

JOB REPORT

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Project Name: A Study of the Texas Shrimp Populations

Period Covered: June 4, 1962 to December 31, 1962

Job No. 10

Migration Study on Brown Shrimp, Penaeus aztecus (Ives), in the Lower Laguna Madre

Abstract: In June 1962, 40,023 brown shrimp were stained with a fast green dye by injection through the dorsal artery. Of the shrimp stained, 37,733 survived and were released at night in the bay near Port Mansfield.

The general bay movement of the shrimp was southward toward the Brazos-Santiago Pass and eastward toward the new Port Mansfield Pass. Gulf returns indicated the shrimp moved in a northerly direction after leaving the bay. It was speculated that the Gulf movement was due to onshore currents caused by prevailing southerly winds.

Stained shrimp returns indicated they were moving at the rate of 0 to 1.88 miles per day.

Objective: To determine the summer movement and migration patterns of brown shrimp, Penaeus aztecus (Ives), in the Lower Laguna Madre.

Procedures: The 1962 brown shrimp staining program was scheduled for the four day period, June fourth through June eight. An advance crew and the boat Goby left Rockport for Port Mansfield two weeks prior to June fourth with the 20 X 40 foot staining barge and all necessary equipment. The barge was anchored just outside of Port Mansfield harbor. The crew began collecting shrimp with a 20 foot trawl of 1 1/2 inch stretch mesh a week before staining was to begin. The shrimp were placed in a live bait box containing circulating bay water. They were then transported back to the barge to be placed in wire holding pens.

On June third a severe squall damaged the holding pens, killing approximately half of the 10,000 shrimp on hand. The storm also did some minor damage to the equipment. The barge was then moved to a public dock at Port Mansfield harbor, which offered maximum protection from the weather. All coastal seasonal biologists arrived in Port Mansfield prior to June fourth and staining began on schedule. Due to extremely hot weather, work began at 6 AM and secured at 3 PM to avoid handling shrimp during the hottest part of the day, (also because we had to prepare the barge and equipment for the normal afternoon squall). The boat Goby would leave the dock at 4 AM each morning and bring in a load of shrimp by 8 AM. A second trip was then made to catch shrimp needed to begin the following days staining.

There were two staining tables on the barge and each had a trough of circulating water that ran the length of the table. Work was arranged so that one man filled the hypodermic needles with the dye. Two men dipped

shrimp from the holding pens, placed them in plastic dishpans, and distributed the pans to the stainers. Three stainers were stationed at each table, and one man counted the stained shrimp after they were dropped in the trough and were being washed into the holding pen.

Stained shrimp were not graded for size, since growth rate was not of major concern in this study, although the majority of the shrimp caught were in a 60 to 80 millimeter size range. Each shrimp was stained with .03 cubic centimeters of a 0.5 per cent solution of fast green dye injected through the dorsal artery between the fifth and sixth body somites. These shrimp were held in pens for six to eight hours to determine the amount of mortality. The Goby pulled the holding pens into the Laguna near Port Mansfield (see figure 1) and released the shrimp at night to reduce the chances of predation.

Following staining operations, posters and handbills were distributed to bait dealers in the Lower Laguna Madre area asking fishermen to watch for stained shrimp in their catch. The posters offered a reward and requested fishermen to send frozen or preserved shrimp with the date and location they were taken to any biologist, game warden, or to the Texas Game and Fish Commission Marine Laboratory in Rockport. Twenty eight bait dealers in the Port Mansfield, Port Isabel, and Brownsville shrimp basin areas were visited and given posters and handbills.

The boat Goby shrimped the Gulf from Port Isabel to Port Mansfield for three days following the release of the shrimp in an attempt to trace them as they moved into the Gulf. The area biologist in the Lower Laguna Madre also attempted to trace the shrimp in the bay area.

Six rewards of twenty five dollars each were offered for stained shrimp through the cooperation of the Texas Shrimp Association. These rewards, were given upon the drawing of names from those of the fishermen who returned stained shrimp.

Results: 40,023 brown shrimp were stained in June (approximately 200 per hour per stainer) of which 37,733 survived. Mortalities during this study were approximately six per cent. Daily staining activities were as follows:

<u>Date</u>	<u>Number Stained</u>	<u>Number Releases</u>	<u>Estimated Mortalities</u>	<u>% Mortalities</u>
6/4/62	1,363	7,942	420	5
6/5/62	11,439	10,287	1,140	10
6/6/62	12,326	11,836	490	4
6/7/62	<u>7,906</u>	<u>7,666</u>	<u>240</u>	<u>3</u>
Total	40,023	37,733	2,290	6

The highest percentage of mortalities occurred on the first and second days of staining, probably due to the inexperience of personnel in handling and injecting dye. The major causes of mortalities were damaged hypodermic needles and over-crowded holding pens. The original plan was to release 40,000 stained shrimp; however, due to mortalities and an insufficient supply of dye, the job was secured at 37,733.

Of the stained shrimp released, 104 were recovered within 50 days of release (Figure 2). There were 96 returns the first month. Fifty per cent of the recoveries were caught in the release area, 30 per cent were caught

south of Port Mansfield; 18 per cent were caught east of Port Mansfield and two per cent were caught in the Gulf in 14 fathoms of water off Port Mansfield Pass. Six per cent of the returns furnished no valid data. The shrimp that reached the Gulf did so within 30 days after release.

The bay returns indicated a great deal of random movement of the shrimp, but their major migratory routes were south and east of Port Mansfield in the general direction of the Brazos-Santiago Pass and the new Port Mansfield Pass. Gulf returns indicated the shrimp moved in a northerly direction after leaving the bay. Perhaps this northward movement of the Gulf shrimp was caused by onshore currents during the summer due to prevailing southerly winds. The U. S. Fish and Wildlife Service Gulf current data to be published later should shed some light on this puzzling question.

Table 1 lists the stained shrimp returns. Figure 1 shows a map of their movement pattern.

Recommendations for future staining operations:

At least six pens should be used to hold shrimp during staining operations. These should be 3' X 4' X 10' holding pens made of 1/2 inch hardware cloth. Not over 5000 shrimp should be placed in each pen. During extremely hot weather, the number of shrimp should be reduced to 2500.

Care should be taken when filling hypodermic needles as the points are easily burred on the bottom of the dye bottles. This increased staining mortality during the 1962 experiment.

The rewards offered this year were a great help in assuring returns and would be useful in any future work. As there were reports of bait dealers selling stained shrimp the importance of returns in determining movement of the shrimp must be strongly emphasized on posters and handbills. Biologists should personally contact as many bait dealers and shrimpers as possible, explaining the purpose and importance of their cooperation in these programs.

More state boats and biologists are needed to follow the stained shrimp in the bay and Gulf. Traps and nets should be used at all exits from the bays to check movement of the shrimp out of the area. Night samples need to be collected, particularly if brown shrimp are stained, as they are known to be a nocturnal species.

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TABLE 1

Date	Number of Shrimp	Size of Shrimp	Area Caught	Days Out	Distance		Name
					Moved	Miles Per Day	
6/4/62	19	-	East of Port Mansfield	0	-	-	Fred Gillit
6/10/62	22	60-62 mm	Port Mansfield	2	0	0	Al Parker
6/13/62	3	Not Meas.	" "	5	0	0	Mike Murphy
6/14/62	6	60-80 mm	" "	6	0	0	Ken Osborn
6/15/62	2	Not Meas.	" "	7	0	0	Henry Crafka
6/15/62	1	76 mm	Mkr. # 311	7	0	0	Luther Sing
6/17/62	5	Not Meas.	Mouth of Arroyo Colorado	8	15 mi.	1.88	B. Grantland
6/17/62	1	88 mm	Mkr. # 324	9	14 mi.	1.55	M. W. Byrd
6/18/62	2	78-88 mm	Mkr. # 311	10	-	-	Luther Sing
6/19/62	2	78-84 mm	Mkr. # 311	11	10	0.91	Durwood Hall
6/20/62	3	76-86-90	Mkr. # 311	12	-	-	Luther Sing
6/21/62	1	-	Port Mansfield Mouth of Harbor	13	-	-	Phil Guthrie
6/23/62	2	81-84 mm	Mkr. # 311	15	10 mi.	0.66	A. W. Fitzpatrick
6/24/62	1	89 mm	Mkr. # 326	16	15 mi.	0.94	Mrs. Elmer Walk
6/25/62	1	91 mm	Mkr. # 316	17	12 mi.	0.71	U. S. Hinton
6/25/62	2	72-84 mm	SE Corner of Mansfield "Y"	17	-	-	Fred Gillit
6/25/62	1	81 mm	Mkr. # 316	17	14 mi.	0.82	Aaron Sanchez
6/28/62	3	-	North Side of Channel Port Mansfield	20	-	-	Fred Gilbert

TABLE 1 (Con't)

Date	Number of Shrimp	Size of Shrimp	Area Caught	Days Out	Distance Moved	Miles Per Day	Name
6/29/62	2	79-81 mm	Redfish Motel Port Mansfield, Texas	21	-	-	Fred Gilbert
7/7/62	2	93-94 mm	Mkr. # 326	29	14 mi.	0.48	Remco Escobedo
No Date	1	-	I.C.W. of Port Mansfield	-	-	-	J. C. Bellah
No Date	8	-	Anchor Bait Stand Port Mansfield	-	-	-	Mrs. M. Starnes
7/7/62	2	59,85 mm	Mkr. # 328	29	15 mi.	0.52	Kneis J. Norbert
7/7/62	2	74,77 mm	Mkr. # 326	29	14 mi.	0.48	Mr. L. M. Gallion
7/8/62	2	100,115 mm	12 mi. N of Willacy County Line, 9 mi. from shore in 84 ft. of water.	30	appx. 28 mi.	0.94	Coastal Ice & Fish Company
7/13/62	1	91 mm	Port Mansfield	35	0	0	Fred Gillit
7/13/62	1	-	Mouth of Arroyo Colorado	35	15 mi.	0.43	Johnny Ziegler
7/16/62	1	78 mm	Mkr. # 311	38	10 mi.	0.26	-
7/18/62	4	82,82,83, 85 mm	Mkr. # 311	39	19 mi.	0.25	-
7/27/62	1	84 mm	Port Mansfield	49	0	0	Donald Davis

FIGURE 1

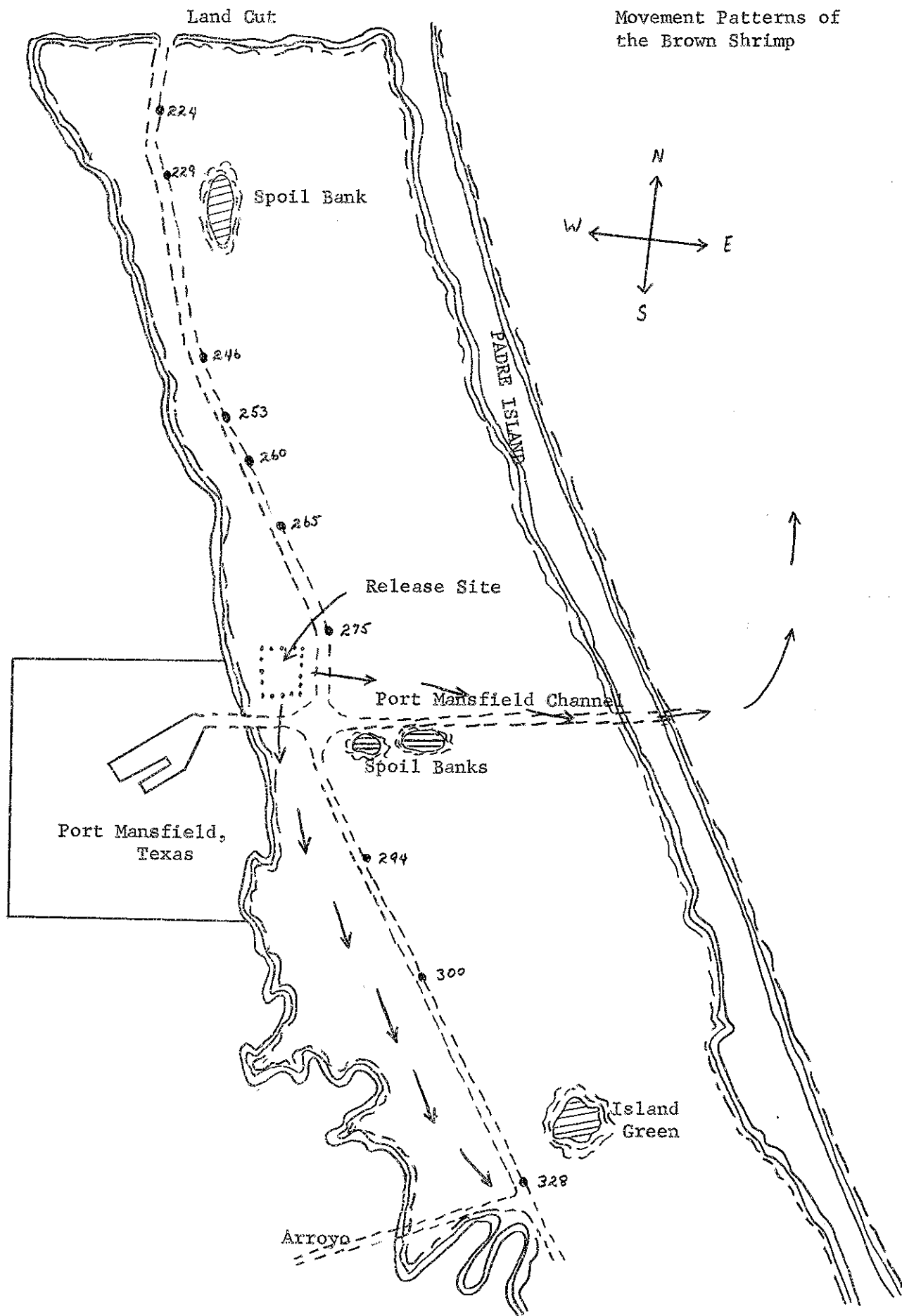


Figure 2  
Brown Shrimp Returns by Five  
Day Periods

