

# Marine Reserves & Protected Areas

“The sea, once it casts its spell, holds one in its net of wonder forever.”

– Jacques Cousteau

Oregon has created a system of underwater parks – marine reserves and protected areas – to invest in the health and future of its ocean. The goal is to conserve the abundance and diversity of marine life to foster vibrant, healthy ocean habitats.



Visit the coast and **EXPLORE** your marine reserves!

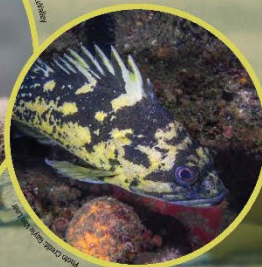
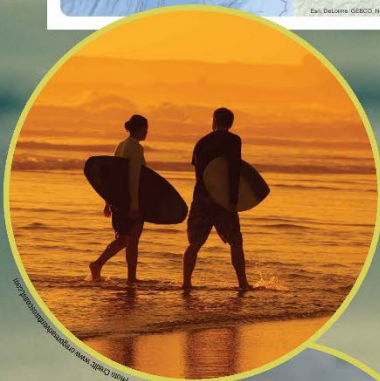
Learn about marine reserves and protected areas, and share this information with family, friends and your community

Help monitor marine reserves and protected areas by participating in citizen science projects

Visit us at [www.oregonmarinereserves.org](http://www.oregonmarinereserves.org) - sign up to receive a quarterly newsletter to learn about current events and the latest scientific research

Learn about how a healthy Oregon ocean supports fishermen, the economy and the people living along the coast

Support funding to implement marine reserves and invest in the health of Oregon's ocean



Visit us [oregonmarinereserves.org](http://oregonmarinereserves.org)

## THE PERFECT CLIMATE

The coast range and Pacific Ocean meet to create a unique climate that has allowed a temperate rainforest to thrive here for thousands of years. Sea winds blow cool during the dry summers and warm during the wet winters to grow one of the most productive forests on Earth.

In summer, seabore currents cool the warm, dry air from the interior and create fog. The fog moves inland, gets trapped by the coast range, and settles over the forest. Sitka spruce and western hemlock trees capture its moisture through their needles, and take a second drink through their roots as condensed fog drips to the forest floor.



Storms are a vital process in the forest and as much a part of the natural cycle as fire or drought. Wind and strong sun erode land and shape tree growth. Trees that fall during storms open up space in the canopy, allowing sunlight to reach the forest floor.



Intense winter rains drench the forest habitat, turning it into a true rainforest.



Winter winds blow down large trees, leaving snags or stumps. These become nurse logs that support new generations of forest growth as they decay. Snags also offer foraging and nesting spots for birds and rodents.

## FROM SEA TO FOREST

One of the most profound influences the sea has on the forest is hidden from view. As summer winds pull water out to sea, water rich with nutrients replaces it, flowing towards shore and upwelling to the surface.

Reaching the light, the nutrients in the water give rise to phytoplankton, the foundation of the marine food web. This hidden treasure helps sustain the web of life in both forest and marine ecosystems, and makes this place one of the most productive along Oregon's coast.

## THE LAND-SEA CONNECTION



During winter, the rare marbled murrelet stays on the open ocean.

Cape Perpetua is where old forest, heathland meadows, and the rocks of the tidal margin meet the sea.



There's more to this amazing view than meets the eye. Beneath its rugged, beautiful surface, Cape Perpetua is a unique place where land and sea intersect and shape each other's existence.

Both environments are managed and protected in their natural state. Nutrients, water, and species are continually cycled between the two. This complex interaction creates and sustains a vast connecting web of terrestrial and marine species.



Cape Perpetua protects some of the last remaining old growth coastal forests, prime habitat for marbled murrelets.



## LIVING PROOF

The marbled murrelet is living proof of the vital connection between ocean and forest.

This endangered seabird depends on a healthy marine habitat for food and can only build its nest in increasingly rare old growth forest. Cape Perpetua provides this unique combination of ecosystems, and several nests have been observed here.



In spring, the marbled murrelet lays its single egg on a mossy branch high in an old growth tree. It flies up to 30 miles back and forth to the sea to feed itself and its chick.

## FROM FOREST TO SEA

The magnificent forest you see surrounding Cape Perpetua is the Siuslaw National Forest. Its 630,000 acres extend 35 miles up and down the coast and include some of the most protected old growth coastal rainforest in the Pacific Northwest.

This vast forest is a multilayered system of plants and animals whose nutrients flow back to nourish the sea.

Salmon and other forest wildlife consume nourishment from the forest. Even the waste they excrete is beneficial because it retains critical nutrients which flow into creeks and out to sea.



The four major rivers in the Siuslaw National Forest act as arteries, transporting nutrient-rich sediment as well as groundwater, fog, and rain runoff back to the ocean.



At each layer of the forest—from the soil, fungi, bacteria, lichens, and insects of the forest floor to the mossy heights of the canopy, nutrients flow back to nourish the sea.

## KEEPING IT HEALTHY

Today, the Forest Service protects ancient forests and actively thins dense, even-aged plantations to speed the recovery of diverse, natural forests.

Because of this decades-long commitment to forest health, the Siuslaw National Forest continues to play a role in the cycle of life between land and sea.

# Researching the Reserve

## *A Scientist / Community Collaboration*

Will prohibiting fishing in Redfish Rocks Marine Reserve be good for the marine ecosystem? Will the Marine Reserve eventually give local fishermen a more sustainable fishing industry? Research helps to answer these questions.

The Oregon Department of Fish and Wildlife and biologists from Oregon State University are collaborating with local fishermen on several research projects. ODFW studies look at changes in fish, invertebrates, algae and habitats over time inside and outside of the reserve. OSU tracking studies help determine what kinds of fish are here, and where they move.



The Fishtracker Project studies movements of fish in the Redfish Rocks Marine Reserve. Anchored underwater microphones called hydrophones record signals from fish that have been implanted with transmitters. This information is being used to understand how much time fish spend within the reserve's boundaries.



The remotely operated vehicle, or ROV, is a complex video tool that can swim up, down, and around obstacles. Biologists analyze the video, measuring the habitat features and the abundance and size of each fish species.



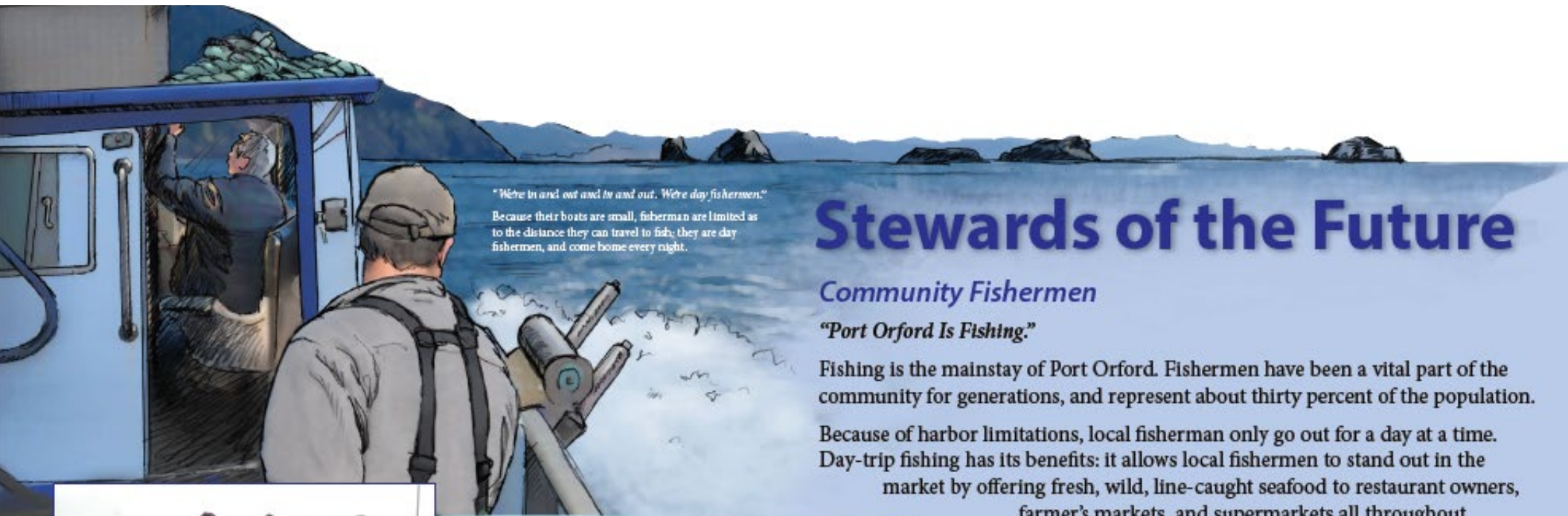
Changes in fish size and weight are the first early signs of potential marine reserve effects. Hook-and-line surveys done both inside the reserve and outside it in fished areas capture this information by sampling over time.

## *The Stars of the Show*

Rockfish live at least as long as humans do, and the older they are the more larvae they produce. This makes them ideal research subjects. Scientists track numbers and movement behavior of both adults and larval rockfish in collaboration with local fishermen.



This volunteer SCUBA diver is conducting visual surveys on fish and habitat.



*"We're in and out and in and out. We're day fishermen."*

Because their boats are small, fishermen are limited as to the distance they can travel to fish; they are day fishermen, and come home every night.

# Stewards of the Future

## Community Fishermen

### "Port Orford Is Fishing."

Fishing is the mainstay of Port Orford. Fishermen have been a vital part of the community for generations, and represent about thirty percent of the population.

Because of harbor limitations, local fishermen only go out for a day at a time. Day-trip fishing has its benefits: it allows local fishermen to stand out in the market by offering fresh, wild, line-caught seafood to restaurant owners, farmer's markets, and supermarkets all throughout Western Oregon.

### Long Term Investment

In spite of a rich nutrient source, it's possible to over-fish, even here. The new marine reserve prohibits fishing, but fishermen see this as a "bank" allowing them to invest in the future. They hope the Reserve will bring more fish and fish larvae to adjacent fishing grounds as "spillover."



Over time, the numbers of fish in a well-designed marine reserve increase to the point where the area is too crowded, and fish are pushed out into adjacent marine habitat. Fishermen just outside the boundary will reap the benefits.



Time and meticulous research will reveal whether or not the Marine Reserve is working as everyone hopes. Local fishermen keep up to date with tracking and research project results.



Nutrient-rich waters from upwelling combine with the sheltered reefs of Redfish Rocks to make this part of the coast ideal for a wide variety of fish.



Port Orford's "Dolly Dock," one of two in the U.S., uses a crane to lift the fishing fleet in and out of the water each day. Its weight constraints require that fishing vessels be limited in size.

# Life at the Rocks

## Redfish Rocks Marine Reserve

From the tips of the rocks to their deep water roots, Redfish Rocks Marine Reserve offers food for millions of marine animals, from tiny invertebrates to rockfish to whales.

The food comes courtesy of an amazing process called “upwelling.” In spring and summer, northwest winds bring nutrient-rich water to the surface near shore. Light hitting the nutrients fuels an explosion of plankton, tiny organisms that form the basis of the ocean food web.

Can you see the line of brown water meeting the blue? If you can, this is upwelling! Upwelling attracts fish, invertebrates, birds, marine mammals, and even algae to Redfish Rocks, along with visiting wildlife like grey and great white whales, green sturgeon, and salmon.

## Abundant Resources

From top to bottom, the Rocks provide food and shelter for wildlife. The species you'll find at a given layer depends on the organism's needs—tolerance to air, wind, strong currents, even geography. Redfish Rocks are like icebergs: There's more going on underwater than above!

The surface offers nesting habitat to many species of birds. Some of them, like these common murrelets, nest in colonies.



Brandt's cormorants, black oystercatchers, and pigeon gullenots nest in pairs in the protected crevices on the surface of the Rocks.

Underwater, several kinds of rockfish choose the depth and environment that suits them best – from hard, rocky bottom that is covered with sponges and algae to softer, sandy bottom.



Steller sea lions and harbor seals swim and hunt for food in the waters around the Rocks, and gray whales feed in the area.



Tiny phytoplankton are close to the surface. They form the foundation of the food web that feeds all life in Redfish Rocks.



At the base of the Rocks, coralline and other algae offers food and shelter for organisms that can tolerate the pounding of the sea: anemones, barnacles, sponges and hermit crabs.



The reefs well below the waterline of the Rocks are a rich habitat for many kinds of rockfish, along with lingcod, cabezon, kelp greenling, Dungeness crab and red sea urchins.



Bull kelp, anchored to the ocean floor, offers protective shelter for young fishes and invertebrates like sea urchins, sea stars, snails and crabs.



# INTERNATIONAL DESTINATION

Every year, threatened or endangered birds from all over the world find a rich source of food and shelter in the waters off Cape Perpetua. They migrate from breeding grounds as far away as Antarctica, the Arctic, Japan, and New Zealand.

Because of this amazing influx of international travelers, the nearshore waters of Perpetua Banks, Heceta Banks, and Stonewall Banks have been designated a Global Important Bird Area.

The ancient murrelet, a cousin of our local marbled murrelet, breeds in the Yellow Sea islands off China and Korea and comes here for food.



© Tom Eason



The South Polar skua migrates thousands of miles north to reach this area from its breeding ground in Antarctica.



© Wildlife

The black-footed albatross breeds on the Northern Hawaiian Islands and the islands of Japan. It travels long distances to find food.



© Tom Eason

Cape Perpetua Marine Reserve adds a vital layer of protection for 3 miles from shore in this section of the California Current System along the Oregon Coast.

The rare Buller's shearwater comes here in late summer and fall after breeding in New Zealand.



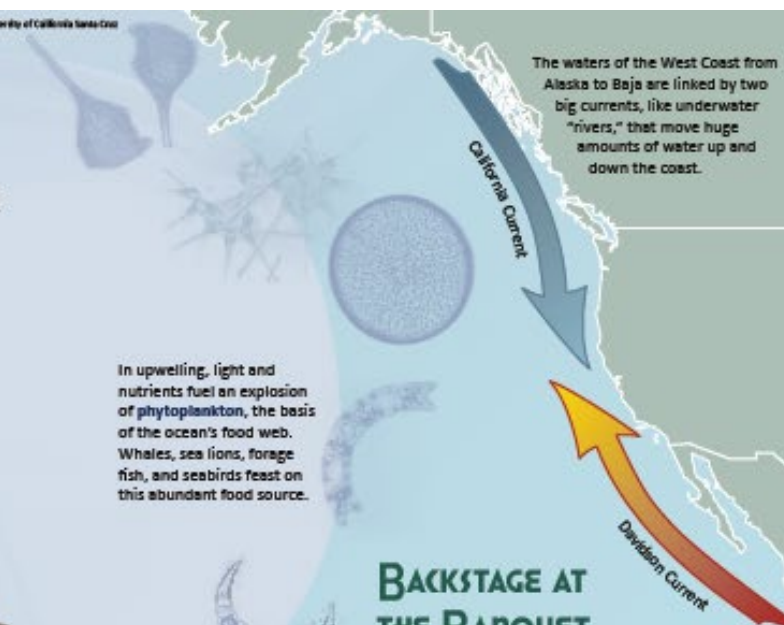
© Tom Eason

Volunteers are tracking seabirds throughout the Reserve. Grab your binoculars and join the search! Find out about it at [www.oregonmarinereserves.org](http://www.oregonmarinereserves.org)



Courtesy of the Oregon Audubon Society

University of California Santa Cruz



The waters of the West Coast from Alaska to Baja are linked by two big currents, like underwater "rivers," that move huge amounts of water up and down the coast.

In upwelling, light and nutrients fuel an explosion of phytoplankton, the basis of the ocean's food web. Whales, sea lions, forage fish, and seabirds feast on this abundant food source.

## BACKSTAGE AT THE BANQUET

Why do they come? Because of the California Current System, and the rich food resources it provides.

In spring and summer, the slow-moving California Current comes from the north, bringing nutrient-rich water with it as it moves closer to shore. As northwest winds blow, the nutrients rise to the surface in a process called upwelling.

# Research at the Caves

## Watching and Learning

Every day, behind the scenes, volunteers and scientists are learning more about the wildlife of Sea Lion Caves. Portland State University's Pinniped Ecology Applied Research Lab (PEARL) is working with the Oregon Department of Fish and Wildlife and other scientists, using state-of-the-art technology to learn about Steller sea lions.

Volunteers get involved too, monitoring seabird nesting colonies under the direction of the Audubon Society of Portland, Oregon State University, and the US Fish & Wildlife Service.

## Steller Sea Lion Studies

PEARL scientists attach Life History Transmitters to sea lions to track their health and foraging habits. They use video cameras to record how many female sea lions and calves come to Sea Lion Caves. Their goal is to learn about the availability and quality of food in the area of the Caves.

Pinniped researchers are studying Steller sea lion ecology, behavior, and physiology.



Courtesy of  
Dr. Andrew Trites,  
University of  
British Columbia

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British Columbia

## For the Birds

During breeding and nesting season, volunteers make regular visits to Sea Lion Caves to track seabird colonies. They use scopes to observe nesting activity.

With the data collected by volunteers, the team is able to estimate the percentage of nests that successfully hatch young.



© Andrew Trites

Pelagic and Brandt's Cormorants, Rhinoceros Auklets, and Pigeon Guillemots are the stars of the show.



The team also works to keep track of the number of seabird species that come to the area around Sea Lion Caves over time.



© Amelia O'Connor

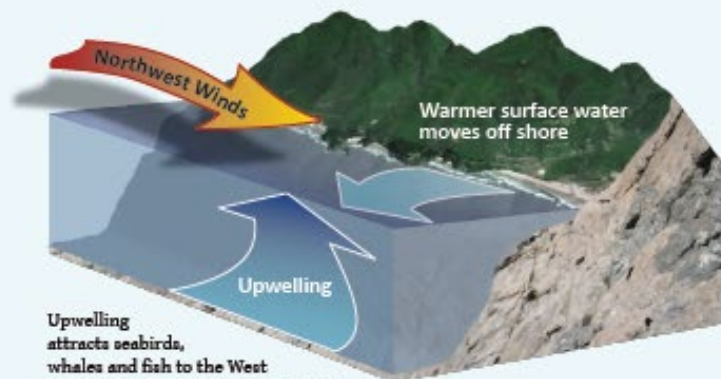


# Upwelling

## Foundation of the Food Web

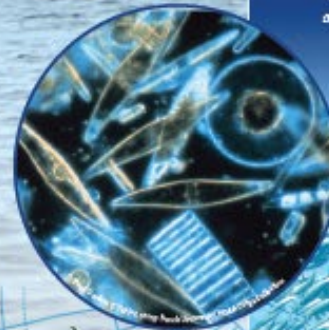
You're looking at one of the most productive marine ecosystems on Earth. In spring and summer, the huge underwater "river" called the California Current brings cold, nutrient-rich water south from the northern Pacific and close to shore. Northwest winds carry the nutrients to the surface in a process called upwelling.

At the surface, light and nutrients fuel an explosion of life. The result? Clouds of tiny, drifting plants called phytoplankton, which form the basis of the ocean food web.



Upwelling attracts seabirds, whales and fish to the West Coast from all over the Pacific Ocean. As each creature eats, their waste adds even more nutrients to the marine food chain.

One of the largest marine animals in the Pacific, the gray whale, eats the smallest food, feeding at the bottom of the food web.



## The Big Picture

Because of powerful currents and winds that know no boundaries, every federal and state marine protected area along our coast is intimately connected not only with the others, but also to the entire West Coast from Alaska to Baja, California, and to the far reaches of the Pacific ocean.

Oregon's marine reserves are intended to help protect and conserve not just our local coastal waters, but the entire fabric of ocean life in the Pacific.



The Whale Trail is a network of marine mammal viewing sites along the Pacific Coast, from British Columbia to California.

## Major League Bait Ball Comes to Oregon

Bait balls are at the center of the action. Millions of "forage" fish—sardines, anchovies, and sand lance—swim together in huge tight spirals, trying to avoid predators. Highly visible, they are eaten by seabirds, dolphins, sharks, salmon, and other large fish.

The big boys enter the scene when the humpback whales and orcas attempt to swallow the remaining bait ball whole.

