Shellfish Upweller

The goal of this project is to restore and protect the back bay ecosystems through:

- Raising shellfish that will be placed in restoration areas
- Support of community volunteers and local students in raising shellfish
- Providing educational opportunities to learn more about shellfish and coastal marine resources and ecosystems

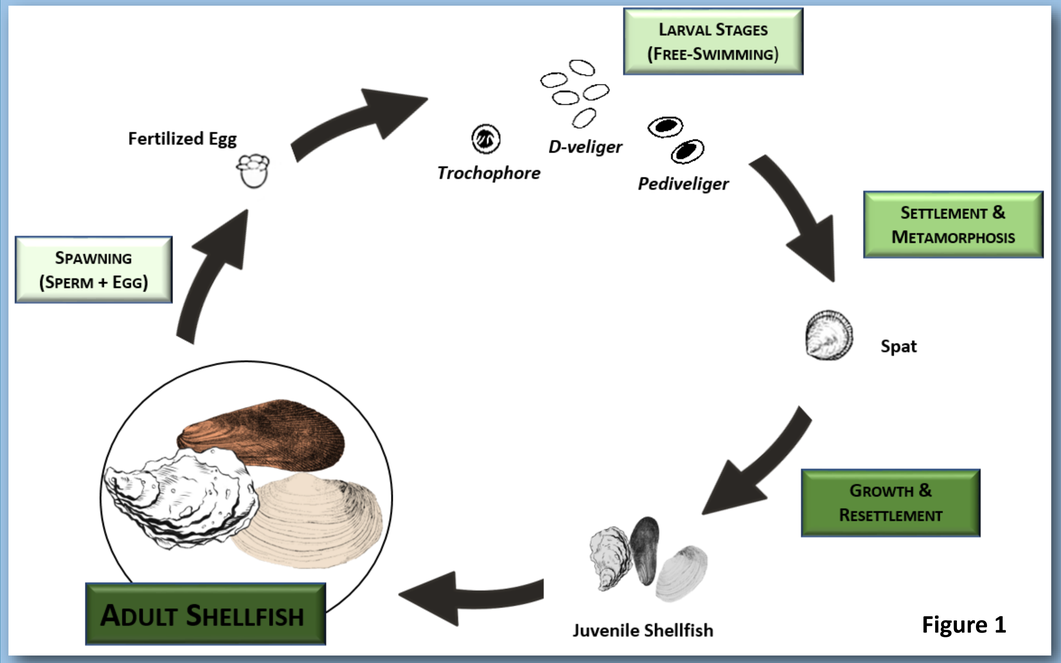


Figure 1

Shellfish Lifecycle

Typical life cycle of shellfish. (Figure 1)

Figures 1 and 2: created by V. Odarchenko, ACT Engineers, Inc.

Partners:

What is an Upweller?

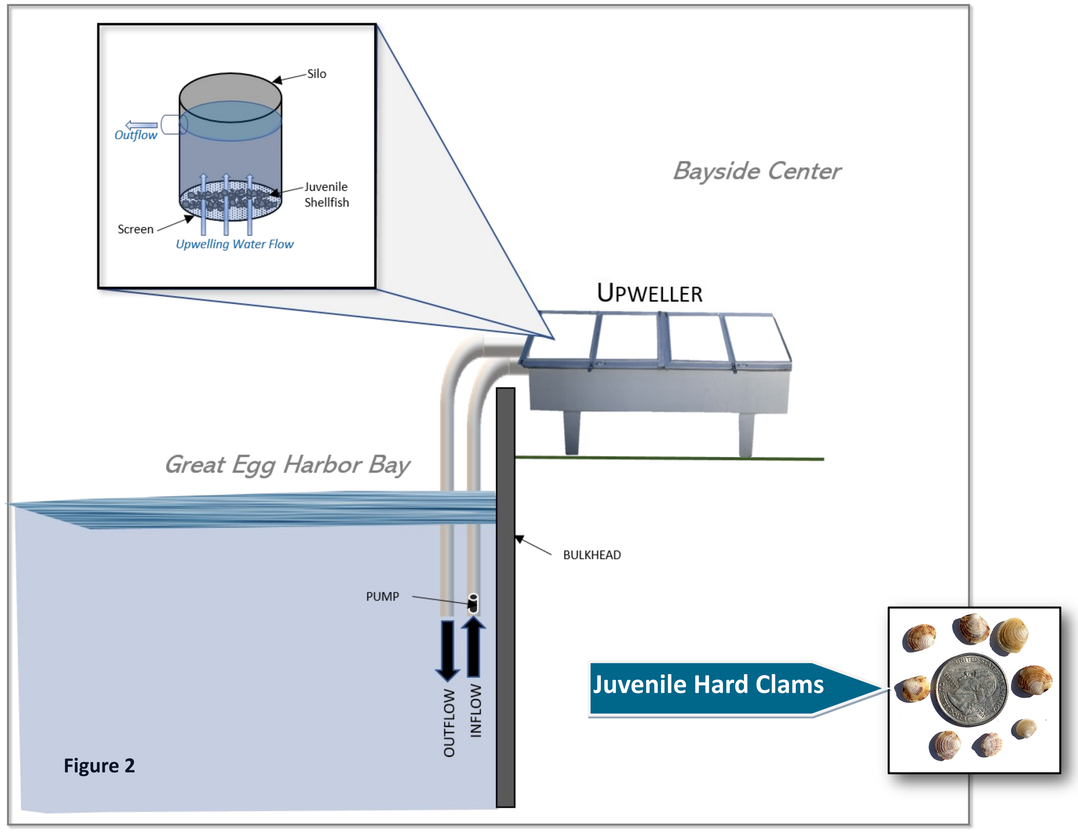


Figure 2

An upweller is a tank system used to grow juvenile shellfish in a protected and controlled environment (Figure 2). Water from the bay is continuously pumped through the upweller to “feed” the shellfish naturally occurring microscopic organisms. The health and growth of the shellfish are monitored until they are big enough to be placed in the bay and along back bay islands, where they will continue to grow and provide natural benefits to the bay environment.

Shellfish & Marsh Restoration

Shellfish provide stabilization to marsh edges and provide habitat and food for fish and wildlife.

Shellfish improve water quality by removing microscopic plants and animals, bacteria, and viruses from the water. Shellfish play an important role in the cycling of nutrients; they help remove excess nitrogen from the water, which can cause algae blooms and other harmful effects.

Ribbed mussels will be placed along Shooting Island to decrease erosion.

Image source, Google Earth.

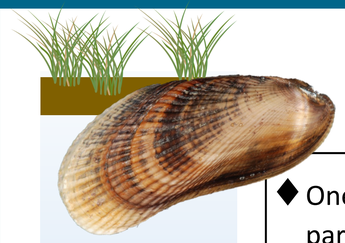
Additional information, ACT Engineers, Inc.

This rock sill was placed to restore Shooting Island to its 1970 shoreline.

Photo by ACT Engineers, Inc.

SHELLFISH in the LAYERS of the WATER COLUMN

Intertidal



Ribbed Mussel
Geukensia demissa

- One ribbed mussel filters 15 gallons of water per day; they filter smaller particles than other bivalves, capturing more bacteria.
- When ribbed mussels are out of the water during low tide, they trap water and bacteria inside.
- Juveniles move with a foot. Adults have byssal threads, which they use to attach and stay in one place. The byssal threads attach to marsh grass and help prevent erosion.

Subtidal

Eastern Oyster
Crassostrea virginica

- One oyster filters 50 gallons of water per day.
- Oysters create a natural reef under water. The oyster reef slows wave energy.
- Oyster larvae set on hard surfaces such as shells, bulkhead, rocks, or other oysters. Adults do not move once they have set.

Benthic

Hard Clam
Mercenaria mercenaria

- One hard clam filters 24 gallons of water per day.
- Hard clams are also known as little necks, cherrystones, or quahogs based on their size.
- Clams have a foot that they use to dig into the sand or sediment. Clams stabilize the ground.

Back Bay Ecosystem

Human Impacts

Human influences have caused significant changes in the function and quality of the back bay, affecting the physical, chemical, and biological components of the ecosystem.

- Wakes in no-wake zones erode shorelines
- Runoff from rain storms carries lawn fertilizer, oil from roadways, and other non-point-source pollutants into the bay and ocean
- Microplastics and other pollution affect water, food, and marine ecosystems

Figure 3

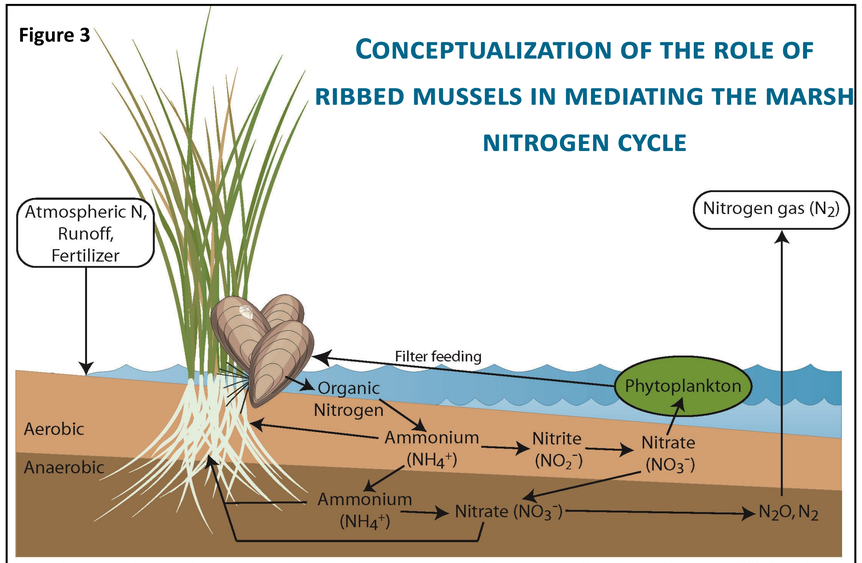
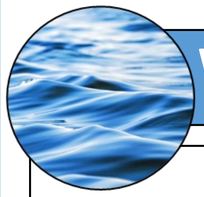


Figure 3: Source: Bilkovic, Donna Marie & Mitchell, Molly & Isdell, Robert & Schliep, Matthew & Smyth, Ashley. (2017). Mutualism between ribbed mussels and cordgrass enhances salt marsh nitrogen removal. Ecosphere. 8. e01795. 10.1002/ecs2.1795.

Benefits of a Healthy Back Bay



Water Quality

- Cleaner and clearer water
- Removal of polluting nutrients and sediments (See Figure 3)
- Reduced algae blooms

Habitat

- Vital habitat for fish, wildlife, and plants
- Food sources for marine life

Protection

- Oyster reefs absorb wave energy
- Flood protection
- Shoreline and erosion control

Community

- Recreation
- Supports local economy
- Food source from fishing and harvesting
- Education and research

How Can You Help?

⇒ Follow boating guidelines to protect shorelines.

⇒ Pick up all litter and dispose in appropriate trash containers.

⇒ Evaluate the impact of products used for household cleaning, lawn and garden care.

⇒ Reduce, reuse, and recycle household items and waste.

⇒ Volunteer, learn, and educate others through partner websites.

For more Information go to:

Ocean City NJ — www.ocnj.us

RCTB — www.reclamthebay.org

Rutgers New Jersey Agricultural Experiment Station — www.aic.rutgers.edu