

JOB REPORT

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Study of Oyster Growth and Population Structure of the Public Reefs in Matagorda,
Tres Palacios and East Matagorda Bays

Abstract: Sample data indicate that Middle Ground Reef is in poor condition due to overcrowding and excessive growths of fouling organisms.

Gadwall Reef received a very heavy spatfall in 1963. Few commercial size oysters were taken but the survival of the 1962 spat was good.

Sand Point Reef suffered extensive mortality from September through December. Dermocystidium marinum samples were negative.

Objective: To obtain data on the growth and population structure of oysters on the public reefs in Matagorda, Tres Palacios, and Lavaca Bays for use in making management recommendations and to determine the centers of commercial harvest in the area.

Procedure: Three reef areas - Middle Ground in Tres Palacios Bay, Gadwall in Matagorda Bay, and Sand Point in Lavaca Bay - were sampled monthly using oyster dredge and hand tongs.

One U. S. standard bushel of uncultured oysters was used as the monthly population sample except in the case of Gadwall Reef which is an experimental reef completed in October of 1961. One quarter bushel samples were taken from this reef in order to minimize the destruction of spat.

All oysters contained in the samples were measured in millimeters along the straight-line distance from hinge to bill. In some cases during months of heaviest spatfall, all oysters having a length of twenty-five millimeters or less contained in one quarter of a standard bushel were measured, the number thus measured being multiplied by a factor of four to estimate the approximate number contained in the entire sample.

Ten of the largest oysters in each sample from Middle Ground and Sand Point reefs were cultured each month for determination of Dermocystidium marinum infection. The anal tract of each oyster was removed aseptically and cultured individually in fluid thioglycollate medium. All tissue culture analyses were made at the Marine Laboratory in Rockport.

Market samples were taken from Middle Ground and Sand Point Reefs in June, August, October, and December. As used here, a market sample is defined as all oysters measuring seventy-five millimeters or more from hinge to bill contained in five U. S. standard bushels of uncultured oysters.

From August to December, each sample taken was examined to determine the percentage of Ostrea equestris present in the population. A sub-sample consisting of approximately one hundred oysters of all sizes was taken from each of the regular population samples and examined to determine the species and length of each oyster. Occurrence of Ostrea equestris in the population was then expressed as a percentage.

Oyster dealers were contracted monthly during the oyster season in order to obtain production data for the area.

Water samples were taken at the time of each collection; salinity being determined by hydrometer and temperature recorded in degrees Centigrade.

Findings

Commercial Production: Oyster dealers in the Matagorda Bay area took very few oysters locally. Dealers in Matagorda took oysters by hand and tong from the area west of the Colorado River delta in the eastern arm of Matagorda Bay. This area provided the only commercial harvest in the Matagorda Bay area.

Tres Palacios Bay remained closed by order of the Texas State Department of Health due to sewage pollution.

Palacios dealers processed oysters taken almost exclusively from Galveston Bay. Port Lavaca dealers obtained oysters from San Antonio and Espiritu Santo bays. Heavy oyster mortality on Sand Point Reef reduced the supply of oysters in Lavaca Bay and made it necessary for the oyster dealers to resort to other bays for their supplies.

Population Studies: As shown in Table 1, a light spatfall was recorded on Middle Ground Reef in May and on Sand Point Reef in June. Heavy spatfall, however, did not begin until July when all three reefs showed a large increase in the number of spat.

Spatfall on Middle Ground Reef was light as compared to Gadwall and Sand Point reefs. Heavy fouling of the reef by tubeworms (Serpulidae), bryozoa (Membraniporidae), mussels (Brachidontes), and sulphur sponge (Cliona) is common and may have contributed to the decrease in spatfall.

Sand Point Reef was in much better condition and received a more substantial spatfall than did Middle Ground Reef. Fouling organisms were much less abundant on this reef than on Middle Ground Reef.

The spat set on Gadwall Reef was very heavy. Fouling was minimal and the relatively new bed provided a large amount of clean shell surfaces for attachment.

The numbers of seed size oysters in each sample is shown in Table 2. Again the poor condition of Middle Ground Reef as compared with Sand Point Reef is illustrated. Gadwall Reef has a very high percentage of seed size oysters, reflecting a heavy spat set during 1962. The survival rate for the 1962 spat appears to have been excellent.

Market sample data for Middle Ground and Sand Point reefs are shown in Tables 3 and 4. All market size oysters from Middle Ground Reef were poor in quality. Due to the overcrowded conditions and heavy growth of fouling organisms, Middle Ground oysters tend to grow lengthwise with little increase in width, producing "snapper" type shells containing little meat. Sand Point oysters, however, are less crowded, permitting more symmetrical growth with an increase in the amount of meats.

The first market size oysters recorded on Gadwall Reef were taken in June when eight were found present in the population sample (see Table 3). Subsequent samples produced four in July, four in August, none in September, thirty-six in October, fifty-two in November, and thirty-two in December.

Oyster Mortalities:

Sand Point Reef suffered extensive mortalities beginning in September. The initial kill affected the market oysters (Table 3) and by December no oysters over 75 mm in length were collected (Table 4). Smaller oysters were also affected and the December sample showed very few oysters remaining above thirty-three millimeters in length.

Oystermen in the Port Lavaca area reported that the kill was general throughout Lavaca Bay except in the extreme north end of the bay around the mouth of the Lavaca River.

The incidence of Dermocystidium marinum infection among Sand Point Reef oysters was very light or negative prior to the beginning of the mortality and was negative during the period of heaviest mortality (Table 6). Middle Ground Reef, which had a relatively high incidence of infection, exhibited very little mortality during the fall period.

Salinity and temperature data obtained at the time of each collection is given in Table 7. Very little differences in temperature or salinity were noted among the three stations sampled.

Ostrea equestris:

Ostrea equestris seems to be evenly distributed throughout the area, incidence rates for Middle Ground and Gadwall reefs from September through December and for Sand Point Reef in September and October being well correlated, considering the small size of the samples taken. Incidence rates for Sand Point Reef in November and December are not representative due to the extensive mortality of the commercial oyster Crassostrea virginica described above.

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Table 1.

Number of Spat per Bushel (25mm and below)

Middle Ground Reef

Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
89	38	23	36	55	84	161	178	250	291	547	234

Gadwall Reef

1532	1136	940	424	344	240	996	2212	1244	1972	1508	1042
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Sand Point Reef

147	53	73	44	58	127	450	976	884	758	495	300
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Table 2.

Number of Seed Oysters Per Bushel (26mm - 75mm)

Middle Ground Reef

Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
227	249	215	269	229	282	280	218	292	237	353	268

Gadwall Reef

1028	956	964	1934	864	1424	1248	908	1100	1292	872	1056
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Sand Point Reef

994	394	523	618	580	426	351	444	517	256	132	104
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Table 3

Number of Market Oysters (above 75mm) per Bushel in Population Samples

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Middle Ground	33	26	38	37	31	43	35	25	22	16	61	42
Gadwall	0	0	0	0	0	8	4	4	0	36	52	32
Sand Point	48	9	37	30	20	45	28	58	25	2	0	0

Table 4

Number of Oysters above 75 mm per Five Bushel Samples

	June	August	October	December
Middle Ground	175	137	118	206
Sand Point	186	176	20	0

Table 5

Percent Q. equestris in Population Samples

	August	September	October	November	December
Middle Ground	-	18.0	9.0	29.1	20.0
Gadwall	44.8	11.6	19.0	21.9	33.7
Sand Point	-	11.0	19.0	60.0	70.0

Table 6

The incidence of Dermocystidium marinum infection on Middle Ground Reef
and Sand Point Reef during 1963

	MIDDLE GROUND		SAND POINT	
	<u>Weighted Incidence</u>	<u>Percent Infection</u>	<u>Weighted Incidence</u>	<u>Percent Infection</u>
January	2.10	100	.25	20
February	0.00	0	0.00	0
March	0.10	20	0.00	0
April	3.00	100	0.00	0
May	0.00	0	0.05	10
June	2.00	100	0.10	10
July	1.00	90	0.00	0
August	1.05	90	0.00	0
September	2.75	100	0.00	0
October	1.65	100	0.00	0
November	.55	80	-	-
December	-	-	-	-

Infection Incidence Scale: 0.5 = Very light
1.0 = Light
2.0 = Light to moderate
3.0 = Moderate
4.0 = Moderate to heavy
5.0 = Heavy

Table 7

Salinity and Temperature at Time of Collection

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
<u>MIDDLE GROUND</u>												
Salinity (‰)	26.2	28.0	27.7	29.2	30.8	None	27.5	None	35.0	35.5	33.3	30.6
Temperature (°C)	16.5	9.5	16.0	23.7	24.9	24.9	29.4	31.0	31.3	24.7	21.1	7.2
<u>GADWALL</u>												
Salinity (‰)	28.9	28.7	None	29.7	29.0	None	31.8	None	36.2	36.1	34.3	31.1
Temperature (°C)	15.1	11.8	15.5	23.5	24.7	28.9	29.3	28.8	30.6	24.3	21.7	7.8
<u>SAND POINT</u>												
Salinity (‰)	26.1	26.7	None	None	29.2	None	29.7	None	33.6	33.7	32.3	30.2
Temperature (°C)	7.0	12.5	21.0	25.7	25.0	29.1	30.2	29.4	31.6	26.2	20.9	6.9

Figure 1

Size Range and Most Common 10mm Group
of Ostrea equestris

