

Window On Washington Waters



The Window on Washington Waters exhibit represents a popular dive spot called Mushroom Rock, located west of Neah Bay. This exhibit shows typical marine habitat and sea life found along the outer coast of Washington.

Mushroom Rock is located off the northern shoreline of Cape Flattery, the most northwesterly point in the contiguous 48 states.

Habitat of the Washington Outer Coast

Fully exposed to the Pacific Ocean at the entrance to the Strait of Juan de Fuca, this coastal region is subject to high tidal current and oceanic wave action. Mushroom Rock is one of a number of heavily carved rocks that channel the surge of water through a series of underwater canyons, containing many large reefs. Strong currents have cut huge channels in the volcanic rock, and large semi-isolated boulders and rock structures provide habitat for a multitude of marine life.

This rocky habitat, rugged and dynamic, differs greatly from the calmer inland-sea environment of Puget Sound.



View from Cape Flattery along the Olympic Peninsula Coast in the Makah Nation

OCEAN LITERACY PRINCIPLE:

The earth has one big ocean with many features.

OCEAN LITERACY PRINCIPLE:

The ocean and life in the ocean shape the features of the earth.

Most of the waters along the Washington outer coast from Cape Flattery southward are part of the Olympic Coast National Marine Sanctuary. The Sanctuary is protected by law to conserve marine resources for everyone.

**OCEAN LITERACY
PRINCIPLE:**

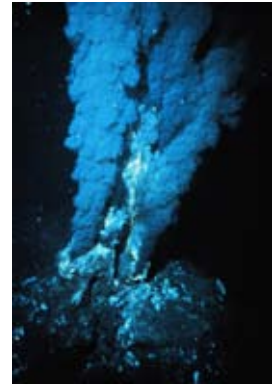
*The ocean
is largely
unexplored.*

*Rockfish are
territorial and
generally slow
to mature. Some
rockfish can
live over 100
years! Many
rockfish species
are in trouble,
and current
fisheries are not
sustainable.*

Life in the Washington Outer Coast

The rich diversity of living things is one of the most amazing features of our outer coast. Upwelling ocean currents off the coast brings cold, nutrient-rich water to the nearshore areas, nourishing marine plankton and plants, providing abundant food and habitat for many species that live in our coastal waters.

Many other factors also contribute to the distribution, species composition and abundance of the life in the outer coast marine environment. The geology of the seafloor, types of substrate or sediments, offshore currents and circulation patterns, exposure to waves, water depth and predator populations all influence the abundance and location of habitats for the numerous marine species. This diversity of life includes a multitude of marine invertebrates, fish, birds and marine mammals, from the tiniest plankton to gray whales. Many new discoveries of marine life occur in deeper, less explored waters. Recent findings include thriving deep-water reefs and an unusual diversity of life surrounding deep sea vents.



Deep sea vent, NOAA



Kelp forest, NOAA

The Kelp Forest

Off the coast, beyond the crashing surf, the dense stands of seaweed (large brown algae) are called kelp forests. Kelp provides a foundation for a complex ecosystem that includes primary producers, herbivores and predators. Kelp forests provide shelter for juvenile fish and support one of the most prolific fisheries along the coast.

Fishes

Rockfish are among the most colorful fish in Window on Washington Waters (WOWW) exhibit. Rockfish have large dorsal fins with well developed venomous spines and vary in size from 6 inches to 3 feet. They are usually slow moving and can hover in mid-water motionless. Twelve different species of rockfish are on display in the WOWW exhibit.



Canary rockfish (Sebastes pinniger)

Greenlings have an elongated body shape. They vary widely in color and patterns; and are found in rocky nearshore habitats, kelp forests and shallow water. Lacking swim bladders, they rest on rocky reefs and other underwater structures. The kelp greenling and lingcod are two species that live in WOWW.



Kelp Greenling (Hexagrammos decagrammus)



Cabezon (Scorpaenichthys marmoratus)

Surf perches are found in shallow water habitats, in kelp covered rocky shores, eelgrass beds and pilings. Perch swim with a rowing motion of pectoral fins. They are small, 4-18 inch fish and have oval, highly compressed bodies with forked tails. One species is in WOWW- the striped sea perch.



Striped Perch (Embiotoca lateralis)



Wolf eel (Anarrhichthys ocellatus)

Wolf eels are not true eels, but a member of the wolffish group. The wolf eel has pectoral fins behind its large, bulbous head and can grow up to 8 feet long. They have no ventral fins, and the dorsal, tail and anal fins appear to be one continuous fin. They have scary looking large canine teeth and molars, but are gentle and slow moving. Wolf eels inhabit dens, crevices and caves.

OCEAN LITERACY PRINCIPLE:

The ocean supports a great diversity of life and ecosystems.

OCEAN LITERACY PRINCIPLE:

The ocean makes earth habitable.

Coho salmon are considered a "species of concern" in Puget Sound/Straits of Georgia.



Coho salmon (Oncorhynchus kisutch), NOAA

Salmon are anadromous fish, spending one to several years at sea (depending on the species). They often migrate hundreds or even thousands of miles before returning to spawn in the lake, river or stream where they were born. There are seven Pacific salmon species found in Washington, with coho salmon the only species represented in WOWW. The silvery, schooling coho are usually found swimming higher in the exhibit. Can you guess how many coho are in WOWW?

Marine Invertebrates

The nearshore rocky habitat in the WOWW exhibit supports a wide variety of marine invertebrate species (animals without backbones). There are several common invertebrates visible in WOWW include:

Anemones occur in the intertidal zone, as well as deep in the ocean. Most attach to rocks, pilings and even other animals. Their flower-like bodies have tentacles with stinging cells used to gather food and for protection. Count how many different kinds of anemones you see in the WOWW!



Green anemone (Anthopleura xanthogrammica)

Sea cucumbers live in sheltered areas between rocks as well as exposed areas, from low intertidal to deep water. Most are "detritivores" eating dead plant and animal material on the sea floor. The California sea cucumber in WOWW has a long red body covered with harmless projections.

Sea stars are one of the most recognizable invertebrates in WOWW. Sea stars are basically a set of arms (rays) arranged around a central disc. There are several species of sea stars in the exhibit. Can you spot them?

Take nothing from the beach except litter. If we leave each animal at the beach where we found it, others will have the opportunity to marvel at it when they visit.

Traditional Culture of Neah Bay

“When the tide is out, the table is set” is often stated by Native peoples who harvest from the bountiful tidelands in Neah Bay. The collection, consumption and trade of the many resources of nearshore areas represent the most traditional uses of the shoreline.

The natural abundance of marine food items such as fish, shellfish and seaweeds defines the lifestyle of Native peoples of the Olympic Peninsula.



Makah Canoe Journey, NOAA

The Makah have lived in the area around Neah Bay for thousands of years. The Makah Reservation includes Neah Bay, and extends westward to Cape Flattery. Coastal tribes traditionally made distinctive carved, cedar canoes which they used to navigate the tides and off-shore waters for harvesting fish and other marine resources, as well as for transportation.

WOWW Exhibit

The window is almost 20 feet high by nearly 40 feet wide and holds 120,000 gallons of water. The window is made of 12.5 inch thick acrylic.

Salt water is pumped in from Puget Sound and flows back to the Sound after passing through the exhibit. The water temperature in the exhibit is the same as the water outside, about 50 degrees Fahrenheit (about 10 degrees Celsius).

All of the animals are native to Washington waters. Our animals are fed a diet of krill, anchovies or herring and squid; they receive a balanced diet and mix of roughage, fat, protein and carbohydrates to ensure their health.



Visitors watch the diver show in WOWW at Seattle Aquarium

Coastal tribes carry their heritage forward balancing their roles as natural resource managers and stewards of traditional culture.

OCEAN LITERACY PRINCIPLE:

The ocean and humans are interconnected.

**OCEAN LITERACY
PRINCIPLE:**

The ocean is a major influence on weather and climate.

Visit the Aquarium. Our staff and volunteers can help you learn more about marine life and ocean science.

Divers

At the Seattle Aquarium, divers use surface-supplied air through a hose called a hookah. The tank on the diver's back is a back-up air supply. Our divers wear a special suit called a drysuit so that no part of their body gets wet. They also wear special full face masks, which have a built-in microphone to allow the divers to talk to people outside the exhibit, and ear phones to let the diver hear what the audience is saying. Staff and volunteer divers clean the exhibit (scrub algae off of rocks, clean the window and vacuum the gravel), feed the animals, make sure the animals are healthy and talk to visitors from inside the exhibit.



Diver feeding the fish in WOWW

At the Aquarium

As you observe the animals in the WOWW exhibit, notice where you find various species of invertebrates on the rocky formations. Watch their behavior as the current moves through the exhibit. How do they move? Can you tell what or how they eat? Do they interact with fish or the diver?

Resources

Olympic Coast National Marine Sanctuary: olympiccoast.noaa.gov

This website provides information on the sanctuary, including research, resource protection, marine life, culture and teacher resources.

Ocean Literacy Network: www.coexploration.org/oceanliteracy

The process of creating an ocean literate world is continual. Find out what makes a person ocean literate and join the ocean literacy network to contribute your ideas.

Makah Tribe: www.makah.com

Official website of the Makah Tribe that provides history, photographs, maps, as well as information about the Makah whaling tradition.

Seattle Aquarium: www.seattleaquarium.org



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