

Pike



Esox lucius

Zebra Mussel



Dreissena polymorpha

Phytoplankton



Aulacoseira islandica, Ceratium hirundinella, & other species

Deepwater Sculpin



Myoxocephalus thompsonii

Emerald Shiner



Notropis atherinoides

Zooplankton



Keratella cochlearis, Daphnia retrocurva, Diacyclops thomasi, & other species

Burbot



Lota lota

Alewife



Alosa pseudoharengus

Ghost Shrimp



Mysis relicta

Ghost Shrimp

Size
tiny to three-quarters of an inch

Predators

Small fish

Prey

Phytoplankton, other zooplankton, and other small particles in the water

Human Impacts

Pollution and chemicals in the water

Photo Courtesy of: the Southeastern Regional Taxonomic Center/South Carolina Department of Natural Resources



Zooplankton

Size
tiny, varies

Predators

Small fish, invertebrates

Prey

Phytoplankton, other zooplankton, and other small particles in the water

Human Impacts

Pollution and chemicals in the water



Photo Courtesy of: National Oceanic and Atmospheric Administration

Phytoplankton

Size
tiny, varies

Predators

Small fish, invertebrates, zooplankton

Prey

Sunlight and nutrients in the water

Human Impacts

Pollution and chemicals in the water



Photo Courtesy of: National Oceanic and Atmospheric Administration

Alewife

Size
to 6 inches

Predators

Lake trout and other large fish

Prey

Phytoplankton and zooplankton

Human Impacts

Unknown

Invasive species



Photo Courtesy of: National Oceanic and Atmospheric Administration

Emerald Shiner

Size
2 to 3.5 inches

Predators

Larger fish, birds

Prey

Phytoplankton, zooplankton, and small fish

Human Impacts

Competition from invasive species such as alewife



Photo Courtesy of: National Oceanic and Atmospheric Administration

Zebra Mussel

Size
to 2 inches

Predators

Freshwater drum (fish) and diving ducks

Prey

Filters phytoplankton, zooplankton, and other small particles in the water

Human Impacts

Pollution and chemicals in the water

Invasive species



Photo Courtesy of: SeaPics @Jeff.Jaskolski/SeaPics.com

Burbot

Size
to 22 inches

Predators

Sea Lamprey and large predatory fish

Prey

Sculpin and other fish

Human Impacts

Unknown

Invasive species

Size
to 3 inches

Predators

Unknown

Prey

Invertebrates that live on the bottom such as worms and shrimp

Human Impacts

Pollution and chemicals in the water, competition from invasive species like alewife

Deepwater Sculpin

Size
to 30 inches

Predators

Humans

Prey

Frogs, smaller fish, small mammals and birds

Human Impacts

Unknown

Pike



Photo Courtesy of: SeaPics @Doug Stamm/SeaPics.com



Photo Courtesy of: National Oceanic and Atmospheric Administration



Photo Courtesy of: SeaPics @Reinhard Dirschel/SeaPics.com

Zooplankton



Various species

Bald Eagle



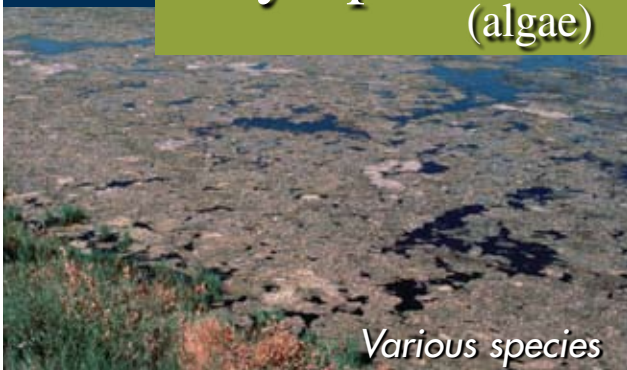
Haliaeetus leucocephalus

River Otter



Lutra canadensis

Phytoplankton
(algae)



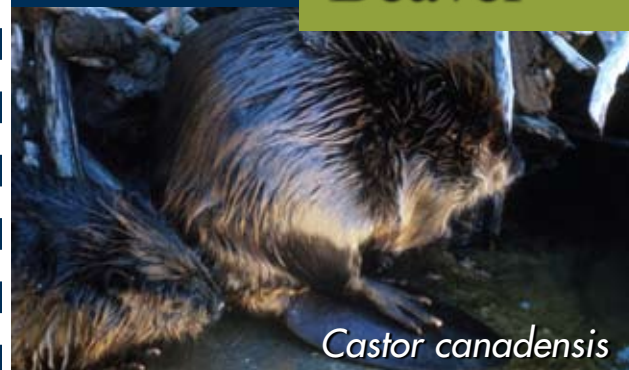
Various species

Bullfrog



Rana catesbeiana

Beaver



Castor canadensis

Crayfish



Various species

Bluegill



Lepomis macrochirus

Largemouth Bass



Micropterus salmoides

Largemouth Bass

to 3 feet

Birds and humans

Crayfish and small fish such as bluegill

Water pollution



Photo Courtesy of: Wyland

Bluegill

to 16 inches

Largemouth bass and other large fish

Zooplankton, fish eggs, and small insects among others

Water pollution



Photo Courtesy of: US Fish and Wildlife Service

Crayfish

varies – to about 3 inches

Otters, fish, birds, frogs, and humans among others

Snails, insects, fish eggs, water plants, dead things, and algae among others

Water pollution



Photo Courtesy of: SeaPics ©D.R. Schirchie/SeaPics.com

Beaver

to 4 feet

Otters, bears, wolves, and humans

Trees and aquatic vegetation

Once heavily hunted for their fur, beavers are now protected and have bounced back in numbers. They still face problems with habitat loss and water pollution.



Photo Courtesy of: Wyland

Bullfrog

to 8 inches

Birds, raccoons, otters, snakes, and humans among others

Insects, crayfish, other frogs, minnows, and occasionally small birds and snakes

Competition from invasive species of frogs and toads. Humans eat frog legs!



Photo Courtesy of: Carl D. Howe/Wikipedia

Phytoplankton (algae)

tiny, varies

Small fish, invertebrates, zooplankton

Sunlight and nutrients in the water

Pollution and chemicals in the water



Photo Courtesy of: National Oceanic and Atmospheric Administration

River Otter

3 to 4 feet

Alligators, humans

Frogs, crayfish, mussels, and fish such as catfish and bluefish among others

Humans trap river otters for their fur. Populations of river otters have been dramatically reduced due to loss of habitat, pollution, and from hunting and trapping. Many areas have reintroduced otters and are putting limits on hunting them.



Photo Courtesy of: Wyland

Bald Eagle

to 2.5 feet with wingspan of 6 feet

Raccoons and owls may prey on eggs or newly hatched eagles. Adults have no natural predators.

Fish and occasional small mammals and birds

A chemical called DDT contaminated the water and the Bald Eagle's food. Once DDT was banned, the Bald Eagle has made a comeback, but is still considered threatened. It now faces threats from habitat loss and polluted waters in some areas.



Photo Courtesy of: Wyland

Zooplankton

tiny, varies

Small fish, invertebrates

Phytoplankton, other zooplankton, and other small particles in the water

Pollution and chemicals in the water



Photo Courtesy of: National Oceanic and Atmospheric Administration

Pacific Sardine



Sardinops sagax

Brown Pelican



Pelecanus occidentalis

Southern Sea otter



Enhydra lutris nereis

Great White Shark



Carcharodon carcharias

California Moray Eel



Gymnothorax mordax

Harbor Seal



Phoca vitulina

California Spiny Lobster



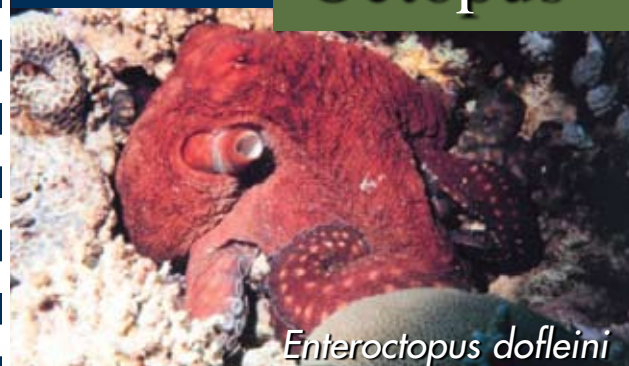
Panulirus interruptus

Giant Black Sea Bass



Stereolepis gigas

Giant Octopus



Enteroctopus dofleini

Giant Octopus

Size to 30 foot arm span

Predators Harbor seals, sea otters, sperm whales, and humans among others

Prey Shrimp, crabs, scallops, clams, abalone, small octopi, and fish among others

Human Impacts Unknown

Photo Courtesy of: National Oceanic and Atmospheric Administration

OCEAN: Kelp Forest

Giant Black Sea Bass

Size to 7 feet

Predators Large sharks and humans are the only predators of adult sea bass.

Prey Stingrays, lobsters, crabs, and flatfish such as halibut among others

Human Impacts Overfishing reduced their numbers dramatically. They are now protected and trying to make a comeback, although illegal poaching of the fish and decline in kelp forest habitat is making it difficult.

OCEAN: Kelp Forest *Photo Courtesy of: Wyland*

California Spiny Lobster

Size to 3 feet

Predators Octopuses, large fish such as Giant black sea bass, humans

Prey Urchins, small crabs, mussels, worms, and dead organisms

Human Impacts Fishing

OCEAN: Kelp Forest *Photo Courtesy of: SeaPics @Phillip Colla/SeaPics.com*

Harbor Seal

Size to 5 feet

Predators Orcas, great white sharks, and some other sharks

Prey Squid, crabs, and fish such as sheephead among others

Human Impacts Getting tangled in fishing gear. They are seen by some fisherman as competition and are sometimes killed by them.

OCEAN: Kelp Forest *Photo Courtesy of: Wyland*

California Moray Eel

Size to 5 feet

Predators Large grouper fish

Prey Octopi, squid, fish among others

Human Impacts Unknown

OCEAN: Kelp Forest *Photo Courtesy of: Wyland*

Great White Shark

Size to 23 feet

Predators No natural predators of adults except humans

Prey Fish, seals, sea lions, seabirds

Human Impacts Shark finning and killing sharks from fear.

Photo Courtesy of: National Oceanic and Atmospheric Administration

OCEAN: Kelp Forest

Southern Sea Otter

Size to 4 feet

Predators Orcas, great white sharks, sea lions, and humans

Prey Clams, urchins, snails, and crabs among others

Human Impacts Sea otters were heavily hunted for their fur. At one time it was estimated that there were only about 50 left along the California coast. They are now protected and are recovering slowly.

Threatened species

OCEAN: Kelp Forest *Photo Courtesy of: Wyland*

Brown Pelican

Size to 4 feet tall with wingspan up to 7 feet

Predators No natural predators for adults

Prey Fish

Human Impacts A chemical pesticide called DDT (now banned) crashed the brown pelican population. Brown pelicans on the Pacific coast are still recovering. Other threats include habitat loss and getting tangled in fishing gear.

Endangered species

OCEAN: Kelp Forest *Photo Courtesy of: Wyland*

Pacific Sardine

Size to 15 inches

Predators Fish, seabirds, seals and sea lions

Prey Plankton

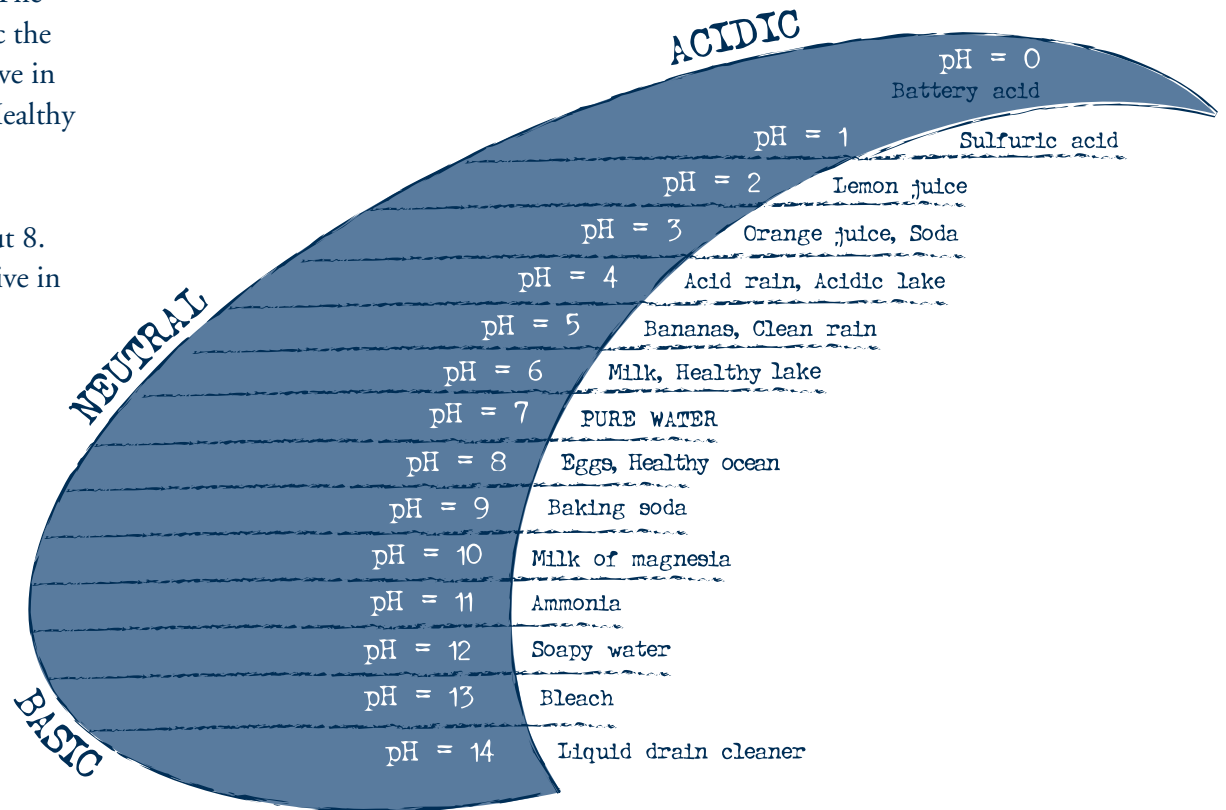
Human Impacts Overfishing. The sardine fishery in California was huge, but collapsed in the 1950s. Only as recently as 1980 have sardines been making a comeback off the coast of California.

OCEAN: Kelp Forest *Photo Courtesy of: Wyland*

WHAT IS pH?

pH—pH is a measurement of the “base” or “acidity” of water on a 0 to 14 range. The lower the pH number, the more acidic the water is. Most living things can’t survive in water that is too acidic or too basic. Healthy freshwater has a pH of about 6.

Healthy ocean water has a pH of about 8. Most fish and invertebrates can only live in water with a pH range of 6 to 9.



WHAT IS Turbidity?

TURBIDITY is the amount of particles (dirt, debris, algae, etc.) floating in the water. What does turbidity tell you about the water?

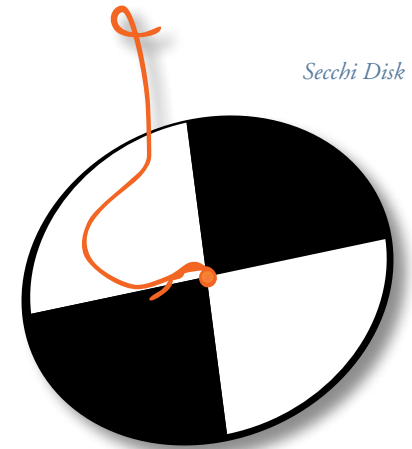
High turbidity can be caused by:

- Polluted runoff from storm drains
- Lack of plants near the water to catch dust and dirt
- Algal blooms, where lots of algae grows very quickly
- Turbulent waters (rushing rivers, crashing waves, etc.) stirring up bottom sediments

When there are a lot of particles in the water, it can be a sign of pollution.

MEASURE TURBIDITY WITH A SECCHI DISK

The disk is attached to a rope and lowered into the water until it can't be seen anymore. The length of rope from the disk to the surface of the water is measured and that is the turbidity reading.



LOW TURBIDITY:
Looks clear



SOME TURBIDITY:
Looks a little dirty



TURBID:
Looks dark and muddy