



...and it's all interconnected

BC's marine waters are teeming with an incredible variety of life, from microscopic creatures to 100-tonne blue whales. Big or small, plant or animal, rare or common, they all depend on one another and on the environment around them.

Making the Links: Food

Every creature needs food to survive. One species feeds on another, which feeds on another and another, creating complex and delicate food webs that connect all kinds of different life forms to one another. Anything that affects one species can affect all the other species connected to it.

Directly or indirectly, marine creatures depend on microorganisms and plants to transform energy into food – a process called primary production.

Most primary production occurs when algae and green plants convert sunlight, carbon dioxide, and water into sugar through photosynthesis.

The creatures that live in BC's deep-sea hydrothermal vents are an exception. Sunlight doesn't reach this deep, so their energy comes from the chemicals that spew out of the vents. The food web here depends on special chemical-eating bacteria to transform those chemicals into energy for other forms of life. This process is called chemosynthesis.

The BC coast is a global hotspot of primary production, thanks to lots of sunlight, rich nutrients, and temperatures that are cold but not frigid.

Making the Links: Oxygen

Most creatures need oxygen to survive. As the ocean's algae convert sunlight to food, they also generate oxygen – in fact, they produce 70 to 90% of the oxygen in the earth's atmosphere. And because cold water holds more oxygen than warm water, BC's cold waters can support lots of life.

Making the Links: Habitat

Each species depends on its physical surroundings. Any place that provides a home for a particular species is called a habitat.

Some species have adapted to an extremely specific area – whether it's the cold, rocky slopes of an underwater mountain or a shallow, muddy estuary. Others travel thousands of kilometres through many different kinds of conditions.

Anything that changes a habitat will affect all the species that live there.

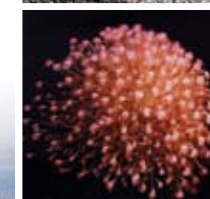
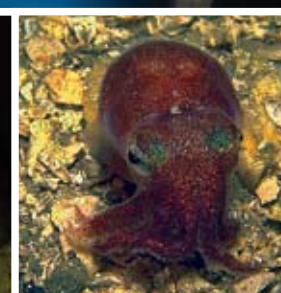
The Complex Web of Life

To make things even more complex, each species may need different habitats and different sources of food at different stages in their life. And at different stages, they are food for different species.

For example, salmon start their life as eggs in the gravel nests of freshwater streams and rivers, making a tasty snack for ducks. After they hatch and grow, young salmon are eaten by bigger fish and seabirds. When they become adults, salmon live in the salty water of the ocean, where they are eaten by orcas, seals and sea lions. As salmon return to the rivers and streams to spawn, bears and bald eagles gobble them up.

When you consider all the different species and habitats that make up this region, and all the different ways they connect to one another, it adds up to an incredibly intricate, ever-changing web of life.

For a small snapshot, open up this fact sheet.



All kinds of plants, animals, fish, birds and other creatures make up this region. This biodiversity gives us food and medicine, shapes our climate, helps to control pollution, and much, much more – and it's just as essential for other species as well.

In other parts of the world, habitat destruction, pollution and over-consumption have damaged nature's delicate networks. In contrast, BC's coast is still relatively untouched by development.

By making the right choices today, we can set a global example. We can conserve the thousands of species, habitats and ecosystems in this region – and enjoy all the benefits they give us.

The pressures are increasing. We have a rare opportunity to make sure the ecosystems around us continue to function and thrive. We also have a global responsibility.

The time is now.

Let's cherish this region's amazing richness



If you want to help shape a vision for this Northeast Pacific Marine Region, or if you want more information, get in touch with us:

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WWF Mission

WWF's mission is to stop the degradation of the planet's natural environment and to build a future where humans live in harmony with nature by:

- **Conserving the world's biological diversity;**
- **Ensuring that the use of renewable natural resources is sustainable;**
- **Promoting the reduction of pollution and wasteful consumption.**

Thank you!

Thank you to the following generous supporters who make our Pacific marine conservation work possible:

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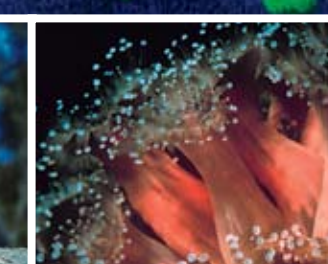


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Marine life on BC's coast is abundant... is diverse ...



Northeast Pacific Marine Region Fact Sheet #2



Making connections

The thousands of species that live on BC's coast are linked to each other and the environment around them in all kinds of ways, creating complex and delicate networks that stretch from inland forests to the deep ocean. Here's just a small snapshot.

BC's salmon-based ecosystems stretch from watersheds far inland to the deep sea. More than 130 species depend on salmon, including rainforest species like eagles, bears and wolves. Even during their early life stages, salmon feed other larger fish, seabirds, as well as marine mammals like seals and orcas. Salmon also provide 10-20% of the nitrogen found in the trees beside rivers and streams.

Volcanic magma has created underwater mountains thousands of metres high. These "seamounts" provide a shallow-water environment in the deep ocean, harbouring black cod, halibut, many species of rockfish and leatherback turtles. The stationary eddies that form around their peaks stop nutrients and larvae from being swept away. Bowie Seamount has the tallest peak, rising from 3100 m off the ground to only about 24 m from the sea surface.

Seaweed grows faster than some of the fastest-growing plants on earth. Bull kelp can stretch up to 1.5 times its length to stop it from breaking in large waves. Forests of kelp create a home for rockfish, lingcod, sea urchins, abalone and crabs.

Leatherbacks are the world's largest sea turtle, weighing up to 900 kg. They migrate north to feed on jellyfish and can travel thousands of kilometres.

Ocean surface currents are driven by the wind, bringing cool water to the tropics and warmer water to northern regions.

Rockfish can live longer than humans. Biologists estimate that one local rougheye was more than 147 years old. Some rockfish take 20 years or more to mature and unlike other fish, they bear live young. Adult inshore rockfish tend to stay in the same local area for the rest of their lives.

Anemones are one of thousands of species of marine invertebrates found here. These carnivorous creatures stay put in one spot and use tentacles covered with venomous barbs to catch shrimp, crabs and small fish.

The unique Hexactinellid sponges are made of silica that has been trapped in sediments. They can form glass-like mounds up to 18 m high and reefs as big as 300 km². Sponge reefs provide important habitat for crabs, shrimp, prawns, octopus, young rockfish and other species.

Black and white orcas have strong teeth that help them feed on seals, dolphins, salmon and birds. Some travel up and down the Pacific coast from California to Alaska, while others remain resident in these waters.

Spawning stage: After one to seven years (depending on the species of salmon), adults begin swimming back to the streams where they were born, following chemical cues in the water. Once they reach freshwater, salmon stop eating, and their bodies release hormones that cause physical changes. For example, spawning sockeye turn a brilliant red.

Although spawning salmon are at the end of their life, they bring the hope of a new generation that will continue to connect and sustain the beautiful forest and marine ecosystems of coastal BC.

Egg: Female salmon lay their eggs in the gravel nests of freshwater streams. The eggs incubate for up to 100 days and hatch between January and March, when the temperature, water quality and flow are right.

Alevin: Barely 2.5-3.5 cm long, these big-eyed fish stay in their gravel nest for about a month after hatching, hiding from fish, herons, ducks and other predators. They get their food from special egg-yolk sacs within their bodies.

Eelgrass creates a sheltered habitat near the shoreline for many creatures, including cod, crabs, snails, jellyfish, anemones and juvenile salmon.

Fry: At this stage, pink and chum fry swim seaward to live in estuaries. Other types of fry may spend up to two years in streams and lakes close to the gravel nests where they hatched. At this stage, salmon have black "parr" marks that camouflage them from predators.

Lingcod males guard the sticky egg mass that the female lays on the ocean floor. These bottom-dwelling fish can grow up to 1.5 m long and weigh 45 kg. They are a source of food for marine mammals and sharks.

Smolt: After spending all their life in freshwater, young salmon now have to adapt to seawater. They grow up to 12 cm long and develop a protective silvery coating. These young salmon provide a tasty treat for larger fish and seabirds such as herons and terns.

The bedrock and boulder rubble that make up **rocky reefs** provide stable shelter in an otherwise rough ocean, creating a home for algae, anemones, rockfish and lingcod.

As winds blow the warmer surface water towards land, the colder water underneath "wells" up to the surface. These **upwelling areas** are rich in nutrients, oxygen and tiny plants and animals called **phytoplankton** and **zooplankton**. This attracts seabirds, salmon, abalone, marine mammals and many other species.

Ocean phase: Once they reach the sea, salmon are always on the move. They hitch a ride on strong ocean currents, travelling thousands of kilometres throughout the north Pacific each year.

Shallow **estuaries** are as productive as the most productive farms. They provide shelter and food for many species of young fish, while the eelgrass meadows and **mud flats** that are often found nearby are important feeding areas for seabirds.

The small crustaceans and fish here feed some of the highest densities of seabirds in the eastern North Pacific. You're not likely to see many of these species, however, because they spend most of their life on the open water. For example, Cassin's Auklets only come ashore at the end of March for nesting season. They land at night, on small islands far away from any human developments.

Forage fish are an essential source of food for many other marine creatures. Just as healthy salmon are vital to BC's coastal ecosystems, healthy forage fish such as **herring** and **sand lance** are vital to salmon.

Although baleen whales such as **humpback whales** are extremely big, they survive by eating tiny creatures like phytoplankton, zooplankton and small fish. They use their baleen—special parts of their mouth that act like sieves—to filter out their dinner from mouthfuls of seawater. Humpback whales grow up to 15 m long.

Deep-sea **hydrothermal vents** are formed when water seeps into cracks in the earth's crust and becomes superheated to more than 400°C. As this water shoots up through the cold ocean, the minerals it carries form a solid "vent chimney" up to 15 storeys high. Here you'll find giant tubeworms, eyeless shrimp, giant clams and spider crabs.