

**Abundance and Size of  
Adult Red Drum off the  
Central Texas Coast during  
December-April  
1977-80 and 1989-90**

**by  
Billy E. Fuls**

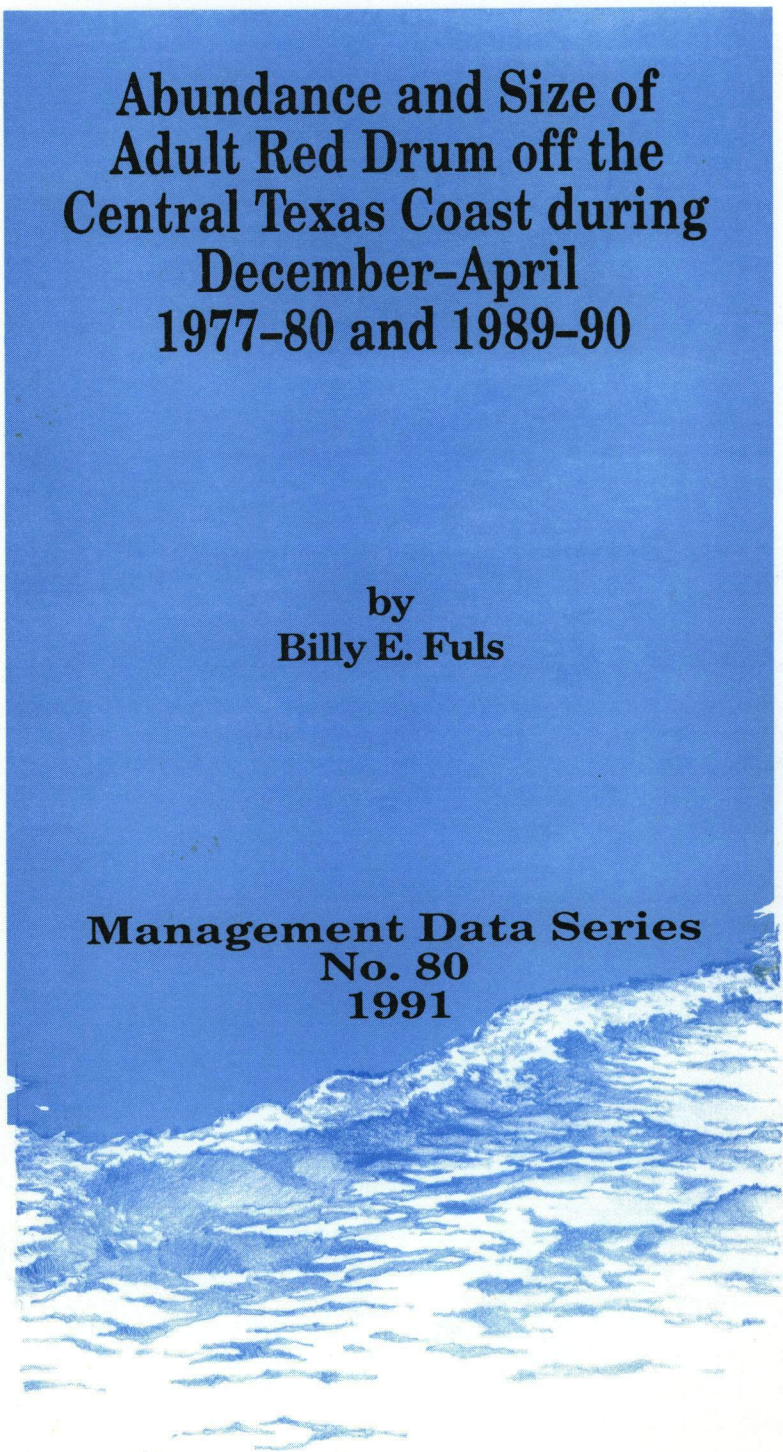
**Management Data Series  
No. 80  
1991**



**TEXAS  
PARKS & WILDLIFE  
DEPARTMENT**

**FISHERIES & WILDLIFE  
DIVISION**

**4200 Smith School Road  
Austin, Texas 78744**



ABUNDANCE AND SIZE OF ADULT RED DRUM OFF THE CENTRAL  
TEXAS COAST DURING DECEMBER-APRIL 1977-80 AND 1989-90

by

Billy E. Fuls

MANAGEMENT DATA SERIES

No. 80

1991

Texas Parks and Wildlife Department  
Fisheries and Wildlife Division  
Coastal Fisheries Branch  
4700 Smith School Road  
Austin, Texas 78744

## ACKNOWLEDGEMENTS

I would like to thank all Texas Parks and Wildlife Department field personnel who collected longline samples off the central Texas coast. Appreciation is extended to C. E. Bryan, Hal Osburn, Maury Osborn, Tom Heffernan, Ed Hegen, Lynn Benefield, Larry McEachron and Ted Storck for reviewing the manuscript.

## ABSTRACT

Catch rates (no./100 hook-h) and mean TL of adult red drum (Sciaenops ocellatus) caught on bottom longlines off the central Texas coast were similar between December-April 1978-80 and 1989-90. A long term longline monitoring study could be conducted in the vicinity of the "car body reef" with minimal effort to provide information on adult red drum.

## INTRODUCTION

In 1984 a profile of the red drum (Sciaenops ocellatus) fishery prepared by the Gulf of Mexico Fishery Management Council and Gulf States Marine Fisheries Commission indicated red drum stocks in coastal waters were being impacted by various types of fishing pressure; growth overfishing was occurring in estuarine areas of Texas and west central Florida (United States Department of Commerce 1986). In 1986 Gulfwide commercial landings of red drum reached a high of 6.2 million kg, due mainly to a purse seine directed fishery in the Gulf of Mexico (Goodyear 1989). During 1986 and 1987 emergency quotas were set by the Secretary of Commerce to reduce the commercial catch of adult red drum within Gulf of Mexico federal waters to maintain gulf spawning stocks of red drum. To ensure proper management, a Management Plan for the Gulf red drum fishery was published in 1986 (United States Department of Commerce 1986); subsequent status reports of red drum stocks were published to aid future regulation for harvest of red drum in federal waters (Goodyear 1987, 1988, 1989). One hinderence to specific red drum management activities and plans has been lack of scientific data on size and condition of the population in Gulf waters. Four studies present information on populations of adult red drum in Texas gulf waters: 1) Heffernan (1974) with rods and reels, multi hook surface and bottom lines and nets in the Texas gulf surf; 2) Cody et al. (1978) with large-mesh fish trawls off the central Texas coast; 3) Cody and Avent (1980) and Cody et al. (1981) with bottom longlines off the central Texas coast; and 4) Ross et al. (1982) with trawls and rods and reels off Freeport.

The objective of the present study was to set longlines in the same general Gulf area and during the same period as Cody and Avent (1980) and Cody et al. (1981) to determine if changes have occurred in relative abundance and size of adult red drum between December-April 1978-80 and 1989-90.

## MATERIALS AND METHODS

Cody and Avent (1980) and Cody et al. (1981) were reviewed to determine the most productive Gulf area, depth and time of year adult red drum could be caught by bottom longline. These studies revealed bottom longlines caught adult red drum most often at a depth of 18 m from December to April and at a depth of 13 m during October off the central Texas coast. Adult red drum caught in 18 m deep water were most often caught in the vicinity of the "car body reef", a man made reef constructed of old cars. Therefore, the "car body reef" area (latitude 27°46.5'; longitude 96°58.2') was selected as the sampling site for the present study (Figure 1).

Bottom longlines were set twice a month (once during 1st-15th and once during 16th-31st) from December 1989 to April 1990; only one longline was set in March due to unsafe sea conditions. The bottom longline was 366 m long (6 mm diameter nylon mittet) with 100 gangions; a standard set was 1 h (time from total release of longline until time retrieval began). Each gangion was 1 m long (90.7 kg test monofilament) with a 13/0 Mustad cadmium-plated circle tuna hook at one end and attached to the longline at the other end by a 127 mm stainless steel halibut snap. Gangions were spaced about 3.5 m apart along the bottom longline. To be comparable to past TPWD bottom longline studies,

50% of the gangions were baited with frozen or fresh squid (Lolliguncula brevis) and 50% were baited with frozen or fresh fish (Leostomus xanthurus). Buoy lines and the bottom longline were deployed using techniques described by Cody et al. (1981). After retrieving the longline, red drum were measured (TL to nearest mm), tagged with internal abdominal tags, and released back into the Gulf.

For analyses, longline catch rate and size data for red drum caught on bottom longlines in the sample area during December 1978-April 1980 were grouped together to compare with December 1989-April 1990 data (Table 1). Catch rates are expressed as number of red drum caught with 100 hooks fished for 1 h (no./100 hook-h).

SAS (SAS Institute Inc. 1985) software programs were used for all analyses. Using the SAS UNIVARIATE procedure it was found that catch rates were not normally distributed, but lengths were close to a normal distribution. Further analyses revealed catch rates for both periods were heteroscedastic, but lengths were not (Sokal and Rohlf 1981). Therefore, catch rates were analyzed non-parametrically by ranking data and testing for significant differences ( $P \leq 0.05$ ) between sample periods using SAS procedure ANOVA for a one-way analysis of variance (AOV) with equal sample size (SAS Institute Inc. 1985, Sokal and Rohlf 1981). Lengths were analyzed parametrically (non-transformed data) using the SAS GLM procedure for a one-way AOV with unequal sample size.

## RESULTS

Catch rates and lengths of adult red drum were similar between the 1978-80 and 1989-90 periods (Tables 2 and 3, Figures 2 and 3). Catch rates during 1978-80 averaged 0.6/100 hook-h, and during 1989-90 averaged 1.4/100 hook-h (Table 1 and Figure 2). Size of red drum during 1978-80 ranged from 890-1,050 mm (mean = 996 mm), and during 1989-90 ranged from 965-1,051 mm (mean = 1,004 mm) (Table 1 and Figure 3). March and April accounted for 82% of all red drum caught during 1978-80 and 92% during 1989-90. The CV for untransformed catch rate data was high (CV = 168), whereas CV for length data was low (CV = 5).

## DISCUSSION

Results of the present study compare favorably with previous studies. Size of red drum caught by Cody et al. (1978) and Ross et al. (1982) in 18 m deep water is comparable to size of red drum caught in the present study. Most red drum caught off Freeport during 1977-81 (Ross et al. 1982) were caught in 13-22 m of water during March and April. During 1975-77 Cody et al. (1978) caught most of their red drum during March with fish trawls off the central Texas coast in water 18 m or deeper. However, Heffernan (1973) caught greatest numbers of red drum in the surf adjacent to Cedar Bayou (a natural pass) during October-December. These fish were smaller in average size than those in the present study; greatest abundance occurred when smaller maturing red drum were emigrating from coastal bays to gulf waters and during the

natural spawning period when they are commonly found in close proximity to coastal passes.

Since information on adult red drum in Gulf waters is vital to efficient Gulfwide management of the species, it appears from the present study that longline catch and release studies off the central Texas coast can supply needed information. However, the high CV for catch rate data indicates an increase in number of samples collected is needed to detect significant changes in catch rate through time. The present study has documented a specific area off the central Texas coast, the "car body reef", where adult red drum are apparently accessible to longline gear year after year. Therefore, it is possible longline studies could be conducted off the central Texas coast during March and April in 18 m deep water in the vicinity of the "car body reef", with increased effort within these months for detection of change in red drum abundance through time. Thus, a long term monitoring study could be conducted with minimal effort to provide information on adult red drum off the central Texas coast.

## LITERATURE CITED

- Cody, T. J., and R. M. Avent. 1980. Assessment of bottom longline fishing off the central Texas coast. Management Data Series Number 16. Texas Parks and Wildlife Department, Coastal Fisheries Branch. Austin, Texas.
- Cody, T. J., B. E. Fuls, G. C. Matlock, and C. E. Bryan. 1981. Assessment of bottom longline fishing off the central Texas coast, a completion report. Management Data Series Number 22. Texas Parks and Wildlife Department, Coastal Fisheries Branch. Austin, Texas.
- Cody, T. J., K. W. Rice, and C. E. Bryan. 1978. Food fish and potential foodfish captured in a large-mesh fish trawl along the central Texas coast. In: Commercial fish and penaeid shrimp studies, Northwestern Gulf of Mexico. Project 2-276-R, Segment 2, Completion Report. Texas Parks and Wildlife Department, Coastal Fisheries Branch. Austin, Texas.
- Goodyear, C. P. 1987. Status of red drum stocks of the gulf of Mexico. United States Department of Commerce, National Marine Fisheries Service, Southeast Fisheries Center, Miami Laboratory Contribution CRD 86/87-34. Miami, Florida.
- Goodyear, C. P. 1988. Status of red drum stocks of the gulf of Mexico. United States Department of Commerce, National Marine Fisheries Service, Southeast Fisheries Center, Miami Laboratory Contribution CRD 87/88-32. Miami, Florida.
- Goodyear, C. P. 1989. Status of the red drum stocks of the Gulf of Mexico. United States Department of Commerce, National Marine Fisheries Service, Southeast Fisheries Center, Miami Laboratory Contribution CRD 88/89-14. Miami, Florida.
- Heffernan, T. L. 1974. Survey of adult red drum (Sciaenops ocellata), 1973. Coastal Fisheries Project Report 1973. Texas Parks and Wildlife Department, Coastal Fisheries Branch. Austin, Texas.
- Ross, J. L., J. S. Pavela, and M. E. Chittenden, Jr. 1982. Seasonal occurrence of black drum, Pogonias cromis, and red drum, Sciaenops ocellatus, off Texas. Northeast Gulf Science. 6(1):67-70.
- SAS Institute Incorporated. 1985. Procedures guide, Version 6.03. Cary, North Carolina.



Sokal, R. R., and F. J. Rohlf. 1981. Biometry, 2nd Edition. W. H. Freeman and Company. San Francisco, California.

United States Department of Commerce. 1986. Secretarial fishery management plan, regulatory impact review, and regulatory flexibility analysis for the red drum fishery of the Gulf of Mexico. United States Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service. Washington, District of Columbia.

Figure 1. TPWD bottom longline sample area off the central Texas coast in 18-m deep water during December-April 1978-80 and 1989-90.

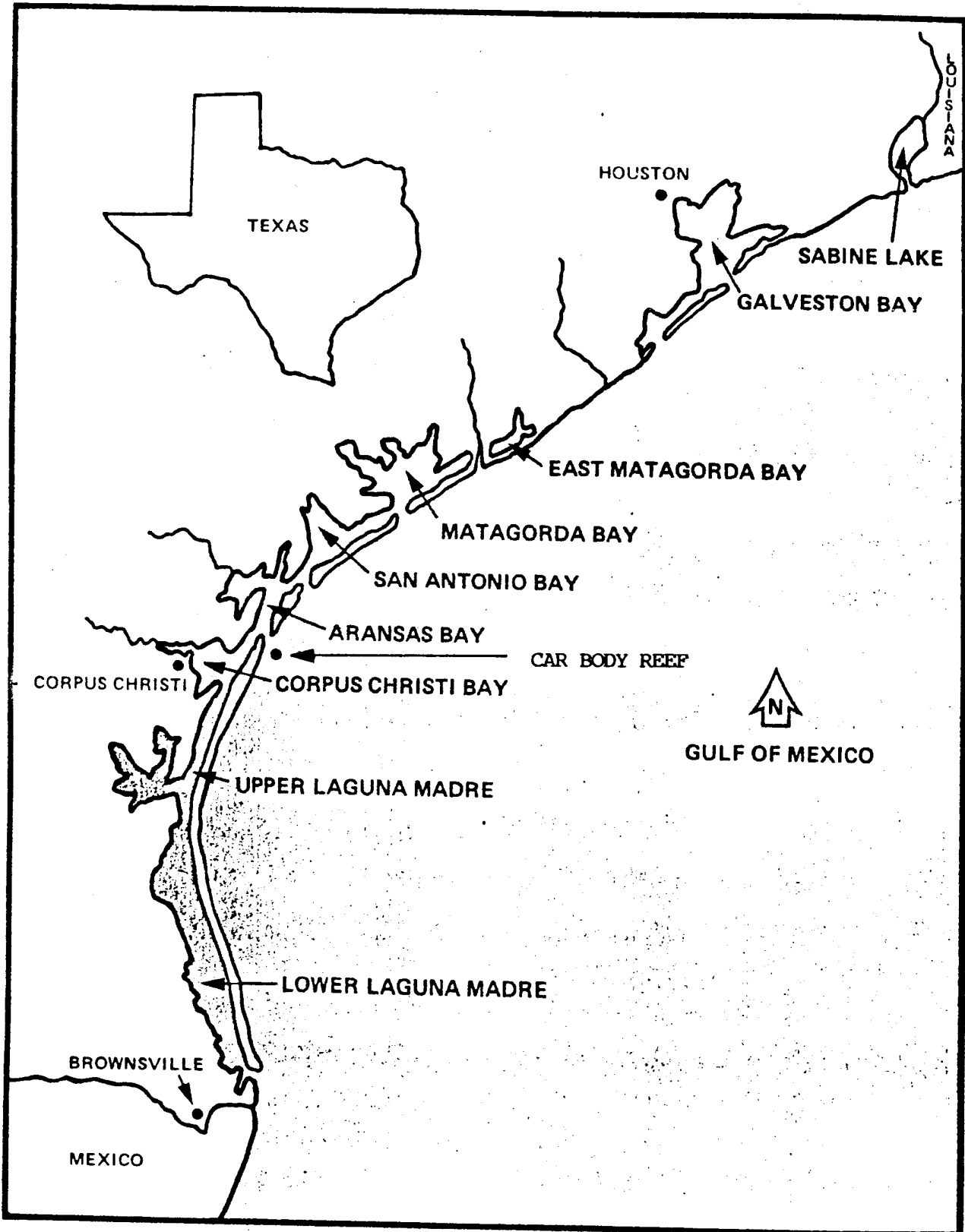


Figure 2. Mean catch rate ( $\pm 2SE$ ) of red drum caught on bottom longline sets off the central Texas coast in 18-m deep water during December-April 1978-80 and 1989-90.

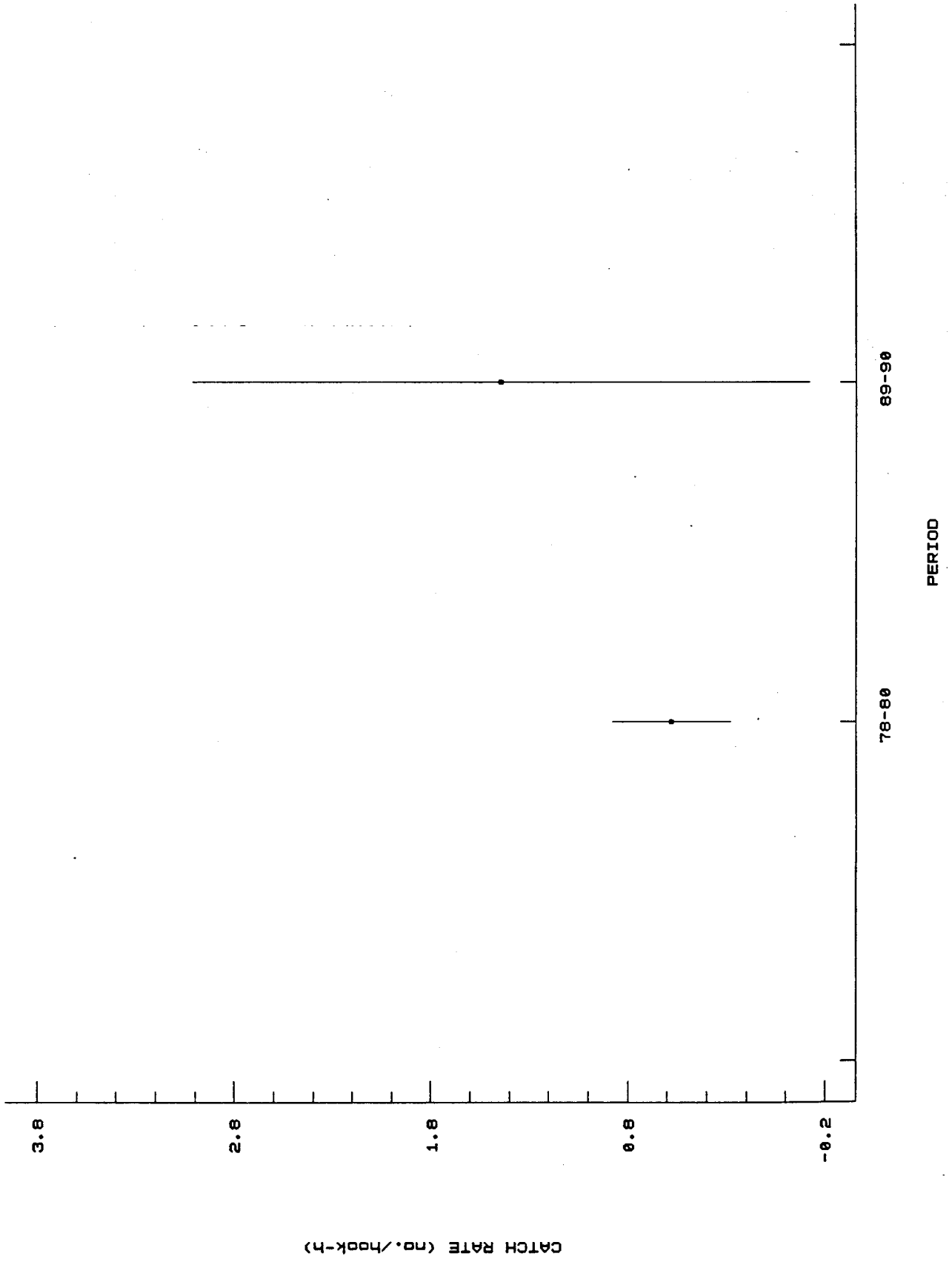
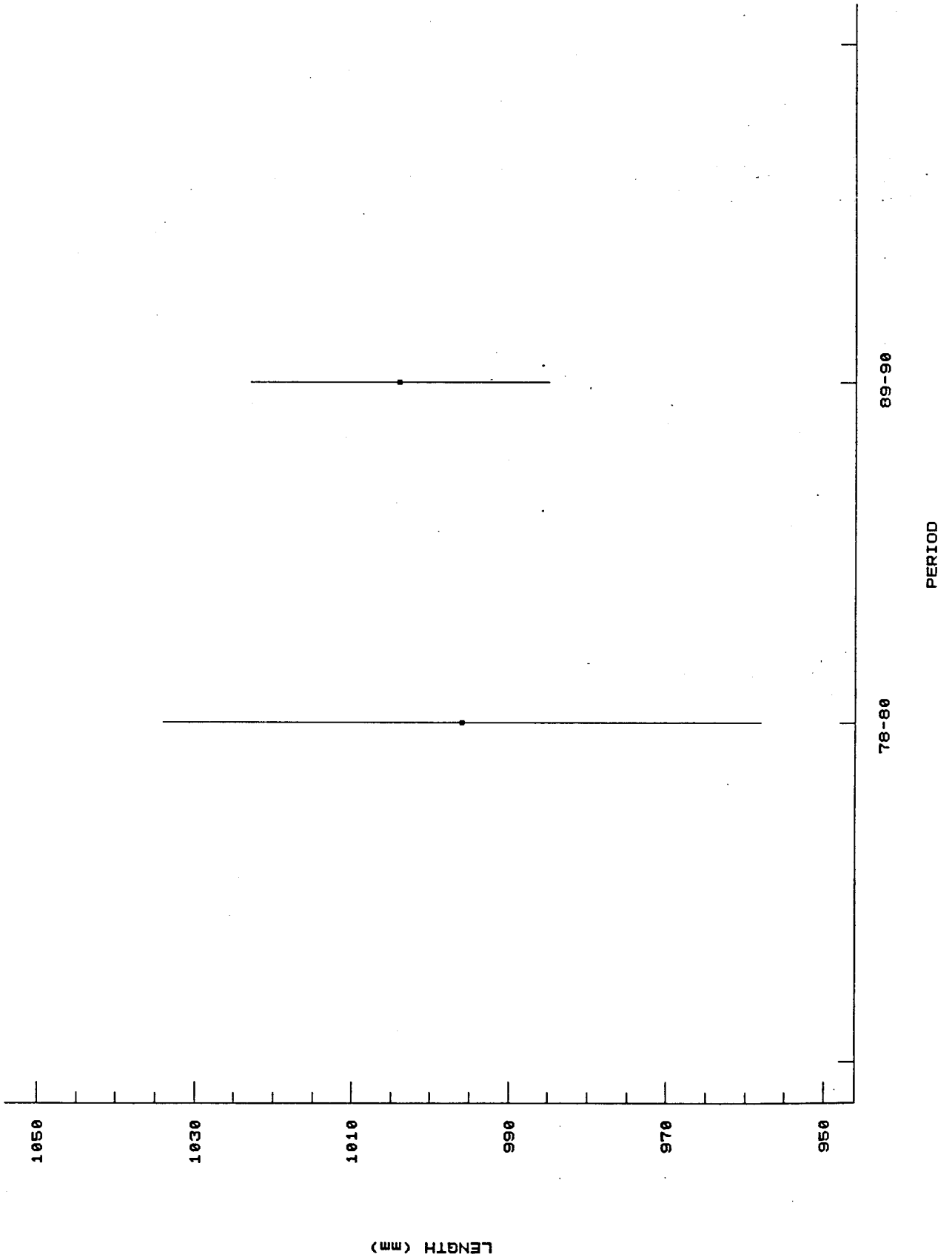


Figure 3. Mean length ( $\pm 2SE$ ) of red drum caught on bottom longline sets off the central Texas coast in 18-m deep water during December-April 1978-80 and 1989-90.



PWD-RP-N3400-379-2/92

Dispersal of this publication conforms with Texas State Documents  
Depository Law and it is available at Texas State Publications Clearing  
house and Texas Depository Libraries