

CASE STUDY

How is the Port Addressing Ocean Acidification?

KEY STATISTICS ON OCEAN ECONOMY:

The Port of Seattle, located on the ancestral lands of the Coast Salish people in the Puget Sound, is home to a rich marine, freshwater, and wetland ecosystem that plays an important role in the economy and is culturally important to many tribal communities. Seattle-Tacoma International Airport (SEA) is the primary gateway for air travel to Washington State. In 2019, Seattle and King County hosted over 41 million visitors who enjoyed the amenities of the region and generated \$7.8 billion in revenue for local business.

The Port plays a critical role in supporting the regional fishing industry, hosting at least 300 fishing vessels at Port facilities that fish in Washington and Alaskan waters. These vessels are engaged in the harvest of pollock, Alaskan king crab, groundfish, and salmon, among many other high value species. Commercial fishing based out of Seattle feeds the world with wild harvested seafood and the economies of the Pacific Northwest and Alaska, supporting more than 11,000 jobs that represent more than half a billion dollars in payroll. Our region supplies 13% of the total US commercial fisheries harvest by value. Finally, the region is home to a robust shellfish industry contributing over \$100 million to the economy in 2017, with South Puget Sound generating over half of that value.

Visitors enjoy the natural beauty of the region and activities like whale watching support over \$216 million worth of economic activity in the Puget Sound Region every year. This activity generates more than \$12 million in state and local tax revenue a year and supports over 1,800 jobs. Tribes have harvested shellfish for generations from Puget Sound and coastal areas, while the recreational harvest of clams and oysters has become important tradition for many families.



VANCOUVER ISLAND

VANCOUVER BC

THE PORT OF SEATTLE

OLYMPIA

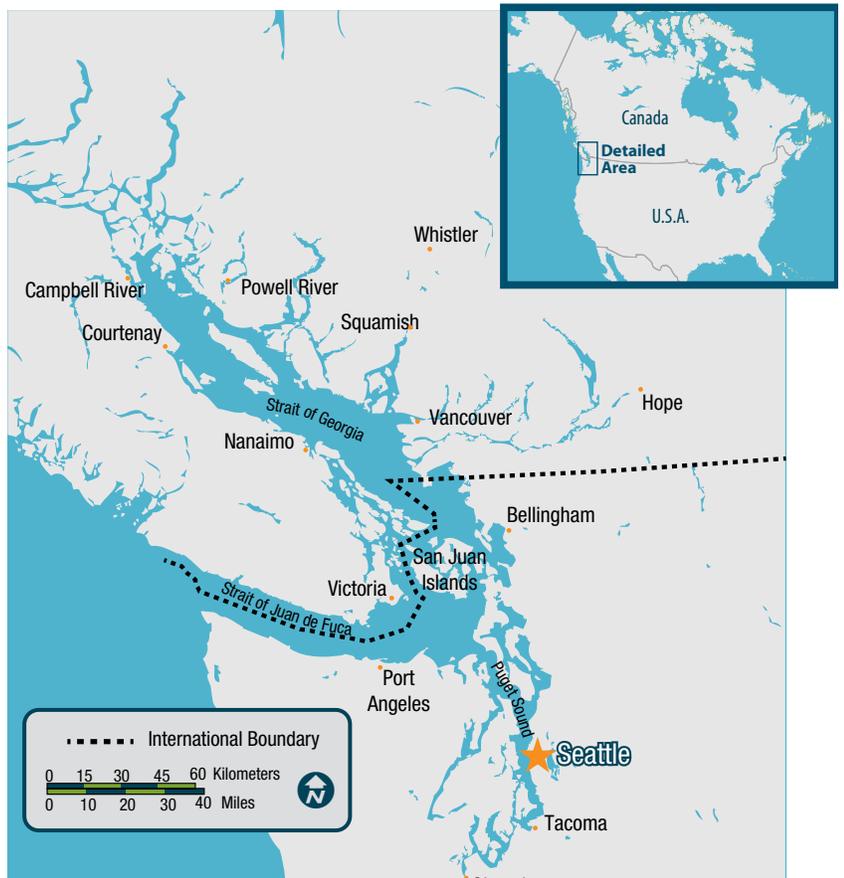
TACOMA

- **Region:** Washington State
- **Kilometers/Miles of Coastline:** 15.6 miles
- **Regionally Significant Marine Resources:** Salmon, crab, mussels, clams, oysters, and other shellfish; kelp beds and other macroalgae; eelgrass beds; salt marsh; ecologically important shorelines; restored subtidal, intertidal, and marsh habitat; culturally important marine fisheries and shorelines
- **Status of Action Plan:** In progress

WHAT IS AT STAKE IN YOUR REGION?

The Port of Seattle is situated on the Puget Sound in the southern portion of the Salish Sea, which extends from Olympia, Washington in the south; to Campbell River, British Columbia in the north; west to Neah Bay and the San Juan Islands; and encompasses the major metropolitan areas of Vancouver, BC, Seattle, and Tacoma, Washington. The region is characterized by hundreds of islands, thousands of miles of coastline, and about eight million people. Additionally, the Salish Sea ecosystem is home to numerous species of mammals, birds, fish, reptiles, and invertebrates, including iconic and culturally important species such as the orca whale and salmon.

Ocean acidification threatens marine life in Northwest waters and throughout the world; Northwest waters are more vulnerable to acidification due to a variety of factors. As nearshore waters of the Puget Sound become more acidic, it will become more difficult for organisms with calcium carbonate shells, such as crab, barnacles, plankton, clams, mussels, and oysters, to develop these protective structures. Many of these organisms are important food source for other marine wildlife; thus, ocean acidification disrupts the foraging habits and, in turn, impacts mortality and reproduction.



Salish Sea

The top seafood exports from the Northwest Seaport Alliance (a partnership between the Ports of Seattle and Tacoma) include:

- Salmon:
 - Sockeye
 - Pink
 - King
 - Silver
 - Chum
- Halibut
- Pacific cod
- Lingcod
- Rockfish
- Pollock
- Sablefish
- Crab
- Shrimp
- Clams
- Oysters
- Mussels

However, ocean acidification has already begun to impact the regional fishing and aquaculture industries. Scientists have documented that coastal waters have been acidifying faster than expected; wild oysters have not reproduced on the Washington coast since 2005. In Puget Sound, loss of oyster larvae in oyster hatcheries has been attributed to increasingly acidic waters. More recently, research indicates that acidic waters inhibit predator avoidance in salmon species and their olfactory sensors, potentially disrupting reproduction. Ultimately, ocean acidification presents the potential to significantly alter the marine ecosystem and the numerous economic and cultural activities that depend on a healthy and productive Puget Sound.



PRIORITY AREAS AND ACTIONS

The Port of Seattle has an ambitious goal to become the “greenest and most energy-efficient Port in North America”, and action on ocean acidification is becoming increasingly important given its far-reaching impact on our region. Each of these initiatives addresses one or more contributors to ocean acidification and respond to the urgent need to address ocean acidification.



Blue Carbon Project (Elliott Bay)

To advance scientific understanding of ocean acidification, the Port of Seattle has partnered with the Washington State Department of Ecology and the Department of Natural Resources to pilot an eelgrass, kelp, and oyster restoration project in Elliott Bay. The purpose is to understand techniques for implementing restoration and their potential benefits related to ocean acidification. Additionally, the Port undertook a carbon sequestration analysis for all current and future habitat restoration sites to better understand the potential ancillary benefits of habitat restoration projects.



Oyster Shell Filtration (Port maritime facilities)

The Port runs a stormwater utility, and manages 1.2 billion gallons of runoff annually, decreasing nutrient loading into receiving waters. Oyster shells are being used to treat stormwater at the Port's Maritime facilities for two purposes: to increase stormwater hardness and remove copper.



Northwest Ports Clean Air Strategy (Washington and British Columbia shared airshed)

This collaborative effort between the Port of Seattle, Port of Tacoma, and Port Metro Vancouver (Canada) will reduce air emissions from shipping and port operations within the shared airshed.



Challenges, Lessons learned, and success metrics

The Port of Seattle is in the early stages of incorporating ocean acidification into our programs and we look forward to sharing lessons learned in the future.