State of the Catch

A PROFESSIONAL'S GUIDE TO SUSTAINABLE SEAFOOD

David Suzuki Foundation

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State of the Catch:
A professional's guide to sustainable seafood

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Contents

The following species are arranged from **most** sustainable to **least** sustainable

"Sustainable seafood options do exist. And it's up to all of us to ensure our fisheries are managed in a way that maintains this incredible natural resource for the future."

— DAVID T. SUZUKI PH.D, CHAIR OF THE DAVID SUZUKI FOUNDATION

Introduction

Welcome to *State of the Catch*, a David Suzuki Foundation publication designed to help food professionals make informed seafood purchasing decisions.

If you're a chef, a commercial fish buyer, a restaurant manager or a concerned consumer, this guidebook is for you. *State of the Catch: A professional's guide to sustainable seafood* documents the current status of many fish and shellfish stocks available in restaurants and supermarkets. The guide will assist you in buying and promoting ocean-friendly fish and shellfish, while avoiding seafood species that are threatened, endangered or poorly managed. Your progressive decisions can help improve fishing practices and secure a sustainable future for our ocean ecosystems.

The guide is based on extensive literature research and interviews with industry experts and conservation scientists. A detailed methodology on how we conducted the stock assessments is provided at the back of the guidebook.

Since the status of certain seafood can change over time, look for updates available in a downloadable format on our website at: **www.davidsuzuki.org/Oceans/**. We will also be assessing additional species of seafood each year so keep an eye on our website for new information.

If you have questions about the information in this guide or have questions about sustainable seafood in general, contact us at the David Suzuki Foundation.

State of the Catch is supported by *Sustainable Seafood Canada*, a collective of Canadian conservation groups that empower seafood stakeholders and users to make choices that best support sustainable fisheries and fishing policies. Member organizations include the David Suzuki Foundation, Canadian Parks and Wilderness Society, the Ecology Action Centre, the Living Oceans Society, and the Sierra Club of Canada, BC Chapter.

How to use this guide

In *State of the Catch,* the selected fish and shellfish stocks are arranged from most sustainable to least sustainable.

For each species, five broad criteria are separately evaluated: habitat, by-catch, precautionary management, stock status, and social equity. For each criterion, a green, yellow, or red ranking is assigned to reflect best, moderate, and worst practices, respectively.

- **GREEN CIRCLE: Criteria with green circles represent best practices with no immediate conservation concerns.**
- **YELLOW CIRCLE: Yellow circles indicate a moderate conservation concern and/or insufficient information to accurately evaluate the criteria.**
- **RED CIRCLE: Criteria with red circles indicate worst practices resulting in severe conservation concerns.**

STATE OF THE CATCH

Giant Pacific Octopus

THE "FISH SCALE"
Rated out of five, the number provides a quick reference tool to determine whether a species is sustainable (high number) or unsustainable (low number).

NAME
The name of the species and its common name.

DIAGNOSIS
A quick summary of the fishery.

the diagnosis

Octopus stock numbers appear healthy and catch rates are low

recommendation

Giant Pacific Octopus is an excellent seafood choice.

RECOMMENDATION
Advice to fish buyers, chefs and consumers. The high-ranked fish are considered good choices for now and low end of the rating scale is to be avoided. For the fish ranked in the middle, we suggest they be used in moderation, and only if there is not a more sustainable option.

THINGS TO WATCH
A brief outline of known factors that may cause a species to be re-ranked in the near future.

things to watch

There are current studies being undertaken to better un
eventual information, combined with a potentially expanding fishery, could lead to a re-classification in the future.

CONCERN	
habitat damage	●
bycatch	●
managed in a suitably precautionary manner	●
healthy stock numbers	●
social equity of the fishery	●

CONCERNS
Specific concerns will be highlighted in five major categories. Again, stocks are categorized from most sustainable (green circle) to moderately sustainable (yellow circle) to unsustainable (red circle). Special concerns, like toxicity or non-fishery induced habitat damage are noted.

toxicity issues

None

TOXICITY
See Methodology section for recommended mercury advice.

for more background on this species >>>

BACKGROUND
In-depth information on each species, including fishing methods, the status of the fishery, how the product is marketed and any significant issues are described on the back of each species evaluation page.

Green Sea Urchin

the diagnosis

Stocks appear healthy in this fishery. However, because of the individual quota system of management, and because most captured sea urchins are sent to Asia for processing, few economic benefits flow from this fishery to B.C.'s coastal communities.

recommendation

The green sea urchin is an excellent seafood choice.

things to watch

Abalone poaching and increasing numbers of sea otters (predator) could lower this urchin's rating in the future.

CONCERN	
habitat damage	●
bycatch	●
managed in a suitably precautionary manner	●
healthy stock numbers	●
social equity of the fishery	●

toxicity issues

None

for more background on this species >>>

background

Green sea urchins live on rocky surfaces at the bottom of the ocean. They feed primarily on kelp and as a result, help control the abundance of this important marine plant. Sea urchins form a large part of the sea otter diet. In the past, severe declines in sea otter populations on the B.C. coast led to increases in sea urchin numbers – consequently, kelp declined. It is unclear how the current increase in sea otter populations on the B.C. coast will affect sea urchin numbers. Green sea urchins are usually shipped live to Asia, where they are harvested for their roe.

B.C.'s green sea urchin fishery

Divers harvest green sea urchins. These invertebrates were not fished commercially in B.C. until 1987. In 1994, catch limits were set by the Department of Fisheries and Oceans, with an individual quota system instituted in 1995. There are now 49 licenses in this fishery and each license holder is allocated an equal portion of the total catch. Historically, more than 90 per cent of the green sea urchin catch came from the areas surrounding the Queen Charlotte Strait and Gulf Islands. Apart from these two areas, all other sites were closed to fishing after 1995.

what are the issues?

Catch rates were very high in the mid-1990s, with the number of green sea urchins off the coast of B.C. falling dramatically. Since then, quotas have been precautionary and the fishery has been rebuilding. Catch rates in this fishery are now closer to what they were before exploitation began.

Quota stacking in this fishery has led to relatively fewer participants. There is also anecdotal evidence that illegal harvest of abalone – listed as threatened in B.C. – may be occurring in some green sea urchin dive fisheries.

Giant Pacific Octopus

the diagnosis
Octopus stock numbers appear healthy and catch rates are low.

recommendation
Giant Pacific Octopus is an excellent seafood choice.

things to watch
There are current studies being undertaken to better understand this animal. This eventual information, combined with a potentially expanding fishery, could lead to a re-classification in the future.

CONCERN	
habitat damage	●
bycatch	●
managed in a suitably precautionary manner	●
healthy stock numbers	●
social equity of the fishery	●

toxicity issues
None

for more background on this species >>>

GIANT PACIFIC OCTOPUS

background

Giant Pacific octopus lives in rocky areas at depths of 100 metres along the ocean bottom. They live in dens, or caves, and can grow to nine metres in length. Adults are predatory, feeding on other invertebrates and some fish. Females lay their eggs on the roof of their den. Once eggs are laid, the female octopus will stop eating and remain in the den to tend them. The female dies shortly before or immediately following hatching.

Octopus can be bought whole, fresh, or frozen, although most octopus caught in B.C. is used for bait and does not enter the commercial market.

B.C.'s octopus fishery

Giant pacific octopus is currently harvested in a dive fishery. Divers use an irritant to flush the octopus from its den without harming the marine environment. The octopus is then captured in a net or bag.

Although the majority of octopus fishing occurs on B.C.'s south coast, divers may choose to fish in one of three management areas. Instead of set quotas, this fishery is managed using minimum size limits and some areas are completely protected. Octopus harvesters are required to collect scientific information as a condition of their license. Some bycatch of octopus is allowed in crab and prawn trap fisheries.

what are the issues?

This fishery is now collecting biological information to better understand the distribution and abundance of this species.

Although catch rates are currently low, the lack of a cap on total catch for this fishery and lack of protection for brooding females could become issues in light of an expanding fishery. Furthermore, there has been no formal stock assessment since 1998.

Red Sea Urchin

the diagnosis
The red sea urchin fishery is effectively managed.

recommendation
Red sea urchin is an excellent seafood choice.

things to watch
Growing populations of predator sea otters could lead to re-classification of this fishery in the future.

CONCERN	
habitat damage	●
bycatch	●
managed in a suitably precautionary manner	●
healthy stock numbers	●
social equity of the fishery	●

toxicity issues
None

for more background on this species >>>

background

Red sea urchins live on rocky surfaces at the bottom of the ocean. They are the largest sea urchin species found in British Columbia and feed mostly on kelp. Sea urchins form a large part of the sea otter diet. In the past, severe declines in sea otter populations on the B.C. coast led to increases in sea urchin numbers and consequent declines in kelp. Red sea urchins are processed locally for their roe, which is sold in Japanese and limited North American markets.

B.C.'s red sea urchin fishery

Divers harvest red sea urchins by hand. This invertebrate has been fished commercially in B.C. since the 1970s. In 1992, a provincial limit was set on the total amount of Red sea urchin catch. An individual quota program was instituted in the fishery in 1996. Currently, there are 110 licenses in this fishery (each license holder is allowed an equal share of the total catch). Catches are also regulated using minimum size limits and area-specific quotas. Red sea urchin roe is extracted at local processing plants and shipped to Asia and elsewhere in North America.

what are the issues?

Quotas in this fishery appear sustainable and Red sea urchin stocks appear healthy. However, some issues do exist. As sea otter numbers increase on the B.C. coast, it is predicted that Red sea urchins (a main food source of the sea otter) will become less abundant.

Quota stacking in this fishery, means that there are relatively few participants. There is also anecdotal evidence that illegal harvest of Northern Abalone – listed as threatened in B.C. – may occur during some Red sea urchin dive fisheries.

Pink and Spiny Scallops

(by dive)

(by trawler)

the diagnosis

Overall, this fishery is sustainable. The scallop dive fishery is ranked slightly higher because of some habitat damage and bycatch concerns within the scallop trawl fishery.

recommendation

If you can ensure that this scallop was dive-caught (the majority), it is an excellent choice. If caught by trawl, it is a moderate to good choice.

things to watch

As more information is gathered on this animal, the recommendation could change. Expansion of this fishery could also result in re-classification.

CONCERN	BY DIVE	BY TRAWLER
habitat damage	●	●
bycatch	●	●
managed in a suitably precautionary manner	●	●
healthy stock numbers	●	●
social equity of the fishery	●	●

toxicity issues

Scallops are susceptible to paralytic shellfish poisoning, but are screened for this.

for more background on this species >>>

background

Of the 14 scallop species in B.C., only two are large enough to be commercially harvested. Pink and Spiny scallops live at depths of up to 200 metres, and are eaten by other invertebrates and groundfish. They live on the ocean bottom, propelling themselves by ejecting water from their bodies. Scallops are particularly susceptible to phycotoxins – the blooms of toxic algae that cause diseases such as paralytic shellfish poisoning. Generally, Pink and Spiny scallops can be bought in their shell, either fresh or frozen. Larger scallops from other regions of the world can often be found for sale without their shell. Exotic species of scallops are also being farmed in B.C.

B.C.'s scallop fishery

B.C.'s commercial scallop fishery began in 1982. Divers harvested more than 85 per cent the scallops, with the remaining 15 per cent harvested in a modified scallop trawl. This fishery was managed with few controls, and without comprehensive assessments. Because of this, concerns about local depletions began to emerge, and in 1999 the fishery was closed.

A new, scaled-back fishery for scallops was opened in 2000, and remains in place today. The fishery is designed to be a scientific one – allowing a limited number of fishermen to catch scallops while collecting the information necessary to reopen a full fishery. Today, 75 to 80 per cent of scallops caught on B.C.'s coast are handpicked by divers, allowing them to be very selective and not damage habitat.

The other 20 to 25 per cent of B.C. scallops are harvested using a modified trawl. This trawl hovers about 20 centimeters above the sea floor, sitting on runners or rollers. B.C.'s scallop fishery is very different from most other scallop fisheries in the world, which usually catch scallops using a dredge or drag, both of which can severely damage habitat. Worldwide, many scallop fisheries are characterized by rapid expansion, followed by decreases in catch caused by decreased stocks.

what are the issues?

The new scallop management regime has addressed the localized depletions that were occurring before the scale-back of the fishery. Currently, most scallops are harvested in the Strait of Georgia, with little data existing outside this region. More information on scallop stocks outside of the Strait of Georgia is needed if this fishery is to expand.

The scallop trawl is far less damaging to habitat than traditional scallop draggers or dredges. However, some habitat disturbance can still be expected. Also, although this trawl brings little bycatch to the surface, it may still damage or exhaust non-target organisms, making them more susceptible to predators.

Clams RAZOR, BUTTER, NATIVE LITTLENECK, MANILA, VARNISH

the diagnosis

Overall, this fishery appears to be sustainable. However, high levels of exploitation and poorly understood stock status persist.

recommendation

This shellfish is a good choice. Preference should be given to native species such as razor, butter and littleneck clams.

things to watch

Red tide blooms make shellfish inedible. They should not be harvested during red tides.

CONCERN	
habitat damage	●
bycatch	●
managed in a suitably precautionary manner	●
healthy stock numbers	●
social equity of the fishery	●

habitat issues

Red tide or polluted surroundings create potential toxicity – check local notices.

toxicity issues

Every year, more clam beaches are lost to pollution.

for more background on this species >>>

background

Only butter, razor, and native littleneck clams are indigenous to the B.C. coast. All remaining clams are alien species, including manila clams, which were accidentally introduced in the 1930s and are now B.C.'s most popular commercially harvested clam species.

Varnish clams are a more recent introduction and are currently being explored as candidates for commercial shellfish aquaculture.

Clams are filter feeders and are only able to move in their larval stage, when they float for several weeks. Clams can be found in the inter-tidal zone of the ocean (between the low and high tide marks). Clams can be bought live, fresh, (shucked or whole) frozen and canned.

B.C.'s clam fishery

B.C. clams are harvested commercially, recreationally, in First Nations fisheries, and in depuration fisheries (fisheries where contaminated clams are harvested and held in purified seawater until they can be sold). Clams are harvested during low tides, using rakes to dig the clam out of the ground. Most clam harvests occur on the south coast, where monitoring programs for water quality and paralytic shellfish poisoning are available. Fisheries near Bella Bella and Massett harvest clams commercially in a joint agreement between the Department of Fisheries and Oceans (DFO) and local First Nations.

Until the 1980s, butter clams were the most commonly harvested clams on the coast. Since then, manila clams, and to a lesser degree littleneck clams have become the most popular. Fishermen licensed to harvest clams in B.C. must choose between one of six management areas. The harvest is controlled by short openings and a minimum harvest size is enforced.

what are the issues?

The main issues surrounding clams are habitat damage and harvest size. Every year, more clam beaches are lost to pollution. Because clams are filter feeders, they are prone to toxins such as fecal contamination and paralytic shellfish poisoning.

The clam fishery is regulated through a minimum harvest size. Often, this results in a complete harvest of all clams over the minimum size, which can lead to an ecological imbalance and affect the number of juvenile clams in future fisheries. This system of minimum harvest does not allow for direct monitoring of clam numbers, which means that biomass estimates are unavailable. Notable exceptions to this include the razor clam fishery on Haida Gwaii, and biomass surveys conducted in the Bella Bella manila clam fishery.

Spiny Dogfish

the diagnosis
Spiny dogfish stocks appear healthy in the north Pacific.

recommendation
Spiny Dogfish from a Pacific Canadian fishery is considered a good choice.

things to watch
This shark species is poorly assessed and historically vulnerable to overexploitation. To ensure the future health of this stock, assessment must become more stringent. Globally, spiny dogfish stocks are being overexploited and Atlantic dogfish should not be purchased.

CONCERN	
habitat damage	●
bycatch	●
managed in a suitably precautionary manner	●
healthy stock numbers	●
social equity of the fishery	●

toxicity issues
High mercury

for more background on this species >>>

background

It is believed that spiny dogfish are the most abundant shark in the world. They grow slowly and ultimately live long – females often do not mature until the age of 35. They generally swim in large schools near the bottom of the ocean. Dogfish are often marketed as fresh and frozen fillets, or as a processed product (e.g. in fish and chips).

B.C.'s dogfish fishery

Dogfish are caught both by hook and line and by groundfish trawling. Today, the hook and line fishery accounts for the majority of dogfish catch. This fishery allows dogfish to be caught by longlining, which uses one main fishing line off of which a series of shorter lines with baited hooks are hung.

what are the issues?

Although spiny dogfish appear to be abundant in the North Pacific, the fishery is not actively assessed. This is despite the fact that the slow growth rate and late maturity of the spiny dogfish renders this shark species vulnerable to collapse. In the north Atlantic, spiny dogfish have been assessed as 'threatened' (in the eastern portion) and 'vulnerable' (in the western portion) by the International Union for Conservation of Nature and Natural Resources (IUCN)– a worldwide body that assesses the status of species at risk. Globally, the IUCN has assessed spiny dogfish as 'near threatened' because it is so vulnerable to overexploitation and because of poor stock health in many regions.

Bycatch also occurs in B.C.'s dogfish fishery.

Dungeness Crab

the diagnosis

Overall, B.C.'s crab fishery appears to be sustainable. There are concerns however, with illegal harvesting and the potential of repeated trapping causing incidental damage.

recommendation

Dungeness crab is a good choice.

things to watch

Some undersized crabs are poached. If poaching increases, the status of the fishery could change.

CONCERN	
habitat damage	●
bycatch	●
managed in a suitably precautionary manner	●
healthy stock numbers	●
social equity of the fishery	●

toxicity issues

Moderate mercury

for more background on this species >>>

background

Crabs are an integral part of the ecosystem. They also serve as prey for a range of organisms as they grow from larvae to adults. Crab generally live on sandy ocean bottoms at depths of up to 50 metres. They grow by moulting, losing their hard outer shell and gradually developing a soft shell that swells and hardens as it takes on water. During their soft-shelled state, crabs are very susceptible to predators, which include fish, octopus and marine mammals. B.C. crab can be bought live, fresh-cooked, frozen, canned, whole, or as leg or body meat.

B.C.'s crab fishery

Using baited traps, crab is harvested in recreational, aboriginal and commercial fisheries. Although crabs are fished commercially all along the B.C. coast, commercial crab fishermen must be licensed to fish in one of seven designated areas. There are limits on the number of licenses and traps allowed. Soft-shelled crab fishing is also prohibited. Furthermore, closures frequently occur in areas where timing of moulting is predictable.

what are the issues?

Overall, B.C.'s crab fishery appears to be sustainably managed. However, there are concerns that juvenile, female and soft-shelled crabs are being harvested illegally. Even if these crabs are caught and released, they are susceptible to damage by being repeatedly caught in traps. If left unchecked, these practices could jeopardize the future sustainability of B.C.'s crab stocks.

Because of the efficiency of the commercial fleet, there are some questions about the accessibility of crab for First Nations and recreational fishermen.

Pacific Hake

the diagnosis

Despite stock abundance being low, this stock is assessed annually and there are several management controls in place.

recommendation

The Pacific Hake products are a great choice.

things to watch

Keep an eye out for this stock to be re-ranked. Conditions exist that could reduce its score.

CONCERN	
habitat damage	●
bycatch	●
managed in a suitably precautionary manner	●
healthy stock numbers	●
social equity of the fishery	●

toxicity issues

None

for more background on this species >>>

background

Pacific hake (also called Pacific whiting) is one of the most abundant groundfish in the north Pacific. Hake spawn in the winter and migrate inshore to feed in spring. In the summer, they collect in mid-water, the area of the ocean that is well below the sunlit surface, but also well above the sea floor. Most hake that migrate into Canadian waters are older females. The main foods for hake are other fish and marine invertebrates, which hake consume in increasing quantities as they age.

Hake is sold as fillets, but is most commonly found processed into surimi, or imitation crabmeat.

B.C.'s pacific hake fishery

Hake is fished using a mid-water trawl – a net shaped like a large mesh cone that is dragged through the middle of the water column. A joint Canadian-U.S. body sets total catch limits for hake. Canada's trawl fishery is managed using an Individual Vessel Quota (IVQ) system, in which each trawl license holder is given a percentage of the total allowable catch set at the beginning of the season.

Prior to 2002, a large proportion of hake caught in Canadian waters was processed on foreign ships. In 2002 a moratorium on offshore processing plants began, with all hake caught in B.C. being processed in local plants. In 2004 this moratorium was lifted, and offshore factory ships are again processing some of B.C.'s hake catch.

what are the issues?

Recently, the total number of hake in the north Pacific was at its lowest level in more than 30 years and the United States declared Pacific hake 'overfished.' However, a large hake birthrate in 1999 has helped numbers recover somewhat and the 'overfished' designation has since been removed. In spite of this, the number of juvenile hake born since 1999 has been below average and it is expected that numbers will continue to decline.

There are also concerns related to the IVQ management system in this fishery. Although it has cut down on the 'race for fish' in the trawl fishery, it can lead to increasing corporate control, with fewer benefits flowing to coastal communities. However, if hake is processed in considerable quantities in local onshore plants, local benefits will be substantial.

Pacific Herring

the diagnosis
The Pacific herring fishery appears to be well managed despite some concerns.

recommendation
This fish is currently a good choice.

things to watch
Local reports from some B.C. First Nations indicate possible regional stock problems. Keep an eye out for this stock to be re-ranked.

CONCERN	
habitat damage	●
bycatch	●
managed in a suitably precautionary manner	●
healthy stock numbers	●
social equity of the fishery	●

toxicity issues
None

for more background on this species >>>

background

Pacific herring is a mid-water species often found in dense schools. These fish come inshore to spawn in the spring, spawning in or just below the intertidal zone. When not spawning, Pacific herring move to offshore feeding grounds. Pacific herring are largely harvested for their roe and a product called spawn-on-kelp. Herring can also be bought fresh, dried, salted, smoked, canned, and frozen.

B.C.'s pacific herring fishery

B.C.'s commercial Pacific herring fishery began near the beginning of the 20th century. Over time, the fishery became focused on processing for fish meal and oils, which resulted in the harvest of large volumes of fish. A combination of over-harvesting and poor environmental conditions led to a stock collapse and a closure of the fishery in the 1960s. After several years, the fishery was reopened with more conservative harvest rates in place. Today, herring is harvested primarily for its high-value roe. Eggs laid on kelp beds are also harvested. The total allowable catch is calculated at 20 per cent of the total biomass in each of five designated management regions on the coast. If the total biomass falls below a certain level, the fishery is not permitted to take place.

Herring – which school in dense aggregations – are caught by seine and gill nets. A seine boat encircles a school of herring with a large net and pulls the net together at the bottom. The net is then pulled on board. Herring gill nets are rectangular panels stretched out from the side of a boat. These nets trapping fish by their gills. Since 1998, each seine and gill net license has been allocated a percentage of the total catch for a given year.

what are the issues?

Overall, the Pacific herring fishery appears to be well managed. Although herring biomass is at historic highs in the Strait of Georgia, levels are low in some regions – most notably around Haida Gwaii (the Queen Charlotte Islands). There are some concerns that, despite rebuilding, smaller stocks may not yet have recovered. Furthermore, herring is a critical component of the ecosystem, forming a major component of Pacific food webs. The impact of herring fishing on other species has yet to be investigated in significant detail. 'License leasing' is common in this fishery, lowering the income levels of leaseholder fishermen.

Prawn BY TRAP

the diagnosis

Overall, this fishery appears to be sustainable. Some concerns remain regarding habitat damage and there are potential difficulties with monitoring and enforcement.

recommendation

Prawn caught by trap is a good seafood choice.

things to watch

If enforcement effort and resources cannot keep up with an increasing popularity of recreational prawn trapping, this fishery could be re-classified in the future.

CONCERN	
habitat damage	●
bycatch	●
managed in a suitably precautionary manner	●
healthy stock numbers	●
social equity of the fishery	●

toxicity issues

None

for more background on this species >>>

PRAWN BY TRAP

background

The prawn trap fishery primarily targets the spot prawn, B.C.'s largest shrimp species. There are almost 90 species of shrimp on the B.C. coast, seven of which can be fished commercially. Shrimp generally live on the ocean bottom, although some species rise in the water column during certain times and conditions. Shrimp habitat varies between species, ranging from the muddy bottom of the sea floor to rocky reefs. Shrimp larvae hatch in the spring and live in the water column for the first two to three months of their lives. Eventually, they settle to the bottom as juveniles. Most shrimp mature as males and then transform into females for the second half of their lives. In addition to the spot prawn, the prawn trap fishery also catches some humpback and coon stripe shrimp. Prawns can be bought live, fresh, frozen cooked or frozen raw, canned, or smoked.

B.C.'s prawn fishery

Prawn trap fishermen are active all along the B.C. coast and deploy traps on long lines attached to buoys. The fishery is managed using a variety of limitations and restrictions. Licenses were limited in 1990 and the number of traps per license was again limited in 1995. More recently, a regulation now limits the number of times a trap can be pulled out of the water to once per day. A minimum mesh size is regulated for all traps to decrease the catch of undersized prawns. Each season, fishing areas are successively closed when the number of females per trap falls to a pre-determined cut off point. The fishery has been managed using the *females per trap* criteria since 1979.

There is a growing recreational fishery for prawns caught by trap. Although recreational fishermen are limited by the number of traps they can set and by how many prawns they can catch per day, there is no limit on entry into the recreational fishery.

what are the issues?

Although bycatch does occur in this fishery, most bycatch species appear to survive the trapping process and are returned to the sea. There are some habitat concerns in this fishery. Trapping generally occurs in rocky areas and the potential for damage to sponge reefs has been raised.

Recreational participation in this fishery is also on the increase and there are concerns commercial fishermen illegally haul their gear more than once per day. The practice of closing the fishery once catch rates fall below a pre-determined point should address these issues. However, concerns remain that prawn trap fishing may increase to a point where it overwhelms managers' capacity to monitor and adequately address illegal harvest issues. Some evidence also exists that the biomass of less-caught shrimp species may be decreasing in some areas.

Sea Cucumber

the diagnosis

Overall, the sea cucumber fishery is sustainable. There are some concerns regarding localized depletion and consolidation of fishing licenses.

recommendation

This is a good seafood choice.

things to watch

Although re-classification is unlikely, local depletion of stocks should be monitored.

CONCERN	
habitat damage	●
bycatch	●
managed in a suitably precautionary manner	●
healthy stock numbers	●
social equity of the fishery	●

toxicity issues

None

for more background on this species >>>

SEA CUCUMBER

background

Sea cucumbers live on the ocean bottom, at depths ranging from shorelines to 250 metres. They are most abundant on rocky bottoms and feed on plant and animal matter. Of the 30 species of sea cucumbers on the B.C. coast, only the giant red sea cucumber is harvested. Sea cucumbers, and their importance to the Pacific marine ecosystem, are poorly understood. Sea cucumbers are usually sold in frozen 'muscle strips' or as dried skins. Although most sea cucumbers harvested in B.C. are shipped to Asia, a limited North American market also exists.

B.C.'s sea cucumber fishery

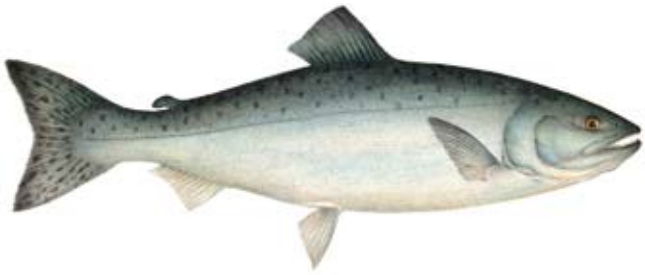
Sea cucumbers are harvested in a dive fishery. Because divers are able to handpick their catch, the fishery is very selective.

The sea cucumber fishery is relatively new – commercial licenses have only been issued since 1971. After a period of rapid expansion, the management regime changed quite drastically in the 1990's. Today, only 25 per cent of B.C.'s coast is open to sea cucumber fishing. A further 25 per cent of the coastline has been designated for scientific-research harvesting, in order to better determine the stock size. The final 50 per cent of the coast is completely closed to sea cucumber fishing.

what are the issues?

There is very little data on sea cucumber stock numbers. However, because of the current precautionary management system, this lack of data should not lead to overexploitation. Surveys are being conducted to better understand sea cucumber population densities and biology. However, depletion in a specific locale is still a concern. It is unclear whether sea cucumbers disperse quickly enough to counteract this concern.

This fishery uses an individual quota system of management. Anecdotal evidence however, suggests that illegal harvest of Northern Abalone – listed as threatened in B.C. – may occur in some sea cucumber dive fisheries.



Pink Salmon

the diagnosis

Pink salmon are one of B.C.'s healthier salmon species. Concern for some individual stocks and a lack of data still remain, however.

recommendation

Pink salmon are a sustainable choice and gets the highest rating of all Pacific salmon.

things to watch

Data on pink salmon returns are questionable and population health is lacking in several regions. Some stocks are under threat from mixed stock fishing and the effects of aquaculture.

CONCERN	
habitat damage	●
bycatch	●
managed in a suitably precautionary manner	●
healthy stock numbers	◐
social equity of the fishery	●

toxicity issues

None

habitat issues

Freshwater habitat has been degraded and the continual loss of habitat is a significant concern.

for more background on this species >>>

PINK SALMON

background

Pink salmon are the smallest and most abundant of B.C.'s five salmon species. They also have the shortest life cycle. In the spring, pink juveniles emerge and leave quickly for the open ocean. After only one and a half years at sea, adult pink salmon return in the fall to their home river or stream to spawn and die. Because this two-year life cycle is fixed, odd and even year pink salmon do not interbreed. Pink salmon are found in streams all along the B.C. coast. This salmon species can be bought whole or filleted, fresh, frozen, smoked or canned.

B.C.'s pink salmon fishery

British Columbia's commercial salmon fisheries are managed by restricting both openings – the allowed times for fishing – and the geographical areas where fishing is permitted. Pink salmon openings occur throughout July and August.

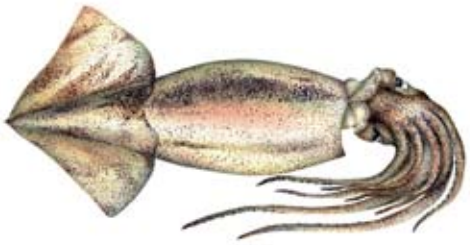
Pink salmon in B.C. are commercially fished in abundance when other salmon species are not as available or as a secondary target in other salmon fisheries. They can be caught using different types of fishing gear, but targeted pink fisheries usually use seine or gill nets. A seine boat encircles a school of salmon with a large net and pulls the net together at the bottom. The net is then pulled on board or salmon are selectively scooped out of the net from the water. Gill nets are strung across migratory corridors and passively catch salmon as they entangle their gills on the fine, nearly invisible, mesh.

Pink salmon are often caught in mixed stock fisheries.

what are the issues?

Mixed stock fisheries are a particular concern for pink salmon in the Strait of Georgia. Here, pinks returning to streams along the strait co-migrate with pinks returning to the Fraser River. Returns to the Fraser River are much greater than those in smaller streams along the strait and heavy fishing pressure can depress these smaller runs. Stocks are also currently low on the west coast of Vancouver Island, on Haida Gwaii (the Queen Charlotte Islands) and in the Broughton Archipelago region.

The issue of commercial salmon farms and their effects on pink salmon has been a contentious one. Salmon farms situated near wild salmon migration routes can pass disease and parasites to migrating salmon. This is of particular concern in the Broughton Archipelago where a pink salmon collapse recently occurred, despite generally healthy pink salmon numbers elsewhere on the coast. Sea lice infestation in local salmon farms is a probable cause.



Squid OPAL OR MARKET

the diagnosis

Because of its small scale, the opal squid fishery in British Columbia appears sustainable. However, several issues of concern may gain relevance as the fishery expands.

recommendation

Squid can be eaten in moderation if it can be confirmed that it comes from the Pacific Canadian fishery.

things to watch

Very little is known about this squid, and the fishery is very small. Increased knowledge or an expanded fishery could lead to increased concerns.

CONCERN	
habitat damage	●
bycatch	●
managed in a suitably precautionary manner	●
healthy stock numbers	●
social equity of the fishery	n/a

toxicity issues

None

for more background on this species >>>

SQUID (OPAL OR MARKET)

background

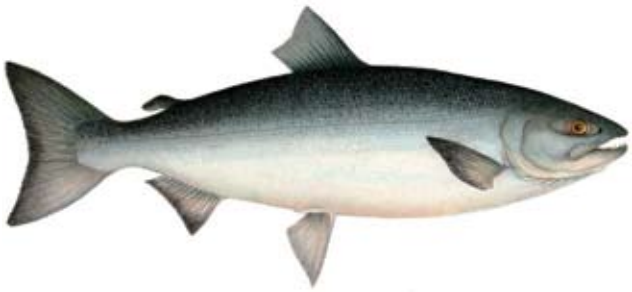
B.C. is at the northern edge of Opal squid habitat. Opal squid, found predominantly in the nearshore and inshore areas south of Vancouver Island's Cape Scott, live less than two years and die after reproducing. Spawning squid form large aggregations in sheltered bays. Opal squid are carnivores that display multiple colours over their body when catching prey. Most B.C. markets sell opal squid caught outside the province, largely in the California fishery.

B.C.'s opal squid fishery

B.C. Opal squid is fished mainly for bait. Because of the large volume of squid caught in the well-established California fishery, there is little room on the market for B.C. product. Opal squid is fished at night with seine nets, using bright lights to attract squid to the nets. Certain areas are never made available for squid fishing. Over the past several years, less than three vessels have reported landings in this fishery. Because of this, recent catch statistics have not been released.

what are the issues?

Opal squid in B.C. have been poorly studied and the species is not actively managed. The stock status is unknown, although for the most part, squid is lightly fished. There is some potential for bycatch near spawning populations of squid – species such as herring and salmon are the most likely to be unintentionally caught. Opal squid is an important component of the Pacific marine food web – if enough squid disappear, the effects will be felt by other species in the food chain.



Chum Salmon

the diagnosis
Many chum salmon stocks appear healthy, but significant concerns remain for some fisheries.

recommendation
While a good choice among Pacific salmon, chum should be consumed in moderation and only if more sustainable options are not available.

things to watch
Many chum populations have not been assessed and there are some populations with significant conservation concern. The recovery of chum appears to be relatively slow, which makes them likely for reduced ranking if further declines occur.

CONCERN	
habitat damage	●
bycatch	●
managed in a suitably precautionary manner	●
healthy stock numbers	●
social equity of the fishery	●

toxicity issues
None

habitat issues
Freshwater habitat has been degraded and continual loss of habitat is a significant concern.

for more background on this species >>>

background

Chum salmon spawn in the lower reaches of coastal streams, but can also move far upstream in larger rivers. Because spawning grounds are generally closer to river and stream outflows, their spawning habitat tends to be more affected by land disturbances such as logging. Chum salmon live anywhere from three to five years. They often spawn later than any other salmon, with adults returning in the fall or winter to their home river or stream. In the spring, juveniles emerge and leave streams quickly, spending weeks or months in estuaries before heading to sea. Like pink salmon, this species tends to colonize new habitats more easily than other Pacific salmon. Chum salmon however, have low productivity rates, making them vulnerable to overexploitation. Chum are marketed in a variety of forms, including whole or filleted, fresh, frozen or smoked.

B.C.'s chum salmon fishery

B.C.'s commercial salmon fisheries are managed by restricting both openings – the allowed times for fishing – and the geographical areas where fishing is permitted. Chum salmon openings occur between July and November.

Chum salmon in B.C. are caught commercially using three types of fishing equipment or gear. A seine boat encircles a school of salmon with a large net and pulls the net together at the bottom. The net is then pulled on board, or salmon can be selectively scooped out of the net from the water. Gill nets are rectangular nets that capture salmon as they move through migratory corridors. Troll boats account for a small proportion of B.C.'s chum catch, hooking salmon on fishing lines that extend from poles at the back of their boats. The recreational salmon fishery also catches a small percentage of chum salmon.

Most commercial salmon fisheries are mixed stock fisheries and they occur in areas where different salmon species and stocks are encountered simultaneously.

what are the issues?

Mixed stock fisheries are a concern for chum salmon in several areas. Fraser River and Strait of Georgia chum – including hatchery-produced fish – are managed as a single stock and this has led to decreased returns in some stocks. Chum numbers are very low and have shown long term declines in some areas of the Central and North coasts.

The collection of data for stock assessment purposes is also a problem in many areas. Salmon farms also pose a threat to chum salmon. Because of their tendency to incubate disease, salmon farms situated near migration routes can pass disease and parasites to wild salmon. The narrow channels of the Broughton Archipelago, which provide important migration corridors for chum salmon, contain many salmon farms. This combination creates a particular challenge for juvenile salmon migrating out to sea.

Geoduck Clam

the diagnosis

Quotas may not always be accurately set in this fishery and fears exist over habitat damage. Some concerns over consolidation of fishing licenses remain.

recommendation

The Geoduck clam should be consumed in moderation and only if more sustainable options are not available.

things to watch

Concerns about the future health of the stock and about the method of harvest exist. Status could change in the future.

CONCERN	
habitat damage	●
bycatch	●
managed in a suitably precautionary manner	●
healthy stock numbers	●
social equity of the fishery	●

toxicity issues

Can have paralytic shellfish poisoning; legally harvested geoduck are tested for this.

for more background on this species >>>

GEODUCK CLAM

background

The geoduck clam is one of the longest-living animals on Earth, with a lifespan of more than 140 years. Weighing as much as four kilograms, the geoduck is a filter feeder and, like the clam, is susceptible to contamination such as paralytic shellfish poisoning. Geoducks are found in dense beds, buried in up to one-metre of sediment with their filtering siphon exposed above ground. Geoduck can be purchased live, fresh, frozen, or dried. Much of the geoduck harvested in B.C. is exported live to Asian markets.

B.C.'s geoduck fishery

The geoduck fishery is one of B.C.'s most valuable. It began in the Strait of Georgia in 1975 and later expanded to the west coast of Vancouver Island and the North coast. Divers use a high-powered water jet to dislodge geoducks from ocean sediments. Licenses were limited in this fishery in 1981 and an individual quota system was introduced in 1989. Geoducks are found in large clusters or beds.

what are the issues?

Poor estimates and the fact that several beds are grouped together into one management area have resulted in the overfishing of some geoduck beds. Some evidence suggests that the survival of juvenile geoduck has declined in both fished and unfished areas, while the recovery of endangered sea otters is expected to further decrease the numbers of geoducks on the coast.

There are also concerns that the high-powered water jet used to harvest geoduck can damage surrounding habitat or juvenile geoducks living near the point of harvest.

Lingcod BY HOOK AND LINE

the diagnosis

Because numbers are extremely low, Lingcod are no longer available from the Strait of Georgia. There are some bycatch and data quality issues attached to the hook and line fishery.

recommendation

This fish should be considered in moderation if you can confirm it was caught by hook and line and if more sustainable options are not available.

things to watch

A lack of data limits understanding of lingcod stock status. More information is necessary to better determine the sustainability of the hook and line fishery. If changes in groundfish management are successfully implemented, hook and line caught lingcod may have an increased ranking in the future. Keep an eye out for this fish to be re-ranked.

CONCERN	
habitat damage	●
bycatch	●
managed in a suitably precautionary manner	●
healthy stock numbers	●
social equity of the fishery	●

toxicity issues

No data

for more background on this species >>>

LINGCOD (BY HOOK AND LINE)

background

Lingcod are only found on North America's west coast. They are a bottom-dwelling fish and live at preferred depths of between 10 and 100 metres. During their spawning season, Lingcod move inshore to spawn. The males make this migration first, find suitable nests and then guard the nests after spawning has occurred. Lingcod are one of the few species of fish where parents actively care for their young. In the event males do not guard their nests, the young fish are unlikely to survive.

As adults, lingcod are fierce predators and have few natural enemies, except marine mammals. The majority of the adult lingcod's diet is composed of herring and hake. Lingcod are considered to be a sedentary species. Lingcod are available whole or filleted, fresh or frozen.

B.C.'s lingcod fishery

While the trawl fishery accounts for the majority of catch, lingcod are also caught by hook and line. B.C.'s trawl fishery is managed using a system of set quotas.

what are the issues?

Overfishing is a serious issue. The fishery was closed to commercial fishing in 1990 and to recreational fishing in 2002. The hook and line fishery is closed for lingcod during winter spawning times. In spite of these closures, there is little evidence to suggest a substantial increase in stock numbers.

Bycatch can be a concern in lingcod fisheries, both in the trawl fishery and the hook and line fishery.

Sablefish (Black Cod)

the diagnosis

Overall, this fishery appears sustainable. Habitat damage from traps and longlines may occur. However, scientists are concerned that there is not an accurate count of how many sablefish are living off the B.C. coast.

recommendation

Sablefish is currently a good choice if it is from a Canadian fishery.

things to watch

Keep an eye out for this stock to be re-ranked. Conditions exist that could reduce its sustainability.

CONCERN	
habitat damage	●
bycatch	●
managed in a suitably precautionary manner	●
healthy stock numbers	●
social equity of the fishery	●

toxicity issues

Moderate mercury

for more background on this species >>>

background

The long-living sablefish live at depths of up to 1,500 meters. Young Sablefish are born as larvae and float in the ocean for several years before traveling up to 3,000 kilometres and settling at the ocean bottom. Sablefish mostly eat other fish, as well as several different types of invertebrates. Several fish species, sharks and whales prey upon sablefish. They are sold smoked or un-smoked, often as fillets or steaks.

B.C.'s sablefish/black cod fishery

In B.C., most Sablefish are caught using traps suspended deep in the water on long lines. Some sablefish are also caught using hooks on long lines, while few are caught in the trawl fishery. B.C.'s fishery is unique – the trap method of sablefish fishing is considered to be a sustainable one as the rate of bycatch is low and habitat damage is thought to be moderate.

The sablefish fishery is run using a system of Individual Vessel Quotas (IVQs), where each fisherman owning a quota can catch a set percentage of the total catch during each year of the fishery.

what are the issues?

In 2001, the fishery closed for a short time because sablefish stock numbers were found to be much lower than expected. It has since been re-opened with lower catch limits – stock numbers have showed some recovery and the fishery now appears to be healthy.

There are also concerns about decreasing numbers of fishermen in this fishery. The quota system used to manage the sablefish fishery can encourage fewer fishermen to catch a larger proportion of the total catch. Because IVQs can be bought and sold by the license holders, they tend to accumulate in the hands of relatively few fishermen. In the 2002/03 fishery, for example, eight vessels caught 75 per cent of the sablefish catch.

Chinook Salmon

the diagnosis
The chinook fishery is fairly well managed, but some significant concerns remain.

recommendation
This fish should be consumed in moderation and only if more sustainable options are not available. If farmed, see Farmed Salmon entry.

things to watch
A lack of data for some regions limits understanding of chinook stock status. Increased information is necessary to better determine the sustainability of this fishery.

CONCERN	
habitat damage	
bycatch	
managed in a suitably precautionary manner	
healthy stock numbers	
social equity of the fishery	

toxicity issues
None

habitat issues
Freshwater habitat has been degraded and continual loss of habitat is a significant concern.

for more background on this species >>>

background

Chinook salmon attain the largest body size of all Pacific salmon species. There are two main groupings of chinook; the spring/summer run and the fall run.

Spring chinook head to freshwater earlier in the year than almost all other salmon. Spring and summer runs return to the upper reaches of rivers and live in freshwater for up to six months before spawning. Once hatched, spring and summer juveniles can spend up to a year in freshwater. They enter the sea as large fish and quickly migrate to rearing grounds in the north Pacific.

Fall run chinook spawn in the lower reaches of rivers, and tend to leave for saltwater almost immediately after hatching. They rear in estuaries and may spend much of their life cycle near their home stream, making them more susceptible to fisheries.

Chinook are primarily available filleted, fresh, frozen or smoked and can be available as a farmed species (farmed species are rated separately).

B.C.'s chinook salmon fishery

Many chinook salmon harvested in B.C. are caught in the recreational fishery. Maximum catch limits, possession limits and size limits regulate recreational catches.

Most chinook salmon targeted commercially are captured by troll boats. Trollers catch salmon using hooks strung on long lines that extend behind the fishing boat. Some chinook are also caught using gill nets – rectangular nets extended across a migratory corridor. Chinook fisheries have traditionally been operated by short openings in specified areas from September through November, and January through May.

what are the issues?

Some harvest restrictions in Canada have been beneficial, but increased U.S. catches on some stocks are still a concern.

Habitat loss continues to be a major concern for many chinook stocks. With very few reference stocks for chinook salmon, it is difficult to assess the true status of this species across its B.C. range. The different groups of chinook salmon along the B.C. coast remain largely undefined by fisheries managers.

Hatcheries release juvenile chinook in an attempt to increase the number of returning adults. The prevalence of hatchery chinook however, may increase harvest pressure on low productivity, co-migrating wild stocks. It is also difficult to assess catch and hooking mortality from some recreational chinook fisheries.

Pacific Halibut

the diagnosis

Catch levels in this fishery are well managed. Habitat damage from bottom longlines is not well understood. Bycatch concerns currently exist and consolidation of licenses and quotas are reducing benefits to communities and eliminating small-boat fishermen.

recommendation

Pacific halibut should be consumed in moderation and only if more sustainable options are not available.

things to watch

Atlantic Halibut is not as sustainable a choice as Pacific. Atlantic Canadian catches are better than U.S. Atlantic, which should be avoided. For Canadian-caught fish, Pacific halibut should be given preference until more accurate assessments can be done on the Atlantic fishery.

Successful implementation of planned management shifts could increase the Pacific score. However, concern over rockfish by-catch could lower the score.

CONCERN	
habitat damage	
bycatch	
managed in a suitably precautionary manner	
healthy stock numbers	
social equity of the fishery	

toxicity issues

Moderate mercury

for more background on this species >>>

background

Pacific halibut are the largest of the flatfish and dwell on the ocean floor. Their life can span more than 50 years and they eat other bottom-dwelling organisms, including crabs, clams, squid and other fish. Mature halibut undertake migrations of up to 1,600 kilometres – in the winter they live in deep water to spawn, and in the summer move to shallow banks to feed. Halibut can be purchased in a variety of different forms, including streaks, fillets, loins, roasts, 'headed,' or 'gutted.'

B.C.'s pacific halibut fishery

Since the 1920s, an international body called the International Pacific Halibut Commission has managed the Pacific halibut fishery in both the United States and Canada. Most Pacific halibut caught in B.C. are caught using hooks strung off long lines that sit on the ocean floor. Since 1991, the B.C. fishery has been managed using an individual vessel quota (IVQ) management system. In this fishery, each fisherman owning a quota is guaranteed a set percentage of the total catch for each year of the fishery. There is also an important sport fishery in B.C. for Pacific halibut.

what are the issues?

Pacific halibut stocks are healthy and have a long history of good management. However, the fishery does incur substantial rockfish bycatch. Many B.C. rockfish stocks are depleted as a result of the Pacific halibut fishery. There are also concerns related to the IVQ management system in this fishery. Although it has eliminated the 'derby' aspect of the Pacific halibut fishery, it also appears to have removed many of the small-boat fishermen from the fishery. This management system can lead to increasing corporate control, with fewer benefits flowing to coastal communities.

Coho Salmon

the diagnosis

Coho numbers are very low and the fishery is improperly managed in some areas. The overuse of hatcheries to 'enhance' populations is having a negative impact on wild stocks, as well.

recommendation

Coho should be should be consumed in moderation and only if more sustainable options are not available.

things to watch

Many coho stocks are severely depressed and adequate information for other stocks is limited. The majority of the fishery has been scaled back, but continued efforts to improve management, as well as a better understanding of the state of coho, will dictate its future ranking.

CONCERN	
habitat damage	
bycatch	
managed in a suitably precautionary manner	
healthy stock numbers	
social equity of the fishery	

toxicity issues

None

habitat issues

Freshwater habitat has been degraded and continual loss of habitat is a significant concern.

for more background on this species >>>

background

Coho salmon spawn in a variety of habitats, from small streams to large rivers. They rear in freshwater for one to two years before migrating to the ocean. Because coho often spawn in small fragile streams, they are significantly affected by habitat degradation. Once in the ocean, coho often remain close to shore, which makes them more susceptible to fisheries than other species. Coho salmon are a popular target of the recreational fishery. Coho can be found whole or filleted, fresh or frozen.

B.C.'s coho salmon fishery

Due to a significant decline in commercial stocks, the coho fishery has experienced a shift from commercial to recreational priority. Remaining commercial fisheries are focused on the North Coast using troll gear. Trollers catch salmon with hooks strung along lines that are dragged behind a boat. Recreational fisheries occur in both the marine and freshwater environments. Hatcheries are used to bolster coho numbers primarily for the recreational fishery.

Coho are common bycatch in other fisheries, particularly those targeting other salmon. As a result of this bycatch problem, many commercial fisheries have implemented strategies to maximize the live release of bycatch coho. However, bycatch is still a significant concern, particularly for severely depressed stocks.

what are the issues?

Several decades of fishing at high levels, coupled with an extended period of poor ocean survival rates, has led to low coho levels in many areas of the coast. Coho stocks of the Thompson (upper Fraser) River are endangered but have not received formal protection. Concerns also exist for stocks in the Skeena area, and other Fraser and Strait of Georgia stocks. Although coho numbers have begun to rise on the North Coast, numbers in the South Coast areas have not recovered as anticipated. Fisheries remain restricted in these areas. Habitat loss and degradation continue to be serious problems for coho salmon.

In addition to past high fishing mortality rates and poor ocean survival, coho are particularly affected by mixed stock fisheries. They tend to stay near-shore for most of their lives and have historically been fished year-round in sport fisheries. Hatcheries may have contributed to declines by increasing fishing pressure that harms small stocks. Today, only marked hatchery coho can be kept recreationally. Coho populations are poorly monitored, making it difficult to understand the extent and consequences of recent declines.

Shrimp BY TRAWL

the diagnosis
The shrimp fishery is affected by habitat, bycatch and insufficient data concerns.

recommendation
Shrimp confirmed to be caught in the Canada's Pacific fishery should be consumed in moderation and only if more sustainable options are not available.

things to watch
Serious concerns about by-catch and habitat damage could lead to re-classification.

CONCERN	
habitat damage	🔴
bycatch	🟡
managed in a suitably precautionary manner	🟢
healthy stock numbers	🟡
social equity of the fishery	🟢

toxicity issues
Unknown

for more background on this species >>>

SHRIMP (BY TRAWL)

background

There are 90 species of shrimp on B.C.'s coast, but only seven are permitted for commercial harvest. While most shrimp live on the ocean bottom, some species rise in the water column at certain times and under certain conditions. Shrimp larvae hatch in the spring and live in the water column for the first two to three months of their lives, eventually settling to the bottom as juveniles. Most shrimp mature as males and then transform into females for the second half of their lives. Smooth pink, northern pink, and sidestripe shrimp are the species most commonly caught in B.C.'s shrimp trawl fishery. Shrimp can be bought live, fresh, frozen cooked or frozen raw, canned and smoked.

B.C.'s shrimp fishery

The shrimp fishery in B.C. uses a bottom-trawling method that has traditionally caught large quantities of bycatch. In an effort to counteract this problem, 'excluder grates' have been mandated in all trawling gear to block the passage of larger fish into the trawl net. The shrimp fishery has been steadily expanding in B.C. since the 1960's. Today, it is managed using a series of shrimp management areas, each of which has a Total Allowable Catch assigned to it.

what are the issues?

Despite the recent requirement of all trawl gear to have excluder grates, bycatch may still be an issue in this fishery. Although smaller fish and other animals may still escape through the excluder grates, evidence suggests that despite being released, this process may exhaust many species, making them more vulnerable to predation.

As with other trawl fisheries, habitat damage is an issue in the shrimp trawl, which operates by dragging fishing gear along the ocean bottom.

Sockeye Salmon

the diagnosis

While some stocks remain abundant, several others face serious declines. Freshwater habitat degradation is also a concern.

recommendation

This fish should be should be consumed in moderation and only if more sustainable options are not available.

things to watch

The increase in the number of stocks listed as threatened or endangered is a concern and could lead to future downgrades in the rating of this salmon species. If Fisheries and Oceans Canada maintain high conservation enforcement, the sockeye that do get to market will be more sustainable.

CONCERN	
habitat damage	
bycatch	
managed in a suitably precautionary manner	
healthy stock numbers	
social equity of the fishery	

toxicity issues

None

toxicity issues

Freshwater habitat has been degraded by development and the continual loss of habitat is a significant management issue.

for more background on this species >>>

background

Sockeye salmon spawn in freshwater streams or lakes. Juveniles spend one to two years rearing in freshwater before migrating to the ocean. Sockeye feed intensively in the north Pacific Ocean for two to three years. Adult sockeye migrate to their birth stream or lake, navigating from the open ocean and upstream over long distances. The ability to return to their specific birth stream or lake has allowed sockeye salmon to evolve into separate populations and stocks with diverse biological characteristics. Sockeye can be bought in a variety of forms: whole or filleted, fresh, frozen, canned or smoked.

B.C.'s sockeye fishery

The sockeye fishery is the most valuable commercial salmon fishery on the B.C. coast. The commercial fishery uses three methods to catch sockeye: purse seine, troll, and gill net. The purse seine fishery takes the largest number of sockeye. A seine boat encircles a school of salmon with a large net and pulls the net together at the bottom. The net is then pulled on board or salmon are selectively scooped out of the net from the water. Trolling involves the deployment of a number of long lines with multiple hooks behind the back of a fishing boat. Gill nets are rectangular nets that are strung across migratory corridors.

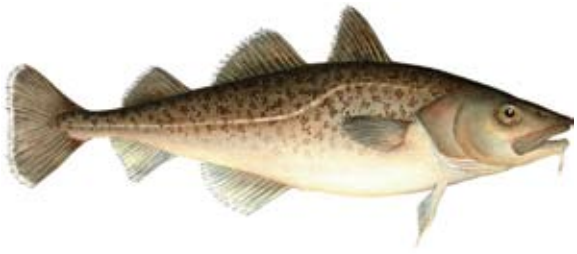
Commercial sockeye fisheries are managed based on the type of fishing gear used to catch them and by restricting openings – the allowed times for fishing – and the geographical areas where fishing is permitted. Sockeye openings occur between June and August. Due to the endangered status of some stocks and problems associated with ocean and freshwater conditions, the B.C. sockeye catch was reduced in the late 1990's and continues to decrease today.

what are the issues?

Mixed-stock fisheries can have a detrimental effect on smaller stocks. Maintaining stock diversity is essential for ensuring the sustainability of salmon and the fishery through environmental change.

Sockeye salmon depend on a wide range of freshwater habitat, from nursery lakes and streams to larger river channels and estuaries that they migrate through as juveniles and returning adults. Degradation of this habitat is a significant concern.

The complexity of salmon and their habitat use limits the assessment and monitoring of their status.



Pacific Cod

the diagnosis

Pacific cod numbers in most areas off the B.C. coast are extremely low. Habitat damage and bycatch are chief concerns within this fishery.

recommendation

Pacific cod should be avoided.

things to watch

Because of the longevity of Pacific cod, lack of data and bycatch issues, it is unlikely this fish will be re-ranked in the foreseeable future.

CONCERN	
habitat damage	●
bycatch	●
managed in a suitably precautionary manner	●
healthy stock numbers	●
social equity of the fishery	●

toxicity issues

Moderate mercury

for more background on this species >>>

background

Historically, Pacific cod have been a valued resource in the B.C. groundfish fishery. Adult Pacific cod live on the ocean bottom and feed on invertebrates and other fish. When their eggs hatch, larvae move upwards in the water column and eventually settle as juveniles near the shoreline. As these fish age, they move to deeper water and adults are generally found at depths between 50 and 300 metres. Pacific cod can be bought whole or filleted, both fresh and frozen, and are a common component of breaded, frozen fish products.

B.C.'s pacific cod fishery

In B.C., Pacific cod is managed as four separate stocks. The fish are caught largely with otter trawl gear, although some longline catch does occur.

B.C.'s trawl fishery, like all trawl fisheries, targets many species. Twenty-three species caught in this fishery have total allowable catches set for them, but many more species without set quotas are being caught.

what are the issues?

Scientists reported record low Pacific cod numbers in the Hecate Strait recently and this led to substantially reduced quotas. Pacific cod off the west coast of Vancouver Island appear to be recovering from similar lows. Although a minor part of the Pacific cod catch, the Queen Charlotte Sound stock has never been assessed. The Strait of Georgia stock, last assessed in 1987, is showing near zero catch rates. Despite this, trawl fishermen in the Strait of Georgia are allowed to catch up to 227 kilograms of Pacific cod per month.

Although muddy-bottom trawling is not as damaging as rocky-bottom trawling, habitat damage is still a concern in this fishery.

Dover Sole

the diagnosis

This fishery contains indeterminate stock numbers, unclear exploitation rates, and problems with bycatch and habitat damage.

recommendation

Dover sole should be avoided.

things to watch

Because of the longevity of this fish, lack of data, poor monitoring and bycatch issues, it is unlikely this fish will be re-ranked in the foreseeable future.

CONCERN	
habitat damage	●
bycatch	●
managed in a suitably precautionary manner	●
healthy stock numbers	●
social equity of the fishery	●

toxicity issues

None

for more background on this species >>>

background

Dover sole live in muddy areas at the ocean bottom and feed on bottom-dwelling invertebrates. Young larvae live in the water column for up to two years before finally settling to the bottom for their adult lives (which can be up to 49 years). Dover sole are commonly caught off the west coast of Vancouver Island, in Hecate Strait, in Queen Charlotte Sound and off the west coast of Haida Gwaii (the Queen Charlotte Islands). Dover sole can be bought fresh or frozen, whole or filleted.

B.C.'s dover sole fishery

Currently, more Dover sole are caught off the B.C. coast than any other sole species. Dover sole are fished using an otter trawl – a large cone-shaped net that is dragged along the ocean bottom.

British Columbia's trawl fishery targets many species. Twenty-three species caught in this fishery have total allowable catches set for them, but many more species with no set quotas are being caught. This fishery is managed using a system of Individual Vessel Quotas (IVQs). In this system, each license holder is given a set percentage of the total allowable catch for all of the species in the fishery for which quotas are set.

what are the issues?

Dover sole is a fairly frequent catch in the trawl fishery. Despite this, stock assessments have not been completed in recent years. The last published stock assessment, undertaken in 1999, did not have the necessary up-to-date data. Although Dover sole is commonly caught in the Strait of Georgia trawl fishery, the Strait was last assessed in 1963.

Although trawling over muddy bottoms is not as damaging as trawling over rocky ones, habitat damage is still a concern in this fishery. Bycatch is another concern in the trawl fishery; especially for the numerous species that are caught and for which biomass estimates and catch quotas have not been set. Furthermore, the 'unmarketable' (often juvenile) fish are often discarded.

Although this IVQ fishery has cut down on the 'race for fish' in the trawl fishery, there continues to be concerns that many of its benefits are not shared within coastal communities.

English Sole

the diagnosis

This fishery has poor population growth rates in the Hecate Strait, poor understanding of populations outside of Hecate Strait, and bycatch and habitat damage concerns.

recommendation

English sole should be avoided.

things to watch

Because of the longevity of this fish, lack of data, poor monitoring and bycatch issues, it is unlikely this fish will be re-ranked in the near future.

CONCERN	
habitat damage	●
bycatch	●
managed in a suitably precautionary manner	●
healthy stock numbers	●
social equity of the fishery	●

toxicity issues

None

for more background on this species >>>

background

B.C. English sole are most commonly found in the Hecate Strait region, although some fishing occurs in Queen Charlotte Sound and in the Strait of Georgia. English sole live over sandy and muddy areas and eat mostly invertebrates. English sole can be bought whole or filleted, fresh or frozen.

B.C.'s english sole fishery

English sole is one of several flatfish species caught in the British Columbia trawl fishery. They are fished using an otter trawl – a large cone-shaped net that is dragged along the ocean bottom.

B.C.'s trawl fishery, like all trawl fisheries, targets many species. Twenty-three species caught in this fishery have total allowable catches set for them, but many more species without set quotas are being caught.

what are the issues?

In Hecate Strait, the numbers of juvenile English sole have been at record low numbers over the past several years. Although English sole is the most commonly caught groundfish in the Strait of Georgia, this stock was last assessed in 1963.

Although trawling over sand and gravel bottoms is not as damaging as trawling over rocky bottoms, habitat damage is still a concern in this fishery. Bycatch is particular disconcerting; especially for the numerous species that are caught and for which biomass estimates and catch quotas have not been set.

Finally, although quotas have cut down on over-fishing within the trawl fishery, there continues to be concerns over the lack of benefits flowing to coastal communities.

Lingcod BY TRAWL

the diagnosis

Because numbers are extremely low, lingcod are no longer available from the Strait of Georgia. The lingcod trawl fishery faces concerns of habitat damage, bycatch, and poor data availability.

recommendation

Trawl-caught lingcod should be avoided.

things to watch

A lack of data limits understanding of lingcod stock status. More information is necessary to better determine the sustainability of the hook and line fishery. If changes in groundfish management are successfully implemented, hook and line caught lingcod may have an increased ranking in the future. Keep an eye out for this fish to be re-ranked.

CONCERN	
habitat damage	●
bycatch	●
managed in a suitably precautionary manner	●
healthy stock numbers	●
social equity of the fishery	●

toxicity issues

None

for more background on this species >>>

background

Lingcod are only found on North America's West Coast. They are a bottom-dwelling fish and live at preferred depths of between 10 and 100 metres. During their spawning season, lingcod move inshore to spawn. The males make this migration first, find suitable nests and then guard the nests after spawning has occurred. Lingcod are one of the few species of fish where parents actively care for their young. In the event males do not guard their nests, the young fish are unlikely to survive.

As adults, lingcod are fierce predators and have few natural enemies, except marine mammals. The majority of the adult lingcod's diet is composed of herring and hake. Lingcod are considered to be a sedentary species. Lingcod are available whole or filleted, fresh or frozen.

B.C.'s lingcod fishery

While the trawl fishery accounts for the majority of catch, lingcod are also caught by hook and line. B.C.'s trawl fishery is managed using a system of set quotas.

what are the issues?

Overfishing is a serious issue. The fishery was closed to commercial fishing in 1990 and to recreational fishing in 2002. The hook and line fishery is closed for lingcod during winter spawning times. In spite of these closures, there is little evidence to suggest a substantial increase in stock numbers.

Bycatch can be a concern in lingcod fisheries, both in the trawl fishery and the hook and line fishery.

Rock Sole

the diagnosis

Rock sole suffer from poor growth in the Hecate Strait, while bycatch and habitat damage are major concerns throughout B.C. As well, there is no stock assessment for the Queen Charlotte Sound population of rock sole which makes it impossible to assess whether catch rates in this region are sustainable.

recommendation

Rock sole should be avoided.

things to watch

There are current studies being undertaken to better understand this animal. This eventual information, combined with a potentially expanding fishery, could lead to a re-classification in the future.

CONCERN	
habitat damage	●
bycatch	●
managed in a suitably precautionary manner	●
healthy stock numbers	●
social equity of the fishery	●

toxicity issues

None

for more background on this species >>>

background

In British Columbia, rock sole are concentrated in the Hecate Strait and Queen Charlotte Sound areas. They live on the ocean floor, over sand and gravel substrates, and feed on bottom-dwelling fish and some invertebrates. Rock sole can be bought whole or filleted, fresh or frozen.

B.C.'s rock sole fishery

Rock sole is a major component of the B.C. trawl fishery in the Hecate Strait and the Queen Charlotte Basin. They are fished using the otter trawl.

Like all trawl fisheries, this fishery targets many species. Twenty-three species have 'total allowable catches' set, with many more species without quotas being caught. This fishery is managed using a system of Individual Vessel Quotas (IVQs). In this system, each license holder is given a set percentage of the total allowable catch for all of the species in the fishery for which quotas are set.

what are the issues?

Despite the fact that scientists do not know how many rock soles there are in Queen Charlotte Sound, more than half of the allowable catch is set in this region. In the Hecate Strait, the numbers of juvenile fish coming into the population has been at or near record low numbers over the past several years – subsequently, allowable catches were lowered for this area. It is unclear whether this decrease was strong enough to counteract population growth concerns. However, because of a protected area for crab conservation, about half of the fishing grounds for rock sole in the Hecate Strait are currently closed.

Although sand and gravel bottom-trawling is not as damaging as rocky bottom-trawling, habitat damage is still a concern in this fishery. Bycatch is also a concern.

Petrale Sole

the diagnosis

Numbers of Petrale sole appear low in B.C. waters as bycatch and habitat damage concerns are prevalent.

recommendation

Petrale sole should be avoided.

things to watch

Because of the longevity of this fish, lack of data and bycatch issues, it is unlikely this fish will be re-ranked in the foreseeable future.

CONCERN	
habitat damage	🔴
bycatch	🔴
managed in a suitably precautionary manner	🔴
healthy stock numbers	🟡
social equity of the fishery	🟡

toxicity issues

None

for more background on this species >>>

PETRALE SOLE

background

Petrale sole are found along sandy ocean bottoms, where they eat invertebrates and other fish. In B.C., Petrale sole live off the west coast of Vancouver Island, in Hecate Strait, Queen Charlotte Sound, and off the west coast of Haida Gwaii (Queen Charlotte Islands). These fish can live up to 25 years of age and are usually sold fresh or frozen, filleted or whole.

B.C.'s petrale sole fishery

Petrale sole are one of several flatfish species caught in B.C.'s trawl fishery. Because of low stock numbers, fishermen are not allowed to specifically target this fish. Petrale sole are fished using an otter trawl.

Like all trawl fisheries, the B.C. fishery targets many species. Twenty-three species have total allowable catches set for them, but many more species without quotas are also being caught. B.C.'s trawl fishery is managed using a system of set quotas.

what are the issues?

Petrale sole is currently considered to be in low abundance. There are some indications that the current catch quota for this species (allowing it to be caught as bycatch when other species are targeted) may be permitting a moderate recovery of Petrale sole numbers. Recently, fishermen have been catching their quota of Petrale sole earlier in the fishing season. Despite this, the quality of data available for Petrale sole stock assessments is poor.

Although sandy bottom-trawling is not as damaging as rocky bottom-trawling, habitat damage is still a concern. Bycatch is also a concern for Petrale sole.

Rockfish

(by trawl)

(by hook and line)

the diagnosis

Overall, rockfish species are extremely vulnerable to overexploitation, and their stock status is poorly understood. They are taken in fisheries that both incur bycatch and cause moderate to serious habitat damage. Because of this, these fish are not recommended.

recommendation

Rockfish should be avoided.

things to watch

Because of the longevity of these fish, poor monitoring and bycatch issues it is unlikely these fish will be re-ranked in the foreseeable future. However, northern and north-central coast inshore rockfish may be in better shape, though we await the science to verify this.

CONCERN	BY TRAWL	BY HOOK
habitat damage	🔴	🟡
bycatch	🔴	🔴
managed in a suitably precautionary manner	🟡🔴	🟡🔴
healthy stock numbers	🟡	🔴
social equity of the fishery	n/a	🟢

toxicity issues

Moderate mercury

for more background on this species >>>

background

There are 37 different species of rockfish off the B.C. coast. Rockfish grow slowly with some species living to be over 100 years old. Different species are found at different depths, anywhere from nearshore areas to depths of 1,500 metres. Of B.C.'s rockfish, all but two species live in aggregates in rocky areas, and unlike most other fish species, bear live young. In contrast, the two Thornyhead rockfish species are found over soft sediments, do not aggregate, and have young that develop from an egg mass. Rockfish can be bought live, fresh whole, or filleted. Some species of rockfish may be sold as red snapper or sole.

B.C.'s rockfish fishery

In B.C., rockfish are targeted in trawl, hook and line, and recreational fisheries. They are also caught in other fisheries as bycatch. Of the 37 species of rockfish found in B.C. waters, total allowable catch provisions only protect 16 species.

There are two types of rockfish trawl fisheries: mid-water and bottom trawl. In the more damaging bottom trawl, rockfish are caught using the otter trawl. B.C.'s trawl fishery is managed using a system of Individual Vessel Quotas (IVQs), where each license holder is given a set percentage of the total allowable catch for all of the species in the fishery for which quotas are set.

Hook and line fishing in British Columbia, also called 'longlining,' consists of one main fishing line, in which a series of shorter lines are hung. Rockfish are also caught as bycatch in several fisheries. The halibut fishery is allocated a percentage of the total allowable catch of certain rockfish species. The recreational catch of rockfish in nearshore areas is also substantial; both by individual sport fishermen and those participating in charter cruises.

what are the issues?

Because rockfish are so long lived they mature at a relatively old age, bearing young with lower survival rates than other fish species. In fact, strong 'birth survival years' only occur about once every decade for many species of rockfish. These factors mean that rockfish can only sustain low levels of fishing pressure.

Rockfish populations are poorly understood. Surveys are difficult because rockfish cannot be caught, tagged and released – they do not survive the process of being brought to the surface because their swim bladders expand. Rockfish are also not distributed evenly over the bottom of the ocean – they tend to aggregate, so biomass surveys are difficult to conduct. In inshore areas, recreational fisheries contribute to a large proportion of the catch, but are poorly monitored. Inshore rockfish fisheries – especially those in the Strait of Georgia – have been declared overfished, and this fishery has been severely restricted in recent years. In deeper waters, Bocaccio – a species of rockfish for which we have very little information – has been declared threatened.

Northern/Pinto Abalone

the diagnosis

Wild Northern Abalone is officially protected as threatened under Canada's Species At Risk Act, and should not be eaten. All wild fisheries are banned. Farmed abalone is an acceptable option.

recommendation

Do not eat wild abalone.

things to watch

The chances of this species being returned to a healthy state are slim. Poaching continues to threaten species recovery and bring illegal wild abalone to the market in the future.

CONCERN	
habitat damage	●
bycatch	●
managed in a suitably precautionary manner	●
healthy stock numbers	●
social equity of the fishery	n/a

toxicity issues

None

for more background on this species >>>

background

Northern (pinto) abalone has long been an integral part of the traditional First Nations fishery. A commercial dive fishery for Northern abalone developed in B.C. in the 1970's. But in 1999, overfishing led to Northern abalone being designated as threatened by the Committee on the Status of Endangered Wildlife in Canada. Northern abalone live on rocky bottoms, generally at depths of less than 10 metres, and tend to be found in clusters. They eat algae as juveniles and macroalgae (e.g. kelp) once they mature.

B.C.'s northern abalone fishery

Traditionally, Northern abalone was harvested by hand at depths of up to one metre. This allowed Northern abalone a natural refuge at greater depths where they were not harvested. The commercial fishery that began in the 1970s was a dive fishery however, and divers were able to access and harvest the abalone found at greater depths. Overfishing led to the closure of the fishery in 1990.

what are the issues?

Estimates suggest that the numbers of Northern abalone are less than five per cent of what they were when commercial exploitation began. Northern abalone is particularly susceptible to exploitation because they are long-lived, sedentary (i.e. easy to locate), and reproduce through broadcast spawning – where male and female abalone release their spawn into the water and fertilization occurs in dense clusters. Although fishing for abalone has been officially prohibited in B.C., poaching is considered to be a major threat to the recovery of this species.

Farmed Salmon

Net Cage Raised – Do Not Eat
Closed Tank Raised – Case Specific

the diagnosis

Farmed salmon raised in open net cages poses a serious threat to wild salmon and the marine environment. Because of this, farmed salmon should not be eaten. As an alternative, choose wild fish from well-managed fisheries or herbivorous farmed fish (such as tilapia or carp) from a sustainable, closed-containment system.

recommendation

Do not purchase farmed salmon raised in open net cages. This represents the vast majority available on the market.

Fish raised in closed tank operations are available in limited quantities. These systems, if properly designed, can be recommended on a case-by-case basis. Please contact the David Suzuki Foundation for up-to-date information. Even closed tank salmon should be consumed in moderation as the production of feed for farmed carnivores puts pressure on global fish stocks.

things to watch

There are several closed tank facilities planned or near implementation in British Columbia. If these facilities perform as planned – low energy requirements, solid waste collection and effluent treatment, no antibiotics, reduced feed requirements, no escapes and no parasite or disease transfer – they will represent a fundamental and welcomed change in the farmed salmon industry.

for more background on this species >>>

background

Most salmon farmed on the B.C. coast are non-native, Atlantic species. However, coho and chinook are also farmed. Most salmon farming techniques involve open net pens that float in the ocean, relatively close to shore. The fish spend their juvenile to adult lives in the pens feeding on pellets containing fishmeal, fish oil, agricultural products and by-products, rendered animal wastes, colourants and, as necessary, therapeutic agents.

what are the issues?

Disease and parasites tend to incubate on tightly packed farmed salmon. As wild fish swim past these farms, diseases and parasites can be passed to them. This is particularly problematic as salmon farms are often located near salmon migration routes. Pink and chum are very small when they emerge from the rivers as juveniles and highly susceptible, especially to sea lice.

Sea lice are currently the most well studied parasite on the B.C. coast. The scientific evidence strongly supports the links between farm-origin lice, increased infections on wild salmon, and harm to the wild juveniles.

As disease is also a concern of salmon farmers, drugs (also called therapeutants) are added to fish feed, which enters the marine environment.

Escapes of Atlantic salmon are of concern. Escaped fish that survive in Pacific waters are an alien species to the local environment, competing for food and habitat space. When Pacific farmed fish escape, interbreeding with wild salmon is possible, which alters the unique genetic mix that is crucial to the survival of wild species.

Pollution (including feces and uneaten food) from open-net salmon farms can damage the marine ecosystem surrounding the farms. This can lead to decreased biodiversity on the sea floor beneath salmon farms.

Fish Feed for carnivorous salmon has fishmeal and fish oil added. The amount of wild fish protein and oil required to raise a farmed salmon is actually greater than the amount produced by farmed salmon. In many cases, the fish used for salmon feed are themselves food sources – which means that salmon farming essentially contributes to the depletion of global fish stocks. All farmed salmon has this problem, although fish raised in closed tanks have lower food demands because the farmers can control the growing conditions and maximize the efficiency of feed use.

Finally, the presence of farmed salmon on the market has lowered the price for wild salmon, seriously affecting the livelihoods of many coastal fishing communities in B.C.

Glossary

Biomass The total weight of a group (or stock) of living organisms (e.g.fish, plankton).

Bottom trawl A fishing method which involves towing trawl nets along the sea floor, as opposed to pelagic trawling, where a net is towed higher in the water column. Bottom trawling can be carried out from one vessel or two vessels fishing cooperatively.

Brooding To sit on or hatch eggs

By-catch (or bycatch) Animals caught by accident in fishing gear; species that the fishers do not intend to catch. By-catch is usually thrown back dead or dying.

Collapse Reduction of a stock by fishing and/or other causes to levels at which the production is negligible compared to historical levels.

Depleted A stock driven by fishing to a very low level of abundance compared to historical levels, with dramatically reduced spawning biomass and reproductive capacity.

Ecosystem The complex system of plant, animal, fungal, and microorganism communities and their associated non-living environment interacting as an ecological unit. Ecosystems have no fixed boundaries; instead their parameters are set to the scientific, management, or policy question being examined. Depending upon the purpose of analysis, a single lake, a watershed, or an entire region could be considered an ecosystem.

Endangered Species in danger of extinction and whose survival is unlikely if causal factors continue operating. Included are taxa whose numbers have been drastically reduced to a critical level or whole habitats that have been so drastically impaired that they are deemed to be in immediate danger of extinction. Also included are those that possibly are already extinct, in so far as they definitely have not been seen in the wild in the past 50 years.

Estuary River mouth. An area in which seawater is appreciably diluted by fresh water from rivers.

Filter feeder An aquatic animal, such as a clam, barnacle, or sponge, that feeds by filtering particulate organic material from water.

Fish stocks A part of a fish population usually with a particular migration pattern, specific spawning grounds, and subject to a distinct fishery. In any particular fishery, the fish stock may be one or several species of fish.

Food web The network of feeding relationships within an ecosystem or a community (i.e. the predator-prey relationships).

Gill net (or entangling net) With gill nets, fish are gilled, entangled or enmeshed in the netting. These nets can be used either alone or, as is more usual, in large numbers placed in line ('fleets' of nets). Depending on their design, ballasting and buoyancy, these nets may be used to fish on the surface, in mid-water or on the bottom.

Groundfish A species or group of fish that live most of its life on or near the sea bottom.

Hatchery Facility used to cultivate and breed a large number of fish in an enclosed environment.

Individual quota (IQ) A quota (possibly a percentage) of a total allowable catch

(TAC) assigned to an individual, a vessel or a company. If an individual quota is transferable it is referred to as an Individual Transferable Quota (ITQ).

Intertidal Between tides, the shoreline between the low and high tides.

Invertebrate Any animal without a spinal column. It includes all animals except fish, reptiles, amphibians, birds and mammals – which are all vertebrates.

Kelp Large seaweeds, belonging to the brown algae and classified in the order Laminariales. There are about 30 different types of kelp. Kelp grow in underwater forests in clear, shallow oceans and require nutrient-rich water below 20°C. It offers a protection to some sea creatures and food for others. Kelp is known for its high growth rate.

Larva Newly hatched. For animals that undergo metamorphosis, the larva is the earliest stage of animals. The animal's form and appearance at this stage differs significantly from the adult.

Longline A fishing gear in which short lines carrying hooks are attached to a longer main line at regular intervals. Longlines are laid on the bottom or suspended horizontally at a predetermined depth with the help of surface floats. The main lines can be as long as 150 km and have several thousand hooks (e.g. tuna fisheries).

Mid-water The area of the ocean that is well below the sunlit surface, but also well above the sea floor.

Mixed stock fishery A fishery that catches a number of different fish stocks at the same time.

Otter trawl Consists of towing a funnel-shaped net leading into a bag (most commonly referred to as a 'codend') over the sea bottom behind a boat. Otter boards (or doors) are used to keep the trawl nets open horizontally whilst being towed. During trawling operations, the disturbance of the seabed created by the otter boards assists in herding the animal into the path of the approaching net.

Over-exploited (or over-fished) A stock is considered "over-fished" when it is exploited to the point where its abundance is considered too low to ensure safe reproduction.

Pelagic fish Fish that spend most of their life swimming in the water column with little contact with or dependency on the bottom.

Precautionary approach A set of agreed measures which ensures cautious foresight and reduces or avoids risk to the resource, the environment, and people.

Purse seine Nets characterised by the use of a purse line at the bottom of the net. The purse line enables the net to be closed like a purse and thus retain all the fish caught. One or two boats operate the purse seines, which may be very large. The most usual case is a purse seine operated by a single boat, with or without an auxiliary skiff.

Quota stacking A consolidation of fishing effort where a single person buys and fishes more than one individual vessel quota from a single boat.

Race for fish A phenomenon where short allowable fishing times force all participants in the fishery to operate at maximum effort at the same time, regardless of weather, product quality and even crew safety.

Red Tide bloom Proliferation of marine plankton that is toxic and often fatal to fish. This natural phenomenon is stimulated by phosphorus and other nutrients that are discharged into waterways by humans. The colour of the tide can be red, yellow, green or brown.

Roe The fully ripe egg masses of fish and certain marine animals. Examples include sea urchins and shrimp.

Seine net Nets which are usually set from a boat, and can be operated either from the shore (beach seines) or from the boat itself (e.g., Danish or Scottish seines). The manner of capture is to surround an area of water with a very long net. The net is hauled in using two ropes fixed to the ends of the net.

Shuck To remove the husk or shell.

Soft-shelled crab Crabs shortly after they molt, or shed, their hard shell. As these crabs grow larger, their shells cannot expand so they molt the exteriors and have a soft covering for a matter of hours during which time they are vulnerable. Considered a delicacy.

Spawn Release of ova, fertilized or to be fertilized.

Spawn-on-kelp (or roe-on-kelp) Broad leaf sea kelp with a covering of herring eggs. It is also known in Japanese as komochi konbu and kazunoko konbu.

Taxa (plural of taxon) grouping of organisms. Once named, a taxon will usually have a rank and can be placed at a particular level in a hierarchy.

Trawl A cone or funnel-shaped net that is towed through the water by one or more vessels.

Troll A surface and sub-surface fishing method in which a vessel at a speed of two to 10 knots drags lines with baits or lures. Trolling is used to catch tuna and tuna-like fish (e.g. Spanish mackerel, Seerfish, Barracuda, marlin, spearfish).

Vulnerable to collapse An IUCN (World Conservation Union) category for listing endangered species. A taxon is considered "Vulnerable" (VU) when it is not *Critically Endangered* or *Endangered* but is facing a high risk of extinction in the wild in the medium-term future.

APPENDIX I: State of the Catch Methodology

Our ranking methodology is explained in the following section. We welcome comments on our methodology, which we will consider in the development of future reviews. We are currently working in cooperation with our partners in sustainable seafood education in North America and worldwide to ensure species assessments are comprehensive and consistent.

Methodology

The fisheries highlighted in this guide were evaluated using a combination of scientific literature and interviews with experts in First Nations, academia, government, industry and environmental non-government organizations.

Our rating system gives a score of zero (0), one (1), or two (2) in the five categories outlined below. The scores are averaged to give an overall rating to the fishery in question. Where there is conflicting or emerging science on a particular issue, half points are occasionally used.

This un-weighted averaging does tend to cluster rankings towards the middle of the range. This results in a recommendation to "consume in moderation and only if more sustainable options are not available" for many stocks.

We use *red flag concerns* that cause an "avoid" recommendation even if the issue-specific ratings average to a more favourable assessment. This system will be further refined for future reviews.

Fishing methods that kill endangered species are an example of a *red-flag concern*. A fishery conducted on healthy stocks, with good management could be given an "avoid" recommendation if it were known to kill Southern resident orca whales, listed as endangered in Canada.

Given the red-flag system and the fact that the most unsustainable fisheries have problems that generate lower scores, our conclusion is that our assessment methodology is thorough and, for the most part, precautionary.

One important note relative to *all* assessments of fish stocks is a concept known as shifting baselines. Today's stock abundance is measured relative to already depressed populations, not historical populations unaffected by extensive fisheries or habitat destruction. A fishery that is greatly reduced from its historic levels can appear sustainable if it is being fished in a way that does not further reduce its number.

Future methodology refinements will be based on user feedback and incorporation of new science. Any extreme rating changes will be explained in future updates, whether due to rating methodology or other factors.

This guidebook is designed to enable update of specific species or additions of new species. Please visit www.davidsuzuki.org/Oceans for the latest information.

Rating Explanations by Area of Concern

1. HABITAT DAMAGE

Grade of 2: Trap and dive fisheries, most other invertebrate fisheries (i.e. anything harvested by hand such as urchin), mid-water trawl fisheries, seine and net fisheries that do not touch bottom and hook and line fisheries that occur over soft bottoms.

Grade of 1: Hook and line fisheries over rocky bottoms and trawling over sandy bottoms (some evidence suggests that this is less damaging than over rocky bottoms).

Grade of 0: Trawling over rocky bottoms.

We made a distinction between whether the fishery itself damages habitat, and whether the fishery is impeded by habitat damage that caused other factors. The latter is noted below the *Concerns* table for relevant fish.

2. BY-CATCH

Grade of 2: Anything hand picked or harvested (e.g. urchins, clams). Some trap fisheries, which may have higher by-catch than other fisheries in this category, were also given a 2 because of the higher survival rate attributed to trap fisheries (versus trawl and other net types). Pelagic schooling species that are fished by trawl, but do not incur a lot of by-catch (because they school), were also given this grade.

Grade of 1: Many hook and line fisheries were put in this category. They would not be expected to have the by-catch of trawl, but mortality of by-catch would be high. Salmon fisheries were put in this category because of mixed-stock fishery issues.

Grade of 0: Anything caught by mixed species trawl.

3. SUITABLY PRECAUTIONARY

This category determines whether the fishery quotas for a specific species were precautionary (see glossary for definition). They are based at least in part on the Department of Fisheries and Ocean's stock assessment reports.

Grade of 2: Fisheries that are clearly precautionary (e.g. urchin and sea cucumber fisheries). These only operate in a small proportion of the coast, and because they are dive fisheries, only operate to a certain depth, even though the species are distributed over a much greater depth range. Halibut are in this category. While there are real questions about the halibut fishery's affect on other species, catches of halibut have been sustained for many decades and stock numbers appear healthy. Some fisheries in this category may deserve a somewhat lower rank. The prawn fishery has good quota-setting criteria, but high recreational catches erode this benefit. In most cases, we have compensated for this by giving a one (1) in the *healthy stock numbers* category.

Grade of 1: Where the data indicate the fishery to be operating at a 'borderline' level of sustainability.

Grade of 0: Data poor fisheries that do no not use a precautionary approach to address their data deficiencies (e.g. with very restrictive quotas and dedicated research), or fisheries where stock numbers have declined drastically.

Because management plans change every year, this and the following category will be re-addressed most often.

4. HEALTHY STOCK NUMBERS

This is a difficult assessment because often the only data is commercial catch numbers (landings) from Fisheries and Oceans Canada, which do not necessarily correspond with stock numbers. This problem can be compounded by the fact that stock abundance is measured relative to already depressed populations, not populations unaffected by extensive fisheries or habitat destruction. Our evaluation concluded that some other assessment methodologies put a bit too much weight on commercial landings.

Grade of 2: Population numbers appear stable.

Grade of 1: Population numbers have declined, with some acknowledgement and movement towards recovery.

Grade of 0: Numbers continue to decline, or fishing is occurring even though there is no adequate method for determining whether the stock is being sustainably harvested. In all cases, we attempted to determine how stock numbers had fluctuated over long time scales (i.e. what might the numbers have been like before industrialized fishing).

5. SOCIAL EQUITY

This is a difficult, but necessary, assessment. Socio-economic, cultural and ecological criteria are all essential considerations for sustainability. Extensive research has shown that globally, some of the best-managed fisheries include a commitment to local participation in the fishery and in the decision-making to manage it. We are currently working with international scientists and economists to develop a comprehensive and widely accepted format for ranking this aspect of fisheries.

The current social equity assessment for B.C. fisheries is based on:

- First Nations ownership;
- Corporate concentration within the fishery; and,
- Adjacency of the fishery (Do licence owners live near the fished area?).

Grade of 2: Fisheries with good First Nations ownership, or those that tend to be less consolidated, and those that have high percentage of local owner operators were ranked one and a half (1.5) or two (2).

Grade of 1: All fisheries received at least a one (1) to acknowledge that some benefit usually flows to coastal communities, even if largely in the form of deck hands or service work to the industry. Fisheries under unrestricted Individual Transferable Quota (ITQ) systems or with extreme corporate concentration also received a one (1).

Grade of 0: Not applicable.

APPENDIX II: Mercury Toxicity Advice

Health Canada, the Canadian Food Inspection Agency, the US Food and Drug Administration and the US Environmental Protection Agency all issue various warnings concerning the consumption of fish with mercury.

The David Suzuki Foundation recommends the following more precautionary approach and advice:

> **Young children, pregnant or nursing mothers, and women of childbearing age should avoid fish with listed mercury concerns in favour of fish without toxicity warnings. Other people should limit consumption of fish with mercury concerns to one or two meals per month.**

There are many seafood options that allow people to get the benefits of seafood without the risks of mercury.

An excellent new reference on mercury in seafood is *Risks and Benefits of Fish Consumption: Yes, Mercury is a Problem,* prepared by Edward Groth, PhD, for Oceana and Mercury Policy Project. December, 2005.

http://oceana.org/fileadmin/oceana/uploads/mercury/Final_Report_12-5.pdf

State of the Catch: A professional's guide to sustainable seafood **is designed to help food professionals make informed seafood purchases.**

If you're a chef, a commercial fish buyer, a restaurant manager, a food writer or a concerned consumer, this guidebook is for you. ***State of the Catch*** **documents the current status of many fish and shellfish stocks currently available in restaurants and supermarkets. The guide will assist you in buying and promoting ocean-friendly fish and shellfish, while avoiding seafood species that are in trouble.**

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