GALVESTON BAY OYSTER STUDIES 1971

PROJECT CO-2-2

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ABSTRACT

Galveston Bay oyster stocks were studied to detect changes which might affect the public reef oyster harvest. A mild winter and above normal salinity values favored increased disease (Labyrinthomyxa) incidence as well as increased predation from oyster drills (Thais) and stone crabs (Menippe). These factors resulted in annual death rates of 52% to 55% among older oyster groups. Oyster spat in an epidemic area were Labyrinthomyxa-infected by fall and suffered above normal mortality.

Seed stock from a "disease-free" area suffered mortality rates of 7% to 40% from spring through fall when placed at stations along a salinity gradient from upper Trinity Bay to lower Galveston Bay. Deaths were least at the upper bay stations. Higher death rates at the lower bay stations were believed due more to predation than to disease.

Oyster spat setting, although generally more abundant than in 1970, was still sparse in Trinity Bay. Spat survival was poor along the lower section of Red Fish Bar due to oyster drill predation.

Labyrinthomyxa infection was found among oysters at the eastern end of Red Fish Bar for the first time in over three years. The pathogen also spread upward into mid-Trinity Bay.

Dwindling market oyster abundance on the major harvest centers was reflected by a drop of almost 70,000 barrels below the 1970-71 harvest.

INTRODUCTION

Galveston Bay has been the major oyster harvest center on the Texas Coast for many years. Large oyster harvests have been possible because of an abundance of marketable oysters on public reefs subject to an intensive fishery. Surveillance of the oyster population on the major reefs has, therefore, been necessary in order to detect changes which affect, or are affected by, the oyster fishery.

Phases of the project include: (1) a study of selected oyster stocks to determine mortality rates associated with predation and/or disease; (2) a survey of the distribution and infection incidence of the primary pathogen, *Labyrinthomyxa marina*; and (3) a study of spat, seed and market oyster populations on representative reefs to determine present and future harvest potentials.

This report summarizes data from the three phases collected during 1971.

METHODS

Oyster tray stations at Switchover Reef in mid-Galveston Bay and Hanna Reef in East Bay (Figure 1) consisted of wooden platforms with lift systems and racks holding 16 trays. The trays were vinyl-coated metal 46 cm wide, 82 cm long and 10 cm deep fitted with tops of 0.6 to 1.2 cm mesh galvanized hardware cloth. Hardware cloth linings were also used in trays containing small oysters. An inverted tray was sometimes used as a cover for trays containing large oysters. All oysters were stacked bill-up in the trays to facilitate examination but water currents and wave action frequently tumbled the oysters about, especially when the trays were not full.

The Hanna Reef tray station contained survivors of the 1965, 1966 and 1967 year-class oysters carried over from previous years in a continuing study. Additionally, 1000 small seed oysters from the 1971 set were stocked in October. These had set on the larger oysters and were separated for stocking. At the Switchover Reef station survivors of the 1969 set were the only oysters stocked. These were oysters from a "disease-free" area; that is, without known *Labyrinthomyxa* infection. They had been collected from Bart's Pass at the eastern end of Red Fish Bar in 1970 and stocked at Switchover during April, 1970.

Four other tray stations were established at artificial reef markers at Trinity Reef, Tern Reef, Triangle Reef and Four-Bit Reef (Figure 1). Each station contained a single tray with an initial stock of 150 oysters from the "disease-free" area (Bart's Pass). These were young seed from the 1970 set. Each tray rested on bottom and was secured to the marker piling with polypropylene line. The line was weighted and submerged in an attempt to prevent theft. The trays were retreived by hooking the line or the tray with a boat hook. In spite of these precautions, trays were stolen or lost.

All tray stations were visited at approximate monthly intervals. Live oysters were counted and measured; dead oysters were measured and gapers were cultured in fluid thioglycollate-antibiotic medium for *Labyrinthomyxa* infection determination.

Oyster population samples, consisting of one standard bushel (35239 cubic centimeters) of unculled oysters were dredged from nine public reefs (Figure 1) each month. Live oysters were culled out and measured, in height, to the nearest millimeter. Measurements were grouped into 25 mm intervals designated as spat (1-25 mm), seed (26-50 mm), sub-market (51-75 mm), small market (76-100 mm), medium market (101-125 mm) and large market (126-150 mm). Average values for each group were calculated for winter, spring, summer and fall quarters.

Rectal tissues from ten market-size oysters from each sample were cultured in fluid thioglycollate medium containing Chloromycetin and Mycostatin to detect *Labyrinthomyxa* infections. The infection incidence of the pathogen was reported on a scale ranging from 0 (negative) to 1 (light), 3 (moderate) and 5 (heavy).

Salinity and temperature of bottom water samples were recorded at tray stations and reef sample stations. Predators such as the oyster drill (*Thais haemastoma*) and the stone crab (*Menippe mercenaria*) were recorded.

RESULTS and DISCUSSION

Salinity and Temperature Observations

Salinity values ranged above average and remained rather stable (Table 1) throughout most of the year reflecting low flow on the Trinity River. Differences between the lowest and highest recorded salinity ranged from 6 to 9 ppt in the first quarter, 2 to 7 ppt in the second quarter, 5 to 9 ppt in the third quarter and 4 to 13 ppt in the last quarter.

During spring, Trinity River flooding normally depresses salinity in the upper bay resulting in a wider variation between upper and middle bay values. But spring 1971 river flow was below normal and salinity ranged above 20 ppt at all stations. In December, Trinity River flooding filled Lake Livingston causing flood gates to be opened on the dam. Consequently, salinity values dropped at all stations and varied by as much as 13 ppt between stations.

Water temperature ranges (Table 1) indicated relatively mild winter and fall weather. This is substantiated by monthly air temperature records at Houston Hobby Airport which ranged 0.8 to

2.8°C above average in the winter quarter, 0.2°C above to 0.7°C below in spring, 0.6°C above to 1.0°C below in summer and 1.7°C to 3.4°C above average in fall.*

Oyster Mortality Studies

During the previous year, the 1969 "disease-free" seed oyster stock at Switchover Reef platform suffered a mortality of approximately 24% from April through December. Gapers were found to be infected by *Labyrinthomyxa* by July, indicating a short infection time (3 months) for one-year old oysters which presumably had not had previous exposure to the pathogen.

Unfortunately all of the 1969 seed stock were stolen from the platform in April, 1971. Because of the oyster theft, as well as extensive damage to the walkway, stringers and lift system, the station was discontinued.

At the Hanna Reef platform the older 1965 year-class oysters numbered 165 in January but an annual mortality rate of 53.9% reduced the survivors to 77. The spring mortality peak occurred in April (Table 2) with a sharp drop in May. Since the shells of many of these oysters were extensively riddled by boring clams (*Martesia*), increased deaths in April may have been due to increased predation by the oyster drill (*Thais*) and the stone crab (*Menippe*) on the more vulnerable oysters. However, *Labyrinthomyxa* infection was found in April indicating that the pathogen was a contributing factor in the mortality. By early summer, monthly death rates became moderate reaching a peak of 15.6% in October, later than usual. Deaths did not decrease rapidly in late fall, possibly because water temperatures did not decline sharply (Table 1). Under such conditions, *Labyrinthomyxa* infection as well as predator activity would be encouraged. Although oyster drills were scarce in December, stone crabs were common in the fall and winter months, undoubtedly contributing to the death rate.

Only 12 gapers were recovered from the 1965 year-class during April through October. Eight were heavily infected with *Labyrinthomyxa*; the other four were uninfected. Of interest was the recovery of three uninfected gapers in late April along with one heavily infected gaper. This may be indicative of the relative importance of predation over disease in the April mortality.

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* Climatological Data, Annual Summary 1971, Vol. 76 No. 13

The 1966 oyster year-class, which numbered 425 in January, was reduced to 189 at year's end (55.3% mortality). Monthly death rates were low until early summer (Table 2), climbing over 6% by June, increasing to 12% in July and peaking at almost 14% in August. Although dropping in September, mortality rates remained above 10% until November. The typical sharp drop in late fall-early winter deaths was absent.

Like the 1965 year-class, shells of the 1966 oysters were riddled by *Martesia* causing the oysters to be more vulnerable to predation. Among the 23 gapers recovered from this group, 19 were heavily infected by *Labyrinthomyxa*, 2 had light infections and 2 were uninfected.

The 1967 oyster year-class numbered 308 in January, but dropped to 146 by December after an annual death rate of 51.5%. Monthly death rates increased gradually from late spring to a September peak of 13.4% followed by a gradual decline (Table 2). Peak deaths thus occurred prior to those in the 1965 group but subsequent to those in the 1966 group. This may be related to differences in population numbers among the three groups rather than to differences in infection rates or predator activity. However, infection incidence appeared higher than that of the other groups. Of the 20 gapers recovered, 18 were heavily infected by *Labyrinthomyxa*, one was moderately infected and one was lightly infected.

During July-August, spat setting was common on all stocks. In October, 1000 of these spat, averaging 35 mm in height and ranging from 25 to 50 mm, were culled and stocked in lined trays. Initial October mortality (Table 2) included deaths due to culling and handling. Overall deaths during fall were low with a quarterly rate of 7.2%. Of the six gapers recovered during fall, one was heavily infected with *Labyrinthomyxa*, one had a light to moderate infection and the remaining four were uninfected. This indicates an early infection among seed oysters from three to five months old. These oysters were also subject to *Martesia* invasion of the shells in October. Limited oyster drill and stone crab predation was noted but the tray liners prevented entry of these predators.

Growth, as determined by measurements of one dimension (height), was poor among the 1965, 1966 and 1967 year-class oysters. In fact, the average height of the 1965 group decreased by 2.7 mm, the 1966 group by 1.7 mm and the 1967 group by 0.8 mm. The average height of the 1971 year-class increased 7.9 mm over a three-month period. Such growth I consider below normal for seed oysters.

In April "disease-free" oysters from Bart's Pass were placed at four "check-stations" oriented along a 14 mile north-south line from Trinity Reef and Tern Reef in the upper bay to Triangle Reef and Four-Bit Reef in the middle bay (Figure 1). Originally, Dry Hole Reef had been selected as one of the upper bay stations but, because of damage to the Dry Hole Reef marker, the station was moved to Tern Reef on July 1st. Each station contained an initial stock of 150 oysters ranging from 50 to 90 mm in height with an average height of about 70 mm.

At the two upper bay stations, cumulative mortality rates were low (Table 3). Through the first six months, the total death rate was 2.0% at Trinity Reef and 2.7% at Tern Reef. During the same time, death rates were 16% at Triangle and 30% at Four-Bit Reefs. Over the full nine-month period, cumulative mortality was only 6.7% at Trinity Reef but 34.7% at Triangle Reef. Data from Four-Bit and Tern Reef were lost when the trays were stolen in October and November.

Very few gapers were recovered; none at Tern Reef or Four-Bit Reef. One gaper from Trinity Reef in October showed no Labyrinthomyxa infection. Of the two gapers found at Triangle Reef, one in September had a light to moderate infection while the other, collected in October, was negative. Possibly the oysters did not succumb to significant Labyrinthomyxa infection at any station and deaths were due to other factors. Unfortunately, the Labyrinthomyxa incidence of the live oysters was not determined during the study.

Stone crabs ranging from 10 to 90 mm in carapace width were common at all stations and, judging by the broken bills or cracked shells of many of the oyster boxes, contributed to oyster mortality. The number of stone crabs did not vary much from station to station. however, and would not account for the difference in mortalities between the upper bay and middle bay stations. Larger crabs become more common at Triangle Reef in the fall and could have been responsible for the increased winter deaths at that station.

Oyster drills were not found at any station except Four-Bit Reef where they first appeared in June, becoming abundant in September. Drill holes and chipped bills among the Four-Bit oyster boxes indicated the importance of this predator in the higher mortality.

Oyster growth, as determined by height alone, differed among stations as well as seasonally (Table 3). Poorest growth, averaging 13.7 mm through September, was recorded at Triangle Reef (in the midst of the most productive harvest area). Best growth, averaging 21.1 mm through September, occurred at Four-Bit Reef. The more rapid growth, however, resulted in thin, sharp-billed oysters less desireable on the market. At Tern Reef and Trinity Reef, average growth of 20.2 mm and 17.7 mm, respectively, resulted in oysters of excellent shape. By October Trinity Reef oysters had grown 4.5 mm more and, based upon cumulative growth through October rather than September, these oysters showed best growth. Possibly the zero death rate early in the year caused overcrowding in the Trinity Reef tray, inhibiting growth. September deaths, although slight, may have alleviated overcrowding.

Growth was generally most rapid in summer, decreasing in late fall-early winter. The December loss in height noted at the Trinity Reef station I attribute to low salinity. This may have affected growth of the Triangle Reef oysters as well but other factors could be involved. These include water temperature, food supply and fouling (which inhibits water circulation through the tray).

Public Reef Oyster Populations

The maximum number of spat per monthly sample was used as an index of peak spat setting at the nine stations (Table 4). In mid-Galveston Bay (Red Fish Bar), peak setting was found in June. Peak setting in the upper bay occurred in July while in East Bay, peak sets were not found until August-October.

In the Red Fish Bar area spat were most abundant at South Red Fish Reef, diminishing considerably northward but more noticeably along the eastern (Bart's Pass) and western (Todd's Dump) sectors. Setting was moderate in East Bay, occurring later and in less abundance at the upper bay (Frenchy's Reef) station. Spat were scarce in upper Galveston and Trinity Bay.

Compared to setting in the previous year, the overall average peak set increased from 180 spat per bushel to 500 spat per bushel. The average peak set at upper bay stations rose from 0 to 30 per bushel, 190 to 675 at mid-bay stations and 280 to 570 at East Bay stations.

The few spat setting at Scott's Reef (Table 5) were sufficient to maintain only a low level population. However, survival of spat at Beezley's Reef resulted in an increase in both seed and sub-market oysters.

South Red Fish Reef, where maximum setting occurred, produced the largest number of seed oysters by fall but the slight increase in sub-market oysters indicated high mortality and/or slow growth of the seed stock. North Red Fish Reef produced the largest number of sub-market oysters along with an abundant seed stock. Survival of a moderate spat set at Todd's Dump was good with a resulting increase in seed and sub-market stocks by fall. Although seed oyster stock increased in fall samples at Bart's Pass, sub-market oyster stocks did not indicating higher mortality and/or slower growth similar to South Red Fish Reef.

Hanna Reef spat were generally "wasted". Predation prevented much increase in seed oyster stocks and sub-market size oysters were scarce. Abundant spat setting at Moody's Reef resulted in no substantial increase in seed oysters and little recruitment in the sub-market oyster group. The late spat set at Frenchey's Reef resulted in an increase in seed oysters in the fall. Trends in sub-market oyster stocks would not be evident until 1972.

Market oysters increased considerably in sample abundance at Beezley's Reef in the fall. Market oysters at Scott's Reef, however, remained near depletion level.

Along Red Fish Bar, market oyster stocks tended to increase at Todd's Dump and Bart's Pass, decrease in North Red Fish and drop considerably at South Red Fish. Until the fall quarter, market oysters were most abundant at Bart's Pass.

Few market oysters were ever found in Hanna Reef samples. However, market oysters, especially the medium size market group, increased noticeably at Moody's Reef and Frenchy's Reef.

Red Fish Bar market oysters averaged 34 per bushel during the fall quarter, 1971, compared to 45 per bushel during fall, 1970. East Bay market oyster stocks, excluding Hanna Reef, rose from 18 to 46 per bushel while Trinity Bay and upper Galveston Bay market oysters increased from 2 to 18 per bushel. The overall average number of market oysters per bushel (fall quarter) increased from 28 in 1970 to 33 in 1971.

Overall averages give equal weight to each reef without considering acreage. Since Red Fish Bar exceeds all other reefs in size and has been the major harvest center, changes in market oyster abundance along this reef network would be more indicative of the harvestable quantity of oysters in the bay.

Oyster Disease Incidence

Labyrinthomyxa infection incidence among market oyster stocks varied considerably (Table 6). No infected oysters were found at Beezley's Reef even though salinity values were high enough for the pathogen to become established. Because market oysters were scarce at Scott's Reef, samples were not routinely collected. Oysters there contained very light infection during spring.

Infection incidence at Red Fish Bar stations peaked in June at South Red Fish, August at North Red Fish and September at Todd's Dump. Bart's Pass oysters were uninfected until September when a very light incidence was detected. This was the first time in over three years that infection has been found among Bart's Pass oysters.

East Bay oysters contained light infections throughout the year with slightly higher incidence in September-October at Frenchy's Reef and March-April at Moody's Reef. Market oysters were too scarce for adequate sampling on Hanna Reef.

The Oyster Harvest

The oyster season opened November 1, 1971 and closed May 1, 1972 under the revised oyster law ('71-62-R-471). All of Red Fish Bar, particularly the north-central portion including the EXXON "A" Lease area, provided most of the harvest. East and West Bays supported few fishermen. A quantity of oysters was harvested from Trinity Bay, especially from the artificial reefs Dry Hole, Tern, Lonesome and Clamshell. The abundance of large oysters within the polluted zone on the Beezley Reef complex attracted a number of fishermen at the beginning of the season, causing law enforcement problems.

Maximum monthly oyster production was recorded in November (Table 7) with a steady decline thereafter. The yield ranged from 2 to 2 1/2 gallons per barrel. Fishermen received from $10 to $14 per barrel. In December the yield per barrel was at a low of two gallons. Since dealers paid the fishermen more per barrel the value increased in spite of declining volume and yield.

CONCLUSIONS

Above normal salinity values and water temperatures favored an increase in oyster predators such as oyster drills and stone crabs as well as the oyster disease organism *Labyrinthomyxa*. These increases were reflected by a corresponding increase in mortality among the older oyster groups at Hanna Reef, with annual death rates of 52-55%. *Labyrinthomyxa* infections were also found among Hanna Reef spat less than six months old. Predation among these spat probably would have been severe if they had not been protected in lined trays.

Seed oysters from a "disease-free" area placed at upper and middle bay locations did not become infected as readily as did the Hanna Reef spat. Cumulative mortalities of 7-40% resulted more from predation than from disease.

Labyrinthomyxa infection among market oysters at Red Fish Bar stations showed no uniform trend. Infection peaks were not as high as expected with relatively uniform and above average salinity. However, Labyrinthomyxa infections were found among Bart's Pass oysters after a lapse of over three years and mid-Trinity Bay oysters were found to be infected by late fall. Thus the pathogen was able to extend its range upward in the bay.

The light Labyrinthomyxa infection among East Bay oysters is puzzling since heavy infections were common at Hanna Reed at the mouth of East Bay. Heavy infections have also been recorded among the middle and upper East Bay oysters in past years.

Oyster spat setting was generally more abundant than in recent years. Substantial sets did not, however, occur in Trinity Bay and setting was below normal along the eastern edge of Red Fish Bar (Bart's Pass). The most abundant spat set was found at South Red Fish Reef where oyster drill predation was severe.

Where disease and predation were common, market oyster stocks tended to decrease; where these factors were not significant, market oyster stocks increased. Since the Red Fish Bar complex supports the bulk of the oyster fishery, changes in Red Fish Bar stocks would be reflected in the harvest. Fall market oyster abundance at Red Fish Bar stations was approximately 24% less than that in fall 1970. The harvest during the 1971-72 season (approximately 132,000 barrels) was approximately 35% below the 1970-71 harvest of 200,000 barrels.

RECOMMENDATIONS

Erratic spat setting, poor spat survival, increased predator activity and increased Labyrinthomyxa incidence have tended to reduce seed and market oyster stocks on the public reefs. In spite of a dwindling oyster supply, fishing pressure remains high and will probably continue. Therefore, the Galveston Bay oyster population should be closely watched. I recommend that reef sampling be continued and expanded to provide information on reef population changes and that tray studies be continued to assess damage inflicted by disease, predation and/or environmental deterioration.

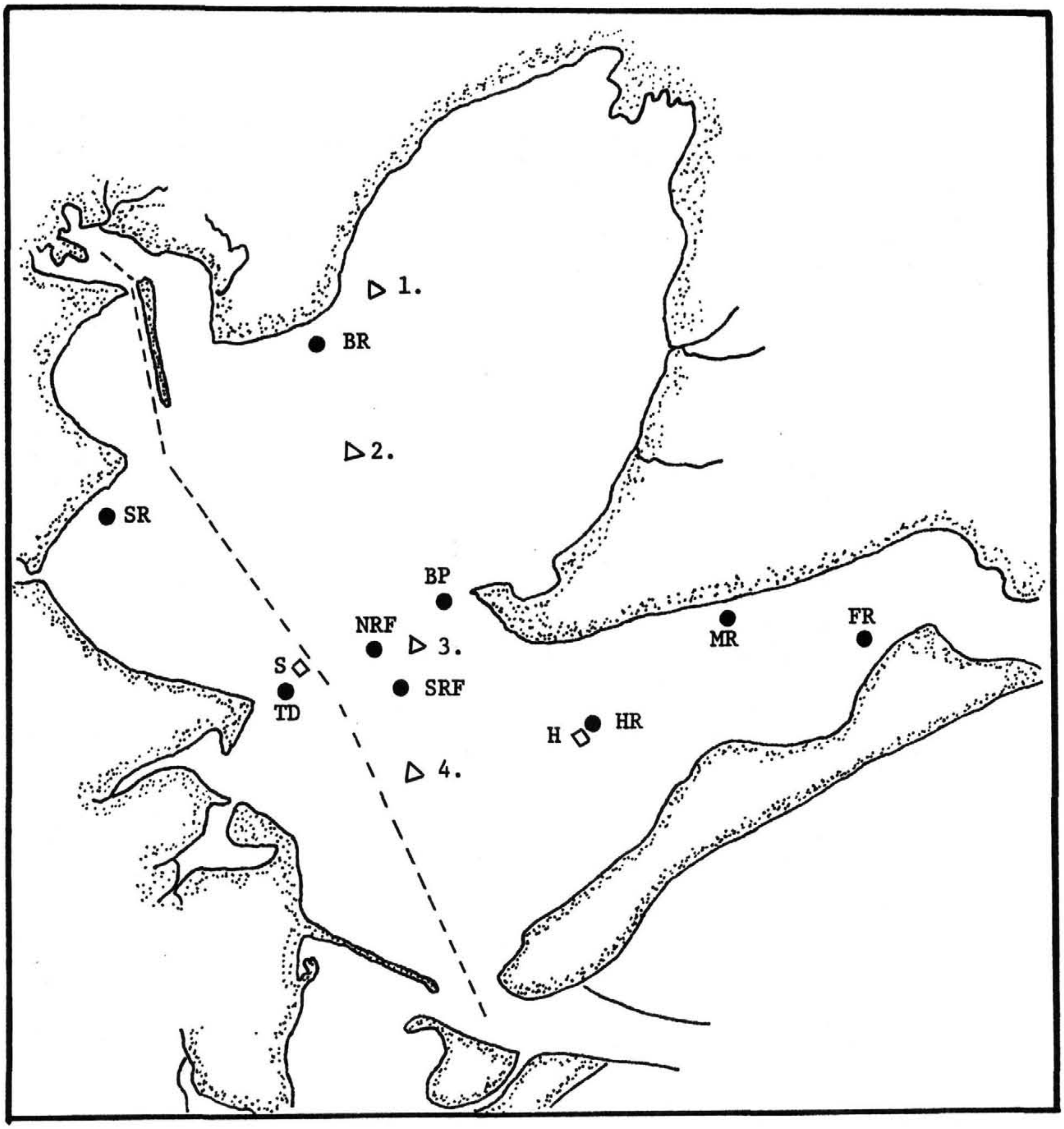

Figure 1: Outline of Galveston Bay showing approximate locations of public reef sample stations, oyster tray platforms and oyster tray check-stations.

(●): Public Reef Sample Stations
BR=Beezley R, SR=Scott R, TD=Todd's Dump, NRF=North Red Fish, SRF=South Red Fish, BP=Bart's Pass, HR=Hanna R, MR=Moody R, FR=Frenchy R.

(□): Oyster Platforms
S=Switchover R, H=Hanna R.

(△): Oyster Tray Check Stations
1=Trinity R, 2=Tern R, 3=Triangle R, 4=Four-Bit R.

Table 1: Monthly salinity values and water temperature ranges recorded at oyster tray and reef sample stations in Galveston Bay during 1971.

Salinity Values (Bottom) o/oo

Station	Month 1	2	3	4	5	6	7	8	9	10	11	12
Upper Bay												
Trinity R.	-	-	-	22	20	22	22	21	19	19	19	7
Beezley R.	18	18	18	22	23	22	23	23	19	19	21	11
Tern R.	-	-	-	23	22	22	22	23	22	22	22	1
Scott's R.	22	22	23	24	23	22	23	24	20	20	23	17
Middle Bay												
Todd's Dump R.	24	24	27	23	25	23	28	27	22	22	23	16
N. Red Fish R.	23	24	27	23	24	24	28	28	23	21	23	14
S. Red Fish R.	23	24	27	23	24	24	28	30	23	21	23	15
Triangle R.	-	-	-	24	22	24	24	26	23	23	23	15
Bart's Pass R.	19	22	22	22	27	24	27	27	21	20	21	12
Four-Bit R.	-	-	-	24	24	24	29	29	24	25	-	-
East Bay												
Frenchy's R.	19	21	22	22	23	23	27	22	18	18	22	17
Moody's R.	19	21	20	21	22	23	23	22	18	19	21	17
Hanna R.	23	23	25	24	27	29	27	26	24	21	21	20

Water Temperature (Bottom) ^{o}C

Range	Month 1	2	3	4	5	6	7	8	9	10	11	12
Low*	16	14	16	16	22	28	29	28	22	21	13	13
High*	17	15	18	24	27	29	30	30	26	24	17	16

* Bottom water temperature ranges are the lowest and highest temperatures observed during a month. Temperature observations were usually made in mid-afternoon and do not represent minimum or maximum ranges.

Table 2: Monthly mortality rate (%) among four year-class oyster groups at Hanna Reef station in East Bay, 1971.

	Oyster Year-Class Death Rate (%)			
Month	1965	1966	1967	1971
January	0.6	0.7	0.3	-
February	0.6	0.7	0.3	-
March	0.6	1.2	0.7	-
April	4.3	0.7	2.0	-
May	0.6	3.4	4.1	-
June	7.7	6.6	8.2	-
July	7.0	12.0	8.5	-
August	10.5	13.9	8.5	-
September	10.0	10.8	13.4	-
October	15.6	12.1	10.7	3.5*
November	10.0	8.2	6.6	2.8*
December	4.9	6.0	6.4	1.1

* 1971 year-class set on older oysters during July-August and were culled and stocked in October.

Table 3: Monthly mortality and growth rates among "disease-free" oysters (Bart's Pass 1970-Class) held in trays at four stations in Galveston Bay during 1971.

	Mortality Rate (%)				Avg. Height Increment (mm)			
	Station				Station			
Month	1	2	3	4	1	2	3	4
January	-	-	-	-	-	-	-	-
February	-	-	-	-	-	-	-	-
March	-	-	-	-	-	-	-	-
April	0.7	0.0	0.0	0.0	-	-	-	-
May	0.0	0.7	0.7	2.0	5.2	4.3	2.7	4.8
June	0.0	0.0	2.0	7.5	5.2	4.5	3.8	8.5
July	0.0	0.7	3.4	4.4	4.0	4.1	2.0	1.0
August	0.0	0.7	5.0	7.7	2.7	3.6	2.8	4.4
September	1.4	0.7	6.0	12.5	0.6	3.7	2.4	2.4
Cumulative	2.0	2.7	16.0	30.0	17.7	20.2	13.7	21.1
October	2.1	1.4	5.6	*	4.5	0.4	2.0	*
November	1.4	*	8.5	-	3.6	*	3.4	-
December	1.4	-	10.2	-	-1.4	-	1.9	-
TOTAL	6.7		34.7		24.6		21.0	

Station 1 = Trinity Reef
2 = Tern Reef (Dry Hole from April to July)
3 = Triangle Reef
4 = Four-Bit Reef

(*) Tray lost

Cumulative mortality figures are computed from the number of live oysters at the beginning of the period and the number of oysters which died during the six or nine month period. They do not include oysters which may have been lost, or removed, in one month. They are not totals of the monthly mortality rates.

Table 4: Peak setting period and relative abundance of oyster spat at Galveston Bay reef sample stations in 1971.

Station	Peak Set (Month)	Relative Abundance
Upper Bay		
Beezley's R.	July	40/Bushel
Scott's R.	July	20/Bushel
Middle Bay		
Todd's Dump	June	200/Bushel
N. Red Fish R.	June	700/Bushel
S. Red Fish R.	June	1500/Bushel
Bart's Pass	June	300/Bushel
East Bay		
Frenchy's R.	Sept.-Oct.	400/Bushel
Moody's R.	August	700/Bushel
Hanna R.	August	600/Bushel

Table 5: Average number of oysters per bushel sample collected each quarter at reef sample stations in Galveston Bay, 1971.

		Number of Oysters in Each Size Group					
Station	Quarter	SP	S	SuM	SM	MM	LM
Upper Bay							
Beezley's	W	0	1	6	8	0	0
	SP	2	1	5	12	1	0
	S	18	7	5	15	2	0
	F	0	9	10	21	9	0
Scott's	W	0	1	0	0	1	1
	SP	1	1	2	2	5	1
	S	6	1	2	1	2	0
	F	1	4	3	4	3	0
Middle Bay							
Todd's Dump	W	15	46	16	16	4	1
	SP	70	28	20	17	5	1
	S	94	137	51	26	6	1
	F	11	111	118	23	3	1
N. Red Fish	W	19	103	48	38	3	1
	SP	240	102	52	36	3	1
	S	191	229	77	31	3	0
	F	49	225	141	33	7	0
S. Red Fish	W	19	95	36	26	3	1
	SP	518	58	20	28	7	1
	S	349	253	28	20	2	1
	F	159	333	60	19	3	1
Bart's Pass	W	4	19	62	48	3	0
	SP	121	11	33	49	4	0
	S	178	129	22	49	11	1
	F	14	143	42	36	11	1
East Bay							
Frenchy's	W	33	106	21	16	6	1
	SP	5	85	52	17	19	6
	S	181	95	74	31	7	1
	F	185	206	80	38	9	1
Moody's	W	27	62	12	10	3	0
	SP	6	49	23	31	14	2
	S	465	63	34	37	11	0
	F	155	186	47	30	13	0
Hanna	W	34	8	1	2	0	0
	SP	59	54	5	1	1	0
	S	548	53	1	1	0	0
	F	316	71	1	0	0	0

Table 6: Weighted incidence of Labyrinthomyxa infection among market oysters from reef sample stations in Galveston Bay, 1971.

	Station Infection Incidence								
Month	BR	SR	TD	NRF	SRF	BP	FR	MR	HR
January	-	-	1.9	1.7	2.3	0.0	0.1	0.0	-
February	0.0	-	1.2	1.4	1.3	0.0	0.7	0.0	-
March	0.0	-	0.4	1.6	0.8	0.0	0.7	0.3	
April	-	0.4	2.5	1.6	2.8	0.0	0.0	0.6	-
May	0.0	-	3.0	2.0	1.0	0.0	0.2	0.*	-
June	0.0	-	1.6	1.9	3.0	0.0	0.0	0.3	-
July	0.0	-	2.2	1.5	2.0	0.0	0.5	0.2	-
August	0.0	-	1.9	2.7	1.8	0.0	0.3	0.0	-
September	0.0	-	3.2	1.6	1.1	0.8	0.7	0.6	-
October	0.0	-	0.7	2.4	2.8	0.2	0.6	0.*	-
November	0.0	-	2.0	2.1	2.6	0.0	0.2	0.6	-
December	-	-	1.6	0.9	0.9	0.0	-	-	-

(-) denotes no sample taken.
(*) denotes very light infection, one oyster only.

BR = Beezley's Reef
SR = Scott's
TD = Todd's Dump
NRF = North Red Fish
SRF = South Red Fish
BP = Bart's Pass
FR = Frenchy's
MR = Moody's
HR = Hanna (Never enough market oyster for adequate sampling).

Table 7: Oyster harvest from Galveston Bay during the 1971-72 season.

Month	Galveston Bay Oyster Harvest		
	Barrels	Yield (Lb. of Meat)	Value ($)
November '71	37,443	819,252	$393,644
December	31,624	553,420	452,409
January '72	22,518	492,672	278,658
February	18,830	412,000	259,202
March	13,699	239,732	202,074
April	7,578	132,614	113,145
Total	131,692	2,649,690	$1,699,132