

B.C.'s seafood sector: total production hits a 20-year high, exports rise steeply

AUTHORS

Fiona Beaty and Karin Bodtker, Coastal Ocean Research Institute, an Ocean Wise initiative

REVIEWER

Jim McIsaac, Executive Director, T. Buck Suzuki Environmental Foundation

What's happening?

In 2016, gross domestic product (GDP) from B.C.'s seafood sector reached \$415 million, the highest value in the last two decades.¹ This market value includes production from commercial fishing and aquaculture, but not seafood processing. Over the last two decades, real GDP² from aquaculture and commercial fisheries combined has fluctuated between \$225 million and \$400 million (Figure 1).³



Spot Prawn Festival 2017 (Photo: Ocean Wise)

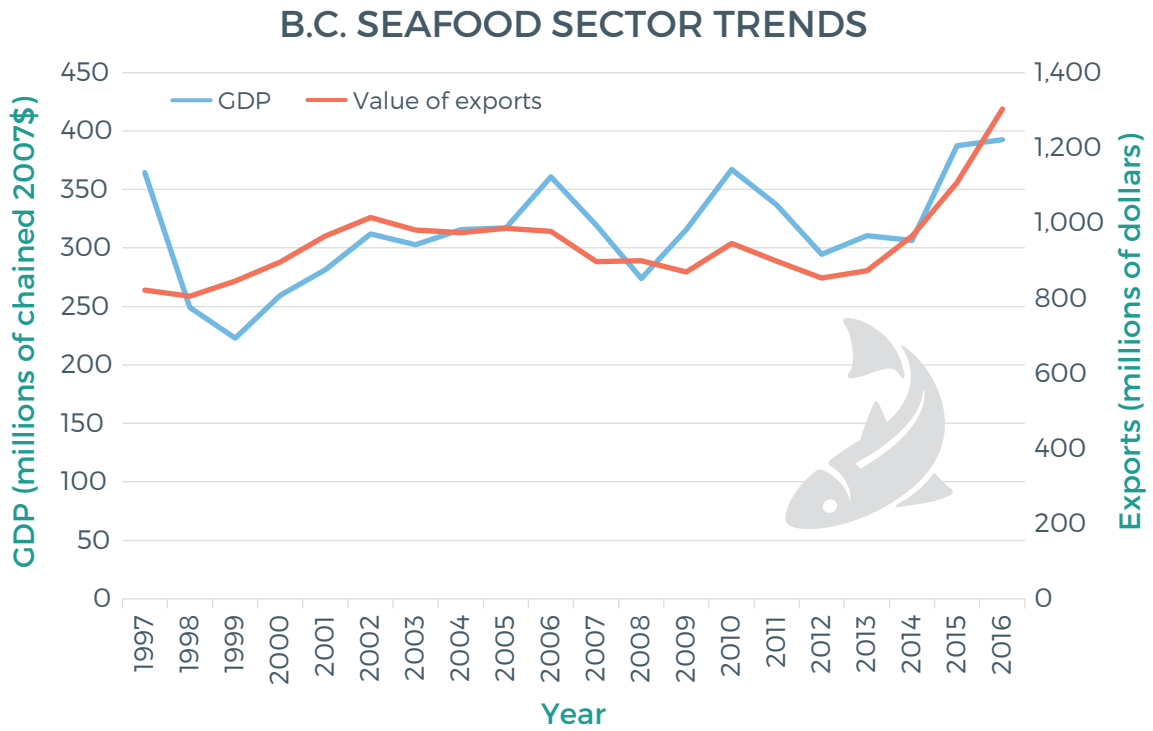


Figure 1. Real GDP for B.C.'s seafood sector is trending up in recent years, as is the value of exported seafood products. Source: Statistics Canada and B.C. Statistics



Photo: Ocean Wise

Further, exports of B.C. seafood products coming from commercial fisheries and aquaculture operations have increased by 10 percent or more for each year between 2013 and 2016.⁴ B.C.'s top export, cultured Atlantic salmon, places the province in the top four global producers of this product, behind Chile, Norway, and the United Kingdom.⁵ The increasing value of seafood exports reflects a growing demand for B.C. fish products outside of B.C. that will continue to expand as global population expands.

Increasing exports and stable or increasing productivity are positive signs for the seafood sector from an economic perspective. However, positive trends in GDP and the value of exports do not necessarily coincide with improvements in social wellbeing, nor do they reflect changes in the environmental sustainability of the sector. Considering the social, cultural, and environmental perspectives raises questions about whether seafood production is sustainably supporting livelihoods and healthy communities, and whether this level of extraction from the ocean is ecologically sustainable. (See articles in the Sense of Place and Wellbeing theme for discussions on social and community wellbeing. Find indicators of employment in the Coastal Development and Livelihoods theme.) Determining what may be a sustainable production level in ever-changing ecosystems and social systems is

the task ahead for the sector, its managers, and consumers alike. Industry has made and continues to make considerable efforts toward ecological sustainability, and consumers are increasingly demanding to know where their seafood comes from, who fishes it, and how sustainably it is fished.



Photo: Ocean Wise

Why is it important?

B.C.'s commercial fishing and aquaculture production contributes hundreds of millions of dollars annually to the province's economy and GDP (Figure 1). GDP is used here as a measure of the sector's size and changes measure growth or shrinkage.⁶ However, even in recent years of high production, B.C.'s seafood sector comprises less than 0.2 percent of total provincial GDP. This is down from 0.6 percent in 2005, which reflects a broader shift in economic importance away from resource extraction industries and to service-based industries.⁷

Interpreting the fluctuations in seafood production in the last few decades requires context. Driven primarily by economic and conservation values, changes in the management and structure of B.C.'s commercial fisheries, in particular the groundfish sector, over this time include:

- Mandatory 100 percent electronic or observer monitoring at-sea, and dockside monitoring of groundfish species by all gear types.
- Higher accountability for what and how much is caught.
- The adoption of Individual Transferable Quotas (ITQs).
- Spatial protection including Rockfish Conservation Areas,⁸ frozen footprint for bottom trawl gear,⁹ and integrated Marine Spatial Planning.¹⁰

- The implementation of the Sustainable Fisheries Framework (SFF).¹¹ The SFF includes policies such as the precautionary approach and ecosystem-based management.

The consequences of these changes are reflected in the industry's economic performance as well as other aspects including employment (see Seafood-related Employment article in the Livelihoods theme) and community and social wellbeing (see Fishing benefits coastal communities article in the Sense of Place and Wellbeing theme).

Attention to conservation and environmental impact has also confronted the aquaculture industry, and it suffers criticism on several fronts. Ocean health issues related to finfish aquaculture in particular include habitat conversion and pollution of the marine environment where farms are located, disease and parasites transfer from farmed organisms to wild ones, escape of farmed species threatening wild populations, and a feed regime that depends on wild-forage fish and uses more food energy than it produces.¹² Globally, the salmon aquaculture industry has made steady progress in reducing its reliance on feed originating from wild fish,¹³ and the industry in B.C. is taking steps to reduce their environmental impact. Regulation of the industry passed from provincial to federal hands in 2010, which led to new regulations.¹⁴ However, concerns remain that increasing production levels may be unsustainable due in part to environmental impacts.

What is the current status?

While GDP measures economic productivity, harvest is a measure of the biomass removed from the ecosystem. Seafood sector harvest reached 292 tonnes¹⁵ in 2016, the highest value since 2005 (Figure 2).¹⁶ The past three decades of change in the sector are reflected in the balance between aquaculture and wild-caught product. Aquaculture harvest has been increasing, almost without exception, since the 1980s when the salmon farming industry began in earnest, whereas the amount of wild seafood harvest has fluctuated (Figure

2). After considerable volatility for several decades, wild harvests – generally cyclic with larger climate cycles – have remained stable since 2007,¹⁷ with a recent uptick in 2016. Wild-caught fishery dependence upon a resource that varies from year to year helps to explain the greater volatility in harvest levels.

The value of total fish products exported from B.C. has risen steeply in the last three years (Figure 1) to \$1.3 billion.¹⁸ These products went to 80 different mar-

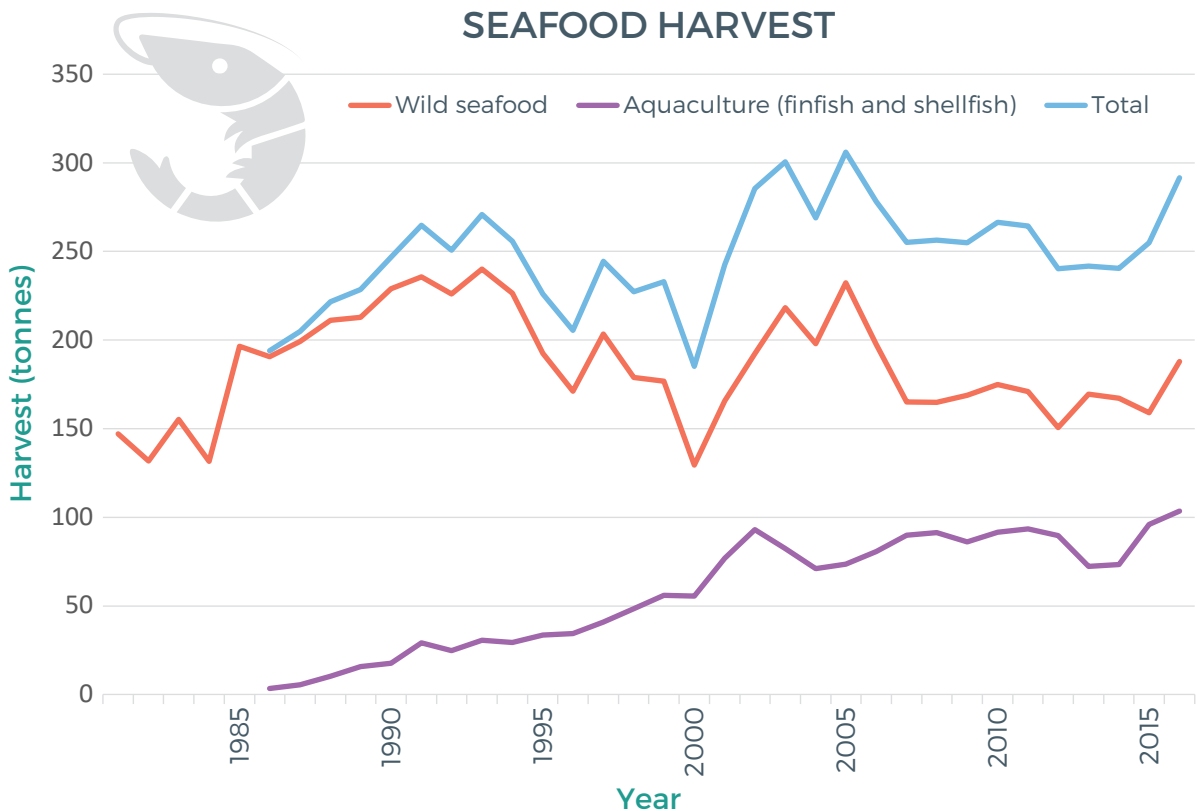


Figure 2. Seafood sector production in terms of harvest (tonnes) of wild and cultured seafood. Sources: Fisheries and Oceans Canada, BC Ministry of Agriculture, and Statistics Canada.

kets, with the biggest buyers being the United States, China, Japan, Ukraine, and Hong Kong.¹⁹ The top five seafood exports were farmed Atlantic salmon, crabs, hake, shrimp and prawns, and herring.

Changing oceanic conditions associated with climate change pose a threat to the sustainability of B.C.'s seafood sector. We are witnessing changes including ocean acidification, increased sea surface temperature, and increased storm intensity and frequency. One example is the warm water "Blob"²⁰ off the coast from

2013 to 2016, which prompted unpredicted changes in species distribution and abundance. A direct consequence of changing conditions including increased ocean temperature and acidity, for example, is diminished growth rates of salmon²¹ and some shellfish.²² An indirect consequence of climate change is the projected increase in frequencies of harmful algal blooms (HABs) as ocean temperatures warm and storm intensity and frequency rises.²³ HABs make shellfish and farmed species unsafe for human consumption.

What is being done?

Regulating and managing commercial fisheries and aquaculture production, in terms of catch limits and licensed production limits,²⁴ is largely the purview of the Federal Government. DFO regularly consults with First Nations (see Governance article in Stewardship and Governance theme), industry and other interested sectors through advisory boards (e.g., the Groundfish Integrated Advisory Board). An advisory body for shellfish aquaculture includes First Nations, industry, and conservation representatives. The status of a similar advisory body for finfish aquaculture is unclear.²⁵ The B.C. government manages coastal aquaculture tenures and licenses marine plant cultivation.

Under the Fish and Seafood Act, the B.C. Ministry of Agriculture tracks reports submitted by all producers of B.C. seafood. These data are analyzed to inform the socioeconomic performance of the sector.²⁶

Certification of wild fisheries and aquaculture operations expands every year, and not without contro-

versy. In 2015, B.C. salmon farming companies attained five certifications through the Aquaculture Stewardship Council (ASC), but all certifications required a variance from the agreed upon limits (in the ASC Salmon Standard) for sea lice levels.²⁷ Also in 2015, the Marine Stewardship Council (MSC) recertified the British Columbia halibut and albacore tuna fisheries as sustainable. B.C. has six species harvested in 14 fisheries holding MSC certification including halibut, hake, albacore tuna, sockeye salmon, pink salmon and chum salmon.²⁸

One example of an integrated approach to the management of ocean resources that combines bottom-up and top-down strategies is round table structures that provide the opportunity for various stakeholders to engage with fisheries management. For example, the West Coast of Vancouver Island (WCVI) Round Tables provide the opportunity for stewardship groups, and recreational, commercial, and First Nations fishermen to meet annually with DFO in order to discuss salmon harvest planning, management, and post-season review.²⁹

What can you do?



Individual and Organization Actions:

- Know your fisherman: choose seafood options that support local fishermen and sustainable harvesting.
- Support B.C.'s buy local program: <https://www2.gov.bc.ca/gov/content/industry/agriculture-seafood/programs/market-development-programs/bc-buy-local-program>
- Purchase and eat sustainable seafood. Learn more at:
 - Ocean Wise Seafood Program: <http://seafood.ocean.org/>
 - Seafood Watch: <http://www.seafoodwatch.org/seafood-recommendations/consumer-guides>
 - Marine Stewardship Council: <https://www.msc.org/track-a-fishery/fisheries-in-the-program/certified/pacific>
- Demand improvements to seafood labelling and traceability requirements: [SeaChoice](#), [ThisFish](#)
- Participate in citizen science efforts that support oceanic monitoring (e.g., Pacific Salmon Foundation's Salish Sea Marine Survival Project Citizen Science Program³⁰ and while on the ocean use the OceanSmart app to report interesting ecosystem events).



Government Actions and Policy:

- Undertake more frequent stock assessments to ensure annual quotas do not exceed sustainable harvest levels.
- Support investment in research for fisheries, sustainable aquaculture techniques and institutions.
- Support comprehensive monitoring of ocean socio-ecological systems, including environmental conditions to facilitate HAB detection and response.

Resources

Fisheries and Oceans Canada, Fisheries Management

<http://www.pac.dfo-mpo.gc.ca/fm-gp/index-eng.html>

Consultations

<http://www.pac.dfo-mpo.gc.ca/consultation/index-eng.html>

Province of BC Agriculture and Seafood Industry and Sector Profiles

<https://www2.gov.bc.ca/gov/content/industry/agriculture-seafood/statistics/industry-and-sector-profiles>

Footnotes

¹ BC Ministry of Agriculture. 2017a. Sector Snapshot 2016: B.C. Seafood. Accessed January 23, 2018. https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/agriculture-and-seafood/statistics/industry-and-sector-profiles/sector-snapshots/bc_seafood_sector_snapshot_2016.pdf

² Real GDP takes the inflation out of GDP figures and is used when examining trends in production. For example see: <https://geozoneblog.wordpress.com/2013/02/19/gdp-real-gdp-and-chained-2005-dollars/>

³ Data source: Statistics Canada. Table 379-0030 – Gross domestic product (GDP) at basic prices, by North American Industry Classification System (NAICS), provinces and territories, annual (dollars)

⁴ Province of British Columbia. 2017a. Trade data, Annual B.C. exports. Accessed Dec 19, 2017. <https://www2.gov.bc.ca/gov/content/data/statistics/business-industry-trade/trade/trade-data>

⁵ Province of British Columbia. 2017b. Agriculture and seafood industry and sector profiles. Retrieved from <http://www2.gov.bc.ca/gov/content/industry/agriculture-seafood/statistics/industry-and-sector-profiles>.

⁶ Province of British Columbia 2017b

⁷ BC Stats. 2007. British Columbia's Fisheries and Aquaculture Sector. Prepared for the BC Ministry of Environment. 108 pp. Accessed January 23, 2018. http://www.eaa-europe.org/files/bc-fisheries-aquaculture-sector-2007_7927.pdf

⁸ Fisheries and Oceans Canada. 2017. Rockfish conservation areas. <http://www.pac.dfo-mpo.gc.ca/fm-gp/maps-cartes/rca-acs/index-eng.html>

⁹ Wallace, S., Turriss, B., Driscoll, J., Bodtker, K., Mose, B., and G. Munro. 2015. Canada's Pacific groundfish trawl habitat agreement: A global first in an ecosystem approach to bottom trawl impacts. Marine Policy. 60: 240-248 DOI: 10.1016/j.marpol.2015.06.028

¹⁰ For example, the PNCIMA Initiative (<http://pncima.org/>), and Marine Protected Area Network Planning for B.C.'s Northern Shelf (<http://mpanetwork.ca/bcnorthernshelf/>).

¹¹ Fisheries and Oceans Canada (DFO). 2016a. Sustainable Fisheries Framework. Accessed January 23, 2018. <http://www.dfo-mpo.gc.ca/reports-rapports/regs/sff-cpd/overview-cadre-eng.htm>.

¹² SeaChoice. 2018. Aquaculture. Accessed February 16, 2018. <http://www.seachoice.org/info-centre/aquaculture/>

¹³ Ytrestøyl, T., Aas, T.S., and T. Åsgård. 2015. Utilisation of feed resources in production of Atlantic salmon (*Salmo salar*) in Norway. Aquaculture 448: 365-374. <https://doi.org/10.1016/j.aquaculture.2015.06.023>

¹⁴ Fisheries and Oceans Canada (DFO). 2011. Aquaculture in British Columbia. Accessed January 23, 2018. http://www.pac.dfo-mpo.gc.ca/publications/pdfs/aqua_mgmt-gest_aqua-eng.pdf

¹⁵ One tonne equals 2,204.6 pounds

¹⁶ Data sources: Aquaculture 1986-2002 from archived Fisheries and Oceans Canada data accessed at <http://www.dfo-mpo.gc.ca/stats/aqua/aqua95-eng.htm>; Aquaculture 2003-2016 from BC Ministry of Agriculture Sector data accessed at <https://www2.gov.bc.ca/gov/content/industry/agriculture-seafood/statistics/industry-and-sector-profiles#Seafood> and originating at Statistics Canada; wild seafood 1981-1995 from archived Fisheries and Oceans Canada data accessed at <http://www.pac.dfo-mpo.gc.ca/stats/comm/ann/index-eng.html>; wild seafood 1996-2007 from archived Fisheries and Oceans Canada preliminary statistics accessed at <http://www.pac.dfo-mpo.gc.ca/stats/comm/ann/index-eng.html>; wild seafood 2008-2016 from BC Ministry of Agriculture Sector data accessed at <https://www2.gov.bc.ca/gov/content/industry/agriculture-seafood/statistics/industry-and-sector-profiles#Seafood> and originating from DFO.

¹⁷ BC Stats. 2013. British Columbia's Fisheries and Aquaculture Sector, 2012 Edition. Prepared for the Department of Fisheries and Oceans Canada. 98 pp. Accessed January 23, 2018. <https://www2.gov.bc.ca/gov/content/data/statistics/business-industry-trade/industry/fisheries-aquaculture>

¹⁸ Province of British Columbia 2017a.

¹⁹ Province of British Columbia 2017b.

²⁰ For example, see Mason, Betsy. 2017. A Striking New View of the Pacific "Blob". National Geographic. Accessed March 16, 2018. <https://news.nationalgeographic.com/2017/02/space-map-pacific-blob/>

²¹ Warmer temperatures have been associated with diminished growth rates and with increased growth in salmon, depending on the region. See: Martins, E.G., Hinch, S.G., Cooke, S.J., and D.A. Patterson. 2012. Climate effects on growth, phenology, and survival of sockeye salmon (*Oncorhynchus nerka*): a synthesis of the current state of knowledge and future research directions. Rev Fish Biol Fisheries. DOI 10.1007/s11160-012-9271-9

²² Haigh, R., Ianson, D., Holt, C.A., Neate, H.E., and A.M. Edwards. 2015. Effects of Ocean Acidification on Temperate Coastal Marine Ecosystems and Fisheries in the Northeast Pacific. *PLoS ONE* 10(2): e0117533. doi:10.1371/journal.pone.0117533

²³ McCabe, R.M., B.M. Hickey, R.M. Kudela, K.A. Lefebvre, N.G. Adams, B.D. Bill, F.M.D. Gulland, R.E. Thomson, W.P. Cochlan, and V.L. Trainer. 2016. An unprecedented coast wide toxic algal bloom linked to anomalous ocean conditions. *Geophysical Research Letters*. 43 (19):10,366–10,376.

²⁴ Fisheries and Oceans Canada. 2017. Aquaculture in British Columbia. Accessed January 23, 2018. <http://www.pac.dfo-mpo.gc.ca/aquaculture/index-eng.html>

²⁵ BC Ministry of Agriculture. 2016. Advisory Council on Finfish Aquaculture (MAACFA). Terms of Reference. Accessed January 23, 2018. https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/agriculture-and-seafood/fisheries-and-aquaculture/minister-or-agriculture-s-advisory-council-on-finfish-aquaculture/maacfa_terms_of_reference_-_final.pdf

²⁶ Province of British Columbia. 2017c. Agriculture and Seafood Statistics. Accessed January 23, 2018. <https://www2.gov.bc.ca/gov/content/industry/agriculture-seafood/statistics>

²⁷ SeaChoice. 2018. ASC Variances and Process. Accessed February 16, 2018. <http://www.seachoice.org/our-work/eco-labels/asc-variances-and-process/>

²⁸ BC Ministry of Agriculture. 2017b. British Columbia Seafood Industry Year in Review 2015. Accessed January 23, 2018. https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/agriculture-and-seafood/statistics/industry-and-sector-profiles/year-in-review/bcseafood_yearinreview_2015.pdf

²⁹ West Coast Aquatic. 2015. WCVI Roundtables. Accessed February 6, 2018. <https://www.roundtables.westcoastaquatic.ca/>

³⁰ Pacific Salmon Foundation. 2017. Salish Sea Marine Survival Project, Citizen Science Program. Retrieved from http://marinesurvivalproject.com/research_activity/list/citizen-science-program/.