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THE OFFSHORE FISHING GROUNDS OF NORTH CAROLINA.^a

By Lewis Radcliffe
As early as 1858 large catches of blackfish or sea bass (*Centropristes striatus*) were taken on the banks along the South Carolina coast. These banks were definitely located and charted and for many years have supplied a considerable percentage of the fish taken by vessel fisheries of that State. To the existence of grounds of similar character on the North Carolina coast one can find scarcely a reference, and practically nothing has been done to determine their location, extent, and resources. Attempts of the fishermen to develop them have resulted in failure largely because of lack of adequate knowledge regarding them. In 1902 the United States Fisheries steamer *Fish Hawk* located and charted the largest of these grounds. The information gained was not placed in the hands of the local fishermen and not until the last year (1913) was a determined effort made to develop them.

For the purpose of determining their location, extent, and resources and to encourage their development, the *Fish Hawk* was detailed to the United States Fisheries Laboratory at Beaufort, N. C., for a period of two months and on September 6, 1913, began a brief survey. The results of this work and the success attending the efforts of the fishermen visiting these grounds are encouraging. As on the South Carolina banks, the blackfish, or sea bass, is the principal fish taken.

THE GROUNDS.

The grounds supplying the largest and best blackfish and in greatest abundance lie about 20 miles offshore in $13\frac{1}{2}$ to $15\frac{1}{2}$ fathoms of water. They are located along a rather definite regional line, approximately parallel to the shore line. (See chart.) In addition to these there are other grounds much closer to shore on which smaller blackfish are taken.^b

^a By Lewis Radcliffe, superintendent and director of the United States Fisheries Laboratory, Beaufort, N. C.

^b In the short space of time available for the work, it was impossible to make an exhaustive survey of the grounds visited or to extend the survey to other localities in which blackfish are reported to have been taken.

Following is a brief description of each of the grounds located or visited during the survey:

Outer Lookout Breakers ground.—This ground is in latitude $34^{\circ} 21' N.$, longitude $76^{\circ} 23' W.$ It is $2\frac{1}{2}$ (nautical) miles NNE. $\frac{1}{4}$ E. of

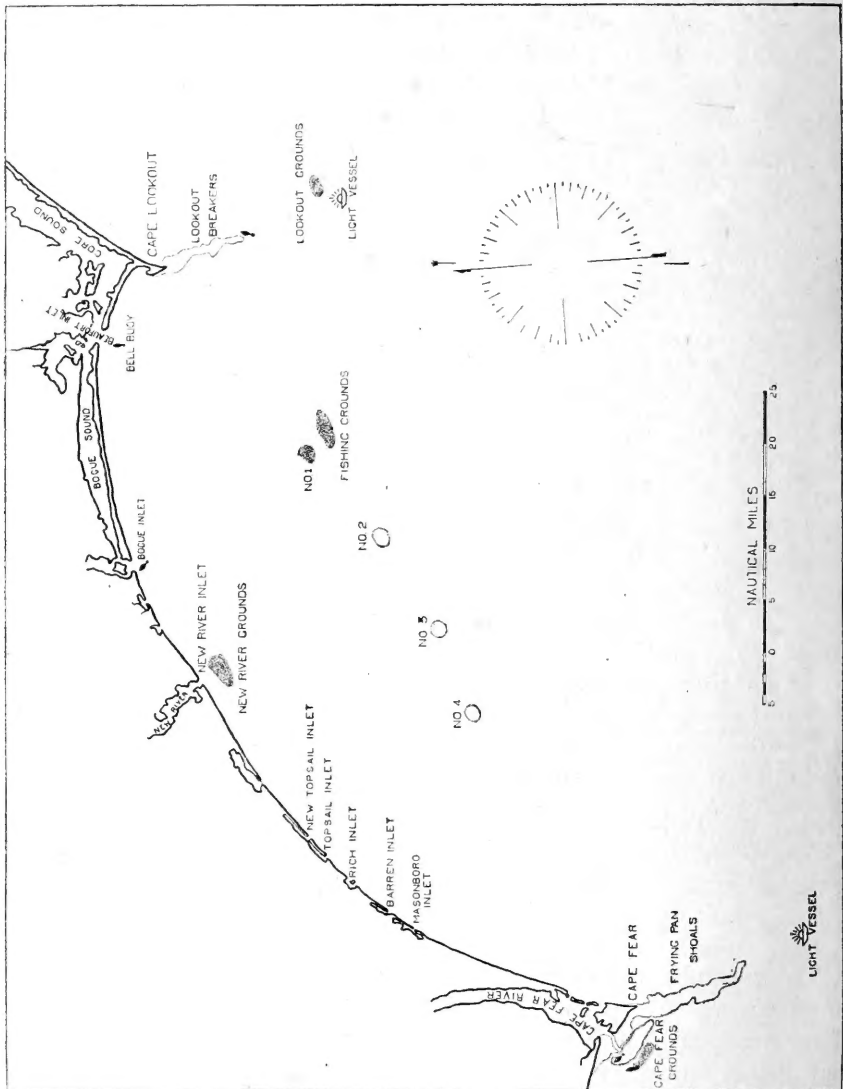


Chart of North Carolina coast, showing fishing grounds (stippled areas).

Lookout Lightship; ^a $7\frac{1}{2}$ miles SSE. $\frac{3}{4}$ E. from buoy No. 8 off Lookout Breakers; 18 miles S. by E. $\frac{5}{8}$ E. of Cape Lookout Light, and 24 miles southeast by south from the bell buoy on Beaufort Bar. It

^a In the latter part of October, 1913, the Lookout Lightship was moved $1\frac{1}{2}$ miles S. by E. $\frac{1}{4}$ E., from its former (charted) position, its present position being latitude $34^{\circ} 18' 24'' N.$, longitude $76^{\circ} 24' 18'' W.$ The bearing given is for the new position.

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lies in $14\frac{1}{4}$ fathoms of water, deepening rather abruptly to 15 and 16 fathoms along its edge. The bottom is shelly and sandy and apparently lacks the rich growth of corals, sponges, etc., found on the grounds to the westward.

The blackfish caught on this bank were of large size and appeared to be abundant. The *Fish Hawk* fishing intermittently for several hours took more than a hundred of these fish. During this time several red snappers (*Lutianus blackfordi*) were hooked and two weighing 19 and 23 pounds, respectively, were caught. Among the 20 species taken were the following food fishes: Grunts (*Hæmulon plumieri*), red-mouthed grunts or tom tates (*Bathystoma rimator*), red porgy (*Pagrus pagrus*), and large sailor's choice or spot-tailed pinfish (*Diplodus holbrookii*). Large trigger-fish (*Balistes carolinensis*) were common and large schools of hairy-backs (*Opisthonema oglinum*) were observed in the vicinity. More surprising was the presence of scallops, and from the numbers taken in the dredge they appear to have been quite common. This is believed to be the first record of their occurrence in numbers at an offshore station on the North Carolina coast.

On October 15, $1\frac{1}{4}$ miles southeast by east from Lookout Breakers Buoy No. 8, excellent hand-line fishing for blackfish obtained. Ten of the largest taken weighed 22 pounds. On a later visit no fishing banks could be located. Whether a school of these fish was picked up on the first visit or whether the bank on which they were living was too small to be readily found was not determined.

Beaufort offshore "fishing grounds."—The main bank lies in latitude $34^{\circ} 19' N.$, longitude $76^{\circ} 59' W.$ It is 21 miles SSW. $\frac{1}{4}$ W. of the bell buoy on Beaufort Bar, $21\frac{1}{2}$ miles SE. by S. from the buoy at the entrance to Bogue Inlet, and 27 miles SE. by E. $\frac{1}{4}$ E. of the entrance to New River Inlet.

This is the largest fishing ground known on the coast. It is about 4 miles long by $1\frac{1}{2}$ miles wide and lies in $13\frac{1}{2}$ to 14 fathoms of water. The bottom is of a coralline nature, and corals, sponges, mollusks, crustaceans, together with a variety of other forms characteristic of a tropical coral reef, occur here.

That there was a "fishing ground" in this region where blackfish were found in great abundance was known to the local fishermen, and those fortunate enough to find it on rare visits in this vicinity always secured large catches of fish. Its exact location, however, was not known until charted by the *Fish Hawk* in 1902. In April, 1913, the position of one of these grounds was shown to local fishermen, and during the succeeding summer and fall a definite attempt to test its commercial possibilities was made, and two fishermen in a small motor boat visited it with some degree of regularity. In a few hours' fishing on each visit they took from 170 to 1,000 pounds of blackfish, or an average of 600 pounds per trip. During the survey the *Fish Hawk*

always found excellent fishing on the grounds. On September 6 over 400 blackfish were caught with hook and line during the periods not devoted to the regular survey work. These fish were of large size, excellent for marketing. Whenever the boat drifted off the grounds no more were taken.

That there is a variety of fish life on this bank and the neighboring patches of coral is evidenced by the fact that 46 species have been reported. Among the food fishes the following have been taken, but not in sufficient numbers to indicate that they will be of commercial importance: Dolphins (*Coryphæna hippurus*), squirrel-fish (*Diplec-trum formosum*), bastard snapper (*Rhomboplites aurorubens*), hogfish (*Orthopristis chrysopterus*), grunt (*Hæmulon plumieri*), red-mouthed grunt or tom tate (*Bathystoma rimator*), sailor's choice or spot-tailed pinfish (*Diplodus holbrookii*), red porgy (*Pagrus pagrus*), two species of porgies (*Calamus* sp.), and flounders (*Paralichthys albiguttus*).

The *Fish Hawk* worked around this bank and followed a zigzag course across the 15-fathom line to a point more than 30 miles to the west-southwest, making occasional stops to search for other banks. During this brief survey other banks or patches of rock where blackfish were found in comparative abundance or where the conditions were favorable to their existence were located but not surveyed. These are indicated as numbered stations in the text and on the chart.

Station 1. This bank lies about $2\frac{1}{2}$ miles northwest of the "fishing grounds" in $15\frac{1}{2}$ fathoms of water. The bottom is of a rough coralline nature, the growth of coral being sufficiently heavy to render the use of beam trawl difficult. From the bottom were taken corals, sponges, crustaceans, and mollusks. In 30 minutes' hand-line fishing, 150 blackfish were taken.

Station 2. This station lies about 12 miles west-southwest of the "fishing grounds" and $22\frac{1}{2}$ miles south of the buoy at the entrance of Bogue Inlet. It is covered by 16 fathoms of water. Although only shells and sand were taken from the bottom, from the catch of fish it is believed that a bank is to be found in the vicinity. That fishes were present in some numbers is evidenced by the fact that six species were taken and that hand-line fishing yielded about 50 blackfish in 20 minutes' fishing.

Station 3. This station is $22\frac{1}{2}$ miles SW. by W. $\frac{7}{8}$ W. of the "fishing grounds" and 23 miles S. $\frac{1}{2}$ E. of the entrance to New River Inlet. On the bottom were sea fans, stony corals, and shells. A single dredge haul yielded blackfish, pinfish (*Lagodon rhomboides*), and ribbon-fish (*Eques acuminatus*).

Station 4. This station is 26 miles S. by W. $\frac{4}{5}$ W. of the entrance to New River Inlet. It lies in $14\frac{3}{4}$ fathoms of water. Coral and shells

were taken from the bottom and a single haul of the dredge yielded eight different kinds of fish. This is in striking contrast to the catch at stations where blackfish grounds did not exist and indicates their presence here. Hand lines were not used.

Of the total number of stations or points where dredge hauls were made to determine the character of the bottom in this region, only a third are contained within the areas represented on the chart. Nearly all the others were outside the general area in which these fishing banks lie, either in shallower or deeper water. This lends credence to the belief that a thorough survey along the line indicated will disclose other grounds; that the fishermen may expect to catch blackfish at many points along this area lying in depths of $13\frac{1}{2}$ to $15\frac{1}{2}$ fathoms of water, and it seems not improbable that other banks may be found scattered along the coast, possibly throughout the entire length down to the ones off Charleston. The fish may work from bank to bank in search of food.

New River fishing grounds.—This is one of the grounds relatively close to shore, lying in $4\frac{1}{2}$ to $6\frac{3}{4}$ fathoms of water off the mouth of New River Inlet. In places the bottom is rocky. A comparatively heavy growth of seaweeds, with sponges (mostly of the finger type), and other forms were found to be growing on the bottom. This ground is reported to have been fished from time to time. As high as 500 pounds of blackfish were taken in one day's fishing in November. At a point one-half of a mile south by east from the mouth of the inlet, the *Fish Hawk* took 25 blackfish in 10 minutes' fishing. As at other banks near shore, the blackfish are smaller than on the offshore grounds. Rudder-fish (*Seriola carolinensis*), grunts (*Hæmulon plumieri*), scup (*Stenotomus aculeatus*), and spot-tailed pinfish (*Diplodus holbrookii*) occur here.

Cape Fear grounds.—This ground surrounds the whistle buoy off the mouth of the Cape Fear River and extends for at least 3 miles to the SE. $\frac{1}{2}$ E. of this point. It lies in 7 to $7\frac{1}{2}$ fathoms of water. On the bottom seaweed, sponges, corals, and other forms characteristic of the fishing grounds were found. This ground is reported to have furnished good fishing in the past. The *Fish Hawk* took blackfish, ribbon-fish, scup, and other forms.

Mud banks off the mouth of Cape Fear River.—On the mud flats off the mouth of Cape Fear River, in $3\frac{1}{2}$ to 5 fathoms of water, fishes and shrimp were found to be very abundant. The area visited is indicated on the chart by a dotted line. Here young trout (*Cynoscion regalis*), croakers (*Micropogon undulatus*), spot (*Leiostomus xanthurus*), white perch (*Bairdiella chrysura*), a rare drum (*Stellifer lanceolatus*), and flounders (*Paralichthys lethostigmus*), together with shrimp of large size, were taken in abundance.

COMMERCIAL ASPECT OF THE BLACKFISH GROUNDS.

With the data at hand it is impossible to determine how large a fishing industry these grounds will support. The results of this brief survey, the reported existence of other grounds off Frying Pan Shoals and to the westward, and the fact that more than 15,000 pounds of blackfish were taken from the Beaufort "fishing grounds" this year indicate that with further development the prospects of success are not without foundation. If the grounds are found to be anywhere near as extensive as those off Charleston, North Carolina possesses a fishery resource worthy of immediate development.

In this connection it may be well to call attention to the value of the blackfish or sea-bass industry to South Carolina fishermen, the conditions apparently being not unlike those on the North Carolina coast. In the special report of the Director of the Bureau of the Census on the Fisheries of the United States for 1908, page 239, the following extract on this fishery in South Carolina appears: "The value of the sea bass taken in the vessel fisheries, however, constituted 25 per cent of the total value of products and 77 per cent of the value of the fish proper reported for such fisheries. The bulk of the product was taken in the vessel fisheries with lines. The following tabular statement gives statistics of the sea-bass product for those years for which figures are available:

CATCH OF SEA BASS ON SOUTH CAROLINA GROUNDS IN GIVEN YEARS.

Years.	Sea-bass products.	
	Quantity.	Value.
	<i>Pounds.</i>	
1908.....	491,000	\$22,000
1902.....	710,000	27,000
1897.....	632,000	26,000
1890.....	826,000	26,000
1887.....	889,000	29,000

CONCLUSION.

This fishery possesses certain features which should recommend it to the fishermen of North Carolina. It can be conducted in the winter time, out of the regular fishing season, at a time when the market supply of this fish is limited and therefore when the species will bring the highest market price. In fact, it is believed that it will be to the advantage of the fishermen to abandon the fishery during the spring and summer season when the prices of this fish are lowest.

The fishermen will find it essential to have permanent buoys placed on the offshore grounds, thus eliminating the present difficulties in locating them on each trip.

It is believed that a more exhaustive survey, especially in the region off Frying Pan Shoals and to the westward, may disclose still other grounds, extending the present scope of the industry.

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