OYSTER STOCK ASSESSMENT REPORT

OF THE

PUBLIC OYSTER AREAS IN LOUISIANA

SEED GROUNDS, SEED RESERVATIONS, AND TONGING AREAS

2005 2005

Louisiana Department of Wildlife and Fisheries

Marine Fisheries Division

Oyster Data Report Series
No. 11
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INTRODUCTION AND OVERVIEW

The oyster resource in Louisiana is one of the largest and most valuable in the nation. Its value is derived from both the economic benefits it provides to the state and the ecological benefits it provides to the estuarine environment. Due to Louisiana's vast coastal wetland area, ample habitat exists where oysters thrive under a variety of environmental conditions. The Department of Wildlife and Fisheries (LDWF) is charged with managing the oyster resource on the public grounds by closely monitoring the size and health of oysters on nearly 1.65 million acres of public water bottoms.

Oysters have been a part of the Louisiana economy for many years; starting from meager beginnings and growing into a multi-million dollar industry. In 2004, the dockside value of oysters totaled nearly 35 million dollars and harvest yielded nearly 14 million pounds of meat (LDWF Trip-Ticket Data). Typically, the oyster industry utilizes the public oyster grounds as a source of seed oysters for transplant to private leases (Figure 1). The public grounds, however, also yield a supply of sack-sized oysters and these oysters may be taken directly to market. The manner in which both the public grounds and private leases are utilized in combination helps to keep Louisiana's industry viable. In fact, Louisiana regularly leads the nation in the production of oysters and accounted for an average of 33% of the nation's oyster landings from 1997-2003 (Figure 2).

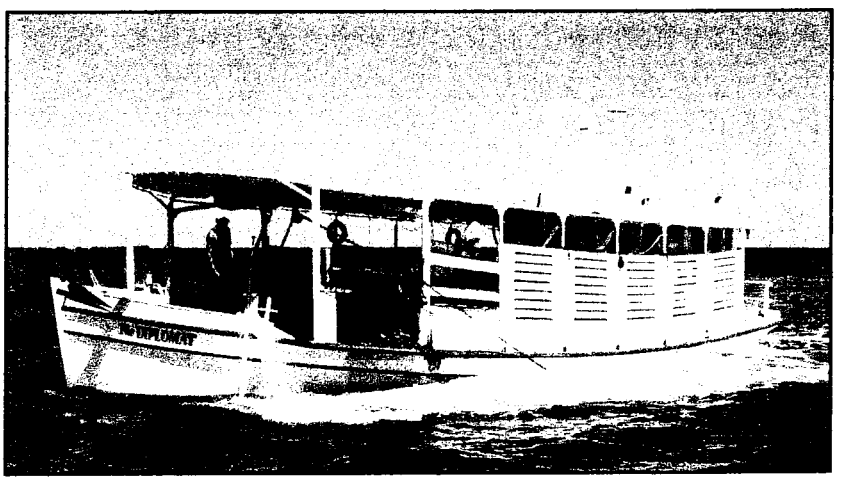


Figure 1. The oyster lugger, The Diplomat, harvests seed oysters from the Sister Lake Public Oyster Seed Reservation during the open season in 2003.

Oysters also play an important ecological role in the estuarine ecosystem. Oyster reefs provide the majority of hard substrate required by other sessile invertebrate species such as barnacles, bryozoans, tunicates, and anemones. Reefs are also utilized as shelter and forage habitat for many species of crabs, worms, fish, and meiofauna. Estuarine water quality can be affected by the filter-feeding activities of oysters and reefs may also play a role in stabilizing shorelines.

Each summer, LDWF biologists from the Marine Fisheries Division perform quantitative evaluation of the oyster resource on the public oyster areas. This biological evaluation includes using SCUBA to collect replicate square meter samples from each public oyster area. The public ground oyster season generally opens in early September or October and runs through March or April of the following year. Square-meter sampling is conducted each July in order to assess the

stock size of the resource and to make recommendations to the Wildlife and Fisheries Commission for the setting of the oyster season.

The Louisiana public ground oyster resource has remained at or above the three million barrel level for over a decade, but has decreased in 2005 to its lowest point since 1992. The total 2005 oyster stock availability of 2,676,797 barrels represents a decrease of nearly 33% from 2004 levels[1]. Stocks of seed oysters account for much of the decrease in the statewide stock size as those numbers dropped from roughly 2.4 million barrels in 2004 to 1.5 million barrels in 2005. Unfortunately, the decrease in statewide seed oyster stock availability was driven largely by the large decrease in seed oyster stocks on the historic seed grounds east of the Mississippi River in Coastal Study Area (CSA) II. 2005 CSA II seed stock availability dropped 48% to just 389,073 barrels. Sack oyster stock availability on the statewide level decrease by 20% (Figure 3), although the sack oyster stocks in the Sister Lake Public Oyster Seed Reservation rose 72% from just 43,193 barrels in 2004 to 153,733 barrels in 2005 (Table 5.6). Sack oyster stock availability continues to remain strong in Calcasieu Lake with nearly 458,000 barrels available (Table 7.1).

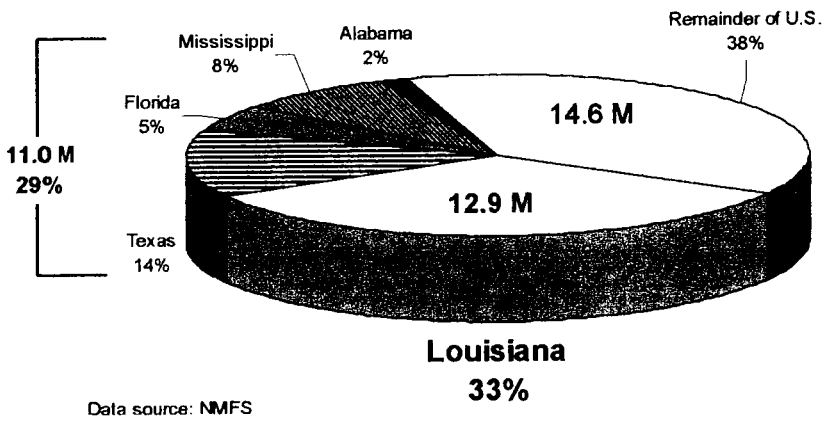


Figure 2. Average 1997 - 2003 oyster landings (all species combined, pounds of meat).

The public oyster grounds are a valuable contributor to overall Louisiana oyster landings each year. The trend from 1970 – 1992 showed the majority of Louisiana oyster landings came from private reefs. From 1992 to 2001, however, the public ground stock size increased, in general, and landings from the public grounds increased as well. Although the general trend since 1992 shows an increased reliance of the oyster industry on the public grounds, recent decreases in public ground oyster availability has lead to decreased harvest from the public grounds since 2002 (Figure 4).

The following report includes both biological and historical production data from each CSA in Louisiana (CSA map depicted on page vi). Biological data was generated from quantitative square-meter sampling (see above) and production data was generated from boarding runs and trip ticket information. Questions and/or comments can be directed to the individual CSA Biologist Managers (page vi) or Patrick Banks at (225) 765-2370.

[1] 2004 levels represent the 2004 stock availability following the CSA I data revision performed in March 2005

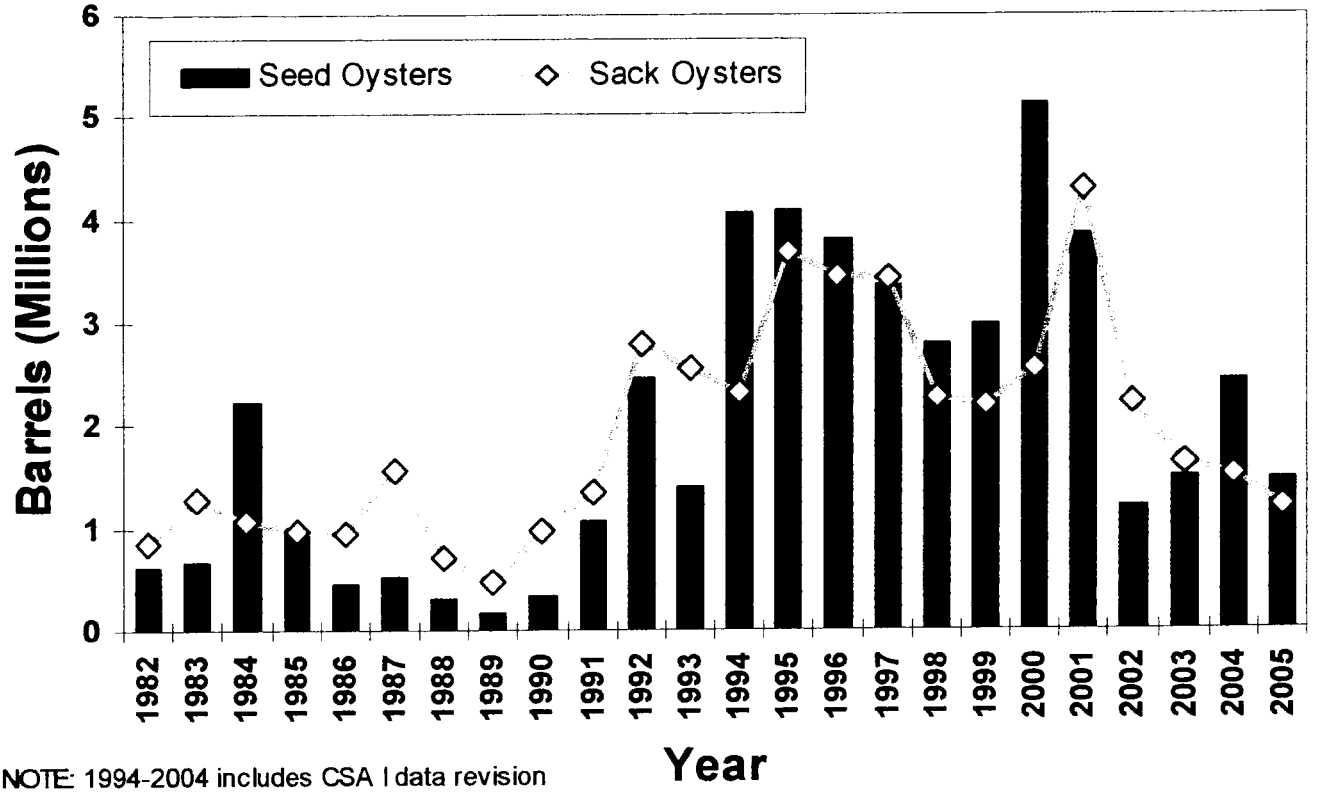


Figure 3. Historical Louisiana oyster stock size on the public oyster areas (estimated based on square meter sample analysis).

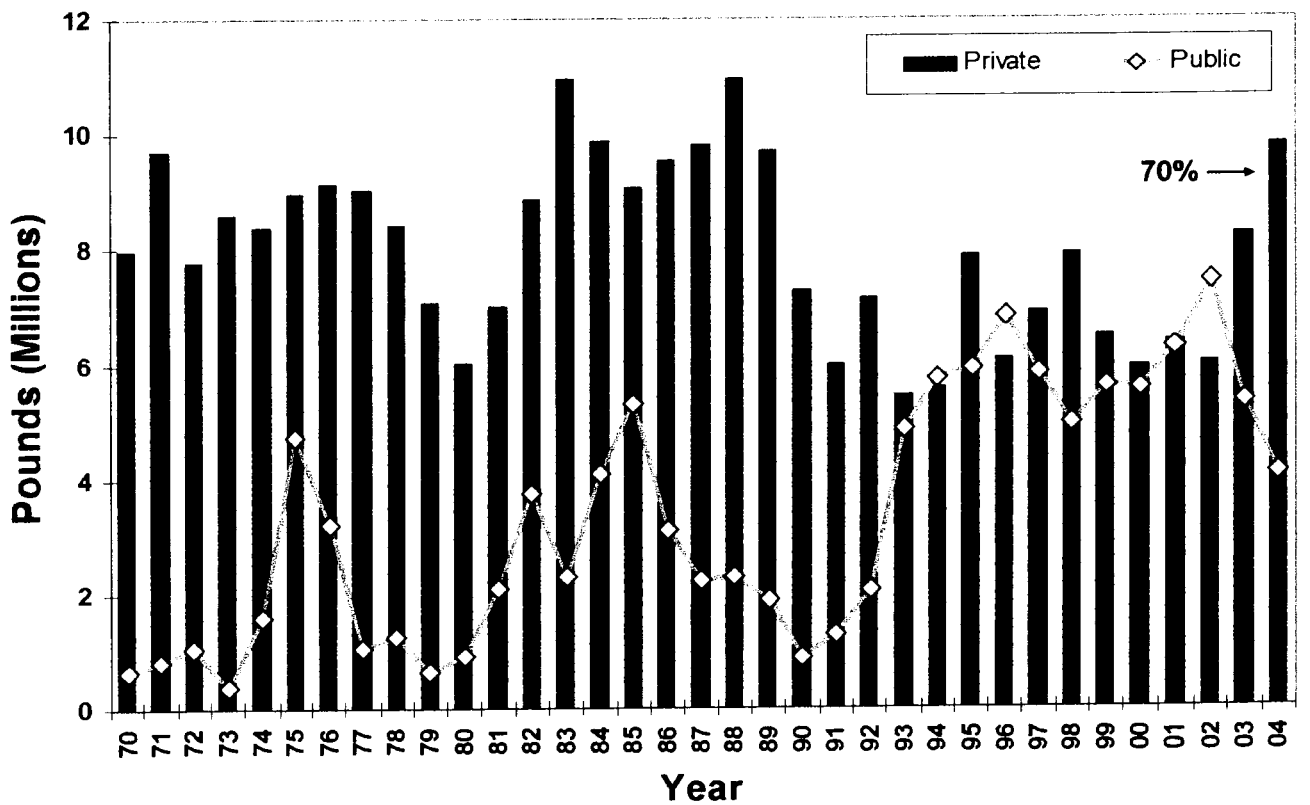


Figure 4. Historical Louisiana oyster landings (NMFS and LDWF data).

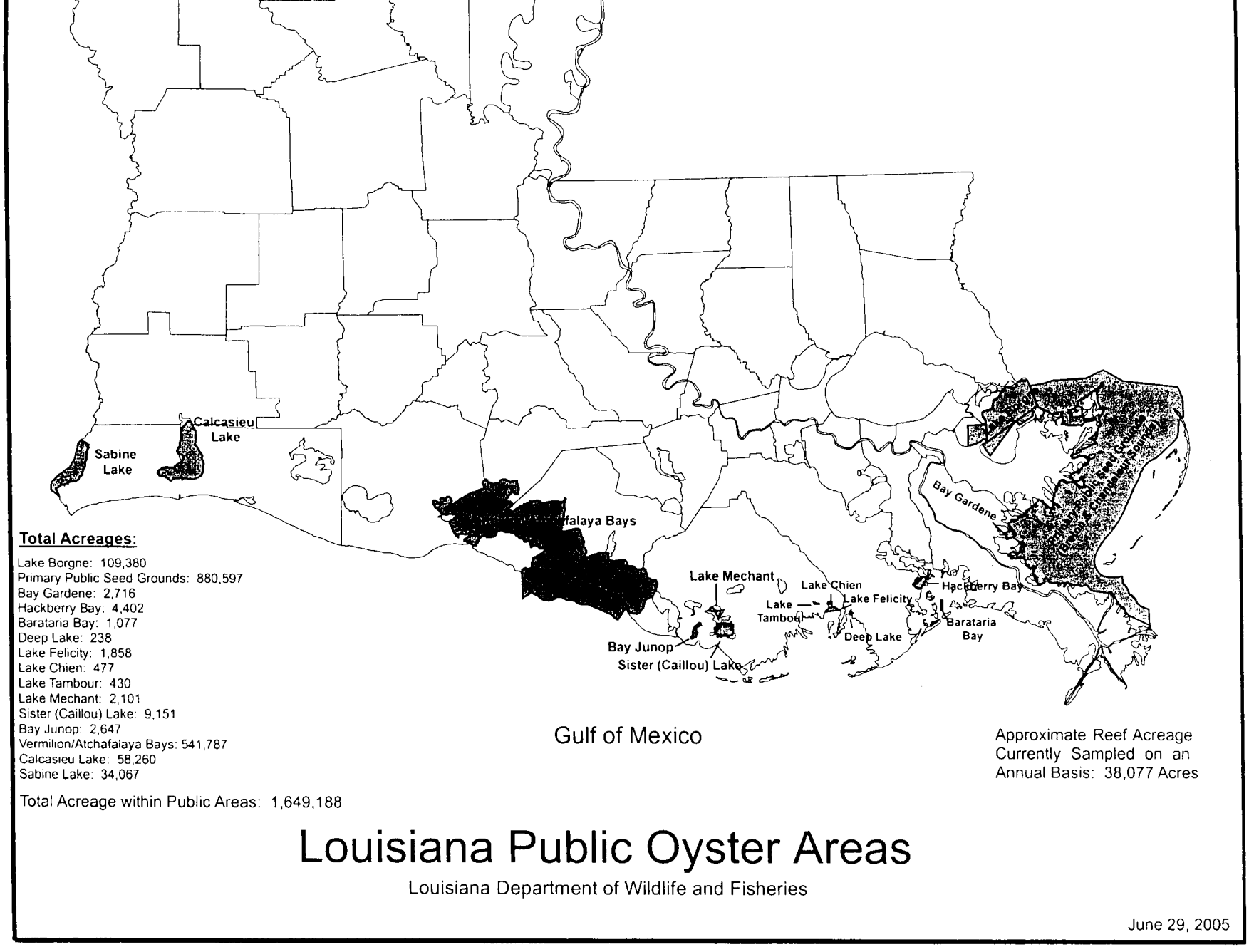
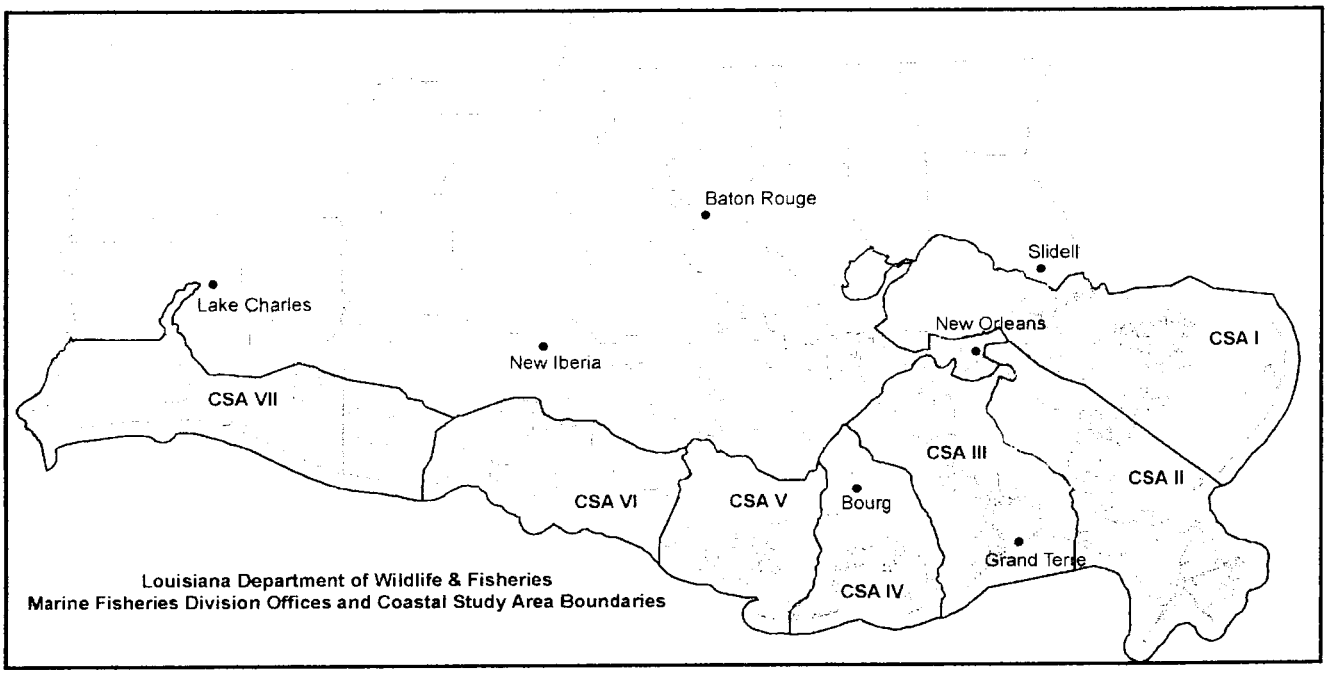


Figure 5. Louisiana public oyster areas.

LDWF Marine Fisheries' Coastal Study Areas (CSAs)



CSA	*Biologist Manager*	*Address*	*Phone Number*	*FAX Number*
1	Brian Lezina	52282 Hwy. 90 Slidell, LA 70461	(985) 646-6441	(985) 646-6481
2	Keith Ibos	1600 Canal Street New Orleans, LA 70112	(504) 568-5671	(504) 568-2048
3	Jason Adriance	P.O. Box 37 Grand Isle, LA 70358	(985) 787-2163	(985) 787-4517
4	Vince Guillory	P.O. Box 189 Bourg, LA 70343	(985) 594-4139	(985) 594-7317
5	Steve Hein	P.O. Box 189 Bourg, LA 70343	(985) 594-4139	(985) 594-7317
6	Paul Cook	2415 Darnall Road New Iberia, LA 70560	(337) 373-0032	(337) 373-0032
7	Michael Harbison	1213 N. Lakeshore Drive Lake Charles, LA 70601	(337) 491-2573	(337) 491-2009

CSA I

MEMORANDUM

TO: Patrick Banks, Biologist Program Manager

FROM: Brian Lezina, CSA I Biologist Supervisor

DATE: July 19, 2005

RE: 2005 Public Oyster Seed Ground Stock Assessment for Coastal Study Area I

METHODOLOGY

Stock assessment samples were completed by Coastal Study Area (CSA) I personnel on July 13, 2005. All samples were taken using a one square-meter frame placed directly on the bottom. All live and dead oysters, as well as shell, were removed from the enclosed area by divers. Live and dead oysters, spat, fouling organisms, and oyster predators were identified and enumerated.

A total of ten stations were visited with two square-meter samples taken at each station (Figure 1.1). The average of the two replicates was used, in combination with reef acreage, to estimate the current oyster stock size. The Lake Borgne Public Oyster Seed Ground was not sampled due to a lack of reef acreage information.

SEED AND SACK STOCK

Based on collected data, the current stock size is estimated at 397,229 barrels (bbls) of seed size oysters and 296,582 bbls of sack size oysters. These numbers are dramatically lower than the 2004 estimate[1] with a 55.5% reduction in seed oysters and a 46.2% reduction in sack oysters. The current estimate falls well below the previous 10 year average with seed and sack estimates suppressed by 39.2% and 58.9%, respectively (Figure 1.2).

Samples for the current estimate were not evenly distributed by station, and the overall sack and seed availability estimates were driven by only a few stations (Table 1.1). It is important to note both within and among station variability when comparing estimates. This variability is magnified when extrapolating low sample size data to include a large area.

SPAT PRODUCTION

Live spat were present in all samples containing a suitable substrate. Overall numbers were low with the exception of the Cabbage Reef area. This is consistent with the large peak in spawning for this site in previous years beginning in July. While dredge and square meter data are used to compare spawning times and magnitude between reefs, it is important to note that spat numbers may be biased by the amount of substrate in a given sample. Also, the timing of the square meter samples may have occurred too early to capture the entire system.

FOULING ORGANISMS

Hooked mussels, *Ischadium recurvum*, were present at four of the ten sample stations. These stations are located in the western portion of the Mississippi Sound and are in close proximity to the Pearl River

[1] Based on revised 1993-2004 stock assessment calculations for CSA I

system. Hooked mussel densities were especially high at two of the westernmost stations (Table 1.2). High densities of mussels have been noted in dredge samples at these stations and the Lake Borgne Area through most of the year. The east-west gradient of salinity was especially pronounced this spring, allowing for the observed distribution of these mussels (Figure 1.3).

OYSTER PREDATORS

The southern oyster drill, *Stramonita haemostoma*, was present at only the Cabbage Reef station (Table 1.2). This station is above 15 ppt for the majority of the year. Mud crabs (Family *Xanthidae*) were found in each sample containing shell. However, these organisms are not identified to species and several "mud crabs" are not oyster predators. There were no blue crabs (*Callinectes sapidus*), or stone crabs (Mennipe *adina*) in the samples.

MORTALITY

Recent mortality estimates were highly variable within and among stations (Table 1.3). Spat mortalities ranged from 0 to 40%, seed mortalities ranged from 0 to 100%, and no sack mortality was observed. Overall mean spat mortality was 8.3%, mean seed mortality was 25.5%, and mean sack mortality was 0%. The cause of the high seed mortalities is unclear at this time. Although three tropical weather systems have influenced the Mississippi Sound seed grounds, Cabbage Reef has shown moderate to high seed mortalities since the start of the dredge monitoring (April 2005) prior to the passage of the first tropical storm. The cause of high spat mortality observed on several of the reef systems remains unclear. *Perkinsus marinus* (Dermo) infection rates, although higher than last year, do not appear to be at critical levels (see Section 8).

LAKE BORGNE ADDITION

The Lake Borgne portion of the public seed grounds was not sampled during the 2005 oyster stock assessment. However, an ongoing dredge monitoring program is in place. This area was heavily utilized by fisherman during the 2004/2005 season. Extensive biofouling problems exist in this area and severely limit harvest efficiency.

BJL
w / attachments

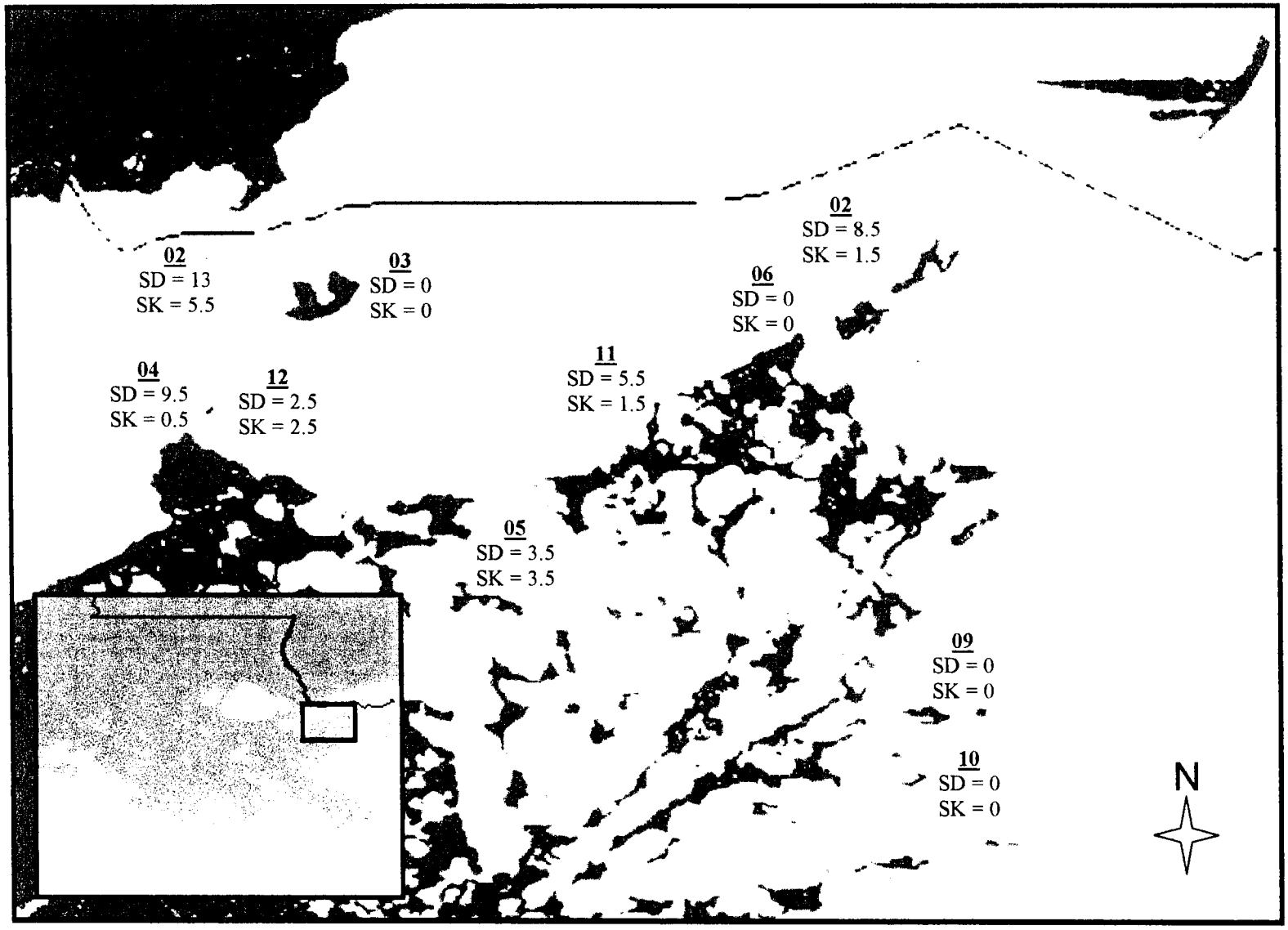


Figure 1.1. Map showing Coastal Study Area 1 oyster stock assessment stations within the Mississippi and Chandeleur Sounds. Numbers below stations are average numbers of seed (SD) and sack (SK) oysters per m^2.

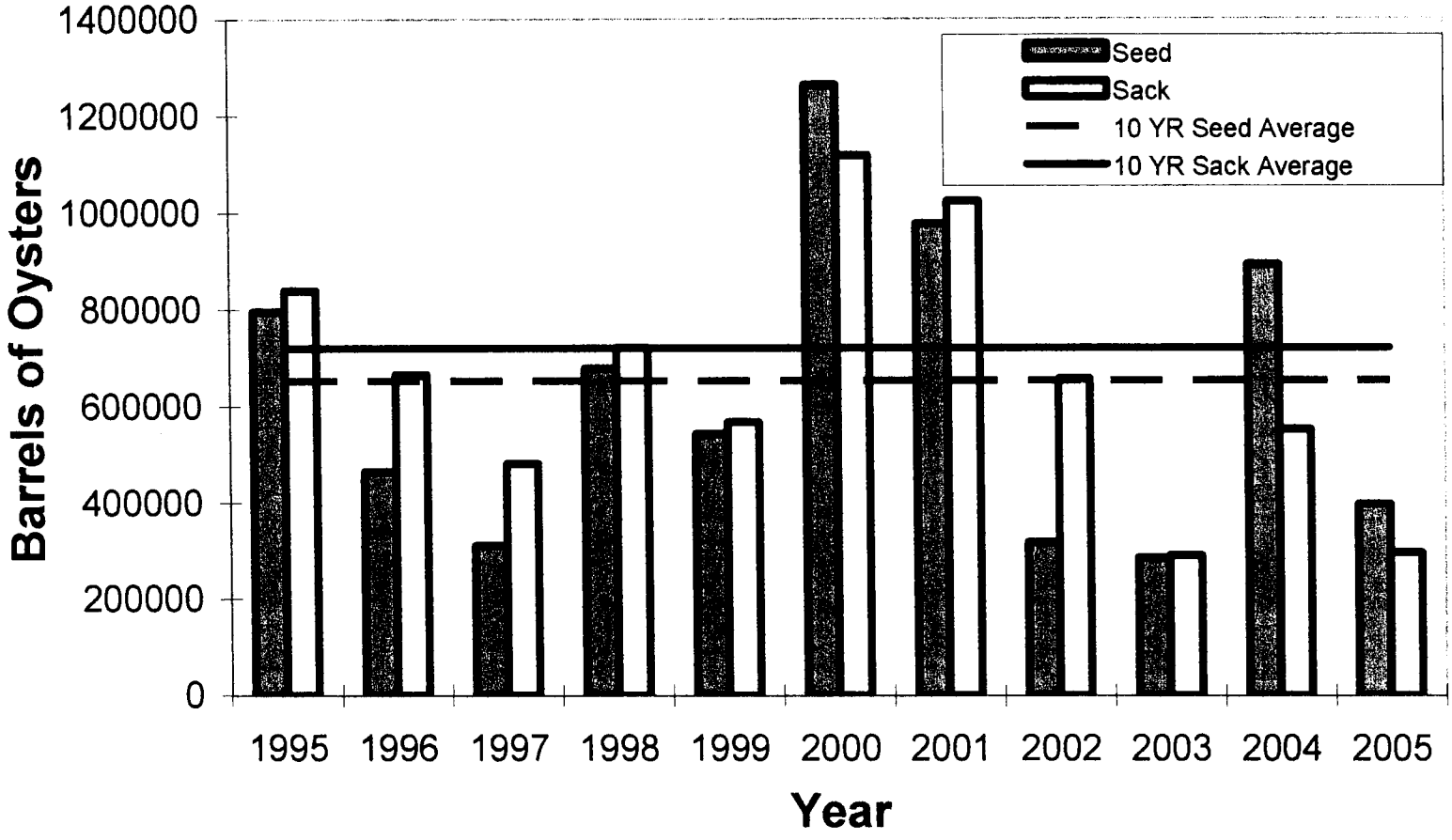


Figure 1.2. Stock Assessment (seed and sack oysters) values for the present year and the 10 previous years. Horizontal lines represent the ten-year seed and sack average. Data reflects the 1994-2004 stock assessment revision completed in March 2005.

Table 1.1. Mean densities of oysters collected at each station.

Station	Station Number	Seed Oysters per m2	Sack Oysters per m2	Number of seed oysters (bbls)	Number of sack oysters (bbls)
Grassy Island	2	13	5.5		
Petit Island	4	9.5	0.5	288,777	154,015
Half-moon Island	3	0	0		
Three-mile Bay	5	3.5	3.5	60,172	120,345
Grand Pass	6	0	0		
Turkey Bayou	11	5.5	1.5	47,295	20,255
Cabbage Reef	7	8.5	1.5		
2000 Shell Plant	12	2.5	2.5	984	1967
Martin Island	9	0	0	0	0
Holmes Island	10	0	0		
Hospital Wall	1	NA	NA	NA	NA
Totals				**397,228**	**296,582**

Table 1.2. Mean density of the hooked mussel, *Ischadium recurvum*, and the southern oyster drill, *Stramonita haemostoma*, at each station. Each mean represents two samples.

Station	Mussel Density (m^2)	*S. haemostoma* density (m^2)
Grassy Island	444	0
Petit Island	1007	0
Half-moon Island	0	0
Three-mile Bay	0	0
Grand Pass	0	0
Turkey Bayou	33	0
Cabbage Reef	0	3
2000 Shell Plant	14	0
Martin Island	0	0
Holmes Island	0	0
Hospital Wall	NA	NA

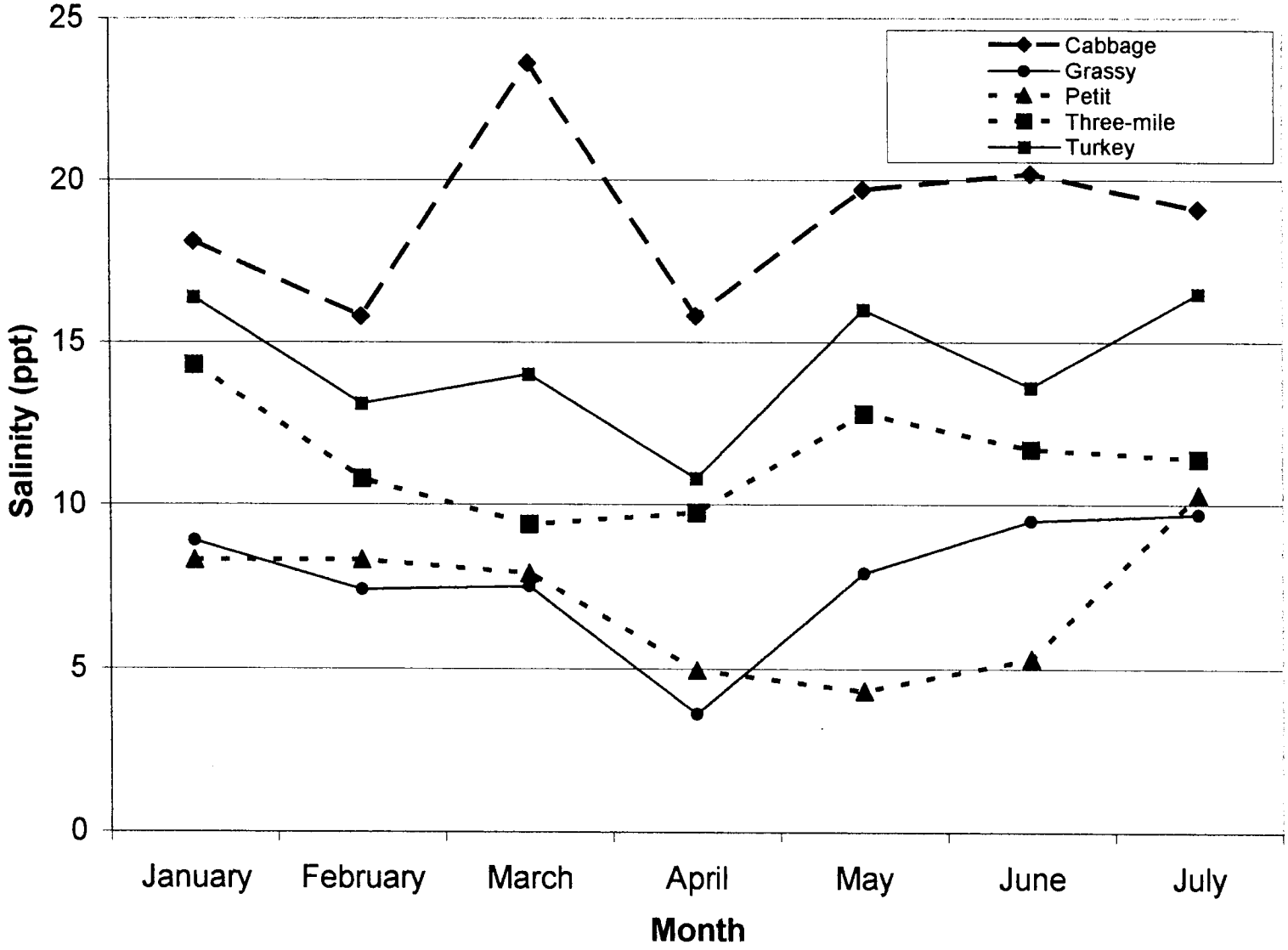


Figure 1.3. Mean monthly salinities for the northern Mississippi Sound public seed grounds.

Table 1.3. Mean oyster mortality estimates from each sample station. N/A – no live or dead oysters were collected in any sample.

Station	Spat Mortality (%)	Seed Mortality (%)	Sack Mortality (%)
Grassy Island	0.0	4.5	0.0
2000 Shell Plant	0.0	25.0	0.0
Petit Island	12.5	0.0	0.0
Half Moon Island	N/A	N/A	N/A
Three-Mile Bay	22.0	0.0	0.0
Turkey Bayou	0.0	21.7	0.0
Cabbage Reef	3.4	27.4	0.0
Grand Pass	20.0	100.0	0.0
Martin Island	N/A	N/A	N/A
Holmes Island	N/A	N/A	N/A

CSA II

MEMORANDUM

TO: Patrick Banks, Biologist Program Manager

FROM: Keith Ibos, Biologist Manager, CSA II
Clarence Luquet, Biologist Supervisor, CSA II

DATE: July 19, 2005

SUBJECT: CSA II Meter Square Samples *2005*

Personnel from Coastal Study Area (CSA) II completed the 2005 meter square sampling project on July 14, 2005. A total of 27 stations were sampled from Bay Gardene and Northern Black Bay to Breton Sound. Sample analysis estimated 389,073 barrels of seed oysters and 299,314 barrels of sack oysters to be available in CSA II for a total of 688,387 barrels of overall stock availability.

The overall availability is down again, 38.5% from last year, and is 78% below the 10 years average. Relative to 2004, the stock of seed oysters is down by 359,483 barrels (48 %), while sack oyster availability is down by 71,280 barrels (19%). Seed oyster availability is still well below the average for the 1990's: down 79 % below the 10 year average. Sack oysters are also below the average of the last ten years (down 76.5 %).

As was the case last season, the majority of the remaining seed oysters are again located in the sacking only area. Many of those seed sized from last year have now grown to market size and will be available this coming season. Seed oysters may be found at Bay Crabe, the Bay Gardene area reefs, and in Black Bay. Sack oyster numbers are down again but they are available in Lake Fortuna, the Bayou Lost area, Bay Crabe, and Black Bay reefs.

The results of this year's Dermo (*Perkinsus marinus*) sampling are not available at this time of writing.

Mussel densities were significantly lower on all reefs and should not be a problem to harvesters except at isolated locations.

Mortalities (recent) in SEED and SACK oysters averaged less than 6% across the area.

Drills (*Stramonita* adults and *Neverita* juveniles) were not found on any of our CSA2 reefs this year, though some egg cases were found in North California Bay, at our Telegraph Island station, number 15, from a single dredge sample.

Overall spat set throughout the area was poor. Young spat (less than one month old) were present at only 10 of our 27 stations. The highest occurrences were in Bay Gardene and Lake Fortuna.

Average numbers of spat and mussels are reported in Table 2.1.

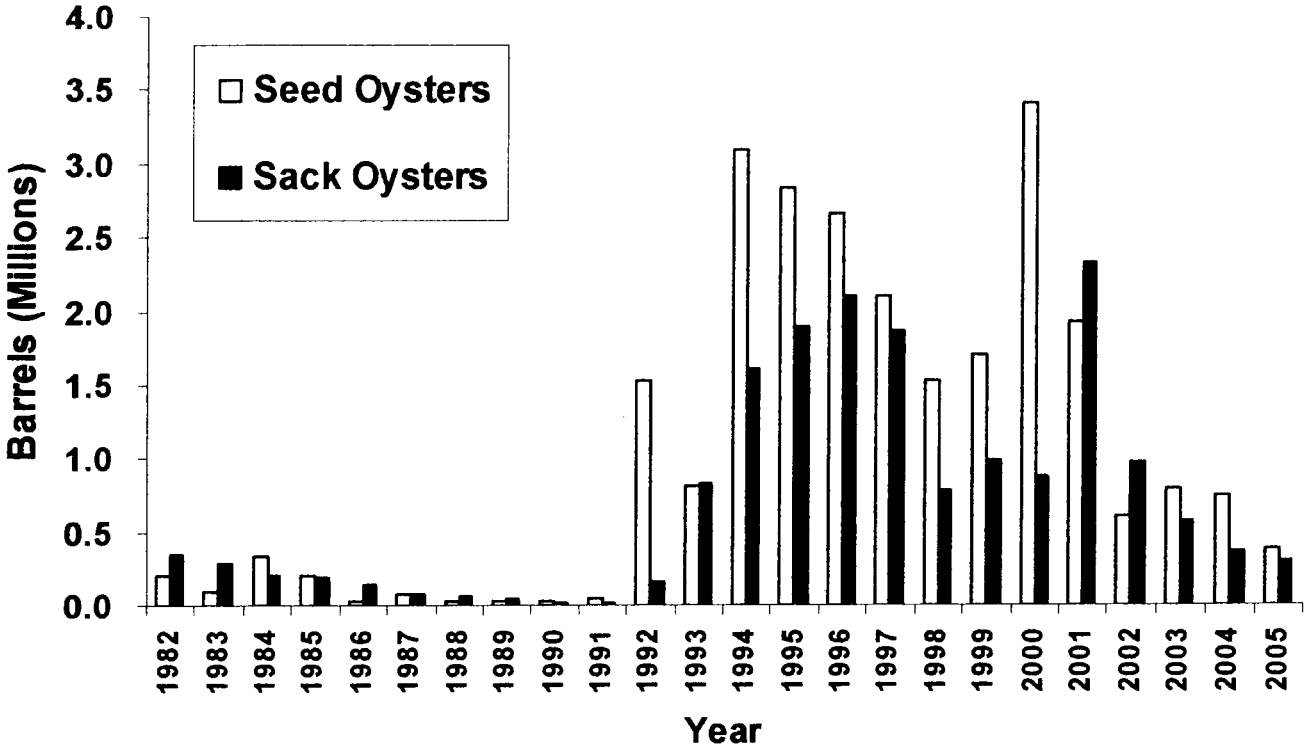


Figure 2.1. Historical oyster stock availability in Coastal Study Area (CSA) II.

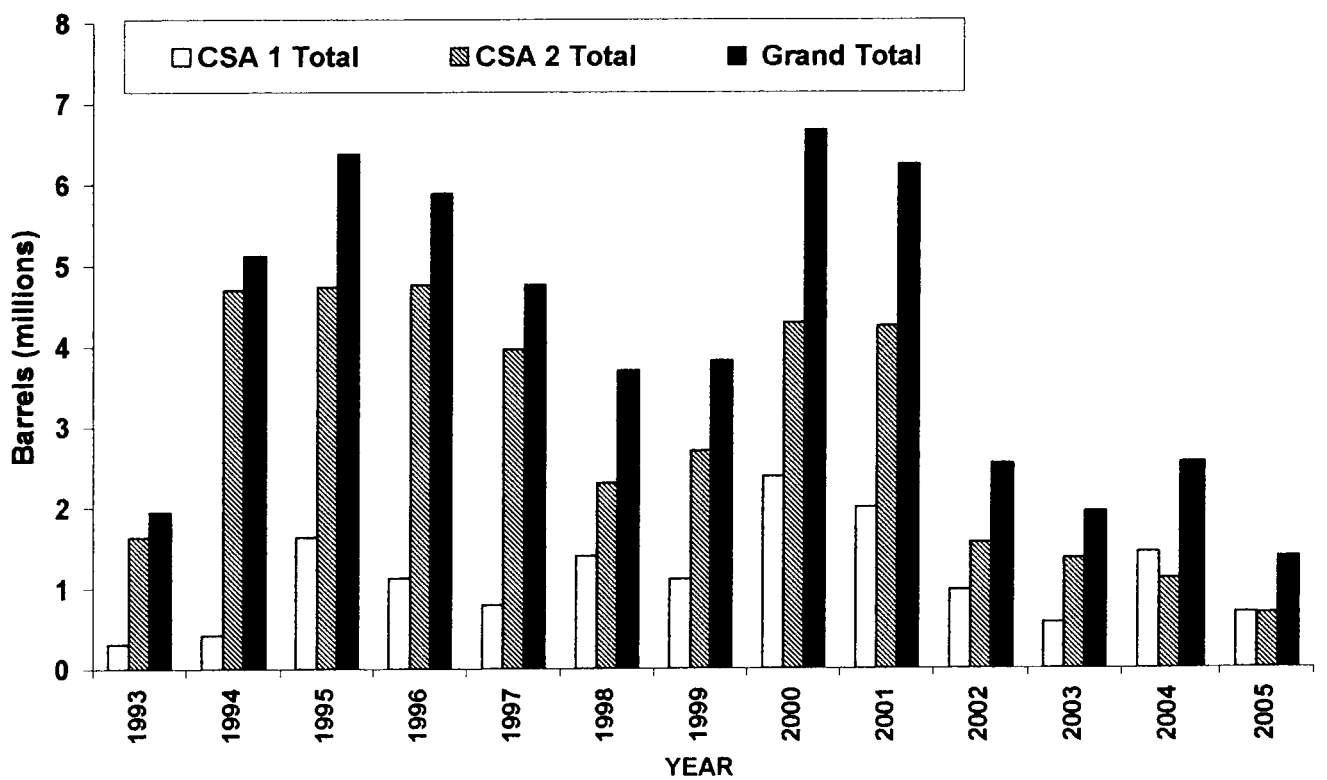


Figure 2.2. Oyster availability on the public grounds east of the Mississippi River (seed and sack oysters combined, estimate based on square meter sample analysis, figure information reflects CSA I revised data).

Table 2.1 2005 square meter sample results for Coastal Study Area II

Stations	Grids	Approx. Reef Acres	Square Meters	Average # of Seed Oysters/m²	Average # of Sack Oysters/m²	Barrels of Seed Oysters Available	Barrels of Sack Oysters Available	Hooked Mussels	Oyster Spat/m²	Oyster Drill Presence	Spat Percent Mortality	Seed Percent Mortality	Sack Percent Mortality	Seed & Sack Percent Mortality	All Size Percent Mortality
1	Snake	506	2,047,782	3.0	0.0	8,532	0	45.3			100	10	NA	10	18.2
2	Jessie	59	283,773	11.0	1.5	4,335	1,182	18.5	1.5		0	0	0	0	0
3	N. Lonesome	896	3,626,112	1.5	1.0	7,554	10,073	48.5	0.5		0	0	0	0	0
5	Bayou Lost	118	477,546	41.5	20.0	27,525	26,530	146.5	1.5		50	0	2.4	0.8	3.1
6	Lonesome	716	2,897,652	0.5	0.0	2,012	0	26.5			NA	0	NA	0	0
7	Black Bay	301	1,218,147	10.5	1.0	17,765	3,384	232.0			NA	0	0	0	0
8	W. Bay Crabe	501	2,027,547	14.5	1.5	40,833	8,448	18.5			NA	12.1	0	11.1	11.1
9	Stone	461	1,865,667	4.0	1.0	10,365	5,182	274.0			NA	0	0	0	0
10	S. Black Bay	145	586,815	0.5	1.5	408	2,445	34.0			NA	0	0	0	0
11	Elephant	339	1,371,933	5.5	1.0	10,480	3,811	53.5	0.5		0	0	0	0	0
12	Curfew	425	1,719,975	0.67	0.67	1,593	3,187	160.0	0.5		66.7	33.3	0	20	37.5
13	N. California	109	441,123	5.0	1.5	3,063	1,838	79.5			NA	0	0	0	0
14	California	7	28,329	1.5	3.0	59	236	247.5			100	62.5	14.3	40	43.8
16	Sunrise	174	704,178	6.0	5.5	5,868	10,758	232.5			NA	0	0	0	0
17 SKIP		659	2,666,973			private leases discontinued									
19	Mangrove	937	3,792,039	0.67	0.67	3,529	7,057	257.0			NA	0	0	0	0
20	W. Pelican	293	1,185,771	2.0	1.0	3,294	3,294	16.7			NA	14.3	0	10	10
21	Bay Crabe	659	2,666,973	10.5	2.0	38,893	14,817	81.5	0.5		0	0	0	0	0
22	E. Bay Crabe	122	493,734	0.0	0.5	0	686	0.0			NA	NA	0	NA	NA
23	E. Gardene	28	113,316	6.5	3.5	1,023	1,102	0.0	0.5		50	18.8	0	13	16
24	Bay Gardene	69	279,243	41.5	6.5	16,095	5,042	67.5	11.5		11.5	13.5	0	11.9	11.9
4,26	N. Black Bay	315	1,274,805	1.8	0.0	3,098	0	0.0	0.5		0	0	NA	0	0
15	Telegraph	127	513,969	3.5	2.0	2,498	2,855	46.0		egg cases	NA	0	0	0	0
18	E. Pelican	1,528	3,164,754	1.0	0.5	4,395	4,395	127.5			NA	0	0	0	0
26 SKIP	see 4,26					combined data	29 not used								
25	Battledore	1419	5,742,693	0.0	0	0	0	0.0			100	NA	NA	NA	100
27	L Fortuna	4288	17,353,536	6.5	3.0	*156,664*	144,613	2.0	5.0		16.7	0	0	0	6.5
28	Wreck	2276	9,210,972	1.5	1.5	19,190	38,379	0.0			NA	0	0	0	0
Sub Total						**389,073**	**299,314**								
ALL TOTAL						***688,387***									

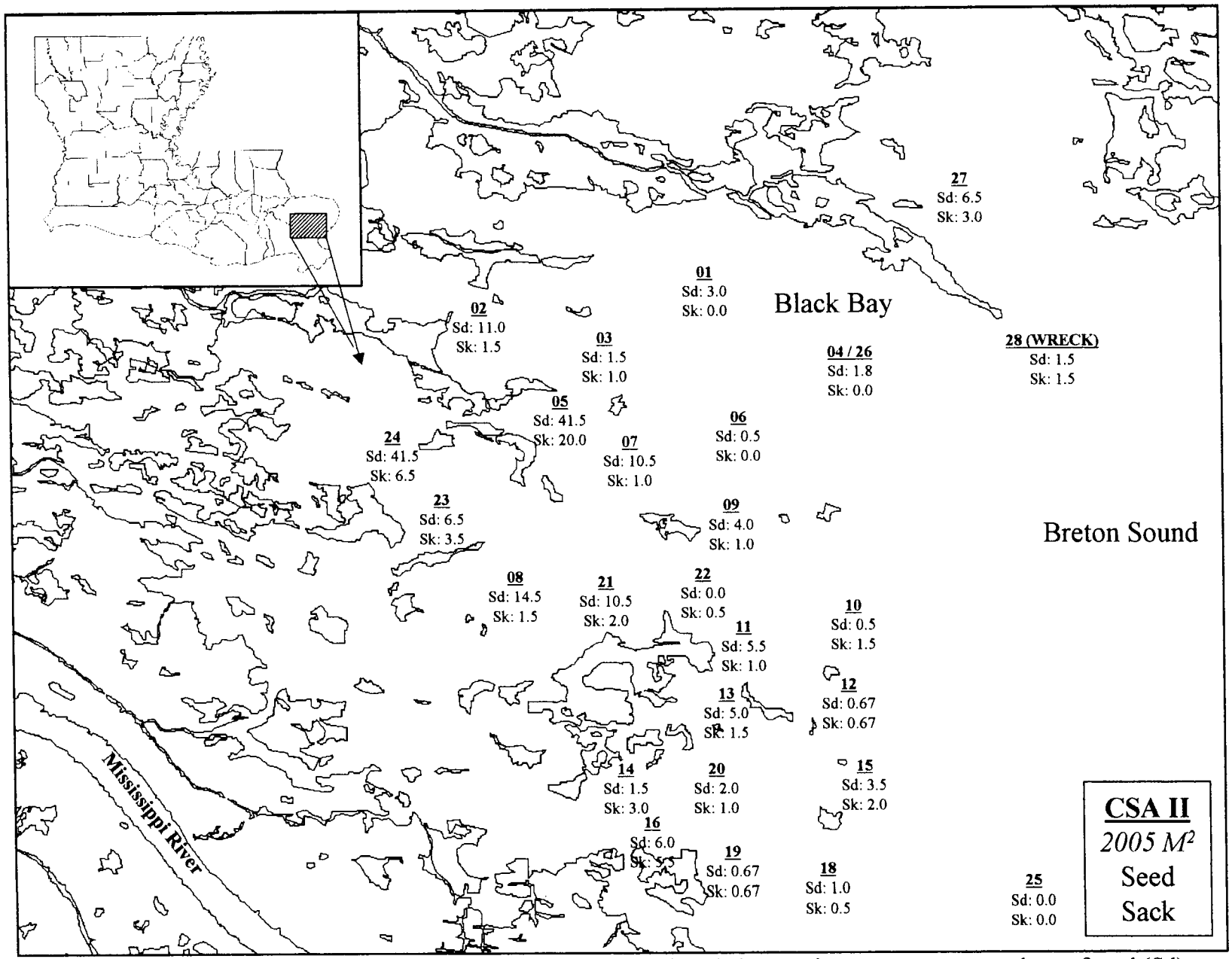


Figure 2.3. CSA II square meter stations and sample results. Numbers below stations are average numbers of seed (Sd) and sack (Sk) oysters per square meter.

CSA III

MEMORANDUM

Date: **July 18, 2005**

To: **Patrick Banks, Biologist Program Manager**

From: **Jason Adriance, Biologist Manager, CSA – 3**

Re: **Hackberry Bay Public Oyster Seed Reservation Meter Square Samples**

During 2004, three new cultch sites were constructed in the Barataria Basin. On May 6-8, 2004 approximately 7,536 cubic yards (40 acres) of crushed concrete was planted in lower Barataria Bay. On May 10, 2004 approximately 2,322 cubic yards (10 acres) of #57 size limestone was planted in northern Hackberry Bay, and on May 10-12, 2004 approximately 4,005 cubic yards (25 acres) of #57 size limestone was planted in southern Hackberry Bay.

Meter square oyster samples were on collected July 7th and July 12th, 2005. The samples on July 7th were taken from the new Barataria Bay Cultch Site (BBCS) site and the Hackberry Bay Seed Reservation (HBSR). The samples taken on July 12th were collected from the new Hackberry Bay North (HBN) and Hackberry Bay South (HBS) cultch sites. The BBCS, HBN, and HBS samples consisted of five replicate ¼ meter square samples taken at random locations on each cultch plant. The HBSR was sampled at three historical stations (upper, middle, and lower) with three replicate meter square samples collected at each station.

Oysters collected in each sample were measured in 5 – mm work groups, averaged for each group, and divided into types by spat, seed, and sack oysters (Figures 3.1, 3.2, and 3.3). Spat oysters, which measured less than 25mm, averaged 1.7 per m^2 on the HBSR, 2.0 per 1/4 m^2 on the BBCS, 12.8 per 1/4 m^2 on the HBN, and 9.8 per 1/4 m^2 on the HBS (Figure 3.1). This number was higher than the previous year for the HBSR, but still below average (Figure 3.2). Seed oysters, which measured 25 mm to less than 75 mm, averaged 15.4 per m^2 on the HBSR, 1.0 per 1/4 m^2 on the BBCS, 43.4 per 1/4 m^2 on the HBN, and 50.0 per 1/4 m^2 on the HBS. The number of seed oysters on the HBSR is higher than the past three years (Figure 3.2). Sack oysters, which measured 75 mm or greater, averaged 0.9 per m^2 on the HBSR, 0.0 per 1/4 m^2 on the BBCS, 0.0 per 1/4 m^2 on the HBN, and 0.0 per 1/4 m^2 on the HBS. This number of sack oysters on the HBSR is slightly below average for the past five years (Figure 3.2). Oysters per m^2 were extrapolated for 5.938 hectares (14.7 acres) of reef for the HBSR and oysters per 1/4 m^2 were extrapolated out for 40.0 acres on the BBCS, 10.0 acres on the HBN, and 25.0 acres on the HBS sites. The results were 1270.1 barrels of seed oysters and 148.5 barrels of marketable oysters for the HBSR (Table 3.1). The BBCS contains and estimated 899.3 barrels of seed oysters and 0.0 barrels of marketable oysters (Table 3.1). The HBN cultch site contains an estimated 9,757.5 barrels of seed oysters and 0.0 barrels of marketable oysters (Table 3.1). The HBS contains an estimated 28,103.3 barrels of seed oysters and 0.0 barrels of marketable oysters (Table 3.1). The above oyster availability estimates assume that 100% of the cultch sites or reservation is exposed at the water bottom. While diving on the sample sites biologists noticed that some portions of each of the cultch sites and reservation were silted over. Without being able to quantify the amount of cultch or reef that is silted over the above estimates may be high.

Hooked mussels per square meter averaged 0.0 for the HBSR, 0.0 per quarter meter for the BBCS, 105.4 per quarter meter for the HBN, and 133.8 per quarter meter on the HBS.

During September 2004 to April 2005 the Hackberry Bay Seed Reservation was closed due to extensive basin-wide oyster mortalities experienced in the summer of 2004, therefore there was no oyster production on the reservation for the 2004 – 2005 season.

On July 7, 2005, oysters were collected for Dr. John Supan (L.S.U. Cooperative Extension Service) from the middle Hackberry station with a dredge and square meter. Sack and seed oysters were divided, and an analysis for *Perkinsus marinus* (Dermo) was preformed. Results of the analysis are pending.

Salinities in Hackberry Bay averaged 14.2 ppt for the month of June in 2005 which is above the 2001 to 2005 average of 10.7 ppt. June temperatures averaged 29.6 degrees C in 2005 which is above the 2001 to 2005 average of 29.1 degrees C. June averages of constant recorder data is presented in Figure 3.4. Tropical storm Cindy passed over Grand Isle and into Barataria Bay on July 5th, 2005. Surface salinities in Hackberry Bay dropped the following week to about 10 ppt, but bottom salinities remained near 20 ppt.

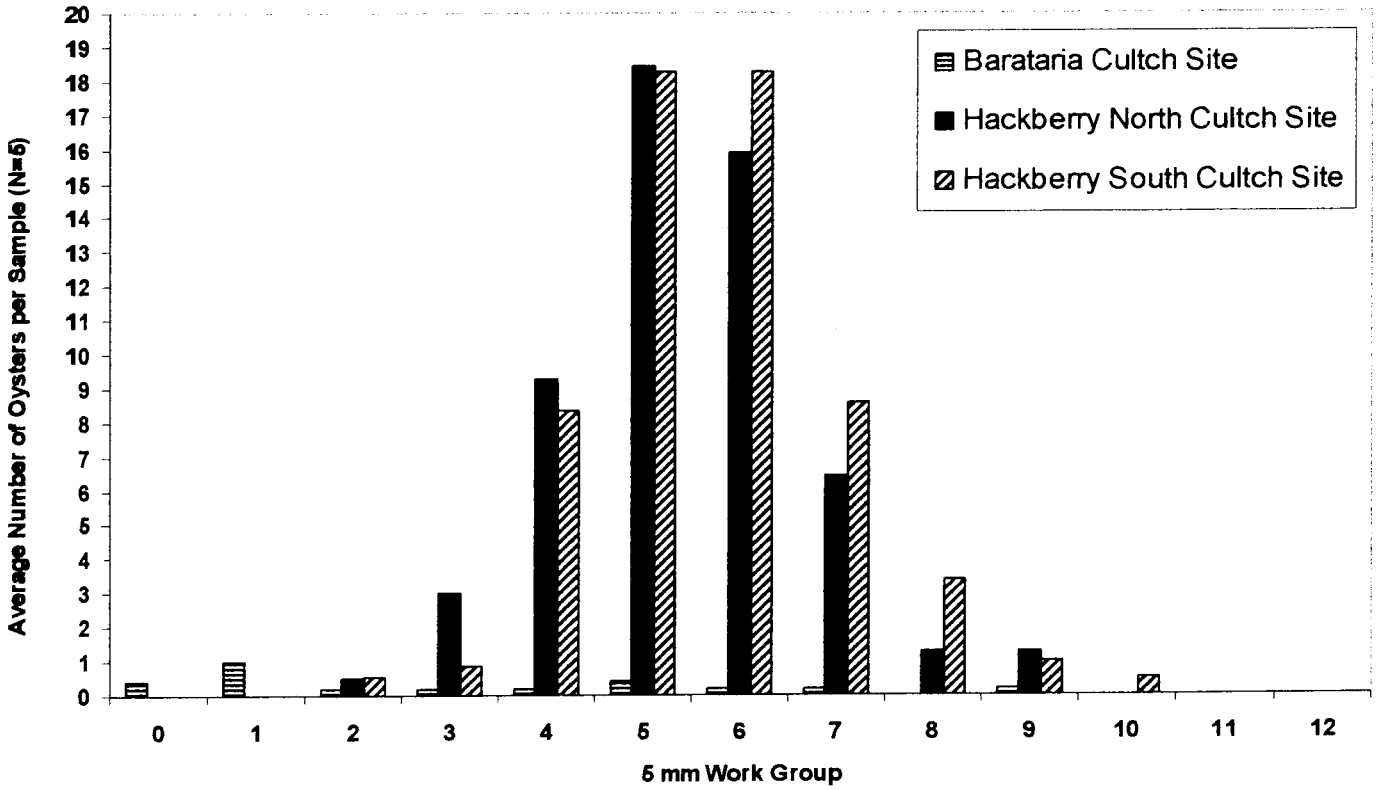


Figure 3.1. Oyster size distribution in samples collected from the 2004 cultch plants in CSA III.

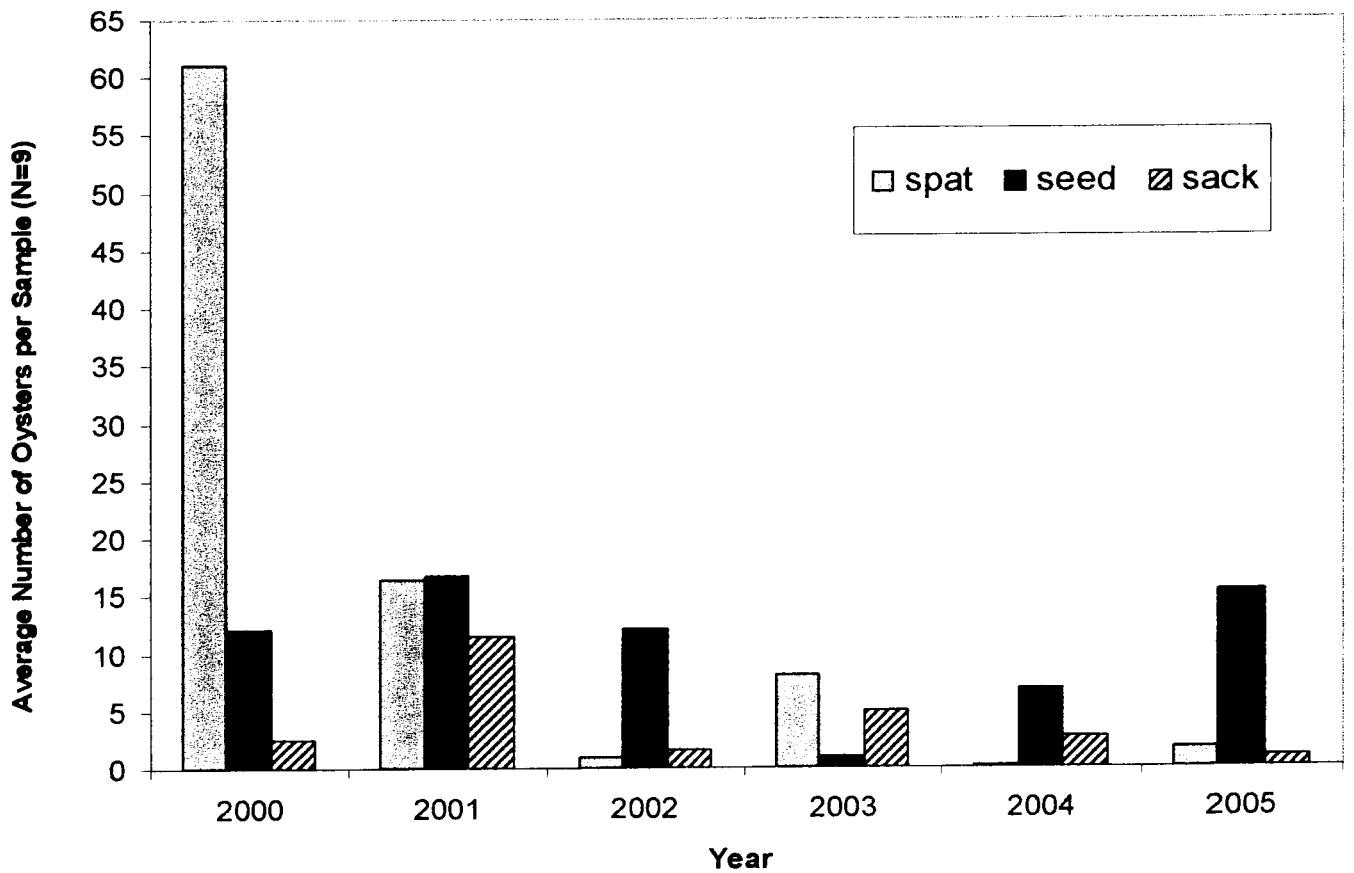


Figure 3.2. Historical oyster numbers in the Hackberry Bay Public Oyster Seed Reservation (excluding 2004 cultch plants).

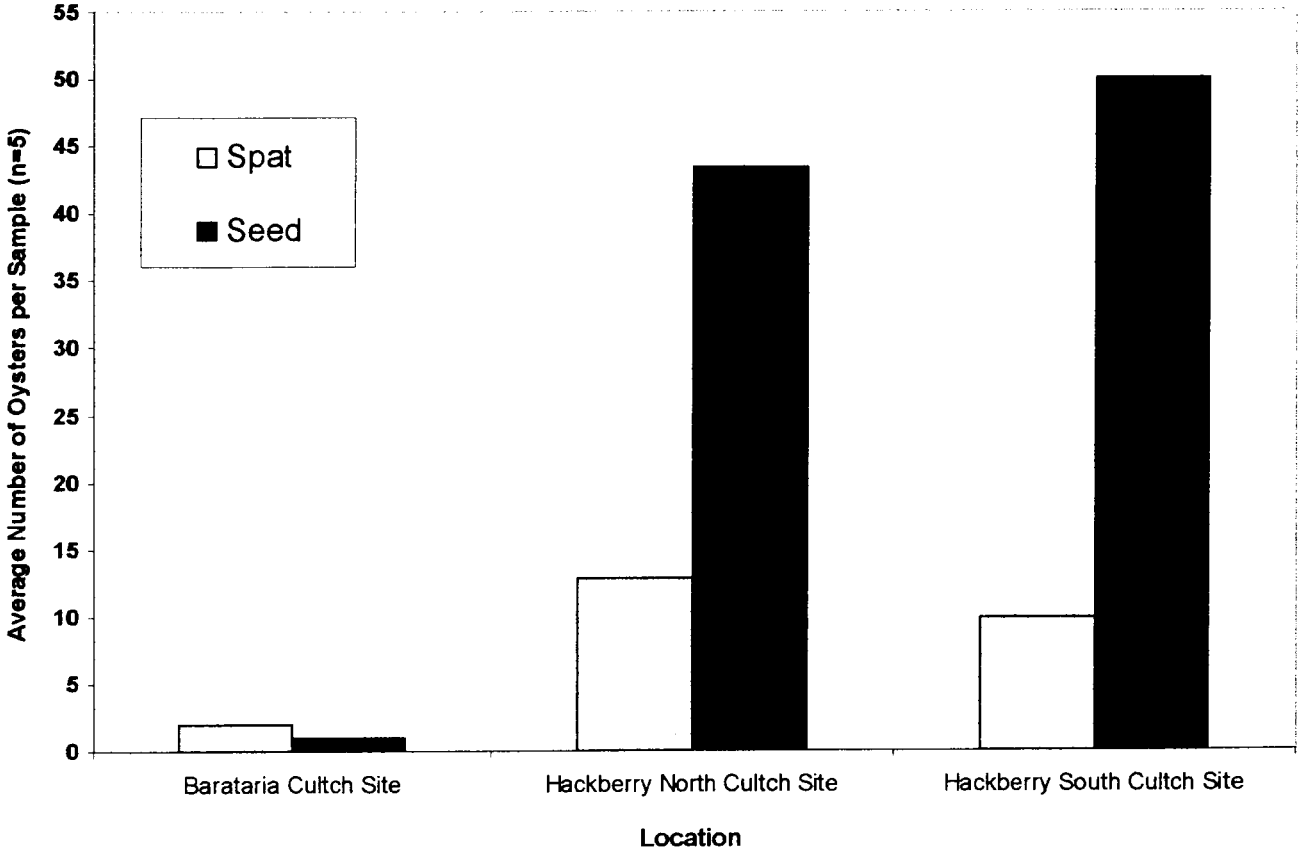


Figure 3.3. Oyster numbers on the 2004 cultch plants in CSA III.

Table 3.1. 2005 oyster availability on the public oyster areas in Coastal Study Area (CSA) III.

Public Oyster Area	Reef Acreage	Square Meters	Seed Oysters Per M^2	Sack Oysters Per M^2	Seed Oysters (BBLS)	Sack Oysters (BBLS)
Barataria Bay (2004 Cultch Plant)	40.0	161,875	4.0	0.0	899.3	0.0
Hackberry Bay (2004 North Cultch Plant)	10.0	40,469	173.6	0.0	9,757.5	0.0
Hackberry Bay (2004 South Cultch Plant)	25.0	101,172	200.0	0.0	28,103.3	0.0
Hackberry Bay (Existing Reefs)	14.7	59,380.0	15.4	0.9	1,270.1	148.5
CSA 3 Totals	***89.7***	***362,896***			***40,030.2***	***148.5***

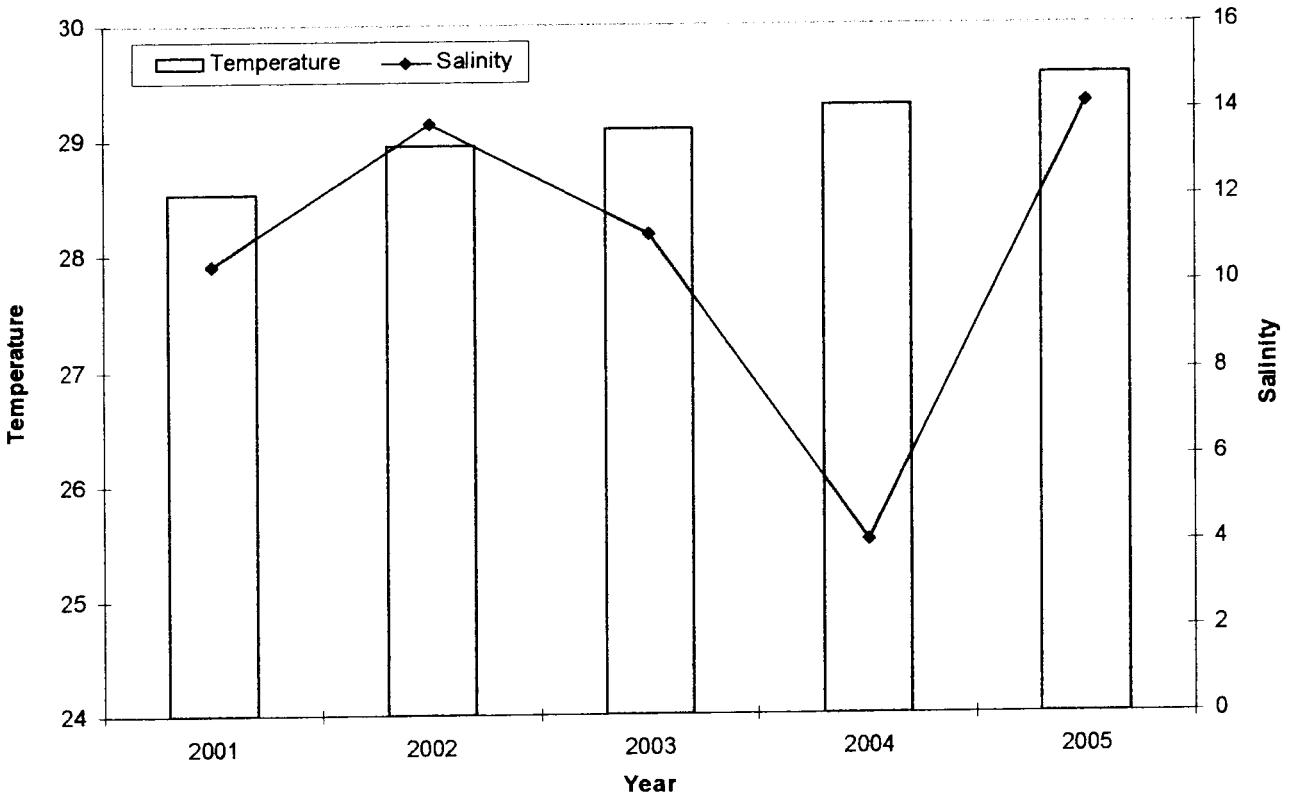


Figure 3.4. Average June salinity and temperature in Hackberry Bay.

CSA IV

MEMORANDUM

To: Patrick Banks, Biologist Program Manager

From: Vince Guillory, CSA IV Biologist Manager
Roy Moffet, CSA IV Biologist Supervisor

Date: July 19, 2005

Re: CSA IV OYSTER STOCK ASSESSMENT

Four public oyster seed grounds were established in CSA IV in 2001; these included Lake Tambour, Lake Chien, and Lake Felicity in Terrebonne Parish and Deep Lake in Lafourche Parish. Two cultch material plants using size number 57 limestone rock were made in the Lake Felicity (Figure 4.1) and Lake Chien (Figure 4.2) seed grounds in 2004. Approximately 6,000 cubic yards were deposited on 15.5 acres in Lake Chien in summer 2004 and approximately 9,000 cubic yards were deposited on 40 acres in Lake Felicity in summer 2004.

Salinity was recorded at two stations on each seed ground twice a month beginning in January 2002. Five one-square meter samples were taken on both the Lake Felicity and Lake Chien reefs on July 28, 2004. On July 14 2005, two 0.25 square meter samples were taken at each reef site.

Average salinities by year on each seed ground were:

Year	Lake Chien	Lake Felicity
2002	16.6	18.2
2003	16.5	18.2
2004	16.2	17.4
2005	14.6	18.8

Sample results and expanded estimates of production for 2004 and 2005 are provided in Tables 4.1 and 4.2, respectively. For 2005, 20,648.1 and 0 barrels of seed oysters are estimated for the Lake Chien and Lake Felicity cultch plants. There were no live oysters present in Lake Felicity samples because of a 6 to 12 inch layer of silt covering the reef. The silting of the Lake Felicity shell plant was most likely attributed to Tropical Storm Cindy on July 5, 2005. Dredge samples taken prior to the storm on June 14 found viable seed oysters on both shell plants. More extensive sampling using the full square meter will be performed in two weeks to ascertain a more comprehensive characterization of CSA IV shell plants. Recent mortalities of spat in 2004 were 19% and 20% on the Lake Felicity and Lake Chien shell plants. In 2005, recent mortalities were 13% in Lake Chien and 100% in Lake Felicity.

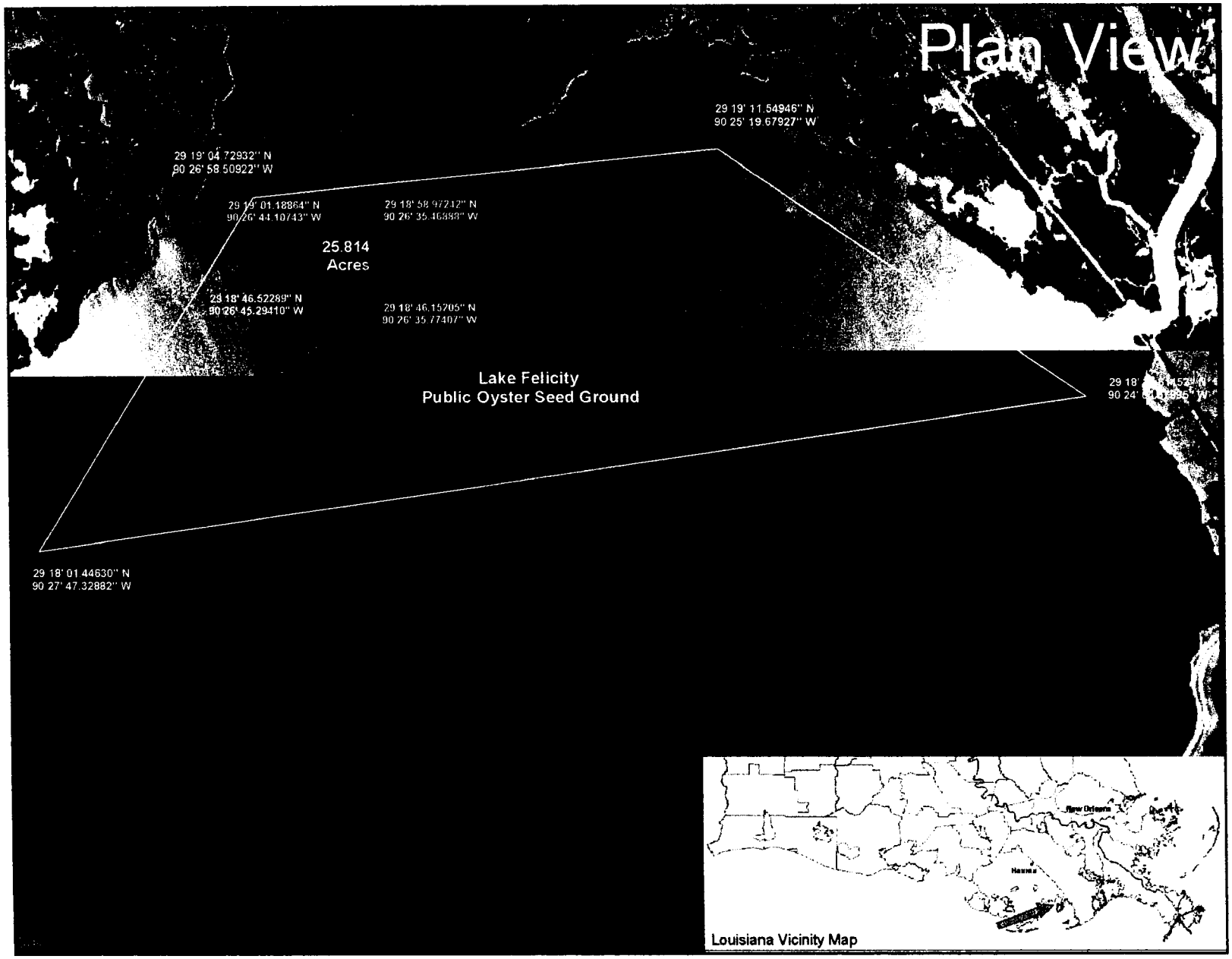


Figure 4.1. The Lake Felicity Public Oyster Seed Ground and the approximate location of the 2004 cultch plant.

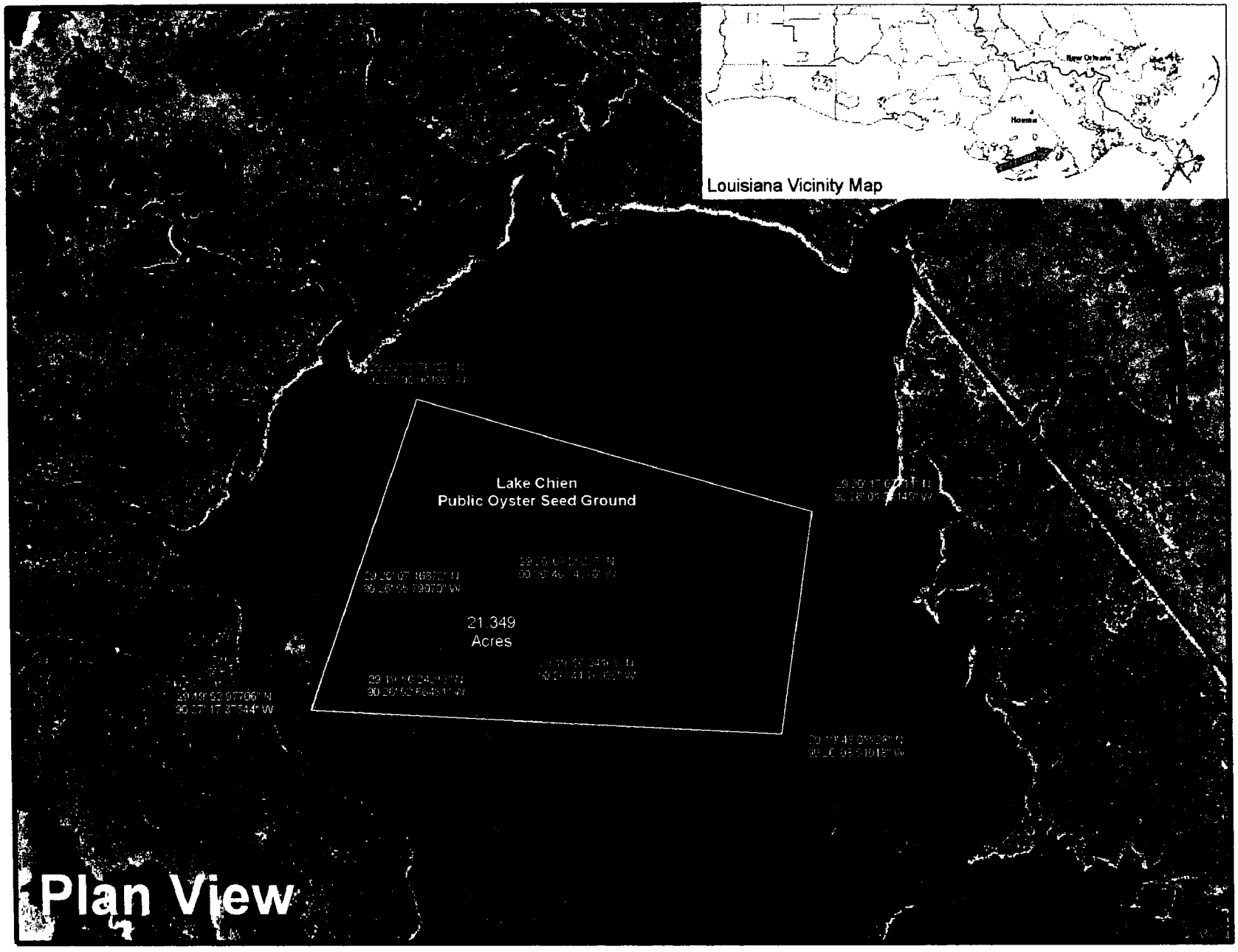


Figure 4.2. The Lake Chien Public Oyster Seed Ground and the approximate location of the 2004 cultch plant.

Table 4.1. Square meter sample results for 2004 cultch plants in Lake Felicity and Lake Chien (CSA IV). Samples taken in July 2004.

Reef	Sample	Number/Sample($1M^2$) Spat	Seed	Sack	Spat % Mortality	Barrels Available Seed	Sack
Lake Felicity	1	1028.3	27.3	0	—	—	—
Lake Felicity	2	0	0	0	—	—	—
Lake Felicity	3	245.1	11.4	0	—	—	—
Lake Felicity	4	644.4	0	0	—	—	—
Lake Felicity	5	1,850.8	0	0	—	—	—
Lake Felicity	Total	753.7	7.7	0	19%	865.6	0
Lake Chien	1	463.4	0	0	—	—	—
Lake Chien	2	1,389.2	0	0	—	—	—
Lake Chien	3	547.8	24.9	0	—	—	—
Lake Chien	4	686.7	0	0	—	—	—
Lake Chien	5	84.0	0	0	—	—	—
Lake Chien	Total	634.2	5.0	0	20%	217.8	0

Table 4.2. Square meter sample results for 2005 in Lake Felicity and Lake Chien (CSA IV). Samples taken in July 2005.

Reef	Sample	Number/Sample($0.25M^2$) Spat	Seed	Sack	Spat % Mortality	Barrels Available Seed	Sack
Lake Felicity	1	0	0	0	—	—	—
Lake Felicity	2	0	0	0	—	—	—
Lake Felicity	Total	0	0	0	100%	0.0	0
Lake Chien	1	88	69	0	—	—	—
Lake Chien	2	47	168	0	—	—	—
Lake Chien	Total	67.5	118.5	0	13%	20,648.1	0

CSA V

MEMORANDUM:

TO: Patrick Banks, Biologist Program Manager

FROM: Stephen Hein, CSA V Biologist Manager

DATE: July 19, 2005

SUBJECT: Oyster Seed Reservation Stock Assessment

With assistance from Marine Fisheries Division staff meter square (m^2) field sampling by Coastal Study Area V personnel was completed on July 7, 2005. A total of 13 stations, nine in Sister Lake (Caillou Lake) [including the 1994 and 1995 cultch plants (Figure 5.1)] and four in Bay Junop (Figure 5.2) were sampled. Replicate m^2 samples were taken at each station. Salinity during sampling averaged 15.9 ppt in Sister Lake and 16.2 in Bay Junop. Water temperatures were also comparable between sample locations as Sister Lake averaged 28.6°C and Bay Junop averaged 28.3°C during the stock assessment sampling event.

Preliminary m^2 site assessment was performed prior to sampling. GPS coordinates were used to place markers at all m^2 stations in Sister Lake and Bay Junop (Tables 5.1 & 5.2).

Sister Lake Oyster Seed Reservation was last opened to harvest during the 2003-2004 season. Fishing effort during that 30-day season was estimated at 1,453 boat days resulting in an estimated harvest of 103,744 sacks of market oysters and 11,840 barrels (BBLS) of seed oysters for a total production of 63,712 BBLS. Sister Lake remained closed for the 2004-2005 season.

Overall, total BBLS available for harvest for the 2005-2006 assessment has increased 58% from last year. Oyster availability in Sister Lake totals 193,785 BBLS of seed oysters and 153,733 BBLS of sack oysters (Table 5.3). Both totals rank 9th highest since 1980 (Table 5.5). Sack oyster availability represents an increase of 72% from last year's assessment, with seed oyster availability increasing 46% from last year's assessment (Figure 5.3). The ratio of seed to sack oyster availability has decreased from 2.4/1.0 in 2004 to 1.3/1.0 in 2005 (Table 5.6). The majority of estimated sack and seed oysters available for harvest is located above the traditional November Department of Health and Hospitals (DHH) reclassification line. Sack oysters have increased at eight of nine stations since last year's assessment, while seed has increased at seven of nine stations. Seed oyster availability from the 2004 cultch plant is not included in Sister Lake seed availability totals and will be treated independently for the purpose of this report.

Bay Junop Oyster Seed Reservation was opened to sack and seed harvest for a ten day period, from October 1 through October 10, 2004. This marked the third consecutive year in which the season was opened with season lengths numbering 24, 12 and 10 days for 2002, 2003 and 2004, respectively. During the 10-day 2004 season, low tides prevented larger vessels from fishing during the first six days of the season. Fishing effort was estimated at 140 boat days with an estimated harvest of 5,245 sacks of market oysters and 5 BBLS of seed oysters for an estimated total production of 2,627 BBLS.

The 2005 Bay Junop stock assessment indicates 9,522 BBLS of seed oysters and 3,385 BBLS of sack oysters available for harvest (Table 5.4), ranking them 15th and 23rd, respectively (Table 5.7). Although this represents a 57% increase in seed availability from the 2004 assessment, this was one

of the lowest Bay Junop seed assessments to date (Figure 5.4). The 2004 sack availability assessment decreased 78% from the previous year and the current assessment is 55% below that level. Seed to sack ratio has increased from last year's assessment of 0.5/1.0 to 2.8/1.0 (Table 5.8).

Water temperatures in Sister Lake and Bay Junop were below the long term average (LTA) for May and above the LTA for June (Table 5.9) with the greatest deviance being 1.2°C. Salinities in Sister Lake were above the LTA (14.6 ppt) for May (15.3 ppt) and LTA (10.6 ppt) for June (17.0 ppt). Salinities in Bay Junop were below the LTA (18.8 ppt) for May (16.9 ppt) and above the LTA (14.4 ppt) for June (20.0 ppt) (Table 5.10).

No significant oyster mortality was observed in current m^2 samples. Overall, mortality averaged 0.1% in Sister Lake and Bay Junop. Below average spat sets were noted, however, with Sister Lake averaging 16 spat per station and Bay Junop averaging 19 spat per station.

Replicate samples were combined to generate a total number of hooked mussels recorded for each station (Tables 5.11 and 5.12). Biofouling rates of hooked mussels in Sister Lake has decreased 82% from last year's assessment with three stations (200, 214, 217) accounting for 70% of the total hooked mussels observed. The number at the remaining six stations ranged from 0-18 hooked mussels per station. Biofouling rates of hooked mussels in Bay Junop have decreased 85% from the 2004 assessment with an average of 8 hooked mussels observed per station and only 50% of stations with any mussels present.

Perkinsus marinus analysis is not available at this time. "Dermo" samples were collected during m^2 sampling and delivered to Nicholls State University for analysis. Results are pending.

No evidence of oyster drills (*Stramonita haemastoma*) was present in m^2 samples, however three snails were noted in May and June dredge samples in lower Bay Junop. Other potential predators included a total of 47 unidentified mud crabs recorded from the 13 stations. No blue crabs (*Callinectes sapidus*), stone crabs (*Menippe adina*), or toadfish (*Opsanus beta*) were collected.

On February 20, 2001, the Louisiana Wildlife and Fisheries Commission designated Lake Mechant as an Oyster Seed Ground and 2004 marked the historic opening of this area to commercial oyster harvest. Originally set to open on October 11, Tropical Storm Matthew precipitated a DHH precautionary closure order. The order was rescinded and the grounds opened on October 20, with the newly established 30-acre cultch plant restricted from harvest. Lack of available resource and fishing effort effectively closed the abbreviated season on October 28. A total of 78 boat days resulted in 2,211 sacks of market oysters with most harvest along the southeast portion of the seed ground. No seed production occurred during this period. Fishermen complained of large amounts of recent dead oysters, at least 50% according to several. This prompted a boarding of vessels by Department biologists and inspections of dredge contents suggested an approximate 40% mortality. Most of this mortality is believed to be a result of the freshwater run-off associated with Tropical Storm Matthew.

Through a Federal Assistance Grant, Coastal Impact Assessment Program (CIAP), the first cultch plant was established on the Lake Mechant Seed Ground in May, 2004. An approximate 30-acre site of suitable substrate and water depth was selected and 9,460 cubic yards (yd^3) of #57 limestone was distributed by bucket dredge. On 7/7/05 the approximate 30-acre site contained 121,410 m^2 with preliminary estimates of 51,936.5 BBLS of seed available. No sack oysters on the cultch plant were observed.

Through an additional Federal Assistance Grant Program, the Louisiana Oyster Rehabilitation and Promotion Project, a new cultch plant was also established in Sister Lake. An area of firm substrate in the southern portion of Sister Lake with sufficient water depth was selected. In May, 2004, approximately 10,300 yd^3 of material was deposited by bucket dredge in combination with high pressure water jetting over the approximate 67-acre site. Materials consisted of: 6,707 yd^3 of #57 limestone, 3,003 yd^3 of crushed concrete and 591 yd^3 of whole oyster shell. On 7/7/05 the 67-acre site contained 271,149 m^2 and a preliminary estimate of 50,463.8 BBLS of seed with no sack oysters available.

Preliminary, limited samples were collected from the two new cultch plants on 7/7/05 in conjunction with the m^2 sampling program (see above). Additional, more comprehensive samples will be collected during the regularly scheduled cultch plant sampling program at the end of July 2005. The cultch plants have and will continue to be monitored for oyster spat set, growth, size, population density, predation, hydrology and mortality.

SH/jbv

cc: Jim Hanifen
Martin Bourgeois

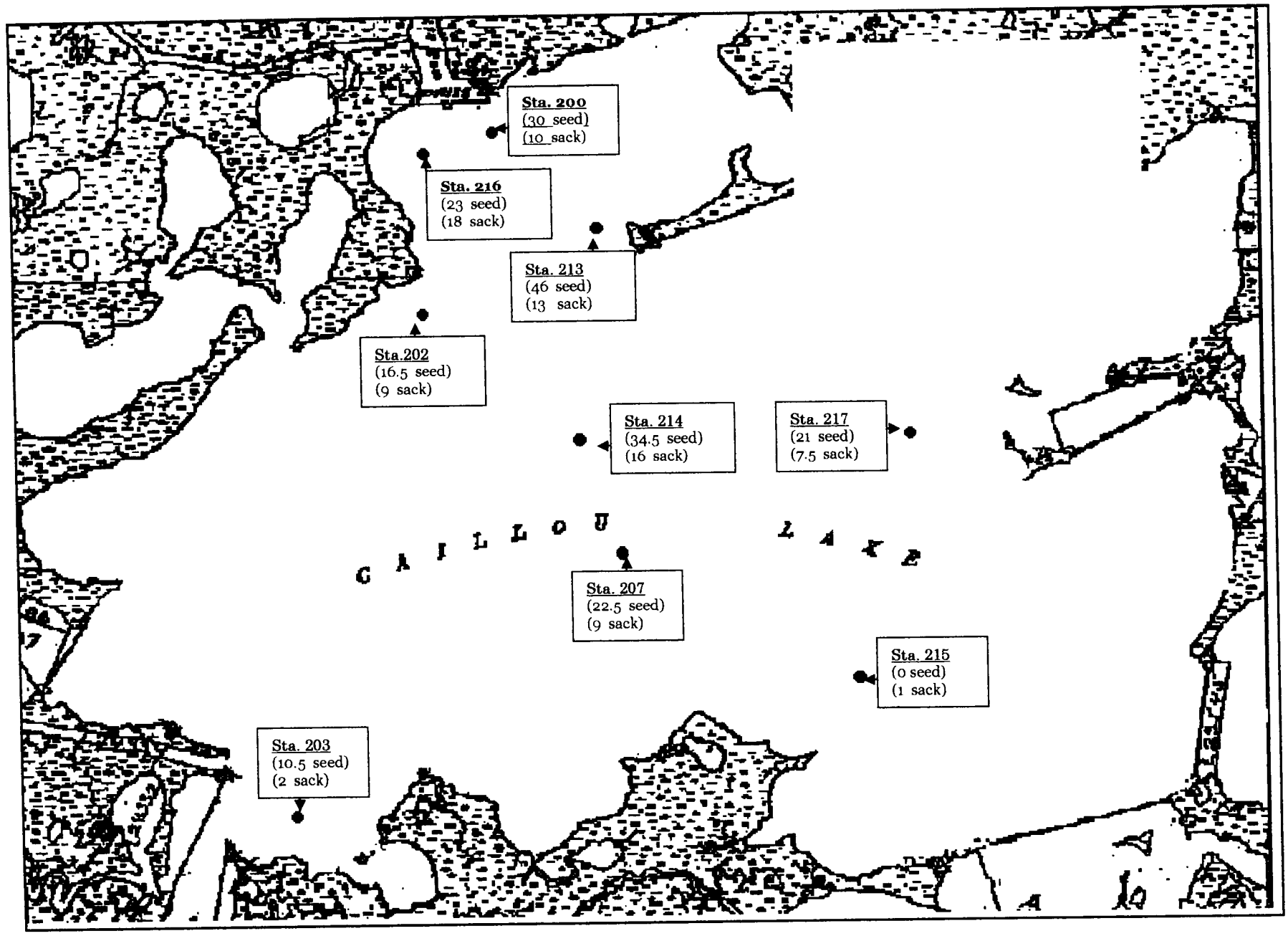


Figure 5.1. Sister Lake sample locations and average number of oysters collected per square meter at each location.

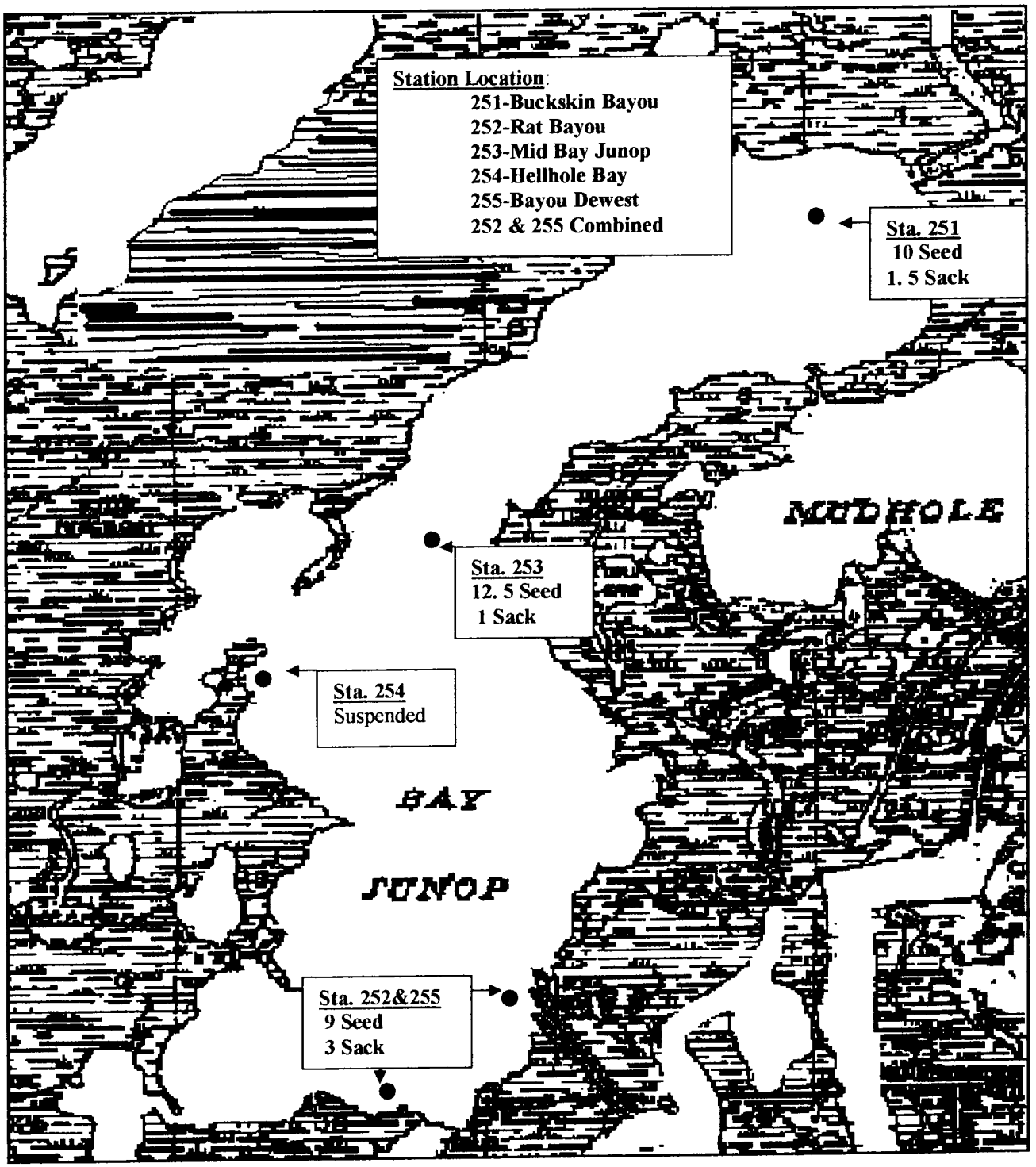


Figure 5.2. Bay Junop sample locations and average number of oysters collected at each location.

Table 5.1. Sister Lake square meter sample location information.

Stn. #	Stn. Name	North Lat.	West Long.	Depth
200	Grand Pass	29°15'28.5"	90°55'45.5"	10'
202	Walkers Pt.	29°14'50.9"	90°56'16.9"	6'
203	Old Camp	29°12'58.2"	90°56'40.2"	4'
207	Mid Sister Lake	29°14'00.1"	90°55'14.7"	6'
213**	N '94 Shell Plant	29°15'02.9"	90°55'30.9"	6'
214**	Mid '94 Shell Plant	29°14'16.5"	90°55'33.8"	6'
215**	S '94 Shell Plant	29°13'14.1"	90°53'53.6"	5'
216***	N '95 Shell Plant	29°15'25.1"	90°56'10.1"	5'
217***	Camp '95 Shell Plant	29°14'21.8"	90°54'18.3"	5'

* Revised July 2001
** Not permanent stations; will sample 5 years then stop; 1995-1999. Continued samples '00-'04.
***Not permanent stations; will sample 5 years then stop; 1996-2000. Continued samples '01-'04.

Table 5.2. Bay Junop square meter sample location information.

Stn. #	Stn. Name	North Lat.	West Long.	Depth
251	@ Buckskin Bayou	29°15'56.1"	91°01'45.1"	6'
252	@Rat Bayou	29°13'06.6"	91°02'52.6"	3'
253	Mid Bay Junop	29°14'43.7"	91°03'08.6"	5'
254	Mid @ Hellhole Bay**	29°14'09.6"	91°03'47.6"	4'
255	@ Bayou deWest	29°12'38.4"	91°03'18.2"	4'

* Revised July 2001
** Suspended due to conflict with private lease

Table 5.3. 2005 Sister Lake oyster availability***

METER² STATION	REEF ACREAGE	#METER²	#SEED OYSTERS	#SACK OYSTERS	BARRELS SEED OYSTERS	BARRELS SACK OYSTERS
200	221.58	896,734.26	30	10	37,363.93	24,909.29
202	81.93	331,570.71	16.5	9	7,598.50	8,289.27
203	151.31	612,352.00	10.5	2	8,930.13	3,401.96
207	185.72	751,608.84	22.5	9	23,487.78	18,790.22
213*	96	388,512	46	13	24,821.60	14,029.60
214*	129	522,063	34.5	16	25,015.52	23,202.80
215*	81	327,807	0	1	0	910.58
216**	115	465,405	23	18	14,867.10	23,270.25
217**	438	1,772,586	21	7.5	51,700.43	36,928.88
TOTAL	**1,499.54**	**6,068,639**	**204**	**85. 5**	**193,784. 99**	**153,732. 85**

* 1994 SHELL PLANTS
** 1995 SHELL PLANTS
***2004 CULTCH PLANT NOT INCLUDED IN TOTALS

Table 5.4. 2005 Bay Junop oyster availability

METER² STATION	REEF ACREAGE	#METER²	#SEED OYSTERS	#SACK OYSTERS	BARRELS SEED OYSTERS	BARRELS SACK OYSTERS
251	17.2	69,608.40	10	1.5	966.78	290.04
252*	67.36	272,605.92	9	3	3,407.57	2,271.72
253	73.26	296,483.22	12.5	1	5,147.28	823.56
254**	94.20	381,227.40				
255*						
TOTAL	**252.02**	**1,019,924.9**	**31.5**	**5.5**	**9,521.63**	**3,385.32**

* STATIONS 252 AND 255 ARE COMBINED.
** SUSPENDED DUE TO CONFLICT WITH PRIVATE LEASE

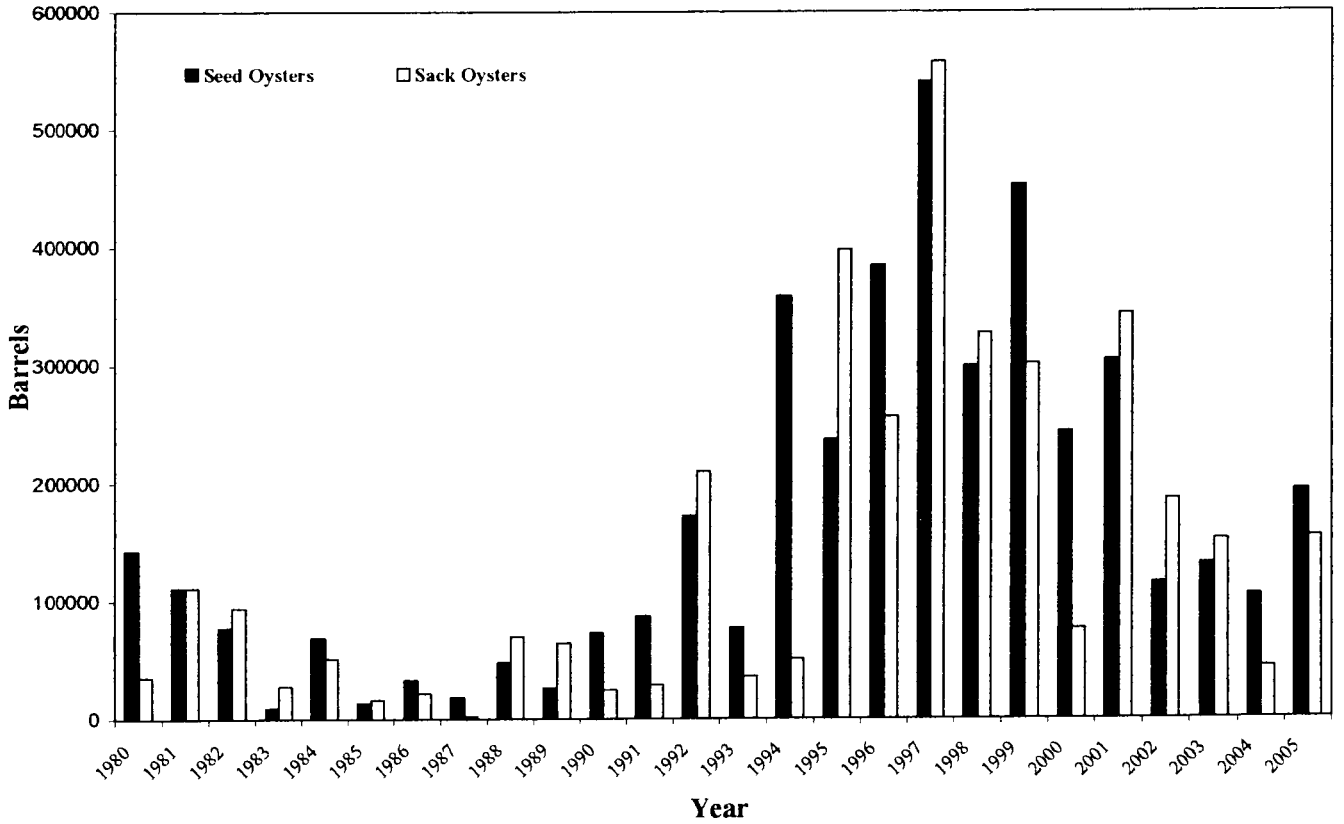


Figure 5.3. Historical oyster availability in the Sister Lake Public Oyster Seed Reservation

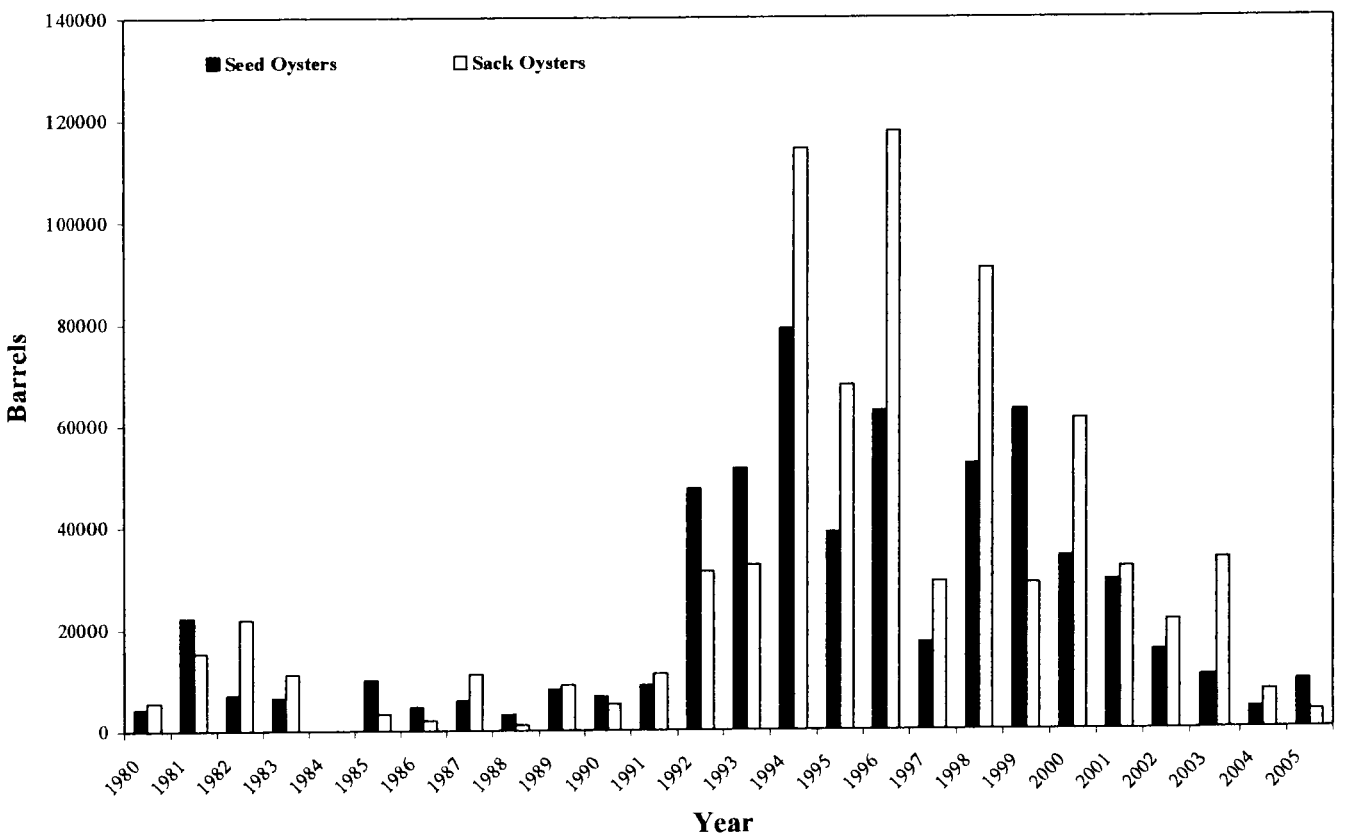


Figure 5.4. Historical oyster availability in the Bay Junop Public Oyster Seed Reservation.

Table 5.5. Annual Sister Lake seed and sack availability rankings

YEAR	BARRELS SEED*
1997	540,270.2
1999	452,991.0
1996	384,500.0
1994	358,455.0
2001	304,763.0
1998	298,975.0
2000	243,589.9
1995	236,687.0
2005**	193,784. 99
1992	172,132.0
1980	142,620.1
2003	131,038.3
2002	115,034.0
1981	111,146.1
2004	104,598.1
1991	87,044.2
1993	77,190.0
1982	76,950.0
1990	72,862.9
1984	69,136.0
1988	47,695.0
1986	32,633.0
1989	26,179.0
1987	18,522.0
1985	13,775.0
1983	8,768.5

YEAR	BARRELS SACK*
1997	557,072.2
1995	397,777.0
2001	343,655.5
1998	327,125.0
1999	301,321.0
1996	256,164.0
1992	209,854.0
2002	186,233.4
2005**	153,732. 9
2003	151,844.5
1981	110,990.2
1982	94,050.0
2000	76,515.5
1988	69,570.0
1989	64,549.5
1984	50,587.0
1994	50,429.0
2004	43,193.1
1993	35,824.0
1980	35,170.3
1991	28,733.7
1983	27,654.5
1990	24,282.0
1986	21,516.0
1985	16,206.0
1987	2,008.0

* BASED ON 1999 ACREAGE
** 2004 CULTCH PLANT NOT INCLUDED IN TOTALS

Table 5.6. Sister Lake historical square meter availability estimates.

YEAR	BARRELS SEED	BARRELS SACK	TOTAL BBLS AVAILABLE	RATIO SEED TO SACK AVAILABILITY
1980*	142,620.1	35,170.3	177,790.4	4.1-1.0
1981	111,146.1	110,990.2	222,136.3	1.0-1.0
1982	76,950.0	94,050.0	171,000.0	0.8-1.0
1983	8,768.5	27,654.5	36,423.0	0.3-1.0
1984	69,136.0	50,587.0	119,723.0	1.4-1.0
1985	13,775.0	16,206.0	29,981.0	0.8-1.0
1986	32,633.0	21,516.0	54,150.0	1.5-1.0
1987	18,522.0	2,008.0	20,530.0	9.2-1.0
1988	47,695.0	69,570.0	117,265.0	0.7-1.0
1989	26,179.0	64,549.5	90,728.5	0.4-1.0
1990	72,862.9	24,282.0	97,144.9	3.0-1.0
1991	87,044.2	28,733.7	115,777.9	3.0-1.0
1992	172,132.0	209,854.0	381,986.0	0.8-1.0
1993	77,190.0	35,824.0	113,014.0	2.2-1.0
1994	358,455.0	50,429.0	408,884.0	7.1-1.0
1995	236,687.0	397,777.0	634,464.0	0.6-1.0
1996	384,500.0	256,164.0	640,664.0	1.5-1.0
1997	540,270.2	557,072.2	1,097,342.4	1.0-1.0
1998	298,975.0	327,125.0	626,100.0	0.9-1.0
1999	452,991.0	301,321.0	452,991.0	1.5-1.0
2000	243,589.9	76,515.5	320,105.4	3.2-1.0
2001	304,763.0	343,655.5	648,418.5	0.9-1.0
2002	115,034.0	186,233.4	301,257.4	0.6-1.0
2003	131,038.3	151,844.5	282,882.8	0.9-1.0
2004	104,598.1	43,193.1	147,791.2	2.4-1.0
2005**	193,785.0	153,732.9	347,517.9	1.3-1.0

* BASED ON 1999 ACREAGE
** 2004 CULTCH PLANT NOT INCLUDED IN TOTALS

Table 5.7. Annual Bay Junop seed and sack availability rankings

YEAR	BARRELS SEED*
1994	78,896.0
1999	63,010.4
1996	62,841.0
1998	52,340.1
1993	51,492.0
1992	47,448.0
1995	38,950.0
2000	34,107.1
2001	29,453.4
1981	22,329.0
1997	17,262.0
2002	15,524.4
2003***	10,455.6
1985	10,004.0
2005***	9,521.63
1991	8,843.0
1989	8,073.7
1982	7,082.2
1990	6,787.0
1983	6,464.0
1987	5,878.0
1986	4,632.0
1980	4,297.4
2004***	4,142.2
1988	3,282.0
1984**	----

YEAR	BARRELS SACK*
1996	117,669.0
1994	114,303.0
1998	90,786.6
1995	67,837.0
2000	61,193.8
2003***	33,518.0
1993	32,466.0
2001	32,004.9
1992	31,128.0
1997	29,243.0
1999	28,763.5
1982	21,809.0
2002	21,583.3
1981	15,213.0
1987	11,188.0
1991	11,166.0
1983	11,129.0
1989	8,935.0
2004***	7,547.3
1980	5,632.3
1990	5,249.5
1986	4,317.0
2005***	3,385.32
1985	3,344.5
1988	1,169.0
1984**	----

* BASED ON 1999 ACREAGE
** NO SAMPLES TAKEN
*** CALCULATED WITHOUT STATION 254

Table 5.8. Bay Junop historical square meter availability estimates.

YEAR	BARRELS SEED	BARRELS SACK	TOTAL BBLS AVAILABLE	RATIO SEED TO SACK AVAILABILITY
1980*	4,297.4	5,632.3	9,929.7	0.8-1.0
1981	22,329.0	15,213.0	37,542.0	1.5-1.0
1982	7,082.2	21,809.0	28,891.2	0.3-1.0
1983	6,464.0	11,129.0	17,593.0	0.6-1.0
1984**	----	----	----	----
1985	10,004.0	3,344.5	13,348.5	3.0-1.0
1986	4,632.0	4,317.0	8,949.0	1.1-1.0
1987	5,878.0	11,188.0	17,066.0	0.5-1.0
1988	3,282.0	1,169.0	4,451.0	2.8-1.0
1989	8,073.7	8,935.0	17,009.0	0.9-1.0
1990	6,787.0	5,249.5	12,036.5	1.3-1.0
1991	8,843.0	11,166.0	20,009.0	0.8-1.0
1992	47,448.0	31,128.0	78,572.0	1.5-1.0
1993	51,492.0	32,466.0	83,958.0	1.6-1.0
1994	78,896.0	114,303.0	193,199.0	0.7-1.0
1995	38,950.0	67,837.0	106,787.0	0.6-1.0
1996	62,841.0	117,669.0	180,510.0	0.5-1.0
1997	17,262.0	29,243.0	46,505.0	0.6-1.0
1998	52,340.1	90,786.6	143,126.7	0.6-1.0
1999	63,010.4	28,763.5	91,773.5	2.2-1.0
2000	34,107.1	61,193.8	95,300.9	0.6-1.0
2001	29,453.4	32,004.9	61,458.3	0.9-1.0
2002	15,524.4	21,583.3	37,107.7	0.7-1.0
2003***	10,455.6	33,518.0	43,973.6	0.3-1.0
2004***	4,142.2	7,547.3	11,689.5	0.5-1.0
2005***	9,521.6	3,385.3	12,906.9	2.8-1.0

* BASED ON 1999 ACREAGE
** NO SAMPLES TAKEN
*** CALCULATED WITHOUT STATION 254

Table 5.9. Sister Lake and Bay Junop average monthly water temperatures (°C)

	SISTER LAKE		BAY JUNOP	
YEAR	MAY	JUNE	MAY	JUNE
1995	27.3	29	29.3	29.3
1996	27.2	29.5	28.4	30.3
1997	27.1	30	26.4	28.6
1998	27.8	30.1	28	28.9
1999	25	28.8	25	28.8
2000	27.3	28.8	28.3	29.7
*2001	24.9	29.3	26.0	30.1
*2002	28.4	28.7	28.4	28.5
*2003	27.8	30.0	27.6	30.2
*2004	27.8	29.5	27.5	29.2
2005	26.5	30.1	26.2	30.2
mean	**27.0**	**29.4**	**27.4**	**29.4**

*OYSTER DREDGE SAMPLES

Table 5.10. Sister Lake and Bay Junop average monthly salinity (ppt)

	SISTER LAKE		BAY JUNOP	
YEAR	MAY	JUNE	MAY	JUNE
1995	14.5	8.8	23.3	12.6
1996	15.8	7.4	24.3	12.2
1997	4.1	3.4	10.6	10.7
1998	6.6	4.8	14.4	8.6
1999	17.7	12.4	19.4	13
2000	22	20.5	25.5	27.7
*2001	17.6	8.2	18.4	9.8
*2002	14.2	11.1	16.6	15.9
*2003	15.4	7.2	18.2	8.9
*2004	17.2	12.2	18.9	18.6
2005	15.3	17.0	16.9	20.0
mean	**14.6**	**10.3**	**18.8**	**14.4**

*OYSTER DREDGE SAMPLES

Table 5.11. Historical hooked mussel (*Ischadium recurvum*) distribution by sample location (station)*** in Sister Lake.

Year	Sample Station								
	200	202	203	207	213	214	215	216	217
1998	2	48	0	112	123	64	31	35	534
1999	28	59	85	85	23	51	567	45	201
2000	2	2	0	11	27	19	6	22	9
2001	764	3	0	0	129	350	0	124	36
2002	322	9	0	36	247	145	4	5	0
2003	224	38	3	73	506	28	0	37	73
2004	146	9	0	110	51	28	23	131	283
2005	30	9	0	5	10	43	0	18	26

*** Hooked Mussels in sample – sample and replicate combined to show total mussels for each station

Table 5.12. Historical hooked mussel (*Ischadium recurvum*) distribution by sample location (station)*** in Bay Junop.

Year	Sample Station				
	251	252	253	254**	255
1998	0	19	88	750	78
1999	136	24	20	452	25
2000	308	0	9	14	17
2001	0	49	0	78	0
2002*	0	0	0	0	0
2003	396	55	10	-	2
2004	161	47	0	-	5
2005	4	27	0	-	0

* No Data Collected – Noted that some stations may have had five or less

** Suspended due to conflict with private lease

*** Hooked Mussels in sample – sample and replicate combined to show total mussels for each station

CSA VI

MEMORANDUM

TO: Patrick Banks, Biologist Program Manager

FROM: E. Paul Cook, CSA VI Biologist Manager

DATE: July 15, 2005

SUBJECT: CSA 6 Square Meter Oyster Samples / 2005

Square meter field sampling of designated sites on the inshore and offshore areas of the Vermilion, East and West Cote Blanche and Atchafalaya Bays Public Oyster Seed Ground was completed on July 12, 2005. A total of 5 (five) stations were sampled with two replicate samples taken at each station. Oysters were measured in 5 mm group sizes and divided into classes of spat, seed, and sack oysters. Numbers of oysters in each class are listed in Table 6.1 and Figure 6.2. Spat oysters (less than 25 mm) averaged 11.7 per square meter, representing the highest numbers seen over the last 8 years. Seed oysters (25 mm to less than 75 mm) averaged 14.8 per square meter, an increase over the past 3 years but not at the levels seen in 2000 and 2001 (Table 6.2). No oysters that meet the sack size criteria (greater than 75 mm) were taken in the 2005 CSA 6 stock assessment samples. High mortality, on an annual basis since 2003, has precluded sufficient growing time for oysters to reach marketable size.

Table 6.1 Vermilion/Atchafalaya Area Square Meter 2005 - Live Oysters by Class

Station No.	Station Name	Avg. No. Live Spat	Avg. No. Live Seed	Avg. No. Live Sack
001	South Pt. / M. I.	4.0	8.5	0.0
002	Big Charles / SWP	10.0	13.5	0.0
003	Indian Pt. / SWP	24.0	32.5	0.0
004	Dry Reef	0.0	0.0	0.0
005	Bayou Blanc	20.5	19.5	0.0

An overall Vermilion/Atchafalaya Bays area stock assessment is not possible at this time as figures relative to oyster reef sizes are not available.

The area oyster resource has once again been affected by low salinity conditions. Atchafalaya River levels reached 15 feet (at Butte La Rose gauge) in July 2004 with low salinity related mortality reaching near 100% by the summer's end. As Atchafalaya River levels fell in August and September 2004, hydrologic conditions improved. A successful spat set was noted in late season (September and October 2004) dredge samples. Winter river levels peaked at 18.7 feet in early February 2005 and did not fall below 10 feet until the end of March. The low water temperatures documented during this period may have protected the resource from low salinity induced mortality as May 2005 dredge samples found that spat and seed sized oysters from the previous year had survived.

Table 6.2 Vermilion/Atchafalaya Area Oyster Availability (by year)

Year	Average No. Seed/Sample (M^2)	Average No. Sack/Samples (M^2)	Seed/Sack Ratio (M^2)
1998	2.70	0	No Sack Oysters
1999	5.50	0.20	27.5:1
2000	81.40	3.30	24.7:1
2001	28.80	4.80	6.0:1
2002	2.25	0.25	9.0:1
2003	1.20	0	No Sack Oysters
2004	4.30	0	No Sack Oysters
2005	14.80	0	No Sack Oysters

With Atchafalaya River levels documented below 10 feet since May 1, 2005, salinities recorded at all CSA 6 sample stations on the seed grounds averaged 3.5 ppt and 5.4 ppt for May and June 2005 respectively (Figures 6.4 and 6.5). Those levels have remained relatively high through July (Table 6.3).

Table 6.3 Vermilion/Atchafalaya Area M^2 Site Salinity and Water Temperature (7/12/05)

Station No..	Station Name	Salinity (ppt)	Temperature (°C)
001	South Point / M. I.	16.2	29.9
002	Big Charles / SWP	14.0	29.8
003	Indian Point / SWP	13.5	30.3
004	Dry Reef	2.9	30.4
005	Bayou Blanc	12.9	29.6

A chart tracking hooked mussel fouling over the past 5 (five) years indicates that levels remain relatively low in the eastern part of system (Bayou Blanc and South Point/Marsh Island). A significant decrease in fouling has been noted at the Big Charles, Dry Reef, and Indian Point sites over the past 2 years (Table 6.4).

Table 6.4 Vermilion/Atchafalaya Area Hooked Mussel Distribution (by year)*

Station No.	Station Name	2001	2002	2003	2004	2005
001	South Point/Marsh Island	3	8	19	34	28
002	Big Charles	54	187	172	45	12.5
003	Indian Point	180	31	90	92	43
004	Dry Reef	78	NDA	468	23	8.5
005	Bayou Blanc	51	65	64	33	9.5

*Average number hooked mussels per M^2 sample.

"Dermo" samples from the eastern and western part of the system were delivered to Dr. Tom Soniat on June 24, 2005. Results of his analysis were not available for this report.

Maps and graphs depicting the 2005 CSA 6 assessment follow:

EPC/dgg

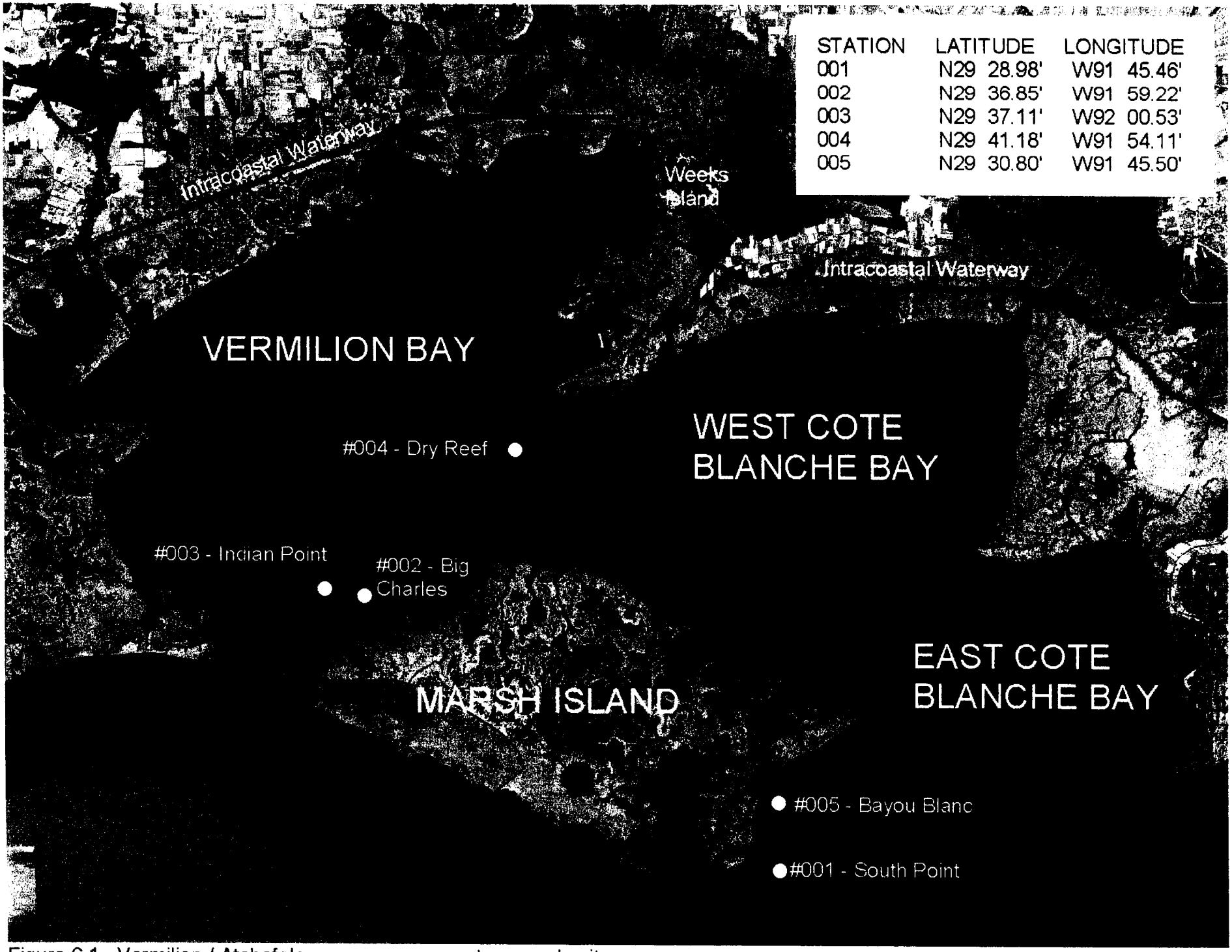


Figure 6.1. Vermilion / Atchafalaya area square meter sample sites.

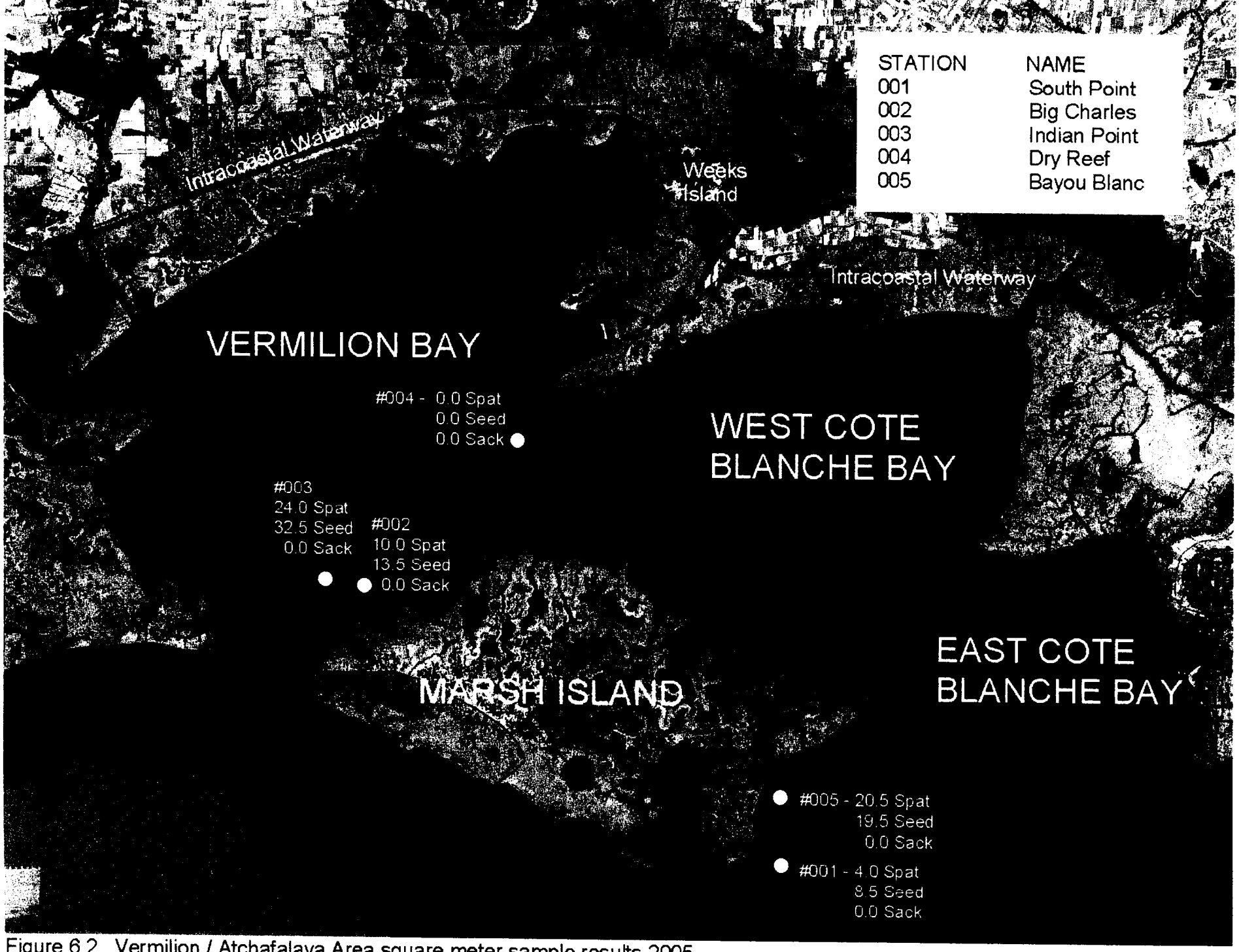


Figure 6.2. Vermilion / Atchafalaya Area square meter sample results 2005.

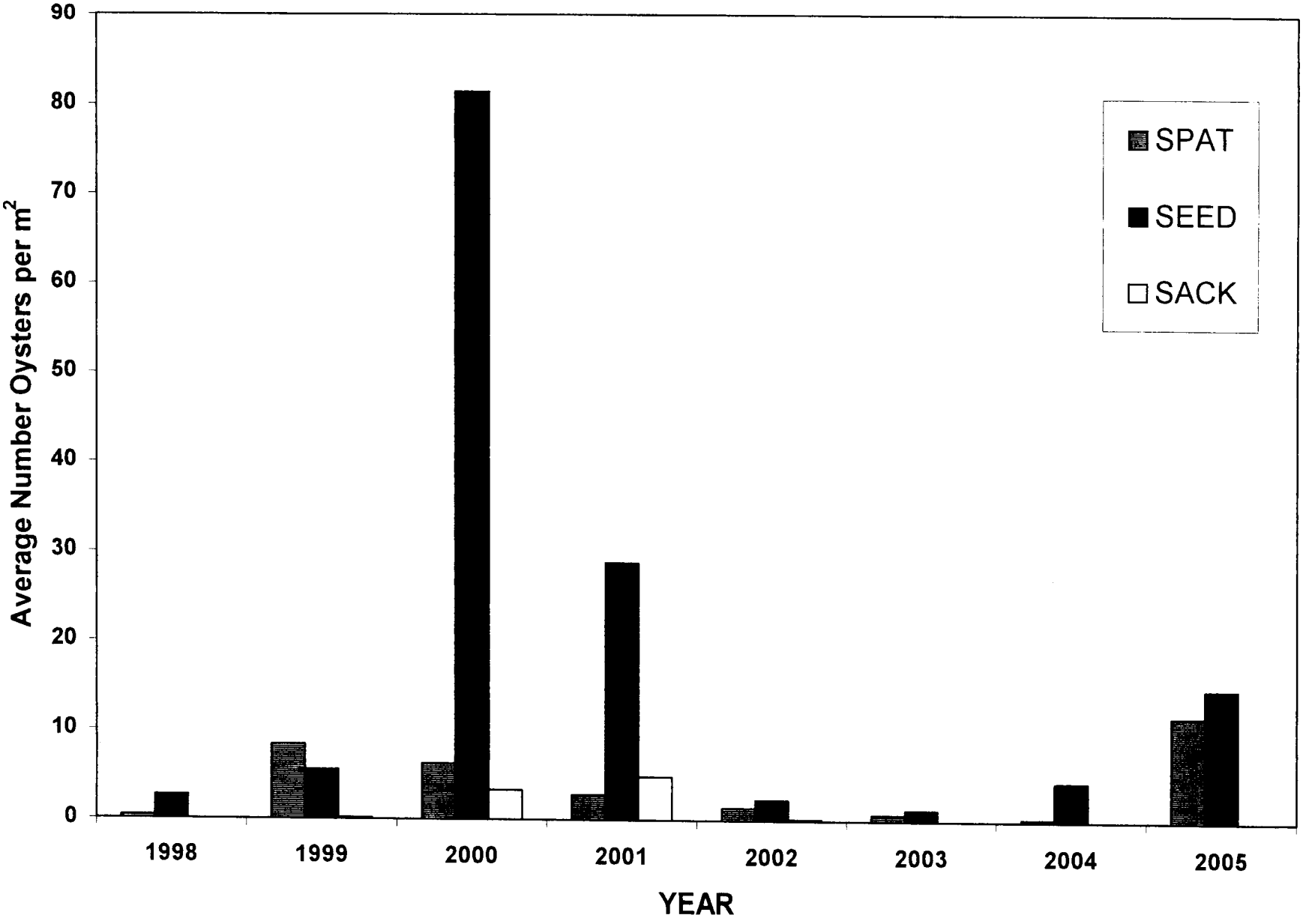


Figure 6.3. Historical average oysters per square meter in Coastal Study Area (CSA) VI.

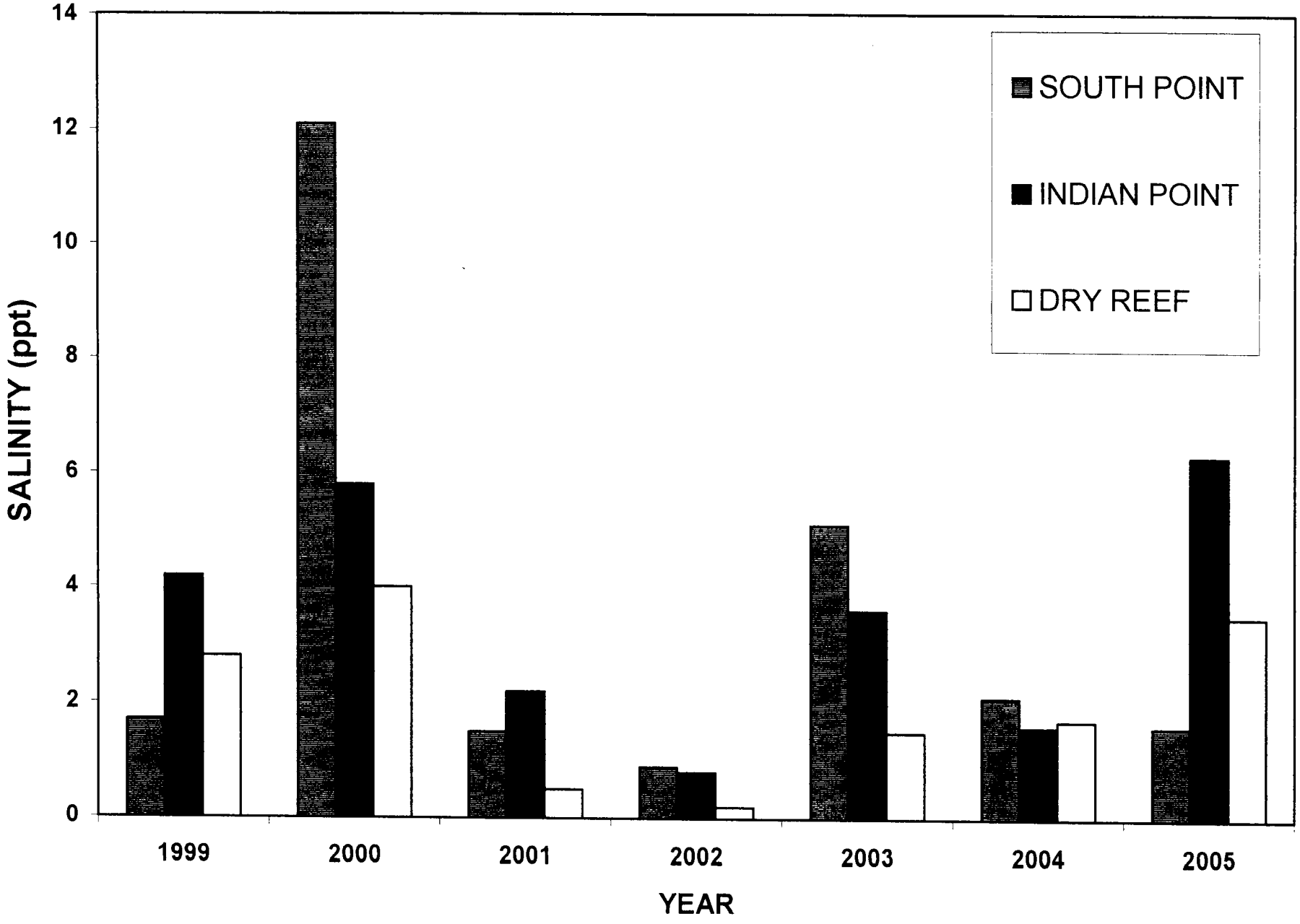


Figure 6.4. Historical average May salinity at selected sample locations in Coastal Study Area (CSA) IV.

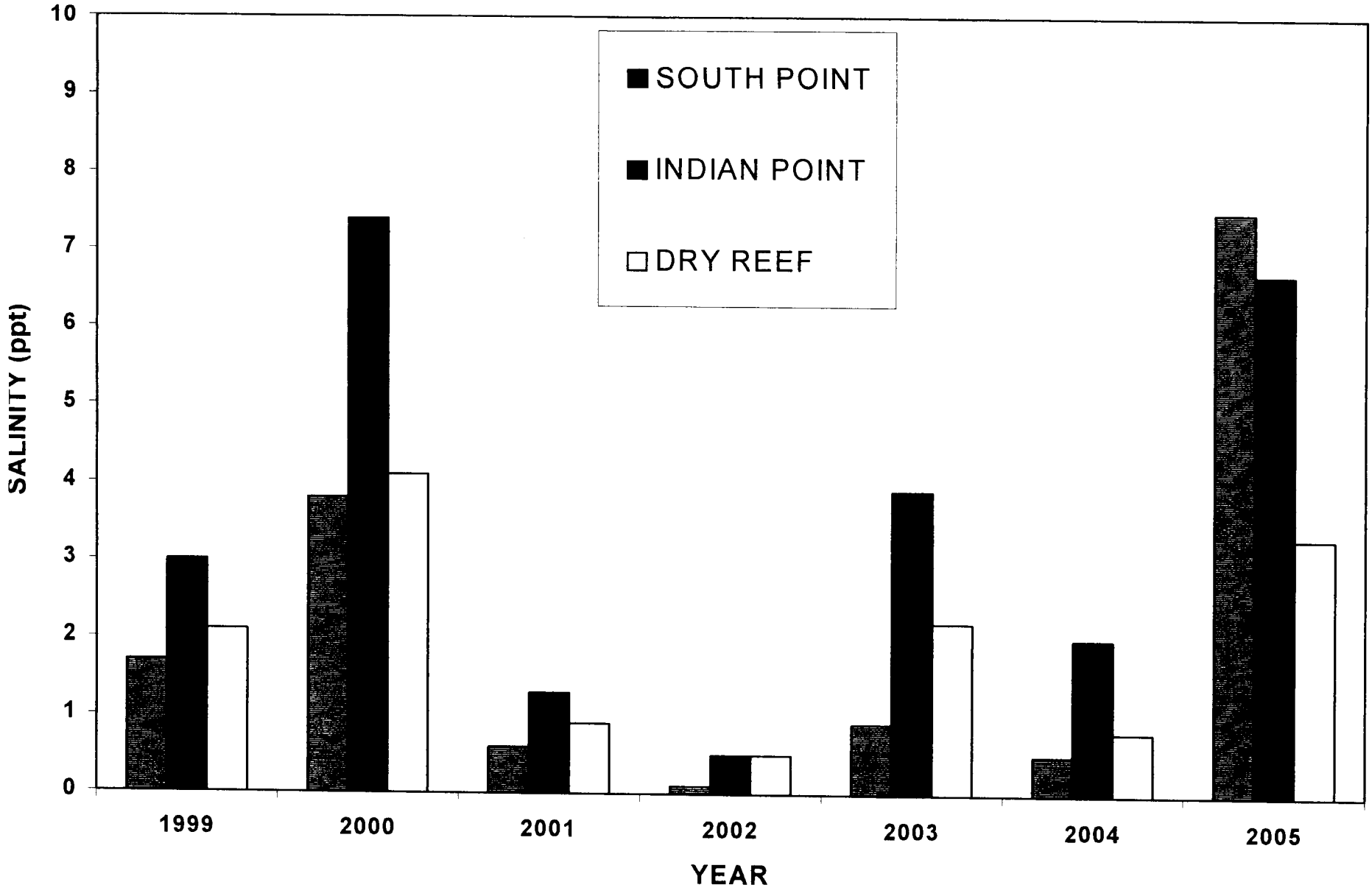


Figure 6.5. Historical average June salinity at selected sample locations in Coastal Study Area (CSA) VI.

CSA VII

MEMORANDUM

To: Patrick Banks, Biologist Program Manager

From: Michael Harbison, CSA VII Biologist Manager

Date: July 13, 2005

Re: 2005 OYSTER STOCK ASSESSMENT

Calcasieu Lake is divided into two conditionally managed areas by Dept. of Health and Hospitals (DHH): Lower Calcasieu Lake Conditionally Managed Area (LCLCMA) and West Cove Conditionally Managed Area (WCCMA) (Figure 7.1). All samples are taken from these two areas. There are three stations in each area.

The 2005 assessment indicates that there are 915,625 sacks of harvestable oysters available in the Calcasieu Conditionally Managed Areas.

Oyster square meter samples were taken July 7th. The samples indicated a decrease in both marketable (≥ 3") and seed (< 3") oysters since last year's survey and the short term average. The total available sack oysters are only down slightly compared to the short term average. The seed oysters had a more substantial drop (see Tables 7.1, 7.2, and 7.3 below).

Table 7.1. ASSESSMENTS BY CONDITIONAL MANAGED AREA

	SACK OYSTERS (≥ 3")			SEED OYSTERS (< 3")		
YEAR	WCCMA	LCLCMA	TOTAL	WCCMA	LCLCMA	TOTAL
2000	462,559.8	383,616.6	846,176.4	152,824.5	198,310.3	351,134.8
2001	572,070.5	591,679.8	1,163,750.3	257,431.7	988,300.3	1,245,732.0
2002	261,517.9	520,158.1	781,676.0	106,069.6	212,511.9	318,581.5
2003	383,257.5	786,739.1	1,169,996.6	137,296.9	393,369.5	530,666.4
2004	171,621.1	927,615.2	1,099,236.3	267,238.6	1,102,084.9	1,369,323.5
AVERAGE	370,205.4	641,961.8	1,012,167.1	184,172.3	578,915.4	763,087.6
2005	282,766.3	632,859.0	915,625.3	179,793.6	446,469.0	626,267.6
% CHANGE FROM AVE.	- 23.6	- 1.4	- 9.5	- 2.4	- 22.9	- 17.9

Table 7.2. CALCASIEU LAKE OYSTER STOCK ASSESMENT (July 2005)

OYSTER NUMBERS

WEST COVE CMA

SIZE	STATION			AVE.
	4	5	6	
≥3″	37	22	45	17.3
1-<3″	41	40	51	22.0

CALCASIEU LAKE CMA

SIZE	STATION			AVE.
	1	2	3	
≥3″	10	46	119	29.2
1-<3″	17	89	141	41.2

OYSTER PRODUCTION AREA

WEST COVE CMA	CALCASIEU LAKE CMA
2,942,076.67 SQ. METERS 727 ACRES	3,901,185.57 SQ. METERS 964 ACRES

PRODUCTION OF ≥3″ OYSTERS

WEST COVE CMA		CALCASIEU LAKE CMA	
OYSTERS:	50,897,926.391	OYSTERS:	113,914,618.644
SACKS:	282,766.3	SACKS:	632,859.0
TOTAL SACKS OF ≥3″ OYSTERS:			915,625.3

PRODUCTION OF 1 - < 3″ OYSTERS

WEST COVE CMA		CALCASIEU LAKE CMA	
OYSTERS:	64,725,686.74	OYSTERS:	160,728,845.484
SACKS:	179,793.6	SACKS:	446,469.0
TOTAL SACKS OF 1-<3″ OYSTERS:			626,262.6

TOTAL PRODUCTION

TOTAL OVERALL POTENTAL OF OYSTERS (SACKS):	1,541,887.9

Table 7.3. CALCASIEU LAKE STOCK ASSESSMENT AND HARVEST ESTIMATES

SEASONS	STOCK ASSESSMENT		ESTIMATED SACKS HARVESTED
	MARKETABLE	TOTAL	
1963	-	-	210,160
1967-74	-	-	NO COMMERCIAL LANDINGS
1975-76	142,726	441,183	40,000
1976-77	694,420	869,475	100,000
1977-78	483,673	621,885	141,976
1978-79	-	-	75,000
1979-80	676-333	979,613	125,000
1980-81	355,664	705,117	150,000
1981-82	608,110	988,575	-
1982-83	-	-	50,000-75,000
1983-84	-	-	150,000
1984-85	125,407	644,788	-
1985-86	315,160	537,760	27,400
1986-87	589,940	1,217,959	200,000
1987-88	796,950	2,703,647	125,000
1988-89	463,331	1,036,580	50,000
1989-90	172,046	640,892	40,000
1990-91	408,961	1,268,962	50,000
1991-92	1,048,882	1,731,367	31,383[1]
1992-93	749,915	1,612,736	27,328
1993-94	748,281	1,238,783	12,818
1994-95	756,525	1,246,480	6,134
1995-56	956,926	1,298,379	29,082
1996-97	618,767	1,083,866	43,441
1997-98	950,979	1,706,510	80,735
1998-99	702,371	1,160,115	39,202[2]
1999-00	614,145	1,032,117	50,592[3]
2000-01	846,176	1,197,311	35,881
2001-02	1,163,750	2,409,482	21,297
2002-03	781,676	1,100,257	21,386
2003-04	1,169,997	1,700,663	18,196
2004-05	1,1099,236	2,468,560	44,293
2005-06	915,625	1,541,893	

1 - STARED USING DEALER REPORTS FOR LANDINGS.
2 - THE 1999 PORTION OF THE LANDINGS WAS DERIVED FROM PRELIMINARY TRIP TICKET DATA.
3 - TRIP TICKET DATA WAS UNAVAILABLE, CALLED DEALERS FOR LANDINGS.

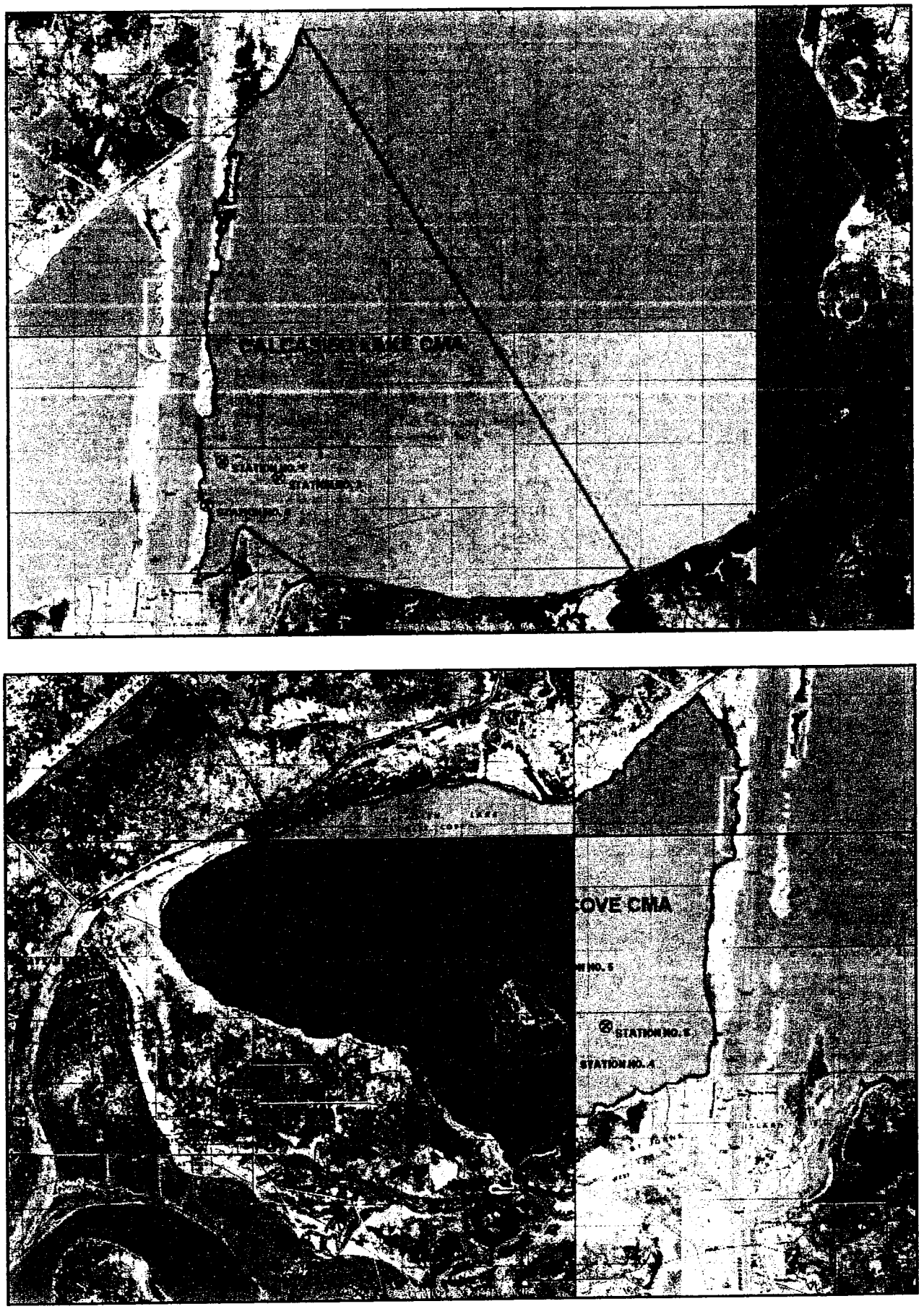


Figure 7.1. Maps of sample locations in Coastal Study Area (CSA) VII.

Dermo (*Perkinsus marinus*) Analysis

Project Title: *Perkinsus marinus* evaluation for managing Louisiana's public and private oyster grounds.

Principal Investigator: Dr. John Supan
Office of Sea Grant Development
Louisiana State University
Baton Rouge, LA 70803

Background and Motivation

Louisiana's public oyster grounds, particularly east of the Mississippi River, are the source of seed oysters for private leaseholders. Louisiana generally leads the nation in oyster production, with up to 80% produced on private leases historically. Therefore, the condition and productivity of the public seed grounds sets the pace for private production; when seed is lacking, so is private production (Berrigan et al. 1991).

During past seasonal openings of the public grounds during September, harvesters noticed increasing mortality in sizes greater than two inches (personal communication, John Tesvich, Port Sulphur Fisheries, Inc. Buras, Louisiana). Collaborative efforts between the Department of Wildlife and Fisheries and the Louisiana Sea Grant College Program have identified Dermo. (*Perkinsus marinus*) as the potential cause of oyster mortality (LDWF, 1996) and has initiated an annual Dermo Advisory Program for oyster leaseholders.

Results of successive samplings on nine stations east of the river and in Hackberry Bay showed high infection intensity and prevalence at most stations during drought years and lower infection during wet years. Although past population density surveys conducted by LDWF have revealed high concentrations of oysters at sampling stations east of the river, they are predominantly in the seed-size range of less than two inches. Many leaseholders experienced high mortalities of bedded seed during the same time periods, concurrent with high salinities and temperatures on their bedding grounds (Supan, unpublished data, and personal communication: Wilbert Collins, Collins Oyster Co., Golden Meadow, Louisiana).

Therefore, the latest year-class of seed oysters available for bedding on leases set among existing oysters that are highly infected with *Perkinsus* will exhibit high mortalities with rising temperature and salinity during the following summer. It is safe to say that more losses will occur during future bedding operations.

Objectives

The objectives of this project are:

(1) to conduct *Perkinsus* analyses on sack and seed oysters collected from LDWF sampling stations during their annual population density evaluations; and,

(2) to develop a database for assisting in the management of the public grounds by LDWF and to develop and continue a Dermo Advisory Program for oyster leaseholders

Approach

Seed and sack oysters were collected by LDWF personnel from ten stations during the annual sampling of the public grounds, including nine stations east of the river and Hackberry Bay. Samples were taken to Sea Grant's Grand Isle Oyster Hatchery for subsequent analyses.

Perkinsus assays were conducted using oyster rectal tissue in Ray's Fluid Thioglycollate Media (RFTM) with a 7-14 day incubation period (Ray, 1966), and ranked according to intensity of infection by a 0-5 evaluation scale (Mackin 1962).

Final laboratory results were forwarded to LDWF for incorporation into its database for oyster management decision making and for the continuation of the Dermo. Advisory Program.

Results

The Dermo infection intensity (weighted incidence) and percent prevalence at the ten stations during July 2005 are listed in Table 1. Table 2 lists the 2004 data for comparison. Generally, Dermo infections remain reasonably low, with no weighted incidences valued at 1 or greater, which is considered a dangerous or lethal value for any given oyster population. Notable increases occurred in seed oyster populations at Lonesome Island, Mozambique Point, Black Bay, Hackberry Bay, Three Mile Pass, and Cabbage Reef.

As always, oyster farmers are advised to harvest seed oysters for bedding from areas with the lowest Dermo infection levels. These levels can increase with bedding into higher salinity and oyster mortality could increase the following summer in such locations as water temperature increases.

Literature Cited

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Table 1
2005 DERMO RESULTS
EAST OF RIVER & HACKBERRY BAY

	Seed		Market	
	Prevelance	Weighted Incidence	Prevelance	Weighted Incidence
Bay Gardene	40%	0.2	27%	0.1
Lonesome I.	73%	0.4	80%	0.4
Mozambique Pt.	47%	0.2	87%	0.5
E. Black Bay	100%	0.5	63%	0.5
S. Black Bay	53%	0.3	53%	0.6
Bay Crabe	50%	0.2	87%	0.5
Telegraph Pt.	40%	0.2	80%	0.4
Cabbage Reef	73%	0.4	87%	0.6
Three Mile	80%	0.4	93%	0.5
Hackberry Bay	40%	0.2	89%	0.8

Mackin Scale used to determine incidence

Table 2
2004 DERMO RESULTS
EAST OF RIVER & HACKBERRY BAY

	Seed		Market	
	Prevalence	Weighted Incidence	Prevalence	Weighted Incidence
Bay Gardene	47%	0.2	27%	0.1
Lonesome I.	13%	0.2	63%	0.4
Mozambique Pt.	23%	0.1	38%	0.2
N. Black Bay	43%	0.2	68%	0.4
S. Black Bay	47%	0.2	27%	0.2
Bay Crabe	73%	0.5	66%	0.3
Telegraph Pt.	66%	0.3	53%	0.4
Cabbage Reef	27%	0.1	70%	0.7
Three Mile	17%	0.08	33%	0.2
Hackberry Bay	20%	0.1	40%	0.2

Mackin Scale (0-5) used to determine incidence.

Levels of the oyster parasite, *Perkinsus marinus* in Louisiana oysters west of the Mississippi River, Summer 2005

by

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Among the most significant causes of oyster mortality is the parasite *Perkinsus marinus* (= *Dermocystidium marinum*), which is responsible for annual mortality rates that exceed 50% in most populations of adult eastern oysters, *Crassostrea virginica*. *Perkinsus marinus* was described in 1950 by John Mackin, Malcom Owen and Albert Collier as *Dermocystidium marinum* – hence the common name "Dermo" which is still in use (Mackin et al. 1950).

The discovery of the parasite was the result of investigations (funded by a consortium of oil companies and directed by Texas A&M University) of the impact of oil and gas activities on the Louisiana oyster industry (Mackin and Hopkins, 1962). Extensive studies were conducted on the effects of crude oil, bleedwater, natural gas, drilling mud and seismographic surveys. It was ultimately realized that none of these pollutants or activities could not explain the widespread mortalities of oysters that were observed. It is now known that the parasite is a major cause of mortality from Maine to Mexico (Soniat, 1996).

The main environmental factors which favor the proliferation of the parasite are high water temperatures and high salinities. Thus infections are more intense in the late summer and on the seaward side of estuaries. Management techniques to minimize disease and increase oyster harvest include moving infected oysters to lower salinity, early harvest of infected populations, and even freshwater diversion into high-salinity estuaries. The success of oyster farming often depends on the ability to manage oyster population in the presence of high levels of disease (Soniat and Kortright, 1998).

The standard assay for determining the level of parasitism is the fluid thioglycollate method (Ray, 1966). The length of ten oysters is measured and a small piece of tissue is removed and assayed for disease after incubation in fluid thioglycollate and antibiotics for one week. *P. marinus* intensity is scored using a 0-to-5 scale developed by Mackin (1962), where 0 is no

infection and 5 is an infection in which the oyster tissue is almost entirely obscured by the parasite. Calculations are made of percent infection (PI) and weighted incidence (WI), which is the sum of the disease code numbers divided by the total number of oysters in the sample. A WI of 2.0 could be considered a level at which severe disease-related mortalities are occurring. For example, Mackin (1962) claims: "a population of live oyster with a weighted incidence of 2.0 contains an intense epidemic, and more than half of the population may be in advanced stages of the disease, with all of the individuals infected."

Oysters for this summer's study were collected from 8 sites west of the Mississippi River. Two sites were in Sister Lake, two in Bay Junop , two in the Atchafalaya area, and two in Lake Calcasieu. The Sister Lake sites were Grand Pass (GP) and Old Camp (OC), the Bay Junop sites were Rat Bayou (RB) and Buckskin Bayou (BB), the Atchafalaya sites were Indian Point (IP) and South Point (SP), and the Lake Calcasieu sites were Big Washout (BW) and Northeast Rabbit Island (NR).

Rectal tissue was removed from each of 10 oysters, incubated at room temperature in fluid thioglycollate for about a week, and assayed according to the standard Ray (1966) technique. The level of infection (disease code) was scored from 0 to 5, where 0 is no infection and 5 is near total coverage of the oyster tissue by the parasite. Weighted incidence (WI) was calculated by summing the disease code values and dividing by 10, the number of oysters in the sample.

WI values were 0.16 (GP), 0.19 (OC), 0.19 (RB), 0.00 (BB), 0.00 (IP), 0.03 (SP) 0.19 (BW) and 0.20 (NR) (Table 1). Salinities were higher this summer as compared to last and this was reflected in slightly higher levels of disease. Disease levels from the summer 2005 samples are relatively low and well below critical levels.

Table 1. Summary data and results from the 2005 Dermo study.

Station	Date sampled	Salinity (ppt)	Temperature (C)	Size range (mm)	Percent infection	Weighted incidence
Grand Pass	07/07/05	14.3	28.5	77-101	50%	0.16
Old Camp	07/07/05	16.7	28.1	38-74	60%	0.19
Rat Bayou	07/07/05	17.2	28.6	85-122	50%	0.19
Buckskin Bayou	07/07/05	14.2	27.7	90-125	0%	0.00
Indian Point	06/23/05	9.4	30.6	56-72	0%	0.00
South Point	06/23/05	12.0	29.3	53-68	10%	0.03
Big Washout	06/20/0	24.6	28.3	90-112	60%	0.19
NE Rabbit Island	06/20/05	20.5	27.1	85-111	20%	0.20

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