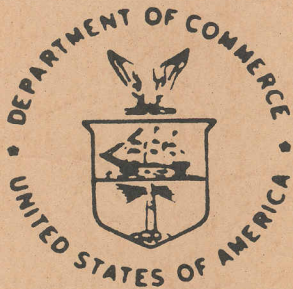
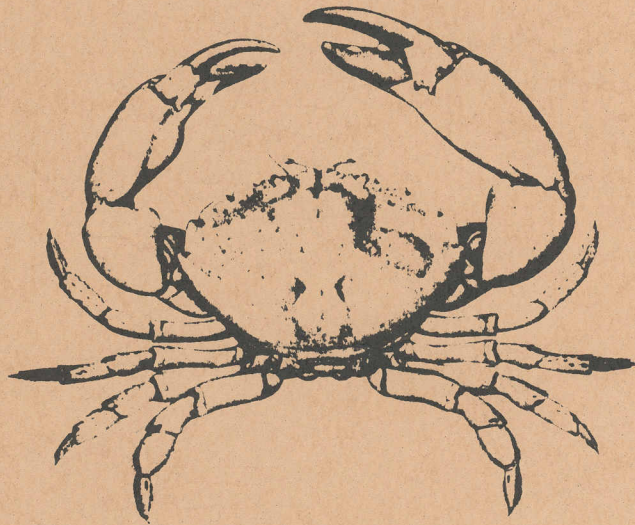


NOAA TECHNICAL MEMORANDUM

NMFS-SEFC-79



ASSESSMENT OF THE FLORIDA STONE CRAB FISHERY

1980-81 Season

James R. Zuboy and J. Ernest Snell

April 1982

U. S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL MARINE FISHERIES SERVICE
SOUTHEAST FISHERIES CENTER
75 VIRGINIA BEACH DRIVE
MIAMI, FLORIDA

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This TM series is used for documentation and timely communication of preliminary results, interim reports, or special purpose information, and have not received complete formal review editorial control, or detailed editing.

U. S. DEPARTMENT OF COMMERCE
Malcolm Baldrige, Secretary

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
John V. Byrne, Administrator

NATIONAL MARINE FISHERIES SERVICE
William G. Gordon, Assistant Administrator for Fisheries

ABSTRACT

Under the auspices of the Magnuson Fishery Conservation and Management Act of 1976, the National Marine Fisheries Service is responsible for providing scientific support for fishery management to the Regional Fishery Management Councils. Accordingly, this is the second annual report on the status of the Florida stone crab (Menippe mercenaria) fishery which is being managed under the Fishery Management Plan for Stone Crabs by the Gulf of Mexico Fishery Management Council. The report updates the fishery statistics and reevaluates the previous estimate of MSY.

The current best estimate of MSY is 1.88 million pounds of claws.

INTRODUCTION

This report on the status of the Florida stone crab (Menippe mercenaria) fishery differs slightly in format from last year's report. The appendices, which contained examples of reporting forms, etc., have been deleted, and the text focuses on updating the fishery statistics and stock assessment. The first annual report, NOAA Technical Memorandum NMFS-SEFC-21, can be referenced if background information is required.

FISHERY STATISTICS

A letter was mailed to each stone crab permit holder on October 1, 1980. The purpose of this letter was to advise permit holders that the same regulations as last year would be in effect and the same reporting practices would be required. The letter also served to identify the commercial stone crab fishermen among the permit holders. Each permit holder who responded to the letter by indicating he did intend to sell claws during the upcoming season was supplied a logbook by mail.

A second mailing was conducted on December 11, 1980 to the stone crab permit holders not responding to the original mailing. The respondents replying to the second mailing who stated that they did intend to sell claws were supplied logbooks by mail (Table 1).

Stone crab dealers were contacted in person by NMFS port agents and given a dealer reporting book during the week prior to season opening (the season is Oct. 15 - May 15).

Following are a series of tables which summarize data obtained from the logbooks and dealer reports, as well as some information obtained by NMFS port agents.

Table 2 summarizes stone crab operating units for 1979-80 and 1980-81. The number of vessels remained the same while the number of boats increased slightly. The number of traps increased by about 17,000, which probably corresponds to the increase in boats.

Table 3 shows the total landings of stone crab claws by month as reported by dealers to NMFS port agents. To obtain an estimate of total value of the reported commercial harvest the monthly totals were apportioned into large and medium claw size categories, based on ratios of same from the mandatory dealer reports, and multiplied by the average price. The total expressed value of the reported commercial catch thus derived is \$4,873,884. Although total catch was down about 300,000 pounds from last season, the value is only about \$250,000 less, due to the higher average prices which prevailed this season.

The landings by month as reported on the mandatory dealer reports are not included here because they were incomplete and did not represent a random sample of the dealers. The total reported for the season on the mandatory dealer report, however, was 1,276,767 pounds, which is 78% of the total reported directly to NMFS port agents.

Tables 4, 5, and 6 show relative effort, relative catch and catch per trap haul, by zone (Figure 1), as derived from fisherman logbooks. Catch

and effort are shown only as percentages since the logbooks did not represent a random sample of fishermen and the data should not be expanded, which would be the tendency if the actual numbers were provided.

The majority of effort and hence catch was, again, in Zones 1 and 2, however, there was a significant increase in activity in Zone 3. The percentage of traps pulled in Zone 3 generally doubled over last season. Average catch per trap haul was highest in Zone 3 this season, whereas last season it was highest in Zone 2. Last year's report suggested that the fishery might expand more in Zone 3 and apparently this has taken place.

The total catch reported on fisherman logbooks was 763,955 pounds, which is about 47% of the total reported by dealers to port agents. This is again, a remarkably high percentage considering that reporting has essentially been on a voluntary basis.

Figure 2 shows the average catch per trap haul for each month from this season compared to last season. The CPUE was lower this season in all but two months, February and April, for which exceptionally high CPUE's in Zone 3 were responsible.

STOCK ASSESSMENT

Assessment of the west coast of Florida stone crab fishery treats the stone crab resource which is exploited in NMFS statistical Zones 1-7 (Figure 3) as a unit stock. (These zones should not be confused with the three inshore-offshore stone crab line zones.) The small amount of crabs caught

on the east coast of Florida is not included in the analysis. The recreational harvest is unknown but thought to be relatively low and is not included either.

The generalized stock production model was used to analyze the fishery. The method requires a time series of catch and effort data (Table 7). A regression line is statistically fit to the relationship of catch per unit of effort and effort to estimate the parameters necessary to fit the curve to the relationship of yield and effort.

Figure 4 shows the effort trend in the stone crab fishery. For the first ten years effort increased rather slowly, then, from 1972 to 1977, it increased steadily and dramatically. The first sign that effort might be leveling off came in 1978 with a substantial decrease in the number of traps. However, in 1979, there was an increase in the number of traps to nearly 300,000 and this season there were about 315,000 traps. (It would be desirable to use number of trap hauls rather than simply number of traps to represent effort, however, only number of traps is known.)

The catch trend (Figure 5) generally followed the effort trend, however, at a somewhat slower rate. The catch gave no indication of leveling off until 1978, and even then one might attribute this to decreased effort in that year. However, in 1979, when there was a large increase in the number of traps in the fishery, the catch did not show a corresponding increase. This season, the number of traps increased by 15,000 while the total catch declined by about 300,000 pounds. Thus it appears that the

stone crab stock may now be fully exploited over the current fishing area, and a further increase in effort is not likely to result in a corresponding increase in yield.

Figure 6 shows the catch per unit of effort (CPUE) trend in the stone crab fishery. CPUE has decreased from a high of nearly 24 lbs/trap in the early years to a low of around 5 lbs/trap currently. Thus, CPUE has decreased by almost a factor of five and may have reached the point where economics will discourage the entry of additional effort in the fishery.

The production model analysis is portrayed in Figure 7. The data point for the 1980-81 season has been added to the graph of last year's analysis. It was noted in last year's assessment that there was a discontinuity in the data, and therefore two curves were fitted. It was suggested that the fishery is describing one curve or the other, but not both, and that the next few years of data should provide an indication of which. Unfortunately, the 1980 point falls approximately half way between the curves and does not help to clarify the situation. Next season will almost certainly shed more light on the situation. We suggest that the fishery is being fully exploited around the level of the upper curve and that what we are seeing is natural variation about that curve, the 1980 catch being at the low end of the range. If this is the case, in all likelihood, the catch next year should be above that of the 1980-81 season. At the present time, the best estimate of MSY is the average of the four high years, 1.88 million pounds, which is not significantly different from the 1.8 million pound estimate

contained in the 1979 FMP. The statement in last year's report that the stone crab fishery should produce approximately 2 million pounds of claws annually at an effort of 250,000 - 300,000 reported traps, given no detrimental environmental effects and the continuance of current size and season regulations, is still valid.

Table 1. Record of response to notification of stone crab logbook reporting requirements.

	<u>First Mailing-October 1, 1980</u> (to 2,718 Permit Holders)		<u>Second Mailing-December 11, 1980</u> (to 1,385 Non-Respondents)		<u>Grand Totals</u>	
	<u>Number</u>	<u>Percent</u>	<u>Number</u>	<u>Percent</u>	<u>Number</u>	<u>Percent</u>
No response	1,385	51	914	66	914	34
Undeliverable	182	7	29	2	211	8
Do intend to sell	287	10	41	3	328	12
Do not intend to sell	<u>864</u>	<u>32</u>	<u>401</u>	<u>29</u>	<u>1,265</u>	<u>46</u>
Total Permits	2,718	100	1,385	100	2,718	100

Table 2. Stone crab operating units for the Florida west coast.

	<u>1979-80</u>	<u>1980-81</u>
Vessels	72	72
Boats	219	236
Crew	454	491
Traps	297,600	314,600

Note: The estimates given here are obtained by port agents from stone crab dealers and reflect the number of actual commercial fishermen as opposed to simply permit holders. Crew includes captain and helper.

Tabl 3. Landings and value of stone crab claws for October 1980 - May 1981.

Month	TOTAL ^{a/} Landings (lbs)	Large			Medium ^{b/}		
		Landings (lbs)	Average Price (\$)	Total Value (\$)	Landings (lbs)	Average Price (\$)	Total Value (\$)
October	167,777	122,477	3.27	400,499	45,300	2.14	96,942
November	245,966	174,636	3.29	574,552	71,330	2.17	154,786
December	236,251	163,013	3.34	544,464	73,238	2.18	159,659
January	191,198	130,014	3.43	445,949	61,184	2.33	142,559
February	202,509	107,330	3.46	371,361	95,179	2.27	216,056
March	202,821	105,467	3.47	365,970	97,354	2.27	220,994
April	280,836	176,927	3.46	612,166	103,909	2.23	231,717
May	111,192	67,827	3.48	236,037	43,365	2.31	100,173
TOTALS	1,638,550	1,047,691		\$3,550,998	590,859		\$1,322,886
GRAND TOTAL	\$4,873,884						

a/ Total landings represent the amount reported to port agents by dealers. This was apportioned into large and medium using the ratio of same obtained on the mandatory dealer report forms. The average price is also from the mandatory dealer reports.

b/ The mandatory dealer report category "small" was integrated into the medium category here, since "small" and "medium" claws are marketed together.

Table 4. Percent of stone crab traps pulled in each zone (derived from logbooks), October 1980 - May 1981.

<u>Month</u>	<u>Zone 1</u>	<u>Zone 2</u>	<u>Zone 3</u>
October	53%	32%	15%
November	55	34	11
December	49	41	10
January	38	50	12
February	42	44	14
March	42	47	11
April	35	51	14
May	35	41	24

Note: See Figure 1 for location of zones.

Table 5. Percent of stone crab catch taken in each zone (derived from logbooks), October 1980 - May 1981.

<u>Month</u>	<u>Zone 1</u>	<u>Zone 2</u>	<u>Zone 3</u>
October	53%	34%	13%
November	47	43	10
December	40	47	13
January	26	57	17
February	31	50	19
March	34	53	13
April	25	56	19
May	30	44	26

Note: See Figure 1 for location of zones.

Table 6. Catch per trap haul (lbs) by zone, October 1980 - May 1981

<u>Month</u>	<u>Zone 1</u>	<u>Zone 2</u>	<u>Zone 3</u>	<u>Average All Zones</u>
October	.58	.61	.51	.58
November	.48	.70	.57	.57
December	.41	.58	.66	.50
January	.35	.57	.63	.49
February	.47	.73	.92	.64
March	.44	.61	.67	.55
April	.49	.73	.84	.66
May	.47	.57	.59	.54
Grand Averages	.46	.64	.67	.57

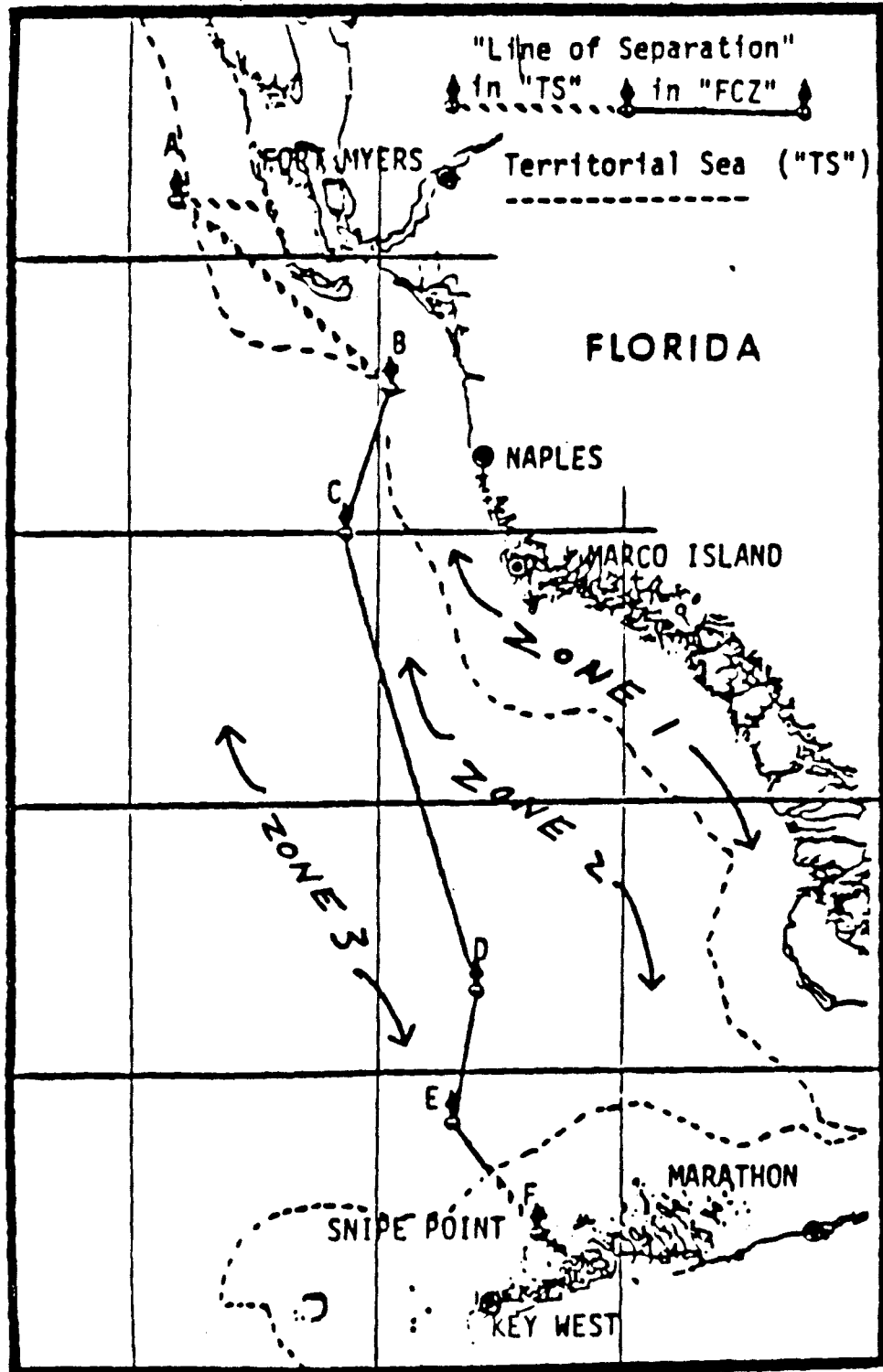
Note: See Figure 1 for location of zones.

Table 7. Catch and effort statistics for the west coast of Florida stone crab fishery.

<u>Season</u>	<u>Catch*</u> <u>millions of pounds</u>	<u>Traps</u> <u>thousands</u>	<u>Catch Per</u> <u>Trap (lbs)</u>
1962-63	.30	14.6	20.6
1963-64	.35	15.0	23.3
1964-65	.35	21.0	16.7
1965-66	.45	19.7	22.8
1966-67	.40	43.2	9.3
1967-68	.55	39.3	14.0
1968-69	.60	55.9	10.7
1969-70	.70	36.0	19.4
1970-71	.85	60.8	14.0
1971-72	.95	73.7	12.9
1972-73	.90	113.3	7.9
1973-74	1.25	143.0	8.7
1974-75	1.00	159.1	6.3
1975-76	1.15	193.2	6.0
1976-77	1.45	213.8	6.8
1977-78	2.10	264.3	8.0
1978-79	1.85	222.0	8.3
1979-80	1.93	297.6	6.5
1980-81	1.64	314.6	5.2

* Catch is claw weight. Claw weight is 1/2 whole weight.

Figure 1. Description of zones used for reporting in fisherman logbooks.



For fishing North of Fort Myers, use the zone explanation below.

ZONE 1 — TERRITORIAL SEA
(Inside 9 nautical miles)

ZONE 2 — FCZ SHOREWARD OF 8 FATHOMS
(outside 9 nautical miles and less than 8 fathoms)

ZONE 3 — FCZ SEAWARD OF 8 FATHOMS
(outside 9 nautical miles and more than 8 fathoms)

Use above zones for the area of Key West to Fort Myers

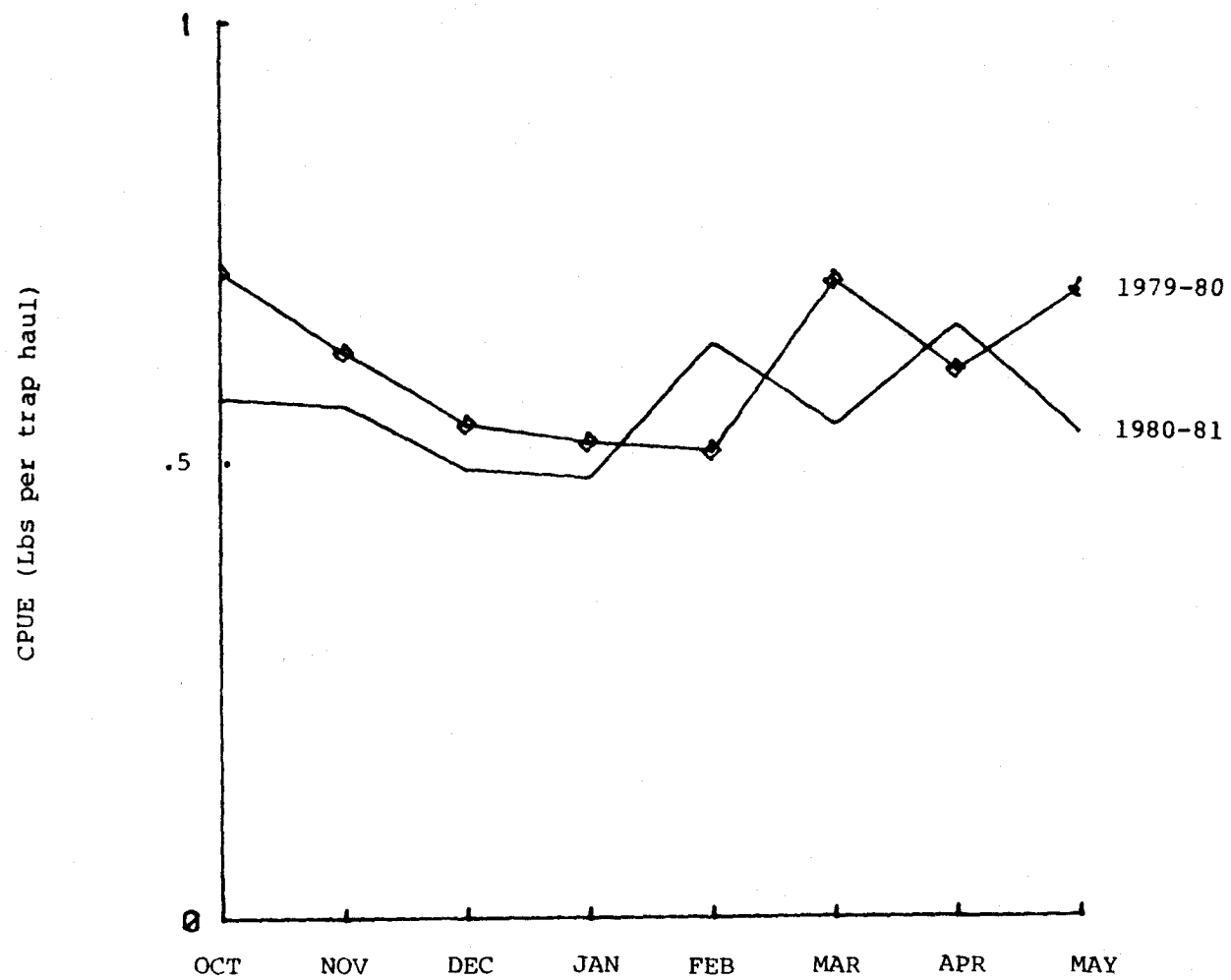


Figure 2. Intraseasonal CPUE in the west coast of Florida stone crab fishery.

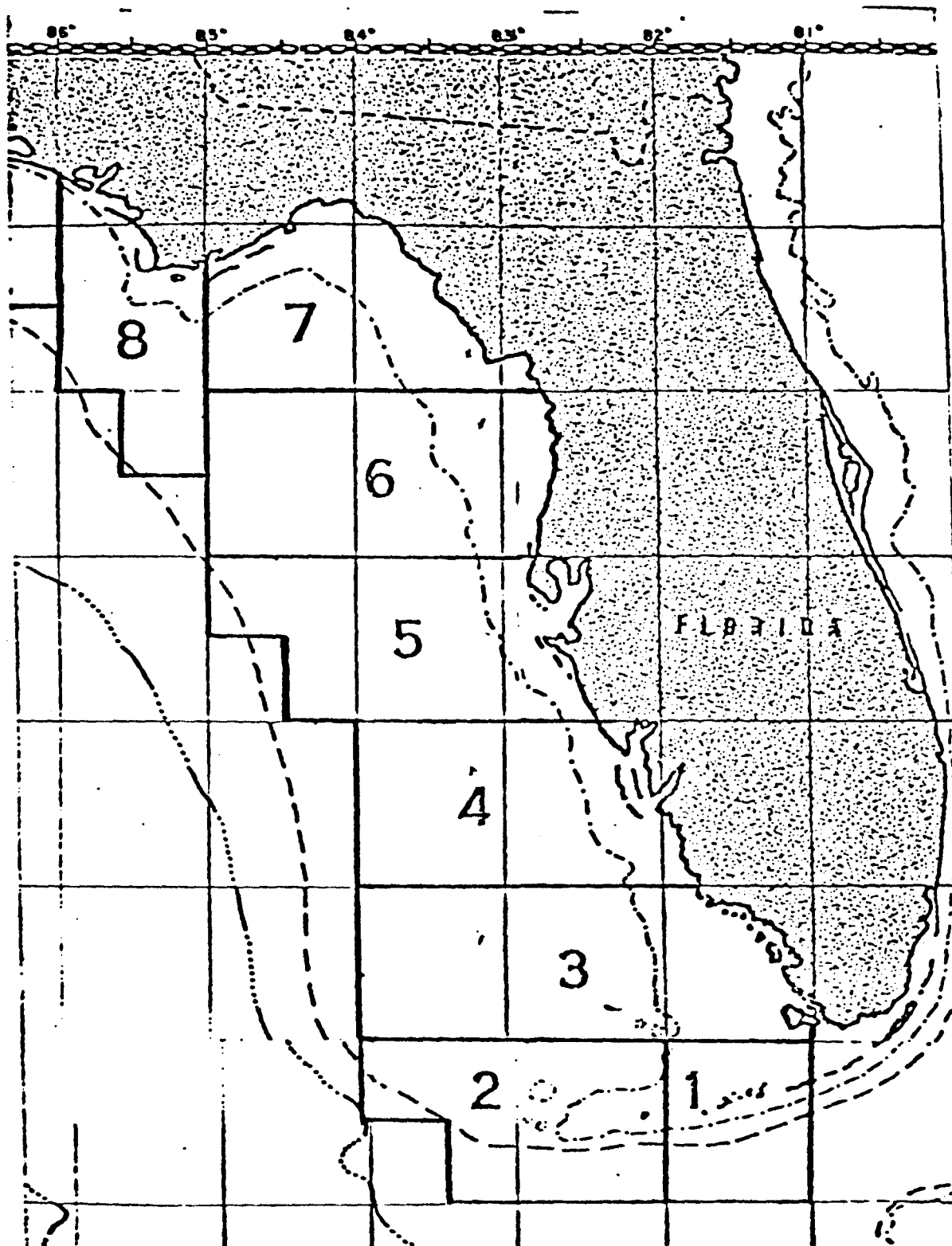


Figure 3. Stock area of the west coast of Florida stone crab fishery.
The assessment covers zones 1 - 7.

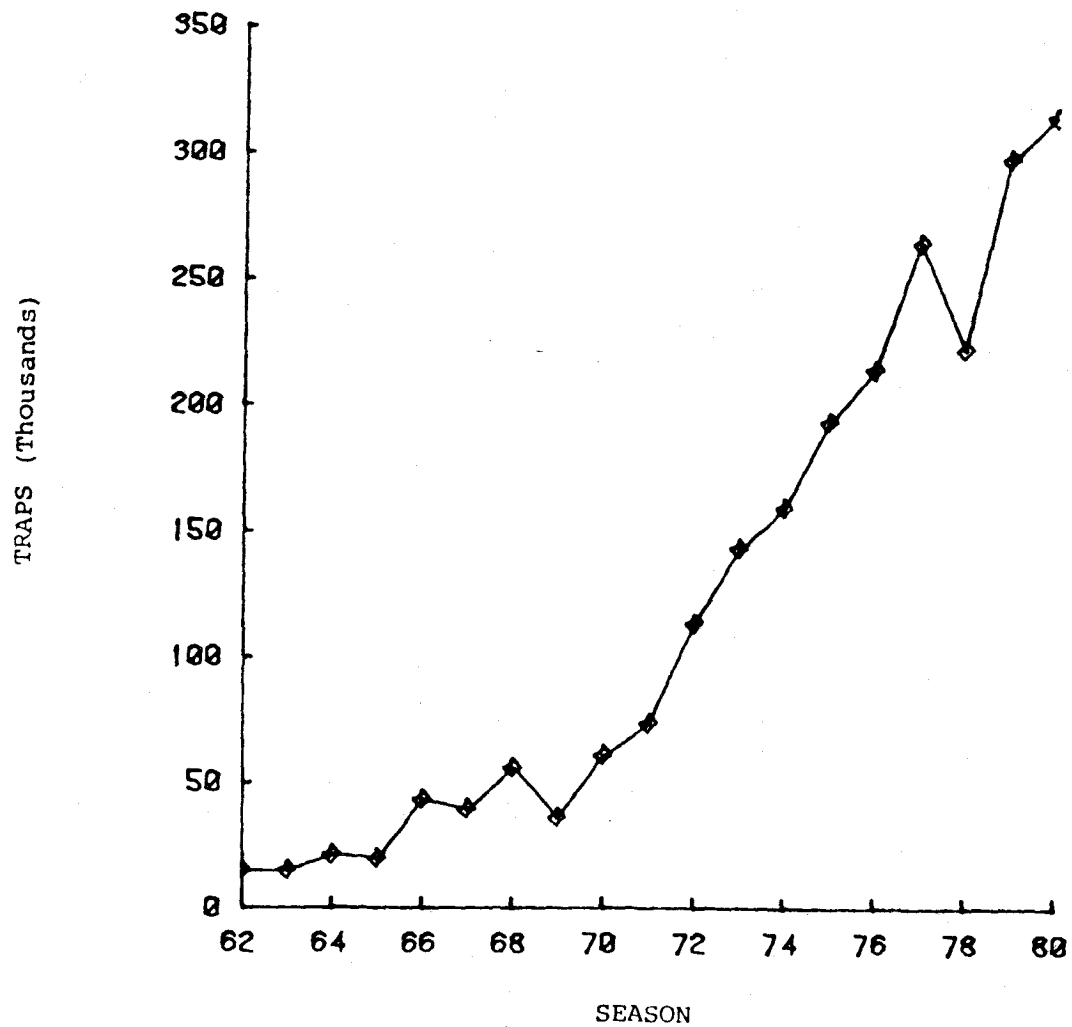


Figure 4. Effort in the west coast of Florida stone crab fishery.

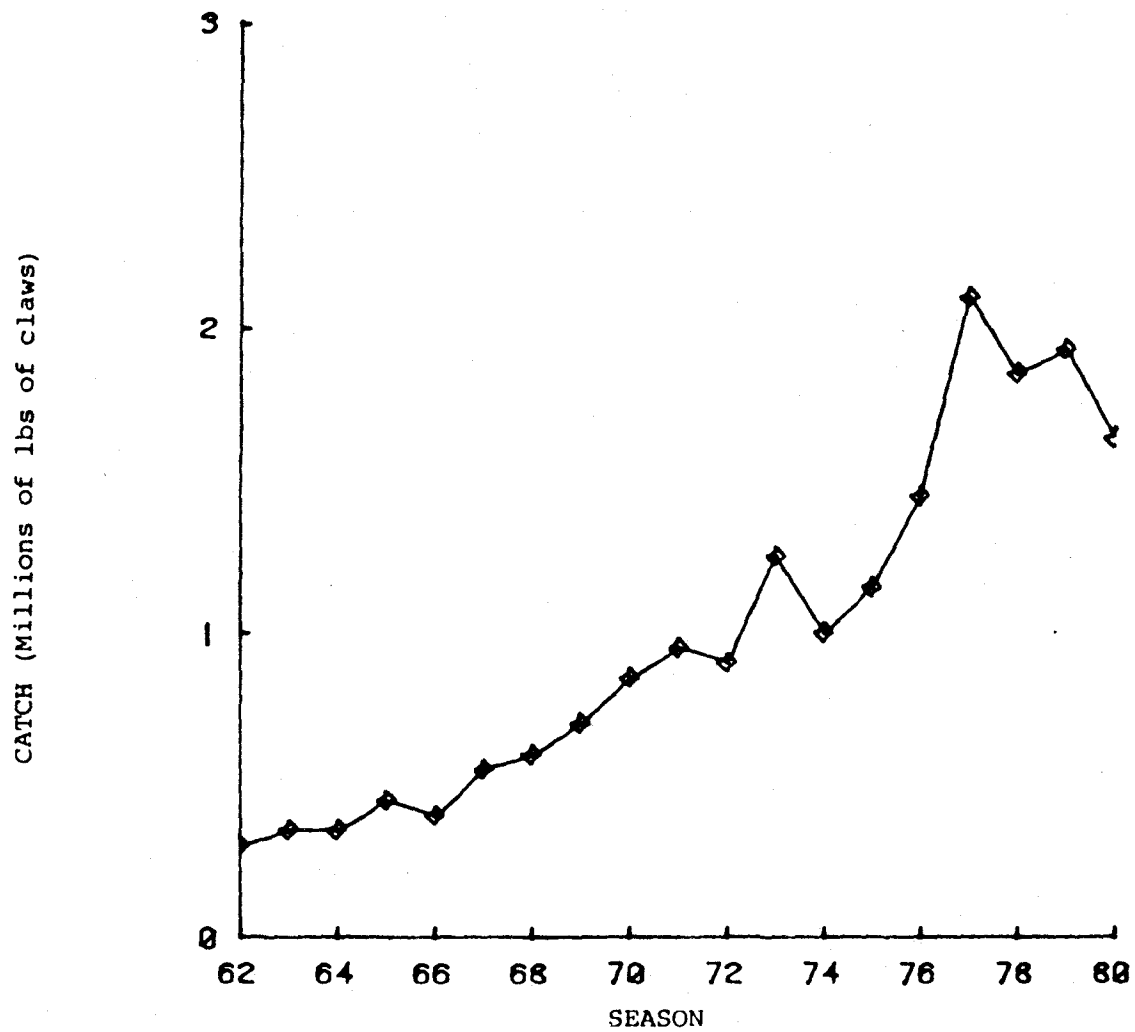


Figure 5. Catch in the west coast of Florida stone crab fishery.

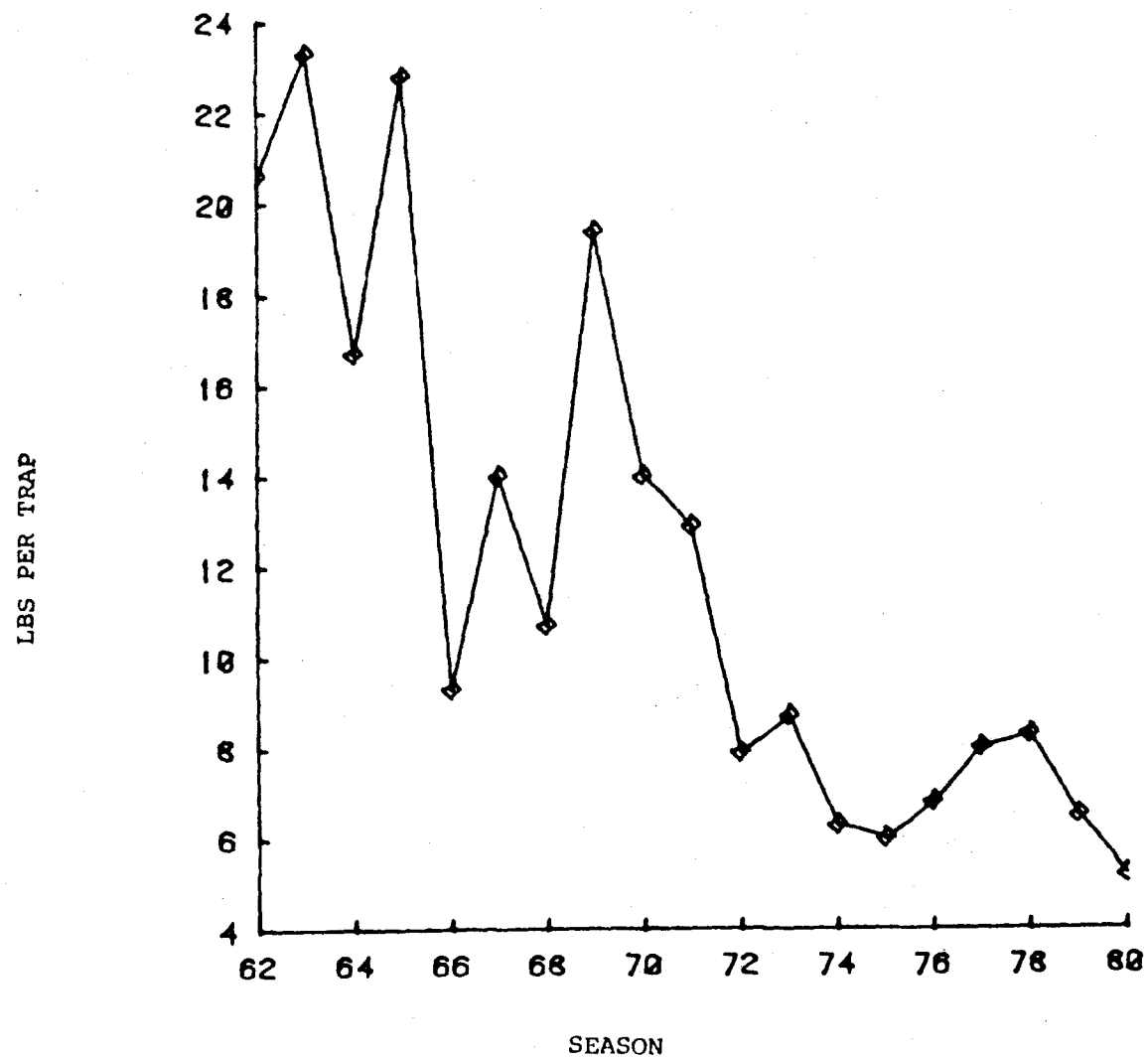


Figure 6. Catch per trap in the west coast of Florida stone crab fishery.

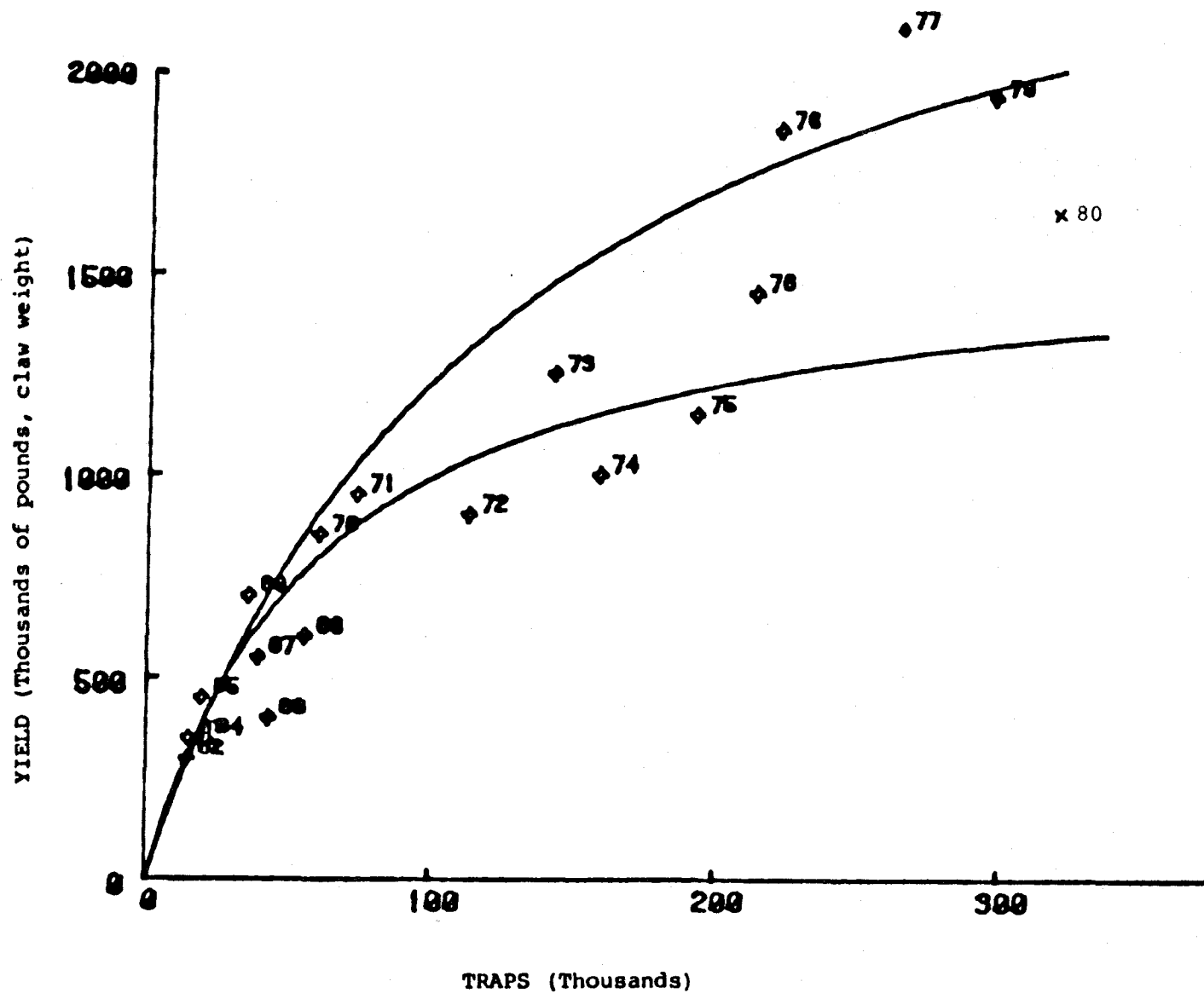


Figure 7. Production models of the west coast of Florida stone crab fishery.
See text for explanation.

A D D E N D U M

Reports on several Florida stone crab studies should be available in the next year. The general subject area of each is listed below. For further information contact:

Theresa M. Bert
1927 16th Avenue Drive West
Bradenton, FL 33505

813-748-0958

- A study on trap bias in considering catch per trap as an index of abundance. (March 1982).
- Distribution and abundance of stone crabs (December 1981).
- Effects of trap soak time on catch (No date set).
- Sampling methods for capturing juvenile stone crabs (No date set).