U. S. Fishery Catch Rises for Third Year

The domestic catch of fish sold for consumption and industrial processing in the United States rose for the third consecutive year in 1980, reaching a record 6.5 billion pounds. The Commerce Department's National Oceanic and Atmospheric Administration (NOAA) said last year's catch was 3 percent higher than the year before, but about the same in value, $2.2 billion.

NOAA also noted that the domestic fishery's share of the commercial U. S. seafood market has risen from 46.5 percent in 1976 to 57.1 percent a year ago. The remainder was supplied by imports. The agency said the catch of edible fish and shellfish last year was up 10 percent over 1979, totaling 3.7 billion pounds. About 2.5 billion pounds of menhaden, a fish used to make oil and fertilizer, also was landed in 1980. It accounted for 38 percent of the total.

Salmon proved the second most important species caught in both quantity and value. Crabs and tuna ranked third and fourth. Shrimp were fifth, but the highest in value.

Leading U. S. ports in quantity of commercial fishery landings were, in descending order, Cameron, La.; San Pedro, Calif.; Pascagoula-Moss Point, Miss.; Empire-Venice, La.; and Dulac-Chauvin, La. Menhaden was the principal species landed at all these ports except San Pedro. There, tuna was the principal catch.

Louisiana led all states in volume with 1.4 billion pounds. It was followed by Alaska with 1.1 billion pounds; California with 804.3 million pounds; Virginia with 634.5 million pounds; and Massachusetts with 438.4 million pounds. The Alaska catch was valued at $560.6 million. It was followed by California with $323.4 million; Massachusetts with $178.6 million; and Louisiana with $178 million.

Gulf Stream Charts Save Time and Fuel

For Gulf Coast fishermen, a key to good fishing and staying out of Cuban waters is knowing the exact location of the Gulf of Mexico's Loop Current and the Gulf Stream. Courtesy of the Federal Government, that information now is as handy to them as the nearest telephone. It also is available on most Florida stations of the NOAA Weather Radio network.

The Commerce Department's National Oceanic and Atmospheric Administration (NOAA) now provides updates every Monday, Wednesday, and Friday on the current and stream through annotated charts available by telecopier and via the broadcasts.

The data, culled from NOAA satellite imagery and other sources, help fishermen pinpoint schools of temperature-sensitive fish found near the Gulf Stream and determine the danger of the current which could carry fishermen into Cuban waters. It covers waters from Florida north to Cape Hatteras and Florida and the Gulf of Mexico. Separate charts are issued for both areas.

Donald C. Gaby, manager of the Miami station of NOAA's National Earth Satellite Service (NESS), said the new service also helps conserve fuel. He said it allows fishermen to determine when the Gulf Stream is too far out in the Atlantic north of Cuba to make fishing economical.

Ships also use it to locate the stream to shave transit time, Gaby noted. C. F. Industries, Inc.[1], Long Grove, Ill., reports saving 6 hours and 1,500 gallons of fuel on a round trip from New Orleans to Norfolk, Va. The company's 600-foot bulk carrier costs $1,200 an hour to operate.

Persons interested in recording charts by telecopier should call (305) 661-0738. Queries about them or telecopier reception should be directed to the Miami station at (305) 665-4707 or (305) 350-4310.

NOAA's National Weather Service extracts portions of the charts for broadcasts over NOAA Weather Radio stations in Miami, Jacksonville, Key West, Daytona Beach, and West Palm Beach. Miami and Jacksonville broadcast on an FM frequency of 162.550 MHz, while the other stations are on 162.400 MHz. Plans call for NOAA Weather Radio stations at Gulf Coast locations to broadcast the Gulf Loop Current information in the future.

Tuna Habitat: The Eastern Tropical Pacific

The eastern tropical Pacific Ocean covers approximately 6 million square miles, stretching between lat. 40°N and 40°S from the west coast of the Americas to long. 160°W. It is an area of high biological productivity and is the habitat for many species including tuna and porpoise. The major tuna species found in the area are yellowfin and skipjack. Major currents in the eastern tropical Pacific, especially in the vicinity of the Equator, serve as geographical boundaries for certain porpoise stocks.

The average depth of the thermocline (the area of sharp temperature difference between warm surface waters and colder deep waters) is much less in the eastern tropical Pacific then in the

[1]Mention of trade names or commercial products or firms does not imply endorsement by the National Marine Fisheries Service, NOAA.

western—usually less than 150 feet in the eastern area and more than 450 feet in the western. The shallow thermocline serves as a barrier that keeps the tuna from diving deep to escape a net—a characteristic that is known and used by fishermen to increase their catches.

The U. S. tuna purse seine fleet catches six tuna and tunalike species in the eastern tropical Pacific, chiefly yellowfin and skipjack tuna, and small numbers of bluefin tuna, bigeye tuna, black skipjack tuna, and bonito. Only yellowfin tuna are frequently caught in association with schools of porpoise, but tuna may also be found and caught in association with floating objects such as logs and other debris to which they are attracted, or in association with whales or whale sharks. Yellowfin and skipjack tuna make up about 62 and 38 percent, respectively, of the average U. S. purse seine catch from the area.

Field observations indicate that tuna swimming in association with porpoise tend to be larger than those that swim in pure tuna schools; smaller tuna tend to swim in tuna-only schools, and in waters closer to shore. Source: NOAA Office of Public Affairs.

Measuring Fresh Fish Quality

Freshness and spoilage are terms that emphasize quality changes of fresh fish from the time it is caught until it is no longer acceptable as food. Various methods are used to measure the quality changes of fish and, commonly, the senses of sight, smell, and touch are used. However, individuals vary in their assessment of quality and objective methods that do not rely on the senses are continually being evaluated, reports the Northwest and Alaska Fisheries Center's Utilization Research Division (URD).

A number of chemical methods have been developed for measuring freshness or quality changes. They all depend on measuring the concentrations of various breakdown products such as hypoxanthine, malonaldehyde, trimethylamine, and pH which change as quality changes.

In research on the effect of holding systems for fresh fish, it is important to measure objectively the quality changes of the fish. For one of the recent studies, a Torrymeter was used to follow the quality changes in walleye (Alaska) pollock held in ice for 8 days. This instrument was developed at the Torry Research Station in Aberdeen, Scotland, to measure quality changes in fresh fish and is simple to use. Table 1 illustrates how the Torrymeter readings and chemical changes in pollock during iced storage can be used as indices of freshness.

Taste panelists began to detect changes in the pollock after the fifth day of iced storage. The methods chosen to monitor the chemical changes in pollock also indicated that rapid changes began to occur after the fifth day. The Torrymeter measures the progressive change in the dielectric properties of fish tissue during storage and the decreasing readings reflect the decrease in freshness. Although the theory is complicated, the Torrymeter is simple to use (just place the sensing head firmly against the side of the fish) and fast compared with the chemical methods that require laboratory facilities and time for the tests.

The Torrymeter is a new instrument and more tests will be made comparing it with chemical methods. Simple accurate methods to measure quality are always being sought and, because of the complexity of the quality changes, those first changes in the freshness of the fish are the most important for consumer satisfaction.

Jerry Babbitt

Table 1.—Changes in quality parameters of Alaska Pollock held in ice.

Days after catch	Torrymeter readings	Hypoxanthine moles/g	Malonaldehyde moles/100 g	Trimethylamine mg/100 g	pH
1	13.8	0.45	0.12	0.26	6.88
3	8.0	1.02		0.61	6.88
5	4.3	1.28	0.29	0.67	7.10
8	1.08	2.06	0.64	2.20	7.15

Carotenoids for Salmonid Diets

A cooperative research study with Sam Meyers of Louisiana State University, Baton Rouge, La., has been reported by the Northwest and Alaska Fisheries Center's Utilization Research Division (URD). The study will investigate the efficacy of carotenoids derived from crawfish wastes.

Several years ago, the URD developed a process for extracting the naturally occurring carotenoid pigments from shellfish and euphausids using soy oil. This effective procedure is being scaled up by Meyers in a menhaden meal and oil plant in Louisiana. At present, about 20 million pounds of crawfish are harvested in Louisiana, but about 85 percent of this figure becomes waste. This waste can be a useable by-product since it is high in carotenoid pigments.

Currently these natural pigments, and their synthetic analogs, are added to aquaculture diets to impart a desirable pink color to the flesh of salmonids. Based on preliminary figures, the 20 million pound harvest will yield about 18 million pounds of waste by-product containing about 2,700 pounds of carotenoids. At a current price of $400 per pound for the synthetic pigment, this could represent over a $1 million resource.

The URD studies in Seattle, Wash., will test the effectiveness of the extract in typical dry diets in both rainbow trout (here in the laboratory) and those being raised in a local commercial mariculture operation in Puget Sound. Several factors need to be determined about this new product: Its stability during feed manufacture and storage, possible interactions of the extract with other dietary components, and uptake rate by the fish of the pigment. This information will aid in determining the viability of using crawfish as a source of these pigments in aquaculture feeds.

John C. Wekell