

A GUIDE TO

Purchasing and Handling North Carolina Seafood

For Restaurant Operators and Retailers

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February 1986

\$1.00

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UNC Sea Grant College Publication UNC-SG-86-01

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The seafood retail trade is an expanding, profitable business because Americans are increasing their awareness of fish and shellfish. The public is learning that seafood is a health food. It is low in fat and calories and rich in vitamins and minerals.

A variety of fish and shellfish is being marketed to satisfy the consumer's search for new and exotic tastes. Although many of these species are old favorites in coastal areas, they are receiving new exposure in inland markets. Improved distribution systems and air freighting have allowed more fresh seafood to be shipped inland.

From North Carolina waters comes a variety of popular fish and shellfish, such as blue crabs, oysters, shrimp, hard clams, flounder and sea trout. Each of these seafoods can offer value buys for the retailer or restaurant owner if attention is paid to quality control.

Examine for freshness

When inspecting whole or dressed fish for freshness, the senses of smell, sight and touch are your best guides for determining quality. Odors caused by spoilage often are first noticed in the gut cavity and between the gills. A good quality fish should have no unpleasant odors. It should smell ocean fresh.

Look for the following characteristics when receiving a shipment of fish:

High quality fish

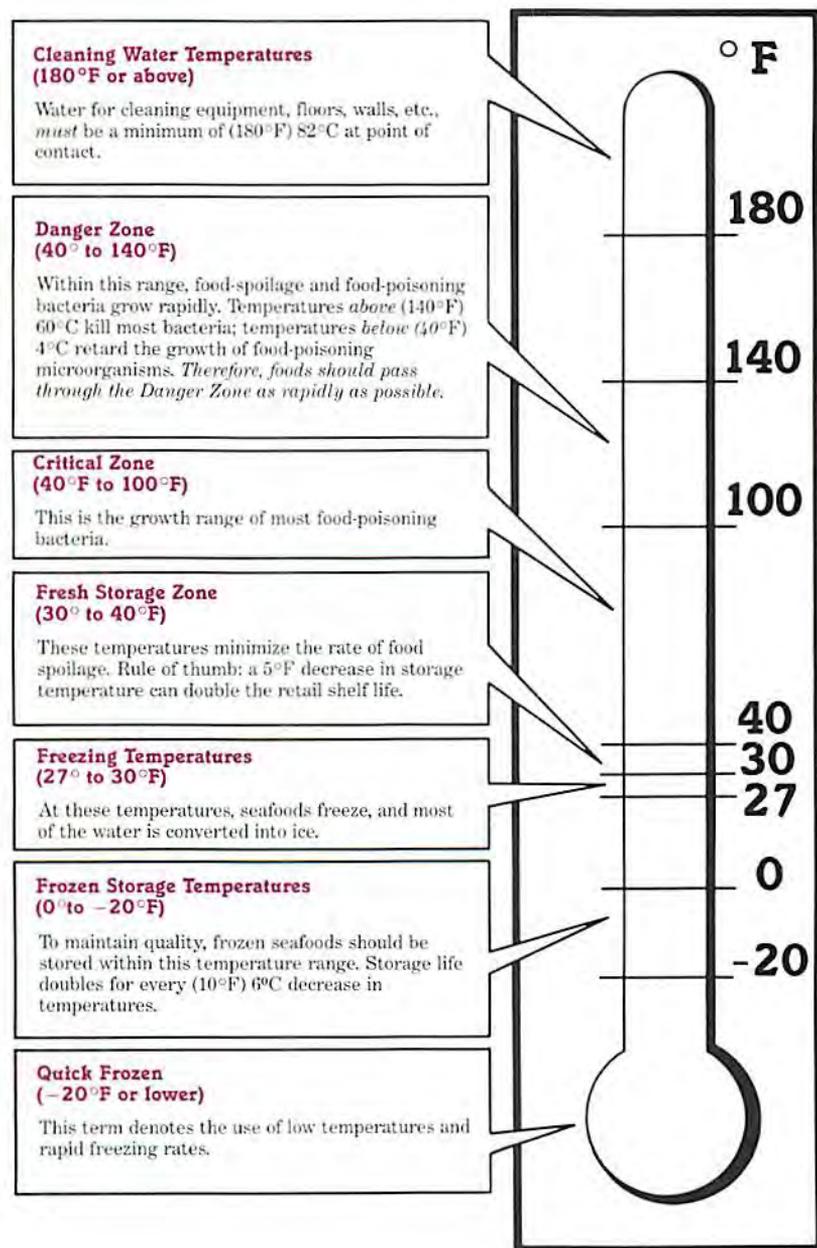
Eyes: bright, clear and full, bulging
Gills: bright red, clear mucus, free from slime
Flesh consistency: firm and elastic to touch

Low quality fish

Eyes: sunken, gray pupil, cloudy
Gills: pink to gray, mucus yellowish
Flesh consistency: soft and flabby, separates from bone, dried out

Seafood should be iced to maintain freshness and prevent spoilage. Use a probe thermometer to check the temperature of incoming product. Fresh fish with an internal temperature over 40°F are grounds for rejection of the shipment.

Seafood-handler's thermometer



Watch your weights

Randomly check individual boxes for net weights and inspect master boxes for damage due to leakage.

Ice glaze

Frozen seafood is usually received in an ice glaze to prevent freezer burn. This glaze sometimes can account for 15 to 20 percent of the gross weight of a package. Some dealers attempt to sell the glazed contents of a package as its net weight. If the buyer accepts such a product, it can be a costly mistake. Suppose a buyer ordered 1,000 pounds of scallops priced at \$5 per pound. If the 20 percent glaze is measured as part of the net weight, then \$1,000 will literally be washed down the drain when the scallops are thawed. All incoming frozen seafood should be randomly sampled for deglazed weights. Net weight generally refers to deglazed product weight.

Percent liquor

Products such as oysters, which are sold in their own liquor, or juices, should be examined for drained weight. Good manufacturing practices call for no more than 15 percent liquor. Some packers, realizing they can sell faucet water, add excess liquid to containers, resulting in oysters containing as much as 30 to 40 percent liquor on the market. Consumers will not be fooled into buying such a product twice.

Count per pound

Because of their wide range of sizes, shellfish such as shrimp and scallops are classified according to count. Count is the number of shrimp or scallops in one pound. Larger shrimp (16 to 20 count) may cost as much as \$2 per pound more than smaller shrimp (31 to 35 count). Examine samples of frozen incoming products for proper count by removing the ice glaze under a cold water spray. Then count the number of meats in one pound. Official methods for determining net weight and count per pound can be found in Appendix I.

Handle with care

Of all meats, fish is most perishable. It should be properly chilled; otherwise, spoilage bacteria multiply rapidly when fish is kept at temperatures above 40°F. These bacteria secrete enzymes into the flesh causing chemical changes and a rancid odor. Generally, a 5-degree decrease in storage temperature from 40°F to 35°F can double the retail shelf life. When a fresh seafood order is received, lower its temperature to 32°F as soon as possible to reduce spoilage. For fresh fish, wet ice is best because it washes as it melts and cuts down on dehydration.

Cross contamination

Guard against cross contamination of one seafood with bacteria from another. Separate cooked product (sterilized to a degree by cooking) from raw product. In a seafood display case, a full-length plastic partition is advisable. Raw product should not be allowed to drip over cooked product. It is particularly important to separate shellfish such as clams, oysters and mussels from other seafood.

Frozen fish

Store frozen fish at a temperature below 10°F to slow spoilage. Fluctuations in freezer temperature should be kept to a minimum because it speeds up dehydration. Fatty fish, such as mackerel and

Shelf Life Curve for a Lean White Fish Such as Red Snapper



mullet, are more prone to rancidity during frozen storage because of the reaction of oxygen with their oils. Special care should be taken when glazing and packaging these species.

Ice glazing is an effective, inexpensive way to prevent dehydration and oxidative rancidity in frozen seafood. A glaze may be applied after initial freezing by dipping the fish in cold water (less than 40°F) or by spraying. To obtain a thicker glaze, dip several times.

Packages used for frozen fish should fit the product tightly to eliminate air spaces. Products in loose packaging material (and not properly ice glazed) will lose quality rapidly because of: 1) oxidation due to the air surrounding the fish, and 2) dehydration caused by migration of moisture from the fish to the inside surface of the package. A good package has low permeability to oxygen and resistance to water absorption. It is also tight-fitting, moisture-proof, durable and inexpensive.

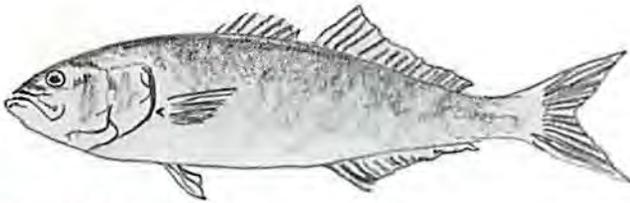
Temperature Guidelines for Various Product Types

| Seafood Product | Ideal Temperature |
|----------------------------|--|
| Any Frozen Seafood Item | 0°F or lower—constant |
| Fresh Finfish | 32°F* |
| Live Oysters/Clams/Mussels | 35°F, No contact with ice or fresh water |
| Fresh Oysters (shucked) | In original container in ice |
| Pasteurized Crab | In original container in ice |
| Fresh Cooked | 32°F |
| Fresh Smoked | 32°F, avoid contact with ice |
| Fresh Prepared | 32°F |
| Salted Fish | 32°F, but avoid ice |
| Marinated | 32°F |
| Live Lobster | In walk-in cooler in original container or salt water tank |
| Hard, Dried, Salted | Refrigeration not required, but does not hurt |
| Canned seafood | Room temperature or less |

*This is the temperature at which the product should be maintained in the case. It is best to set the case temperature for fresh products at 34°F, and use layers of ice to reduce product temperature to 32°F.

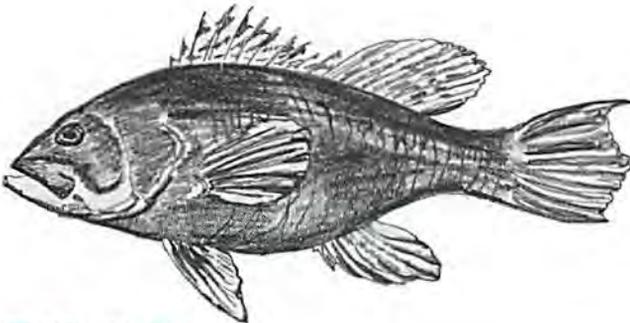
North Carolina seafood selections

North Carolina's productive estuarine system makes the state a major producer of blue crabs and hard clams. Offshore fishermen harvest Gulf Stream reef fishes such as grouper and red snapper. Fishermen also net flounder, sea trout and croaker, which winter in large quantities off our coast.



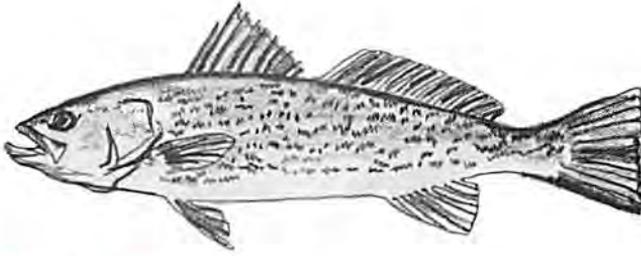
Bluefish

Bluefish are caught in large numbers as they migrate up and down the Atlantic Coast. Smaller sizes are best, having a mild tasting flesh of soft texture and long flake. Since the meat has a high oil content, its shelf life is short. It should be shipped to inland markets one to two days after being caught. Bluefish is quite inexpensive, and, if properly handled, offers excellent value for the money.



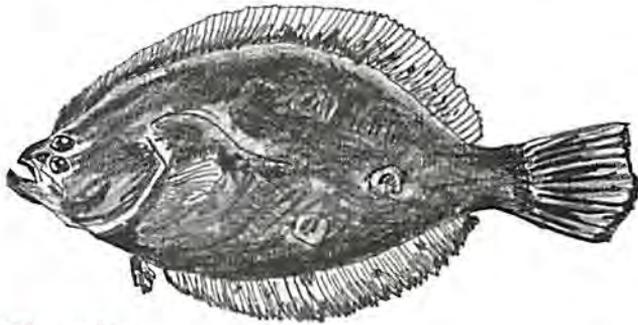
Black sea bass

Black sea bass is a bottom dwelling fish found along the Atlantic Coast from Massachusetts to Florida. It has firm meat with a delicate flavor. In New York's Chinese restaurants, it is often deep fried or steamed and served with a sweet-and-sour sauce.



Sea trout

Sea trout, also called weakfish, generally weigh between 1 and 7 pounds. The flesh is white and lean with a fine, delicate flavor. It can be prepared in a variety of ways, including broiling, baking and pan-frying. Popular along the East Coast, sea trout spend the fall and winter months in North Carolina waters. In recent years these fish have been abundant and thus reasonably priced.



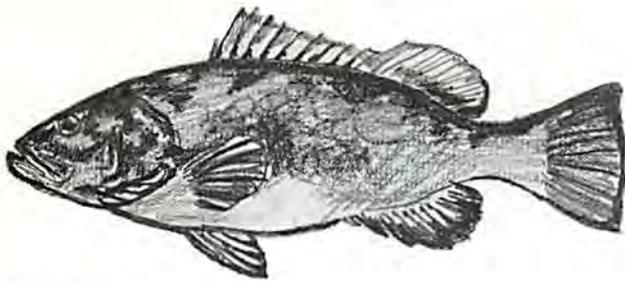
Flounder

The summer flounder is a member of the flounder family that includes winter flounder, yellowtail flounder and a wide variety of soles and dabs. North Carolina is a major supplier of this delicious flatfish during the fall and winter months. Its firm white meat is favored by consumers. Sizes range from 1 to 10 pounds. In the South, fillets are generally marketed with the skin on.



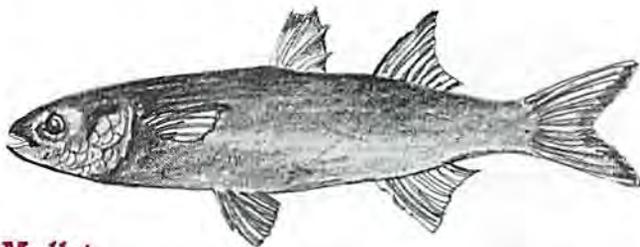
King mackerel

North Carolina is a leading producer of this large member of the mackerel family. The meat is well flavored and is best used for broiling or smoking. Mackerel is excellent marinated in lime juice, then barbecued and basted with garlic butter.



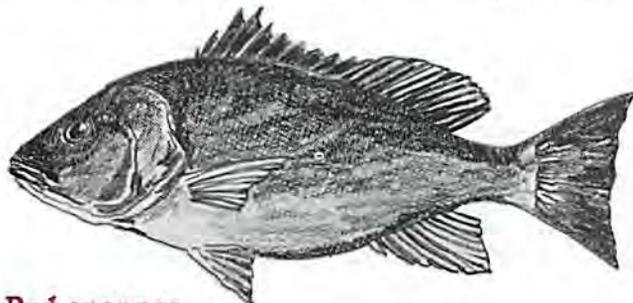
Grouper

Grouper are found in deep waters off the Carolina coast on coral or rocky bottoms. Their gourmet appetite for small fish and shellfish produces a firm, white flesh and a mild flavor similar to that of lobsters or scallops. Each fish is caught by hook and line, pulled in to the boat individually, gutted and placed immediately on ice. This special treatment produces a high quality product that will be moist and fresh for days.



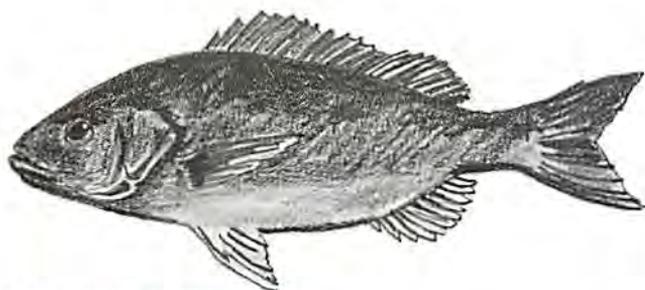
Mullet

To anyone who knows seafood, especially those who live along the Carolina coast, mullet needs no explanation. The light flesh is mild with a nutty flavor and is rich in minerals and protein. When fresh, it's especially good broiled, baked or pan-fried. Although it's a local favorite in the Southeast, supply has always exceeded demand.



Red snapper

The red snapper is not only a beautiful fish, but also a delicious one. Like the grouper, it is caught in the deep waters of the Gulf Stream and handled with care at sea. Red snapper is low in fat and has a mild, but distinctive flavor. When it comes to cooking, the red snapper is particularly well suited for broiling, baking and stuffing.



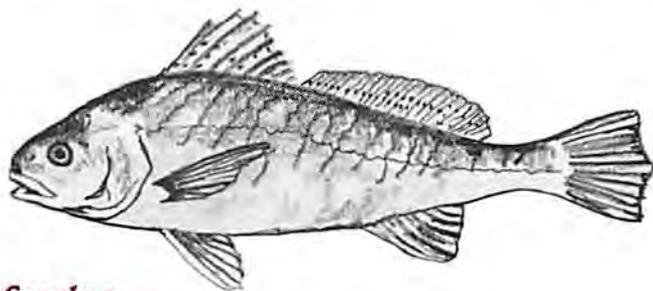
Vermillion snapper

Often substituted for red snapper, the vermillion snapper, or B-liner, is also found on the offshore reefs of North Carolina. It is a tasty, colorful fish, but smaller and less valuable than the red snapper. Light brown lines run obliquely forward and downward from its back, and yellow lines streak its sides. A good bargain, vermillion snapper are usually priced about \$1 per pound less than medium-sized red snapper.



Spot

This local favorite ranges from 12 to 24 ounces and is generally dressed and pan-fried. Large quantities of this low priced fish are landed off the Carolinas. The flesh has a coarse texture and is strongly flavored. Its high oil content reduces the shelf life; thus, proper handling and temperature control are important.



Croaker

Related to sea trout and redfish, the Atlantic croaker weighs between 6 ounces and 3 pounds. North Carolina fishermen land large quantities of croaker year-round. Most often it is sold headless and gutted, or whole. The croaker has succulent, lean, white meat.

Shrimp

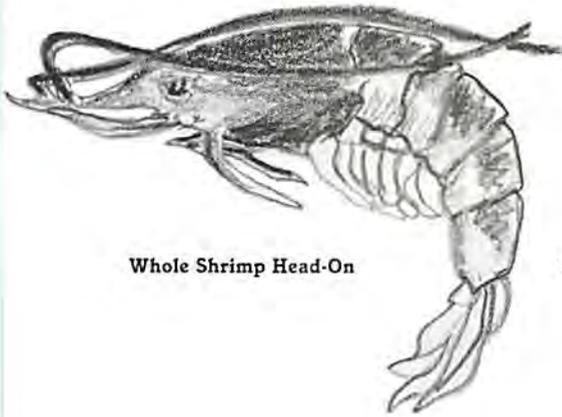
Fresh shrimp have a mild odor and firm meat. The shell color may be gray, green or light pink, depending on the species. Brown shrimp, the major species in North Carolina, account for two-thirds of the state's shrimp landings. They are caught primarily from late June through October. Pink shrimp, fished in the late fall and the following spring, contribute 23 percent of the North Carolina catch. White shrimp, a more southern species, make up the remainder of the state landings.

The standard form for shrimp on the U.S. market is a frozen 5-pound block. They are generally raw, shell-on tails and are referred to as "green headless" or "shell-on" shrimp. Descriptive names for different size categories are given in Appendix II. Local shrimp may be marketed whole and are used by some restaurateurs in salad bars and buffets. Whole shrimp look larger on a plate and take longer to eat since diners must head and peel the shrimp themselves. Whole shrimp have a shorter shelf life because 75 percent of the spoilage bacteria are located in the head.

When receiving a shipment of shrimp, check the counts, net weights and quality. Sometimes shrimp have black patches on the shell. This condition, called melanosis, or black spotting, does not affect the eating quality of the meat. But it is aesthetically unpleasing and a sign that the product is old and hasn't been handled properly. Also, sometimes 4.4 pound (10 kg) block frozen imported shrimp are sold as a 5-pound block. The two appear identical. Check to make sure that you are getting what you purchased. Also examine the bottom of a block of frozen shrimp for dehydration. Packages are often frozen inverted, giving the appearance of a heavily glazed product.



Advanced Black Spotting



Whole Shrimp Head-On



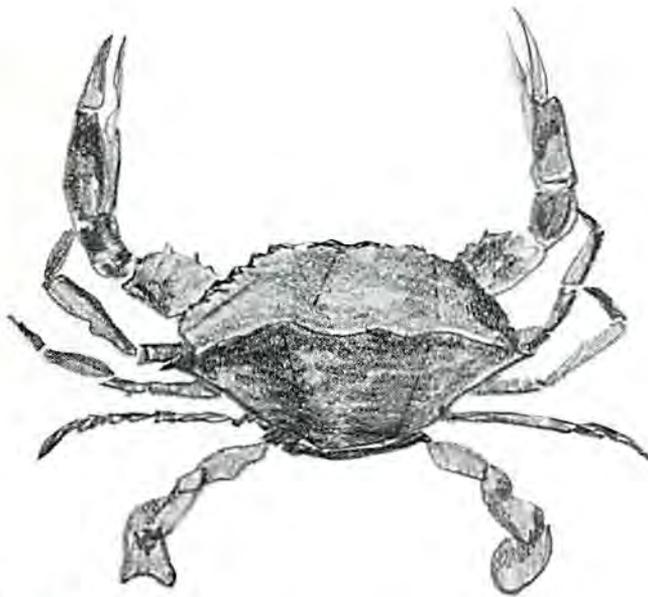
Green Headless Shrimp

Hard clams

Also called quahog, the hard clam is a popular seafood item on the East Coast. It is shipped live in bushel bags. North Carolina is a major source of hard clams, particularly in the winter when ice and high seas keep northern clammers ashore. Smaller clams are more costly than larger ones. Generally, these clams get tougher as they get larger. The following categories are used to describe different sizes of hard clams.

- **Littlenecks**—are the smallest and most expensive clams. There are 450 to 600 per 60-pound bushel. They are eaten raw on the half-shell or occasionally steamed.
- **Cherrystones**—are mid-size clams. There are 300 to 400 clams per 60-pound bushel. They can be eaten raw on the half-shell or used for clams casino and other similarly cooked dishes.
- **Chowder clams**—are large clams. There are 125 per 60-pound bushel. They are used for baked stuffed clams, chowders and clam fritters.





Blue crab

Blue crab meat should look and smell clean. A musty odor is a sign of decomposition. The majority of the crab picking houses in North Carolina produce top quality meat because quality control is stressed. Since fresh crab meat has a short shelf life, many companies sell pasteurized product. Although this may extend shelf life up to six months, many people prefer the taste of fresh crab meat. It is graded into the following categories:

- Lump meat (backfin)—is the highest quality crab meat. It includes solid lumps of white meat from the body cavity adjacent to the backfins. It is used in recipes in which appearance is important, such as hors d'oeuvres and salads.
- Flake meat (regular)—is small pieces of white meat from the rest of the crab's body. It may be combined with some lump meat.
- Claw meat—is taken from the claws, which in many crabs is brownish in color. Because of its coloring, it is not used in recipes where appearance is important.

Soft-shell blue crabs

A true seafood delicacy, soft-shell crabs are blue crabs that have shed (molted) their hard outer shell in preparation for growth. This results in a crab that can be eaten in its entirety. The meat is succulent and sweet. Consumer appeal for this soft-bodied crab has increased enormously in recent years. The common method of preparation is pan-frying or deep-fat frying.

Scallops

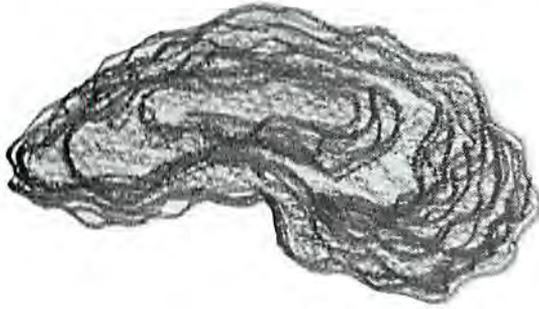
The meat of this popular bivalve has a sweet, nutlike flavor. There are various types of scallops sold in the United States. Three species, which are harvested by North Carolina fishermen and sold fresh, are sea scallops, bay scallops and calico scallops.

- Sea scallops—are a large, deepwater scallop caught by fishermen from North Carolina to Maine. They are hand shucked at sea. What is commonly sold to the consumer is the creamy white adductor muscle. This muscle is called the “meat” and is circular with a flat top and bottom. Scallops range in size from 40 to 60 counts per pound to 20 to 30 counts per pound.
- Bay scallops—are excellent raw and require little cooking time. In North Carolina they are hand shucked at shore-side processing plants. The meats are packed into one-gallon containers weighing 8 pounds. Counts range from 60 to 90 counts per pound. Because of the abundance of the less expensive Calico scallop, the prices for North Carolina bay scallops have been depressed, offering an excellent buy.
- Calico scallops—are harvested primarily along a 200-mile stretch of the northeast Florida coast. They are steam shucked and packaged in one-gallon containers. Counts range from 80 to 200 meats per pound. There have been some complaints about decomposition, the presence of parasites and mislabeling of these scallops in the past. Production has expanded dramatically in the last few years, causing calicos to be priced below other domestic scallops.



Oysters

The ideal way to eat an oyster is on the half-shell. Most of the eastern oysters are sold in the shell for opening by restaurants. Fresh oysters should have the shell closed. If the shells are open, they should close quickly when the oyster is shaken. If the shells can be pried open by hand, the oyster is dead and shouldn't be eaten. Shucked meats should be plump and creamy, and the liquid in a container should be clear, not cloudy.



Appendix I

Determination of Net Weights and Count Per Pound

Remove package from low temperature storage, open immediately, and place contents under gentle spray of cold water. Agitate carefully so product is not broken. Spray until all ice glaze that can be seen or felt is removed. Transfer product to circular No. 8 sieve, 20 cm (8") diameter for product less than or equal to 0.9 kg (2 lb.) and 20 cm (12") for product greater than 0.9 kg (2 lbs.). Without shifting product, incline sieve to angle of 17 to 20 degrees to facilitate drainage and drain exactly 2 minutes (stop watch). Immediately transfer product to tarred pan (B) and weigh (A).
Weight of product = A - B.

Count: "Count" or number of meats per pound is determined by dividing the number of meats in a deglazed sample (as obtained above) by the adjusted weight in pounds.

$$\text{Count per pound} = \frac{\text{Sample count}}{\text{Sample weight (lbs.)}}$$

"Adjusted weight" means the weight of all the whole, unbroken, undamaged meats in the sampled unit.

Appendix II

Size Descriptions for Green Headless Shrimp

| Descriptive names | Count per pound | Number of shrimp per pound | |
|-------------------|-----------------|----------------------------|----------|
| | | over | not over |
| Extra colossal | under 10 | 0 | 9.9 |
| Colossal | 10-15 | 9.9 | 15.0 |
| Extra jumbo | 16-20 | 15.0 | 20.0 |
| Jumbo | 21-25 | 20.0 | 25.0 |
| Extra large | 26-30 | 25.0 | 30.0 |
| Large | 31-35 | 30.0 | 35.0 |
| Medium large | 36-42 | 35.0 | 42.0 |
| Medium | 43-50 | 42.0 | 50.0 |
| Small | 51-60 | 50.0 | 60.0 |
| Extra small | 61-70 | 60.0 | 70.0 |
| Tiny | over 70 | 70 | - |

Appendix III

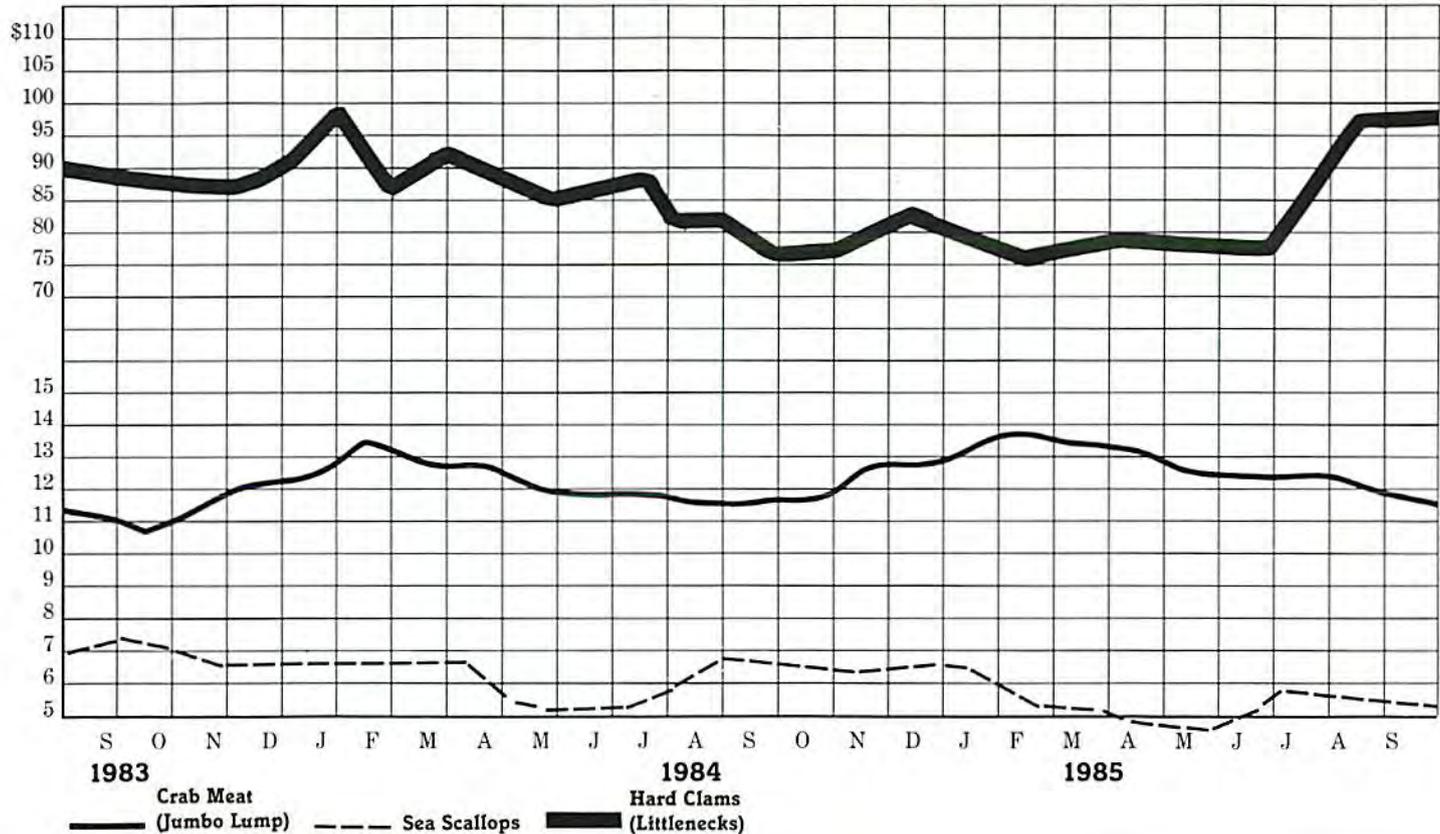
NC Monthly Landings Shown as Percent of Annual Landings (in pounds)

| Species | Average Annual Landings 1980-1984 | J | F | M | A | M | J | J | A | S | O | N | D |
|-----------------------|---|----|----|----|----|----|----|----|----|----|----|----|----|
| Bluefish | 5,331,000 | 15 | 18 | 14 | 13 | 3 | 2 | 2 | 3 | 3 | 5 | 5 | 12 |
| Croaker | 11,916,000 | 6 | 7 | 5 | 5 | 11 | 13 | 13 | 12 | 8 | 5 | 5 | 6 |
| Flounder | 12,016,000 | 22 | 9 | 5 | 3 | 1 | 1 | 1 | 1 | 3 | 8 | 13 | 29 |
| Grouper | 864,000 | 4 | 5 | 6 | 8 | 11 | 11 | 10 | 11 | 9 | 9 | 7 | 5 |
| King Mackerel | 862,000 | 0 | 0 | 1 | 5 | 8 | 3 | 2 | 2 | 6 | 29 | 29 | 9 |
| Mullet | 1,552,000 | 5 | 4 | 2 | 1 | 1 | 2 | 3 | 9 | 29 | 28 | 8 | 2 |
| Sea Bass | 1,012,000 | 21 | 22 | 17 | 13 | 1 | 1 | 1 | 1 | 1 | 2 | 6 | 8 |
| Gray Sea Trout | 14,506,000 | 16 | 18 | 16 | 7 | 2 | 2 | 2 | 4 | 4 | 4 | 6 | 11 |
| Snapper | 490,000 | 5 | 6 | 5 | 6 | 7 | 10 | 7 | 9 | 11 | 12 | 9 | 7 |
| Spot | 4,393,000 | 1 | 1 | 1 | 2 | 5 | 10 | 13 | 14 | 20 | 25 | 4 | 1 |
| Blue Crabs | 35,516,000 | 1 | 1 | 4 | 8 | 9 | 13 | 14 | 14 | 13 | 9 | 6 | 3 |
| Clams, Hard (Meats) | 1,486,000 | 15 | 12 | 9 | 6 | 5 | 7 | 8 | 8 | 7 | 5 | 3 | 12 |
| Oysters (Meats) | 664,000 | 17 | 13 | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 12 | 24 | 23 |
| Scallops, Bay (Meats) | 278,000 | 29 | 19 | 9 | 9 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 28 |
| Shrimp (Heads On) | 5,608,000 | 0 | 0 | 0 | 0 | 3 | 11 | 27 | 28 | 12 | 10 | 3 | 6 |

Compiled from NC Division of Marine Fisheries Statistics

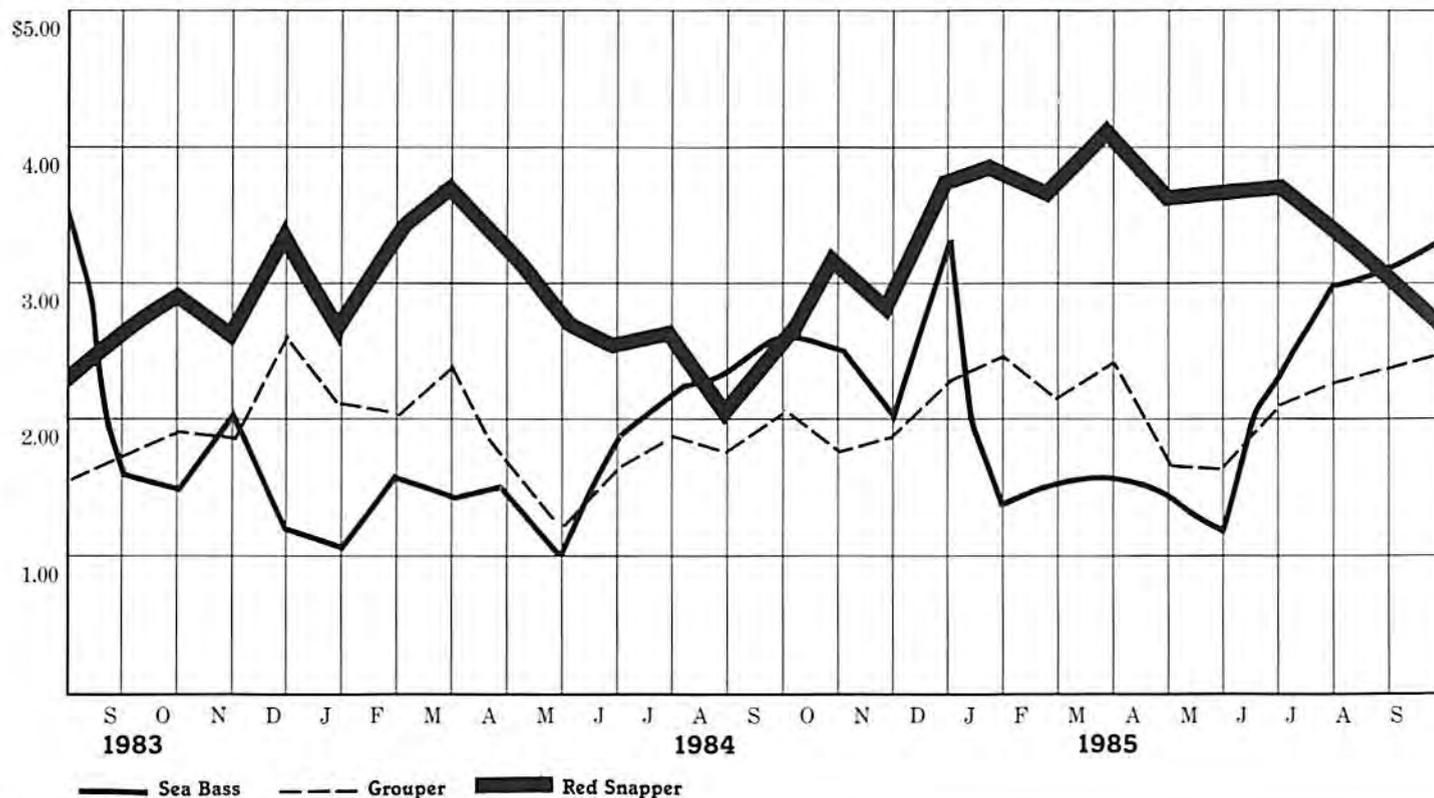
Appendix IV

Wholesale Selling Prices Hard Clams (per bushel), Crab Meat (per pound), and Sea Scallops (per pound)



Appendix V

Wholesale Selling Prices (per pound) Red Snapper, Grouper, and Black Sea Bass, New York



Appendix VI

Wholesale Selling Prices (per pound) Gray Sea Trout, Mullet, and King Mackerel, New York

