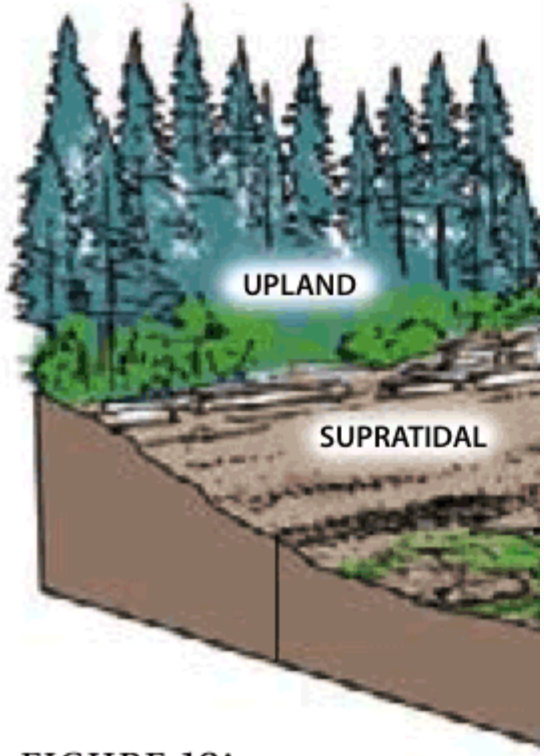
Life Between a Rock and a Hard Place



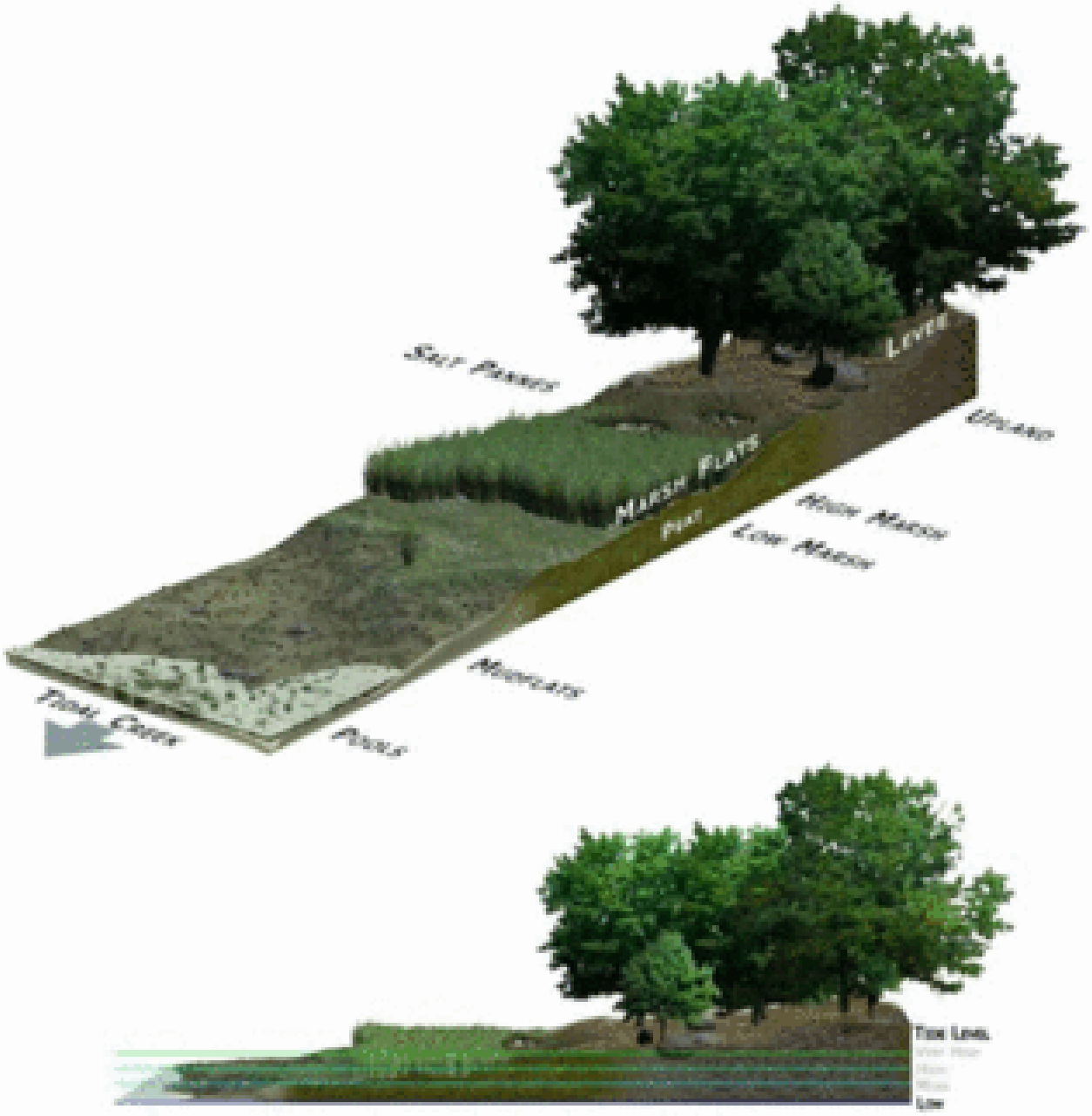
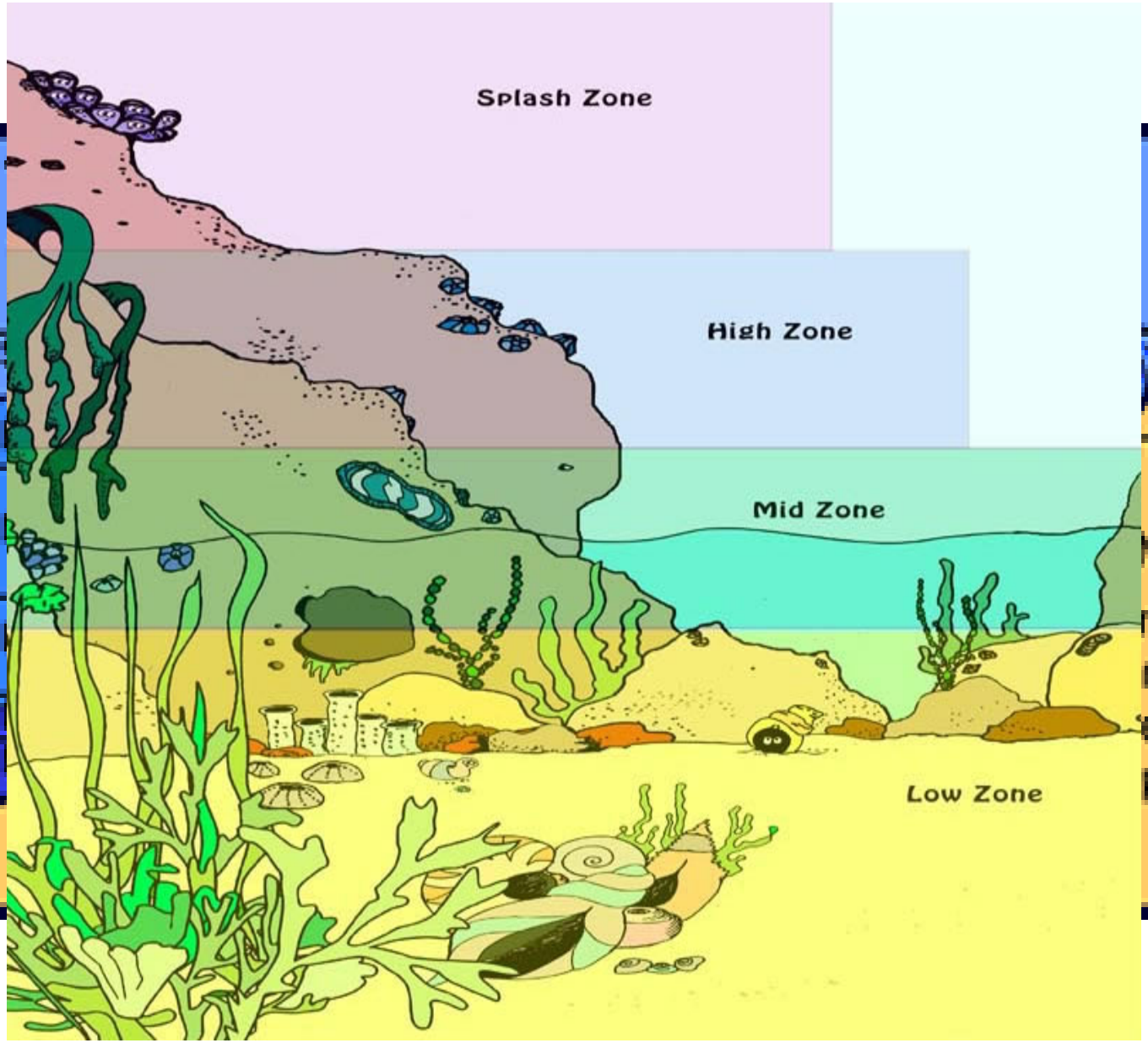


FIGURE 12:

The intertidal zone.
Due to the influences of the lan
and sea, the intertidal zone con
assemblage of biodiversity and
ILLUSTRATION: Soren Henrich.



Littorinids

High Shore Barnacles

Limpets, Top Shells,
Nerite, Siphon Shells

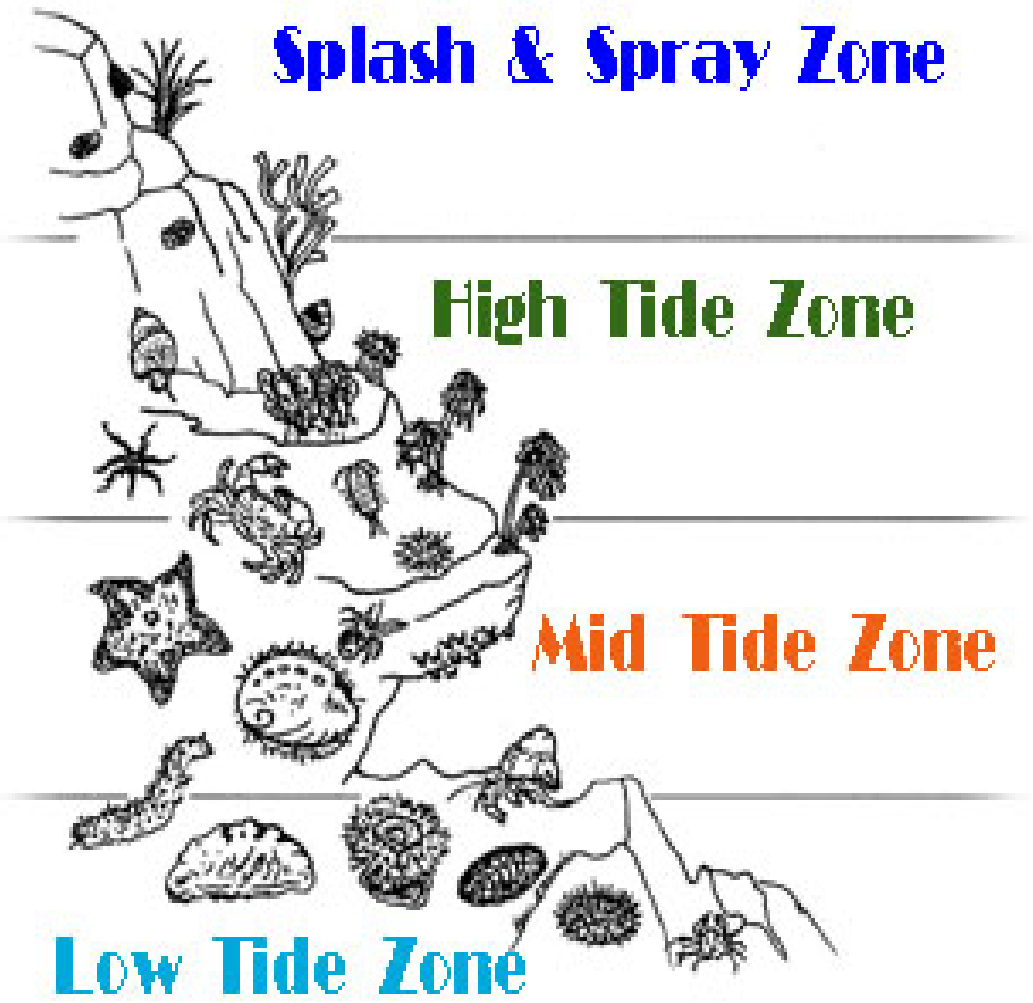
ria, Chitons, Seastars,

nus & Surf Barnacles

e, Cunjevoi, Sponges,

ks, Tritons & Turbans


Intertidal Zone
Organisms
Sculpin
Tidepool
Periwinkle snail
Barnacles
Barnacles
Isopods
Isopods
Chitons
Sea star
Limpets
Sea star
Sea anemone
Mussels
Limpets
Mussels
Isopods
Hermit crab
Crab
©EnchantedLearning.com
Spray Zone
(Usually dry)
High Tide Zone
(Wet during high tide)
Middle Tide Zone
(Wet and dry)
Low Tide Zone
(Usually wet)

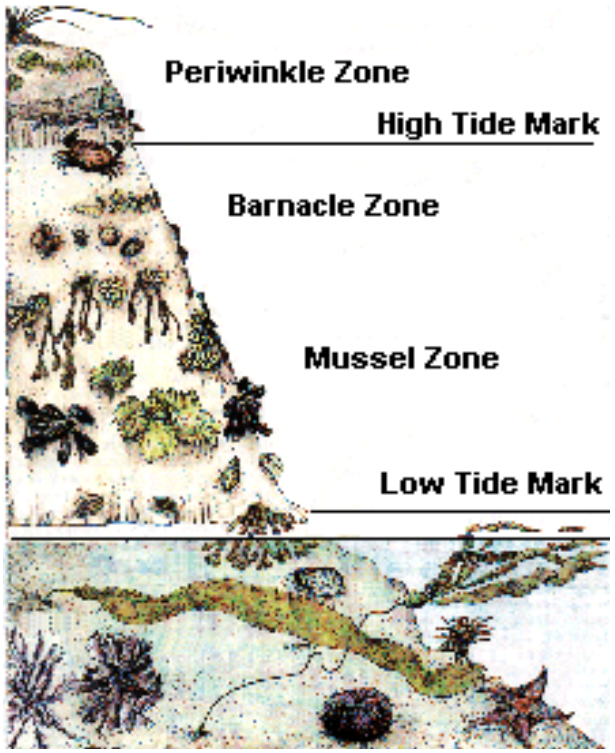

Splash & Spray Zone
High Tide Zone
Mid Tide Zone
Low Tide Zone


Bluegreen Zone
Barnacle Zone
Brown Algal Zone
Red Algal Zone

HIGHEST SPLASH

- *Calothrix*: blue/green algae
  - Dark green mat
  - Jelly like layer
  - Nitrogen fixation for nitrates

UPPER INTERTIDAL/LITTORAL ZONE



- What factors?
- Euryhaline: wide range of salinities

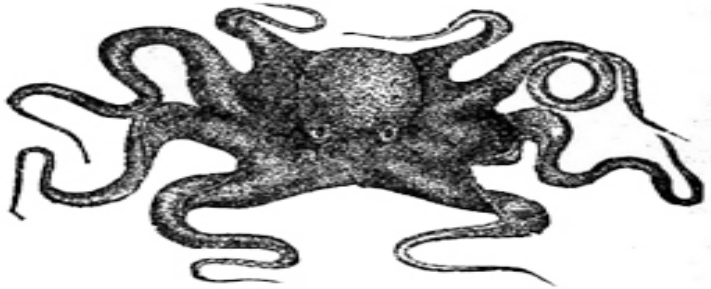
A MOLLUSK

* invertebrate
* soft body
* usually has a shell

A Snail

A MOLLUSK

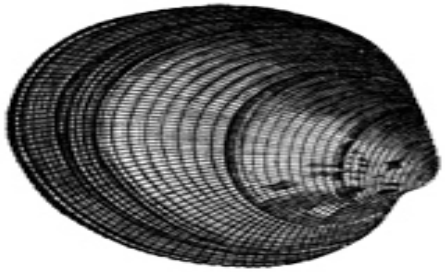
* invertebrate
* soft body
* usually has a shell



An Octopus

A MOLLUSK

* invertebrate
* soft body
* usually has a shell



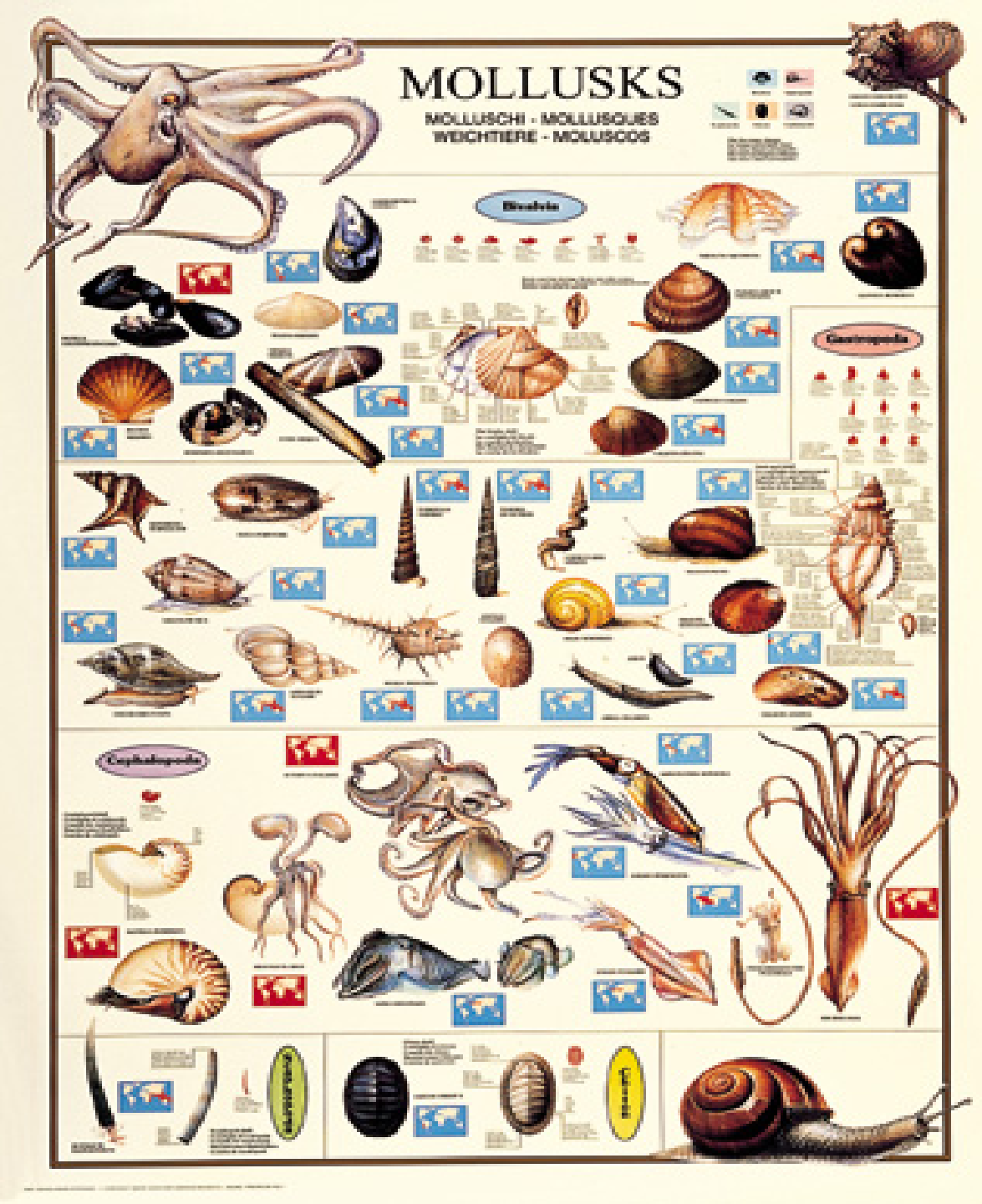
A Clam

WWW.SCIENCE-TEACHERS.COM

Mollusks are soft-bodied animals with a hard protective covering.

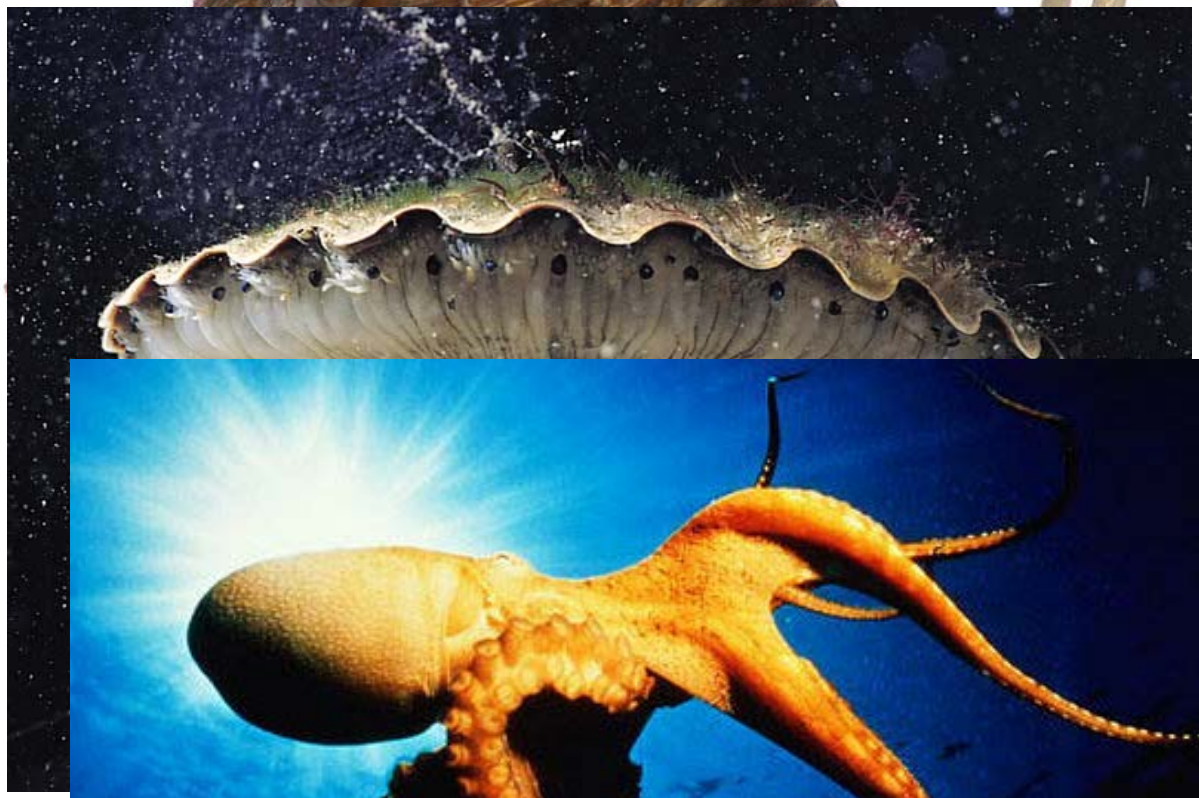
There are many types of mollusks,

There are many Mollusks that we eat!



The Mollusk Phylum has three Main classes:

1. Gastropods
   snails



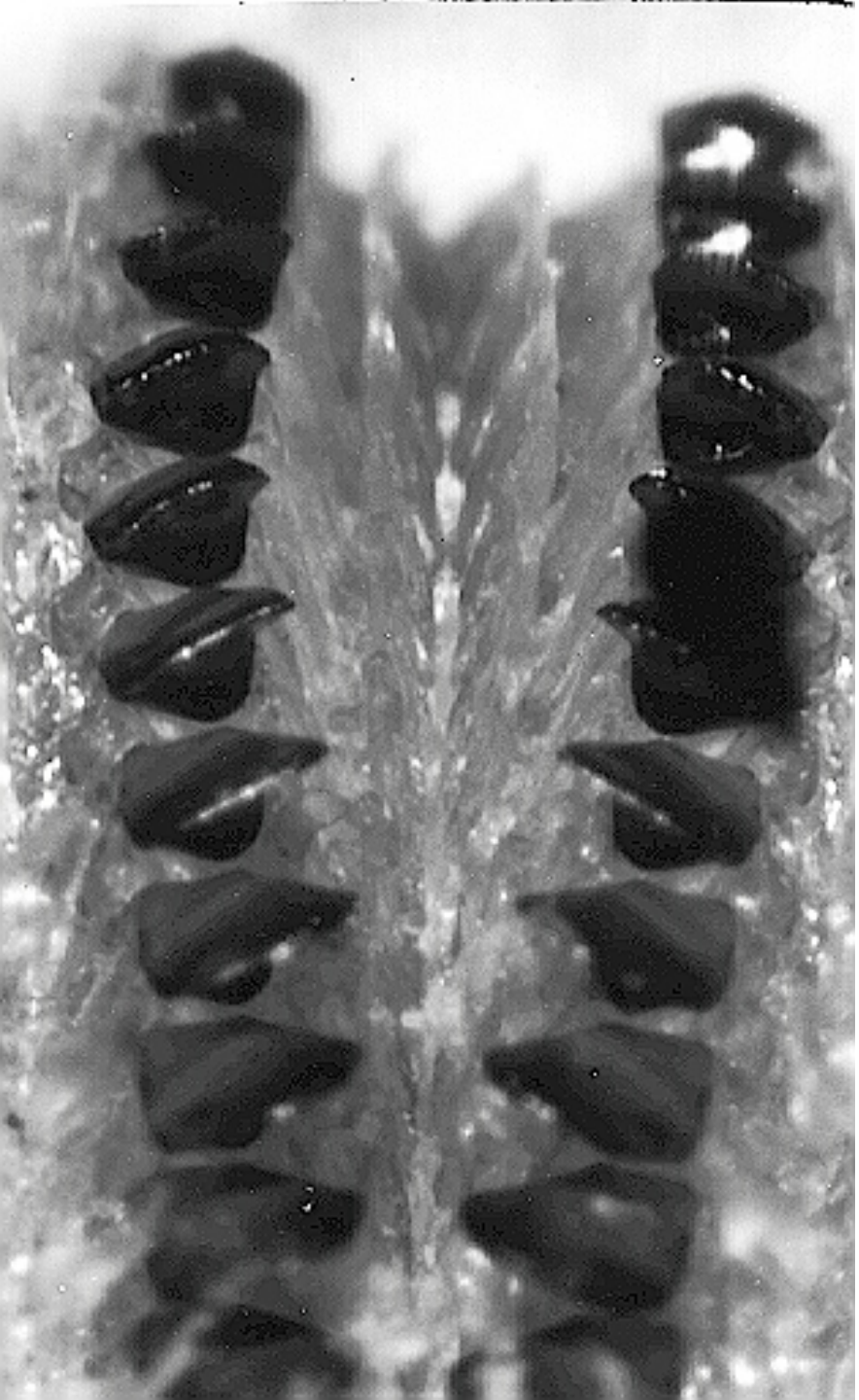
2. Bivalves
   clams

3. Cephalopods
   squid

Gastropods

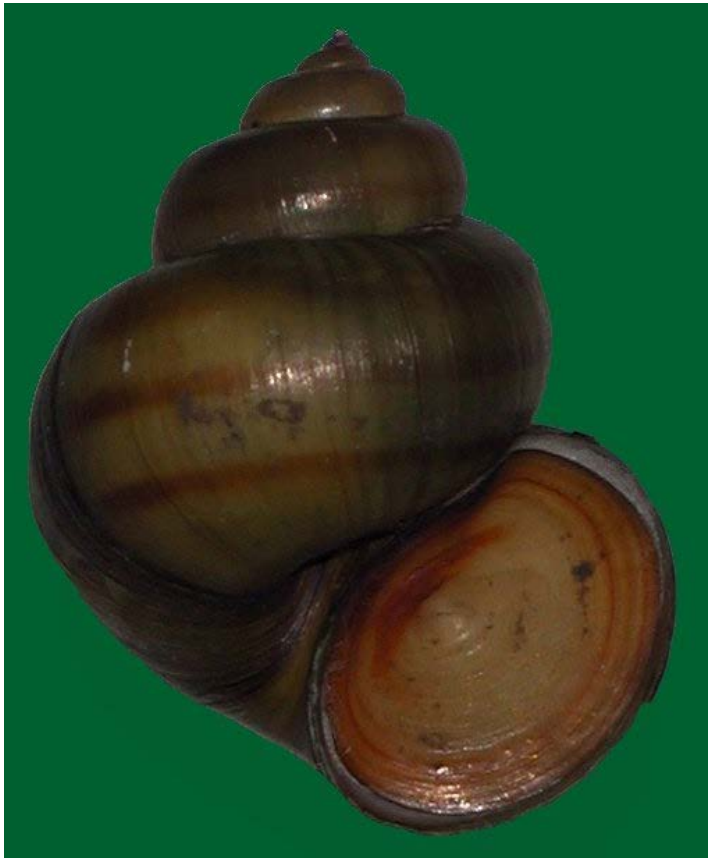
Stomach Foot

- Dominant species: *Littorina* (periwinkles)



Gastropods use a radula, a rough tongue,
to eat by scraping off food.

- Operculum



TIDE POOLS

- Micro-communities
- Large fluctuations
- *Enteromorpha (*Sea Lettuce*)*: green, fronds, high rate of photosynthesis

MIDDLE INTERTIDAL

- Dominant upper: barnacles (*Balanus*)
- Dominant mid: *Fucus*
- Dominant lower: *Mytilis*

Barnacles (*Ba*

- Avoids lower zo
  (seastar, dog w
  seaweeds

- Cementum: to attach
- Live close together
- Closed by plates (what is the purpose?)
- What is the purpose of the shape?

How do barnacles obtain food?

Suspension feeders: plankton & detritus

Cirri (6 pairs)

How do barnacles obtain food?

https://www.youtube.com/watch?v=66p3eNtbypU

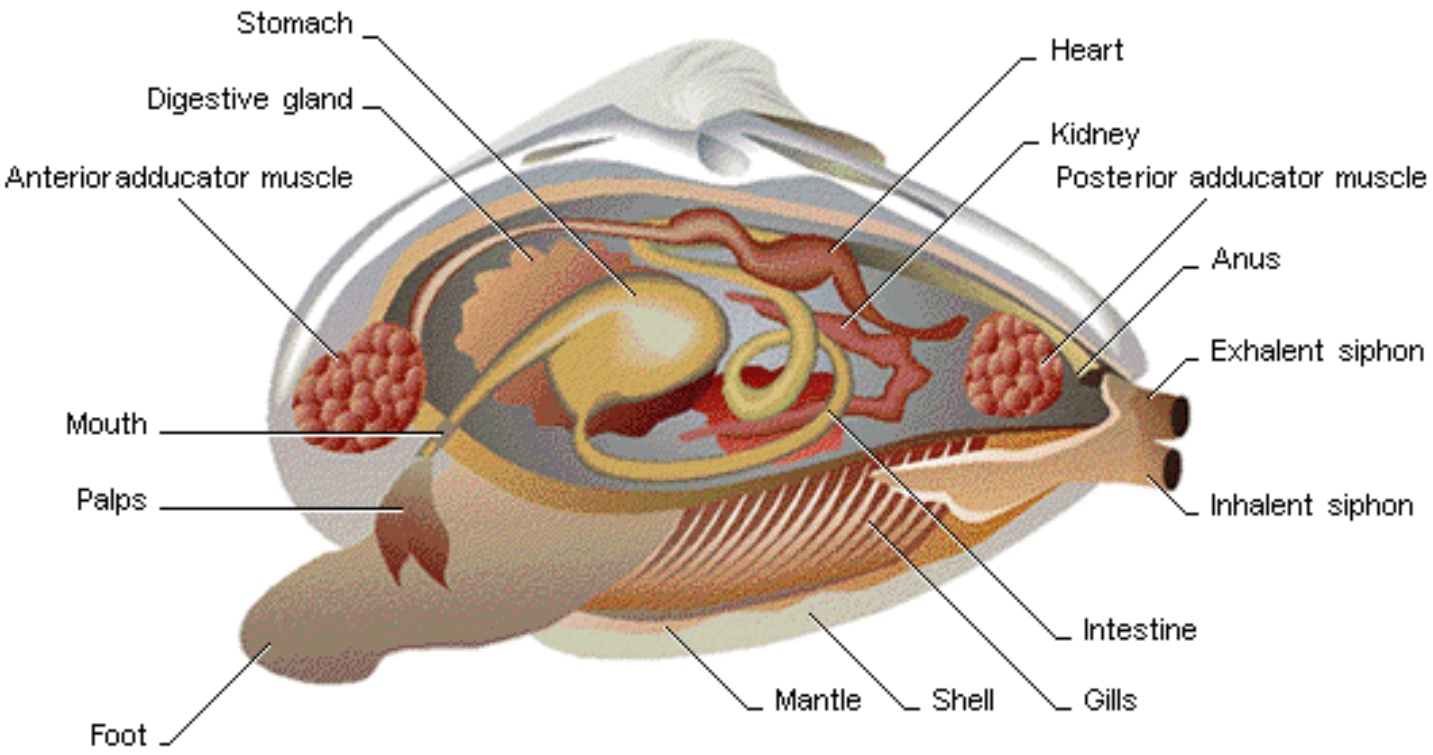
Brown Sea (*Fucus*)

- Softens waves for others


Substrate: what it attaches to

What are the air bladders for?

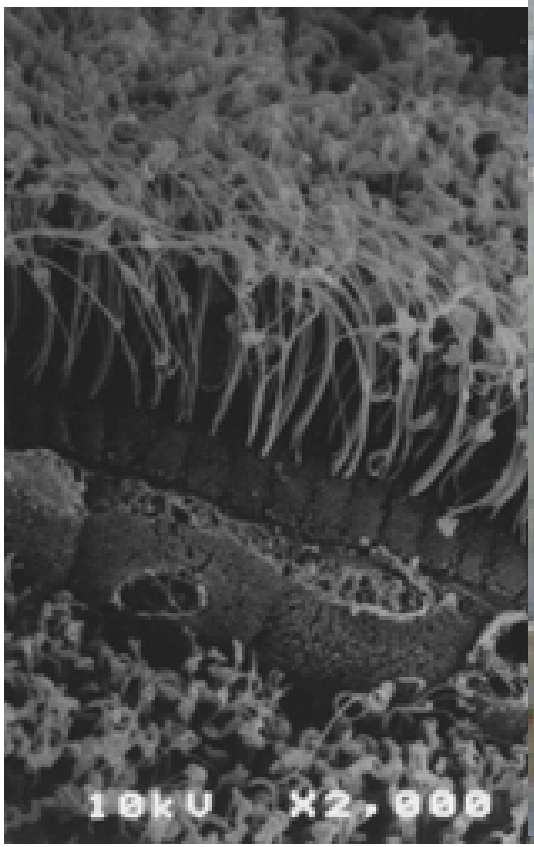

Holdfast
Substrate

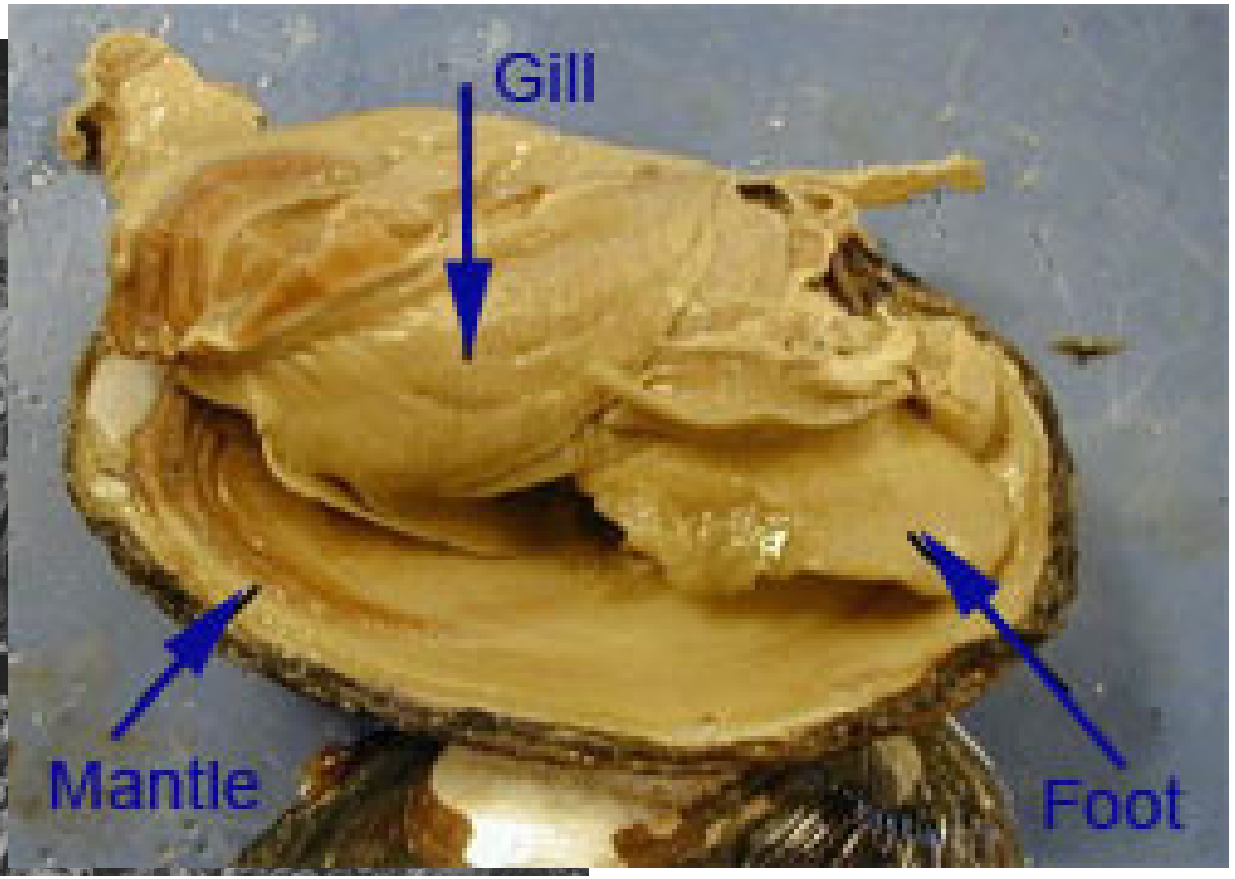


Mantle: which is protective tissue covering its body & produces shell

Muscular foot: for locomotion

- Byssal threads (beard): sec
  regenerate
- Streamlined to decrease friction (upper zones)





Gills:

breathing, obtain Oxygen from water

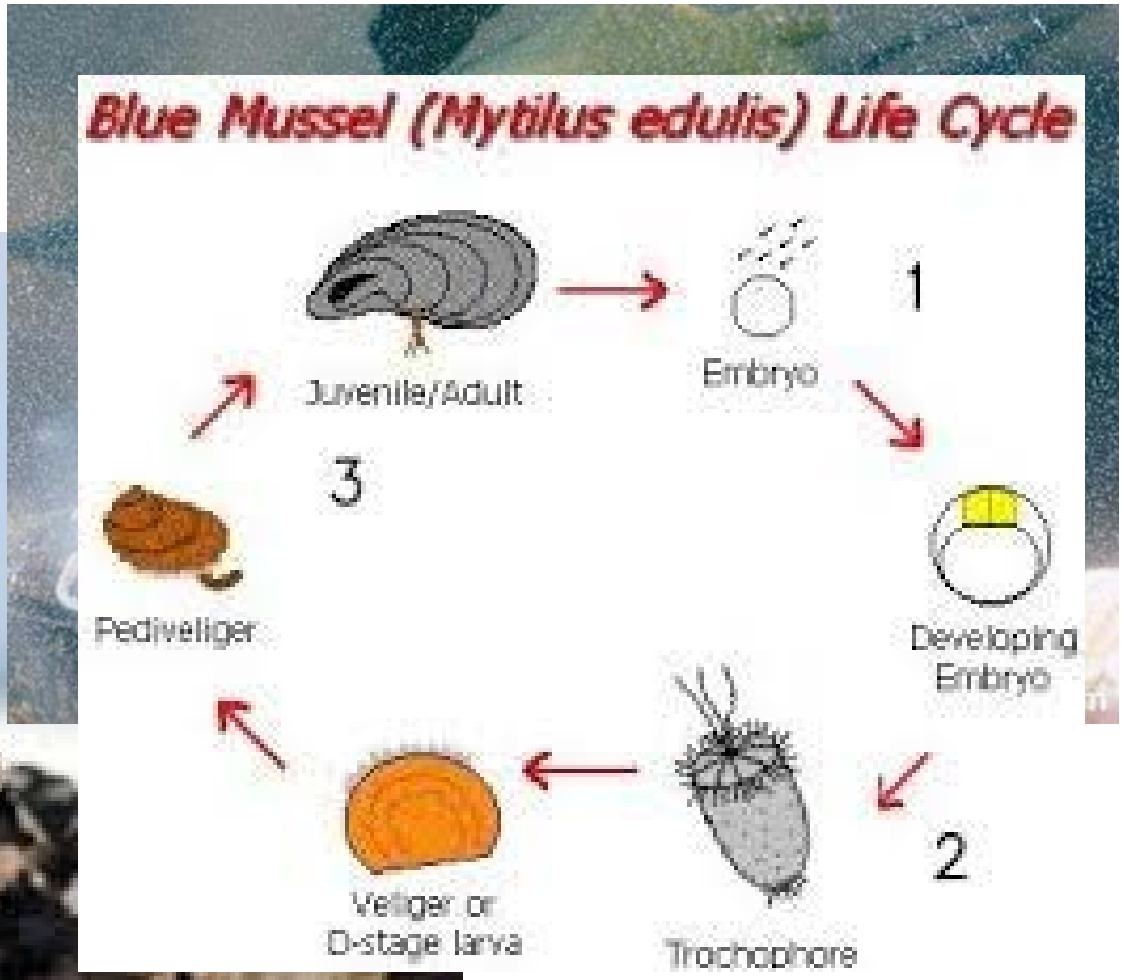
AND

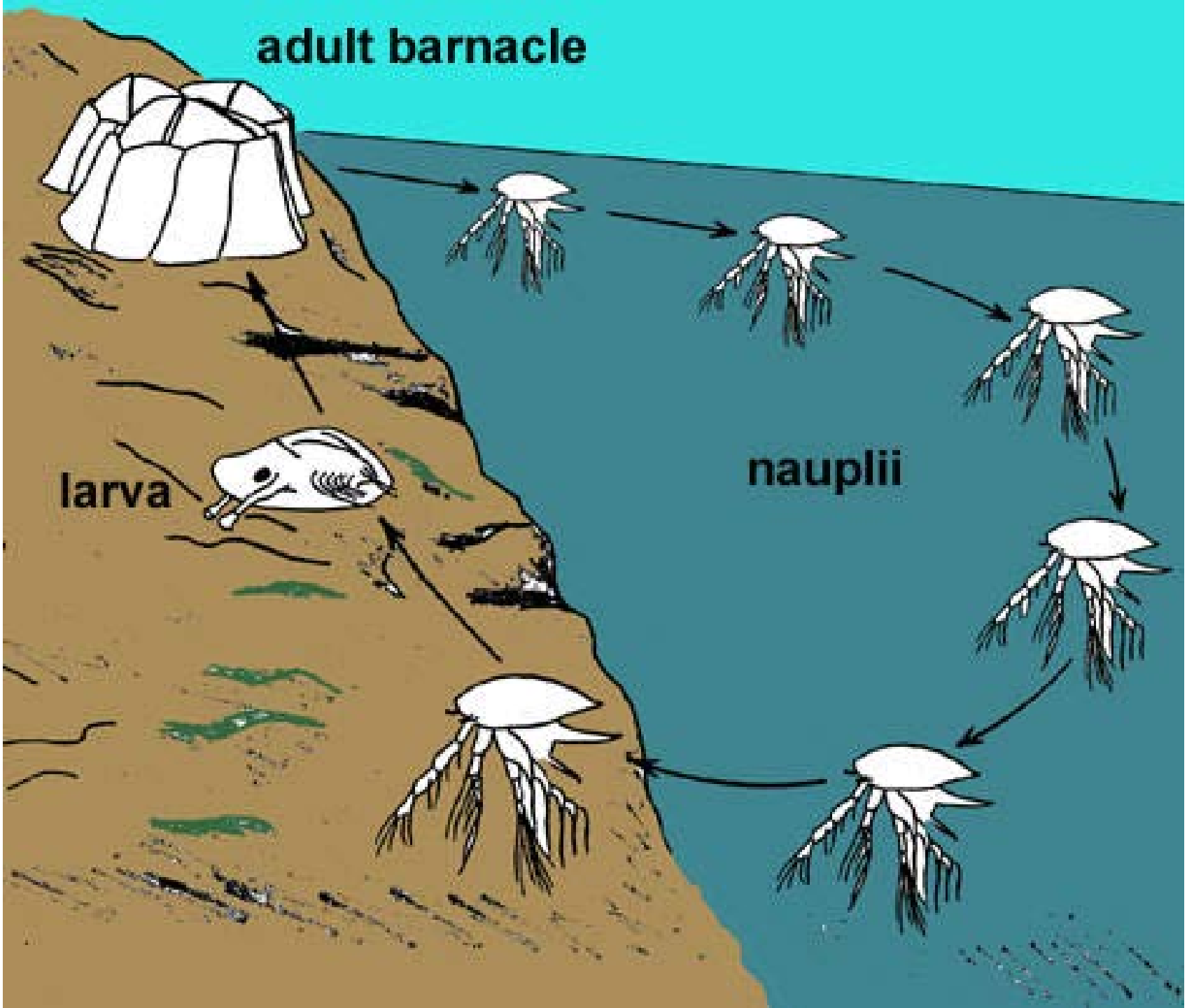
For filtering food from the water!

- Close tight to prevent desiccation/predation
- Predators: seastars, crabs, predatory snails, birds (lowest zones only)

Mytilus Zone

- Broadcasting fertilization
- Larvae




adult barnacle
larva
nauplii

Slipper Snails (*Crepidula*)

- Gastropod
- Filter feeders
- Muscular foot
- Change sexes

What is the main limiting factor in this area?

- Competition for space
- Predation & control on lesser species

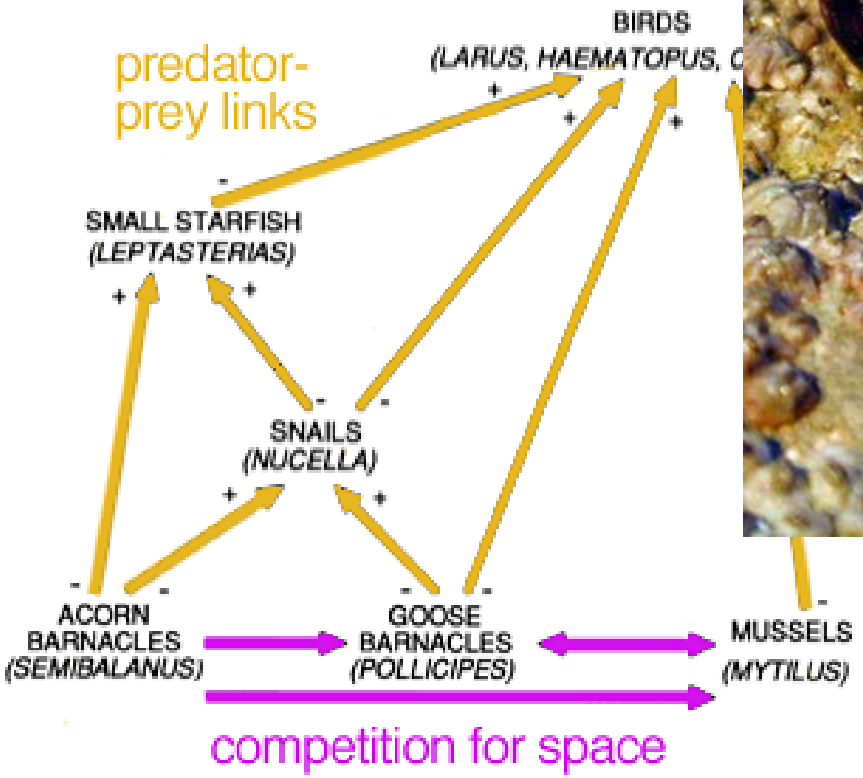
- If your 1st to a new area: effective dispersal by larvae

What stressors affect the critters?

Competition

- Light

- Limiting factors is space, NOT food



Spray or Splash Zone

The point where land ends and the sea begins is difficult to pinpoint. From the land we see a transition from land-based vascular (seed-bearing) plants to an assemblage of lichens. It is interesting to note, however, that the land plants are often examples of things not found elsewhere, like the Seaside-Plantain. They, like all of the plants and animals of the coast, have evolved special adaptations to survive in an ecosystem of extreme conditions. This highest band is known as the spray or splash zone.

Black Zone

An extreme high tide mark (one which feels the influence of saltwater only every two weeks) is characterized by a patchy encrustation of black lichens, a few Rough Periwinkles, and a blue-green algae, *Calothrix*. This zone is known as the black zone.

Barnacle Zone

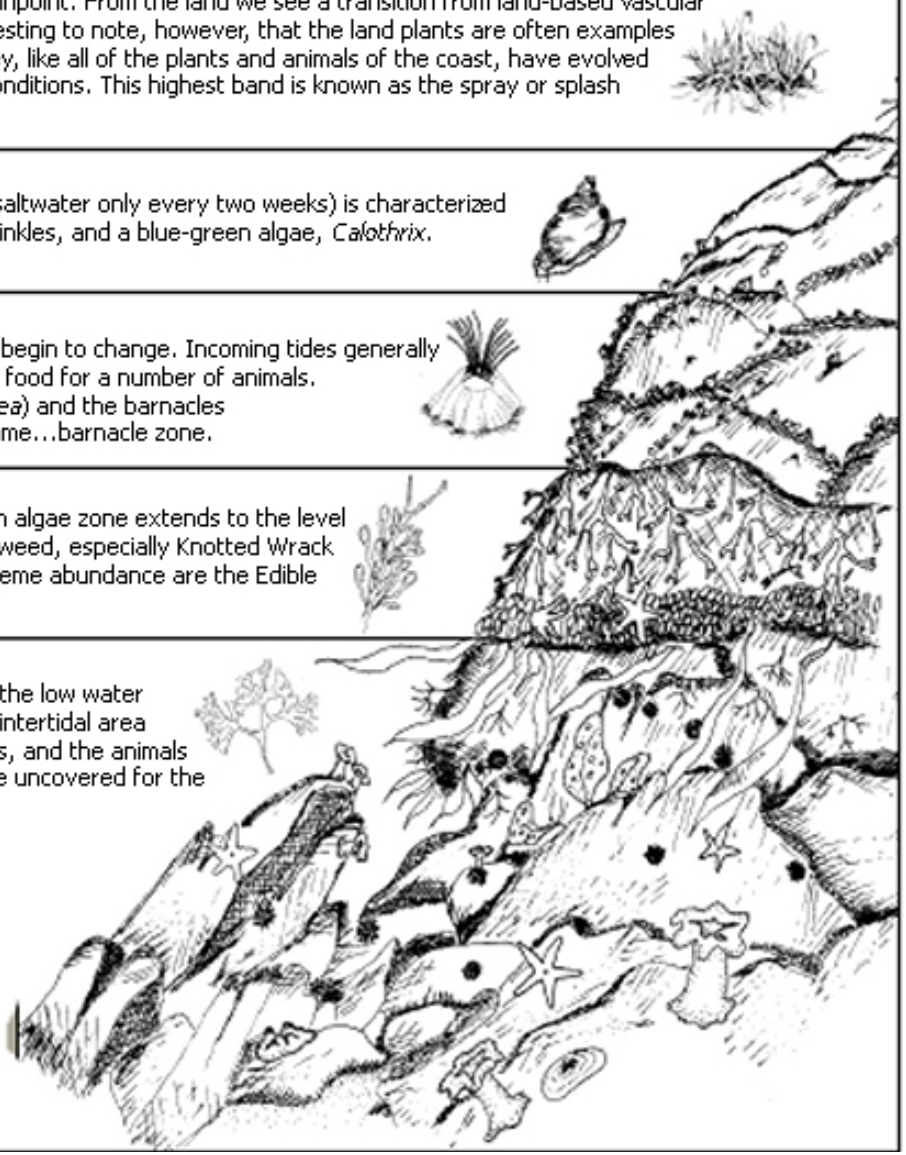
Farther down the beach, the diversity and abundance of life begin to change. Incoming tides generally flood this high intertidal area every day, providing necessary food for a number of animals. The most common are the Common Periwinkle (*Littorina littorea*) and the barnacles (primarily *Balanus balinoides*) from which this zone gets its name...barnacle zone.

Brown Algae Zone

Midway down the shore, below the barnacle zone, the brown algae zone extends to the level of mean low water. Here a marked increase in the fucoid seaweed, especially Knotted Wrack (*Ascophyllum nodosum*), can be detected. Also found in extreme abundance are the Edible or Blue Mussel, the Smooth Periwinkle, and barnacles.

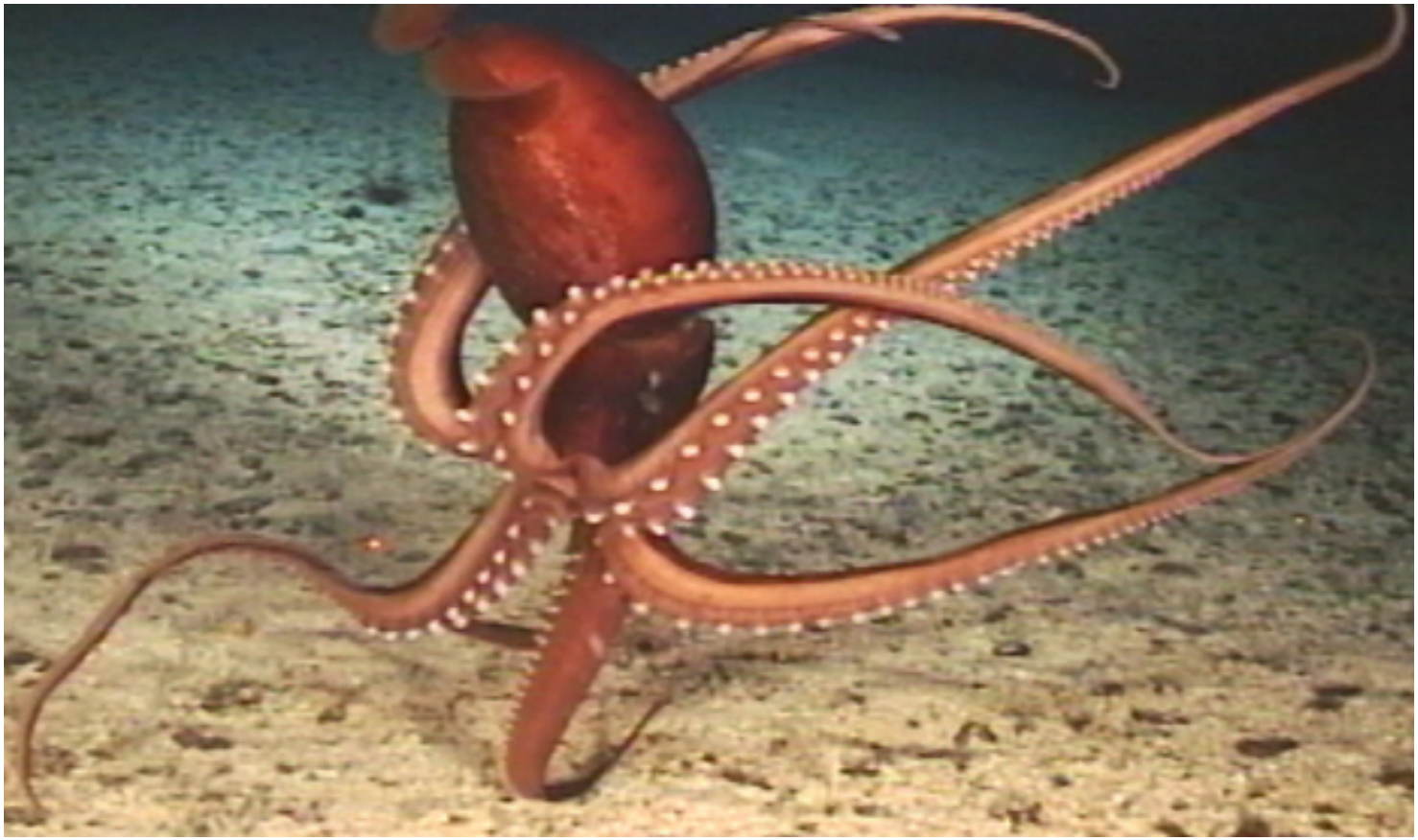
Irish Moss Zone

From the end of the brown algae zone and extending below the low water mark is the Irish Moss zone. This lowest section of the rocky intertidal area displays the greatest diversity and abundance of living things, and the animals and plants of greatest size. This is primarily because they are uncovered for the least amount of time.



CEPHALOPODS

octopi and squid.



Cephalopod means “head-foot”.
Can you see why it has this name?

Octopus Escape National Geographic
https://www.youtube.com/watch?v=SCAIedFgdY0

<u>Cephalopods have many advancements:</u>

1. Closed circulatory system (blood always within heart or veins)

2. A foot divided in to tentacles

3. A well-developed nervous system with eyes

Fact or fiction?

Here is a photo of a real giant squid.

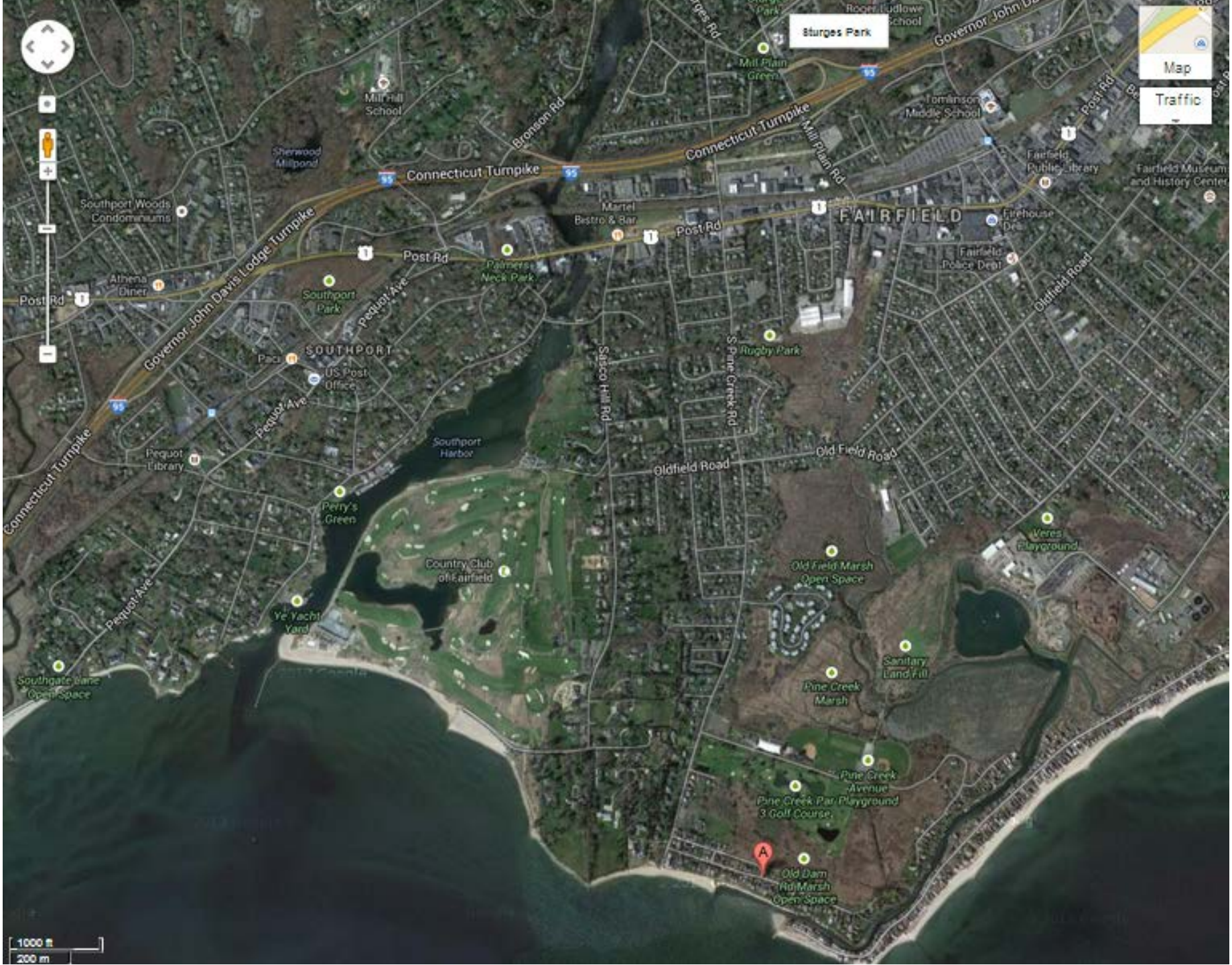
http://www.youtube.com/watch?v=U2s3C0lkQE0

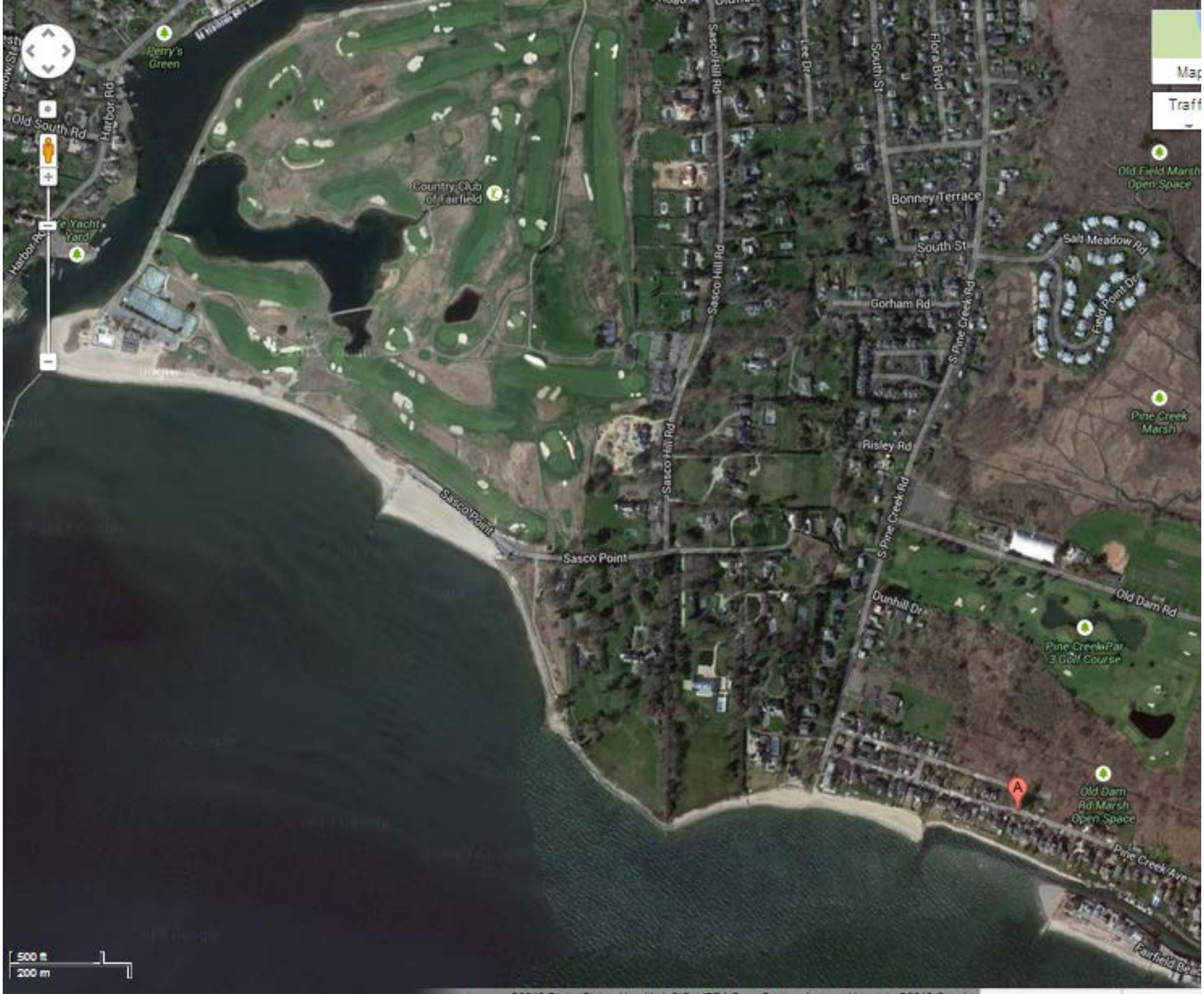

© Conor Bofin

The squid in the previous picture measured 50 feet long and weighed 5000 lbs.! It's eyes would be almost the size of a soccer ball.

And here's an interesting fact….in the water, Giant squid are "Horace Mann" maroon in color. Perhaps we should reconsider our mascot?

Kings of Camouflage Video


Sturges Park
Mill Plain Green
Roger Ludlowe School
Governor John D
Map
Traffic
Mill Hill School
Bronson Rd
Connecticut Turnpike
Tomlinson Middle School
Post Rd
Mill Plain Rd
Fairfield Public Library
Fairfield Museum and History Center
Sherwood Millpond
Southport Woods Condominiums
Martel Bistro & Bar
FAIRFIELD
Firehouse Deli
Fairfield Police Dept
Palmers Neck Park
Athena Diner
Southport Park
Pequot Ave
Governor John Davis Lodge Turnpike
SOUTHPORT
US Post Office
Rugby Park
Sasco Hill Rd
S. Pine Creek Rd
Oldfield Road
Old Field Road
Southport Harbor
Pequot Library
Perry's Green
Veres Playground
Country Club of Fairfield
Old Field Marsh Open Space
Ye Yacht Yard
Sanitary Land Fill
Pine Creek Marsh
Southgate Lane Open Space
Pine Creek Avenue
Pine Creek Par 3 Golf Course
Playground
Old Dam Rd Marsh Open Space
A
1000 ft
200 m


Berry's Green
Old South Rd
Harbor Rd
Country Club of Fairfield
Yacht Yard
Sasco Hill Rd
Lee Dr
South St
Flora Blvd
Bonney Terrace
Old Field Marsh Open Space
South St
Salt Meadow Rd
Field Point Dr
Gorham Rd
S Pine Creek Rd
Pine Creek Marsh
Risley Rd
Sasco Point
Dunhill Dr
Old Dam Rd
Pine Creek Par 3 Golf Course
Old Dam Rd Marsh Open Space
Pine Creek Ave
Fairfield Be
500 ft
200 m


Map
Traffic
Old Field Marsh Open Space
Bonney Terrace
South St
Salt Meadow Rd
Field Point Dr
Gorham Rd
S Pine Creek Rd
Sasco Hill Rd
Flora Blvd
Old Field Dr
Mellow St
Veres St
Veres Playground
Richard White Way
Sanitary Land Fill
Pine Creek Marsh
Risley Rd
Dunhill Dr
Old Dam Rd
Pine Creek Avenue Playground
Pine Creek Par 3 Golf Course
Old Dam Rd Marsh Open Space
Pine Creek Ave
Fairfield Beach Rd
500 ft
200 m

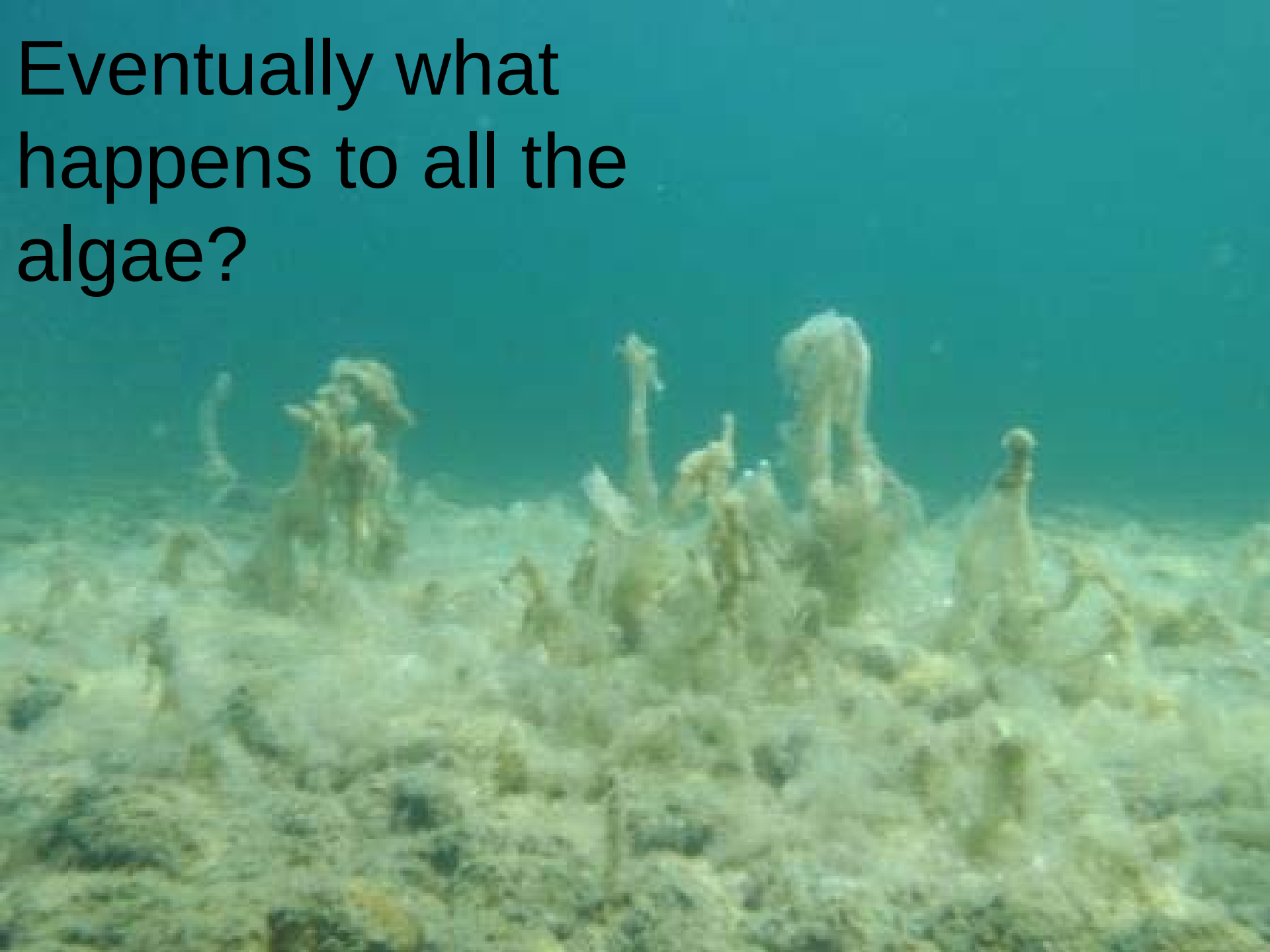
Point source pollution

Nonpoint source Pollution

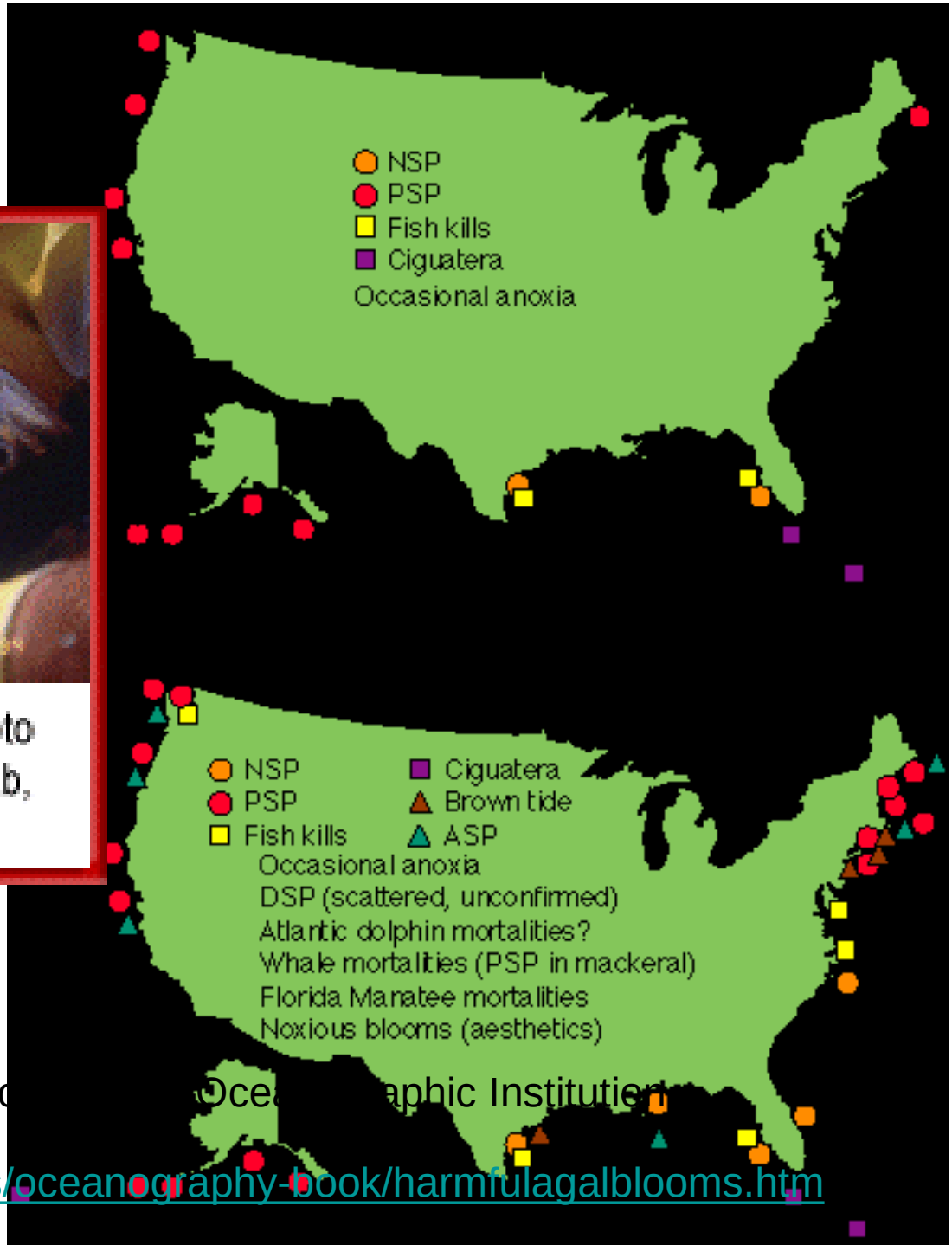
What happens when the fertilizers run-off to LIS?

Algae bloom

Eventually what happens to all the algae?



Pfiesteria-related fish lesions. Photo courtesy of the Aquatic Botany Lab, North Carolina State University.



From Harmful Algal Bloom project, Wo Ocea aphic Institution

http://oceanworld.tamu.edu/resources/oceanography-book/harmfulagalblooms.htm