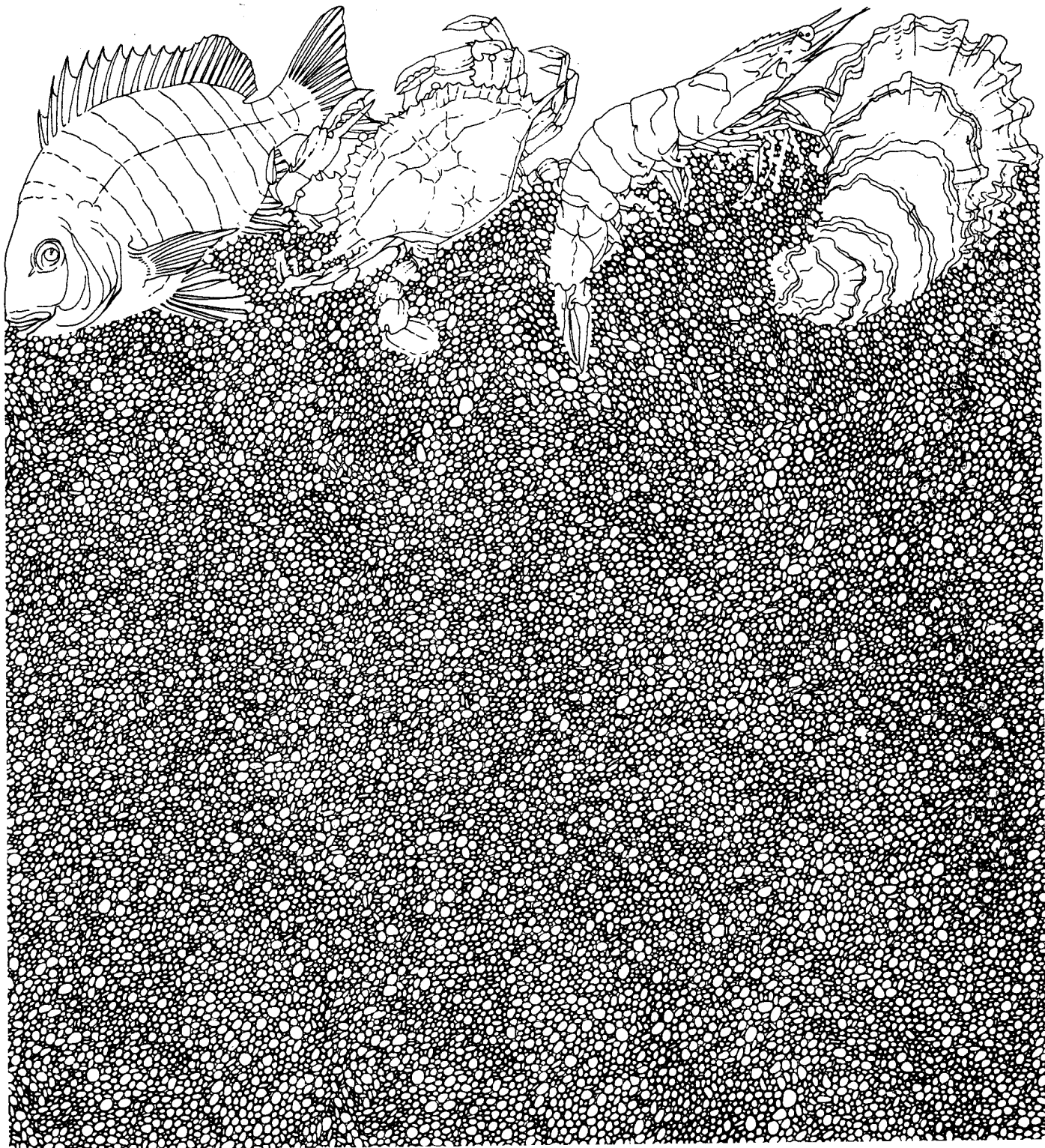


# Survival of Red Drum Fry Stocked Into Christmas Bay, Texas

by Gary C. Matlock

Management Data Series Number 152  
1988

Texas Parks and Wildlife Department  
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## ABSTRACT

Red drum fry (2.5 days old) were stocked into Christmas Bay in May 1979 to enhance native populations. No stocked fish were recaptured in bag seines during 4 months after stocking. Reasons for this apparent lack of success are unknown. However, additional research is needed to determine the feasibility of using fry stocking to enhance red drum stocks.

## INTRODUCTION

Red drum (*Sciaenops ocellatus*) is economically important in Texas and has been severely overfished (Matlock 1982). The potential to increase the recovery by stocking hatchery-reared fish appears promising (Matlock et al. 1986). From 1975 through 1982, 2.8 million fingerlings and 45.1 million fry were stocked (Matlock 1984). The potential success of fingerling stocking was assessed by Matlock et al. (1986) but fry stocking has not been evaluated. Since 1983, the stocking of 7 to 10 million fingerlings (25 to 50 mm TL) annually into Texas bays has become an integral part of the Texas Parks and Wildlife Department's (TPWD) red drum management strategy. However, fingerling production is expensive (annual operating costs = \$200,000). An alternate, less expensive approach may be the use of fry.

This study examines whether or not red drum fry stocked into a Texas bay and out of phase with natural fry survived and grew.

## MATERIALS AND METHODS

Red drum fry (2.5 days old) were obtained from the TPWD Marine Fisheries Research Station, Palacios in May 1979. Fish were transported in oxygen filled plastic bags (100,000/bag); 4.8 million fry were released into Christmas Bay on the south shore of Follets Island (Figure 1) during 7 days (Table 1). Fish were acclimated to ambient bay temperature for 5-15 minutes and for up to 35 minutes to ambient bay salinity before release.

Collections were made with bag seines during June through September in Christmas Bay to recapture stocked fish. Bag seines were 18.3 m long by 1.8 m deep with a 1.8 x 1.8-m bag of 12.7-mm stretched mesh; stretched mesh was 19.0 mm in remainder of seine. They were pulled at six sites for 30.5 m parallel to shore twice in June and once each month from July through September 1979. Collections were made during each trip at four (randomly selected) of the seven stocking sites and at two sites on the north shore of the bay (one site from each of two equal quadrants). Each of the north shore sites was randomly selected from four sites in each quadrant.

Red drum were counted and measured (nearest mm TL). Stocked fish were identifiable by size because spawning occurs only in fall (Matlock 1984); wild fish <50 mm would not be present during June-September (Matlock et al. 1986).

## RESULTS AND DISCUSSION

No stocked red drum were recaptured, but four native red drum were caught. Two fish (228 and 233 mm) were caught on 15 June, and two fish (257 and 274 mm) were caught on 19 July. These fish were too large to be stocked fish. This apparent lack of survival of stocked fry may be due to:

1. inadequate stocking density to detect survival and growth within the sampling effort;
2. high mortality from handling and transporting stress, unsuitable environmental conditions, predators, or inadequate food;

### 3. movement from Christmas Bay to adjacent unsampled areas.

With existing data it is impossible to determine which is the most likely explanation. However, it does not appear that environmental conditions measured during and after stocking would have caused high mortality. Surface water temperature ( $\pm$  1SE) increased from 26.8 ( $\pm$ 0.7) C on 15 June to 33.3 ( $\pm$ 0.3) C on 6 August, then decreased to 29.5 ( $\pm$ 1.5) C on 6 September (Table 2). Among-site variation was 2 to 3 C on each date (Table 2). Surface salinity approximated 16-17 o/oo at each site on each date except on 6 August at all sites but one when salinities were 4 to 9 o/oo (Table 2). Dissolved oxygen was always  $\geq$  7.0 ppm. Fry survival exceeded 40% (during 30 days) in ponds containing water with much higher temperatures and salinities than found during this study (McCarty et al. 1985). Additional research with higher stocking rates in smaller areas is needed to determine if stocking rate was inadequate. Food availability (quantity, type, and size) should also be determined.

## LITERATURE CITED

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Table 1. Number and location of 4.8 million red drum dry stocked into Christmas Bay during May 1979 with temperature ( $^{\circ}\text{C}$ ) and salinity (0/00) in the transport water at loading and at the stocking site at release.

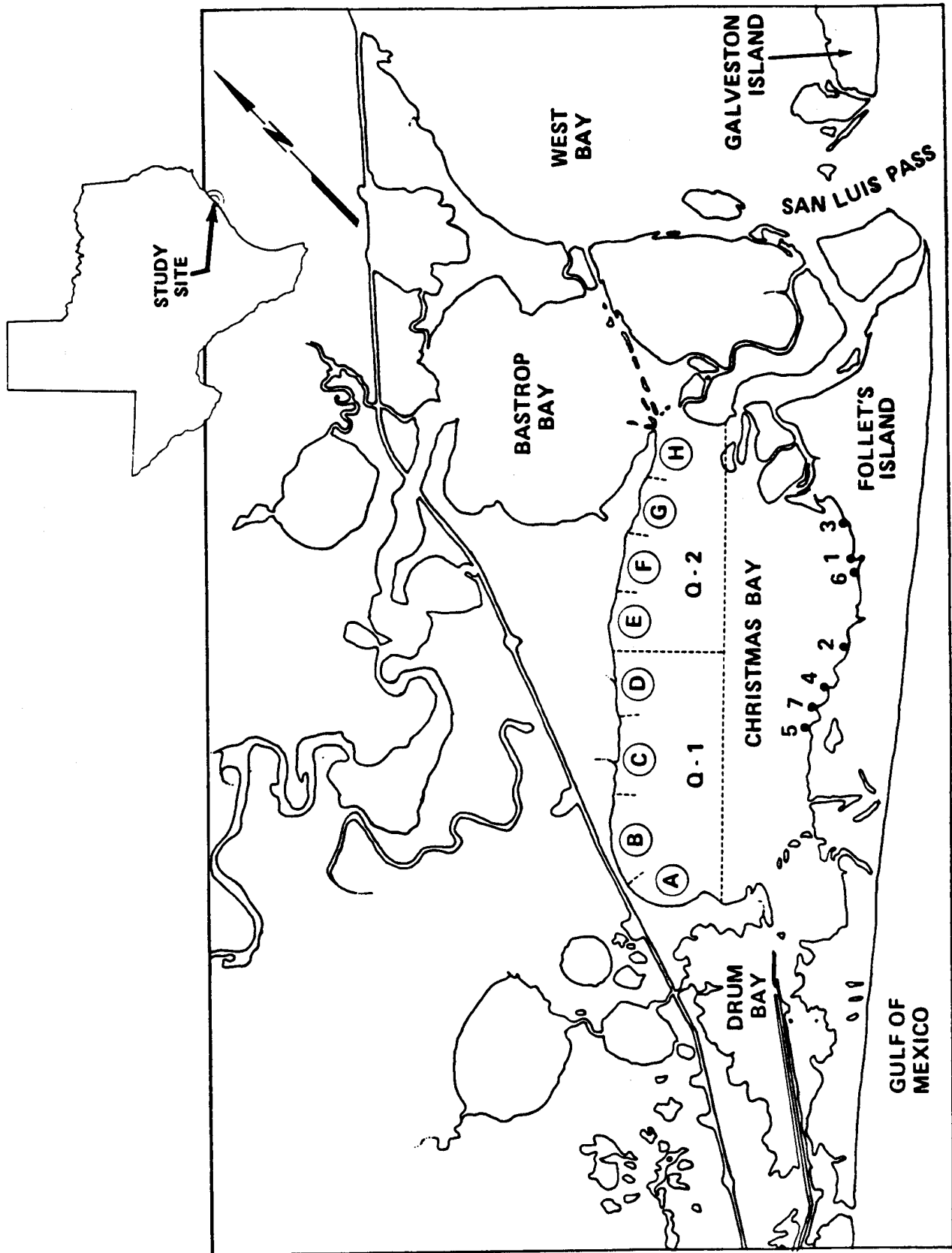
Date	Stocking time (CDT)	Stocking location	No.	Temperature		Salinity	
				Loading	Stocking	Loading	Stocking
5-11-79	1530	0.2-0.3 km E of boat ramp	600,000	25.0	26.0	30.0	21.1
5-12-79	1530	1.6 km W of boat ramp	700,000	22.5	22.0	29.0	20.5
5-13-79	1530	0.8 km W of boat ramp	1,100,000	22.0	26.0	29.4	20.5
5-14-79	1500	3.2 km W of boat ramp	600,000	22.0	26.5	25.5	17.8
5-15-79	1500	4.8 km W of boat ramp	900,000	23.0	26.0	21.1	17.8
5-18-79	1530	Boat ramp	400,000	21.0	27.0	20.0	19.4
5-19-85	1500	4.0 km W of boat ramp	500,000	20.5	26.0	19.4	19.9



Table 2. Hydrological data collected at each collection site during June-September 1979. Banks indicate no data collected.

Date	Quadrant	Site	Water temperature (°C)	Salinity (o/oo)	Dissolved oxygen (ppm)
15 June	Release	3	26.0	15.5	7.2
	Release	4	27.0	16.1	10.8
	Release	5	28.0	15.5	10.4
	Release	6	29.0	15.0	9.8
	4	H	26.0	16.7	9.6
	3	C	24.5	16.7	8.2
29 June	Release	3	33.0	18.9	16.0
	Release	6	35.0	16.7	16.0
	Release	4	33.5	15.5	18.0
	Release	5	34.0	15.5	16.0
	3	C	31.0	13.9	13.0
	4	F	32.5	16.7	15.0
19 July	Release	1	31.0		
	Release	4	31.0		
	Release	5	31.0		
	Release	5	30.0		
	4	E	32.0		
	3	D	31.0		
6 Aug	Release	6	34.0	6.1	11.0
	Release	5	33.0	7.8	9.0
	Release	4	34.0	8.9	11.0
	Release	2	34.0	8.9	11.0
	3	C	32.0	4.4	9.0
	4	E	33.0	16.7	7.0
6 Sep	Release	3	28.0	17.8	7.0
	3	B	31.0	17.8	10.0

Figure 1. Location of stocking sites (indicated by numbers) and potential bag seine collection sites (indicated by letters) in each of two quadrants (Q-1 and Q-2) in Christmas Bay.



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