Job Report

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Project Name: Oyster and Fisheries Investigations of Area M-5

Period Covered: May 1, 1960 to April 30, 1961 Job No. B-4

Survey of Oyster Reef Populations in San Antonio and Espiritu Santo Bays

Abstract: The oyster studies of Area M-5 for the past year have shown a rapid decline in the oyster population. Floods starting in October 1960 killed many of the oysters in San Antonio Bay. Along with the floods, a high incidence of D. marinum infection contributed to the decline in oyster population of San Antonio Bay. Espiritu Santo Bay was not adversly affected by either the floods or D. marinum, but the increased fishing pressure depleted this bay considerably. Recommendations were made for the approaching season to remove one month from the start of the season and one month from the last of the season. A large spat set early this summer was completely killed by floods north of the Intracoastal Waterway in San Antonio Bay. Most of the large oysters in this same area were also killed. Flood control is definitely needed in this area, along with increased circulation with the Gulf of Mexico.

Objectives: To determine the changes in abundance and size of oysters on major reefs in San Antonio and Espiritu Santo Bays, and to study the organisms associated with oysters, with special emphasis on Dermocystidium marinum.

Procedure: Oyster samples were collected from four major reefs in the area. These reefs are representative of the oyster producing portions of Area M-5. The volume of each sample, to permit comparison, was one standard bushel of 2,150.4 cubic inches. All shell in a bushel, either dead or alive, was included to determine percent mortality. These oysters were all measured to the nearest millimeter. Observation and collection of associated organisms was made at the time oyster samples were taken. Special emphasis was placed on the parasitic fungus, Dermocystidium marinum, and periodic checks were made throughout the study period to determine extent of infection.

Findings: At the start of this job, Area M-5 contained a very dense crop of oysters. Commercial production for the previous year (1959-1960) had been at a 25-year high. Commencing in September 1960, incidence of D. marinum was steadily increasing, and by November had heavily infected most of San Antonio Bay. Starting in November, the Guadulupe River reached flood stage and continued to flood past the first month of 1961. At the onset of December, many oysters were dead and decaying on the reefs. D. marinum infection continued high even in the greatly reduced salinities. Commercial production practically ceased except in Espiritu Santo Bay, which was being heavily oystered. Approximately 70 per cent of the commercial size oysters in San Antonio Bay were killed, either by heavy infection of D. marinum or fresh water, or both combined.

Effects Shown on the Four Sampling Areas:

Mosquito Point Reef: At the start of this study, Mosquito Point Reef (see Fig. 5) was heavily populated with rapidly growing oysters. The average bushel contained 105 oysters (20 mm. and up in size). In September 1960, this had increased to 204 oysters of this size range. At this time, there were 56 market size oysters (above 90 mm.) per bushel. By April 1961, the reef population had decreased to 58 oysters per bushel with only 28 market size oysters per bushel. (See Figure 1, a through f.) This reef was heavily oystered in September and October, 1960, but the harvesting was ordered discontinued by the Texas Health Department after this time because the dead and decaying oysters created a health menace. Late in the oyster season this condition abated; but due to the small numbers of market oysters left alive on the reef, no further harvesting occurred.

Josephine Reef: This reef is representative of the oyster-producing reefs in Espiritu Santo Bay (see Fig. 5). When this study began the reef was heavily populated with growing oysters, mostly spat or small seed oysters. The reef had been worked very heavily for commercial oysters the previous season, and most of the present crop were either spat or seed oysters (218 spat, 184 seed, and 28 market oysters per bushel). The reef at times had a moderate infection of D. marinum, but no damage from this organism was noted. The reef population steadily increased in size until the oyster season opened in September, then rapidly decreased as the large oysters were harvested. (See Figure 2, a through f.) This reef and all others in Espiritu Santo Bay were worked very heavily throughout the 1960-61 season. By April 1961, the population was 3 spat, 219 seed, and 7 market oysters per bushel. Unless there is a recovery of the San Antonio Bay oysters, it may become necessary to shorten the 1961-62 season in Espiritu Santo Bay. This should relieve some fishing pressure in this area and prevent a complete closing of the bay due to overfishing. Considerable numbers of seed oysters just under legal market size were harvested and sold. This helped to deplete the reefs for the coming season.

Panther Point Reef: This reef is representative of the oyster growing area in lower San Antonio Bay (see Fig. 5), and is the main reef in this portion of the bay. It had a dense population at the start of the study period, with a large percentage of market size oysters (21.68 per cent). During the summer and early fall months the incidence of infection of D. marinum steadily increased. By September many oysters of all sizes were dead and market oysters had decreased to 3.19 per cent. The total number of oysters per bushel had decreased from 454 to 331. There was no commercial production from this reef during the oyster season of 1960-61. In April 1961, the reef had recovered slightly and had 4.83 per cent commercial oysters. The D. marinum combined with winter flood had killed practically all market oysters. Small surviving oysters resumed growth early in 1961 and accounted for the slight increase in commercial oysters in April. (See Figure 3, a through f.) In April 1961, the incidence of D. marinum infection was very light.

Chicken Foot Reef: This reef lies in the southwest corner of San Antonio Bay. (See Figure 5.) Environmental conditions in this area are subject to rapid change, due mostly to the flow of the Guadalupe River. Most fresh water from river discharge follows the west shore of San Antonio Bay, past Chicken Foot Reef, and on to the Gulf of Mexico through Cedar Bayou. With an incoming tide this area will receive salty gulf waters frequently. These periodic salinity changes normally create a very productive reef. This reef in the past has

produced the largest crop of market oysters per acre of any reef in Area M-5. In June 1960, the average bushel of oysters on this reef contained 182 oysters. Of this number, 47 were spat (25.8 per cent), 73 seed (40.0 per cent), and 62 were market size oysters (34.2 per cent). This is the highest percentage of market oysters of any reef in this area. In September 1960, the growth of spat and seed oysters changed this to 216 oysters per bushel; 1 spat (0.93 per cent), 93 seed oysters (78.90 per cent), and 24 market oysters (20.17 per cent). However, this does not give a true view of the conditions. If the fresh dead shell on the reef were considered, about 60 per cent of the standard bushel would be dead shell. This would then show only 8.41 per cent market oysters per bushel of reef shell, both live and fresh dead. (See Figure 4, a through f.)

Dermocystidium marinum: Periodic checks were made for the presence of this oyster-infecting organism. Usually the tests were made with oysters from the standard bushel taken for population studies from the reefs just described. Panther Point Reef had the highest incidence recorded during this study period. This was in October 1960. The results of these tests are shown below:

Incidence of Dermocystidium marinum Infection

	April, 1960	Oct., 1960	April, 1961
Chicken Foot Reef	0.0	1.6	0.0
Mosquito Point Reef	0.0	1.2	0.0
Panther Point Reef	0.0	1.8	0.0
Josephine Reef	0.0	1.2	0.4

Associated Organisms: Some of the pests, predators, and other associated organisms found on or near oyster reefs were noted at the time oyster samples were taken. No attempt was made to determine relationships or damage by these organisms, except for the boring clam, Diplothyra (Martesia) smithii. Considerable damage was done to shell of oysters on Panther Point Reef by this species. However, no mortality was noted that could be directly attributed to the boring clam.

The following list includes those forms actually observed during the study period:

Porifera

Cliona sp. Boring sponge. Abundant during summer months on Josephine Reef.

Microciona prolifera. Red encrusting sponge. Common on Josephine Reef during summer months.

Coelenterata

Stomolophus meleagris. Cabbage head. Common through summer months in higher salinities.

Ctenophora

Beroë ovata and Mnemiopsis mccradyi. Common during warmer months throughout the area.

Bryozoa

Bugula sp. Common in San Antonio Bay.

Mollusca

Brachidontes exustus. Abundant on all reefs in this area.

Diplothyra (Martesia) smithii. Abundant on Panther Point Reef and found on all reefs in San Antonio Bay.

Crassostrea virginica. Commercial oyster. The most common mollusk on the reefs and the basis of this survey.

Annelida

Polydora websteri. Abundant on all reefs in the area.

Dexiospira sp. Tube worms. Abundant on Josephine and all reefs in Espiritu Santo Bay.

Arthropoda

Clibanarius vittatus. Hermit crab. Common throughout the area.

Petrolisthes armatus. Common during summer months.

Callinectes sapidus. Blue crab. Common throughout this area all year.

Eurypanopeus depressus. Common in all this area.

Menippe mercenaria. Stone crab. Common on reefs in this area. Juveniles especially abundant.

Balanus improvisus. Barnacle. Common throughout this area; most abundant during summer.

Comments: San Antonio Bay is very productive at times, but is highly erratic in its oyster production, being influenced by the flow of the Guadalupe River. Espiritu Santo Bay is more stable in its production, but does not produce as many market oysters as San Antonio Bay. Controlled flow of the Guadalupe River

would prevent damaging flood waters from periodically destroying oysters in San Antonio Bay.

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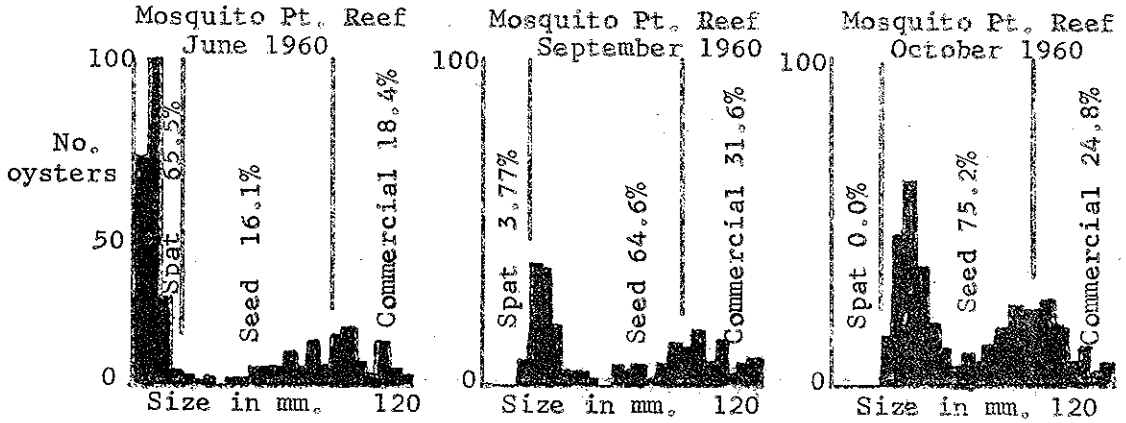

Figure 1-a-c

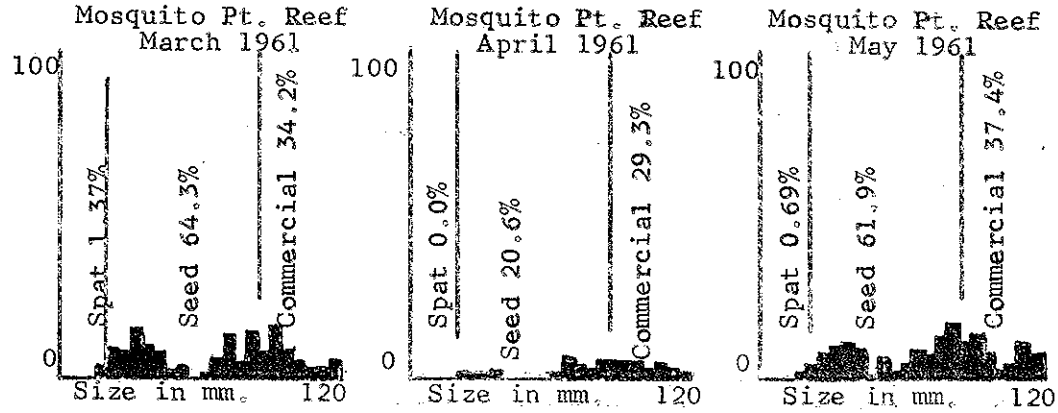

Figure 1-d-f

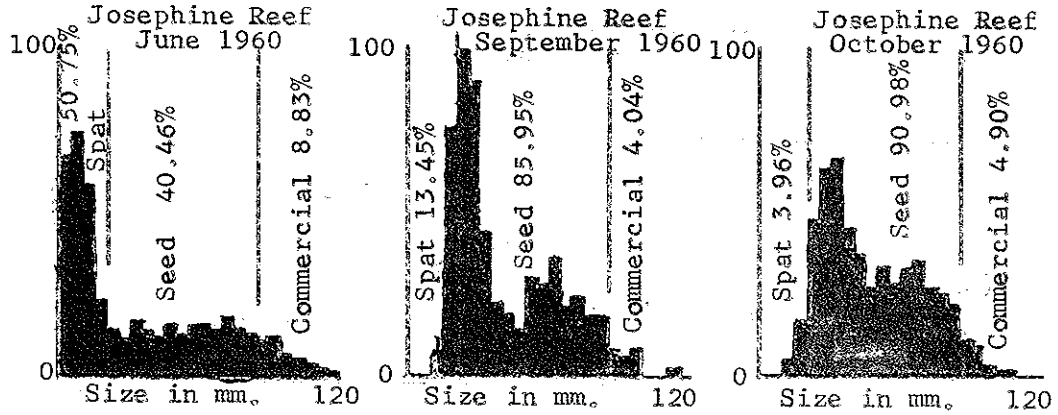

Figure 2-a-c

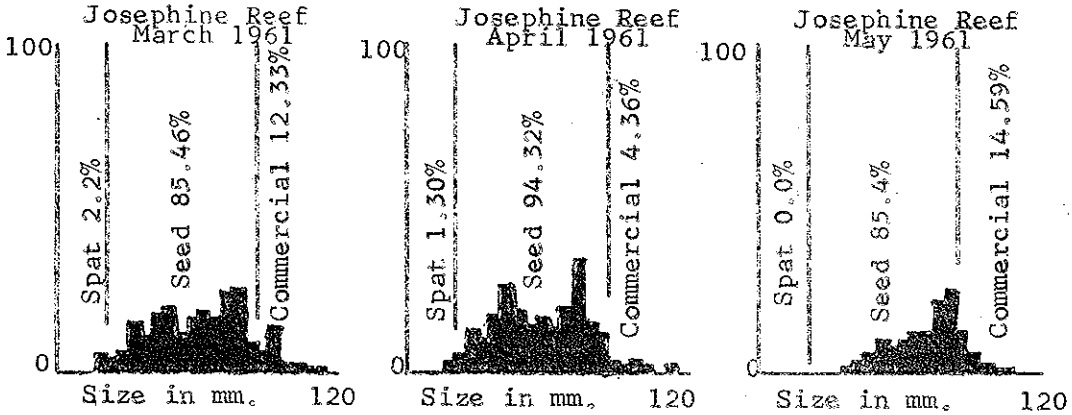

Figure 2-d-f

Figure 3-a Figure 3-b Figure 3-c

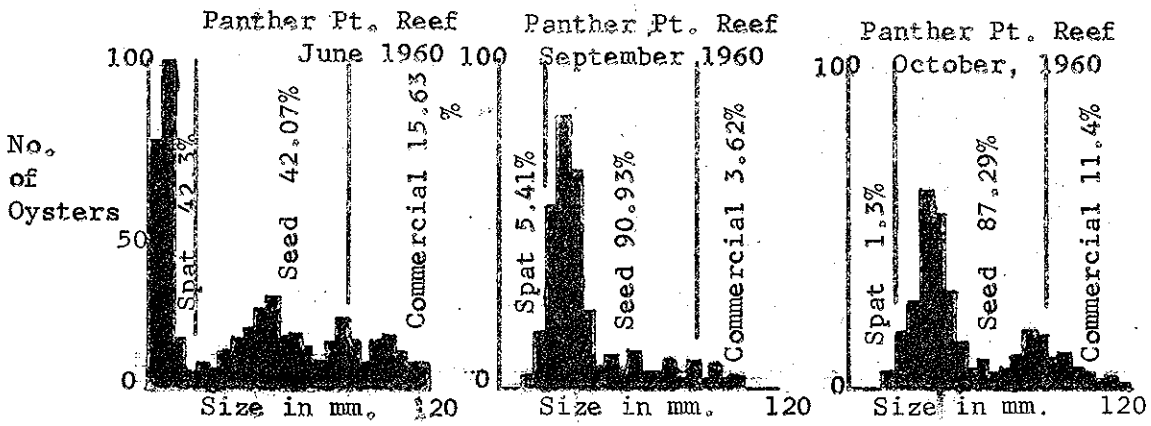

Figure 3-d-f

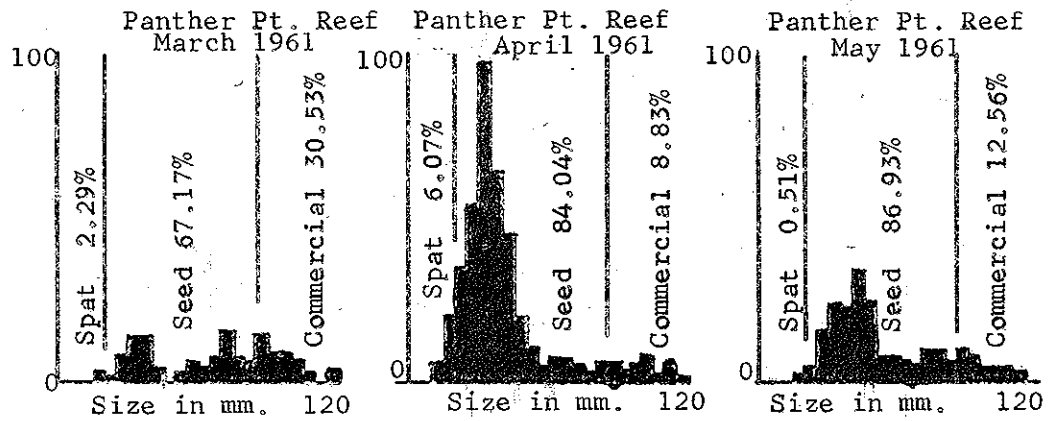

Figure 4-a-c

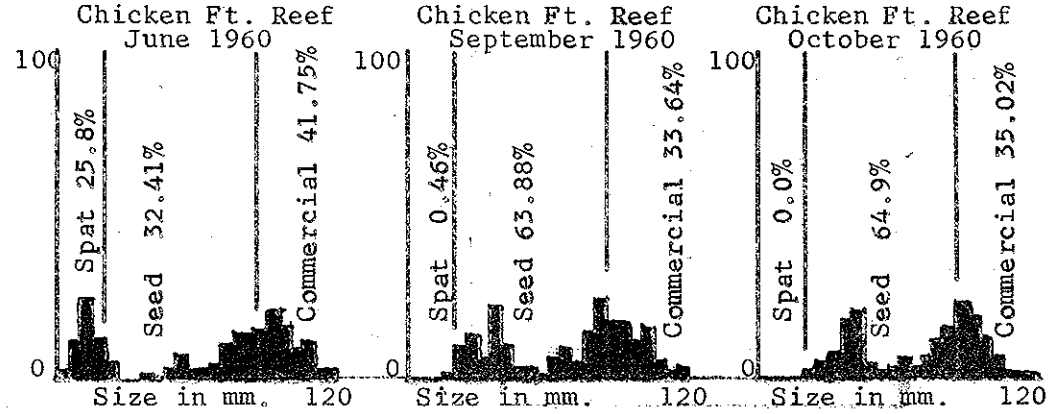

Figure 4-d-f

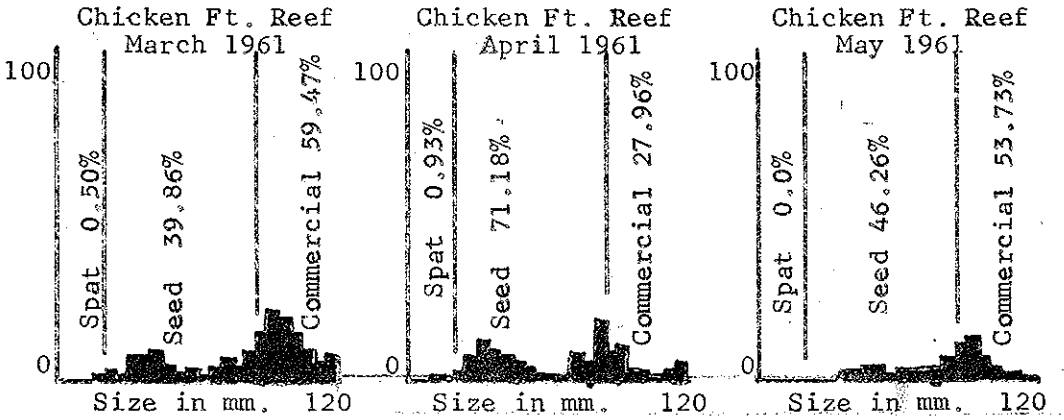

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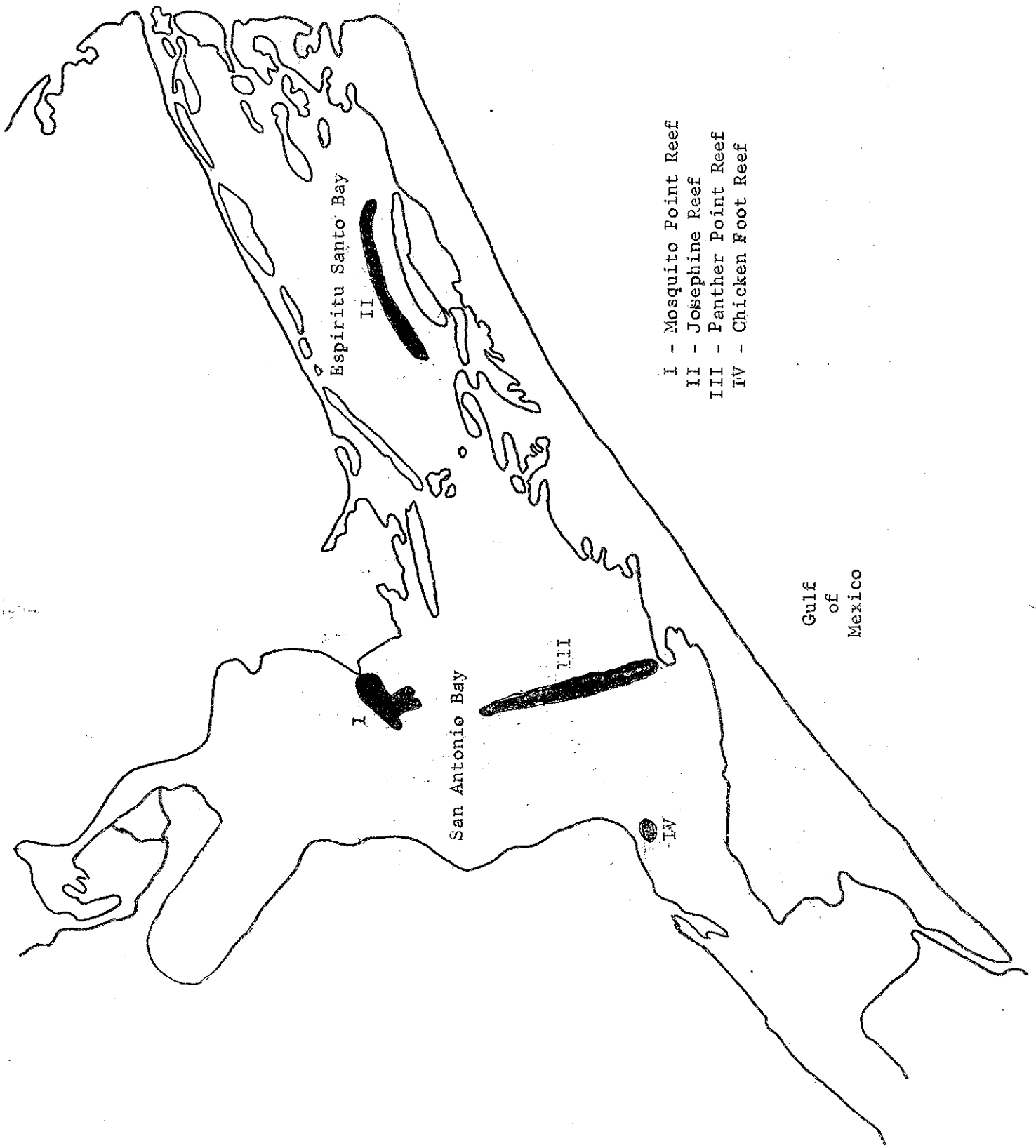
Figure 5


Espiritu Santo Bay
II
I
San Antonio Bay
III
IV
Gulf
of
Mexico
I - Mosquito Point Reef
II - Josephine Reef
III - Panther Point Reef
IV - Chicken Foot Reef