What is at Risk? OAH Impacts on Oregon's Nearshore Rockfish

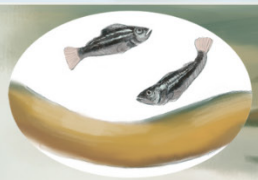
More than 10 species of rockfish are commonly found in Oregon's nearshore waters. These rockfish live in a variety of habitats, but primarily prefer rocky reefs. They also support many recreational and commercial fisheries. This diverse group of fishes will have very different responses to Ocean Acidification and Hypoxia.

Economic Effects

The rockfish caught by fishers are changing their behavior on short time scales (due to hypoxic events) and longer time scales (due to changing ocean conditions). These shifts will affect fishers' ability to access and utilize this resource valued at nearly 20 million dollars.

Sensory Effects

Acidified ocean water increases anxiety and stress in juvenile rockfish.



Direct Effects

Changing conditions affect ear bone growth (an essential management tool), decrease ability to uptake oxygen, change ability to digest food, and alter fish behavior.

Food Web Effects

During hypoxic events, some rockfish move out of the area while others stay put. These changes — combined with shifting availability of prey — will impact food webs.

Habitat Effects

Animals like corals and sponges form structure on rocky reefs, which is important for rockfish. Hypoxia is often lethal to these animals since they cannot move.

Cumulative Effects

Rockfish species will each respond differently to these ocean changes — there will be winners and losers. Rockfish population and location changes will directly impact the coastal communities and cultural identities tied to these nearshore fisheries.

Artist: Emy Daniels

Oregon Coordinating Council on Ocean Acidification & Hypoxia

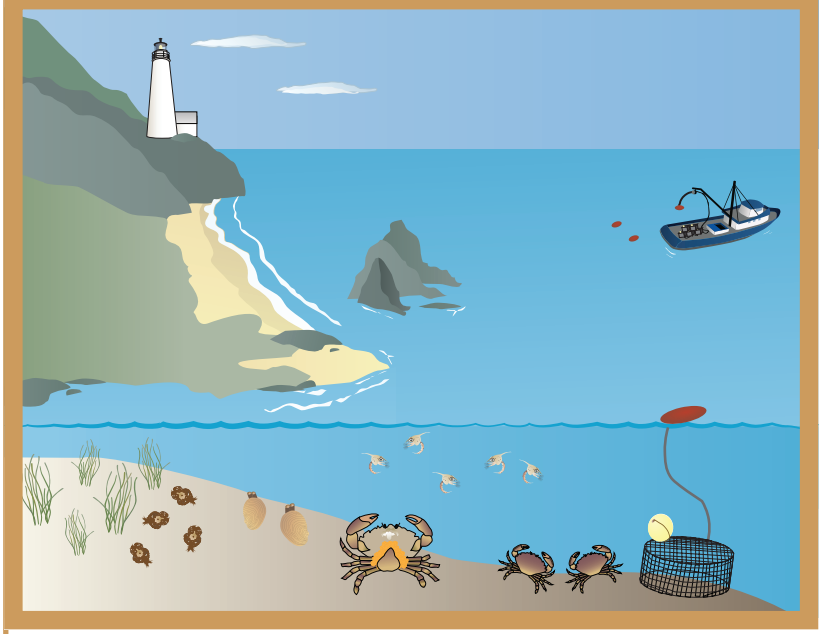
OREGON Fish & Wildlife Marine Resources

Species Spotlight

Dungeness Crab

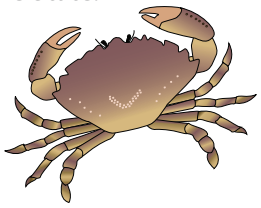
Ocean Acidification (OA) and Hypoxia (H) are harmful to ocean life and the economic stability of the Oregonians who rely on a healthy ocean. The Dungeness crab fishery is one of Oregon's highest harvest values commercial fisheries, and is an iconic pastime for recreational harvesters.

What is at risk?



Economic Effects

Overall declines in harvest levels, resulting in possible economic and recreational losses throughout the State.



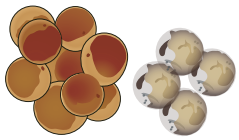
Foodweb Effects

Declines in food (such as clams and mussels) affect crab health.

Habitat Effects

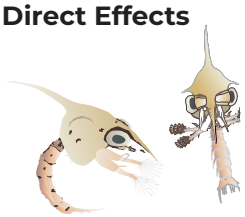
Eelgrass is an important habitat for crabs, and may buffer short term effects of OAH through photosynthesis (absorbing CO_2 and releasing oxygen).

Cumulative Effects



Poor ocean conditions are likely to lead to lower productivity.

Direct Effects



Larval growth and shell formation out of chitin (a calcium carbonate compound) can also be affected by lower acidity.

Sensory Effects

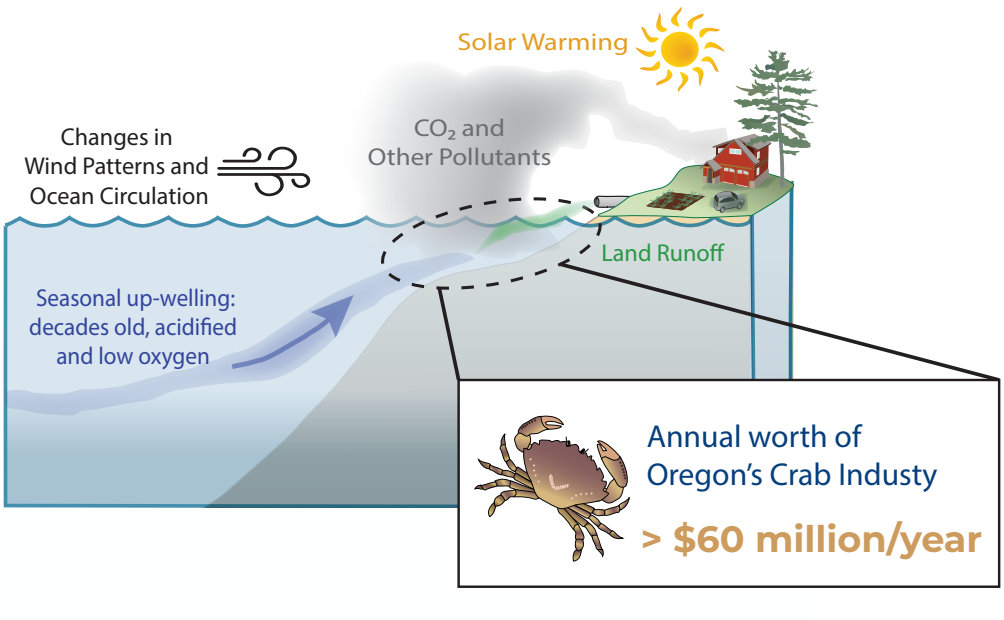
Behavior maybe affected by changing cues, due to altered chemical signaling (peptide production) needed for juvenile settlement.

What is OAH?

Ocean acidification and hypoxia (OAH) are increasing, and are related to the same factor that is causing climate change.

The culprit? **Fossil fuel combustion and related accumulation of CO_2 and other greenhouse gases.**

The solution? **Local actions will lead to a brighter future, for the oceans, its species and the communities that depend on them. We can and must act now!**



The earth's oceans have absorbed 30% of the excess CO_2 produced from fossil fuel combustion since the Industrial Revolution (mid 1800s). When absorbed by seawater, CO_2 undergoes chemical reactions that lower seawater pH (making it more acidic), and thus hampers shell formation in marine life. Hypoxia (low oxygen) conditions are also on the rise as a result of climate change, due to changing wind and weather patterns. This is leading to extended periods of hypoxia in some of Oregon's coastal waters, impacting a wide range of marine animals from crabs to fish.

Support Action!

Ocean Acidification and Hypoxia (OAH) will not stop on its own, and actions must be taken by regional and national governments, communities, and scientists now in order to address the growing problems. Through coordination and collaboration, such as through the **Oregon OAH Action Plan**, Oregon will be able to adapt and mitigate the effects of OAH. Solutions are needed to help Oregon's wild fisheries and marine resources withstand the projected changes in OAH.

To learn more about OAH science, impacts, and solutions, please visit the Oregon OAH Council's website:

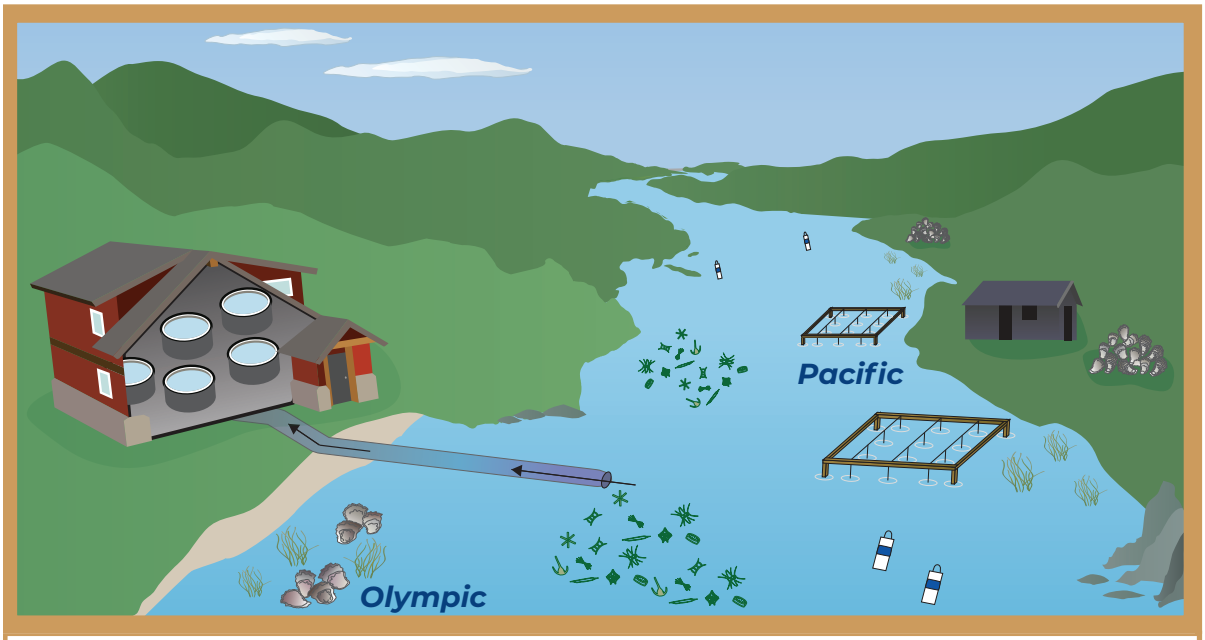
oregonocean.info/index.php/ocean-acidification

Species Spotlight

Olympic and Pacific Oysters

Ocean Acidification (OA) and Hypoxia (H) are harmful to ocean life and the economic stability of the Oregonians who rely on a healthy ocean. Olympic oysters (native) and Pacific oysters (cultured) provide important ecological and industry opportunities throughout coastal Oregon.

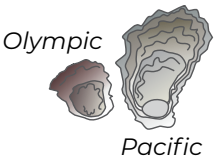
What is at risk?



Habitat Effects

Eelgrass, habitat for Olympic and Pacific oysters, may buffer short term effects of OAH through photosynthesis (absorbing CO_2 and releasing oxygen).

Cumulative Effects

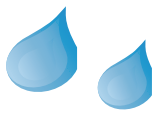


Small changes in pH make a large difference in growth conditions, which could affect Olympic and Pacific oysters throughout their life.

Direct Effects

Larval growth and calcium carbonate shell formation in Olympic and Pacific oysters are lowered by OA.

Hatchery Effects



Pumped seawater used in hatcheries now must be chemically modified to reduce the effects of OAH on larval Pacific oysters.

Foodweb Effects

Species shifts in phytoplankton, feed for Olympic and Pacific oysters, may occur with changing ocean conditions.

Economic Effects

With declining larval supplies, Pacific oyster farmers may experience declines in production.

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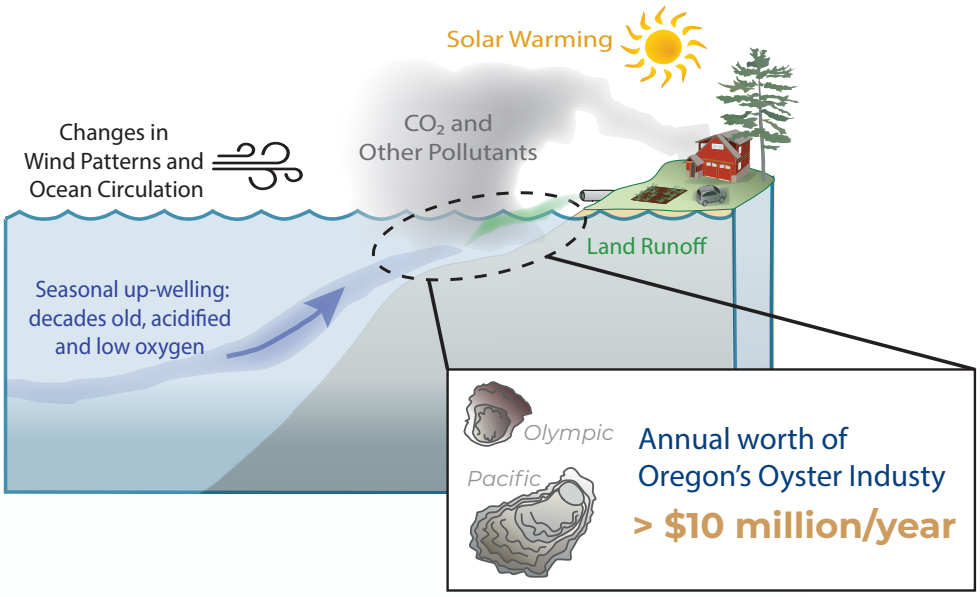

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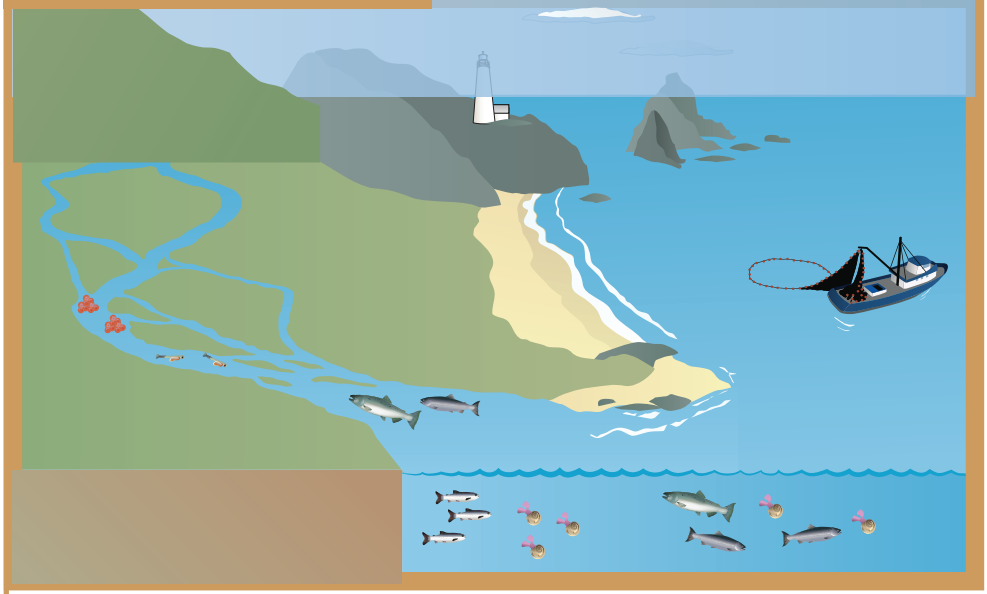
Species Spotlight

Salmon

Ocean Acidification (OA) and Hypoxia (H) are harmful to ocean life and the economic stability of the Oregonians who rely on a healthy ocean. Salmon are one of the favorite pursuits of Oregon's recreational and commercial anglers, as well as being an essential cultural resource Northwest tribes.

What is at risk?



Habitat Effects

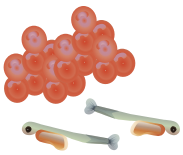
Changes in OAH can not only affect oceans but are also experienced in estuarine and river environments.

These environmental effects have carryover into all aspects of the Salmon life cycle.

Foodweb Effects

Pteropods (marine snails) are key prey, whose shells are sensitive to OA and are pitted by increased acidity.

Cumulative Effects



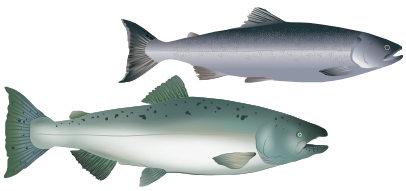
Early Salmon life stages' survival could be altered as a result of material diet changes due to OAH.

Direct Effects

Juveniles may experience reduced growth rates, which can increase the risk of predation.

Sensory Effects

Signaling in brains can be disrupted, causing fish to possibly not recognize prey, predators, or migration cues.



Economic Effects

Fisheries managers and researchers are not certain how OAH effects may compound across Salmon life stages and on habitats, or if there will be any effects on commercial and recreational Salmon harvests.

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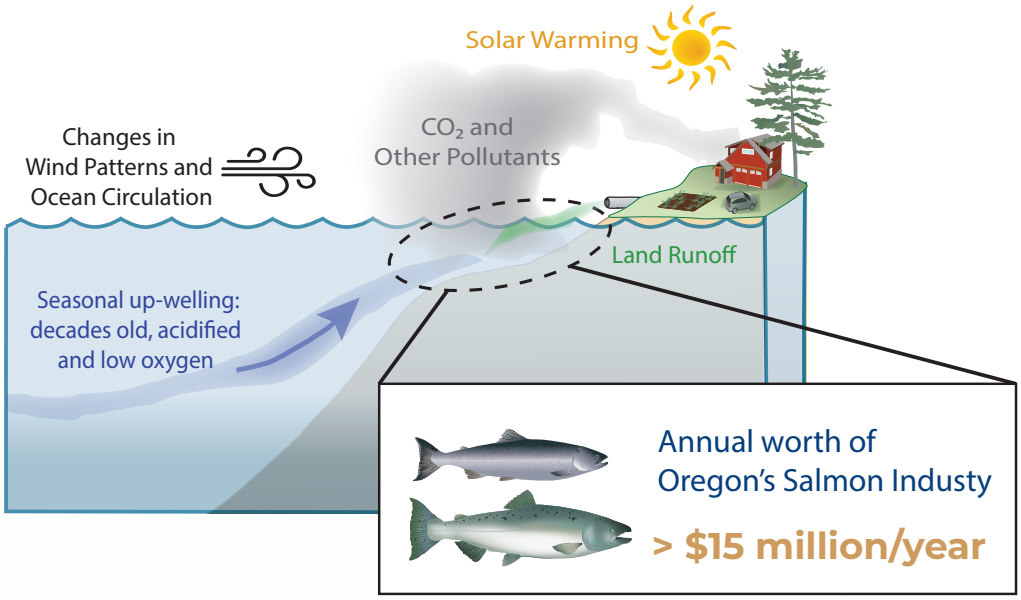

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