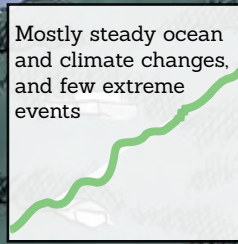


2040 Scenarios for West Coast Fisheries:

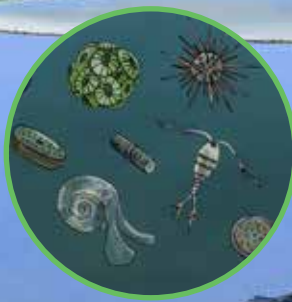
Fortune and Favor

This is a world of gradual warming, with fish stocks responding favorably. Many stocks shift northward in predictable ways, and few severe extreme events occur. Societal values move away from globalization and instead encourage collective support of local fishing.



Greater abundance and diversity have led to increased catch of weak stocks in fisheries using less selective gear.

Community-focused fishing, processing, and marketing is informed by investments in new monitoring technologies.



Under continuing ocean acidification, most shell-forming plankton at the base of the food chain have adapted.

Highly Migratory Species like the Bluefin Tuna persist and shift northward.

Coastal pelagic species like the Pacific Sardine thrive and grow as they expand northward.

The ecosystem continues to provide attractive forage for salmon and other higher-order predators, and reduced worldwide marine pollution improves both freshwater and ocean habitat.

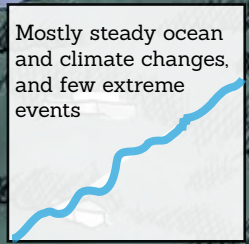
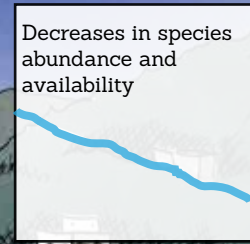
Marine mammals and Loggerhead Sea Turtles are at healthy population levels. Leatherbacks remain depleted due to distant impacts.

Kelp forests may rebound to the benefit of a host of nearshore fish species, including Black Rockfish.

2040 Scenarios for West Coast Fisheries:

Blue Revolution

This is a world of gradual warming, with climate less variable year to year. Familiar stocks decline, but new subtropical stocks appear. Open, globalized commerce encourages alternative uses of ocean resources. Aquaculture and offshore energy put pressure on commercial fishing.



Off Southern California, Bluefin Tuna ranches compete with fishing boats for space and markets.



With strong public support and policies, extensive offshore energy facilities are installed.



Some Highly Migratory Species decline, though Bluefin Tuna populations likely persist.



Marine mammal populations mostly decline, though sea turtle populations stabilize.



Wild salmonids face challenging ocean conditions, but improved hatchery practices and technology will benefit hatchery stocks.



The Northern Anchovy population shifts northward and expands, as the Pacific Sardine stock contracts.

New subtropical and tropical species appear in the southern California Current Ecosystem (CCE).



Black Rockfish may become locally depleted, and may be subject to increasing fishing pressure from recreational fisheries.

2040 Scenarios for West Coast Fisheries:

Hollowed Out

An unstable world produces unpredictable and extreme shifts in conditions, and many fish stocks crash. There is a fundamental reorganization of the food web. Extreme storms and rising tides create regular and damaging inundations. The nature of coastal activity changes as some places are neglected while others become fortified, commercial hubs.

Decreases in species abundance and availability

Highly variable ocean and climate conditions.

Marine mammal and sea turtle populations decline, with some species disappearing entirely.

This is a world of polluted oceans.

Harmful Algal Blooms are persistent.

There is less commercial fishing and infrastructure is abandoned. Urban waterfronts are fortified.

Populations of many Highly Migratory Species decline and shift northward.

Some of the few newly-seen species outcompete previously valued target species.

The Pacific Sardine stock diminishes and moves northward, like other coastal pelagic species.

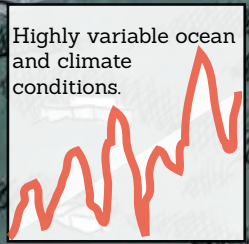
Harvesting periodic jellyfish blooms becomes modestly profitable.

Black rockfish are locally depleted, vulnerable to shifts in the health of kelp forests and targeted by recreational fishing.

2040 Scenarios for West Coast Fisheries:

Box of Chocolates

This is a world of environmental surprises and extremes, but fish populations are more productive, presenting novel opportunities. Regular “boom and bust” cycles result for some key stocks. New technology is deployed to better monitor the unpredictable environment, though seafood marketing becomes more difficult because of the high variability in availability.



The expansion of aquaculture is encouraged by regulations but limited by the extreme environment.

Small vessel artisanal fisheries survive, but larger vessels concentrate in a few ports.

Marine mammal and turtle populations are healthy.

The ability to catch new species not commonly encountered off the West Coast proves a boon to recreational fisheries.



Precise monitoring has allowed improved prediction of environmental conditions. A revolution in fishing technology has occurred.

Harmful Algal Blooms are chronic, driving periodic fishing closures.

Highly Migratory Species like Bluefin Tuna tend to persist and shift northward.

Coastal Pelagic Species move northward. The Anchovy population stabilizes by 2040 and supplements the role of Pacific Sardine in the ecosystem.

Salmonids experience “boom and bust” cycles, though higher ocean productivity benefits those that reach the ocean.

There are unpredictable benefits and losses for groundfish. Black Rockfish face meager kelp forests but less recreational fishing.