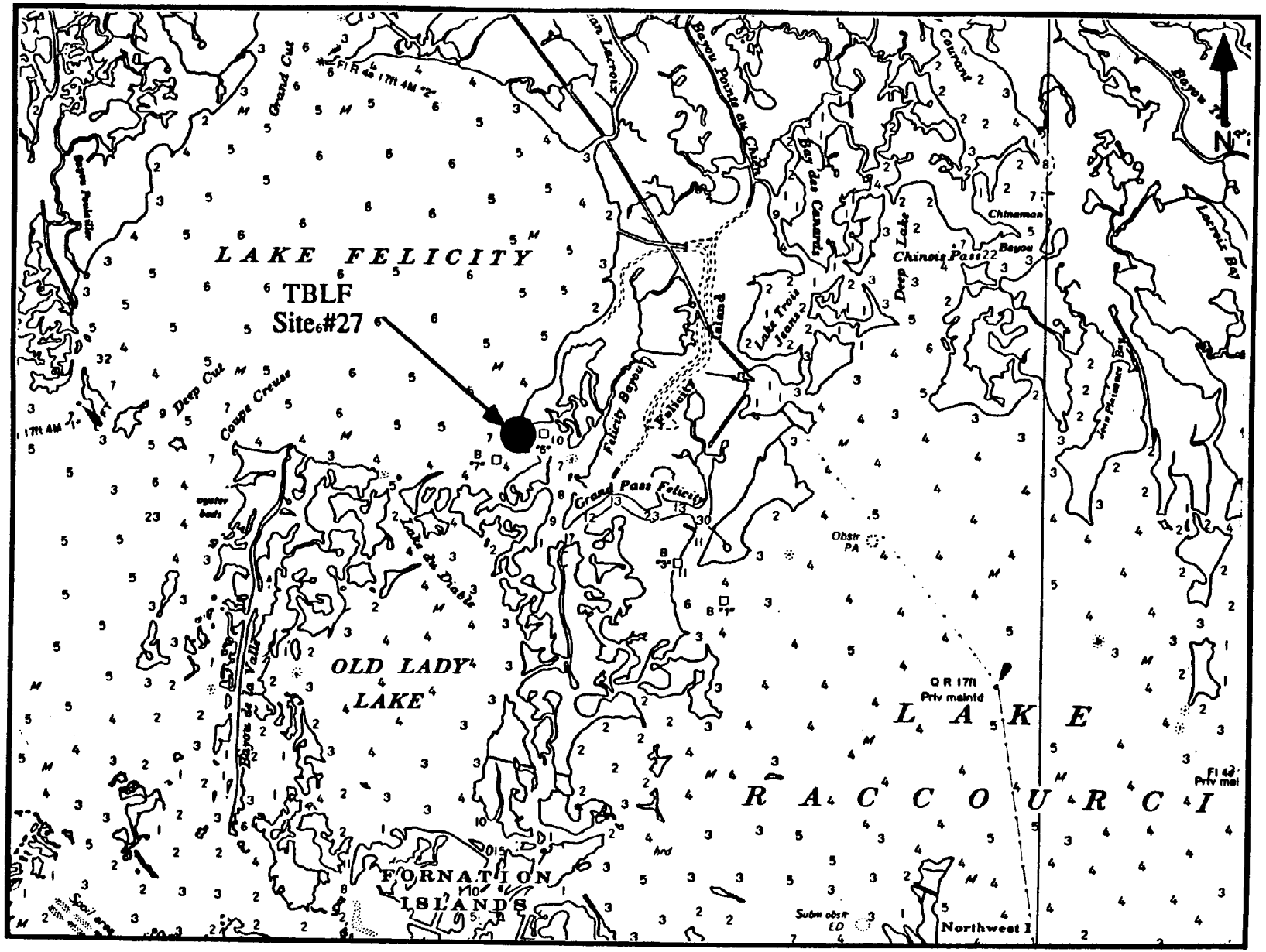
POSSIBLE CONTAMINANTS - There were no obvious sources of contamination in the vicinity except for the very large producing oil and gas field in Terrebonne Bay between Lake Barre and Lake Felicity.

ENVIRONMENTAL DATA

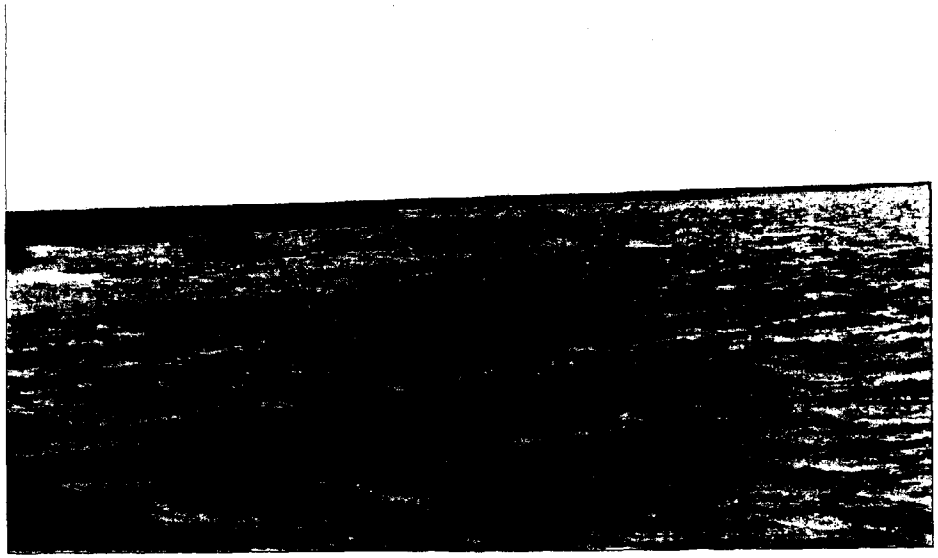
	Salinity (‰)	Temperature (°C)	Dates Sampled
YEAR I	19.0	21.0	28 March 1986
YEAR II	16.0	20.0	11 February 1987
YEAR III	27.0	15.0	29 January 1988
YEAR IV	26.0	22.0	7 January 1989
YEAR V	21.0	15.0	7 January 1990
YEAR VI	26.0	14.0	9 January 1991
YEAR VII	20.0	16.0	9 January 1992
YEAR VIII	20.0	16.0	6 January 1993
YEAR IX	15.0	15.0	11 January 1994



Site #27 (TBLF), Terrebonne Bay Lake Felicity.



Site #27 (TBLF), Terrebonne Bay Lake Felicity (from chart 11357).



SITE NUMBER - 28 **DESIGNATOR** - BBSD

SITE - BAYOU ST. DENIS, BARATARIA BAY, LA

NOMINAL SITE CENTER - 29°24.18'N 89°59.75'W

LOCATED ON NOS CHART # - 11358

SITE ACCESS - The site is accessed by boat, launching at the Happy Jack Marina in Point Sulfur or the Cheramines Marina in Grand Isle. From Grand Isle proceed north up the Barataria Waterway to green channel marker 31. Islands and landforms have changed since the chart was published, and the land forms provide little reference for determining position. Run time to the site is approximately 1 hr.

SITE DESCRIPTION - This site was located in Bayou Cholas on the west side of Barataria Bay and the Barataria Waterway. Oysters have been collected in the bay area and along the shoreline of the small island on the north side of the bay.

OYSTER COLLECTIONS

Years I & II - Oysters in Years I and II were taken from intertidal mud and sand bottom on the west side of island west of green channel marker 31. The oysters found were very old and few in numbers. Year I oysters were purchased from a commercial lugger working on the reefs in the area. Station 1 was on the south part of the island, at a bearing of 360° to channel marker 9. Station 2 was 120 m north of Station 1. Landmark bearings were 121° to channel marker 9; 20° to channel marker 11. Station 3 was 100 m north of Station 2. Bearing were 65° to pipeline platform and 285° to channel marker 9.

Year III - Year III stations were on a submerged reef west of Barataria Waterway between channel marker 30 and 33, near several small islands to the west in Bayou Cholas. Station 1 was on a bearing of 30° to green marker 13 and 105° to marker 9. Station 2 was 50 m to the south, and Station 3 was another 50 m south.

Year IV - Due to the lack of oysters at the stations sampled in Year III, the sample location was moved approximately 500 m to the east. Year IV stations were located on the island directly west of channel marker 33. Station 1 was on the east end of the island (nearest the channel) and extended along the south facing shoreline for 50 m. Station 2 was in the middle part of the island and was 50 m due west of Station 1. Station 3 was on the west end of the island next to Station 2.

Year V - Stations collected this year were those described in Year IV. Oysters were scarce. There were numerous dead oysters and fish due to the recent hard freeze.

Year VI - There were no oysters on the island this year so the site was moved back to the submerged reef. Stations sampled in Year III were resampled this year.

Year VII - There were no live oysters found in this part of the bay.

Year VIII - Oysters were present again this year, but were scarce and small. Stations sampled in Year III were resampled this year.

Year IX - The site was not scheduled for sampling this year.

SEDIMENT COLLECTIONS

Years I & II - Sediments were taken from subtidal areas west of channel marker 26.

Year III - Sediments were taken adjacent to the reef 30-40 m east of each station.

Year IV - Sediments were collected 100 to 150 m south of each oyster station in 1 to 1.5 m of water.

Years V, VI, VII, VIII, & IX - Sediments were not sampled during these years.

SAMPLING METHOD

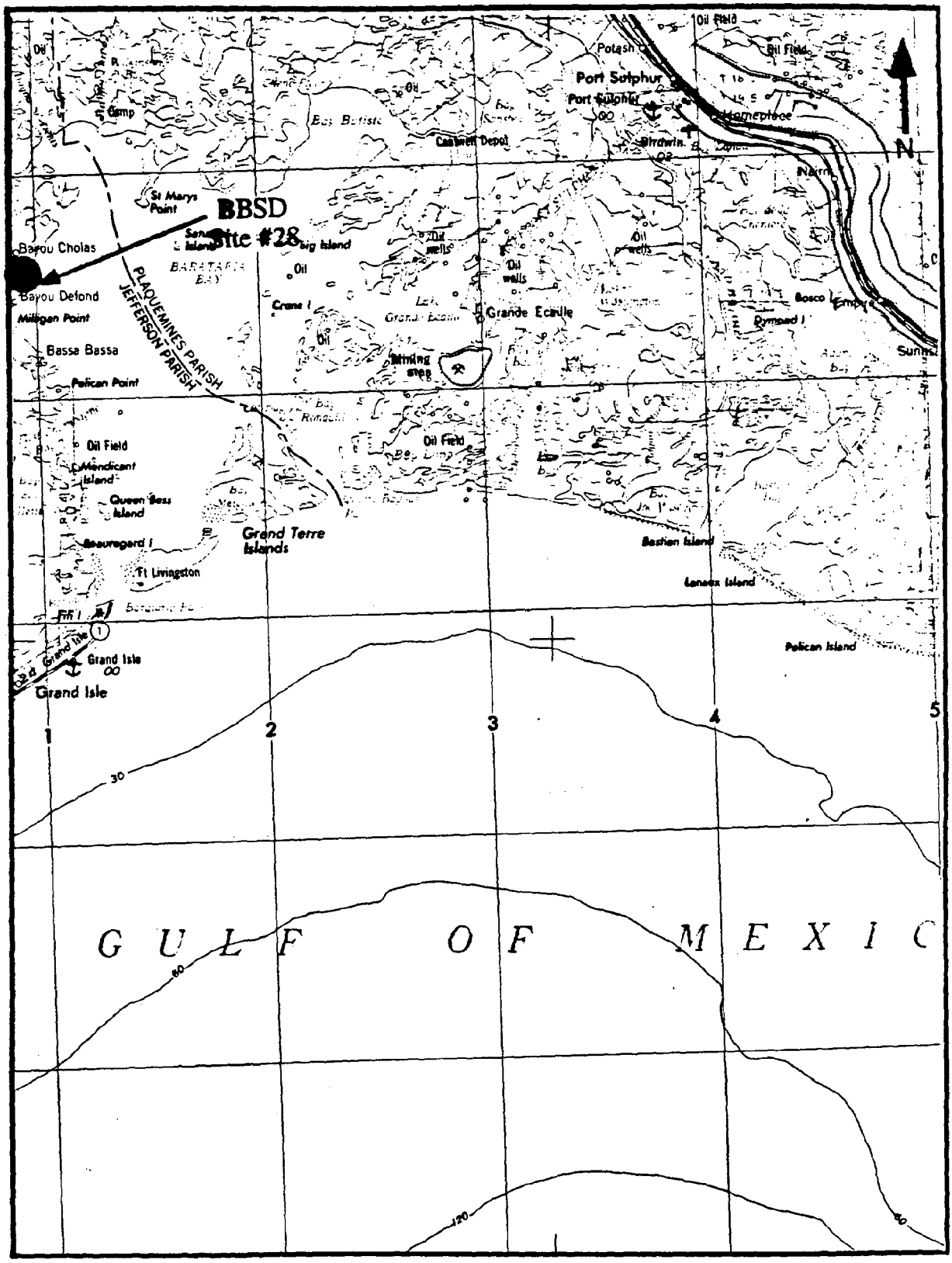
Oysters - commercial dredge, tongs, and hand
Sediments - box core

WATER DEPTH - intertidal or subtidal, 0.3 to 3 meters

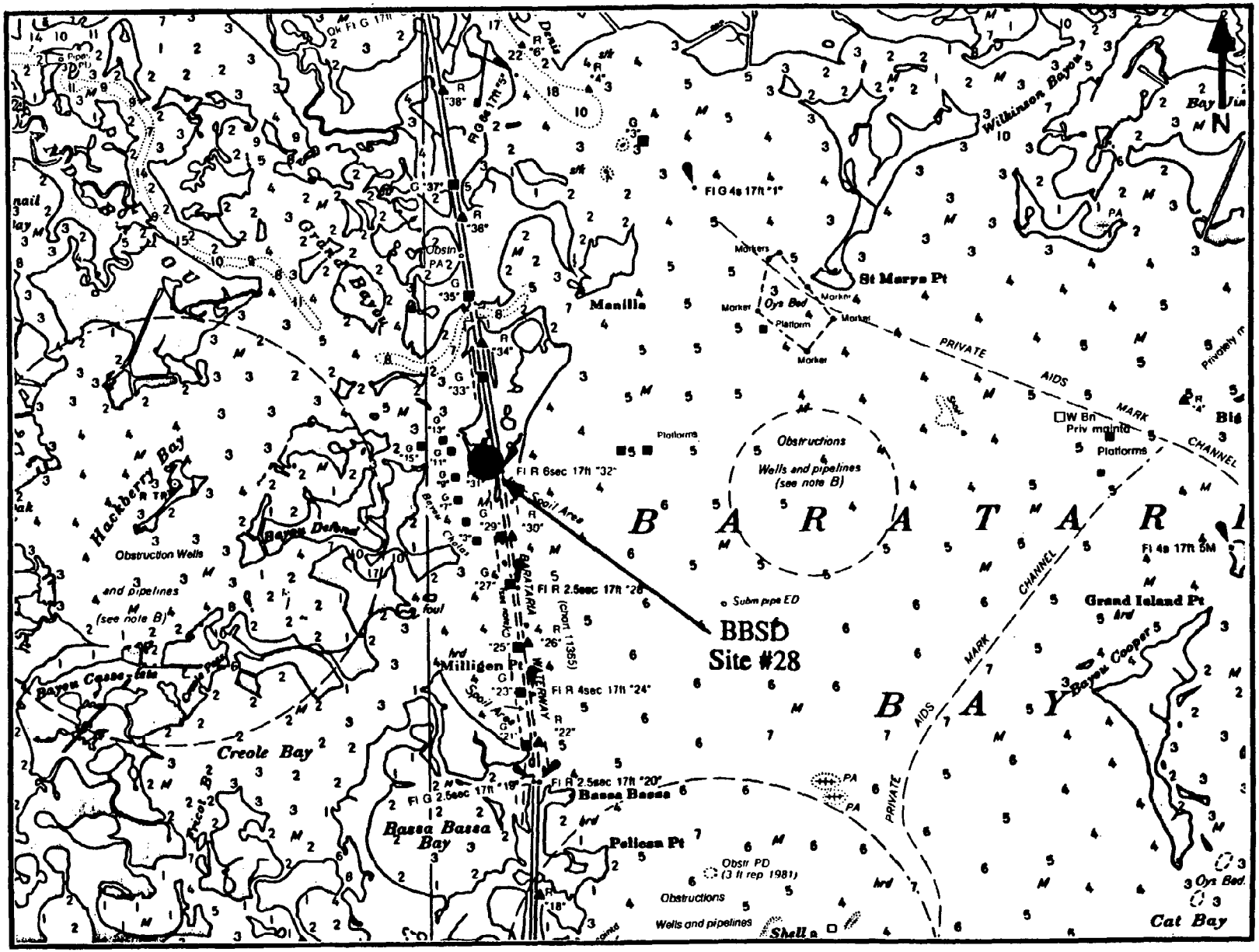
POSSIBLE CONTAMINANTS - Contamination factors included marine traffic, dredging, and a compressor station.

ENVIRONMENTAL DATA

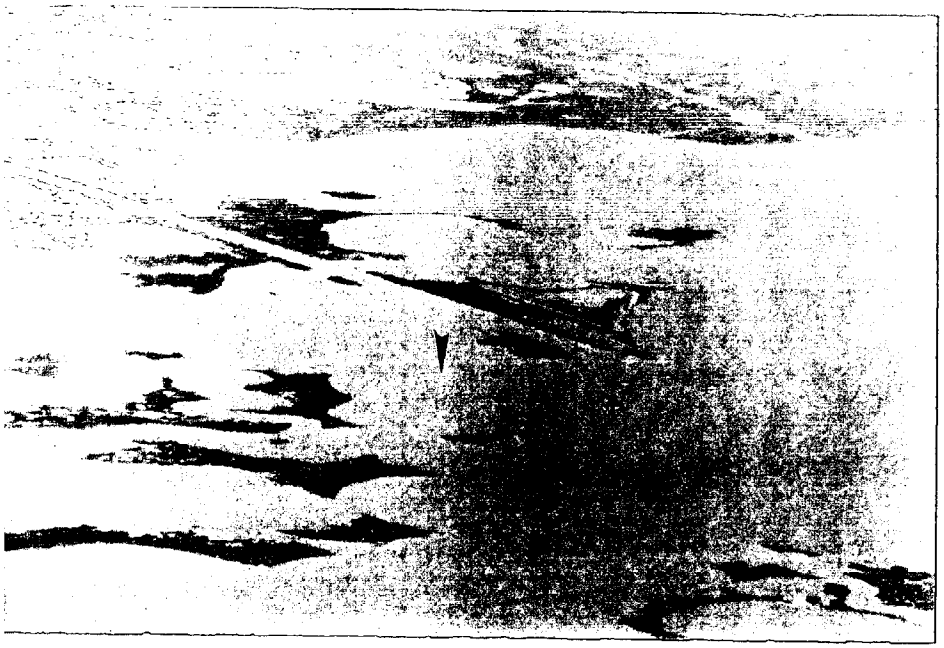
	Salinity (‰)	Temperature (°C)	Dates Sampled
YEAR I	19.0	19.0	27 March 1986
YEAR II	19.0	19.0	13 February 1987
YEAR III	12.0	11.0	28 January 1988
YEAR IV	19.0	18.0	6 January 1989
YEAR V	16.0	16.0	6 January 1990
YEAR VI	7.7	15.0	8 January 1991
YEAR VII	20.0	16.0	8 January 1992
YEAR VIII	10.0	19.0	5 January 1993

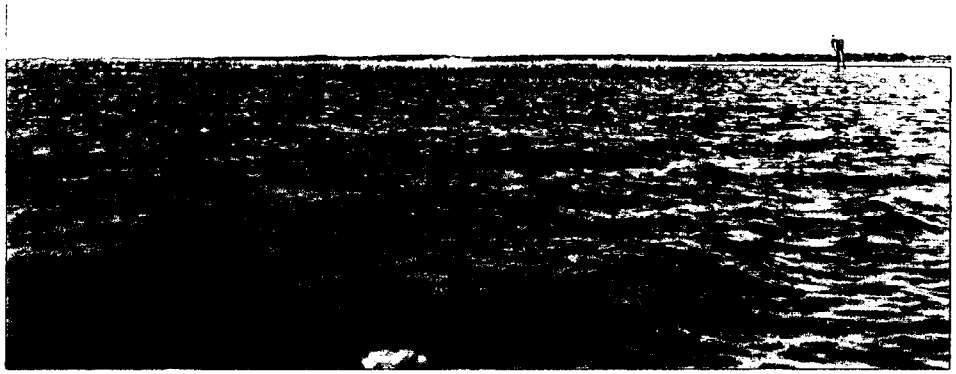


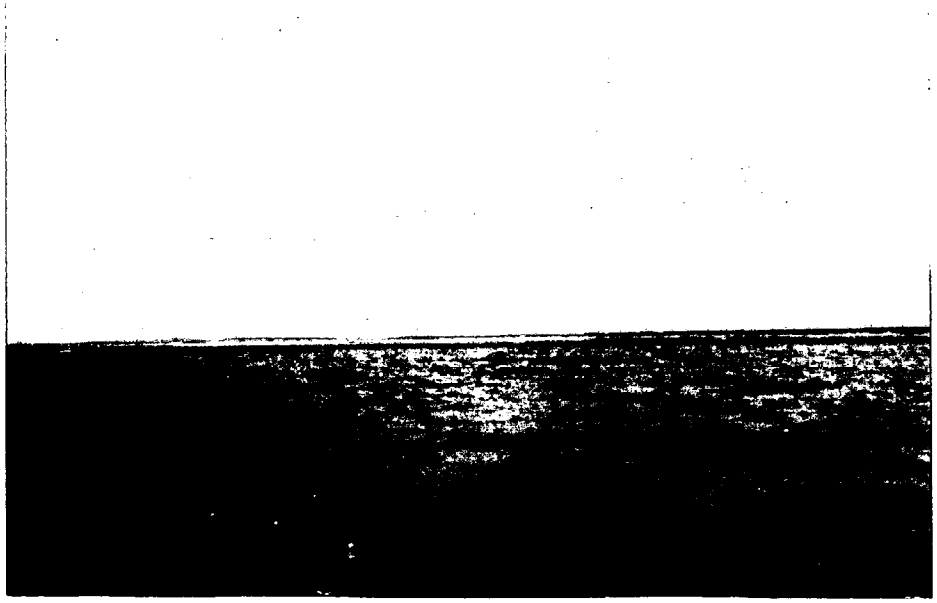
Site #28 (BBSD), Barataria Bay Bayou St. Denis.



Site #28 (BBSD), Barataria Bay Bayou St. Denis (from chart 11358).







SITE NUMBER - 29 **DESIGNATOR** - BBMB

SITE - MIDDLE BANK, BARATARIA BAY, LA

NOMINAL SITE CENTER - 29°16.55'N 89°56.53'W

LOCATED ON NOS CHART # - 11358, 11365

SITE ACCESS - During the first two years of the study, the boat was launched at the High Point Marina, Point Sulfur. The run from this point is at least 2 hours. The site is now accessed by boat launched at Cheramines Marina in Grand Isle. From the marina, proceed east across Barataria Pass to the Louisiana Fish and Wildlife Camp on the northwestern tip of the westernmost island of the Grand Terre Islands. Run time is less than 10 minutes.

SITE DESCRIPTION - This site was located in *Spartina alterniflora* marsh along the channel going to the Grand Terre F&WL station on the east side of the channel to F&WL camp harbor. The site was only 10 minutes from Grand Isle. Oysters and sediments during Years I, II and III were collected from intertidal waters inside the Fish and Wildlife boat basin. Oysters were found scattered on the mud and sand bottom. There were very few oysters during Year II. There was a reported die-off after the first year's collection.

OYSTER COLLECTIONS

Years I, II, III, IV, V, VI, VII, & VIII - Station locations for oyster collections were: Station 1 - located at the dock; Station 2 - 50 m to the north; Station 3 - 70 m north of Station 2. Station locations were the same for all eight years.

Year IX - The site was not scheduled for sampling this year.

SEDIMENT COLLECTIONS

Years I, II, & III - Sediments were collected along the channel adjacent to each of the oyster stations.

Years IV, V, VI, VII, VIII, & IX - Sediments were not sampled during these years.

SAMPLING METHOD

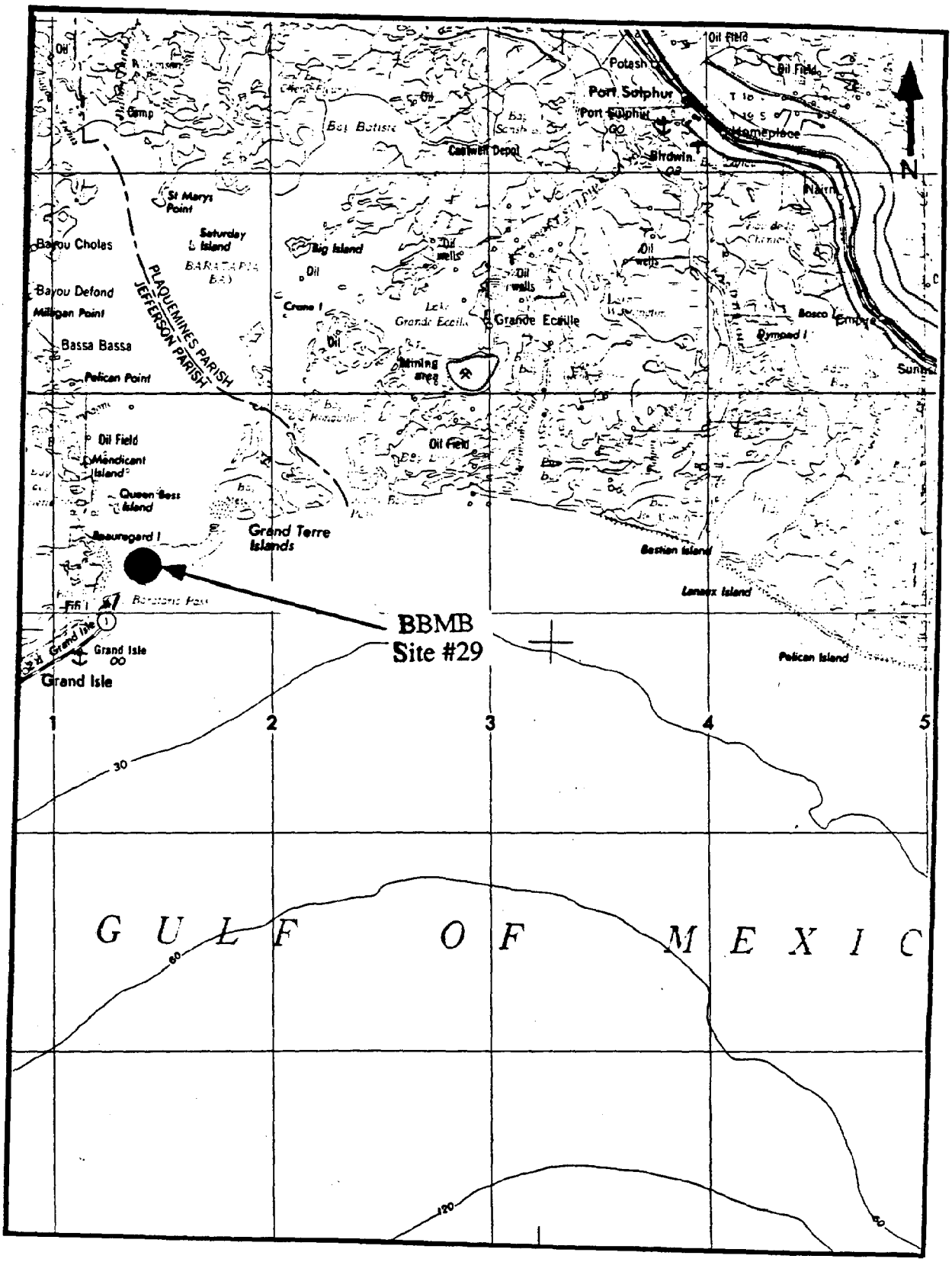
Oysters - hand
Sediment - hand

WATER DEPTH - intertidal, 0 to 0.5 meters

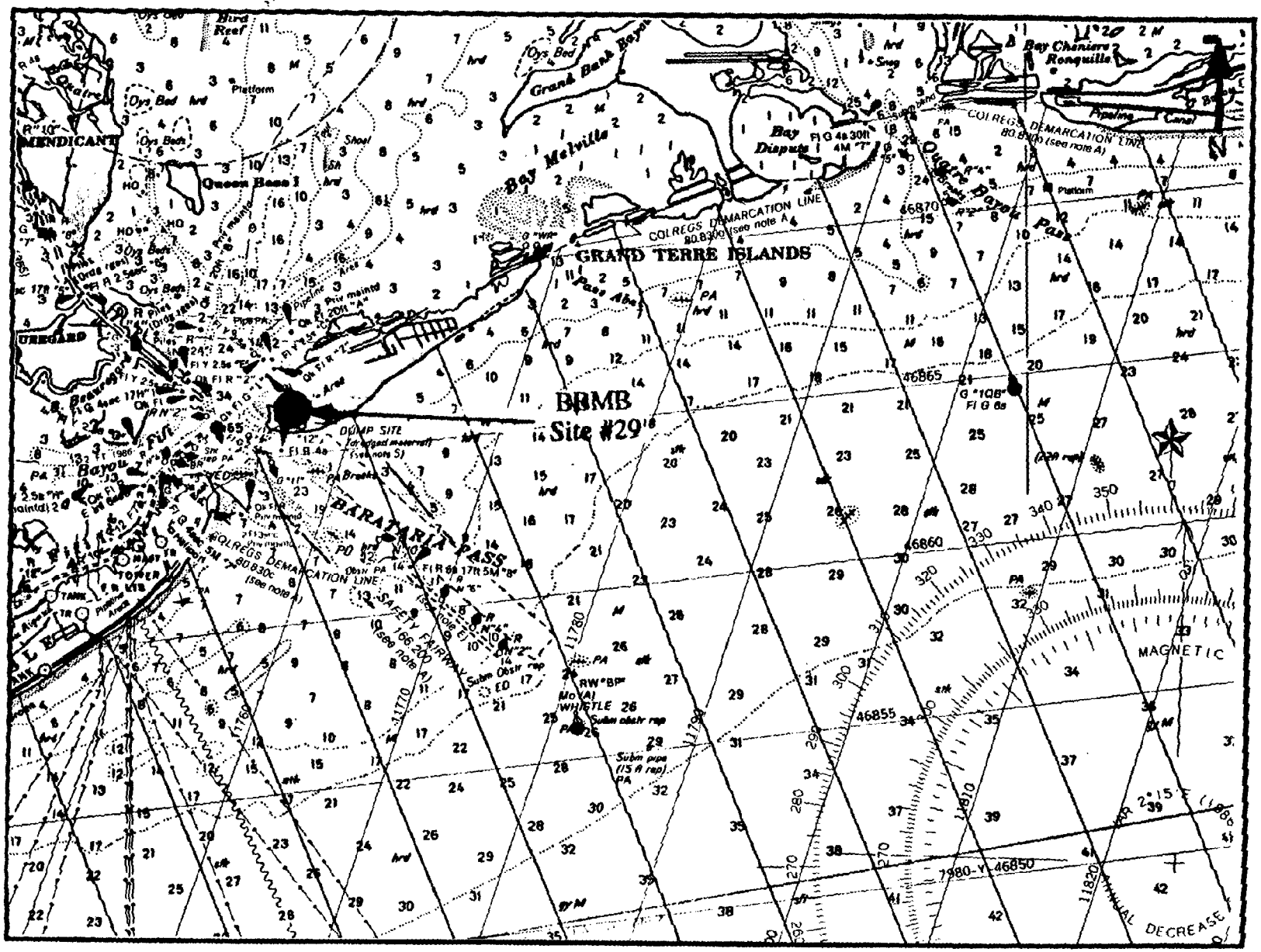
POSSIBLE CONTAMINANTS - Possible contamination would be from Fish and Wildlife bottom-fouling paint and possibly from pesticides.

ENVIRONMENTAL DATA

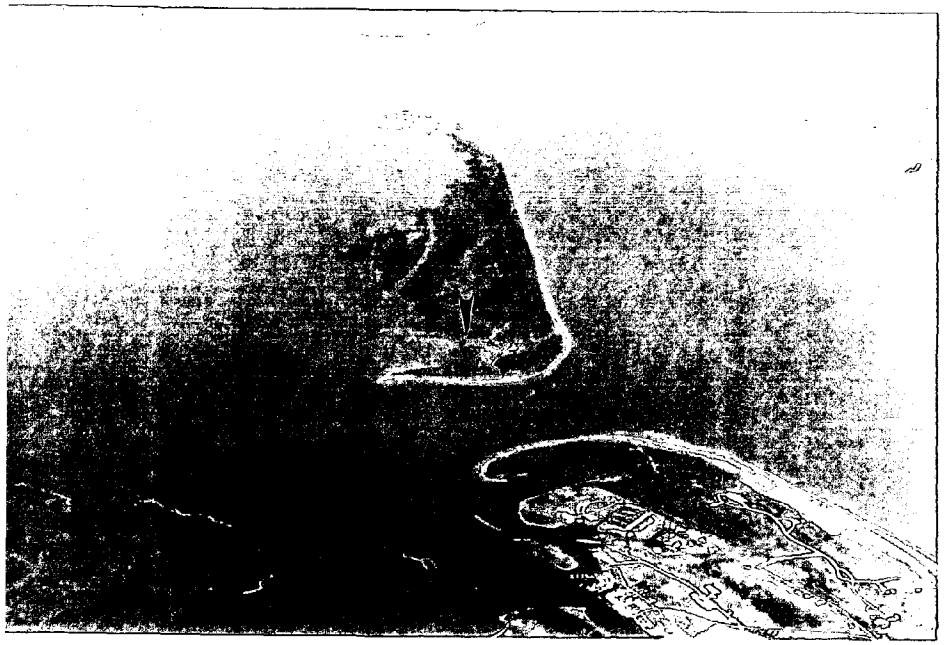
	Salinity (‰)	Temperature (°C)	Dates Sampled
YEAR I	22.0	24.0	27 March 1986
YEAR II	-	22.0	12 February 1987
YEAR III	23.0	11.0	28 January 1988
YEAR IV	29.0	21.0	6 January 1989
YEAR V	30.0	18.0	6 January 1990
YEAR VI	23.0	16.0	8 January 1991
YEAR VII	27.0	18.0	8 January 1992
YEAR VIII	20.0	19.0	5 January 1993

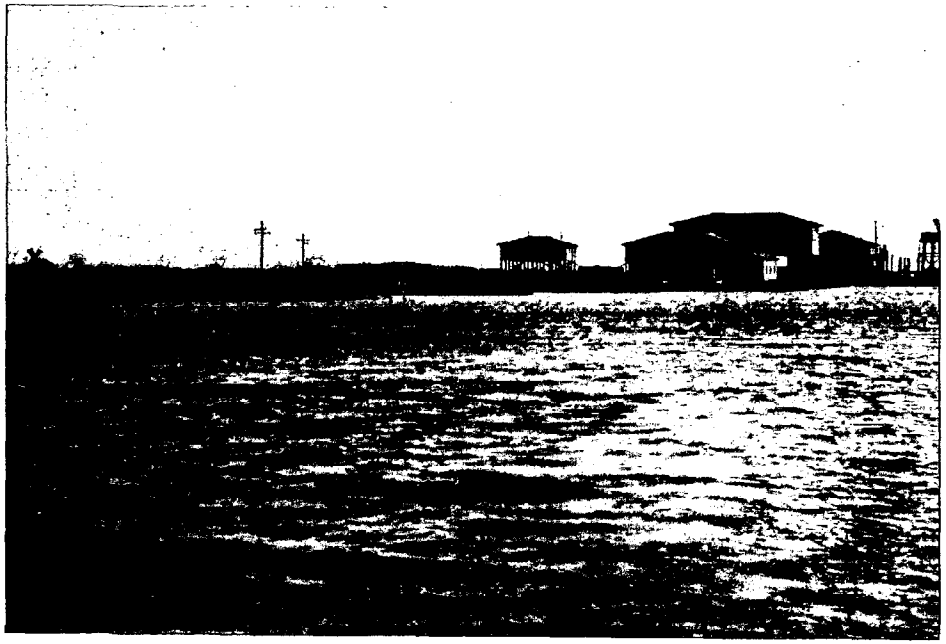


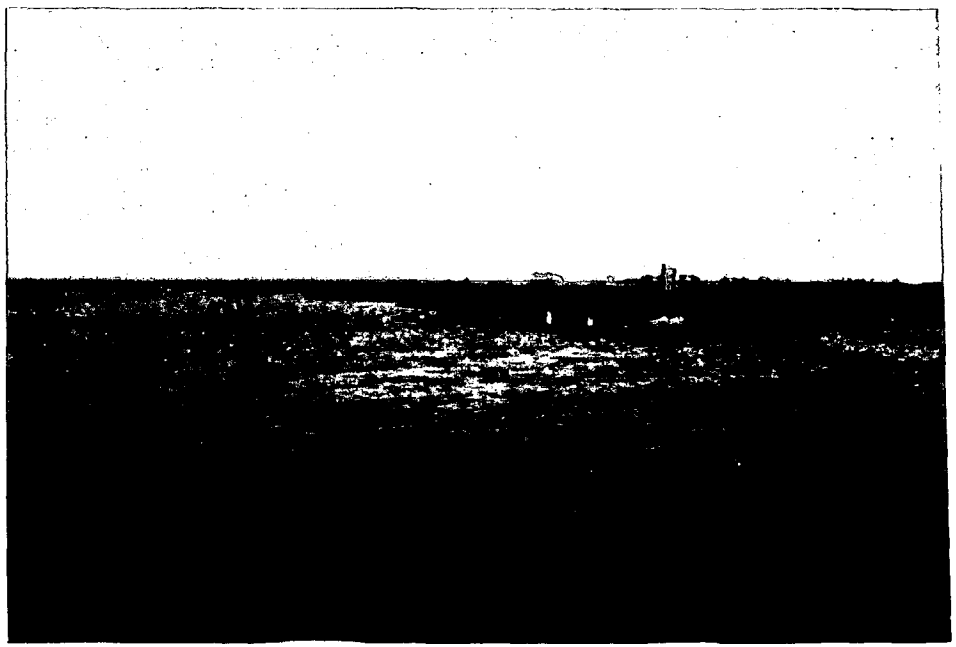
Site #29 (BBMB), Barataria Bay Middle Bank.



Site #29 (BBMB), Barataria Bay Middle Bank (from chart 11358).







SITE NUMBER - 61 **DESIGNATOR** - BBTB

SITE - TURTLE BAY, BARATARIA BAY, LA

NOMINAL SITE CENTER - 29°30.67'N 90°05.00'W

LOCATED ON NOS CHART # - 11352

SITE ACCESS - Access to this collection site is at the marina at the end of LA Highway 45. By boat proceed north on Barataria Waterway and turn left into Bayou Rigolettes. Follow Bayou Rigolettes south of Harvey Cutoff and then south to Turtle Bay. In Turtle Bay proceed southeast for approximately 1.2 miles past the mouth of Long Bay to the mouth of Bayou St. Denis past several small islands en route.

SITE DESCRIPTION - The site, established in Year III, was located on the south side of the entrance to Bayou St. Denis from Little Lake at a row of red and white poles which parallel the shoreline to the south. Oysters were not abundant; therefore distinct stations were not established. Oysters were dredged from a black muddy bottom which contained numerous dead shells. Landmarks to locate the site were: 110° to a small treed island and 30° to a green camp house and silver storage tank.

OYSTER COLLECTIONS

Year III - Station 1 was at the north end of the island 50 m from shore. Station 2 was 20 m offshore, opposite the oyster dredge site. Station 3 was at the south end of the dredge site in a small cove 20 m from shore.

Years IV, V, VI, VII, & VIII - This site was not sampled during these years.

Year IX - The site was revisited this year and no live oysters were found within a half-mile radius. An alternate site - MBCP (Cedar Point Reef, Mobile Bay) was substituted.

SEDIMENT COLLECTIONS

Year III - Sediments were taken along the shoreline to the south. Sediments were black fine silty mud with detrital matter and an obvious H_2S odor.

Years IV, V, VI, VII, VIII, & IX - Sediments were not sampled during these years.

SAMPLING METHODS

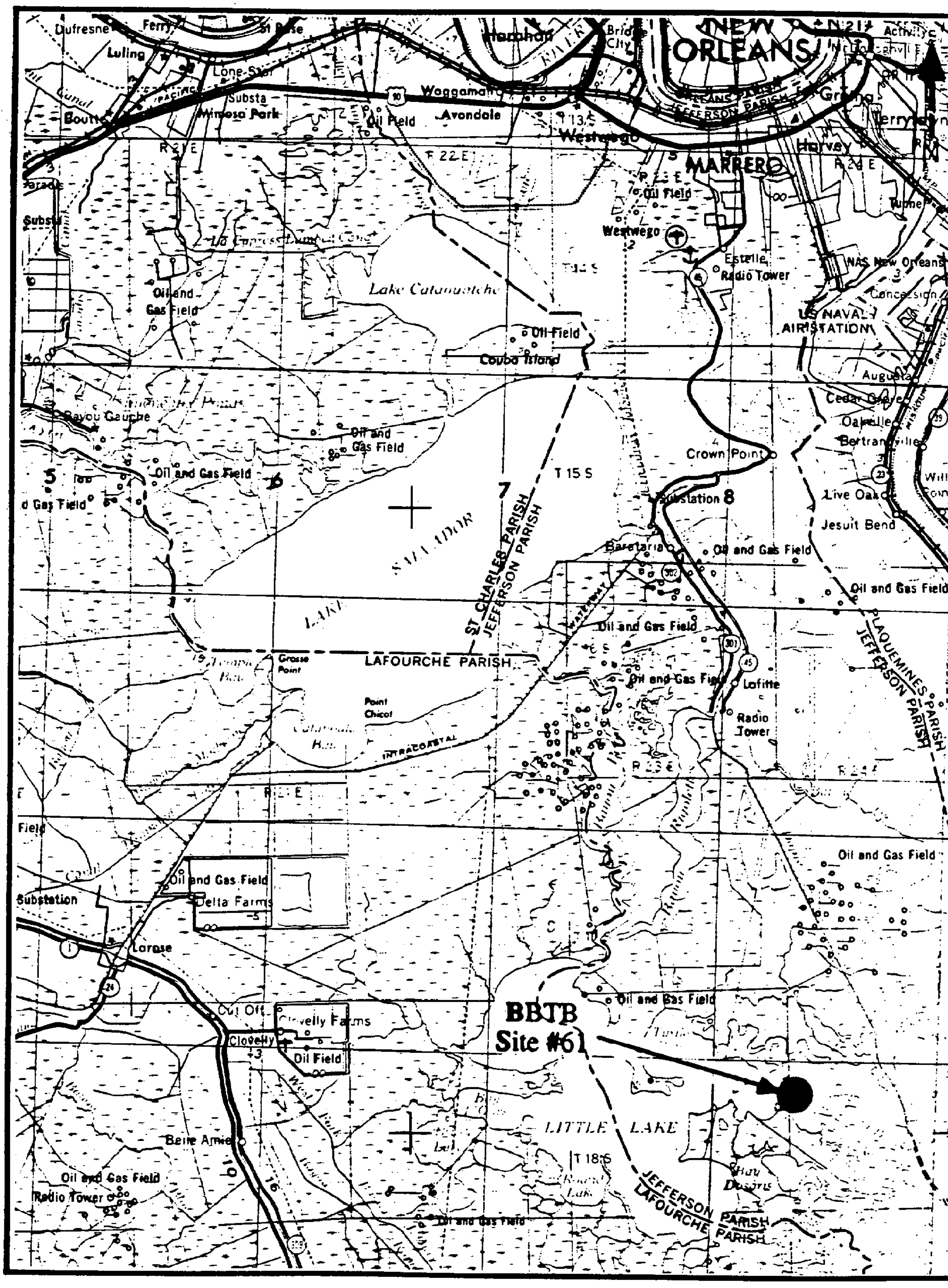
Oysters - dredge
Sediment - box core

WATER DEPTH - subtidal, 2 to 3 meters

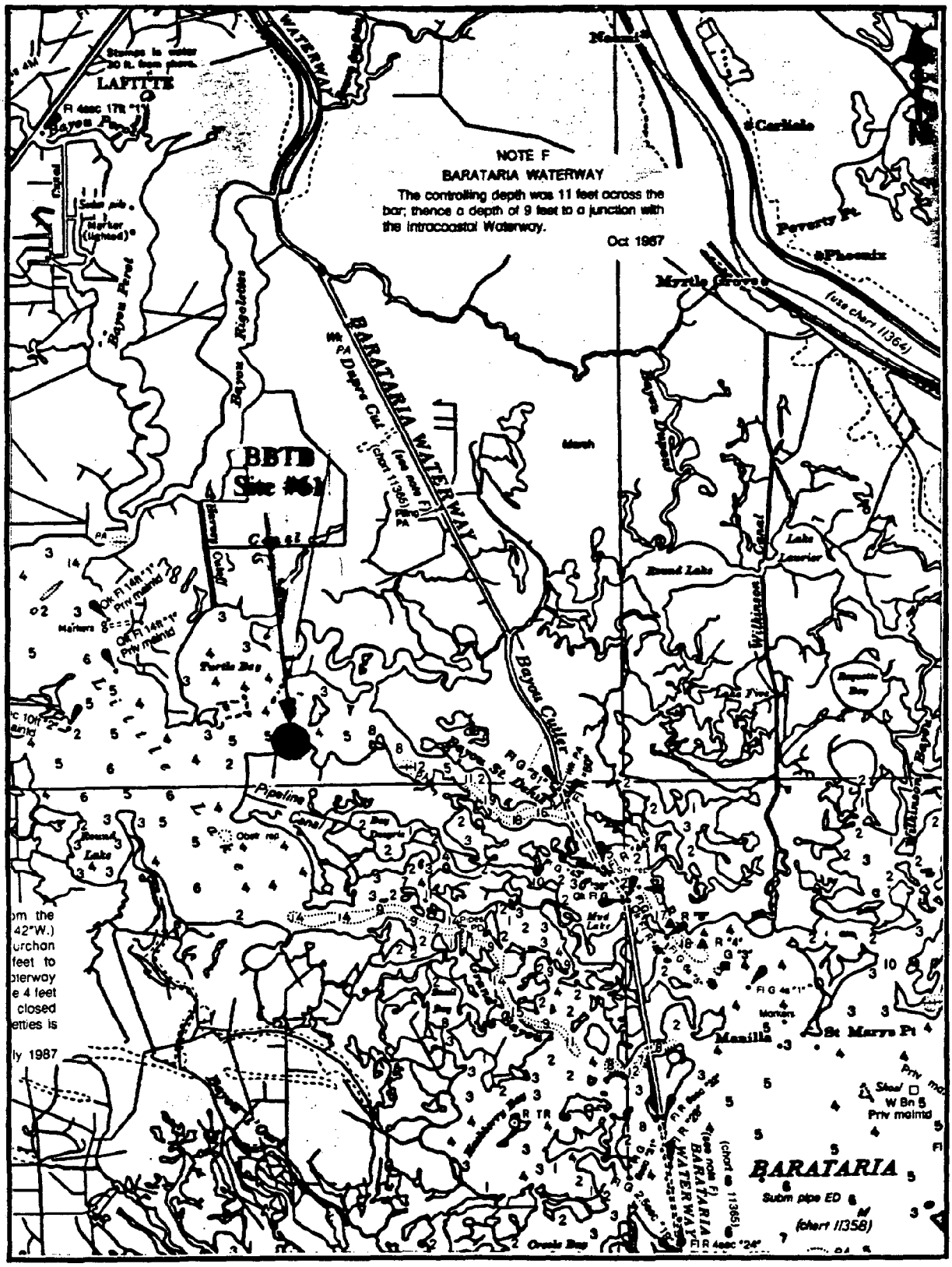
POSSIBLE CONTAMINANTS - No point sources were evident, however there were several petroleum facilities in the general area.

ENVIRONMENTAL DATA

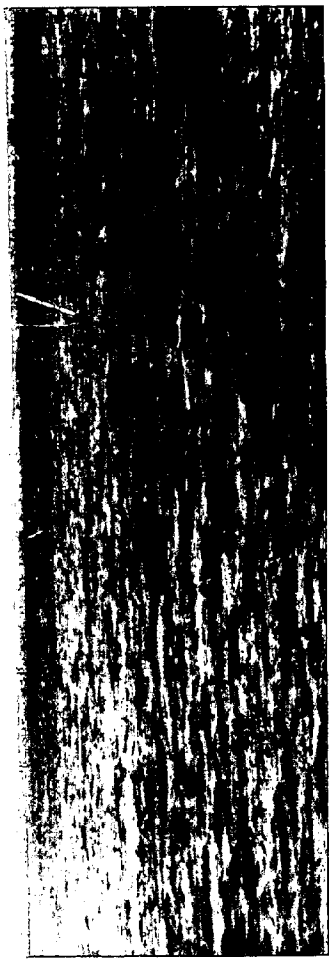
	Salinity (‰)	Temperature (°C)	Dates Sampled
YEAR III	12.0	15.0	30 January 1988
YEAR IX	5.3	12.0	12 January 1994

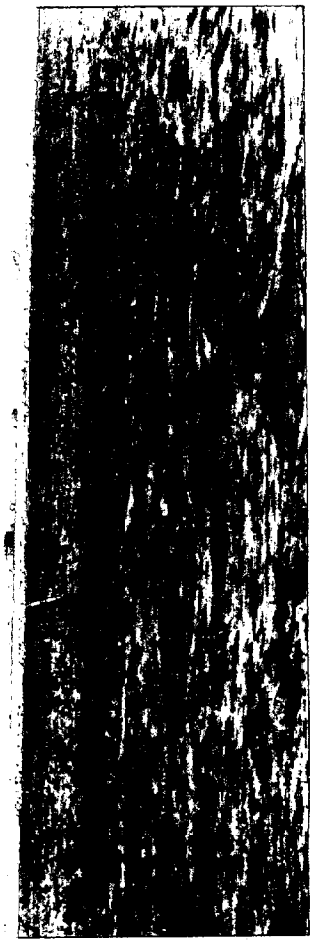


Site #61 (BBTB), Barataria Bay Turtle Bay.



Site #61 (BBTB), Barataria Bay Turtle Bay (from chart 11352).





SITE NUMBER - 65 **DESIGNATOR** - MRTP

SITE - TIGER PASS, MISSISSIPPI RIVER, LA

NOMINAL SITE CENTER - 29°08.69'N 89°25.67'W

LOCATED ON NOS CHART # - 11361

SITE ACCESS - Access to the site is by boat. From the boat launch at the Venice Marina proceed down Tiger Pass; this takes 0.5 to 1 hour depending on weather conditions. It is best not to go to the site in foggy weather. The mouth of Tiger Pass is bordered by a jetty on both sides; proceed past the jetty on the north side to channel marker 7 then turn north and go back to the shoreline. The site is directly north of the jetty and channel marker 9.

SITE DESCRIPTION - This site, established in Year III, was located on the west side of the Mississippi River delta near the mouth of Tiger Pass. The site was on the southwest shoreline of a small smooth cordgrass island. The site was located near a telephone pole at the edge of the marsh.

OYSTER COLLECTIONS

Year III - Individual stations were contiguous along the shoreline. Station 1 was along the shoreline just north of where the Tenneco pipeline canal ran into the bay on the east and southeast from the pole at Station 2. Station 2 was the next ~100 m of shoreline to the north across from the telephone pole with two bolts. The pole was approximately 20 m from the shoreline. Station 3 was northwest from the pole up to where the canal forms the northwest boundary of the marsh island. Oysters at all three sites were found lying in the edge of the marsh in the smooth cordgrass marsh.

Year IV - The same three stations were again sampled, except that Station 3 was combined with Station 2 because of the scarcity of oysters in the Station 3 location. Station 2 oysters were larger and more abundant than in the initial sampling in Year III.

Year V - There were very few oysters present this year. Due to the scarcity of oysters, Stations 1 and 2 were not distinguished. All the oysters in the area were collected and split into two groups. Station 3 was in the same location as previous years. The number of oysters has decreased each year and it may be necessary to move this site.

Year VI - The same site was collected this year. Oysters were almost depleted from this area and only a partial set of oyster samples were collected this year. Additional sites in the immediate vicinity were examined but no oysters were present. There was no oyster reproduction occurring at this site and there were no oysters remaining to be collected, therefore a new site farther to the north should be established.

Year VII - The same site was collected this year. Oysters were not abundant thus distinct sites were not recognized.

Year VIII - The same stations sampled in Year V were resampled this year; however, dinstinct stations were not recognized since oysters were not abundant.

Year IX - The site was not scheduled to be visited this year.

SEDIMENT COLLECTIONS

Year III - Sediments were collected offshore of the oyster stations. Sediments were composed of fine silty muds taken 20-50 m offshore from the oyster stations. Station 1 was at the southeast point of the marsh island, Station 2 was 20 m offshore from the oysters. Station 3 was northwest across the channel from the oysters.

Years IV, V, VI, VII, VIII, & IX - Sediments were not sampled during these years.

SAMPLING METHOD

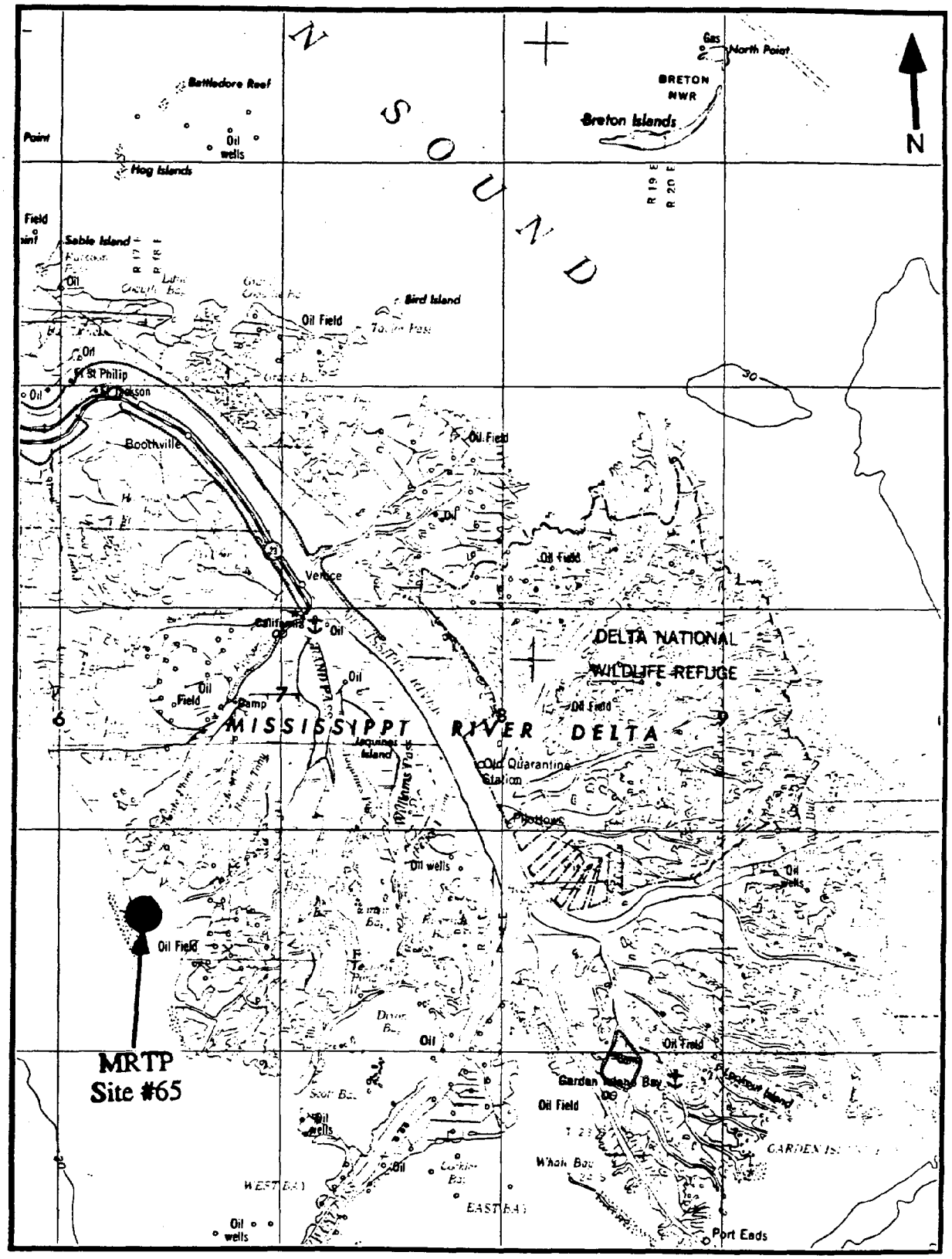
Oysters - hand
Sediments - box core

WATER DEPTH - intertidal, 0 to 0.1 meters

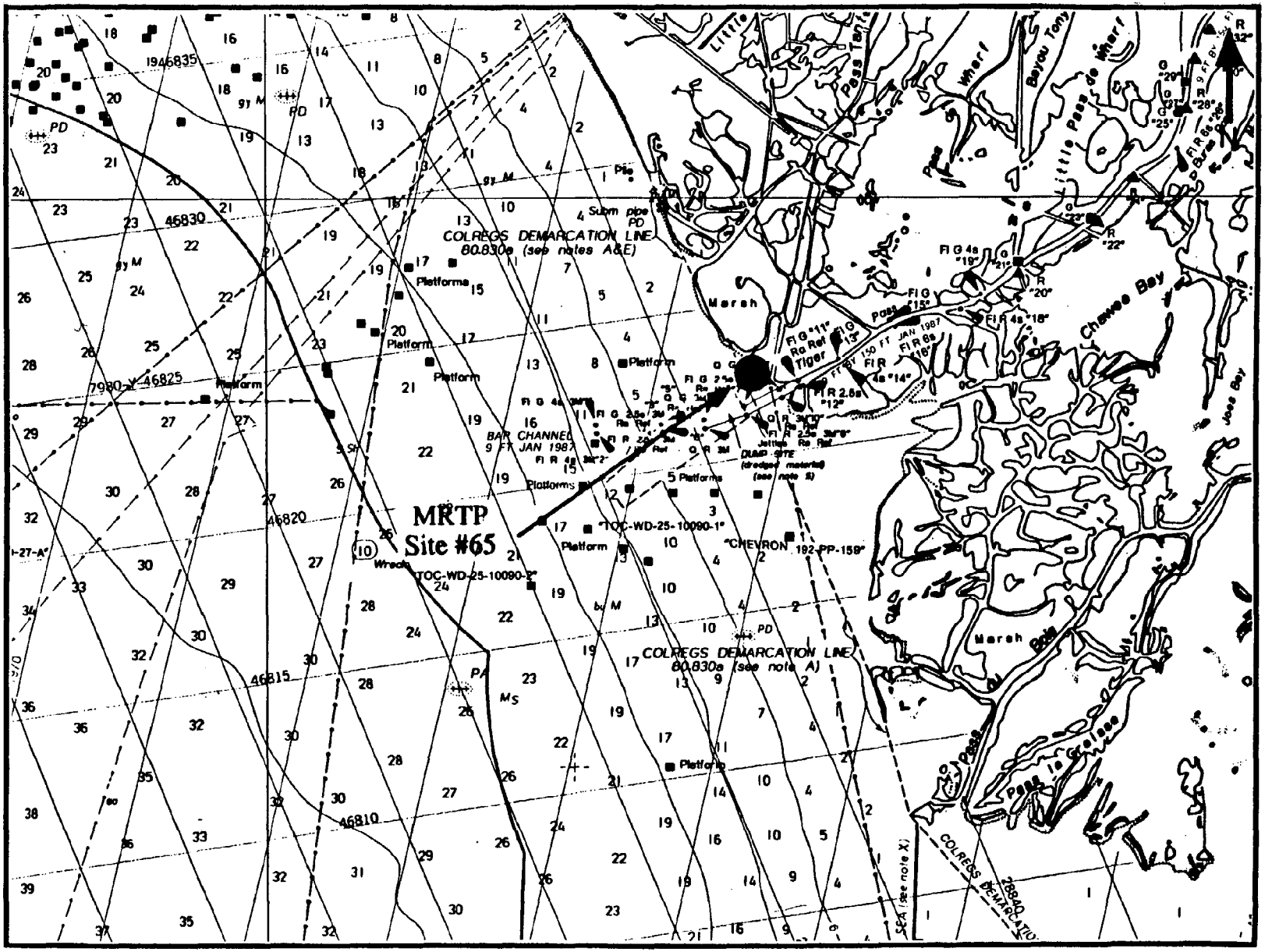
POSSIBLE CONTAMINANTS - No known sources of contamination were visible.

ENVIRONMENTAL DATA

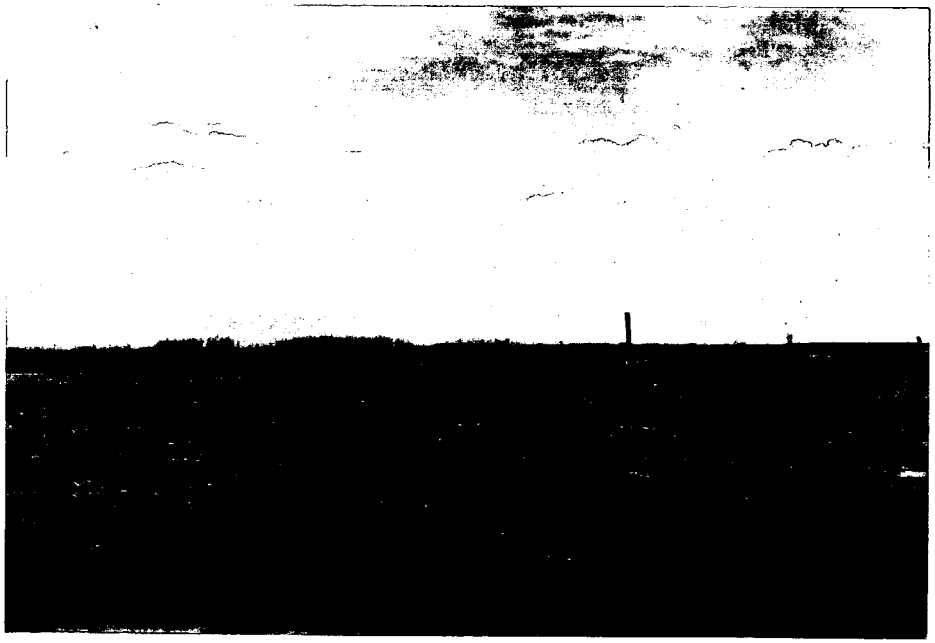
	Salinity (‰)	Temperature (°C)	Dates Sampled
YEAR III	30.0	13.0	31 January 1988
YEAR IV	23.0	19.0	8 January 1989
YEAR V	30.0	15.0	8 January 1990
YEAR VI	10.0	14.0	11 January 1991
YEAR VII	>0.5	12.0	10 January 1992
YEAR VIII	2.0	13.0	7 January 1993

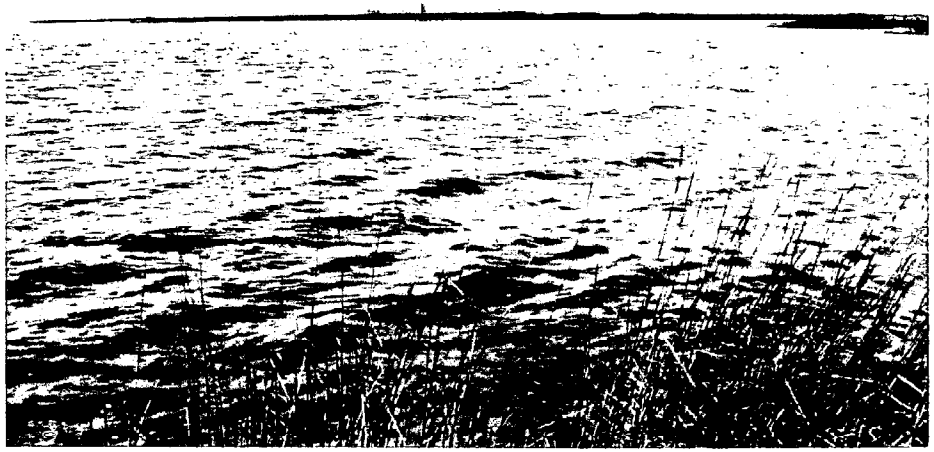


Site #65 (MRTP), Mississippi River Tiger Pass.



Site #65 (MRTP), Mississippi River Tiger Pass (from chart 11361).





SITE NUMBER - 64 **DESIGNATOR** - MRPL

SITE - PASS A LOUTRE, MISSISSIPPI RIVER, LA

NOMINAL SITE CENTER - 29°04.87'N 89°05.53'W

LOCATED ON NOS CHART # - 11361

SITE ACCESS - The departure point for this site established in Year III is from the Venice Marina. From the boat basin, head upstream to the main fork of the Mississippi River and proceed downstream to Head of Passes. At this point, take the east fork holding to the south shore to avoid the large sandbar at the entrance to Pass a Loutre. Proceed east to the first cut to the south and proceed to the Louisiana Fish and Wildlife Headquarters which is located south of the entrance to Johnson Pass. The Louisiana Fish and Wildlife personnel provided guidance to the site the first year. Proceed back upstream to Loomis Pass, turn to the southeast into the pass and proceed downstream entering Cognevich Pass and on into the Gulf of Mexico. At this point, turn north to the mouth of Redfish Bay. No attempt should be made to travel to this site except in calm weather. In Year IX, access was gained to Redfish Bay via Pass a Loutre, down SE Pass to the first oil tanks (29°07.75'N, 89°05.78'W), and then south into Redfish Bay via a narrow reed lined channel.

SITE DESCRIPTION - The site is located at the extreme southeast edge of Redfish Bay just north of the last small island. Prominent landmarks are the Port Eads Lighthouse (240°) at South Pass and the Exxon platform with green tanks (350°).

OYSTER COLLECTIONS

Year III - No distinct oyster stations were established at this site. Oysters were located by poling and occur in scattered areas of large clumps of old large oysters. This was an old reef which has silted over with fine sediment. Oysters were collected with tongs and are difficult to break loose from the reef.

Year IV - Oysters were collected by dredge in the same area that was tonged in Year III. Sampling was difficult because of windy conditions and the overall sparsity of live oyster beds. Dredging yielded barely enough for two replicates. The site was located about 200 m east of the seawardmost pole marking the entrance to Johnson Pass, and on a line to the small barrier island. The only way to find the isolated scatterings of oysters in the soft mud was to randomly dredge or feel the bottom with a bamboo pole. This did not distinguish live and dead reefs. Oysters could not be hand picked from the marsh plants on the nearby islands because the mud was far too soft to walk on and the water was too shallow to approach by boat.

Year V - Oysters were again dredged from along the north side of the last *Phragmites* island on line with Port Eads lighthouse and the green oil tanks (29°04.30'N, 89°04.60'W). Oysters were found primarily on roots and

old crabs pots and were very scarce. It required 2 hours of dredging to obtain enough oysters for three replicates. The substrate was a black anoxic mud.

Year VI - This site was not sampled this year.

Year VII - The site was moved slightly to the north and west of the Year V site. Oysters were dredged from a linear submerged reef west of the small *Phragmites* island. The site was approximately 500 m due south of the green oil tanks located near the north end of Redfish Bay. The reef was very narrow and difficult to locate.

Year VIII - Oysters were dredged from the south end of the linear reef described in Year VII. Distinct stations were not recognized since extensive dredging was required to obtain an adequate sample.

Year IX - A very small patch of live oysters was found on the extreme end of the SE promontory on Redfish Bay, just north of the southernmost island. The oysters were dredged 5 to 10 m out from the shore in 1 m of water. Seperate stations were not distinguished due to the size of the reef. The rest of the bay was devoid of any live oysters.

SEDIMENT COLLECTIONS

Year III - Three sediment stations were established on the reef ~100 m apart. Fine grained silty sediment were mixed with shell.

Years IV, V, VI, VII, VIII, & IX - Sediments were not sampled during these years.

SAMPLING METHODS

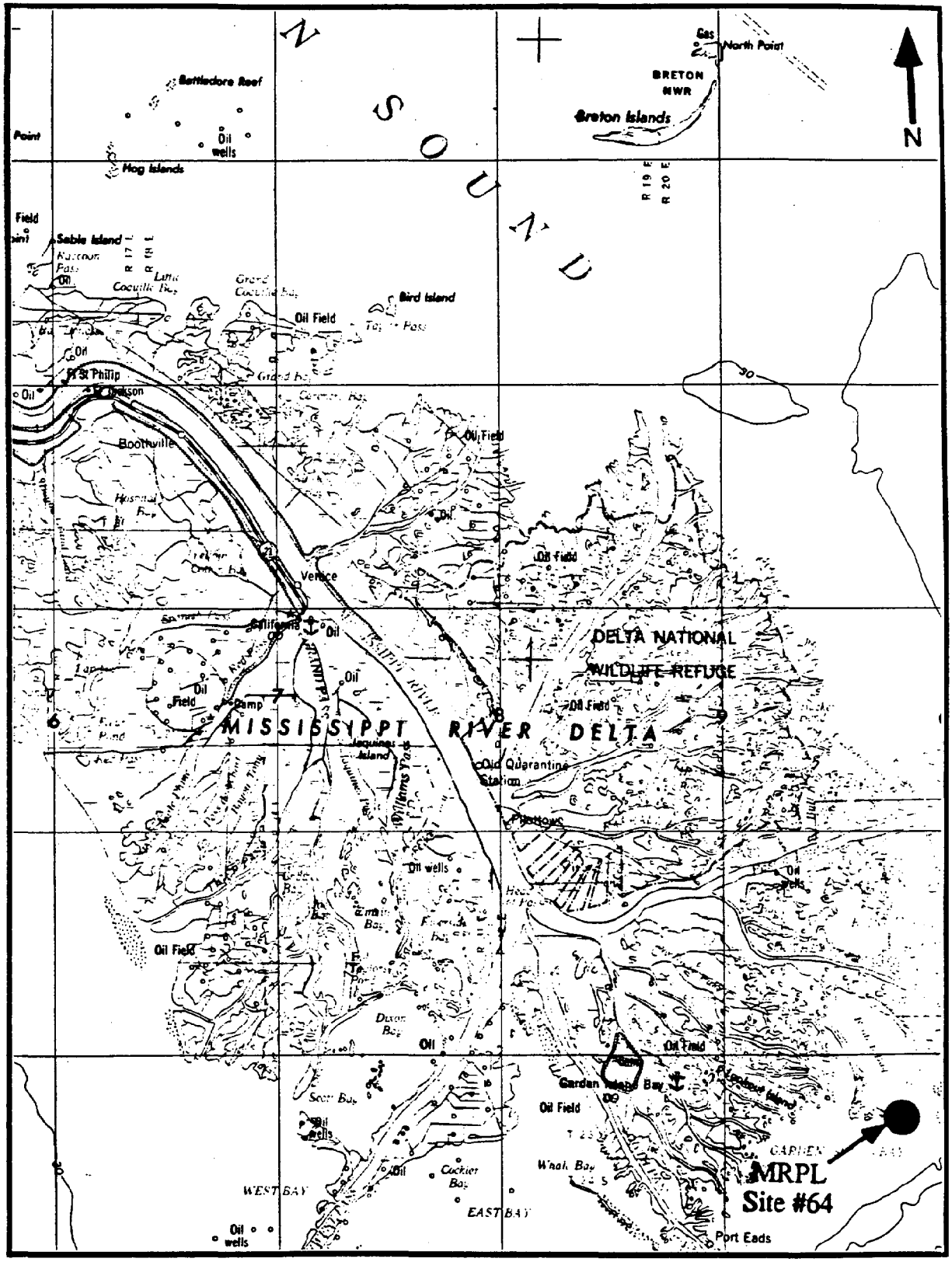
Oyster - tongs or dredge
Sediment - box core

WATER DEPTH - subtidal, 1 to 5 meters

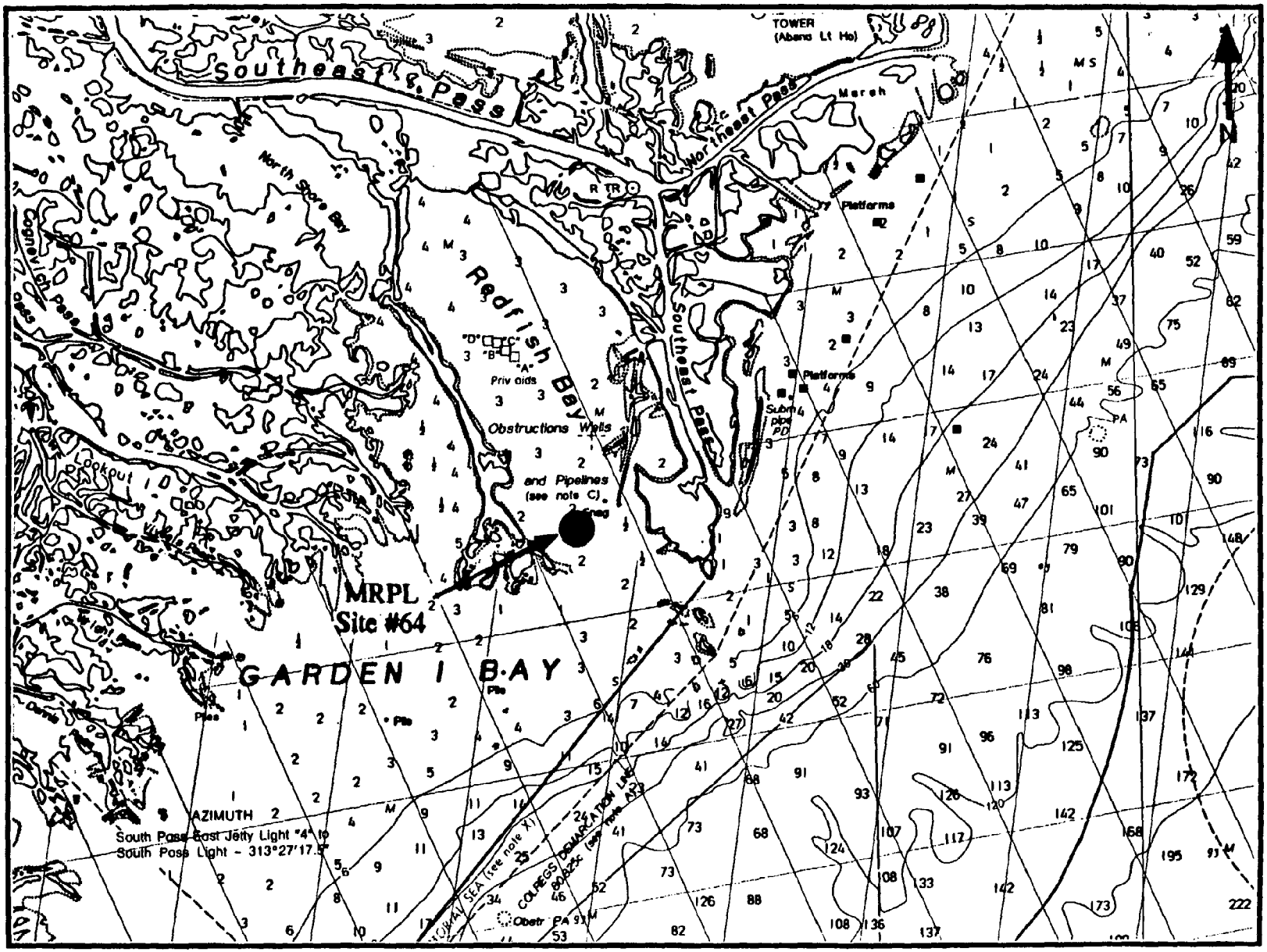
POSSIBLE CONTAMINANTS - The only point sources were the nearby oil productions facilities in the upper part of Redfish Bay.

ENVIRONMENTAL DATA

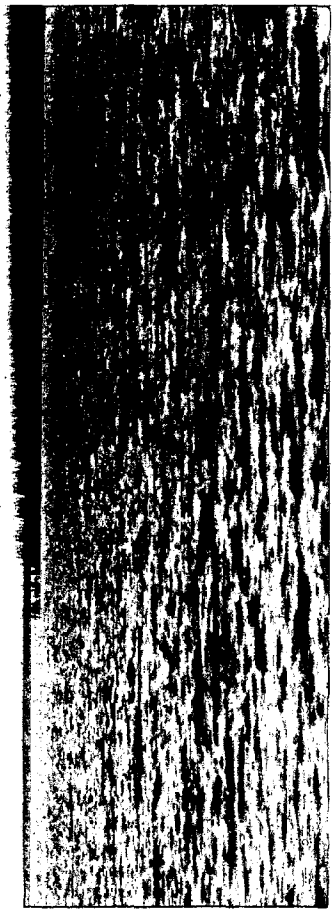
	Salinity (‰)	Temperature (°C)	Dates Sampled
YEAR III	-	13.0	26 February 1988
YEAR IV	2.0	15.0	9 January 1989
YEAR V	9.0	13.0	9 January 1990
YEAR VII	>0.5	13.0	10 January 1992
YEAR VIII	5.0	13.0	7 January 1993
YEAR IX	2.0	8.0	14 January 1994

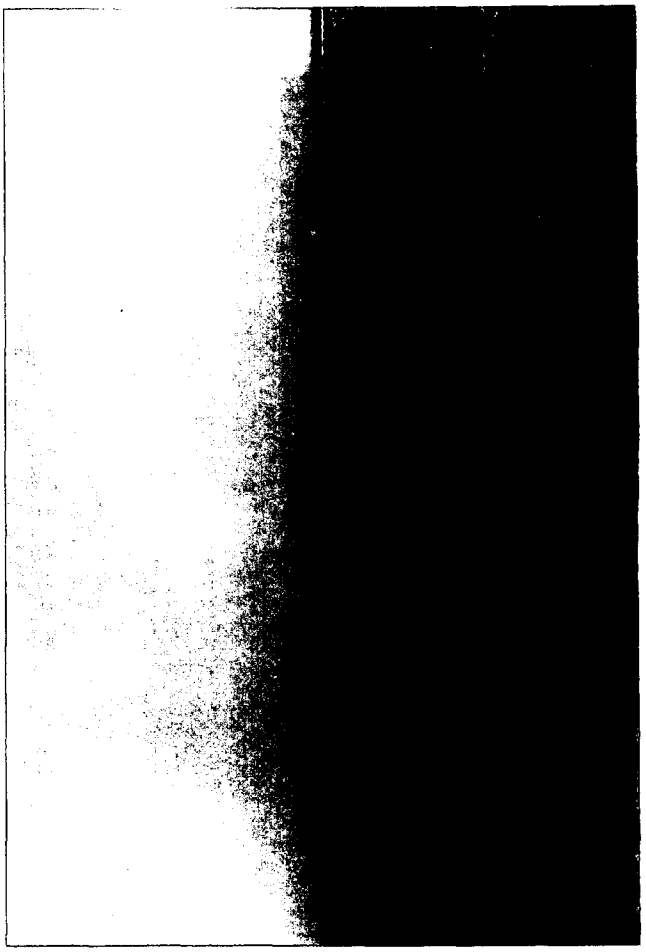


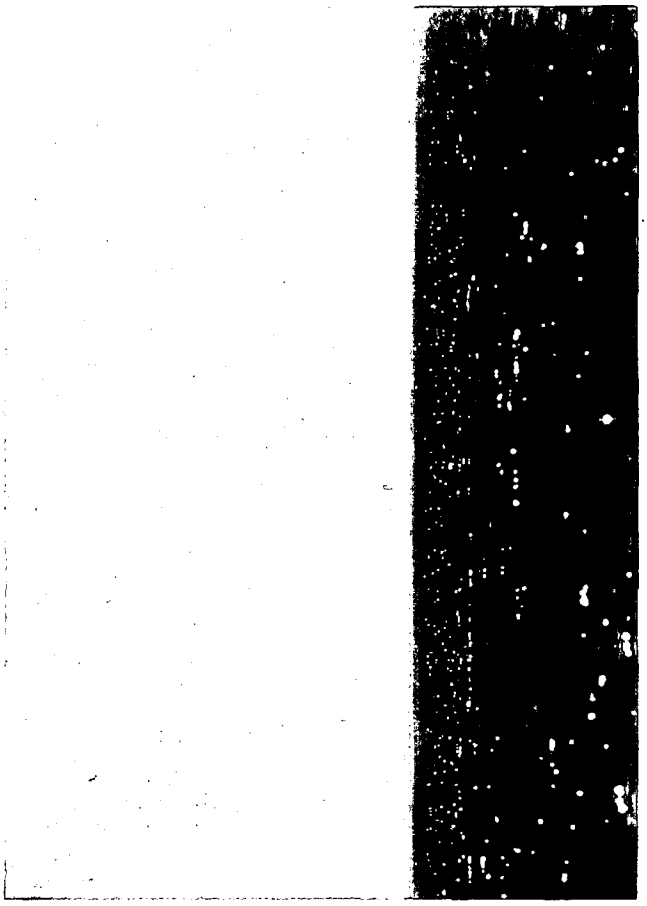
Site #64 (MRPL), Mississippi River Pass A Loutre.



Site #64 (MRPL), Mississippi River Pass A Loutre (from chart 11361).







SITE NUMBER - 30 **DESIGNATOR** - BSBG

SITE - BAY GARDENE, BRETON SOUND, LA

NOMINAL SITE CENTER - 29°35.90'N 89°37.25'W

LOCATED ON NOS CHART # - 11364

SITE ACCESS - The site is accessed by boat launched at Pointe a la Hache from the Chevron Marina. Proceed from the marina southeast down the Back Levee Canal to Lower Grand Bayou, then east along the bayou to Battle Ground Bay. In Battle Ground Bay go generally east paralleling the shore to Tripple Pass. Then go northeast and northwest to Pintail Point in Bay Gardene. At Pintail Point proceed east-northeast to Bayou Lost to the Louisiana Fish and Wildlife Camp. The site is along the south shore of the western end of Bayou Lost, west of the Fish and Wildlife Camp. Approximate run time to the site is 0.75 hours.

SITE DESCRIPTION - This site was located on small unnamed islands between Bayou Lost and Lonesome Island. Oysters were abundant. No visible contamination factors were observed.

OYSTER COLLECTIONS

Year I - Oysters were collected by dredge off the western tip of the island. Landmarks used to located the position are: 68° to the Fish and Wildlife camp, 129° to white grain elevators, and 293° to the oil terminal.

Years II & II - In all years, Station 1 was collected on the westernmost tip of the island on the south side of Bayou Lost near Pintail Point in Bay Gardene. Station 2 was 100 m to the east of Station 1. Station 3 was 100 m to the east of Station 2.

Years IV, V, VI, VII, & VIII - The stations sampled were the same as in previous years, along the east end of the island at the Fish & Wildlife camp on the south shore of Bayou Lost.

Year IX - The site was not scheduled for sampling this year.

SEDIMENT COLLECTIONS

Years I, II, & III - Sediments were collected by box corer in subtidal waters adjacent to the oyster collection areas.

Years IV, V, VI, VII, VIII, & IX - Sediments were not sampled during these years.

SAMPLING METHOD

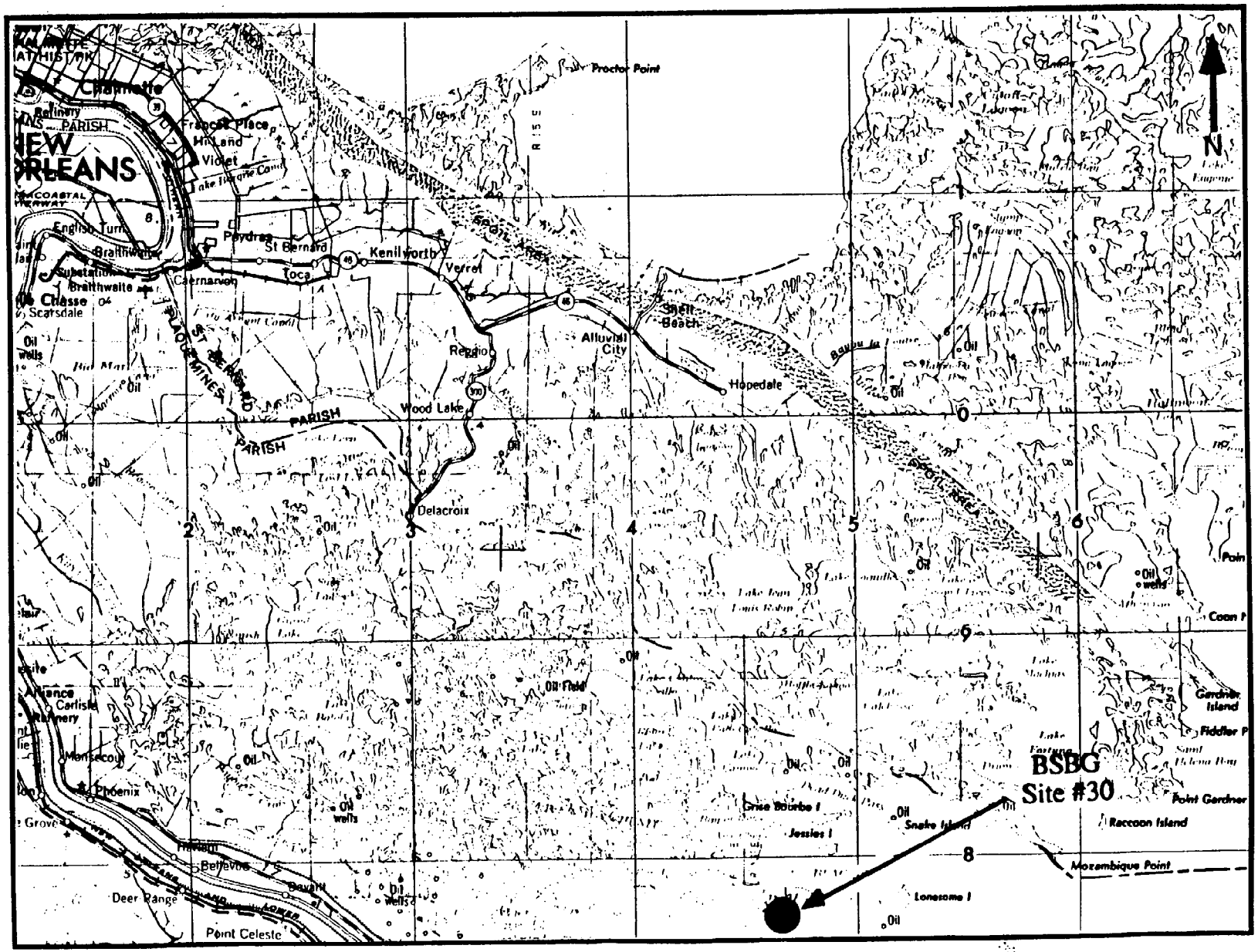
Oysters - hand and dredge
Sediment - hand and box core

WATER DEPTH - intertidal or subtidal, 0.1 to 3 meters

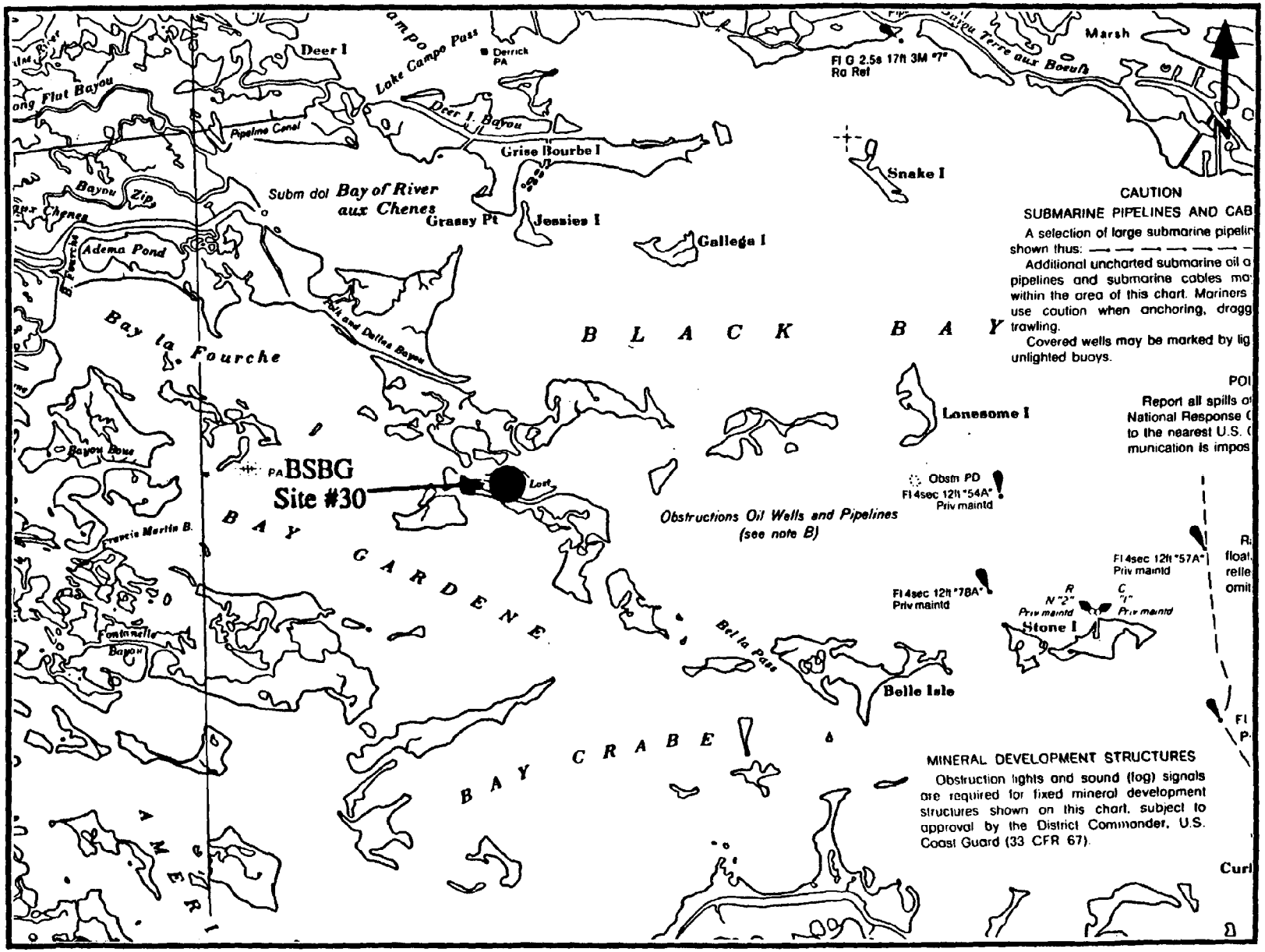
POSSIBLE CONTAMINANTS - No sources observed.

ENVIRONMENTAL DATA

	Salinity (‰)	Temperature (°C)	Dates Sampled
YEAR I	15.0	18.0	26 March 1986
YEAR II	15.0	18.0	14 February 1987
YEAR III	12.0	17.0	25 February 1988
YEAR IV	20.0	21.0	8 January 1989
YEAR V	10.0	14.0	8 January 1990
YEAR VI	24.0	17.0	10 January 1991
YEAR VII	10.0	13.0	10 January 1992
YEAR VIII	10.0	16.0	7 January 1993



Site #30 (BSBG), Breton Sound Bay Gardene.



Site #30 (BSBG), Breton Sound Bay Gardene (from chart 11364).

SITE NUMBER - 31 **DESIGNATOR** - BSSI

SITE - SABLE ISLAND, BRETON SOUND, LA

NOMINAL SITE CENTER - 29°24.11'N 89°29.10'W

LOCATED ON NOS CHART # - 11364

SITE ACCESS - During the first two years, access to the site was by boat which was launched at Point a La Hache Marina. Proceed southeast on Back Levee Canal to Fucich Bayou. Fucich Bayou enters California Bay and channel markers are followed to California Point. Avoid the shoals at California Point by staying near the platform structure off the point where the telephone lines appear to end. Turn south from California point and cross through the oil field to Sable Island. Travel time by boat is 1 to 1.5 hours, and the open water crossing at California Bay and south to Sable Island requires a calm day and/or a larger protected boat. In Years III-V of the study, the boat was launched at the Venice Marina. There are several way to reach the site but the easiest is to go up the Mississippi River to the Ostrica Canal Locks and then out the private channel across Quarantine Bay to Sable Island. Run time to the site is still about an hour. In Year VI a new launch site was used at Delta Marine in Empire. It is necessary to go through the Empire Lock then down river to the Ostrica Lock, but the run time is much shorter than coming up river. In Year IX, the Buras Riverside Marins on the west bank of the Mississippi River, was used. This shortened the boat run time to less than 30 minutes, allowing for the Ostrica Locks.

SITE DESCRIPTION - The site surrounded Sable Island. Oyster reefs were ubiquitous around the island, but live oysters were found by trial and error. The best oyster beds were on the southwest end of the island. In Year IX, there was a good reef, clearly marked with PVC poles, on the SW side of Sable Island (29°24.26'N, 89°29.09'W).

OYSTER COLLECTIONS

Years I & II - Oysters were found by commercial oystermen on the north side of the island in Year I (29°24.70'N, 89°28.70'W)(with limited success), and were more abundant on the south side in Year II (29°24.20'N, 89°28.80'W) (again with a commercial dredger collecting the samples). Landmarks to help locate the area were: Station 1 - 245° to well nearest north shore; 310° to tanks nearest large platform. Station 2 - 20° to the nearest well on the north shore; 257° to platform with 4 pipes and 3 tanks. Station 3 - 262° to platform with 3 pipes and 3 tanks; 344° to nearest large platform on the north side of the island.

Year III - In Year III, oysters were hand collected at Station 1 on the northwest shore of Sable Island (29°24.21'N, 89°29.10'W), oysters were not abundant. Oysters at Stations 2 and 3 were purchased from commercial fishermen who were operating just offshore.

Year IV - The oysters were collected by dredge in the area between the larger part of Sable Island and the smaller mostly shell island to the north (29°23.94'N, 89°29.09'W). Oysters for all three sites were taken from a marked leased area about 200 m west of the well jacket with a red beacon light. Oysters were plentiful on a mud bottom in 1 m of water.

Year V - Oysters were dredged on the northwest side of the island along the edge of the reef approximately 50 m from the island. All stations were obtained along a 500 m area (29°24.32'N, 89°29.05'W). Oysters were not plentiful.

Year VI - All three stations were located off of the southwest end of the island (29°24.20'N, 89°29.04'W). Station 1 was located on the south end and west side of the island. Station 2 was approximately 100 m farther southwest. Station 3 was another 100 m to the southwest of Station 2. Oysters were sparse at Stations 1 and 2 and abundant at Station 3.

Year VII - Oysters were collected near the same stations described for Year VI, but the stations were shifted slightly to the southwest. Oysters were moderately abundant with numerous mussels attached.

Year VIII - Oysters were collected at the station described for Year VII. Mussels were very numerous, covering most of the oyster shell.

Year IX - Oysters were abundant and easily dredged from the same station areas as in Year VIII. Numerous small mussels covered most of the oysters.

SEDIMENT COLLECTIONS

Years I, II, & III - Sediments were available nearshore on the south side. In all years, sediments were collected at three stations ~50 m apart on the south side of the island. Sediments were gray-brown silt over dark black mud.

Years IV, V, VI, VII, VIII, & IX - Sediments were not sampled during these years.

SAMPLING METHOD

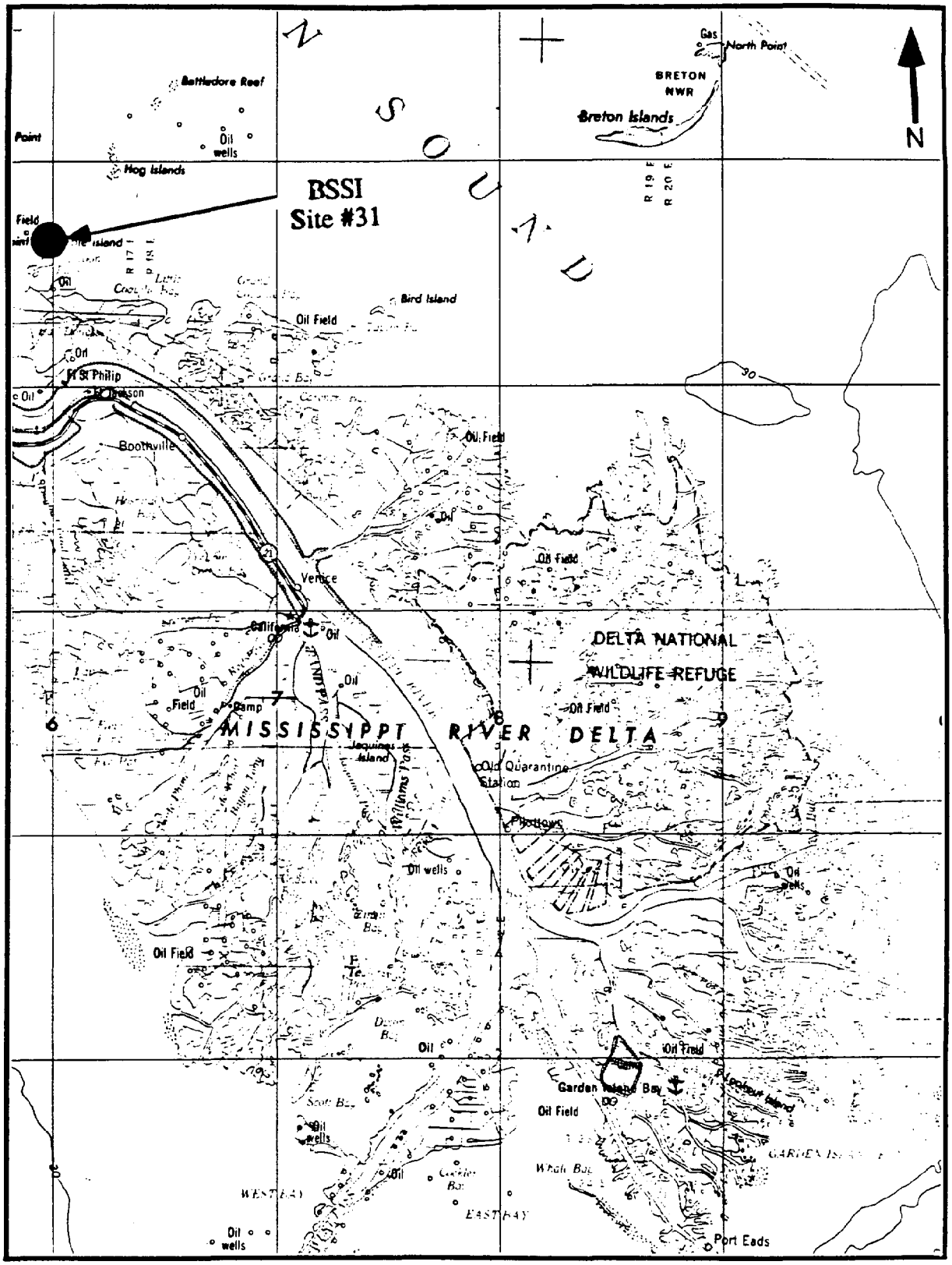
Oysters - dredge and hand
Sediment - box core

WATER DEPTH - subtidal, 0.3 to 2.5 meters

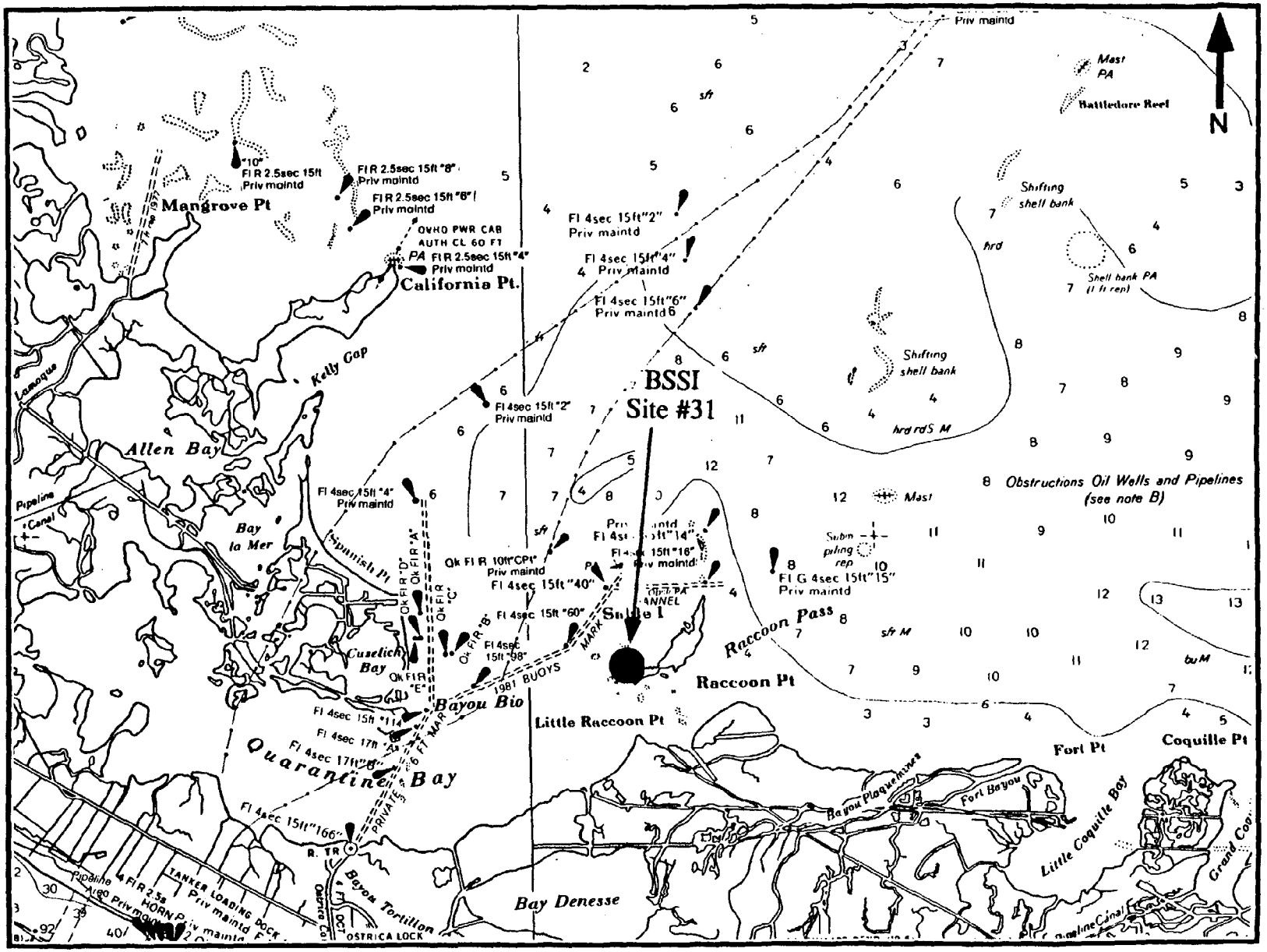
POSSIBLE CONTAMINANTS - Obvious sources of contamination included extensive oil and gas platforms to the north and west (closer than 0.5 mile) and widespread oil and gas development in the overall delta area east of the river.

ENVIRONMENTAL DATA

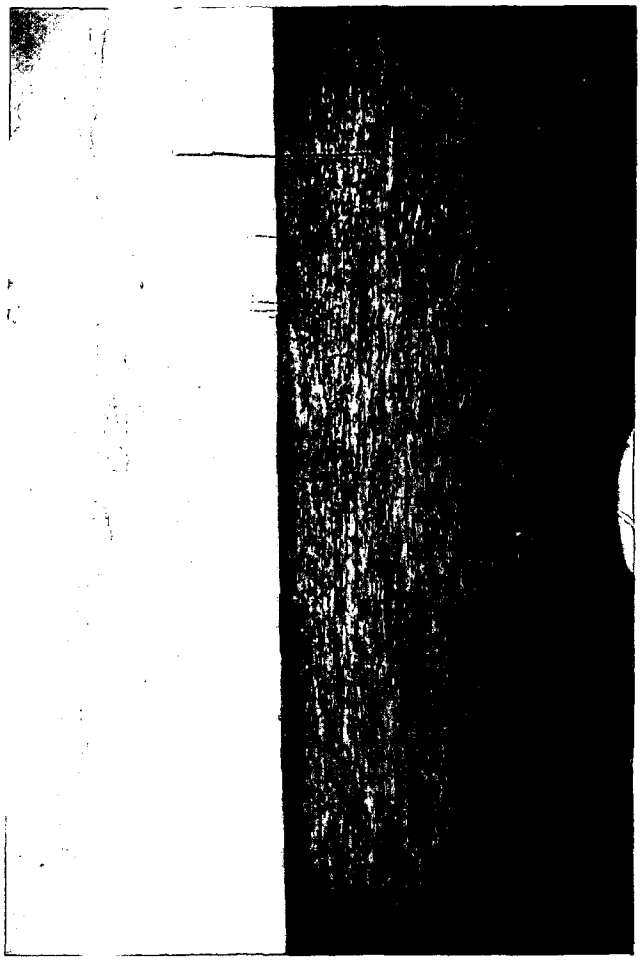
	Salinity (‰)	Temperature (°C)	Dates Sampled
YEAR I	12.0	17.0	26 March 1986
YEAR II	15.0	15.0	14 February 1987
YEAR III	8.0	14.0	25 February 1988
YEAR IV	-	18.0	8 January 1989
YEAR V	14.0	12.0	9 January 1990
YEAR VI	4.3	13.0	11 January 1991
YEAR VII	>0.5	10.0	11 January 1992
YEAR VIII	2.0	10.0	8 January 1993
YEAR IX	1.0	10.0	13 January 1994

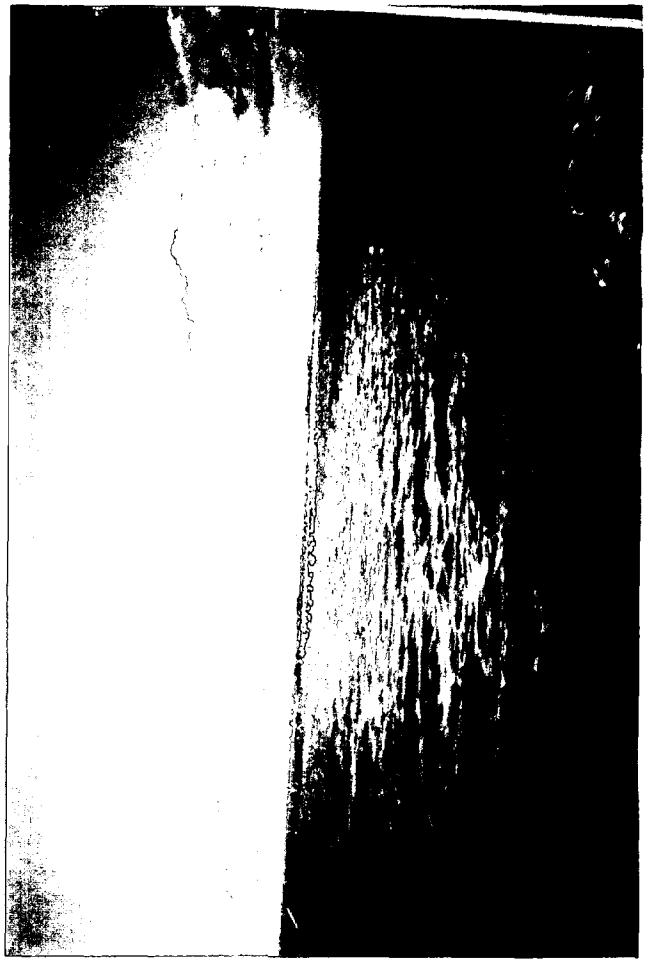


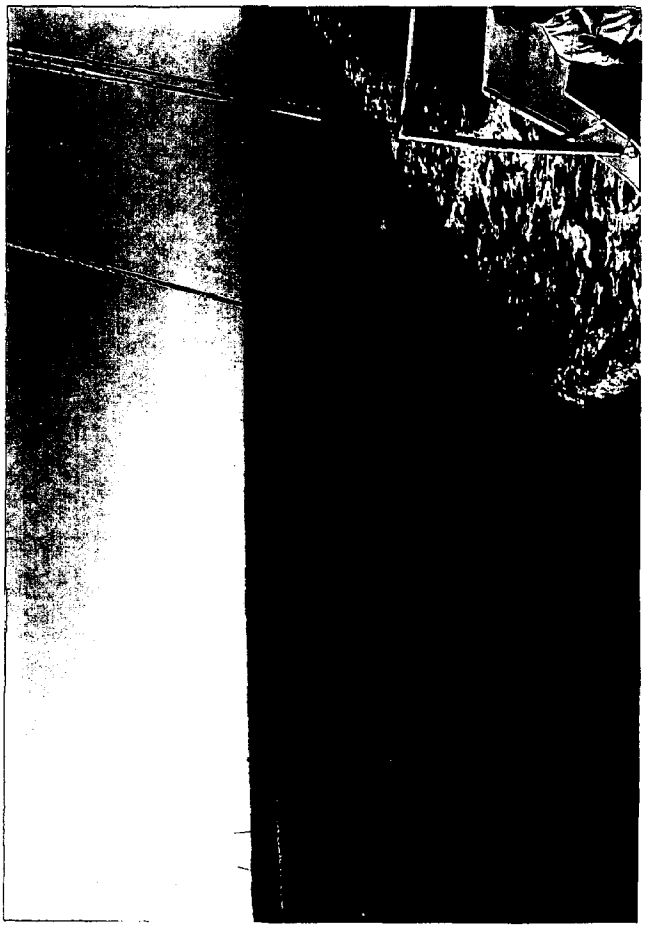
Site #31 (BSSI), Breton Sound Sable Island.



Site #31 (BSSI), Breton Sound Sable Island (from chart 11364).







SITE NUMBER - 32 **DESIGNATOR** - LBMP

SITE - MALHEUREUX POINT, LAKE BORGNE, LA

NOMINAL SITE CENTER - 29°52.02'N 89°40.70'W

LOCATED ON NOS CHART # - 11371

SITE ACCESS - Access to the site is via LA Highway 39 to Shell Beach. At Shell Beach, launch in Bayou Yscloskey and proceed north across the Mississippi River Gulf Outlet Canal and into to Lake Borgne. Enter the lake and proceed to the west side of Old Fort Beauregard. Run time to the site is less than 0.5 hours.

SITE DESCRIPTION - Oysters were collected from intertidal waters in mud. They were attached to bricks from the historic fort. The site was located on the west side of Old Fort Beauregard. Oysters were abundant.

OYSTER COLLECTIONS

Year I - Station 1 was in the southeast part of the small cove 100 m west of channel marker 2. Station 2 was 60 m north of Station 1, 150 m west of channel marker 2. Station 3 was 60 m north of Station 2, 200 m west of channel marker 2. Oysters were collected with a commercial dredge.

Years II, III, IV, V, VI, & VII - The oysters were collected by hand along the shore west of the Fort. Station 1 was on the west side by the shore. Station 2 was approximately 50 m north of Station 1 by the rock rubble, and Station 3 was 70 m west of Station 2 by the mud flat.

Year VIII & IX - The same stations were collected again these two years, but the oysters were less abundant.

SEDIMENT COLLECTIONS

Years I & II - Sediments were taken 300 m offshore in subtidal waters northwest of the channel markers.

Year III - Sediments were taken 100 m offshore in a north-south transect, with stations 50 m apart. Station 1 was on the north and Station 3 on the south.

Year IV - Sediments were not sampled this year.

Year V - Sediments were composed of soft mud and shell and were collected adjacent (25 m) to each of the oyster stations in 1 m of water.

Year VI - Sediments were not sampled this year.

Years VII, VIII, & IX - Sediments were not sampled during these years.

SAMPLING METHOD

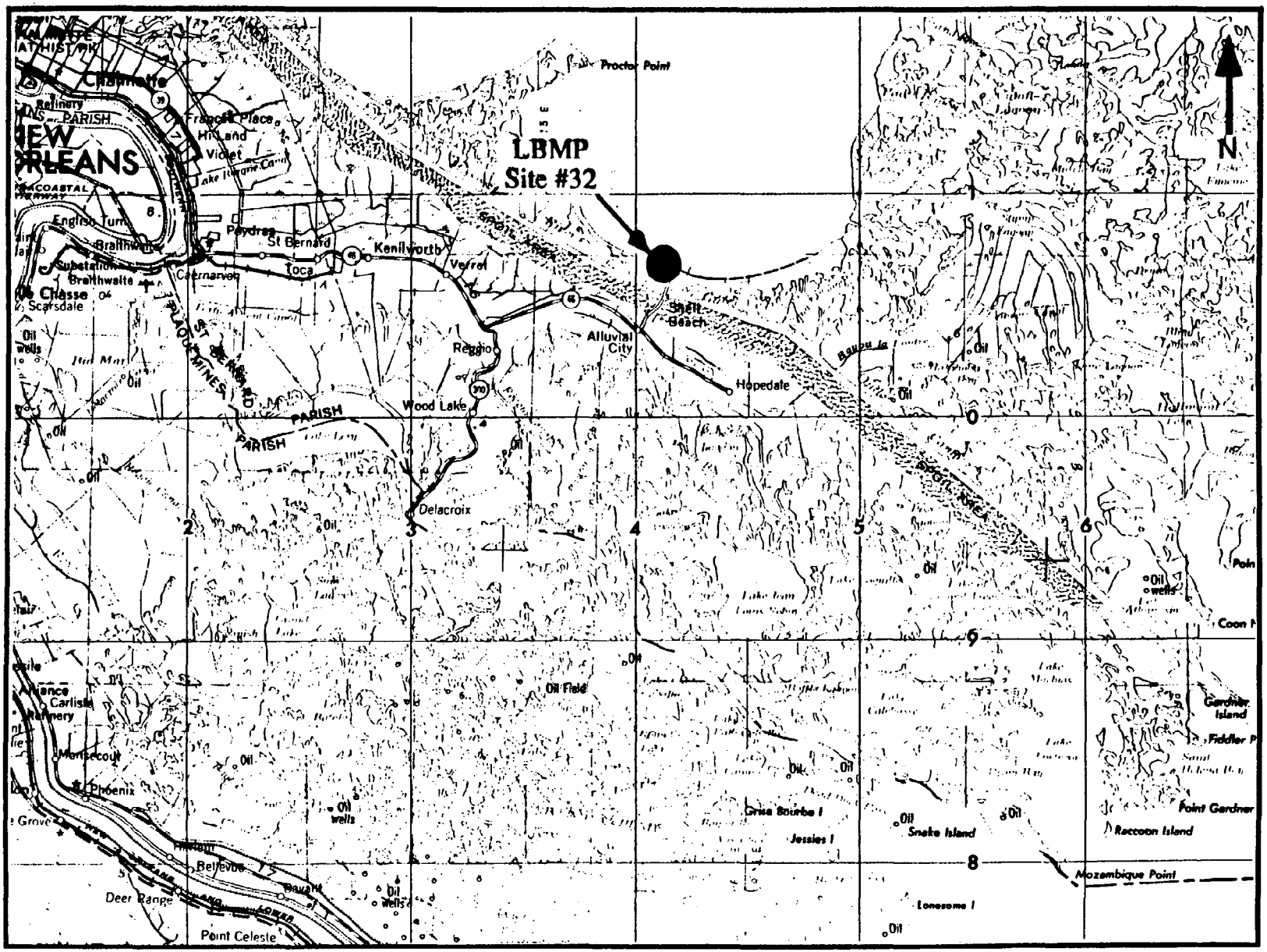
Oysters - commercial dredge and hand
Sediment - box core and hand

WATER DEPTH - intertidal, 0.1 and 0.3 meters

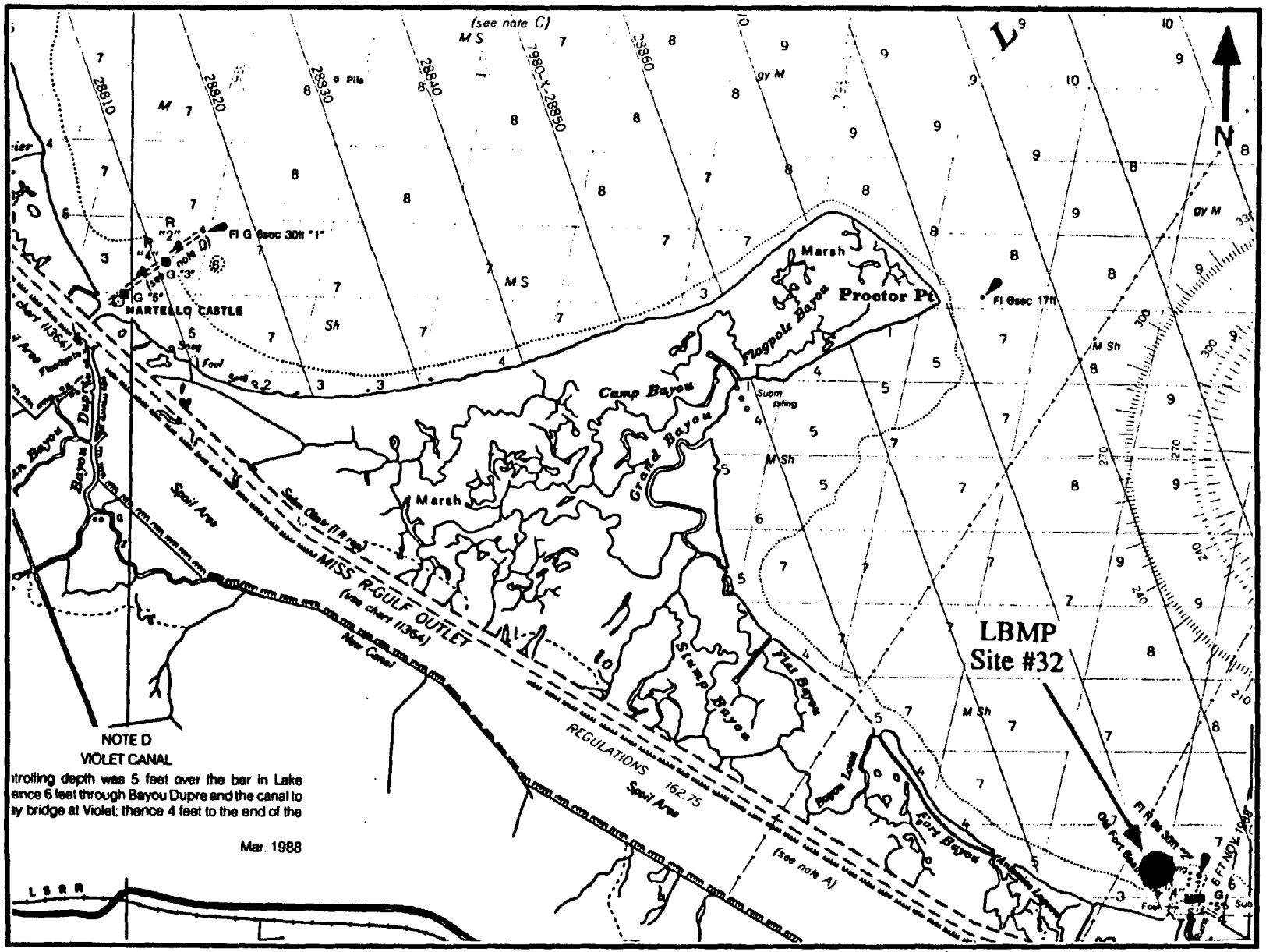
POSSIBLE CONTAMINANTS - Contamination factors included outwash from the Yscloskey Bayou and Mississippi River Gulf Outlet Canal, an ammunitions dump, and oil and gas pipelines.

ENVIRONMENTAL DATA

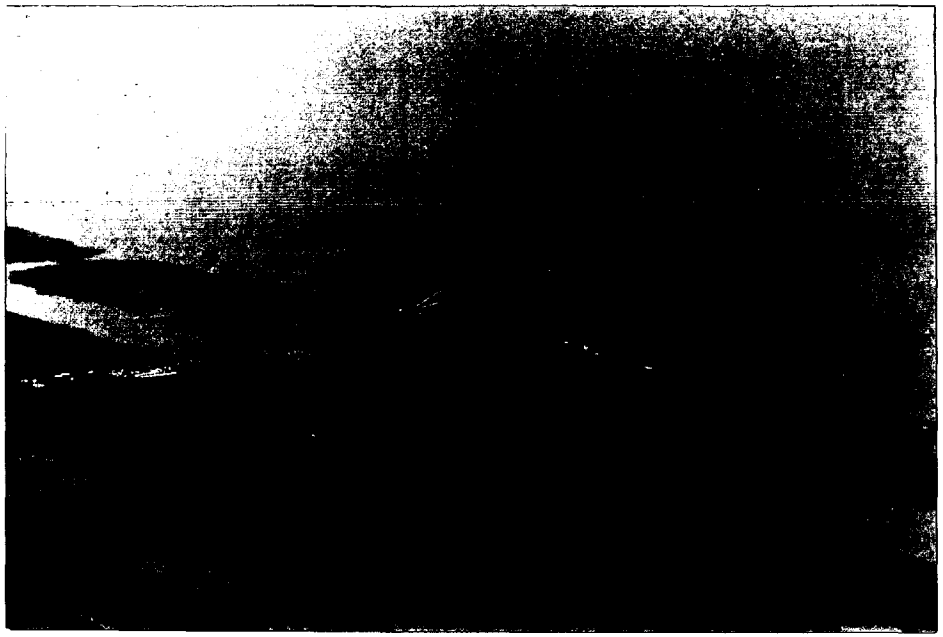
	Salinity (‰)	Temperature (°C)	Dates Sampled
YEAR I	12.0	20.0	27 March 1986
YEAR II	12.0	20.0	15 February 1987
YEAR III	17.0	16.0	30 January 1988
YEAR IV	-	18.0	8 January 1989
YEAR V	4.0	11.0	8 January 1990
YEAR VI	16.0	16.0	10 January 1991
YEAR VII	10.0	14.0	10 January 1992
YEAR VIII	8.0	16.0	7 January 1993
YEAR IX	6.0	10.0	14 January 1994

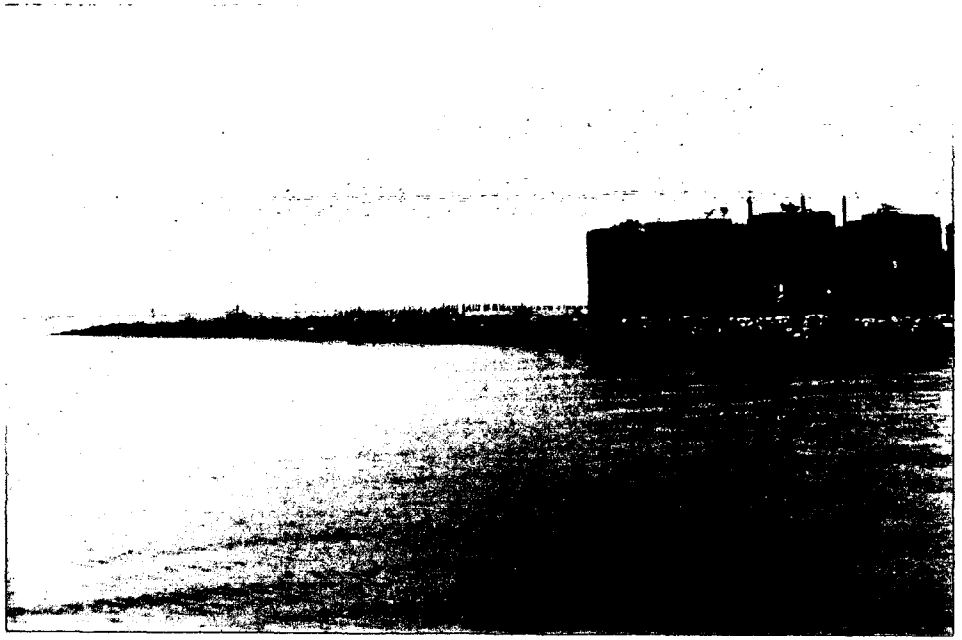


Site #32 (LBMP), Lake Borgne Malheureux Point.



Site #32 (LBMP), Lake Borgne Malheureux Point (from chart 11371).





SITE NUMBER - 62 **DESIGNATOR** - LBNO

SITE - NEW ORLEANS, LAKE BORGNE, LA

NOMINAL SITE CENTER - 29°56.60'N 89°50.10'W

LOCATED ON NOS CHART # - 11364

SITE ACCESS - Access is by boat launched at the marina north of Chalmette on LA Highway 47. From the marina, travel north to Bayou Bienvenue, then east to the first channel or continue on to the Mississippi River Gulf Outlet Canal. Turn right (southeast) and continue on for 5 miles, then turn right into Lake Borgne.

SITE DESCRIPTION - This site was established in Year III and was located on the west side of Lake Borgne. The site was located just inside the pass into the lake along the south shore and was due south of Martello Castle.

OYSTER COLLECTIONS

Year III - The oyster stations were located along the shoreline from east to west. Oysters were collected by hand in 10-20 cm water at low tide. Live oyster clumps were interspersed with abundant dead shell. Station 1 was due south of Martello Castle. Station 2 was 50 m to the west. Station 3 was another 50 m west.

Years IV, V, VI, VII, & VIII - The site was not sampled during these years.

Year IX - The site was not scheduled to be sampled this year, but was substituted as an alternate site for LPGO (Gulf Outlet, Lake Pontchartrain). The oysters were large and abundant, and were collected form the same stations as in Year III.

SEDIMENT COLLECTIONS

Year III - Sediment sites were located 50 m offshore to the north of each oyster station in an east to west line. Sediments were a mixture of peat, mud and shell.

Years IV, V, VI, VII, VIII, & IX - Sediments were not sampled during these years.

SAMPLING METHODS

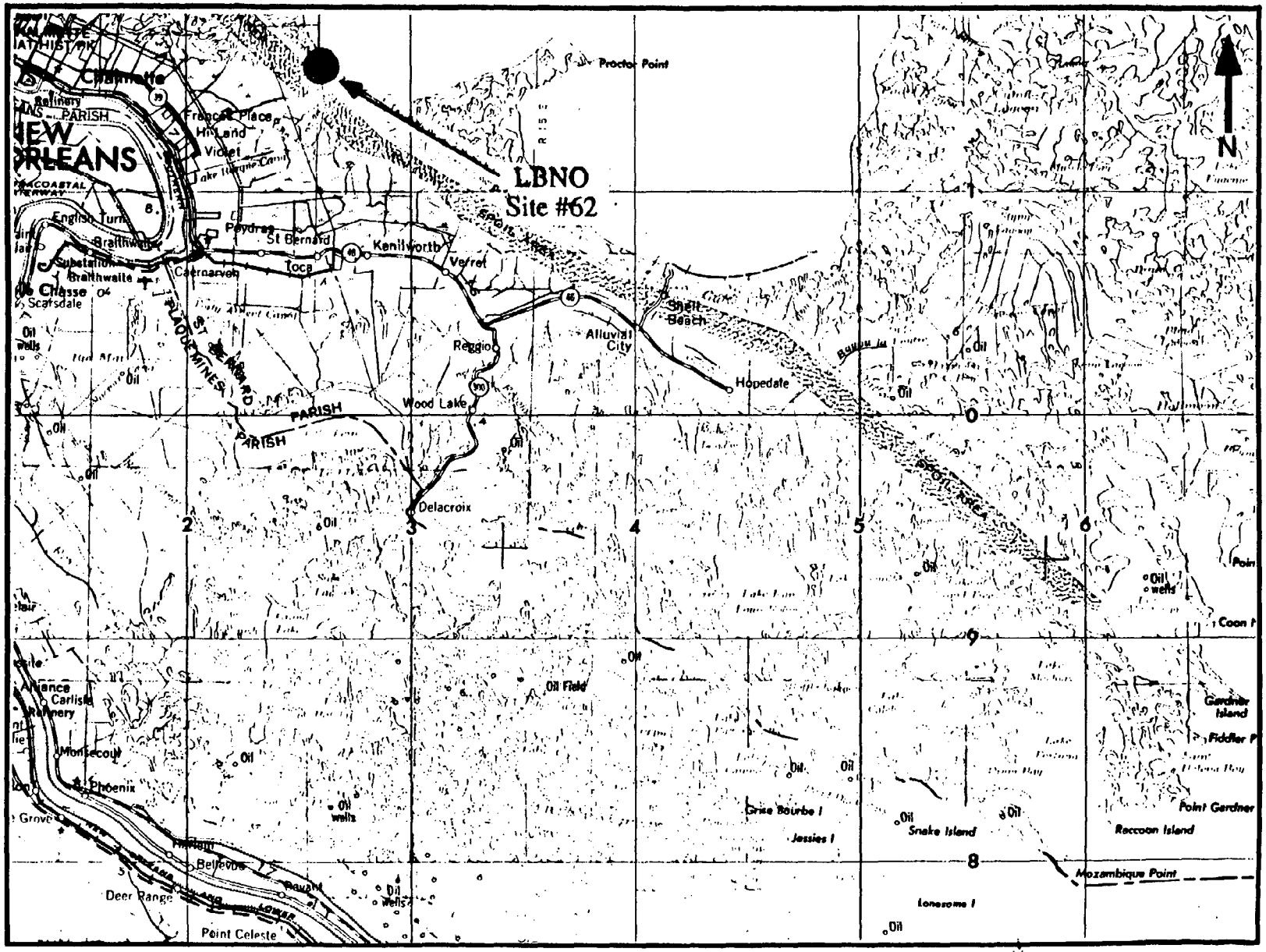
Oysters - hand
Sediment- box core

WATER DEPTH - intertidal, 0.1 - 0.2 meters

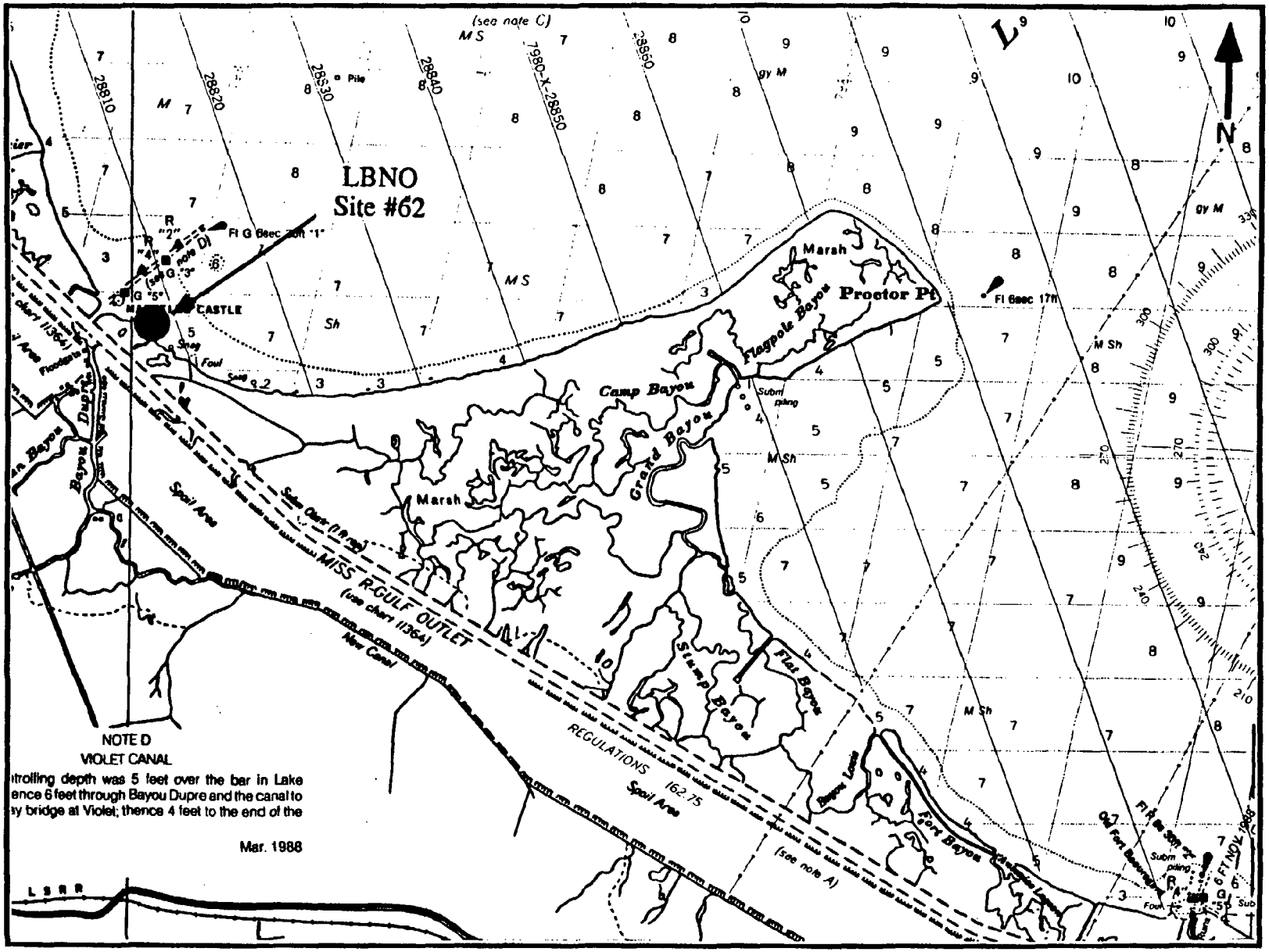
POSSIBLE CONTAMINANTS - No obvious pollution sources were evident. However, the Mississippi River Gulf Outlet drained the area from around New Orleans as well and carried boat and ship traffic.

ENVIRONMENTAL DATA

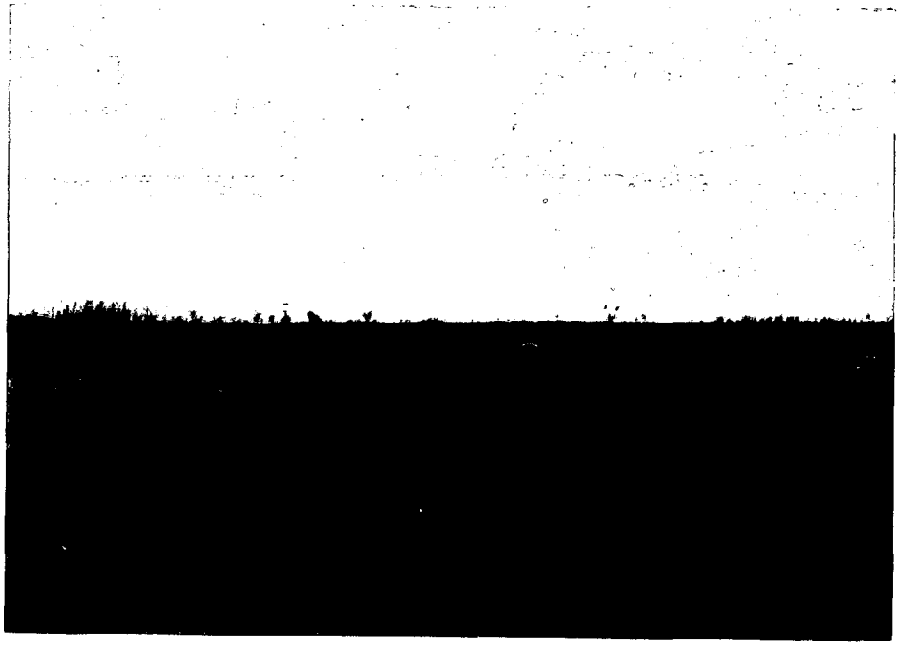
	Salinity (‰)	Temperature (°C)	Dates Sampled
YEAR III	16.0	18.0	31 January 1988
YEAR IX	7.0	9.0	14 January 1994

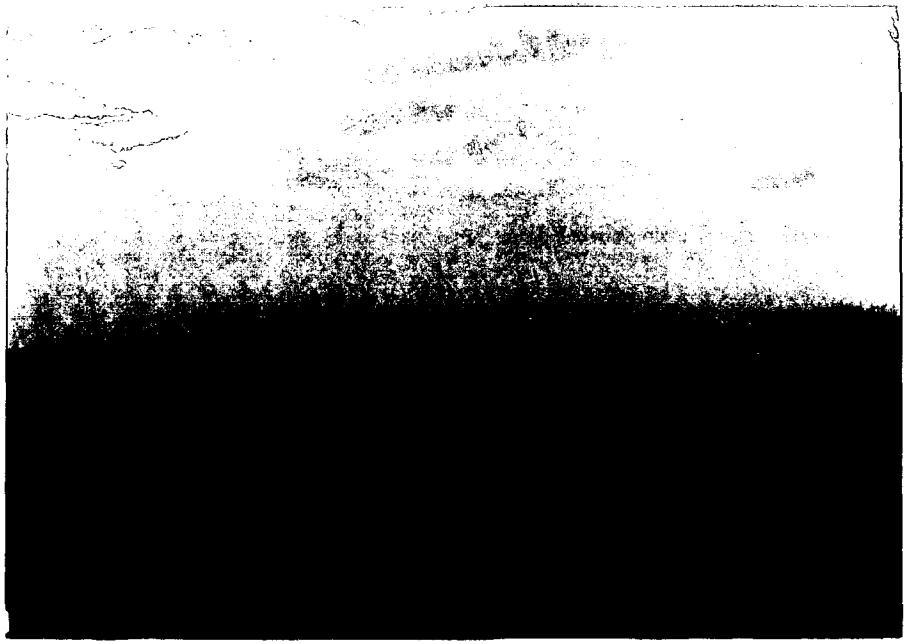


Site #62 (LBNO), Lake Borgne New Orleans.



Site #62 (LBNO), Lake Borgne New Orleans (from chart 11371).





SITE NUMBER - 63 **DESIGNATOR** - LPGO

SITE - GULF OUTLET, LAKE PONTCHARTRAIN, LA

NOMINAL SITE CENTER - 30°02.44'N 90°02.57'W

LOCATED ON NOS CHART # - 11369

SITE ACCESS - A boat is launched at the ramps located under Shoreline Drive Bridge. The site is located just to the north of the ramps in the south edge of Lake Pontchartrain. Travel time to the site is less than 5 minutes. This site cannot be sampled when there is a strong north wind due to high waves.

SITE DESCRIPTION - An attempt was made in Year III to establish a site at the Gulf Outlet on the south shore of Lake Pontchartrain. Although the site was recommended as being most likely to support oysters, no oysters were present; therefore, no stations were established nor was sediment collected. Based on new information, a sampling site was established in Year VI near the Gulf Outlet on the south side of Lake Pontchartrain. The site was located approximately 1 km north of the bridge adjacent to the New Orleans Lakefront Airport. Oysters occured at this site due to a salt water wedge that entered through the outlet. The high salinity water allowed the oysters to exist on the bottom near the Gulf outlet.

OYSTER COLLECTIONS

Year VI - The oyster stations were located along the edge of the channel in deep water. Oysters were sparse this year because the Louisiana Fish and Wildlife Department had removed most of them in a replanting project. Stations were not distinguished due to the sparse population. Three hours of dredging was required to obtain 90 oysters. This station should improve in future years since the area is closed to commercial luggers.

Years VII & VIII - Oysters were not collected at during these years.

Year IX - Only three live oysters were found after three hours of dredging. As a result, an alternate site was selected - LBNO (New Orleans, Lake Borgne) for sampling.

SEDIMENT COLLECTIONS

Year VI - The only suitable sediments were found in deep water along the edge of the channel. All of the south end of the Lake had hard packed sandy bottom. Station 2 was located at the coordinates given for the oyster collection. Station 1 was located 200 m to the northwest and Station 2 was 300 m to the east. Sediments can only be obtained by a box corer equipped with a 10 m rope and a messenger.

Years VII, VIII, & IX - Sediments were not sampled during these years.

SAMPLING METHODS

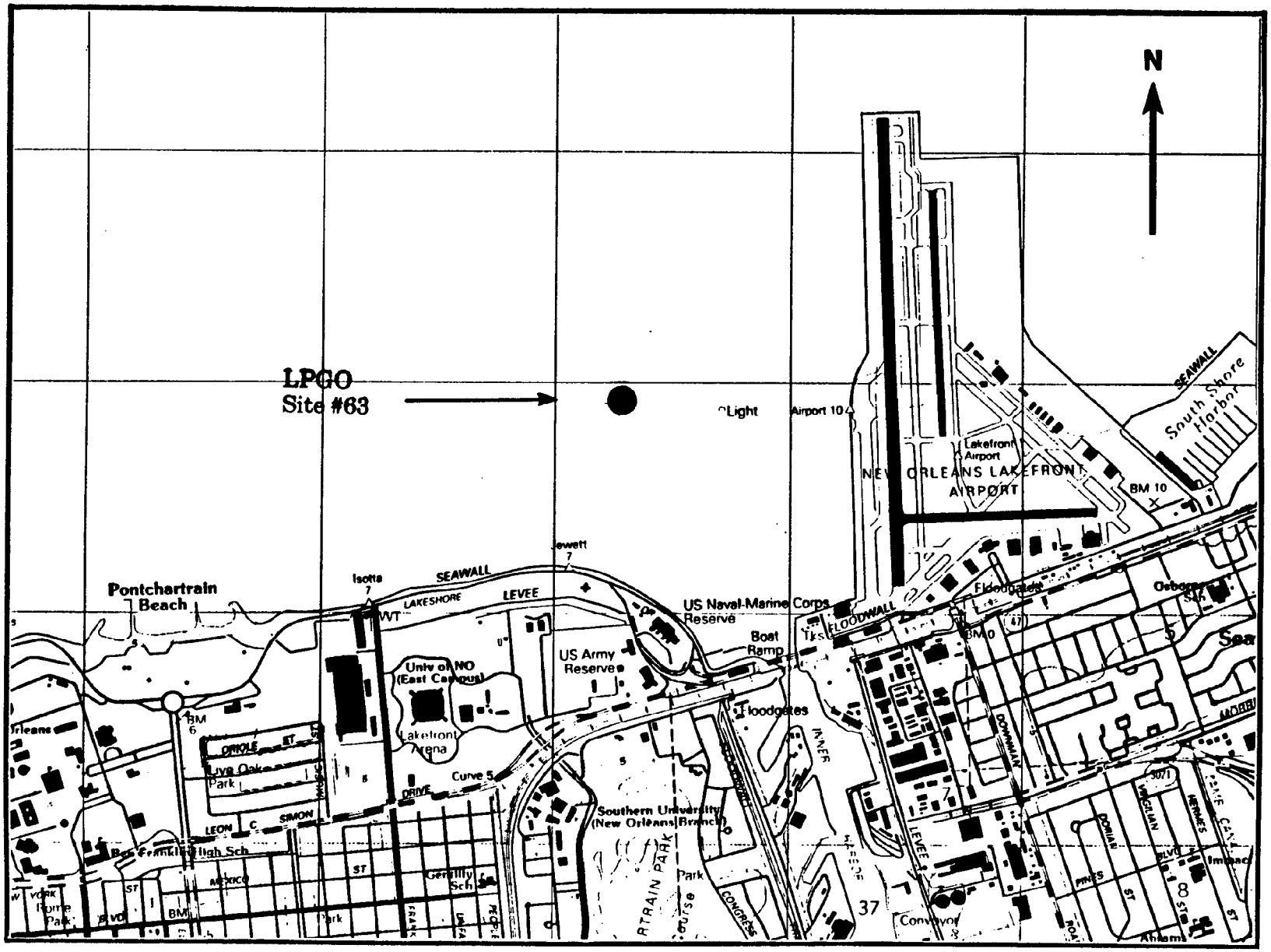
Oysters - dredge
Sediment - box core attached to a rope

WATER DEPTH - Oysters 4 to 5 m and greater than 5 m for sediment.

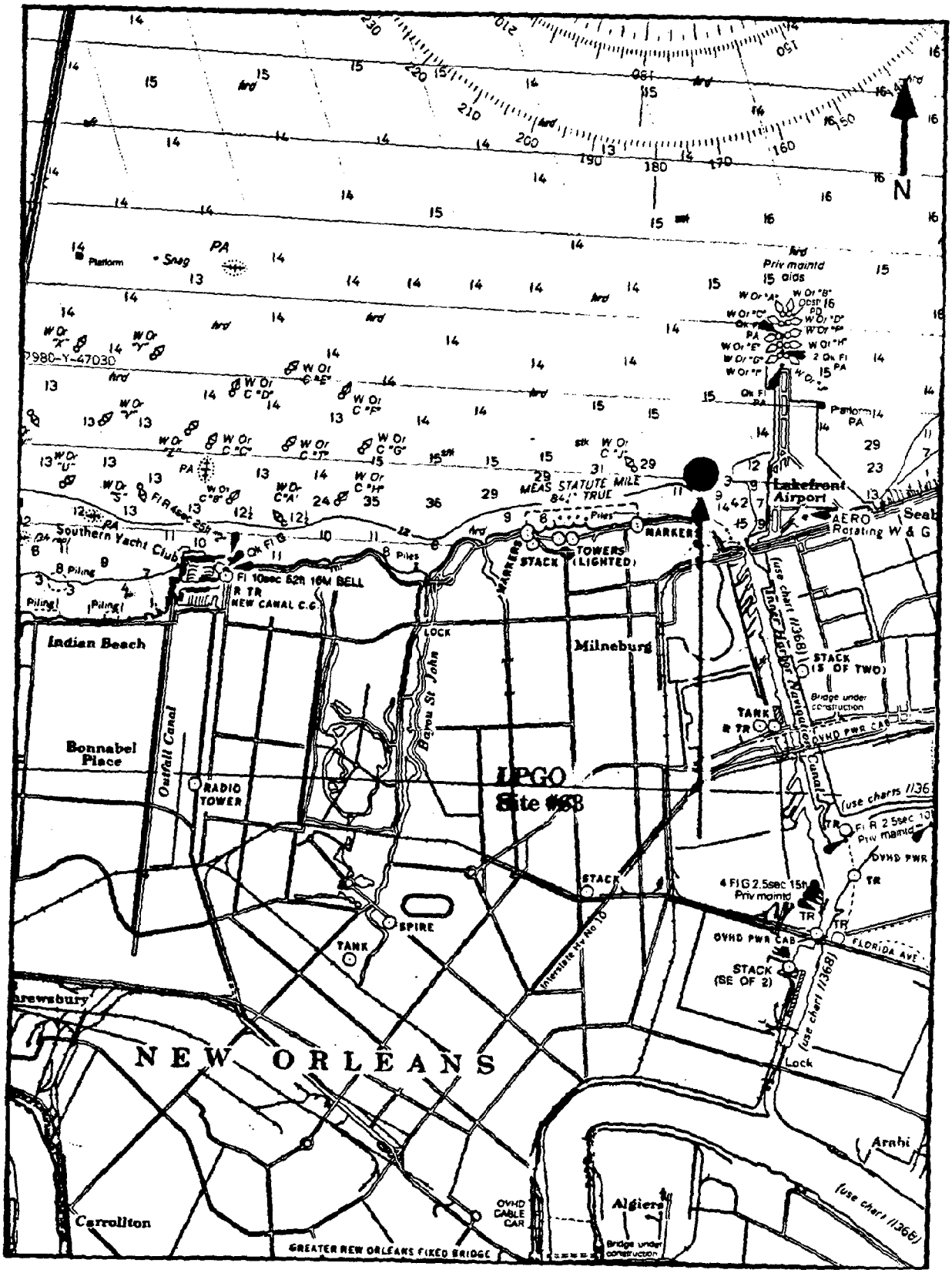
POSSIBLE CONTAMINANTS - No obvious pollution sources were evident, but Lake Pontchartrain drained through this outlet and tidal water from New Orleans flushed back into the lake. There was also abundant boat and ship traffic.

ENVIRONMENTAL DATA

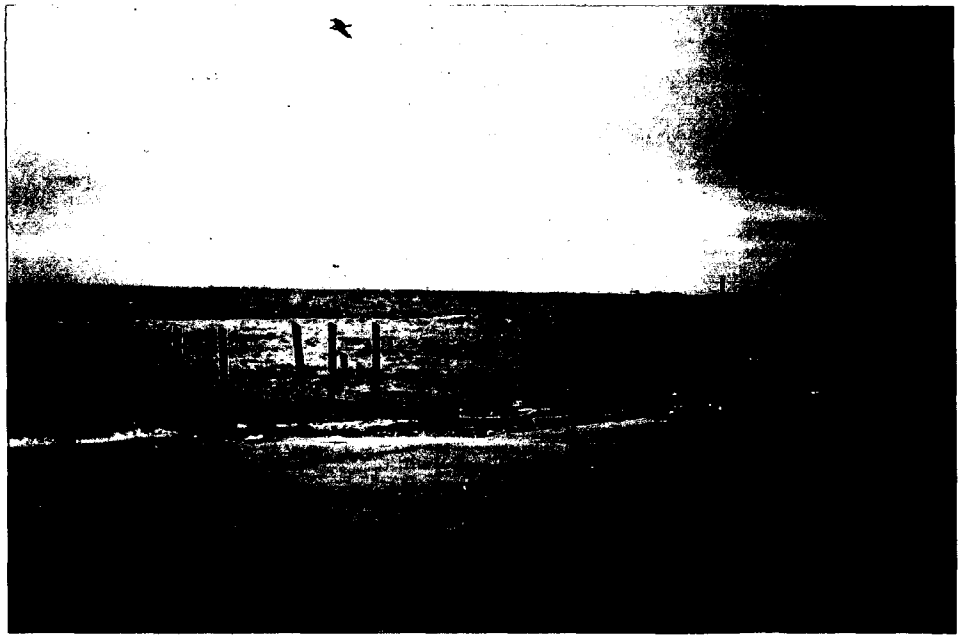
	Salinity (‰)	Temperature (°C)	Dates Sampled
YEAR VI	5.0	11.0	31 January 1988
YEAR IX	5.0	9.0	13 January 1994

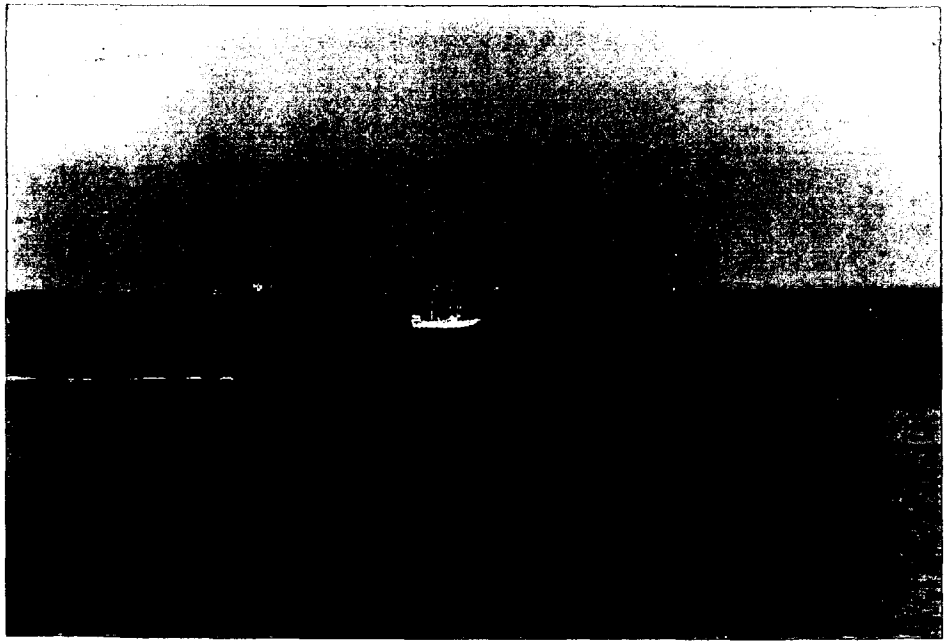


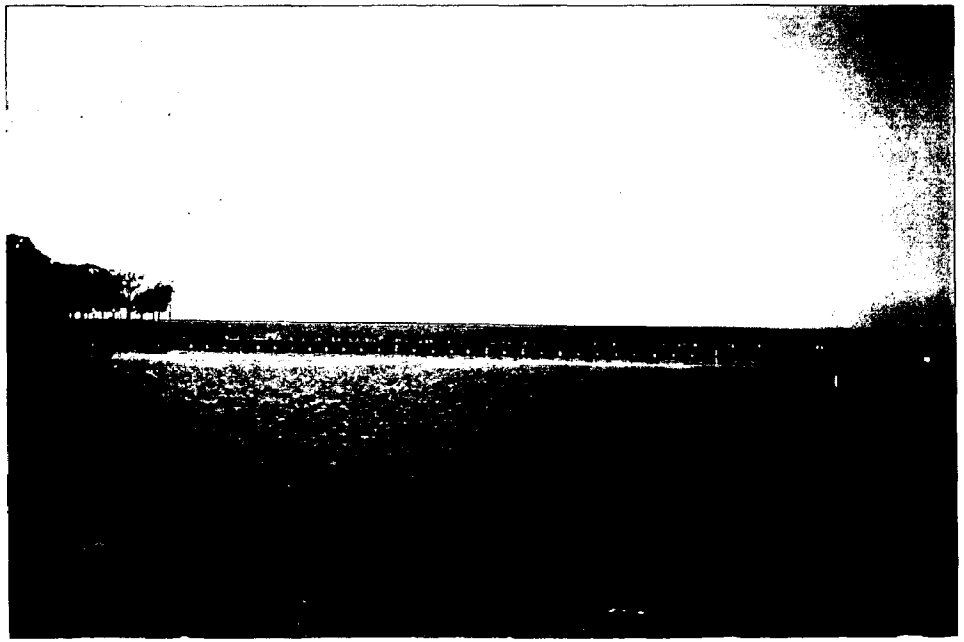
Site #63 (LPGO), Lake Pontchartrain Gulf Outlet



Site #63 (LPGO), Lake Pontchartrain Gulf Outlet







MISSISSIPPI SITES

SITE NUMBER 33 **DESIGNATOR** - MSPC

SITE - PASS CHRISTIAN, MISSISSIPPI SOUND, MS

NOMINAL SITE CENTER - 30°18.12'N 89°19.62'W

LOCATED ON NOS CHART # - 11372, 11373

SITE ACCESS - Access point in Year I was from Pass Christian small craft harbor with an approximate running time of 20 minutes. From Year II on, access to the site was via automobile, taking the first exit on the west side of the bridge at Highway 90 and following the road south along the shoreline to Veterans Pier. A boat ramp was located on the south side of the jetty/pier for sediment sampling.

SITE DESCRIPTION - In the first year oysters were tonged from the open water offshore from Bay St. Louis (30°17.75'N and 89°19.60'W). The original reef location off Pass Christian was dead in Year II and the site was moved onshore to the Veterans Pier. At the pier, oysters were attached to rocks and on the muddy sand bottom. Accessibility was best at low tide.

OYSTER COLLECTIONS

Year I - Year I stations were located in Bay St. Louis. Station 1 was approximately 0.5 to 0.75 miles south of the railroad bridge. Bearing to landmarks were: 70° to the silver water tower, 230° to the center pivot trestle, and 350° to the buoy marker. Station 2 was 200 m north of Station 1 and Station 3 was 200 m farther north.

Years II & III - During Year II no oysters were found at the Year I site. In Years II and III, the site was moved to the Veteran's Pier at Bay St. Louis. The oysters were intertidal and were collected by hand without the use of a boat. Station 1 was on the north side of the jetty. Station 2 on the seaward side of the "T" end of the jetty and under the pier. Station 3 was on the south side of the jetty.

Year IV - In Year IV, the site was the same as in Year II & III, on Veteran's pier. Stations were located as before. Construction was in process along the shore, jetty and pier and sand had been filled on the beach. Additional rock rubble had been added to the "T" end of the jetty, covering most of the oysters at Station 2. However oysters were more plentiful and larger than in the past.

Year V - Stations were in the same locations as previously sampled. Oysters were very scarce due to the recent freeze which had killed all oysters above the low tide line.

Year VI - There were no live oysters at Stations 2 and 3. At Station 1 there were very few live oysters attached to the concrete rubble but there were numerous oysters at a small reef 20 m north of the north end of the "T" end of the jetty. All three stations were collected on this small reef. Stations were not differentiated.

Year VII - This site was not sampled this year. No live oysters could be found at any of the previously sampled sites nor in the surrounding bay.

Year VIII - No oysters were present at the Veteran Pier, so the site was moved 1.65 nm to the NE (bearing 57°). The site is located at a submerged reef which parallels the Highway 90 bridge. The reef lies 10 meters south of the bridge on the east side of the channel in 2.5 m of water. Oysters were numerous but since the reed is small, individual stations were not recognized. Loran coordinates for the new reef are 30° 18.87'N and 89° 18.05'W.

Year IX - Veteran's Pier was re-occupied this year, as there was an abundance of small oysters again.The sampled stations were the same as those used in Years II through V.

SEDIMENT COLLECTIONS

Year I - Sediments were taken at 100, 150 and 175 m south, respectively, from each oyster station.

Year II - Sediments were obtained by box coring directly offshore from the jetty at distances of 200, 400, and 600 m, respectively, for the three stations.

Year III - Sediment stations were collocated with each oyster station. Silty-sand sediments were collected along the shoreline and can be reached by wading.

Years IV, V, VI, VII, VIII, & IX - Sediments were not sampled during these years.

SAMPLING METHOD

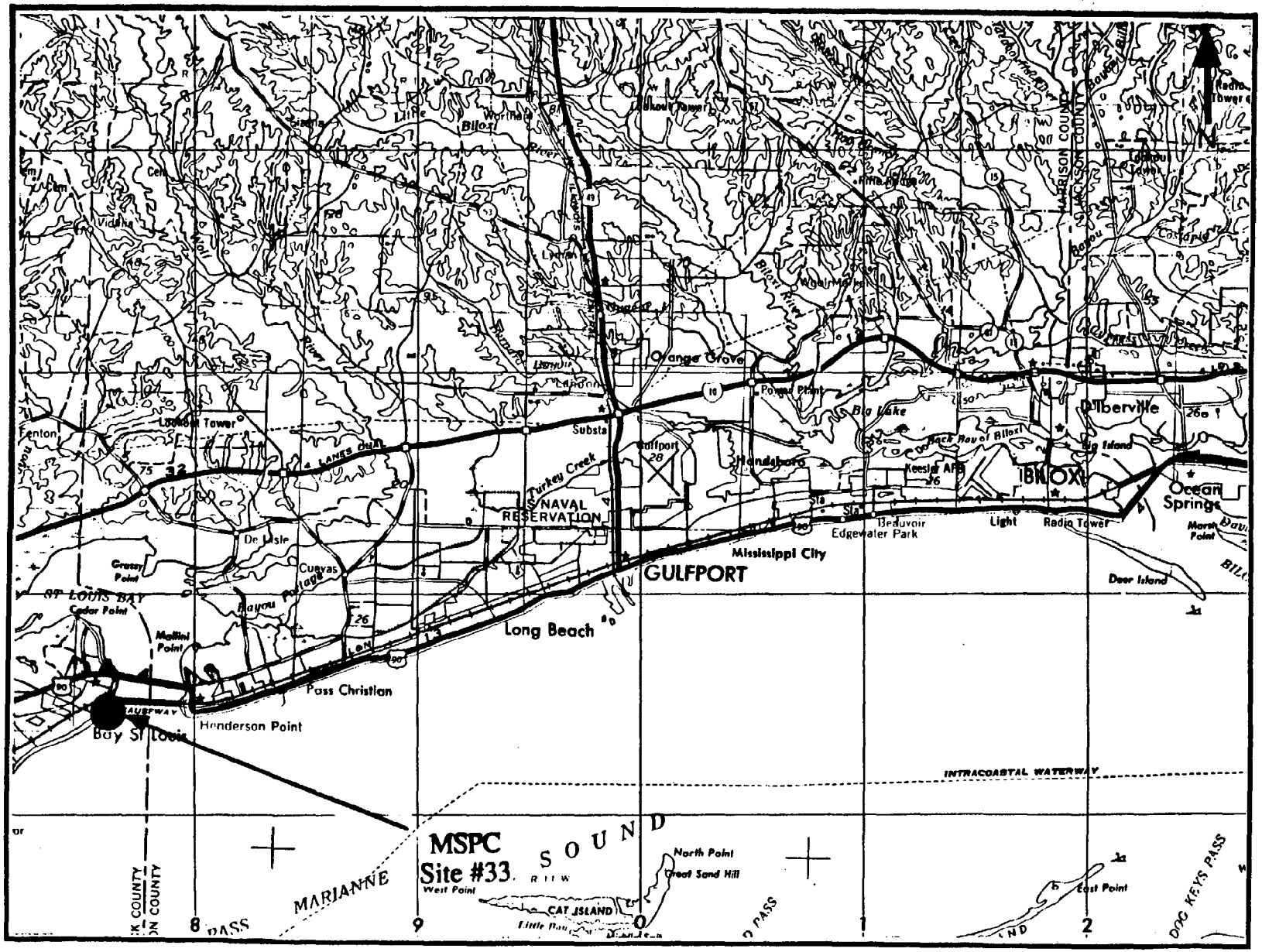
Oysters - tonging and hand
Sediment - box core and hand

WATER DEPTH - 0 to 3 meters (subtidal in Year I, intertidal in succeeding years)

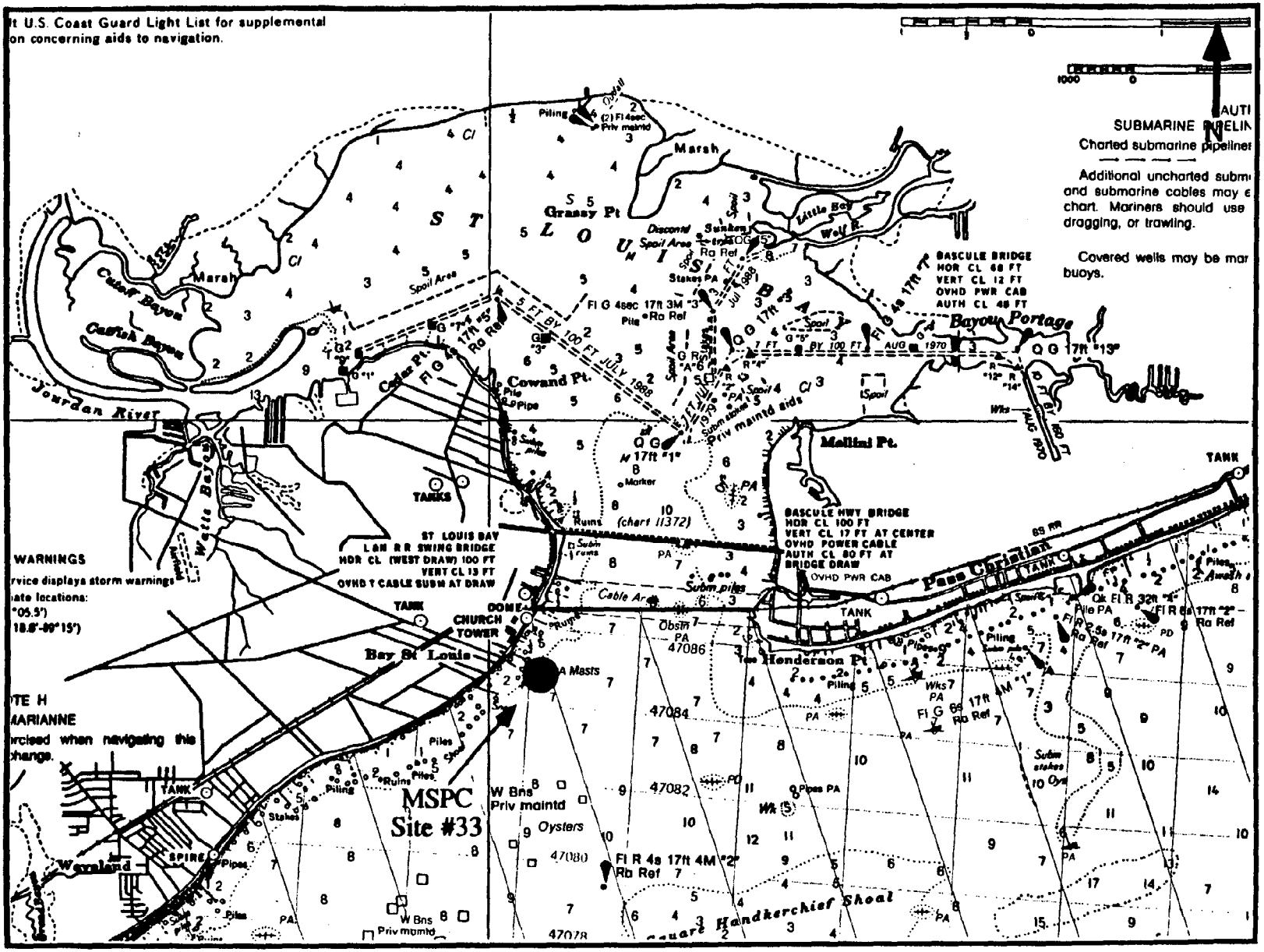
POSSIBLE CONTAMINANTS - There were no obvious sources of contamination nearby.

ENVIRONMENTAL DATA

	Salinity (‰)	Temperature (°C)	Dates Sampled
YEAR I	11.3	16.0	6 March 1986
YEAR II	8.0	15.0	16 February 1987
YEAR III	18.0	17.0	2 February 1988
YEAR IV	16.0	-	10 January 1989
YEAR V	9.0	16.0	10 January 1990
YEAR VI	17.3	11.0	12 January 1991
YEAR VIII	10.0	15.0	8 January 1993
YEAR IX	18.0	6.0	15 January 1994



Site #33 (MSPC), Mississippi Sound Pass Christian.



Site #33 (MSPC), Mississippi Sound Pass Christian (from chart 11372).

SITE NUMBER 34 **DESIGNATOR** - MSBB

SITE - BILOXI BAY, MISSISSIPPI SOUND, MS

NOMINAL SITE CENTER - 30°23.55'N 88°51.45'W

LOCATED ON NOS CHART # - 11373, 11372

SITE ACCESS - No boat is necessary since this is a walk up site. Access to the site is via automobile, parking at the Marine Education Center on Highway 90 at the Biloxi-Ocean Springs bridge.

SITE DESCRIPTION - The sample area was along the shoreline in intertidal waters. Oysters were taken from the concrete bulkhead, rocks and debris in the water. There were a limited number of oysters at this location.

OYSTER COLLECTIONS

Years I, II, & III - The stations established in Year I were collected the next two years also. Station 1 was adjacent to Marine Education Center. Station 2 was next to the west end of the bridge on the south side. Station 3 was northeast of the bridge ~150 m from Station 2.

Year IV - In Year IV, the stations were: Station 1, under the bridge at the second and third support from the west end; Station 2, at the first pier support under the bridge; and Station 3, on the shoreline bulkhead and into the bay. As before the oysters were collected by hand from the concrete pilings, piers and concrete rubble.

Year V - Stations 2 and 3 were in the same locations as sampled last year. Station 1 was moved from under the bridge to 125 m up the shoreline to near the point north of the bridge. This station was moved due to the lack of live oysters. A freeze had recently killed most of the oysters.

Year VI - Stations 2 and 3 were again at the locations sampled last year. Station 1 had not recovered from the freeze, so it was collected north of the bridge on a concrete bulkhead. Oysters were numerous at this site.

Year VII - No live oysters could be found at any of the stations this year.

Year VIII - Oysters were again present and were collected at the locations described for Year V.

Year IX - The site was not scheduled to be sampled this year.

SEDIMENT COLLECTIONS

Years I, II, & III - Sediments were taken offshore from the three oyster sampling locations, with the boat being launched at the city marina ~0.25 mile to the east from the Mareing Education Center.

Years IV, V, VI, VII, VIII, & IX - Sediments were not sampled during these years.

SAMPLING METHOD

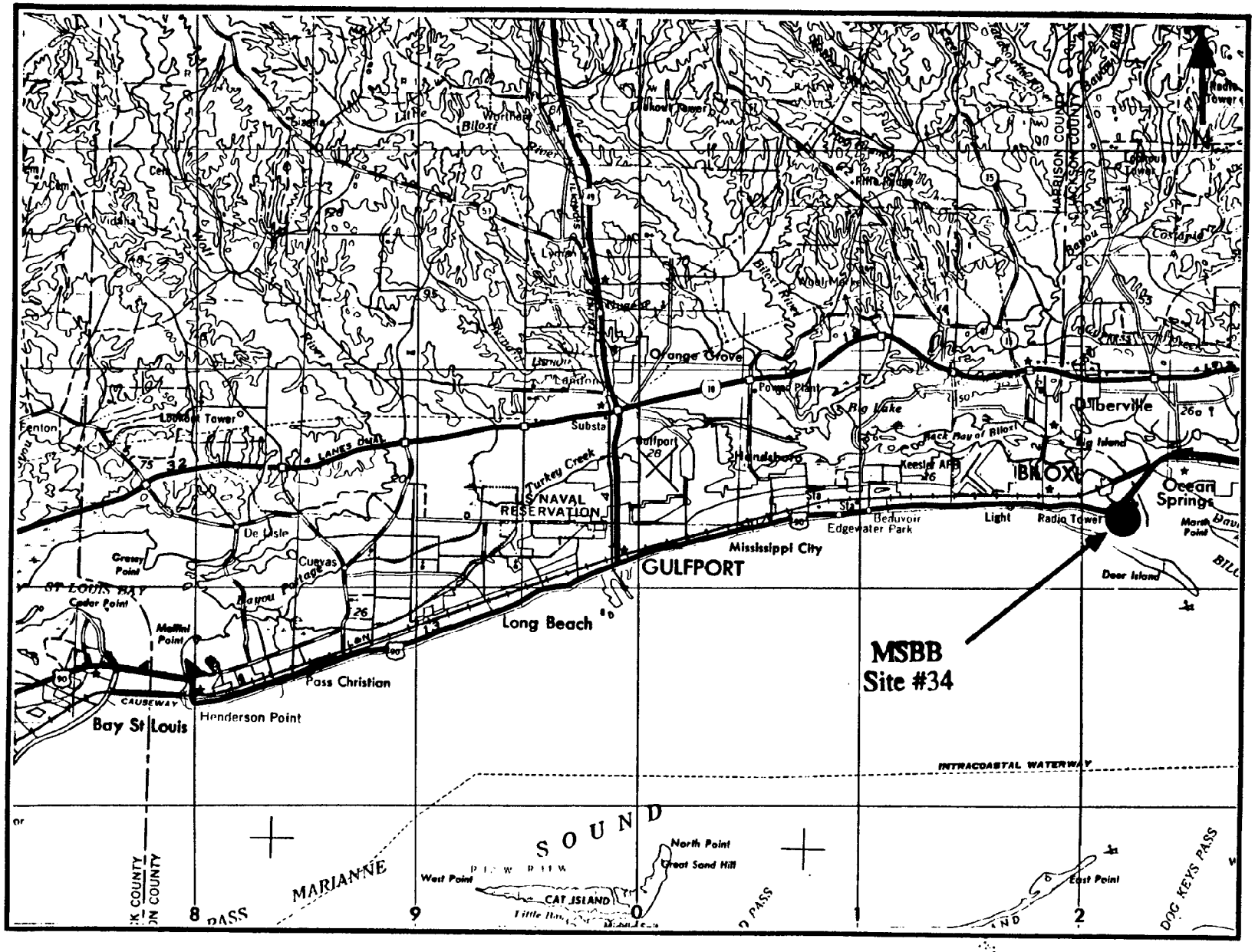
Oysters - hand
Sediment - box core

WATER DEPTH - intertidal, 0.1 to 0.3 meters

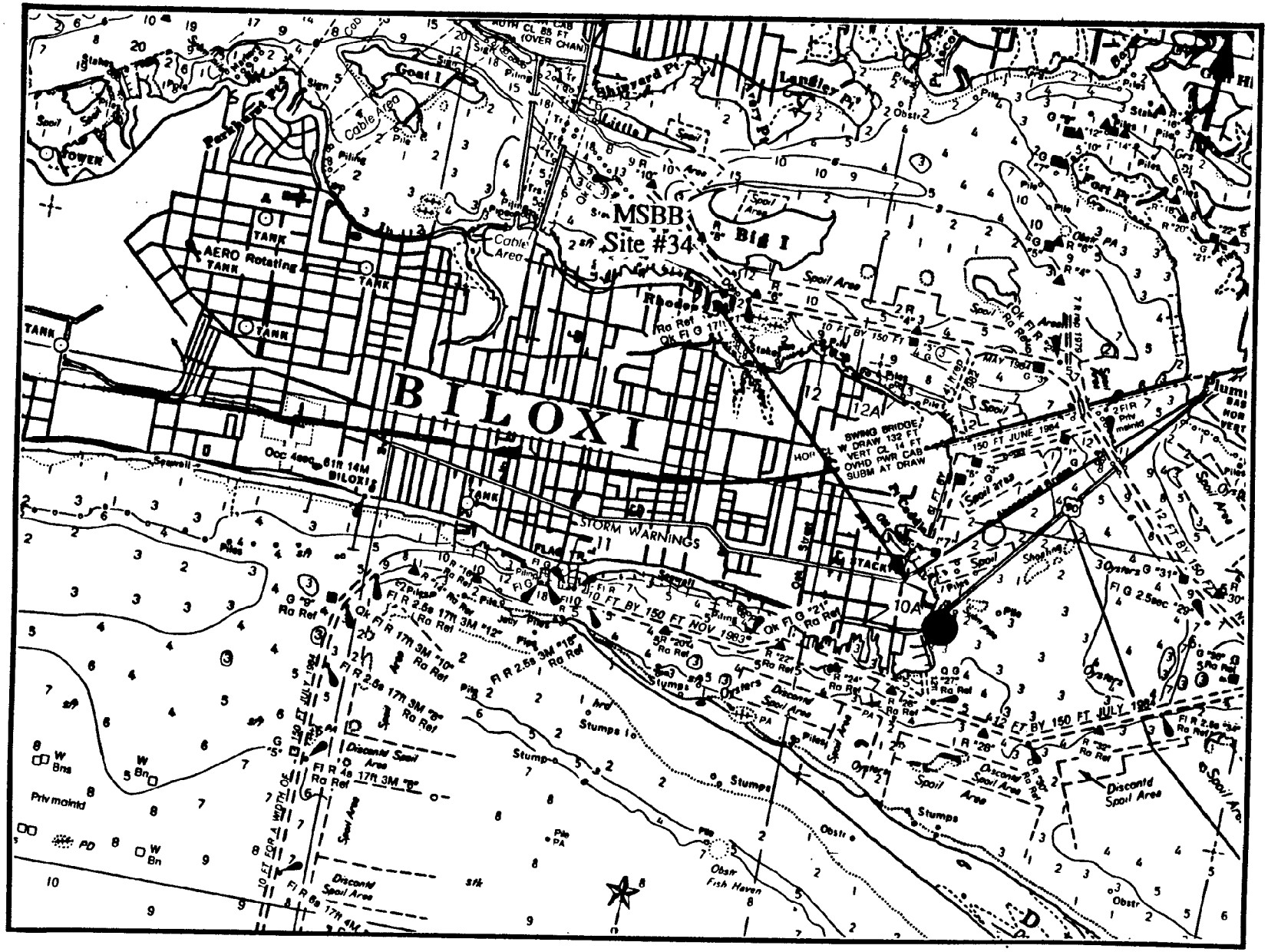
POSSIBLE CONTAMINANTS - Possible contamination factors included marine traffic and city pollution.

ENVIRONMENTAL DATA

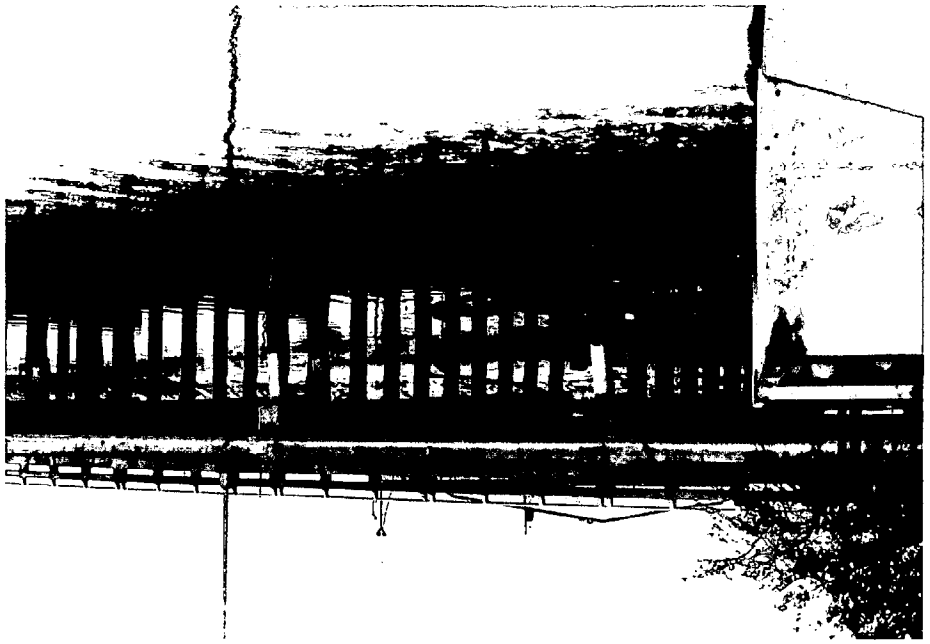
	Salinity (‰)	Temperature (°C)	Dates Sampled
YEAR I	15.0	15.0	4 March 1986
YEAR II	15.0	15.0	16 February 1987
YEAR III	16.0	14.0	2 February 1988
YEAR IV	14.0	17.0	10 January 1989
YEAR V	5.5	15.0	11 January 1990
YEAR VI	3.0	14.0	12 January 1991
YEAR VIII	10.0	16.0	8 January 1993

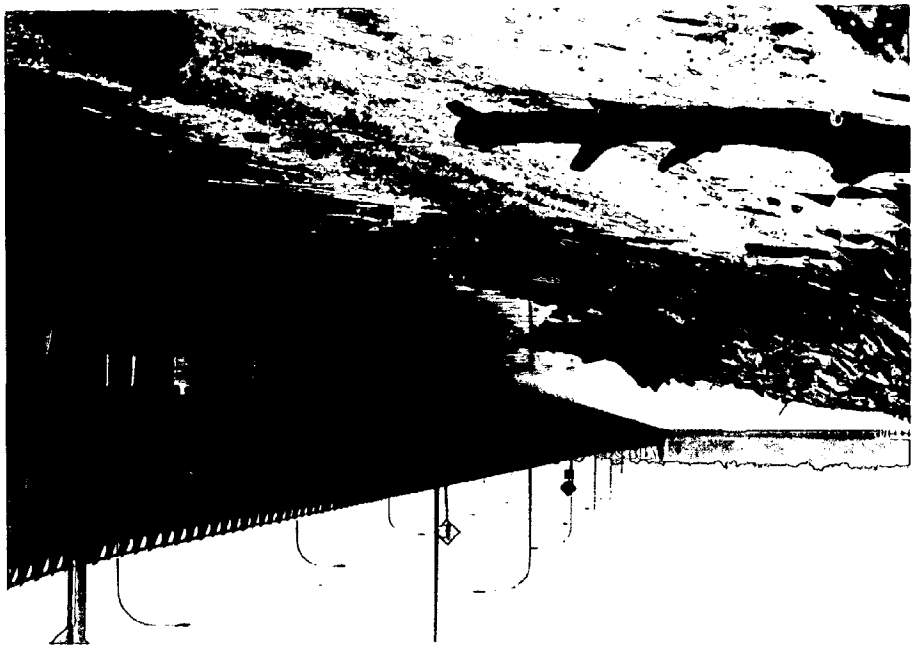


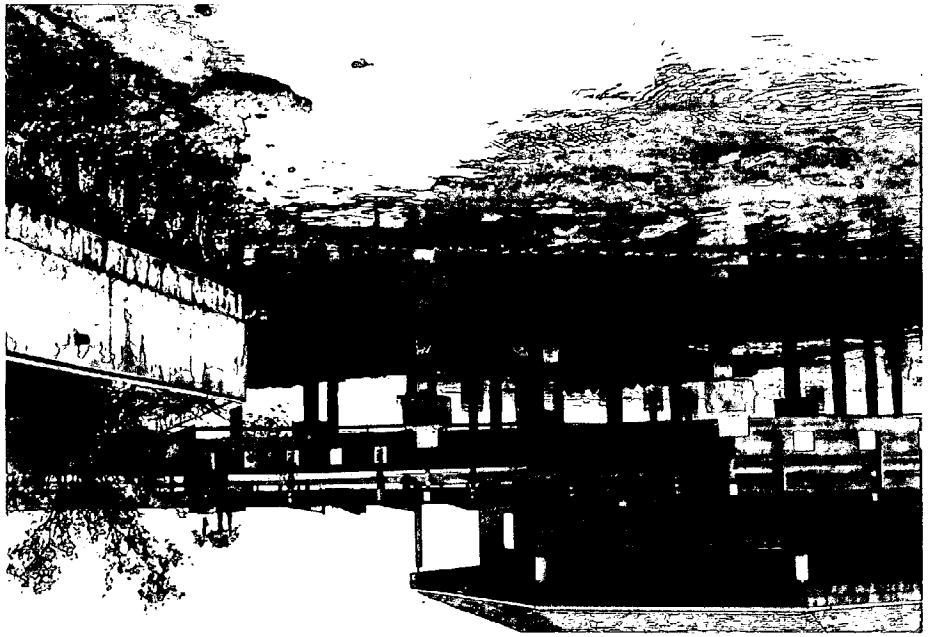
Site #34 (MSBB), Mississippi Sound Biloxi Bay.

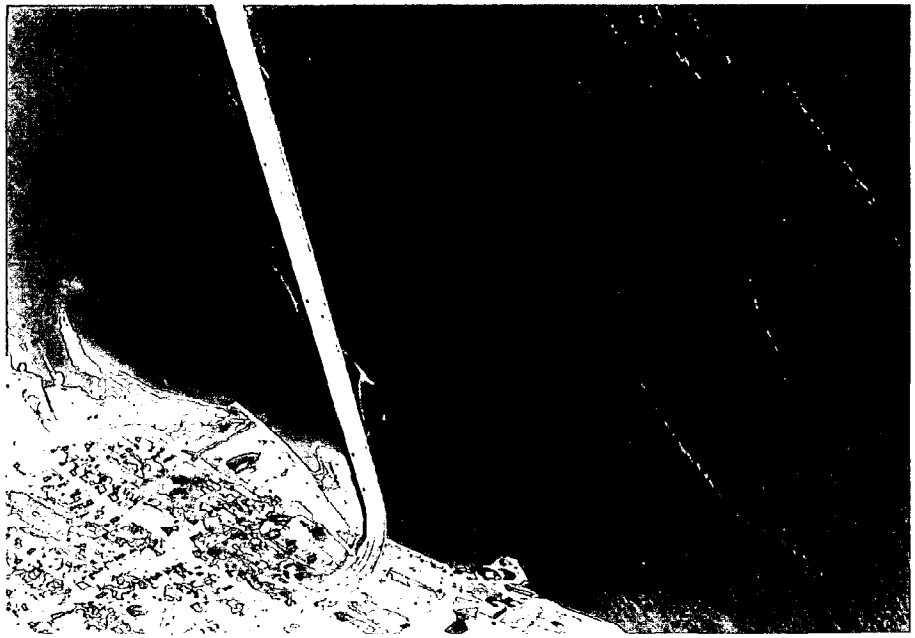


Site #34 (MSBB), Mississippi Sound Biloxi Bay (from chart 11372).









SITE NUMBER 35 **DESIGNATOR** - MSPB

SITE - PASCAGOULA BAY, MISSISSIPPI SOUND, MS

LATITUDE 30°20.03'N 88°36.10'W

LOCATED ON NOS CHART # - 11374, 11373

SITE ACCESS - To reach the boat ramp on the Pascagoula River turn off Highway 90 onto Market Street going south. When the road dead-ends at the beach, turn right and drive west to the end of the road. The boat is launched at the public ramp. Then by boat proceed west to red channel marker 4. Run time to the site is less than 10 minutes.

SITE DESCRIPTION - The site was located west of the new causeway going to the Naval Base near the mouth of the West Pascagoula River. Oysters were generally abundant and were found by poling the subtidal reef. Soft mud sediments were found adjacent to the reef at each collection point. Oysters were abundant.

OYSTER COLLECTIONS

Years I, II, & III - Year I stations were centered around red channel marker 4. Station 1 was 100 m east of red channel marker 4. Bearing to permanent landmarks were: 80° to grain elevators and 260° to Bellefontaine Point Lighthouse. Station 2 was at the red channel marker 4 (80° to grain elevators; 255° to the lighthouse). Station 3 was 150 m west of red channel marker 4 (80° to the grain elevators and 262° to the lighthouse). Oysters were collected by tonging.

Year IV - As in Year III, the site was centered around channel marker 4 which was just west of the new causeway and west of Ingalls shipyard. Station 1 was about 100 m east of the marker in shallow water which had been affected by silting from dredging operations. Oysters were smaller and fewer live ones were present than at other stations. Station 2 had to be moved from the marker to about 200-300 m north of the marker where a small iron pipe and a cane pole marked the channel. Oysters here were prolific and fairly large. Station 3 was 150 m west of the marker. It also had oysters in abundance. The whole area around the site was closed to oystering by the health department. Oysters were collected by dredging.

Year V - Stations were located in the same areas as sampled last year. Oysters were collected by tongs this year.

Year VI - The site was centered around channel marker 4 (30°20.55'N, 88°35.96'W). Station 1 was 100 to 200 m east of the marker. Station 2 was at channel marker 4. Station 3 was 100 to 200 m west of the channel marker. Oysters were very abundant at all three stations.

Years VII & VIII - All three stations were centered around channel marker 4. Station 1 was in the same area as last year, 100 to 150 m east of the marker. Station 2 was moved slightly north (50 to 150 m) of the marker. Station 3 was 150 m west of the marker. Oysters were abundant at all three stations.

Year IX - No oysters were found in the vicinity of channel marker #4. A new location was found off the NW corner of the Naval Base Island, next to the new causeway (30°20.14'N, 88°35.17'W). Station 1 was 100 m offshore next to the causeway, Station 2 was 50 m further south and Station 3 another 50 m to the south. The oysters were abundant and easily dredged.

SEDIMENT COLLECTIONS

Years I, II, & III - Sediments were gray and brown mud mixed with sand. Collection sites were north of each site within 75 to 100 m.

Years IV, V, VI, VII, VIII, & IX - Sediments were not sampled during these years.

SAMPLING METHOD

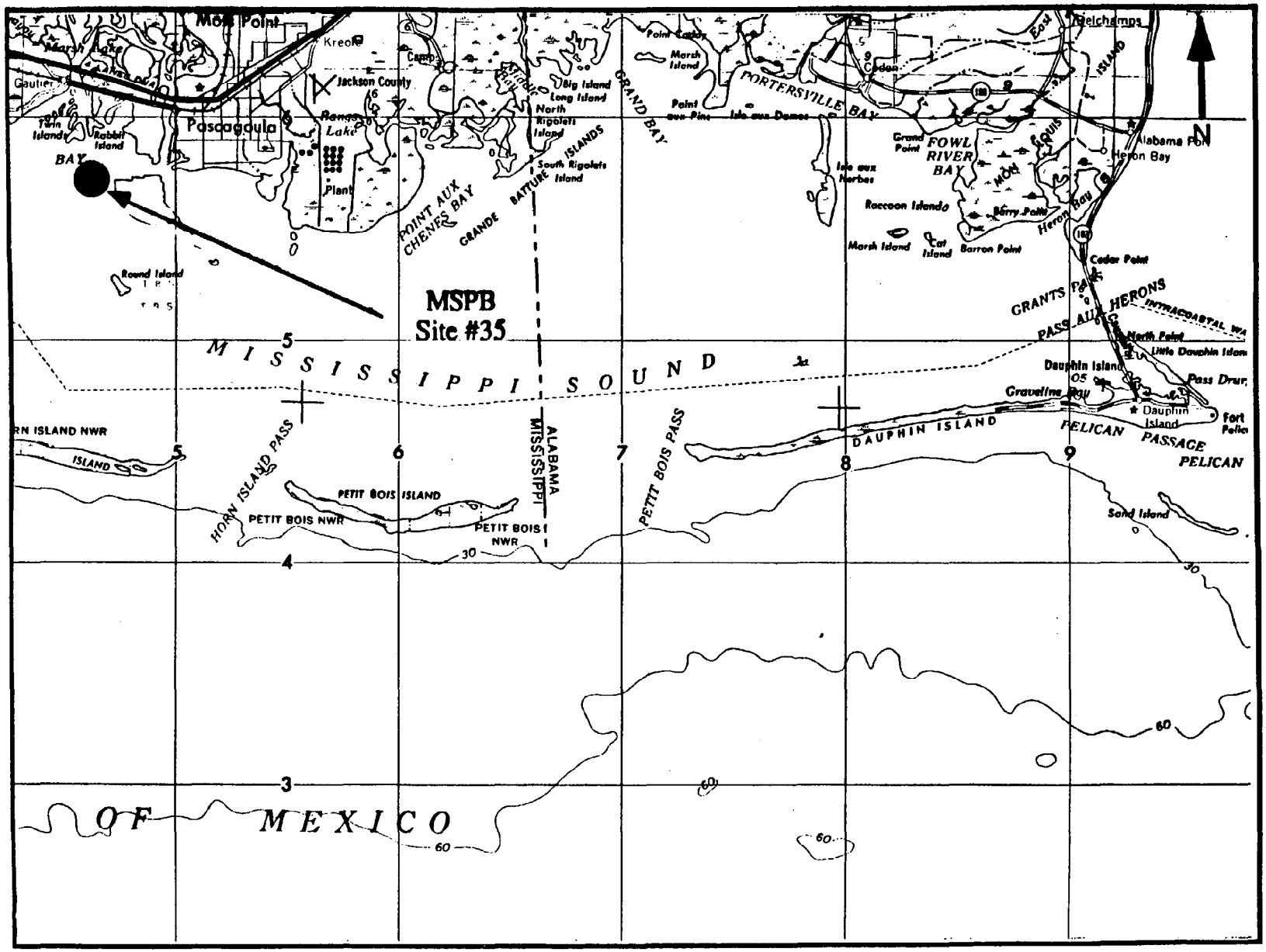
Oysters - tongs and dredge
Sediment - box core

WATER DEPTH - subtidal, 1 to 1.5 meters

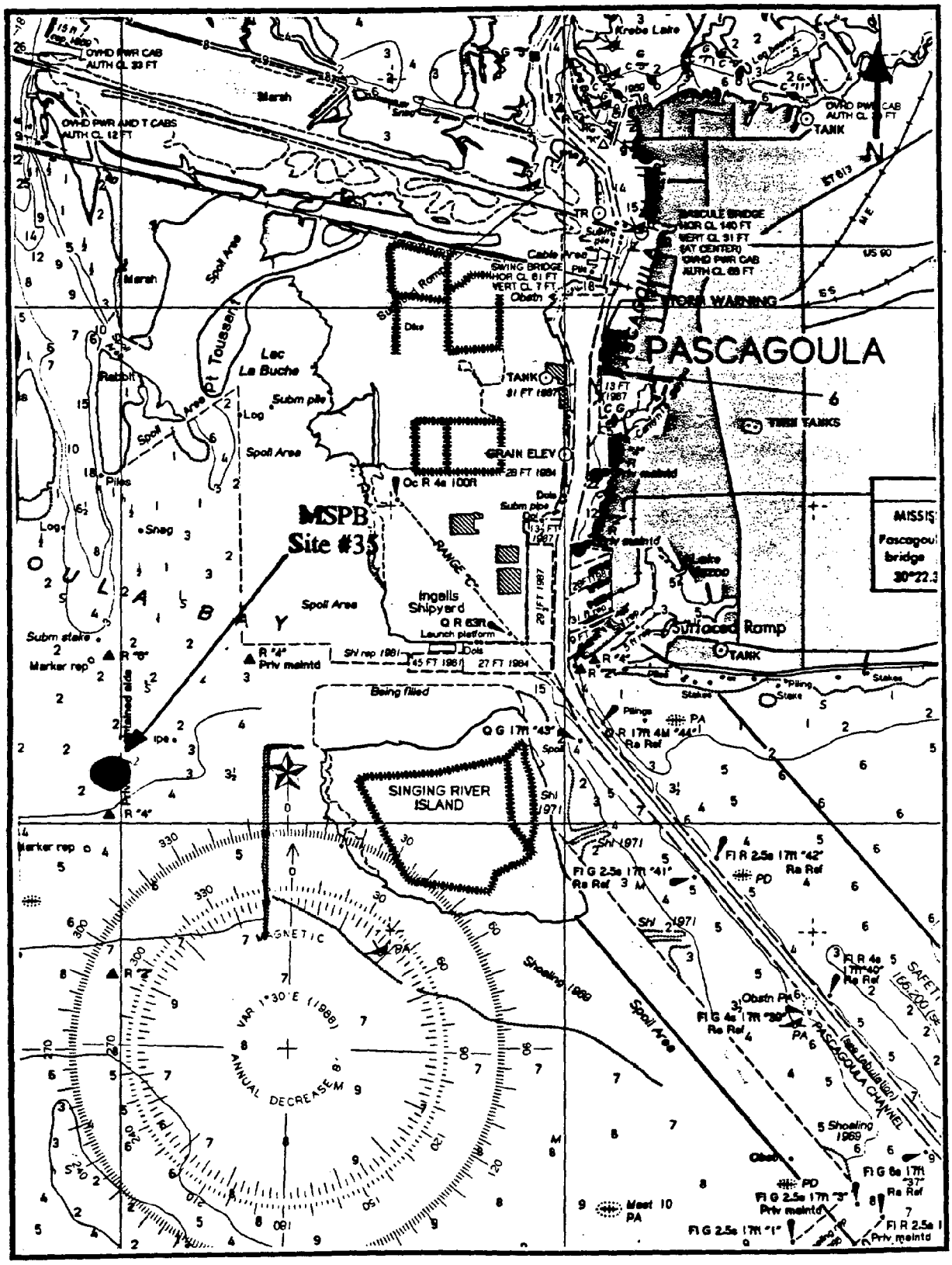
POSSIBLE CONTAMINANTS - Possible contamination sources included the Pascagoula River, City of Pascagoula, Naval Ship Yard, heavy marine traffic and nearby industries.

ENVIRONMENTAL DATA

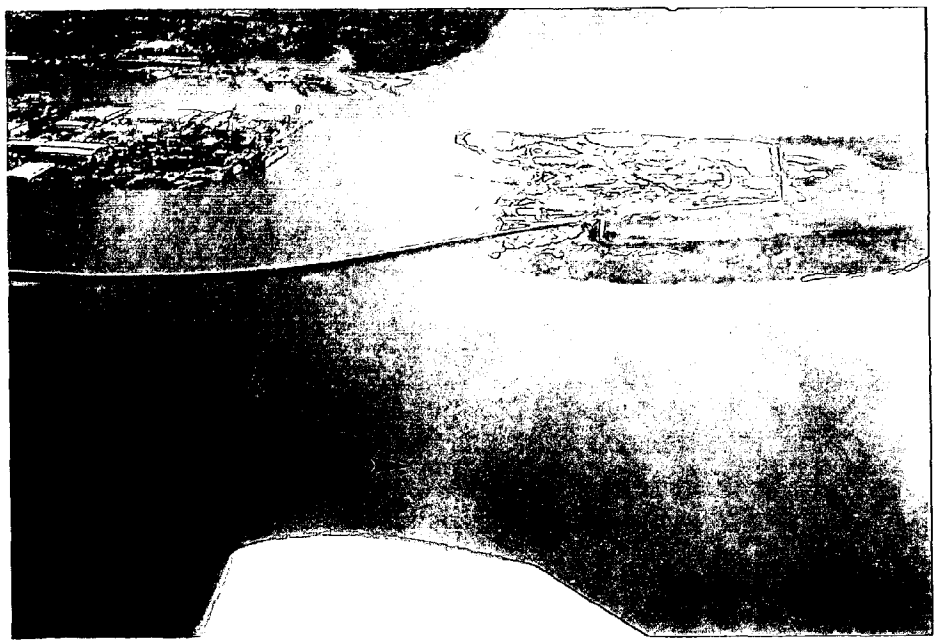
	Salinity (‰)	Temperature (°C)	Dates Sampled
YEAR I	19.0	14.0	5 March 1986
YEAR II	19.0	14.0	16 February 1987
YEAR III	5.0	12.0	15 February 1988
YEAR IV	2.0	14.0	10 January 1989
YEAR V	1.0	12.0	12 January 1990
YEAR VI	6.0	11.0	13 January 1991
YEAR VII	22.0	14.2	12 January 1992
YEAR VIII	6.0	12.0	9 January 1993
YEAR IX	18.0	11.0	15 January 1994

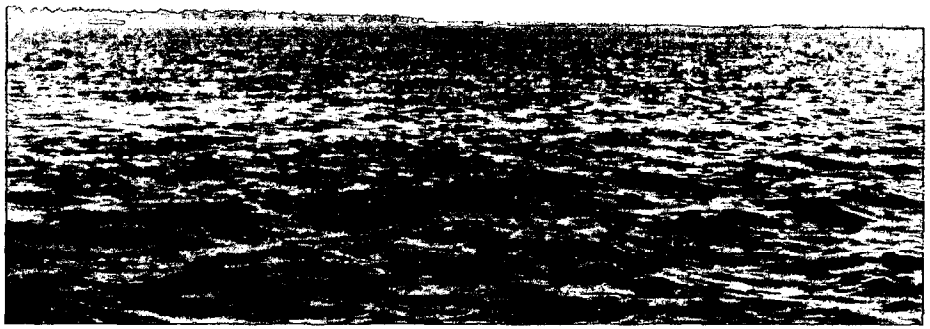


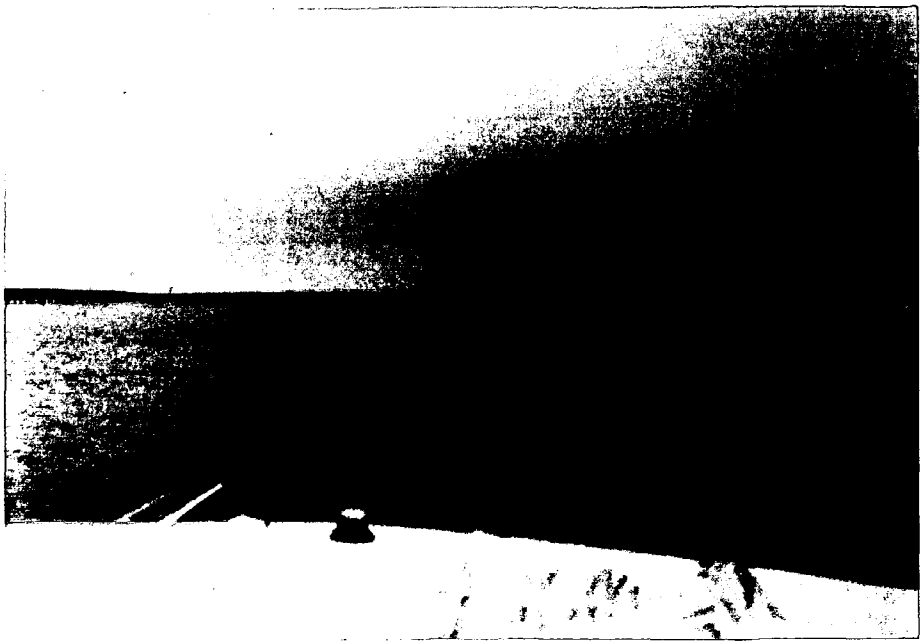
Site #35 (MSPB), Mississippi Sound Pascagoula Bay.



Site #35 (MSPB), Mississippi Sound Pascagoula Bay (from chart 11374).







ALABAMA SITES

SITE NUMBER - 36 **DESIGNATOR** - MBCP

SITE - CEDAR POINT REEF, MOBILE BAY, AL

NOMINAL SITE CENTER - 30°18.70'N 88°08.00'W

LOCATED ON NOS CHART # - 11376, 11378

SITE ACCESS - Boat launch is at the small bridge just north of the Dauphin Island causeway bridge. The site is located directly east of the middle part of Cedar Point. At low tide the site can be reached by walking across the shallow sandbar on the north end of the reef. By boat the site is 10 to 15 minutes from the launch site.

SITE DESCRIPTION - The site was located on an oyster reef 0.25 mile offshore and east from the highway leading to the causeway bridge to Dauphin Island. The reef was almost due east of the Cedar Point fishing pier which was on the west side of the highway.

OYSTER COLLECTIONS

Year I - Oysters were tonged from 2-3 m of water at a site approximately 0.75 miles east of the Dauphin Island highway. Station 1 was at bearings 180° to center of ICW bridge; 280° to Alabama Port Point, and 134° to Fort Gaines. Station 2 was 500 m to the south at bearings 180° to the center of ICWW bridge; 283° to Alabama Port Point and 133° to Fort Gaines. Station 3 was 300 m southeast of Station 2. Bearing to local landmarks were 178° to center of the ICWW bridge; 278° to Alabama Port Point, and 122° to Fort Gaines.

Year II - Sampling stations were distinguishable during Year I but not in Year II because of the scarcity of the oyster population. Oysters were purchased from a commercial tonger who had been working for 7 hours to tong only 180 oysters.

Year III - Year III oysters were tonged east of the causeway on a submerged reef. Station 1 was on the south end of the reef. Station 2 was 50 m north of Station 1 and Station 3 was another 75 m to the north. There were several oystermen tonging in the immediate vicinity.

Year IV - In Year IV, the oysters were sampled by hand at low tide on a sand and shell reef to the east of the causeway adjacent to the Cedar Point fishing pier. Station 1 was at the south end of the reef; Station 3 was at the north end; Station 2 was in the middle. Total distance from Stations 1 to 3 was 150 m and water depth at low tide was 0.2 m. The oysters were not abundant.

Year V - Sampling stations were located on the same reef in the same positions as sampled last year. Oysters were very sparse, perhaps because of the recent freeze.

Year VI - Oysters were collected at the same locations again this year. Oysters were more abundant this year.

Years VII & VIII - Oysters sites were at the same locations as described in Year IV.

Year IX - This was not scheduled to be visited this year, however it was sampled as an alternative to BBTB (Turtle Bay, Barataria Bay). The oysters were collected from the same locations as in Years IV through VIII.

SEDIMENT COLLECTIONS

Year I - Sediment sites in Year I were 25, 125 and 115 m east, respectively, for each station.

Year II - Sediment sites were south from the oyster sites in close proximity to the bridge pilings. Station 1 was located at the eighth bridge pillar from the north end of causeway; Station 2 was 0.25 mile south of the north end of the causeway bridge and 25 m to the east; and Station 3 was taken east of the south end of the cut-off bridge where the boat was launched.

Year III - Sediments were collected adjacent to the bridge. Station 1 was at the eighth bridge pillar from the north end of the causeway. Station 2 was at the second set of telephone poles east of the causeway. Station 3 was on a submerged reef 75 m north of Station 2. The bottom was primarily sand, shell and silt.

Years IV, V, VI, VII, VIII, & IX - Sediments were not sampled during these years.

SAMPLING METHODS

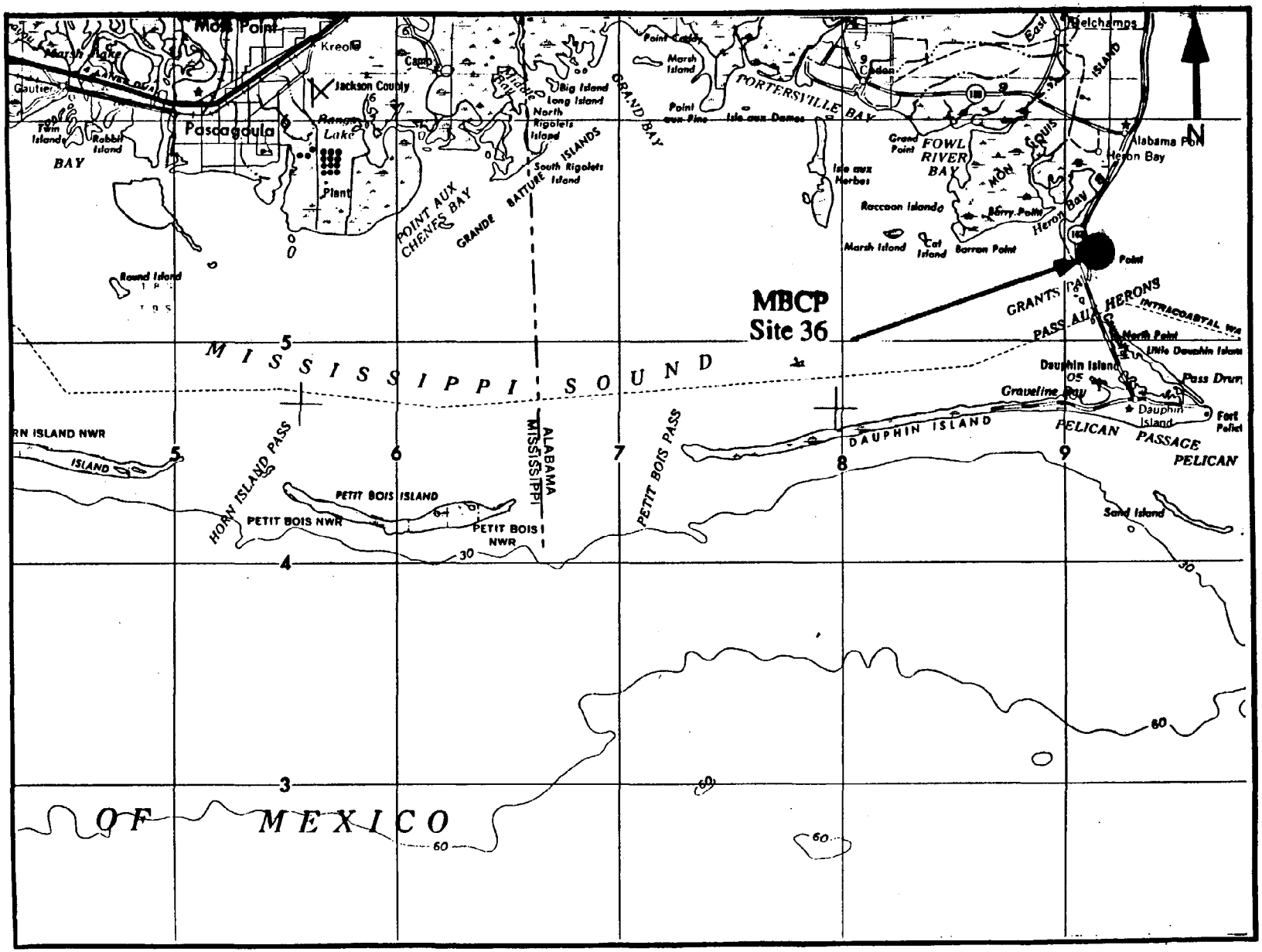
Oysters - tongs and hand
Sediment - box core

WATER DEPTH - intertidal to subtidal, 0.2 to 1.2 meters.

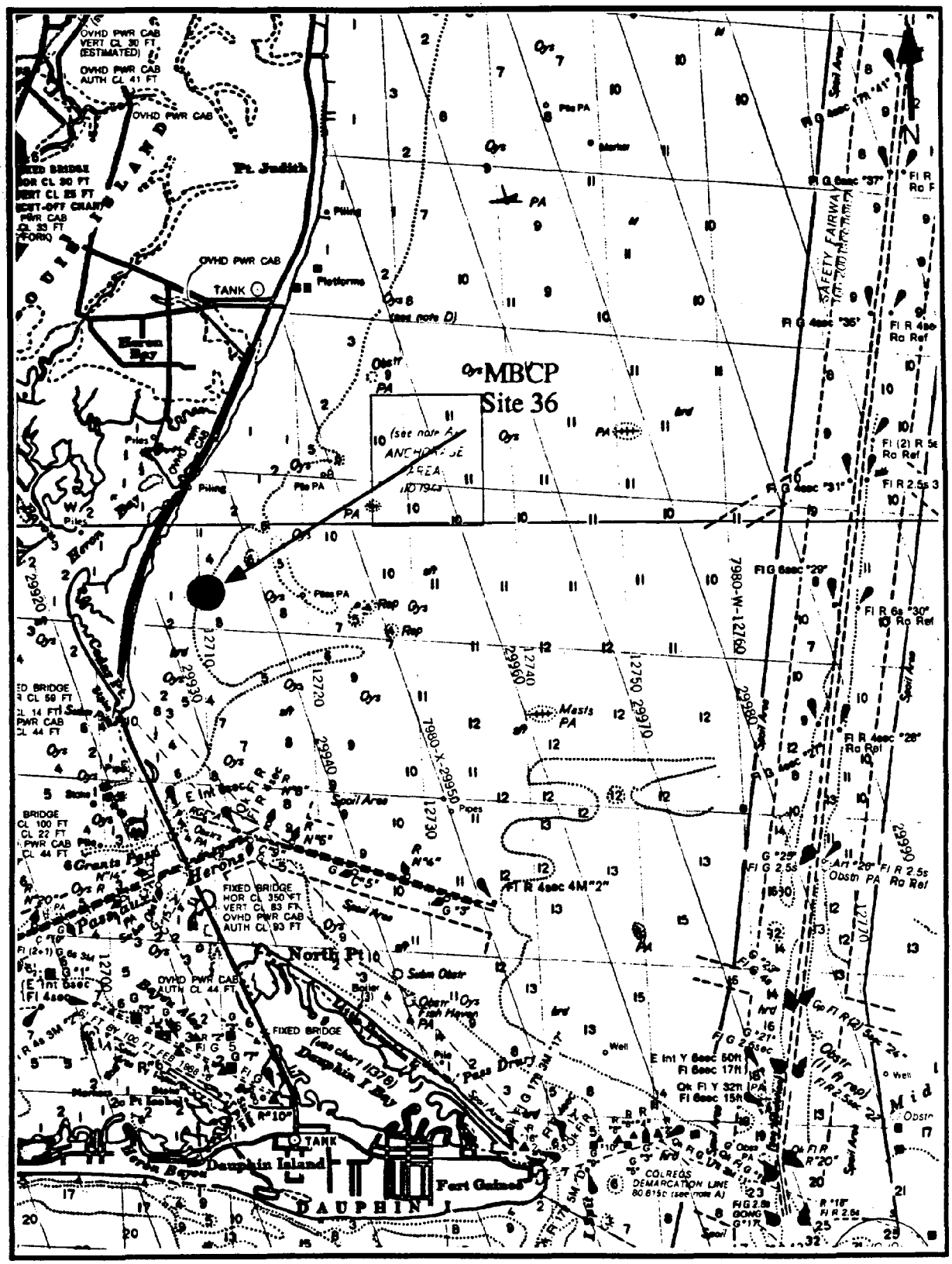
POSSIBLE CONTAMINANTS - No obvious sources of contaminants were observed.

ENVIRONMENTAL DATA

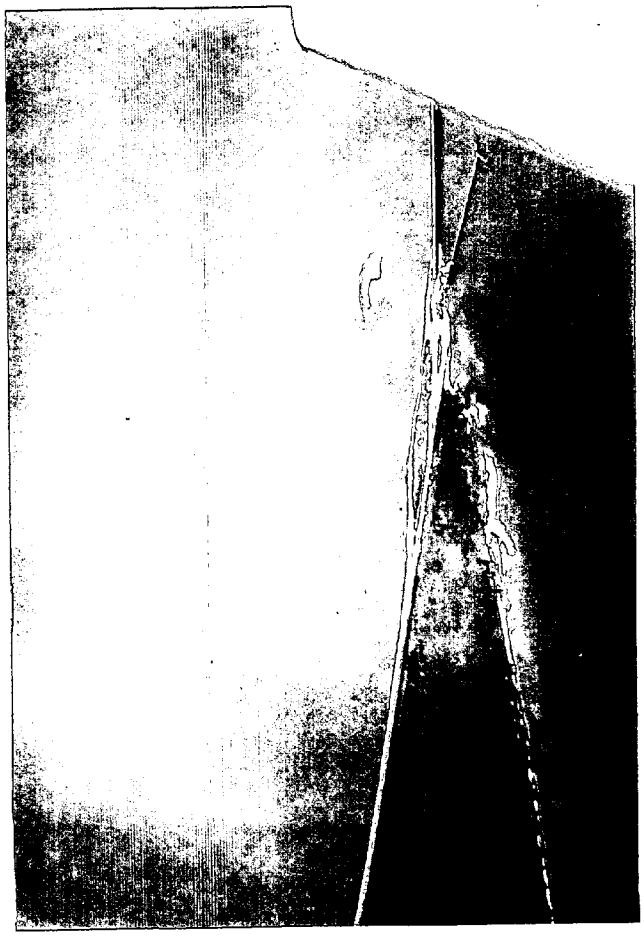
	Salinity (‰)	Temperature (°C)	Dates Sampled
YEAR I	15.0	16.0	4 March 1986
YEAR II	6.0	15.0	16 February 1987
YEAR III	5.0	14.0	2 February 1988
YEAR IV	5.0	14.0	10 January 1989
YEAR V	11.0	14.0	9 January 1990
YEAR VI	8.0	13.0	12 January 1991
YEAR VII	14.0	13.0	12 January 1992
YEAR VIII	7.0	14.0	9 January 1993
YEAR IX	20.0	11.0	15 January 1994

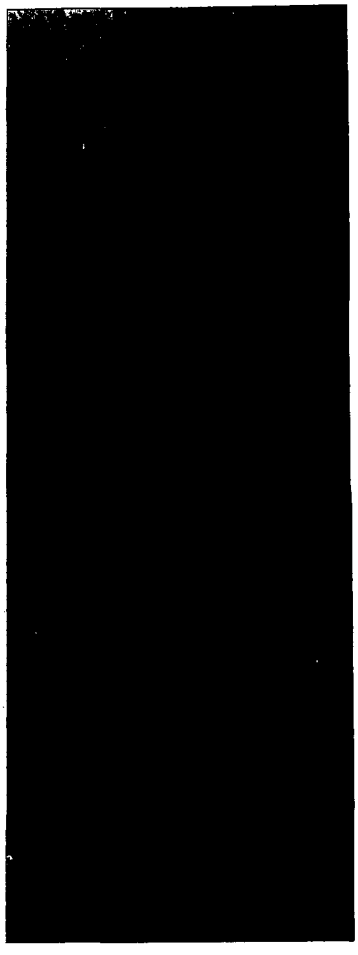


Site #36 (MBCP), Mobile Bay Cedar Point Reef.



Site #36 (MBCP), Mobile Bay Cedar Point Reef (from chart 11376).





SITE NUMBER 66 **DESIGNATOR** - MBHI

SITE - HOLLINGERS ISLAND CHANNEL, MOBILE BAY, AL

NOMINAL SITE CENTER - 30°33.80'N 88°04.50'W

LOCATED ON NOS CHART # - 11376

SITE ACCESS - The launch point is at Dog River which is south of I-10 on the Dauphin Island Parkway. Launch at the Beach Comber and proceed out the Dog River channel to channel marker 10. Turn south and start poling for oysters.

SITE DESCRIPTION - This collection site established in Year III was in the upper reaches of Mobile Bay and was near the upper distributional limit of oysters in the bay.

OYSTER COLLECTIONS

Year III - Oysters were located in 2 m of water on small scattered reefs with oysters, shell and clams. Oysters were difficult to locate and were collected by tonging. Station 1 was directly south of red buoy 10 in the Dog River to Biloxi channel. Station 2 was 75 m to the south of Station 1. Station 3 was another 75 m south.

Year IV - In Year IV, the oysters were collected by tonging on a small and sparsely populated reef about 100 m southwest of channel marker 9 and an equal distance southeast from a 4 legged wooden stand, just east of the Dog River marina. Station 1 was at the north end. Station 3 was at the south end, and Station 2 was in the middle. Water depth was 2 m, and the reef can only be located by poling the bottom. Oysters came up mostly from the shelly mud bottom as singles, and large aggregations were not found. The bottom was a mixture of sand, mud and shell. This site is best collected in calm weather.

Year V - Oyster stations were in the same general locations as sampled last year. The oysters were sparse. This site required all day to complete since it required poling and tonging to locate and collect the oysters.

Year VI - Oysters were collected at the same stations described in Year IV (30°33.88'N, 88°04.58'W).

Years VII, VIII, & IX - Oysters were collected at the same stations described in Year IV, but were dredged these years. Oysters are still not very abundant during any of these years.

SEDIMENT COLLECTIONS

Year III - Sediment stations are collocated with each oyster station and must be located by poling.

Years IV & VI - Sediments were not sampled during these years.

Year V - Sediment samples were taken at the same locations as the oyster samples.

Years VII, VIII, & IX - Sediment samples were not taken during these years.

SAMPLING METHODS

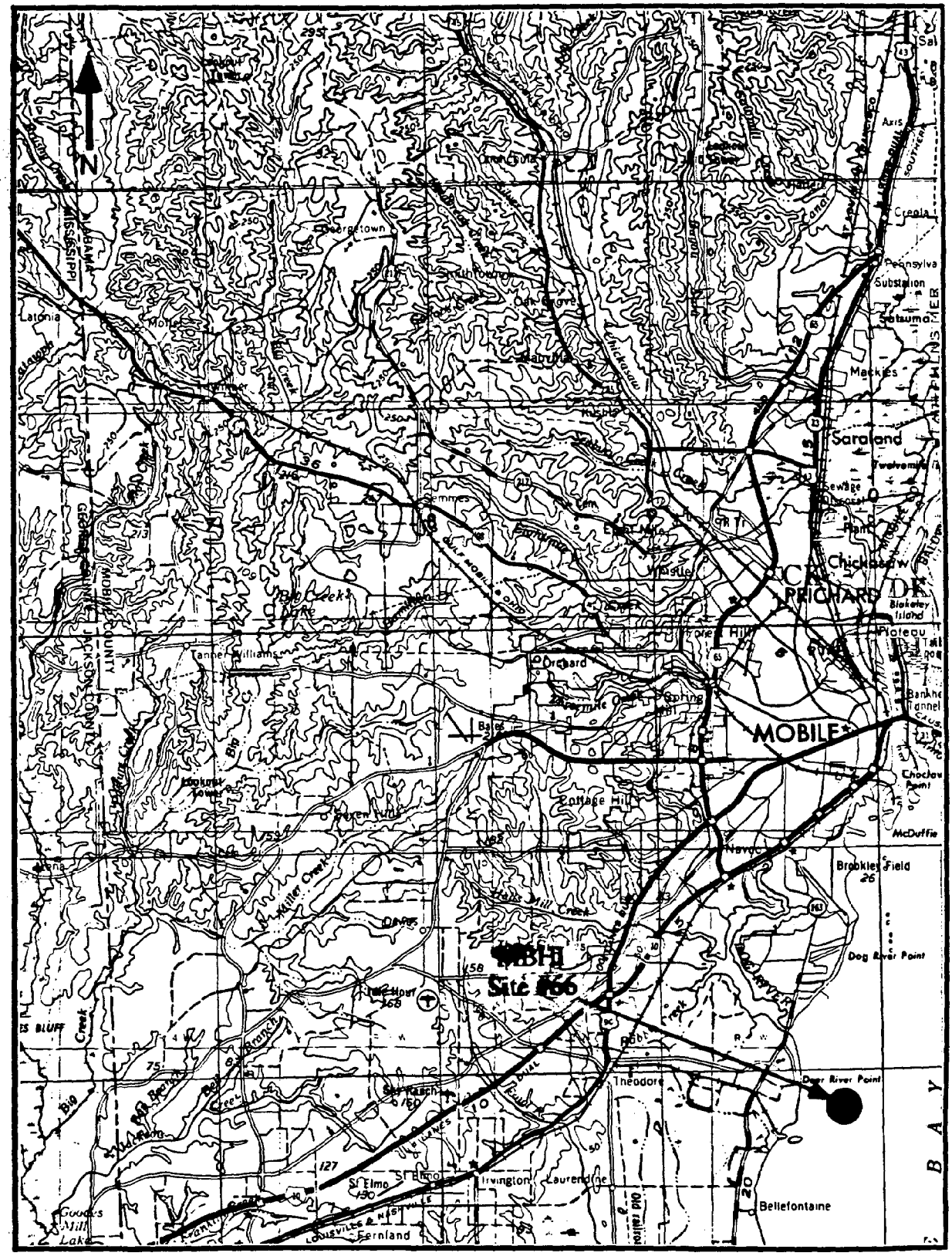
Oysters - tongs
Sediment - box core

WATER DEPTH - subtidal, 2 to 2.5 meters

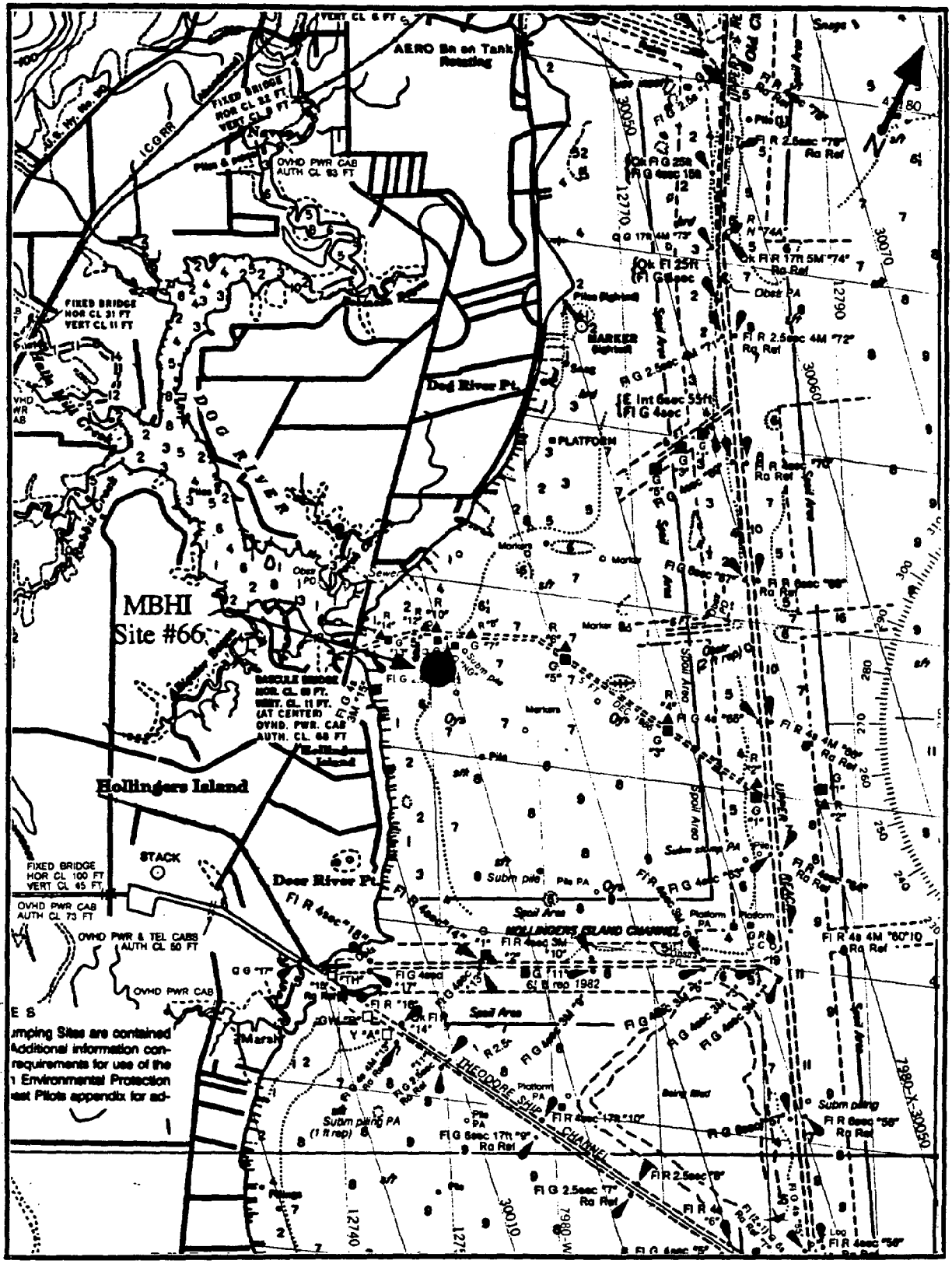
POSSIBLE CONTAMINANTS - Contamination in the region was from ship traffic, industry, and inflow from the Dog River which drained much of Mobile. The upper part of the bay was heavily influenced by the Mobile River and the site was in an area closed to oystering by the Department of Health.

ENVIRONMENTAL DATA

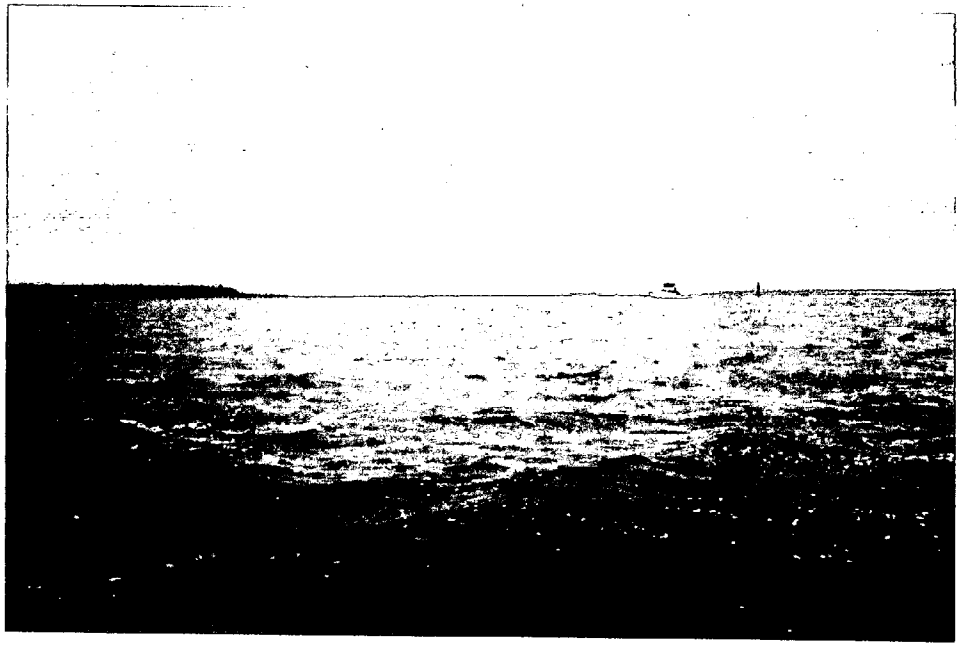
	Salinity (‰)	Temperature (°C)	Dates Sampled
YEAR III	6.0	13.0	15 February 1988
YEAR IV	6.0	15.0	10 January 1989
YEAR V	2.0	12.0	10 January 1990
YEAR VI	5.0	15.0	12 January 1991
YEAR VII	7.0	12.0	12 January 1992
YEAR VIII	5.0	14.0	9 January 1993
YEAR IX	7.0	9.0	15 January 1994

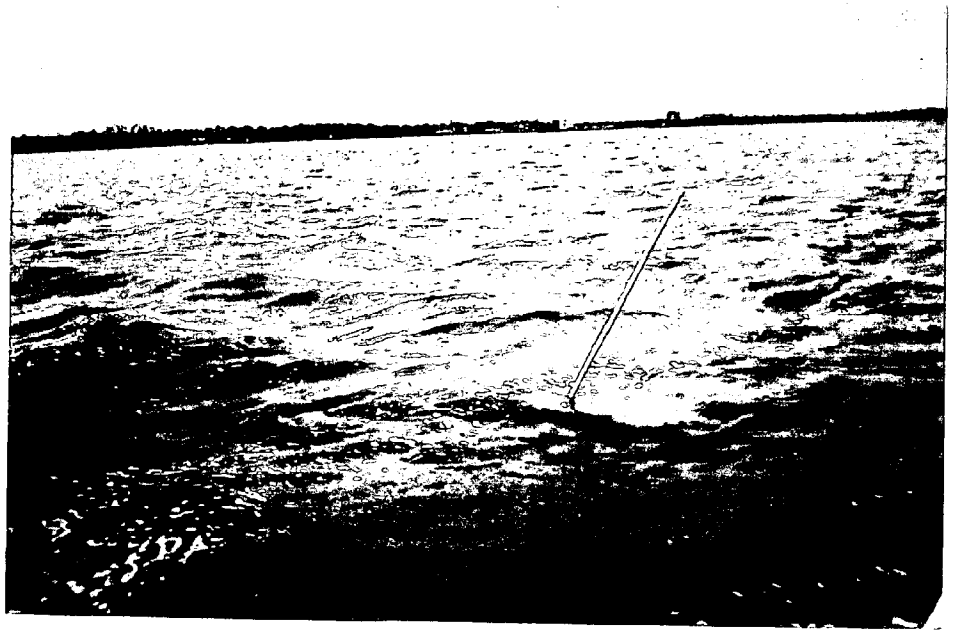


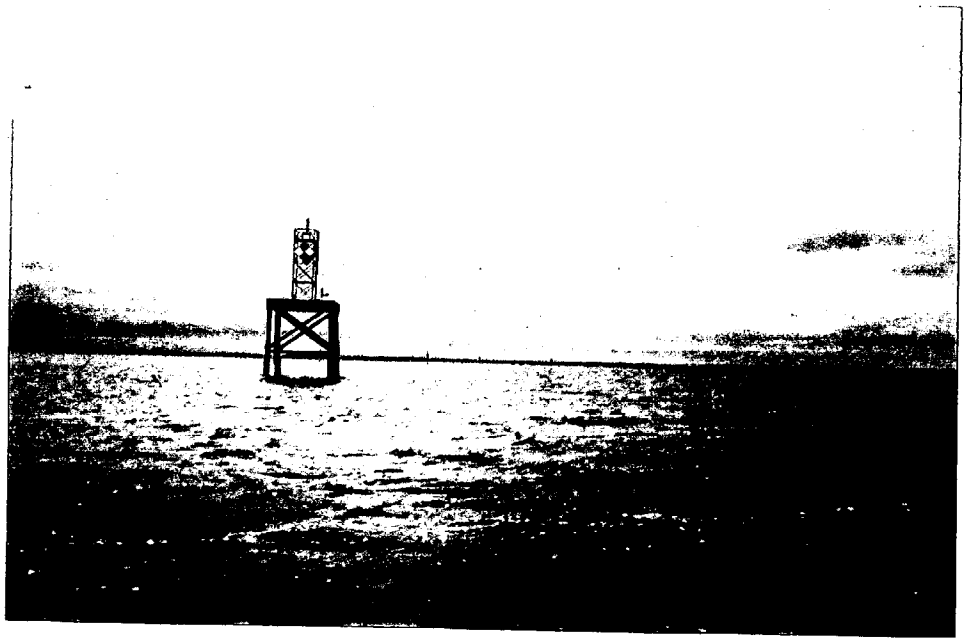
Site #66 (MBHI), Mobile Bay Harbor Island.



Site #66 (MBHI), Mobile Bay Harbor Island (from chart 11376).







SITE NUMBER 79 **DESIGNATOR** - MBDR

SITE - DOG RIVER, MOBILE BAY, AL

NOMINAL SITE CENTER - 30°35.50'N 88°02.72'W

LOCATED ON NOS CHART # - 11376

SITE ACCESS - The launch point is at Dog River which is south of I-10 on the Dauphin Island Parkway. Launch at the Beach Comber and proceed out the Dog River channel to The Mobil Ship Channel and go north to green channel marker 69. Turn into the short channel west of marker 69 and proceed to channel marker 5. The site is located approximately 75 m on a bearing of 280° from channel marker 5

SITE DESCRIPTION - This collection site, established in Year V, was in the upper reaches of Mobile Bay and was near the upper distributional limit of oysters in the bay. The site was located on a reef which runs west-southwest from channel marker 5 for approximately 300 m. Poling was required to locate the oysters.

OYSTER COLLECTIONS

Year V - Oysters were located in 1.5 m of water on small scattered reefs with oysters, shell and clams. Oysters are difficult to locate and are collected by tonging. Station 1 was on the southwest end of the reef. Station 2 was approximately 100 m to the northeast. Station 3 was another 100 m northeast of station 2.

Years VI, VII, VIII, & IX - Oysters were not sampled during these years.

SEDIMENT COLLECTIONS

Year V - Sediment samples were taken 50 m north of each of the oysters stations. Sediments were a mixture of mud, shell and sand.

Years VI, VII, VIII, & IX - Sediment samples were not collected during these years.

SAMPLING METHODS

Oysters - tongs
Sediment - box core

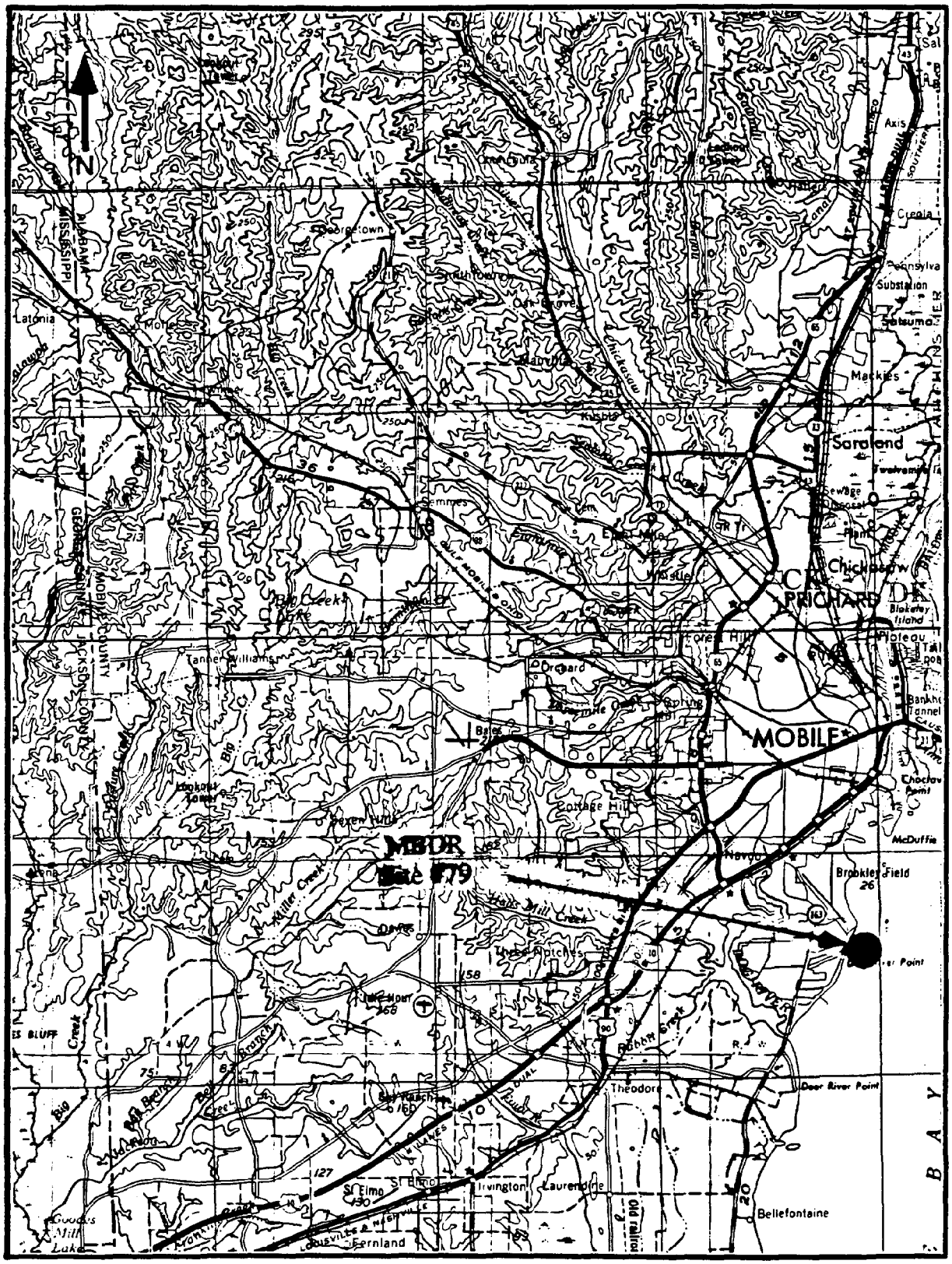
WATER DEPTH - subtidal, 1.5 meters

POSSIBLE CONTAMINANTS - Contamination in the region was from ship traffic, industry, and inflow from the Dog River which drained much of Mobile.

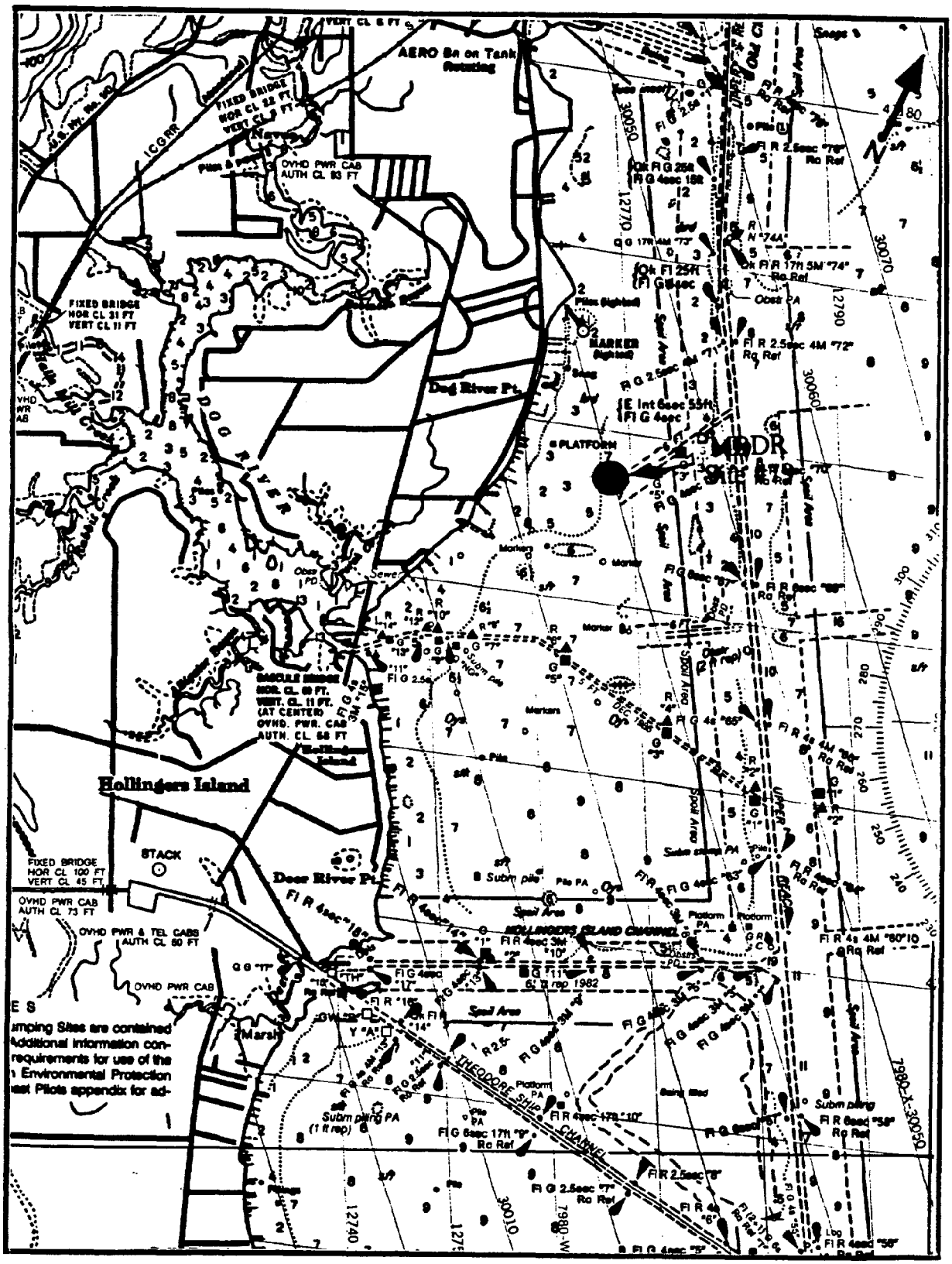
The upper part of the bay was heavily influenced by the Mobile River and the site was in an area closed to oystering by the Department of Health.

ENVIRONMENTAL DATA

	Salinity (‰)	Temperature (°C)	Dates Sampled
YEAR V	2.0	12.0	10 January 1990



Site #79 (MBDR), Mobile Bay Dog River.


Dog River Pt.
MBDR
PLATFORM
MARKER
Hollingers Island
Dear River Pt.
HOLLINGERS ISLAND CHANNEL
THEODORE SHIP CHANNEL
Spoil Area
Marsh
STACK
FIXED BRIDGE
HOR CL 31 FT
VERT CL 11 FT
FIXED BRIDGE
HOR CL 100 FT
VERT CL 45 FT
OVHD PWR CAB
AUTH CL 73 FT
OVHD PWR & TEL CABS
AUTH CL 80 FT
OVHD PWR CAB
AUTH CL 85 FT
BASCULE BRIDGE
HOR CL 80 FT.
VERT CL 11 FT.
(AT CENTER)
OVHD. PWR. CAB
AUTH. CL 65 FT
AERO Bn on Tank
Fl R 2.5sec "7"
Ro Ref
Fl G 2.5sec "1"
Fl R 4sec "10"
Fl G 4sec "3"
Fl G 6sec 17ft "9"
Ro Ref
Subm piling PA
(1 ft rep)
Subm piling
Fl R 6sec "5"
Ro Ref
Fl R 4sec "6"
Fl G 4sec "5"
Fl R 4sec "56"
Fl R 4sec 17ft "10"
Fl R 4s 4M "80"10
Ro Ref
Fl G 4sec "7"
Fl G 4sec "9"
Fl G 4sec "11"
Fl R 4sec "13"
Fl G 4sec "15"
Fl R 4sec "17"
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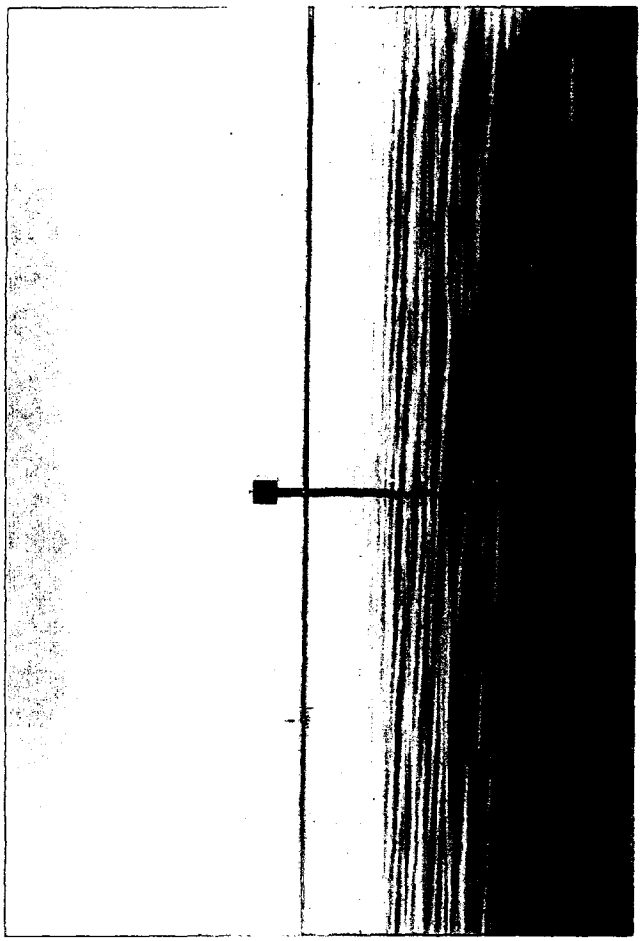
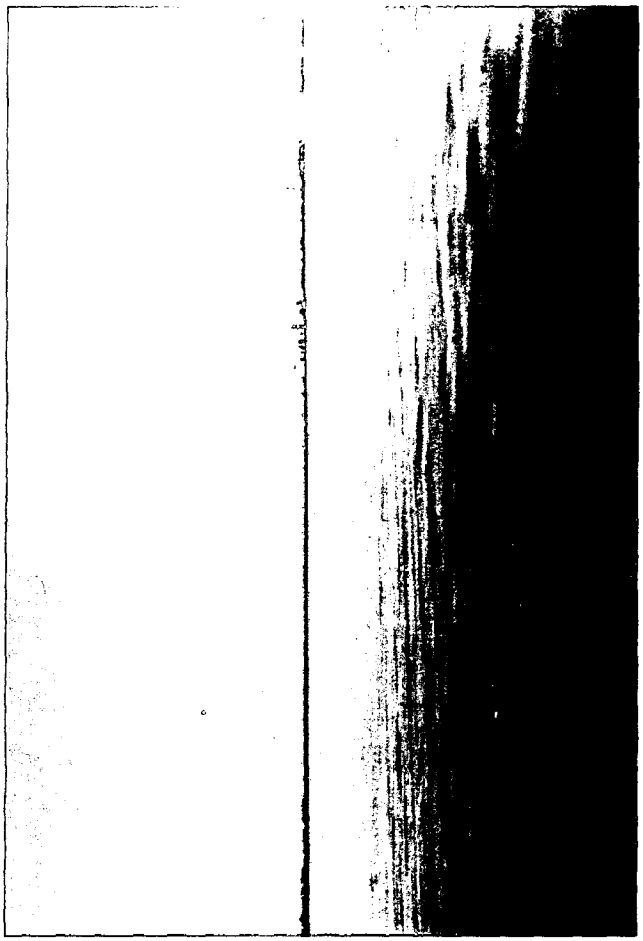
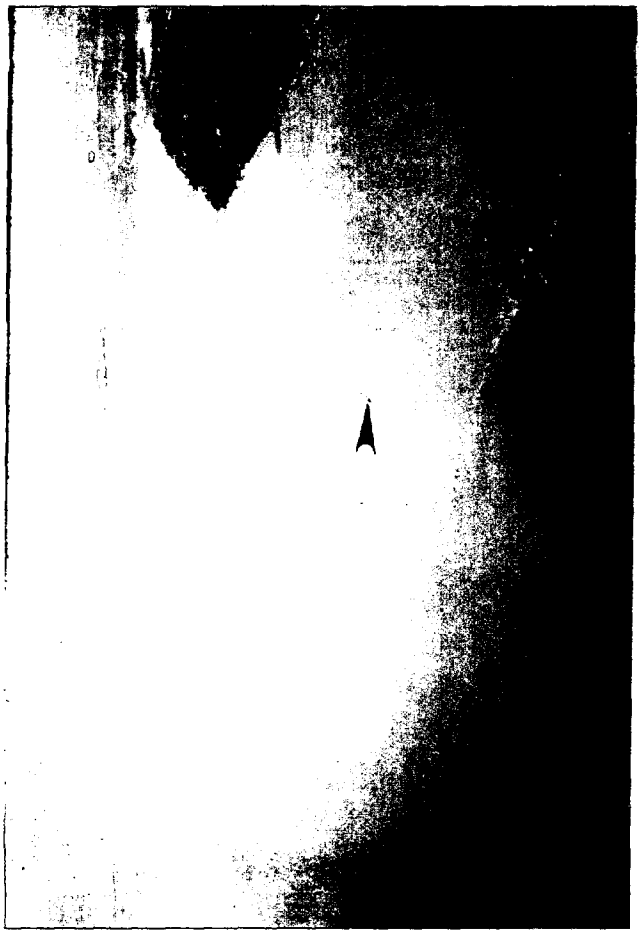
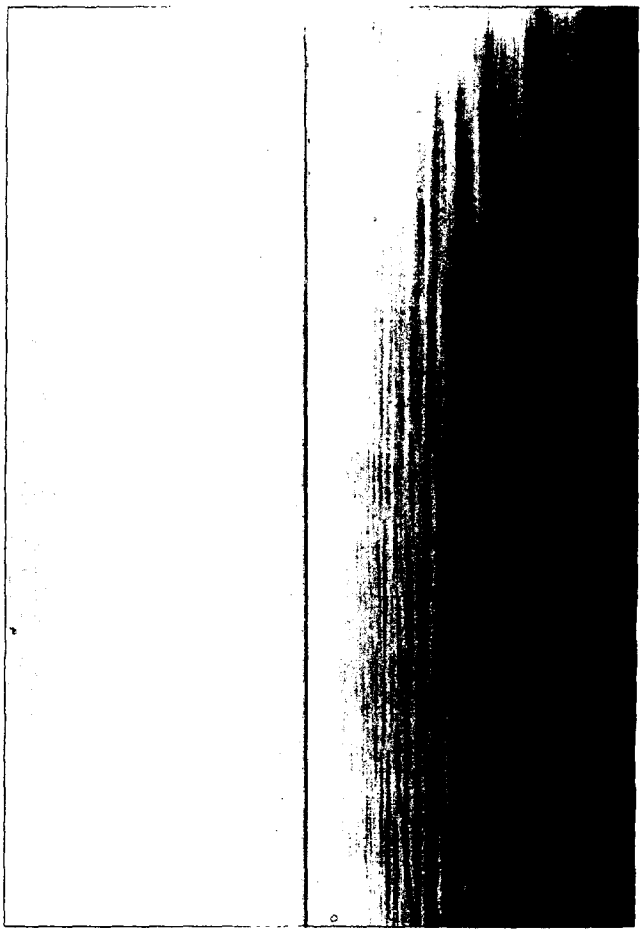
Fl R 4sec "21"
Fl G 4sec "23"
Fl R 4sec "25"
Fl G 4sec "27"
Fl R 4sec









FLORIDA SITES

SITE NUMBER 67 **DESIGNATOR** - PBPH

SITE - PUBLIC HARBOR, PENSACOLA BAY, FL

NOMINAL SITE CENTER - 30°24.63'N 87°11.42'W

LOCATED ON NOS CHART # - 11382

SITE ACCESS - Access to the site is by boat launched at the public ramp northeast of the Highway 98 bridge and the Pensacola Bay Pier.

SITE DESCRIPTION - This collection site was established in Year III. It was located in Pensacola under the Pensacola Fishing Pier which was the old Highway 98 bridge. The pier was on the east side of the new bridge. Collections from this site were easiest at low tide and in calm weather since the boat had to be tied to the piers.

OYSTER COLLECTIONS

Years III & IV - Oysters were collected by hand from concrete piling under the bridge. Oyster Station 1 was at the seventh set of pilings from the north shore. Station 2 was at the eleventh set of pilings. Station 3 was at the fifteenth set of pilings. All oysters collected were intertidal.

Year V - Oysters were collected in the same locations as sampled last year. There were many recently dead oysters on the upper part of the piling. This was primarily due to the recent freeze.

Years VI & VII - Oysters were collected at the same locations as previously sampled. Oysters were larger and more abundant.

Years VIII & IX - Oysters were collected at the same stations previously sampled, but were more abundant.

SEDIMENT COLLECTIONS

Years III, IV, & V - Water depth at the site was ~7 m. No sediments were collected because of the depth. Substrate near the boat ramp was sandy.

Year VI - No sediment samples were collected this year.

Year VII - Sediment samples were collected for the first time at 30°24.14'N and 87°11.38'W. Suitable sediments were located in 6.2 m of water and were collected with a box corer. Three stations were collected 50 m apart on a line starting at the 45 mph sign on the bridge running toward the north.

Years VIII & IX - No sediment samples were collected during these years.

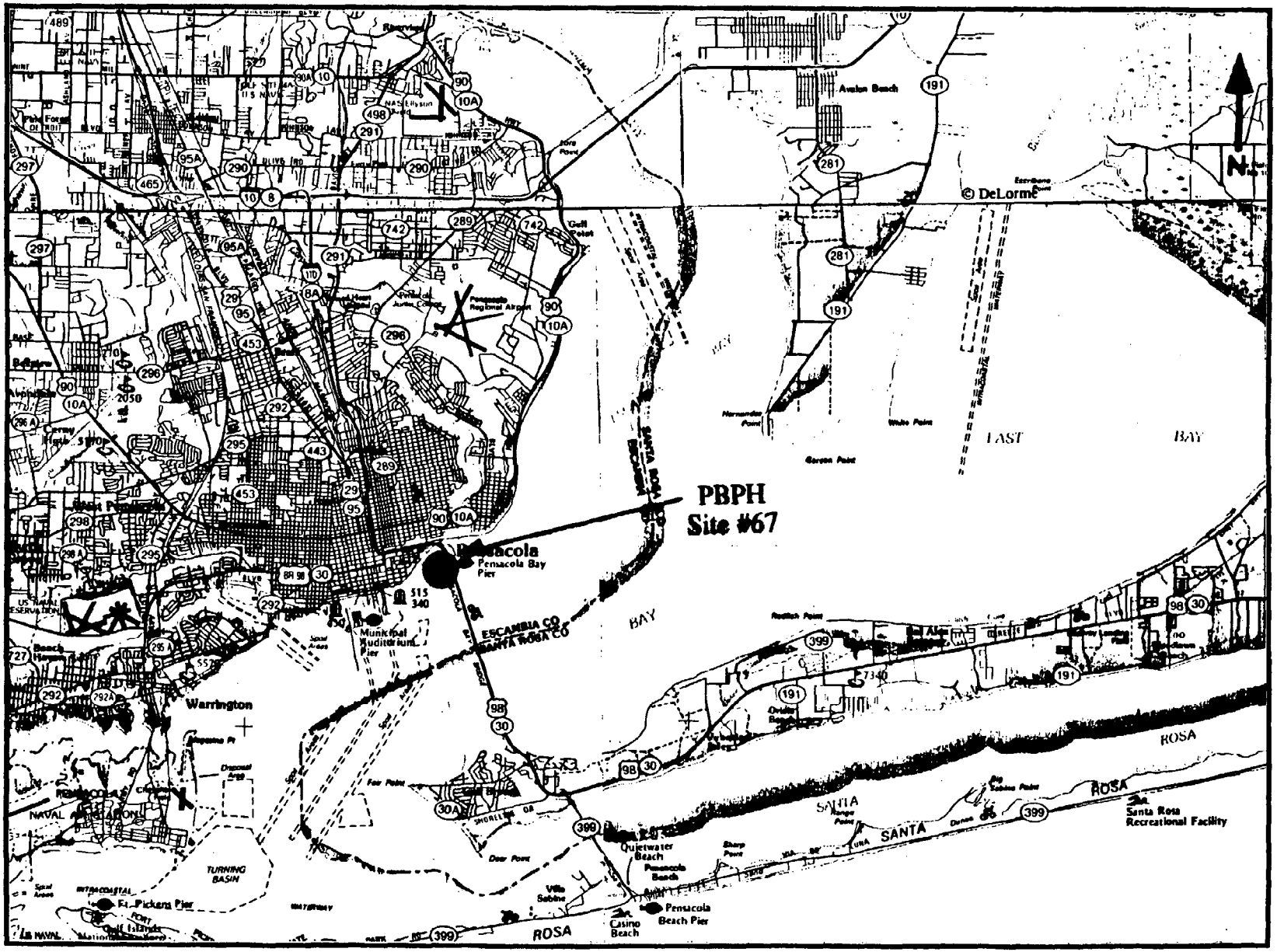
SAMPLING METHOD - Oysters were collected by hand from the concrete pilings of the old bridge in the intertidal zone. The site can only be collected in calm weather since the oysters are collected by hand from the boat.

WATER DEPTH - intertidal, 0 to 0.4 meters

POSSIBLE CONTAMINANTS - Contamination was likely from several sources including both municipal and marine traffic.

ENVIRONMENTAL DATA

	Salinity (‰)	Temperature (°C)	Dates Sampled
YEAR III	22.0	12.0	19 February 1988
YEAR IV	19.6	15.0	25 January 1989
YEAR V	9.0	14.0	26 January 1990
YEAR VI	21.0	12.0	26 January 1991
YEAR VII	8.0	9.0	22 January 1992
YEAR VIII	18.0	16.0	11 January 1993
YEAR IX	24.0	10.0	16 January 1994



Site #67 (PBPH), Pensacola Bay Public Harbor.

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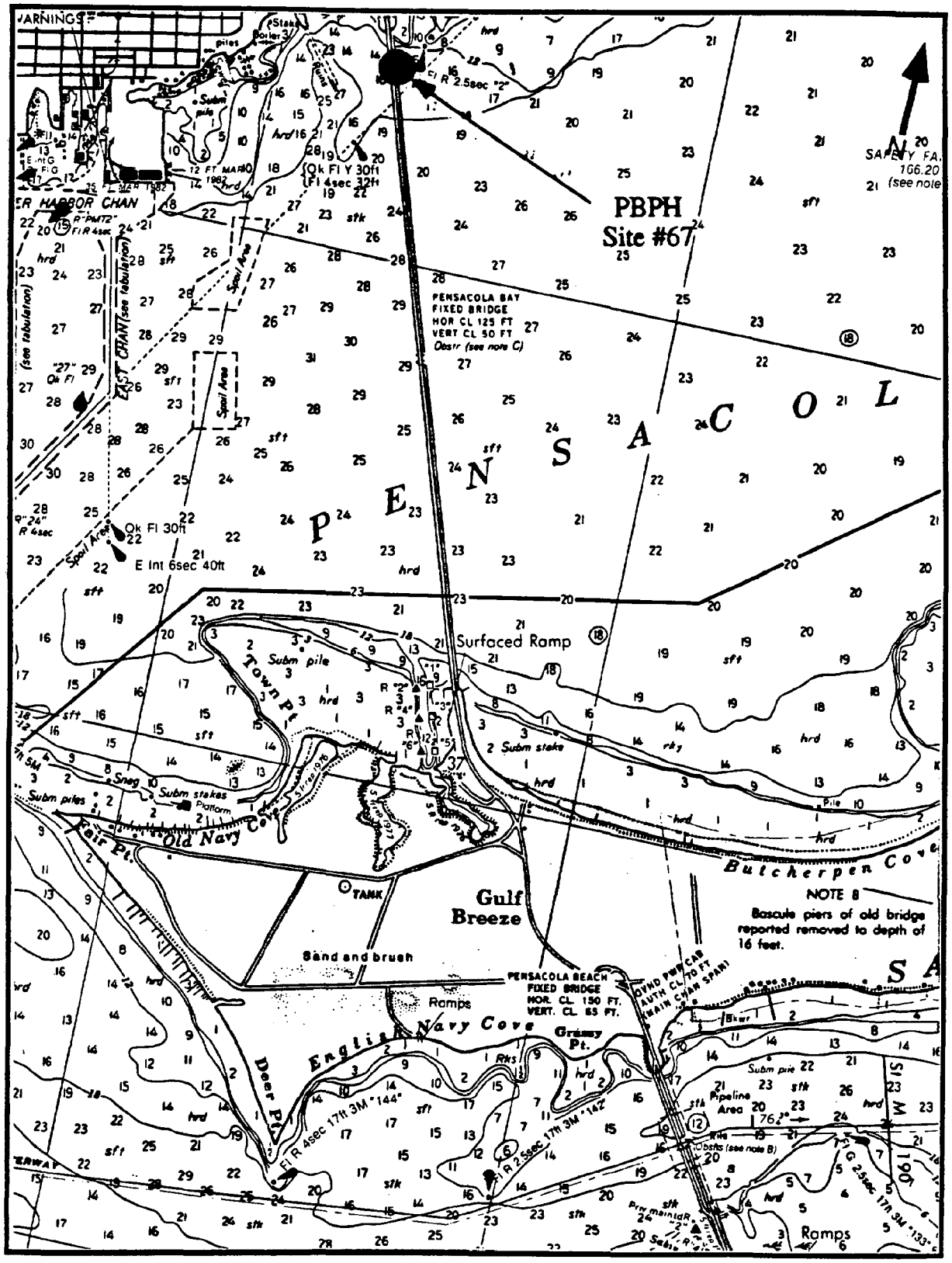
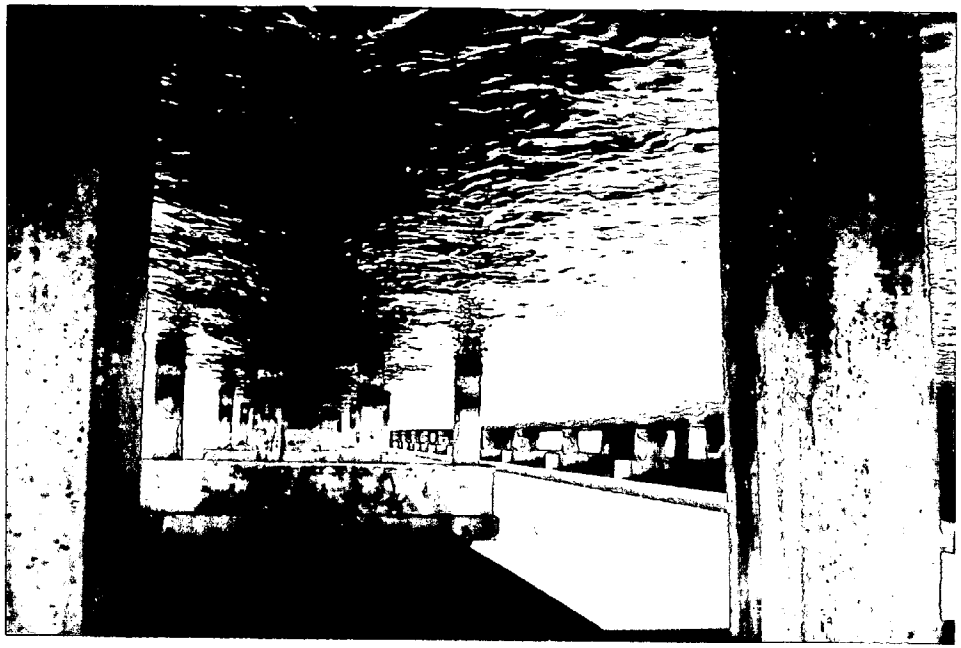
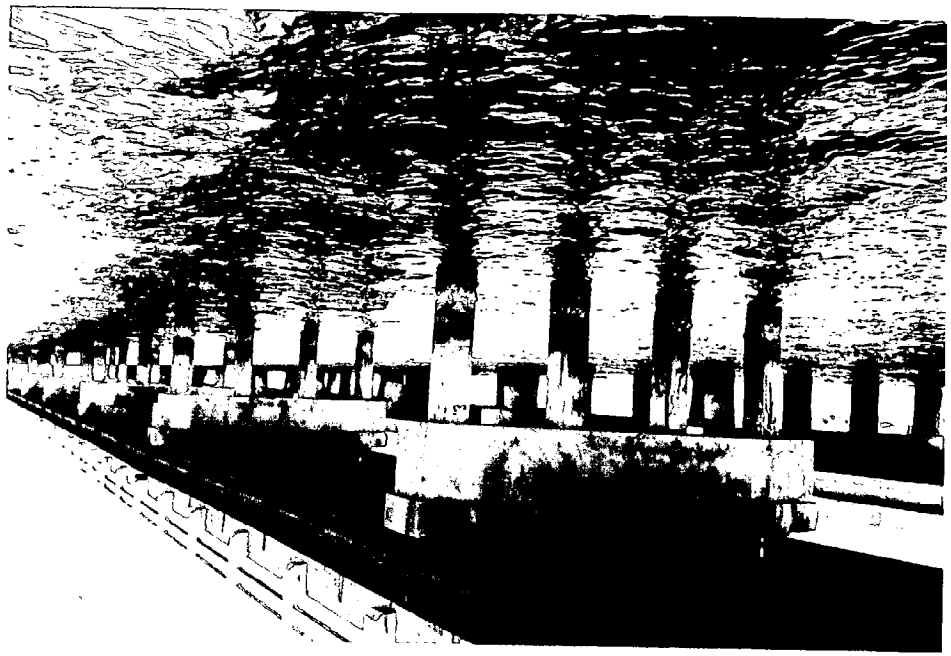
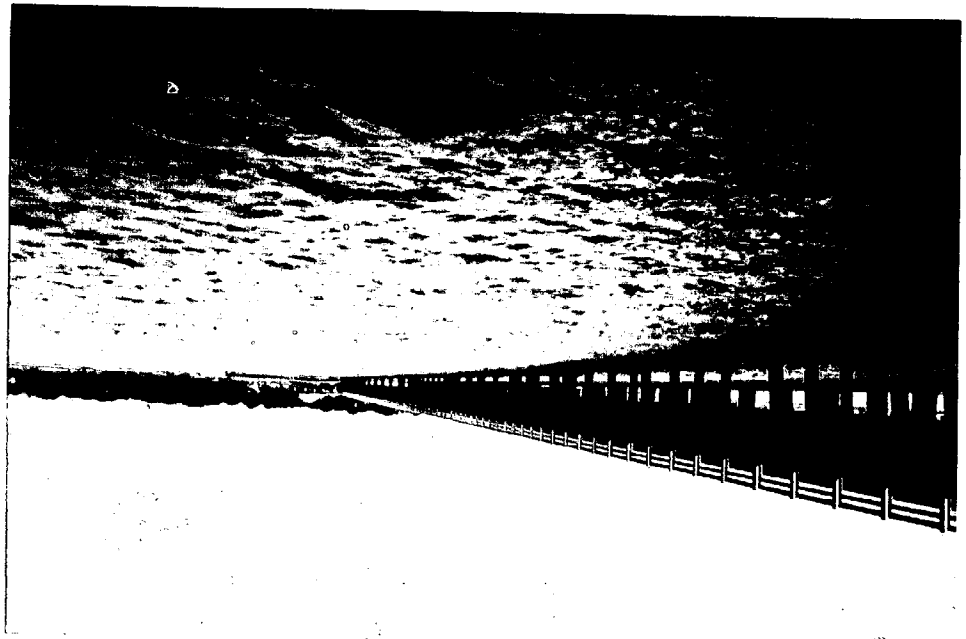


Site #67 (PBPH), Pensacola Bay Public Harbor (from chart 11378).







SITE NUMBER - 37 **DESIGNATOR** - PBIB

SITE - INDIAN BAYOU, PENSACOLA BAY, FL

NOMINAL SITE CENTER - 30°31.00'N 87°06.70'W

LOCATED ON NOS CHART # - 11382, 11378

SITE ACCESS - Access to the site is by automobile off I-10 on Avalon Blvd. Drive to the Indian Bay Marina and turn right on Connido Street. Proceed to a dirt road intersection, turn left and proceed to a dead end at Indian Bayou. Launch the boat at the small ramp and proceed down Indian Bayou to its mouth. In Year IV, the mouth of Indian Bayou had silted in, so the launch point was moved. To reach the boat ramp, exit I-10 at Avalon then go north to SR 281. Turn left and go to the stop sign, turn left again and follow the dirt road until it ends at the Archie Glover Park. To reach the site, follow the marked channel out to Escambia Bay and then turn south going under the bridge to the reef. The reef is located about 1 mile south of the bridge on a bearing of 140°. Run time to the site is approximately 20 min.

SITE DESCRIPTION - There was generally an abundant supply of oysters at this location. Year I oysters were collected by hand near the mouth of Indian Bayou at 30°31.35'N and 87°06.38'W. In Year II the site was moved to a more permanent location. Oysters sites were located on a subtidal reef west of the entrance to Indian Bayou. The site was marked by several pilings, one of which had an "Oyster Reef" sign. The site was located between the poles marked "Danger, Oyster Reef."

OYSTER COLLECTIONS

Year I - Year I oysters were collected by hand near the mouth of Indian Bayou. Station 1 was 30 m north of Indian Bayou. Bearing to landmarks useful in locating the site were: 292° to factory towers; 249° to the water tower. Station 2 was 50 m south of Indian Bayou (290° to the factory towers; 248° to the water towers). Station 3 was 30 m south of the bayou mouth in the bayou.

Years II, III, & IV - The site was moved out into the bay in Year II. Oysters were tonged from three locations along the reef. Station 1 was at the northeast end of the reef; Station 2 was 100 m southwest of Station 1, near the poles marking the reef; Station 3 was 100 m southwest of Station 2, near the "Danger" sign.

Year V - No oysters were available for collection at this site due to high volumes of freshwater inflow which had recently killed all of the oysters.

Year VI - The oyster reef was recovering from the dieoff experienced in Year V. Station 1 was at the northeast end of the reef between the two poles marking the edge of the reef. Station 2 was on the middle of the reef between the two middle poles. Station 3 was on the south end of the reef due north of the last

pole. This narrow reef was oriented north to south. Oysters were mixed in black silty mud that has apparently silted over the underlaying shell reef.

Years VII, VIII, & IX - The oyster reef was still recovering from the dieoff experienced in Year V. Oysters were only found at Station 2 which was located in the middle section of the reef between the two middle poles.

SEDIMENT COLLECTIONS

Year I - Sediments in the area were primarily shell and sand. The best source of fine grained sediment was located in Indian Bayou. In all years, sediments were taken from Indian Bayou. In Year I, sediment stations were collocated with the oyster stations.

Years II & III - Sediments were taken as follows: Station 1 was from the narrow bayou opening to the bay. Station 2 was along the north shore of the bayou 300 m from the mouth and 30 m from shore, and Station 3 was 100 m northeast of Station 2.

Years IV, V, VI, VII, VIII, & IX - Sediments were not sampled during these years.

SAMPLING METHOD

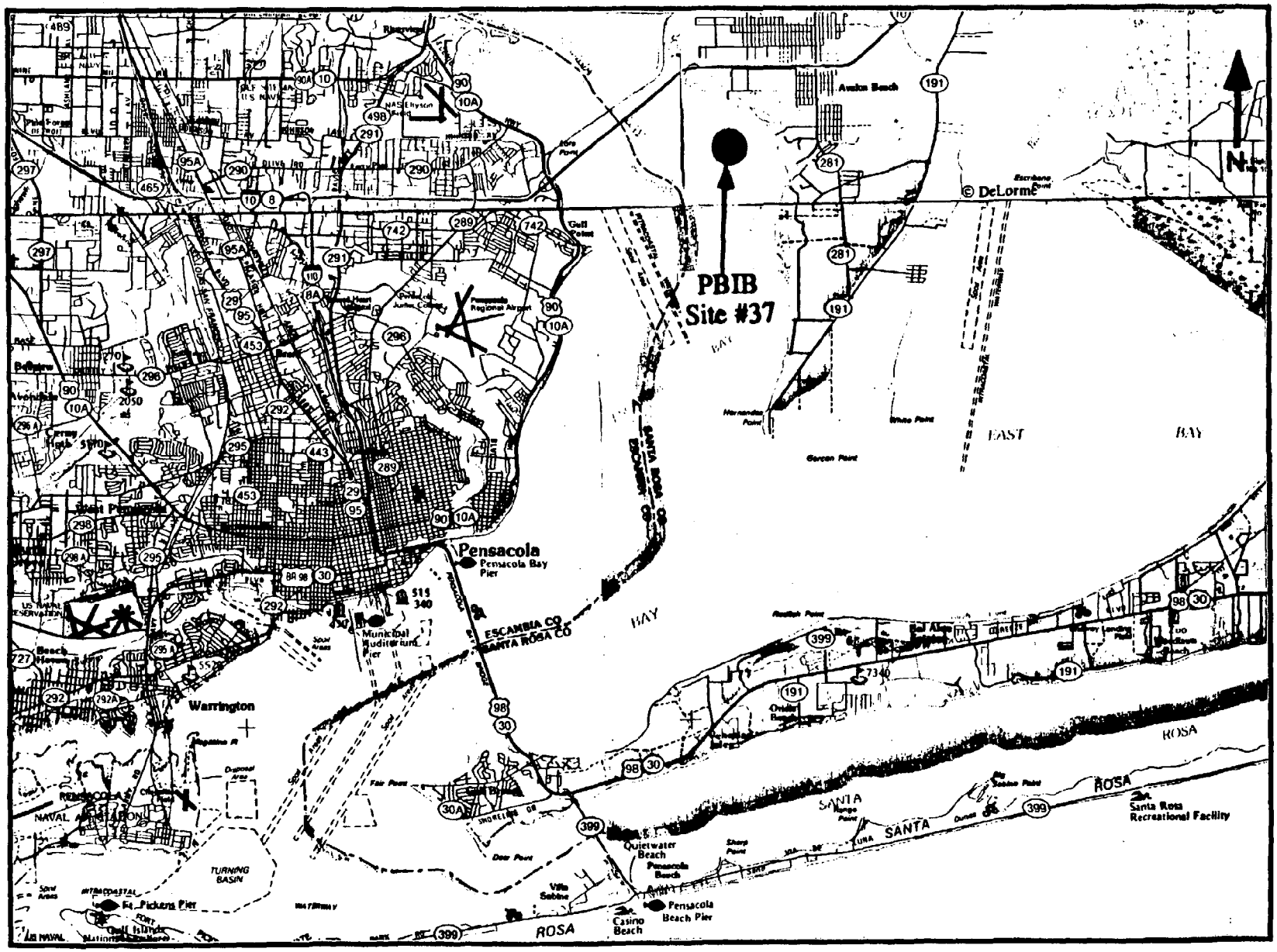
Oysters - hand, tongs and dredge
Sediment - hand or box core

WATER DEPTH - intertidal, 0.3 - 1 meters (Year I), subtidal, 2 meters, in subsequent years.

POSSIBLE CONTAMINANTS - There were no observable sources of contamination.

ENVIRONMENTAL DATA

	Salinity (‰)	Temperature (°C)	Dates Sampled
YEAR I	10.3	16.0	3 March 1986
YEAR II	13.0	13.0	28 February 1987
YEAR III	14.0	14.0	16 February 1988
YEAR IV	27.0	17.0	25 January 1989
YEAR V	4.0	15.0	27 January 1990
YEAR VI	25.0	12.0	26 January 1991
YEAR VII	4.0	10.0	22 January 1992
YEAR VIII	23.3	15.0	11 January 1993
YEAR IX	23.0	11.0	16 January 1994



Site #37 (PBIB), Pensacola Bay Indian Bayou.

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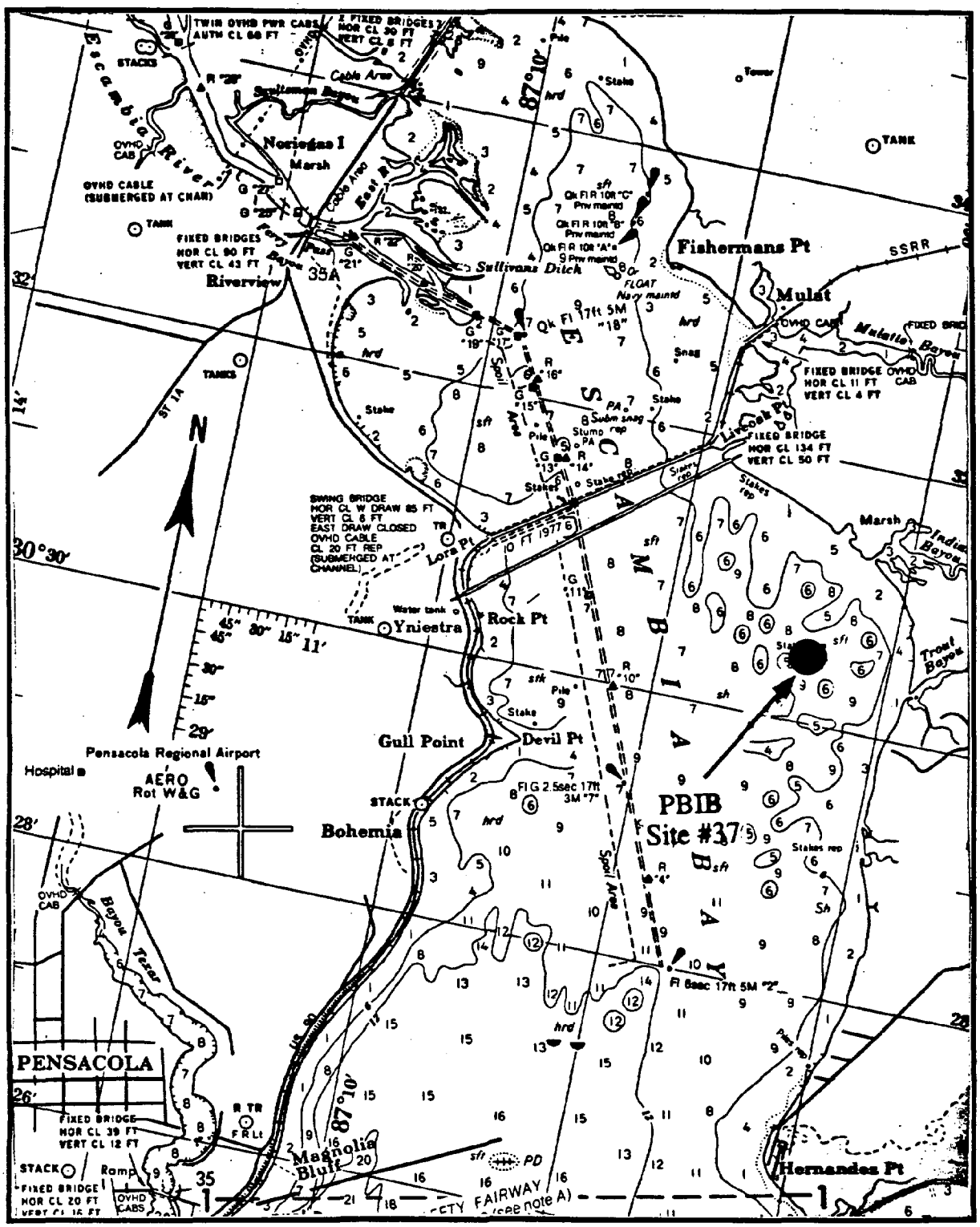
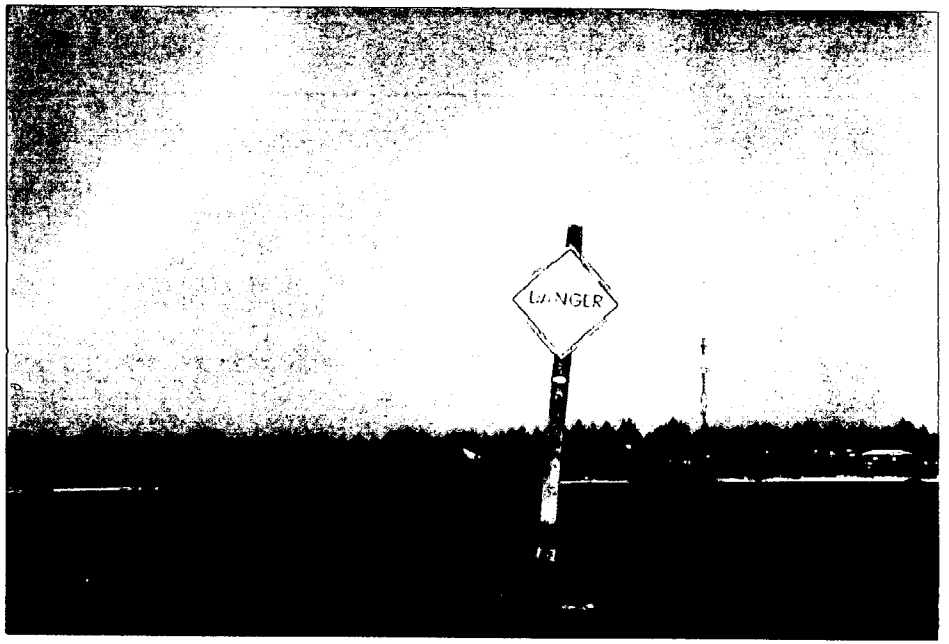


Site #37 (PBIB), Pensacola Bay Indian Bayou (from chart 11378).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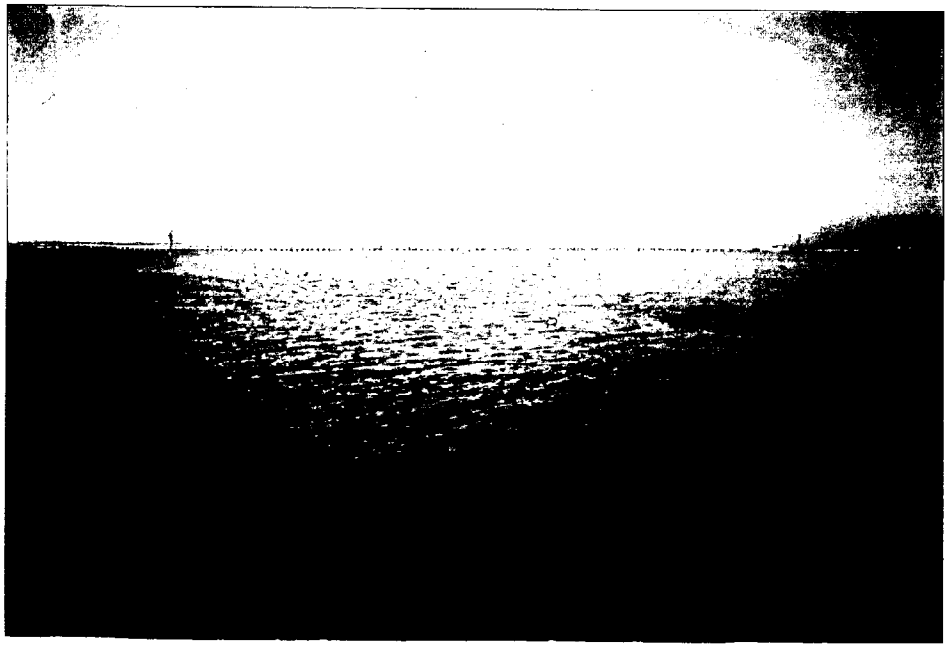
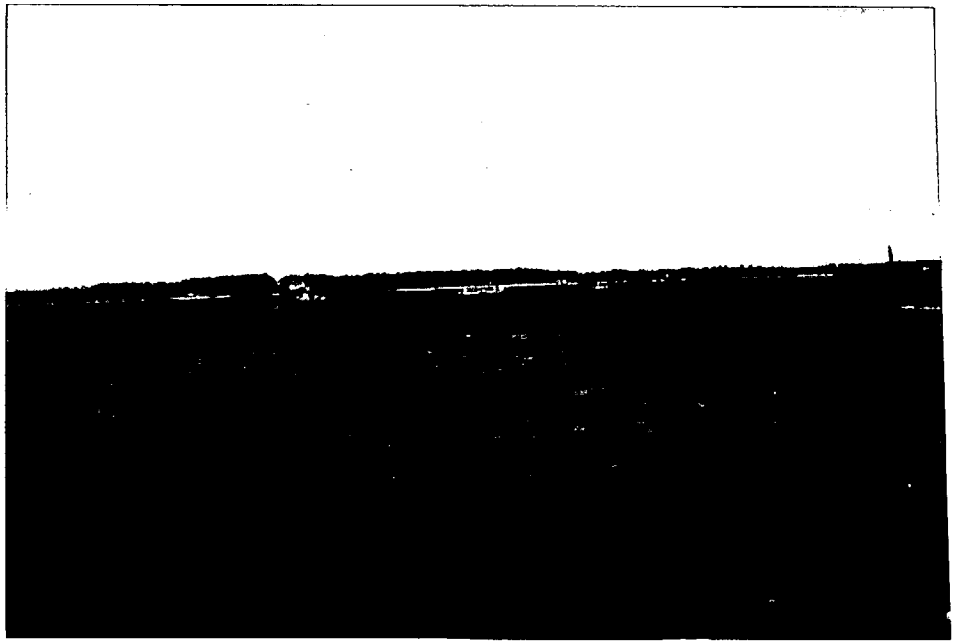




SITE NUMBER 80 **DESIGNATOR** - PBSP

SITE - SABINE POINT, PENSACOLA BAY, FL

NOMINAL SITE CENTER - 30°20.80'N 87°09.10'W

LOCATED ON NOS CHART # - 11382

SITE ACCESS - Access to the site is by boat which is launched at the public ramp in Gulf Breeze. To reach the site cross the Pensacola Bay Bridge on Highway 98, go through Gulf Breeze to Shoreline Drive. Turn right and go to the Shoreline Drive Park. Turn left and continue to the boat ramp on the north side of the Santa Rosa Sound.

SITE DESCRIPTION - This collection site established in Year V is located in Santa Rosa Sound. The site is located under the Highway 399 bridge on the south side of the ICWW. Collections from this site are easiest at low tide and in calm weather since the oysters are attached to the concrete piers.

OYSTER COLLECTIONS

Year V - Oysters were collected by hand from concrete piling under the bridge. Oyster Station 1 was the first 7 sets of piers on the south side of the bridge. Station 2 was directly north of the first station and included the next nine large concrete piers. Station 3 was the next eight piers to the north on Station 2. The site ends at the channel. All oysters collected were intertidal. Numerous oysters were dead due to the recent freeze.

Years VI & VII - Oysters were not sampled these years.

Year VIII - Oysters were collected at the same stations as described for Year V.

Year IX - The site was not scheduled for sampling this year.

SEDIMENT COLLECTIONS

Year V - Sediments were collected approximately 1 mile to the northeast, along the shoreline at latitude 30°21.03'N and longitude 87°09.35'W. Sediments were primarily sand.

Years VI, VII, VIII, & IX - No sediments were samples were collected during these years.

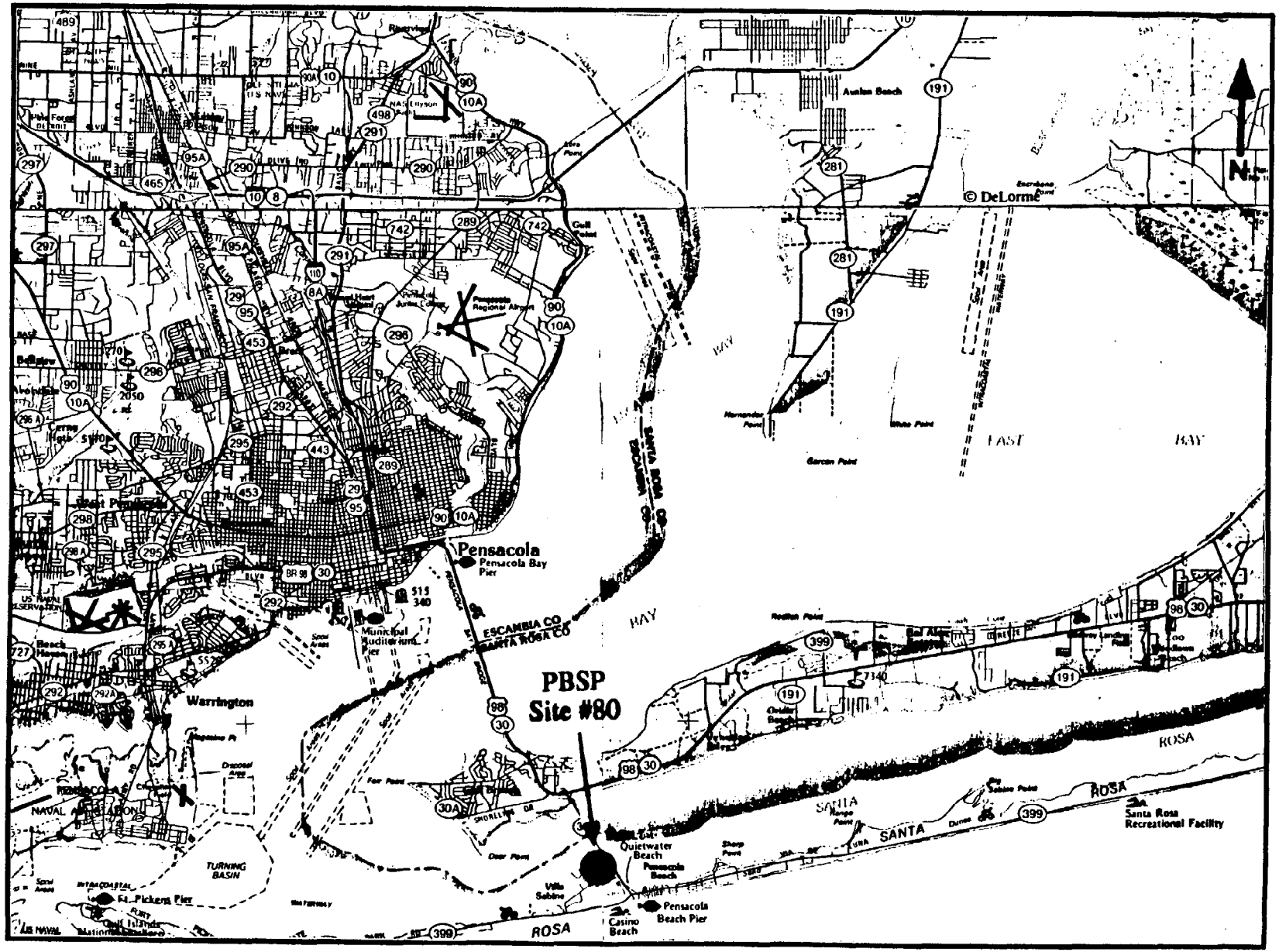
SAMPLING METHOD - Oysters were collected by hand from the concrete pilings of the old bridge in the intertidal zone. The site can only be collected in calm weather since the oysters are collected by hand from the boat.

WATER DEPTH - intertidal, 0 - 0.4 meters

POSSIBLE CONTAMINANTS - Contamination was possible from municipal and marine traffic.

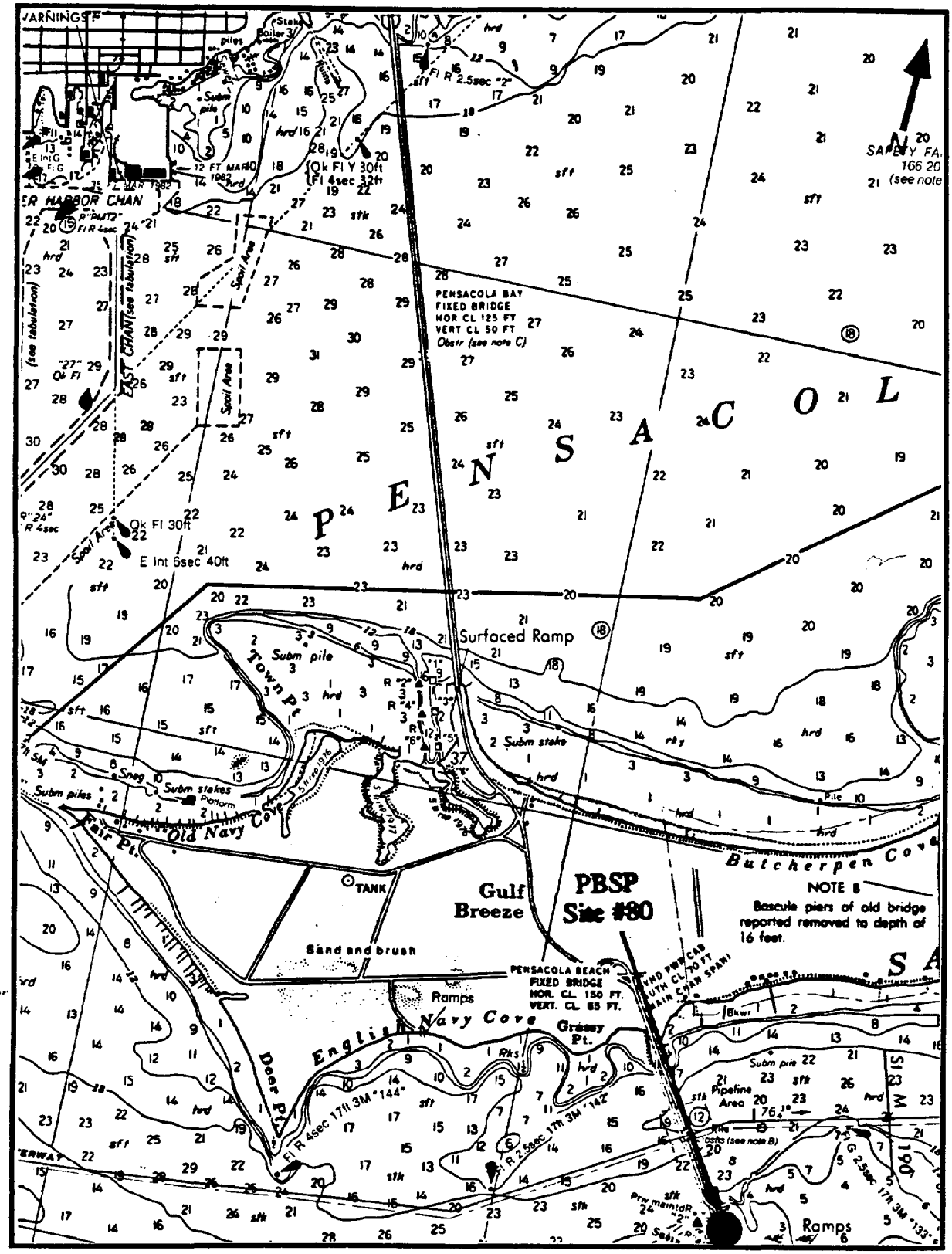
ENVIRONMENTAL DATA

	Salinity (‰)	Temperature (°C)	Dates Sampled
YEAR V	15.0	15.0	26 January 1990
YEAR VIII	25.0	15.7	11 January 1993

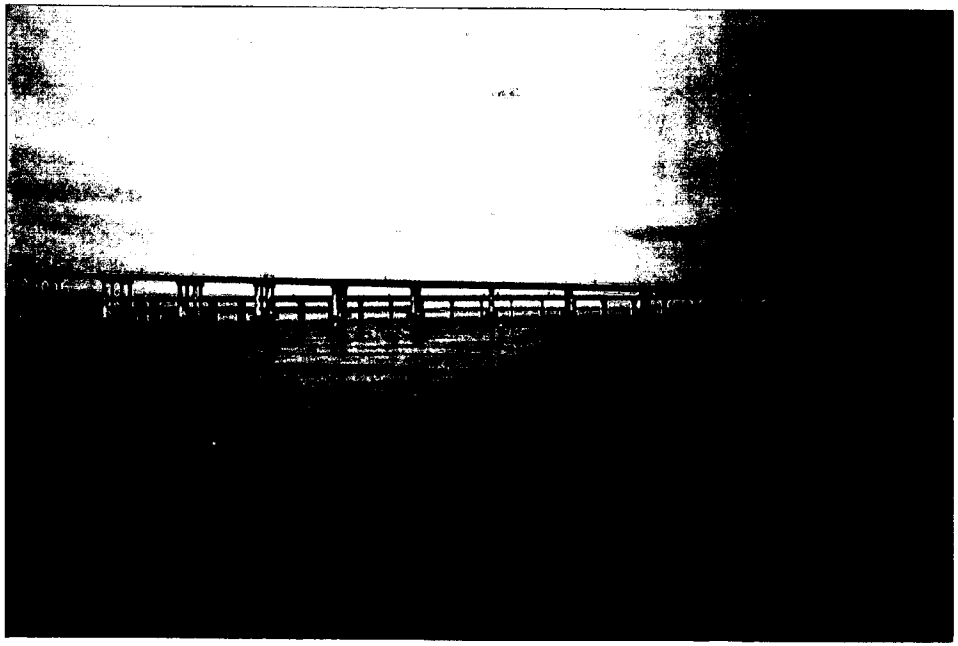


Site #80 (PBSP), Pensacola Bay Sabine Point.

)DeLorme Mapping Company. Map Taken from Florida Atlas and Gazetteer. Reproduced with permission.



Site #80 (PBSP), Pensacola Bay Sabine Point (from chart 11378).



SITE NUMBER - 73 **DESIGNATOR** - CBJB

SITE - JOE'S BAYOU, CHOCTAWAHATCHEE BAY, FL

NOMINAL SITE CENTER - 30°24.62'N 89°29.45'W

LOCATED ON NOS CHART # - 11388, 11385

SITE ACCESS - The location is a walk-up site and is reached by driving up Beach Drive to the boat ramp. The site is located just south of the boat ramp.

SITE DESCRIPTION - The site which was established in Year IV was on the south shore of Choctawahatchee Bay between the other two Choctawhatchee Bay sites. The site was located at the mouth of Joe's Bayou where it enters the Bay. The collections were taken from the area directly south of the boat ramp, the oysters were intertidal and accessible by wading from shore. More oysters were available farther up the bayou along the shoreline structures. Access to these sites had to be by boat because the surrounding grounds were all private homes.

OYSTER COLLECTIONS

Years IV & V - The three stations were along the shoreline with Station 1 at the launch/pier; Station 2 next; and Station 3 as far south as one can go before encountering the private dock. The total distance spanned only 50-100 meters.

Year VI - The same stations as were sampled in Year V were collected this year. Oysters were numerous but small.

Years VII, VIII, & IX - The same stations as described in Year IV were sampled during these years.

SEDIMENT COLLECTIONS

Year IV - No sediments of anything other than hard packed sand or fresh humic materials composed primarily of pine needles could be found. The upper reaches of the bayou and the mouth out into the bay were checked. No sediments were obtained because none met the sampling criteria.

Year V - Suitable sediments were located in the southern arm of the upper part of Joe's Bayou in 1.5 m of water. Station 1 was 30 m from the west shoreline between the wood boathouse and the two boat pier to the north. Bearing to locate the station was 120° to the Destin water tower. Station 2 was in the northeast arm of upper Joe's Bayou near the end on the north shore between the last and next to last boathouse. Water depth was 1.2 m and the sediment was very loose brown silt. Station 3 was across the bayou (east) from Station 2, between last boat house and boat house #016.

Years VI, VII, VIII, & IX - No sediments were sampled during these years.

SAMPLING METHODS

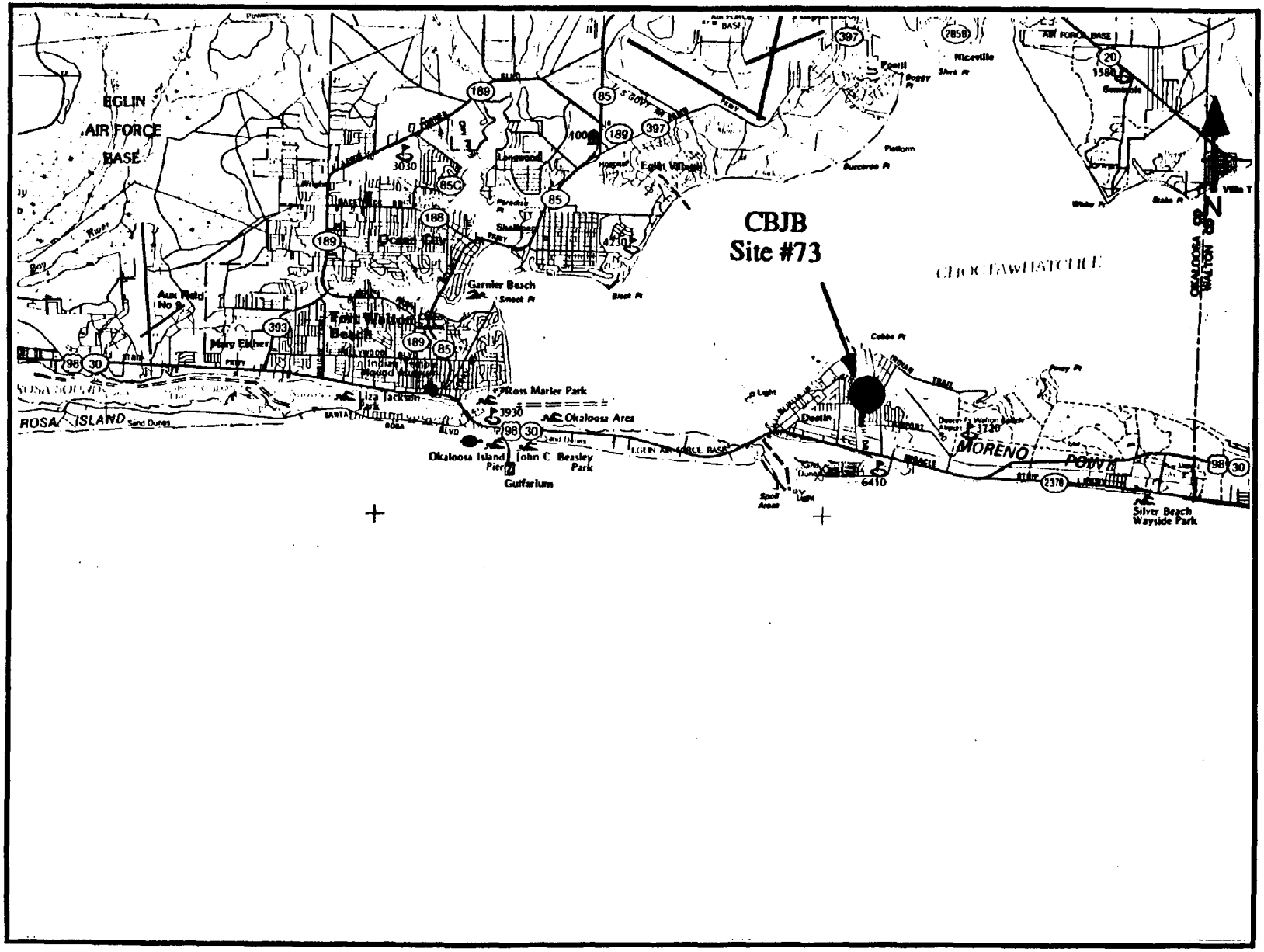
Oysters - hand
Sediment - box core

WATER DEPTH - intertidal, 0 to 0.6 meter

POSSIBLE CONTAMINANTS - There appeared to be no drainage other than rainfall runoff from the immediate area into the bayou, and its proximity to the bay suggested that it was fairly representative of the bay. No obvious sources of contaminants were apparent except for a sand and gravel transfer yard immediately to the north of the site.

ENVIRONMENTAL DATA

	Salinity (‰)	Temperature (°C)	Dates Sampled
YEAR IV	0.3	16.0	27 January 1989
YEAR V	6.0	14.0	27 January 1990
YEAR VI	15.0	12.0	27 January 1991
YEAR VII	24.0	12.0	22 January 1992
YEAR VIII	12.0	17.0	12 January 1993
YEAR IX	24.0	11.0	17 January 1994



Site #73 (CBJB), Choctawhatchee Bay Joes Bayou.

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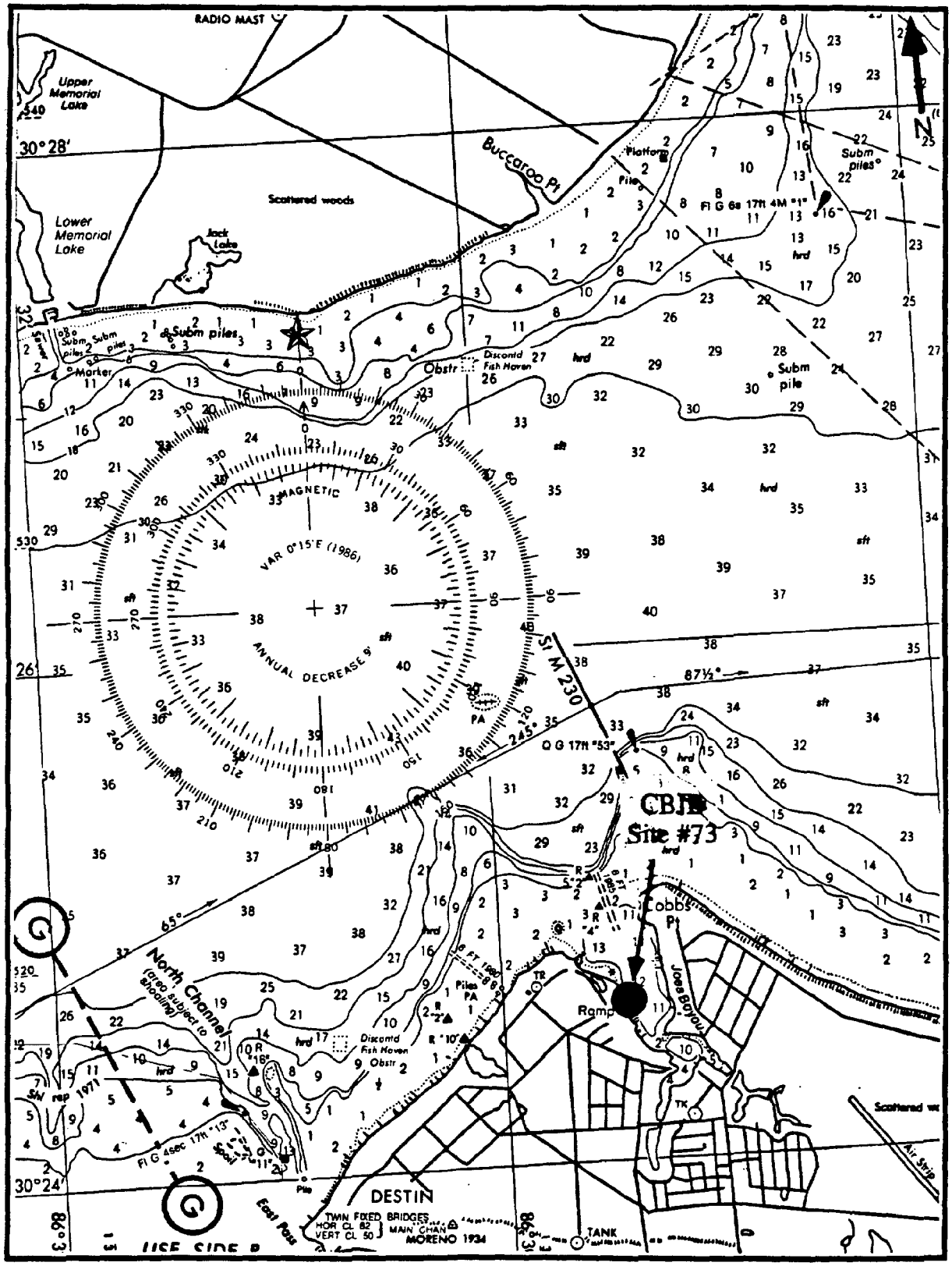
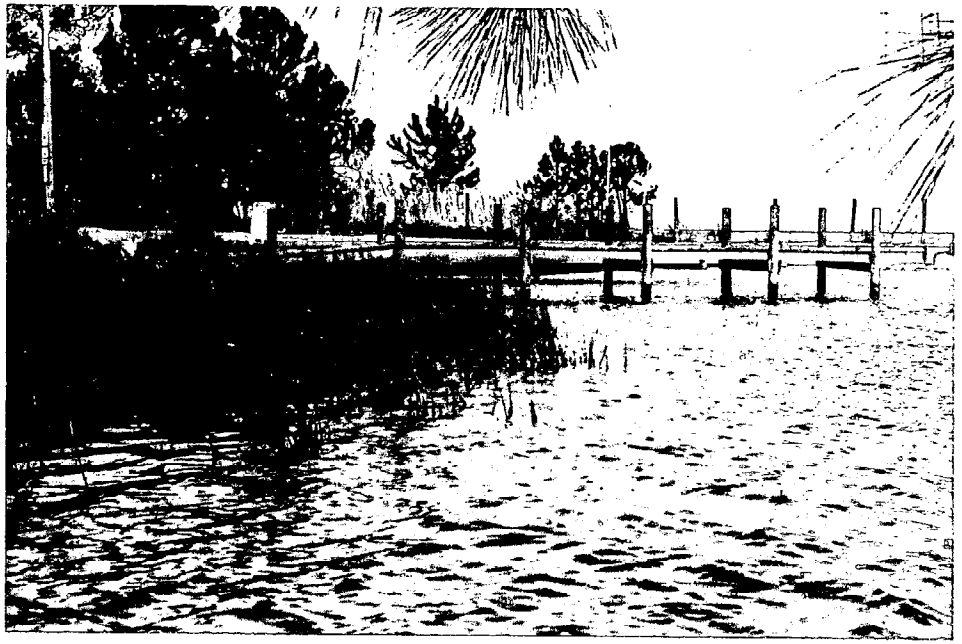
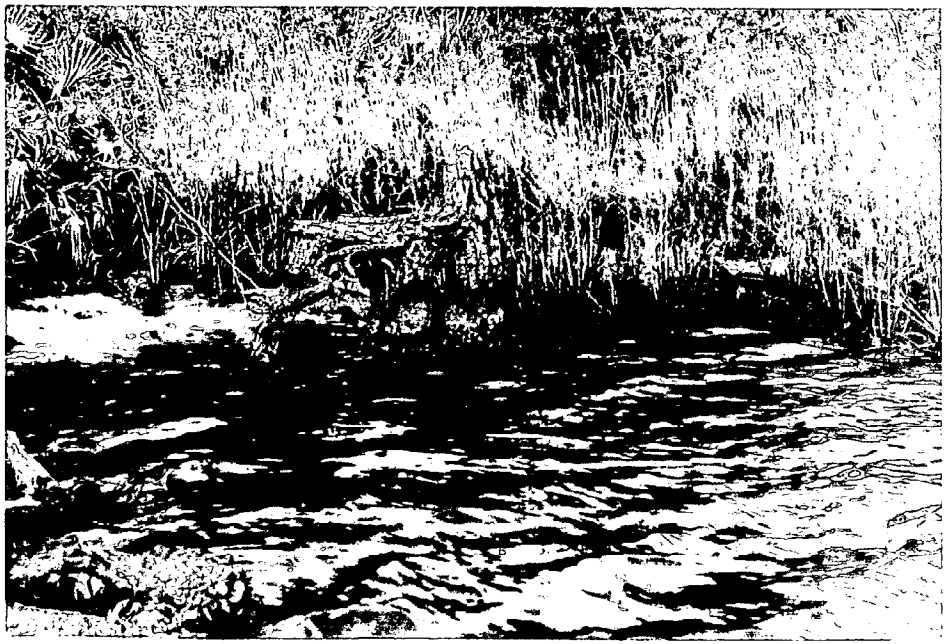


Site #73 (CBJB), Choctawhatchee Bay Joes Bayou (from chart 11385).





SITE NUMBER 38 **DESIGNATOR** - CBSR

SITE - OFF SANTA ROSA, CHOCTAWHATCHEE BAY, FL

NOMINAL SITE CENTER - 30°24.78'N 86°12.25'W

LOCATED ON NOS CHART # - 11388, 11385

SITE ACCESS - The site is located in the eastern portion of Choctawhatchee Bay near U.S. Highway 331. Access to the site is by boat launched from ramps on either side of the south end of the bridge crossing Choctawatchee Bay or at the Yodum's Grocery ramp north of the drawbridge. From the drawbridge proceed west to channel marker 34 on the ICWW.

SITE DESCRIPTION - Two distinct locations have been sampled for this site. In Year I, oysters were tonged south of the channel marker 34. The subtidal oyster reef was extensive and the outer margin of the reef was marked with four wood pilings. However, in Year II & III, no oysters could be found in the subtidal sampling area and the site was moved to the shoreline where a small bayou enters the bay (southeast from a large white house) at latitude 30°24.35'N and longitude 86°12.75'W. Oysters were attached to rocks and a wooden bulwarks around a large tree. Oysters were small and not overly abundant. The site was moved in Year IV due to oyster depletion at the shoreline site. In Years IV, V and VI, oysters were tonged southeast of channel marker 40 (30°24.53'N, 86°11.40'W).

OYSTER COLLECTIONS

Year I - The oyster reefs south of channel marker 34 were tonged for oysters. This site was approximately 1 mile west of the drawbridge and 1 mile north of the south shoreline. Oyster stations were located on a south to north line with Station 1 being on the south end. Station 1 was approximately 300 m south of channel marker 34 on a bearing of 250°. Other bearings to locate the station were: 300° from the south end of the drawbridge, 108° from south Live Oak Point, and 350° from the microwave tower. Station 2 was approximately 100 m to the north and Station 3 was another 100 m to the north near the channel marker.

Year II - No oysters could be located in the area sampled during Year I, so the site was move to the shoreline. To reach the shore site, take a bearing of 70° from channel marker 34 to a small bayou. This site was southeast from a large white house on the shore. Oysters were attached to wood and rocks along the bank. No significant geographic distinction could be made between the oyster stations because of the paucity of oysters.

Year III - Oysters were again collected from the rocks and wood pilings. Stations were segregated with 50 meters between locations.

Year IV - In Year IV, the site was relocated to a commercially fished reef near channel marker 40 (bearing 062° to the marker). The reef ran northeast-southwest (260/080°) and was marked by poles and signs "Danger, submerged oyster reefs". This reef was in 3 m of water and had to be sampled by tonging. Station 1 was at the southern end of the reef about 50 m north of the last pole. Station 2 was 30 m south of the "Danger..." sign, near the middle of the reef. Station 3 was at the northeast end of the reef, bearing 240° from channel marker 40, and 15 meters west of the northern most pole marking the reef.

Year V - Stations were located in approximately the same locations as last year. Oysters were sparse due to recent die-offs, and many recently dead oysters were tonged. Station 1 was 30 m south of the southmost pole on the west side of the reef, between the two poles marking the south end of the reef. Station 2 was in the middle of the reef, 15 m south of the second pole from the north. Station 3 was at the northeast end of the reef, between 15 and 50 m west of the northmost pole.

Year VI - Stations were in the same locations as last year. Oysters were dredged and were more abundant this year.

Years VII & VIII - Oysters were dredged from the same stations sampled the previous three years. Oysters were abundant both years but were covered with numerous mussels.

Year IX - The site was not scheduled to be sampled this year.

SEDIMENT COLLECTIONS

Year I - Sediment samples in Year I were collocated within 30 m of each oyster station. These sediments were a charcoal gray to black mud overlain by dark brown surface.

Year II - Sediments sampled were a loose black mud taken on a line from the oyster collection site on shore toward channel marker 34. Station 1 was 500 m from channel marker 34 marker with Stations 2 and 3 being 400 and 300 m from the marker. Sediments shoreward of this point (nearer the oysters) were much too sandy.

Year III - Sediment stations in Year III were collected on the same line at distances of 100 m apart on a line to channel marker 34.

Year IV - No sediments were sampled.

Year V - Sediment samples were black silty sand mixed with oyster shell and were collected near each oyster station. Station 1 was collected 30 m north of the pole at the oyster station. Station 2 was 30 m north of the pole at the oyster station. Station 3 was also 30 m north of the pole at that oyster station.

Year VI - Sediments (NIST) were collected adjacent to each oyster station.

Years VII, VIII, & IX - No sediments samples were collected during these years.

SAMPLING METHOD

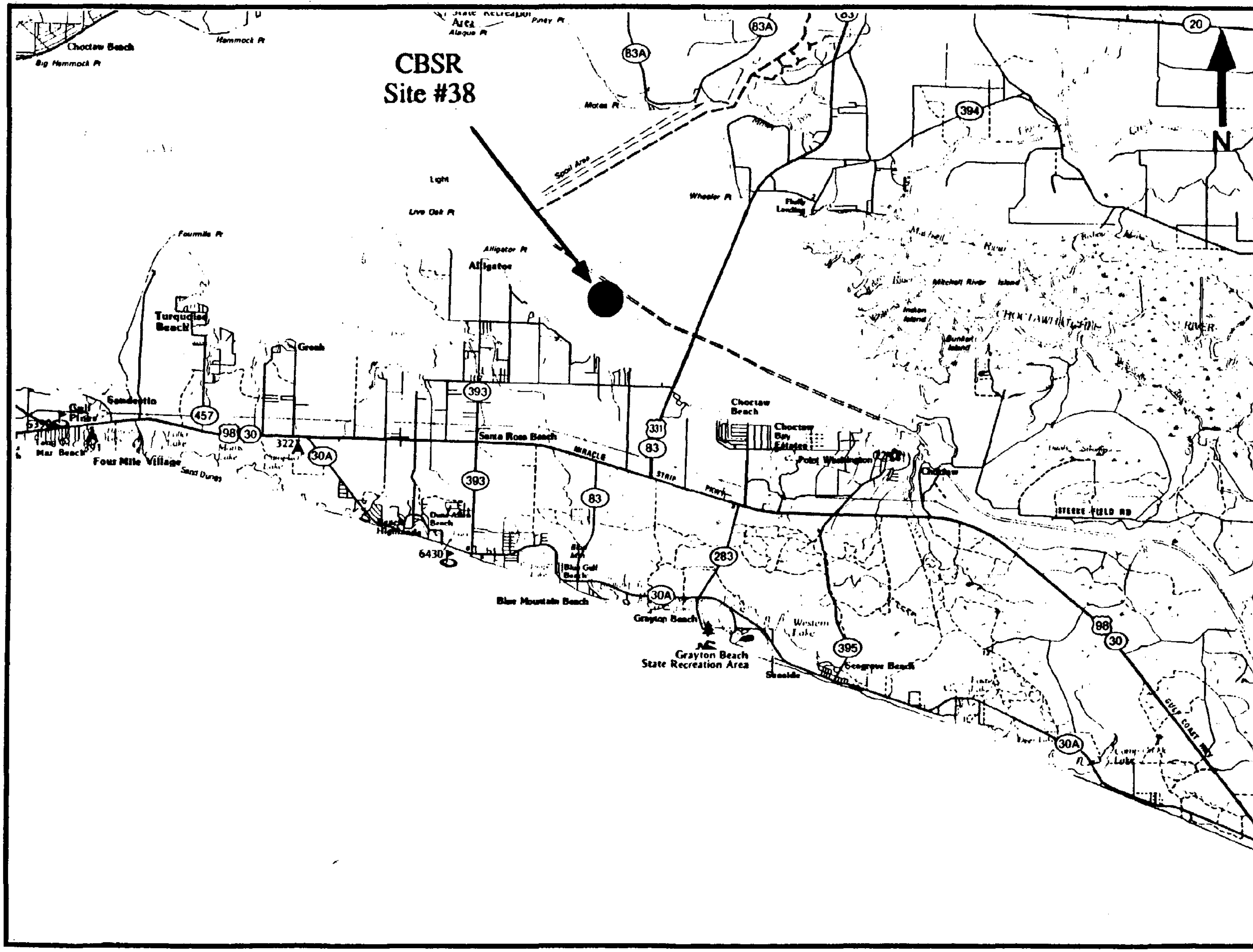
Oysters - tongs and hand
Sediments - box core

WATER DEPTH - subtidal, 2 - 3 meters (Years I, IV, V, VI) and intertidal, 0 - 0.3 (Years II & III)

POSSIBLE CONTAMINANTS - No sources of contamination were evident in the area.

ENVIRONMENTAL DATA

	Salinity (‰)	Temperature (°C)	Dates Sampled
YEAR I	-	14.0	2 March 1986
YEAR II	5.0	12.0	26 February 1987
YEAR III	6.0	11.0	17 February 1988
YEAR IV	21.0	15.0	26 January 1989
YEAR V	4.0	15.0	27 January 1990
YEAR VI	12.0	10.8	27 January 1991
YEAR VII	21.0	11.0	22 January 1992
YEAR VIII	10.0	16.7	11 January 1993



Site #38 (CBSR), Choctawhatchee Bay Off Santa Rosa.

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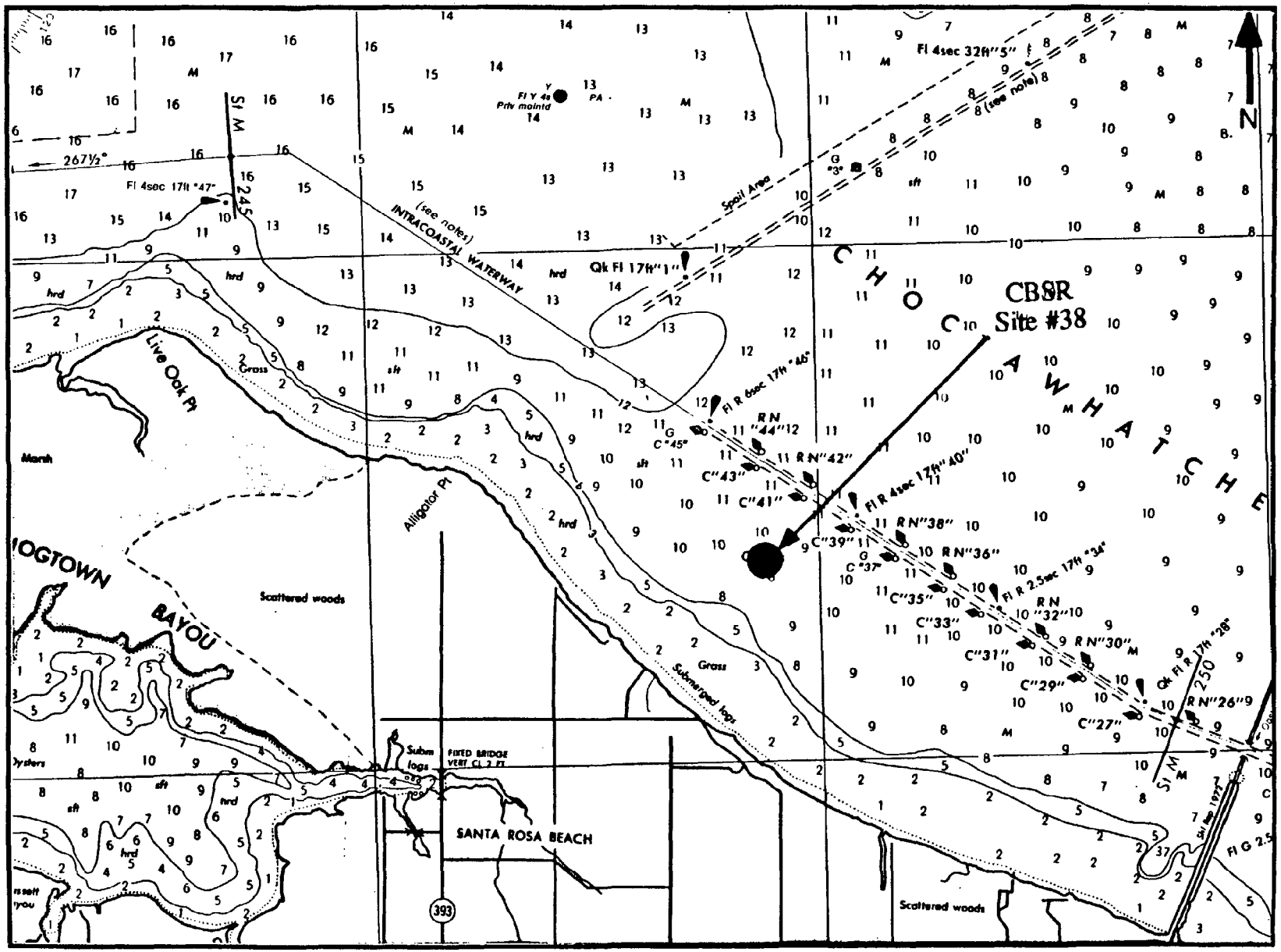
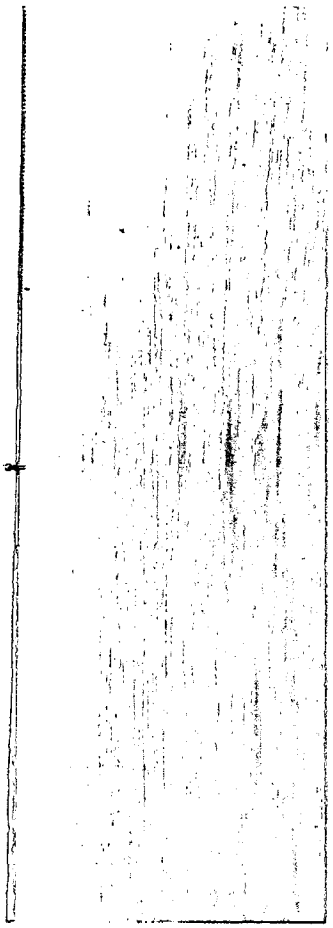
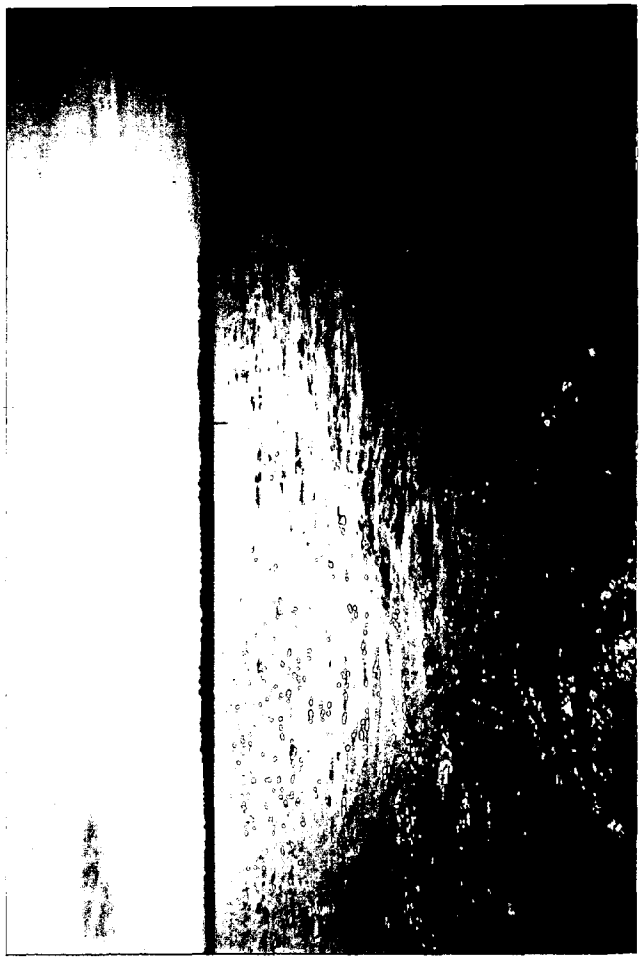
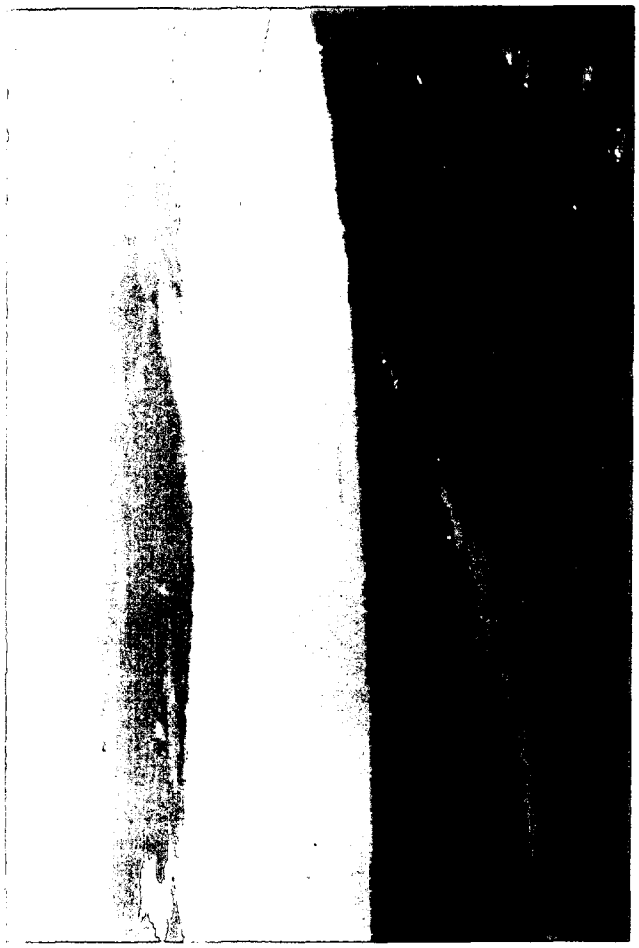
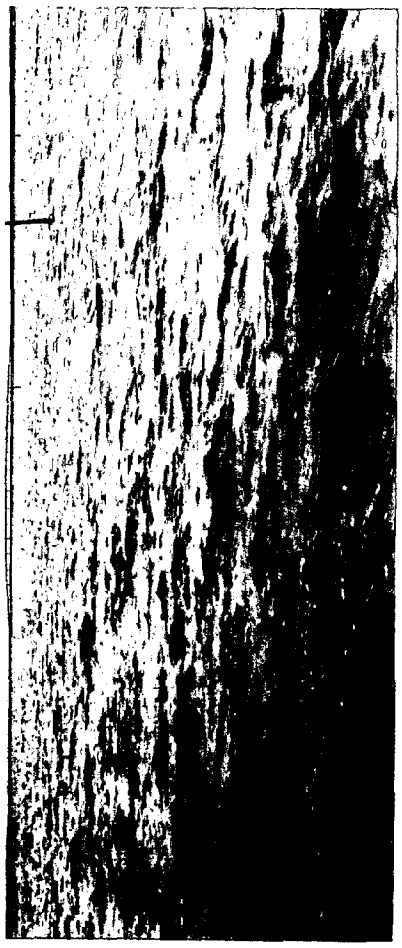


Site #38 (CBSR), Choctawhatchee Bay Off Santa Rosa (from chart 11385).









SITE NUMBER 82 **DESIGNATOR** - CBBL

SITE - BEN'S LAKE, CHOCTAWHATCHEE BAY, FL

NOMINAL SITE CENTER - 30°27.15'N 86°32.45'W

LOCATED ON NOS CHART # - 11388, 11385

SITE ACCESS - The site is reached by boat with access from the boat ramp located on Bayshore Drive on the east side of Boggy Bayou. Travel from Fort Walton to Niceville on Highway 85, cross Boggy Bayou bridge, turn right on Bayshore Drive, and continue to the public ramp on the right. By boat go south down Boggy Bayou to Choctawhatchee Bay, then go west to the entrance to Bens Lake. Travel time is approximately 30 minutes in good weather.

SITE DESCRIPTION - This site, established in Year VII, was located at the entrance to Bens Lake which was on the north side of Choctawhatchee Bay. The entire area was part of the Eglin Air Force Base. Oysters were located on concrete and brick rubble along the shoreline at the entrance to Bens Lake.

OYSTER COLLECTIONS

Year VII - Oysters were collected by hand from concrete, brick and rocks in the intertidal zone. Station 1 was from the east side of the entrance into Bens Lake. Station 2 was also on the east side of the entrance into the bay but was 30 m to the north. Station 3 was on the west side of the entrance into the bay.

Year VIII - This site was not visited this year.

Year IX - Oysters were collected from the same station locations as in Year VII.

SEDIMENT COLLECTIONS

Year VII - Sediment collection sites were located within Bens Lake. Station 1 was near the east bank approximately 150 m from the entrance. Station 2 was also on the east bank, approximately 75 m from the entrance. Station 3 was near the marina pier on the west bank of the lake.

Years VIII & IX - No sediments were collected during these years.

SAMPLING METHOD

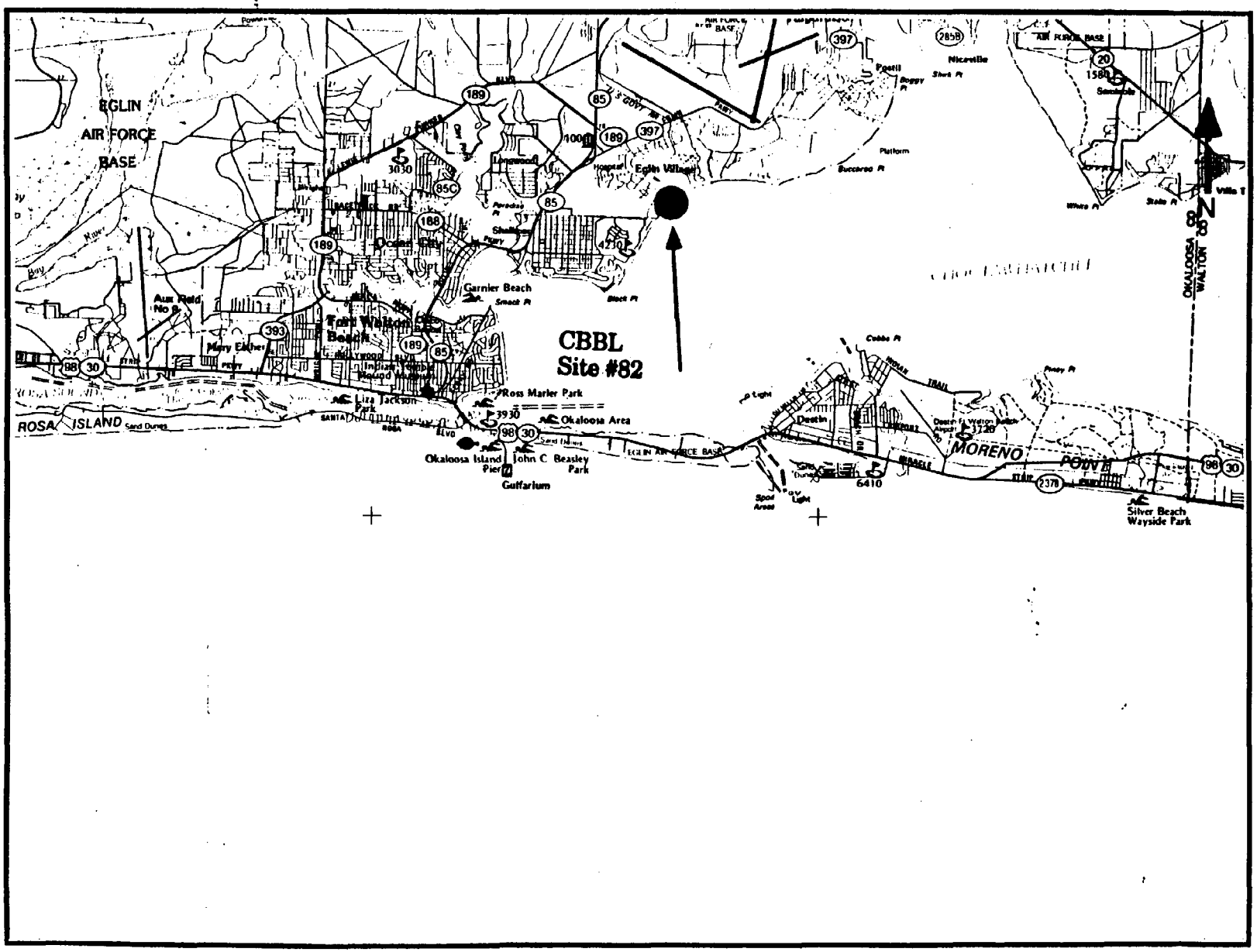
Oysters - hand
Sediment - box corer

WATER DEPTH - intertidal, 0.1 to 0.5 meter

POSSIBLE CONTAMINANTS - A possible source of contamination was surface runoff originating from the marina area.

ENVIRONMENTAL DATA

	Salinity (‰)	Temperature (°C)	Dates Sampled
YEAR VII	20.0	14.0	23 January 1992
YEAR IX	25.0	13.0	17 January 1994



Site #82 (CBBL), Choctawhatchee Bay Bens Lake

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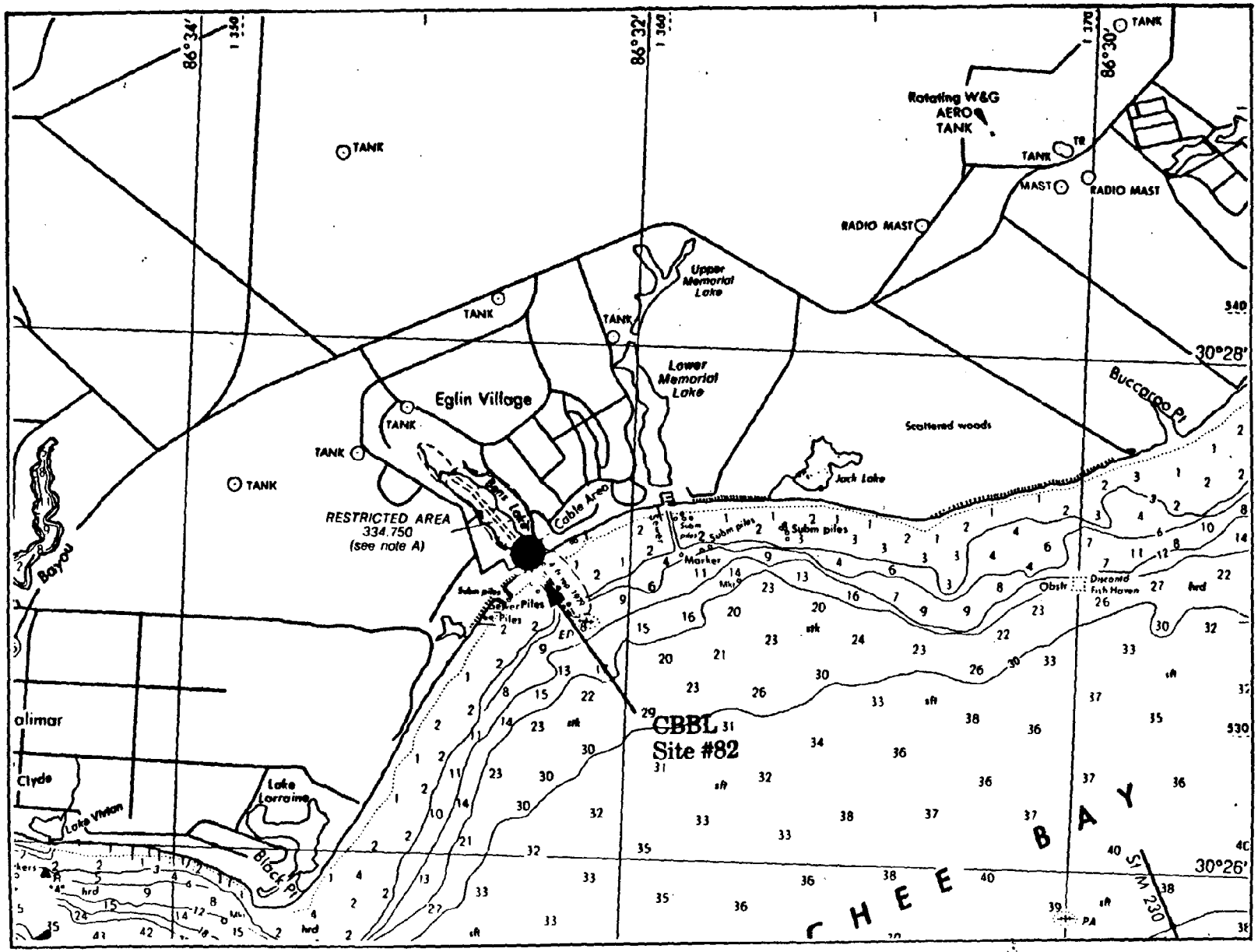
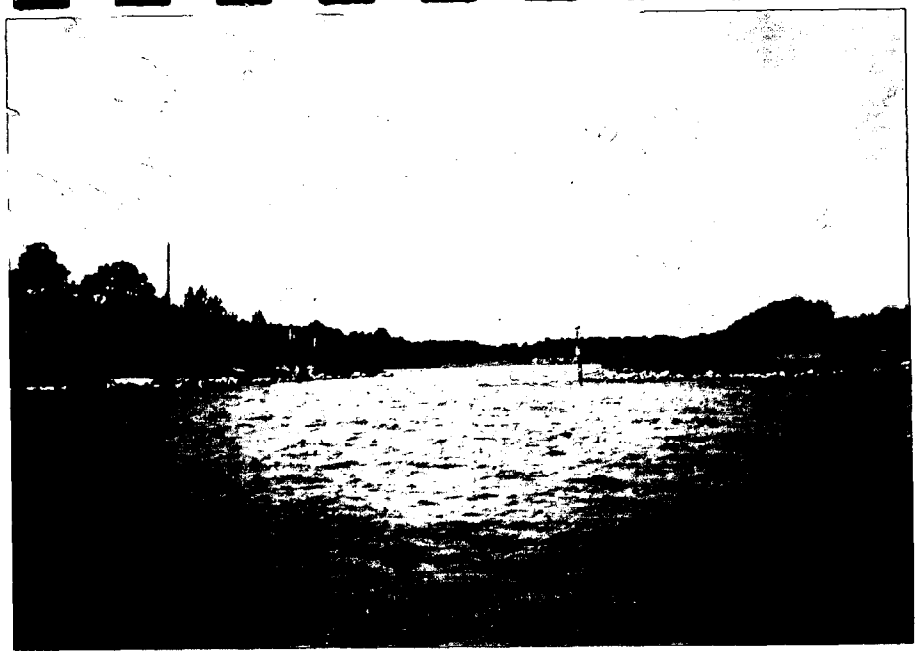


Site #82 (CBBL), Choctawhatchee Bay Bens Lake



SITE NUMBER 39 **DESIGNATOR** - CBPP

SITE - POSTIL POINT, CHOCTAWHATCHEE BAY, FL

NOMINAL SITE CENTER - 30°28.85'N 86°28.73'W

LOCATED ON NOS CHART # - 11388, 11385

SITE ACCESS - The site is reached by automobile with access through Eglin Air Force Base. Enter Eglin Air Force Base on Highway 85. Stop at the visitor center at Eglin Air Force Base and obtain a pass and ask the guard to direct you to the family camping area at Postil Point.

SITE DESCRIPTION - The site was located on the west bank at the entrance to Boggy Bayou which was on the north side of Choctawhatchee Bay. A military Family Camping and Recreation area was located on Boggy Point. Oysters were collected by hand from along the shoreline from the entrance into Postil Lake north to Postil Point.

OYSTER COLLECTIONS

Years I, II, III, & IV - Oysters were collected by hand from intertidal waters. Station 1 oysters were taken from sandy bottom, jetty rocks and the bulkhead where Postil Lake entered Choctawhatchee Bay. Oyster Station 2 was located along the shoreline ~200 m north of Station 1. Oysters were attached to the rocks. Oyster Station 3 was on the south side of Postil Point in the shoreline rocks. Oysters were not overly abundant at this site.

Year V - Oysters were collected at the same sites as were previously sampled. This year there were fewer oysters due to the recent freeze. All of the oysters above the low tide mark were recently dead.

Year VI - Oyster sampling stations were located in the same areas as previously sampled. Oysters were more abundant than last year.

Year VII - Oyster sampling stations were located in the same areas as previously sampled. Oysters were less abundant this year.

Year VIII - Oysters were collected at the same stations described for Year I.

Year IX - The oyster sampling stations were the same as those used in Year I. The population was sparse as many oysters had been killed in a recent cold weather freeze.

SEDIMENT COLLECTIONS

Year I - Sediments were collected in Choctawhatchee Bay out from Postil Point. These sediments were primarily sand.

Years II & III - Sediments were collected along the northwest shoreline in Postil Lake. Sediment Station 1 was ~25 m north of the entrance into the lake near oyster Station 1. Station 2 was ~50 m north of Station 1. Station 3 was another 50 m to the north along the shoreline. Sediments were primarily organic peat with some silt and were characterized by a strong H_2S odor.

Year IV - Sediments were not collected this year.

Year V - Sediments were collected ffom the same stations as in Years II & III.

Years VI, VII, VIII, & IX - No sediments were sampled during these years.

SAMPLING METHOD

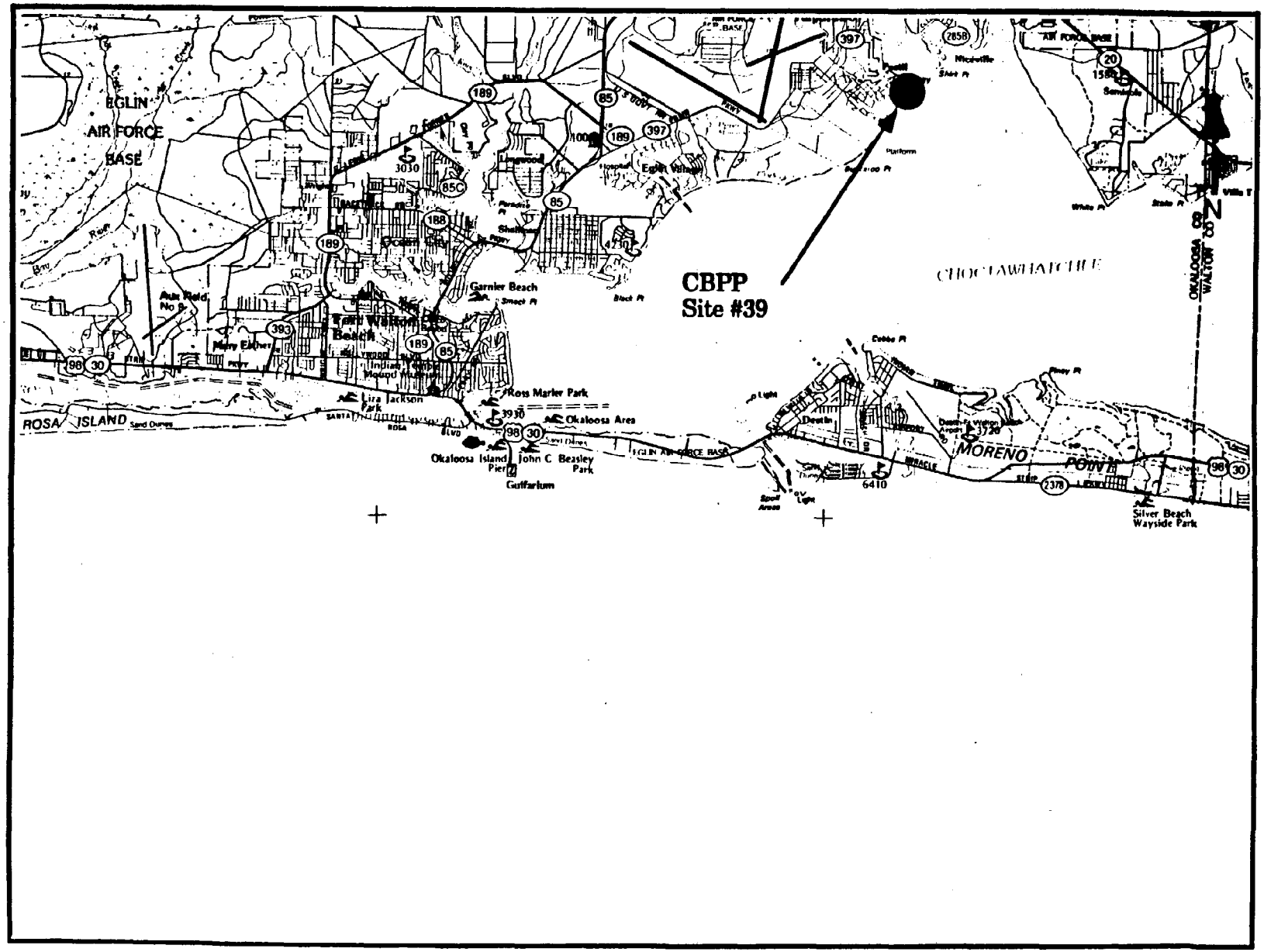
Oysters - hand
Sediment - hand

WATER DEPTH - intertidal, 0.1 to 0.2 meter

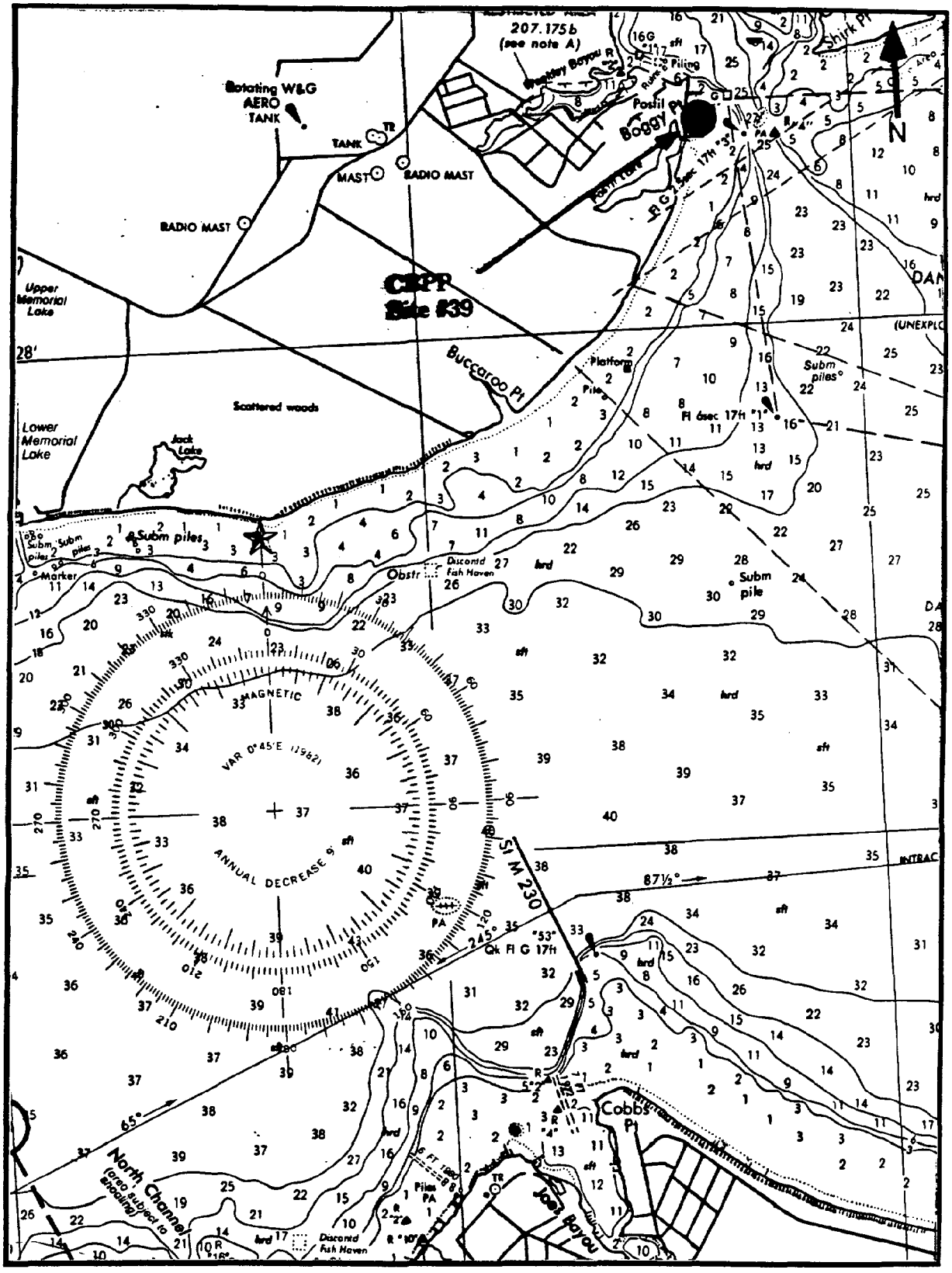
POSSIBLE CONTAMINANTS - A possible source of contamination was from surface runoff originating from the recreational area.

ENVIRONMENTAL DATA

	Salinity (‰)	Temperature (°C)	Dates Sampled
YEAR I	13.3	16.0	1 March 1986
YEAR II	8.0	13.0	26 February 1987
YEAR III	20.0	9.0	17 February 1988
YEAR IV	18.0	18.0	26 January 1989
YEAR V	5.5	17.0	27 January 1990
YEAR VI	17.3	13.7	27 January 1991
YEAR VII	18.3	14.0	23 January 1992
YEAR VIII	10.0	17.0	11 January 1993
YEAR IX	24.0	6.0	16 January 1994



Site #39 (CBPP), Choctawhatchee Bay Postil Point (from chart 11385).



Site #39 (CBPP), Choctawhatchee Bay Postil Point (from chart 11385).

SITE NUMBER 83 **DESIGNATOR** - CBBB

SITE - BOGGY BAYOU, CHOCTAWHATCHEE BAY, FL

NOMINAL SITE CENTER - 30°30.18'N 86°29.65'W

LOCATED ON NOS CHART # - 11388, 11385

SITE ACCESS - The site is reached by boat with access from the boat ramp located on Bayshore Drive on the east side of Boggy Bayou. Travel from Fort Walton to Niceville on Highway 85, cross Boggy Bayou bridge, turn right on Bayshore Drive, and continue to the public ramp on the right. By boat go south down Boggy Bayou to channel marker 9, turn southwest and proceed into Toms Bayou. Proceed west for approximately 500 m to the bridge.

SITE DESCRIPTION - This site was established in Year VII. The oysters were located on the piling of the bridge which crossed the middle of Toms Bayou. Station 1 was on the south end of the bridge and includes the first 5 sets of bridge pilings. Station 2 included the middle 5 sets of piers. Station 3 was composed of the northern 5 sets of piers.

OYSTER COLLECTIONS

Year VII - Oysters were collected from the concrete bridge pilings. Station 1 was on the south end of the bridge and includes the first 5 sets of bridge pilings. Station 2 included the middle 5 sets of piers. Station 3 was composed of the northern 5 sets of piers.

Year VIII - Oysters were not collected at this station this year.

Year IX - The oysters were easily collected from the bridge pilings described in Year VII. Small to medium sized oysters were numerous at all of the stations.

SEDIMENT COLLECTIONS

Year VII - Sediments were collected in 1 to 2 m of water from the base of the pilings at each of the three oyster collection stations. Sediments were softy silty brown mud over a hard sandy layer.

Year VIII & IX - Sediment samples were not taken during these years.

SAMPLING METHOD

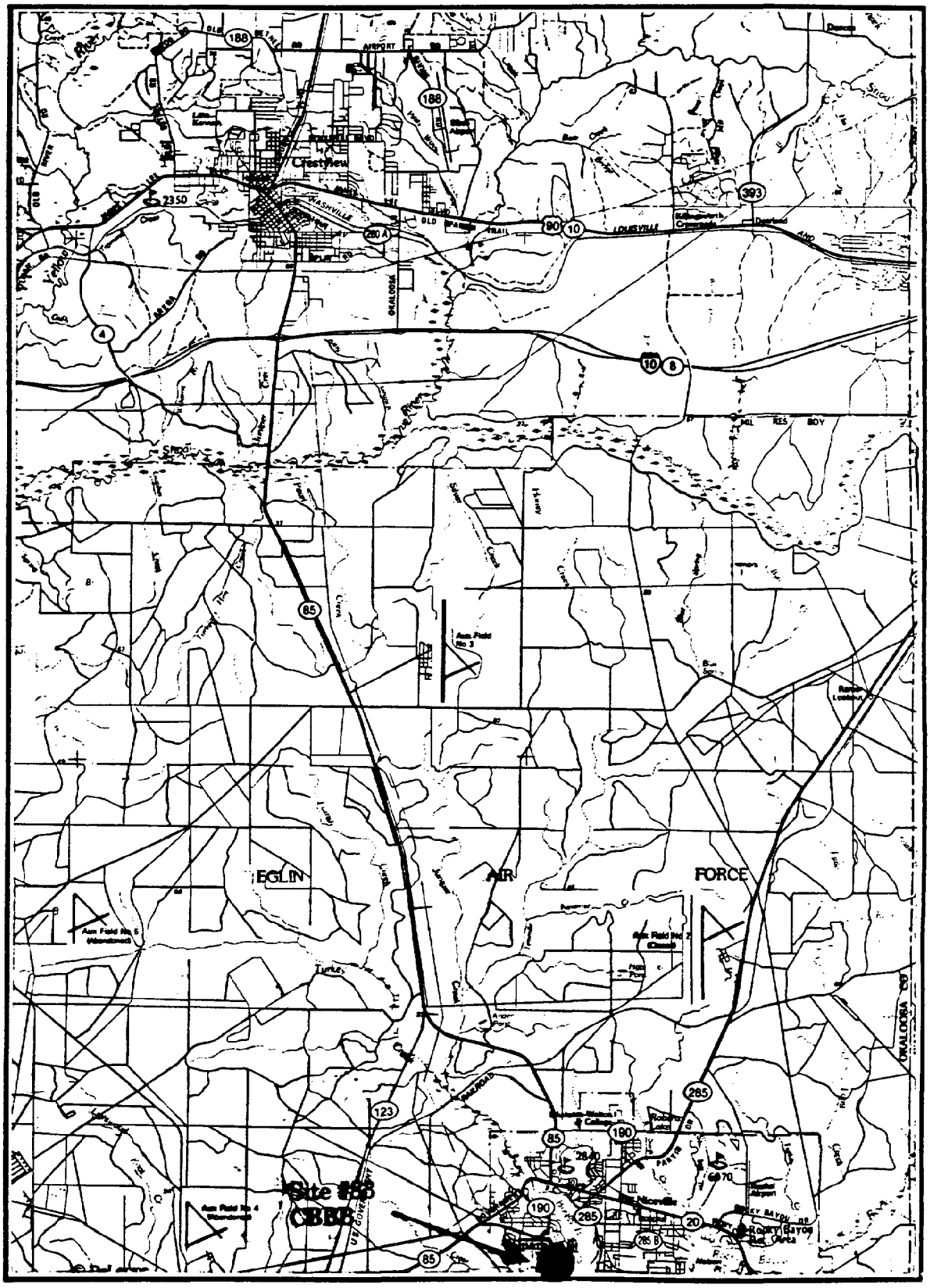
Oysters - hand
Sediment - box corer

WATER DEPTH - intertidal, 0.5 meter

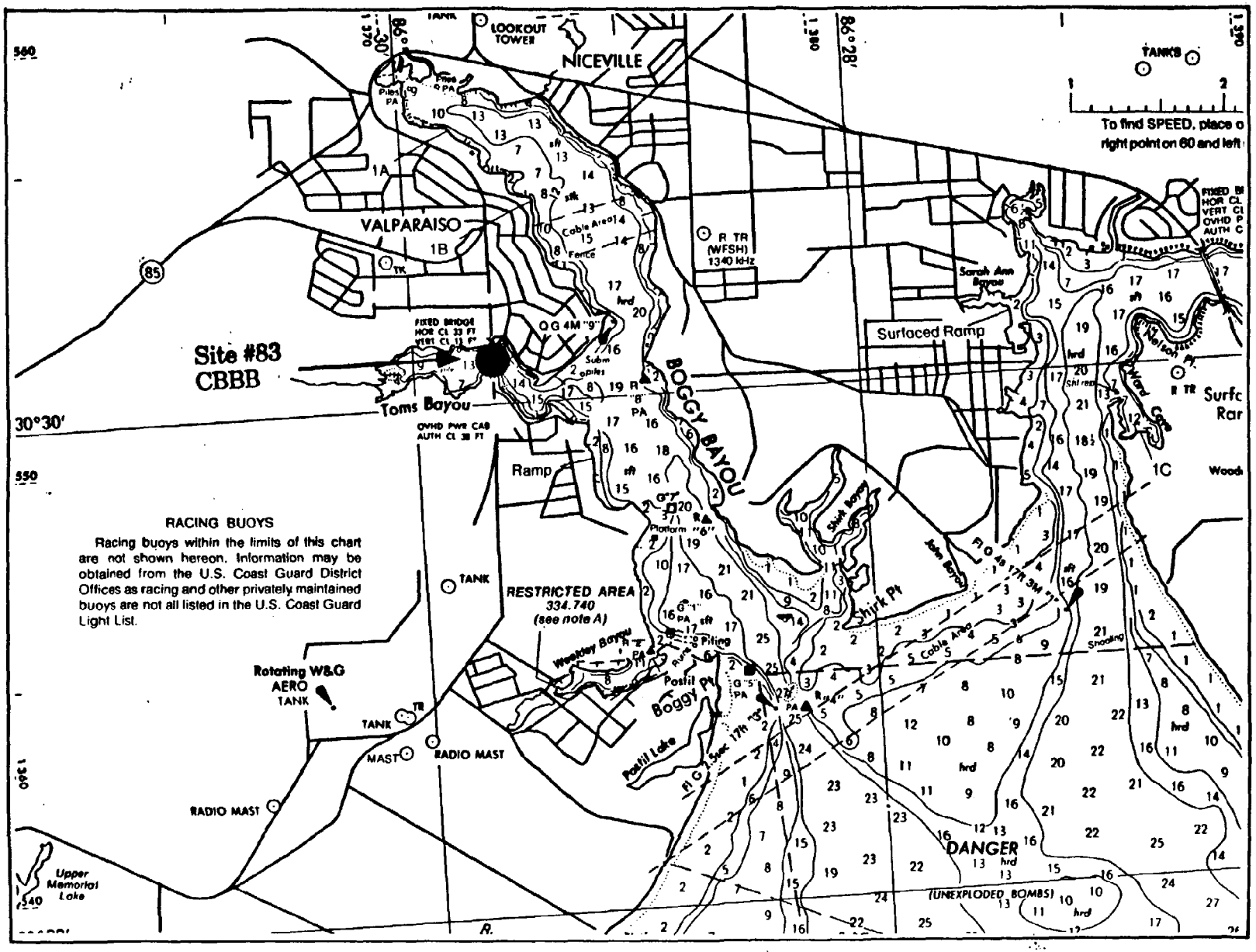
POSSIBLE CONTAMINANTS - A possible source of contamination was from surface runoff originating from Valparaiso and Eglin Air Force Base.

ENVIRONMENTAL DATA

	Salinity (‰)	Temperature (°C)	Dates Sampled
YEAR VII	18.0	14.0	23 January 1992
YEAR IX	17.0	7.0	16 January 1994



Site #83 (CBBB), Choctawhatchee Bay Boggy Bayou.



Site #83 (CBBB), Choctawhatchee Bay Boggy Bayou.

SITE NUMBER - 74 **DESIGNATOR** - PCLO

SITE - LITTLE OYSTER, PANAMA CITY

NOMINAL SITE CENTER - 30°15.19'N 85°40.95'W

LOCATED ON NOS CHART # - 11390

SITE ACCESS - Access to the site is via boat launched at the public ramp at Richard Simpson Park. The park is located at the east end of the Hathaway Bridge (Highway 98) on the north side where it crosses West Bay. Cross the bridge then turn north on Moody Avenue to the old highway. Turn left and the ramps are on the right. In Year VII the boat was launched at the Leslie Port Wayside Park boat ramp which in on Highway 77 on the north side of Panama City.

SITE DESCRIPTION - The site was not established until Year IV of the program and was located at Little Oyster Bar Point in North Bay. The site was on the edge of the U.S. Air Force Petroleum Depot. The oyster and sediment sites were separated across the bay by a distance of about 2 miles. The sediment site was located near the mouth of Mud Bayou and east of West Bay Point.

OYSTER COLLECTIONS

Years IV & V - Oysters were taken from the concrete bases of the high voltage transmission towers crossing the bay at Little Oyster Bar Point. Station 1 was on the tower on the shoreline. Station 2 was the next tower from the east shore (southeast of channel marker 6). Station 3 was the second tower from the east shore (north of channel marker 6). Station 1 could be collected as a walk-up station, but the other two stations had to be sampled from the boat.

Year VI - All three stations were collected at the same locations previously sampled. Station 1 was depleted of oysters and will have to be moved next year. This was partially due to siltation occurring around the base of the concrete pilings and at the mouth of the small pond which blocks the tidal flow at this site.

Year VII - Station 1 was completely silted over and no oysters were present; therefore, it was moved to the northwest side of the bay. The new site was established at the second set of transmission piers out from the north shoreline. The new site was located at 30°15.59 north and 85°41.13 west. Stations 2 and 3 remained at the locations previously sampled.

Year VIII - Collection stations remained the same as described in Year VII.

Year IX - The previosly sampled stations could not be reached, due to adverse weather conditions. Stations 1 & 2 were collected 50 m east of the old Station 1 (Years IV & V). The site was a small intertidal pond next to the

shoreline. Station 1 & 2 oysters were contiguous to one another. Station 3 oysters were collected from the electrical transmission pilings on the northshore side of the bay. Oysters at both sites were all very small and sparsely situated.

SEDIMENT COLLECTIONS

Years IV & V - Sediments were collected at the mouth of Mud Bayou (30°14.27'N and 85° 42.69'W). Station 1 was to the north of the Bayou. Station 2 was just to the south of the mouth at the sandy beach. Station 3 was 300 meters south of the Bayou mouth. All stations were sampled in 0.2 meters of water approximately 25 meters from the shoreline. There were oysters scattered in the grass beds and several small reefs in this area but oysters were too few and scattered to be reliable for repeat sampling.

Years VI, VII, VIII, & IX - Sediments were not sampled during these years.

SAMPLING METHODS

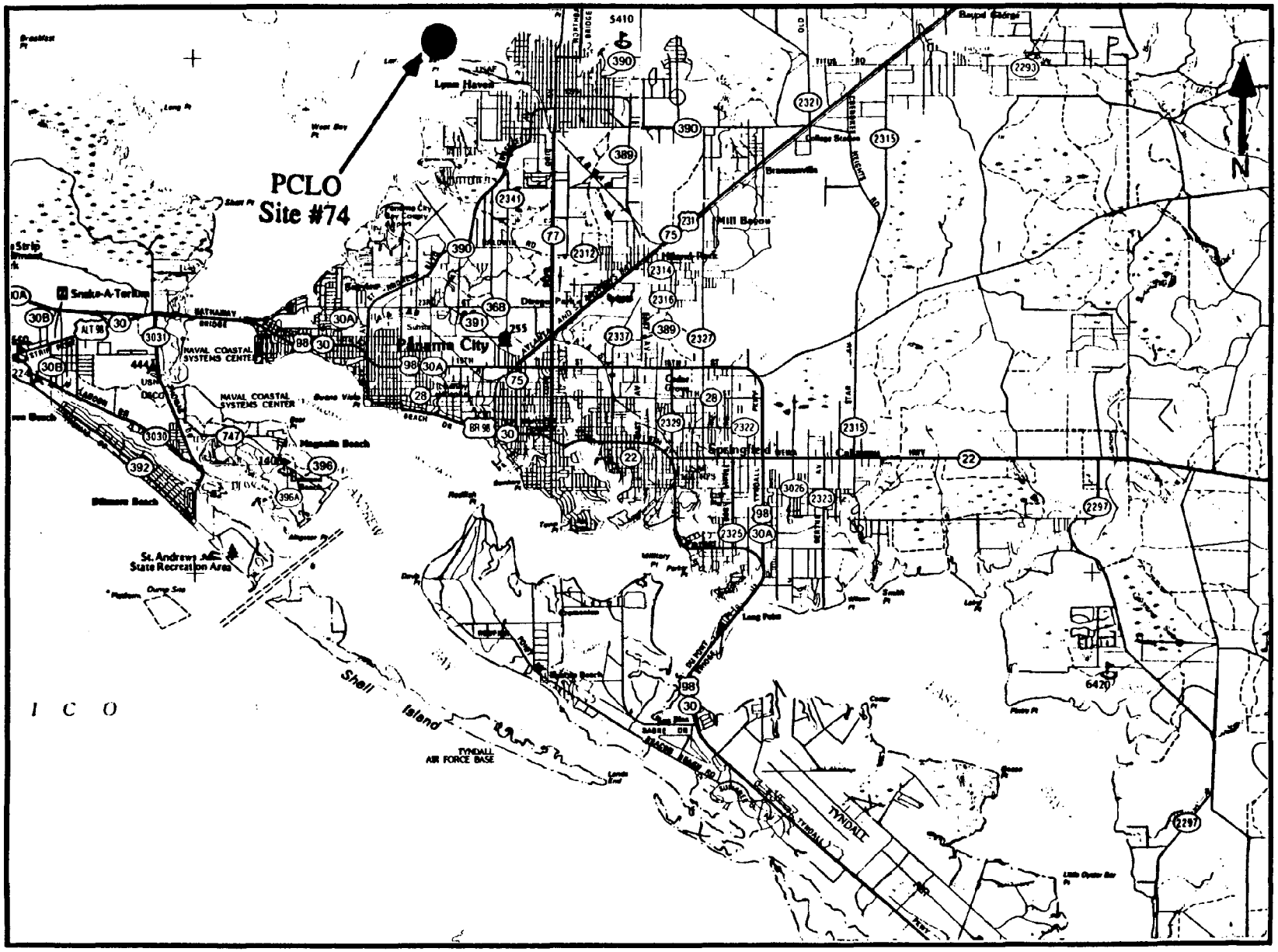
Oysters - hand
Sediment - box core

WATER DEPTH - intertidal, 0 to 0.3 meters.

POSSIBLE CONTAMINANTS - Possible contamination included a military fuel depot at Little Oyster Bar Point and a coal burning power plant across the bay.

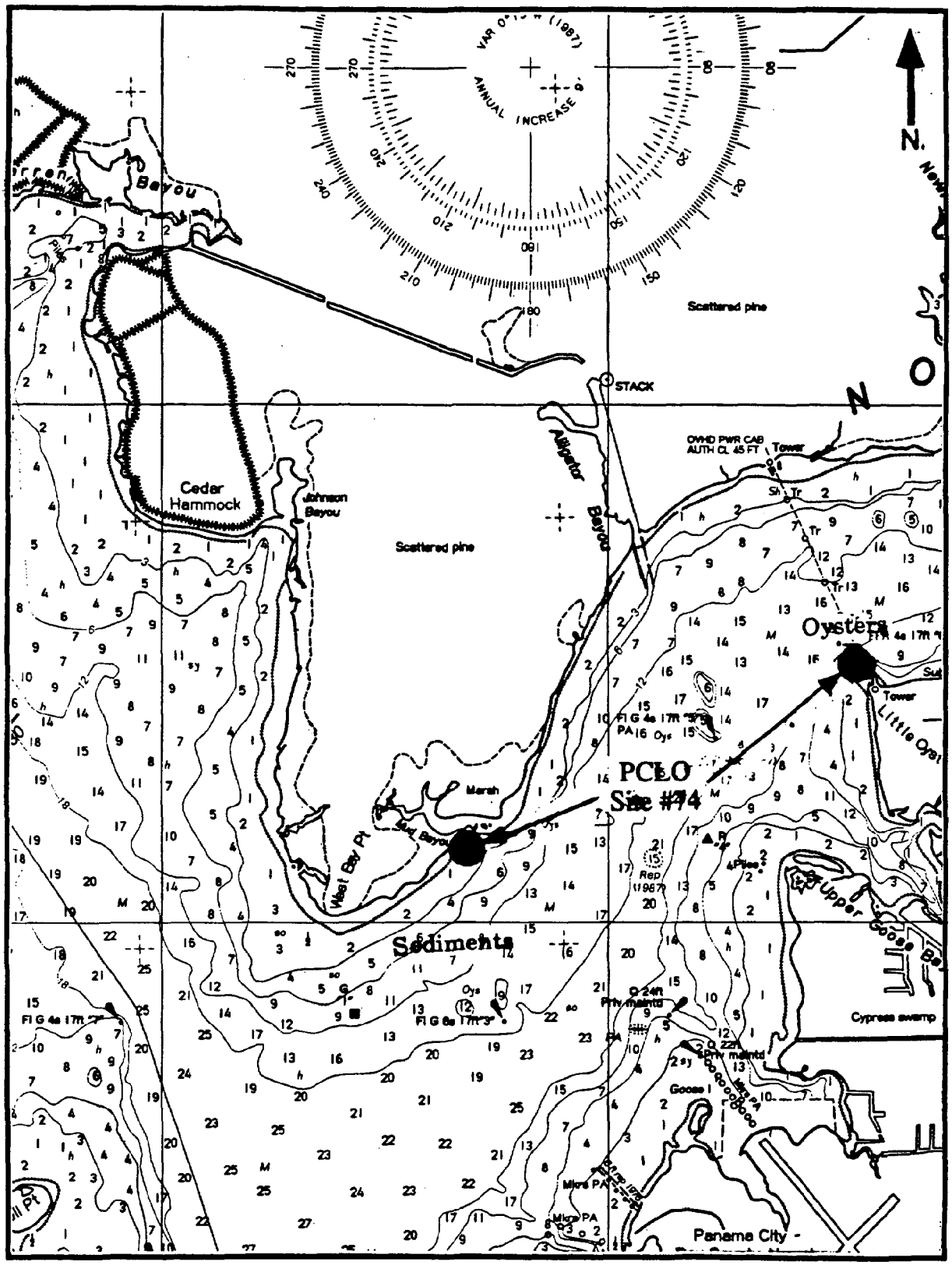
ENVIRONMENTAL DATA

	Salinity (‰)	Temperature (°C)	Dates Sampled
YEAR IV	30.3	20.0	27 January 1989
YEAR V	14.0	15.0	28 January 1990
YEAR VI	18.3	13.2	28 January 1991
YEAR VII	25.0	14.0	24 January 1992
YEAR VIII	18.7	19.0	12 January 1993
YEAR IX	10.0	12.0	17 January 1994

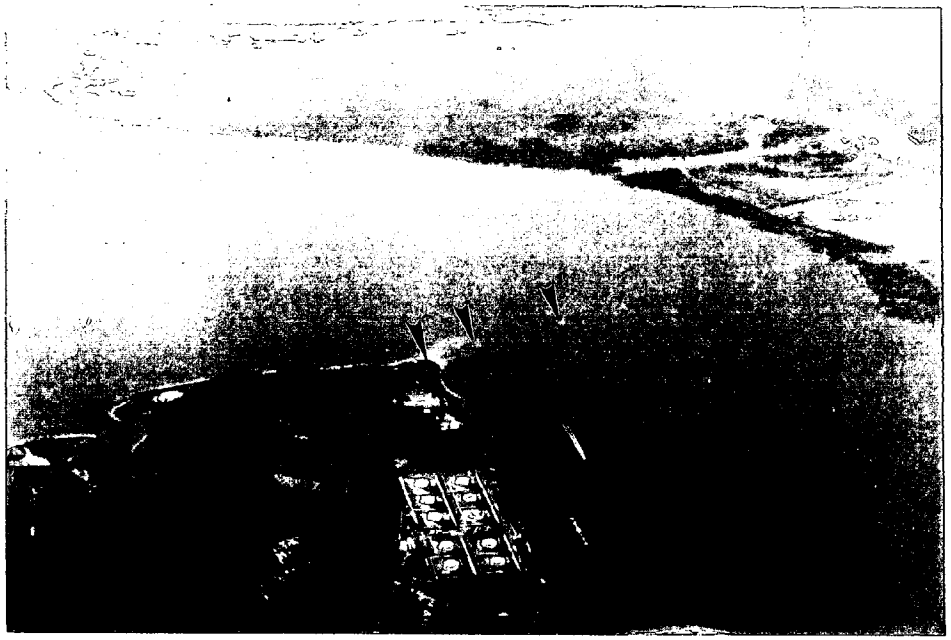


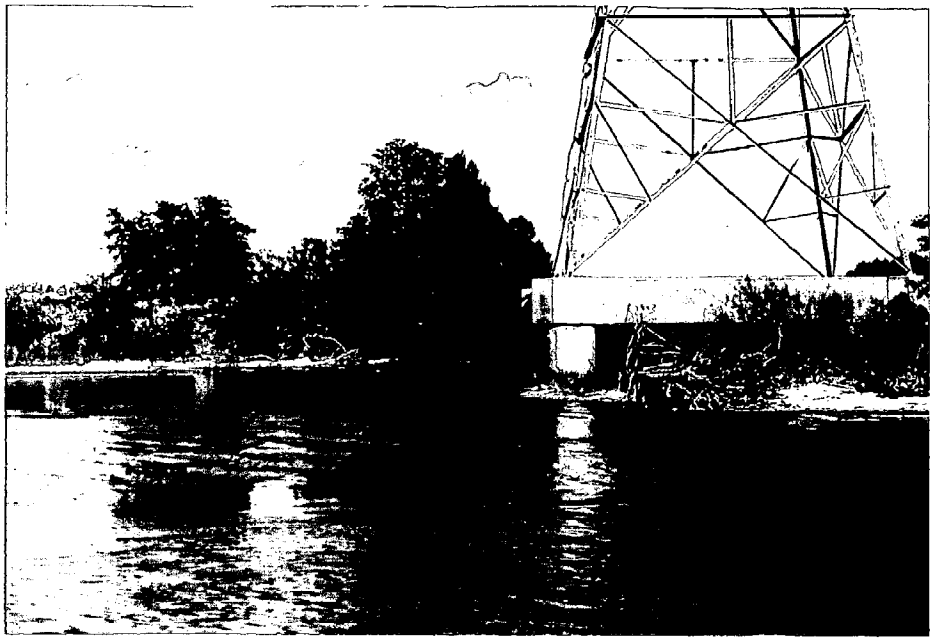
Site #74 (PCLO), Panama City Little Oyster Bay.

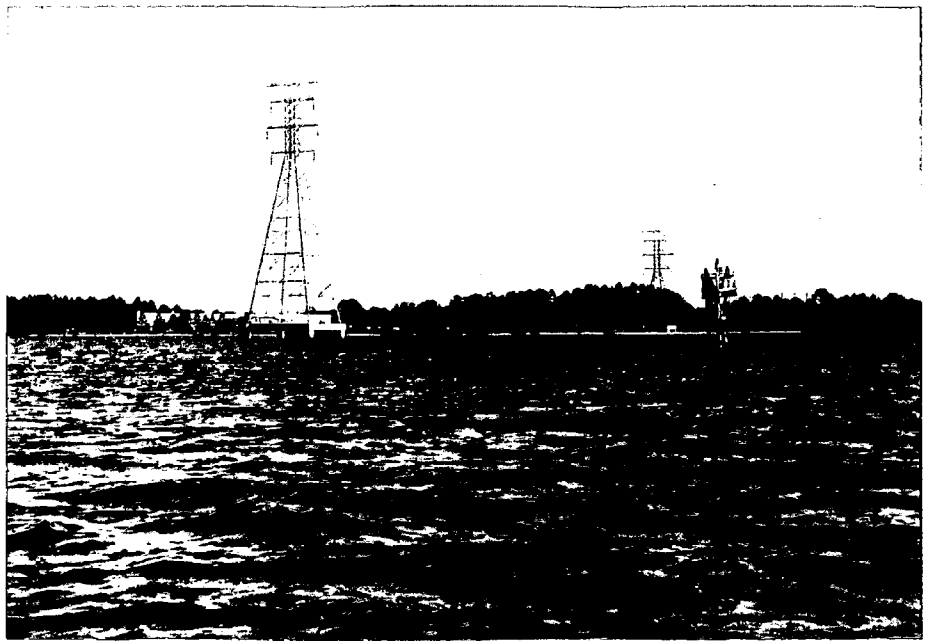
DeLorme Mapping Company. Map Taken from Florida Atlas and Gazetteer. Reproduced with permission.

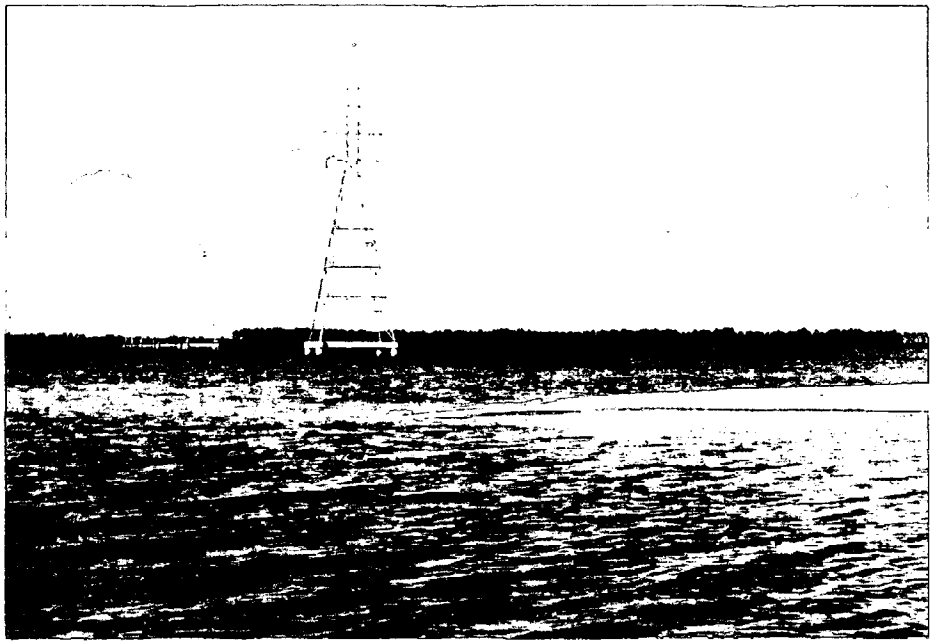


Site #74 (PCLO), Panama City Little Oyster Bay (from chart 11390).









SITE NUMBER 68 **DESIGNATOR** - PCMP

SITE - MUNICIPAL PIER, PANAMA CITY, FL

NOMINAL SITE CENTER - 30°09.00'N 85°39.80'W

LOCATED ON NOS CHART # - 11390

SITE ACCESS - This station is located at the Bay City Marina in Panama City. A boat is necessary to collect this site and is launched at the public boat ramp. All three stations are located at the marina.

SITE DESCRIPTION - This site was not established until Year III and was located at the Bay City Marina. The stations were placed inside and at the entrance of the marina.

OYSTER COLLECTIONS

Year III - Station 1 for both oysters and sediments was located inside the breakwater on the east side of the marina. Oysters were collected along the breakwater and were numerous at and to 0.5 m below the normal high tide line. Station 2 was located opposite Station 1 on the outside of the breakwater. Oysters were slightly less abundant but were still numerous. Oyster Station 3 was located north of Station 2 and outside the breakwater. It was directly east of the parking lot which was north of the boat ramp. Oysters were collected from a submerged concrete mass but were also found below the tide line of the breakwater.

Years IV & V - In both years, the collection sites were the same as was first sampled in Year III. Station 1 was inside the harbor on the bulkhead directly southeast of the boat ramp. Station 2 was outside the marina, directly opposite Station 1. Station 3 was directly north of Station 2 along the concrete bulkhead next to the parking lot at the boat ramp.

Years VI & VII - Oysters were not sampled at this station during these years.

Year VIII - Oysters were collected at the stations described for Year III.

Year IX -The site was not scheduled for collection this year.

SEDIMENT COLLECTIONS

Year III - The only fine grained sediments were at the base of the bulkhead at Station 1. No suitable sediments were found in the vicinity of Stations 2 and 3, nor in any location near the marina.

Years IV & VI - No sediment samples were collected during these years.

Year V - Sediment samples were collocated with each of the three oyster stations.

Years VII, VIII, & IX - Sediments were not sampled during these years.

SAMPLING METHODS

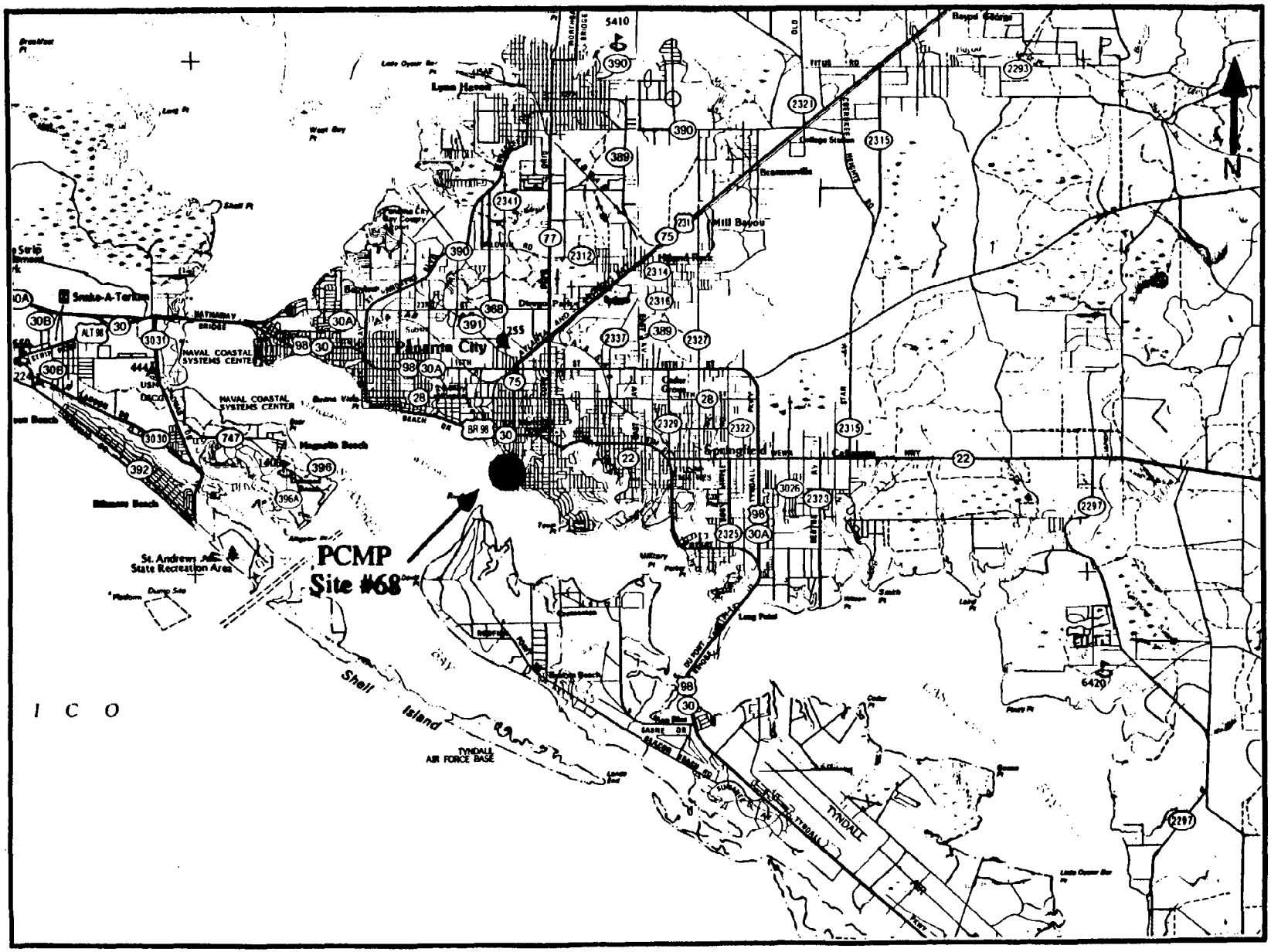
Oysters - tongs and by hand
Sediment - box core

WATER DEPTH - intertidal, 0 to 0.3 meter

POSSIBLE CONTAMINANTS - Potential sources of contamination were likely from the boat traffic in the marina as well as run-off from the nearby streets of downtown Panama City.

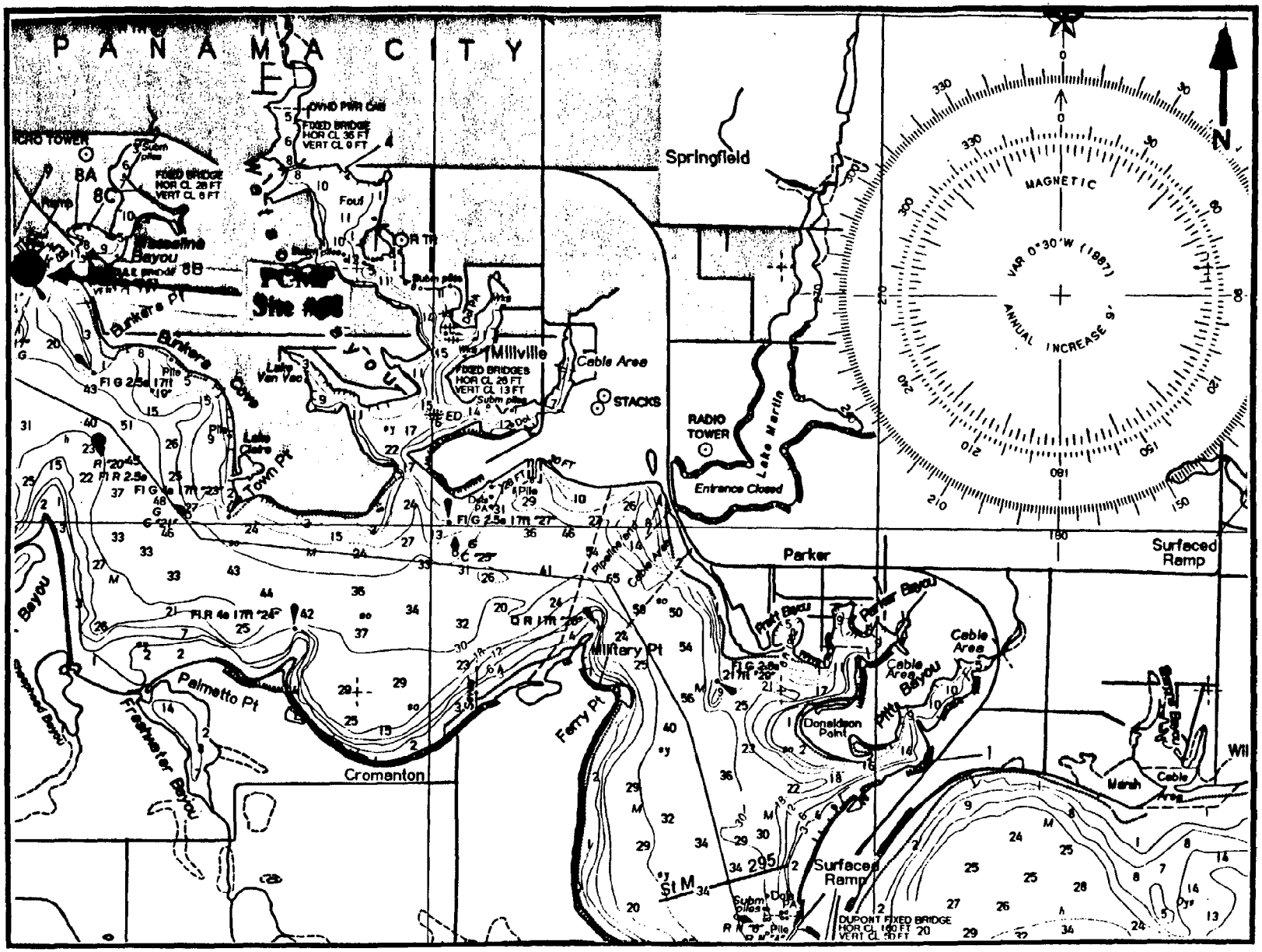
ENVIRONMENTAL DATA

	Salinity (‰)	Temperature (°C)	Dates Sampled
YEAR III	33.0	9.0	18 February 1988
YEAR IV	33.3	16.0	27 January 1989
YEAR V	24.0	15.0	27 January 1990
YEAR VIII	20.0	19.3	12 January 1993

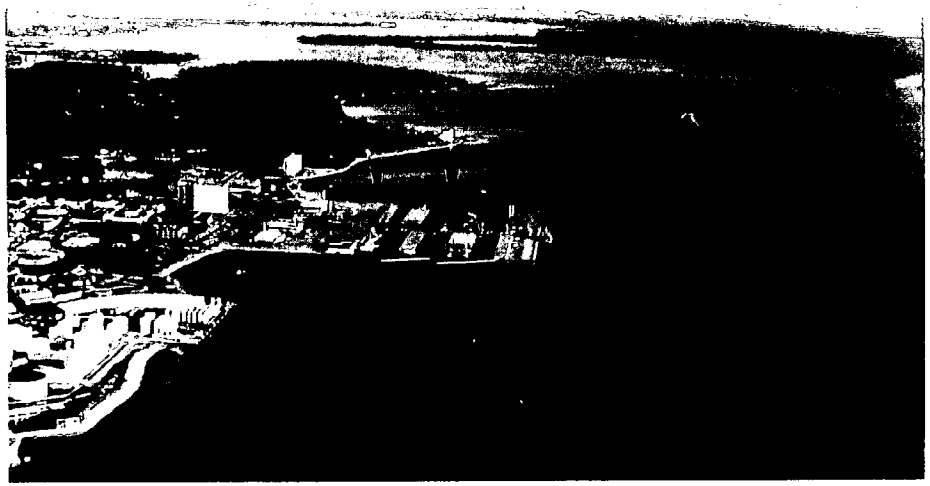


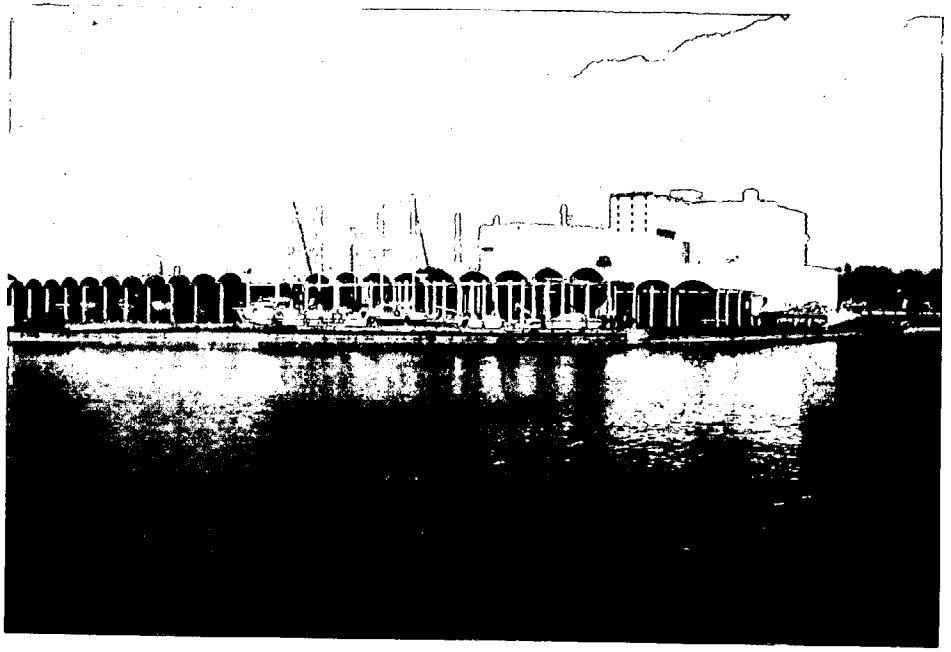
Site #68 (PCMP), Panama City Municipal Pier.

DeLorme Mapping Company. Map Taken from Florida Atlas and Gazetteer. Reproduced with permission.



Site #68 (PCMP), Panama City Municipal Pier (from chart 11390).





SITE NUMBER 40 **DESIGNATOR** - SAWB

SITE - WATSON BAYOU, ST. ANDREW BAY, FL

NOMINAL SITE CENTER - 30° 08.53'N 85°37.92'W

LORAN TD's - 14142.0 46990.4

LOCATED ON NOS CHART # - 11389, 11390

SITE ACCESS - The station is located in Watson Bayou which is located east of the Bay City Marina in Panama City. After collection of the Municipal Pier site travel by east down the ICWW to Watson Bayou. The site is at the first point on the right (east side) after entering the Bayou.

SITE DESCRIPTION - The oysters were attached to rocks on a point of land identified by a former shipyard, just west of the dockage for ships and boats on the channel that led up to the paper mill. Oysters were intertidal, small and sparse.

OYSTER COLLECTIONS

Years I, II, & III - All the oysters were collected at the same location in Years I, II and III. No significant geographic distinction could be made between oyster stations. Landmarks to locate the site were: 352° to the white oil tanks; 78° to the tall smoke stack.

Years IV, V, VI, VII, & VIII - The site was the same as in previous years. All stations were taken from the rock rubble along the shore on the first point on the east side of Watson Bayou.

Year IX - The site was not scheduled to be visited this year.

SEDIMENT COLLECTIONS

Years I, II, & III - Sediments in the entire bay area were coarse sands, except for the upper reaches of the slough leading to the paper mill. Sediments were sampled just south of the small bridge at the paper mill (Station 1), across the channel from the paper mill (Station 3), and slightly upstream (near the outfall pipe) from the paper mill near the upper end of the slough (Station 2). The sediments were a black ooze with the consistency of pudding. Sediments and the air had a peculiar and unpleasant odor.

Years IV & VI - No sediment samples were collected.

Year V - Sediment samples were in the same locations as sampled during the first three years.

Years VII, VIII, & IX - Sediments were not sampled during these years.

SAMPLING METHOD

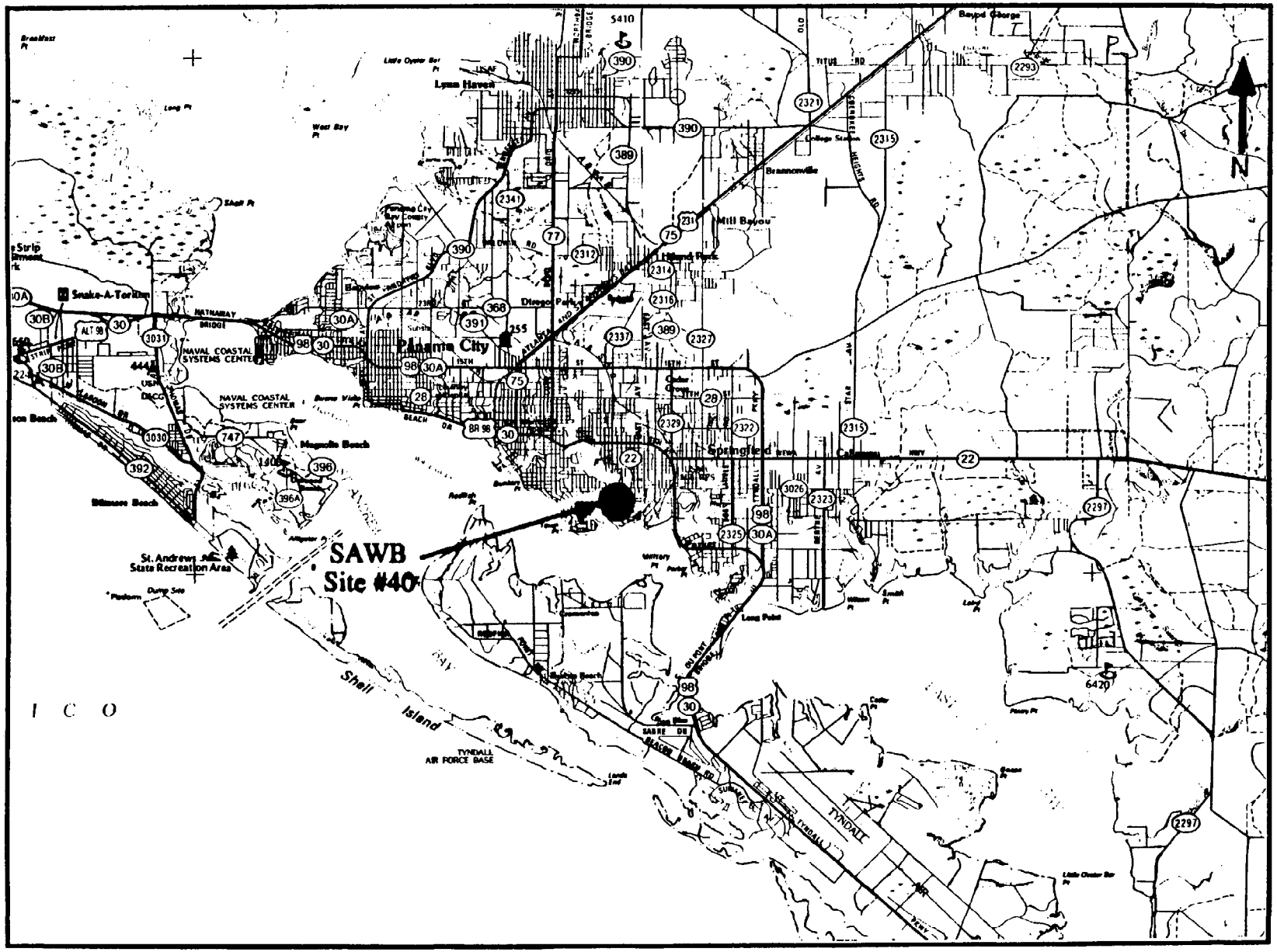
Oysters - hand
Sediments - box core

WATER DEPTH - intertidal, 0 - 0.5 meters

POSSIBLE CONTAMINANTS - Probable contamination would be expected from the dockage facilities around the corner from the site, fuel oil storage and transfer facilities around the embayment, and the effluents from the paper mill.

ENVIRONMENTAL DATA

	Salinity (‰)	Temperature (°C)	Dates Sampled
YEAR I	23.0	15.0	1 March 1986
YEAR II	18.0	14.0	25 February 1987
YEAR III	33.0	9.0	18 February 1988
YEAR IV	32.0	17.0	27 January 1989
YEAR V	20.0	17.0	28 January 1990
YEAR VI	14.0	14.0	28 January 1991
YEAR VII	24.0	14.0	24 January 1992
YEAR VIII	20.0	18.0	12 January 1993



Site #40 (SAWB), St. Andrew Bay Watson Bayou.

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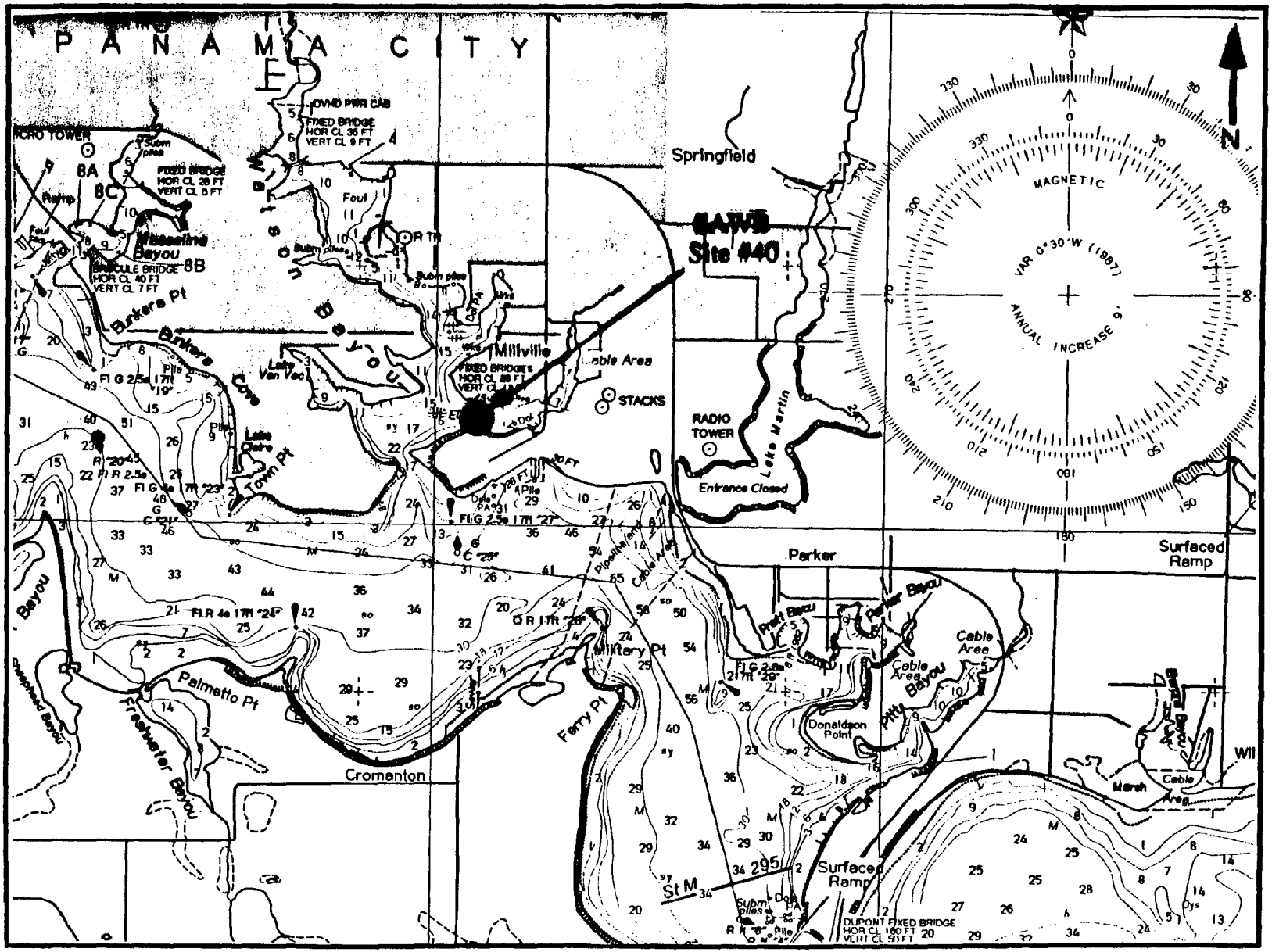
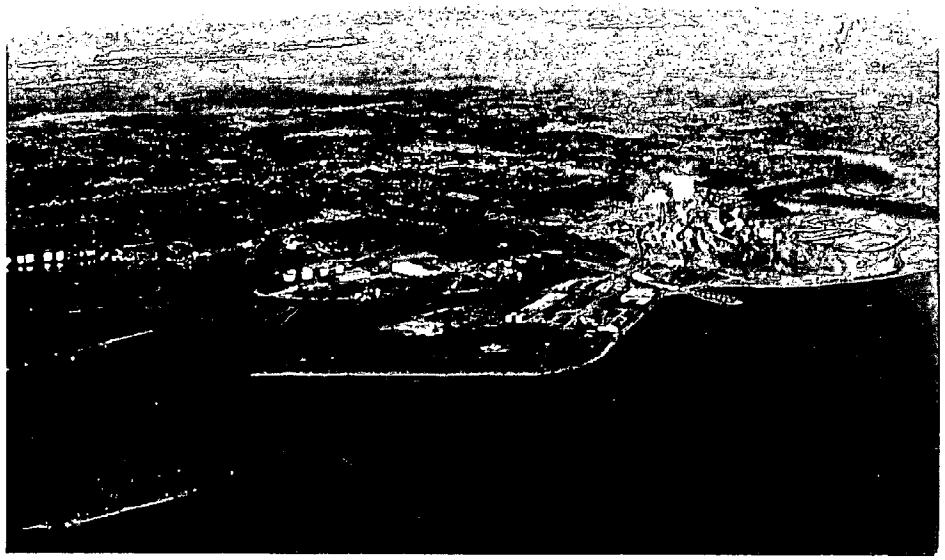
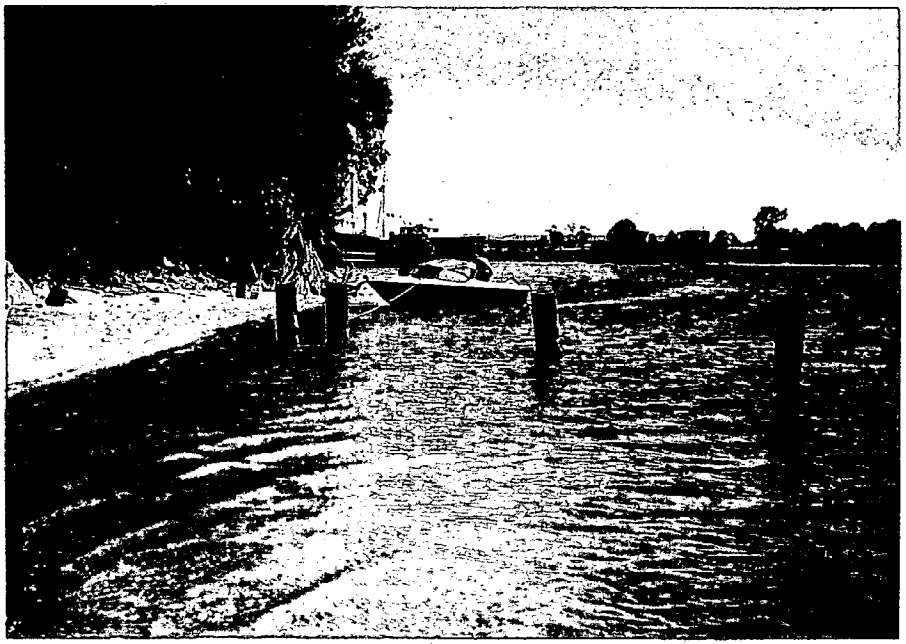


Site #[redacted]SA[redacted], St. Andrew Bay Watson Bayou (from chart 11390).





SITE NUMBER 41 **DESIGNATOR** - APDB

SITE - DRY BAR, APALACHICOLA BAY, FL

NOMINAL SITE CENTER - 29°40.45'N 85°04.40'W

LOCATED ON NOS CHART # - 11402, 11404

SITE ACCESS - The site is accessed by a 30 minute boat ride originating at the ramp in Apalachicola near the southwest end of the John Gorrie Memorial Bridge. Proceed west along the inside channel to the first channel going south into Apalachicola Bay. Run a compass course (bearing 250°) to the northeast end of St. Vincent Island at St. Vincent Point.

SITE DESCRIPTION - The site was located on the northeast corner of St. Vincent Island at St. Vincent Point. Oysters were located north of the point on subtidal shell and sand bottom.

OYSTER COLLECTIONS

Year I - Stations were located in a line running south to north. Station 3 was at bearing of 330° from St. Vincent Point, 105° from Green Point and 60° from the Apalachicola Bay drawbridge. During Year I stations were submerged.

Year II - Year II samples were collected by hand from an abundant oyster population. Stations were oriented in a west to east direction paralleling St. Vincent Point. Station 1 was located on the west end of the bar, Station 2 was 200 m east of Station 1, and Station 3 was 200 m farther east.

Year III - Year III oysters were collected at the same sites as Year II, but the oysters were tonged due to high tidal conditions.

Years IV, V, VI, VII, & VIII - Oysters were collected by hand at the same location described for Year II.

Year IX - The site was not scheduled for collection this year.

SEDIMENT COLLECTIONS

Year I - Sediments were obtained from one location 30 m to the east of oyster Station 3.

Year II - No sediments of an appropriately fine texture were found anywhere near the oyster site. Sediments were taken from the mouth of the Apalachicola River near St. Vincent Island which is south of the bridge.

Years III, IV, V, VI, VII, VIII, & IX - Sediments were not sampled during these years.

SAMPLING METHOD

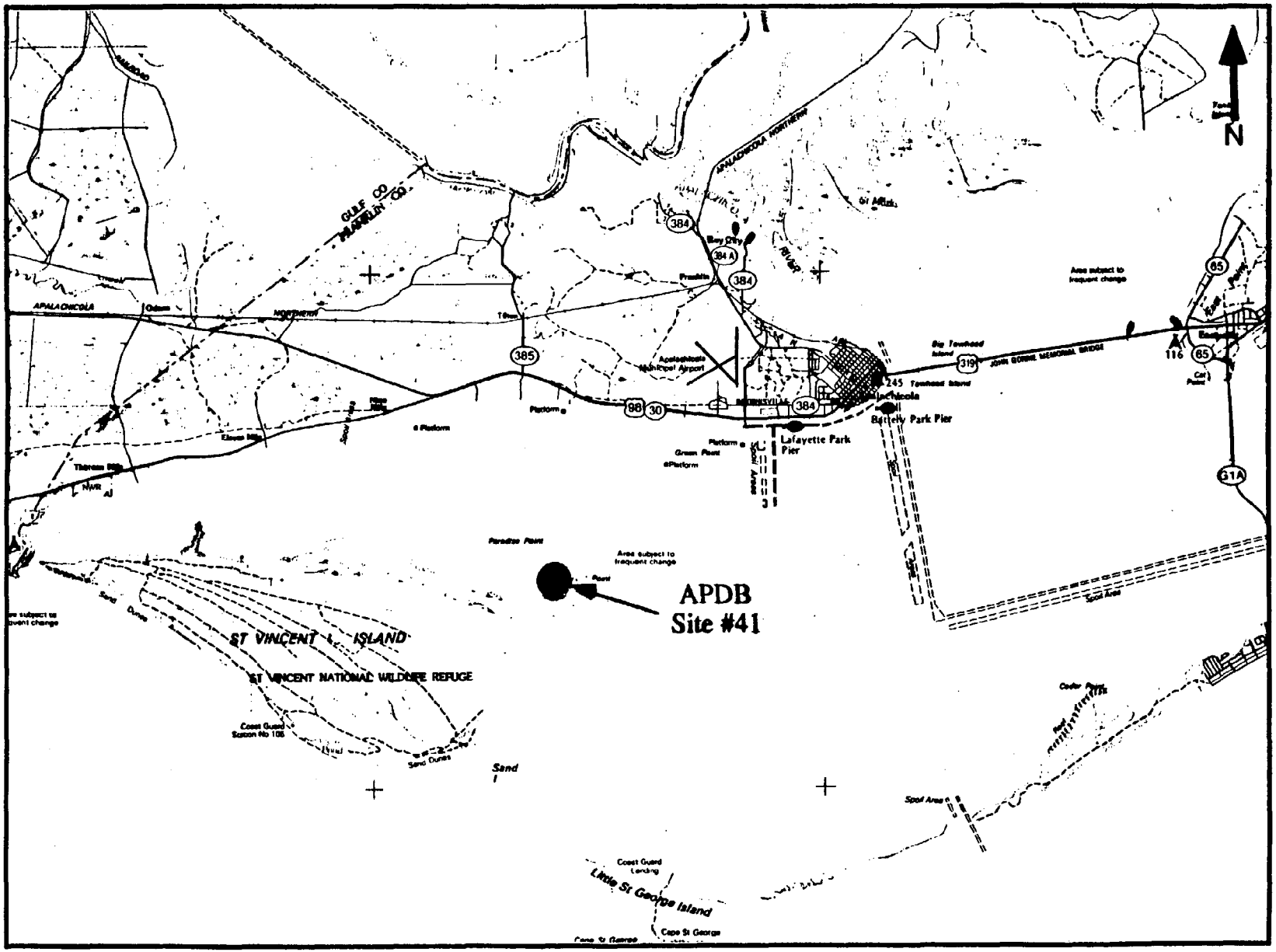
Oysters - tongs and by hand
Sediment - box core

WATER DEPTH - intertidal, 0 to 1 meter

POSSIBLE CONTAMINANTS - Contamination factors included the river, rusty iron dump near samples, and ship traffic.

ENVIRONMENTAL DATA

	Salinity (‰)	Temperature (°C)	Dates Sampled
YEAR I	13.0	17.0	28 February 1986
YEAR II	7.6	17.0	27 February 1987
YEAR III	17.0	12.0	18 February 1988
YEAR IV	20.0	18.0	28 January 1989
YEAR V	3.0	16.0	27 January 1990
YEAR VI	10.0	13.0	28 January 1991
YEAR VII	15.0	13.0	24 January 1992
YEAR VIII	5.0	20.0	13 January 1993



Site #41 (APDB), Apalachicola Bay Dry Bar.

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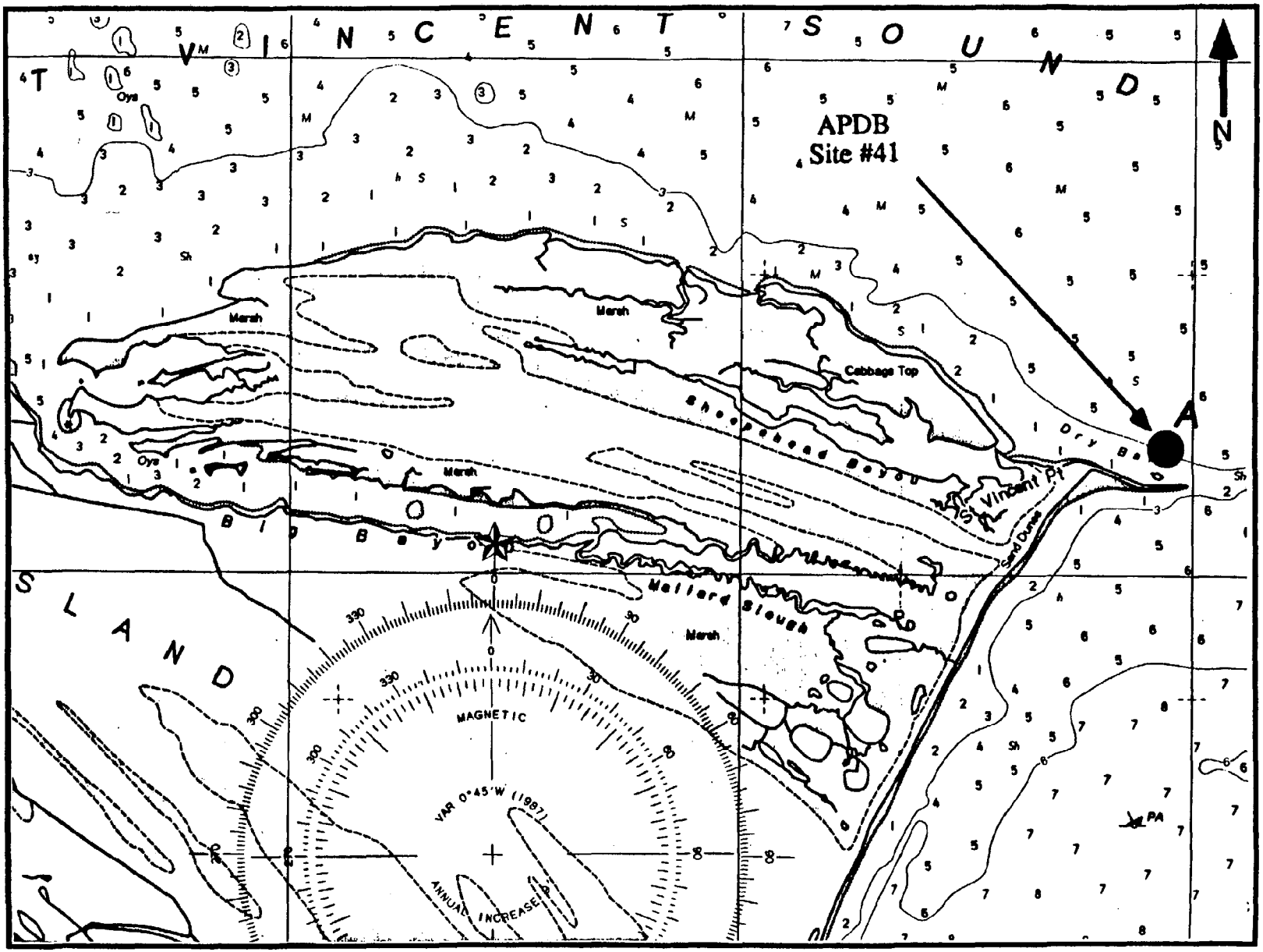
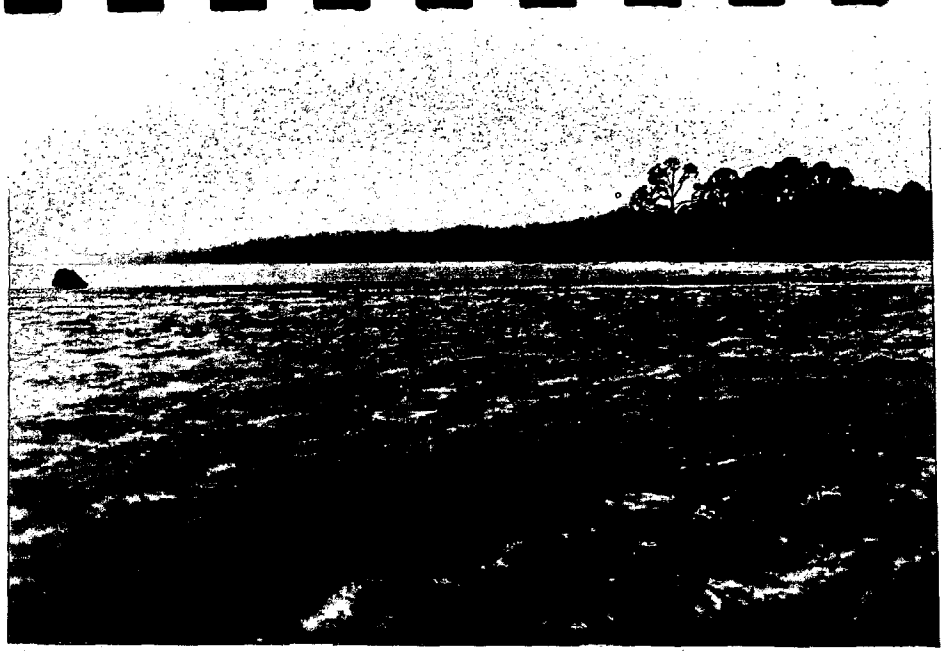


Site #41 (APDB), Apalachicola Bay Dry Bar (from chart 11402).



SITE NUMBER 42 **DESIGNATOR** - APCP

SITE - CAT PT. BAR, APALACHICOLA BAY, FL

NOMINAL SITE CENTER - 29°43.45'N 84°53.05'W

LOCATED ON NOS CHART # - 11404, 11402

SITE ACCESS - This is a walk-up site from the beach at low tide. It is accessed by boat when tides are high. To reach the site drive south on road G1A to the toll booth. Turn left on the dirt road to the east to East Point Beach. Park and walk to East Point Beach where oysters can be picked up by hand at low tide. If the tide is high the boat can be launched at one of the ramps on Highway 30, which is east of the site.

SITE DESCRIPTION - The site was located at Cat Point. The reef was exposed at low tide and was the major source for oysters in eastern Apalachicola Bay. At high tide the oysters were collected by tonging.

OYSTER COLLECTIONS

Year I - Oysters were collected by hand along the exposed reef. Station 1 was 100 m off the beach, south of East Point. Station 2 was located 100 m south of Station 1 ~200 m offshore. Station 3 was east of Stations 1 and 2 ~25 m offshore.

Year II - During Year II, the boat was launched from the ramp in the boat basin at the town of East Point (two blocks south of Highway 98). It was a five minute ride to the tonging site on a large reef that parallels the telephone poles crossing the bay. The oyster site was 200 m east of telephone pole #6 (bearing 260° to sixth pole from shore). Oysters were abundant but tonging was required; dredges were not permitted in Apalachicola Bay. Oysters were collected for all stations at one place in Year II.

Years III, IV, V, & VI - Samples were taken at the Year II station locations. However, since the tide was low, the oysters were collected by hand and separate stations were established. Oysters stations were ~100 m apart. Station 1 was at the north end of the reef, Station 2 in the middle and Station 3 was at the south end.

Years VII & VIII - Samples were taken at the same locations described for Year III.

Year IX - The site was not scheduled to be visited this year.

SEDIMENT COLLECTIONS

Year I - Sediments for the first year were located just off the reef (east and northeast) collocated with each oyster station. The sandy mud sediments were as fine a texture as could be found in the area.

Year II - Sediment Station 1 was located 500 m east of #6 pole. Station 2 was 500 m east of the 8th pole. Station 3 was 500 m east of the 4th pole. The substrate was sandy mud with small shell fragments.

Year III - Sediments were collected 500 m east of the oyster stations. Sediments were fine silt over sand.

Years IV, V, VI, VII, VIII, & IX - Sediments were not sampled during these years.

SAMPLING METHOD

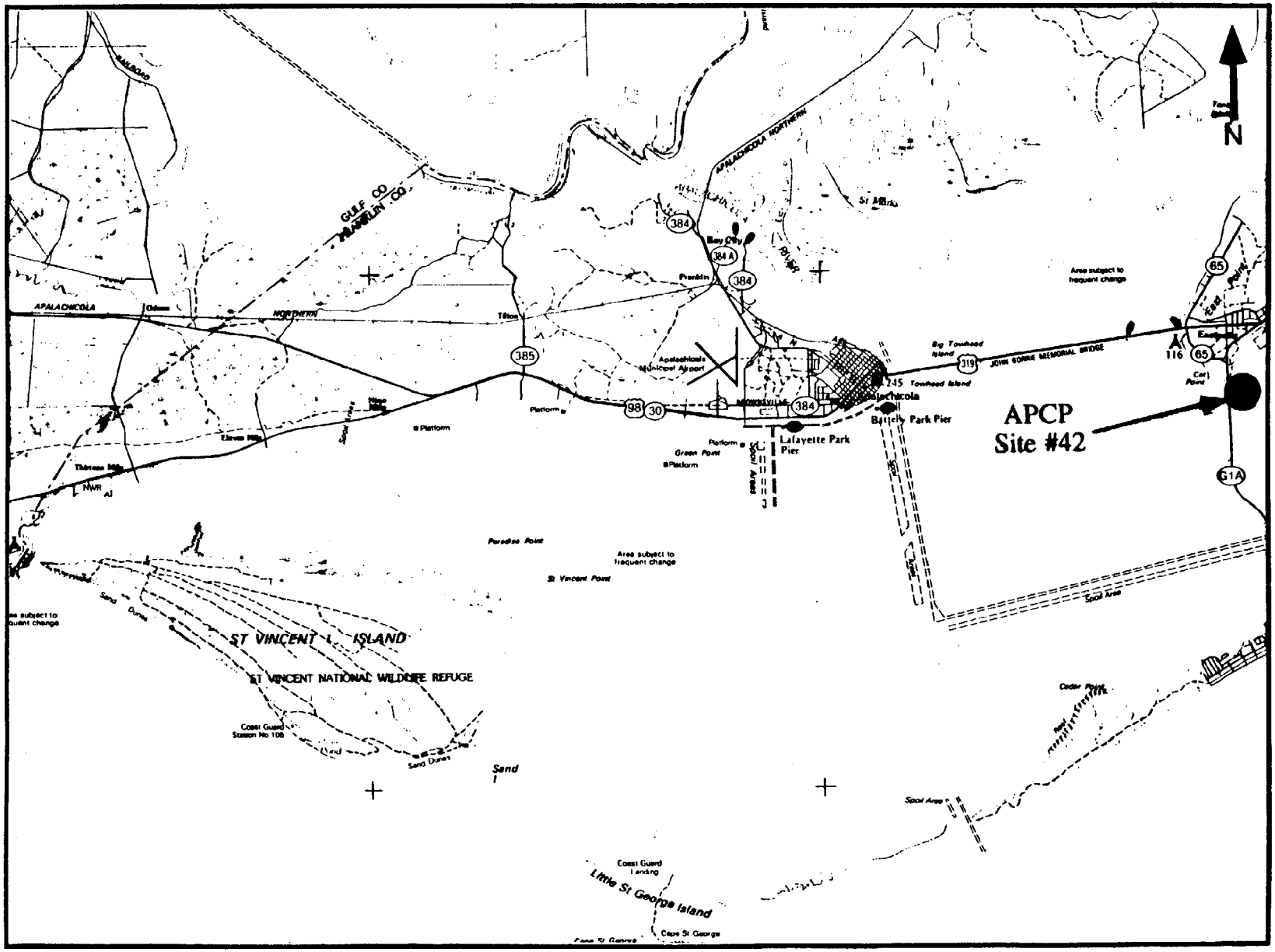
Oysters - tongs and by hand
Sediment - box core

WATER DEPTH - intertidal, 0 to 0.7 meters

POSSIBLE CONTAMINANTS - No sources of contamination were evident.

ENVIRONMENTAL DATA

	Salinity (‰)	Temperature (°C)	Dates Sampled
YEAR I	7.0	18.0	27 February 1986
YEAR II	30.0	15.0	26 February 1987
YEAR III	15.0	12.0	18 February 1988
YEAR IV	33.0	12.0	28 January 1989
YEAR V	9.0	20.0	28 January 1990
YEAR VI	22.3	14.0	28 January 1991
YEAR VII	11.3	11.0	24 January 1992
YEAR VIII	20.0	19.0	13 January 1993



Site #42 (APCP), Apalachicola Bay Cat Point Bar.

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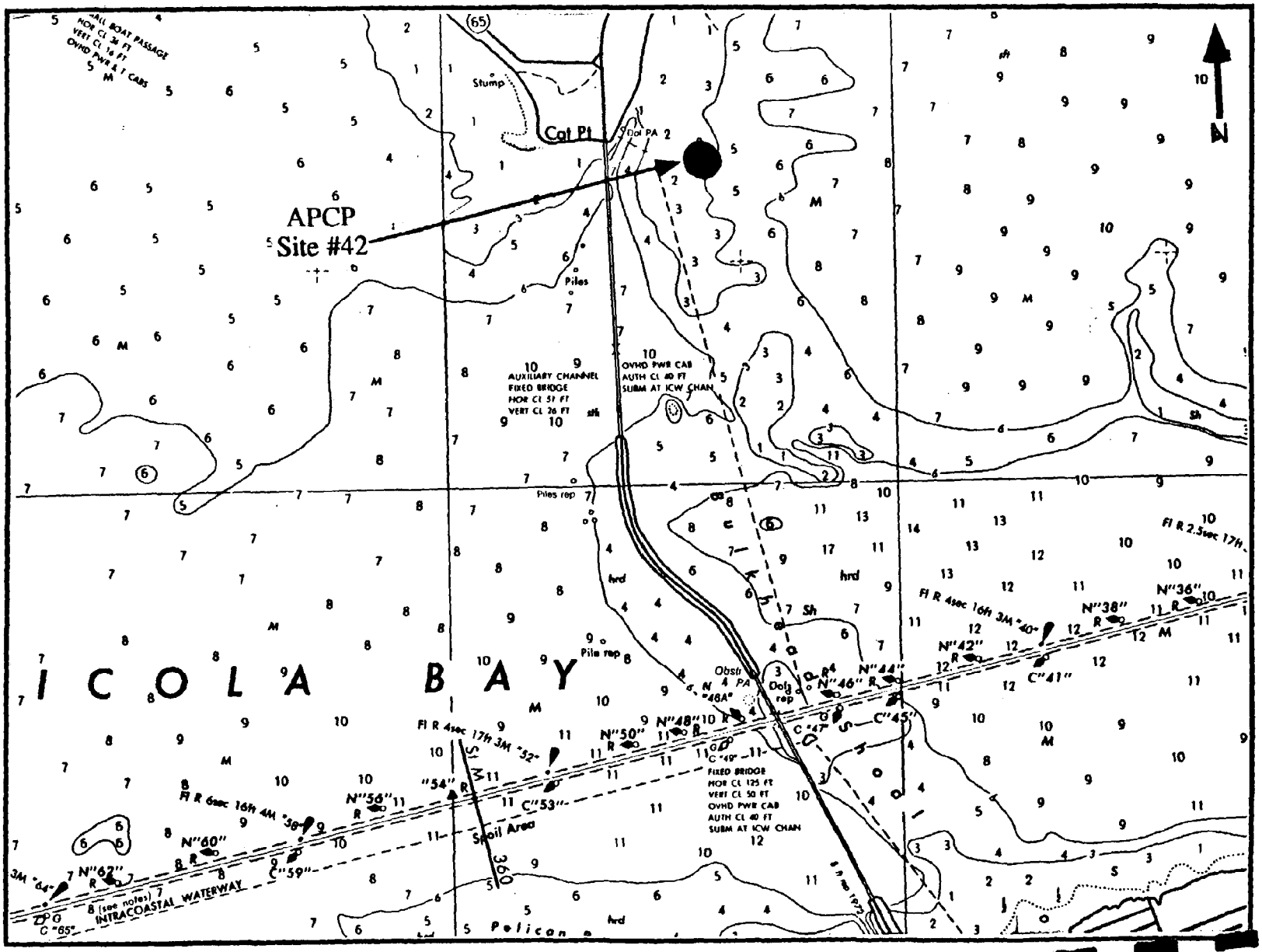
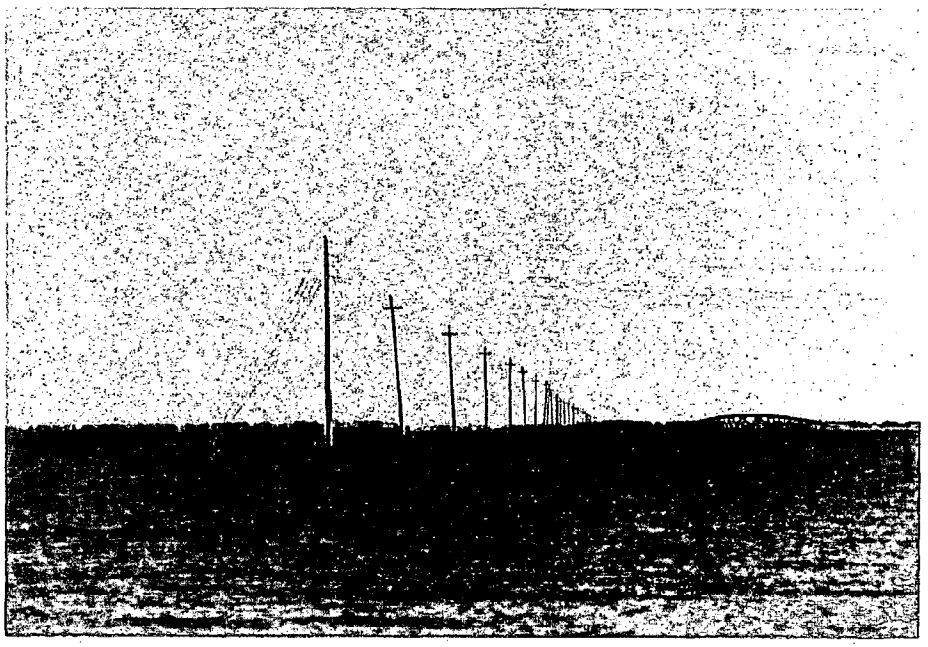
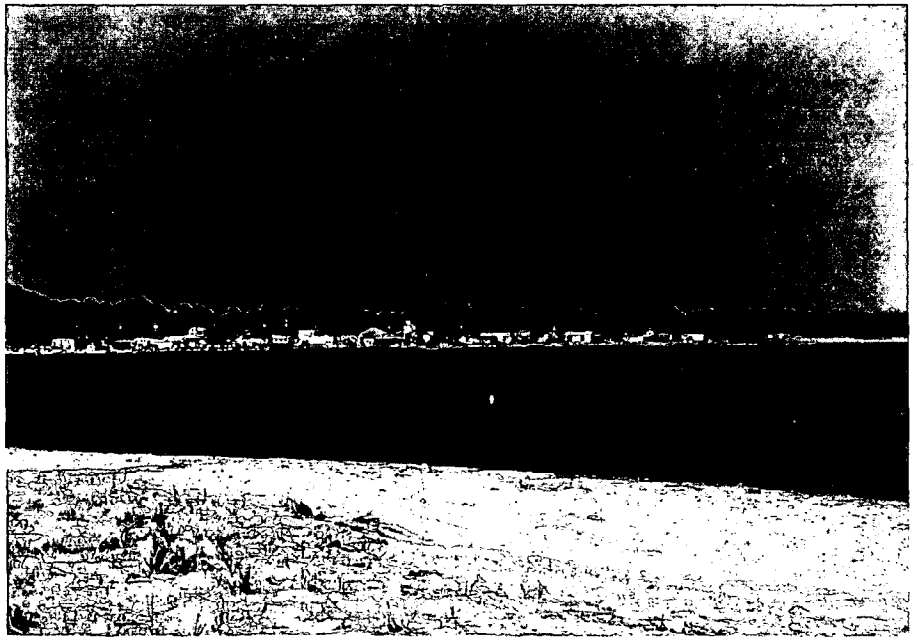
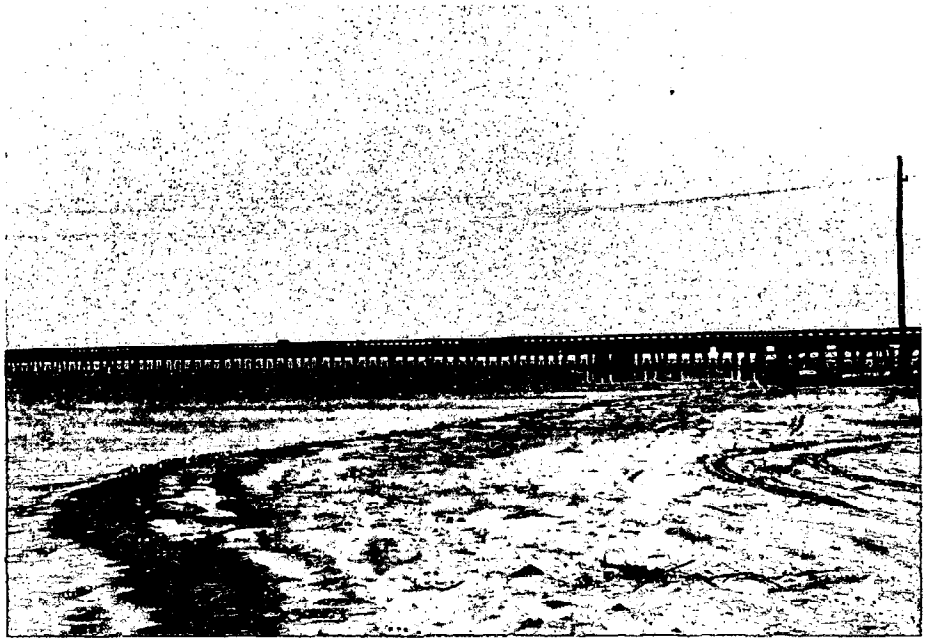


Site #42 (APCP), Apalachicola Bay Cat Point Bar (from chart 11[redacted]







SITE NUMBER 75 **DESIGNATOR** - AESP

SITE - SPRING CREEK, APALACHEE BAY, FL

NOMINAL SITE CENTER - 30°03.75'N 84°19.37'W

LOCATED ON NOS CHART # - 11405

SITE ACCESS - To reach the site turn off of U.S. Highway 98 onto 375 and proceed to Highway 365. Turn right and go to the end of the road. The Spears Seafood Company at the end of the road has a launch that can be used. Proceed out the marked channel to the collection site.

SITE DESCRIPTION - This site, which was established in Year IV, was located on the west side of Apalachee Bay where Spring Creek enters Oyster Bay. Sampling stations were located in the midst of very prolific reefs where Spring Creek entered Oyster Bay. The site was located along an "S"-shaped reef 300 m south of channel markers 31 and 32, and northwest to southwest of channel markers 29 and 30.

OYSTER COLLECTIONS

Year IV - Year IV oysters were sampled by hand from the intertidal parts of the reef. Station 1 was at the north end of the exposed part of the reef which extends as a subtidal portion farther north into the marsh. Station 3 was at the south end of this reef. Station 2 was located on the east side of the reef, mid-way between 1 and 3. Reef length was 300 m.

Year V - Collection locations were the same as established last year. The number of oysters were much reduced from last year. Most of the reef was composed of dead shells.

Year VI - Station locations were the same as last year. Oysters were more abundant than last year.

Years VII, VIII, & IX - Station locations were at the same sites as originally established in Year IV.

SEDIMENT COLLECTIONS

Year IV - Sediments for Station 1 were taken about 100 m from the reef, midway and on a line from the north end of the reef to channel marker 29. Stations 2 and 3 sediments were located adjacent to the oyster stations about 25 and 50 m, respectively, from each station on the east side of the reef.

Year V - Sediments were collected adjacent to each oyster station. Station 1 was from the west side of the reef 10 m from the shoreline. Station 2 was also on the west side of the reef 10 m from the shore adjacent to the oyster station.

Station 3 was 5 m from the reef on the west side. Sediments were composed of fine grained black silt in pockets over shell and shell hash.

Years VI, VII, VIII, & IX - Sediments were not sampled during these years.

SAMPLING METHODS

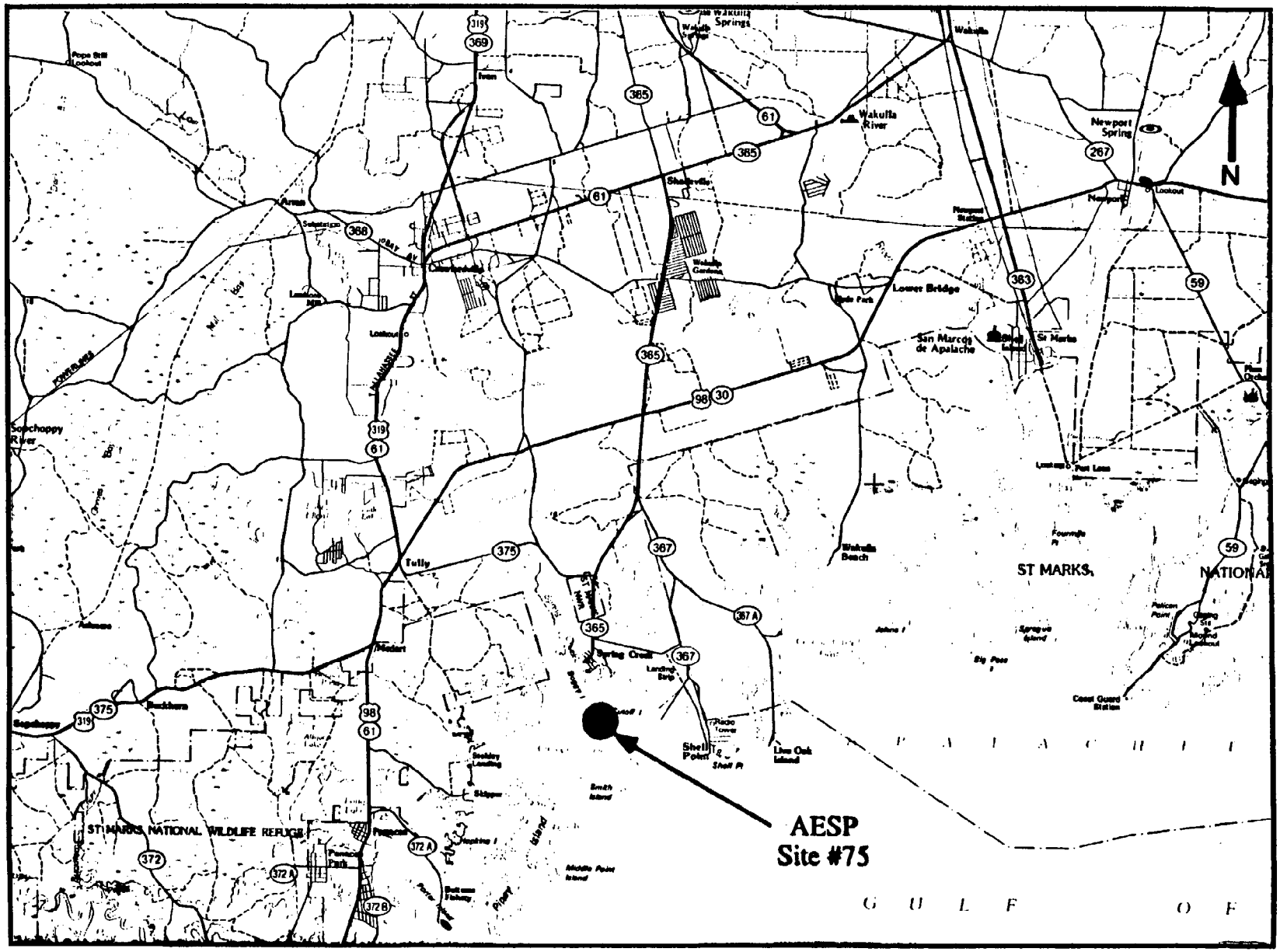
Oysters - hand
Sediment - box core

WATER DEPTH - intertidal, 0 - 0.5 m.

POSSIBLE CONTAMINANTS - There were no obvious contamination sources, although the site was located in waters which were closed and/or conditional to shellfish harvesting.

ENVIRONMENTAL DATA

	Salinity (‰)	Temperature (°C)	Dates Sampled
YEAR IV	15.7	17.0	28 January 1989
YEAR V	8.3	19.0	29 January 1990
YEAR VI	1.0	15.0	29 January 1991
YEAR VII	22.0	15.0	30 January 1992
YEAR VIII	5.0	20.0	13 January 1993
YEAR IX	13.3	15.0	18 January 1994



Site #75 (AESP), Apalachee Bay Spring Creek.

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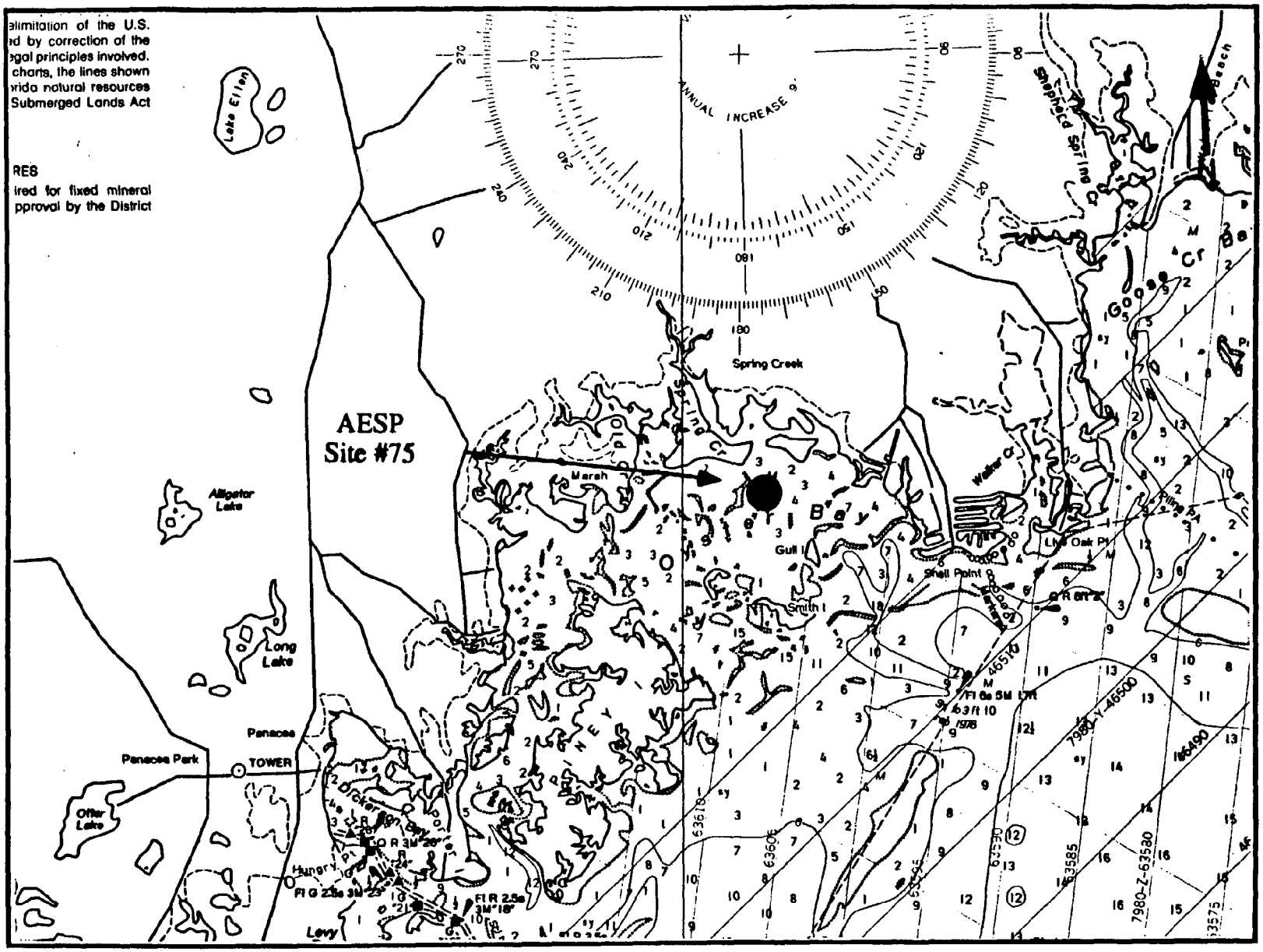
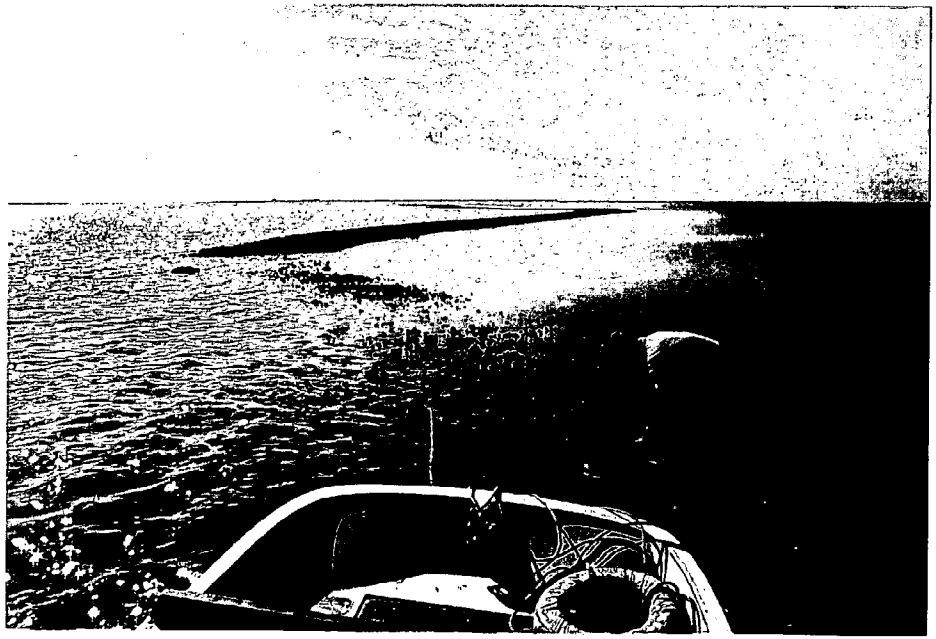


Site #75 (AESP), Apalachee Bay Spring Creek (from chart 11405).



SITE NUMBER 69 **DESIGNATOR** - SRWP

SITE - WEST PASS, SUWANNEE RIVER, FL

NOMINAL SITE CENTER - 29°19.75'N 83°10.45'W

LORAN TD's - NA

LOCATED ON NOS CHART # - 11408

SITE ACCESS - Established in Year III, this site is accessible only by small boat. Access is from the Suwannee Marina located near the middle of the town. From the boat launch proceed southwest to the first channel to the north. Proceed slowly up the channel which passes through Suwannee. The channel passes under a bridge then bends left, passes under another bridge and then turns left and then right. Turn north at the last house on the right into another channel and proceed until it intersects a channel with markers. Proceed out to channel marker 20 and go north for ~2 km to Cat Island.

SITE DESCRIPTION - This site was established and sampled only in Year III. Oysters were collected along the margins of Cat Island. Reefs were numerous east of Cat Island and were exposed at low tide. The margins of the islands were covered with *Spartina alterniflora*.

OYSTER COLLECTIONS

Year III - Oyster Station 1 was located on the northeast shore of Cat Island between a topless palm and a pole in the water. At low tide the reef is exposed and numerous small oysters are present. Oysters can be collected by hand or tonged. Station 2 was a subtidal reef with an exposed intertidal portion. It was located between Cat Island and a small island to the northeast. Station 3 was ~50 m north of Station 1 on the north side of the same reef. Oysters at all three stations could be collected by hand at low tide but had to be tonged at high tide.

Years IV, V, VI, VII, VIII, & IX - The site was not sampled during these years.

SEDIMENT COLLECTIONS

Year III - Sediment Station 1 was collected along the intertidal marsh on the east side of Cat Island. Station 2 was in a small inlet directly east of the second oyster station. Sediment was a peaty/organic sandy mud. Station 3 was collected several hundred meters away from the other station. This station was collected when returning to the ramp, after a turn north at channel marker 22 into a cove that ran west from the main channel. A sawgrass marsh surrounded this site and the sediments were an organic peaty mud.

Years IV, V, VI, VII, VIII, & IX - Sediments were not sampled during these years.

SAMPLING METHODS

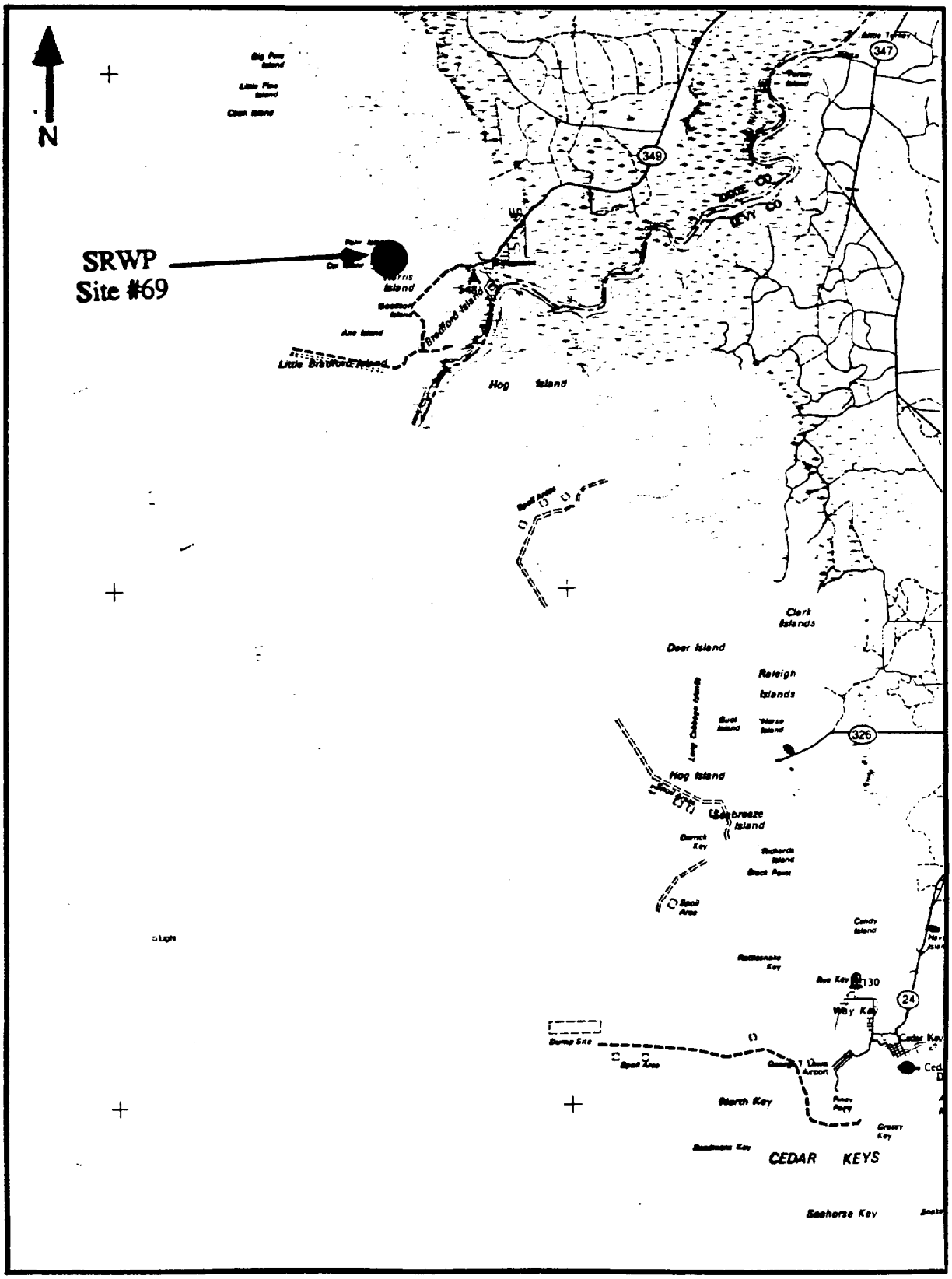
Oysters - tongs and by hand
Sediment - box core

WATER DEPTH - intertidal, 0 - 1 meter

POSSIBLE CONTAMINANTS - No contaminant sources were identified at this site.

ENVIRONMENTAL DATA

	Salinity (‰)	Temperature (°C)	Dates Sampled
YEAR III	13.0	15.0	19 February 1988



Site #69 (SRWP), Suwanee River West Pass.

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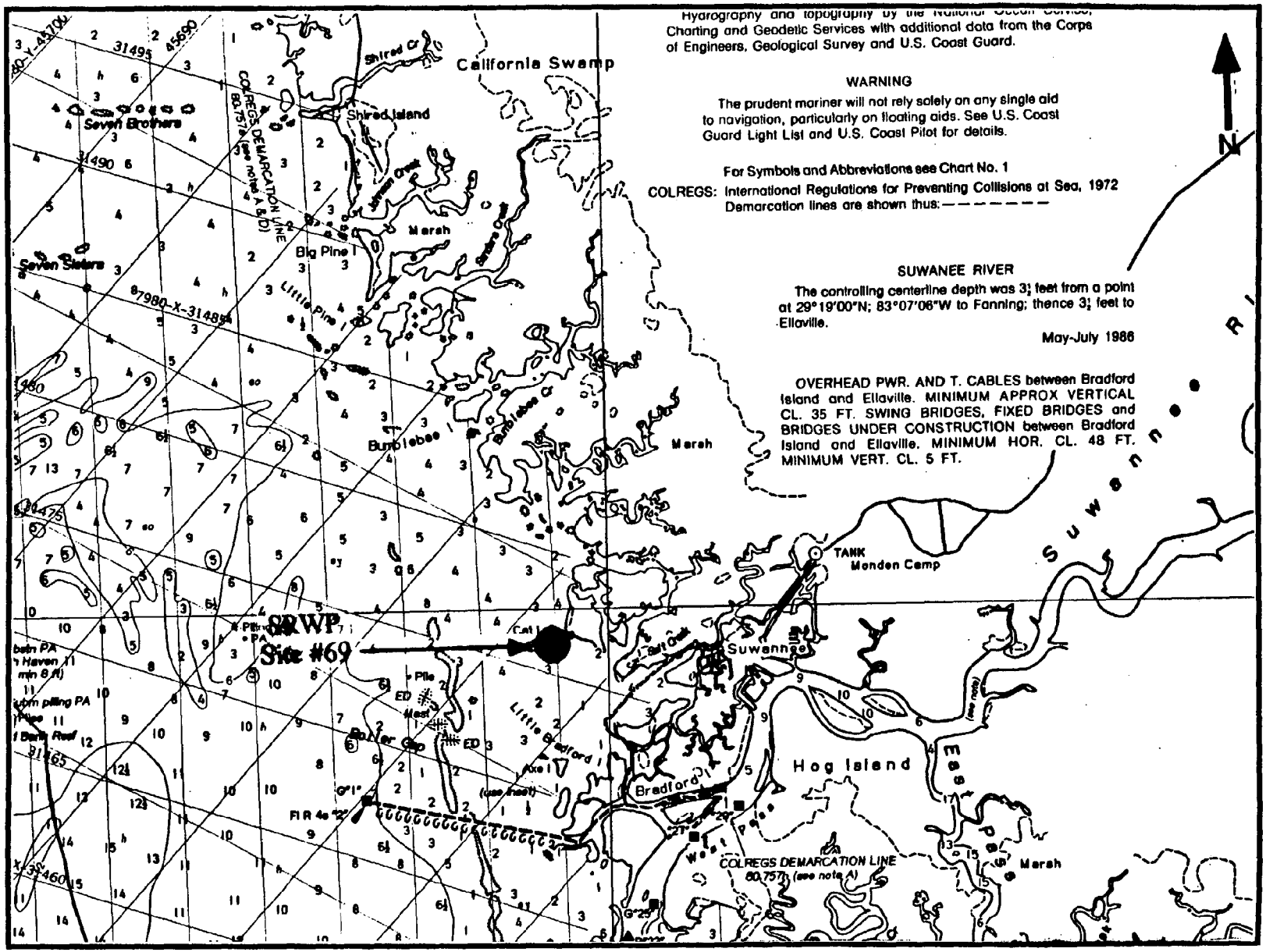
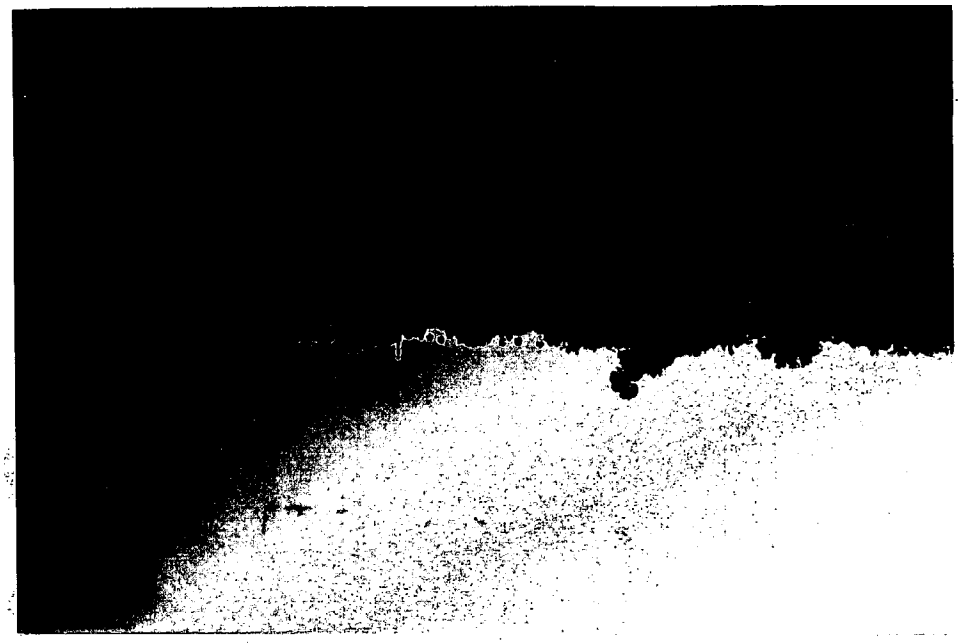


Site #69 (SRWP), Suwanee River West Pass (from chart 11408).



SITE NUMBER 43 **DESIGNATOR** - CKBP

SITE - BLACK POINT, CEDAR KEY, FL

NOMINAL SITE CENTER - 29°12.32'N 83°04.25'W

LOCATED ON NOS CHART # - 11408

SITE ACCESS - Access to the site in Years I and II was by boat launched at the city boat basin at the end of Highway 24 in Cedar Key. Shoals require that the channel markers be followed from the city marina to Derreck Key. The oyster site is located on the northeast side of a "U" shaped island adjacent to channel marker 2 at Derreck Key. Approximate run time to the site is an hour. In Year III, the boat was launched at a boat ramp north of Cedar Key at the end of Highway 326 off of Highway 347. The ramp is very shallow and launching at low tide is difficult, but the site can be reached in less than 10 minutes. From the boat ramp go south ~ 1 km.

SITE DESCRIPTION - Oysters were collected from the subtidal perimeter of the small island. At low tide there were numerous exposed oyster reefs. The oyster site was located at a crescent-shaped reef with smooth cordgrass on the west side, west of an island with three palm trees and one topless palm. The stations were located inside the crescent.

OYSTER COLLECTIONS

Year I - Year I oysters were collected from the perimeter of the small island in subtidal and intertidal water. Station 1 was at the mouth of a creek 0.75 miles from Black Point on a bearing of 125°. Other bearings to locate the site were 245° from the radio tower, 285° from the bridge center, and 345° from the water tower. Station 2 was an exposed reef 220° from Station 1. Local landmarks had a bearing of 250° from the radio tower, 284° from the bridge and 350° from the water tower. Station 3 was 300 m from Station 1 on a bearing of 120°.

Year II - Significant geographic differentiation of the oyster stations was not possible this year. Bearings to local landmarks were 262° to channel marker 2, 149° to the Cedar Key water tower, and 317° to green channel marker 5. The oysters were collected by hand from subtidal and intertidal clumps which made up the island.

Year III - In Year III, samples were collected in approximately the same location as Year II. The site was a crescent shaped reef covered with smooth cordgrass. An obvious landmark to locate the site was the three palm trees due east of the site. All three station were located from inside the crescent on the east side Station 1 was in the middle. Station 2 was on the north end. Station 3 was at the south end. Oysters were collected by hand and tongs.

Year IV - Year IV stations were collected in the same locations as Year III. Oysters were very small in large clumps and the shells were very thin.

Year V - Oyster stations were in the same location as previously collected. Oysters were much less numerous this year.

Year VI - Collection sites remained the same as those sampled last year (29°10.25'N, 83°03.00'W), but oysters were smaller and less numerous.

Year VII - Due to extremely low tidal conditions the boat could not be launched this year; therefore, the site was moved approximately 1 km to the north (29°12.28 north 83°04.34 west), adjacent to the boat launch area. There are numerous reefs in the vicinity of the launch area. All three stations were located on the south side of the launch area. Station 1 was 50 m south of the launch, Station 2 was 50 m farther south , and Station 3 was another 50 m to the south.

Year VIII, & IX - Oysters were collected at the same stations as described for Year VII.

SEDIMENT COLLECTIONS

Year I - Sediments were collocated with each of the oyster stations.

Year II - Sediments were taken from isolated pockets of sandy, shelly mud on the inside curve of the island and were adjacent to each oyster station. Many shell fragments were present over the entire bottom. A box core and wading was required to locate and retrieve the sediment samples.

Year III - Sediments in Year III were located within 5 m of the oyster stations and were sandy mud with some shells.

Years IV, V, VI, VII, VIII, & IX - Sediments were not sampled during these years.

SAMPLING METHOD

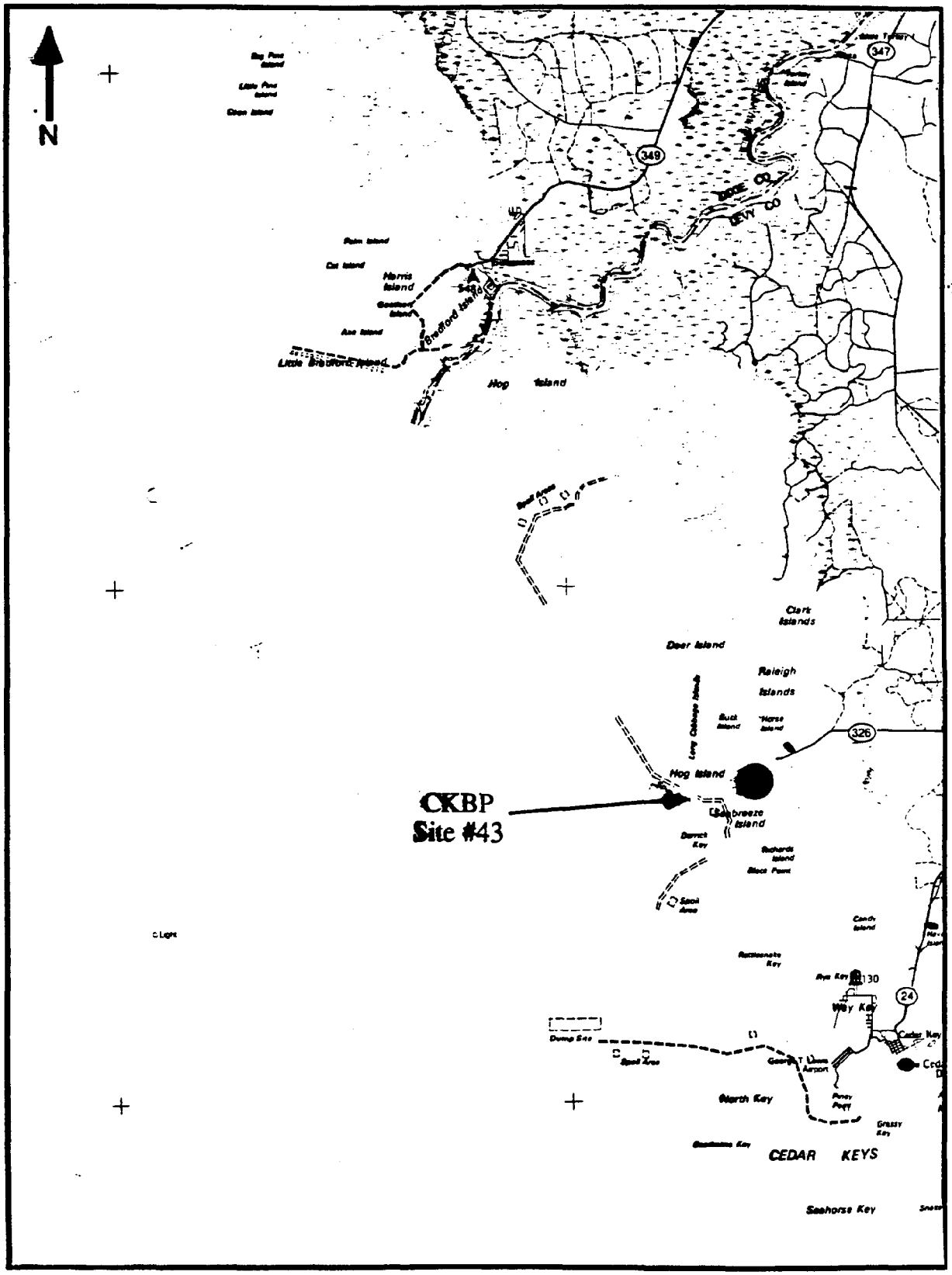
Oysters - tongs and by hand
Sediment - box core

WATER DEPTH - intertidal, 0.2 - 0.4 meters

POSSIBLE CONTAMINANTS - The site was mainly open water and no sources of contamination were observed. The site was miles from any habitation, industry or port facility of any size. Effluents from Suwannee River may have influenced the site.

ENVIRONMENTAL DATA

	Salinity (‰)	Temperature (°C)	Dates Sampled
YEAR I	14.3	23.0	27 February 1986
YEAR II	23.0	20.0	28 February 1987
YEAR III	31.0	14.0	19 February 1988
YEAR IV	26.0	18.0	28 January 1989
YEAR V	25.0	18.0	29 January 1990
YEAR VI	23.0	16.0	29 January 1991
YEAR VII	24.0	17.0	30 January 1992
YEAR VIII	27.0	22.0	13 January 1993
YEAR IX	19.0	4.0	19 January 1994



Site #43 (CKBP), Cedar Key Black Point.

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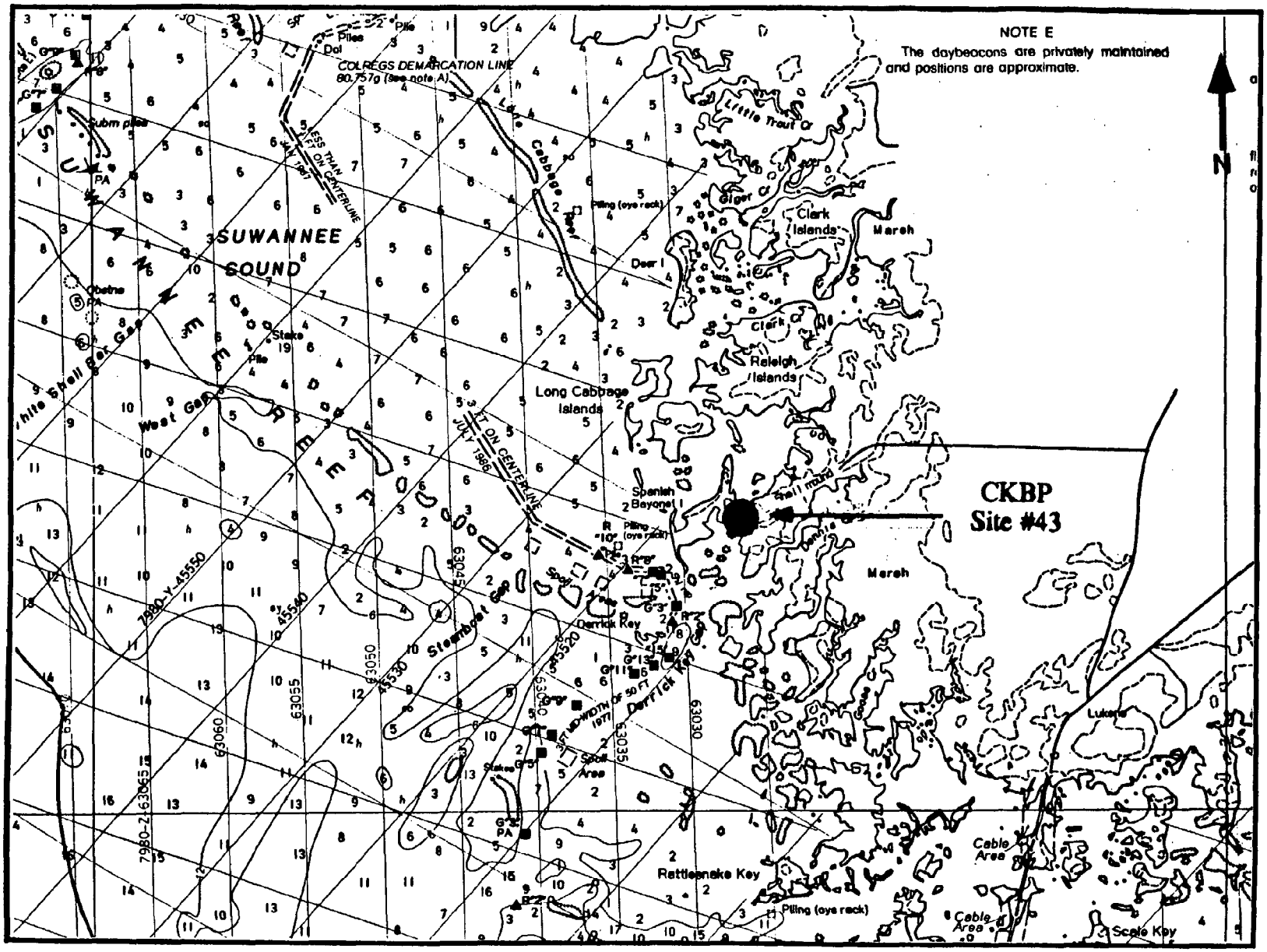
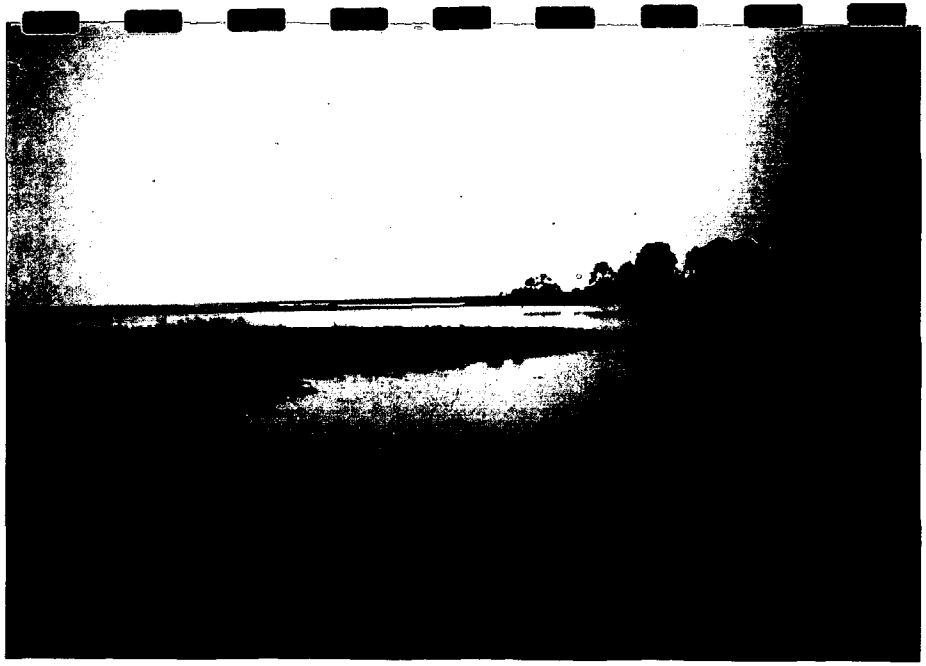
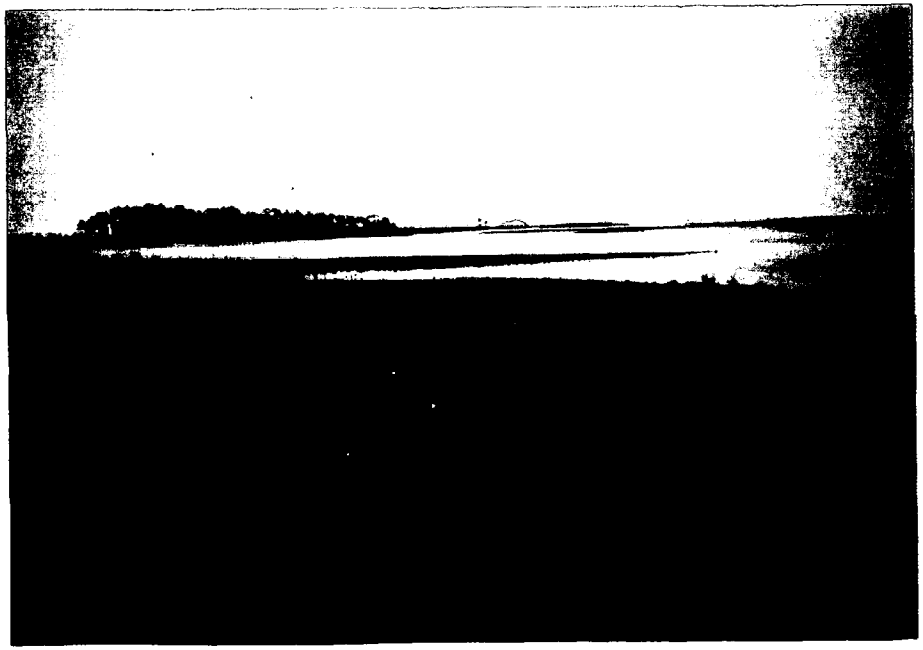


Site #43 (CKBP), Cedar Key Black Point (from chart 11408).





SITE NUMBER - 70 **DESIGNATOR** - TBOT

SITE - OLD TAMPA BAY, TAMPA BAY, FL

NOMINAL SITE CENTER - 28°01.48'N 82°37.95'W

LOCATED ON NOS CHART # - 11413

SITE ACCESS - To reach the site, take Highway 275 to 92 west and then take Hillsborough Avenue toward Tampa Bay Downs. Turn south on Double Branch Road and proceed to State Street, turn left and go to the boat ramp at the end of the street.

SITE DESCRIPTION - This site, established in Year III, produced the most abundant oysters collected in the Tampa Bay area. Substrate was primarily sandy mud with pockets of oozy mud scattered around the shoreline.

OYSTER COLLECTIONS

Year III - Oysters at all three stations were well developed and sorted. They were of moderate size and looked healthy. They were plentiful, were easily picked by hand and required little sorting. All three reefs were clearly visible and partially exposed at low tide, but were still easily accessible at high tide by wading. Oyster Station 1 was located ~ 50 m north of the boat ramp. The reef extended across water from east to west and was exposed at low tide. Station 2 was a small subtidal reef ~ 10 m east of the end of the boat ramp. Station 3 was 50-m southeast of the boat ramp where the creek forks on the east side of the channel.

Year IV - The same three stations were sampled in Year IV as were first established in Year III. The site remained closed to harvesting, and the oysters from external appearance and abundance appeared in good shape.

Years V & VI - The same stations were sampled again these year. Oysters were mostly alive and were in better condition than those at sampling sites to the north.

Year VII - This site was not sampled this year.

Years VIII & IX - Oysters were collected at the same stations as described for Year III.

SEDIMENT COLLECTIONS

Year III - Sediments were collocated with the oysters. Sediments were collected with the teflon scoop directly from the bottom substrate.

Year IV - No sediments were sampled.

Year V - Sediment samples were taken adjacent to each of the oyster collection stations. Sediment was a thin silt layer over hard sand found along the edge of the mangroves. Station 1 was in a small cove on the west end of the reef. Station 2 was 20 m northwest of the oyster site along the shore. Station 3 was 20 m to the east in the small cove on the north side of the channel.

Year VI - Sediments (NIST) were collected in the same locations described in Year V.

Years VII, VIII, & IX - No sediments were sampled during these years.

SAMPLING METHOD

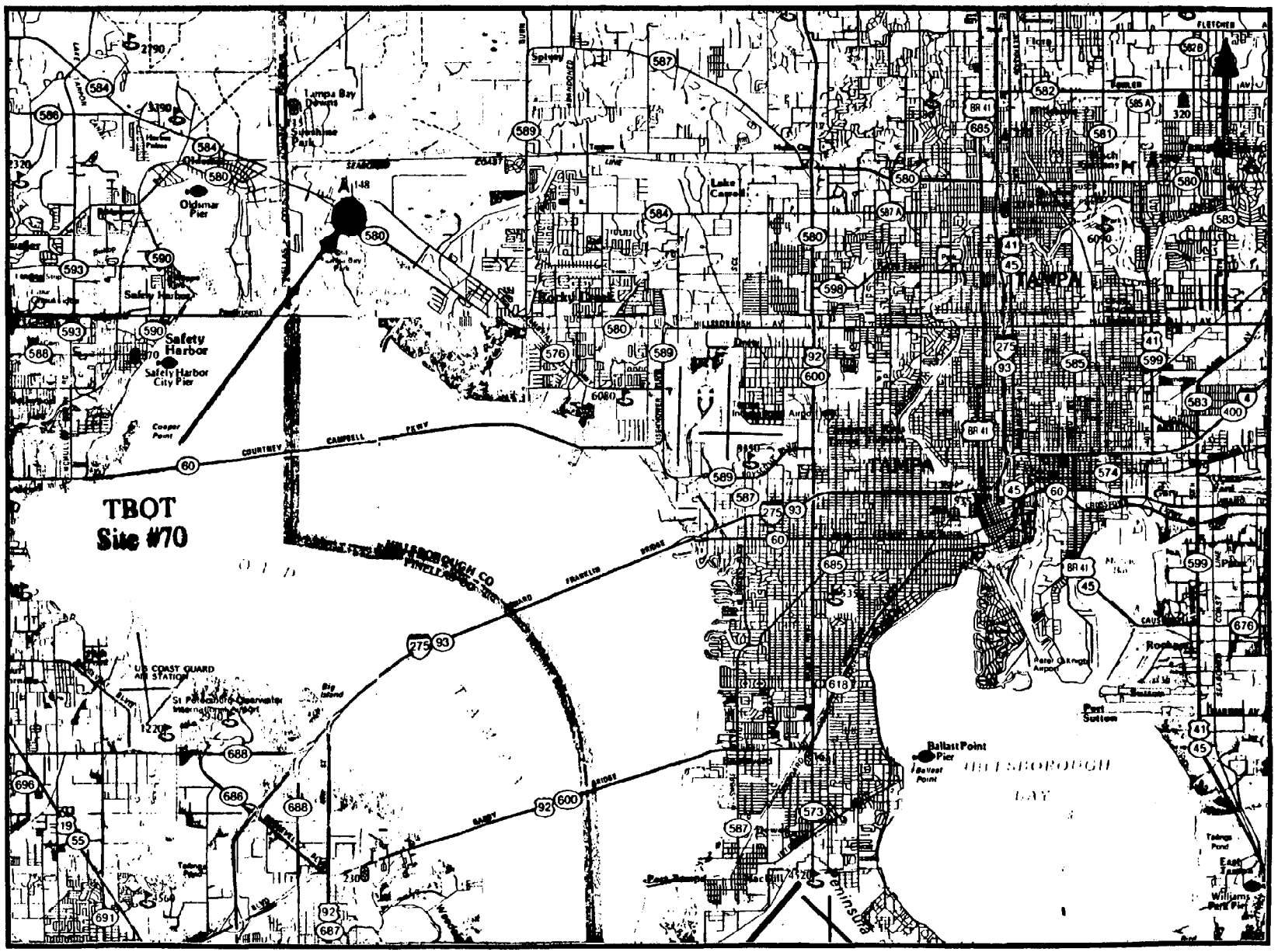
Oysters - hand
Sediment - hand

WATER DEPTH - intertidal, 0 - 0.3 meters

POSSIBLE CONTAMINANTS - Contamination at the site was not obvious, but mobile home and housing developments were present upstream from the collection site. No industrial contaminant sources were observed.

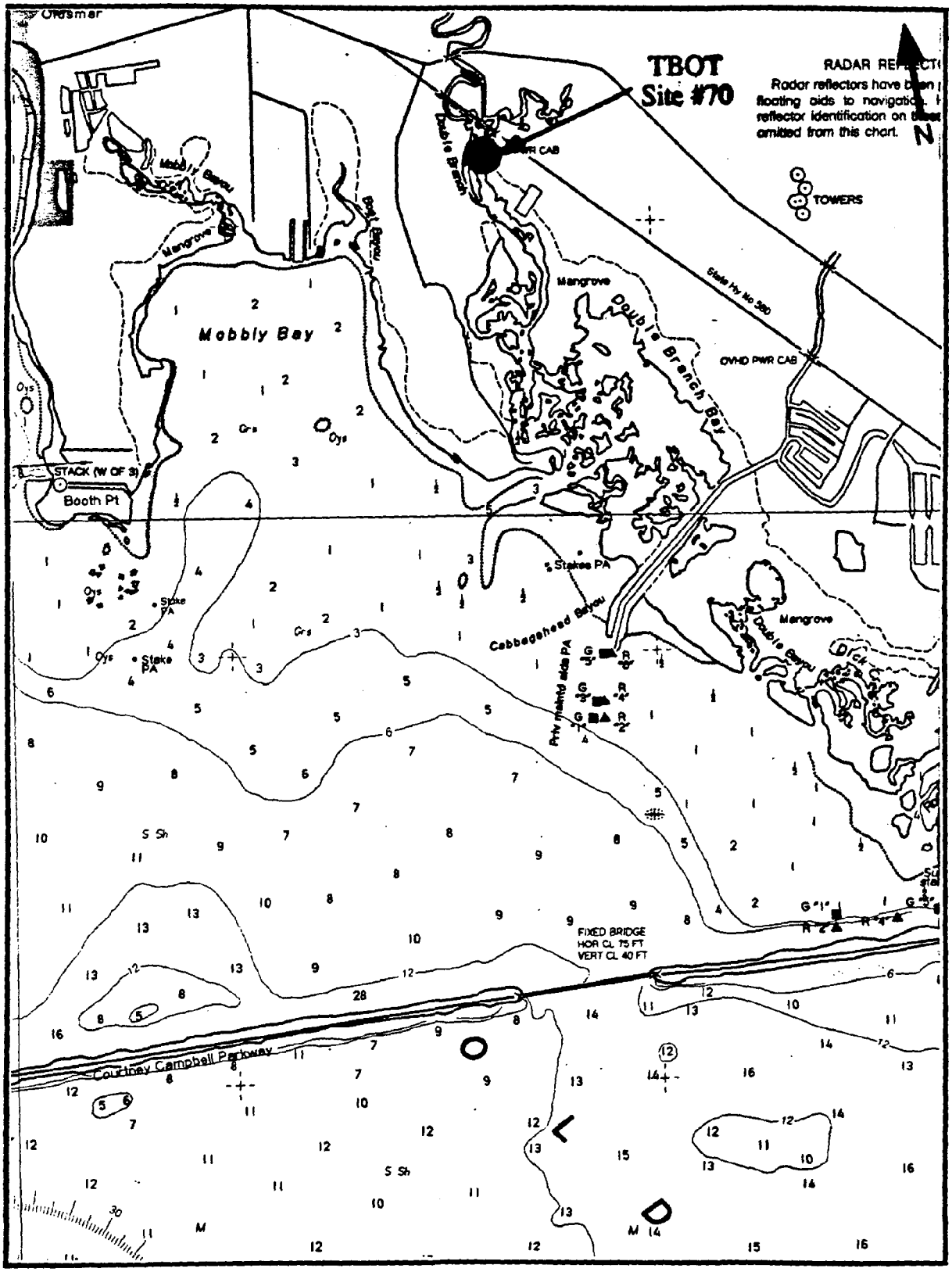
ENVIRONMENTAL DATA

	Salinity (‰)	Temperature (°C)	Dates Sampled
YEAR III	10.0	14.0	22 February 1988
YEAR IV	-	20.0	29 January 1989
YEAR V	16.7	22.0	30 January 1990
YEAR VI	7.3	16.7	30 January 1991
YEAR VIII	14.0	22.0	14 January 1993
YEAR IX	2.0	13.0	20 January 1994

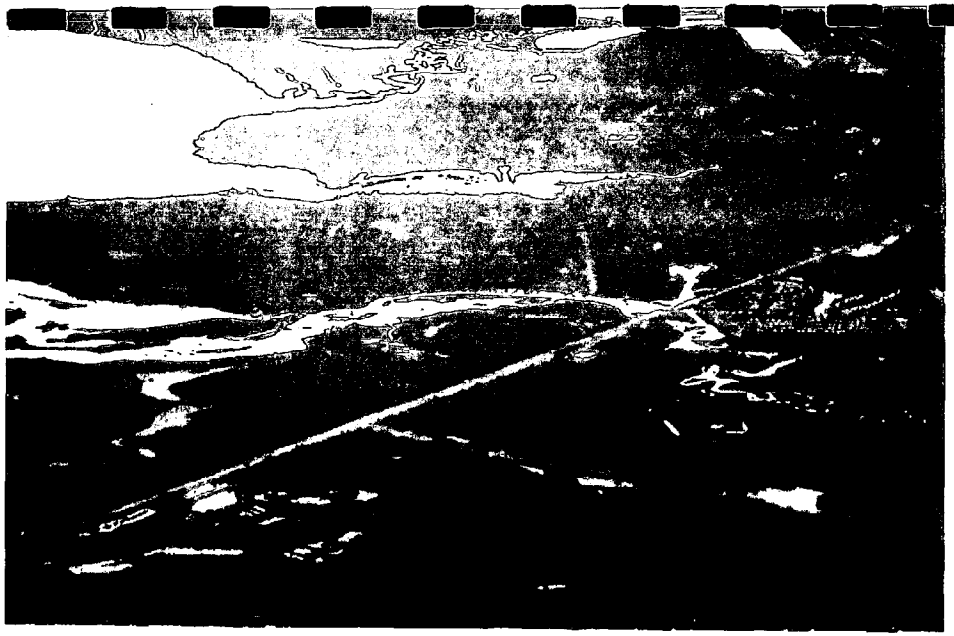


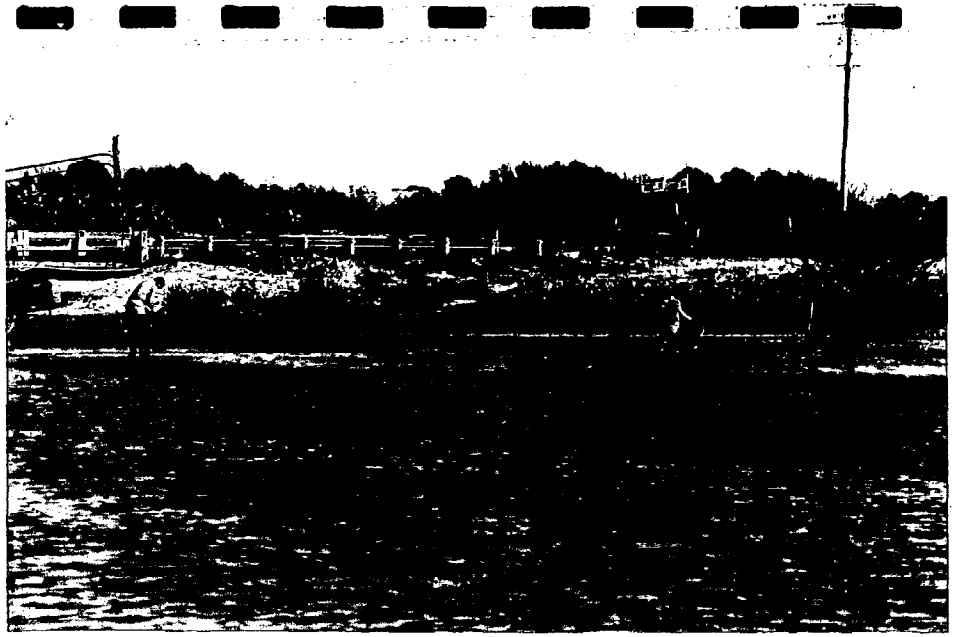
Site #70 (TBOT), Tampa Bay Old Tampa Bay.

DeLorme Mapping Company. Map Taken from Florida Atlas and Gazetteer. Reproduced with permission.



Site #70 (TBOT), Tampa Bay Old Tampa Bay (from chart 11413).





SITE NUMBER 44 **DESIGNATOR** - TBPB

SITE - PAPYS BAYOU, TAMPA BAY, FL

NOMINAL SITE CENTER - 27°50.53'N 82°36.62'W

LOCATED ON NOS CHART # - 11413

SITE ACCESS - The site is accessed by boat or by driving to the site. By boat, depart the city marina in St. Petersburg and cross the west side of Tampa Bay to Papys Bayou (~30 minutes). Access to the site for sampling by wading is accomplished by driving to the Weeden Island Wildlife Refuge via Weeden Drive. In Year VII a boat was launched at Gandy Bridge Marina. The site was reached by traveling out the channel parallel to the highway to Tampa Bay and then south to channel marker 15, then turn west to the entrance to Papys Bayou. This ride takes approximately 20 minutes.

SITE DESCRIPTION - The oyster site in Year I was a small intertidal reef (found by following channel markers to where reef almost blocked channel) at the back end of the bayou and the mangrove roots along the adjacent shoreline. A wood and steel pier-type of structure was at the end of the bayou where samples were taken. In Year II, the station was moved to within 100 m of the old bridge at the end of Weeden Drive.

OYSTER COLLECTIONS

Year I - Oysters were collected on a submerged oyster reef surrounding an old wooden and metal structure on the east side of the bayou in a mangrove area. Landmarks to locate the site were 140° from the tall radio tower and 195° from the smoke stacks at the power plant. The sites were separated by 100 m.

Year II - Year II collections were made in the same location. Oyster stations were not differentiated geographically this year.

Year III - In Year III, we drove to the site and collected the oysters by hand. A large healthy reef was located 100 m from the wooden pier at the end of Weeden Pond. Oysters were numerous but distinct stations were not recognized.

Years IV, V, & VI - The site was in the same position as sampled in Year III. No station distinctions were made. The stations were on the first large reef south of the pier at the end of Weeden Road. The site was best accessed by wading from the pier. The Year III and IV site was approximately 100-200 m north of the site sampled in Year II. Oysters were very abundant and accessible. In Year VI the oysters were very small and many had died recently.

Year VII - The same location was sampled again this year. Oysters were numerous but were very small.

Year VIII - Oysters were not abundant on the reef, so the site was moved 30 m to the fishing pier.

Year IX - Station 1 oysters were collected from the mangroves at the shore end of the pier, Station 3 oysters from the distal end of the pier, and Station 2 oysters from the midpoint of the pier between Stations 1 & 3.

SEDIMENT COLLECTIONS

Years I & II - Sediments from the oyster site were all sand and shell. Sediments were collected on Weeden Island north of Harbor Isle. Sediments were intertidal sands with some humic material.

Year III - Sediments were collected along the mangrove-lined shoreline. Station 1 was at the small boat ramp. Station 2 was 50 m to the north around the point. Station 3 was another 30 m north in a small cove. The majority of the bottom was sand except along the mangrove tree margin (1-2 m zone) where fine-grained silt was found.

Years IV, V, VI, VII, VIII, & IX - Sediments were not sampled during these years.

SAMPLING METHOD

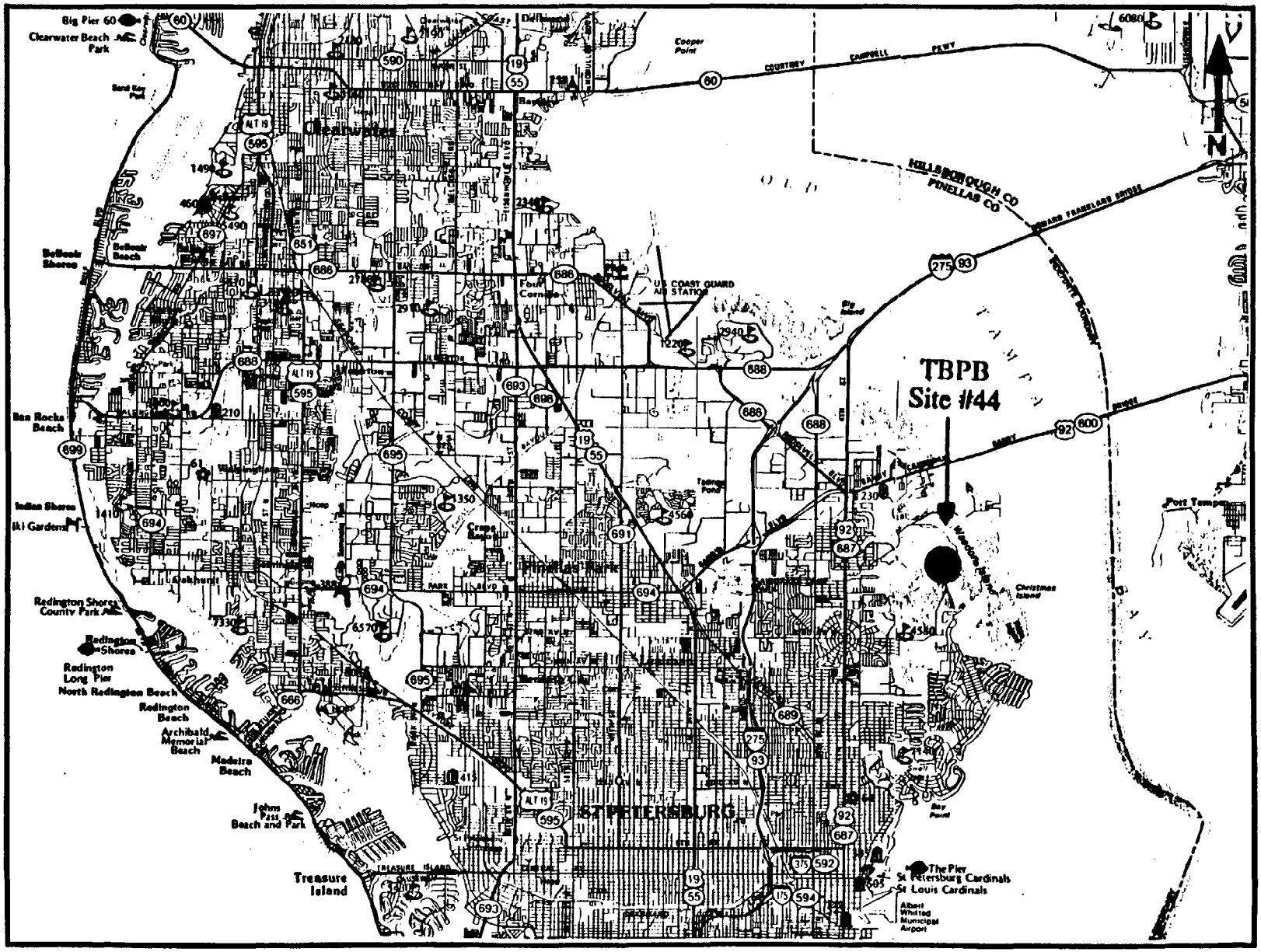
Oysters - hand
Sediment - box core

WATER DEPTH - intertidal, 0 - 0.5 meters

POSSIBLE CONTAMINANTS - Sources of contamination included heavy recreational boating in the restricted embayment, and an electric power generation plant near the bay.

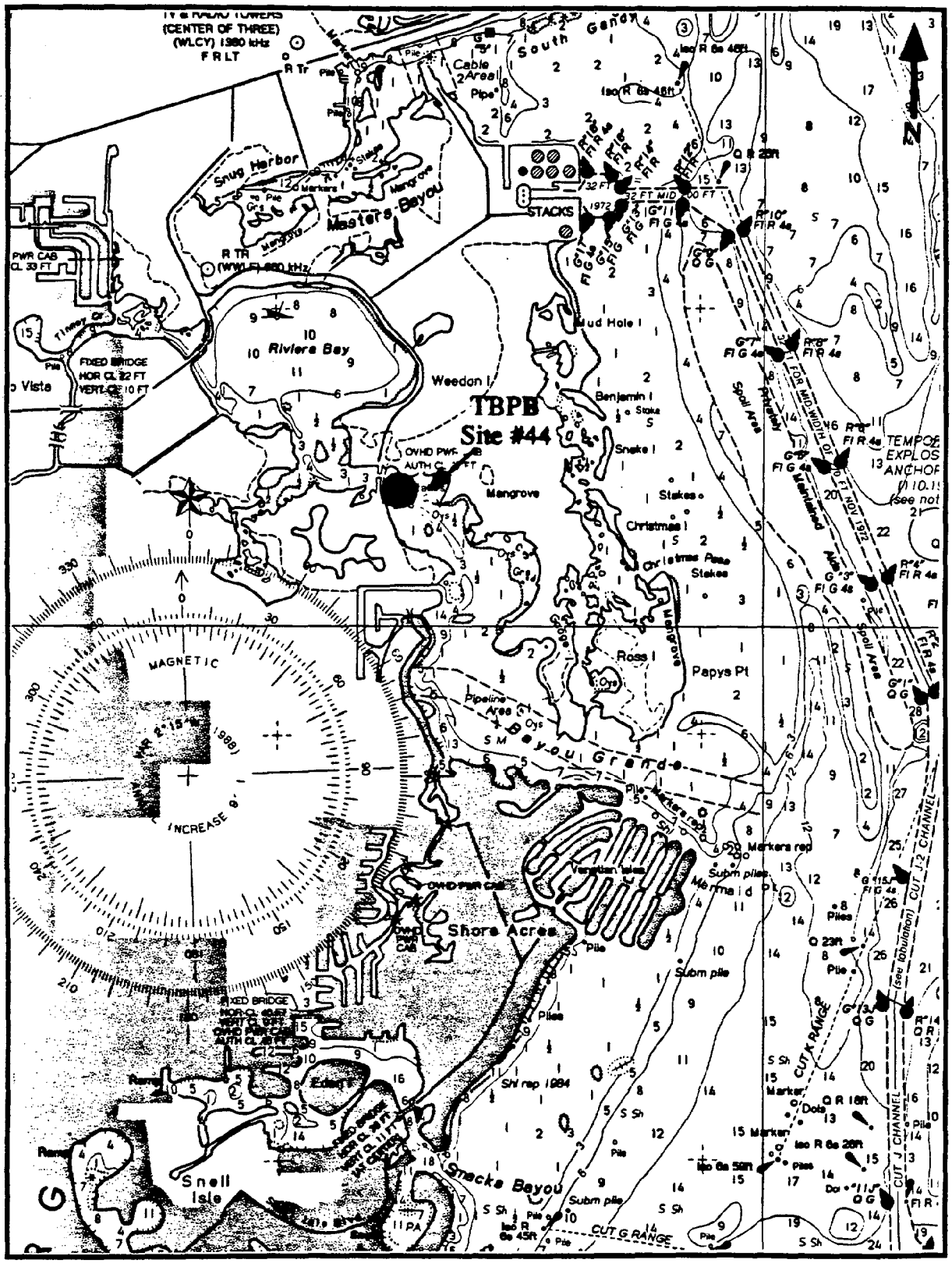
ENVIRONMENTAL DATA

	Salinity (‰)	Temperature (°C)	Dates Sampled
YEAR I	28.0	27.0	23 February 1986
YEAR II	21.0	24.0	28 February 1987
YEAR III	30.0	17.0	21 February 1988
YEAR IV	21.0	23.0	29 January 1989
YEAR V	25.0	23.0	30 January 1990
YEAR VI	30.0	19.0	31 January 1991
YEAR VII	28.0	18.0	28 January 1992
YEAR VIII	15.0	21.0	15 January 1993
YEAR IX	28.0	14.0	20 January 1994

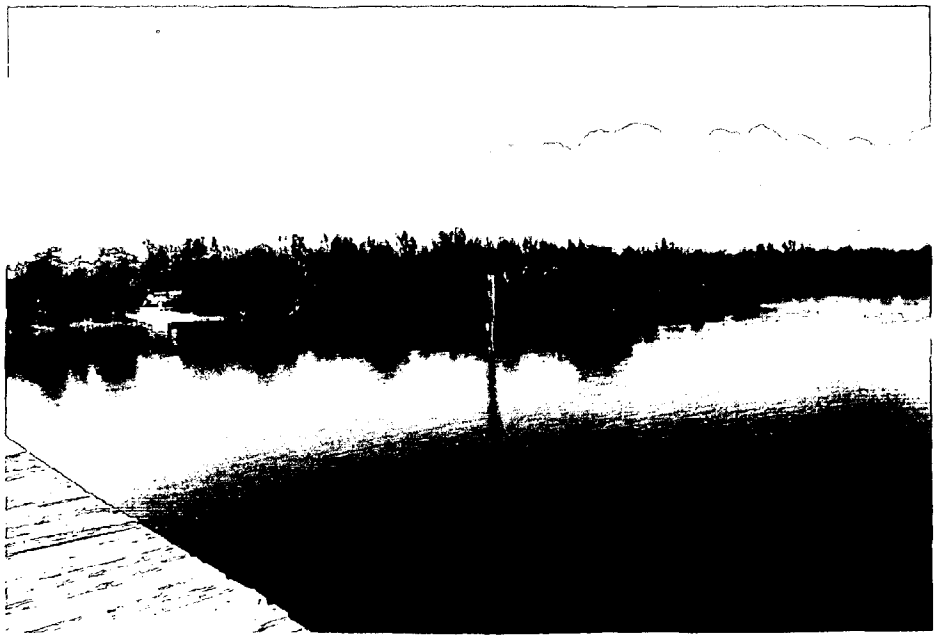


Site #44 (TBPB), Tampa Bay Papys Bayou.

DeLorme Mapping Company. Map Taken from Florida Atlas and Gazetteer. Reproduced with permission.



Site #44 (TBPB), Tampa Bay Papys Bayou (from chart 11413).



SITE NUMBER 45 **DESIGNATOR** - TBHB

SITE - HILLSBOROUGH BAY, TAMPA BAY, FL

NOMINAL SITE CENTER - 27°51.28'N 82°23.75'W

LOCATED ON NOS CHART # - 11413

SITE ACCESS - The boat was launched at the ramp on the northwest corner of the Highway 41 bridge over the Alafia River.

SITE DESCRIPTION - This site was located on the north bank of the Alafia River. The sites were established along the riprap shoreline on the east side of channel marker 15.

OYSTER COLLECTIONS

Years I & II - The only oysters in the area were attached to rock rubble and tree roots at the shell hash beach on the north bank of the river next to the phosphate plant (downstream from their dock). The bank was steep and quickly became too deep for sampling. Oysters were very sparse, and this site may not provide sufficient oysters for extended study. No geographic distinction could be made in the oyster collection sites. The three stations were contiguous to each other. Station 1 was on the west end and Station 3 was on the east end of the site.

Year III - In Year III, there were only enough oysters for one station. This site should be dropped because of the lack of oysters. There were not likely to be other sources for oysters in the Hillsborough area, since this was the best we could locate in Year I.

Years IV, V, VI, & VII - The site was not sampled during these years.

Year VIII - Oysters were collected at the same stations as described in Year III. Oysters were numerous but small.

Year IX - The only oysters to be found this year were directly across the river on the south side, attached to mangrove roots. The three stations were contiguous to one another and were not distinguished.

SEDIMENT COLLECTIONS

Year I - Sediments of fine texture in close proximity to and representative of the site were not possible. Therefore, a site was selected approximately 0.5 miles east. Station 1 was between the boat launch and oyster site. Station 2 was from the boat basin across the river from the boat launch. Station 3 from upstream past the railroad bridge to the south side of the river in front of Captain D's Marina.

Years II & III - Sediments for Years II and III were at the same sites, except that no sediments were located for Station 1.

Years IV, V, VI, VII, VIII, & IX - Sediments were not sampled during these years.

SAMPLING METHOD

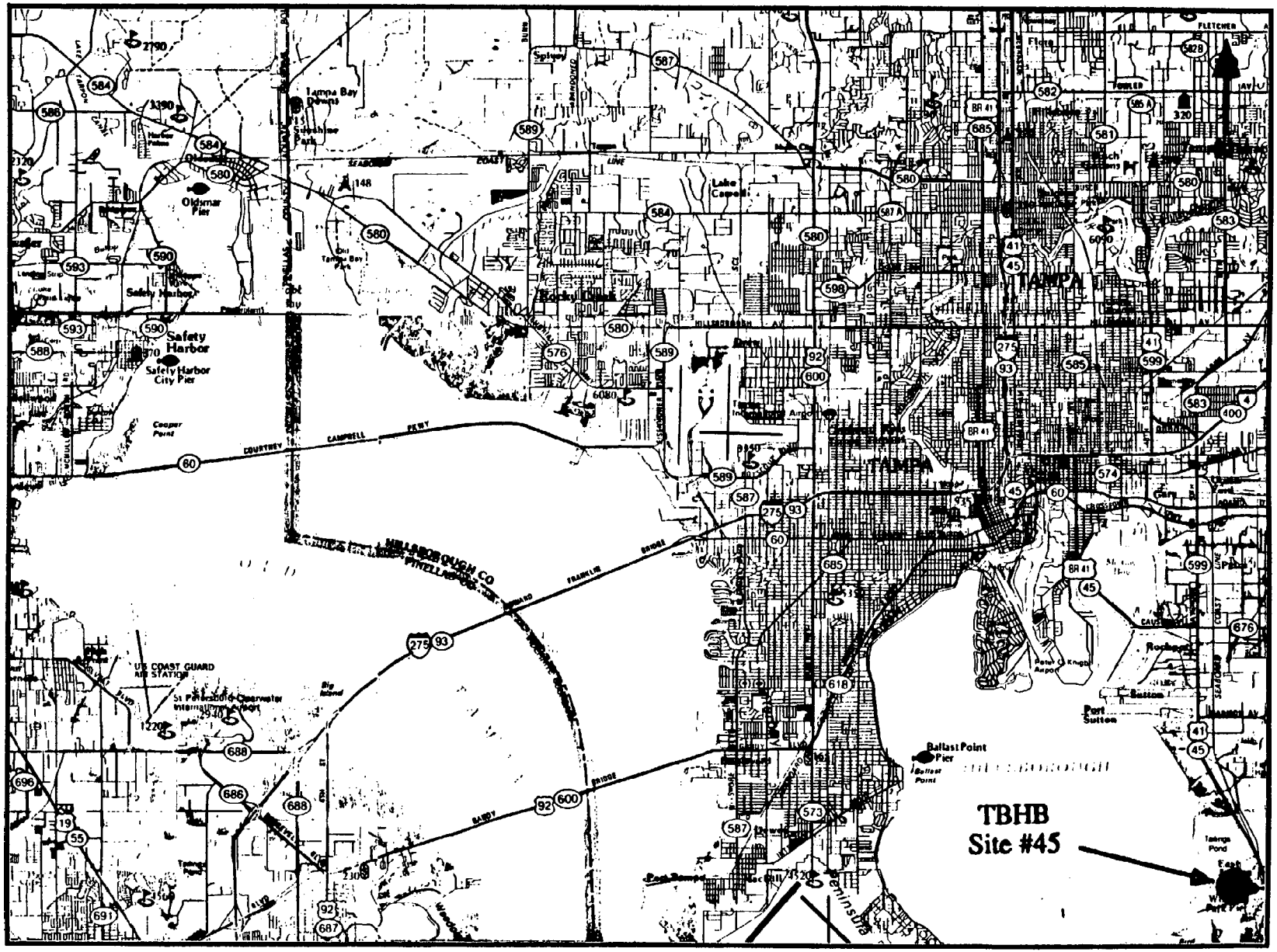
Oysters - hand
Sediment - box core

WATER DEPTH - subtidal, 0.6 meters

POSSIBLE CONTAMINANTS - Obvious sources of contamination included the phosphate plant which was directly adjacent to the oyster collection site. In the case of two sediment samples, the boat basin/marinas were sources of contamination.

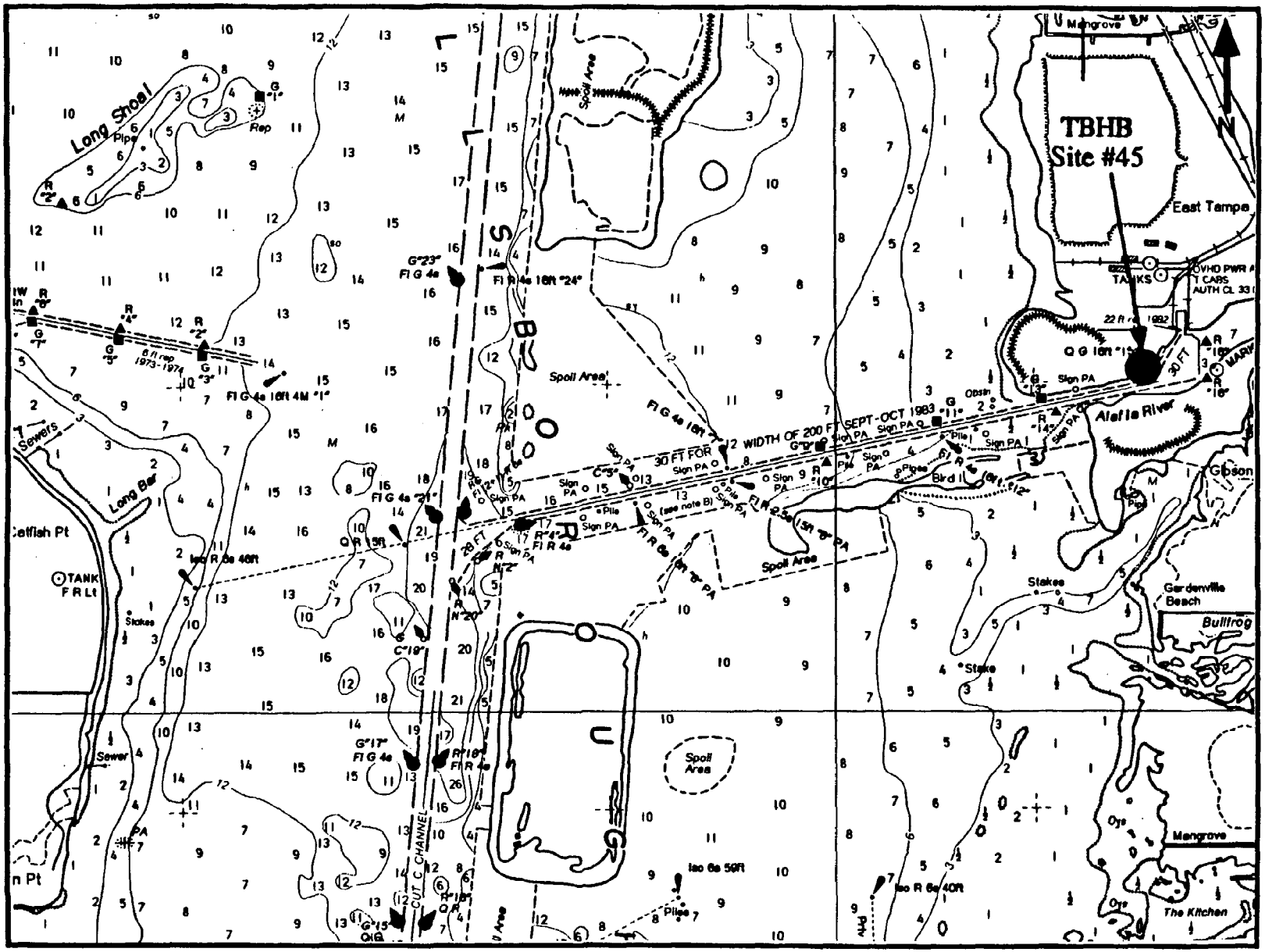
ENVIRONMENTAL DATA

	Salinity (‰)	Temperature (°C)	Dates Sampled
YEAR I	22.0	22.0	24 February 1986
YEAR II	21.0	20.0	1 March 1987
YEAR III	-	23.0	20 February 1988
YEAR VIII	15.0	20.0	15 January 1993
YEAR IX	15.0	15.0	21 January 1994

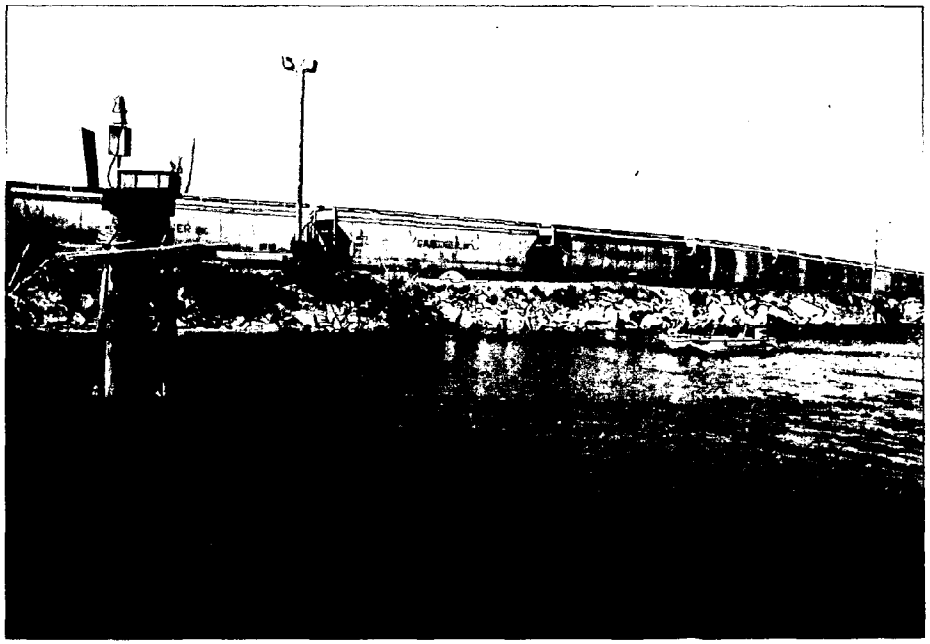


Site #45 (TBHB), Tampa Bay Hillsborough Bay.

eLorme Mapping Company. Map Taken from Florida Atlas and Gazetteer. Reproduced with permission.



Site #45 (TBHB), Tampa Bay Hillsborough Bay (from chart 11413).



SITE NUMBER 46 **DESIGNATOR** - TBCB

SITE - COCKROACH BAY, TAMPA BAY, FL

NOMINAL SITE CENTER - 27°40.55'N 82°30.56'W

LOCATED ON NOS CHART # - 11414

SITE ACCESS - The site is accessed by driving to Highway 41 and taking the Cockroach Bay Road to the west. The launch ramp is at the end of the road. Shallow draft boats with tilt motors are required. Access to the site requires winding around many small islands to the open bay to the east. Upon entering the open bay, proceed east to a very small island (mostly subtidal) near the southeast shore.

SITE DESCRIPTION - The site was located on an exposed reef on the south side of Cockroach Bay. Oysters were collected by hand from the subtidal portions of the reef. Neither the sediments or oyster collection stations could be differentiated geographically around the small island. All were composites of random samples from around the island.

OYSTER COLLECTIONS

Year I - Oysters were collected from an exposed reef on the south side of the bay. Station 1 was on the reef which is 195° from the tall radio tower. Station 2 was along mangrove roots ~100 m east of Station 1. Station 3 was ~100 m east of Station 1 and 30 m north of Station 2.

Years II, III, IV, V, VI, VII, & VIII - In these years, all stations were taken from the same very small reef in the back (south side) of Cockroach Bay. No station distinctions could be made due to the small area from which oysters were available. However, Cockroach Bay has many other sites suitable for oyster collection, both from the roots of mangroves and other reefs nearer the mouth of the bay.

Year IX - The site was not scheduled to be sampled this year.

SEDIMENT COLLECTIONS

Years I, II, & III - Sediments were found in isolated pockets around this reef and were limited to the extreme upper layer.

Years IV & V - No sediments were sampled during these years.

Year VI - Sediments (NIST) were collected from around the small island where the oysters were collected.

Years VII, VIII, & IX - No sediments were sampled during these years.

SAMPLING METHOD

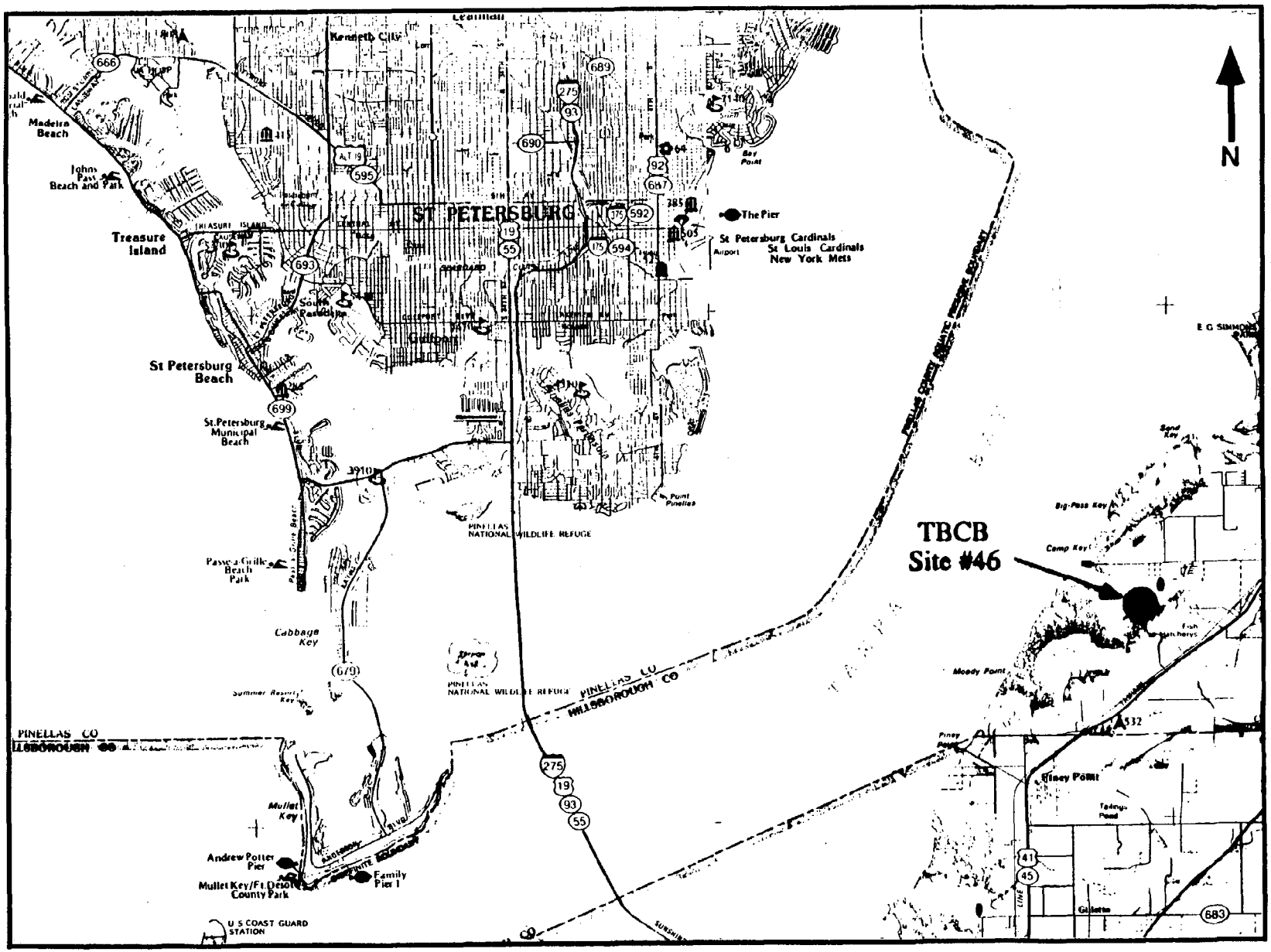
Oysters - hand
Sediment - Sediments were sampled by hand with the teflon scoop, and required compositing samples from many scoops in different pockets to acquire sufficient material.

WATER DEPTH - intertidal, 0 to 0.6 meters

POSSIBLE CONTAMINANTS - There were no obvious sources of contamination in this very secluded site, although the surrounding area appeared to be vegetable and fruit farms.

ENVIRONMENTAL DATA

	Salinity (‰)	Temperature (°C)	Dates Sampled
YEAR I	28.0	25.0	24 February 1986
YEAR II	24.0	20.0	1 March 1987
YEAR III	30.0	24.0	20 February 1988
YEAR IV	22.0	23.0	31 January 1989
YEAR V	26.0	22.0	1 February 1990
YEAR VI	30.0	27.0	30 January 1991
YEAR VII	29.3	20.0	29 January 1992
YEAR VIII	14.0	22.0	15 January 1993



Site #46 (TBCB), Tampa Bay Cockroach Bay.

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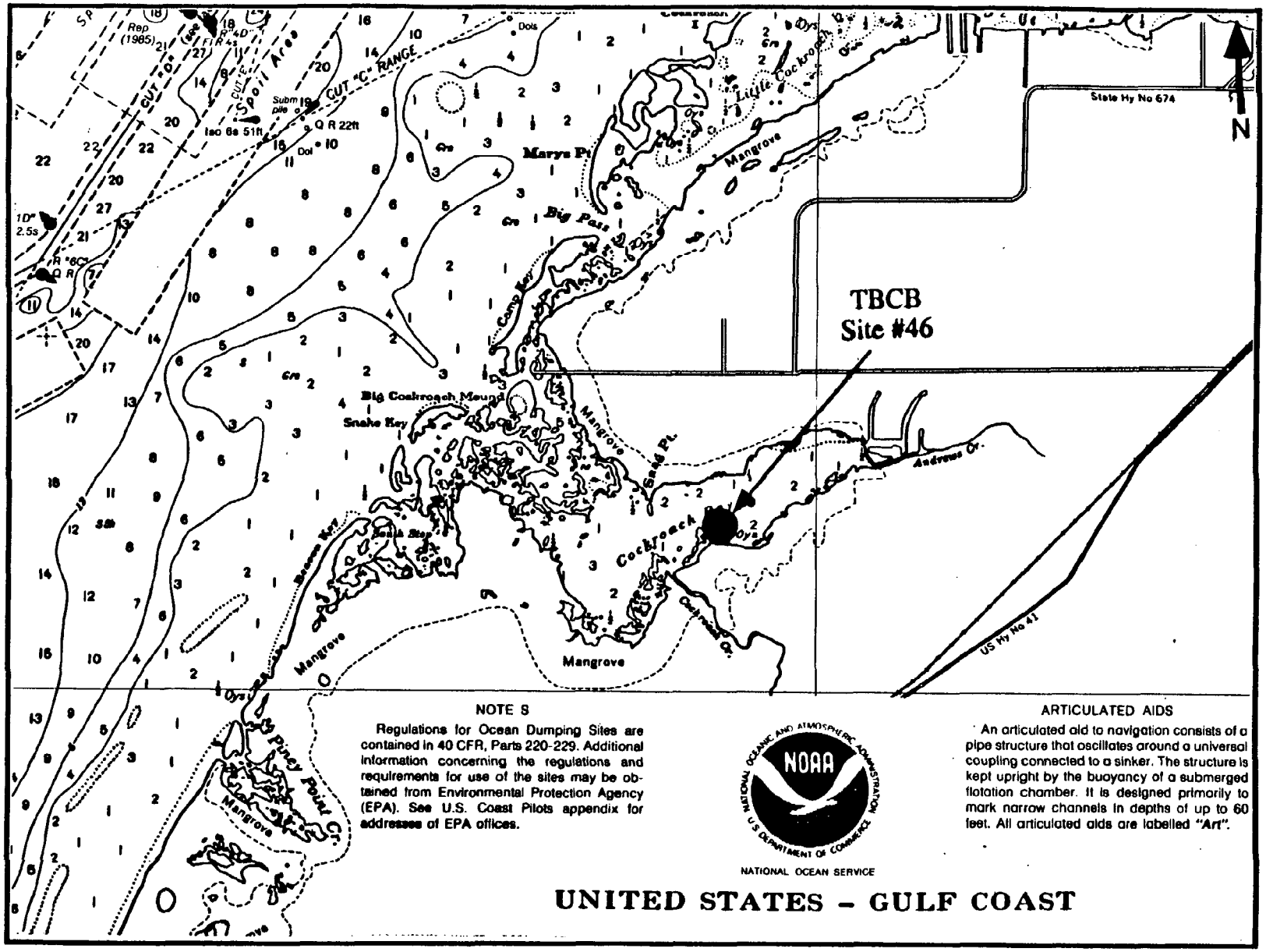
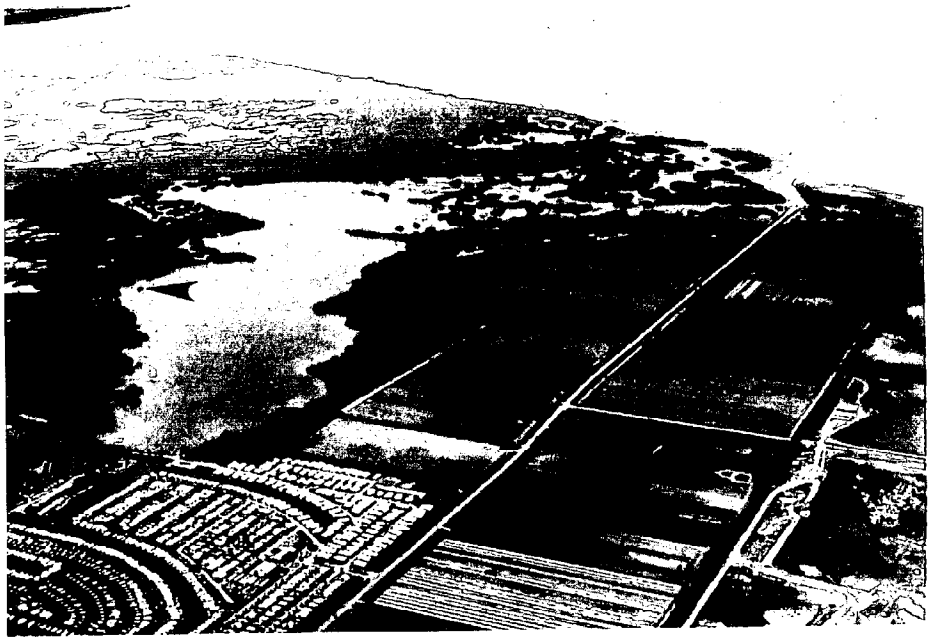


Site #46 (TBCB), Tampa Bay Cockroach Bay (from chart 11414).



SITE NUMBER 47 **DESIGNATOR** - TBMK

SITE - MULLET KEY BAYOU, TAMPA BAY, FL

NOMINAL SITE CENTER - 27°37.28'N 82°43.62'W

LOCATED ON NOS CHART # - 11414

SITE ACCESS - The site is accessed by automobile from Fort DeSoto County Park on Mullet Key. To reach the site, travel out Highway 679 turn right on Anderson Blvd. Turn right (north) on the a small shell road north of the pier parking lot. Travel until the road ends at the water.

SITE DESCRIPTION - The site was located in the southwest corner of Mullet Key Bayou north of Family Fishing Pier 1.

OYSTER COLLECTIONS

Year I - Oysters were collected at the edge of shore in intertidal waters on the sand bottom and on mangrove roots at three locations roughly 200 m apart Station 1 was 50 m east of Fort Road just offshore from mangrove roots. Station 2 was 50 m to the right of Fort Road. Station 3 was at the end of the Fort Road and west of Station 2. Oysters were small and not plentiful.

Years II, III, IV, & V - Station 1 was located 30 m from the ramp, just south of the three poles and by the mangroves. Station 2 was located at and to the east of the ramp, approximately 150 m east of Station 1. Station 3 was 100 m east of Station 2, at the second point of mangroves where there is a small reef.

Years VI, VII, VIII, & IX - The same stations described for Years II-V were sampled again these years.

SEDIMENT COLLECTIONS

Years I, II, & III - Sediment samples were taken 10 m away from each of the oyster station.

Years IV, V, VI, VII, VIII, & IX - Sediments were not sampled during these years.

SAMPLING METHOD

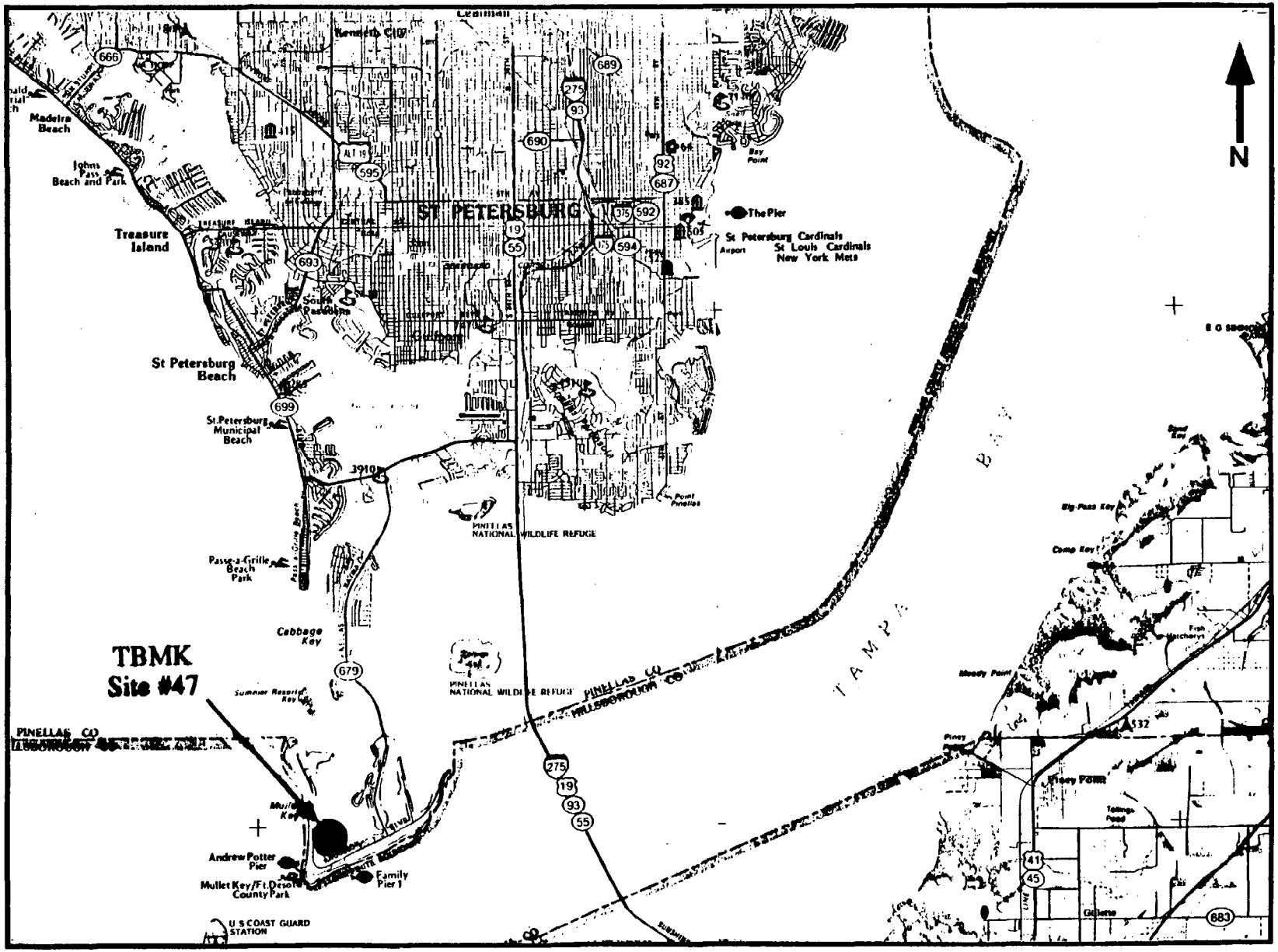
Oysters - hand
Sediment - box core

WATER DEPTH - intertidal, 0 to 0.5 meters

POSSIBLE CONTAMINANTS - There were no observable contamination sources.

ENVIRONMENTAL DATA

	Salinity (‰)	Temperature (°C)	Dates Sampled
YEAR I	34.0	24.0	25 February 1986
YEAR II	20.0	19.0	1 March 1987
YEAR III	37.0	29.0	19 February 1988
YEAR IV	32.0	21.0	31 January 1989
YEAR V	31.0	23.0	31 January 1990
YEAR VI	35.0	22.0	30 January 1991
YEAR VII	35.0	16.0	28 January 1992
YEAR VIII	33.0	22.0	14 January 1993
YEAR IX	33.0	15.0	21 January 1994



Site #47 (TBMK), Tampa Bay Mullet Key Bayou.

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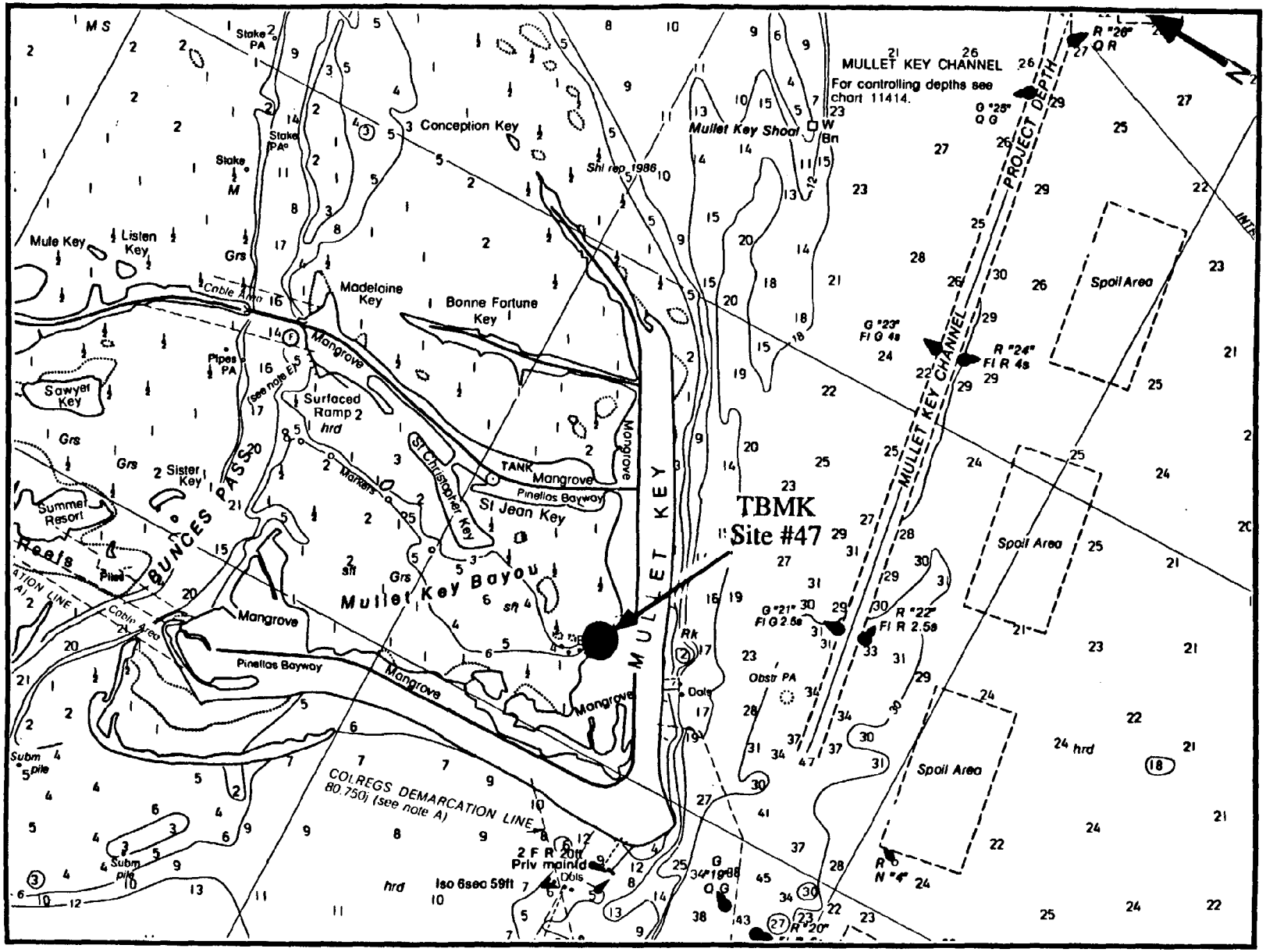
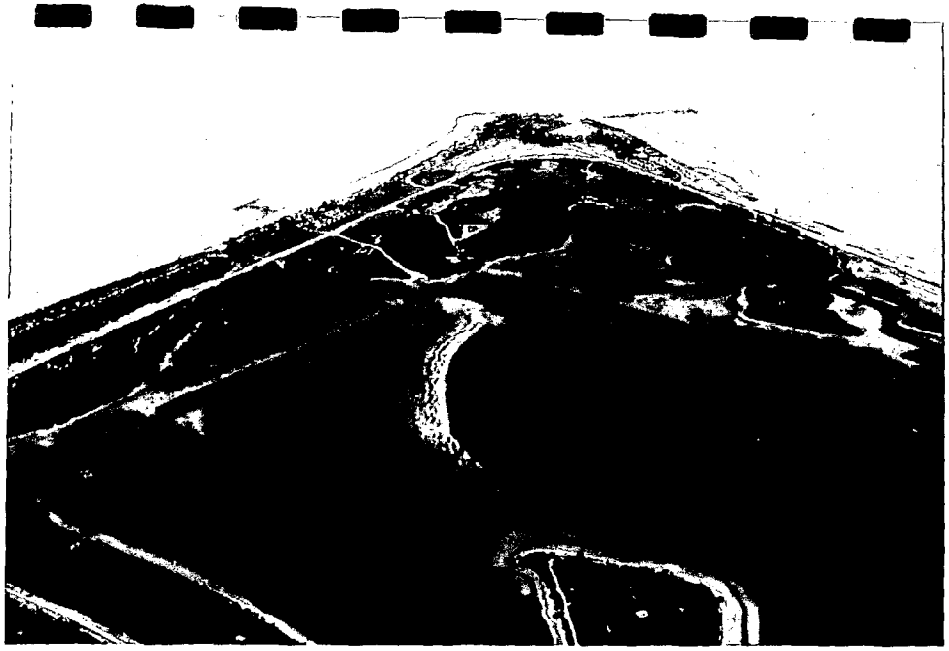
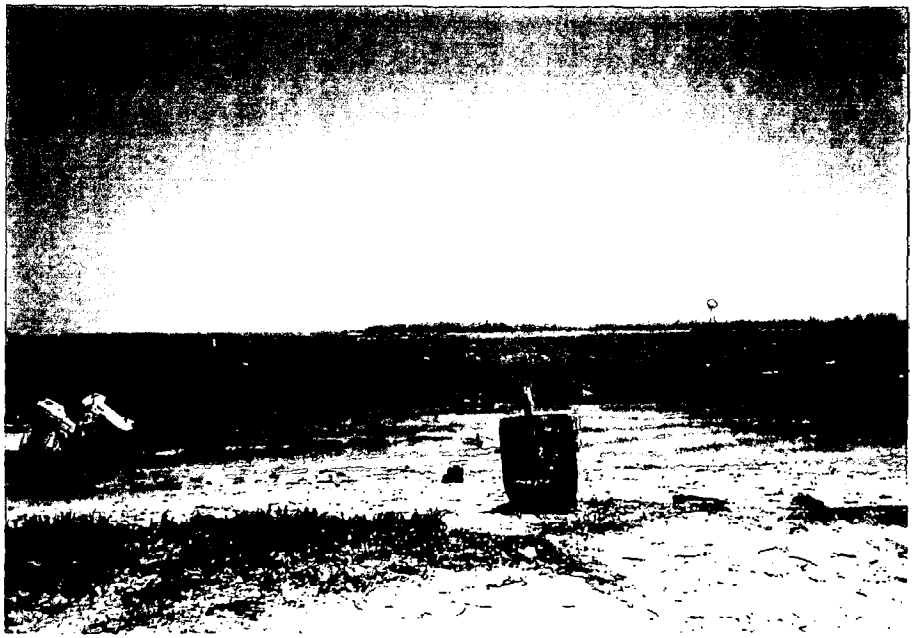


Site #47 (TBMK), Tampa Bay Mullet Key Bayou (from chart 11411).





SITE NUMBER 77 **DESIGNATOR - TBKA**

SITE - KNIGHT AIRPORT, TAMPA BAY, FL

NOMINAL SITE CENTER - 27°54.46'N 82°27.29'W

LOCATED ON NOS CHART # - 11413

SITE ACCESS - The stations were established on a jetty which extends from the end of the runway into the bay. The site is located on the south end of the Davis Islands, adjacent to the Peter O. Knight airport and the Davis Islands Yacht Club. To reach this site from St. Petersburg, take I-275 east and take exit 24, go south on Armenia to Swann Ave., then east to join Bayshore Blvd. Cross the bridge to the Davis Islands. Stay on west Davis Blvd. and then exit right on Airport to Marinique which follows the seawall.

SITE DESCRIPTION - The site was not established and sampled until Year IV. Oysters were intertidal and were attached to the rocks of the jetty. The sampling site was located along the seawall and jetties.

OYSTER COLLECTIONS

Years IV, V, VI, VII, VIII, & IX - Station 1 was located along the seawall beginning at the junction of the seawall and jetty on the east side of the jetty. Station 2 was at the bay end of the jetty, and Station 3 was on the west side of the jetty beginning at the seawall.

SEDIMENT COLLECTIONS

Years IV & V - Suitable fine grained sediments were difficult to obtain near the site because the bottom was mostly sand. Isolated pockets of fine black muds with some sand were located along the seawall some distance from the oysters sites. Station 1 was about midway down the seawall to the the east, and was sampled by boxcore from the seawall. Station 3 was about 200 m to the west of the seawall/jetty junction, at the first joint in the concrete wall (from the west). Station 2 sediments were from the far eastern end of the seawall, at the corner closest to the airport terminal building.

Year VI, VII, VIII, & IX - No sediments were sampled during these years.

SAMPLING METHOD

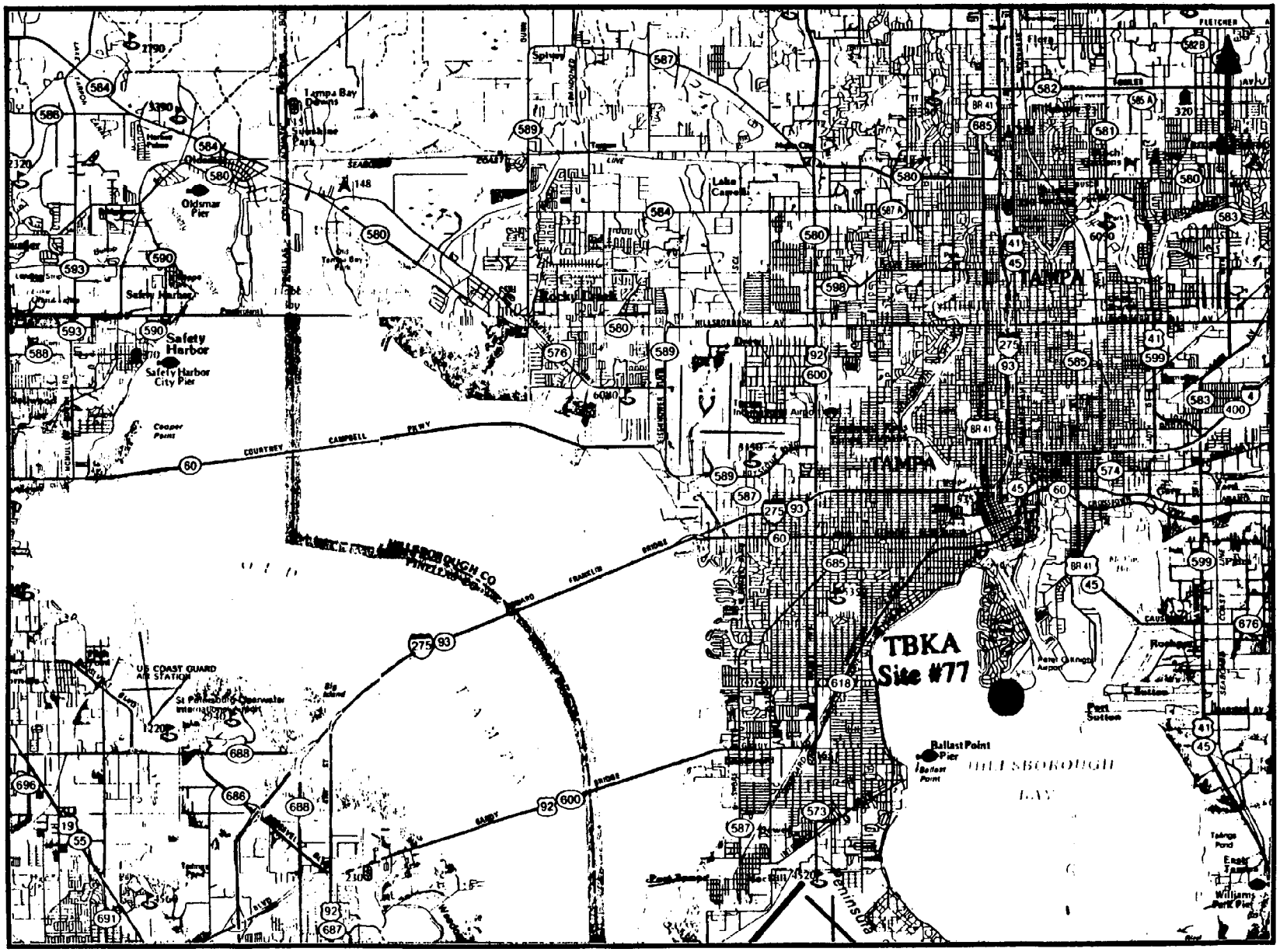
Oysters - hand
Sediments - box core

WATER DEPTH - intertidal, 0.1 meters

POSSIBLE CONTAMINANTS - No sources of contaminants were identified.

ENVIRONMENTAL DATA

	Salinity (‰)	Temperature (°C)	Dates Sampled
YEAR IV	20.7	24.0	31 January 1989
YEAR V	24.0	22.0	31 January 1990
YEAR VI	27.0	22.0	29 January 1991
YEAR VII	28.0	18.0	29 January 1992
YEAR VIII	27.0	22.0	14 January 1993
YEAR IX	30.0	14.0	20 January 1994



Site #77 (TBKA), Tampa Bay K. Airport.

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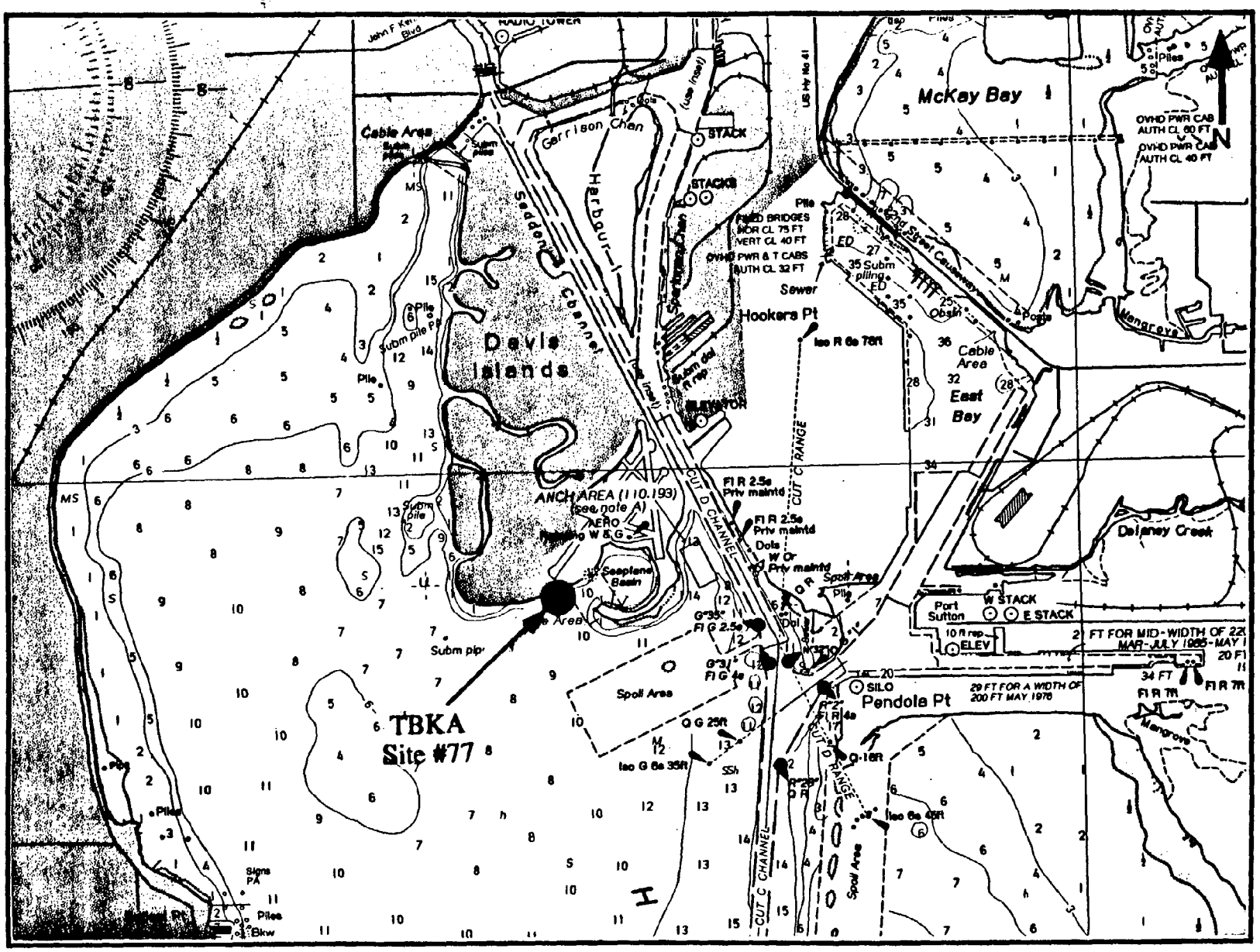
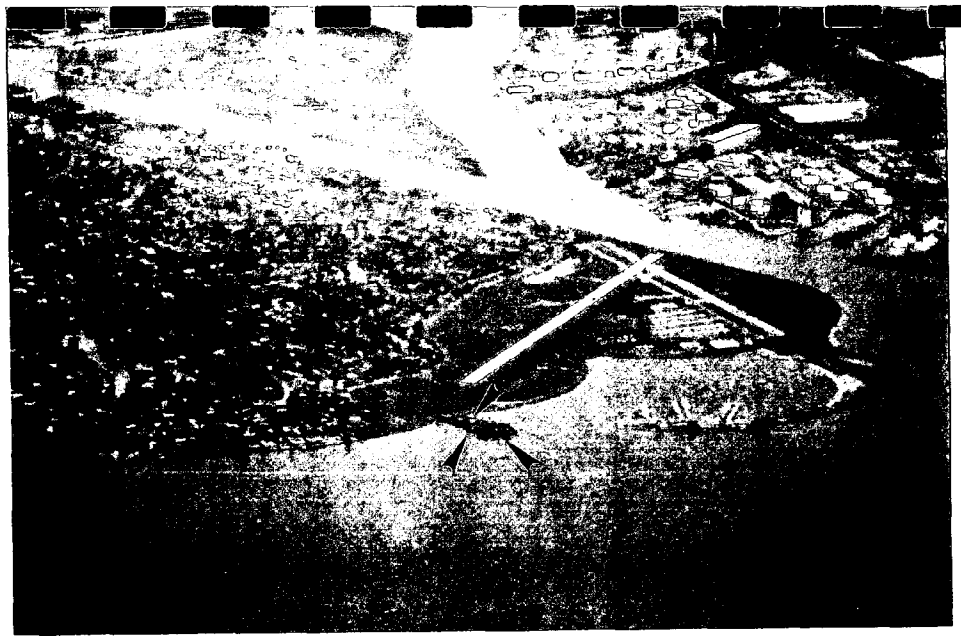


Site #77 (TBKA), Tampa Bay K. Airport (from chart 11413).



SITE NUMBER 76 **DESIGNATOR** - TBNP

SITE - NAVAREZ PARK, TAMPA BAY, FL

NOMINAL SITE CENTER - 27°47.28'N 82°45.28'W

LOCATED ON NOS CHART # - 11413

SITE ACCESS - The site, which was established in Year IV, is located at the boat ramp in Navarez Park which is located on the east side of Boca Ciega Bay north of the Treasure Island Causeway. To reach the site, travel west on 5th Ave. north and turn north on Park Street. Turn off of Park street to the west onto Elbow Lane.

SITE DESCRIPTION - This site has an old boat basin and sand ramp that was no longer used and two concrete ramps and a fishing pier. All three stations were located south of the new boat ramp.

OYSTER COLLECTIONS

Years IV, V, & VI - Oysters were abundant at all three stations. Station 1 was along the north and east side of the boat basin. Oysters were attached to the concrete bulkhead, on rocks and debris on the bottom, and on the sandy bottom. Station 2 was 50 m to the southwest across the boat basin on a point that jutted to the north. The site began at the northernmost point of land and continued south for approximately 50 m. Oysters were attached to concrete rubble and on the sandy bottom. Station 3 was 100 m south of Station 2 on a small point of land that jutted out to the west. Oysters were attached to the concrete rubble.

Years VII & VIII - The same stations were sampled again these years.

SEDIMENT COLLECTIONS

Year IV - All three sediment stations were located within the small boat basin. Sediments outside of the basin were very sandy. Station 1 was on the north side of the basin along the concrete bulkhead. Station 2 was at the east end of the basin. Station 3 was on the south side of the basin just inside the mouth and directly west of the pole with the tidal gauge. (This station was collocated with oyster Station 2). Sediments were fine grained soft black-gray silty sand.

Year V - Sediments were not sampled this year.

Year VI - Sediments (NIST) were collected at the same locations described for Year IV.

Years VII, VIII, & IX - Sediments were not sampled during these years.

SAMPLING METHOD

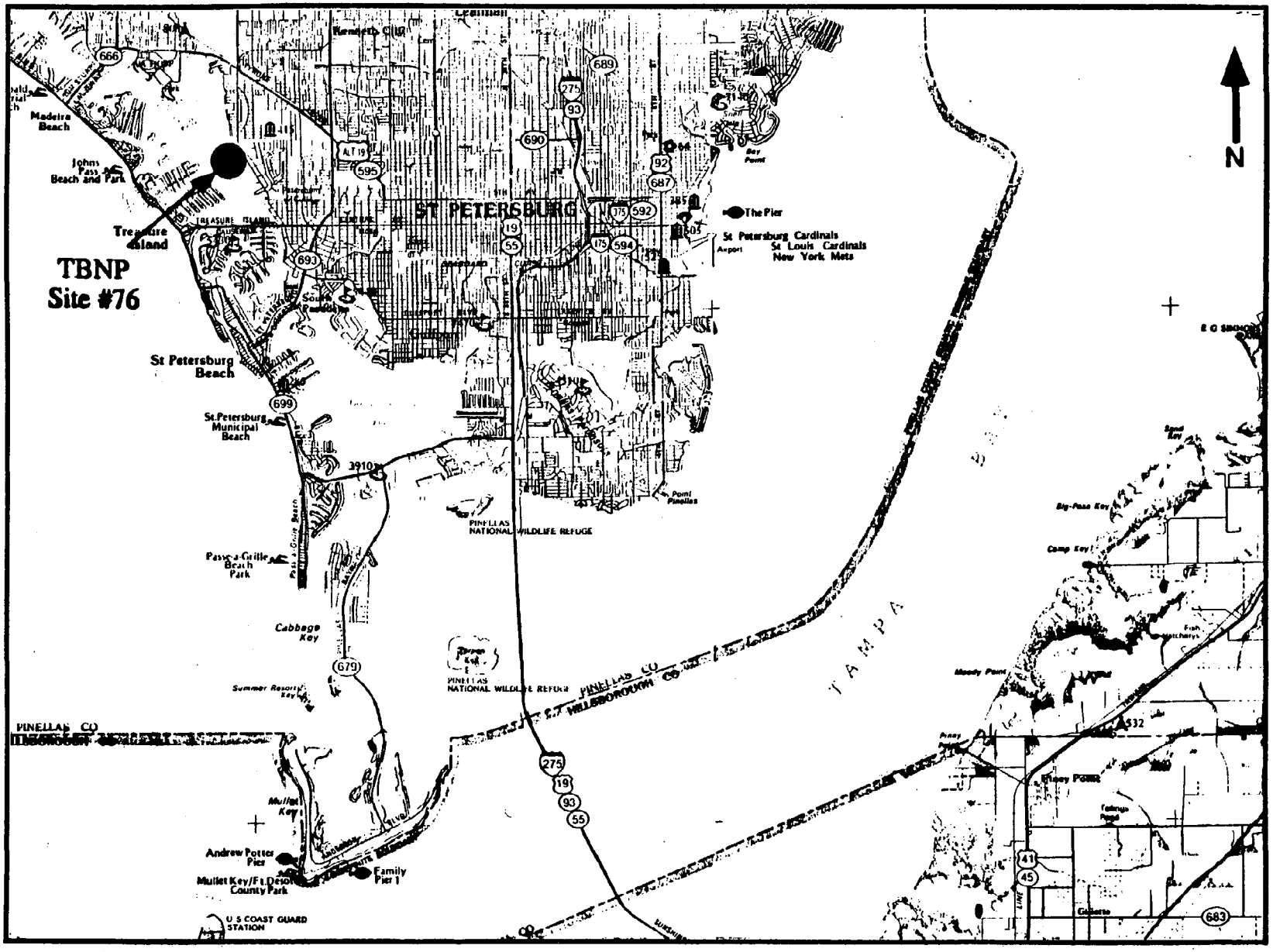
Oysters - hand
Sediments - box core

WATER DEPTH - intertidal, 0 to 0.3 meters

POSSIBLE CONTAMINANTS - Several sources for contamination were possible such as urban runoff and pollution from marine boat traffic.

ENVIRONMENTAL DATA

	Salinity (‰)	Temperature (°C)	Dates Sampled
YEAR IV	31.3	24.0	31 January 1989
YEAR V	31.0	20.0	1 February 1990
YEAR VI	34.0	19.5	31 January 1991
YEAR VII	33.0	17.0	28 January 1992
YEAR VIII	34.0	22.0	14 January 1993



Site #76 (TBNP), Tampa Bay Navarez Park.

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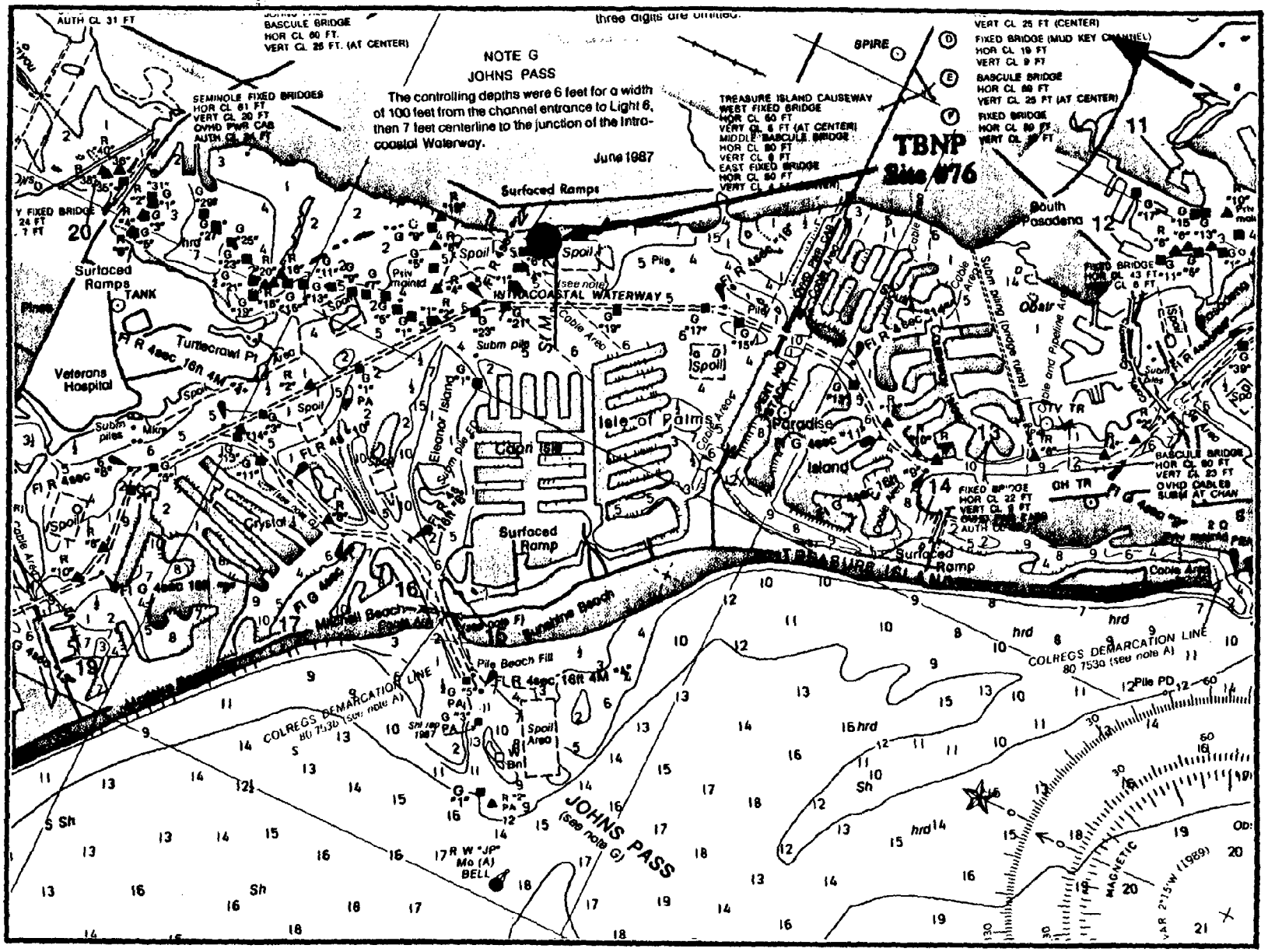
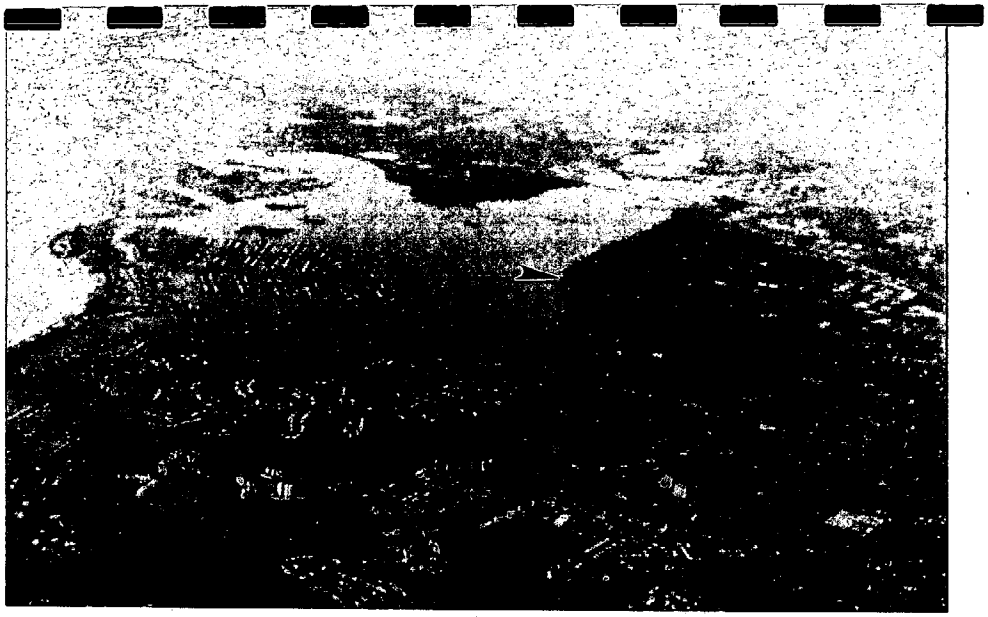
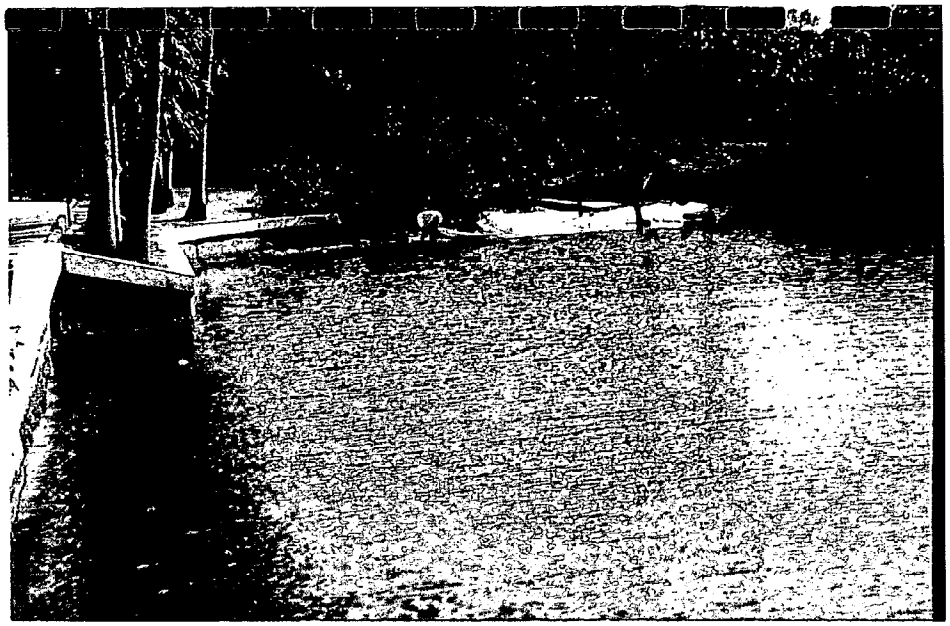


Site #76 (TBNP), Tampa Bay Navarez Park (from chart 11411).





SITE NUMBER 48 **DESIGNATOR** - CBBI

SITE - BIRD ISLAND, CHARLOTTE HARBOR, FL

NOMINAL SITE CENTER - 26°30.73'N 82°02.18'W

LOCATED ON NOS CHART # - 11427

SITE ACCESS - Boat launch is at the marina/bait shop next to St. James Restaurant on the main road which runs the length of Pine Island. Proceed down the canal, turn left and enter the bay. Join the channel markers and proceed to Bird Island After the second year, the launch site was moved to the public ramp at Red Fish Point in Ft. Meyers. To reach the site proceed down the Calooshatchee River along the ICWW past Big Shell Island. Turn north at channel marker 2 and 2A. This will take you to the west of Bird Island. An alternate launch site is at the Punta Rassa Ramp.

SITE DESCRIPTION - The site was located in San Carlos Bay in the Matlacha Pass National Wildlife Refuge. The site was on a reef which was directly north of Bird Island and northeast of Merwin Key. Oysters were plentiful on the subtidal portions of the reef and could be collected either by hand or with tongs.

OYSTER COLLECTIONS

Year I - Collections were made on the submerged reef approximately 150 m from Bird Island. Bearings to locate Station 1 were 305° from Bird Island, 325° from the end of large bridge, and 70° from the north end of Merwin Key. Station 2 was 250 m north of Bird Island at 210° and 325° from the large bridge, and 60° from the north end of Merwin Key. Station 3 was about 200 m from Bird Island at 290°, 325° from the bridge, and 70° from the north end of Merwin Key.

Year II - Year II stations were in approximately the same locations. Station 1 was on the east side of Bird Island. Station 2 was north of Bird Island, and Station 3 was on the west side of Bird Island.

Years III & IV - Years III and IV oyster stations were collected on the large reef north of Bird Island. Bearing to Bird Island were 110° and 130° to the high rise condo.

Years V & VI - Oysters were collected approximately 500 m northwest of Bird Island at the second reef. This was the same general location as last year. Station 1 was on the east end of the reef, Station 2 was in the middle 100 m west of #1, and Station 3 was on the west end of the reef 150 m from the last station.

Years VII, VIII, & IX - The same stations described for Year V were sampled again these years.

SEDIMENT COLLECTIONS

Year I - Sediments were collected adjacent to the oyster stations. No fine sediments were found anywhere near the oyster site.

Year II - Sediments were sampled west of Bird Island ~50-100 m from the oyster Station 3 (Station 1) and then again 200 m farther west (Station 2). These sediments were silty sand at best and contained significant amounts of sea grasses. The third sediment was collected at the mouth of the dredged channel which led to the boat launch. This site was several miles from Bird Island and about 0.5-1 mile from the boat launch.

Year III - Sediments were collected approximately 30 m south of each oyster station.

Years IV, V, VI, VII, VIII, & IX - Sediments were not sampled during these years.

SAMPLING METHOD

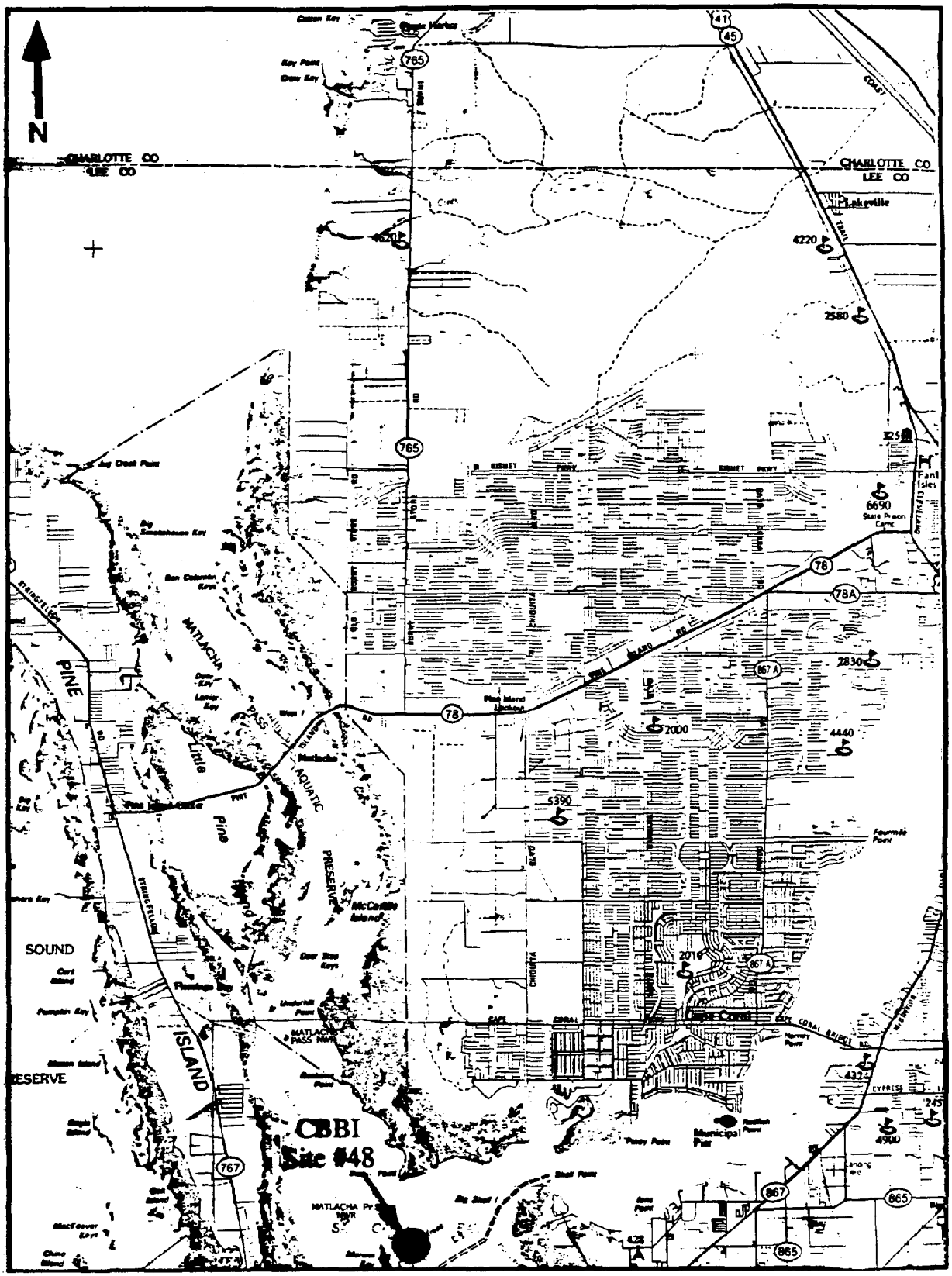
Oysters - tongs and by hand
Sediment - box core

WATER DEPTH - intertidal, 0 to 0.8 meters

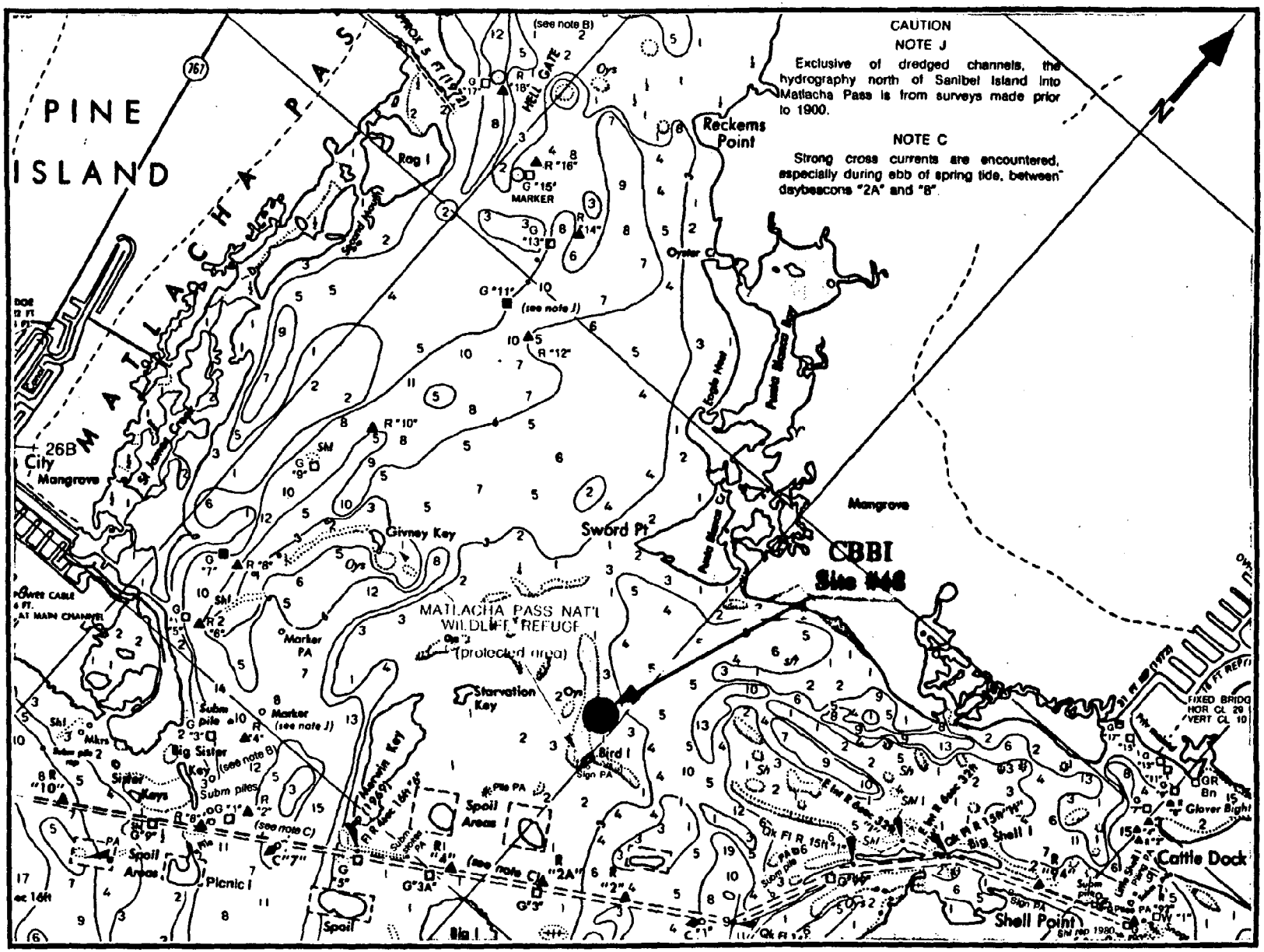
POSSIBLE CONTAMINANTS - There were no obvious sources of contamination at the Bird Island site. The site was in the open in a large bay. Station 3 sediments would not be considered representative of contaminant exposure at the oyster site. However, it was the only source of sediments which clearly met the size criteria, and the sediments would have been subject to contamination from residential and recreational boating areas which surrounded the canal.

ENVIRONMENTAL DATA

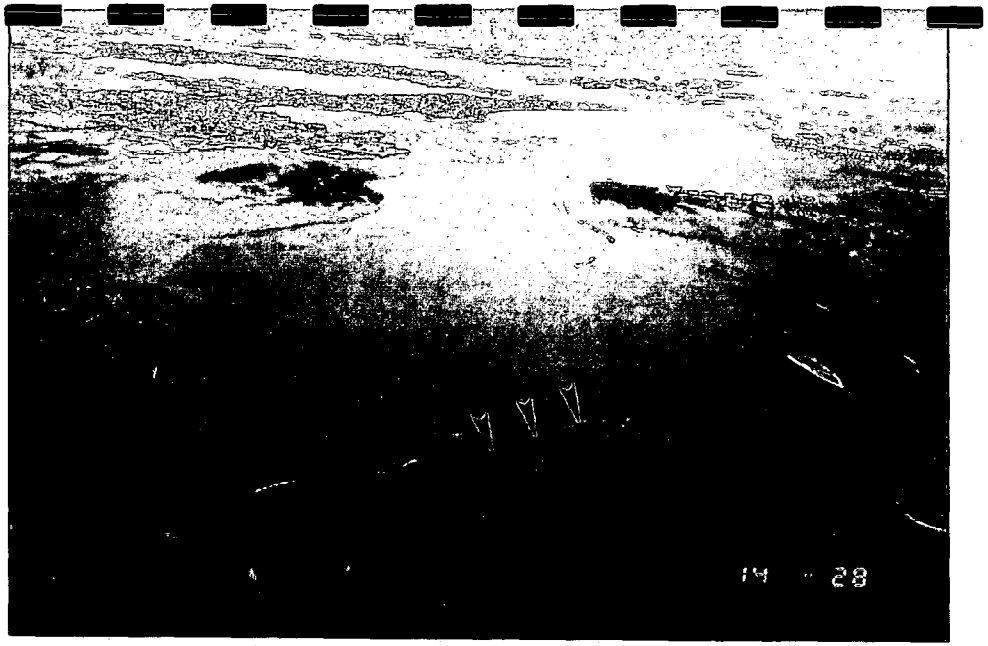
	Salinity (‰)	Temperature (°C)	Dates Sampled
YEAR I	34.0	27.0	21 February 1986
YEAR II	31.0	20.0	2 March 1987
YEAR III	31.0	20.0	22 February 1988
YEAR IV	33.0	22.0	30 January 1989
YEAR V	30.3	25.0	31 January 1990
YEAR VI	30.0	26.0	31 January 1991
YEAR VII	33.0	19.0	28 January 1992
YEAR VIII	24.0	20.0	18 January 1993
YEAR IX	26.0	16.0	21 January 1994



Site #48 (CBBI), Charlotte Harbor Bird Island.



Site #48 (CBBI), Charlotte Harbor Bird Island (from chart 11427).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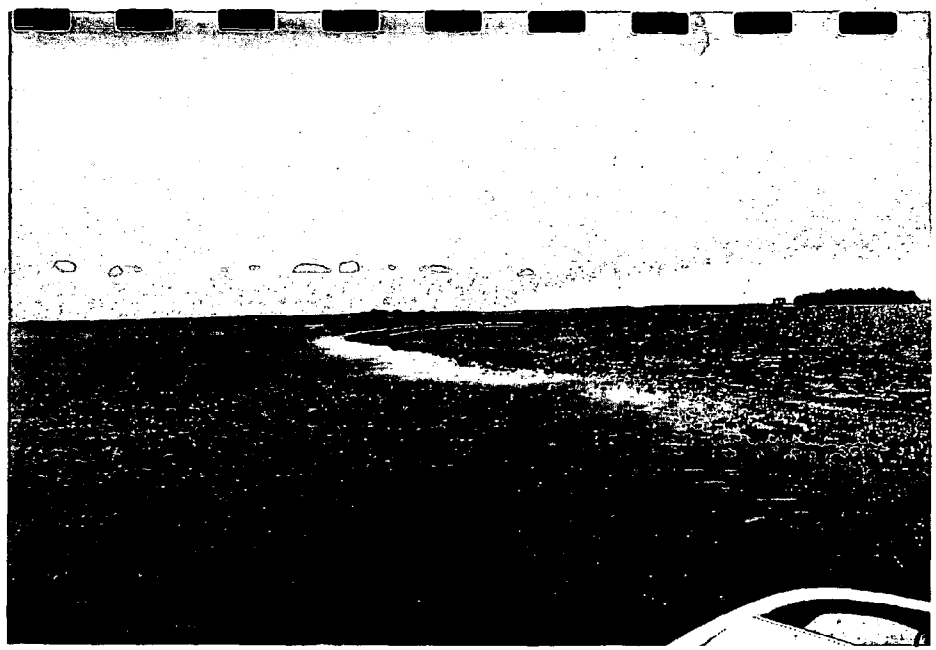
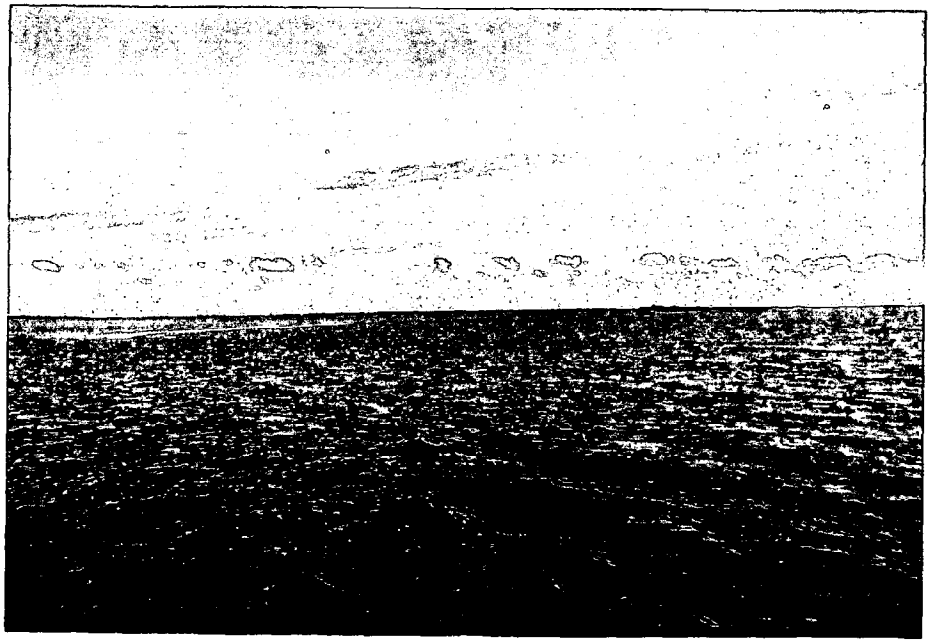
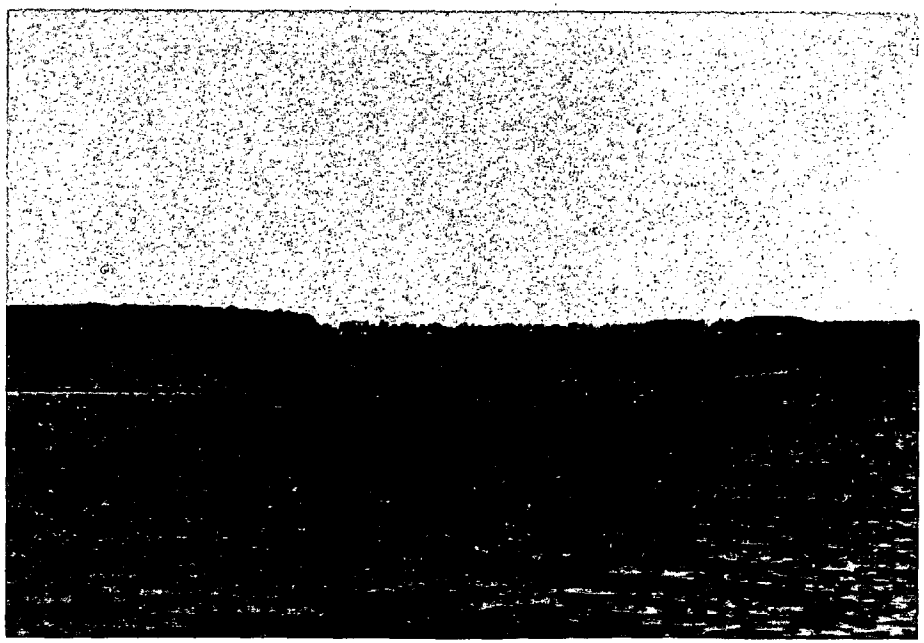






SITE NUMBER 71 **DESIGNATOR** - CBFM

SITE - FORT MEYERS, CHARLOTTE HARBOR, FL

NOMINAL SITE CENTER - 26°33.50'N 81°55.37'W

LOCATED ON NOS CHART # - 11427

SITE ACCESS - This site, established in Year III, is reached by boat launched at the public boat ramp at Redfish Point. Proceed up the Calooshatchee River to the Cape Coral Bridge. The site is on the east end of the bridge.

SITE DESCRIPTION - The site was located on the east end of the bridge on both sides of the highway. Small oyster clumps along with clams and barnacles were attached along the base of the bridge and were in clumps on the sand and shell bottom.

OYSTER COLLECTIONS

Year III - Oyster Station 1 was on the east end of the bridge on the northeast side. Oyster Station 2 was on the south side of the Cape Coral Bridge. Station 3 was 100 m to the south along the bulkhead.

Years IV, V, VI, VII, & VIII - Oyster collections stations were the same sites as sampled in Year III.

Year IX - The site was not scheduled to be sampled this year.

SEDIMENT COLLECTIONS

Year III - Sediments were collected 50 to 100 m offshore from the oyster stations. Sediments were primarily sand with some mud. Sediment Station 1 was collected about 50 m north of the oyster collection site in 1 to 1.5 m of water. Sediment Station 2 was located 75 m south of the oyster collection site. Sediment Station 3 was in 1.5 m of water ~100 m to the northwest of the oyster collection area.

Year IV - Sediments were not sampled this year.

Year V - Sediment samples were collected adjacent to each of the oysters collection sites. Suitable sediment occurred as a thin layer of silt in small depressions. Most of the recent sediment appeared to be associated with recent road construction.

Year VI - Sediments were not collected this year.

Years VII, VIII, & IX - No sediments were collected during these years.

SAMPLING METHODS

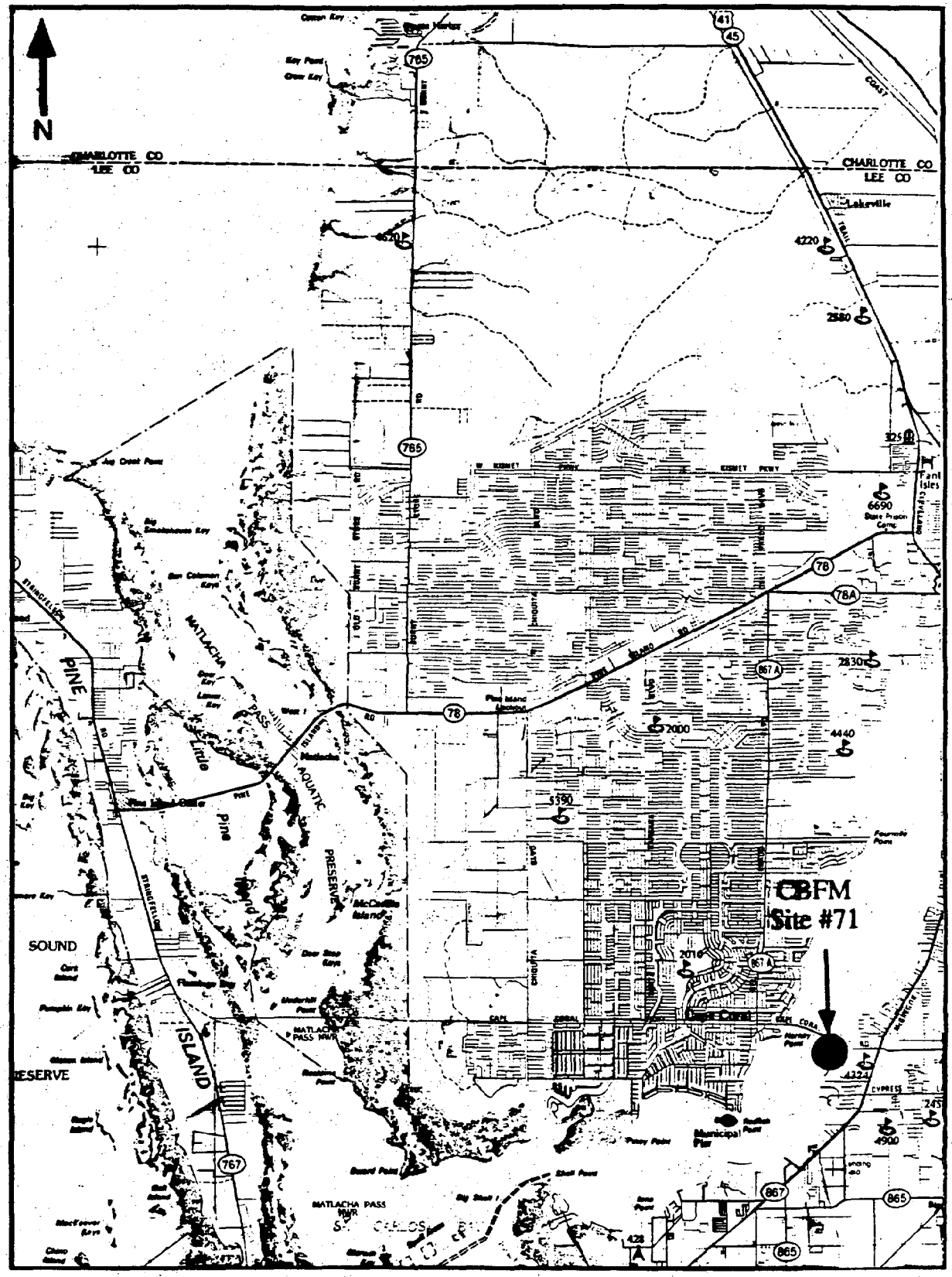
Oysters - hand
Sediment - box core

WATER DEPTH - intertidal, 0.1 - 0.6 m

POSSIBLE CONTAMINANTS - Contamination was present from highway drainage and possibly from septic systems.

ENVIRONMENTAL DATA

	Salinity (‰)	Temperature (°C)	Dates Sampled
YEAR III	24.0	20.0	22 February 1988
YEAR IV	20.3	20.0	30 January 1989
YEAR V	24.0	23.0	31 January 1990
YEAR VI	19.0	25.0	31 January 1991
YEAR VII	26.0	18.0	28 January 1992
YEAR VIII	14.0	20.0	18 January 1993



Site #71 (CBFM), Charlotte Harbor Fort Meyers.

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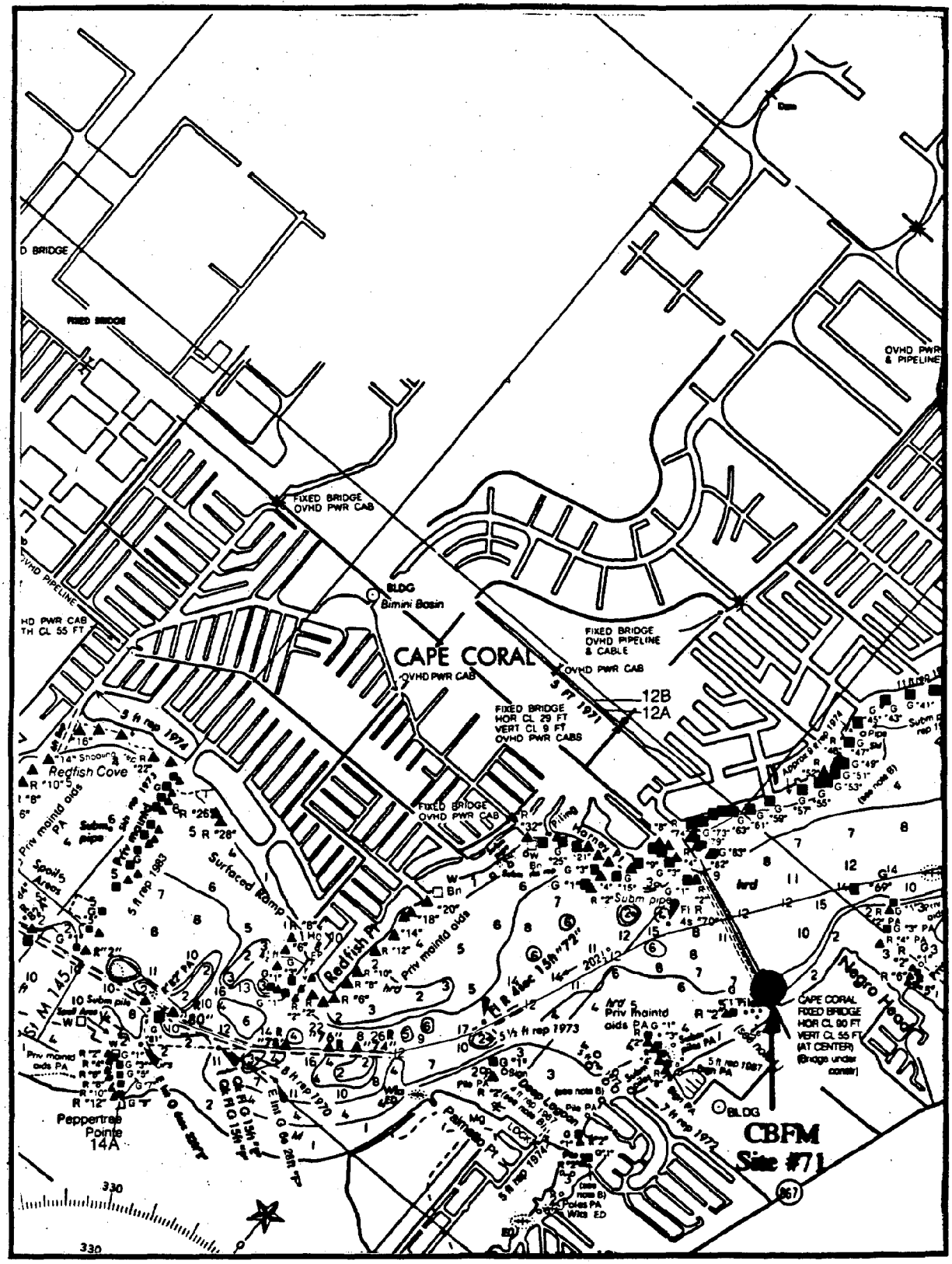
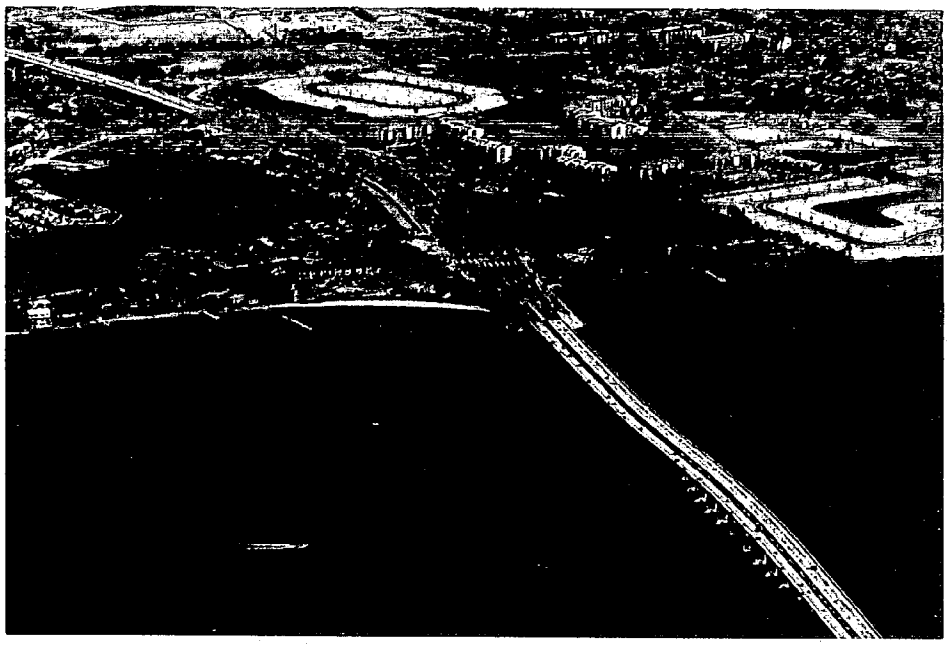


Site #71 (CBFM), Charlotte Harbor Fort Meyers (from chart 11427).



SITE NUMBER 49 **DESIGNATOR** - NBNB

SITE - NAPLES BAY, NAPLES BAY, FL

NOMINAL SITE CENTER - 26°06.78'N 81°47.15'W

LOCATED ON NOS CHART # - 11430, 11429

SITE ACCESS - The boat is launched from Bayview Park on the south side of Naples. It is accessible almost directly from the interstate via the exit for Marco Island. Proceed south on Highway 951 to Rattlesnake Hammock Road (Highway 864). Go across Highway 41 to Thommason Road and proceed to the end of the road at Bayview Park. Proceed by boat north from the park up the channel to channel marker 24.

SITE DESCRIPTION - The oyster reefs were located to the east and adjacent to channel marker 24. The old reefs were primarily consolidated and cemented old shell fragments.

OYSTER COLLECTIONS

Year I - Year I oysters were collected by hand. Station 1 was at a reef in a residential area with bearing of 185° to channel marker 24; 268° to channel marker 26. Station 1 was at the first reef adjacent to channel marker "Red 24". Station 2 was at the second reef with bearing of 172° to channel marker 22; 298° to channel marker 24. Station 3 was 100 m east of Station 2 at the small reef with a tree.

Year II - The oysters during Year II were collected with tongs from the subtidal portions of the reef. Stations were not differentiated, but rather were composites of randomly collected oysters around the small, mostly dead reef.

Year III - Year III oysters were collected in the same area but the stations were not distinguished.

Years IV, V, VI, VII, & VIII - The site was the same as sampled previously, a submerged reef adjacent to channel marker 24. Station 1 was the submerged reef with the single mangrove tree growing on it. Station 2 was on the east side of the reef; Station 3 was sampled from clumps of oysters by the point to the east of the Station 2.

Year IX - The site was not scheduled to be sampled this year.

SEDIMENT COLLECTIONS

Year I - Sediments from the area were almost non-existent, due to the nature of the consolidated shell bottom. Fine sediments were located only in very small isolated pockets that were found by chance and in boating channels

that were dredged to the homesites. Year I sediments were collected along the shore east of the respective oyster stations.

Year II - Sediment Station 1 was among the oyster stations. Sediment Station 2 was north of the oyster site in to the channel east and north of channel marker 26 & 27 (channel identified as Tarpon Road and Kingfisher Road). Sediment #3 was from the entrance to the boat basin at the launch ramp in Bayland Park.

Years III, IV, & V - Sediments were located in the same areas as sampled in Year II.

Years VI, VII, VIII, & IX - No sediments were sampled during these years.

SAMPLING METHOD

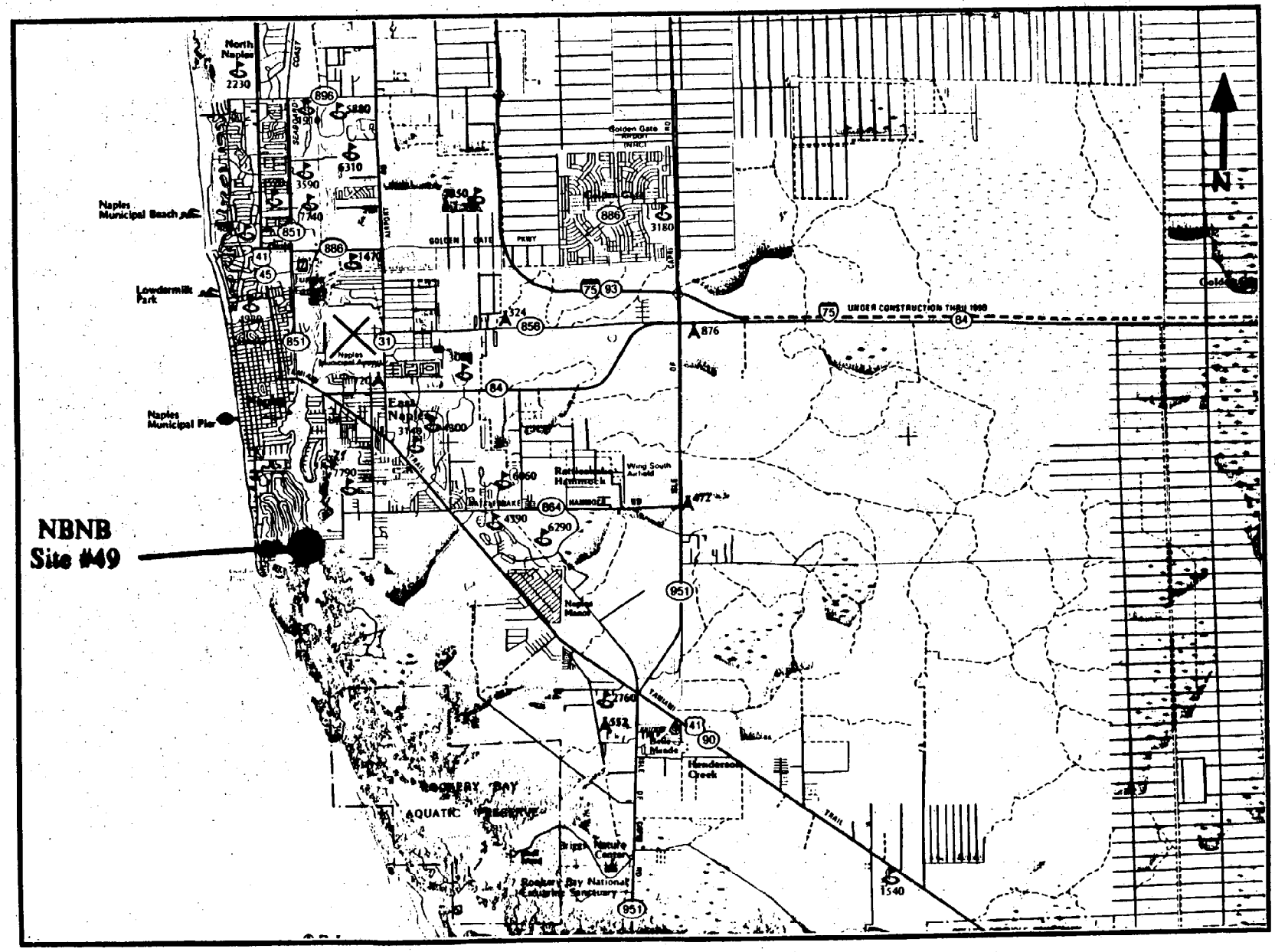
Oysters - tongs and by hand
Sediment - box core

WATER DEPTH - intertidal, 0.2 to 1 meter

POSSIBLE CONTAMINANTS - Sources of contamination would be from very heavy recreational boating and dense residential development along and farther upstream on the waterfront.

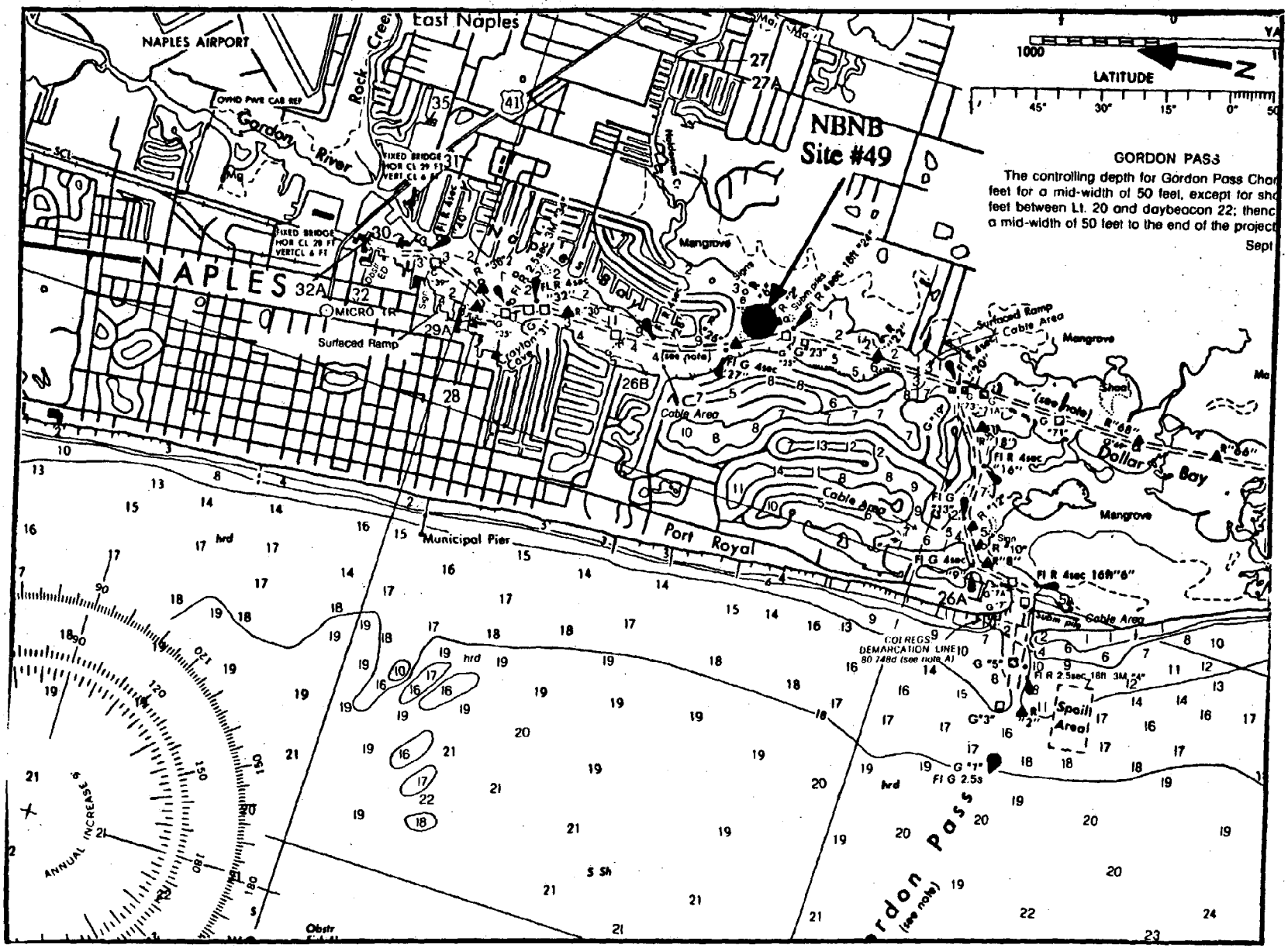
ENVIRONMENTAL DATA

	Salinity (‰)	Temperature (°C)	Dates Sampled
YEAR I	27.6	23.0	21 February 1986
YEAR II	25.0	19.0	2 March 1987
YEAR III	23.0	20.0	20 February 1988
YEAR IV	-	23.0	29 January 1989
YEAR V	34.0	22.0	29 January 1990
YEAR VI	32.0	25.0	1 February 1991
YEAR VII	36.0	19.0	27 January 1992
YEAR VIII	30.0	23.0	18 January 1993

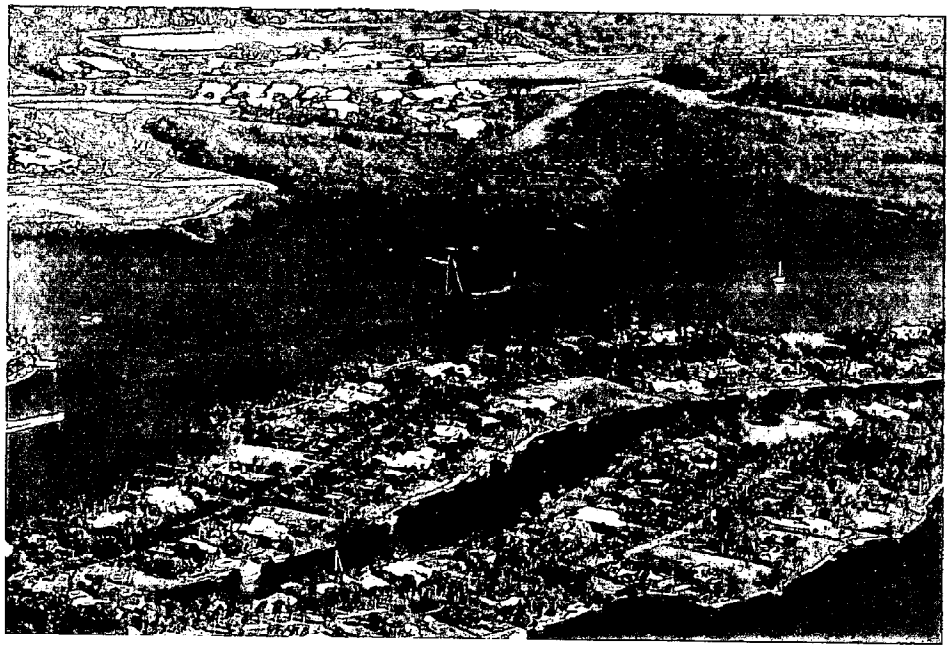


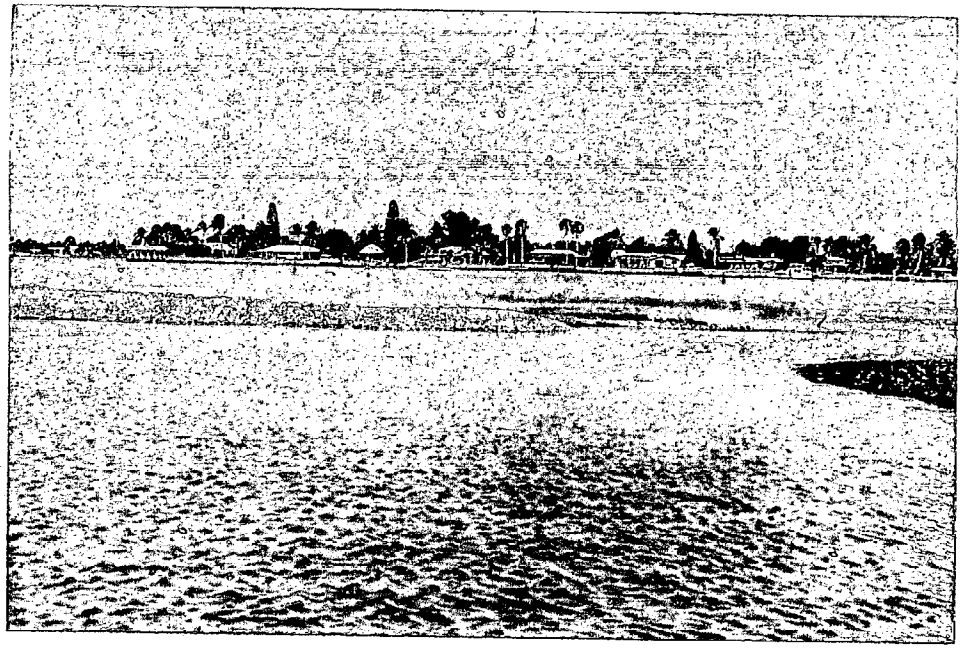
Site #49 (NBNB), Naples Bay Naples Bay.

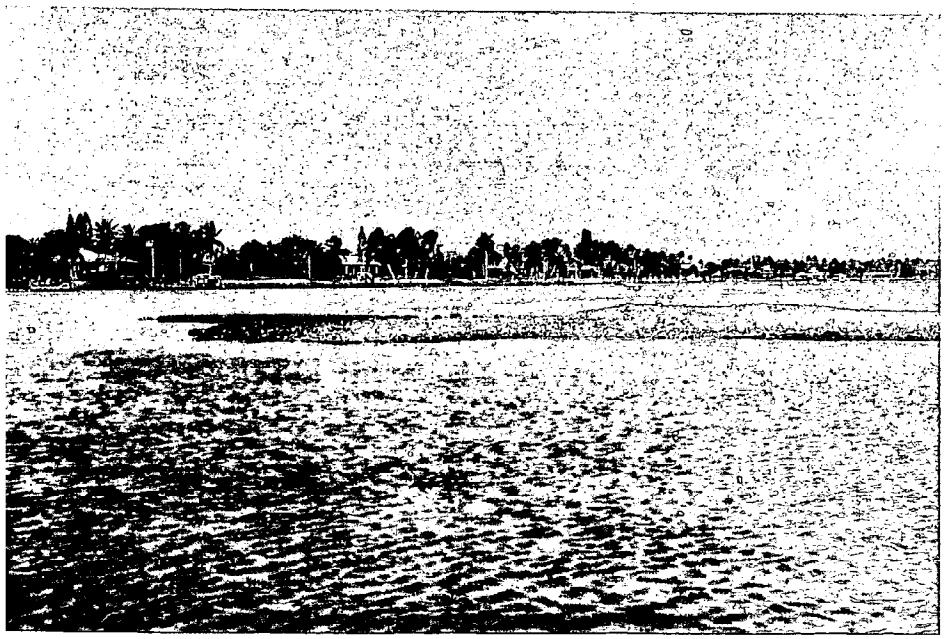
DeLorme Mapping Company. Map Taken from Florida Atlas and Gazetteer. Reproduced with permission.

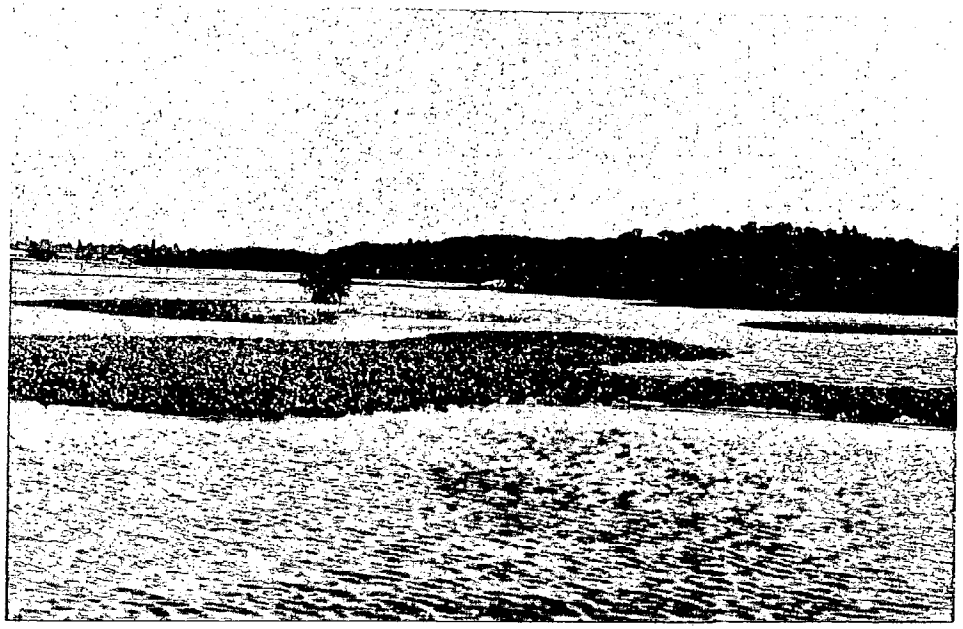


Site #49 (NBNB), Naples Bay Naples Bay (from chart 11430).









SITE NUMBER 50 **DESIGNATOR** - RBHC

SITE - HENDERSON CREEK, ROOKERY BAY, FL

NOMINAL SITE CENTER - 26°01.50'N 81°44.20'W

LOCATED ON NOS CHART # - 11430, 11429

SITE ACCESS - The site was accessed from I-75 by driving west (or south) on Florida 951, ~ 2.6 miles past the intersection of U.S. Highway 41, Turn right on Shell Island Road. Shell Island Road is marked by a sign for the Briggs Nature Conserancy and Marine Research Lab. Proceed to the Rookery Monument, past the Rookery Headquarters and to the boat ramp at the end of the road.

SITE DESCRIPTION - The site was located in Rookery Bay Aquatic Preserve in Henderson Creek. All three sites were near the mouth of the creek, in the vicinity of the Childrens Monument.

OYSTER COLLECTIONS

Year I - The oyster population at this site was not large but was sufficient for repeated sampling. Oysters were collected by hand from a subtidal reef along the shore and from mangrove roots. Station 1 was a submerged bed adjacent to mangrove clump, where mangroves constrict Henderson Creek at Rookery Bay. Station 1 was to the south. Station 2 was ~250 m southeast of Station 1 located at 82° from the monument. Station 3 was ~10 m west of monument.

Years II, III, IV, V, VI, VII, & VIII - In these years the site was located in the same area around the monument along the shore line. Oysters were located on clumps on the mangrove roots. Station 1 was south of the monument; Station 2 was north of the monument; and Station 3 was approximately 100 to the northeast.

Year IX - The site was the same as previously designated, at the monument. Station 1 was on the same shoreline as the monument, approx. 150 m to the south at the first bare reef patch in the mangroves. Station 2 was located on the shore opposite the monument, at a small cove in the mangroves, next to the manatee sign. Station 3 was located on the shoreline opposite the monument, approx. 200 m to the northeast at the bare patch in the mangroves, where the channel begins to constrict from the passage out of Henderson Reef into Rookery Bay.

SEDIMENT COLLECTIONS

Years I, II, & III - Sediments were taken from among the mangrove roots at each station.

Years IV, V, VI, VII, VIII, & IX - Sediments were not sampled during these years.

SAMPLING METHOD

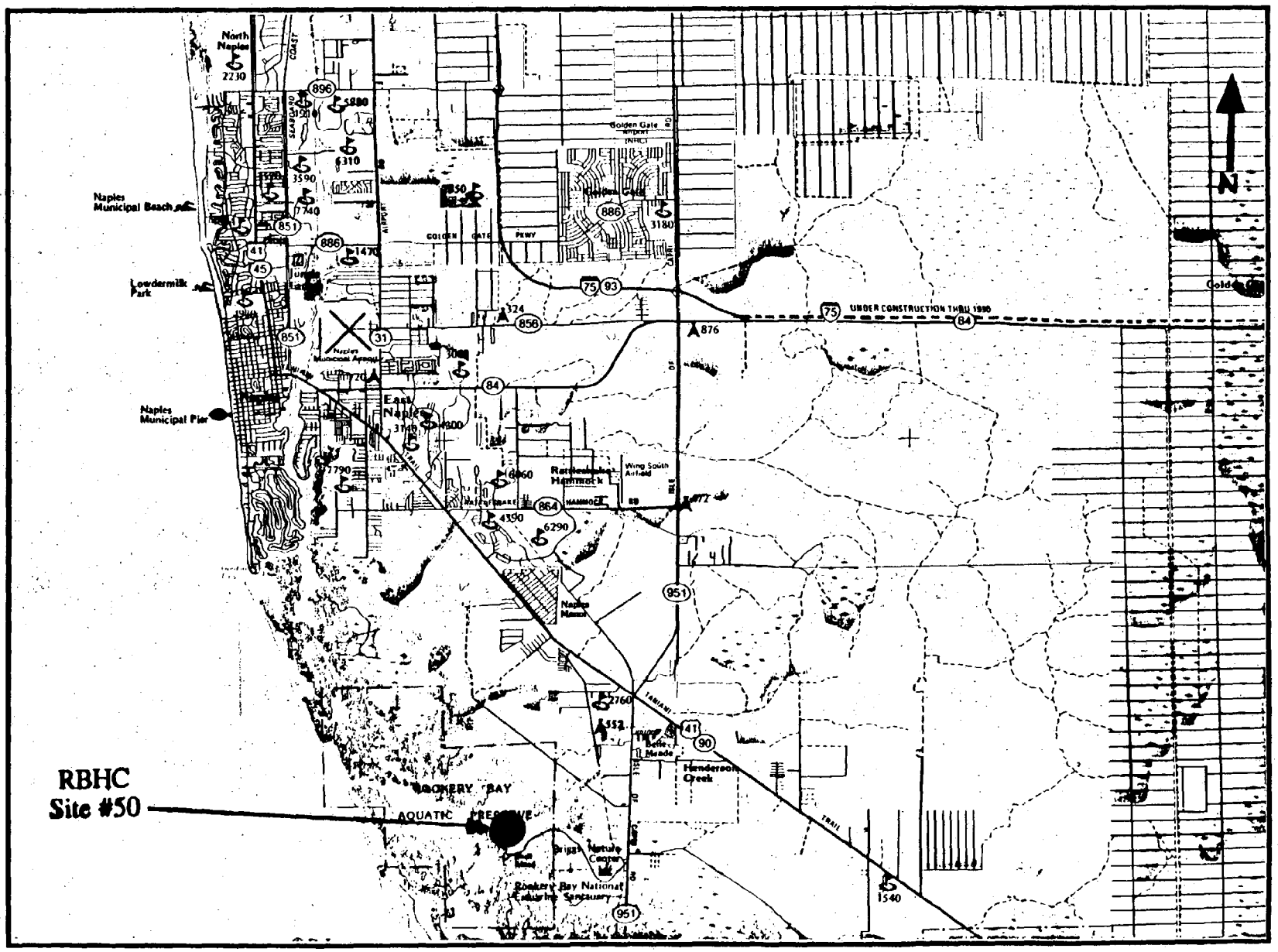
Oysters - hand
Sediment - hand.

WATER DEPTH - intertidal, 0.2 to 0.5 meters

POSSIBLE CONTAMINANTS - No observable contamination factors were noted.

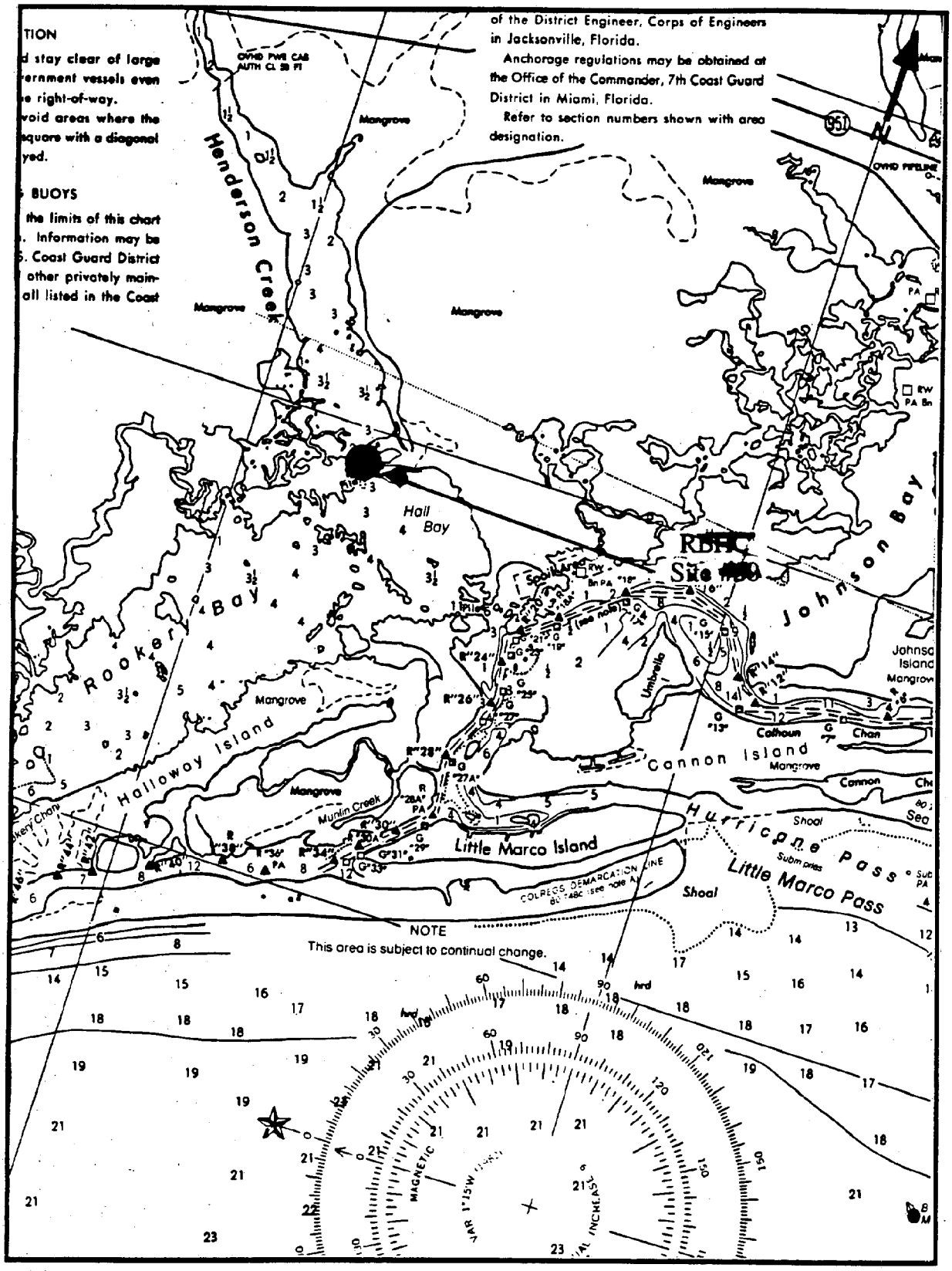
ENVIRONMENTAL DATA

	Salinity (‰)	Temperature (°C)	Dates Sampled
YEAR I	34.0	23.0	20 February 1986
YEAR II	16.6	22.0	2 March 1987
YEAR III	16.0	21.0	21 February 1988
YEAR IV	-	23.0	30 January 1989
YEAR V	35.0	24.0	30 January 1990
YEAR VI	34.0	25.0	2 February 1991
YEAR VII	37.0	20.0	27 January 1992
YEAR VIII	35.0	21.0	18 January 1993
YEAR IX	34.0	18.0	21 January 1994

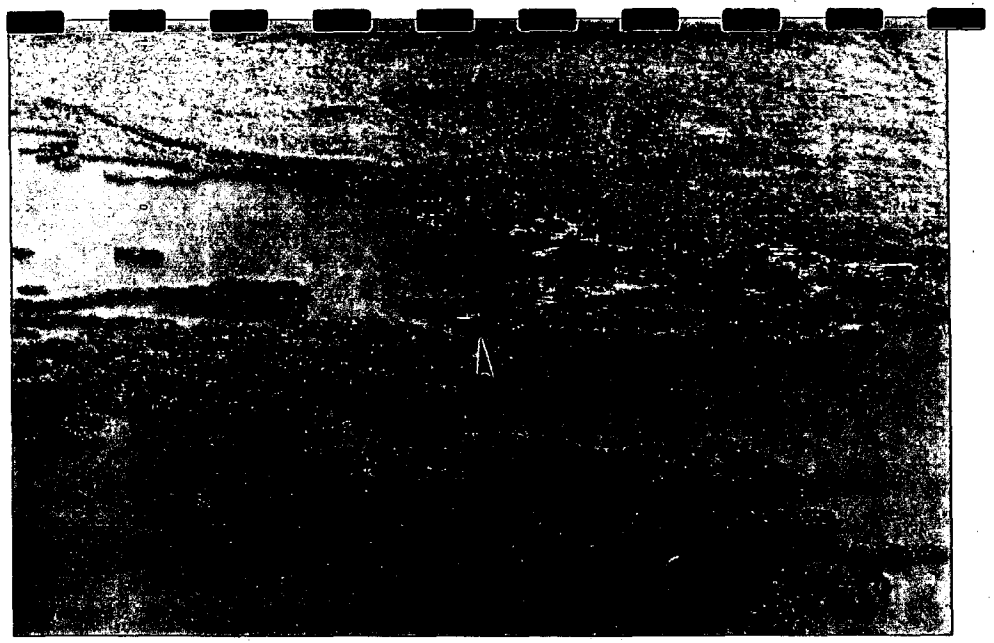


Site #50 (RBHC), Rookery Bay Henderson Creek.

Lorme Mapping Company. Map Taken from Florida Atlas and Gazetteer. Reproduced with permission.



Site #50 (RBHC), Rookery Bay Henderson Creek (from chart 11430).



SITE NUMBER 51 **DESIGNATOR** - EVFU

SITE - FAKA UNION BAY, EVERGLADES, FL

NOMINAL SITE CENTER - 25°54.08'N 81°30.78'W

LOCATED ON NOS CHART # - 11430, 11429

SITE ACCESS - The site is accessed by driving to Port of the Islands Resort south of Naples on U.S. Highway 41 and by launching at the resort. Proceed south along a man-made channel to Faka Union Bay. The sample site is on a mangrove island near channel marker 53.

SITE DESCRIPTION - Faka Union Bay is located in the Cape Romano-Ten Thousand Islands Aquatic Preserve. An intertidal reef surrounds a mangrove island. The oysters were abundant, and no observable contamination factors were noted.

OYSTER COLLECTIONS

Year I - Year I oyster collections were made on a small exposed reef with mangroves. Station 1 was located 30 m from channel marker 48 on a bearing of 180°. Station 2 was 100 m to the north of Station 1 and 25 m from channel marker 50. Station 3 was 100 m southeast of Station 1.

Year II - Year II stations were moved slightly to the south to the submerged reef on the island at the end of the channel near marker 53. Station 1 was at the west end of the reef. Station 2 was in the middle. Station 3 was on the east end of the island.

Years III, IV, V, VI, VII, & VIII - Oyster collection stations were the same as those described for Year II.

Year IX - The site was not scheduled to be sampled this year.

SEDIMENT COLLECTIONS

Years I, II, III, & IV - Sediments were collected at each oyster station among the mangrove roots.

Years V, VI, VII, VIII, & IX - Sediments were not sampled during these years.

SAMPLING METHOD

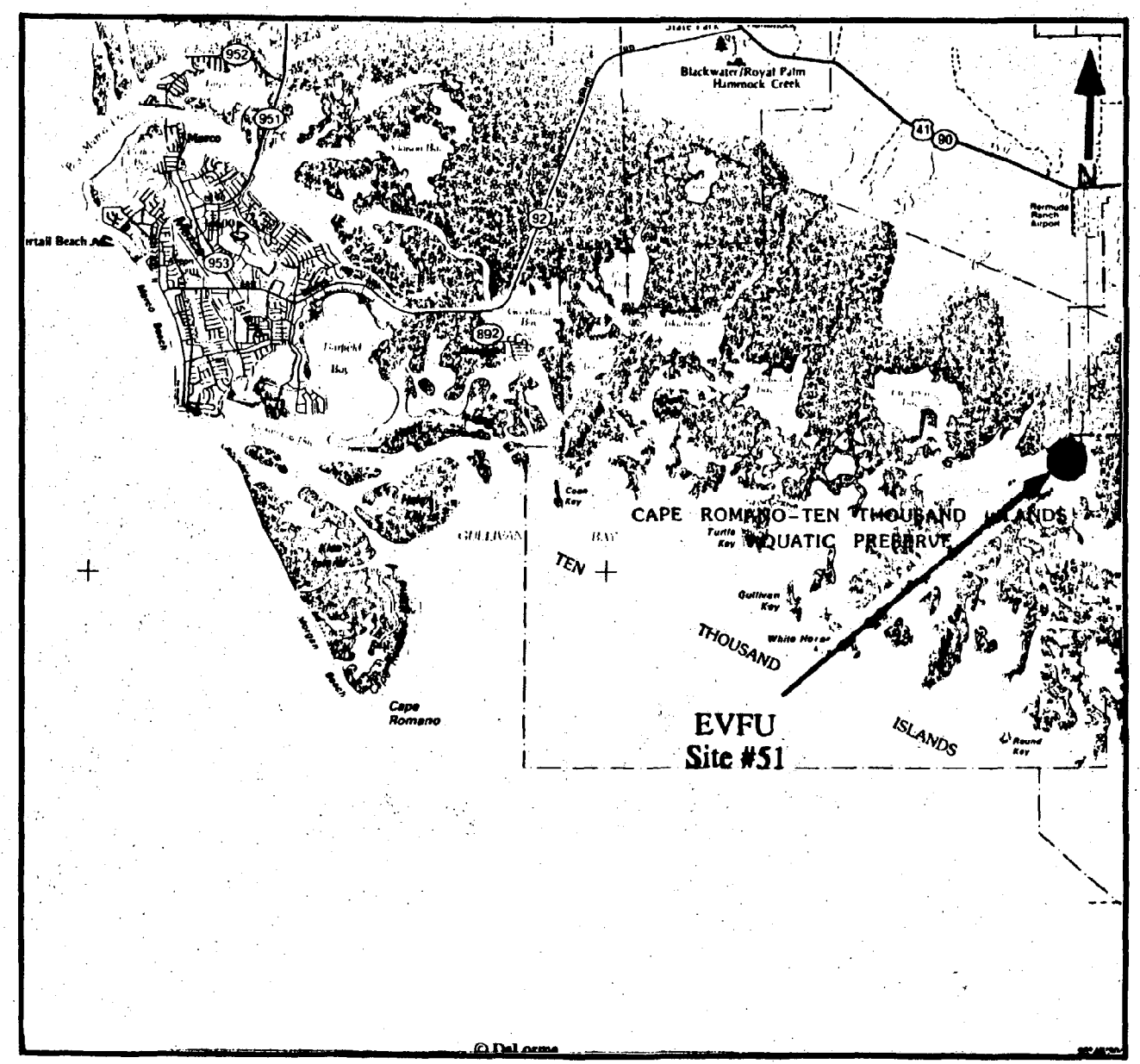
Oysters - hand
Sediment - hand

WATER DEPTH - intertidal, 0 to 0.3 meters

POSSIBLE CONTAMINANTS - No sources of contaminants were identified.

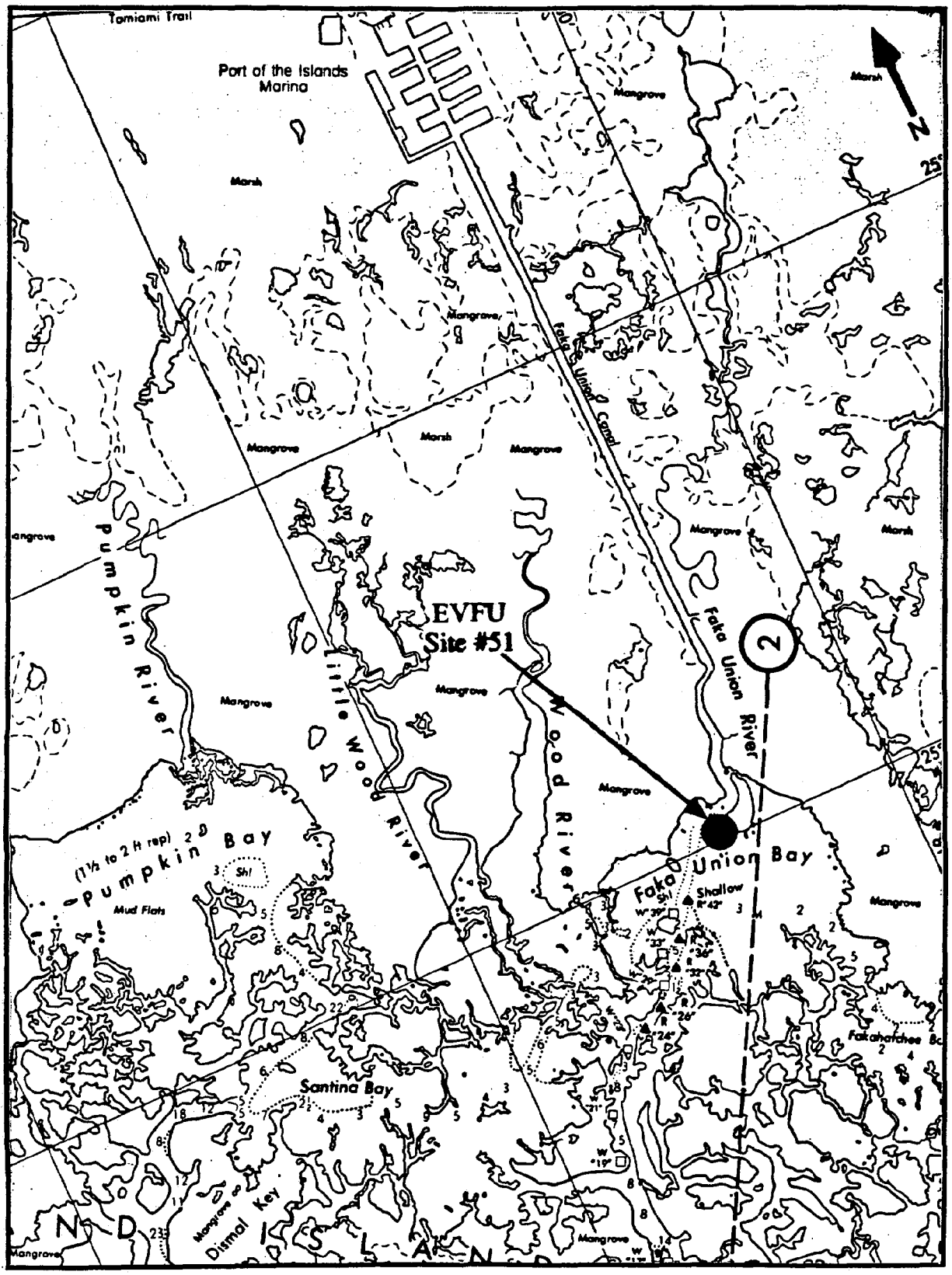
ENVIRONMENTAL DATA

	Salinity (‰)	Temperature (°C)	Dates Sampled
YEAR I	27.3	27.0	20 February 1986
YEAR II	27.3	27.0	2 March 1987
YEAR III	31.0	21.0	21 February 1988
YEAR IV	-	25.0	30 January 1989
YEAR V	29.0	23.0	30 January 1990
YEAR VI	15.0	24.0	3 February 1991
YEAR VII	32.0	19.0	27 January 1992
YEAR VIII	13.0	22.0	18 January 1993

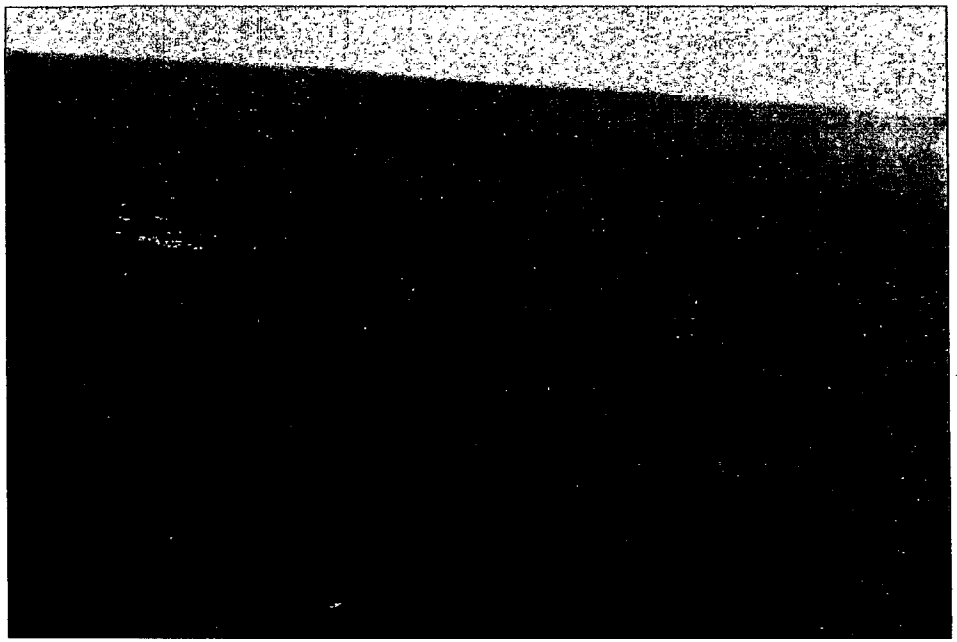


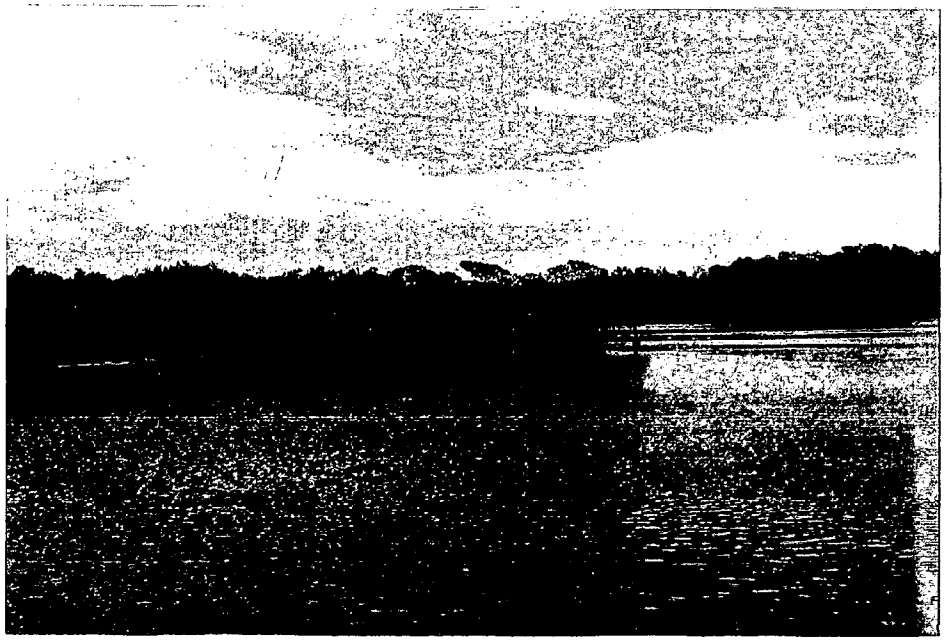
Site #51 (EVFU), Everglades Faka Union Bay.

DeLorme Mapping Company. Map Taken from Florida Atlas and Gazetteer. Reproduced with permission.



Site #51 (EVFU), Everglades Faka Union Bay (from chart 11430).





SITE NUMBER 87 **DESIGNATOR** - FBFO

SITE - FLAMINGO, FLORIDA BAY, FL

NOMINAL SITE CENTER - 25°08.27'N 80°55.25'W

LOCATED ON NOS CHART # - 11451

SITE ACCESS - The boat can be launched at the Flamingo Marina boat ramp in Flamingo City, in the Everglades National Park. A special collecting permit is required from the National Park for this site, and must be obtained ~ 2 months in advance. This was a new site for Year IX.

SITE DESCRIPTION - The site is located within and just outside the small boat basin. The stations are all within 100 m of each other, and can be collected by hand at low tide.

OYSTER COLLECTIONS

Year IX - Station 1 was located within the boat basin next to the boat ramp. The oysters were collected by hand from the boat - along the concrete bulkheads and wooden pilings. Station 2 was located ~ 100 m south of Station 1, in a small boat basin surrounded by tall concrete walls. The oysters were taken by hand from the NE wall by the Visitors Center. Station 3 was located ~ 80 m southwest of Station 2, along the opposing wall and rock area. The oysters were attached to the rocks and wall. Note - the oysters may be hard to spot, due to the heavy algae growth along the rocks and concrete walls.

SEDIMENT COLLECTIONS

Years IX - The sediments were of a silty nature, and were collected using a small box-core. The sediments for Stations 2 & 3 were taken next to the oyster stations. Station 1 sediments were collected from the middle of the boat basin, near the oyster station.

SAMPLING METHOD

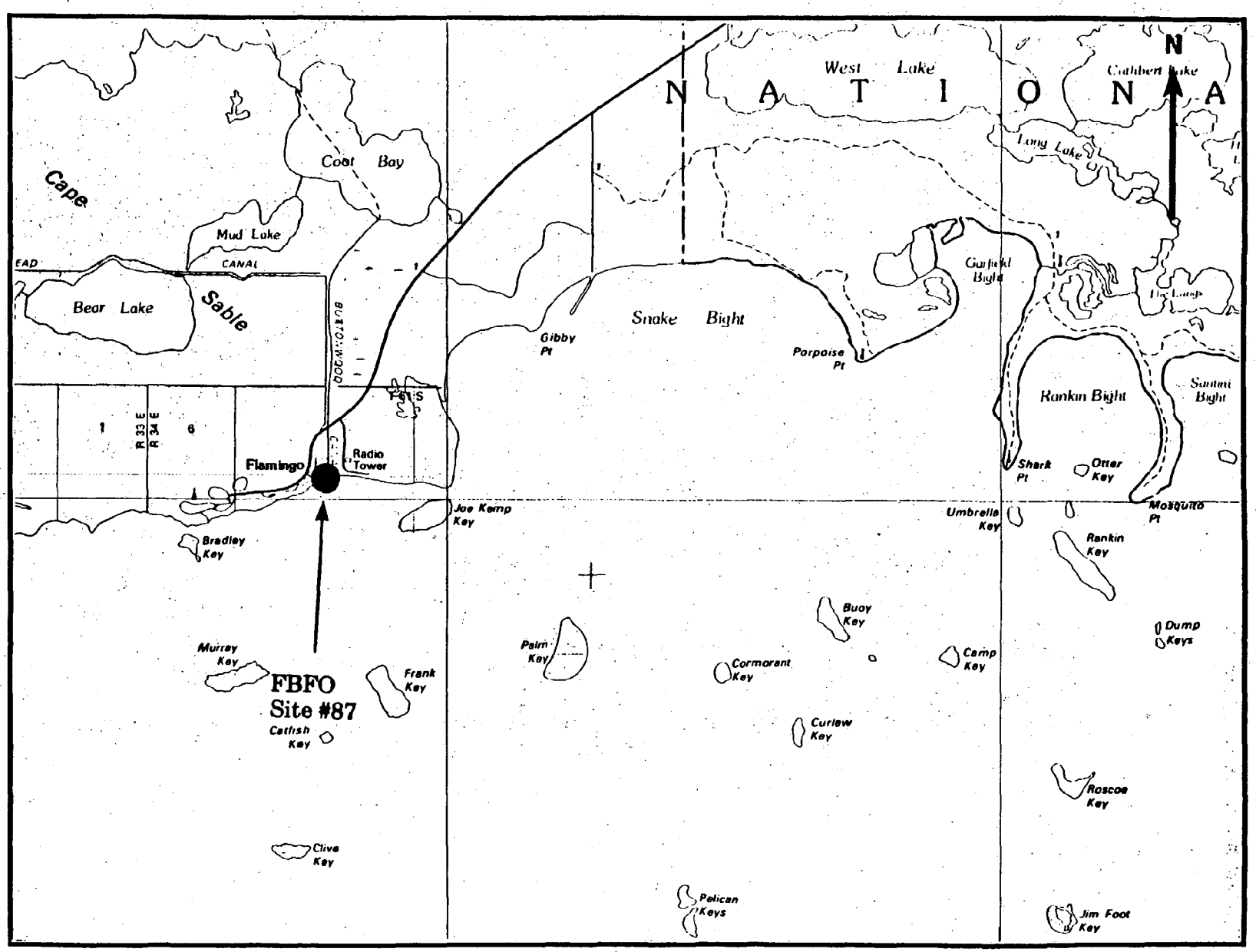
Oysters - hand
Sediment - Box-core

WATER DEPTH - Intertidal, 0 - 1.0 meters

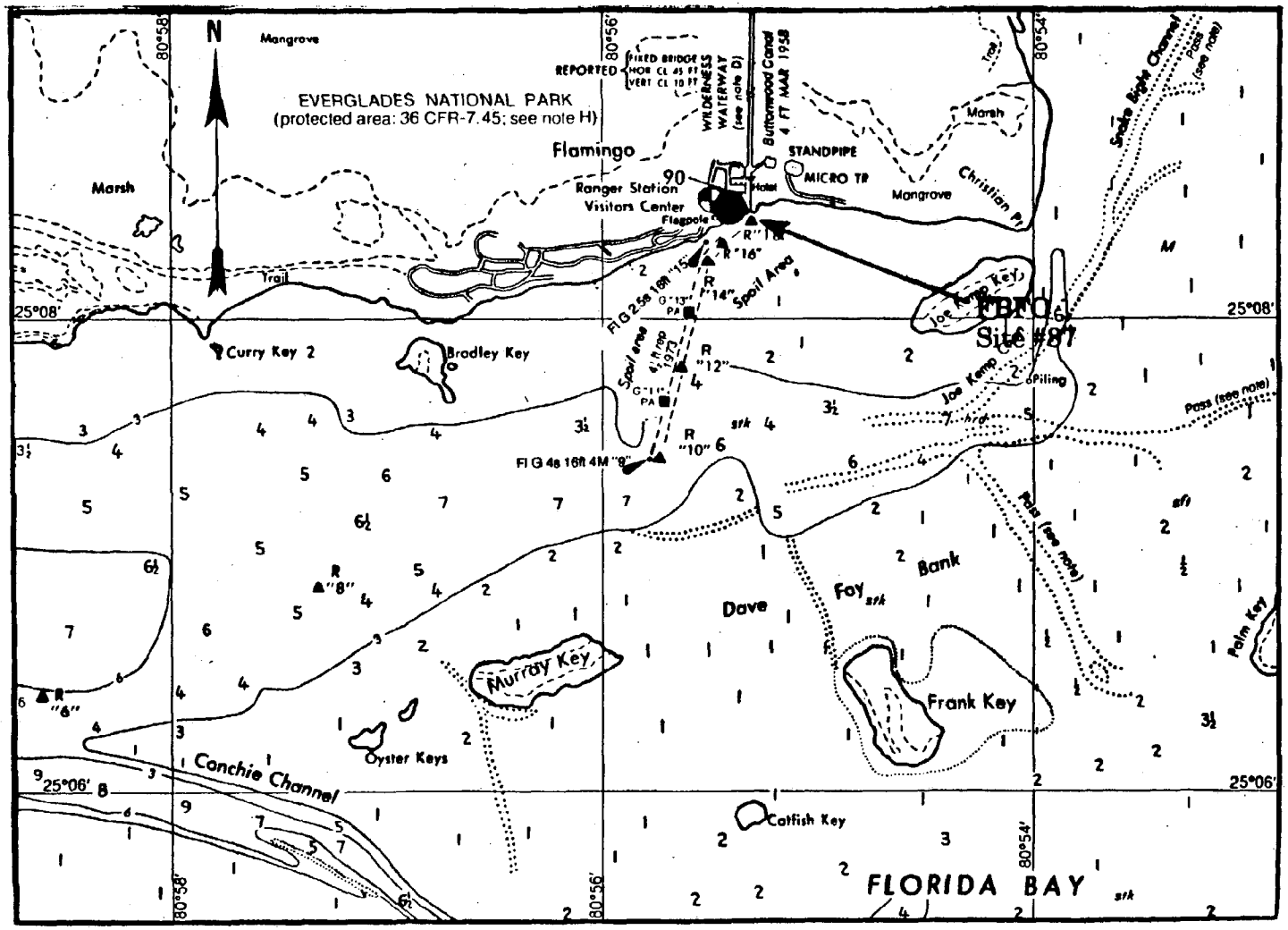
POSSIBLE CONTAMINANTS - No sources of contaminants were identified, other than from passing boats and ground water run-off from the Visitors Center and Restaurant.

ENVIRONMENTAL DATA

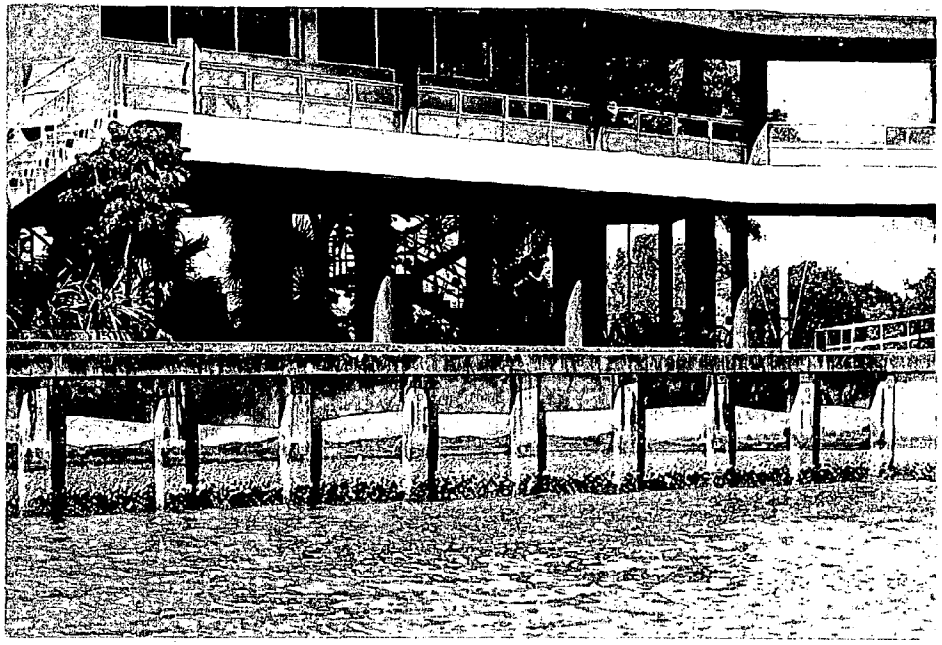
	Salinity (‰)	Temperature (°C)	Dates Sampled
YEAR IX	35.0	20.0	25 January 1994

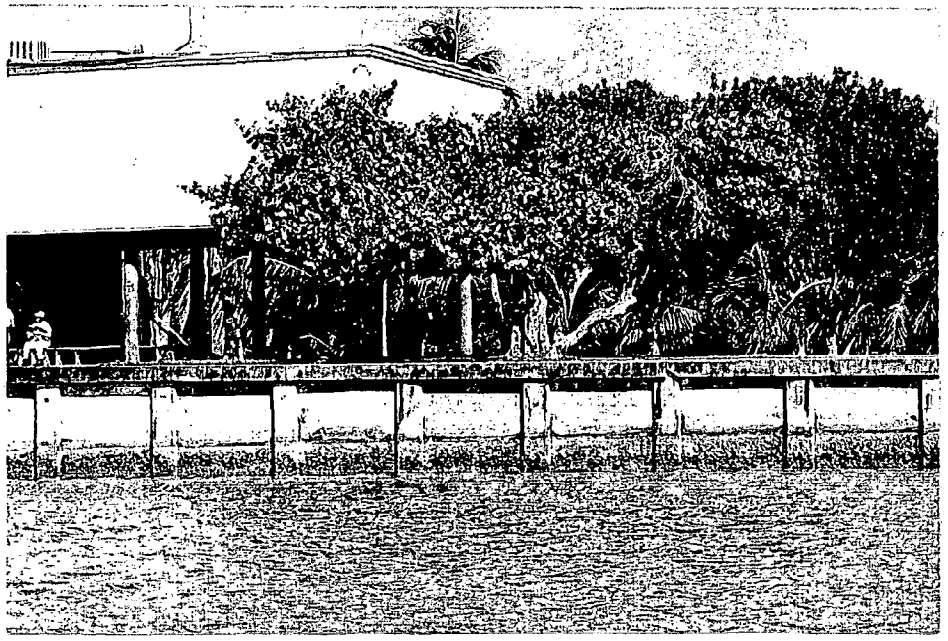


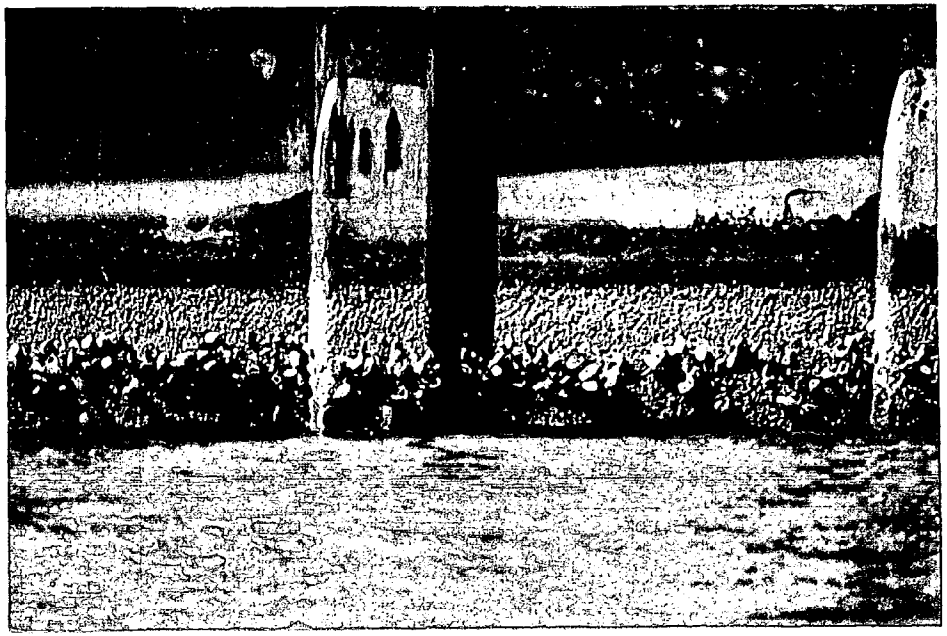
Site #87 (FBFO), Florida Bay Flamingo.



Site #87 (FBFO), Florida Bay Flamingo.







SITE NUMBER 88 **DESIGNATOR** - FBJB

SITE - JOE BAY, FLORIDA BAY, FL

NOMINAL SITE CENTER - 25°12.53'N 80°32.00'W

LOCATED ON NOS CHART # - 11451

SITE ACCESS - The boat can be launched in Florida Bay at the Key Largo Ranger Station. To reach the Ranger Station, proceed down US Hwy 1 to mile marker (MM) 98.7. The Ranger Station is on the right hand side of the road, and the boat ramp is behind the station. The ramp is a rough coral one, which ia adequate for small boats. Check with the Rangers for an update on local conditions. The oyster stations are approx. 10 miles away, at a heading of 330° at a marked channel into Joe Bay.

SITE DESCRIPTION - The site is situated along the cut into Joe Bay, and along the eastern side of Joe Bay.

OYSTER COLLECTIONS

Year IX - Station 1 was located within the cut into Joe Bay, Station 2 was located within Joe Bay along the eastern shoreline ~ 50 m north of Station 1, and Station 3 was located approx. 50 m north of Station 2 along the same shoreline. The oysters were all attached to mangrove roots. The landmarks are the "Closed Area" signs and the channel marker poles with arrows.

SEDIMENT COLLECTIONS

Year IX - The sediments were collected using a small box-core, near the oyster stations within Joe Bay. The sediments were a silty sand with sea-grass.

SAMPLING METHOD

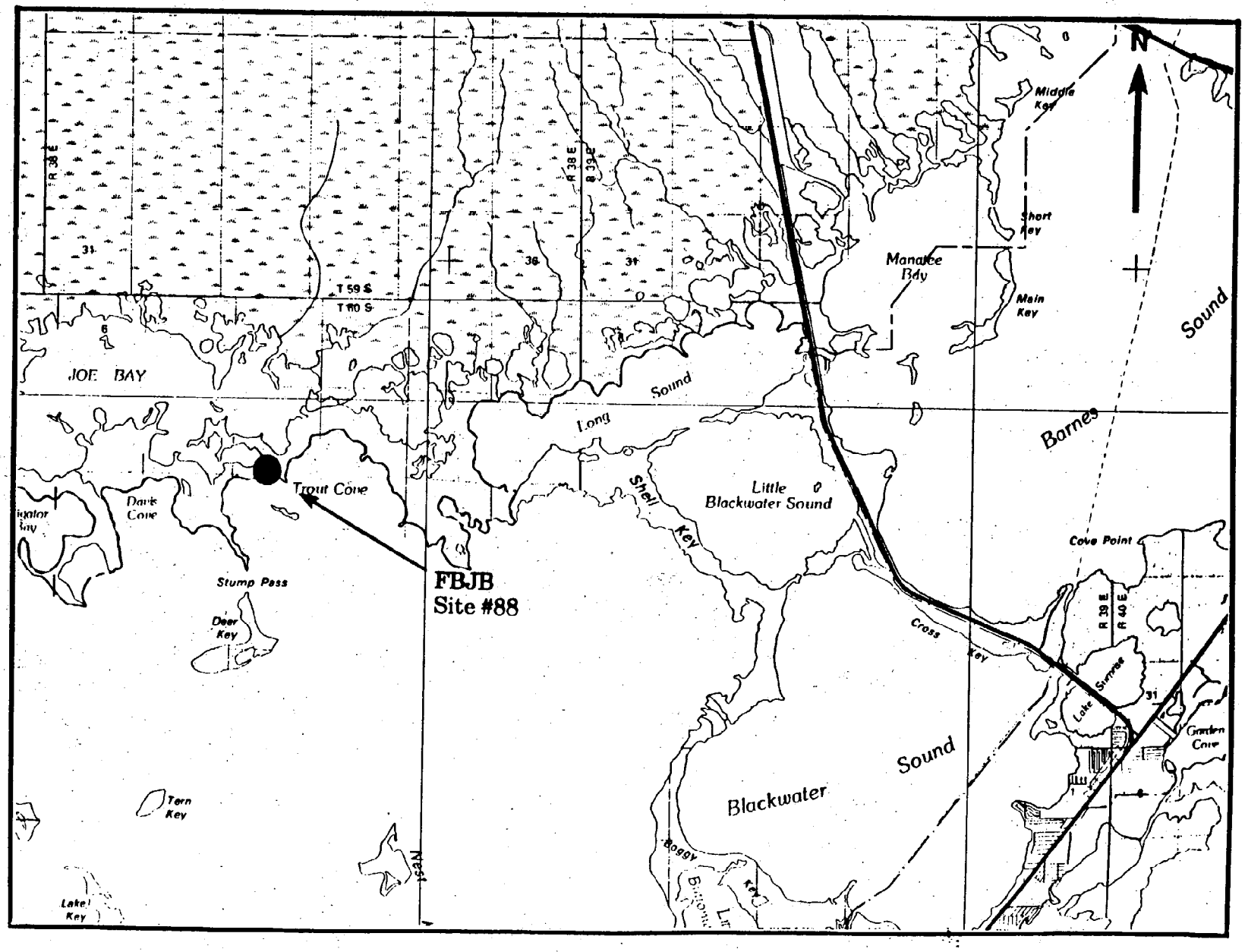
Oysters - hand
Sediment - box-core

WATER DEPTH - Intertidal, 0 - 1.0 meters

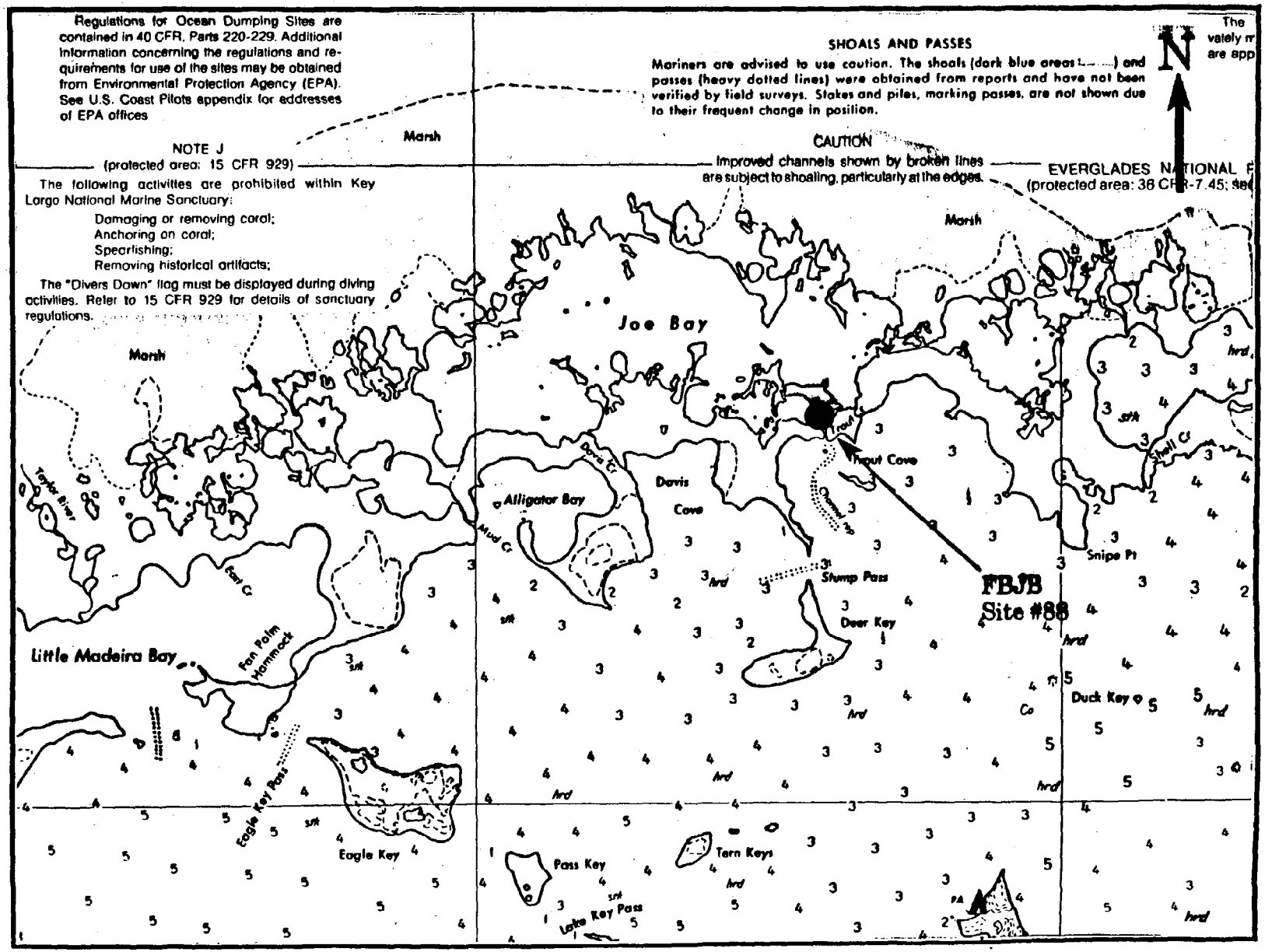
POSSIBLE CONTAMINANTS - No sources of contaminants were identified, other than that from passing boat traffic and fishermen.

ENVIRONMENTAL DATA

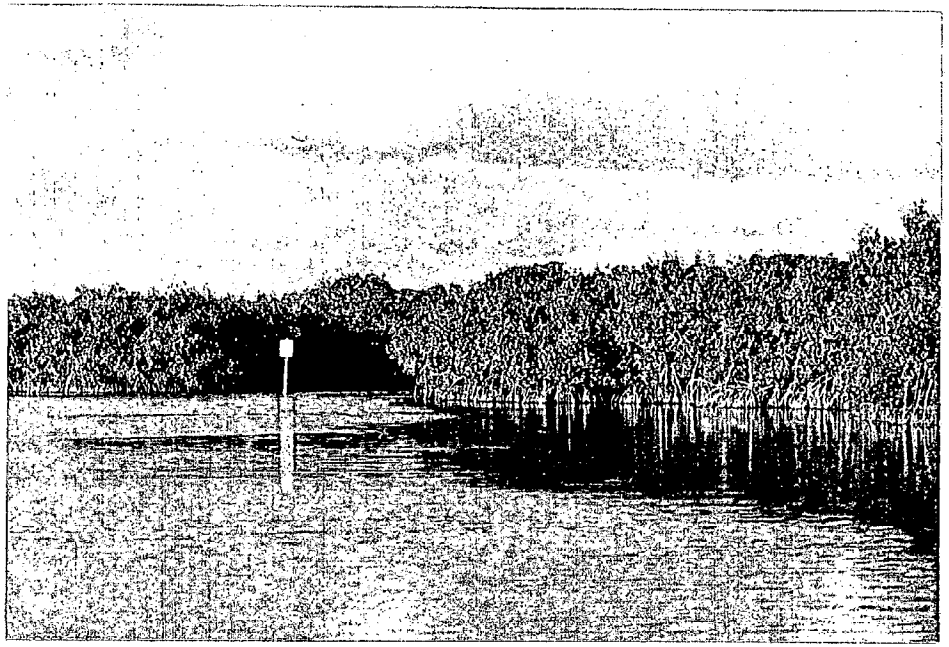
	Salinity (‰)	Temperature (°C)	Dates Sampled
YEAR IX	30.0	23.0	25 January 1994



Site #88 (FBJB) Florida Bay Inset Map



Site #88 (FBJB), Florida Bay-Joe Bay.



SITE NUMBER 81 **DESIGNATOR** - BHKF

SITE - BAHIA HONDA KEY, FL

NOMINAL SITE CENTER - 24°39.52'N 81°16.43'W

LOCATED ON NOS CHART # - 11445

SITE ACCESS - The bivalve collection site is located directly north of the entrance to the Bahia Honda Recreation Area and can be reached by driving to the site and walking to the shoreline. The sediment collection site must be accessed by a boat.

SITE DESCRIPTION - This site was established in Year VI. There were no oysters present but an alternate bivalve, the smooth-edge jewel box (*Chama sinuosa*) of the family Chamidae, was collected for analysis. The bivalves were attached to the edge of the vertical face of a hard carbonate wall which is on the northeast side of a U shaped cove.

OYSTER COLLECTIONS

Year VI - All three stations were collected along the carbonate wall. Station 1 was in the center of the northeast shoreline. Station 2 was seaward (west) of Station 1. Station 3 was to the inside of the cove toward the road. The site was accessible from the shore and was best sampled using a mask and snorkle.

Year VII - The same stations were collected again this year.

Year VIII - The site was not scheduled to be sampled this year.

Year IX - The same stations were sampled as in Years VI & VII.

SEDIMENT COLLECTIONS

Year VI - Sediments were collected along the mangrove shoreline east of the bivalve sites at latitude 24°40.17'N and longitude 81°15.90'W. The site could only be reached by boat traveling through shallow water. This was 0.65 mi east of the bivalve collection sites at the first point of land extending into the bay. Station 1 was at the point and Station 2 was 100 m to the east. Station 3 was 100 m to the west. Sediments at the site were primarily detrital material (mostly sea grasses) overlaying fine carbonate sand. After removing the overburden of decomposing organic material to get to the oozy carbonate/detrital mixture which comprised the "surficial sediment", sediments were obtained at a water depth of 0.2 m.

Years VII, VIII, IX - Sediments were not sampled during these years.

SAMPLING METHOD

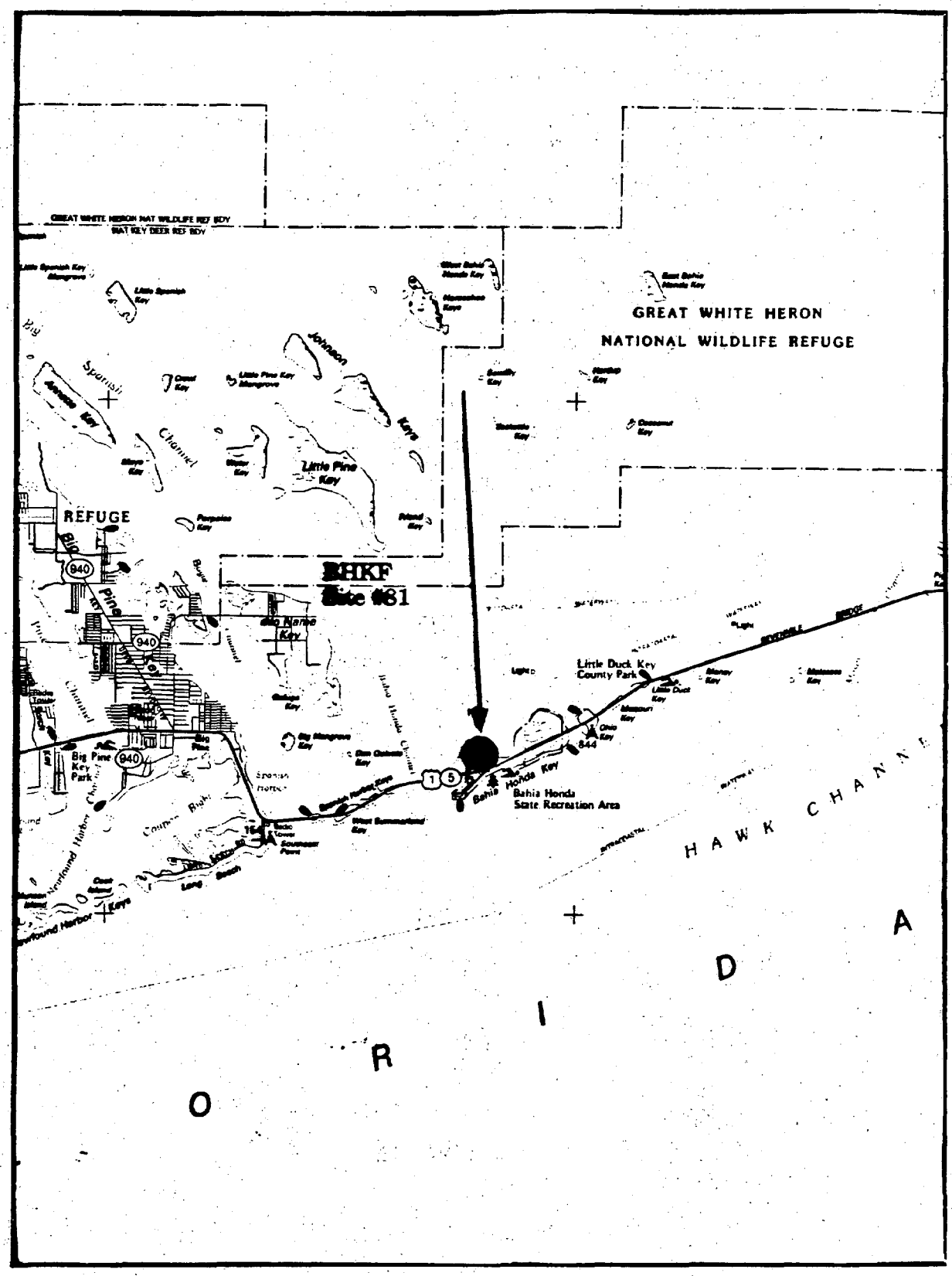
Oysters - hand
Sediment - hand

WATER DEPTH - Subtidal, 0.5 meters

POSSIBLE CONTAMINANTS - No sources of contaminants were identified.

ENVIRONMENTAL DATA

	Salinity (‰)	Temperature (°C)	Dates Sampled
YEAR VI	40.3	25.0	22 January 1991
YEAR VII	36.0	20.0	27 January 1992
YEAR IX	35.0	20.0	19 January 1994



Site #81 (BHKF), Bahia Honda Key

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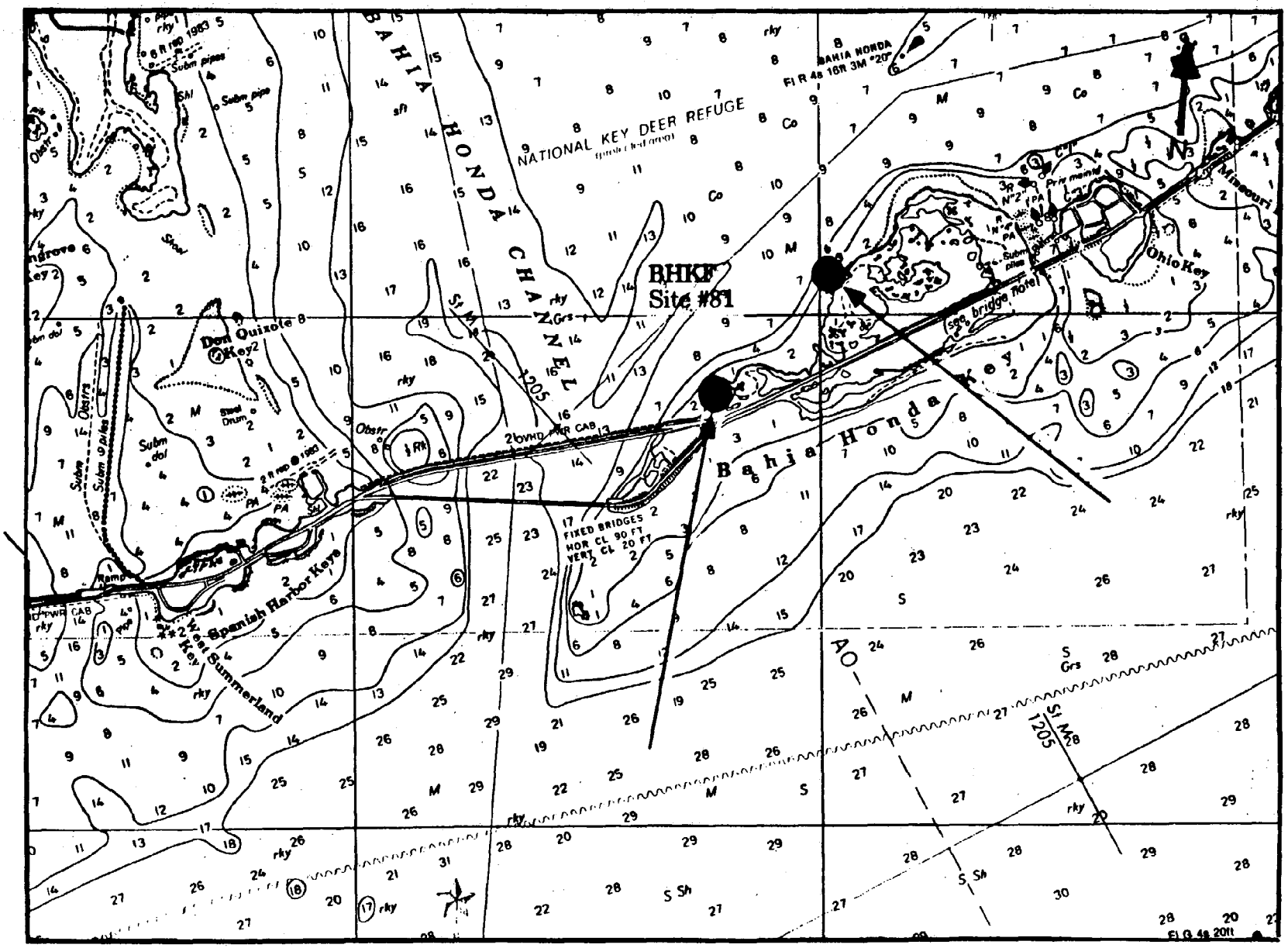
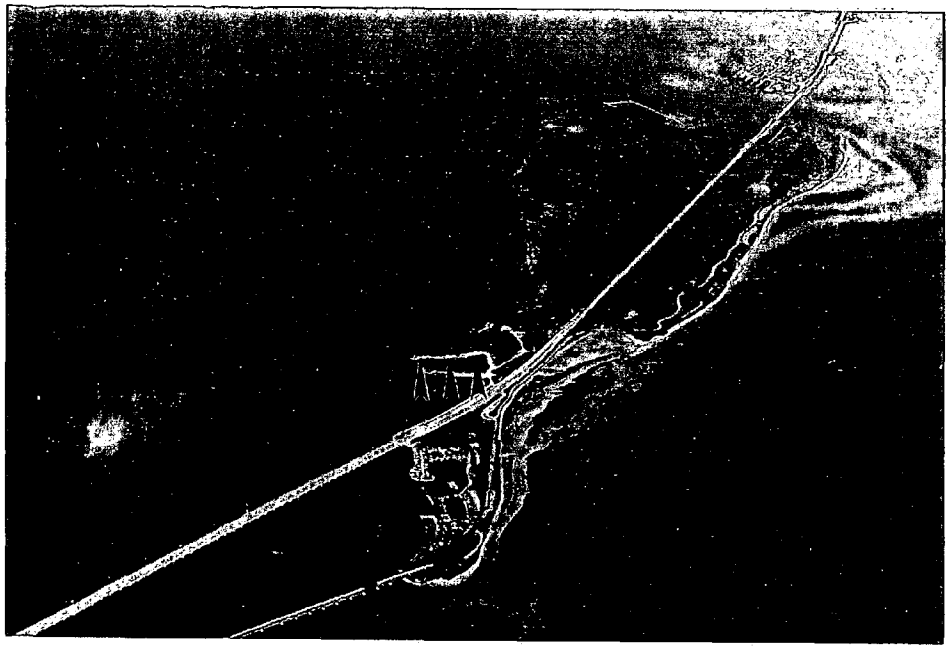


#81 BHKF Bahia Honda Key



PUERTO RICO SITES

SITE NUMBER 84 **DESIGNATOR** - PRBB

SITE - BAHIA DE BOQUERON, PUERTO RICO, PR

NOMINAL SITE CENTER - 18°00.44'N 67°10.72'W

LOCATED ON NOS CHART # - 25675, 25671

SITE ACCESS - The site is accessible only by boat. A boat and operator is available for rent in the town of Boqueron. To reach the site travel from the boat dock in Boqueron across Bahia de Boqueron (Boqueron Bay) on a course of 150° to the entrance of a smaller bay. Pass through mouth of the unnamed bay, turn to a heading of 50°, and proceed to the east side of the bay. All three stations are located in the small bay system on the south side of Boqueron Bay

SITE DESCRIPTION - Station 1 was located along the east shoreline across from the marine police boat dock (295° back to the dock). Station 2 was located on the north side of the small island at the near the mouth of the bay. The island was located south of a small channel running to the west the and west of the main channel which runs to the southeast. Landmarks from the site were the Boqueron pier (55°) and the beach cottages (90°). Station 3 was further west down the channel at the end of the cove. There were no visible reference landmarks.

OYSTER COLLECTIONS

Years VII, VIII, & IX - Oysters at all three stations were collected from the roots of red mangrove trees. Many dead oysters were found interspersed with the live oysters, presumably from recent fresh water inflow. Stations are described in the site description section.

SEDIMENT COLLECTIONS

Year VII - Sediments were located with the oysters and were collected among the mangrove roots in 0.1 to 1 m of water. Sediments were soft anaerobic black mud over hard reddish brown clay.

Years VIII & IX - No sediments were collected during these years.

SAMPLING METHOD

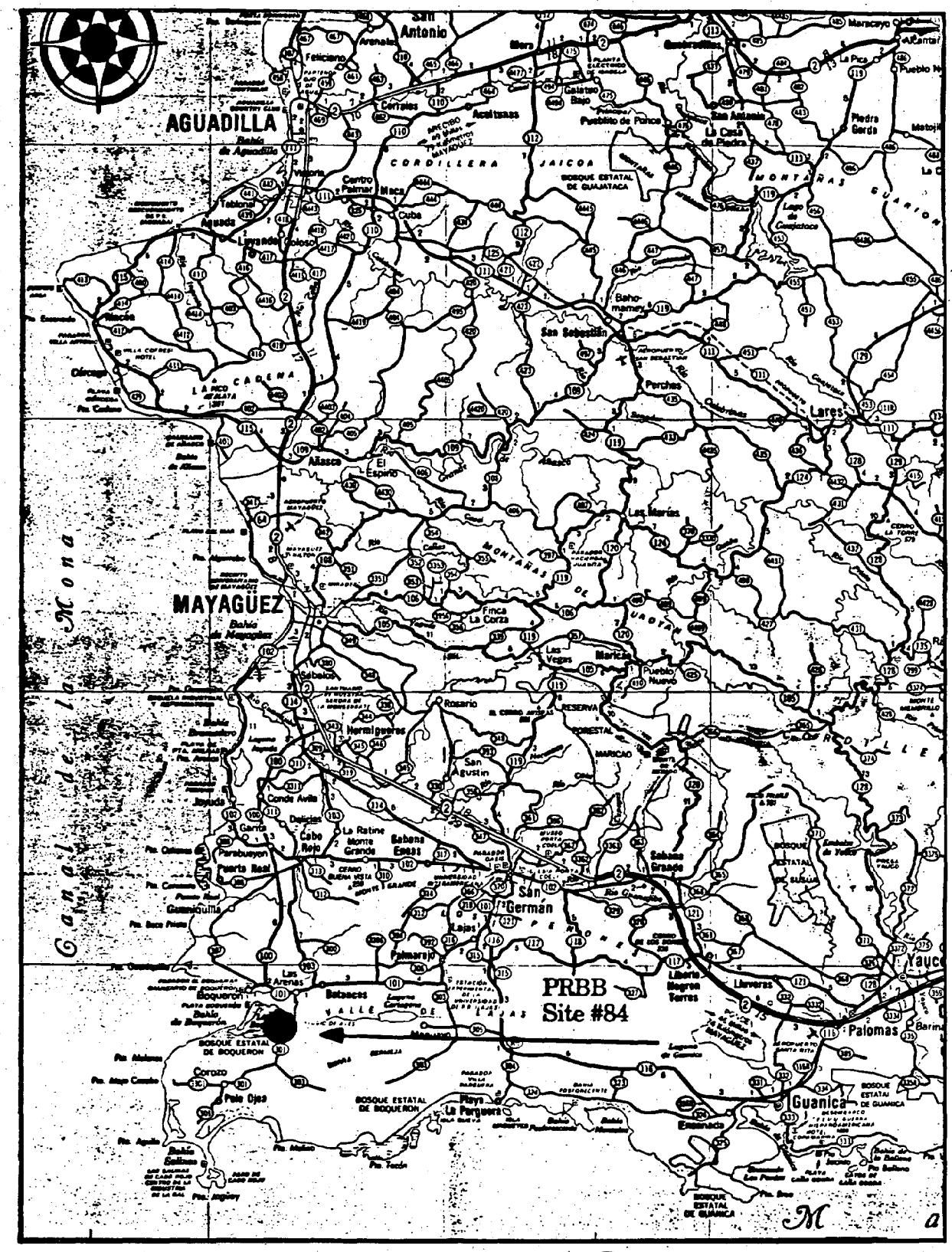
Oysters - hand
Sediment - hand or box corer

WATER DEPTH - intertidal, 0.2 - 0.6 m

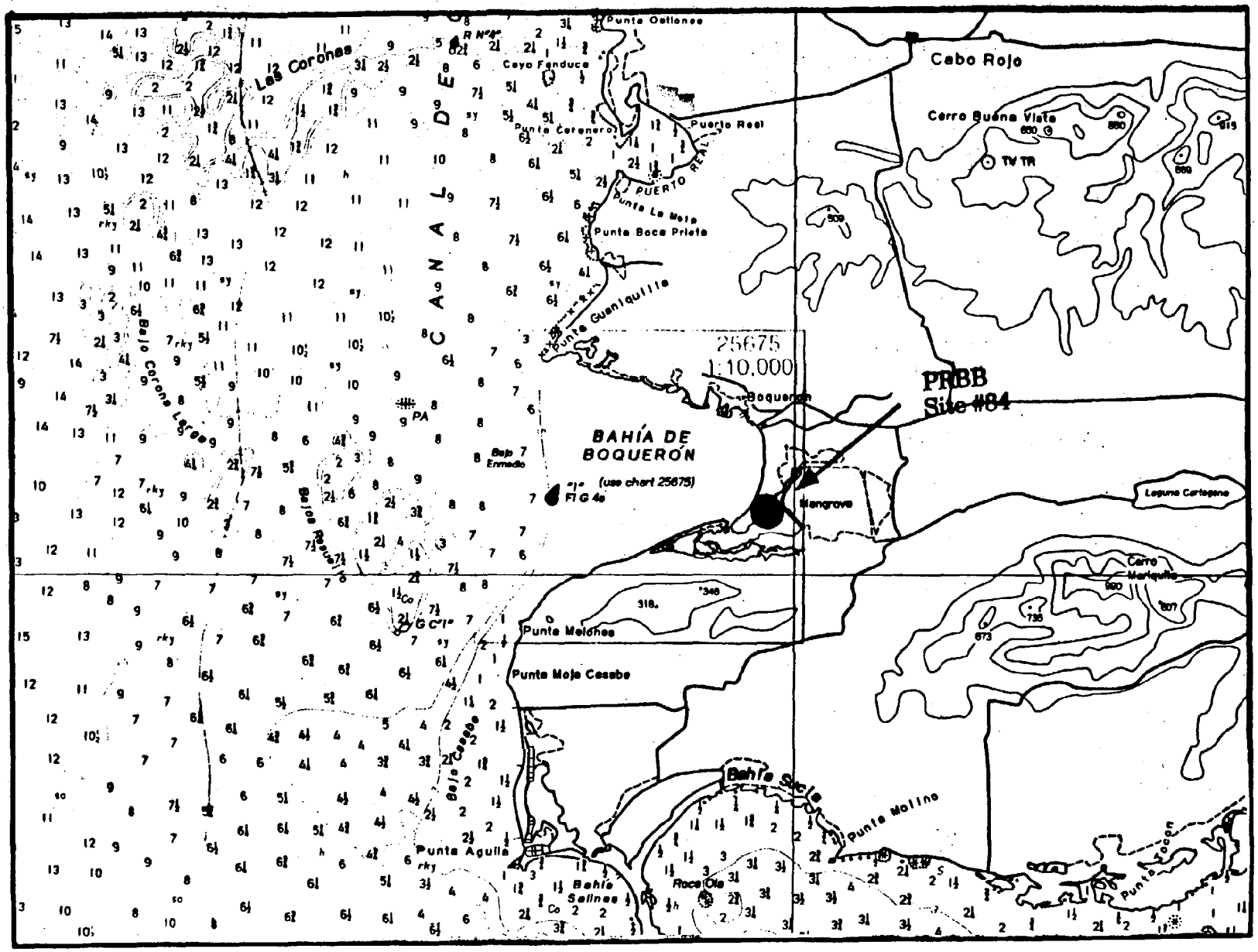
POSSIBLE CONTAMINANTS - A possible source of contamination was runoff from a nearby dump.

ENVIRONMENTAL DATA

	Salinity (‰)	Temperature (°C)	Dates Sampled
YEAR VII	35.0	28.0	11 February 1992
YEAR VIII	36.0	28.7	19 February 1993
YEAR IX	35.0	25.0	14 February 1994



Site #84 (PRBB), Puerto Rico Bahia De Boqueron.



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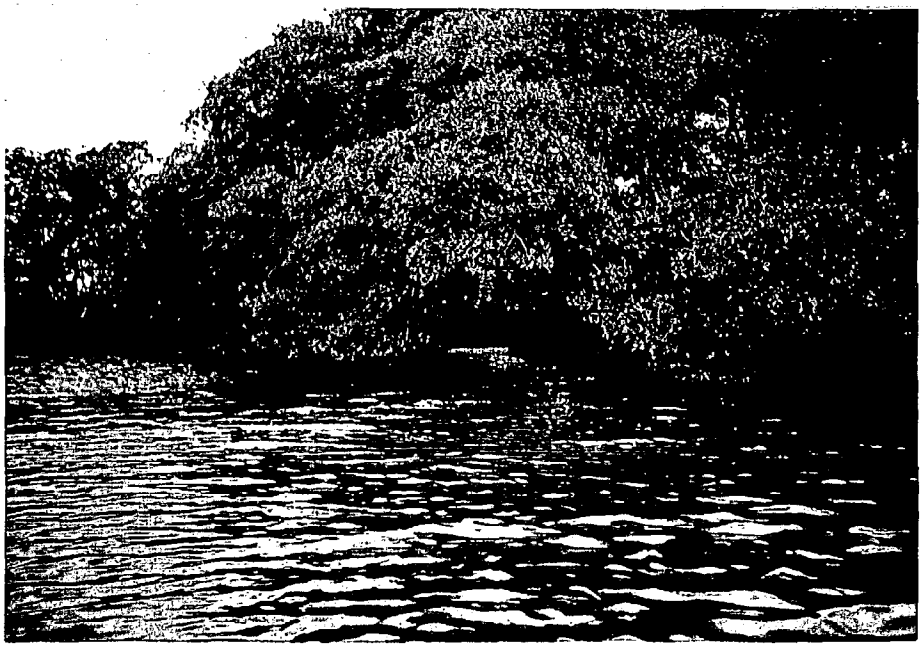
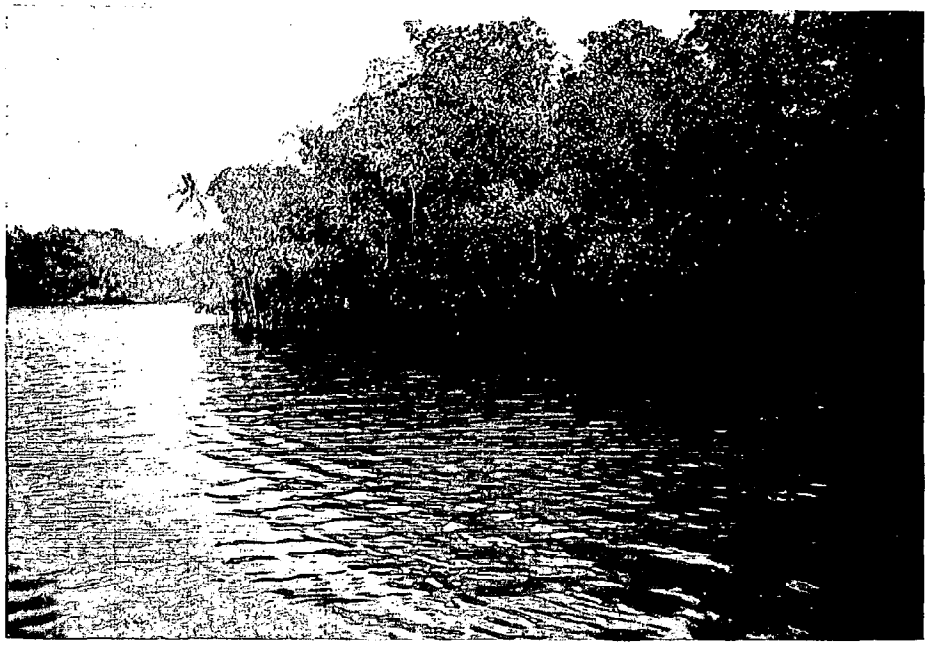




SITE NUMBER 85 **DESIGNATOR** - PRBM

SITE - BAHIA MONTALVA, PUERTO RICO, PR

NOMINAL SITE CENTER - 17°58.23'N 66°59.43'W

LOCATED ON NOS CHART # - 25671

SITE ACCESS - This site is a walkup site and is reached by automobile. Travel from the La Parguera area north on Highway 304 to Highway 324. Take Highway 324 toward Ensenada, travel east to the Highway 323 turn off, continue on for approximately 200 m on Highway 324 to the first dirt road past the white house with a pink roof. Turn right and follow the dirt road past the pole barn with the rusty roof and across the salt pond to the edge of Bahia Montalva (Montalva Bay).

SITE DESCRIPTION - All three stations were located along the north shoreline. Station 1 was directly south of the pole barn adjacent to the boat anchoring area. Station 2 was 50 m east of Station 1. Station 3 was 50 m west of Station 1.

OYSTER COLLECTIONS

Years VII, VIII, & IX - Oysters were collected at the stations described in the site description. Station 1 oysters were attached to red mangrove roots, rubble, PVC and wood pilings along the shoreline. Station 2 and 3 oysters were all attached to mangrove roots. Oysters were small and very thin shelled.

SEDIMENT COLLECTIONS

Year VII - Sediments were collocated with the oysters. Station 1 was located approximately 5 m west of the oysters at a small boat dock. The sediment was black mud. Station 2 was at the end of the eastern most small boat dock. Sediments were black sandy mud. Station 3 was 2-3 m from the oysters and was collected from around the mangrove roots and in open patches among the turtle grass beds. Sediments at this site were much sandier and contained some broken shell.

Years VIII & IX - No sediments were collected these years.

SAMPLING METHOD

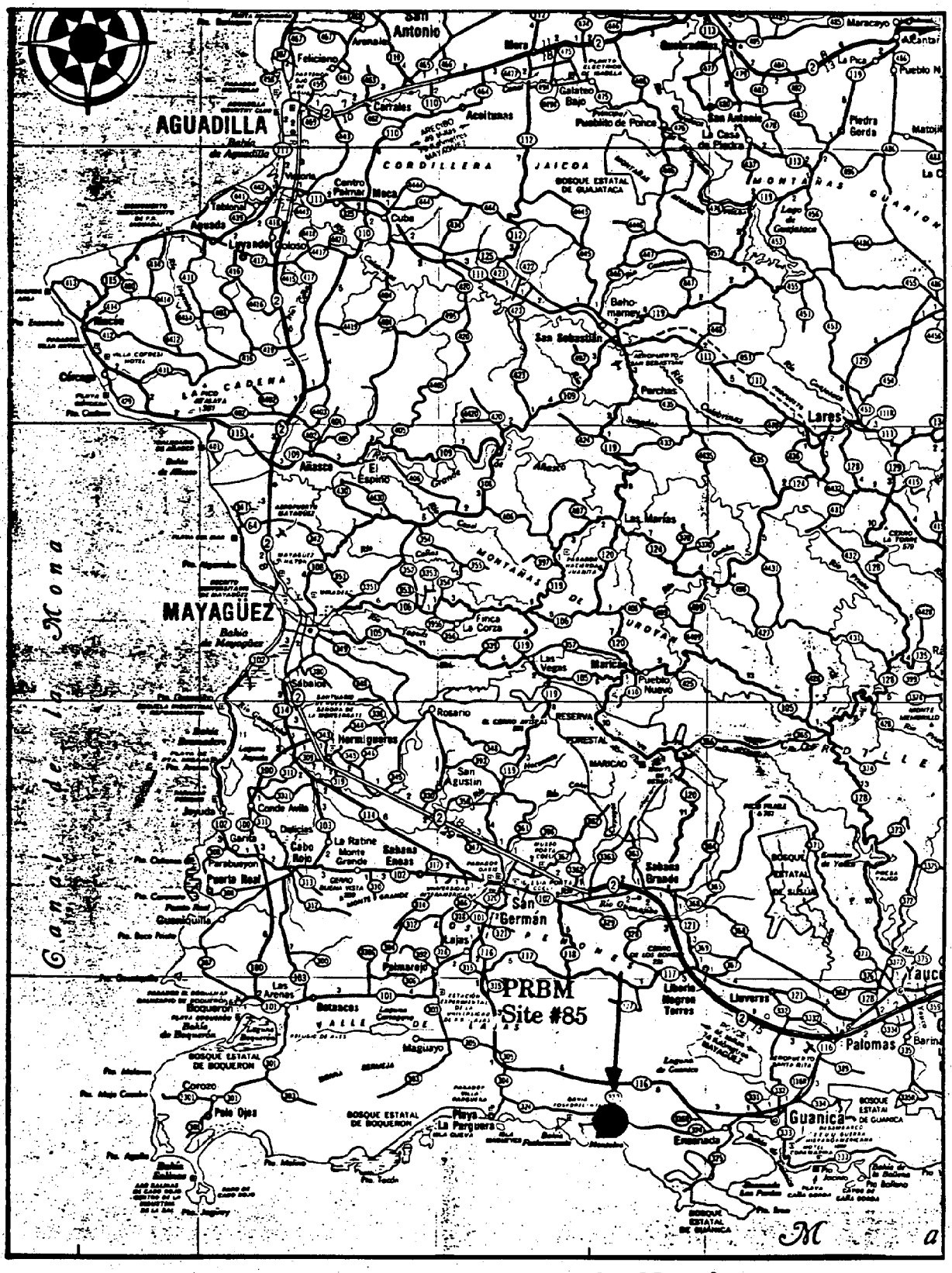
Oysters - hand
Sediment - hand

WATER DEPTH - intertidal, 0.2 meter

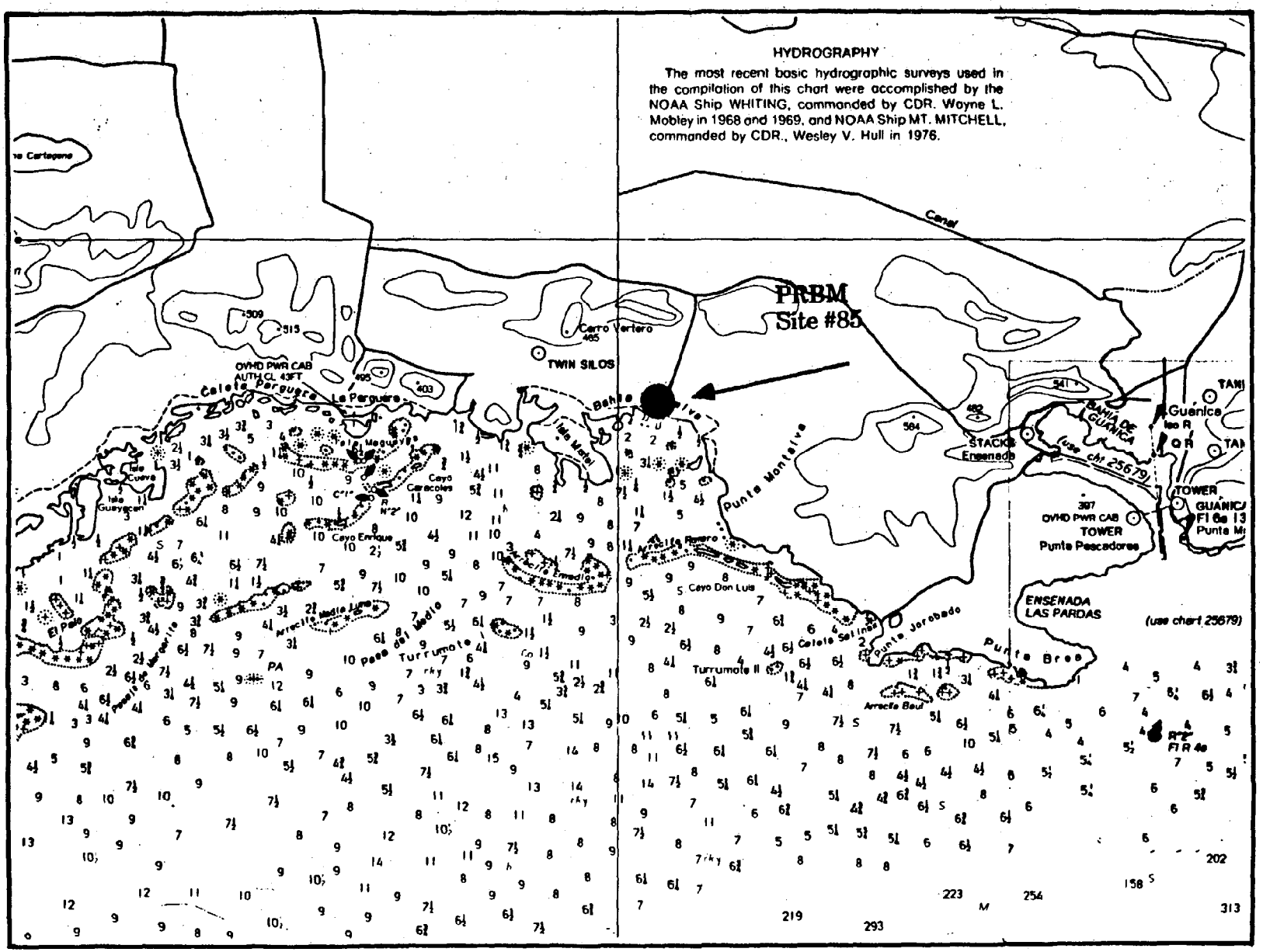
POSSIBLE CONTAMINANTS - There were no obvious sources of contamination, the area is very rural with no industry nearby.

ENVIRONMENTAL DATA

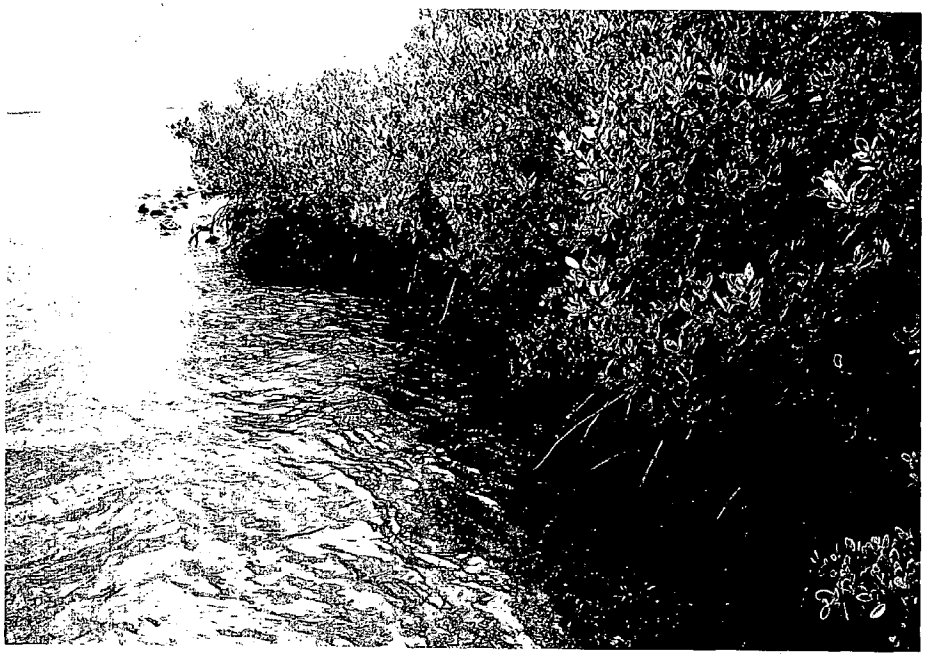
	Salinity (‰)	Temperature (°C)	Dates Sampled
YEAR VII	36.0	30.3	13 February 1992
YEAR VIII	37.0	28.0	20 February 1993
YEAR IX	36.0	26.0	13 February 1994



Site #85 (PRBM), Puerto Rico Bahia Montalva.



Site #85 (PRBM), Puerto Rico Bahia Montalva.



SITE NUMBER 86 **DESIGNATOR** - PRBJ

SITE - BAHIA DE JOBOS, PUERTO RICO, PR

NOMINAL SITE CENTER - 17°56.33'N 66°10.95'W

LOCATED ON NOS CHART # - 25677

SITE ACCESS - This site is located in the east end of Bahia de Jobos (Jobos Bay) and can only be reached by boat. There are no boats for lease in the area so arrangements must be made with a local fisherman. To reach the boat launch area travel from Jobos by automobile on Highway 7710 toward Pozuelo, go to the second small bay area where boat are anchored. By boat go through the mangroves into the bay and turn east. Proceed to the east end of the bay to the inlet into Laguna de las Mareas.

SITE DESCRIPTION - All three stations were located at the east end of Bahia de Jobos. Station 1 was approximately 100 m west of the inlet into Laguna de las Mareas on the south shoreline. Station 2 was at the inlet into Laguna de las Mareas. Station 3 was 100 m north of the inlet in a small cove. An obvious landmark is the electric generation station at the opposite end of the bay near Aguirre.

OYSTER COLLECTIONS

Years VII, VIII, & IX - Oysters were collected at the stations described in the site descriptions. Oysters at all three stations were found on the roots of red mangrove trees. Oysters were not abundant.

SEDIMENT COLLECTIONS

Year VII - Sediments sampling stations were collocated with the oysters in 1 to 2 m of water and were collected within 2 to 3 m of the edge of the mangrove roots. Station 1 sediments were fine grain black silt with some shell hash. Station 2 sediments were fine grained black silty sand. Sediments from Station 3 were fine grained black silt. Turtle and manatee grass was abundant throughout the bay starting near the edge of the mangrove roots.

Years VIII & IX - No sediments were collected during these years.

SAMPLING METHOD

Oysters - hand
Sediment - box corer

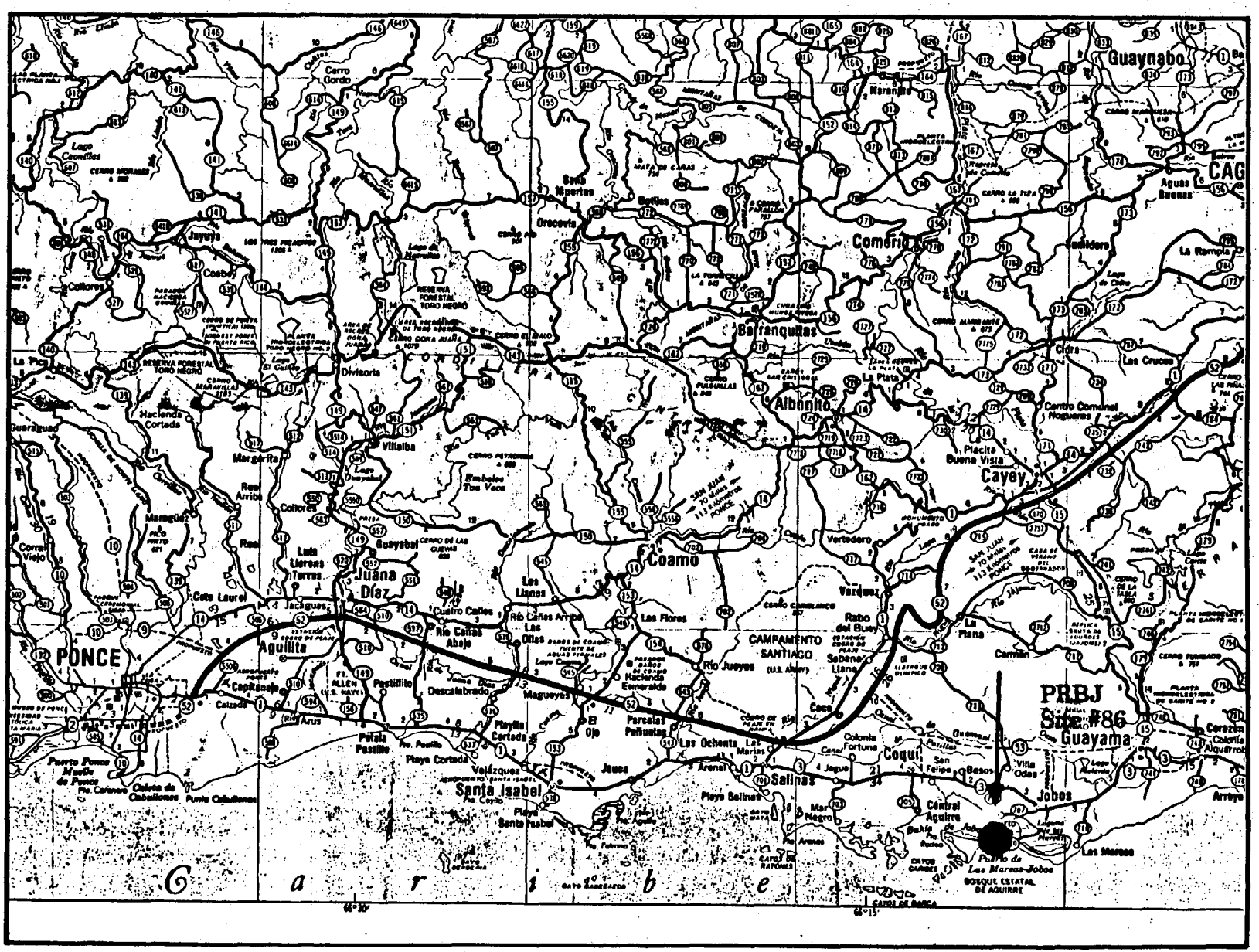
WATER DEPTH - intertidal, 0.1 to 0.2 meter

POSSIBLE CONTAMINANTS - There were no obvious sources of contamination. Contamination is possible from the opposite end of the bay from the power

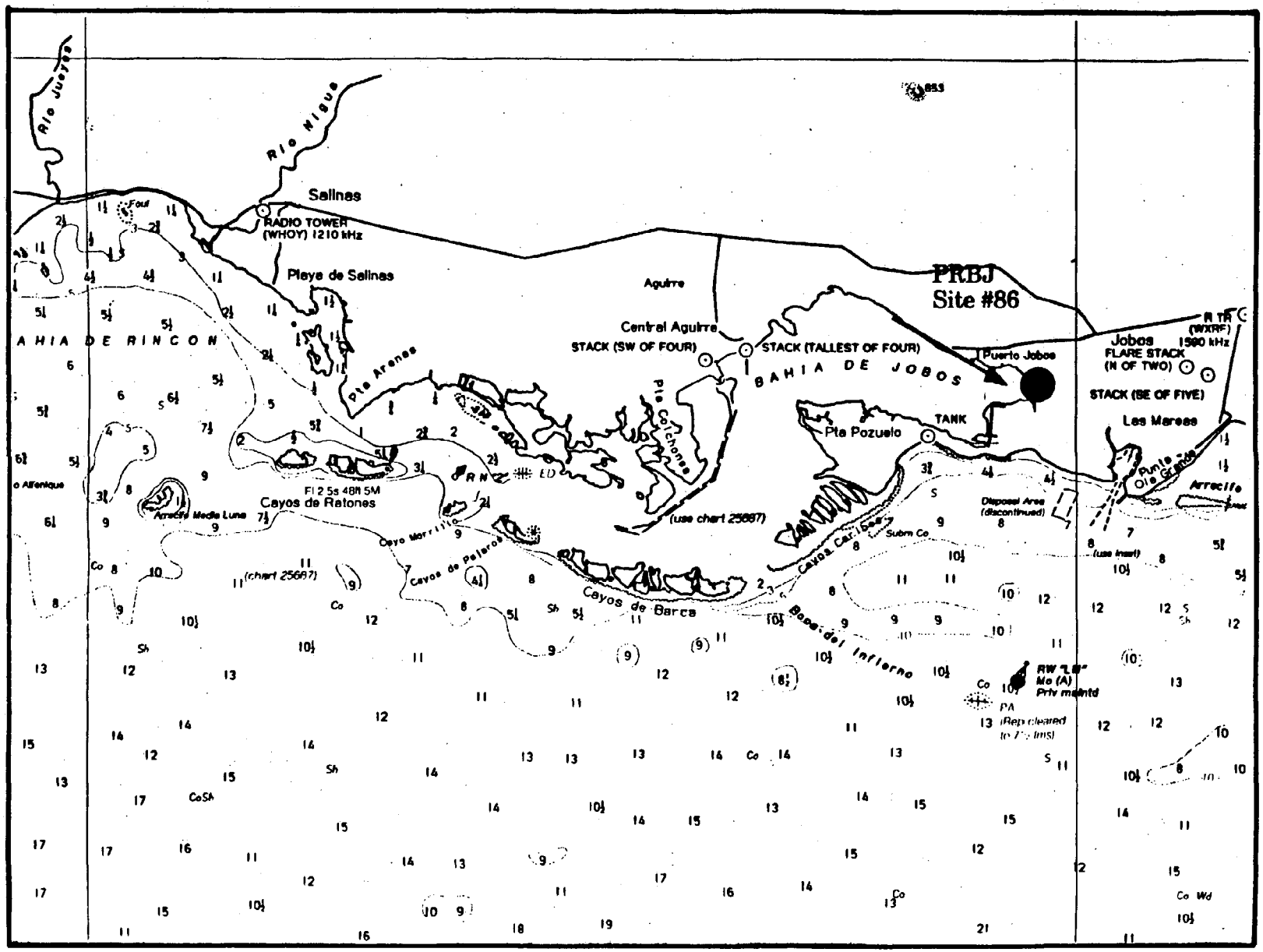
generation plant. The fisherman who took us to the site said that there had been a mercury spill in the bay, but did not remember when.

ENVIRONMENTAL DATA

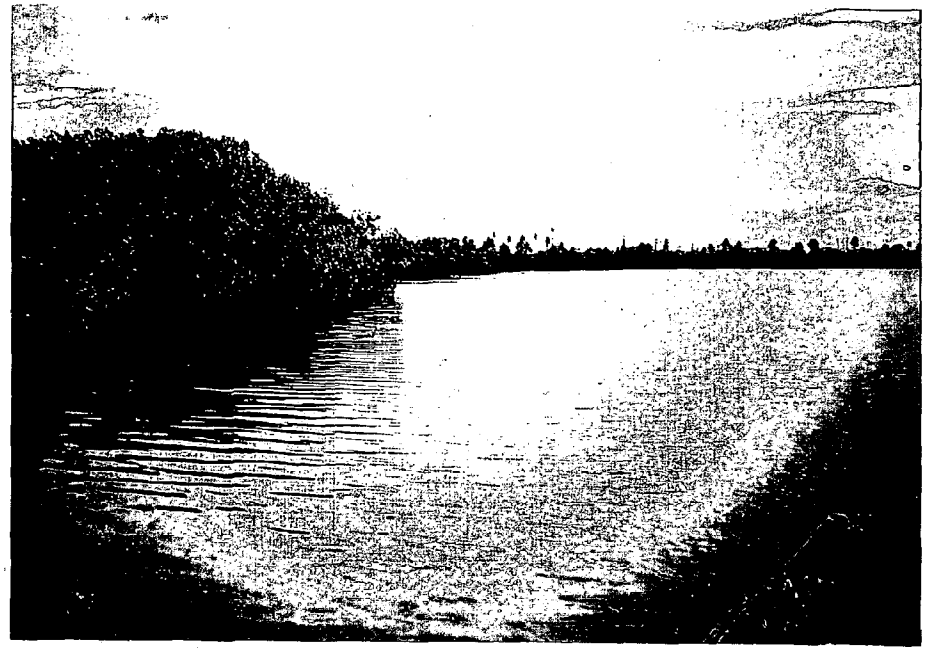
	Salinity (‰)	Temperature (°C)	Dates Sampled
YEAR VII	36.0	27.0	14 February 1992
YEAR VIII	38.0	26.7	22 February 1993
YEAR IX	36.0	26.0	15 February 1994



Site #86 (PRBJ), Puerto Rico Bahia De Jobos.



Site #86 (PRBJ), Puerto Rico Bahia De Jobos.



Appendix A

Field Station Data

MUSSEL WATCH PROJECT YEAR 9 - FIELD STATION DATA

Site	Name	Deg Min Latitude	Deg Min Longitude	Type	M/D/Y Date	Collection Method	Bottom Type	Scientist	Species	(m) Depth	°C Temp	0/00 Salinity	Local Time High Water	Local Time Low Water	Tidal Reference	Tidal Horizon (m)
LMSB	SOUTH BAY LOWER LAGUNA MADRE	26°02.77'	97°10.48'	B	12/9/93	H	N	Fay	*C. virginica*	0.3	19	31	15:27	6:00	Pt. Isabel	0.34
		26°02.77'	97°10.48'	B	12/9/93	H	N	Fay	*C. virginica*	0.3	19	31	15:27	6:00	Pt. Isabel	0.34
		26°02.77'	97°10.48'	B	12/9/93	H	N	Fay	*C. virginica*	0.3	19	31	15:27	6:00	Pt. Isabel	0.34
LMPI	PORT ISABEL LOWER LAGUNA MADRE	26°04.62'	97°12.05'	B	12/8/93	H	N	Fay	*C. virginica*	0-0.5	21	29	14:09	5:13	Pt. Isabel	0.34
		26°04.62'	97°12.05'	B	12/8/93	H	N	Fay	*C. virginica*	0-0.5	21	29	14:09	5:13	Pt. Isabel	0.34
		26°04.62'	97°12.05'	B	12/8/93	H	N	Fay	*C. virginica*	0-0.5	21	29	14:09	5:13	Pt. Isabel	0.34
LMAC	ARROYO COLORADO LAGUNA MADRE	26°16.80'	97°17.30'	B	12/8/93	H	HNG	Fay	*C. virginica*	0.3	22	30	22:49	4:10	Padre Is.	0.34
		26°16.80'	97°17.30'	B	12/8/93	H	HNG	Fay	*C. virginica*	0.3	22	30	22:49	4:10	Padre Is.	0.34
		26°16.80'	97°17.30'	B	12/8/93	H	HNG	Fay	*C. virginica*	0.3	22	30	22:49	4:10	Padre Is.	0.34
CCNB	NEUCES BAY CORPUS CHRISTI	27°51.17'	97°21.55'	B	12/14/93	H	SM	Wilson	*C. virginica*	0 - 0.2	13	32	18:50	10:38	Aransas P.	0.65
		27°51.17'	97°21.55'	B	12/14/93	H	SM	Wilson	*C. virginica*	0 - 0.2	13	32	18:50	10:38	Aransas P.	0.65
		27°51.17'	97°21.55'	B	12/14/93	H	SM	Wilson	*C. virginica*	0 - 0.2	13	32	18:50	10:38	Aransas P.	0.65
ABLR	LONG REEF ARANSAS BAY	28°02.96'	96°56.77'	B	12/16/93	D	MNSG	Jobling	*C. virginica*	0 - 0.5	16	23	20:06	12:07	Aransas P.	0.5
		28°02.96'	96°56.77'	B	12/16/93	D	MNSG	Jobling	*C. virginica*	0 - 0.5	16	23	20:06	12:07	Aransas P.	0.5
		28°02.96'	96°56.77'	B	12/16/93	D	MNSG	Jobling	*C. virginica*	0 - 0.5	16	23	20:06	12:07	Aransas P.	0.5
MBAR	AYRES REEF MESQUITE BAY	28°10.15'	96°49.95'	B	12/15/93	H		Wilson	*C. virginica*	0 - 0.1	13	24	19:30	11:23	Aransas P.	0.58
		28°10.15'	96°49.95'	B	12/15/93	H		Wilson	*C. virginica*	0 - 0.1	13	24	19:30	11:23	Aransas P.	0.58
		28°10.15'	96°49.95'	B	12/15/93	H		Wilson	*C. virginica*	0 - 0.1	13	24	19:30	11:23	Aransas P.	0.58
SAPP	PANTHER PT. REEF SAN ANTONIO BAY	28°14.00'	96°42.55'	B	12/15/93	D	S	Jobling	*C. virginica*	0.2-1.5	15	24	19:30	11:23	Pt. O'Con.	0.2
		28°14.00'	96°42.55'	B	12/15/93	D	S	Jobling	*C. virginica*	0.2-1.5	15	24	19:30	11:23	Pt. O'Con.	0.2
		28°14.00'	96°42.55'	B	12/15/93	D	S	Jobling	*C. virginica*	0.2-1.5	15	24	19:30	11:23	Pt. O'Con.	0.2
ESSP	SOUTH PASS REEF ESPIRITU SANTO	28°17.90'	96°37.33'	B	12/16/93	HD	R	Wilson	*C. virginica*	0.1-0.5	17	24	20:06	12:07	Pt. O'Con.	0.17
		28°18.90'	96°37.33'	B	12/16/93	HD	R	Wilson	*C. virginica*	0.1-0.5	17	27	20:06	12:07	Pt. O'Con.	0.17
		28°19.90'	96°37.33'	B	12/16/93	HD	R	Wilson	*C. virginica*	0.1-0.5	17	24	20:06	12:07	Pt. O'Con.	0.17
ESBD	BILL DAYS REEF ESPIRITU SANTO	28°24.85'	96°26.27'	B	12/16/93	H	SNA	Wilson	*C. virginica*	0 - 0.3	16	30	20:06	12:07	Pt. O'Con.	0.17
		28°24.85'	96°26.27'	B	12/16/93	H	SNA	Wilson	*C. virginica*	0 - 0.3	16	30	20:06	12:07	Pt. O'Con.	0.17
		28°24.85'	96°26.27'	B	12/16/93	H	SNA	Wilson	*C. virginica*	0 - 0.3	16	30	20:06	12:07	Pt. O'Con.	0.17
MBGP	GALLINIPPER PT., MATAGORDA BAY	28°35.25'	96°34.17'	B	12/14/93	D	SMH	Jobling	*C. virginica*	2.0	15	25	18:50	10:38	Pt. Lavaca	0.32
		28°35.25'	96°34.17'	B	12/14/93	D	SMH	Jobling	*C. virginica*	2.0	15	25	18:50	10:38	Pt. Lavaca	0.32
		28°35.25'	96°34.17'	B	12/14/93	D	SMH	Jobling	*C. virginica*	2.0	15	25	18:50	10:38	Pt. Lavaca	0.32
MBCB	CARANCAHUA BAY MATAGORDA BAY	28°39.40'	96°23.18'	B	12/14/93	H	SR	Jobling	*C. virginica*	0 - 0.3	15	25	18:50	10:38	Pt. Lavaca	0.32
		28°39.40'	96°23.18'	B	12/14/93	H	SR	Jobling	*C. virginica*	0 - 0.3	15	25	18:50	10:38	Pt. Lavaca	0.32
		28°39.40'	96°23.18'	B	12/14/93	H	SR	Jobling	*C. virginica*	0 - 0.3	15	25	18:50	10:38	Pt. Lavaca	0.32
BRCL	CEDAR LAKE BRAZOS RIVER	28°51.50'	95°27.83'	B	12/7/93	H	R	Wilson	*C. virginica*	0 -0.3	18	22	22:01	4:06	Freeport	0.34
		28°51.50'	95°27.83'	B	12/7/93	H	R	Wilson	*C. virginica*	0 -0.3	18	22	22:01	4:06	Freeport	0.34
		28°51.50'	95°27.83'	B	12/7/93	H	C	Wilson	*C. virginica*	0 -0.3	18	22	22:01	4:06	Freeport	0.34
GBOB	OFFATS BAYOU GALVESTON BAY	27°17.08'	94°50.15'	B	12/8/93	H	B	Wilson	*C. virginica*	0-0.5	17	21	23:13	5.55	Galveston	0.35
		27°17.08'	94°50.15'	B	12/8/93	H	B	Wilson	*C. virginica*	0-0.5	17	21	0:13	5.55	Galveston	0.35
		27°17.08'	94°50.15'	B	12/8/93	H	B	Wilson	*C. virginica*	0-0.5	17	21	1:13	5.55	Galveston	0.35
GBTD	TODD'S DUMP GALVESTON BAY	29°30.06'	94°53.82'	B	12/8/93	D	SM	Jobling	*C. virginica*	1.5	16	13	23:46	6:36	Texas City	0.35
		29°30.06'	94°53.82'	B	12/8/93	D	SM	Jobling	*C. virginica*	1.5	16	13	23:46	6:36	Texas City	0.35
		29°30.06'	94°53.82'	B	12/8/93	D	SM	Jobling	*C. virginica*	1.5	16	13	23:46	6:36	Texas City	0.35
GBSC	SHIP CHANNEL GALVESTON BAY	29°42.27'	94°59.58'	B	12/7/93	D	SM	Jobling	*C. virginica*	1.5	16	12	23:16	5:49	Texas City	0.25
SLBB	BLUE BUCK POINT SABINE LAKE	29°47.50'	93°54.42'	B	12/9/93	D	SM	Wilson	*C. virginica*	1.5	16	11	13:25	5:27	Sabine	0.64
		29°47.50'	93°54.42'	B	12/9/93	D	SM	Wilson	*C. virginica*	1.5	16	11	13:25	5:27	Sabine	0.64
		29°47.50'	93°54.42'	B	12/9/93	D	SM	Wilson	*C. virginica*	1.5	16	11	13:25	5:27	Sabine	0.64

BOTTOM: S=SHELL,M=MUD,E=CONCRETE,N=SAND,G=GRASS,H=HASH,C=CLAY,R=REEF,B=RUBBLE,K=KELP,A=ALGAE,T=ROOTS,P=PEAT COLLECTION METHOD: H=HAND,T=TONGS,D=DREDGE,R=RAKE SAMPLE TYPE: B=BIVALVE,S=SEDIMENT

MUSSEL WATCH PROJECT YEAR 9 - FIELD STATION DATA

Site	Name	Deg Min Latitude	Deg Min Longitude	Type	M/D/Y Date	Collection Method	Bottom Type	Scientist	Species	(m) Depth	°C Temp	0/00 Salinity	Local Time High Water	Local Time Low Water	Tidal Reference	Tidal Horizon (m)
CLLC	LAKE CHARLES CALCASIEU LAKE	30°03.42'	93°18.42'	B	12/9/93	H	SM	Wilson	*C. virginica*	0.2-0.5	18	12	12:31	5:43	Mermentau	0.85
		30°03.42'	93°18.42'	B	12/9/93	H	SM	Wilson	*C. virginica*	0.2-0.5	18	12	12:31	5:43	Mermentau	0.85
		30°03.42'	93°18.42'	B	12/9/93	H	SM	Wilson	*C. virginica*	0.2-0.5	18	12	12:31	5:43	Mermentau	0.85
VBSP	SOUTHWEST PASS VERMILLION BAY	29°34.60'	92°02.75'	B	1/11/94	D	SMH	Jobling	*C. virginica*	2.0	8	3	17:09	9:09	SW Pass	0.71
		29°34.60'	92°02.75'	B	1/11/94	D	SMH	Jobling	*C. virginica*	2.0	8	3	17:09	9:09	SW Pass	0.71
		29°34.60'	92°02.75'	B	1/11/94	D	SMH	Jobling	*C. virginica*	2.0	8	3	17:09	9:09	SW Pass	0.71
CLCL	CAILLOU LAKE CAILLOU LAKE	29°15.25'	90°55.80'	B	1/12/94	D	SM	Jobling	*C. virginica*	2.0	10	10	22:11	9:31	Caillou	0.55
		29°15.25'	90°55.80'	B	1/12/94	D	SM	Jobling	*C. virginica*	2.0	10	10	22:11	9:31	Caillou	0.55
		29°15.25'	90°55.80'	B	1/12/94	D	SM	Jobling	*C. virginica*	2.0	10	10	22:11	9:31	Caillou	0.55
TBLF	LAKE FELICITY TERREBONNE BAY	29°15.80'	90°24.40'	B	1/11/94	H	SM	Wilson	*C. virginica*	0-0.5	15	15	21:07	8:26	Timbalier	0.55
		29°15.80'	90°24.40'	B	1/11/94	H	M	Wilson	*C. virginica*	0-0.5	15	15	21:07	8:26	Timbalier	0.55
		29°15.80'	90°24.40'	B	1/11/94	H	MG	Wilson	*C. virginica*	0-0.5	15	15	21:07	8:26	Timbalier	0.55
MRPL	PASS A LOUTRE MISSISSIPPI RIVER	29°04.87'	89°05.53'	B	1/14/94	D	MS	Jobling	*C. virginica*	1 - 1.5	8	2	19:40	7:49	P-a-Loutre	0.34
		29°04.87'	89°05.53'	B	1/14/94	D	MS	Jobling	*C. virginica*	1 - 1.5	8	2	19:40	7:49	P-a-Loutre	0.34
		29°04.87'	89°05.53'	B	1/14/94	D	MS	Jobling	*C. virginica*	1 - 1.5	8	2	19:40	7:49	P-a-Loutre	0.34
BSSI	SABLE ISLAND BRETON SOUND	29°24.11'	89°29.10'	B	1/13/94	D	MS	Jobling	*C. virginica*	1.0	10	1	23:33	9:50	Breton S.	0.42
		29°24.11'	89°29.10'	B	1/13/94	D	MS	Jobling	*C. virginica*	1.0	10	1	23:33	9:50	Breton S.	0.42
		29°24.11'	89°29.10'	B	1/13/94	D	MS	Jobling	*C. virginica*	1.0	10	1	23:33	9:50	Breton S.	0.42
LBMP	MALHEUREUX POINT LAKE BORGNE	29°52.02'	89°40.70'	B	1/14/94	H	SM	Wilson	*C. virginica*	0 - 0.4	10	6	20:40	9:36	N. Orleans	0.22
		29°51.99'	89°40.71'	B	1/14/94	H	SM	Wilson	*C. virginica*	0 - 0.4	10	6	20:40	9:36	N. Orleans	0.22
		29°51.99'	89°40.71'	B	1/14/94	H	SM	Wilson	*C. virginica*	0 - 0.4	10	6	20:40	9:36	N. Orleans	0.22
LBNO	NEW ORLEANS LAKE BORGNE	29°56.60'	89°50.10'	B	1/14/94	H	SMP	Wilson	*C. virginica*	0.2	9	7	20:40	9:36	N. Orleans	0.22
		29°56.60'	89°50.10'	B	1/14/94	H	SMP	Wilson	*C. virginica*	0.2	9	7	20:40	9:36	N. Orleans	0.22
		29°56.60'	89°50.10'	B	1/14/94	H	SMP	Wilson	*C. virginica*	0.2	9	7	20:40	9:36	N. Orleans	0.22
MSPC	PASS CHRISTIAN MISSISSIPPI SOUND	30°18.12'	89°19.67'	B	1/15/94	D	NSH	Jobling	*C. virginica*	2.5	6	18	11:02	22:09	Bay S. Lou	0.46
		30°18.12'	89°19.67'	B	1/15/94	D	NSH	Jobling	*C. virginica*	2.5	6	18	11:02	22:09	Bay S. Lou	0.46
		30°18.12'	89°19.67'	B	1/15/94	D	NSH	Jobling	*C. virginica*	2.5	6	18	11:02	22:09	Bay S. Lou	0.46
MSPB	PASCAGOULA BAY MISSISSIPPI SOUND	30°20.03'	88°36.10'	B	1/15/94	D	SR	Jobling	*C. virginica*	1.5	11	18	9:29	19:57	Pascagoula	0.42
		30°20.03'	88°36.10'	B	1/15/94	D	MS	Jobling	*C. virginica*	1.5	11	18	9:29	19:57	Pascagoula	0.42
		30°20.03'	88°36.10'	B	1/15/94	D	SR	Jobling	*C. virginica*	1.5	11	18	9:29	19:57	Pascagoula	0.42
MBCP	CEDAR POINT REEF MOBILE BAY	30°18.70'	88°08.00'	B	1/15/94	H	NS	Wilson	*C. virginica*	0.2-1.2	11	20	1:59	11:28	Mobile	0.3
		30°18.64'	88°08.15'	B	1/15/94	H	NS	Wilson	*C. virginica*	0.2-1.2	11	20	1:59	11:28	Mobile	0.3
		30°18.64'	88°08.15'	B	1/15/94	H	NS	Wilson	*C. virginica*	0.2-1.2	11	20	1:59	11:28	Mobile	0.3
MBHI	HOLLINGERS ISLAND MOBILE BAY	30°33.80'	88°04.50'	B	1/15/94	D	MSN	Wilson	*C. virginica*	2.0	9	7	1:59	11:28	Mobile	0.3
		30°33.80'	88°04.50'	B	1/15/94	D	MSN	Wilson	*C. virginica*	2.0	9	7	1:59	11:28	Mobile	0.3
		30°33.80'	88°04.50'	B	1/15/94	D	MSN	Wilson	*C. virginica*	2.0	9	7	1:59	11:28	Mobile	0.3
PBPH	PUBLIC HARBOR PENSACOLA BAY	30°24.63'	87°11.42'	B	1/16/94	H	N	Wilson	*C. virginica*	0.5	10	24	0:52	10:07	Pensacola	0.52
		30°24.63'	87°11.42'	B	1/16/94	H	N	Wilson	*C. virginica*	0.5	10	24	0:52	10:07	Pensacola	0.52
		30°24.63'	87°11.42'	B	1/16/94	H	N	Wilson	*C. virginica*	0.5	10	24	0:52	10:07	Pensacola	0.52
PBIB	INDIAN BAYOU, PENSACOLA BAY	30°31.00'	87°06.70'	B	1/16/94	D	SM	Wilson	*C. virginica*	2.0	11	23	0:52	10:07	Pensacola	0.52
		30°31.00'	87°06.70'	B	1/16/94	D	SM	Wilson	*C. virginica*	2.0	11	23	0:52	10:07	Pensacola	0.52
		30°31.00'	87°06.70'	B	1/16/94	D	SM	Wilson	*C. virginica*	2.0	11	23	0:52	10:07	Pensacola	0.52
CBJB	JOE'S BAY CHOCTAWATCHEE BAY	30°24.62'	86°29.45'	B	1/17/94	H	SBRMN	Wilson	*C. virginica*	0.1 - 0.5	11	24	16:54	10:26	Destin	0.13
		30°24.62'	86°29.45'	B	1/17/94	H	SBRMN	Wilson	*C. virginica*	0.1 - 0.5	11	24	16:54	10:26	Destin	0.13
		30°24.62'	86°29.45'	B	1/17/94	H	SBRMN	Wilson	*C. virginica*	0.1 - 0.5	11	24	16:54	10:26	Destin	0.13
CBBL	BEN'S BAYOU CHOCTAWAHATCHEE BAY	30°27.15'	86°28.73'	B	1/17/94	H	CB	Wilson	*C. virginica*	0.1 - 0.5	13	25	16:54	10:26	Destin	0.13
		30°27.15'	86°28.73'	B	1/17/94	H	CB	Wilson	*C. virginica*	0.1 - 0.5	13	25	16:54	10:26	Destin	0.13
		30°27.15'	86°28.73'	B	1/17/94	H	CB	Wilson	*C. virginica*	0.1 - 0.5	13	25	16:54	10:26	Destin	0.13

BOTTOM: S=SHELL,M=MUD,E=CONCRETE,N=SAND,O=GRASS,H=HASH,C=CLAY,R=REEF,B=RUBBLE,K=KELP,A=ALGAE,T=ROOTS,P=PEAT COLLECTION METHOD: H=HAND,T=TONGS,D=DREDGE,R=RAKE SAMPLE TYPE: B=BIVALVE,S=SEDIMENT

MUSSEL WATCH PROJECT YEAR 9 - FIELD STATION DATA

Site	Name	Deg Min Latitude	Deg Min Longitude	Type	M/D/Y Date	Collection Method	Bottom Type	Scientist	Species	(m) Depth	°C Temp	‰ Salinity	Local Time High Water	Local Time Low Water	Tidal Reference	Tidal Horizon (m)
CBPP	POSTIL POINT CHOCTAWHATCHEE BAY	30°28.85'	86°28.73'	B	1/16/94	H	B	Jobling	*C. virginica*	0 - 0.3	6	24	0:25	11:27	Destin	0.24
		30°28.85'	86°28.73'	B	1/16/94	H	B	Jobling	*C. virginica*	0 - 0.3	6	24	0:25	11:27	Destin	0.24
		30°28.85'	86°28.73'	B	1/16/94	H	B	Jobling	*C. virginica*	0 - 0.3	6	24	0:25	11:27	Destin	0.24
CBBB	BOGGY BAYOU CHOCTAWAHATCHEE BAY	30°30.18'	86°29.65'	B	1/16/94	H	E	Jobling	*C. virginica*	0.5	7	17	0:25	11:27	Destin	0.24
		30°30.18'	86°29.65'	B	1/16/94	H	E	Jobling	*C. virginica*	0.5	7	17	0:25	11:27	Destin	0.24
		30°30.18'	86°29.65'	B	1/16/94	H	E	Jobling	*C. virginica*	0.5	7	17	0:25	11:27	Destin	0.24
PCLO	LITTLE OYSTER PANAMA CITY	30°15.19'	85°40.95'	B	1/17/94	H	M	Jobling	*C. virginica*	0.2	12	10	17:15	9:26	Lyn Haven	0.34
		30°15.19'	85°40.95'	B	1/17/94	H	M	Jobling	*C. virginica*	0.3	12	25	17:15	9:26	Lyn Haven	0.34
		30°15.19'	85°40.95'	B	1/17/94	H	M	Jobling	*C. virginica*	0.2	12	10	17:15	9:26	Lyn Haven	0.34
AESP	SPRING CREEK APPALACHEE BAY	30°03.75'	84°19.37'	B	1/18/94	H	SR	Wilson	*C. virginica*	0.5	15	13	17:58	0:15	Bald Pt.	0.57
		30°03.75'	84°19.37'	B	1/18/94	H	SR	Wilson	*C. virginica*	0.5	15	13	17:58	0:15	Bald Pt.	0.57
		30°03.75'	84°19.37'	B	1/18/94	H	SR	Wilson	*C. virginica*	0.5	15	13	17:58	0:15	Bald Pt.	0.57
CKBP	BLACK POINT CEDAR KEY	29°12.28'	83°04.34'	B	1/19/94	H	MSR	Wilson	*C. virginica*	1.0	4	19	17:47	0:20	Cedar Key	0.69
		29°12.28'	83°04.34'	B	1/19/94	H	MSR	Wilson	*C. virginica*	1.0	4	19	17:47	0:20	Cedar Key	0.69
		29°12.28'	83°04.34'	B	1/19/94	H	MSR	Wilson	*C. virginica*	1.0	4	19	17:47	0:20	Cedar Key	0.69
TBPB	PAPYS BAYOU TAMPA BAY	27°50.53'	82°36.62'	B	1/20/94	H	SR	Wilson	*C. virginica*	0.5	14	28	19:55	2:50	St. Peters.	0.55
		27°50.53'	82°36.62'	B	1/20/94	H	SR	Wilson	*C. virginica*	0.5	14	28	19:55	2:50	St. Peters.	0.55
		27°50.53'	82°36.62'	B	1/20/94	H	SR	Wilson	*C. virginica*	0.5	14	28	19:55	2:50	St. Peters.	0.55
TBOT	OLD TAMPA BAY TAMPA BAY	28°01.48'	82°37.95'	B	1/20/94	H	NSR	Wilson	*C. virginica*	0.2	13	2	21:33	4:45	Safety H.	0.67
		28°01.48'	82°37.95'	B	1/20/94	H	SR	Wilson	*C. virginica*	0.2	13	2	21:33	4:45	Safety H.	0.67
		28°01.48'	82°37.95'	B	1/20/94	H	SR	Wilson	*C. virginica*	0.2	13	2	21:33	4:45	Safety H.	0.67
TBKA	KNIGHT AIRPORT TAMPA BAY	27°54.52'	82°27.27'	B	1/20/94	H	NBH	Fay	*C. virginica*	0.2	14	30	20:02	3:16	Hillsbrgh.	0.67
		27°54.52'	82°27.27'	B	1/20/94	H	NBH	Fay	*C. virginica*	0.2	14	30	20:02	3:16	Hillsbrgh.	0.67
		27°54.52'	82°27.27'	B	1/20/94	H	NBH	Fay	*C. virginica*	0.2	14	30	20:02	3:16	Hillsbrgh.	0.67
TBNP	NAVAREZ PARK TAMPA BAY	27°47.28'	82°45.28'	B	1/20/94	H	N	Wilson	*C. virginica*	0.3	12	32	18:15	1:32	Madeira B.	0.55
		27°47.28'	82°45.28'	B	1/20/94	H	N	Wilson	*C. virginica*	0.3	12	32	18:15	1:32	Madeira B.	0.55
		27°47.28'	82°45.28'	B	1/20/94	H	N	Wilson	*C. virginica*	0.3	12	32	18:15	1:32	Madeira B.	0.55
TBHB	HILLSBOROUGH BAY TAMPA BAY	27°51.28'	82°23.75'	B	1/21/94	H		Wilson	*C. virginica*	0 - 0.6	15	15	20:53	4:30	Hillsbrgh.	0.75
		27°51.28'	82°23.75'	B	1/21/94	H		Wilson	*C. virginica*	0 - 0.6	15	15	20:53	4:30	Hillsbrgh.	0.75
		27°51.28'	82°23.75'	B	1/21/94	H		Wilson	*C. virginica*	0 - 0.6	15	15	20:53	4:30	Hillsbrgh.	0.75
TBMK	MULLET KEY BAYOU TAMPA BAY	27°37.28'	82°43.62'	B	1/21/94	H		Wilson	*C. virginica*	0 - 0.5	15	33	18:37	3:20	St. Pete B.	0.52
		27°37.28'	82°43.62'	B	1/21/94	H		Wilson	*C. virginica*	0 - 0.5	15	33	18:37	3:20	St. Pete B.	0.52
		27°37.28'	82°43.62'	B	1/21/94	H		Wilson	*C. virginica*	0 - 0.5	15	33	18:37	3:20	St. Pete B.	0.52
CBBI	BIRD ISLAND CHARLOTTE HARBOR	26°30.73'	82°02.18'	B	1/21/94	D	SR	Fay	*C. virginica*	0.8	16	26	20:27	4:30	Pineland	0.5
		26°30.73'	82°02.18'	B	1/21/94	D	SR	Fay	*C. virginica*	0.8	16	26	20:27	4:30	Pineland	0.5
		26°30.73'	82°02.18'	B	1/21/94	D	SR	Fay	*C. virginica*	0.8	16	26	20:27	4:30	Pineland	0.5
RBHC	HENDERSON CREEK ROOKERY BAY	26°01.50'	81°44.20'	B	1/21/94	H	SN	Fay	*C. virginica*	0 - 0.4	18	34	19:23	2:34	Marco	0.51
		26°01.50'	81°44.20'	B	1/21/94	H	SN	Fay	*C. virginica*	0 - 0.4	18	34	19:23	2:34	Marco	0.51
		26°01.50'	81°44.20'	B	1/21/94	H	SN	Fay	*C. virginica*	0 - 0.4	18	34	19:23	2:34	Marco	0.51
FBFO	FLAMINGO FLORIDA BAY	25°08.27'	80°55.25'	SB	1/25/94	H	N	Wilson	*C. virginica*	0 - 1.0	20	35	1:02	9:49	Flamingo	0.88
		25°08.27'	80°55.25'	SB	1/25/94	H	N	Wilson	*C. virginica*	0 - 1.0	20	35	1:02	9:49	Flamingo	0.88
		25°08.27'	80°55.25'	SB	1/25/94	H	N	Wilson	*C. virginica*	0 - 1.0	20	35	1:02	9:49	Flamingo	0.88
FBJB	JOE BAY FLORIDA BAY	25°12.53'	80°32.00'	SB	1/25/94	H	NG	Wilson	*C. virginica*	0 - 1.0	23	30	1:02	9:49	Flamingo	0.88
		25°12.53'	80°32.00'	SB	1/25/94	H	NG	Wilson	*C. virginica*	0 - 1.0	23	30	1:02	9:49	Flamingo	0.88
		25°12.53'	80°32.00'	SB	1/25/94	H	NG	Wilson	*C. virginica*	0 - 1.0	23	30	1:02	9:49	Flamingo	0.88
BHKF	BAHIA HONDA KEY FLORIDA	24°39.52'	81°16.43'	B	1/19/94	H	NGP	Fay	*C. virginica*	0.5	20	35	14:00	7:42	B.Honda K	0.29
		24°39.52'	81°16.43'	B	1/19/94	H	NGP	Fay	*C. virginica*	0.5	20	35	14:00	7:42	B.Honda K	0.29
		24°39.52'	81°16.43'	B	1/19/94	H	NGP	Fay	*C. virginica*	0.5	20	35	14:00	7:42	B.Honda K	0.29

BOTTOM: S=SHELL,M=MUD,E=CONCRETE,N=SAND,G=GRASS,H=HASH,C=CLAY,R=REEF,B=RUBBLE,K=KELP,A=ALGAE,T=ROOTS,P=PEAT COLLECTION METHOD: H=HAND,T=TONGS,D=DREDGE,R=RAKE SAMPLE TYPE: B=BIVALVE,S=SEDIMENT

MUSSEL WATCH PROJECT YEAR 9 - FIELD STATION DATA

Site	Name	Deg Min Latitude	Deg Min Longitude	Type	M/D/Y Date	Collection Method	Bottom Type	Scientist	Species	(m) Depth	°C Temp	0/00 Salinity	Local Time High Water	Local Time Low Water	Tidal Reference	Tidal Horizon (m)
PRBB	BAHIA DE BOQUERON PUERTO RICO	18°00.44'	67°10.72'	B	2/14/94	H	M	Wilson	*C. virginica*	0 - 0.3	25	35	10:50	17:16	San Juan	0.33
		18°00.44'	67°10.72'	B	2/14/94	H	M	Wilson	*C. virginica*	0 - 0.3	25	35	10:50	17:16	San Juan	0.33
		18°00.44'	67°10.72'	B	2/14/94	H	M	Wilson	*C. virginica*	0 - 0.3	25	35	10:50	17:16	San Juan	0.33
PRBM	BAHIA MONTALVA PUERTO RICO	17°58.23'	66°59.43'	B	2/13/94	H	TB	Wilson	*C. virginica*	0 - 0.3	26	36	2:58	6:57	San Juan	0.37
		17°58.23'	66°59.43'	B	2/13/94	H	TB	Wilson	*C. virginica*	0 - 0.3	26	36	2:58	6:57	San Juan	0.37
		17°58.23'	66°59.43'	B	2/13/94	H	TB	Wilson	*C. virginica*	0 - 0.3	26	36	2:58	6:57	San Juan	0.37
PRBJ	BAHIA DE JOBOS PUERTO RICO	17°56.33'	66°10.95'	B	2/15/94	H	TN	Wilson	*C. virginica*	0 - 0.3	26	36	0:23	7:56	San Juan	0.3
		17°56.33'	66°10.95'	B	2/15/94	H	TN	Wilson	*C. virginica*	0 - 0.3	26	36	0:23	7:56	San Juan	0.3
		17°56.33'	66°10.95'	B	2/15/94	H	TN	Wilson	*C. virginica*	0 - 0.3	26	36	0:23	7:56	San Juan	0.3

BOTTOM: S=SHELL,M=MUD,E=CONCRETE,N=SAND,G=GRASS,H=HASH,C=CLAY,R=REEF,B=RUBBLE,K=KELP,A=ALGAE,T=ROOTS,P=PEAT COLLECTION METHOD: H=HAND,T=TONGS,D=DREDGE,R=RAKE SAMPLE TYPE: B=BIVALVE,S=SEDIMENT

Appendix B

Final Positions

SITE	DESIG.	SITE NAME	LOCATION	STATE	CHART		LORAN		GPS	
					deg,min,sec Lat	deg,min,sec Long	decimal deg Lat	decimal deg Long	decimal deg Lat	decimal deg Long
1	LMSB	SOUTH BAY	LOWER LAGUNA MADRE	TX	26°02.77'	97°10.48'	26°02.58	97°10.49		
52	LMPI	PORT ISABELL	LAGUNA MADRE	TX	26°04.62'	97°12.05'				
78	LMAC	ARROYO COLORADO	LAGUNA MADRE	TX	26°16.80'	97°17.30'				
2	CCNB	NEUCES BAY	CORPUS CHRISTI	TX	27°51.17'	97°21.55'			27°51.24'	97°21.47'
3	CCIC	INGLESIDE COVE	CORPUS CHRISTI	TX	27°50.28	97°14.28	27°50.22'	97°14.24'	27°50.31''	97°14.28'
53	CCBH	BOAT HARBOR	CORPUS CHRISTI	TX	27°50.17'	97°22.72'				
4	ABLR	LONG REEF	ARANSAS BAY	TX	28°02.96'	96°56.77'	28°03.38'	96°54.40'	28°03.96'	96°57.79'
54	ABHI	HARBOR ISLAND	ARANSAS BAY	TX	27°50.33'	97°04.52'				
5	CBCR	COPANO REEF	COPANO BAY	TX	28°08.47'	97°07.67'	28°08.50'	97°07.68'	28°08.57'	97°07.68'
6	MBAR	AYRES REEF	MESQUITE BAY	TX	28°10.15'	96°49.95'	28°10.10'	96°49.90'	28°09.82'	96°48.96'
7	SAPP	PANTHER PT. REEF	SAN ANTONIO BAY	TX	28°14.00'	96°42.55'	28°14.10'	96°42.50'	28°13.95'	96°42.54'
8	SAMP	MOSQUITO POINT	SAN ANTONIO BAY	TX	28°20.65'	96°42.78'	28°20.57'	96°42.69'	28°20.64'	96°42.77'
9	ESSP	SOUTH PASS REEF	ESPIRITU SANTO	TX	28°17.90'	96°37.33'	28°17.83'	96°37.50'	28°17.90'	96°37.30'
10	ESBD	BILL DAYS REEF	ESPIRITU SANTO	TX	28°24.85'	96°26.27'	28°24.66'	96°26.65'	28°25.02'	96°25.86'
11	MBLR	LAVACA RIVER MOUTH	MATAGORDA BAY	TX	29°39.80'	96°34.83'	29°39.62'	96°34.72'	29°39.79'	96°34.89'
12	MBGP	GALLINIPPER PT.	MATAGORDA BAY	TX	28°35.25'	96°34.17	28°35.13'	96°34.23'	28°35.20'	96°34.21'
13	MBTP	TRES PALACIOS BAY	MATAGORDA BAY	TX	28°39.50'	96°13.45'	28°39.43'	96°13.25'	28°39.66'	96°13.33'
14	MBEM	EAST MATAGORDA	MATAGORDA BAY	TX	28°42.67'	95°53.00'	28°42.64'	95°52.96'	28°42.67'	95°53.04'
55	MBDI	DOG ISLAND	MATAGORDA BAY	TX	28°38.28'	96°00.15'				
56	MBCB	CARANCAHUA BAY	MATAGORDA BAY	TX	28°39.40'	96°23.18'				
72	BRCL	CEDAR LAKES	BRAZOS RIVER	TX	28°51.50'	95°27.83'	28°51.46'	95°27.75'	28°51.50'	95°27.75'
57	BRFS	FREEPORT SURFSIDE	BRAZOS RIVER	TX	28°55.25'	95°20.33'	28°55.31'	95°20.56'	28°55.25'	95°20.35'
18	GBCR	CONFEDERATE REEF	GALVESTON BAY	TX	29°15.75'	94°54.88'	29°15.71'	94°54.76'	29°15.74'	94°54.94'
17	GBHR	HANNA REEF	GALVESTON BAY	TX	29°28.85'	94°44.00'	29°28.58'	94°43.22'	29°28.86'	94°44.34'
58	GBOB	OFFATTS BAYOU	GALVESTON BAY	TX	29°17.08'	94°50.15'	29°16.96'	94°50.08'	29°17.07'	94°50.15'
59	GBSC	SHIP CHANNEL	GALVESTON BAY	TX	29°42.27'	94°59.58'	29°41.97'	94°59.37'	29°42.42'	94°59.59'
16	GBTD	TODD'S DUMP	GALVESTON BAY	TX	29°30.06'	94°53.82'	29°30.06'	94°53.82'	29°30.13'	94°53.86'
15	GBYC	YACHT CLUB	GALVESTON BAY	TX	29°37.30'	94°59.50'	29°37.39'	94°59.35'	29°37.36'	94°59.73'
19	SLBB	BLUE BUCK POINT	SABINE LAKE	TX-LA	29°47.50'	93°54.42'			29°47.09'	93°54.36'
20	CLSJ	ST. JOHNS ISLAND	CALCASIEU LAKE	LA	29°49.83'	93°23.00'	29°49.85'	93°22.93	29°49.65'	93°23.04'
60	CLLC	LAKE CHARLES	CALCASIEU LAKE	LA	30°03.42'	93°18.42'			30°03.51'	93°18.43'
21	JHJH	JOSEPH HARBOR BAYOU	J. HARBOR BAYOU	LA	29°37.75'	92°45.75'			29°37.96'	92°45.78'
22	VBSP	SOUTHWEST PASS	VERMILLION BAY	LA	29°34.60'	92°02.75'	29°34.45'	92°02.91'		
23	ECSP	SOUTH POINT	EAST COTE BLANCHE	LA	29°28.50'	91°48.00'				

SITE	DESIG.	SITE NAME	LOCATION	STATE	CHART		LORAN		GPS	
					deg,min,sec Lat	deg,min,sec Long	decimal deg Lat	decimal deg Long	decimal deg Lat	decimal deg Long
24	ABOB	OYSTER BAYOR	ATCHAFALAYA BAY	LA	29°14.40'	91°08.10'	29°14.51'	91°08.13'	29°14.40'	91°08.08'
25	CLCL	CAILLOU LAKE	CAILLOU LAKE	LA	29°15.25'	90°55.80'	29°15.30'	90°56.02'		
26	TBLB	LAKE BARRE	TERREBONNE BAY	LA	29°15.60'	90°35.70'	29°15.56'	90°35.77'	29°15.60'	90°35.76'
27	TBLF	LAKE FELICITY	TERREBONNE BAY	LA	29°15.80'	90°24.40'	29°15.84'	90°24.06'	29°15.81'	90°23.88'
28	BBSD	BAYOU ST. DENIS	BARATARIA BAY	LA	29°24.18'	89°59.75'	29°24.15'	89°59.85'	29°24.05'	89°59.82'
29	BBMB	MIDDLE BANK	BARATARIA BAY	LA	29°16.55'	89°56.53'	29°16.56'	89°56.64'	29°16.55'	89°56.49'
61	BBTB	TURTLE BAY	BARATARIA BAY	LA	29°30.67'	90°05.00'				
30	BSBG	BAY GARDERNE	BRETON SOUND	LA	29°08.69'	89°25.67'	29°08.64'	89°25.66'	29°08.68'	89°25.59'
31	BSSI	SABLE ISLAND	BRETON SOUND	LA	29°04.87'	89°05.53'	29°04.90'	89°05.54'	29°04.87'	89°05.53'
32	LBMP	MALHEUREUX POINT	LAKE BORGNE	LA	29°24.11'	89°29.10'	29°24.12'	89°29.21'	29°24.11'	89°29.10'
62	LBNO	NEW ORLEANS	LAKE BORGNE	LA	29°35.90'	89°37.25'	29°35.94'	89°37.40'	29°35.90'	89°37.27'
63	LPGO	GULF OUTLET	LAKE PONCHARTRAIN	LA	29°52.02'	89°40.70'	29°52.02'	89°40.88'	29°51.99'	89°40.71'
64	MRPL	PASS A LOUTRE	MISSISSIPPI RIVER	LA	29°56.60'	89°50.10'				
65	MRTP	TIGER PASS	MISSISSIPPI RIVER	LA	30°02.44'	89°02.57'				
33	MSPC	PASS CHRISTIAN	MISSISSIPPI SOUND	MS	30°18.87'	89°18.05'	30°18.13'	89°19.70'		
34	MSBB	BILOXI BAY	MISSISSIPPI SOUND	MS	30°23.55'	88°51.45'	30°23.57'	88°51.50'	30°23.55'	88°51.46'
35	MSPB	PASCAGOULA BAY	MISSISSIPPI SOUND	MS	30°20.03'	88°36.10'	30°20.44'	88°35.55'	30°20.70'	88°35.45'
36	MBCP	CEDAR POINT REEF	MOBILE BAY	AL	30°18.70'	88°08.00'	30°18.62'	88°08.24'	30°18.64'	88°08.15'
66	MBHI	HOLLINGERS ISLAND	MOBILE BAY	AL	30°33.80'	88°04.50'	30°33.73'	88°04.58'	30°33.93'	88°04.59'
79	MBDR	DOG RIVER	MOBILE BAY	AL	30°35.50'	88°02.72'				
67	PBPH	PUBLIC HARBOR	PENSACOLA BAY	FL	30°24.63'	87°11.42'	30°24.39'	87°11.41'	30°24.62'	87°11.43'
37	PBIB	INDIAN BAYOU	PENSACOLA BAY	FL	30°31.00'	87°06.70'	30°30.86'	87°06.66'	30°31.06'	87°06.68'
80	PBSP	SABINE POINT	PENSACOLA BAY	FL	30°20.80'	87°09.10'	30°20.59'	87°09.12'	30°20.67'	87°09.03'
73	CBJB	JOES BAYOU	CHOCTAWHATCHEE BAY	FL	30°24.62'	86°29.45'	30°24.63'	86°29.43'	30°24.63'	86°29.46'
38	CBSR	OFF SANTA ROSA	CHOCTAWHATCHEE BAY	FL	30°24.78'	86°12.25'	30°24.83'	86°12.25'	30°24.70'	86°12.26'
82	CBBL	BENS LAKE	CHOCTAWHATCHEE BAY	FL	30°27.15'	86°32.45'	30°27.16'	86°32.34'		
39	CBPP *	POSTIL POINT	CHOCTAWHATCHEE BAY	FL	30°28.85'	86°28.73'	30°28.76'	86°28.62'	30°28.74'	86°28.75'
83	CBBB	BOGGY BAYOU	CHOCTAWHATCHEE BAY	FL	30°30.18'	86°29.65'	30°30.16'	86°29.46'	30°30.11'	86°29.65'
74	PCLO	LITTLE OYSTER BAY	PANAMA CITY	FL	30°15.19'	85°40.95'	30°15.22'	85°40.84'	30°15.17'	85°40.92'
68	PCMP	MUNICIPAL PIER	PANAMA CITY	FL	30°09.00'	85°39.80'	30°09.05'	85°39.84'	30°09.05'	85°39.80'
40	SAWB	WATSON BAYOU	ST. ANDREW BAY	FL	30°08.53'	85°37.92'	30°08.51'	85°37.84'	30°08.48'	85°37.91'
41	APDB	DRY BAR	APALACHICOLA BAY	FL	29°40.45'	85°04.40'	29°40.40'	85°04.51'	29°40.44'	85°04.51'

SITE	DESIG.	SITE NAME	LOCATION	STATE	CHART		LORAN		GPS	
					deg,min,sec Lat	deg,min,sec Long	decimal deg Lat	decimal deg Long	decimal deg Lat	decimal deg Long
42	APCP	CAT PT. BAR	APALACHICOLA BAY	FL	29°43.45'	84°53.05'	29°43.35'	84°53.32'	29°43.46'	84°53.22'
75	AESP	SPRING CREEK	APALACHEE BAY	FL	30°03.75'	84°19.37'	30°03.67'	84°19.47'	30°03.75'	84°19.37'
69	SRWP	WEST PASS	SUWANEE RIVER	FL	29°19.75'	83°10.45'				
43	CKBP	BLACK POINT	CEDAR KEY	FL	29°12.32'	83°04.25'	29°12.28'	83°04.34'	29°12.32'	83°04.28'
70	TBOT	OLD TAMPA BAY	TAMPA BAY	FL	28°01.48'	82°37.95'				
44	TBPB	PAPYS BAYOU	TAMPA BAY	FL	27°50.53'	82°36.62'	27°50.46'	82°36.74'		
45	TBHB	HILLSBOROUGH BAY	TAMPA BAY	FL	27°51.28'	82°23.75'	27°51.15'	82°23.80'	27°51.31'	82°23.70'
46	TBCB	COCKROACH BAY	TAMPA BAY	FL	27°40.55'	82°30.56'	27°40.44'	82°30.70'	27°40.53'	82°30.62'
47	TBMK	MULLET KEY BAYOU	TAMPA BAY	FL	27°37.28'	82°43.62'	27°37.24'	82°43.59'	27°37.31'	82°43.57'
77	TBKA	KNIGHT AIRPORT	TAMPA BAY	FL	27°54.46'	87°27.29'	27°54.42'	87°27.38'	27°54.52'	82°27.27'
76	TBNP	NAVAREZ PARK	TAMPA BAY	FL	27°47.28	82°45.28			27°47.33'	82°45.19'
48	CBBI	BIRD ISLAND	CHARLOTTE HARBOR	FL	26°30.73'	82°02.18'	26°30.74'	82°02.19'		
71	CBFM	FORT MEYERS	CHARLOTTE HARBOR	FL	26°33.50'	81°55.37'	26°33.55'	81°55.75'	26°33.19'	81°55.75'
49	NBNB	NAPLES BAY	NAPLES BAY	FL	26°06.78'	81°47.15'	26°06.61'	81°47.14'	26°06.75'	81°47.14'
50	RBHC	HENDERSON CREEK	ROOKERY BAY	FL	26°01.50'	81°44.20'	26°01.40'	81°44.15'	26°01.48'	81°44.26'
87	FBFO	FLAMINGO	FLORIDA BAY	FL	25 08.27'	80 55.25'				
88	FBJB	JOE BAY	FLORIDA BAY	FL	25 12.53'	80 32.00'				
51	EVFU	FAKA UNION BAY	EVERGLADES	FL	25°54.08'	81°30.78'	25°53.84'	81°30.80'	25°54.12'	81°30.87'
81	BHKF	BAHIA HONDA KEY	FLORIDA KEYS	FL	24°39.52	81°16.43	24°39.52	81°16.28		
84	PRBB	BAHIA DE BOQUERON	PUERTO RICO	PR	18°00.44'	67°10.72'			18°00.44'	67°10.72'
85	PRBM	BAHIA MONTALVA	PUERTO RICO	PR	17°58.23'	66°59.43'			17°58.23'	66°59.43'
86	PRBJ	BAHIA DE JOBOS	PUERTO RICO	PR	17°56.33'	66°10.95'			17°56.33'	66°10.95'

* name change in 1992

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