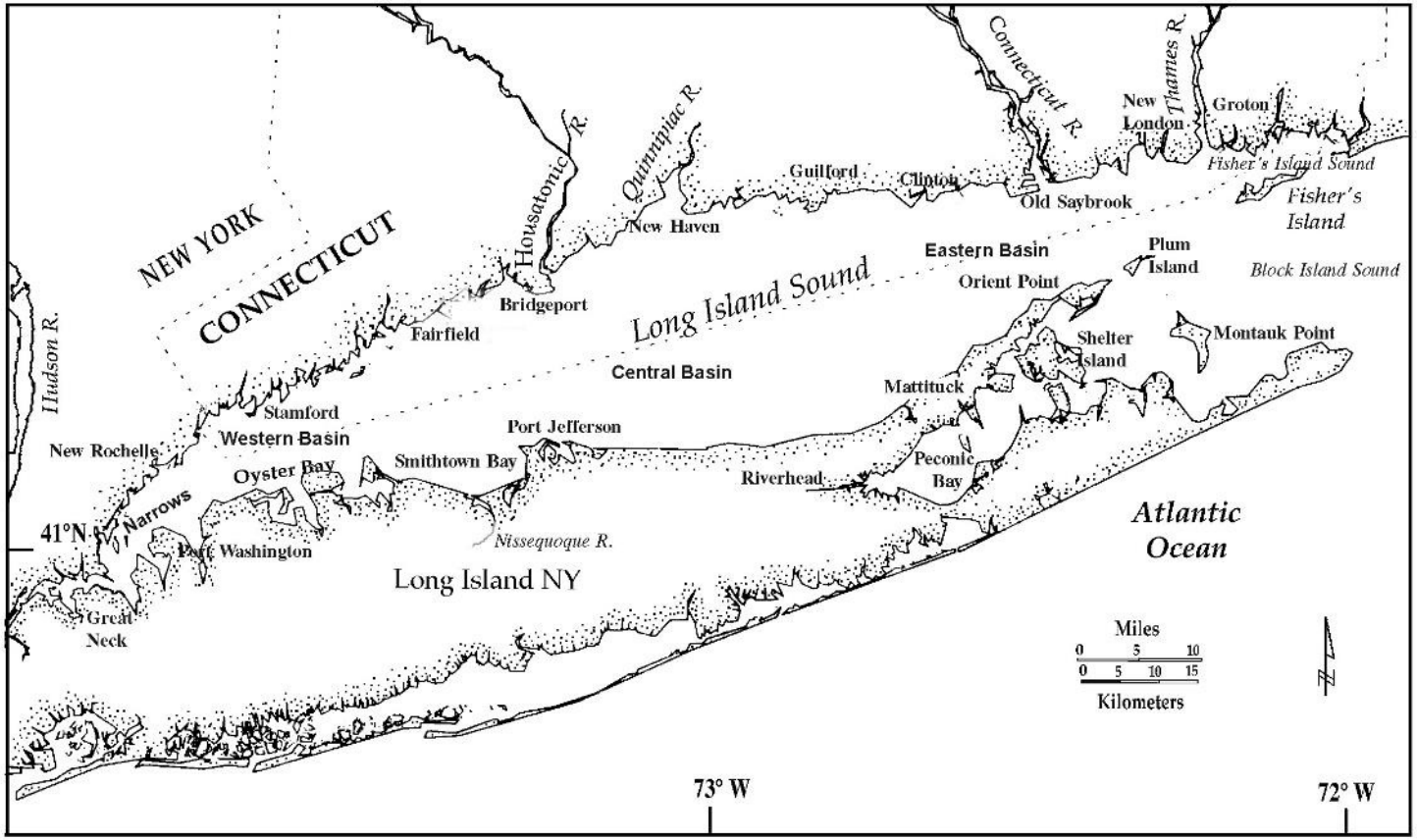
Living Treasures:

The Plants and Animals of Long Island Sound

Nancy Balcom, Connecticut Sea Grant; updated 2021

Long Island Sound is bordered on the south by Long Island, New York and on the north and west by the coasts of Connecticut and Westchester County, New York



Long Island Sound is the nation's second largest estuary – a special place where fresh water from rivers and streams and salt water from the ocean meet and mix

- Estuaries are among the most productive ecosystems in the world, providing feeding, breeding, nesting and nursery areas for many animals
- They are water bodies of constantly changing conditions, such as temperature and salinity
- Plants and animals that live in estuaries must be able to tolerate these changes; many have special adaptations that help them cope
- More than 170 fish species and 1,200 invertebrate species live year-round or seasonally in Long Island Sound

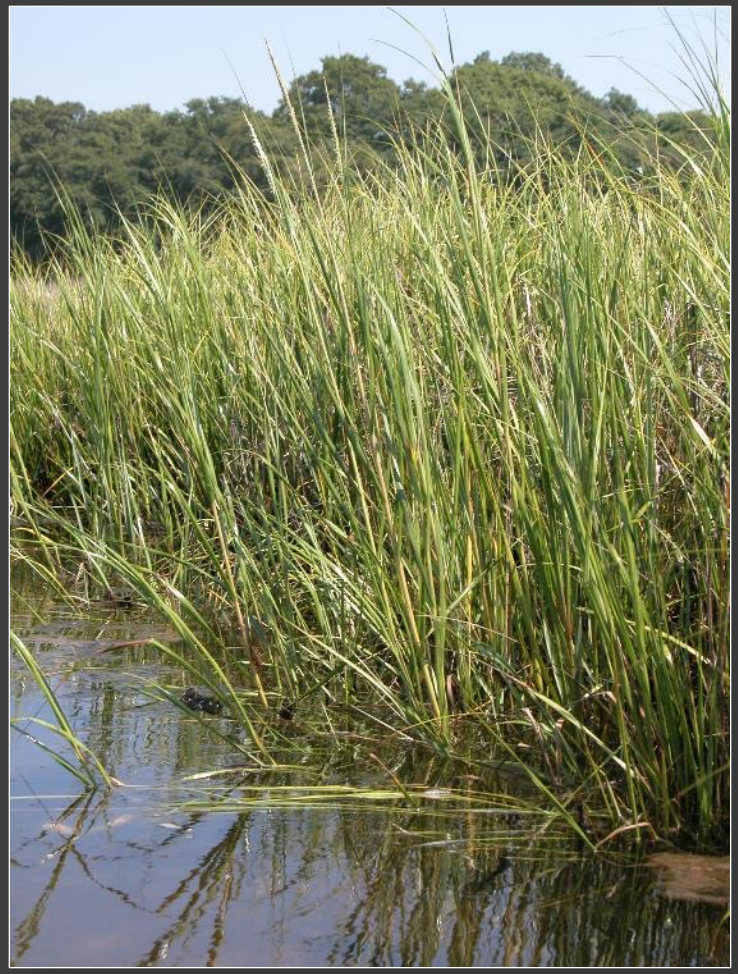
Habitat: It's Where You Live

- Long Island Sound has a broad range of habitat types, which in turn support a wide variety (diversity) of plant and animal species
- A habitat meets the primary needs of organisms, including food, water, air, and shelter
- Primary habitat types in the Sound are:
  - Salt marshes
  - Sandy beaches
  - Tidal flats
  - Rocky intertidal
  - Submerged bottom
  - Open water

Salt Marshes: Nature's Nurseries


A salt marsh serves many important roles in the Sound's ecosystem — nursery, filter, sponge, and nutrient source

Mosquito ditches crisscross the marsh; they were originally hand-dug to combat diseases carried by mosquitoes, which breed in pools of standing water



- Salt marshes have distinct zones of vegetation determined by elevation
- Tall saltmarsh cordgrass grows along the water's edge in the low marsh, which is regularly flooded by the tides; this grass tolerates changing water level, salt concentration, and temperature

The high marsh is flooded only during storms or unusually high tides; saltmeadow cordgrass and spikegrass (inset) dominate this part of the marsh

Salt pannes are small, “desert-like” depressions in the marsh, where soil salinity can reach levels that are almost twice that of full-strength sea water

Glasswort, a succulent plant, grows in the salt pannes and along the edges of the saltmarsh, looking like a field of tiny, spineless cacti; some species turn reddish in the fall

Sea lavender, with its delicate purple flowers and wiry stems, grows in salt pannes and the low marsh

Ribbed mussels grow along the edges of tidal creeks in salt marshes, providing food for terrestrial mammals and other organisms

Fiddler crabs burrow into the sand, mud and peat at edges of saltmarshes; male crabs have one greatly enlarged right or left pincer for combat and mating rituals; the claws of females are about equal in size

The longwrist
hermit crab,
carrying an empty
snail shell on its
back for protection,
moves about in the
shallows of the
marsh and tidal flats

As it outgrows its
shell, it needs to find
a new, larger one

Green crabs inhabit the Sound's marshes, rocky areas and tidal flats; voracious eaters of bivalve shellfish, they also eat seaweed and worms and other crabs

Tidal creeks and mosquito ditches winding through the salt marsh shelter small fish from most larger predators, while blue crabs forage for prey in these creeks

Striped killifish and other minnows rely on camouflage coloration and swimming in schools to confuse their predators

Atlantic silversides, named for the silvery metallic stripe along their bodies, are an important source of food for predators like striped bass and bluefish

The uplands are a transition zone from marsh to forest, and are home to many shrubs and broad-leaved plants

Common reed or *Phragmites* often grows in dense stands at the upland edge of disturbed marshes; the thick stems can reach 15 feet tall

Sumac is a shrub that grows in the upland zone, providing food and shelter for birds

Two sparrow species of special concern, the seaside sparrow (left) and the saltmarsh sharp-tailed sparrow (right), rely on larger patches of salt marsh in Long Island Sound as key habitat; they build their nests in the marsh grasses

Great egrets (left) and snowy egrets (right) are commonly found wading in the shallows of salt marshes and tidal channels to spear fish; most are colonial nesters

The great blue heron (left) and green heron (center) feed on fish while the glossy ibis (right) feeds on aquatic invertebrates

Clapper rails live in salt marshes; they use the marsh vegetation as refuges, especially at high tide; these birds feed on fiddler and other crabs, fish and plant matter

Diamondback terrapins live in the Sound's salt marshes and tidal creeks, eating a mixture of fish, snails, crabs and worms; once hunted for their meat, they are now protected in both Connecticut and New York

Tidal Flats: Low Energy Calm

Water currents near tidal flats are quieter, allowing mud or sand to settle out; the fine sands, silts, and clay particles trap a lot of organic debris, which is then broken down by bacteria and fungi

This translucent white sea cucumber, reaching up to 6 inches (15 cm) in length, is very common; it burrows into mudflats, sandflats and gravel in the intertidal zone and in deep water

Segmented bristled worms work the sand and mud, helping to bring oxygen down into the sediment

Food for other animals, bloodworms (top) and clam worms (bottom) are good fish bait, especially for winter flounder

A moon snail is a gastropod mollusc that uses its file-like mouth part to drill holes in bivalve molluscs for food; it constructs gelatinous sand grain egg cases, which sometimes can be found on the beach resembling fragile sand “collars”

Mud snails feed on detritus (decaying material) and algae on the surface of tidal flats

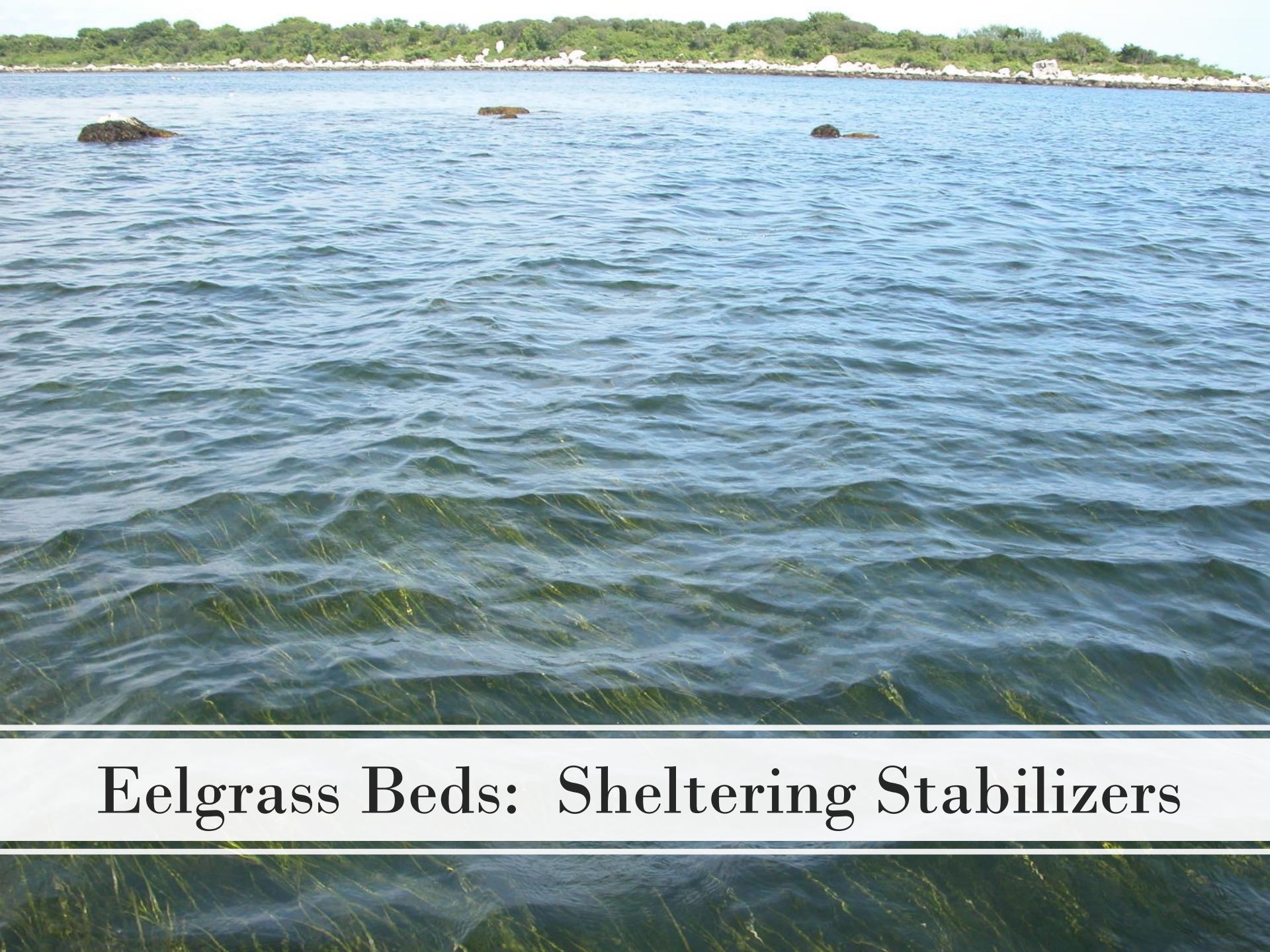
A hard clam feeds by drawing water in through one of its two siphons, straining plankton from the water, and discharging the water and its wastes through the other siphon

Often, the only signs that bivalve molluscs are present in tidal flats are their siphons extending from holes in the sand or mud as they filter microscopic plankton from the water

Softshell clams, also known as steamers or long-necks, live in deep burrows in the flats and shallows; when disturbed, they shoot up a spurt of water

Razor clams burrow in the mud or sand straight up and down; they are fast and deep “diggers”

Small, translucent sand shrimp burrow in the soft bottom sediments and are important food for other animals



Eelgrass Beds: Sheltering Stabilizers

Eelgrass grows in shallow waters where sunlight can reach deep enough to support the plant's growth; the roots help stabilize soft bottom sediments from being eroded by tidal currents

Many eelgrass beds in the Sound have disappeared due to disease, predation, or poor water quality

Eelgrass beds provide young fish and bay scallops with shelter from predators

Juvenile bay scallops attach to the eelgrass blades during their first few weeks, which may help them avoid predation from crabs

Translucent grass shrimp are common shallow-water inhabitants, finding shelter among aquatic vegetation such as eelgrass; they are preyed upon by many organisms

Mute swans dine heavily on eelgrass and the green seaweed, sea lettuce; their long necks enable them to reach down and pull the eelgrass out by its roots, destroying the beds

Canada geese also feed on aquatic vegetation and seaweed; they often concentrate in large flocks, and their wastes can cause local water quality problems

Sandy Beaches: Ever-Changing

Sandy beaches are high-energy habitats that constantly change throughout the year, reflecting the effects of tides, winds, storms, and currents

Red sand comprised of garnet (left) and slipper shells (right) deposited on sandy beaches by wind and waves

Beach sands may appear devoid of life, but many tiny animals live beneath and between grains of sand, or in the wrack line, the line of decaying seaweed and eelgrass that washes up along the high tide mark

Dune grass and plants help keep the sand in place; while the plants can withstand the harsh environment of a sandy beach, their root systems are fragile and easily damaged if walked on by humans

The upper side of each beach grass blade has 10-12 parallel ridges, alternating with grooves, that run from the base to the tip; this ribbed structure causes the leaves to roll up tightly when water is scarce and to unroll when water is available

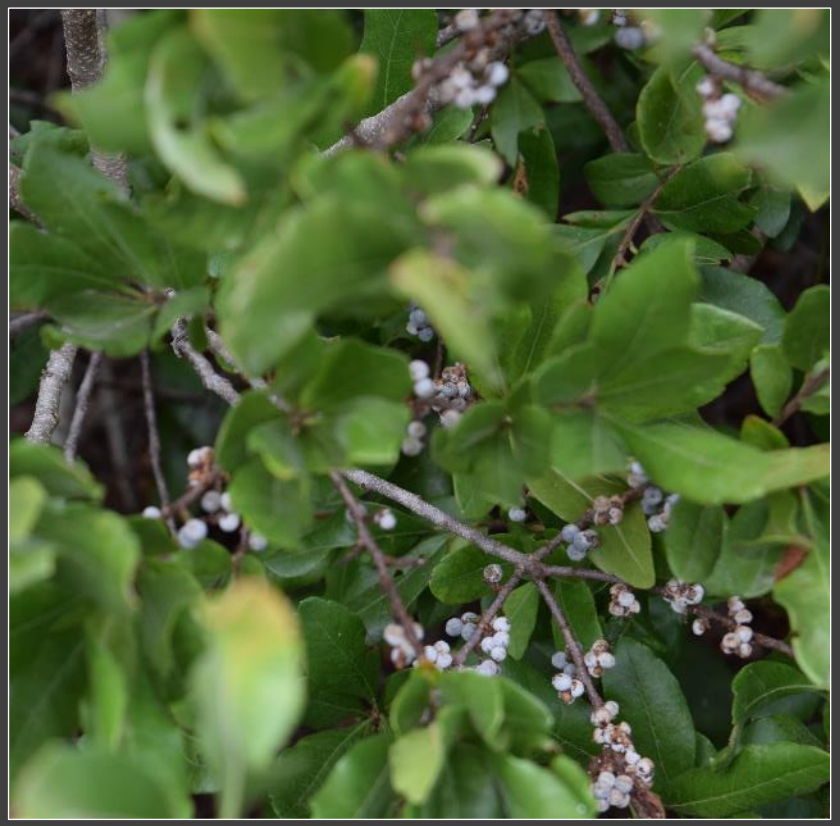
Beach pea grows on the dunes, helping to stabilize the sand while providing a splash of color throughout the summer; its dark brown seed pods (peas) are eaten by birds and mice

Rough cocklebur and northern seaside goldenrod are hardy plants that can call sandy or rocky beaches "home" - they help anchor beach sand in place

Other plants commonly found on sandy dunes and upper beaches are the American sea rocket (left) and saltwort (right); the seeds of the sea rocket float and are easily dispersed along the beach by water

Salt-spray rose, with its pink or white flowers and prickly stems, is common to the upper reaches of the beach; high in Vitamin C, the colorful fruit or rose hips can be used in tea or jelly

Bayberry bushes, with their waxy blue berries and sweet-smelling leaves, grow in the sandy soil of the upper beach among the dune grasses



The carnivorous channeled whelk (left) is one of the largest snails inhabiting the Sound; each disk of its parchment egg case (right) contains several fully formed baby whelks

Retracting its soft body into the shell, the snail uses the smaller dark oval-shaped shell or operculum (arrow) to protect itself from predators and to retain moisture

Horseshoe crabs are one of the most primitive arthropods; they have lived unchanged in form for more than 360 million years

Although they are arthropods, they are not true crabs, being more closely related to spiders and scorpions than they are to blue crabs and rock crabs

The front appendages of the burrowing mantis shrimp are similar to those of the praying mantis insect; barbs on these legs are used to quickly spear and crush prey

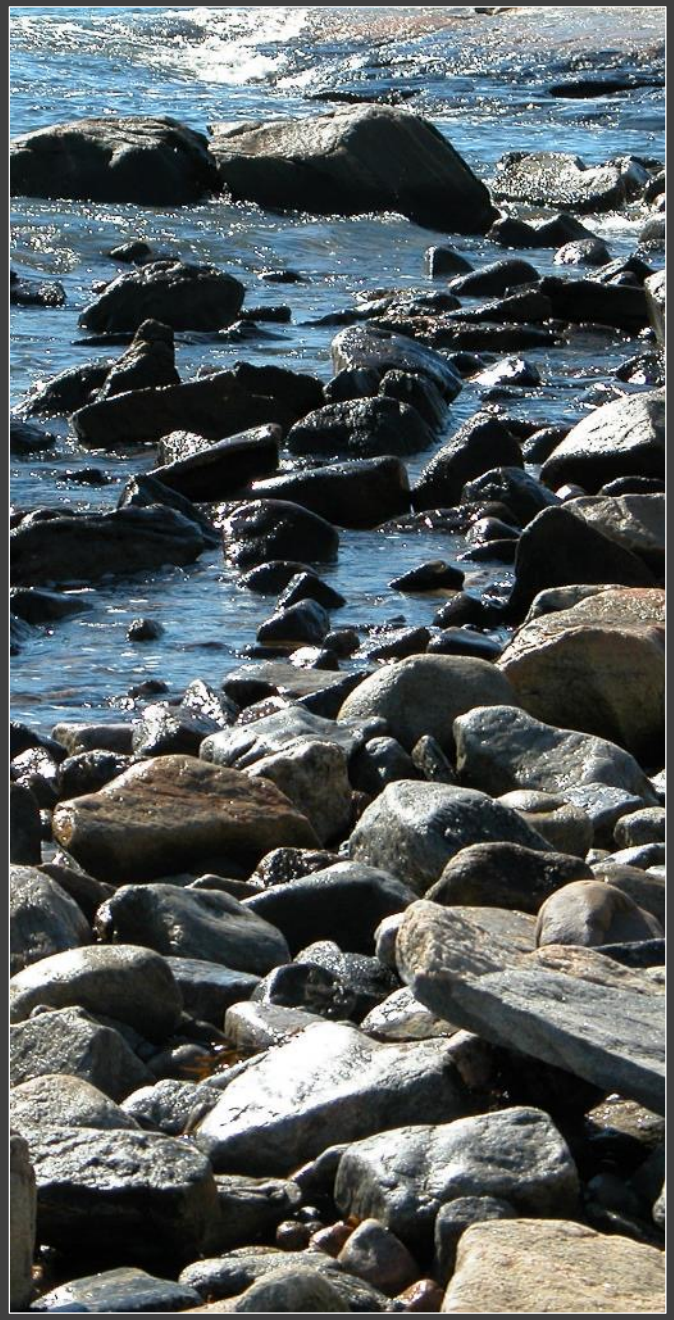
Sanderlings (above) and piping plovers (right) skitter up and down the beach at the water's edge, seeking small molluscs and crustaceans as the waves wash in and out

A black-bellied plover forages for worms, crustaceans or molluscs in wet sand; plovers have a distinctive behavior of running forward, pausing, looking or listening, then seizing their prey

American oystercatchers, recognized by their bright red bills, prefer sandy shelly beaches without predators for nesting

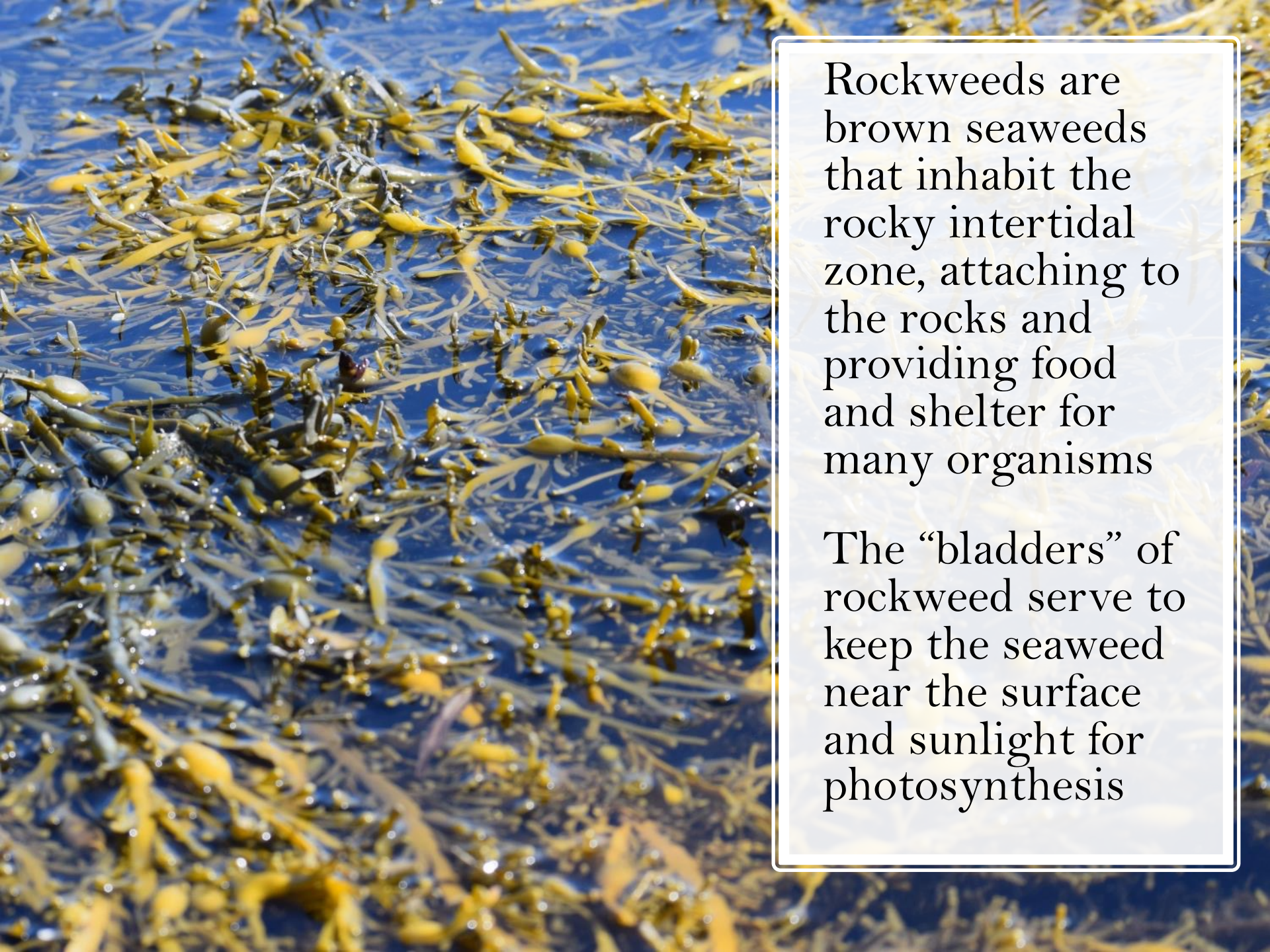
Common terns nest on rocky islands and barrier beaches, diving into open water for sand lances and other small fish, crustaceans and insects; they nest in colonies on sand, gravel or cobble near low-growing vegetation which provides cover for their chicks

Rocky Intertidal: High Energy Action



Intense wave action among the rocks, exposure to drying air during daily low tides, freezing winter and extreme summer temperatures, freshwater rainfall and predation create harsh conditions for organisms living in the rocky intertidal zone

Zonation is evident in the rocky intertidal zone - lighter bands of barnacles higher on the rocks give way to darker bands of periwinkle snails, blue mussels, and various seaweeds lower on the rocks



Rockweeds are brown seaweeds that inhabit the rocky intertidal zone, attaching to the rocks and providing food and shelter for many organisms

The “bladders” of rockweed serve to keep the seaweed near the surface and sunlight for photosynthesis

Green sea lettuce grows abundantly in nutrient-rich waters, and is grazed upon by snails, crabs, some fish, and waterfowl

Deadman's fingers, or green fleece, is a spongy, thick green alga (seaweed) that grows in the subtidal zone

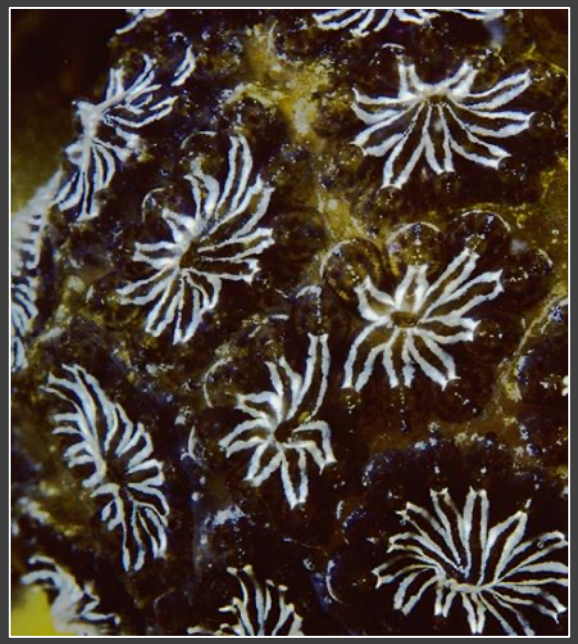
Irish moss is a red alga that grows in dense clumps at the low tide line; it serves as food and habitat for many other species

Periwinkles are snails that live in huge numbers in the rocky intertidal area, scraping algae off the rocks with their radula (tongue-like organ)

Blue mussels grow in large clumps in the intertidal zone, attaching to the rocks and each other with strong, elastic threads called byssus or byssal threads

Barnacles feed during high tide by waving feathery appendages through the water, sweeping plankton into their mouths; as the tide recedes, the valves at the top close tightly

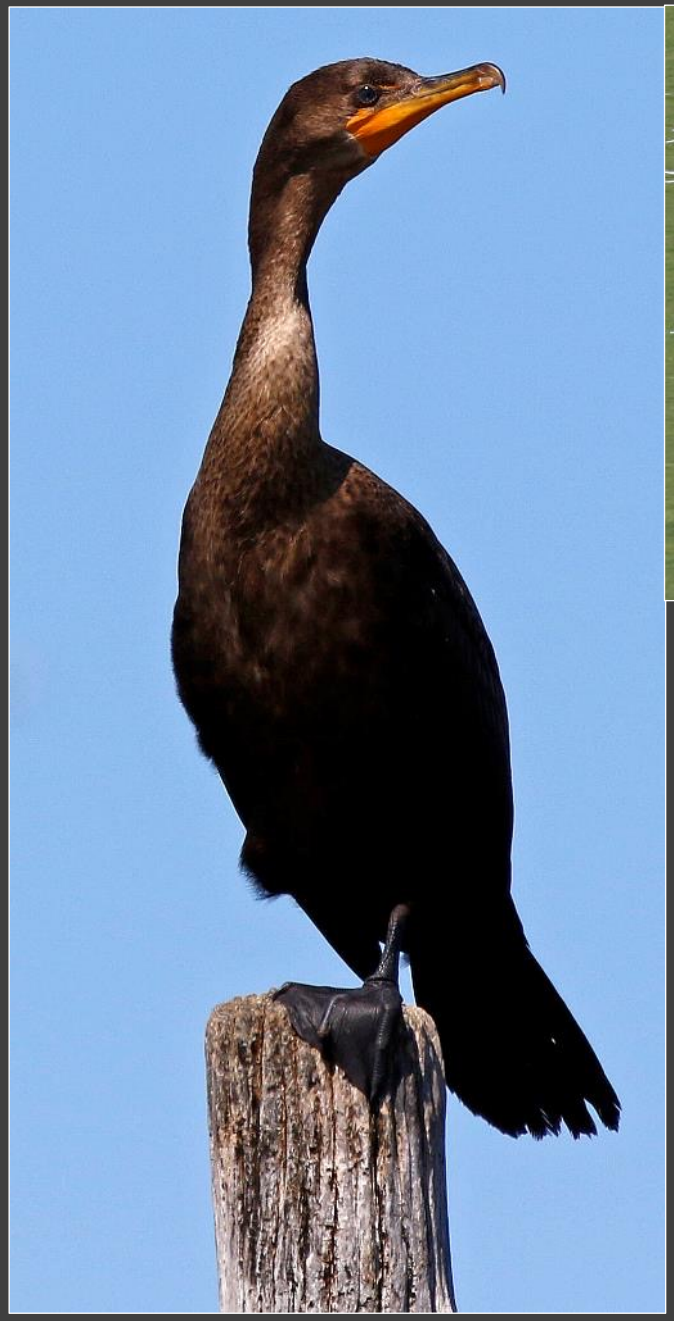
The Asian shore crab is a species endemic to Japan and Asia; introduced to Long Island in the early 1990s, it is the most dominant crab in the intertidal zone, easily found between and under rocks at low tide



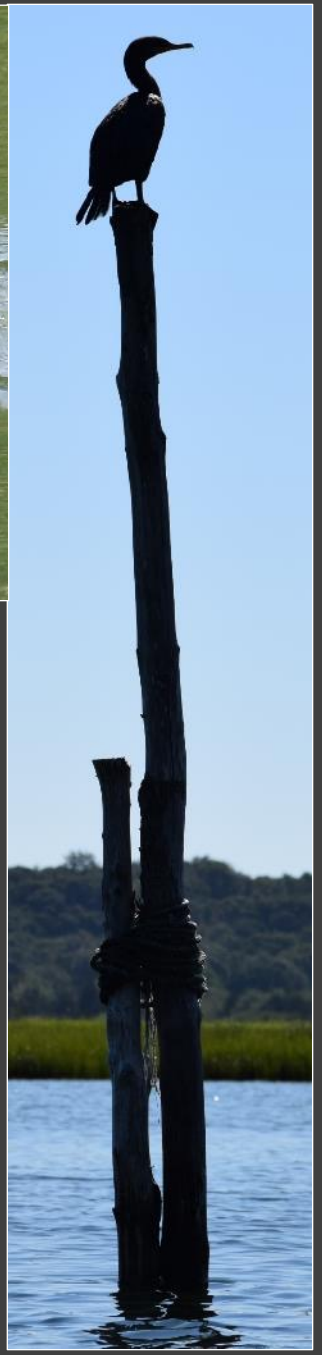
Several tunicate species or sea squirts inhabit the Sound; some are solitary organisms and others are colonial—made up of many individuals

Clusters of sea grapes are commonly found on pilings, floats, and docks; solitary tunicates, they have two siphons used to filter water and food and excrete wastes

Numerous gull species (‘seagulls”) live year-round or visit Long Island Sound, including the ring-billed gull (left) and herring gull (right) which nest in large colonies on islands from early May through July

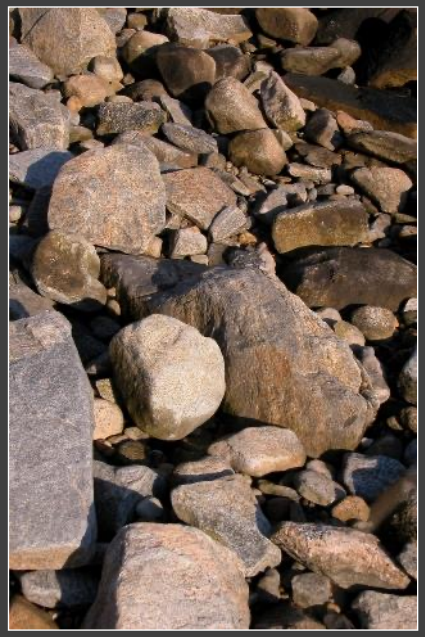


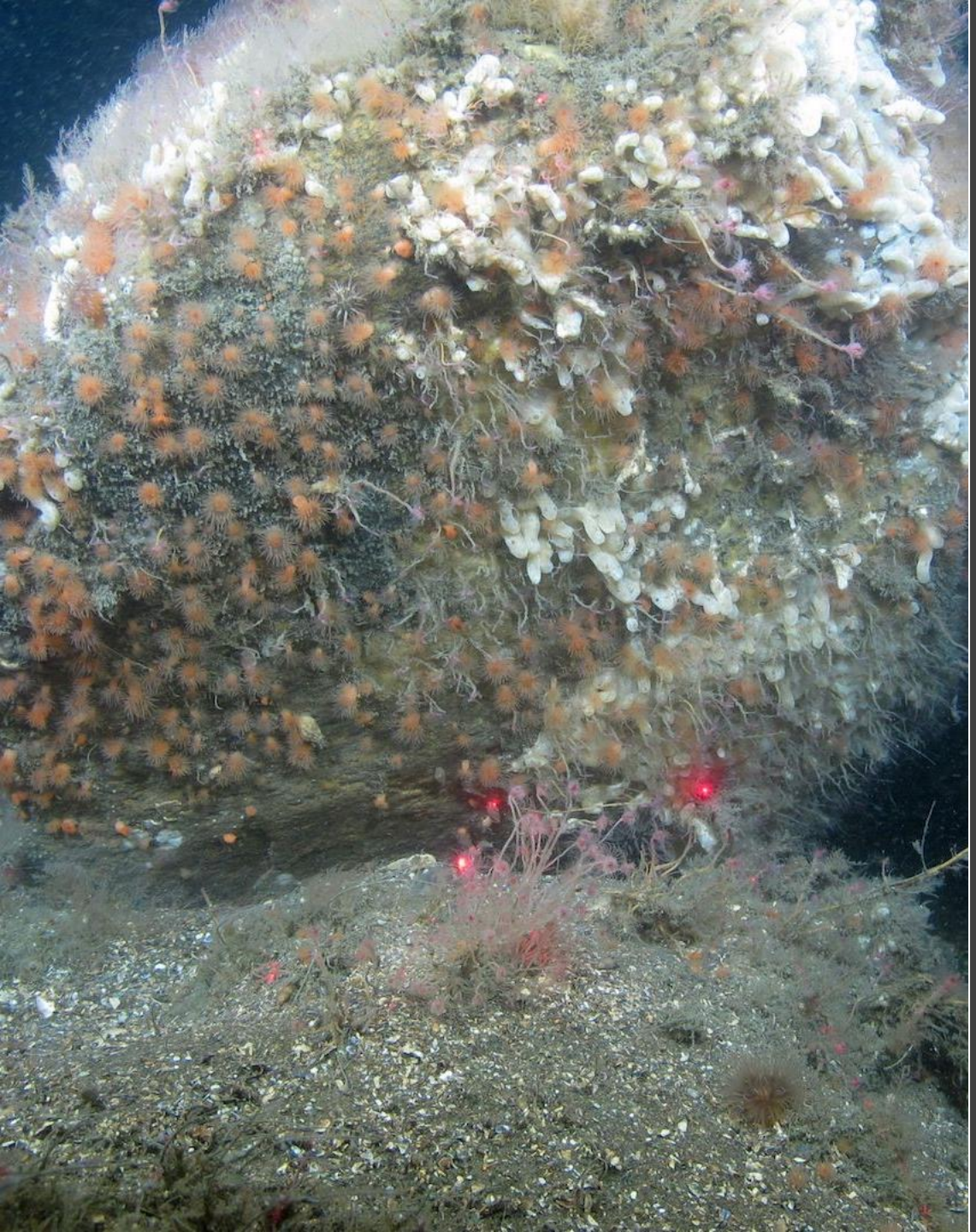
Double-crested cormorants live here year-round; they are more numerous in summer when they breed on rocky islands



Submerged Bottom: Mud to Boulders

The seafloor in Long Island Sound is as diverse as the habitats along the shore, varying from mud and silt, to sand, to cobble and boulders





Boulders, deposited by receding glaciers, provide structure and shelter for organisms living on or near the bottom of Long Island Sound

Brown kelp, a seaweed, grows in subtidal beds or “forests,” attaching to hard surfaces on the bottom with a holdfast; kelp holdfasts and blades provide food and shelter for many benthic and pelagic species

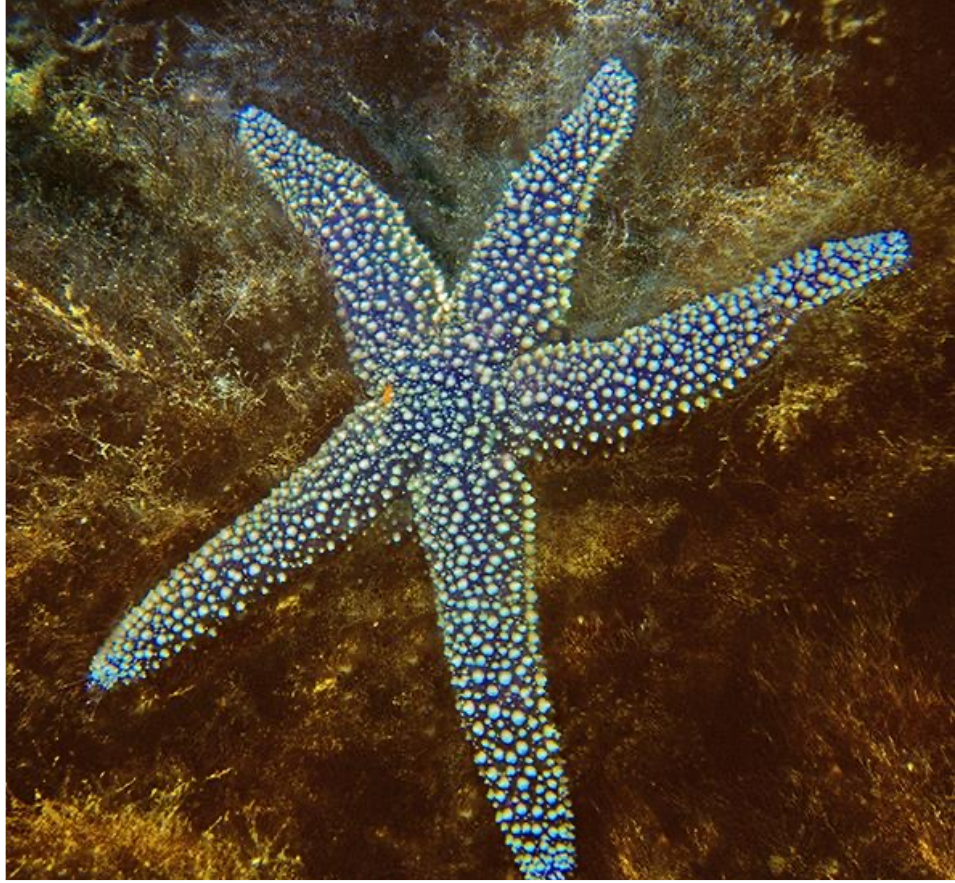
Kelp is farmed in Long Island Sound on longlines as a “sea vegetable”

Yellow breadcrumb sponges, pink tubularians and pink-orange ghost anemones feed by filtering plankton and particulates out of the water

Benthic rocky communities support attached organisms such as this frilled anemone, which, in turn, provide food and shelter for other organisms; anemones, with their stinging cells, are cnidarians

Lined anemones attach to hard surfaces such as rocks, shells or pilings; the tentacles capture and direct food particles to the mouth in the center

Corals are living colonies of individual cnidarians set within calcium carbonate shells; this northern star coral is found on rocky reefs in the Sound

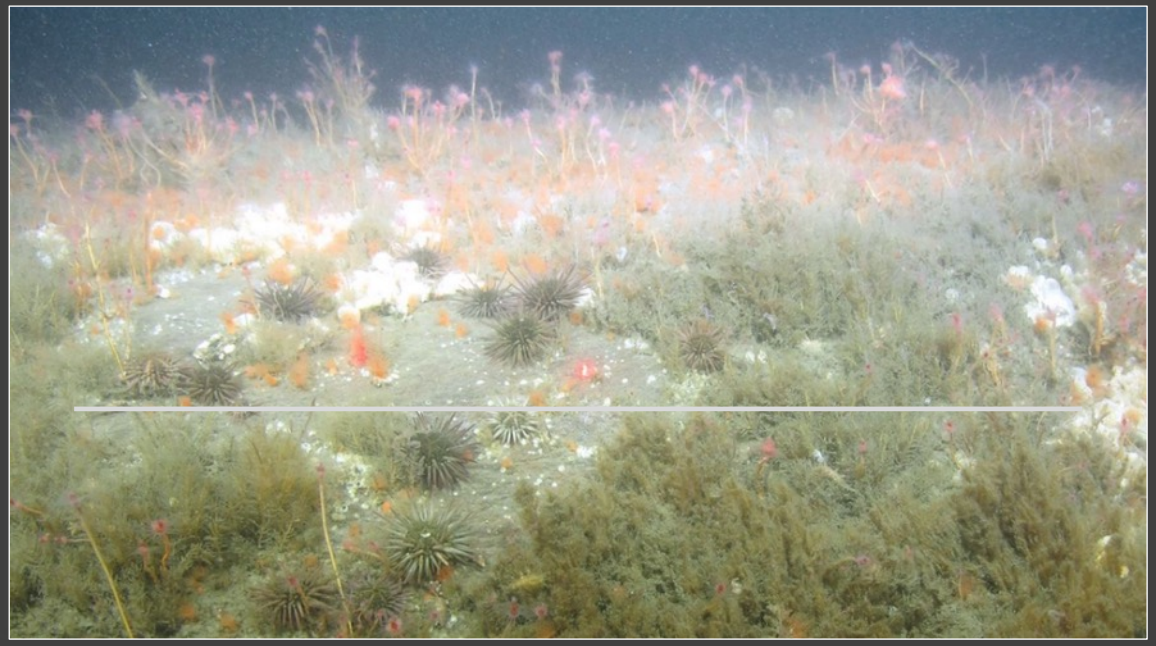


Echinoderms are spiny-skinned animals with five-part symmetry, like sea stars and sea urchins

Sea stars feed on shellfish, other invertebrates, and even fish, dead or alive

The blood star is another species of sea star that lives in Long Island Sound

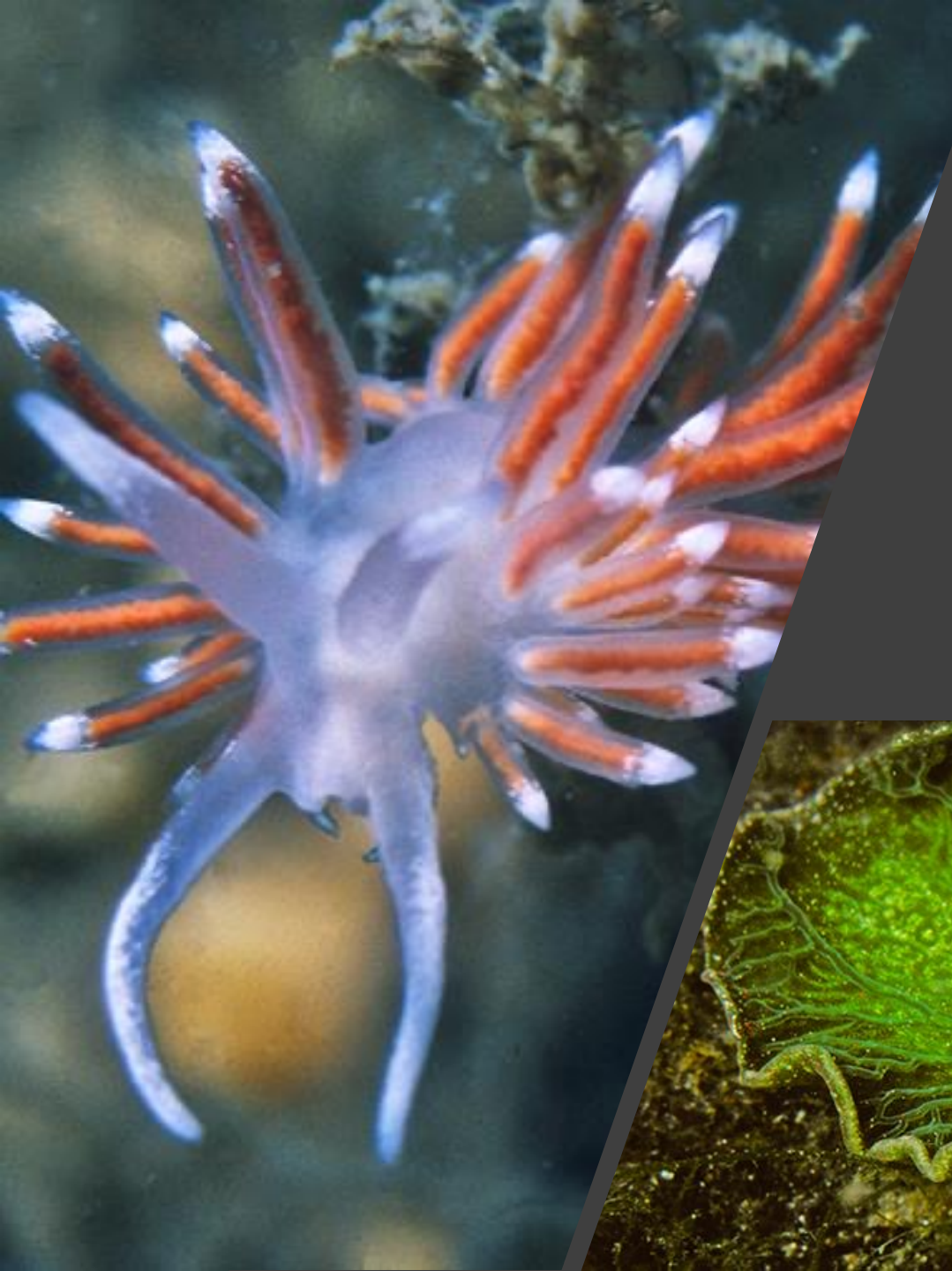
Sea urchins, armored with spines, have five hard pointed teeth at the center of their underside which they use to scrape algae and detritus off rocks and other substrates



Sea cucumbers are also echinoderms; the hairy or common sea cucumber lives on submerged bottom and feeds using ten finger-like tentacles around its mouth to filter plankton from the water column

Eastern oysters are an important commercial shellfish – bivalve molluscs

They are farmed on the bottom of the Sound on leased grounds, a practice known as aquaculture



Nudibranchs are molluscs with no shells; they are sometimes referred to as “sea slugs” and can be very colorful

The most commercially-important crustacean in Long Island Sound is the American lobster

Crustaceans such as lobsters, shrimp and crabs, are arthropods; all arthropods have jointed appendages

A lady crab is identified by its purple spots and sharp pincers

Like the blue crab it is a swimming crab, using its back pair of paddle-shaped swimming legs to propel it through the water

Red beard sponge offers a safe refuge

Spider crabs are well camouflaged; primarily scavengers, they cluster together in groups to molt (shed their outer shell or exoskeleton in order to grow larger) and mate

Atlantic rock crabs are the favorite food of lobsters; they feed on worms, molluscs and other invertebrates

Named for the translucent areas on either side of its "pointed snout", a clearnose skate feeds along the bottom (benthos) of the Sound; relatives of sharks and rays, skates possess skeletons entirely made of cartilage

Striped sea robins (left) and northern sea robins (right) migrate from deeper offshore waters to Long Island Sound in the spring to spawn and feed, returning to the deeper waters in the fall

Sea ravens and their relatives, sculpins, have large spiny heads and wide mouths; sea ravens possess fleshy tabs on their heads and ragged dorsal fins; they inhabit rocky or hard bottoms where they eat both invertebrates and finfish

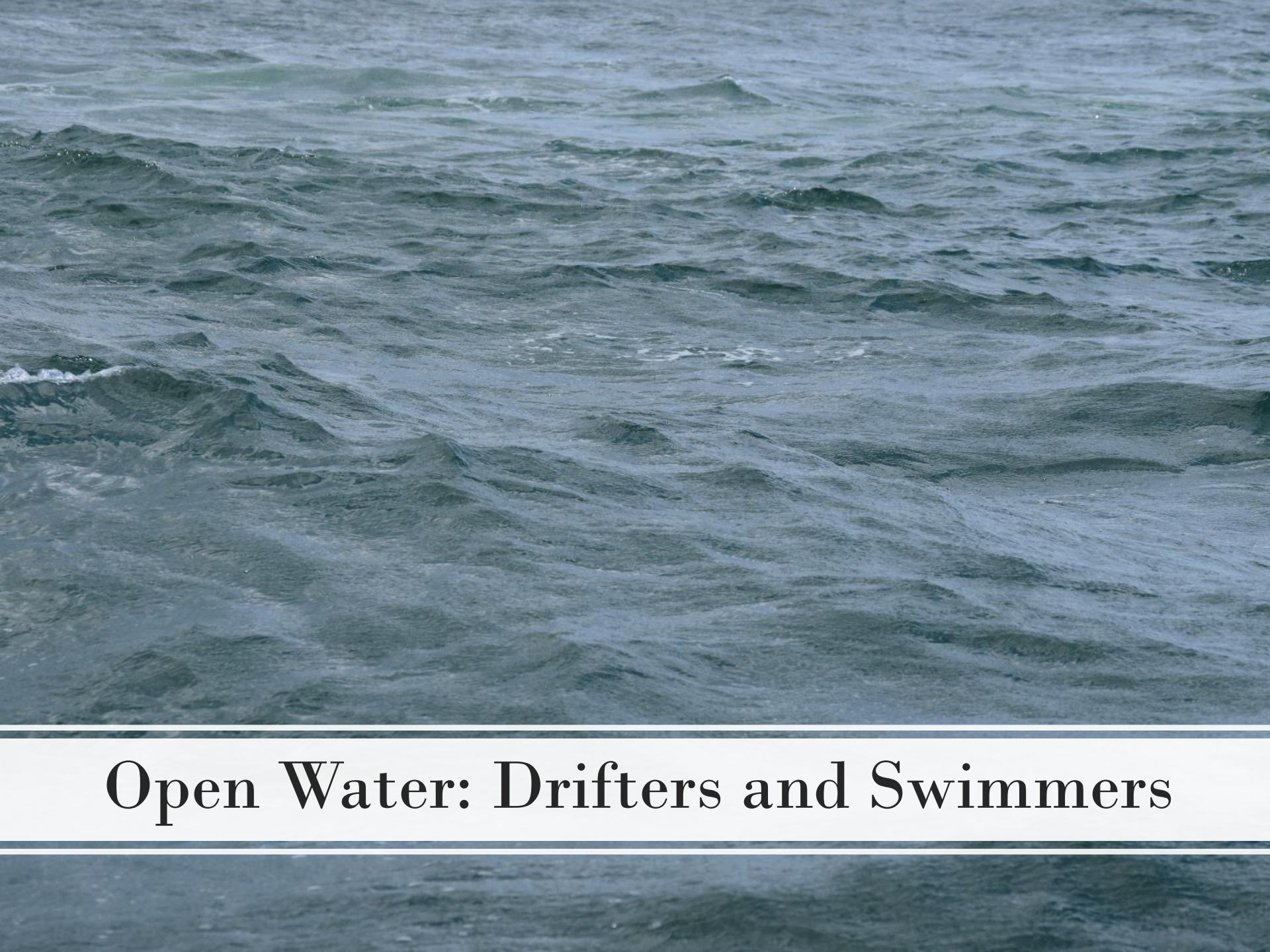
Winter flounder are year-round residents of Long Island Sound; “right-eyed” flatfish, they swim along the bottom feeding on soft-bodied animals in the sediments

Windowpane, or sand dabs, are also year-round flatfish residents of the Sound; “left-eyed” flatfish, they have larger mouths than winter flounder, and will leave the bottom to ingest swimming prey

Like all flatfish, "left-eyed" summer flounder have a chameleon-like ability to change their color to blend in with the surrounding sediments, an adaptation that serves them well against most predators

A black sea bass (left) and a scup or porgy (right) feed and shelter among the boulders; scup migrate to the Sound from their wintering grounds in Delaware Bay and Chesapeake Bay

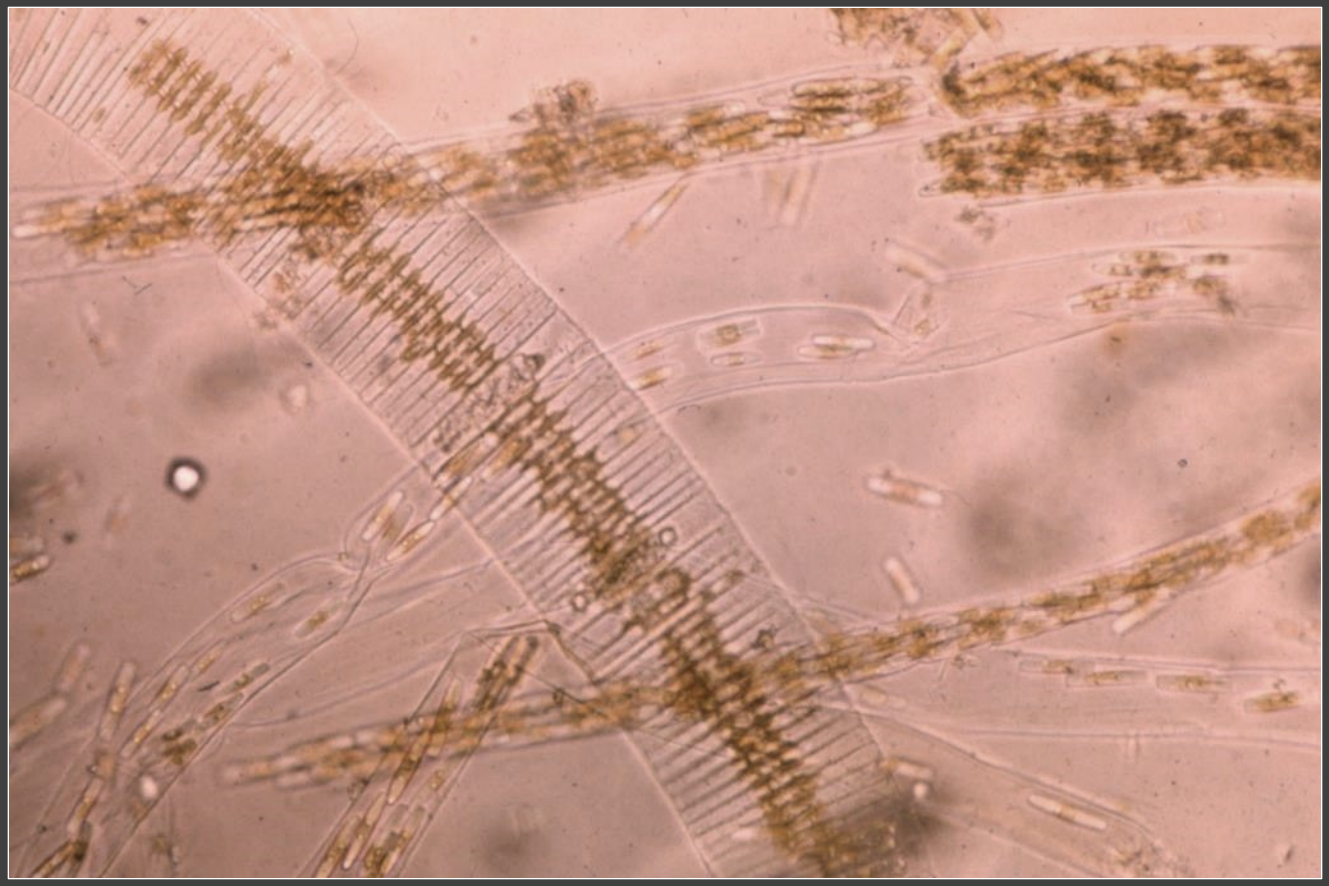
Cunner also like to hang around rocks and boulders; the warming climate has enabled this finfish species to expand its range north into Long Island Sound



Open Water: Drifters and Swimmers

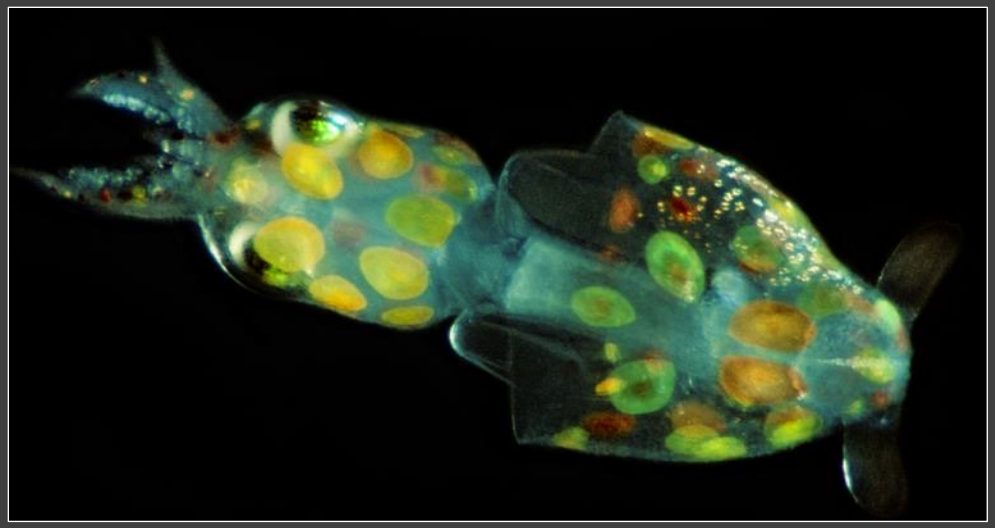
The water column, or pelagic zone, of Long Island Sound is home to finfish and other interesting organisms, such as squid, jellyfish, and marine mammals

Drifting microalgae or phytoplankton form the base of the food web in estuaries; here are a variety of microscopic marine diatoms common to Long Island Sound waters

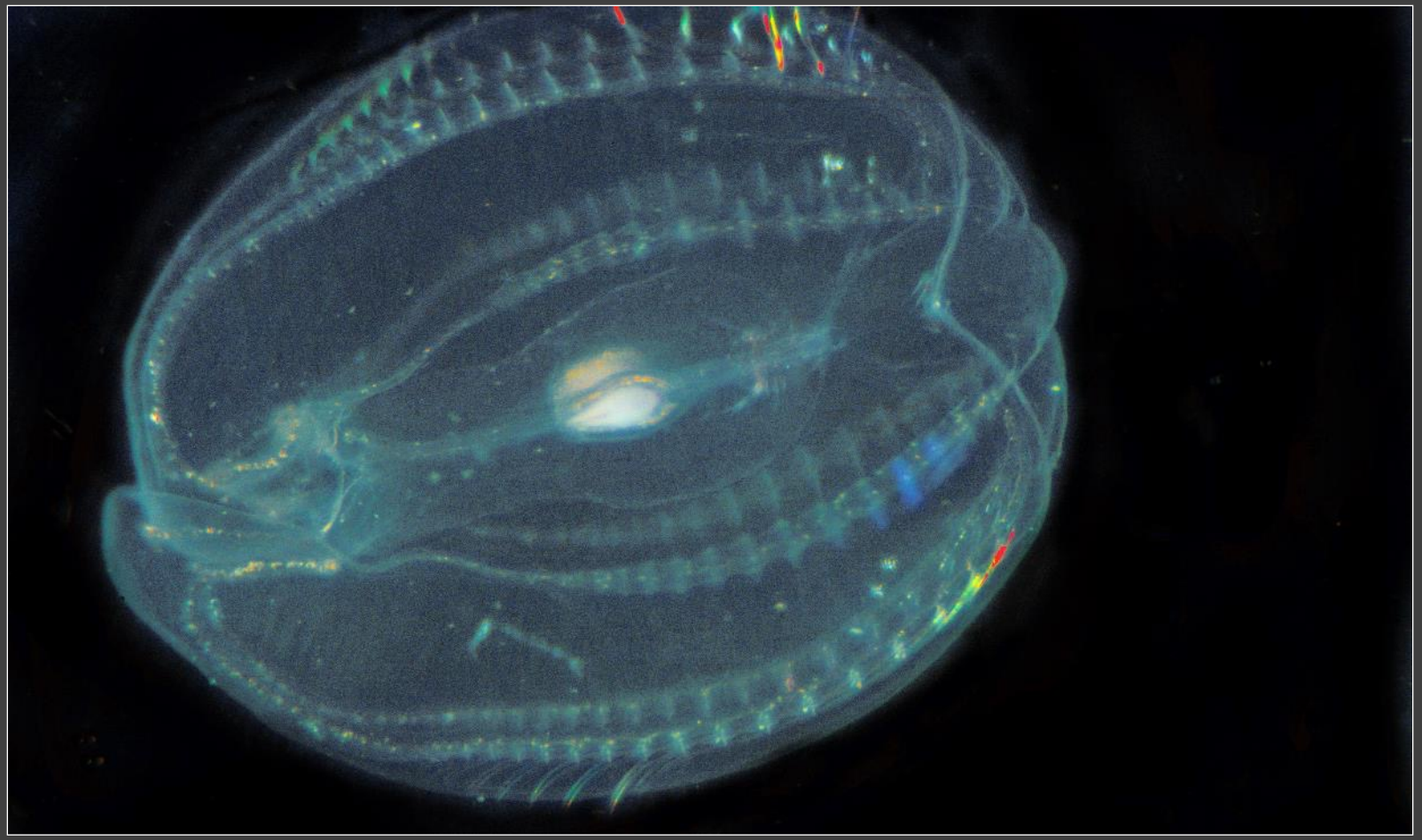


Zooplankton are drifting or weakly swimming organisms, ranging in size from this tiny (2-3mm) copepod to large jellyfish

Most animals in the Sound, such as fish, crabs and clams, begin life as part of the zooplankton community



A newborn longfin squid (top) and a larval American lobster (bottom) spend the early part of their life cycle among the zooplankton

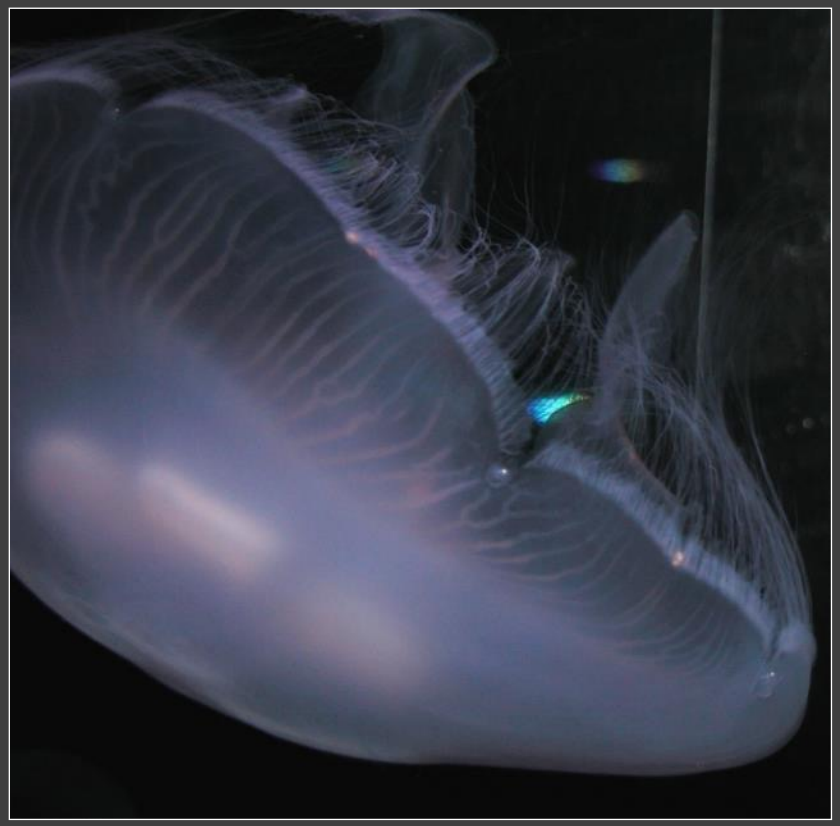


Comb jellies are planktonic animals, propelled through the water by cilia comprising the luminescent bands running along their bodies; unlike true jellyfish, they have no stinging cells

Semi-transparent Atlantic sea nettles (left) are jellyfish with long thin tentacles and frilly mouth-arms

Lion's mane jellyfish (right), with reddish-purple stripes radiating from the center of the umbrella, are common in the Sound during the summer and early fall

Commonly found in the Sound's waters during late spring, the moon jelly is one of the larger members of the zooplankton community, with a nearly flat, pale pink, orange, or milky-white bell, and a fringe of short tentacles



Striped bass are anadromous fish, spending their adult lives at sea and returning to fresh rivers to spawn; while they do not spawn in Long Island Sound tributaries, they are popular sport fish migrating into the Sound in the summer to feed on squid and finfish

American eels are catadromous, meaning they have the reverse migration pattern of anadromous fish

Adult American eels migrate from freshwater streams or nearshore habitats to the Sargasso Sea, south of Bermuda, to spawn; the adults die there, but the young glass eels return to the streams and shore areas

The only true marine mammals that inhabit the Sound regularly are harbor seals (above) and gray seals; migrating from northern pupping grounds to winter in the Sound, they haul out to rest on rocky outcrops

Osprey or fish hawks are a common sight around Long Island Sound, especially in eastern regions

They arrive in March to nest, mostly on man-made platforms which keep their nests out of the reach of predators

Long Island Sound is a tremendous resource of fascinating, ecologically and economically-important organisms. Humans have the greatest impact on the Sound's health and viability, so it is up to all of us to protect Long Island Sound, a living treasure.

- **The Long Island Sound Study (LISS)** is a partnership of federal, state, and local government agencies, private organizations, and educational institutions working together to restore and protect Long Island Sound. This research, management, and education project began in 1985 as part of the National Estuary Program under the federal Clean Water Act.

- **The Connecticut Sea Grant College Program** is a partnership between the NOAA National Sea Grant College Program and The University of Connecticut. Along with New York Sea Grant, it is one of a network of 34 university-based programs in the coastal and Great Lake states. Established by Congress in 1966, Sea Grant fosters the conservation and wise use of our coastal and marine resources by supporting research, providing extension and technology transfer services, and raising public awareness of coastal and marine environments through educational programs.

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