Paul Hammerschmidt

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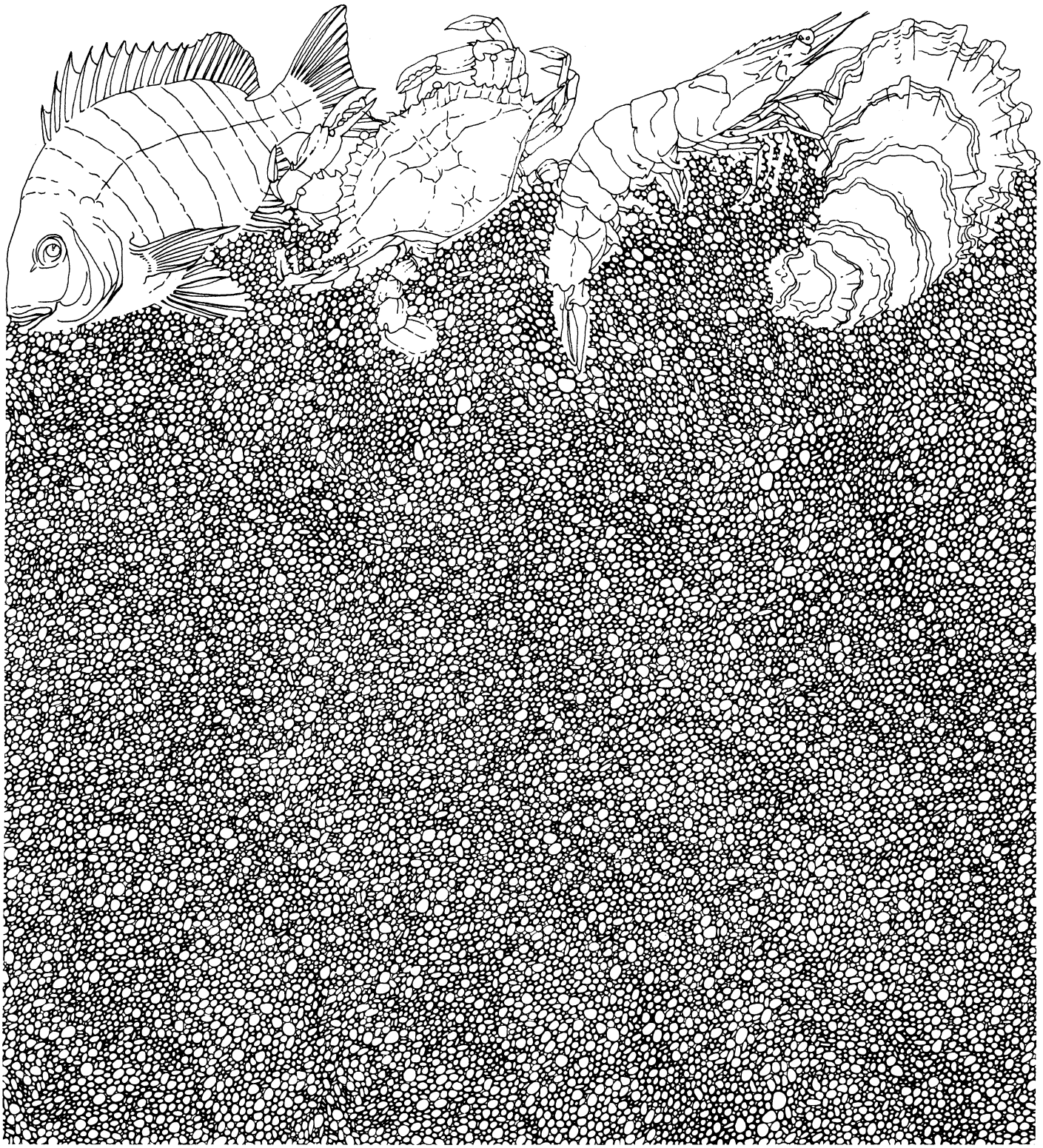

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ABSTRACT

Catches in 6.1-m trawls towed with nylon rope and wire cable were similar. Therefore, either towing line can be used in the Texas Parks and Wildlife Department routine trawl monitoring program.

INTRODUCTION

Stock assessments using standardized sampling techniques are required for effective management of marine organisms. The Texas Parks and Wildlife Department (TPWD) assesses bay populations in shoreline areas using bag seines and gill nets (McEachron and Green 1985). Penaeid shrimp populations have been monitored by trawls in open bay waters by the TPWD in at least some of the Texas bay systems since 1958 (Benefield and Baker 1980). The TPWD implemented a coastwide monitoring program in 1982 to establish long term trend information on relative abundance and size of penaeid shrimp and associated organisms (Benefield et al. 1983). These trawl data are used in conjunction with data from bag seines and gill nets to assess changes in abundance in finfish and shellfish populations in Texas bay waters.

It is important in routine monitoring programs that gears and sampling procedures be standardized to reduce biases in the collected data. The otter trawl is used to sample open water populations because of its economic, efficient, and versatile ability in sampling (Livingston 1976). Both nylon rope and wire cable have been used by TPWD to tow trawls in the standardized monitoring program.

This study was conducted to: 1) compare catch rates in trawls pulled with nylon rope and in trawls pulled with wire cable and 2) determine if towing gear (nylon rope vs wire cable) affects loss or damage of trawls.

MATERIALS AND METHODS

Standard otter trawls (6.1-m wide with 38-mm stretched mesh webbing; doors 1.2-m long and 0.6-m tall with 38-mm wide iron runners) were used in the Aransas Bay system during June 1983 (Figure 1) according to procedures of Benefield et al. (1983). Towing lines were 30.5-m long of either 13-mm diameter nylon rope or 7-mm diameter steel-wire cable.

Thirty trawl samples were collected during daylight using a TPWD 8.5-m inboard vessel. Each cable-towed sample was replicated by a rope-towed sample in the same general area as the cable-towed sample. All organisms caught in each sample were identified (Andrews 1981, Felder 1973, Hoese and Moore 1977, Parker et al. 1972) and counted.

Mean catch rates for select species, total number of species caught/tow, and total number of organisms caught/tow were compared ($P \leq 0.05$) using one-way analyses of variances (Sokal and Rohlf 1981). Individual catch rates were developed only for those species where $\geq$ 100 individuals were caught. Catch rates were estimated for Atlantic bumper (*Chloroscombrus chrysurus*), Atlantic croaker (*Micropogonias undulatus*), bay anchovy (*Anchoa mitchilli*), blue crab (*Callinectes sapidus*), brief squid (*Lolliguncula brevis*), brown shrimp (*Penaeus aztecus*), cabbagehead (*Stomolophus meleagris*), lesser blue crab (*C. similis*), pinfish (*Lagodon rhomboides*), sand seatrout (*Cynoscion arenarius*) and spot (*Leiostomus xanthurus*).

RESULTS

There were no significant differences between rope and cable towing lines for individual catch rates, for total number of species caught/tow, and for total number of organisms caught/tow (Table 1).

No torn trawls or loss of gear were encountered during the study with either towing line.

DISCUSSION

Either wire cable or nylon rope can be used to pull trawls in the TPWD routine shrimp monitoring program. Catches with both trawling lines are comparable and all trawl data can be used in assessing fluctuations in bay finfish and shellfish populations.

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Figure 1. The Aransas Bay system, Texas.

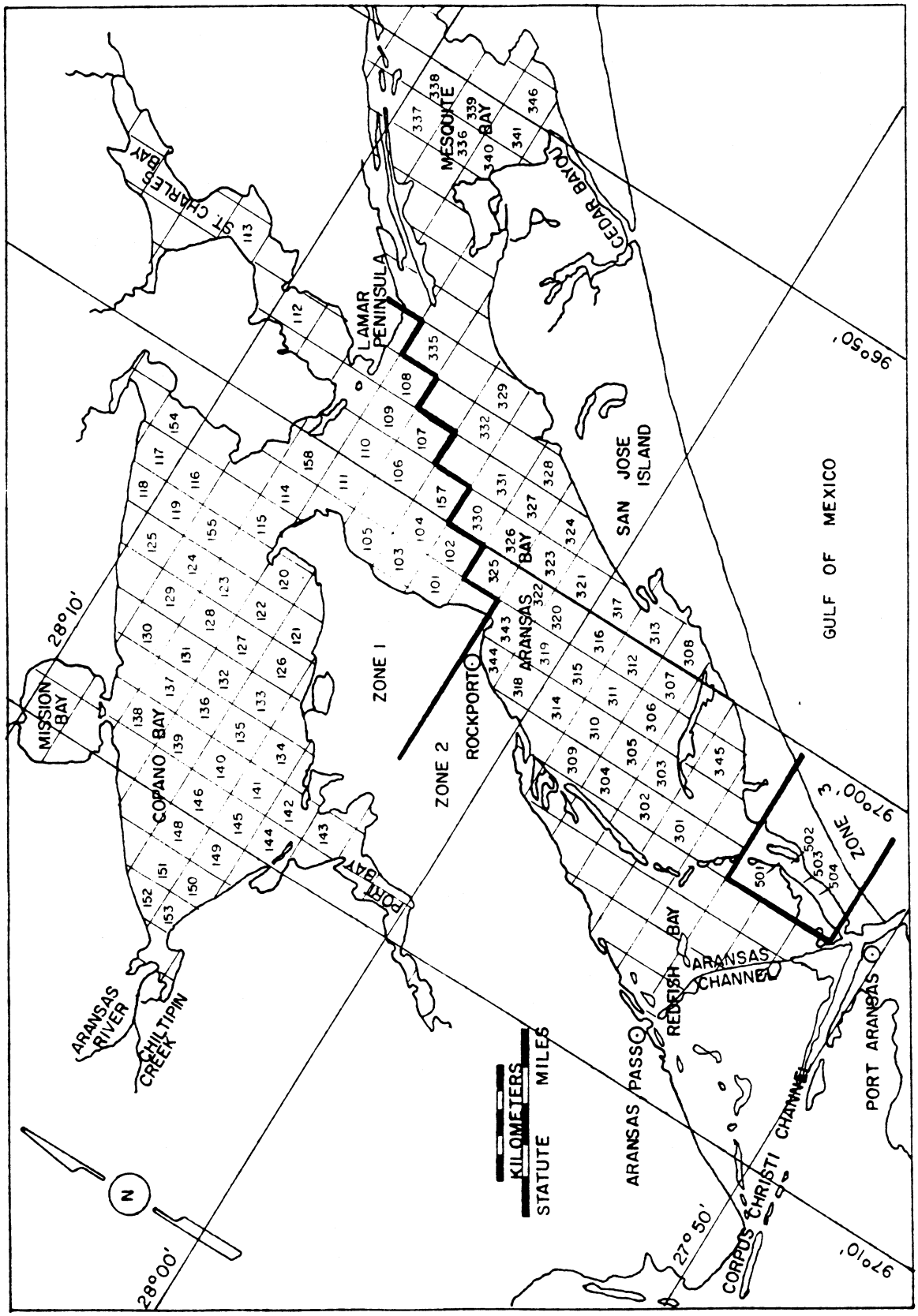
MISSION BAY
COPANO BAY
ARANSAS RIVER
CHILTIPIN CREEK
ST. CHARLES BAY
LAMAR PENINSULA
MESQUITE BAY
CEDAR BAYOU
ROCKPORT
ARANSAS BAY
PORT BAY
SAN JOSE ISLAND
GULF OF MEXICO
ZONE 1
ZONE 2
ZONE 3
ARANSAS PASS
REDFISH BAY
ARANSAS CHANNEL
PORT ARANSAS
CORPUS CHRISTI CHANNEL
KILOMETERS
STATUTE MILES
N
28°00'
28°10'
27°50'
96°50'
97°00'
97°10'

Table 1. Summary of results of one-way analyses of variance of select species catch rates, total number of species caught/tow and total number of organisms caught/tow between nylon rope and wire cable towing lines in the Aransas Bay system, Texas during June 1983.

Species	Source of variation	df	Mean square	F
Atlantic bumper	Total	59	475.525	
	Towing gear	1	426.667	0.896 NS
	Error	58	476.368	
Atlantic croaker	Total	59	487.298	
	Towing gear	1	176.817	0.359 NS
	Error	58	492.651	
Bay anchovy	Total	59	61.542	
	Towing gear	1	46.817	0.758 NS
	Error	58	61.796	
Blue crab	Total	59	482.046	
	Towing gear	1	48.600	0.099 NS
	Error	58	489.520	
Brief squid	Total	59	25.050	
	Towing gear	1	9.600	0.379 NS
	Error	58	25.316	
Brown shrimp	Total	59	7860.202	
	Towing gear	1	792.067	0.099 NS
	Error	58	7982.067	
Cabbagehead	Total	59	153.722	
	Towing gear	1	160.067	1.042 NS
	Error	58	153.613	
Lesser blue crab	Total	59	138.707	
	Towing gear	1	35.267	0.255 NS
	Error	58	138.456	
Pinfish	Total	59	32.426	
	Towing gear	1	4.817	0.146 NS
	Error	58	32.899	
Sand seatrout	Total	59	13.054	
	Towing gear	1	0.150	0.011 NS
	Error	58	13.276	
Spot	Total	59	73.031	
	Towing gear	1	132.017	1.833 NS
	Error	58	72.014	
Total number of species caught/tow	Total	59	15.911	
	Towing gear	1	11.267	0.704 NS
	Error	58	15.990	
Total number of organisms caught/tow	Total	59	13,422.417	
	Towing gear	1	756.150	0.055 NS
	Error	58	13,640.800	

NS = $P > 0.05$

Table 2. Number of organisms (by species and towing gear) caught with 6.1-m trawls in Aransas Bay, Texas during June 1983. Thirty tows were made with each towing gear.

Species	Nylon rope	Wire cable	Total
Invertebrates			
Big claw hermit crab	9	4	13
Blue crab	386	440	826
Brief squid	91	67	158
Broken-necked shrimp	0	1	1
Brown shrimp	1848	1630	3478
Cabbagehead	17	115	132
Calico crab	0	3	3
Eastern oyster	29	31	60
Family mud crabs	5	6	11
Florida rock shell	1	0	1
Lesser blue crab	175	129	304
Long claw hermit crab	14	3	17
Mantis shrimp	3	2	5
Order anemones	0	2	2
Pistol shrimp	2	1	3
Pink shrimp	2	0	2
Porcellanid crab	0	2	2
Portunid crab	1	0	1
Purple crab	0	3	3
Sergestid shrimp	1	0	1
Spider crab	1	3	4
Striped hermit crab	14	16	30
Stone crab	3	4	7
White shrimp	6	6	12
Subtotal	2608	2468	5076
Vertebrates			
Atlantic bumper	10	170	180
Atlantic croaker	504	401	905
Atlantic midshipman	2	3	5
Atlantic moonfish	3	0	3
Atlantic stingray	1	1	2
Atlantic threadfin	8	5	13
Banded drum	1	0	1
Bay anchovy	112	162	274
Bay whiff	18	15	33

Table 2. (Cont'd.).

Species	Nylon rope	Wire cable	Total
Vertebrates (Contd.).			
Blackfin searobin	8	7	15
Bluntnose jack	2	0	2
Crevalle jack	1	1	2
Fringed flounder	0	2	2
Gulf butterfish	14	8	22
Gulf menhaden	9	8	7
Gulf toadfish	1	1	2
Hardhead catfish	12	5	17
Harvestfish	2	1	3
Hogchoker	9	3	12
Least puffer	2	3	5
Lined seahorse	2	0	2
Longnose anchovy	0	1	1
Lookdown	1	0	1
Naked goby	0	1	1
Orange filefish	0	1	1
Pigfish	10	1	11
Pinfish	59	42	101
Sand seatrout	65	62	127
Silver perch	34	9	43
Southern flounder	12	8	20
Southern kingfish	1	0	1
Spot	166	77	243
Spotted seatrout	2	0	2
Subtotal	1071	998	2069
GRAND TOTAL	3679	3466	7145

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