

ARTICLES

HISTORY OF SCALLOP AND CLAM EXPLORATIONS IN THE GULF OF MEXICO

By James S. Carpenter*

Extensive scallop and clam resources have been outlined during BCF explorations in the Gulf of Mexico during the past 9 years. Greatest concentrations of calico scallops (Aequipecten gibbus) were off Cape San Blas, Fla., Gulf Shores, Ala., and St. George, Fla., in waters shallower than 20 fathoms. Productive beds of hard clams (Mercenaria campechiensis) were found off Pas-a-Grille, Venice, San Carlos, and Cape Romano, Fla., in 3 to 4 fathoms.

Small concentrations of paper-shell scallops (Amusium papyraceus) and Gulf clams (Pitaria cordata) were discovered offshore in the northwestern Gulf, from Ship Shoal, La., to Laguna Madre, Mexico.

Since 1954, BCF research vessels have carried out intermittent scallop and clam explorations in the Gulf of Mexico--primarily to locate clam and scallop beds on the Continental Shelf and to develop more effective harvesting methods. Another aim has been to determine if clams are again abundant in areas where, formerly, they were taken in large commercially significant amounts. This report documents commercial fishing efforts in the Gulf, outlines exploratory work accomplished, and indicates steps needed to continue the development of a commercial scallop and clam industry. Background material on early calico scallop explorations by BCF's research vessels and commercial fishing vessels was extracted from Bullis and Ingle (1959).

CALICO SCALLOPS

When the Tortugas shrimp grounds were discovered and fished in late 1949 and early 1950, the shrimp trawls took relatively large amounts of calico scallops (Aequipecten gibbus). The interest of the fishing industry was stirred, but only momentarily. Scallop catches decreased as the shrimp grounds were more closely delineated and fewer try nets were dragged in shallow water; the fleet then caught few scallops.

The first explorations specifically for commercial concentrations of scallops in the Gulf were conducted in April 1954 by BCF's

exploratory fishing vessel "Oregon" off southwest Florida (table 1). A modified, 4-foot, Biloxi-type oyster dredge and 40-foot shrimp trawls were used. No scallops were caught, although the Oregon dragged where its shrimp trawls had taken scallops in 1951. Apparently the scallops had either moved or died.

In July and August 1955, the commercial trawler "Goodwill" explored north of the Middle Grounds as far west as Cape San Blas. Several try-net drags, south of Cape St. George, caught calico scallops in 25 to 50 fathoms. The number of good-size scallops indicated that an extensive bed lay between the offings of Cape San Blas and Cape St. George.

The commercial vessel "Debbie K." explored the 10- to 30-fathom area off Panama City and Apalachicola, Fla., for scrap fish in fall 1955. It found calico scallops heavily concentrated in several areas, and it stopped trawling in some places because the large scallop catches impeded the efficiency of fish trawls. A catch of 25 bushels was brought to Panama City for shucking and marketing trials, but the facilities were not capable of handling it.

To supplement the rather uncertain supply of bay scallops (Aequipecten irradians concentricus) and to allow a longer period of production each year, a fishing firm in Pan-

*Fishery Biologist (General), BCF, Exploratory Fishing and Gear Research Base, Pascagoula, Mississippi.

Table 1 - Bureau of Commercial Fisheries Explorations for Scallops and Clams in the Gulf of Mexico

Research Vessel	Cruise No.	Date	Area Covered	Type Gear Used
Oregon	22	3/31-4/23/54	Northeast and eastern Gulf	Oyster dredge and shrimp trawl
Oregon	43	2/5-2/21/57	North-central to eastern Gulf	Scallop dredge
Oregon	44	3/5-3/21/57	North-central to northwestern Gulf	Scallop dredge
Silver Bay . . .	2	7/12-7/29/57	Northeast and eastern Gulf	Scallop dredge
Silver Bay . . .	3	8/14-8/29/57	Northeast and north-central Gulf	Quahog dredge
Silver Bay . . .	10	7/17-8/3/58	Northeast and north-central Gulf	Scallop dredge
Silver Bay . . .	13	1/13-1/15/59	Northeast Gulf	Shrimp and midwater trawls
Oregon	67	5/27-6/2/60	North-central Gulf	Scallop trawl
Oregon	68	7/12-7/18/60	North-central Gulf	Scallop trawl
Oregon	70	9/6-9/23/60	North-central Gulf	Scallop trawl
Oregon	81	9/11-10/2/62	North-central and northwestern Gulf	Tumbler and quahog dredges
Oregon	83	11/28-12/21/62	Northeast Gulf	Tumbler and quahog dredges

ama City, Fla., began small-scale exploratory fishing for calico scallops offshore early in 1956. It made monthly trips to locate scallops and to observe their size and growth.

In February 1957, the Oregon made 54 scallop dredge drags between Pensacola and Cape St. George; the BCF-chartered vessel, "Silver Bay," continued the work in July and completed about 30 drags between Cape San Blas and Cape St. George. The gear used was an 8-foot, "Georges Bank" type sea-scallop dredge, constructed with 2-inch rings. The best catch was 6 bushels per 30-minute drag, but it was discovered later that 80 to 90 percent of the Silver Bay's scallop catch was being lost through spaces between the rings. Comparative drags made in August with this gear, which had been equipped with a 2-inch-stretched-mesh liner, took capacity catches (about 40 bushels) per 15-minute drag.

During the 1957-58 winter, vessels of the Panama City firm found rather dense populations of small scallops extending about 25 miles south-southeast of St. Andrews Bay. The bed lay in 6 to 20 fathoms, was 5 to 10 miles wide, 10 miles long, and was apparently the same one found by Debbie K. It extended 3 miles west of St. Joe Buoy to south of St. Andrews Bay Old Pass. There were heavy concentrations of scallops but they were not large enough for commercial use until February 1958. In March 1958, two Panama City boats started working the grounds. Four boats worked in early April. Catches were landed in Panama City, and all scallops were shucked by hand. One tub of unshucked scallops (about 500) yielded about 5 pounds of meats. A gallon of meats was produced by $1\frac{3}{5}$ tubs of scallops. Production of scallop

meats during spring and summer 1958 was 1,200 to 2,000 gallons per week.

Fishing was no longer considered profitable in September 1958 because of the poor market for scallops and the large number of scallop meats needed to produce a pound of meat. The size of the adductor muscle appeared to decrease during and after spawning. In late summer, presumably after spawning, the animals die. These conditions made enlargement of the fishery unattractive, and no boats joined the fleet of four.

Although they were produced in limited numbers as early as 1958 in the Gulf, calico scallops were grouped with and shown as bay scallops in "Fishery Statistics of the United States" until 1962; therefore, the true value of the calico harvest cannot be given before 1962. It is known, however, that the stocks discovered by the Oregon and Silver Bay were fished commercially in 1958; production was 102,500 bushels with ex-vessel value of \$102,500. Production of calico scallops in 1962 was 3,935 bushels, valued at \$4,882 (Power and Lyles, 1964). In 1963, production was only 50 bushels, valued at \$44 (Lyles, 1965).

HARD CLAMS

Schroeder (1924) reported that probably the largest bed of hard clams (*Mercenaria campechiensis*) in the United States was off southwest Florida near Ten Thousand Islands. He estimated a bed about 40 miles long and 5 miles wide, with area of 150 square miles. Continued explorations by BCF vessels have shown this bed extends from Ten Thousand Islands area to St. Petersburg, and that an area of about 200 square miles now produces

clams. The shoreline slopes very gradually and the depth is less than 12 feet in many places 4 to 5 miles offshore (Tiller, Glude, and Stringer, 1952). In 1943, a fishery marketing specialist of the U. S. Fish and Wildlife Service visited the Ten Thousand Islands area. He estimated potential production was almost unlimited and an abundance of 1 bushel of clams per 6 square yards dredged (Tiller, et al., 1952).

Although hard clams had been fished for many years in the Gulf with rakes, hoes, tongs, grabs, and by hand for home consumption, they were not fished commercially until the late 1880s. From 1889 to 1915, Key West boats made occasional trips to the Ten Thousand Islands area to harvest clams during the spring, summer, and fall. Catches landed in Key West varied from 10,000 to 25,000 clams annually. The average weight of a clam was 1 pound (Schroeder, 1924).

The clam stocks of the Ten Thousand Islands area were fished commercially with a conveyor-belt dredge (continually modified and improved) from 1913 to 1947. The dredge was essentially a large wooden scow, about 30 by 80 feet, with a rectangular opening in the bottom through which the dredge belt operated. Clams were washed from the bottom by high-pressure jets of water and brought to the surface by a conveyor belt (Tiller, et al., 1952). Clams taken by the dredge were shucked and used for canned chowder, minced clams, and clam juice. "The annual catch of the dredge from 1943 to 1946 was 30,000, 50,000, 78,000, and 25,000 bushels. In 1947, clams were so scarce that operations halted" (Tiller, et al., 1952).

Hard clams have been found also from Charlotte Harbor to lower Tampa Bay and Clearwater, but most beds are small and clams are taken only for home use. At one time, Matanzas Inlet, Charlotte Harbor, and inshore waters near Englewood supported small fisheries, but when the beds were depleted, the operations became unprofitable (Tiller, et al., 1952).

Despite the well-established fishery for hard clams off southwest Florida during the 1920s, commercial harvesting through 1960 fell to less than 20,000 pounds annually (Rosen and Robinson, 1961). This amounted to 2,923 bushels valued at \$5,462 (Power, 1963). Although an upsurge in the industry in 1962 netted 26,664 bushels for \$50,172 (Power and

Lyles, 1964), the increase was only temporary; the harvest dropped to 874 bushels, valued at \$2,331, in 1963 (Lyles, 1965).

EXPLORATORY FISHING AND GEAR METHODS

During BCF explorations, scallops were harvested with modified 5- to 8-foot scallop and tumbler dredges, described by Posgay (1957) and Bullis and Cummins (1961), and 25-foot scallop trawls similar to those described by Rivers (1962).

Hard clams were fished with modified 13-, 14-, and 22-tooth "Fall River" dredges with 2-inch-stretched-mesh liners.

Most drags for both scallops and clams were for 15 or 30 minutes. Dragging speeds varied between 2 and 2½ knots.

The Oregon and Silver Bay searched for scallops and clams. Both vessels have relatively deep drafts and could not explore for clams in shoal water areas inside 3 fathoms.

EXPLORATIONS

Calico Scallops

Although BCF and commercial-vessel explorations in the early 1950s disclosed calico scallops, commercially significant catches were not made until 1957. In February and July 1957, the Oregon and Silver Bay, using scallop dredges in 17 to 25 fathoms off Cape San Blas, made several promising catches.



Fig. 1 - About 15 bushels of calico scallops dumped from Georges Bank scallop dredge onto deck of Silver Bay.

As a result, BCF planned future explorations there.

In July 1958, the Silver Bay made 43 drags with scallop dredges in the Cape San Blas area and caught almost 20,000 pounds, or about 275 bushels of scallops (fig. 1). Eleven 15- to 30-minute drags, centered around lat. $29^{\circ}51'$ N., long. $85^{\circ}35'$ W., caught over 211 bushels; 1 drag netted 40 bushels, and 2 drags 30 bushels each. Scallops were concentrated at 11 fathoms. The mainbed appeared to run 10 miles in northerly direction to south of Panama City. The scallops averaged about $2\frac{1}{2}$ inches in diameter, yielded about 2 quarts of meats per bushel. Scallops averaging $2\frac{3}{4}$ inches in diameter were present in deeper water. Texture and taste were comparable to northern bay scallop. Bullis and Ingle (1959) also reported high catch rates for commercial boats during same period. In 1959, however, that area was almost completely devoid of scallops; commercial operations were abruptly curtailed.

In July 1958, the Silver Bay dragged about 20 miles east-southeast of Cape St. George and discovered an extensive bed of scallops.

They averaged 1 inch in diameter, in 10-15-fathom depths. Catch ranged from 1 to 40 bushels per 30-minute drag. A less extensive bed of small scallops, $\frac{3}{4}$ to 1 inch in diameter, was found midway between Mobile, Ala., and Pensacola, Fla., in 10 to 15 fathoms.

In January 1959, the Silver Bay located an extensive bed of 1 to $1\frac{1}{2}$ -inch scallops between Mobile and Pensacola in 16 to 20 fathoms. Ontwo cruises in 1960, off Gulf Shores, Ala., the Oregon made commercially significant catches. Scallops were fairly evenly distributed between 15 and 17 fathoms, but extensive, heavy concentrations were not located. In July 1960, 19 drags in 15 to 17 fathoms caught 2,680 pounds, or 38 bushels; in September 1960, 4 drags in 16 fathoms took 52 bushels; one 30-minute drag caught 40 bushels.

To summarize, 556 stations have been made with scallop gear (fig. 2), and calico scallops have been found at 145 localities (fig. 3). Heaviest concentrations were off Cape San Blas, Fla., and south of Gulf Shores, Ala., in less than 20 fathoms; maximum production came from 11 fathoms. A few calico scallops were taken east-north-

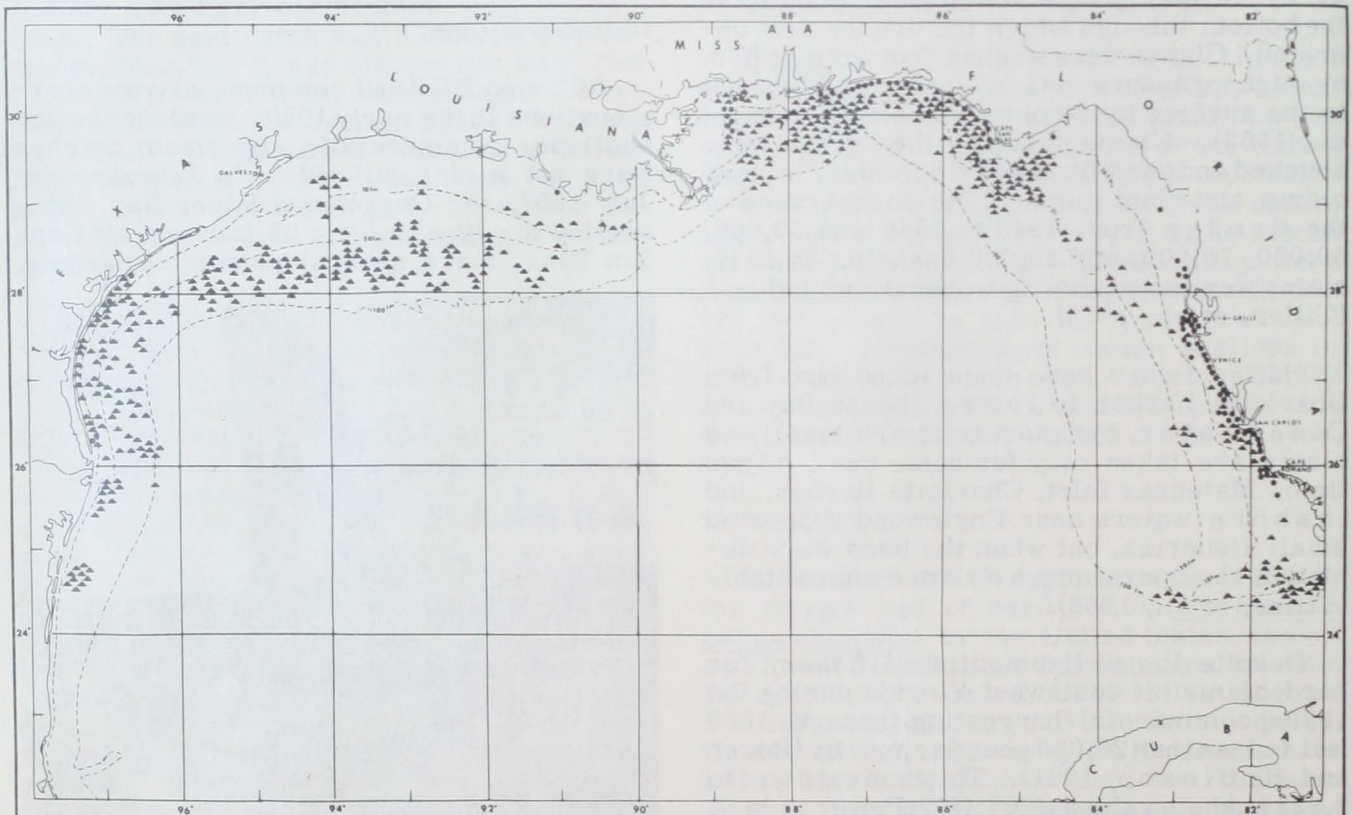


Fig. 2 - Fishing effort in the Gulf of Mexico, using scallop and clam gear, 1957-62. The triangles show where scallop gear was used and the dots where hard clam gear was fished.

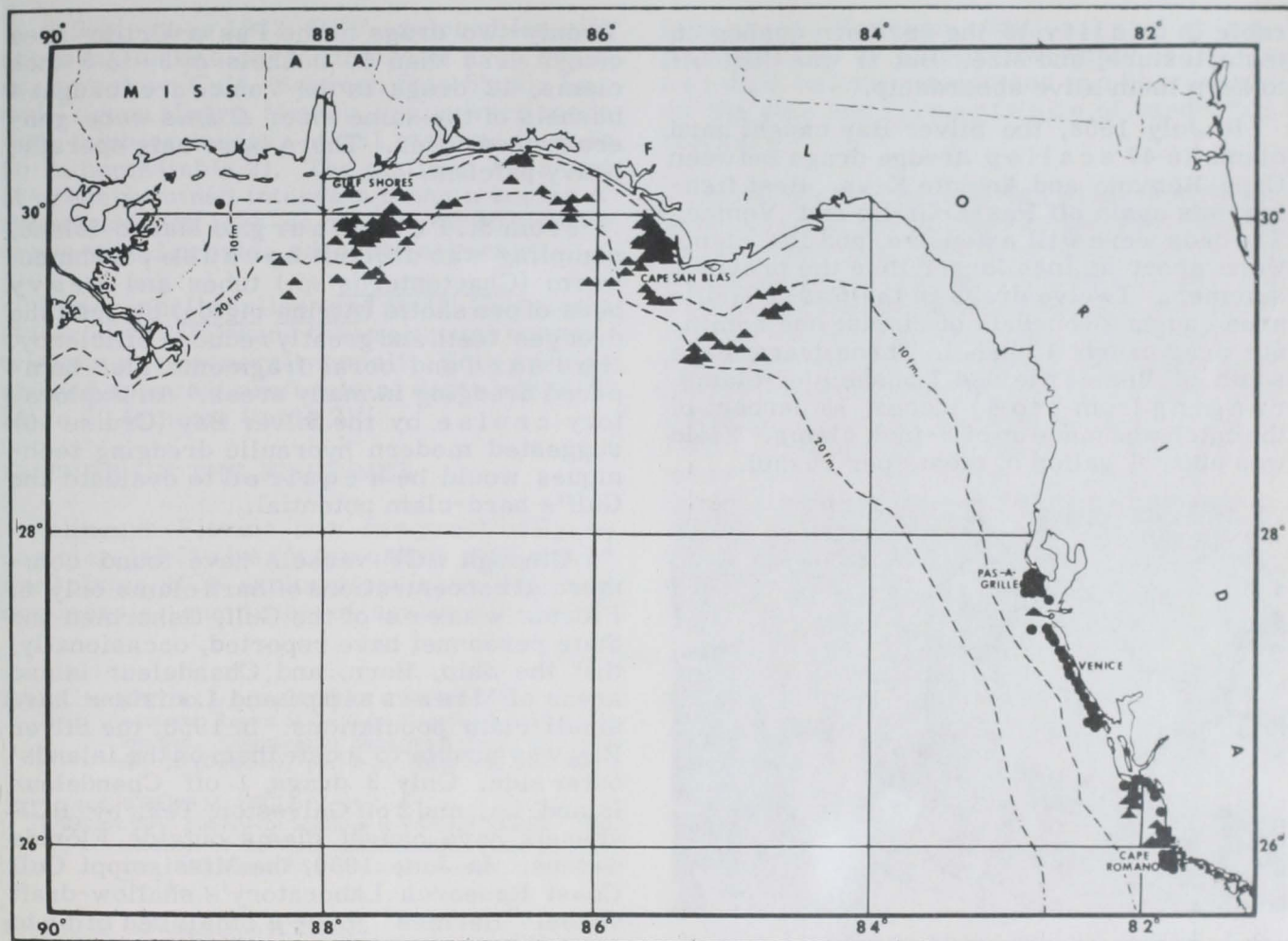


Fig. 3 - Calico scallop and hard clam occurrence in the Gulf of Mexico, 1957-62. The triangles shown where calico scallops were caught and the dots where hard clams were taken.

east of Cape Sable, Fla., south-southeast of Cameron, La., and off Galveston and Brownsville, Tex., and Laguna Madre, Mexico.

Bullis and Ingle (1959) made preliminary studies on growth rate and seasonal yield of scallops taken by commercial vessels. They found the maximum shell diameters had two well-delineated size groups that probably represent year classes. Shell sizes ranged from 0.6-1.0 inch for 1-year-olds and 1.8-2.5 inches for 2-year-olds. This indicates tentatively that scallops grow about 1 inch per year. Their study showed that scallops of commercial size have meats with about $\frac{1}{2}$ - to 1-inch diameters. It is difficult to study the growth of known scallop populations, which apparently move about. Additional studies are needed to learn more about growth rate and seasonal yield, determine seasonal availability, and to investigate the apparent movement and disappearance of well-defined concentrations from year to year.

Inshore Hard Clams

Hard clam (*Mercenaria campechiensis*) explorations have been conducted separately and with scallop explorations since 1957. Of 221 stations fished with clam gear (fig. 2), hard clams were found at 110 stations between St. Petersburg and Cape Romano, Fla. (fig. 3). The most productive beds were located off Pas-a-Grille, Venice, San Carlos, and Cape Romano. Best catches were made in 3 to 4 fathoms in the Pas-a-Grille and Venice areas in summers of 1957-58 (fig. 4). In August 1957, the Silver Bay took hard clams in 23 drags using quahog dredge between Sand Key and Gasparilla Island. The best catch (300 small clams--about 1 bushel per 30-minute drag) was confined to areas off Pas-a-Grille and Venice, Fla. Seventy percent of the catch consisted of 2-inch clams (little necks), with the remainder 3- to 4-inch cherrystones. Yield was about 1 gallon of meats per bushel. These clams were compa-

rable in quality to the northern quahog in taste, texture, and size. But it was difficult to keep them alive aboardship.

In July 1958, the Silver Bay caught hard clams in 47 scallop dredge drags between Cape Romano and Anclote Keys. Best fishing was again off Pas-a-Grille and Venice. The beds were still extensive, and the clams were about an inch larger than the previous summer. Twelve drags in the Pas-a-Grille area caught 20 bushels of clams; one 5-minute drag caught 1 bushel. Three drags made south of Venice yielded 7 bushels of clams, ranging from 2 to 4½ inches; 75 percent of the catch was made up of 3-inch clams. Yield was about 1 gallon of meats per bushel.

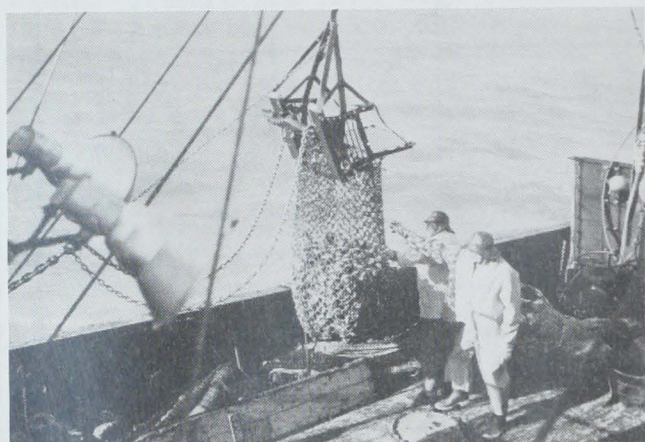


Fig. 4 - Modified Fall River type dredge with 3 to 4 bushels of hard clams being brought aboard Silver Bay.

Clam beds were located in the San Carlos and Cape Romano areas. These beds were not extensive and most catches were considerably less than those off Pas-a-Grille and Venice. Clams were kept alive for 15 days with negligible losses in a wooden tank, in which sea water was circulated continuously.

In December 1962, when the Oregon checked the beds' stability, clam populations had decreased in all four areas. Sixteen drags in the San Carlos and Cape Romano areas produced only 1 bushel of clams.

Twenty-two drags in the Pas-a-Grille area caught less than 10 bushels of 3- to 5-inch clams; 12 drags in the Venice area caught 4 bushels of the same size. Clams were generally scattered. There were only sporadic heavy patches.

From St. Petersburg to Marco Island, sampling was difficult because parchment worm (*Chaetopterus* sp.) tubes and heavy beds of pen shells (*Atrina rigida*) clogged the dredges' teeth and greatly reduced efficiency. Hard sand and coral fragments also hampered dredging in many areas. An exploratory cruise by the Silver Bay (Cruise 10) suggested modern hydraulic dredging techniques would be required to evaluate the Gulf's hard-clam potential.

Although BCF vessels have found commercial concentrations of hard clams only in Florida waters of the Gulf, fishermen and State personnel have reported, occasionally, that the Ship, Horn, and Chandeleur Island areas of Mississippi and Louisiana have small clam populations. In 1958, the Silver Bay was unable to locate them on the islands' outer side. Only 3 drags, 1 off Chandeleur Island, La., and 2 off Galveston, Tex., by BCF vessels have caught clams outside Florida waters. In June 1960, the Mississippi Gulf Coast Research Laboratory's shallow-draft vessel "Hermes" found a small bed of 5- to 6-inch clams in shoal waters inside Horn Island, Miss.

Offshore Scallops and Clams

In October 1960, the Oregon took up to 1 bushel per drag of paper-shell scallops (*Amusium papyraceus*) measuring 2 to 3 inches in diameter in 14 shrimp-trawl drags in 30 to 50 fathoms between Grand Isle, La., and Brownsville, Tex. Although these scallops were caught during 10 earlier cruises, this was the first indication that this species might have a commercial potential.

Table 2 - Catch of Gulf Clams (*Pitaria cordata*) and Paper-Shell Scallops (*Amusium papyraceus*) Taken by Oregon Between Ship Shoal, La., and Laguna Madre, Mexico, September 1962

Drags and Species	Depth Range (Fathoms)								Total
	0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	
Drags made	27	43	81	50	20	6	2	2	231
Gulf clams (<i>Pitaria cordata</i>)	0	17	44	23	10	1	0	1	96
Paper-shell scallops (<i>Amusium papyraceus</i>) . . .	0	2	41	42	10	0	0	0	95

In September 1962, BCF explored for off-shore mollusks along the midshelf area of the northwestern Gulf. Between Ship Shoal, La., and Laguna Madre, Mexico, drags were made with tumbler dredges at 231 stations in 4 to 80 fathoms (table 2). The stations were set at predetermined intervals along a series of transectional legs so the 15- to 30-minute drags would provide adequate coverage.

Paper-shell scallops and small Gulf clams (*Pitaria cordata*) were taken although concentrations were generally small. Both species showed apparent preferential depth range of 21 to 50 fathoms (table 2).

FUTURE OF THE FISHERIES

Although Florida now has practically no commercial fishery for calico scallops or hard clams, BCF explorations have indicated commercial quantities of scallops in local-

ized areas. However, additional exploration, particularly in shallow-water areas, is needed before conclusions can be reached on the size and importance of hard-clam stocks.

Although the scallop and clam industries have had their ups and downs (production now is low) their future is promising. As public continues to increase consumption of sea food, price and demand for shellfish will warrant increased catches, and mechanical shuckers and eviscerators will eventually lead to reestablishment of Florida's scallop fishery. Tiller, et al., said of hard clams in 1952: "Restoration of the Ten Thousand Islands stocks might offer an opportunity for the development of a market for shucked frozen meats to be used by northern canneries, or perhaps for locally-canned clam products."

LITERATURE CITED

- BULLIS, HARVEY R., Jr., and ROBERT CUMMINS, Jr.
1961. An Interim Report of the Cape Canaveral Calico Scallop Bed. Commercial Fisheries Review, vol. 23, no. 10 (October), pp. 1-8. (Also Sep. No. 630.)
- and ROBERT M. INGLE
1959. A New Fishery for Scallops in Western Florida. Proceedings of the Gulf and Caribbean Fisheries Institute, 11th Annual Session (November 1958), pp. 75-78.
- BUREAU OF COMMERCIAL FISHERIES
1958. Gulf of Mexico Explored for Hard Clams and Scallops (M/V Silver Bay Cruise 10). Commercial Fisheries Review, vol. 20, no. 9 (September), pp. 41-43.
- CAPTIVA, FRANCIS J.
1960. Chain Bridles and Accumulators Increase Effectiveness of "Fall River" Clam Dredges in Deep Water. Commercial Fisheries Review, vol. 22, no. 12. Equipment Note No. 6 (December), pp. 20-22. (Also Sep. No. 607.)
- LYLES, CHARLES H.
1965. Section 6 - Gulf Fisheries. Fishery Statistics of the United States, 1963. U. S. Fish and Wildlife Service, Statistical Digest 57, pp. 219-256.
- POSGAY, J. A.
1957. Sea Scallop Boats and Gear. U. S. Fish and Wildlife Service, Fishery Leaflet 442, 7 pp.
- POWER, E. A.
1963. Section 6 - Gulf Fisheries. Fishery Statistics of the United States, 1961. U. S. Fish and Wildlife Service, Statistical Digest 54, pp. 227-268.
- and C. H. LYLES
1964. Section 6 - Gulf Fisheries. Fishery Statistics of the United States, 1962. U. S. Fish and Wildlife Service, Statistical Digest 56, pp. 207-242.
- RIVERS, JOAQUIM B.
1962. New Scallop Trawl Developed for Hard-Bottom Fishing. Fish Boat (February 1962 issue), pp. 26-27.
- ROSEN, ALBERT and RICHARD K. ROBINSON
1961. Summary of Florida Commercial Marine Landings, 1960, and an Analysis of the Catch and Effort of Certain Species. Institute of Marine Science, University of Miami, Marine Fisheries Research Report to Florida State Board of Conservation, pp. 1-32.
- SCHROEDER, WILLIAM C.
1924. Fisheries of Key West and the Clam Industry of Southern Florida. Report of the U. S. Commissioner of Fisheries, 1923, Appendix 12, 74 pp. (Document 962).
- TILLER, RICHARD E.; JOHN B. GLUDE; and LOUIS D. STRINGER
1952. Hard-Clam Fishery of the Atlantic Coast. Commercial Fisheries Review, vol. 14, no. 10 (October), pp. 1-25. (Also Sep. No. 323.)

