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EXPERIMENTAL FISH TRAWLING SURVEY ALONG THE FLORIDA WEST COAST

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ABSTRACT

At the request of industry, the U. S. Bureau of Commercial Fisheries and the Florida Board of Conservation made a bottomfish trawl survey along the west coast of Florida from April to July 1965. The main objective was to assess the trawl-fish potential of the area. Modified New England roller-rigged trawls 30 and 39 feet each were fished from the R/V Hernan Cortez. Although not conclusive, results from the 213 trawl stations did not show commercial concentrations of marketable bottomfish. Information on the gear used, catch composition, distribution, and station log data is included in the report.

INTRODUCTION

The fishing industry of the west coast of Florida depends on gill-net and hand-line fisheries for market fish. Gill nets are used mostly during the winter and spring, and hand lines throughout the year. During the summer an acute shortage of marketable fish forces many processors to cease operations for 3 to 4 months. At the request of several processors, the trawl-fish potential of the Florida west coast was surveyed during April to July 1965. The survey was a cooperative effort of the U.S. Department of the Interior's Bureau of Commercial Fisheries and the Division of Salt Water Fisheries, Florida Board of Conservation. Robert Ingle, Director of Research, Florida Board of Conservation, cooperated in the arrangements for use of the vessel, project objectives, and plans. The main aims of the survey were to determine the species composition, distribution, relative abundance, and availability to trawling gear of the bottomfish fauna in the 5- to 50-fathom depths between Panama City and Dry Tortugas. Field work was performed from April 29 to July 11, 1965.

VESSEL MATERIALS AND METHODS

The Florida Board of Conservation's R/V Hernan Cortez was used in the survey. This ship is a conventional, double-rigged shrimp trawler, built in 1964. The vessel has an overall length of 72 feet, a 20-foot beam and 7-foot draft. Propulsion is provided by a diesel engine developing 340 hp. at 1,800 r.p.m. The fish hold was converted to sleeping quarters for 3 persons with additional berths on the main-deck cabin for the captain and 2 crew members. Fuel and water capacities were sufficient for 3 to 4 weeks of continuous operation, but galley and food-storage facilities limited the sea time to 6 or 7 days. A triple-drum trawling winch was driven by a main engine power take-off. Capacity of the two drums is about 350 fathoms of $\frac{1}{2}$ -inch cable. Electronic equipment aboard the Hernan Cortez included a loran receiver, magnetic-compass automatic pilot, AM radio receiver and transmitter, and a 0-450 fathom depth-recorder. The double-rig deck arrangement (Knake, Murdock, and Cating 1958) permitted dragging a single net from either side or two nets simultaneously.

GEAR

The trawls were scaled-down versions of the New England trawls (Knake 1956). The bracket doors were standard 6 feet by $3\frac{1}{2}$ feet and $5\frac{1}{2}$ feet by $3\frac{1}{3}$ feet constructed of wood with steel bracing and runners (Captiva and Rivers 1959).

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The 30-foot 4-seam fish trawl had a 30-foot 3-inch headrope and a 38-foot 7-inch footrope, and the net was of nylon. Wings, square, and bosom of the net were of 3-inch-stretched mesh, No. 30 thread nylon webbings. Body of the net was of 2-inch-stretched mesh, No. 18 thread; funnel, 1½-inch-stretched mesh, No. 18 thread; intermediate, 1½-inch-stretched mesh, No. 36 thread and cod end, 1⅝-inch, stretched mesh, No. 36 thread.

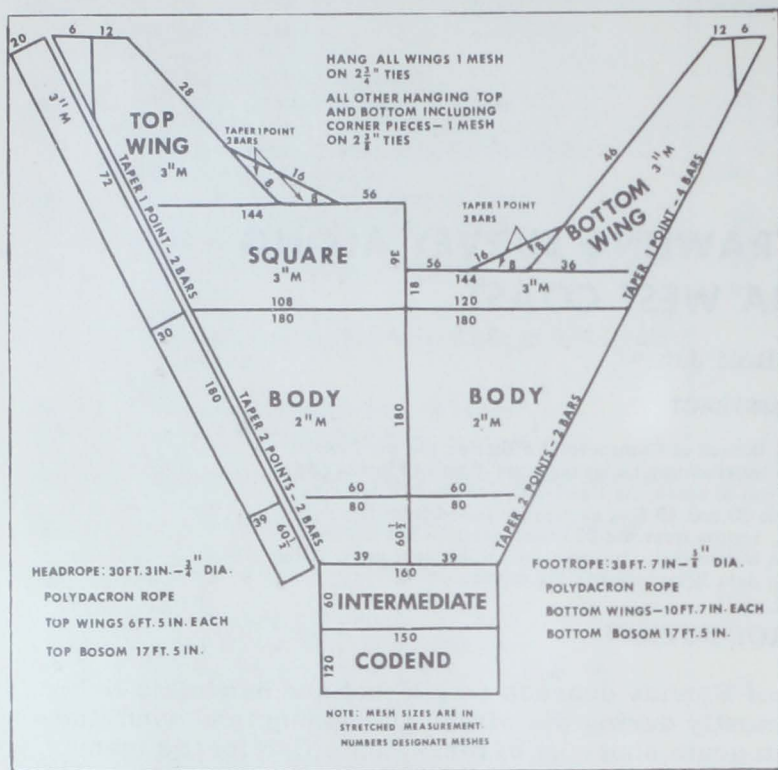


Fig. 1 - Diagram of 30-foot 4-seam fish trawl.

15 links. The "legs" between the net and doors were 5 fathoms long, with 3/16-inch wire cable on the headrope and 1/2-inch on the footrope. The bridles from bracket to warp, 1/2-inch wire rope, were 20 fathoms long.

The 39-foot 4-seam fish trawl had 40-foot 3-inch headrope and 48-foot 7-inch footrope.

The same size mesh, thread weight, and rope were used in this net as in the 30-foot net. The headrope was buoyed with 18 evenly spaced 4-by 8-inch plastic floats and two pairs of floats tied at midpoint; and the bosom section of the footrope was fitted with 15 wooden rollers and 1/4-inch chain in the same manner as the smaller net. A "kite" or rising-panel device to prolong the life of the headrope proved unsatisfactory because of excessive tangling during "shooting" operations.

OPERATION

Except for minor modifications, the roller-rigged fish trawls were

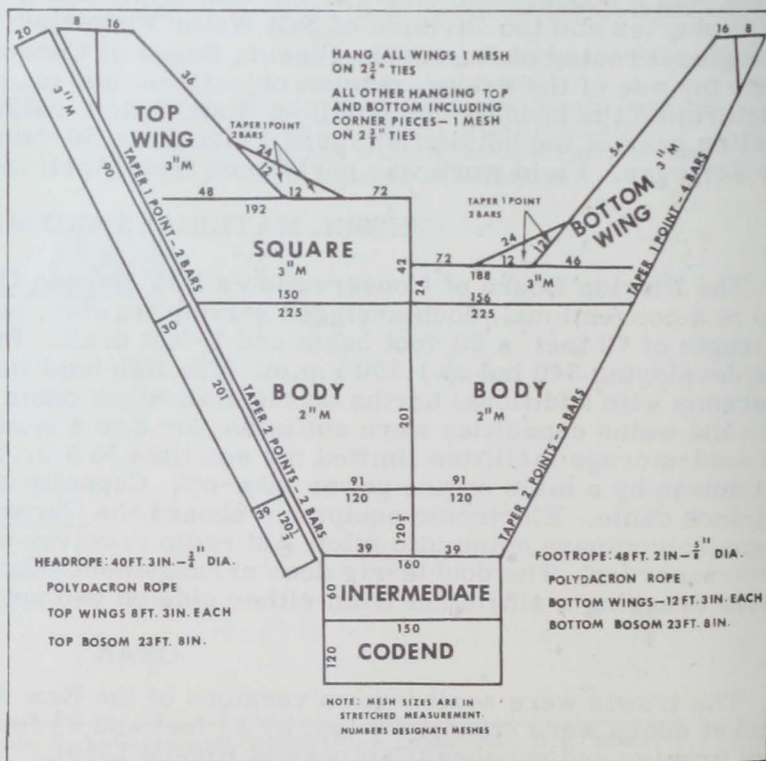


Fig. 2 - Diagram of 39-foot 4-seam fish trawl.

Hauled like standard double-rigged shrimp trawls (Knake, Murdock, and Cating 1958). The towing speed was $2\frac{1}{2}$ knots with the engine turning 1,250 r.p.m. when using two nets, and 1,100 r.p.m. during single-net operation. A ratio of 3:1 of towing warp length to water depth was used normally, but increased to 4:1 when fishing shallower depths.

The rugged doors, heavy twine, and roller rig were used because broken bottom, coral reefs and loggerhead sponge areas characterized much of the area surveyed. Tears and hang-ups were frequent but damage to the gear was not excessive. The same nets were used throughout the entire survey. In gear evaluation studies a single net was fished with the roller attached directly to the footrope, without spacers. Results indicated that spacers are a desirable feature in reducing bottom debris in the catch, especially cumbersome loggerhead sponges and coral.

The Hernan Cortez followed a transect course with trawl stations every 10 miles, and deviations from the track were made when echo-sounder tracings showed bottom configurations unsuitable for trawling. Drags were repeated in areas of large catches. Trawls were operated between 6 a.m. and 10 p.m., completing 5 to 7 drags per day. Trolling lines were fished whenever possible, fish traps set while at anchor, bridge lookout for surface schools maintained during daylight hours, and routine meteorological and water temperature data recorded at each station.

Port calls were made in Cedar Keys, Panama City, St. Petersburg, Fort Myers, and Ft Myers Beach, to unload fish and replenish supplies.

RESULTS

The main purpose of the survey was to explore for concentrations of fishes with commercial potential so data presented are limited to catches of over 5 pounds of a species from a single drag. A station summary, listing the total weight of fish per drag and significant species, is included in the appendix^{1/}

The most productive depths were 21 to 30 fathoms both north and south of Tampa Bay. This depth band coincided with the heaviest loggerhead sponge concentrations, especially south of Tampa Bay where one net produced over a ton of loggerheads during a 45-minute drag. Similar conditions were found earlier during the R/V Oregon shrimp explorations (Springer and Bullis 1954).

The largest fish catch, 525 pounds, consisted mostly of nonfood species. The least productive drags were made in 40 to 50 fathoms north of lat. $28^{\circ}28'$ N. and at all depths fished south of lat. $26^{\circ}30'$ N.

Of the 210 hauls that caught fish, 94 were made with double trawls and 116 with a single trawl. The average fish catch per single trawl was 23 pounds and for double trawl 105 pounds.

Five species of snapper were caught with vermilion snapper taken most frequently. Snapper were caught in 150 drags in depths over 10 fathoms. Red grouper, the most common of the five grouper species, were caught in all but the 30-40 fathom depth range.

Black sea bass were common in 5- to 10-fathom depths from Tampa Bay to Cape San Blas and rare in deeper water. The black sea bass appeared more often in drags deeper than 20 fathoms, from Tampa Bay southward.

Sixteen species of commercial interest (fish weighing over $\frac{1}{2}$ pound each) were caught. Selectivity of the gear, its small size, and relatively slow towing speed precluded capture of some large species.

Invertebrates of commercial interest included the Spanish lobster (bulldozer), which was captured at 59 trawl stations. Although present at all depths, it was taken more frequently in 20 to 30 fathoms between Tampa Bay and Fort Myers Beach. As many as five

^{1/}Appendix is available with reprint of this article (ask for Separate No. 764).

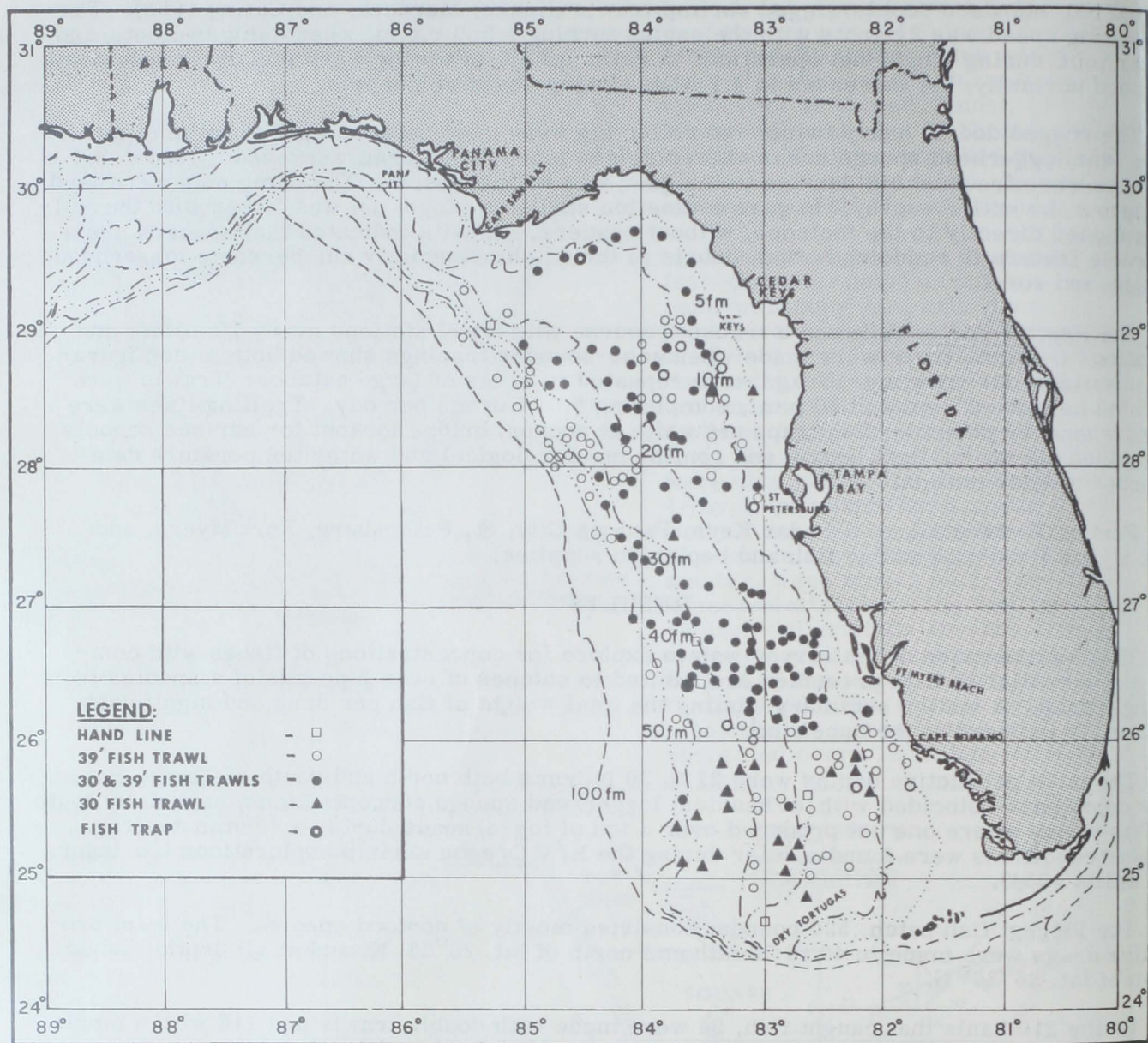


Fig. 3 - The survey fishing stations of the R/V Herman Cortez.

were taken in a single drag, and the largest single specimen weighed 2 pounds. Night fishing produced only small numbers of pink and rock shrimp.

GENERAL NOTES

Surface schools of fish were observed frequently inside the 10-fathom contour, with greatest concentrations near Cape San Blas, Tampa Bay, Fort Myers Beach, and Cape Romano. Between Cape St. George and San Blas 18 to 20 schools, containing 8 to 10 tons each, of round scad (*Decapterus* sp.) were observed. Off Tampa Bay round scad and Spanish sardines (*Sardinella anchovia*) were found, each in schools of 3 to 5 tons. Spanish sardine schools of 2 to 4 tons predominated off Fort Myers Beach and Cape Romano. From Cape Romano southward the dominant species was thread herring (*Opisthonema* sp.) in schools of 2 to 10 tons; 12 to 14 schools could be observed at one time, usually in depths less than 10 fathoms. Little tuna (*Euthynnus alletteratus*) were seen in varying numbers throughout the study areas from Cedar Keys to Dry Tortugas, with heavier concentrations south of Fort Myers.

Trolling lines fished between stations produced little tuna, king mackerel, and Spanish mackerel. Weather during the survey was excellent with only 1 day of fishing time lost because of rough seas.

CONCLUSIONS

Although the survey trawls were smaller than typical commercial gear, catch composition proved fishing capability equal to shrimp trawls and demonstrated that roller-rigged fish trawls can be fished without excessive damage in areas unsuitable to conventional shrimp trawling. This type of fish trawl can be adapted for use on standard double-rigged and single-rig shrimp boats. In addition to preventing excessive trawl damage, rollers help considerably in avoiding undesirable bottom detritus.

Except for a few marginal catches, the survey did not show commercial concentrations of bottomfish. The catch per net was more than twice as productive on double-trawl drags than single-trawl drags.

RECOMMENDATIONS

1. Repeat this type of survey over the same and adjoining areas during fall and winter to determine changes in availability and composition of the bottomfish fauna.
2. Use fish-finding echo-sounders, preferably the "white line" type, in future surveys. Concentrations of fish could be located more readily and effectively fished.
3. Try larger trawls of 50- to 60-foot headrope length, and near-bottom midwater trawls in the 20-30 fathom depth to obtain some commercial measure of the available bottomfish stocks.

APPENDIX

A detailed appendix includes: Table 1 - Species Composition by 10-Fathom Intervals from Panama City to Tampa Bay; Table 2 - Species Composition by 10-Fathom Intervals from Tampa Bay to Dry Tortugas; Table 3 - Species Composition by One Degree Latitude from Panama City to Dry Tortugas; Table 4 - List of Species Referred to in Fishing Log of R/V Hernan Cortez, April 29-July 11, 1965 (213 Drags); Table 5 - Fishing Log of R/V Hernan Cortez, April 29-July 11, 1965. Appendix appears in Separate No. 764 of the article. For a free copy of the Separate write to Publications Office, U. S. Department of the Interior, Fish and Wildlife Service, Bureau of Commercial Fisheries, Washington, D. C. 20240.

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