Marine Shellfish / Finfish Connecticut Historical Fishing Landings and Restoration Information

Notes on Connecticut's Marine and Coastal Resources December 1987 Sea Grant Publication

Reprinted by the Sound School Regional Vocational Aquaculture Center
Adult Education Program, April, 2009

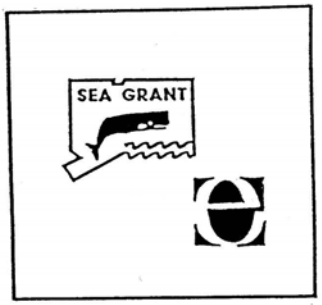
Key Words: CT Historical Fish Landings, Inshore Fish Species of Flounder, Eels, Tautog and Smelts.
Shellfish Restoration Techniques, Natural Shellfish Beds, Habitat Enhancement, Natural Shellfish Depuration Procedures

This publication was first printed in December 1987 by the
University of Connecticut, Sea Grant Marine Advisory Program and Groton, CT.

The University of Connecticut Sea Grant Marine Advisory Program is an information transfer activity of the Connecticut Sea Grant Marine Advisory Program implemented through the Cooperative Extension Service.

This report was developed with funds provided by the Office of Sea Grant, National Oceanic and Atmospheric Administration, U.S. Department of Commerce.

NOTES ON CONNECTICUT'S MARINE AND COASTAL RESOURCES



DECEMBER 1987

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INTRODUCTION

Beginning in 1986 and continuing through 1987, the Connecticut Sea Grant Program and Project Oceanology held a series of on-the-water workshops for public officials and community leaders in Connecticut's coastal towns. The program was conceived to help these leaders to become better informed about the conservation and utilization of Connecticut's coastal and marine resources. In the unique learning environment of the ENVIRO LAB research vessel, local decision-makers were able to observe marine processes first-hand and to discuss marine issues with resource people from academia, state and federal agencies, environmental organizations and other groups.

Workshops covered a broad spectrum of topics including harbor management, wastewater treatment, seafood use, shellfish resource management, the environmental quality of Long Island Sound, and the Connecticut River and other estuarine systems.

The following articles are based on the topics covered in the workshops. They have been used by workshop participants, and we hope that they will prove beneficial to others in the coastal and marine resources fields.

The on-the-water workshops were funded as part of the Connecticut Sea Grant Program, which conducts marine research, education, and advisory programs staffed by scientists, educators, and other specialists in Connecticut.

NOTES ON ESTUARIES

Chester Arnold
Connecticut Sea Grant
Marine Advisory Program

The Definition of an Estuary

The word estuary derives from the Latin aestus, meaning tide. The most widely-used definition of "estuary" today is that of Pritchard (1967): "an estuary is a semi-enclosed coastal body of water which has a free connection with the open sea and within which sea water is measurably diluted with fresh water derived from land drainage." The last part of this definition is crucial, because most of the unique characteristics of estuaries are due to the **estuarine circulation** that results from the meeting of fresh and salt water.

Types of Estuaries and Estuarine Circulation

One way of classifying estuaries is by their method of geological formation. The most common type of estuary in the Northeast is the **drowned river valley** estuary, formed by the encroachment of rising sea level into ancient river valleys in the 18,000 years since the last glaciation. A more important classification is by the type of water circulation within the estuary. Typical estuarine circulation involves the seaward flow of less dense fresh water over a landward-flowing layer of higher density salt water. The ratio of the volume of fresh water entering from upstream to salt water entering from the sea determines the particular circulation pattern of the estuary; most estuaries in the Northeast are classified as **partially mixed**, which means that both tidal and riverine flows have important influences. Factors that determine the circulation include channel geometry, river flow, and tidal range at the estuary mouth. The circulation pattern, in turn, dictates the sedimentation patterns and biological characteristics of the estuary.

Both the lower Connecticut River and Long Island Sound (LIS) are estuaries, albeit ones of vastly different size. While the Sound is not a classic drowned river valley and has a more complicated system due to the influence of the East River at its western end, both the Connecticut River Estuary and LIS exhibit types of estuarine circulation.

Land Use and the Unique Properties of Estuaries

Although many of the individual natural properties of estuaries can be found in other coastal areas, it is the unique combination of these characterisitics which has historically drawn men to live and work along estuarine

shores. Below is an basic outline of the relationship between natural estuarine features and land use.

geographic properties:

An estuary is semi-enclosed, offering protected water that often makes a good harbor. In addition, most larger estuaries are connected to a river suitable for the transport of materials inland. Thus, many estuaries are natural centers for shipping, and as such were historically the locations of the major population centers in the Northeast. Of course, shipping is not the only lure attracting estuarine use - in recent times, the protected coastal location and natural beauty of the estuary has placed it in great demand for residential, commercial, and recreational uses.

geological/oceanographic properties:

From a geological perspective the present abundance of estuaries on the East Coast today is a rarity, occuring only during periods of gradual sea level rise. Estuaries are not only rare but (geologically) short-lived, because they commonly act as a **sediment trap**, gradually infilling with sediment from riverine, marine, and biological sources. This natural sedimentation is often exacerbated by man's activities, such as upstream land use practices that increase soil erosion and channel obstructions which slow circulation. When sedimentation conflicts with other estuarine uses, dredging and dredge spoil disposal problems are the end result. These issues are often complicated by the addition of pollutants to the system, because many contaminants tend to bind to the fine-grained suspended particles that eventually become a component of the bottom sediment.

The circulation of estuaries is such that the **flushing rate** to the receiving water body is greater than for a simple river or bay. Large volumes of salt water enter the estuary in the lower layers, mix upward with the fresh river water, and are expelled - thus during any given tidal cycle the amount of water leaving the mouth is much greater than the river flow entering at the head of the estuary. This may serve to remove and/or dilute pollutants, and makes estuaries an attractive location for the disposal of industrial and municpal wastewater.

biological properties:

The wide range of physical conditions (such as salinity and temperature) in estuaries results in a biological community made up of a relatively small number of plant and animal species that are able to survive changeable conditions. However, these resilient species are typically present in large populations, because estuaries are rich in nutrients trapped by the circulation from the river and fringing salt marshes. This makes estuaries very **highly productive biological areas.** The sheltered waters of the estuary serve as a nursery area for many fish and shellfish species, and the salt marshes provide nesting grounds for many aquatic and shore birds. This makes them attractive for many uses, including wildlife preservation, aquaculture, and sport and commercial fishing.

Man and the Estuarine Environment

The list of estuarine uses outlined in the preceding section result in a range of environmental effects - both good and bad - too wide to examine in these notes. It is encouraging to note that estuaries tend to be resilient natural systems due to their flushing action, chemical buffering, and the filtering capactiy of their fringing wetlands. However, they are also extremely complex systems in which seemingly simple changes can produce wide-reaching effects. For example, changes in the circulation brought about by river diversion or channel obstruction can change the geological and biological properties of the estuary; among the resultant effects could be changes in siltation patterns, shellfish larvae dispersal, and migratory patterns of certain fish.

In many instances, the different uses desired for an estuary conflict with each other. The resulting problems for the land use decision-maker are compounded by the fact that these uses may also conflict with the natural workings of the system. For instance, in addition to being incompatible with most recreational uses, disposal of wastewater in an estuary may be ineffective in disposing of the waste; it may dilute dissolved contaminants but concentrate those contaminants binding to the sediment. Another example would be the natural tendency of estuaries to become filled with sediment, which so obviously conflicts with most uses.

This is not to suggest that all of man's effects are detrimental or that strict conservation is the only viable use of estuaries; rather, that emphasis should be placed on the wise management of our estuarine resources. The complexity of the issues involved requires that local decision-makers not only be aware of the economic and political factors involved, but come to understand the workings of natural systems.

RESOURCE LIST

publications:

available from The Natural Resources Center
Dept. of Environmental Protection
165 Capitol Avenue, Room 553
Hartford, CT. 06106 tel: 566-7719

- Long Island Sound: An Atlas of Natural Resources
- The Face of Connecticut: People, Geology, and the Land
- coastal resource map series
- shellfish area map series
- USGS quadrangle map series

organizations:

- Sea Grant Marine Advisory Program

UConn @ Avery Point
Groton, CT. 06340
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670 Wintergeen Avenue
Hamden, CT. 06514
tel: 789-7865/7866

- DEP Coastal Management Office
71 Capitol Avenue
Hartford, CT. 06106
tel: 566-7404

- The Sounds Conservancy, Inc.
Marine Sciences Institute, UConn
Groton, CT. 06340
tel: 445-1868

NOTES ON THE CONNECTICUT RIVER AND ITS ESTUARY

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The Connecticut River

The Connecticut River is the largest river in New England - in drainage area, length, and freshwater discharge it is comparable to its more publicized neighbor to the west, the Hudson. Most of the Connecticut flows through broad valleys of sedimentary deposits and glacial lake sediments. However, south of Middletown it carves a gorge through ancient bedrock uplands, emerging to the coastal plain region about 13 km from where it empties into Long Island Sound (LIS). The word "Connecticut" derives from the Algonquin word meaning "long tidal river". This name is still appropriate today, as tidal influence extends more than 100 km up the river until it is halted by the dam at Windsor Locks. The limit of salt water intrusion into the river is usually about 10-15 km upstream from the mouth, occasionally reaching 25 km upstream under very low river flow conditions. This salinity intrusion defines the lower reaches of the river as an estuary.

What is an Estuary?

An estuary is defined as "a semi-enclosed coastal body of water which has a free connection with the open sea and within which sea water is measurably diluted with fresh water derived from land drainage." Estuaries such as the Ct. River Estuary have been created by the encroachment of rising sea level into the lower river valleys in the 18,000 years following the last glaciation. Estuaries form a coastal environment with unique properties that are a result of the estuarine circulation created by the mixing of fresh river water and saline sea water. This circulation typically forms a "trap" for sediment and nutrients, creating shoaling problems but making the estuary a very biologically productive area. Estuaries were the sites of many of the earliest settlements in New England, and continue to be centers of large population concentrations today, supporting the entire range of marine uses from critical wildlife habitat to contaminated wastewater disposal.

The Connecticut River Estuary

the unusual geology of the estuary:

The Connecticut River Estuary is somewhat atypical as estuaries in the Northeast go; the restricted channel geometry and low tidal range at the mouth combine to make the freshwater river flow a more dominant factor in the circulation than in most comparable estuaries. During high river flows in the spring, in fact, the fresh water can completely push the salt water out into LIS and the lower river thus briefly ceases to be an estuary. Also unusual are the bottom sediments of the estuary, which are predominately

sandy due to the available sources of coarse sediment in both the upstream drainage basin and shoreline glacial deposits. Finally, although most estuaries are known to act as sediment traps, researchers at Wesleyan University have found that the Connecticut seems to expel most of its suspended sediment load to the Sound, particularly during the very high spring "freshet" river flows.

land use and environmental implications:

The atypical aspects of the Connecticut River Estuary influence the usage of both the water and the land around it. Because of the restricted, shallow channel and shifting sand bars near its mouth, the estuary is not a good harbor; as a result, unlike most of the major estuaries in the Northeast it did not become a major population center. In addition, the steep river banks of the gorge section directly north of the estuary deterred extensive settlement downstream of Middletown. Along this lower 40 km, then, the river is dominated not by development but by scenic cliffs and extensive wetlands. Local decision-makers should realize that the existence of these undeveloped areas presents both unique opportunities and added complexities in the shaping of land use policies.

The pattern of development of the lower Connecticut is thus fairly unusual, with the more urbanized areas upstream of the less-developed sections near the mouth. This situation has created technical and political difficulties in the efforts to reduce the level of pollutants introduced into the biologically productive estuarine and salt marsh areas; often the municipality seeking to combat pollution has no jurisdiction over the sources of contamination. On an encouraging note, estuaries are generally resilient natural systems due to their high flushing rates and the filtering capacity of the fringing salt marshes. Also, the fact that the CT River Estuary apparently does not act as a trap for fine sediments may lessen the environmental impacts of contaminants that tend to bind to these particles, simplifying issues such as dredging.

This is not to suggest that river pollution is not a critical concern, both for the estuary and for the receiving waters of LIS. General conditions in the estuary may not apply to localized problems such as might exist in small shoreline embayments. There is also some concern about the role of the Connecticut River in the degradation of Long Island Sound. The river is by far the largest source of freshwater to the Sound. A recent report by the National Oceanic and Atmospheric Administration (NOAA) showed that although the concentrations of most contaminants in the river water are low, the sheer volume of the discharge make the Connecticut the single largest contributor of contaminants to LIS. Because the Sound is itself an estuary, the concern is that the river output may be carried by the estuarine circulation to its western end, where the waters are already sustaining heavy pollutant loads from New York City (via the East River).

The lower Connecticut River, then, is a complex natural system in which matters of local importance can both influence and be influenced by conditions from the river headwaters near Canada to metropolitan New York. It is important that local decision-makers gain knowledge of the workings of this system in order to be able to guide the wise use of this vital natural resource.

Some Facts & Figures on the Connecticut River

length: river = 650 km; estuary = normally 10-15 km
drainage area: 29,100 square km
average freshwater flow at mouth: yearly ave --> 560 cubic meters/sec
high flow --> 1400 cms (April ave)
low flow --> 200 cms (August ave)
average tidal flow: 250 cubic meters/sec
tidal range at mouth: average 1.1 meter
limit tidal influence: 100 km (Windsor Locks)
limitsaltintrusion: average10-15 km (Essex);range 0-25km (E Haddam)
sediment load: 100,000 to 1,000,000 metric tons/year
average depth of estuary channel: 7 meters
bottom sediments: mostly sandy in estuary

RESOURCE LIST

publications:

- Long Island Sound: An Atlas of Natural Resources
- The Face of Connecticut: People, Geology, and the Land
- various map series showing natural resources

--> available from The Natural Resources Center
Dept. of Environmental Protection
165 Captitol Avenue, Room 553
Hartford, CT. 06106 tel: 566-7719

- NOAA nautical charts, available at marine supply stores

organizations

Sea Grant Marine Advisory Program

Univ. of CT.
Avery Pt. Campus
Groton, CT. 06340
tel: 445-8664

New Haven Extension Office
670 Wintergreen Ave.
Hamden, CT. 06514
tel: 789-7865/7866

The Connecticut River Watershed Council
Lower Valley Office
103 Constitution Plaza
Hartford, CT. 06103
tel: 277-6914

NOTES ON REBUILDING CONNECTICUT'S MARINE FISHERIES

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Historical Fisheries

Connecticut's creeks, rivers and coastal bays once supported substantial inshore fisheries. These unique nearshore environments were extremely productive, providing critical habitats for both reproduction and growth for "estuarine dependent species." Connecticut's early fisheries were mostly carried on for commerce. The Stonington and New London areas once sustained large fish reduction (menhaden) fisheries. According to Goode (1887), New London was the principal food fish producing port south of Cape Cod. Goode details the 1880 catch of the New London fleet was "1,230,000 pounds of cod, 490,000 pounds of halibut, 467,500 pounds of bluefish, 73,500 pounds of swordfish, 159,800 pounds of striped bass, 4,223 barrels of mackerel and 170,000 pounds of lobsters. The shore fisheries yielded about 150,000 pounds of flounder, eels, tautog (blackfish), smelts and other species and 30,000 pounds of lobsters."

Connecticut's fisheries have suffered declines, however, and landings today are generally lower. For instance, landings of blackback flounder declined from a 1930 high of 11 million pounds to as little as one million pounds annually in recent years. These landing statistics can be used only as a rough indication of variations in abundance.

Recreational and Commercial Fisheries

Commercial fishing is conducted from small ports along Connecticut's coastline. Commercial fisheries can be found for lobsters, flounder, conch, squid, fluke and shad. Commercial vessels are mostly inshore "day boats" that participate in several seasonal fisheries. The Port of Stonington, home of Connecticut's last major offshore fishing fleet, has rebounded recently after major improvement to shoreside facilities.

After World War II, recreational fishing gained popularity and importance as an industry. Recreational fishing is a large industry in coastal communities. It consists of party and charter boats, private boats, pier fishing and surf casting. Some of the more sought after species are scup, blackfish, fluke, flounder and bluefish (at the present time, there is a moratorium

upon the taking of striped bass.) A large number of Connecticut residents also hold personal use lobster licenses, and the taking of blue crabs for personal use is a popular recreational fishery.

Restoration of Marine Fisheries

In many coastal towns, shoreline development had damaged or eliminated marine resources in salt ponds, bays and salt marshes. For example, in the Town of Fairfield, one salt marsh acreage has been reduced from over 600 acres in 1914 to about 17 acres in 1979. Embayment tidal flushing has been restricted by causeways and insufficient culverts. Sewage pollution has closed several popular shellfishing beds. However, two State programs currently under way have the potential of restoring the productivity of Connecticut's near shore environments.

In 1983, Special Act # 83-13 was passed by the Connecticut General Assembly authorizing a study of approximately 135 coves and embayments along the State's 280 mile coastline. Under the auspices of the Department of Environmental Protection Coastal Area Management Program, a Coastal Coves and Embayment Advisory Board has been created to study coastal water bodies and make recommendations for possible restoration efforts.

In 1986, the Connecticut Department of Health Services-Vector Section implemented Open Marsh Water Management techniques in coastal salt marshes. An earlier program initiated in 1900 was established to control mosquito populations after an outbreak of malaria hit coastal regions of the State. Open Marsh Water Management (OMWM) reduces mosquito populations while creating ponds for fish and rejuvenating our coastal salt marshes to be a productive part of our marine food chain again.

For additional reading:

Long Island Sound: An Atlas of Natural Resources

available from: The Natural Resources Center
Department of Environmental Protection
165 Capital Avenue, Room 553
Hartford, CT 06106
Tel: 566-7719

A History of Connecticut's Coast

available from: DEP Coastal Management Office
71 Capital Avenue
Hartford, CT 06106
Tel: 566-7404

A Marine Resources Management Plan for the State of Connecticut

available from: DEP Marine Fisheries Program
Connecticut Department of Environmental Protection
P. O. Box 248
Waterford, CT 06385
Tel: 443=0166

Long Island Sound: Issues, Resources, Status and Management

available from: U. S. Department of Commerce
NOAA Estuarine Programs Office
National Marine Fisheries Service
Washington, DC 20235

The Fisheries and Fishery Industries of the United States Section II, A Geographical Review of the Fisheries Industries and Fishing Communities for the Year 1880 by George Brown Goode. United States Commission of Fish and Fisheries. Washington Printing Office, 1887.

Organizations:

- Sea Grant Marine Advisory Program
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  New Haven Extension Office
670 Wintergreen Avenue
Hamden, CT 06514
Tel: (203) 789-7865 or (203) 789-7866

- DEP Coastal Management Office
71 Capitol Avenue
Hartford, CT 06106
Tel: (203) 566-7404

- The Sounds Conservancy, Inc.
Avery Point
Groton, CT 06340
Tel: (203) 445-1868

- Connecticut DEP
Marine Fisheries Office
P. O. Box 248
Waterford, CT 06385
Tel: (203) 443-0166

- Connecticut Department of Health Services
Vector Section
51 Mill Road
Madison, CT 06443
Tel: (203) 245-2198

NOTES ON THE RESTORATION OF CONNECTICUT'S SHELLFISHERIES

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Historical Fisheries

Connecticut's early shellfish history is a rich one. Connecticut's rivers, creeks and bays provided ideal habitats and low salinities that shellfish species such as the oyster prefer. Native Americans, and later European settlers, availed themselves to the vast populations of clams, oysters, mussels and scallops during winter time when terrestrial food supplies were scarce. Shellfish were gathered with rakes, tongs and hand dredges from shellfish beds along Connecticut's 280 miles of coastline. As Connecticut's population increased, additional demand for shellfish (especially the oyster) promoted more organized and intensive cultivation techniques rather than relying on harvests from wild stocks. Today, this underwater farming of shellfish is called "aquaculture." The oldest and most successful aquaculture industry in Connecticut is the cultivation of the oyster, Crassostrea virginica. This industry dates back to 1855 when private culture rights were first granted as franchises by the State. So successful was this early form of aquaculture that by 1900, thousands of acres were devoted to raising the famous "Connecticut Blue Oyster." The oyster industry peaked in Connecticut at 2-million bushels in 1910 but fell to only 40,000 bushels in 1967. Improvement in water quality has helped the industry recently (from about 1970) and many beds now again produce oysters. Today, oyster culture remains the largest private aquacultural effort in the State.

Municipal Shellfish Commissions

As the shellfish aquaculture industry rapidly developed from 1860 to 1880, an offshore town/State jurisdiction line was proposed. After meeting acceptance, a State/town jurisdiction line for regulating shellfisheries was established for the entire coast in 1881. Inside this line, town "oyster ground committees" would regulate private culture rights; all other areas would be regulated by a State shellfish commission and later by the Department of Agriculture - Aquaculture Division.

Eventually, State statutes provided for the creation of town "shellfish commissions" to regulate public shellfisheries within "town waters." Today, most shoreline towns have established shellfish commissions that govern shellfishing seasons, and issues permits for areas open for public shellfish harvesting.

Most often it is required that town shellfish permits be purchased before shellfishing. When purchasing shellfish permits, it is important that you obtain information on what areas are certified (open) for shellfish harvesting.

Shellfish Restoration Programs

Town shellfish beds still produce significant quantities of mussels, soft-shell clams, hard-shell clams, oysters and scallops although production today is just a fraction of past harvests. Many thousands of acres within municipal jurisdiction remain closed due to sewage outfalls or bacterial contamination. Renewed interest in improving water quality and reducing pollution may hopefully reopen these closed areas to public shellfishing. In the meantime, it is possible to restore neglected or abandoned shellfish beds in these closed areas. Several town shellfish commissions have taken an active role in rebuilding formerly productive shellfish beds in closed areas with recultivation or habitat enhancement programs. On the State natural beds, the Connecticut Department of Agriculture-Aquaculture Division has commenced a seed oyster restoration program for historical productive offshore areas. Shellfish management plans have initiated commercial relays of shellfish from town closed areas to open certified waters to undergo a natural cleansing process. In this way, the resource is utilized for recreational and commercial shellfishing and is not wasted. Relay programs have increased substantially in the last few years and quite possibly in the not-too-distant future, Connecticut's shoreline will once again be filled with a string of famous shellfish-producing towns.

For additional information:

Pearl Makers - The Tidemarsh Guide to Clams, Oysters, Mussels and Scallops by Mervin F. Roberts. The Saybrook Press, Old Saybrook, Connecticut. 1984.

The Fisheries and Fishery Industries of the United States. Section II - A Geographical Review of the Fisheries Industries and Fishing Communities for the Year 1880. George Brown Goode. United States Commission of Fish and Fisheries. Washington Printing Office. 1887.

Oystering From New York to Boston by John M. Kochiss. Published for Mystic Seaport, Inc., by Wesleyan University Press, Middletown, Connecticut. 1974.

The Oyster by Robert A. Hedeen. Tidewater Publishers, Centreville, Maryland. 1986.

Connecticut Aquaculture Findings and Recommendations - Aquaculture Commission. A Final Report to the Governor and General Assembly. January 1986. Compiled by John H. Volk, Chairman, Aquaculture Commission.

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  New Haven Extension Office
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  Hamden, CT 06514
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- DEP Coastal Management Office
  71 Capitol Avenue
  Hartford, CT 06106
  Tel: (203) 566-7404

- The Sounds Conservancy, Inc.
  Avery Point
  Groton, CT 06340
  Tel: (203) 445-1868

- Connecticut DEP
  Marine Fisheries Office
  P. O. Box 248
  Waterford, CT 06385
  Tel: (203) 443-0166

- Connecticut Department of Agriculture
  Aquaculture Division
  Rogers Avenue
  Milford, CT 06460
  Tel: (203) 874-0696

- Connecticut Dept. of Health Services
  150 Washington Street
  Hartford, CT 06106
  Tel: (203) 566-1258

SEAFOOD SECRETS

James L. Wallace
Connecticut Sea Grant
Marine Advisory Program

The Connecticut Seafood Industry

Everyone has a great seafood story to tell! Whether it is the bluefish you caught last summer or the lobster dinner you had last night, seafood usually comes up in any conversation about food. Seafood has always been a part of life in Connecticut. The Indians harvested clams for food and "wampum" and buried lobsters next to their corn for fertilizer. In the early 1800s, Stonington and New London were thriving ports from which vessels traveled around the world in search of seals and whales. Many of the houses built by whaling captains still stand as monuments to these adventurous seafarers.

Fishing is still an active industry in Connecticut although less visible than it was 100 years ago. Connecticut is the home of over 1,000 commercial fishermen who in 1986 harvested over 7-million pounds of fish and shellfish. Connecticut's most abundant species include flounder, lobster, bluefish, oysters and shad, to name only a few. Commercial fishermen represent the consumers' right of access to edible marine resources of the State. In addition to fishermen, there are over 300 retail markets and supermarkets.

Seafood is Health Food

Long-term studies of seafood consumers in Greenland, Japan and The Netherlands have linked eating seafood with a low incidence of heart disease. These studies have brought the health benefits of seafood to the attention of scientists encouraging further studies on omega-3 fatty acids--the substance credited with seafood's heart-healthy effect. The fatty acids in seafood differ from those found in plant and animal sources. These omega-3 fatty acids, found in significant quantities only in marine animals and plants, provide many protective benefits in relation to heart disease. Scientists are now learning that omega-3 fatty acids protect the body in the following ways:

* They lower the level of triglycerides in the blood more effectively than do polyunsaturated vegetable oils. Under certain conditions, high levels of triglycerides have been associated with increased incidence of heart disease.

* They reduce the stickiness of blood platelets, platelets which are too "sticky" can cause blockages in coronary blood vessels.

* They lower total cholesterol levels and favorably change the balance of certain types of cholesterol in the blood.

Further, seafood is high in protein and minerals and low in cholesterol. Additional scientific studies are currently under way which indicate that omega-3 fatty acids may play a role in helping prevent certain diseases and medical disorders such as breast cancer, inflammatory diseases, arthritis, high blood pressure, migraine headaches and some kidney diseases.

Buying Seafood

Consumers can purchase fresh seafood from a number of sources, including specialty seafood stores and supermarkets. These purveyors will have seafood not only from Connecticut but from all over the United States. In some cases you may find seafood from exotic places like New Zealand, Taiwan and Norway! Because there is so much variety, consumers are sometimes confused or intimidated by the seafood counter. Establishing a working relationship with the purveyor is always a good way to learn more about the different types of seafood available.

Whatever the variety, whole fish have certain characteristics that indicate freshness:

* Bright, clear full eyes that are often protruding. As the fish loses freshness, the eyes become cloudy, pink and sunken.

* Bright red or pink gills. Avoid fish with dull colored gills that are gray, brown or green. Fresh fish should be free from slime.

* Firm and elastic flesh that springs back when pressed gently with the finger. With time the flesh becomes soft and slips away from the bone.

* Shiny skin, with scales that adhere tightly. Characteristic colors and markings start to fade as soon as a fish leaves the water.

* A clean, pink intestinal cavity.

* A Fresh and mild odor

Fillets should have firm and elastic flesh and a fresh-cut appearance with no browning or drying around the edges. Fillet flesh separates if it is left too long in the case.

The many kinds of shellfish available today share certain common characteristics that indicate freshness. Look for the following signs of freshness when buying shellfish.

* A sea breeze odor.

* Tightly closed shells for clams, mussels and oysters. If the shells gape slightly, tap them with a knife. They should close; discard any that do not.

* Leg movement for live crabs and lobsters. They will not be very active if they have been refrigerated, but they should move at least a little bit. Another sign of life is that the tail of a live lobster curls tightly under its shell when it is picked up. Discard any crabs or lobsters that do not show these signs of life.

* A mild odor for freshly shucked scallops and oysters. The smaller bay and calico scallops are usually creamy white, though there may be some normal light tan or pink coloration. The larger sea scallops are also generally creamy white, though they may show some normal light orange or pink color.

RESOURCE LIST

Publications (Available from Connecticut Sea Grant)

Basic Introduction to Finfish with recipes
Basic Introduction to Shellfish with recipes
Basic Introduction to Seafood Cookery in the Microwave with recipes
Basic Introduction to Seafood Nutrition with recipes

Organizations

Sea Grant Marine Advisory Program
University of Connecticut
Avery Point
Groton, Connecticut 06340
Tel: (203) 445-8664

Cooperative Extension Service
Seafood Education Team
Tel: (203) 486-4128
(Call for office located closest to you. Ask for Home Economist)