OYSTER STUDIES 1969
PROJECT MO-R-11

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ABSTRACT

Oyster sampling was confined to Galveston Bay. Monitoring of 1965, 1966 and 1967 year class oysters at two tray stations indicated a relatively low annual mortality rate of under 20 percent. Peak death rates, associated with Labyrinthomyxa infection, occurred in late summer.

Moderate oyster spat setting occurred in the mid-bay area beginning in July. Survival was good and seed stock increased. Labyrinthomyxa marina infection among market oyster stocks remained below epidemic level and more oysters were available to the fishermen.

Oystering was again centered in the mid-bay area and was judged to be relatively heavy. The harvest of 173,300 barrels was 22 percent higher than that of the previous season.

INTRODUCTION

Studies of oyster (Crassostrea virginica) populations have been conducted for a number of years in several estuaries. Such studies have been, essentially, assessments of oyster stocks to determine changes which might affect the harvest. Beginning in the early 60's, epidemics depleted oyster populations in mid-coastal bays leading to an emphasis on oyster disease studies. With the initiation of disease monitoring, reef sampling was gradually discontinued except in the heavily fished Galveston Bay.

During the year changes in projects were effected and the oyster project was confined in Galveston Bay. This report summarizes findings of the disease monitoring and reef sampling studies.

MATERIALS and METHODS

The oyster disease monitor stations at Hanna and Switchover Reefs (Figure 1) contained survivors of 1966 and 1967 year class oysters. Additionally, the Hanna Reef station contained survivors from 1965 oyster stocks. All oysters were held in vinyl-coated metal trays with hardware cloth tops. Stations were visited monthly; dead oysters were removed and measured; gaper tissues were cultured in fluid thioglycollate medium containing the antbiotics Mycostatin and Chloromycetin to determine Labyrinthomyxa marina incidence.

Death rates among the various year classes were calculated on a monthly basis.

Reef samples consisted of three standard bushels (2,150 cubic inches per bushel) of unculled oysters dredged from six public reefs (Figure 1) at monthly intervals. Live oysters were culled and measured (height) with measurements grouped into 25 millimeter 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), large market 126-150 mm). Samples were grouped into quarterly intervals (January-March, etc.) designated as winter, spring, summer and fall. Ten market oysters from each sample were cultured in fluid thioglycollate-antibiotic medium to determine Labyrinthomyxa infection. Infection incidence ranged from negative (0) to heavy (5).

RESULTS

OYSTER MORTALITY STUDY

Monthly mortality rates among three oyster year-classes at tray stations on Switchover and Hanna Reefs are shown in Table 1. Following a typical winter low, death rates began to increase in early spring. With the exception of the 1967 Switchover stock death rates dropped noticeably in July. Peak monthly death rates were found in late summer (September or October). By November deaths among all year-classes had dropped. Smothering of some of the 1965 and 1966 Hanna Reef stocks by fine shell (probably due to heavy wave action) produced the slight increase in December death rates.

Annual mortality rates of the two Switchover stocks were considerably higher than those of similar stocks at Hanna Reef. Among the Hanna Reef oysters the annual mortality rate increased progressively from the youngest (1967 stock) to the oldest (1965 stock). Differences between the 1966 and 1967 Hanna Reef stocks were slight.

Monthly incidence of Labyrinthomyxa infection among gapers recovered from each year class is given in Table 2. Because gapers were not common, infection incidences from both stations were averaged to better indicate seasonal trends. Live oysters were not examined. Data suggest that Labyrinthomyxa was the primary pathogen during August-November but other factors may have been of equal importance in the spring.

REEF SAMPLING

Quarterly changes in the various size groups of oysters at six sample stations are shown in Table 3. Spat setting was delayed until July or August and was light in East Bay and at Todd's Dump, moderate at North and South Red Fish and relatively heavy at Bart's Pass. A secondary setting

period was observed at most stations in October.

Spat survival appeared to be good with a subsequent increase in seed stock. Sub-market stocks changed little but tended to decline from winter to fall, except at Bart's Pass. Small market oysters remained steady in samples throughout most of the year. Decreases in market oysters at Todd's Dump and North Red Fish in fall samples were believed to reflect the effects of the heavy fishery in November. East Bay market stocks remained low but were sufficient to support a small, intermittent fishery.

Salinity values decreased at all stations in spring (Table 4) due to Trinity River flooding. A slight, flood-associated mortality was noted at Bart's Pass. By fall, salinity was relatively high at all stations.

Low spring salinity apparently retarded development of Labyrinthomyxa (Table 5). The average quarterly infection incidence remained below epidemic level (2.0) throughout the year. Maximum monthly infection incidence among Red Fish Bar samples occurred in October; among East Bay samples in September. Bart's Pass oysters remained uninfected throughout the year.

THE OYSTER HARVEST

The oyster fishery (season opening November 15th) appeared somewhat larger than in the previous season with many out-of-state dredge boats participating. Total production during the 1969-70 season was 173,300 barrels; approximately 22% higher than in 1968-69.

Most of the oyster harvest was obtained from South Red Fish Reef, North Red Fish Reef and the Humble "A" Lease area. Bart's Pass was fished towards the end of the season while most of the fishing pressure on Todd's Dump occurred at the beginning of the season. A few boats, mostly equipped for "hand dredges", were observed working East Bay reefs. One reef in West Bay (Confederate Reef) was heavily fished by hand dredge boats late in the season.

DISCUSSION

Spring flooding on the Trinity River lowered salinity values throughout most of the bay system, possibly retarding Labyrinthomyxa infection among the oyster stocks but producing only a minor fresh water-associated mortality. Consequently, annual death rates among the older year class oysters were below normal and more market oyster stocks were generally available for the harvest. Spat setting appeared to be adequate at most of the important mid-bay reefs and an increase in seed oyster stock resulted. These oysters would ultimately supply a large portion of the 1970-71 harvest.

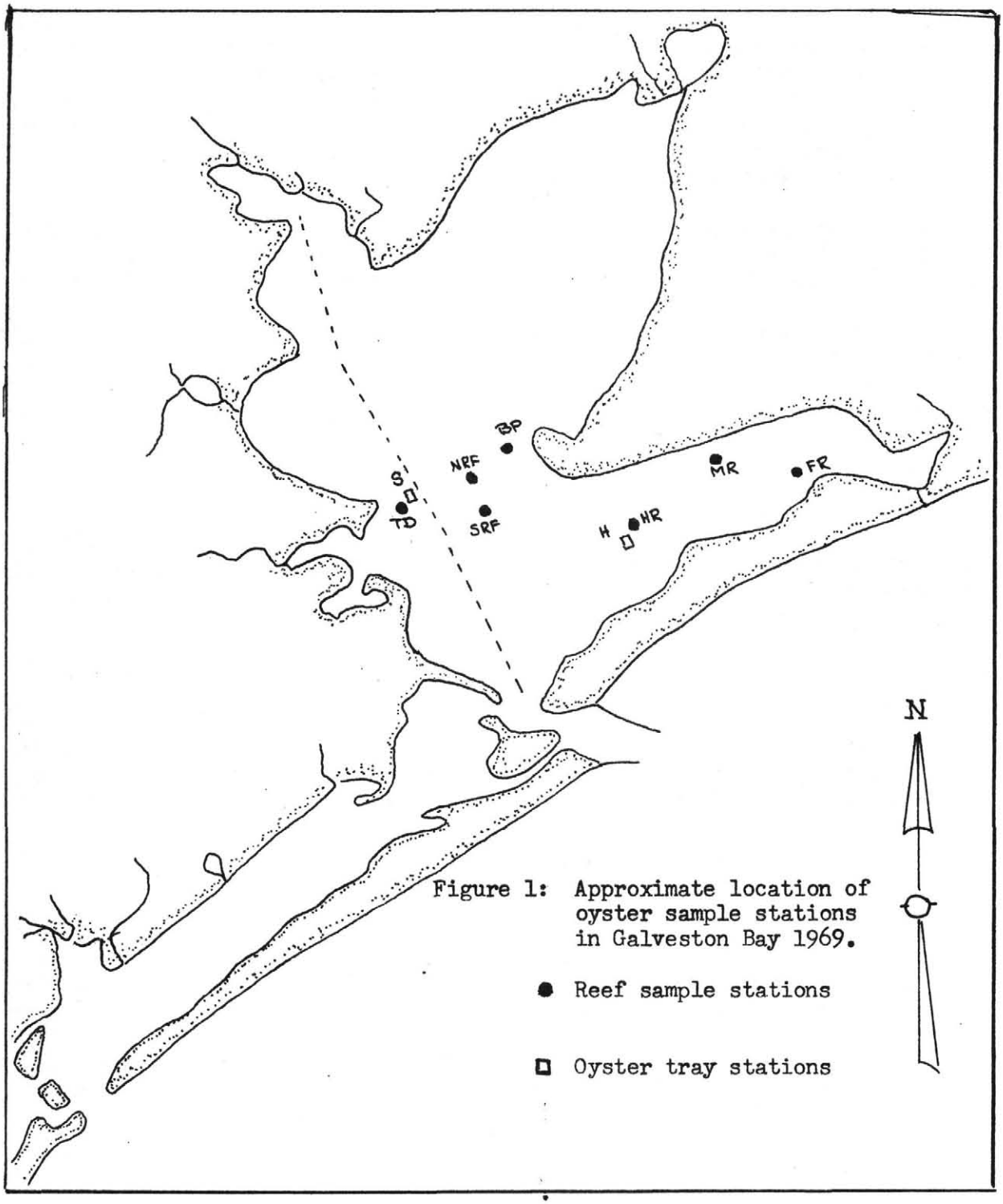

Figure 1: Approximate location of oyster sample stations in Galveston Bay 1969.

● Reef sample stations

□ Oyster tray stations

Table 1: Monthly mortality rates (%) among three oyster year-classes at Switchover and Hanna Reef tray stations in Galveston Bay during 1969.

	MORTALITY RATE (%) AMONG YEAR CLASSES					
	1965 Class		1966 Class		1967 Class	
MONTH	S*	H*	S	H	S	H
January	**	0.0	0.0	0.0	0.1	0.0
February		0.0	0.2	0.1	0.3	0.2
March		0.5	0.2	0.2	0.6	0.2
April		0.3	1.6	0.4	3.7	1.1
May		0.8	1.6	0.5	3.2	1.1
June		1.4	4.3	1.2	3.4	1.3
July		0.6	2.7	0.2	3.5	0.2
August		4.2	6.9	1.8	4.1	0.8
September		6.5	7.6	2.4	5.4	1.5
October		3.2	2.9	1.8	3.4	2.1
November		1.0	0.9	1.6	2.0	1.8
December		2.0	1.2	3.3	1.2	1.4
Annual Moratlity Rate		18.5	26.7	12.8	27.0	10.9

*S - Switchover; H - Hanna

** The 1965 Switchover oysters were stolen in 1968.

Table 2: Average incidence of Labyrinthomyxa infection among gapers recovered from Switchover and Hanna Reef tray stations in Galveston Bay during 1969.

	Labyrinthomyxa Incidence Among Year Classes		
MONTH	1965	1966	1967
January	-	-	0
February	-	5.0	0
March	-	-	0
April	-	-	-
May	1.5	2.8	0
June	-	0.2	0.5
July	-	2.5	3.0
August	-	3.3	3.2
September	4.5	4.4	5.0
October	5.0	5.0	5.0
November	-	5.0	3.8
December	2.0	3.8	2.9

Table 3: Average number of oysters per bushel sample at Galveston and East Bay stations during 1969

REEF	QUARTER	AVERAGE NUMBER/SIZE GROUP/BUSHEL SP	S	SuM	M
Todd's Dump	W	2	19	23	24
	SP	0	9	15	23
	S	9	21	27	34
	F	8	16	21	22
N. Red Fish	W	2	37	74	47
	SP	0	21	64	45
	S	65	37	48	41
	F	29	42	43	35
S. Red Fish	W	6	39	65	51
	SP	7	28	64	53
	S	49	54	40	51
	F	33	51	47	59
Bart's Pass	W	15	139	32	7
	SP	5	87	33	5
	S	169	128	44	4
	F	50	139	80	4
Frenchy's	W	1	4	18	9
	SP	0	2	5	9
	S	13	7	4	8
	F	15	34	7	11
Moody's	W	0	6	14	11
	SP	0	2	13	16
	S	11	11	10	15
	F	1	21	13	21

SP=Spat (1-25 mm), S=Seed (26-50 mm); SuM=Sub-market (51-75 mm); M=Market (76-100 mm), (Also includes a few oysters over 100 mm).

Table 4: Quarterly salinity averages at reef sample stations in Galveston and East Bays during 1969.

STATION	AVERAGE SALINITY/QUARTER (°/oo) W	SP	S	F
Todd's Dump	18	9	20	22
N. Red Fish	18	7	20	22
S. Red Fish	19	7	21	22
Bart's Pass	16	2	16	19
Frenchy's	16	4	12	20
Moody's	14	4	14	20

Table 5: Average quarterly incidence of Labyrinthomyxa infection at reef sample stations in Galveston and East Bays during 1969.

STATION	AVERAGE LABYRINTHOMYXA INFECTION/QUARTER W	SP	S	F
Todd's Dump	0.2	0.6	1.3	1.5
N. Red Fish	0.2	0.7	0.6	1.6
S. Red Fish	1.0	0.4	0.9	1.3
Bart's Pass	0	0	0	0
Frenchy's	0	0.6	0.6	0
Moody's	0.4	0.1	0.4	0.5