The Tidal Exchange

Newsletter of the New York ~ New Jersey Harbor Estuary Program

Winter 2003

THIS ISSUE

HARBOR ESTUARY NEWS

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Commercial Shellfishing in the Harbor Estuary

Are There Local Clams in Your Chowder?

Cathy Yuhas

At the Fulton Fish Market, on the East River in Manhattan, hard clams from New Jersey waters were selling at wholesale from $30 for cherrystones (150 count/bag) to $90 for littlenecks (400 count/bag) in December 2002. As these prices indicate, shellfish are a valued economic and natural resource in NY-NJ Harbor and throughout the coastal states. In 2001, more than 24 million pounds of clams and bivalves were harvested in the coastal US, which was worth close to 14 million dollars at dockside.

Shellfish are filter feeders, which means they pump water through their systems to capture phyto-plankton for nourishment. Unfortunately, during this process they also accumulate contaminants that can lead to disease in humans when the shellfish are consumed. The quality of waters used for shellfish harvest is of concern not only for human health, but also for the growth of local economies that rely on the commercial shellfish industry.

The water quality of the Harbor allows direct harvesting of shellfish only in a small portion of the Navesink and Shrewsbury Rivers, and there only seasonally. Even so, a viable shellfishing industry does exist through purification processes such as transplant/relay programs and depuration programs. Both New York and New Jersey conduct transplant or relay programs in which shellfish from the Harbor are transported to clean waters for purification. The shellfish are held in these waters for a minimum of 30 days in New Jersey and 21 days in New York. New Jersey also conducts a depuration program in which shellfish are placed in a holding container and flushed with clean water for a minimum of

Clams undergoing purification at a depuration facility, the Clean Water Clam Plant in Sea Bright NJ, the region's original plant.

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The Tidal Exchange
Winter 2002

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The Tidal Exchange is a publication of the New York – New Jersey Harbor Estuary Program (HEP), a partnership of federal, state and local governments, scientists and citizens working together to protect and restore the natural resources of the estuary. The purpose of the newsletter is to promote an informative dialog on issues related to the Harbor Estuary Program.

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Slated for Beneficial Use

The Potential Use of Dredged Bedrock for Habitat Restoration in the Harbor

Joel Banslaben

Container Ships in the Port of NY & NJ.

For centuries, shipping has been a defining characteristic of the New York – New Jersey Harbor. The constant flow of imports and exports provides the Metropolitan area with a myriad of goods ranging from petroleum-based products to computers and soybeans, while creating employment opportunities numbering in the tens of thousands. To take advantage of "economies of scale," shipping technologies have developed larger deep-draft container ships. The result is that ports worldwide must dredge shipping channels to adapt to the new fleet of modern ships or face decreased economic activity and increased vehicle trips, which in turn elevate local noise and air pollution.

Several waterways in the Port of New York and New Jersey will require deepening, most prominently the Kill van Kull, Arthur Kill, and Port Jersey Channel. While conducting the Harbor Navigation Study, the Port Authority of NY & NJ and US Army Corps of Engineers were faced with a daunting task: How to tackle 10 million cubic yards of bedrock expected to be generated as a by-product of dredging activities over the next decade. Imagine Giants Stadium at the Meadowlands filled completely to the brim with freshly dredged bedrock... then multiply by ten. This begins to estimate the magnitude of material associated with this effort and, subsequently, the potential for large scale and diverse beneficial use projects.

Two major factors have dictated the initial planning efforts of the Harbor Navigation Study: regulatory guidelines and geological specifications. The Water Resources Development Acts (WRDA) state that dredged material should, where possible, be used in an environmentally beneficial manner based on the least cost principle. Any and all beneficial use projects are required to go through alternatives analysis to determine relative costs and benefits. In addition, recent amendments to WRDA encourage cost sharing between agencies as a means for increasing potential collaborative efforts.

Geological specifications, on the other hand, describe properties of the bedrock that lies beneath the Harbor. Deposited millions of years ago, this material now acts as the foundation for softer soils in the region. Initial studies of the Harbor's channels showed that the unique geological composition of the material would determine what cadre of uses might be feasible for the underlying bedrock. Subsequent sampling determined that the material fell into

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New Jersey Watershed Ambassadors

Ready to Serve Their Watershed Communities

Christine Hirt

Are you looking for an exciting environmental presentation for your classroom or community group? Are you interested in learning about volunteer monitoring techniques? Do you want to know more about your watershed? The New Jersey Watershed Ambassadors Program can help you.

The New Jersey Watershed Ambassadors program is a community-oriented AmeriCorps program hosted by the New Jersey Department of Environmental Protection's Division of Watershed Management. Through this program, AmeriCorps members are stationed in watershed management areas across the state, ready to serve their watershed communities.

Watershed Ambassadors monitor the rivers of New Jersey through River Assessments and Biological Assessments volunteer monitoring programs. The members also train community volunteers in these two volunteer monitoring techniques. Members are available to make presentations to community organizations and schools, which provide information about water and watershed issues in New Jersey.

The NJDEP Division of Watershed Management began hosting this AmeriCorps program in September 2000. AmeriCorps is a national service initiative that was started in 1993 as the domestic arm of the Peace Corps. After two weeks of intensive training in volunteer monitoring techniques, watershed management issues and presentation skills, AmeriCorps members were placed with a host agency in their home watershed management area.

To schedule a presentation, please see the list below and contact the Watershed Ambassador for your area. ❖

Christine Hirt *is the Watershed Ambassador Program Manager for the NJDEP Division of Watershed Management.* For more information about the program, e-mail Christine at christine.hirt@dep.state.nj.us or call her at 609-777-1406.

WMA 1
Upper Delaware
Eric Watkins: 908-735-0733

WMA 2
Wallkill
Janet Creegan: 973-579-6998

WMA 3
Pompton, Pequannock, Wanaque, Ramapo
MacKenzie Hall: 973-299-7592

WMA 4
Lower Passaic, Saddle River
Kimberly Daly: 973-817-5735

WMA 5
Hackensack, Hudson, Pascack
Tara Casella: 201-968-0808

WMA 6
Upper & Mid Passaic, Whippany, Rockaway
Elyssa Serrilli: 973-966-1900

WMA 7
Arthur Kill
Aimee Petkus: 908-527-4032

WMA 8
North & South Branch Raritan
John Neuberger: 908-234-1852

WMA 9
Lower Raritan, South River, Lawrence
Jessica Johnson: 732-745-3479

WMA 10
Millstone
Beth Hartmaier: 609-737-3735

WMA 11
Central Delaware Tributaries
Dana Coyle: 609-883-9500

WMA 12
Monmouth
Jennifer Dufine: 732-683-2287

WMA 13
Barnegat Bay
Brian Senna: 732-349-1152

WMA 14
Mullica
Tammy West: 609-652-1665

WMA 15
Great Egg Harbor
Lisa Merman: 609-272-6997

WMA 16
Cape May
Brad Rosenthal: 609-465-1082

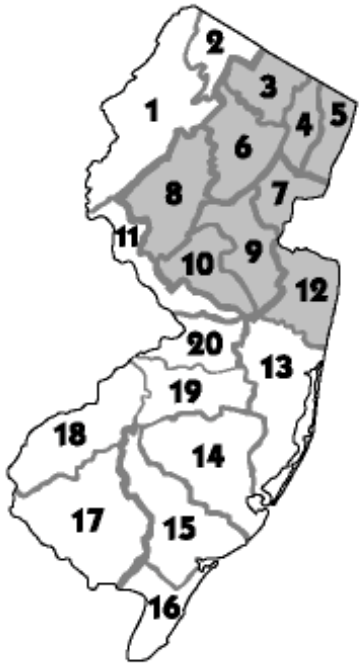
WMA 17
Maurice, Salem, Cohansey
Christina Steward: 856-453-2169

WMA 18
Lower Delaware
Joshua Kahan: 856-614-3657

WMA 19
Rancocas Creek
Jenna Wernham: 856-983-5665

WMA 20
Assiscunk, Crosswicks, Doctors
Tan Do: 609-586-9603

Or Visit the Website:
www.state.nj.us/dep/watershedmgt/ambassadors_index.htm



Map of New Jersey Watershed Management Areas (WMAs). Shaded WMAs are part of the larger Harbor Estuary watershed.

Commercial Shellfishing

(from page 1)

48 hours.

This article will focus on the factors that determine the acreage of harvestable shellfish beds in the Harbor. Although water quality is the primary factor influencing the number of acres open to shellfishing, the abundance of the resource, the shellfishing industry's interest in an area, buffers, and administrative closures also play an important role. Buffers are areas closed to shellfishing due to their proximity to potential pollution sources, such as, sewage treatment outfalls, permitted and unpermitted discharges, stormwater outfalls, and marinas. Administrative closures may be imposed due to limited supervision available to patrol the waters.

So, where in the Harbor is shellfishing allowed? This question is best answered by looking at each state individually.

New York

In New York State, none of the waters in the core Harbor area are certified for shellfishing. With a special permit, however, hard clams may be harvested from the NY portion of Raritan Bay, including Great Kills Harbor (see classifications on page 5). Clams are harvested there from April to October and transplanted to clean waters for purification. Regardless of improved water quality, direct market harvesting may never occur in Raritan Bay due to the potential for combined sewer overflow (CSO) discharges in wet weather and treatment plant upsets discharging in the immediate vicinity regardless of weather.

The NY portion of the New York Bight is classified as certified for harvesting surf and mahogany clams. There are administrative closures in some areas due to sewage treatment outfalls.

The acreage of uncertified shellfish beds in the NY portion of the Harbor, 74,745 acres, has remained constant since 1970. In 2002, there was less acreage being harvested by special permit in Raritan Bay than there was in 2001. This decrease was caused by a NYS Department of Environmental Conservation decision to move from vessel-based to land-based supervision. The potential for opening more shellfish beds for transplant harvest is evaluated based on survey information indicating the presence of a harvestable resource and industry requests.

The hard clam harvest from New York's Raritan Bay waters has increased from 1979 to 2001 (see Figure A1). The transplant program in Raritan Bay accounted for about 45% of New York State's total harvest in 2001.

New Jersey

In New Jersey, the Raritan and Sandy Hook Bays are classified as special restricted. Hard clams harvested from the bays are purified through relay and depuration programs. In 1997, 15 to 16 million hard clams were harvested from the Raritan and Sandy Hook Bays.

The Bureau of Marine Water Monitoring does not monitor the Arthur Kill, Kill van Kull and Newark Bay because the shellfish industry has not expressed interest in harvesting shellfish from these waters, most likely due to an insufficient shellfish resource. Because these waters are not monitored, they are therefore classified as prohibited.

The National Shellfish Sanitation Program requires that all sewage treatment outfalls have a buffer area that is classified as prohibited from shellfishing. Buffers are associated with the Middlesex County Utilities Authority outfall at the western end of Raritan Bay and the Monmouth County Bayshore Outfall Authority (MCBOA) outfall located one mile offshore in the New York Bight.

In January of 2002, more than 5,000 acres of the NJ portion of Raritan Bay were upgraded from prohibited to special restricted: 4,441 acres at the eastern end around Flynn's Knoll and another 984 acres known as sub-area 14

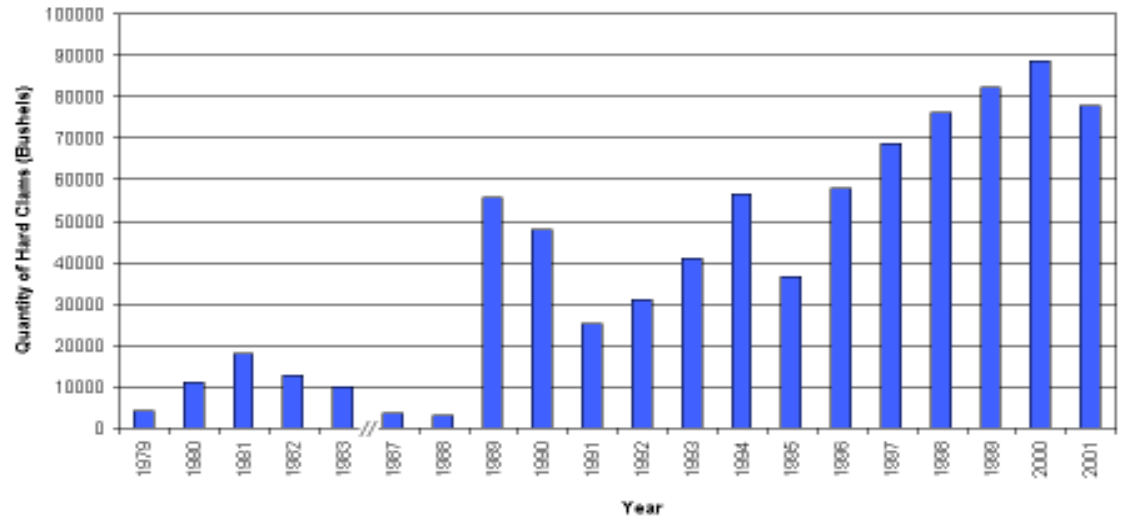


Figure A1: New York State Hard Clam Production in Raritan Bay, 1979-2001. (Source: NYSDEC)

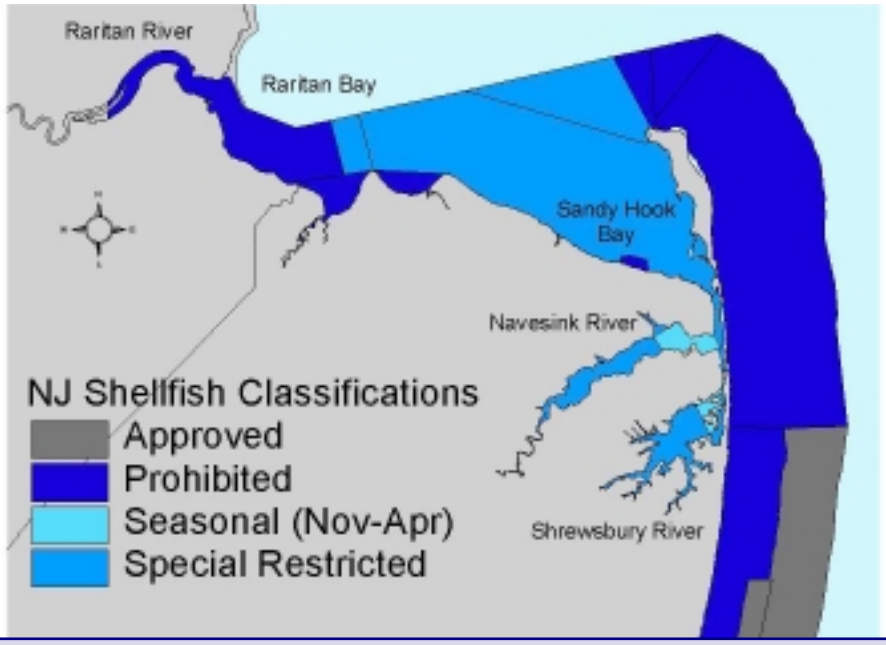


Figure A2: New Jersey Shellfish Classifications. (Source: NJDEP, Bureau of Marine Water Monitoring, 2002)

at the western end of the Bay. These upgrades were based on acceptable monitoring results for both coliform bacteria and toxics. Approximately 1,000 acres north of Sandy Hook may be upgraded to special restricted in the next few years based on more data being collected by the NJ Department of Environmental Protection and EPA Region 2.

The Navesink and Shrewsbury Rivers are also classified as special restricted, except for the small portion classified as seasonally approved for direct harvesting from November to April (see Figure A2). Hard clams and soft clams are harvested from the Rivers' 2,290 acres of shellfish growing waters. This area provides almost the entire soft clam fishery in New Jersey. The water quality of the Navesink has improved since 1993 due to decreased non-point source loadings from coastal development, agricultural waste, and marina and boating-related contamination in the watershed. This improvement lead to the upgrading of lower Navesink waters from special restricted to seasonally approved in 1996.

Despite water quality improvements, the NJ Bureau of Marine Water Monitoring closed all but a small area of the Navesink and Shrewsbury Rivers to shellfishing effective May 1, 2002. The closure was necessary due to a shortage of manpower and resources to patrol the waters on a daily basis. The shortage came about when the 5,000 acres in Raritan and Sandy Hook Bays were upgraded.

Harbor waters can also be closed to harvesting because of inclement weather and water conditions. On January 1, 2003, sub-area 14 of the Raritan Bay was closed because it is too dangerous at that time of the year for the clammers. At the same time, the Navesink and Shrewsbury Rivers were reopened to provide a sheltered area for the clammers to shellfish.

The harvesting of surf clams is conducted along the coast of New Jersey in the NY Bight. From Sandy Hook to Sea Bright, the waters are classified as prohibited because they are potentially affected by Raritan Bay/Hudson River complex waters and the MCBOA outfall. Some areas from Monmouth Beach to Asbury Park, also potentially affected by the Harbor waters, are classified as prohibited because of non-point sources of pollution and buffers around four wastewater treatment plants.

Although you probably don't visit the Fulton Fish Market to buy shellfish from NY and NJ waters, many local retailers do. So, the next time you sit down to a bowl of clam chowder at your favorite restaurant, just think… they may have been caught in your local waters, the Harbor Estuary! ❖

Cathy Yuhas *(NJMSC NJ Sea Grant Extension Program) is the Technical Specialist for the NY-NJ Harbor Estuary Program.*

SHELLFISH BED CLASSIFICATIONS

New York

Certified
✓ Open for direct harvesting

Uncertified with a special permit
✓ Allows harvesting under a special permits program requiring purification before marketing

Uncertified
✖ Closed

New Jersey

Approved
✓ Open for direct harvesting

Seasonally Approved
✓ Open for direct harvesting at a certain time of the year

Special Restricted
✓ Allows harvesting under a special permits program requiring purification before marketing

Seasonal Special Restricted
✓ Allows harvesting at a certain time of the year under a special permits program requiring purification before marketing

Prohibited
✖ Closed

Slated for Beneficial Use

(from page 2)

four major classifications: diabase, serpentinite, shale, and sandstone.

Research into environmentally beneficial projects using dredged bedrock revealed several relatively small-volume projects in the United States and abroad. The majority of these case studies defined their output as "Offshore Disposal." Lack of precedent dictated that the Port Authority and Corps' NY District focus their efforts on the current least cost alternative - artificial reefs.

In order to evaluate other potential options for beneficial use in the NY-NJ Harbor, a framework was developed for performing the alternatives analysis. This framework provides a streamlined process for examining the relative merits of each beneficial use by considering the major issues in logical order (see Figure B1).

Once the geological specifications were determined, and the initial options outlined, the analysis focused on the implementation issues. Each option was examined in depth for economic, institutional, engineering, regulatory, and environmental merit. Independent feasibility scores for each of these implementation issues were then placed in a matrix for evaluation. For example, groins and jetties are environmentally beneficial in reducing shore erosion and protecting vital upland habitats; however, from an engineering perspective, they require increased design and rehandling of material.

Heavily Eroding Salt Marsh in the Arthur Kill.

In and around Harbor, artificial reefs have proven to be a highly feasible option because they present a low cost option for dredged bedrock disposal. In 2002, all dredged bedrock in the region was blasted with explosives, placed into split hopper dredges and taken to the offshore waters of New York and New Jersey to create recreational fishing and diving habitat. Inshore oyster and lobster reefs are also feasible, but would require a greater degree of planning and coordination because of their proximity to the shore.

Shore protection devices are another alternative that can be implemented in the region. Benefits can be achieved through a wide variety of methods, from nearshore wave attenuating devices and groins for trapping sediment, to breakwaters and revetments that dissipate wave energy. As previously discussed, geological specification largely defines the suitability of bedrock to be used in this capacity. Material used to construct revetments must fall under guidelines defined in the USACE Shore Protection Manual. Other alternatives, such as offshore breakwaters, have proven to be relatively feasible based on their shore protection qualities and minimal deviation from current dredging and placement methods.

The use of bedrock for habitat restoration incorporates several elements of shore protection, reef creation, and other beneficial use options. For example, dredged bedrock may be used in nearshore wave attenuating devices that

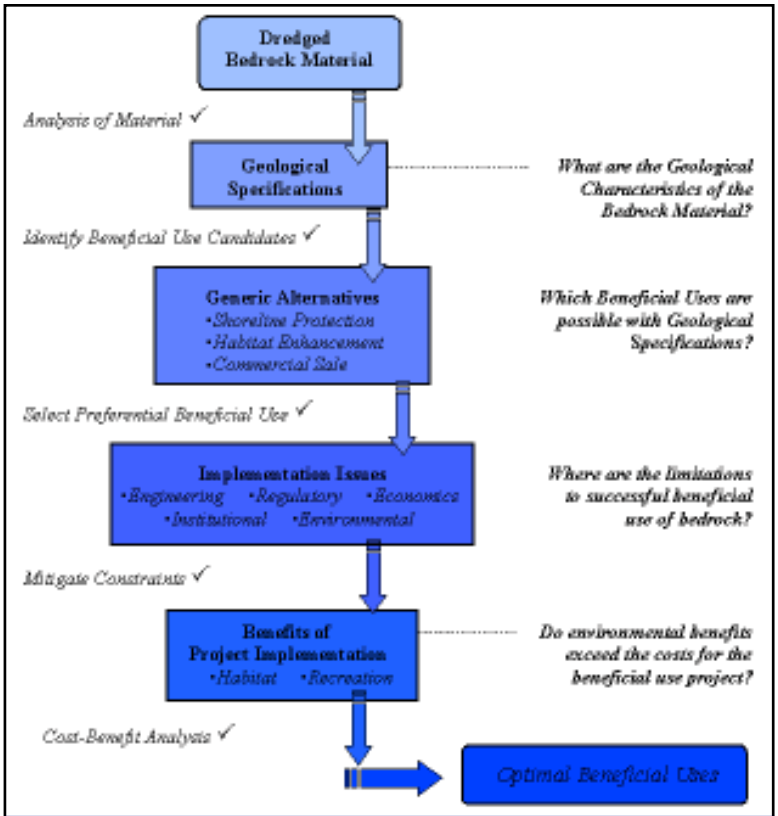


Figure B1: Beneficial Use Decision-Making. (Battelle 2002)

are intended to protect salt marshes. In this scenario, marshes are protected from increased wave action while allowing for sediment accrual landward. Another option involves the use of lower durability bedrock as sediment feeder material along highly erosive shores. This strategy results in immediate shore protection by reducing wave action, as well as long-term benefits from the slow release of coarse and fine grain sediment to downstream habitats.

Commercial sale of dredged bedrock as aggregate material is an innovative market solution, which requires private sector involvement in order to maximize potential benefits. These benefits include reduced transport costs from marine-based transportation (aggregate is currently trucked in from upstate quarries) and potential profit generating activities (material can be sold to interested parties). Material might also be used for local infrastructure projects (e.g. rebuilding downtown New York). The major constraints associated with the commercial sale of dredged bedrock would be developing public/private partnerships and coordinating dredging schedules and outputs.

The large volume of bedrock involved in the Harbor Navigation Study dictates that the least cost option, artificial reefs, be the first choice of decision makers. However, other beneficial uses will become more feasible as the environmental benefits they generate are more accurately quantified and included in the overall analysis. In the case of beneficial uses such as nearshore wave attenuating devices, the additional cost of implementation must be weighed against the increased benefit of habitat protection and restoration. Using alternatives analyses to determine the benefits and costs for bedrock use will allow for a consistent allocation of valuable financial resources. With millions of dollars being invested in the restoration of places like Jamaica Bay and the Passaic River, it will benefit us all if we can use our assets in the most productive and efficient manner. ❖

Joel Banslaben *is a Policy Analyst for Battelle located in Stony Brook, NY. He was co-author and editor of the recent USACE report, "Beneficial Use of Dredged Bedrock in the NY/NJ Harbor."*

Figure B2: Potential Locations for Wave Attenuation Structures in NY-NJ Harbor. (Source: USACE, 2001)

Capt. Pete Says...

Stuffed Clams

Peter L. Sattler

The hard shell clam (Mercenaria mercenaria) is a local resource. Raritan Bay waters, shared by both New York and New Jersey, represent half of each state's hard clam harvest. Recreational harvest from these waters is restricted, so it's best to catch your clams from the shelf of a local market. An excellent appetizer, the ingredients can be expanded to make a meal in itself.

STUFFED CLAMS

1	Lemon, cut in wedges
3	Cans (6.5 oz) chopped clams, drain ¾ of liquid
3	Garlic cloves, minced
8 tsp	Bread crumbs
6	Bacon strips, cut in 1" squares
4	Scallop shells, large or 12 small shells
	Tabasco
	Salt/Pepper

- Mix clams, garlic, salt & pepper; set aside for 15 minutes
- Pack shells with clam mixture, sprinkle with breadcrumbs
- Top each shell with bacon
- Place under broiler for about 3 minutes, or until bacon is crisp
- Serve immediately with lemon wedges; Tabasco to taste

Fiddler Crabs, *Uca pugnax*

Dr. Judith S. Weis, Rutgers University

Fiddler crabs are common residents of tidal marshes in temperate climates and in mangrove areas in tropical climates. They are all small, box-shaped semi-terrestrial crabs in the family Ocypodidae, in which the male has one greatly enlarged claw. This claw is used for courtship activities, in which it is waved, in a species-specific pattern, at females. It is also used in fighting other males. All of the nearly 100 species of fiddler crabs around the world are in the genus *Uca*, and most of the species are found in the tropics where they can be active year round. A few species venture into temperate habitats.

M. Rosenberg

Uca pugnax

Website for more information:
www.fiddlercrab.info

While three species are found in our area, the most abundant is *U. pugnax* (the others being *U. pugilator*, which prefers sandier substrates, and *U. minax*, which is found in lower salinities). *U. pugnax*, commonly known as mud fiddlers, is found in salt marshes from Massachusetts down to Florida. Like other fiddler crab species, but unlike most other intertidal organisms, they are active at low tide and retreat into their burrows when the tide comes in. During their period of activity at low tide, they spend a good deal of time feeding. They use their small claws to bring scoops of sediment to their mouths; their mouthparts then process the sediments so they consume detritus and microalgae associated with the sediments. The males, with only one feeding claw cannot feed as rapidly as females with two. Their feeding activities modify the sediments. Burrows are of major importance to fiddler crabs, as they are inhabited during high tides, and are used as a site for mating and a place to hibernate during the winter months. Their burrows make major alterations in the marsh surface. They serve to aerate sediments below the surface and provide air to the roots of marsh grasses, thus improving their growth. Because of these effects of fiddler crabs on the marsh, they are often referred to as "ecological engineers." Fiddler crabs are also used recreationally as bait for blackfish and serve as a food source for wading birds such as the black-crowned night heron.

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