

NOT FOR NAVIGATION

SAFETY NOTICE: This map is not intended for use as a navigational chart. Although various structures under the water are shown other hazardous areas are not. The publisher is not responsible for omissions or location changes of these navigational aids.

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UW-Milwaukee Harbor Habitat Maps Research Project
uwm.edu/harbormaps

FEATURE SYMBOLS

- Boat Landing (Hand-carry)
- Festival Grounds
- Museum
- Marker
- Park
- Marina
- Clay, Mud, Sand
- Rocks
- Mixed Rocky
- Boulders
- Small, Large Wood
- Wood, Steel Piling
- Nuisance Species
- Non-native Species
- Panfish
- Salmon
- Trout
- Northern pike
- Bass
- Fish
- Vegetation
- Substrate
- Forage

HABITAT HOTSPOTS

South Shore

If there is any place in the harbor that looks and acts like an inland Wisconsin lake it is the coastal area off South Shore Park. A gently sloping bottom with diverse substrate gives way to large stands of native and non-native vegetation. This is a major Smallmouth Bass and Rock Bass spawning site, especially on the southern end where it is shallow and where there is significantly less boat traffic. The dense vegetation acts somewhat like forested areas might above ground, sheltering young fish in and among the weeds, supporting small invertebrate prey, and keeping larger predators and open water fish at bay.

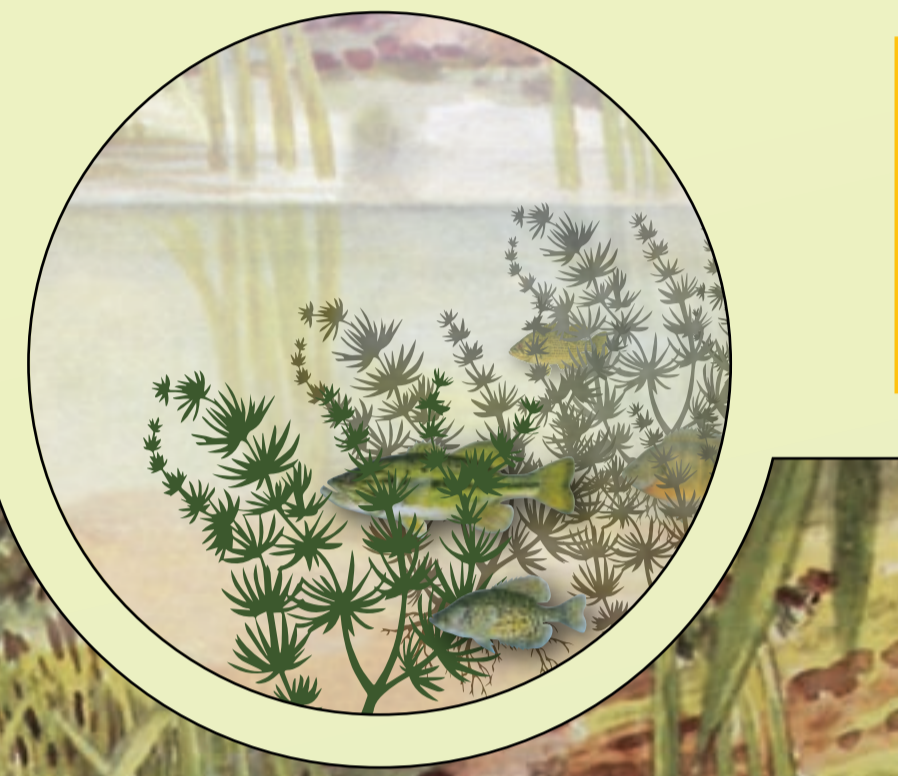
Submerged vegetation is an important environmental factor for fishes. Underwater plants are increasingly being used worldwide for the assessment of aquatic ecological condition. Some of the same conditions that create good habitat for certain species of fish, such as sheltered conditions with less water flow, also make swimming conditions for humans less than ideal, and South Shore is notorious for lower water quality when it comes to biological contamination.

VEGETATION

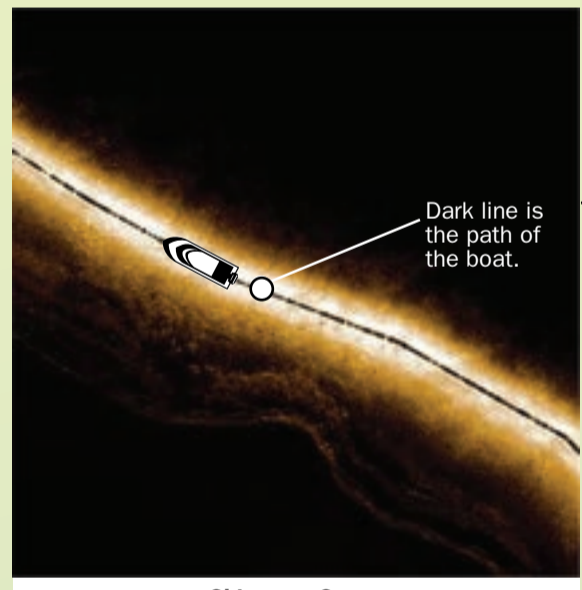
There isn't as much vegetation in the Milwaukee Harbor as would be ideal if habitat were our primary concern. Shipping channels, sheet piling along the shoreline, water depth, and a bottom made of loose sediment limit areas where plants can effectively grow. However there remains a wide diversity of vegetation in the Harbor and up into the river system. Where it occurs, we are almost certain to find invertebrates and fishes, as well as terrestrial animals such as water fowl, which feed on aquatic organisms and the plants themselves. In our continued efforts to strengthen and connect habitat in the Harbor, expanding the opportunities for submerged vegetation is crucial.

Select Aquatic Plants Found At South Shore

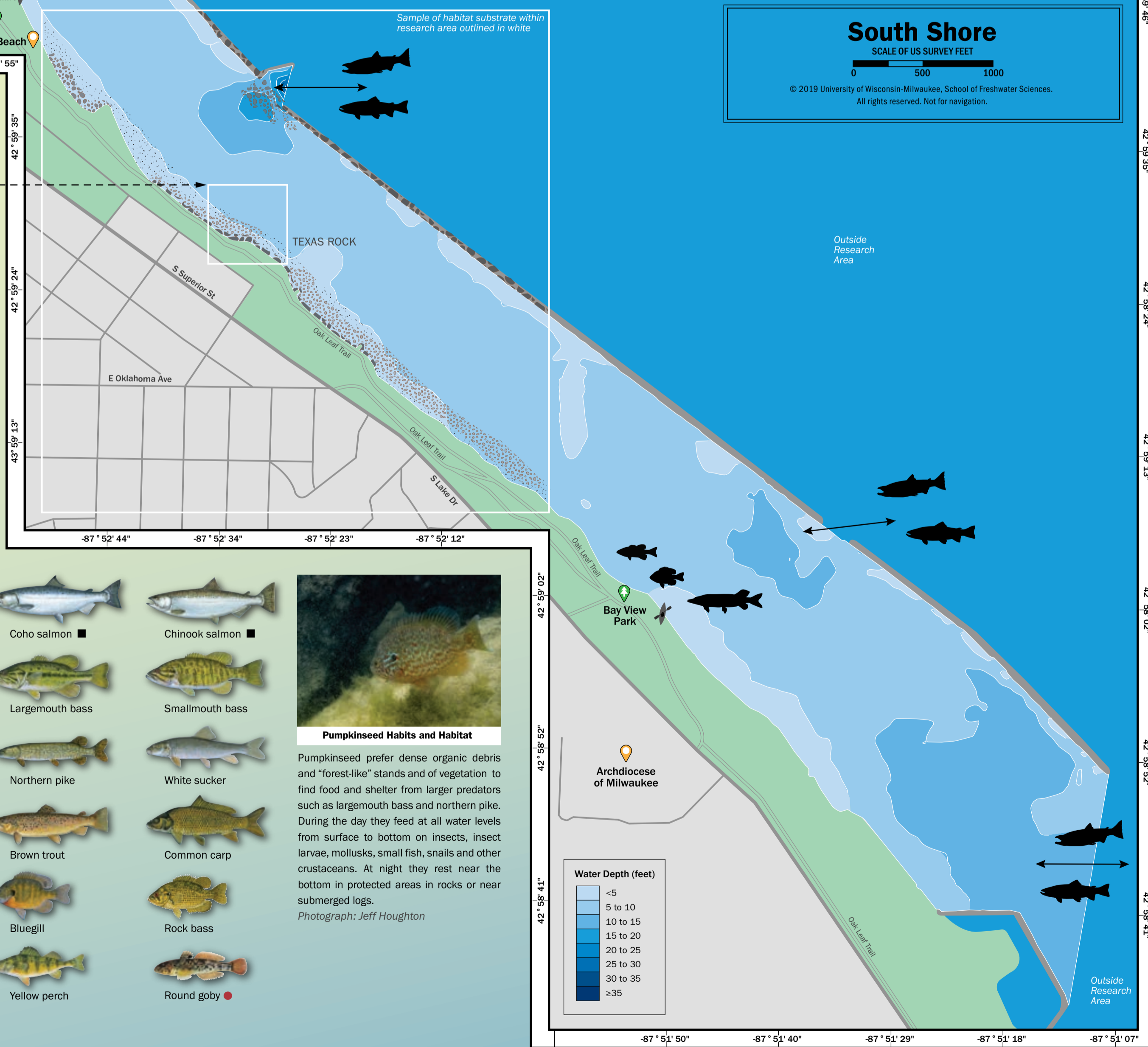
- American waterweed
- Coontail
- Curly-leaf pondweed
- Elodea
- Eurasian watermilfoil
- Fineleaf pondweed
- Flatstem pondweed
- Longleaf pondweed
- Narrowleaf pondweed
- Nitella
- Purple loosestrife
- Richardson's pondweed
- Sago pondweed



Artwork (cropped section): B. H. Fitchew



Side-scan Sonar can be used to generate images of the bottom and its physical structure. These images are created from sonar pings that produce brighter or darker images depending on the rate of return (or no return) from the transducer. It is similar to when someone shines a flashlight in a dark room and all the objects in the room cast a shadow. The objects that are closer to the light are brighter and those further away are darker. Side-scan moves a flashlight along the bottom and reveals what is in the dark room.



South Shore

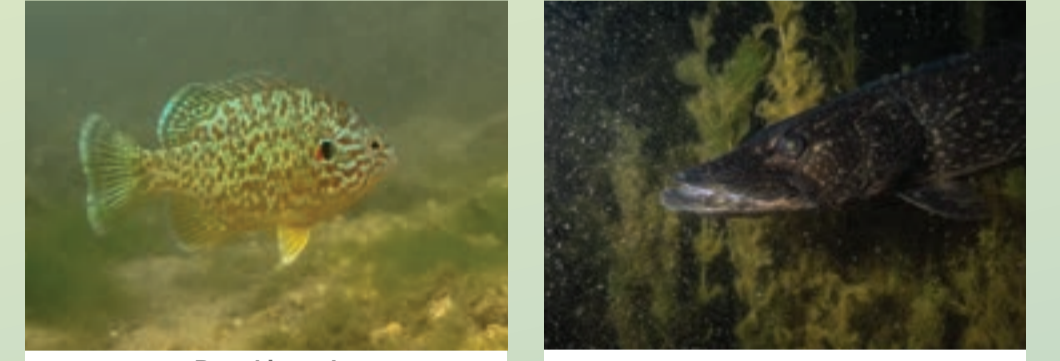
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FORAGE

Hunting Prey in an Underwater Forest

While other fishes are more seasonal visitors tied to water temperature and vegetative cover, northern pike are common to South Shore year round. Photographs: Jeff Houghton



Small prey fish, such as pan fish, hide in and among the vegetation commonly found at South Shore during the summer. Like a tiger stalking its prey, a northern pike (one of the largest predators in the harbor) waits among the plants for an unsuspecting fish to swim by.



NON-NATIVE AND NUISANCE SPECIES

Invasive quagga mussels are now the dominant species in Lake Michigan. They are found, along with their cousins, zebra mussels, on almost every surface in the Milwaukee Harbor.

Invasive mussels cause tremendous ecological and economic damage. In addition to clogging pipes, damaging piers, and befouling the bottoms of boats, these filter-feeders consume vast quantities of tiny plants and animals floating in the water—plankton—clearing the water while depleting food resources for other animals. They have completely altered the ecosystem.

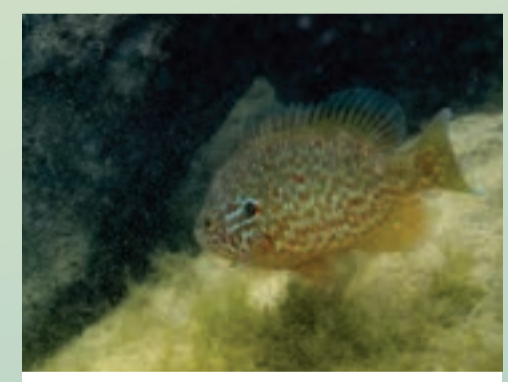
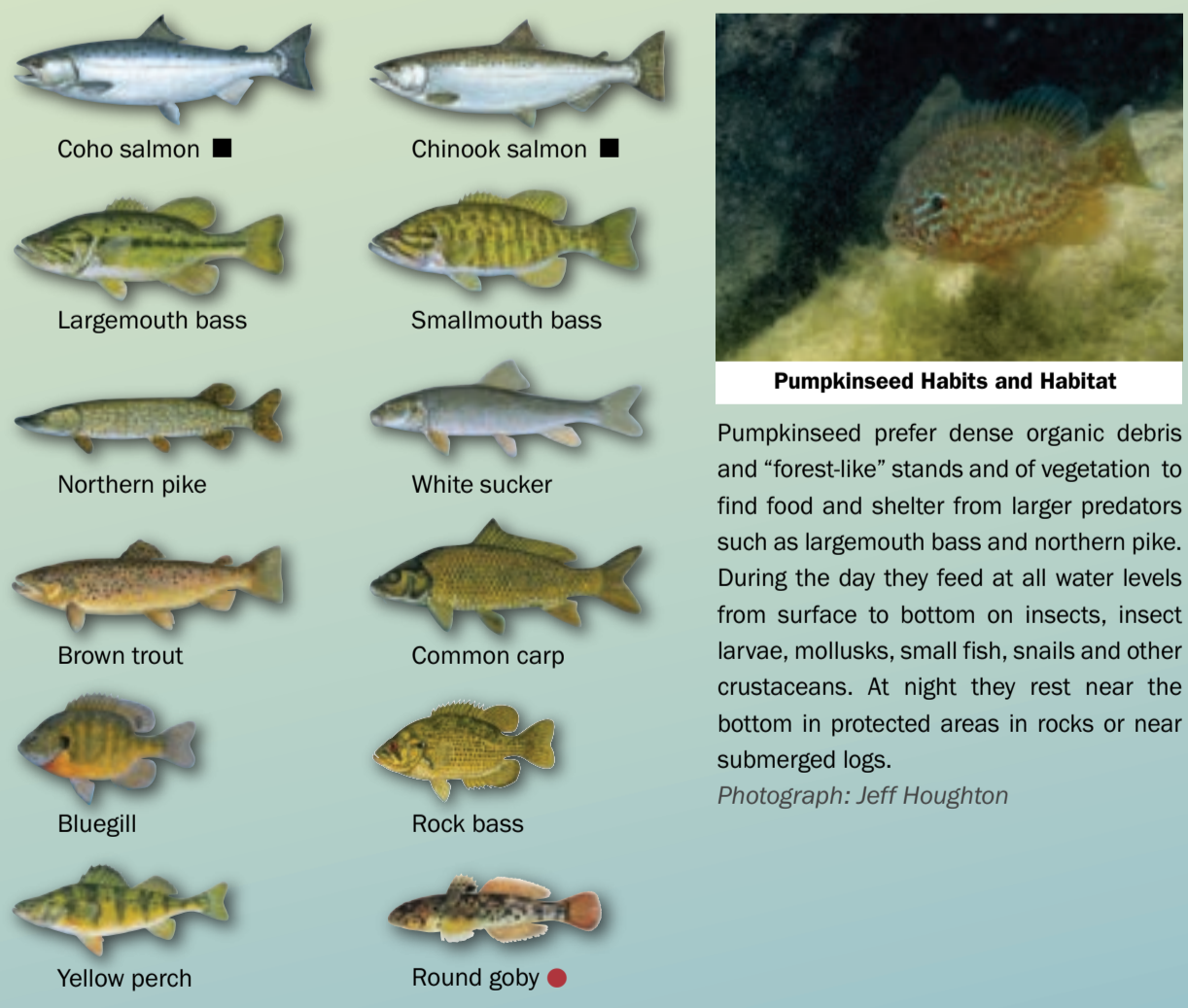
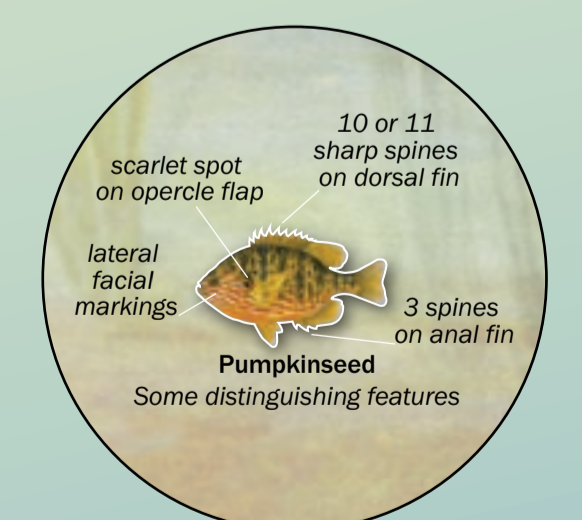
Very few animals eat quagga or zebra mussels. Their shells protect them from many native predators. A species that does eat them, however, is the invasive round goby. This is part of the reason the gobies are so successful in coastal areas of the lake. Interestingly, native fish like lake trout and whitefish are learning to eat gobies, providing a link between the invasive mussels and desirable sport fishes.



For more information: dnr.wi.gov/topic/invasives/fact/quagga2012.html

FISH

Underwater substrate found in South Shore attracts a variety of fish. Fish Paintings: Virgil Beck



Pumpkinseed Habits and Habitat
Pumpkinseed prefer dense organic debris and "forest-like" stands and of vegetation to find food and shelter from larger predators such as largemouth bass and northern pike. During the day they feed at all water levels from surface to bottom on insects, insect larvae, mollusks, small fish, snails and other crustaceans. At night they rest near the bottom in protected areas in rocks or near submerged logs. Photograph: Jeff Houghton

HARBOR HABITAT
Milwaukee Wisconsin