# NOAA Teacher at Sea
# Lisha Lander Hylton
# Onboard NOAA Ship DELAWARE II
# June 29 – July 11, 2008

**NOAA Teacher at Sea: Lisha Lander Hylton**
NOAA Ship DELAWARE II
Mission: Surfclam and quahog survey
Geographical area of cruise: Off the coast of the northeastern United States, approximately 20 miles off coast of New Jersey
Date: Friday, July 4th, 2008, Stations 51-57

**Weather Data from the Bridge**

**Today's weather e-mail:**

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July 4, 2008 ANZ450>455-041000- */O.ROU.KPHI.MA.F.0000.000000T0000Z-000000T0000Z/* COASTAL WATERS FROM SANDY HOOK TO MANASQUAN INLET NJ OUT 20 NM- COASTAL WATERS FROM MANASQUAN INLET TO LITTLE EGG INLET NJ OUT 20 NM- COASTAL WATERS FROM LITTLE EGG INLET TO GREAT EGG INLET NJ OUT 20 NM- COASTAL WATERS FROM GREAT EGG INLET TO CAPE MAY NJ OUT 20 NM- COASTAL WATERS FROM CAPE MAY NJ TO CAPE HENLOPEN DE OUT 20 NM- COASTAL WATERS FROM CAPE HENLOPEN TO FENWICK ISLAND DE OUT 20 NM- * 825 PM EDT THU JUL 3 2008* * OVERNIGHT* S WINDS 15 TO 20 KT WITH OCCASIONAL GUSTS TO AROUND 25 KT...BECOMING SW. SEAS 3 TO 4 FT. * FRI* SW WINDS 10 TO 15 KT. SEAS 2 TO 3 FT. A CHANCE OF SHOWERS AND TSTMS IN THE AFTERNOON MAINLY N OF GREAT EGG INLET. * FRI NIGHT* S WINDS 10 TO 15 KT. SEAS 2 TO 4 FT. SHOWERS AND TSTMS LIKELY. * SAT* S WINDS 10 TO 15 KT. SEAS 3 TO 4 FT. SHOWERS AND TSTMS LIKELY. * SAT NIGHT* S WINDS AROUND 10 KT. SEAS 2 TO 4 FT. A CHANCE OF SHOWERS AND TSTMS. * SUN* S WINDS AROUND 15 KT. SEAS 3 TO 4 FT. A CHANCE OF SHOWERS AND TSTMS. * SUN NIGHT* S WINDS 10 TO 15 KT. SEAS 3 TO 4 FT. A CHANCE OF SHOWERS AND TSTMS. * MON* S WINDS AROUND 15 KT. SEAS AROUND 4 FT. * TUE* SW WINDS AROUND 15 KT. SEAS 2 TO 4 FT. WINDS AND SEAS HIGHER IN AND NEAR TSTMS.

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**Science and Technology Log**
Today we learned the compared quahogs to surfclams: how they are alike and how they are different. The following information was taken from Wikipedia.

***Quahogs***
"The common hard shell clam, or quahog, is well adapted to life in the sea, particularly the sand and mud flats of the subtidal and lower intertidal zone. The northern quahog, Mercenaria mercenaria, belongs to the class Bivalvia, easily identifiable by two, somewhat rounded, hinged shells, protruding burrowing foot, and the purple or dark blue border found on the inside of the shell. The variety known as M. Mercenaria notata is widely grown in Massachusetts. It is distinguished by a chestnut brown zigzag line of the outside of the shell. Some cultivators prefer this variant because of its faster growth rate and natural identifiability. The name Mercenaria comes from the historic use of the shell for making Indian money, or wampum. Beads made from the purple part of the quahog shell were the most valuable form of wampum.

The quahog spends most of its life (which can last for up to 20 years) buried into the sediments of the subtidal and lower intertidal zone, with its two siphons reaching just above the surface to feed and discharge wastes. It feeds by filtering phytoplankton from water that it pulls in over its gills with one siphon and then pumps it back out through the other. Quahogs reproduce in the same manner as most bivalves, by shooting vast quantities of sperm and eggs into the water. Here the eggs are fertilized and dispersed by the currents. Hard clams spawn when the water temperature reaches approximately 60 degrees F. Of the millions of eggs shot out by female clams, only a small percentage survives to maturity in an uncontrolled environment.

Quahogs typically grow up to four inches and sometimes larger. Commercially, there are three names, based on size; the littleneck (48mm valve length or 1.5 inches), the cherrystone (60mm valve length or 2 inches), and the chowder (greater than 75mm or 3 inches or more). Some individuals can attain sizes of up to 130mm or 5 inches.

Quahogs are the preferred food of several predator species, notably green crabs, starfish, moon snails, and horseshoe crabs."

***Surfclams***

"Surf clams have thick, triangular, yellowish-white shells with rounded edges and concentric ridges. The shells do not close fully and therefore slightly gape (Fay et al. 1983). Surf clams are the largest bivalves in the mid-Atlantic Bight, with commercially harvested adults averaging 12 to 15 centimeters and the largest individuals reaching approximately 20 centimeters. Surf clams utilize an unusual behavior in response to stress: they leap from the sediment surface in order to relocate. Surf clams have been observed using this avoidance behavior in response to crowding and the presence of predators.

**TAS Hylton holds up some surfclams**

*Distribution*. Surf clams are found from the Gulf of Maine to Cape Hatteras, North Carolina (Fay et al. 1983). Water currents play an important role in the distribution of juvenile clams and eventual settlement patterns. Adult beds are found from beach zones to an average of 50 meters in depth. During harsh winter storms, surf clams can be thrown onto beaches; one such storm placed an estimated 50 million clams along a 10-mile stretch of beach. In New York/New Jersey Harbor, surf clams are found predominantly in the area where the harbor opens into the Atlantic Ocean.

Surf clams are mostly oceanic in distribution, preferring turbulent waters at the edge of the breaker zone. They can be found in some estuarine areas, but their distribution is limited by salinity (Fay et al. 1983). Juvenile clams prefer medium to fine, low organic sands averaging 9 to 25 meters in depth. Adults prefer medium- to coarse-grained sand and gravel, burying themselves just below the sediment surface. They are often found at evenly distributed positions relative to one another, with spacing interval negatively correlated to density. Additionally,

adults often remain in their juvenile burrows unless they are displaced by storm events (Fay et al. 1983).

*Feeding*. Surf clams are planktivores during all life stages. As larvae, surf clams consume algal cells, and adults primarily feed on diatoms, green algae, and naked flagellates. Adult surf clams have an incurrent siphon surrounded by a ring of papillae. Food particles are trapped on the siphon's mucus lining, which is transported to the stomach for digestion, and excreta are removed via the excurrent siphon.

*Fishery*. Surf clams have only recently gained popularity as a commercially harvested species. Prior to World War II they were mostly used as a bait species, but increased demand in the early 1970s resulted in almost 75 percent of the U.S. clam market comprised of surf clams. According to the National Marine Fisheries Service (1999), until the 1970s, most of the fisheries for surf clams came from New Jersey. The U.S. Food and Drug Administration closed the New York fishery because of bacterial and chemical contamination. Populations in most inshore areas are depleted; therefore the fisheries are currently offshore. In 1981 a minimum size catch was instituted, which further pushed clamming offshore.

## Life Cycle

Surf clams have two spawning periods, the first in mid-July through early August and the second in mid-October to early November, and these periods are believed to be synchronous across an entire bed. The timing depends on specific changes in temperature, with only one spawning cycle. Eggs are spherical and approximately 1.5 millimeters in diameter. Planktonic larvae develop shell valves and "feet" prior to settling. Juvenile clams develop after 21 days and begin their sedentary life stage at less than 1 millimeter in size. Surf clams grow to approximately 4.5 centimeters by the end of their first year, and sexually mature by the end of their second year. After five or six years, surf clams reach commercial size (12.5 centimeters. Adults are estimated to live 25 years with lengths reaching 20 centimeters; on average, open water adults live longer than inshore adults (Fay et al. 1983).

## Environmental Influences

*Salinity*. Salinity is a critical factor limiting the distribution and survival of surf clams. Larval clams require a salinity of 16 parts per thousand, surf clams prefer salinities greater than 28 ppt, and this keeps them from most estuarine environments.

*Predation*. Though little is known about many of the species that prey on surf clams, two species of moon snail prey on clams approximately 80 millimeters in size (Fay et al. 1983). Suspected predators include boring snails, ducks, haddock, and cod, which typically consume smaller adults. Fish have mostly been observed feeding on surf clams only after a major storm event. Although salinity limits surf clam distribution, larval predation may. Predation by crabs, gastropods, and bottom-feeding fish has been observed to limit development of beds in near shore areas colonized by larval surf clams.

*Pollution*. Surf clams are affected by sewage and metal pollution in the New York area. High fecal coliform counts were found in most of the clams within 11 kilometers of a sewage dumpsite, and these dense populations were unfit for human consumption. Metals such as silver, iron, copper, and even arsenic from oceanic dump sites and outfalls have also been the cause of much of the fisheries closures in the New York Bight area."

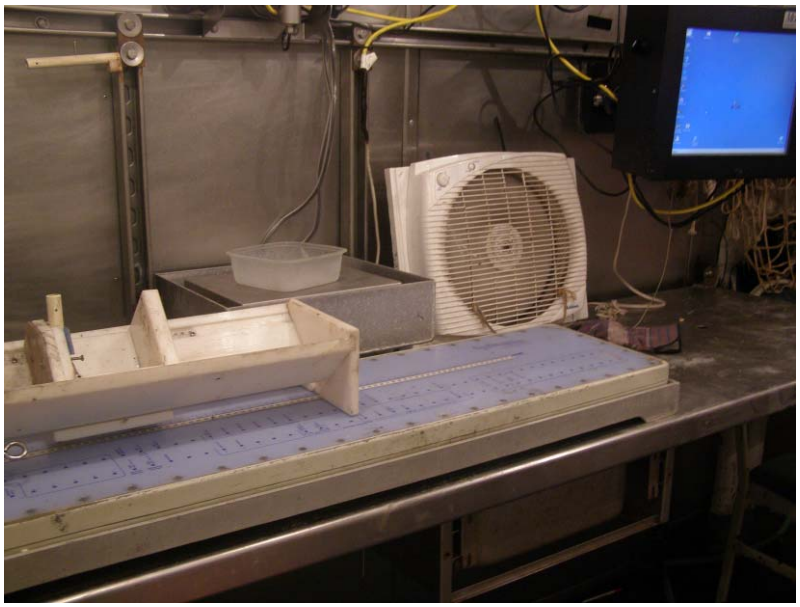
**Question of the Day**
Which weighs more, a surfclam or a quahog?
Answer: a quahog

**New Term/Word/Phrase**
Quahog

**Something to Think About**
Are quahogs and surfclams ever found in the same location?
Answer: YES!

**Challenge Yourself**
Learn what shucking a clam is all about and if you ever get the opportunity, try like, you'll love it!

**Did You Know?**



**This is the technological device that we use to measure and weigh quahogs and surfclams.**

**Animals Seen Today**
Black sea bass
Windowpane flounder
Four spot flounder
Sand dollar
Sea Urchin
Sea Worm
Rock crab