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Job Report

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Project No. MO-1-D-2 Date 1 August 1960.

Project Name: Oyster Reef Development and Protection.

Period Covered: 1 July 1959 to 30 June 1960. Job No. B-3

Management of the Mudshell Industry

Objectives: To regulate the mudshell industry for the protection of existing live oyster reefs. To explore means and methods for permitting maximum shell production with minimum damage to the oyster resources.

Procedures: Dredging areas were examined to determine the presence of oyster reefs and approval was given only for those areas in which minimum damage would occur. Special permits were prepared for areas in which sub-marginal reefs or towheads were present. These permits carried certain restrictions which set dredging limits, required oyster transplanting and reef construction, and provided for immediate withdrawal from the permit area if reef damage was indicated. All dredging operations were continually supervised by the Oyster Warden.

Areas suitable for oyster plantings were located and the industry-sponsored plantings were supervised. Log books were furnished to the oyster boats conducting planting operations, and a monthly summary of activities was required from each boat.

Findings: Supervision of the mudshell industry is the responsibility of the Game and Fish Commission. Such supervision includes the issuing of permits for dredging, the enforcement of laws and regulations pertaining to dredging, and the collection of revenue from sale of the shell.

In the past, inspection of dredging permits and enforcement of dredging regulations were conducted by the Law Enforcement Division. In 1954 these duties were taken over by the newly organized Sand, Shell and Gravel Division. Two shell wardens were assigned to the coast, one at Corpus Christi and the other at Houston. Their primary duties were to "sound barges"; that is, to measure the quantity of shell. Other duties included the inspection of permit areas and the policing of dredging activities. Shortly thereafter, the examination of permit areas was assigned to the Marine Fisheries Division in co-operation with Sand, Shell and Gravel.

Until recently the task of enforcing regulations was fairly simple. The principle regulation prohibited dredging within 1500 feet of a live reef. This was designed to provide ample protection against siltation. Mudshell deposits in Trinity Bay were abundant and there was little necessity for a dredge to work within that distance. Nevertheless, reefs were damaged or destroyed and the reputation of the mudshell industry was blackened among sportsmen and commercial fishermen alike.

By 1957 the large shell deposits in Trinity Bay had been removed and the dredges moved closer to Red Fish Bar in middle Galveston Bay. Violations of

dredging regulations became more and more common. Finally, in May 1959, a special oyster warden was assigned to Galveston Bay to work under the direction of the Marine Fisheries Division. His chief duties were to inspect dredging operations and enforce the regulations.

The efficient control of shell dredging activities provided by the oyster warden was the first step towards better management of the industry. Closer supervision actually allowed the dredges to operate with more freedom than before. In the past, a dredge might set up in one location only to be moved abruptly when it was found to be too close to a live reef. Under the new program, dredging areas were more thoroughly examined and the dredges could operate with freedom in areas which were clearly defined and effectively patrolled.

Constant supervision of dredging operations revealed that a number of sub-marginal reefs and towheads were blocking extensive shell deposits. The reefs, although of slight value, were live and dredging was not permissable. These minor reefs were wasting resources by preventing the full exploitation of the shell deposits. Therefore, special permits were issued to allow controlled dredging in certain areas. Sub-marginal reefs, consisting of scattered lumps of oysters or thin crusts of shell with no clearly defined reef base, were opened to dredging after the oysters had been transplanted to new beds. Dredging was also permitted within 1500 feet of certain reefs as long as silt damage did not occur. Oysters from such reefs were also required to be transplanted to new grounds.

The three major shell companies; Parker Brothers, W.D. Haden, and Horton and Horton operated under special permits. Each company hired commercial oystermen to transplant oysters and construct shell reefs. The W.D. Haden Company has employed an oyster boat since October, 1957; Parker Brothers since May 1959 and Horton and Horton since August, 1959.

The Bay Dredging and Towing Company has operated under regular permits without need for an oyster boat and crew. The Bauer Dredging Company also operated under regular permits during the time it worked in Galveston Bay.

Innovations in the management of the shell industry were based on a number of observations and experiments.

Past, illegal dredging within 1500 feet of a live reef had indicated that oysters were not necessarily buried in silt. Reefs with a substantial crest usually escaped with minor damage although flat reefs were subject to a greater amount of siltation. Currents and tides were found to be as important as distance in determining the quantity of silt deposited on a reef. Continual examination of reefs for silt deposition could therefore substitute for rigid enforcement of the 1500 foot limit.

Oyster plantings have been carried on for a number of years in many parts of the world and have become a pre-requisite for successful oyster farming. Suitable bottom was readily available for such plantings in Galveston Bay, usually adjacent to natural reefs.

Shell pads have been constructed in Texas waters for many years although they were not designed for raising oysters. Most oil drilling rigs require a shell pad to provide a strong, level base for the drilling barge. Many of these pads have produced, and are producing, marketable oysters. Experimental reefs constructed by the Game and Fish Commission have also proven to be successful. (See Job B-2). In addition, shell companies have constructed

artificial reefs in previous years. Parker Brothers built two "fishing reefs" in Galveston Bay; one off Bayview in 1952 and the other off Umbrella Point in 1954. The Matagorda Shell Company built two similar reefs in Matagorda Bay in 1955.

Thus the procedures had been tested over a period of years and had been given sufficient trial to justify their use in this program.

Eight reefs have been constructed, or are under construction, in Galveston Bay. Their locations are shown in Figure I. Summaries of oyster and shell plantings are given in Tables 1, 2, and 3.

Initial plantings, which consisted of unculled oysters andshell, were made on bottom composed of sticky mud or mud and shell. Whenever possible the oysters were planted alongside existing reefs. Since much of the bay bottom consisted of silt overlying firm mud or shell, wide-scale operations were not possible. Oysters planted on such bottom would sink beneath the silt layer and be lost. Therefore the shell companies were encouraged to supply mudshell to form a pad for the oysters.

Shell plantings were started in December 1959. Flat-decked barges were furnished by Parker Brothers and Horton and Horton and all three companies supplied the shell. Valentino Marine Service, which had the contract for oyster planting, also undertook the shell planting.

Shovels were used to unload the first barge. Subsequent plantings were made with a bull-dozer. At first the barge was anchored over the reef area and the shell was spread by adjusting the anchorage. Later, the barge was towed in a circular path while the dozer continually pushed shell off the side. This method produced a smooth surface with a few gaps or lumps. A dragline was also employed on occasion but the resulting shell pad was not as smooth as that placed by the dozer.

Since the quantity of oysters and shell available for planting was not known in advance, no attempt was made to mark off definite limits for the reefs. Bottom composition was checked over wide areas and planting were made within rough limits. All of the reefs can be expanded, and for this reason exact surveys have not been made. Such surveys will be done when the reefs are judged to be complete.

All but two of the reefs have been placed in areas approved by the State Health Department and will be available for the commercial fishery. Reef #5 is located in an area off Seabrook where sports fishing intensity is high. It is doubtful whether this area will ever be opened by the Health Department but the reef will be available for fishing and for seed oysters. Reef #8 is located on the north side of Smith Point near State Experimental Reef #3. Although the area has been closed by the Health Department in recent years it is expected to be opened again at a future date.

Comments: Industry-sponsored reefs have in Galveston Bay received little support from the public. There appears to be a deep-rooted belief that the replacement reefs are tokens given for the complete destruction of the natural oyster beds. This belief probably stems from the ill-feelings against the shell companies because of their past actions in the bay. A major handicap has been that the program started too late to permit the creation of extensive

reserves. The reefs, even though successful, are too few to make much impression on the public. The scope of the plantings must be increased to keep pace with shell production.

Prepared by R.P. Hofstetter Accepted by Howard T. Lee

Marine Biologist. Date 12 January 1961

Table 1

Oyster and Shell Plantings (1959-60)

Month	Oysters (Bbls)				Shell (Cu. Yds)			
	PB	H-H	H	Total	PB	H-H	H	Total
1959								
September	3,130	2,750	3,120	9,000				
October	2,660	3,030	2,990	8,680				
November	2,345	2,745	2,670	7,760				
December	1,555	2,300	2,535	6,390	100	400		500
1960								
January	1,590	2,280	1,195	5,065	650			650
February	1,140	2,095	1,280	4,515	550	275		825
March	2,175	2,235	2,305	6,715		500		500
April	2,270	1,820	1,120	5,210	3,300		2,193	5,493
May	3,300	400	2,720	6,420		5,287		5,287
June	1,975	2,785	1,690	6,450	3,500		5,843	9,343
TOTAL	22,140	22,440	21,625	66,205	8,100	6,462	8,036	22,598

No record of oyster plantings before September 1959.
No shell plantings until December 1959.

PB - Parker Brothers and Company, Inc.

H-H - Horton and Horton

H - W.D. Haden Company.

Table 2

Summary of Reef Plantings (to July, 1960)

Reef	Oyster Barrels	Shell Cubic Yards
SR#1	60,000	
SR#2	30,000	
SR#3	25,000	1,825
SR#4	24,000	650
SR#5	4,000	2,193
SR#6	3,000	12,643
SR#7	---	5,287
SR#8	2,000	
Total **	148,000	22,598

** Oyster plantings are given in round numbers.

The total oyster plantings will not agree with the totals in Table 1 because SR#1 and SR#2 were constructed before the project year. Estimates only are available for these two reefs.

Table 3

Summary of Transplanted Reefs (to July, 1960)

Reef #1: Location: State Tract 286 on west side of Red Fish Island.
Bottom: Firm mud. Sandy mud inshore, softer mud on outer edge.
Plantings: Oysters only. Oysters transplanted from area between Houston Ship Channel and east side of Red Fish Island.
Started: October 1957.
Remarks: Worked commercially in 1957, 1958, 1959.

Reef #2: Location: State Tract 266, south of old Trinity River Channel.
Bottom: Mud with scattered lumps of oysters.
Plantings: Oysters only from Red Fish Bar area.
Started: May 1959.
Remarks: Worked commercially in 1959. Used as a sportsfishing reef when marked.

Table 3 - Continued

Reef #3:	Location:	State Tract 288, NW of Sun Oil Well #4.
	Bottom:	Firm mud with a slight sand crust.
	Plantings:	Oysters and shell. Oysters from Seabrook area reefs.
	Started:	July, 1959.
	Remarks:	Not worked commercially in 1959 although capable of supporting dredging.
Reef #4:	Location:	State Tract 264 east of Houston Ship Channel Buoy #58.
	Bottom:	Shell on east side, mud in center, sand crust on west side.
	Plantings:	Oysters and shell. Oysters from Red Fish Bar area.
	Started:	October, 1959.
	Remarks:	Spoil from Houston Ship Channel dredging caused 37% mortality along north edge of reef in limited area but good recovery was noticed. Used as sportsfishing area when marked.
Reef #5:	Location:	State Tract 293.
	Bottom:	Small area of exposed shell surrounded by shell covered by varying amounts of mud.
	Plantings:	Oysters and shell. Oysters from Seabrook area reefs.
	Started:	April, 1960.
	Remarks:	Existing reef area has been expanded from two acres to one of seven acres. Used by party boats and sportsfishermen.
Reef #6:	Location:	State Tract 307.
	Bottom:	Very small live reef surrounded by sandy mud bottom.
	Plantings:	Mostly shell with some oysters. Oysters from Seabrook area reefs.
	Started:	April, 1960.
Reef #7:	Location:	State Tract 228 NE of Pan-Am pipeline marker "E".
	Bottom:	Sandy mud alongside live reef.
	Plantings:	Shell only.
	Started:	May, 1960.
	Remarks:	Shell received abundant spat set during summer months, 1960.
Reef #8:	Location:	State Tract 108 near State Experimental Reef #3 and Smith Point Tripod marker.
	Bottom:	Sandy mud with a few scattered oysters.
	Plantings:	Oysters only from Vingtune Reef.
	Started:	June, 1960.
	Remarks:	Planting insufficient to judge results at end of project year.

Figure I

Galveston Bay, showing location of artificial reefs.