NOAA Technical Memorandum NMFS-SEFC-68

NOAA/NMFS FINAL REPORT TO DOE

Shrimp and Redfish Studies, Bryan Mound Brine Disposal Site Off Freeport, Texas 1979-1981

A report to the Department of Energy on work conducted under provisions of Interagency Agreement DE-A10178US07146 during 1979-1981.

Volume IV

CATCH-EFFORT SAMPLING SURVEY

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Southeast Fisheries Center
Galveston Laboratory
Galveston, Texas 77550

JUNE 1981

NOAA Technical Memorandum
NMFS-SEFC-68

Shrimp and Redfish Studies; Bryan Mound Brine Disposal Site Off Freeport, Texas, 1979-1981.

VOL. IV-INTERVIEW SAMPLING SURVEY OF SHRIMP CATCH AND EFFORT

By

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A report to the Department of Energy on work conducted under provisions of Interagency Agreement DE-A10178US07146 during 1979-1981.

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U. S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
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NOTICE TO USERS

Work Unit 6 (Interview Sampling Survey of Shrimp Catch and Effort) involved the collection of current fisheries statistics, and supplemented similar surveys conducted by the National Marine Fisheries Service, Southeast Fisheries Center's Technical Information and Management Services. Analyses of these catch and effort data associated with the Bryan Mound brine disposal site will be conducted as part of an extension of Work Unit 4 (Shrimp Mark-Recapture Investigations), which will began in May 1981, with a final report to the Department of Energy in September 1982. These analyses will be performed to estimate rates of growth, mortality and migration of marked-released-recaptured shrimp for comparison with rates estimated for other regions of the Texas coast.

DISCLAIMER

This document is a Final Report. It has been reviewed by the National Marine Fisheries Service and the National Oceanic and Atmospheric Administration and approved for printing. Such approval does not signify that the contents necessarily reflect the views and policies of the U. S. Department of Energy, NOAA or NMFS. This report has not been formally released by the DOE. Mention of trade names and commercial products herein does not constitute endorsement or recommendation for use.

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This Report should be cited as follows:

Johnson, M. F. 1981. Interview sampling survey of shrimp catch and effort. Vol. IV. In: Jackson, W. B. and J. R. Bennett (eds.). Shrimp and redfish studies; Bryan Mound brine disposal site off Freeport, Texas, 1979-1981. NOAA Technical Memorandum NMFS-SEFC-68, 38 p. Available from: NTIS, Springfield, Virginia.

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Texas A&M University

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Volume VI - SHRIMP BIOASSAYS

Work Unit 8 - Brine Toxicity and Avoidance/Attraction Bioassays on Shrimp

University of Houston

N. R. Howe, Ph.D.

INTRODUCTION

In compliance with the Energy Policy and Conservation Act of 1975, Title 1, Part B (Public Law 94-163), the Department of Energy (DOE) implemented the Strategic Petroleum Reserve (SPR) with the goal of storing a minimum of one billion barrels of crude oil. After evaluating several physical storage possibilities, DOE determined that storage in commercially developed salt dome cavities through solution-mining processes was the most economically and environmentally advantageous option.

Four coastal areas along the northwestern Gulf of Mexico were assessed for brine discharge into nearshore waters (Figure 1). This project, "Shrimp and Redfish Studies; Bryan Mound Brine Disposal Site off Freeport, Texas", deals with potential impacts of brine disposal from the Bryan Mound site. Under permit from the Environmental Protection Agency (EPA), this brine discharge site (Latitude 28° 44.28'N; Longitude 95° 14.64'W) was selected about 12.5 miles directly offshore of Bryan Mound.

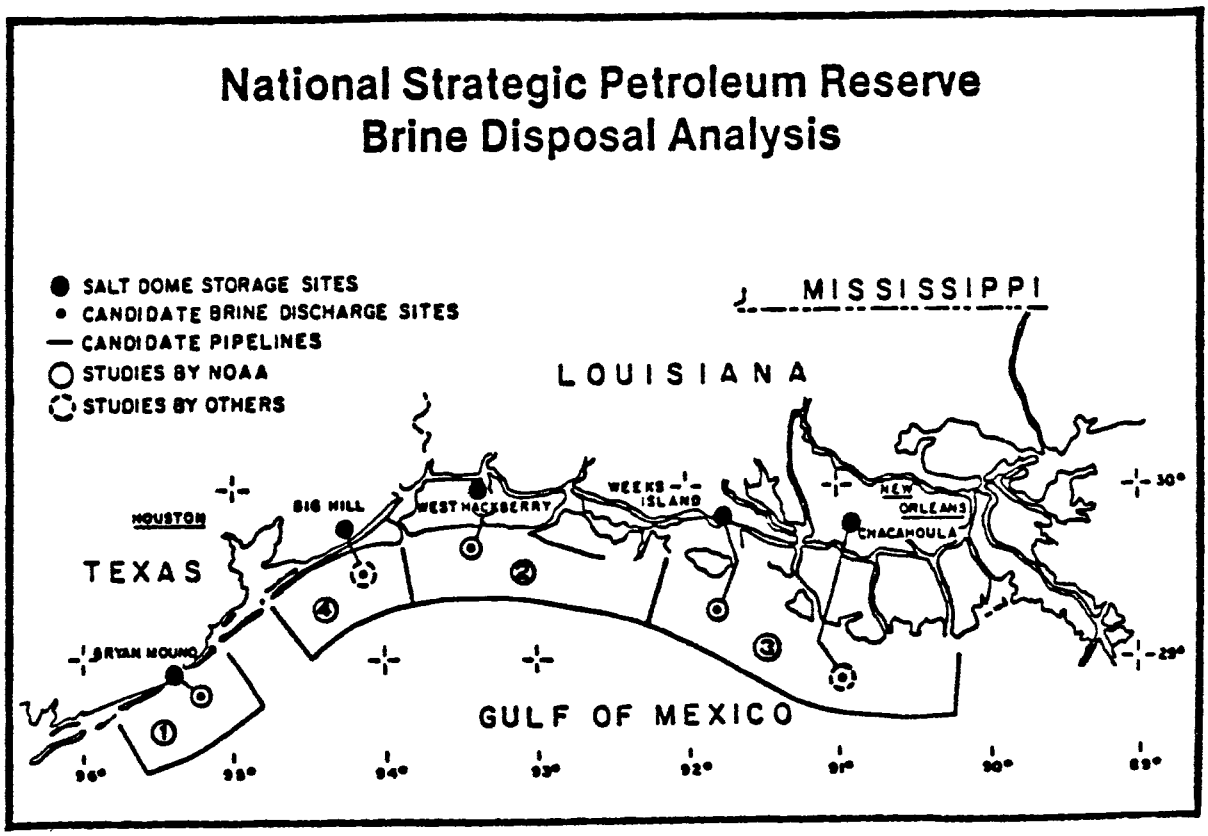

Figure 1. Regions of Study for Brine Disposal Assessment-DOE/NOAA Interagency Agreement (adapted from Environmental Data and Information Service, DOC/NOAA).

The process of creating a storage cavern within a salt dome involves dissolving the solid salts with raw water. The water source for leaching of the Bryan Mound salt dome is the Brazos River. Water from the Brazos River is piped under pressure into the dome. The resultant brine (dissolved salts) is discharged, at variable rates (over 100,000 barrels/day) into the Gulf of Mexico.

To complement the site-specific oceanographic and biological monitoring of brine disposal conducted by Texas A&M University, a regional assessment of important commercial and recreational fisheries was initiated in August, 1979. The objectives of this assessment were (1) to conduct a pre-discharge/post-discharge assessment of shrimp populations in relation to the Bryan Mound salt dome brine disposal site and (2) to determine acute toxicity and avoidance/attraction responses of shrimp and redfish to Bryan Mound brine. These objectives were achieved through field and laboratory investigations and through statistical analysis of the data. Specific studies included (1) analysis of data on shrimping success, shrimp recruitment and associated environmental variables, (2) analysis of Texas coast shrimp catch and effort data, (3) shrimp mark-release investigations, (4) shrimp spawning site survey, (5) interview sampling survey of shrimp catch and effort, (6) brine toxicity and avoidance/attraction bioassays on redfish and (7) brine toxicity and avoidance/attraction bioassays on shrimp.

The major products of the Shrimp and Redfish Studies are: Final Reports available through the National Technical Information Service (NTIS), Springfield, Virginia; data files available through the Environmental Data and Information Service (EDIS), Washington, D.C., and any publications that may be written by participating principal investigators and submitted to scientific or technical journals. Preliminary results have been made available through DOE/NOAA/NMFS project reviews and workshops attended by project participants and various governmental, private and public user groups.

The DOE has developed comprehensive Environmental Impact Statements listed below:

1. Strategic Petroleum Reserve - Seaway Group Salt Domes, June 1978, Final EIS, DOE/EIS-0021.

2. Strategic Petroleum Reserve - Bryan Mound Salt Domes, January 1977, Final EIS, FES 76/77-6.

3. Strategic Petroleum Reserve - Expansion of Reserve, January 1979, Final Supplement to Final EIS, FEA-FES-76-2.

All three reports are available from the U.S. Department of Commerce, National Technical Information Service (NTIS), 5285 Port Royal Road, Springfield, Virginia 22161.

Texas A&M University (TAMU) has conducted studies of physical oceanography, sediments, water quality, benthos and nekton at the Bryan Mound brine disposal site from September, 1977 to February, 1979. In addition, TAMU has developed a towed sensing system for tracking the brine plume. Results of this research are available in:

Metzbower, H. T., S. S. Curry and F. A. Godshall. 1980. Handbook of the Marine Environment - Bryan Mound. NOAA Report to DOE Strategic Petroleum Reserve Program, Salt Dome Storage/Brine. 92 p.

The Massachusetts Institute of Technology (MIT) has developed a mathematical, 3-dimensional, hydrodynamic simulation model of the brine plume dispersion. The model and test-tank simulations have the capacity to evaluate effects of varying effluent discharge rates and currents and to identify various plume configurations and densities. Salinity dispersion was modeled showing that a dilution rate of 100:1 can be expected within 100 feet of the diffuser head. The MIT analyses are available in DOE's final Bryan Mound EIS (FES 76/77-6) listed earlier.

LIST OF REPORTS AND PUBLICATIONS

Shrimp and Redfish Studies, Bryan Mound Brine Disposal Site off Freeport, Texas 1979-1981

Comiskey, C. E. 1981. Analyses of data on shrimping success, shrimp recruitment and associated environmental variables. Vol. I. In: Jackson, W. B. and J. R Bennett (eds.). Shrimp and redfish studies; Bryan Mound brine disposal site off Freeport, Texas, 1979-1981. NOAA Technical Memorandum NMFS-SEFC-65. (In preparation).

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Owens, D. W., K. A. Jones and L. A. Reitsema. 1981. (Part B) Brine avoidance/attraction bioassays on redfish. Vol. V. In: Jackson, W. B. and J. R. Bennett (eds.). Shrimp and redfish studies; Bryan Mound brine disposal site off Freeport, Texas, 1979-1981. NOAA Technical Memorandum NMFS-SEFC-69. (In preparation).

Biological/Chemical Survey of Texoma and Capline Sector Salt Dome Brine Disposal Sites off Louisiana, 1978-1979

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Brooks, J. M. 1980. Determine seasonal variations in inorganic nutrient composition and concentration of the water column. Vol. VIII. In: Jackson, W. B. and G. M. Faw (eds.). Biological/chemical survey of Texoma and Capline sector salt dome brine disposal sites off Louisiana, 1978-1979. NOAA Technical Memorandum NMFS-SEFC-32, 31 p. Available from: NTIS, Springfield, Virginia.

Hausknecht, K. A. 1980. Describe surficial sediments and suspended particulate matter. Vol. V. In: Jackson, W. B. and G. M. Faw (eds.). Biological/chemical survey of Texoma and Capline sector salt dome brine disposal sites off Louisiana, 1978-1979. NOAA Technical Memorandum NMFS-SEFC-29, 56 p. Available from: NTIS, Springfield, Virginia.

Landry, A. M. and H. W. Armstrong. 1980. Determine seasonal abundance, distribution and community composition of demersal finfishes and macro-crustaceans. Vol. IV. In: Jackson, W. B. and G. M. Faw (eds.). Biological/chemical survey of Texoma and Capline sector salt dome brine disposal sites off Louisiana, 1978-1979. NOAA Technical Memorandum NMFS-SEFC-28, 180 p. Available from: NTIS, Springfield, Virginia.

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chemical survey of Texoma and Capline sector salt dome brine disposal sites off Louisiana, 1978-1979. NOAA Technical Memorandum NMFS-SEFC-33, 293 p. Available from: NTIS, Springfield, Virginia.

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Tillery, J. B. 1980. Determine trace metal composition and concentration in major components of the marine ecosystem. Vol. VII. In: Jackson, W. B. and G. M. Faw (eds.). Biological/chemical survey of Texoma and Capline sector salt dome brine disposal sites off Louisiana, 1978-1979. NOAA Technical Memorandum NMFS-SEFC-31, 72 p. Available from: NTIS, Springfield, Virginia.

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Caillouet, C. W., F. J. Patella and W. B. Jackson. 1980. Trends toward decreasing size of brown shrimp, Penaeus aztecus, and white shrimp, Penaeus setiferus, in reported annual catches from Texas and Louisiana. NOAA/NMFS Fishery Bulletin 77(4):985-989.

Caillouet, C. W., D. B. Koi and W. B. Jackson. 1980. Relationship between ex-vessel value and size composition of annual landings of shrimp from the gulf and south Atlantic coasts. Marine Fisheries Review 42(12):28-33.

Caillouet, C. W. and D. B. Koi. 1980. Trends in ex-vessel value and size composition of annual landings of brown, pink and white shrimp from the gulf and south Atlantic coasts of the United States. Marine Fisheries Review 42(12):18-27.

Caillouet, C. W. and D. B. Koi. (1981). Trends in ex-vessel value and size composition of reported May-August catches of brown and white shrimp from the Texas, Louisiana, Mississippi and Alabama coasts, 1960-1978. Gulf Research Reports (in press).

II. PRINCIPAL INVESTIGATOR'S SECTION

WORK UNIT 6 - INTERVIEW SAMPLING SURVEY OF SHRIMP CATCH AND EFFORT

M. F. JOHNSON, Ph.D.

LGL Ecological Research Associates, Inc.

ABSTRACT

An interview sampling survey of shrimp catch and fishing effort was conducted at specified ports along the Texas coast to strengthen the information base required to determine the effect of the disposal of brine from the Bryan Mound salt dome off Freeport, Texas on commercial brown shrimp (*Penaeus aztecus*) and white shrimp (*Penaeus setiferus*) populations in the Gulf of Mexico. Catch-effort and mark-recapture data are being used by LGL to estimate rates of shrimp growth, mortality, and migration, as part of an extension of Work Unit 4 (Shrimp Mark-Recapture). These results will be reported in September, 1982.

LGL port agents interviewed shrimpers at the ports of Galveston, Port Bolivar, Kemah, Freeport, Palacios, Port Lavaca, Port O'Connor, Rockport-Fulton and Aransas Pass. The data recorded included port number, vessel name, official vessel number, shrimp dealer number, date of landing, area fished, depth of capture, days fished, and pounds of shrimp caught by species and size categories. Additional detailed information on number and size of trawls, area of fishing (latitude and longitude), and fishing effort (day *vs*. night) was reported by LGL.

According to the NMFS, Southeast Fisheries Center, Technical Information Management Services, between 1 September 1979 and 31 January 1981 there were a total of 9,327 offshore vessel trips at the ports surveyed by LGL. The LGL port agents conducted 3,922 interviews of shrimpers and completed 4,046 attachment forms. The LGL port agents also collected, processed and recorded data for a total of 2,128 tagged shrimp recovered by shrimpers, fish house employees and bait dealers.

L I S T O F F I G U R E S

L I S T O F T A B L E S

T A B L E O F C O N T E N T S

ACKNOWLEDGEMENTS

I wish to thank the LGL port agents who were responsible for the success of this project: Garry Phillips (Galveston-Port Bolivar-Kemah), Rick Schroeder (Freeport), Diane Mumme (Palacios-Port Lavaca-Port O'Connor) and Kathy Fischer (Rockport-Fulton and Aransas Pass). The port agents worked long hours and with such determination to obtain interviews that it is a small wonder they did not interview every fisherman that had the misfortune of unloading shrimp at their ports.

I wish to acknowledge Mr. Orman Farley, NMFS Supervisory Reporting Specialist, who I will never be able to thank enough for all the help he provided me. It was a pleasure to work with him.

Many thanks also go to Jean Erwin for her excellent typing of this report, and to Bonnie Bower for the figures.

INTRODUCTION

Shrimp populations inhabiting shallow coastal waters of the Gulf of Mexico support intensive and valuable fisheries. In 1956 the Bureau of Commercial Fisheries initiated a continuing survey to provide the fishing industry with trends in shrimp production, to furnish data needed to assess the shrimp resource itself and to formulate a resource management program (Kutkuhn 1962a). Numerous studies have been published on the data gathered in these surveys (Kutkuhn 1962a, b, 1966; Gunter 1962; Caillouet and Baxter 1973; Lyon and Baxter 1974; Patella 1975; Jackson 1976; Caillouet and Patella 1978). In addition, the National Marine Fisheries Service (NMFS) has published annual summaries of Gulf coast shrimp data and an annual summary of Shrimp Landings for the entire U.S.A. since 1960.

The information obtained from interviews (catch and fishing effort) in conjunction with data from mark-recapture experiments has been used to estimate the shrimp population size (Iversen 1962). Catch and effort data have been used with mark-recapture data to determine fishing and natural mortality (Klima 1964, 1974; Kutkhun 1966; Berry 1969). These interview data have provided a basis for decisions concerning management of the Gulf of Mexico shrimp fishery.

Since the initiation of the survey of the commercial shrimp fleet in 1956 "statistical" or port agents have interviewed shrimpers, recording information on location and amount of fishing effort, volume and species composition of the catch. This function has been performed by the Technical Information Management Service (TIMS) of NMFS.

In the present study LGL port agents interviewed shrimpers at Texas ports between Galveston and Rockport-Fulton to obtain a random sample of the fishing trips in the general area where mark-release operations were being conducted. The data gathered by the LGL and TIMS port agents will be utilized by LGL as part of a continuing study in estimating rates of growth, mortality and migration, and in determining the effect of the disposal of brine from the Bryan Mound salt dome off Freeport, Texas on commercial brown shrimp (*Penaeus aztecus*) and white shrimp (*Penaeus setiferus*) populations in the Gulf of Mexico. Figure 1 illustrates the location of the Bryan Mound brine disposal site. LGL maintained confidentiality of data through strict data handling protocol and transferred the data to NMFS SEFC.

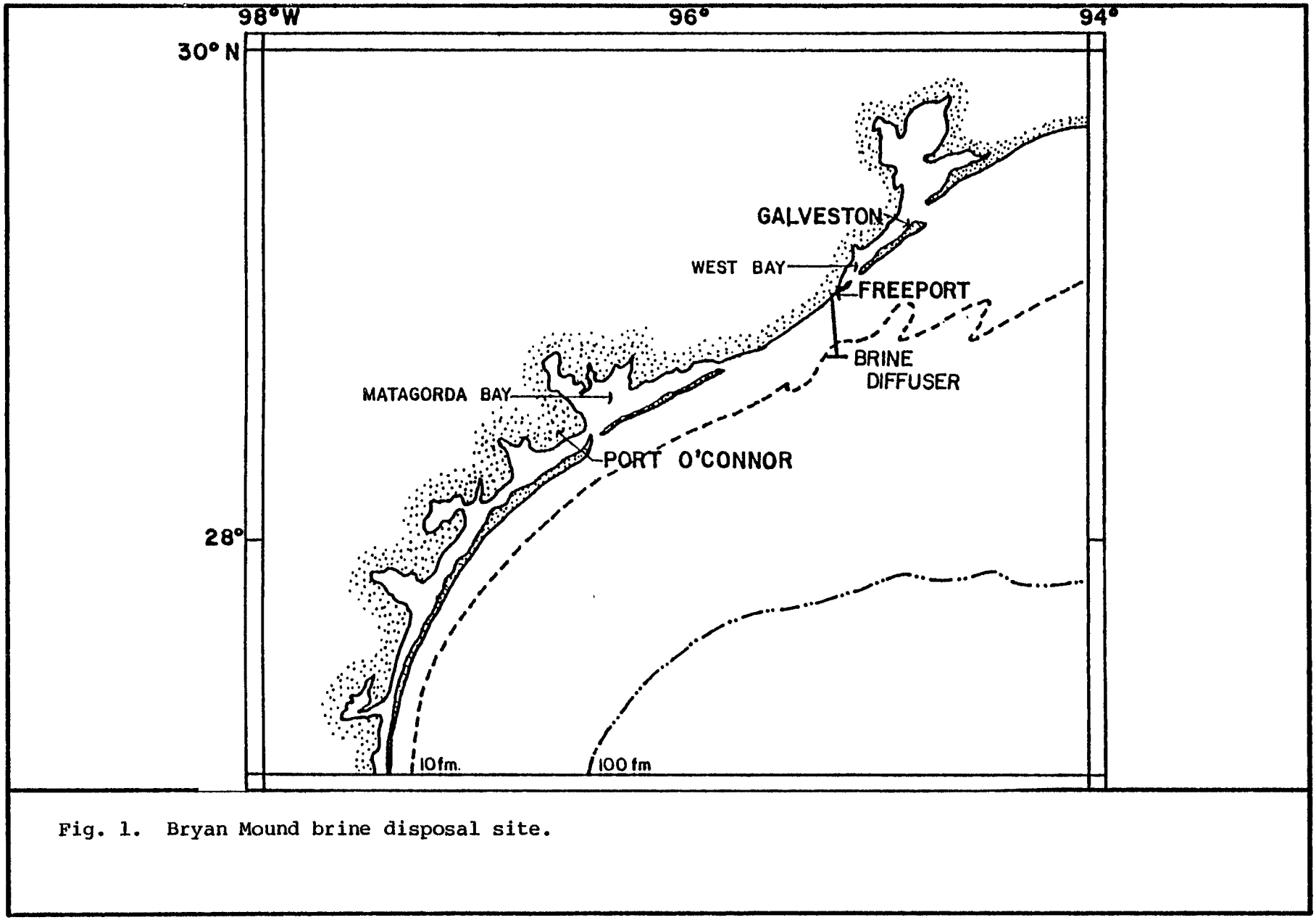


Fig. 1. Bryan Mound brine disposal site.

OBJECTIVES

The objectives of the interview sampling survey of shrimp catch and effort were to:

1. Supplement the TIMS shrimp trip interview sampling survey of shrimp catch and fishing effort (Gulf Coast Shrimp Data) at specified ports along the Texas coast using the methods employed by TIMS.

2. Provide additional detailed information on fishing effort (e.g. duration of fishing effort [day *vs.* night] and location [latitude-longitude]).

3. Collect, process and record data for tagged shrimp recaptured by fishermen and landed at specified ports along the Texas coast.

SUMMARY

An interview sampling survey of shrimp catch and effort was conducted by LGL at specified ports along the Texas coast from September 1979 to 31 January 1981.

A minimum of 50% of the total number of offshore vessel trips was to be sampled each month by a combination of LGL and TIMS port agents. Of this 50% of the total trips, LGL was to provide the following percentages: 1) Galveston-Port Bolivar-Kemah = 80% LGL (20% NMFS); 2) Freeport = 80% LGL (20% NMFS); 3) Palacios-Port Lavaca-Port O'Connor = 100% LGL; 4) Rockport-Fulton = 100% LGL.

The percentages of trips interviewed by LGL were determined by dividing the number of LGL interviews by 50% of the offshore vessel trips at each port.

At the port of Galveston the LGL port agent conducted 721 interviews and collected and processed 206 recaptured tagged shrimp. The overall interviewing level of LGL was 71.1% of half the trips.

At Port Bolivar the LGL port agent conducted 301 interviews and collected and processed 369 recaptured tagged shrimp. The overall interviewing level of LGL was 100.5% of half the trips.

At the port of Kemah the LGL port agent conducted 27 interviews and collected and processed 29 recaptured tagged shrimp. The overall interviewing level of LGL was 96.4% of half the trips.

At the port of Freeport, where LGL's interviewing was confined by TIMS to two shrimp houses, the LGL port agent conducted 1,009 interviews and collected and processed 316 recaptured tagged shrimp. The overall interviewing level of LGL was 48.2% of half the trips.

At the port of Palacios the LGL port agent conducted 615 interviews and collected and processed 366 recaptured tagged shrimp. The overall interviewing level of LGL was 156.9% of half the trips.

At Port Lavaca the LGL port agent conducted 279 interviews and collected and processed 549 recaptured tagged shrimp. The overall interviewing level of LGL was 154.1% of half the trips.

At Port O'Connor the LGL port agent conducted 284 interviews and collected and processed 71 recaptured tagged shrimp. The overall interviewing level of LGL was 106.0% of half the trips.

At the ports of Rockport and Fulton the LGL port agent conducted 398 interviews and collected and processed 106 recaptured tagged shrimp. The overall interviewing level of LGL was 103.1% of half the trips.

Between November 1979 and November 1980 LGL surveyed fishermen at Aransas Pass. The LGL port agent conducted 288 interviews and collected and processed 116 recaptured tagged shrimp.

There was a total of 9,327 offshore vessel trips at Galveston, Port Bolivar, Kemah, Freeport, Palacios, Port Lavaca, Port O'Connor and Rockport-Fulton between 1 September 1979 and 31 January 1981. The LGL port agents conducted a total of 3,922 interviews and processed 2,128 recaptured tagged shrimp. The overall interviewing level of LGL was 84.1% of half the trips.

MATERIALS AND METHODS

In order to supplement the NMFS-SEFC-TIMS interview sampling survey of offshore shrimp catch and fishing effort along the Texas coast, several ports were surveyed by LGL port agents from September 1979 to 31 January 1981 (Fig. 2). Four LGL port agents conducted the survey. The territory of each is shown in Table 1. One conducted interviews at Galveston, Port Bolivar and Kemah; a second interviewed at Freeport; a third handled Palacios, Port Lavaca and Port O'Connor; and the fourth interviewed at Rockport and Fulton. A minimum of 50% of the total number of offshore fishing trips reported by NMFS-TIMS for each port was to be interviewed every month by a combination of LGL and TIMS port agents. The LGL port agents were to contribute interviewing levels according to the following percentages: 1) Galveston-Port Bolivar-Kemah = 80% LGL (20% NMFS); 2) Freeport = 80% LGL (20% NMFS); 3) Palacios-Port Lavaca-Port O'Connor = 100% LGL; 4) Rockport-Fulton = 100% LGL. Between November and May, when there were fewer offshore fishing trips, an interviewing intensity exceeding 50% of the total trips was required to obtain an adequate number of interviews.

Each port had several dealers that unloaded and purchased the shrimp from the fishermen. The port agent visited each of the dealers to see whether any shrimpers had returned from an offshore fishing trip. One of the docks where shrimpers unloaded their catch is shown in Fig. 3.

The port agent recorded the following data for each shrimper interviewed: port number, vessel name, official vessel number, date of landing, type grading used, dealer number, area fished (LORAN A or C lines, if available), depth of capture, days fished, pounds of shrimp caught by species and size category, number and size of trawls, and number of hours fished day and/or night. This information was transcribed onto a Shrimp Trip Interview Form (88-20B) provided by the Government (Fig. 4). When more than two area/depth combinations were fished in a single trip by a vessel, additional Shrimp Trip Interview forms were used. The number of attachments did not necessarily correspond to the number of interviews. Information concerning two fishing grounds could be placed on one attachment form (see Fig. 5). When the shrimper fished at more than two grounds during a single trip, additional attachments were needed.

Some of the data reported on the Shrimp Trip Interview Form are not routinely keypunched by the TIMS staff at Galveston, Texas. An additional data sheet entitled "Shrimp Trip Interview-Attachment to Form 88-20B" (Fig. 5) was provided to the LGL port agents, so that information on number and size of trawls, location and duration of fishing effort could be entered into the computer record. Representatives of the NMFS-SEFC Galveston Laboratory (Environmental Research Division) prepared similar attachments to form 88-20B from the interviews obtained by TIMS port agents.

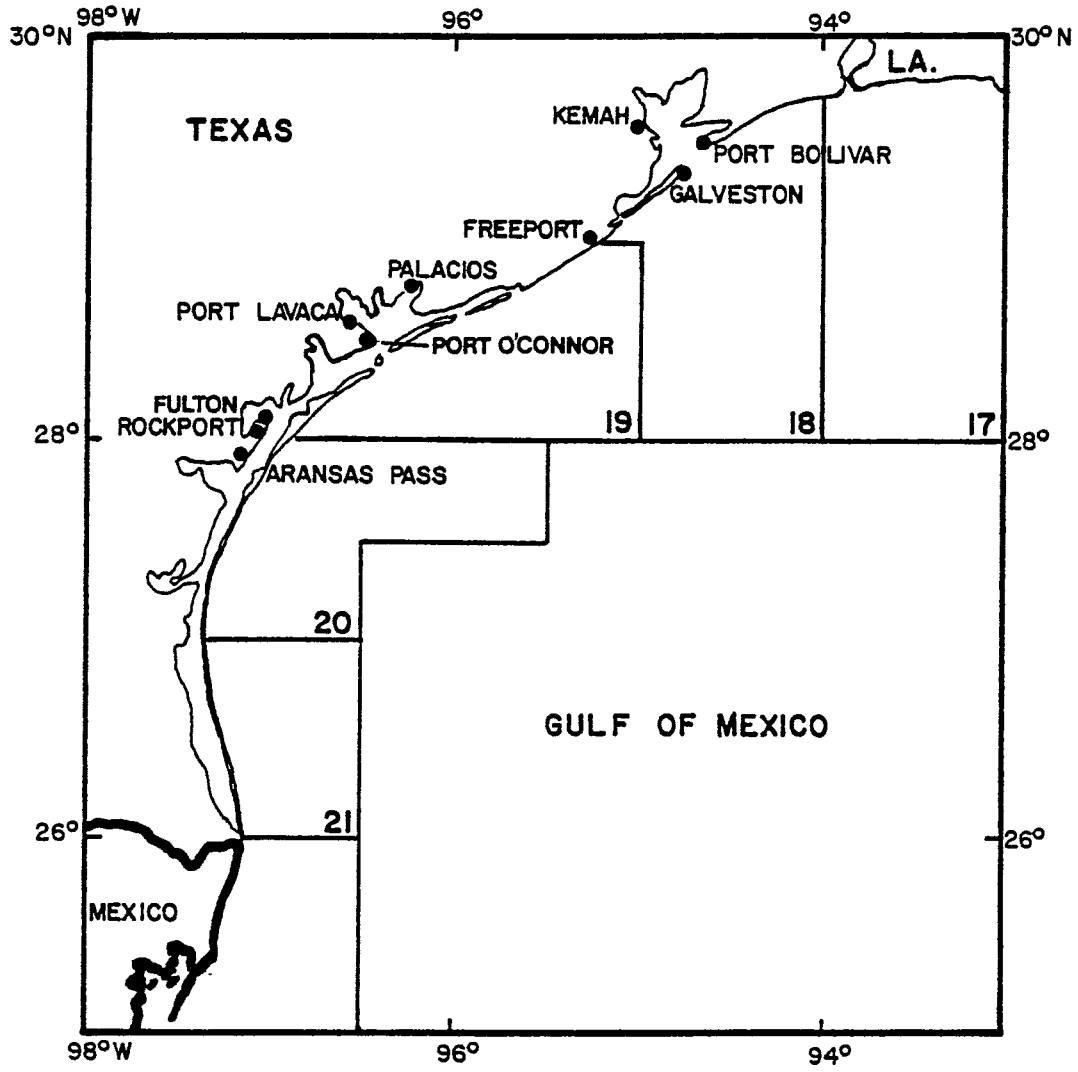


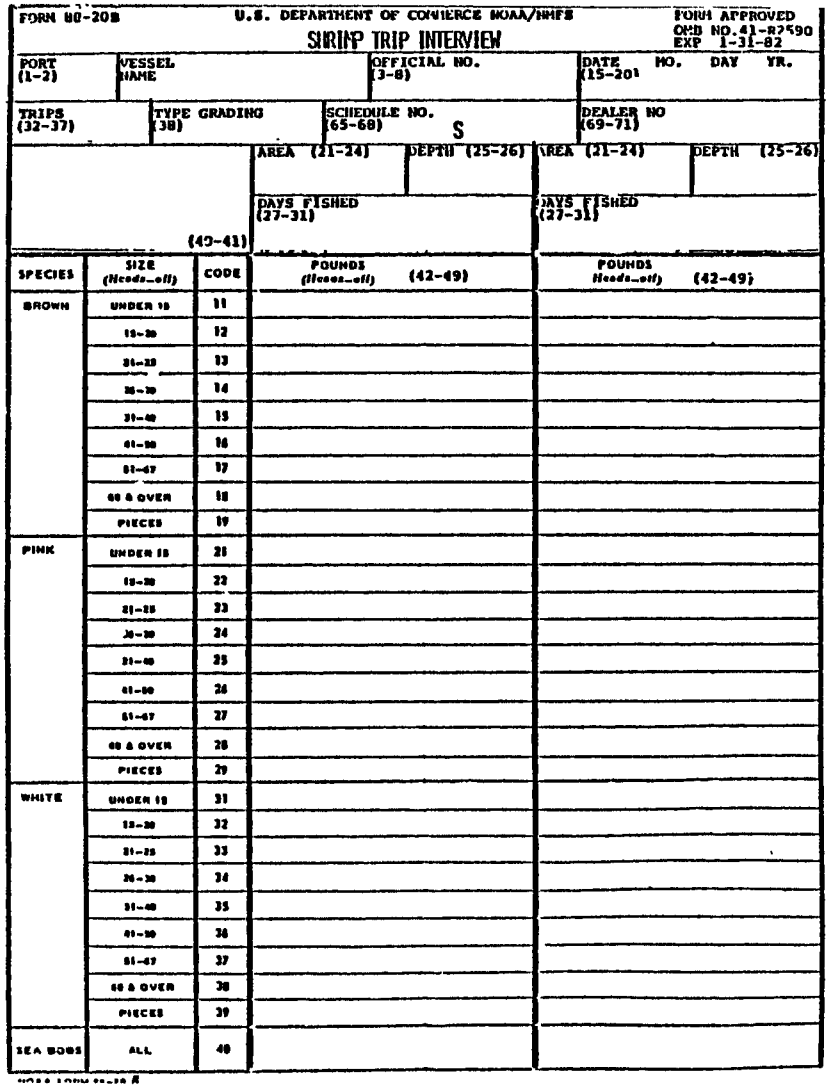
Fig. 2. Ports surveyed by LGL. The statistical areas of the Texas coastal waters are also illustrated.

TABLE 1. LGL PORT AGENT TERRITORY

Port Agent	Port
1	Galveston Port Bolivar Kemah
2	Freeport
3	Palacios Port Lavaca Port O'Connor
4	Rockport-Fulton Aransas Pass*

*Interviews were conducted at Aransas Pass from November 1979 to November 1980 at the request of the NMFS-SEFC-TIMS Supervisory Reporting Specialist. This port was not included in Contract No. NA79-GA-C-00030.

Fig. 3. Photograph of one of the docks at Galveston where shrimpers unloaded their catch.



FORM 88-20B U.S. DEPARTMENT OF COMMERCE NOAA/NMFS FORM APPROVED OMB NO. 41-R2590 EXP 1-31-82

SHRIMP TRIP INTERVIEW

PORT (1-2) | VESSEL NAME | OFFICIAL NO. (3-8) | DATE (15-20) MO. DAY YR.

TRIPS (32-37) | TYPE GRADING (38) | SCHEDULE NO. (65-68) S | DEALER NO (69-71)

AREA (21-24) | DEPTH (25-26) | AREA (21-24) | DEPTH (25-26)

(40-41)

DAYS FISHED (27-31) | DAYS FISHED (27-31)

SPECIES	SIZE (Heads-off)	CODE	POUNDS (Heads-off) (42-49)	POUNDS Heads-off (42-49)
BROWN	UNDER 15	11		
	15-20	12		
	21-25	13		
	26-30	14		
	31-40	15		
	41-50	16		
	51-67	17		
	68 & OVER	18		
	PIECES	19		
PINK	UNDER 15	21		
	15-20	22		
	21-25	23		
	26-30	24		
	31-40	25		
	41-50	26		
	51-67	27		
	68 & OVER	28		
	PIECES	29		
WHITE	UNDER 15	31		
	15-20	32		
	21-25	33		
	26-30	34		
	31-40	35		
	41-50	36		
	51-67	37		
	68 & OVER	38		
	PIECES	39		
SEA BOBS	ALL	40		

NOAA FORM 88-20 B

NOAA FORM 88-20 (3-78) U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION NATIONAL MARINE FISHERIES SERVICE FORM APPROVED OMB NO. 41-R2590

FIELD WORK SHEET-SHRIMP TRIP INTERVIEW

VESSEL NAME	DATE OF LANDING MO. DAY YR.	DEALER
SIZE OF TRAWLS	NUMBER OF TRAWLS	TOTAL CATCH

ITEM		FISHING ACTIVITY BY GROUNDS		
		GROUNDS	GROUNDS	GROUNDS
FATHOMS				
EFFORT	NIGHT ONLY	0 Hrs.	0 Hrs.	
	DAY ONLY	0 Hrs.	0 Hrs.	
	DAY AND NIGHT			
CATCH	BROWN SHRIMP			
	PINK SHRIMP			
	WHITE SHRIMP			
	SEA BOBS			

CONDITION LANDED: ☐ HEADS-ON ☐ PEANUTS ☐ BOXES ☐ HEADS-OFF ☐ BARRELS ☐ BASKETS

REMARKS

Fig. 4. Shrimp Trip Interview Form (88-20B) and Field Work Sheet.

SHRIMP TRIP INTERVIEW-ATTACHMENT TO FORM 88-20B

NOAA/NMFS-LGL ECOLOGICAL RESEARCH ASSOC., INC.

The following information associates this record with the original:

Port (1-2)	Vessel Name	Official No. (3-8)	Date: MO. DAY YR. (15-20)

	Area (21-24)	Depth (25-26)		Area (21-24)	Depth (25-26)
1			2		

The following is the new information. If the original record has 2 grounds fished, fill sections 1 & 2, otherwise only fill out section 1.

Size of trawls (ft.) (27-29)	Number of trawls (30-32)		Size of trawls (ft.) (27-29)	Number of trawls (30-32)	

Effort: (hours)	Day (33-35)	Night (36-38)	Both (39-41)	Effort: (hours)	Day (33-35)	Night (36-38)	Both (39-41)

Latitude- Longitude: (degs, mins)	(42-45)	(46) N	(47-50)	(51) W	Latitude- Longitude: (degs, mins)	(42-45)	(46) N	(47-50)	(51) W

Only one of these records should be filled out for each trip interview. If the vessel interviewed fished more than 2 grounds and there are more than 1 interview forms filled out for that trip then the number of these forms filled out should correspond with the number of interview forms filled out.

Fig. 5. Shrimp Trip Interview-Attachment to Form 88-20B.

These supplemental data were provided to Mr. Hillman Holley (NMFS, NSTL Station, Miss.) for keypunching.

Interviews were conducted daily (Monday to Friday) and on Saturday, when necessary. All interviews were random. If two vessels were encountered at the same time, a coin-toss was used to determine the vessel to be sampled.

Frequent contact was maintained with the NMFS TIMS port agents during all phases of the interview sampling survey. This contact enabled the LGL port agents to: 1) acquire information on total number of trips each month by port, pounds of shrimp unloaded by vessel, and species and size composition of landings of each vessel; 2) identify and correct errors in interview records concerning species composition of the catch, depth and area of shrimping by vessel and by trip; and 3) provide corrected data entry forms on a monthly basis. Since correction of interviews was based on dealer records obtained by the TIMS port agents, the dealer number was carefully checked and recorded so that information on the interview could be corroborated with dealer records. The completed and corrected interview forms were transmitted to Mr. Orman Farley, the TIMS Supervisory Reporting Specialist for the Texas coast. Copies of the completed Shrimp Trip Interview forms also were sent to the Principal Investigator for further verification. Errors on the interviews were corrected and reported to Mr. Farley.

The Shrimp Trip Interview-Attachments to Form 88-20B were sent by the LGL port agents to the Principal Investigator at monthly intervals. The information on the Shrimp Trip Interview was used to corroborate the data on the attachment form. Errors on the attachment form (e.g. latitude-longitude, hours fished, etc.) were corrected at this time. The corrected attachment form was transmitted to TIMS and the data manager.

In addition to obtaining interviews, the LGL port agents also collected and processed tagged shrimp recaptured by shrimpers, fish house employees and bait dealers. For each tagged shrimp received, the port agent completed a tagged shrimp return slip (Fig. 6). The return slip contained the following information: vessel name; port; port agent name; tag number and color; tail length (mm) and weight (g) of species caught; date, location (LORAN lines, if available) and depth caught; name, address and phone number of person returning the shrimp. The person was provided with a receipt for each tagged shrimp given to the LGL port agent. Each shrimp was placed in a zip-lock bag and frozen immediately to ensure preservation and prevent undue shrinkage or loss of weight.

The LGL port agent recorded the following information for each tagged shrimp on a recapture data form provided by the NMFS SEFC Galveston Laboratory, Fishery Data Analysis Division (Fig. 7): tag number, species, sex, tail length (mm), tail weight (g), latitude-longitude, recapture date, depth caught (fm), confidence interval to indicate accuracy of recapture date, return code to indicate extent of recapture information, and additional comments (e.g. tail broken, decomposed, etc.). On the reverse side of the data form the name, address and phone number of the

TAGGED SHRIMP RETURN SLIP
NMFS, Galveston, Texas

BOAT NAME _____

PORT _____ AGENT _____

TAG NUMBER _____ COLOR _____

DATE CAUGHT _____

LOCATION CAUGHT: (Area, loran, or long. & lat.)

_____

DEPTH CAUGHT (Fathoms) _____

NAME _____

ADDRESS _____

_____ PHONE _____

SPECIES _____ LENGTH _____ WT. _____

RECEIPT

RECEIVED OF _____

TAGGED SHRIMP NO. _____

DATE _____

AGENT _____

Fig. 6. Tagged Shrimp Return Slip and Receipt.

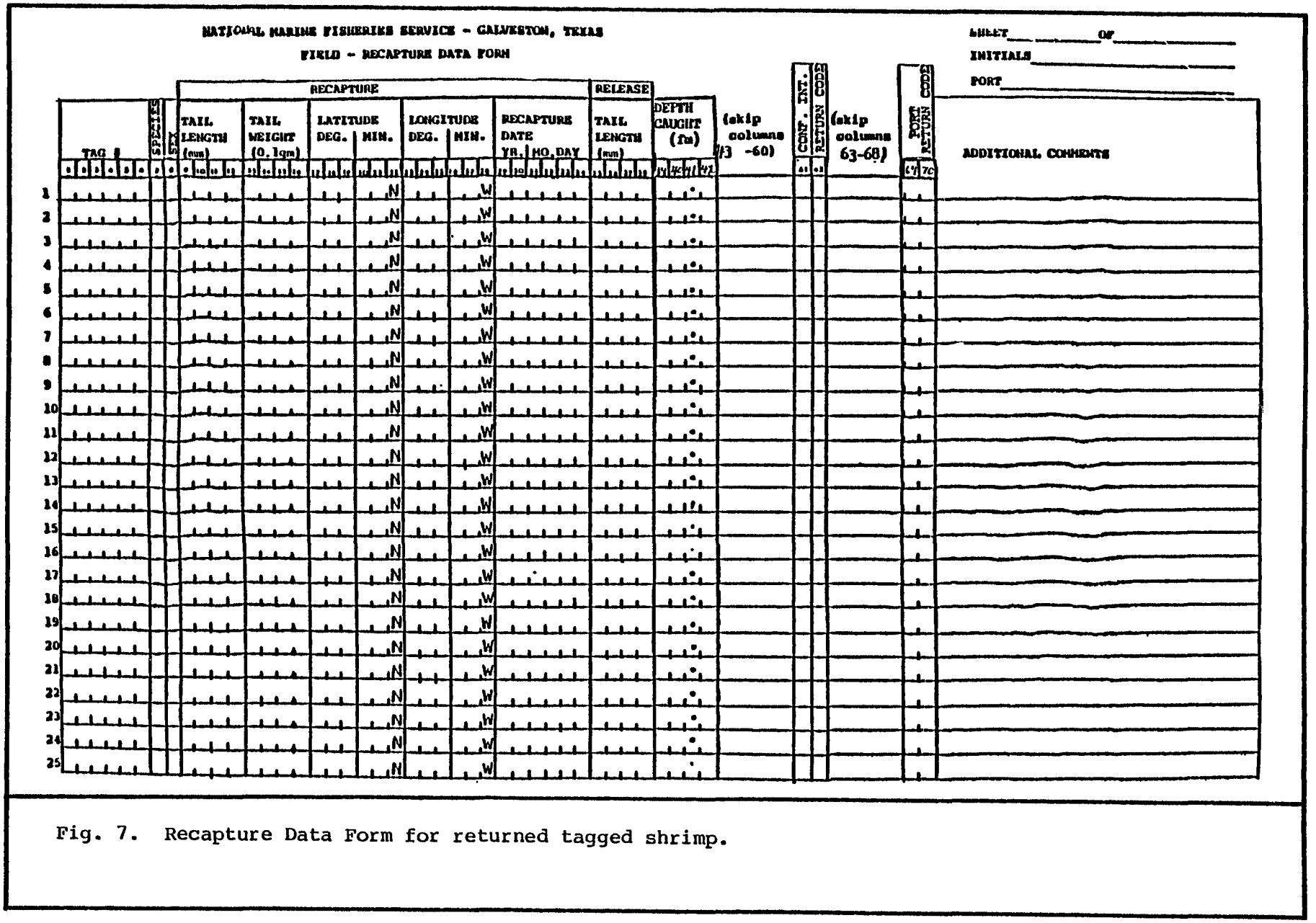


Fig. 7. Recapture Data Form for returned tagged shrimp.

fisherman was recorded. After each shrimp was weighed and measured it was transferred to plastic jars and preserved in a 10% solution of formalin. A maximum of 25 shrimp were placed in each jar. The preserved shrimp were transmitted with the completed recapture data forms and tagged shrimp return slips to Mr. Dennis Emiliani (NMFS, SEFC Galveston Laboratory) at weekly intervals. Copies of the return slips were kept by the LGL port agents.

The confidentiality of the data gathered by the port agents was maintained at all times. The information was provided only to the following representatives of NMFS: Mr. Orman Farley--interviews; Mr. Neal Baxter or Mr. Dennis Emiliani--recaptured tagged shrimp; Mr. William Jackson--attachments to form 88-20B.

RESULTS AND DISCUSSION

INTERVIEW SAMPLING SURVEY AT SPECIFIED TEXAS PORTS

The total number of offshore vessel trips by port, 50% of the total trips, the number of fishermen (i.e. offshore vessel trips) interviewed by LGL, the percentage interviewed, the percentage required, the number of attachment forms completed and the number of tagged shrimp processed by LGL port agents are shown in Tables 2 to 10.

Galveston

At the port of Galveston, there were 2,029 offshore vessel trips between September 1979 and January 1981 (Table 2). The minimum level of sampling required was 50% or 1,015 of the offshore trips, with 80% of the 1,015 vessel trips to be sampled by LGL. During the 17-month study the LGL port agent conducted 721 interviews at Galveston, which was equal to 71.1% of the 1,015 trips. The overall percent interviewed was less than LGL's contract goal of 80%. The numerous factors that accounted for the lower interviewing intensity are described below:

1. The LGL port agent for Galveston also was responsible for the ports of Kemah and Port Bolivar. Kemah is approximately 30 miles (one-way) from Galveston and Port Bolivar can only be reached by ferry.
2. During the first few months of the study the LGL port agent was advised by the TIMS port agent for Galveston to interview almost exclusively at Port Bolivar. Because of the time spent at Port Bolivar the LGL port agent was unable to survey the required number of vessel trips at Galveston.
3. The Galveston shrimpers often made one trip each day, rather than the longer trips common at some of the other Texas ports. Each time a fisherman unloaded his catch, even if it was less than 100 lbs., it was recorded as a "trip" or "landing".
4. There were four dealers in Galveston that the LGL port agent visited; if one shrimper was unloading his catch at each of these docks at the same time the LGL port agent would be unable to obtain three of the four interviews.

TABLE 2. SHRIMP TRIP INTERVIEWS CONDUCTED BY LGL AT GALVESTON

Month	Total No. Vessel Trips*	50% Total Trips	No. Interviewed	Percent Interviewed**	Percent Required	No. Attachment Forms	No. Tagged Shrimp Recovered
Sept 1979	101	50.5	11	21.8	80	12	2
Oct	179	89.5	30	33.5	80	32	27
Nov	145	72.5	48	66.2	80	48	28
Dec	129	64.5	31	48.1	80	31	9
Jan 1980	49	24.5	28	114.3	80	29	2
Feb	82	41.0	22	53.7	80	23	6
Mar	59	29.5	24	81.4	80	24	0
Apr	49	24.5	23	93.9	80	23	0
May	106	53.0	43	81.1	80	43	4
Jun	123	61.5	45	73.2	80	45	2
Jul	162	81.0	46	56.8	80	46	4
Aug	162	81.0	48	59.3	80	48	20
Sept	195	97.5	90	92.3	80	90	4
Oct	230	115.0	87	75.7	80	87	47
Nov	154	77.0	85	110.0	80	85	31
Dec	84	42.0	50	119.1	80	50	20
Jan 1981	20	10.0	10	100.0	80	10	0
TOTALS	2029	1014.5	721	71.1	80	726	206

*Total number of vessel trips provided to LGL by the TIMS port agent.

**Number interviewed divided by 50% of total trips.

5. Some of the dealers conducted most of their business with shrimpers who brought in their catch by truck. In such transactions the vessel name was not recorded, thereby making it impossible for the LGL port agent to obtain the interview at a later date.

6. Shrimpers who did not own the vessel left the docks as soon as the catch was unloaded and they were paid. The vessel owner frequently hired a new captain for each trip, making it impossible for the LGL port agent to obtain the interview at a later date, even when the vessel name was known.

7. On occasion shrimpers refused to give the LGL port agent an interview.

The LGL port agent collected, weighed, measured and recorded catch information on 206 tagged shrimp recovered from shrimpers, fish house employees and bait dealers in Galveston. Occasionally this port agent was asked to collect tagged shrimp a considerable distance from Galveston (e.g. Winnie, Texas). The greatest number of tagged shrimp were recovered during the shrimp tagging operations inshore at Galveston and offshore near Freeport, Texas for the "Shrimp and Redfish Studies in Relation to Bryan Mound Brine Disposal Site off Freeport, Texas-Work Unit 4: Shrimp Mark-Release Investigations" (Contract No. NA79-GA-C-00030). The tagging operations for this study were conducted between September and November 1979 (30,192 white shrimp tagged and released) and between May and July 1980 (40,369 brown shrimp tagged and released). The increase in the number of tagged shrimp recovered from October to December 1980 was attributable to the tagging effort inshore at Port Bolivar and offshore near Sabine, Texas between September and November 1980 (approximately 40,000 shrimp tagged and released) for the "Shrimp Population Studies: West Hackberry and Big Hill Brine Disposal Sites off Southwest Louisiana and Upper Texas Coasts" (Contract No. NA80-GA-C-00043).

Port Bolivar

The total number of offshore vessel trips made at Port Bolivar is unknown since the TIMS Supervisory Reporting Specialist (Mr. Orman Farley) was unable to obtain the dealer records at two of the three unloading docks. As a result the LGL port agent could not identify and correct errors in the interviews, or determine the percent interviewed. Numerous attempts were made by Mr. Farley to obtain the dealer records. By December 1979, the LGL Principal Investigator and Mr. Farley agreed that sampling at Port Bolivar should be restricted to the unloading dock where dealer records were available to TIMS, so that the information on the interviews could be verified and the interviewing intensity determined.

At the one dealership covered by an LGL port agent, there were 599 offshore vessel trips between September 1979 and January 1981 (Table 3). The minimum level of sampling required was 50% or 300 of the offshore trips, with 80% of the trips to be interviewed by LGL. During the 17-month study LGL conducted 301 interviews, which was equal to the 50% sample of the trips. The LGL port agent interviewed at the three fish houses at Port Bolivar from September to November 1979. Sampling was discontinued at one of the unloading docks when the owner informed the port agent that he was no longer welcome there. Although the overall sampling level was above 80%, the LGL port agent was unable to conduct the required number of interviews between December 1979 and March 1980 due to circumstances beyond his control. During those months the number of landings at Port Bolivar was very low. Although the LGL port agent continued to visit Port Bolivar two times each week he rarely encountered any shrimpers. Occasionally boats unloaded at Port Bolivar on the days that he interviewed at Galveston or Kemah. The required interviewing intensity also was not attained between June and September 1980. During these months it often took 2-3 hours to reach Port Bolivar by ferry because of its heavy use by vacationers. The long wait for the ferry was not cost-effective, so the port agent visited Port Bolivar only once a week during the summer. It was felt that the port agent's time could be more effectively spent at Galveston, where there were a greater number of vessels landing their catch.

The LGL port agent completed 302 interviews between September 1979 and January 1981.

A total of 369 tagged shrimp was collected from shrimpers, fish house employees and bait dealers. The greatest number of shrimp were recovered in November 1980 after completion of the inshore tagging operation at Port Bolivar for the "Shrimp Population Studies: West Hackberry and Big Hill Brine Disposal Sites off Southwest Louisiana and Upper Texas Coasts."

Kemah

At the port of Kemah there were a total of 56 offshore vessel trips between September 1979 and January 1981 (Table 4). The minimum level of sampling required was 50% or 28 of the offshore trips, with 80% to be sampled by LGL. During the 17-month study the LGL port agent conducted 27 interviews at Kemah, which was equal to 96.4% of the sample. The overall percent interviewed was above LGL's contract goal of 80%. During two months the percent interviewed by LGL was zero. In September 1980 the port agent was unable to find the captain of the one vessel that had fished offshore. The same problem occurred in January 1981. The port agent even attempted to obtain telephone numbers or house addresses, but was unable to procure that information.

The LGL port agent completed 27 interviews and processed 29 tagged shrimp recovered from shrimpers, fish house employees and bait dealers.

TABLE 3. SHRIMP TRIP INTERVIEWS CONDUCTED BY LGL AT PORT BOLIVAR

Month	Total No. Vessel Trips*,	50% Total Trips	No. Interviewed	Percent Interviewed**	Percent Required	No. Attachment Forms	No. Tagged Shrimp Recovered
Sept 1979	65	32.5	65†	200.0	80	65	0
Oct	64	32.0	50†	156.3	80	50	8
Nov	36	18.0	27†	150.0	80	27	2
Dec	33	16.5	15	90.9	80	15	0
Jan 1980	18	9.0	6	66.7	80	6	3
Feb	13	6.5	3	46.2	80	3	2
Mar	15	7.5	3	40.0	80	3	2
Apr	17	8.5	7	82.4	80	7	2
May	19	9.5	9	94.7	80	9	1
Jun	37	18.5	11	59.5	80	12	2
Jul	55	27.5	17	61.8	80	17	4
Aug	54	27.0	18	66.7	80	18	4
Sept	81	40.5	26	64.2	80	26	57
Oct	47	23.5	20	85.1	80	20	264
Nov	23	11.5	5	43.5	80	5	5
Dec	13	6.5	12	184.6	80	12	9
Jan 1981	9	4.5	7	155.6	80	7	4
TOTALS	599	299.5	301	100.5	80	302	369

*Total number of vessel trips provided to LGL by TIMS port agent. This was the number of trips at one dealership only.

†Interviewed at three fish houses at Port Bolivar, although only one of the dealers provided statistics to the TIMS agent.

**Number interviewed divided by 50% of total trips.

TABLE 4. SHRIMP TRIP INTERVIEWS CONDUCTED BY LGL AT KEMAH

Month	Total No. Vessel Trips*	50% Total Trips	No. Interviewed	Percent Interviewed**	Percent Required	No. Attachment Forms	No. Tagged Shrimp Recovered
Sept 79	0	0	0	-	80	0	0
Oct	10	5.0	4	80.0	80	4	4
Nov	8	4.0	3	75.0	80	3	3
Dec	9	4.5	5	111.1	80	5	5
Jan 1980	5	2.5	3	120.0	80	3	0
Feb	0	0	0	-	80	0	0
Mar	5	2.5	2	80.0	80	2	2
Apr	2	1.0	2	200.0	80	2	0
Mar	4	2.0	2	100.0	80	2	1
Jun	6	3.0	3	100.0	80	3	1
Jul	2	1.0	2	200.0	80	2	0
Aug	0	0	0	-	80	0	0
Sept	1	0.5	0	0	80	0	2
Oct	2	1.0	1	100.0	80	1	2
Nov	0	0	0	-	80	0	0
Dec	0	0	0	-	80	0	5
Jan 1981	2	1.0	0	0	80	0	4
TOTALS	56	28.0	27	96.4	80	27	29

*Total number of vessel trips provided to LGL by TIMS port agent.

**Number interviewed divided by 50% of total trips.

Freeport

At the Port of Freeport there were 4,189 offshore vessel trips between September 1979 and January 1981 (Table 5). The total number of vessel trips shown in Table 5 does not accurately represent the total number of vessel trips for port 73 (Freeport), since the vessel trips of three dealers a considerable distance from Freeport are not included and were not covered by LGL port agents. The minimum level of sampling required was 50% or 2,095 of the offshore trips, with 80% of the 2,095 to be sampled by LGL. During the 17-month study the LGL port agent conducted 1,009 interviews, which was equal to 48.2% of the sample. The overall percent was below LGL's contract goal because of the inclusion of additional dealers not interviewed at all by LGL. It was impossible for the LGL port agent at Freeport to meet the contract goal because he was restricted by TIMS to interviewing at only two dealerships at Freeport. The rationale for this arrangement is described below. In late August 1979 Mr. Orman Farley, the LGL Principal Investigator and the TIMS and LGL port agents for Freeport met in Galveston to determine the best method for the two port agents to survey the shrimpers so that duplication of interviews would be prevented. It was recommended by Mr. Farley that the TIMS port agent continue to conduct interviews at one group of fish houses and that the LGL port agent restrict his sampling to a different group. Mr. Farley believed that the group of dealers covered by the LGL port agent handled approximately 50% of all the offshore trips at Freeport. In reality this group handled only 34.9% of the offshore trips made between September 1979 and January 1981 (Table 5). Therefore, even if the LGL port agent had interviewed every shrimper unloading his catch at the dealerships he covered, he would have been unable to achieve the contract goal.

The LGL port agent completed 1,012 interviews between September 1979 and 31 January 1981.

A total of 316 tagged shrimp collected from shrimpers, fish house employees and bait dealers was processed by the LGL port agent. Most of the tagged shrimp were recovered between September and December 1979 and between July and October 1980 (Table 5). The period of maximum recovery of tagged shrimp corresponded with the offshore tagging operations near Freeport, Texas in fall 1979 and summer 1980 for the Bryan Mound brine disposal site study.

Palacios

At the port of Palacios there were 784 offshore vessel trips between September 1979 and January 1981 (Table 6). The minimum level of sampling required was 50% or 392 of the offshore trips with LGL responsible for all the interviews. The LGL port agent conducted 615 interviews or 156.9%, well above the goal of the contract. The cooperation between the Palacios dealers and the LGL port agent contributed to the success of the interview effort at this port.

The LGL port agent completed 620 interviews between September 1979 and 31 January 1981.

TABLE 5. SHRIMP TRIP INTERVIEWS CONDUCTED BY LGL AT FREEPORT

Month	Total No. Vessel Trips*,**	50% Total Trips	No. Interviewed	Percent Interviewed †	Percent Required	No. Attachment Forms	No. Tagged Shrimp Recovered
Sept 1979	356	178.0	48	27.0	80	50	21
Oct	403	201.5	98	28.6	80	99	87
Nov	194	97.0	70	72.2	80	70	44
Dec	359	179.5	58	32.3	80	58	57
Jan 1980	56	28.0	38	135.7	80	38	14
Feb	53	26.5	24	90.6	80	24	12
Mar	21	10.5	10	95.2	80	10	1
Apr	23	11.5	5	43.5	80	5	0
May	16	8.0	5	62.5	80	5	1
Jun	50	25.0	18	72.0	80	18	7
Jul	319	159.5	67	42.0	80	67	20
Aug	583	291.5	141	48.4	80	141	30
Sept	614	307.0	164	53.4	80	164	4
Oct	596	298.0	142	47.7	80	142	15
Nov	203	101.5	67	66.0	80	67	2
Dec	307	153.5	38	24.8	80	38	1
Jan 1981	36	18.0	16	88.9	80	16	0
TOTALS	4189	2094.5	1009	48.2	80	1012	316

*Total number of vessel trips provided to LGL by TIMS port agent.

**Does not include dealers 12, 17 and 18 which are not in Freeport.

†Number interviewed divided by 50% of total trips.

TABLE 6. SHRIMP TRIP INTERVIEWS CONDUCTED BY LGL AT PALACIOS

Month	Total No. Vessel Trips*	50% Total Trips	No. Interviewed	Percent Interviewed**	Percent Required	No. Attachment Forms	No. Tagged Shrimp Recovered
Sept 1979	36	18.0	34	188.9	100	34	6
Oct	54	27.0	47	174.1	100	49	48
Nov	36	18.0	26	144.4	100	26	75
Dec	35	17.5	34	194.3	100	34	12
Jan 1980	10	5.0	9	180.0	100	9	42
Feb	23	11.5	20	173.9	100	20	3
Mar	27	13.5	22	163.0	100	22	5
Apr	39	19.5	33	169.2	100	33	15
May	46	23.0	34	147.8	100	34	6
Jun	36	18.0	24	133.3	100	25	4
Jul	100	50.0	63	126.0	100	65	87
Aug	62	31.0	40	129.0	100	40	61
Sept	48	24.0	39	162.5	100	39	1
Oct	65	32.5	50	153.9	100	50	0
Nov	80	40.0	65	162.5	100	65	0
Dec	67	33.5	59	176.1	100	59	1
Jan 1981	20	10.0	16	160.0	100	16	0
TOTALS	784	392.0	615	156.9	100	620	366

*Total number of vessel trips provided to LGL by TIMS port agent.

**Number interviewed divided by 50% of total trips.

A total of 366 tagged shrimp collected from shrimpers, fish house employees and bait dealers was processed by the LGL port agent (Table 6). The greatest number of tagged shrimp was recovered during and shortly after the tagging operations off Freeport in fall 1979 and summer 1980 for the Bryan Mound brine disposal site study.

Port Lavaca

At Port Lavaca there were 362 offshore vessel trips between September 1979 and January 1981 (Table 7). The minimum level of sampling required was 50% or 181 of the offshore trips, with LGL responsible for all the interviews. The LGL port agent conducted 279 interviews or 154.1%, well above the contract goal. Most of the time the dealers gave the port agent full cooperation. However, when the Port Lavaca winners of the fishing contest did not receive their incentive awards on time, the LGL port agent was refused permission to interview at this port until the incentive awards were presented to the recipients.

The LGL port agent completed 283 interviews between September 1979 and 31 January 1981.

A total of 549 tagged shrimp collected from shrimpers, fish house employees and bait dealers was processed by the LGL port agent (Table 7). In addition she also weighed and measured a few hundred recaptured tagged shrimp received from the Port Lavaca Marine Extension Agent. The peak recovery of tagged shrimp coincided with the tagging operations inshore at Port O'Connor and offshore near Freeport for the Bryan Mound brine disposal site study.

Port O'Connor

At Port O'Connor there were 536 offshore vessel trips between September 1979 and January 1981 (Table 8). The minimum level of sampling required was 50% or 268 offshore trips, with LGL responsible for all the interviews. The LGL port agent conducted 284 interviews or 106% of the sample. Although the overall percent was above the contract goal, the LGL port agent was unable to obtain the required sample during the first two months of the study. During this period some of the shrimpers refused to give any information to the port agent. In June and July 1980 the port agent missed numerous interviews because a large number of bay boats fished offshore. These vessel captains normally fished exclusively in Port Lavaca and Matagorda Bays, but the good weather and abundance of shrimp along the beach led them to fish outside of Pass Cavallo.

A total of 284 interviews were completed by the LGL port agent between September 1979 and 31 January 1981.

The LGL port agent collected and processed 71 tagged shrimp recovered by shrimpers, fish house employees and bait dealers. In 1979 most of the shrimp were recovered between October and December during the inshore tagging operations in Port O'Connor for the Bryan Mound brine disposal site study.

TABLE 7. SHRIMP TRIP INTERVIEWS CONDUCTED BY LGL AT PORT LAVACA

Month	Total No. Vessel Trips*	50% Total Trips	No. Interviewed	Percent Interviewed**	Percent Required	No. Attachment Forms	No. Tagged Shrimp Recovered
Sept 1979	19	9.5	17	179.0	100	17	9
Oct	35	17.5	33	188.6	100	33	65
Nov	19	9.5	17	179.0	100	19	67
Dec	23	11.5	20	173.9	100	21	30
Jan 1980	8	4.0	8	200.0	100	8	47
Feb	12	6.0	11	183.3	100	11	0
Mar	1	0.5	1	200.0	100	1	0
Apr	0	0.0	0	-	100	0	0
May	5	2.5	4	160.0	100	4	0
Jun	19	9.5	15	158.0	100	15	0
Jul	62	31.0	34	109.7	100	35	213
Aug	31	15.5	23	148.4	100	23	7
Sept	29	14.5	23	158.6	100	23	31
Oct	31	15.5	23	148.4	100	23	77
Nov	30	15.0	22	146.7	100	22	1
Dec	27	13.5	20	148.2	100	20	0
Jan 1981	11	5.5	8	145.5	100	8	2
TOTALS	362	181.0	279	154.1	100	283	549

*Total number of vessel trips provided to LGL by TIMS port agent.

**Number interviewed divided by 50% of total trips.

TABLE 8. SHRIMP TRIP INTERVIEWS CONDUCTED BY LGL AT PORT O'CONNOR

Month	Total No. Vessel Trips*	50% Total Trips	No. Interviewed	Percent Interviewed**	Percent Required	No. Attachment Forms	No. Tagged Shrimp Recovered
Sept 1979	35	17.5	15	85.7	100	15	1
Oct	52	26.0	24	92.3	100	24	8
Nov	24	12.0	18	150.0	100	18	27
Dec	25	12.5	19	152.0	100	19	11
Jan 1980	5	2.5	5	200.0	100	5	2
Feb	8	40.0	4	100.0	100	4	0
Mar	7	3.5	5	142.9	100	5	0
Apr	7	3.5	4	114.3	100	4	1
May	18	9.0	11	122.2	100	11	5
Jun	45	22.5	21	93.3	100	21	0
Jul	149	74.5	64	85.9	100	64	8
Aug	39	19.5	23	118.0	100	23	1
Sept	37	18.5	22	118.9	100	22	3
Oct	37	18.5	20	108.1	100	20	1
Nov	31	15.5	17	109.7	100	17	0
Dec	11	5.5	9	163.6	100	9	0
Jan 1981	6	3.0	3	100.0	100	3	3
TOTALS	536	268.0	284	106.0	100	284	71

*Total number of vessel trips provided to LGL by TIMS port agent.

**Number interviewed divided by 50% of total trips.

Rockport-Fulton

At the ports of Rockport and Fulton there were 772 offshore vessel trips between September 1979 and January 1981 (Table 9). The minimum sampling level required was 50% with the LGL port agent responsible for all the interviews. During the 17-month period the LGL port agent conducted 398 interviews or 103.1% of the sample. Although the overall percent was above the contract goal, during a few months the necessary interviews were not obtained. The LGL port agent did not begin interviewing at Rockport-Fulton until 12 September 1979 since she was being trained by the TIMS port agents at Aransas Pass. In February and March 1980 many shrimpers tied up their boats for the remainder of the slow season. Since they did not return to the docks the LGL port agent was unable to obtain their interviews. In July 1980 the LGL port agent missed many interviews because more than 90 of the offshore trips were made by bay boats. These vessels rarely fished offshore but the calm seas and abundance of shrimp resulted in a change in their fishing habits, unbeknown to the port agent.

A total of 475 interviews were completed by LGL between September 1979 and 31 January 1981. Many of these shrimpers trawled at more than two fishing grounds.

The LGL port agent collected and processed 106 tagged shrimp recaptured by shrimpers, fish house employees and bait dealers (Table 9). The recovery of most of the tagged shrimp coincided with the offshore tagging operations in fall 1979 and summer 1980 for the Bryan Mound brine disposal site study.

Aransas Pass

The port of Aransas Pass was not included in the contractual agreement between TIMS and LGL (Contract No. NA70-GA-C-00030). The LGL port agent for Rockport-Fulton began working at Aransas Pass at the request of Mr. Orman Farley, the TIMS Supervisory Reporting Specialist. Mr. Farley hoped that help from the LGL port agent would ease the heavy work load of the two TIMS port agents at Aransas Pass. In October 1979 the LGL port agent helped process the tagged shrimp recovered at Aransas Pass by the TIMS port agents. In November 1979 the LGL port agent began to interview shrimpers at Aransas Pass, in addition to conducting interviews at Rockport-Fulton. The LGL port agent continued to interview at Aransas Pass until November 1980 when a new TIMS port agent was hired.

Between November 1979 and November 1980 the LGL port agent interviewed 288 vessels fishing offshore and completed 317 interviews (Table 10). Many of the shrimpers at Aransas Pass trawled at more than two fishing grounds.

The LGL port agent collected and processed a total of 116 recaptured tagged shrimp. The recovery of most of the tagged shrimp coincided with the tagging operations for the Bryan Mound brine disposal site study.

TABLE 9. SHRIMP TRIP INTERVIEWS CONDUCTED BY LGL AT ROCKPORT-FULTON

Month	Total No. Vessel Trips*	50% Total Trips	No. Interviewed	Percent Interviewed**	Percent Required	No. Attachment Forms	No. Tagged Shrimp Recovered
Sept 1979	48	24.0	19	79.2	100	20	1
Oct	51	25.5	42	164.7	100	51	24
Nov	49	24.5	32	130.6	100	45	49
Dec	47	23.5	26	110.6	100	35	6
Jan 1980	35	17.5	18	102.9	100	24	1
Feb	22	11.0	6	54.6	100	9	0
Mar	13	6.5	3	46.2	100	3	1
Apr	4	2.0	2	100.0	100	6	0
May	14	7.0	10	142.9	100	11	0
Jun	25	12.5	13	104.0	100	15	0
Jul	155	77.5	33	42.6	100	37	1
Aug	78	39.0	42	107.7	100	44	17
Sept	53	26.5	35	132.1	100	41	3
Oct	59	29.5	34	115.3	100	39	3
Nov	56	28.0	35	125.0	100	40	0
Dec	48	24.0	36	150.0	100	43	0
Jan 1981	15	7.5	12	160.0	100	12	0
TOTALS	772	386.0	398	103.1	100	475	106

*Total number of vessel trips provided to LGL by TIMS port agent.

**Number interviewed divided by 50% of total trips.

TABLE 10. SHRIMP TRIP INTERVIEWS CONDUCTED BY LGL AT ARANSAS PASS

Month	Total No. Vessel Trips*	50% Total Trips	No. Interviewed	Percent Interviewed**	Percent Required	No. Attachment Forms	No. Tagged Shrimp Recovered
Sept 1979	-	-	-	-	-	-	-
Oct	-	-	-	-	-	-	-
Nov	75	37.5	28	74.7	0	28	40
Dec	100	50.0	34	68.0	0	39	38
Jan 1980	61	30.5	20	65.6	0	24	6
Feb	55	27.5	9	32.7	0	13	0
Mar	18	9.0	6	66.7	0	10	0
Apr	32	16.0	6	37.5	0	8	0
May	43	21.5	12	55.8	0	12	1
Jun	61	30.5	16	52.5	0	17	0
Jul	129	64.5	28	43.4	0	32	9
Aug	196	98.0	38	38.8	0	39	16
Sept	178	89.0	42	47.2	0	43	3
Oct	154	77.0	49	63.6	0	52	3
Nov	-	-	-	-	-	-	-
Dec	-	-	-	-	-	-	-
Jan 1981	-	-	-	-	-	-	-
TOTALS	1102	551.0	288	52.3	0	317	116

*Total number of vessel trips provided to LGL by TIMS port agent.

**Number interviewed divided by 50% of total trips.

TOTAL SAMPLE OF LGL SURVEY IN TEXAS

A total of 3,922 interviews were conducted by LGL port agents between September 1979 and 31 January 1981. The largest number of interviews were obtained between July and October 1980 (Fig. 8), which corresponded with the period of maximum fishing effort at the ports surveyed (Fig. 9). Data from "Shrimp Landings-Annual Summary" also show peak shrimping activity from late summer to late autumn.

Overall, the LGL port agents sampled 84.1% of half of the total number of vessel trips (Table 11, Fig. 10). These results compare favorably with those described by Iversen (1962) for the Tortugas pink shrimp fishery in Florida. He reported an average of 19% of shrimpers interviewed between January and March and a mean of 22% between November and December.

The LGL port agents collected 2,128 recaptured tagged shrimp between September 1979 and January 1981. Figure 11 illustrates the number of shrimp recaptured during each month of the study. The first peak corresponded to the time of the fall 1979 tagging operations for the study of the "Bryan Mound Brine Disposal Site off Freeport Texas-Work Unit 4: Shrimp Mark-Release Investigations". A total of 38,245 tagged shrimp was released by LGL between September and November 1979 (Johnson 1981). Between September 1979 and May 1980 1,002 tagged shrimp were collected by the LGL port agents. Approximately 93% of the returns occurred between September 1979 and January 1980. Other studies also indicate a maximum return of tagged shrimp in the first few months after tagging. Iversen (1962) reported that most tagged pink shrimp were recovered within 4-6 weeks after release. Klima (1964) reported that, among white shrimp released in September off the Louisiana coast, 97% of the recoveries occurred between September and December; among brown shrimp released 90% of the recoveries occurred within 10 days after release. Kutkhun (1966) reported maximum recoveries of pink shrimp in the Tortugas fishing grounds during the sixth week after release.

In summer-fall 1980 there were two peak periods of tag recoveries. The recaptures in July and August 1980 corresponded with the release of 42,793 tagged shrimp for the Bryan Mound brine disposal site study (Johnson 1981). The large number of recaptures in October 1980 was related to the release of tagged shrimp for the "Shrimp Population Studies: West Hackberry and Big Hill Brine Disposal Sites off Southwest Louisiana and Upper Texas Coasts" (Contract No. NA80-GA-00043). During September and October 1980 a total of 5,141 tagged shrimp were released inshore at Port Bolivar, Texas and 5,596 tagged shrimp were released offshore near Sabine, Texas in the vicinity of the Big Hill brine diffuser site.

The goal of this program (to sample 50% of the offshore vessel trips in conjunction with TIMS) was achieved by LGL alone at all except three of the Texas ports surveyed. At Kemah the sampling level was 1.8% below the program goal. At Galveston and Freeport the percent interviewed was, respectively, 14.5% and 25.9% below the program goal. Additional agents would need to be placed at these ports to achieve a sampling level of 50% of the offshore vessel trips.

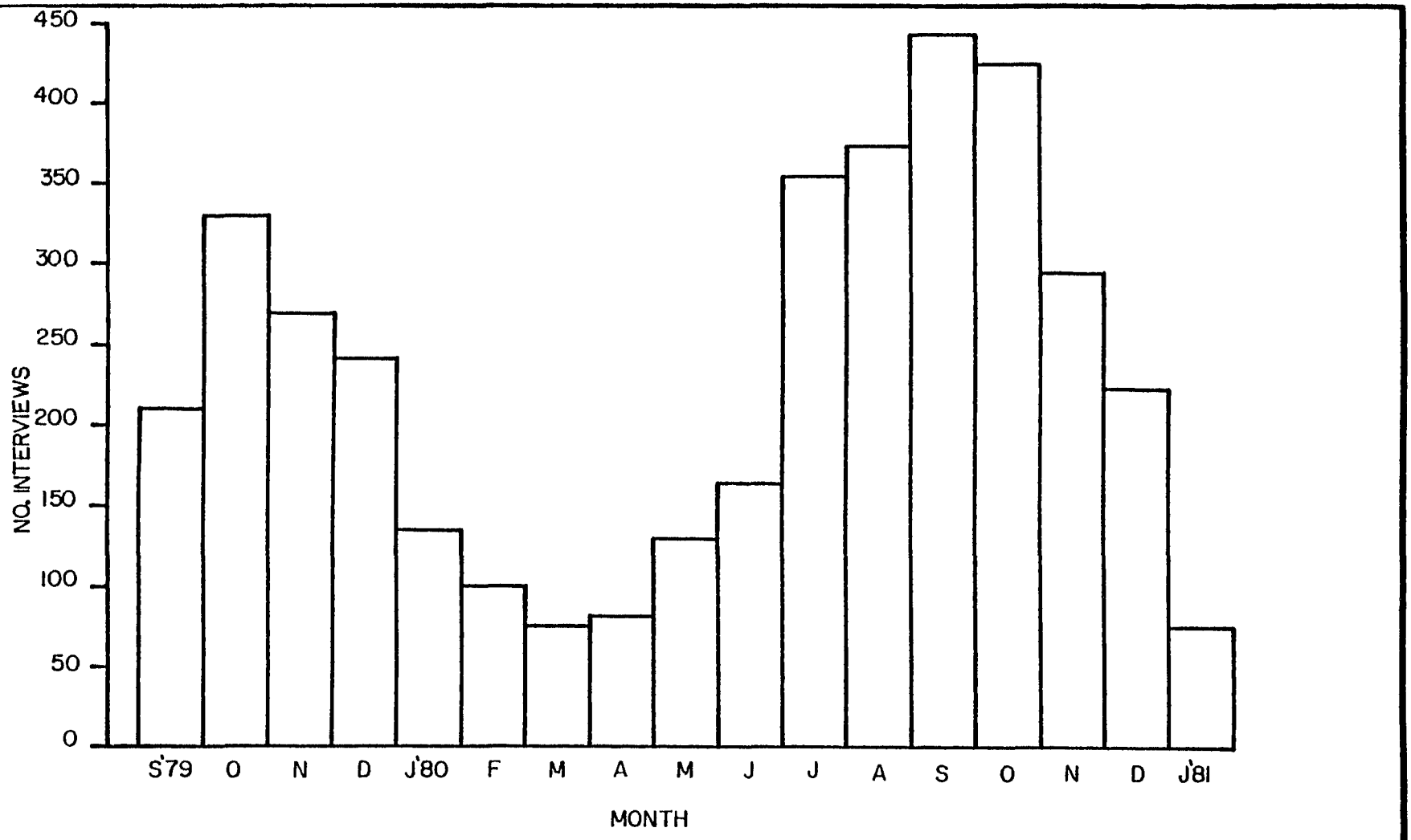


Fig. 8. Number of interviews conducted by LGL port agents at specified Texas ports between September 1979 and 31 January 1981.

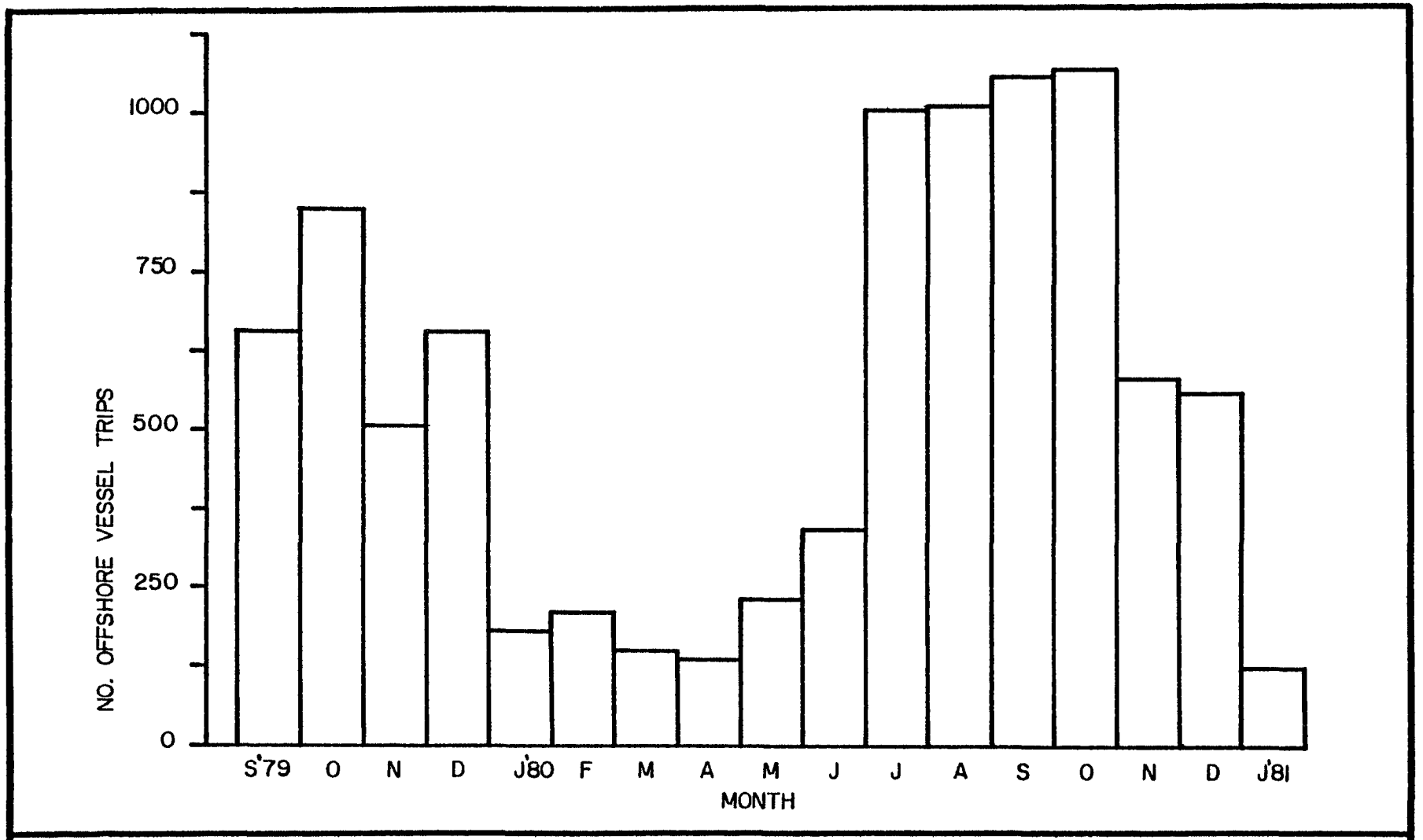


Fig. 9. Total number of offshore vessel trips reported by TIMS for Texas ports surveyed by LGL port agents between September 1979 and 31 January 1981.

TABLE 11. TOTAL NUMBER OF INTERVIEWS CONDUCTED BY LGL IN TEXAS FROM SEPTEMBER 1979 TO 31 JANUARY 1981

Port	Total Vessel Trips	50% Total Trips	Number Interviewed	% Required (of 50%)	% Interviewed (of 50%)
Galveston	2,029	1,015	721	80	71.1
Port Bolivar	599	300	301	80	100.7
Kemah	56	28	27	80	96.4
Freeport	4,189	2,095	1,009	80	48.2
Palacios	784	392	615	100	156.9
Port Lavaca	362	181	279	100	154.1
Port O'Connor	536	268	284	100	106.0
Rockport-Fulton	772	386	398	100	103.1
Aransas Pass	-		288	-	-
TOTAL	9,327	4,665	3,922		84.1

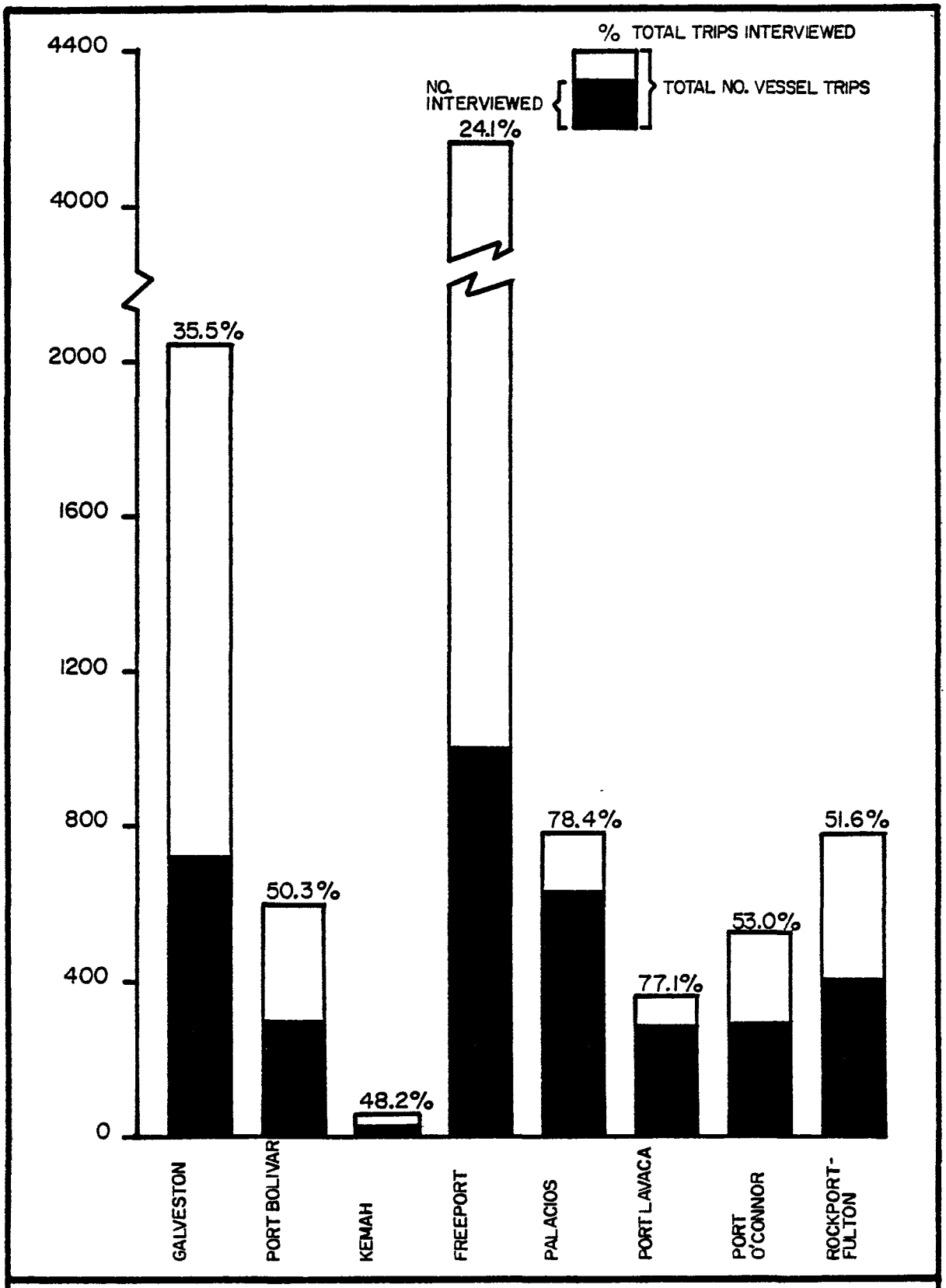


Fig. 10. Comparison of number of offshore vessel trips and number of interviews conducted by LGL at specified Texas ports from September 1979 to 31 January 1981.

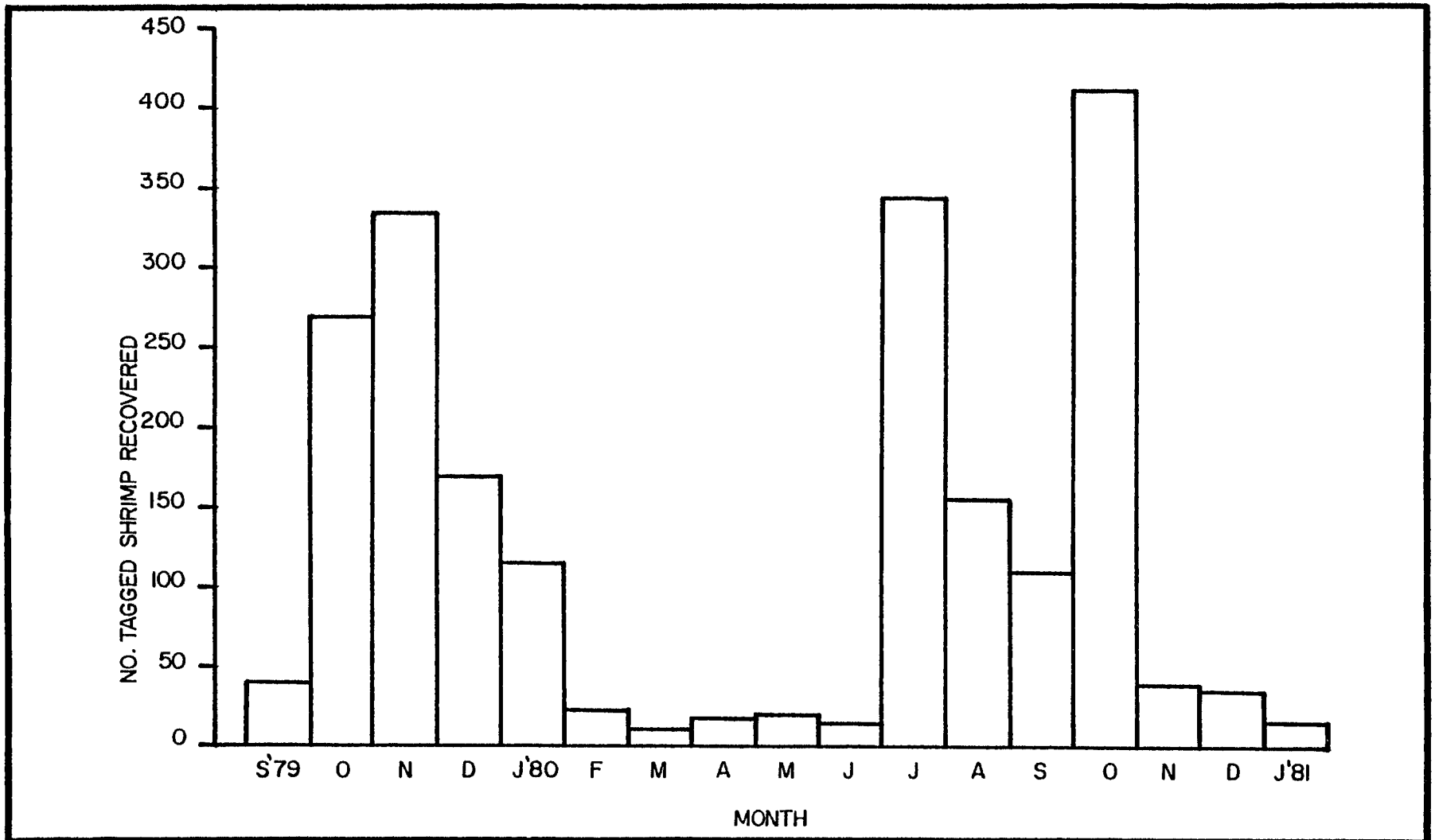


Fig. 11. Number of recaptured tagged shrimp collected by LGL port agents at specified Texas ports between September 1979 and 31 January 1981.

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