

tember. The course of study will last 3 to 5 years.

**Albania has extended its territorial sea to 15 nautical miles from 12 miles, a distance it has claimed since 1970.**

**Iceland's general strike and the trawlermen's strike ended on 28 February.** Meanwhile, there was progress in the fisheries dispute between Iceland and the United Kingdom and a

6-month agreement was signed on 1 June 1976.

**The Scottish Highlands and Development Board is funding a \$750,000 study on the blue whiting stocks of the Western Isles to determine if stocks can support a fish meal industry.** Preliminary tests indicate that 500,000 metric tons of blue whiting could be caught each season.

#### *Fishery Notes*

## **Sharks Score Well in Texas Taste Surveys**

Shark meat fared well when compared with accepted seafoods like redfish, according to a shark meat taste test and attitude survey conducted for the Texas Parks and Wildlife Department (TP&WD). Although all data were not yet analyzed, tentative results indicated that Texans were willing to accept shark meat as a seafood.

Four tests were conducted, two each in Arlington and the north Dallas areas. In the first taste test, 128 persons were served four pieces of broiled, unseasoned fish. The four fish tested were redfish, used as the control piece, bonnethead, sharpnose and blacktip sharks. Respondents were asked to score the fish on flavor, taste and overall satisfaction on a range of one to seven. On that basis, redfish scored an average of 4.3, as did sharpnose. Bonnethead scored 3.9, while blacktip averaged a 3.6 grading. Overall, the testers preferred the taste of sharpnose, one of the smaller-sized sharks.

"This doesn't mean the lowest score indicates the taste of blacktip was not liked," said Bill Schwartz of the TP&WD. "The scores were used to rank one species in relation to the others. Even though blacktip scored lowest in this test, 23 persons said they liked the taste of it the best."

The second test involved 80 testers, and all were served four pieces of blacktip shark. They were given a small and a large piece of fish as in the first test, plus two more pieces, large and small, that had been soaked in water for 1.5 hours. Soaking the shark meat in water prior to cooking is thought to remove a bitter taste. Results, however, showed the large, unsoaked piece of meat was rated

highest, 4.5, while the small treated piece was rated lowest at 3.5.

For the third test, the shark meat was breaded and fried. Some 80 testers were given three bite-sized pieces of fish: 1) redfish; 2) sharpnose soaked in water before cooking; 3) untreated sharpnose. Here, the redfish control and the soaked piece of shark meat scored identically, 5.4. The untreated sharpnose scored slightly lower, 5.2.

In the fourth test, 64 testers were given identical pieces of blacktip shark. "The only difference was we told them that one piece of meat was shark, but we did not say the other piece was also shark," Schwartz said. Surprisingly, the piece identified as shark received a higher rating than the unidentified piece of fish. Of the 64, only four said they could not distinguish between the two pieces. There was, in fact, no difference, since both portions were blacktip shark.

"These results surprised us somewhat," Schwartz noted, "but it shows a general indication of positive reaction, as far as taste is concerned. The public in our samples thinks shark meat tastes good, and most of the shark meat got basically the same scores as redfish, which is an accepted good-tasting fish."

Regarding all four tests, Schwartz indicated much of the data have not been cross-referenced, nor has an analysis been completed. Several computer tests remained to be applied to the data before a definite analysis could be drawn and results defined. Still, Schwartz added, "We do know that women are more averse to eating shark than men, and we do know that all species of shark do not taste the same. The differences in taste, however slight, are real."

On the attitude survey, individuals were asked their reaction if they ate a piece of good-tasting fish and were then told it was shark meat. Out of 199 respondents, 144, or 72 percent, said they would be pleasantly surprised and continue eating. Only 23 persons, 11 percent, said they would be upset at being told it was shark meat and stop eating.

"Our data thus far indicate shark is not all that different in taste from other types of fish and what differences there are are in the shark's favor. Its meat is of firmer texture, and won't flake apart, 65 percent of the animal is edible and there are no bones in the flesh," Schwartz noted. More than 20 species of shark are found in the Gulf of Mexico, and Schwartz feels the shark supply is available in enough quantity to be marketable if people accept it as a source of food.

## **Texas Calls Black Drum Underutilized Species**

More than a million pounds of black drum are harvested commercially every year in Texas, but Texas Parks and Wildlife Department fisheries biologists still feel it is one of the most underutilized food fish on the Texas Gulf coast. Although plentiful, drum are not the most sought-after fish, ranking far below popular game fish such as speckled trout, flounder, and redfish.

Known under a variety of names, including Texas drum, sea or saltwater drum and tambor, this member of the croaker family is a commercial fishing mainstay, but it has never been fully accepted by sport fishermen. It is most abundant along the lower coastal areas and is found in almost all bay and inshore Gulf waters. Its name comes from the fish's ability to produce croaking or drumming sounds with its air bladder. Small drum of a pound or so sometimes are called butterfly drum, while the larger size of 30 pounds or more are known as bull drum.

The species can thrive as easily in shallow, warm water as it can in 100-foot-deep, cold water, and also survive freezing weather better than any other fish. Their adaptability makes the black drum available to a greater number of anglers than any

other bay fish. Drum are chunky, high-backed, and vary from jet black to silver or bronze in color.

Drum spawn in either bay or Gulf or in connecting passes during late winter between February and April by random release of eggs. By early summer, one-half- to one-inch juveniles are common in shallow creeks and boat basins.

The drum grows to good size, reaching 16 inches in three years, and growing an average of two inches a year thereafter. The largest black drum on record weighed 146 pounds; the Texas angling record is 78 pounds. Most drum caught in Texas weigh 30-40 pounds.

Tagging studies conducted by P&WD biologists have recorded drum migrations of 245 miles in one year, but distances of 10 miles or less are average for spawning migrations or movements to freshwater flows.

Drum are rarely taken on artificial bait since they feed by feel and smell. Cut shrimp, squid, or fish are preferred baits. Since drum feed along the bottom, the basic fishing technique is to put a baited hook on the bottom and wait for the drum to swallow it. Schools of drum feed in shallow water and when drum runs occur, anglers by the score gather at intracoastal canals. Drum seldom jump or make long runs but they are powerful fighters.

During the period December through March, with a peak in February, the bull drum move from the Gulf into the bays and congregate along channels and turning basins. These annual runs result in the most notable sport harvests.

### **Efforts to Restore Lake Trout to Lake Michigan Continue**

Upwards of 958,000 lake trout are being planted in the Wisconsin waters of Lake Michigan this year, with a special attempt to stock 280,000 at two historic lake trout spawning reefs, according to the Wisconsin Department of Natural Resources (DNR).

Ron Poff, DNR Great Lakes fishery supervisor, said that, "We are going to plant 70,000 lake trout at Horseshoe reef in Green Bay and 210,000 at Milwaukee reef in Lake Michigan. Horseshoe reef is located in Green Bay

off Door County and historically produced significant numbers of lake trout. Milwaukee reef, located in midlake Ozaukee and Sheboygan counties, historically contributed significant numbers of lake trout to the southern half of Lake Michigan."

To date, biologists have failed to find any natural reproduction of lake trout in Lake Michigan even though lakers have been stocked since 1965. Lake trout originally reproduced in Lake Michigan until the sea lamprey entered the lake and completely eliminated the lake trout population. "Reef planting is part of a continuing effort by the Department to reestablish lake trout populations," said Poff, "with other efforts including a reduction in the sport fishing daily bag limit to 3 and continued closure of the commercial fishery for lakers. Hopefully these steps will provide more spawners.

#### *Publication*

### **International Navigation Aid Literature Published**

The U.S. Coast Guard, in the interest of promoting marine safety through broader understanding of aids to navigation, is distributing informational literature concerning International Association of Lighthouse Authorities (IALA) publications. IALA is a non-government association of services or organizations responsible for the provision or maintenance of lighthouses and other aids to marine navigation. The Coast Guard, as the U.S. Government organization responsible for provision of aids to navigation in the United States, is a member of IALA. The Commandant of the Coast Guard is an ex-officio permanent member of the Association's Executive Committee.

In order to promote the improvement and effectiveness of aids to navigation, IALA has prepared several publications for the use of both providers and users of aids to navigation. Two such IALA publications are: "International Dictionary of Aids to Marine Navigation"; and the "Manual on Radio Aids to Navigation." The "Manual on Radio Aids to Navigation" (Chapters 1-4) is for sale at 30 Swiss francs per copy. It discusses: 1) General Review (of radio navigation

Ultimately our objective is to re-establish a self-sustaining stock of lake trout." Poff added that there have been some encouraging signs, including high survival rates of fish planted in Lake Michigan and that wounding rates from sea lampreys are relatively low, indicating some success in controlling the sea lamprey.

Lake trout planted in Lake Michigan are descendants of lake trout originally from Lake Michigan, which should increase their probability of survival and reproduction. Other species being stocked in Lake Michigan this year include: 1.2 million chinook salmon, 550,000 coho salmon, 23,000 "tiger" trout, 959,950 rainbow trout, 150,050 brown trout, and 27,500 brook trout. Plantings in Lake Superior will include: 18,000 splake, 585,000 lake trout, 145,000 rainbow trout, 24,000 brown trout, and 31,050 brook trout.

aids); 2) Direction Finding; 3) Consol; and 4) Decca. The IALA dictionary is published in English, French, German, and Spanish. Its nine chapters are being published as separate booklets with an alphabetical index in each. The following have been printed: Chapter 1, General Terms, 12 francs; Chapter 2, Visual Aids, 35 francs; Chapter 3, Audible Aids, 9 francs; and Chapter 4, Radio Aids, 25 francs. Orders must specify the language desired.

In addition to these publications, IALA publishes the quarterly IALA Bulletin, which contains articles on technical and operational aspects of aids to navigation, plus information about Association activities. The Bulletin is available from the IALA Secretariat at an annual subscription price of 100 Swiss francs.

Orders for IALA publications must be placed with the Secretariat of the Association. They are not available from the U.S. Coast Guard. Orders should be addressed to: IALA Secretariat, 43, Avenue du President Wilson, 75775 PARIS CEDEX 16, France. Orders must be accompanied by an international money order for the full amount of the order. Publications are mailed postpaid.