



# Salmon Aquaculture in BC

**Presented to: Minister of Agriculture's Advisory Committee on Finfish Aquaculture**

**Date: October 25, 2016**



## IN THE BEGINNING

- Initial salmon farming began in the 1970's and 1980's. BCSFA formed in 1984.
- Expanded from 10 marine sites in 1984 to 113 by 1987. Optimal harvest size of 2kg (2 years of rearing)
- Small pioneering companies (one or two sites each) and minimal operating capital.
- Consolidation through the 1990's + increased globalization and capitalization
- First Nations agreements begin in 1990's
- Over the past 15 years there have been at least 10 direct or indirect public reviews of salmon farming (federal / provincial / judicial) as well as multiple inclusive marine planning programs.

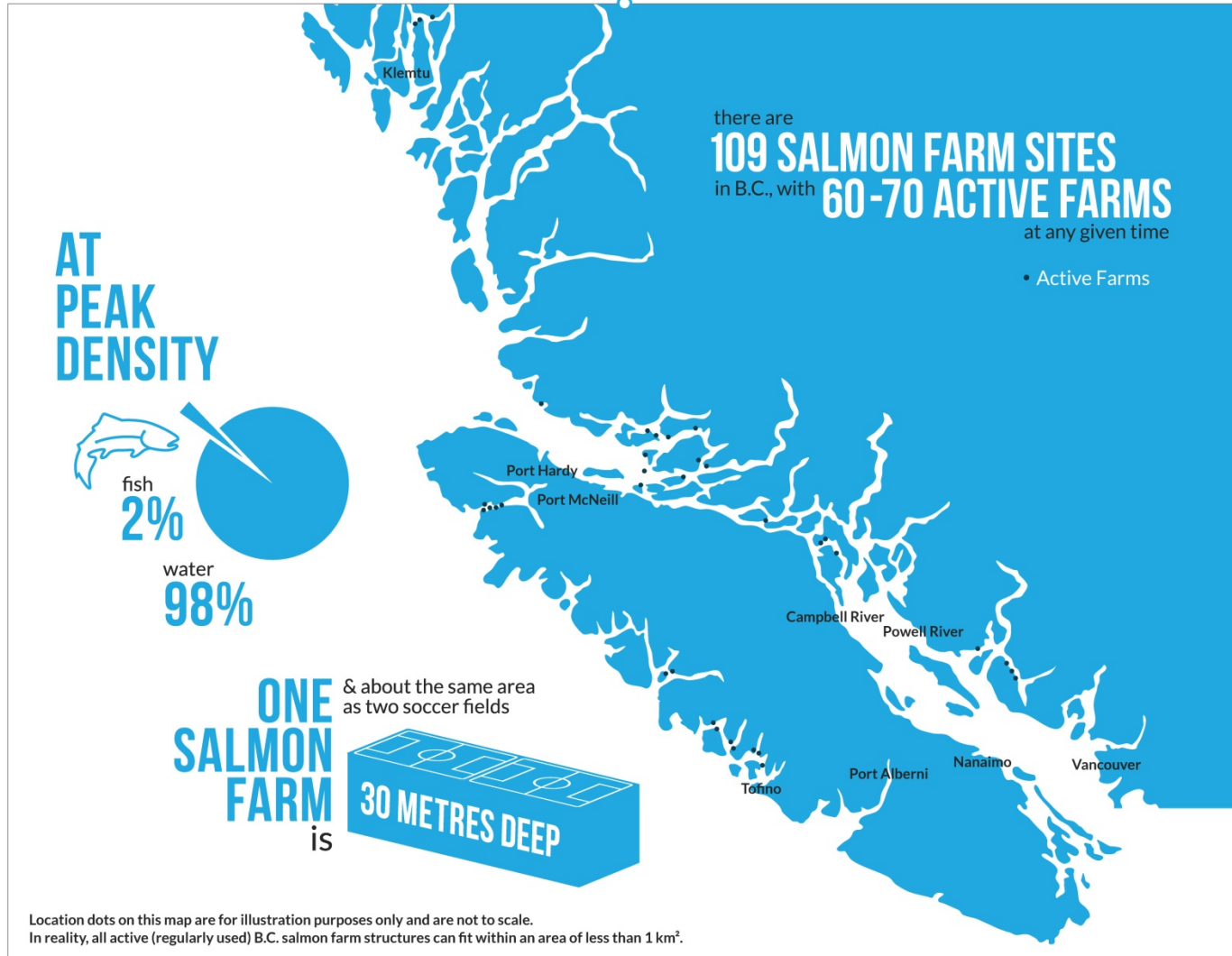


# FINFISH AQUACULTURE 2016

- BCSFA represents seven companies operating ocean farms (112 sites)
  - Marine Harvest Canada (54 sites)
  - Cermaq Canada (27 sites)
  - Grieg Seafood BC (20 sites)
  - Creative Salmon (6 sites)
  - Golden Eagle Sablefish (3 sites)
  - Saltstream Engineering (1 site)
  - Omega Pacific Seafarms (1 site)
- On average, 70 sites are operational at any one time. The others are fallow
- Less than .05% of BC's total coastline is used for salmon aquaculture
- 0.4% of areas biophysically suited for aquaculture is used for growing salmon

# B.C. SALMON FARMS

occupy **LESS THAN 0.05%** of B.C.'s Coast



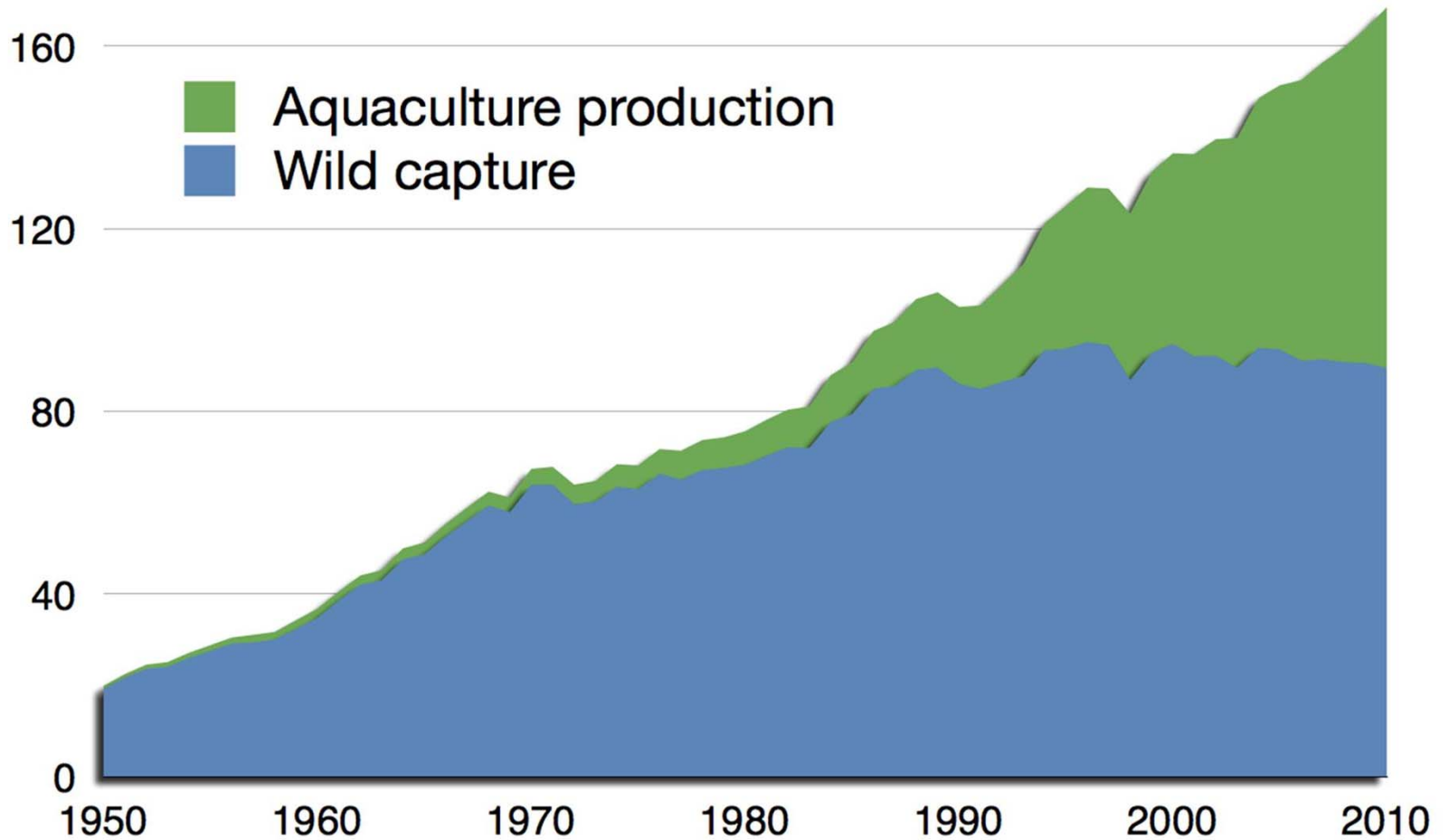


# FINFISH AQUACULTURE 2016

- BCSFA represents nine companies operating land-based farms (20 sites)
  - Marine Harvest Canada (8 sites)
  - Cermaq Canada (4 sites)
  - Grieg Seafood BC (1 site)
  - Creative Salmon (1 site)
  - Golden Eagle Aquaculture (1 site) – full grow-out
  - Golden Eagle Sablefish (1 site)
  - Omega Pacific (1 site)
  - Saltstream Engineering (1 site)
  - West Coast Fishculture (2 sites) – lake grow-out
- Members are in the midst of investing \$135-million to 2017 to further modernize feed mills, hatchery upgrades, farm cage, and feeding systems



# CRITICAL TO FUTURE FISH SUPPLY



Source: UN FAO

## SALMON FARMING: A GLOBAL INDUSTRY

**\$10**  
**BILLION**  
(USD)

GLOBAL SALMON  
PRODUCTION







# ECONOMIC SUSTAINABILITY – KEY ACHIEVEMENTS

## B.C. FARM-RAISED SALMON

BC's  **AGRICULTURAL EXPORT**

HIGHEST-VALUED  
seafood product worth  
**\$475 MILLION**  
landed value

Jobs in salmon farming pay  
**30% HIGHER**  
than B.C.'s median  
employment income

salmon farming contributes  
**+\$1.1 BILLION** to  
the  
provincial economy

(MNP, 2015)



## Contributions to the Economy

- Expenditures on goods and services, employment, tax revenues
- \$400 million in GDP - \$60 million in tax revenues

## Coastal Employment

- Jobs paying about 30% more than medium income in BC
- 5,000 jobs generated in BC





# ECONOMIC SUSTAINABILITY – AREAS OF FOCUS

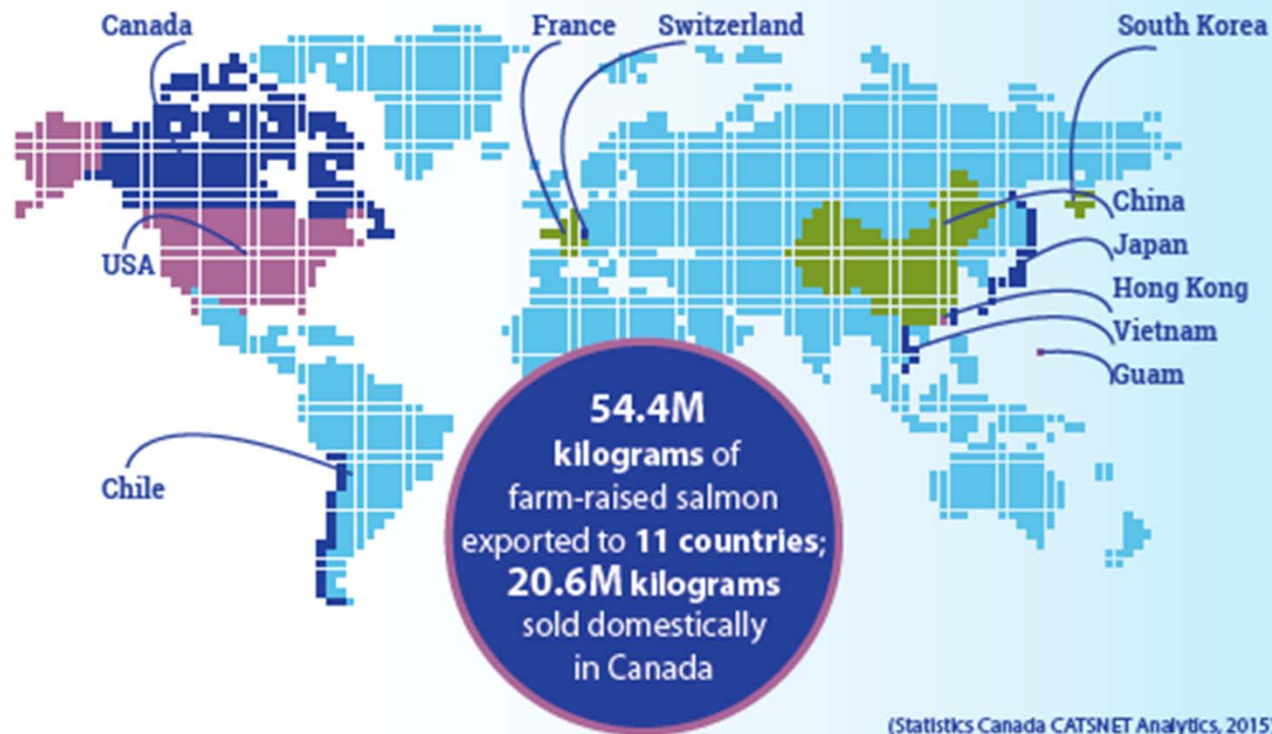
## First Nations Partnerships

- 20 economic and social partnerships with coastal First Nations
- 78% of B.C.'s annual production of farm-raised salmon is harvested from areas covered by agreements with First Nations

## Exports

- 70% of production exported. 30% sold domestically
- 2015 record set + 2016 on track for new record

## B.C. FARM-RAISED SALMON WORLD EXPORTS



# THIRD PARTY CERTIFICATIONS



**Best Aquaculture Practices Certification**  
The Responsible Seafood Choice



## Third Party Certifications and Recommendations







# THIRD PARTY CERTIFICATIONS

All salmon farms in B.C. have at least one third-party certification

100% BCSFA member Chinook salmon farms are Certified Organic Chinook Salmon

100% BCSFA member Atlantic salmon are GAA-BAP certified

15% of active Atlantic salmon farms are certified to the Aquaculture Stewardship Council (ASC) salmon standard

Farmers raising Atlantic salmon have a goal to be 100% ASC certified by 2020





# Survival of Stock

**An average of 90% survival from marine entry to harvest**





## Vaccines

- Farm-raised salmon are currently vaccinated to protect against six diseases
- The two bacterial diseases of B.C. for which vaccine research is underway are Yellow Mouth and SRS
- The development of vaccines help to minimize the current need for antibiotics in B.C.





## Antibiotics

- Antibiotics are an important part of animal and human welfare
- In aquaculture, antibiotics are only available through prescription by a licensed veterinarian, and only used to treat for illness in sick fish.
- British Columbia's aquaculture industry continually strives to set a high standard for antibiotic reporting
- Antibiotic use is not permitted for farm-raised salmon sold under the certified organic standard

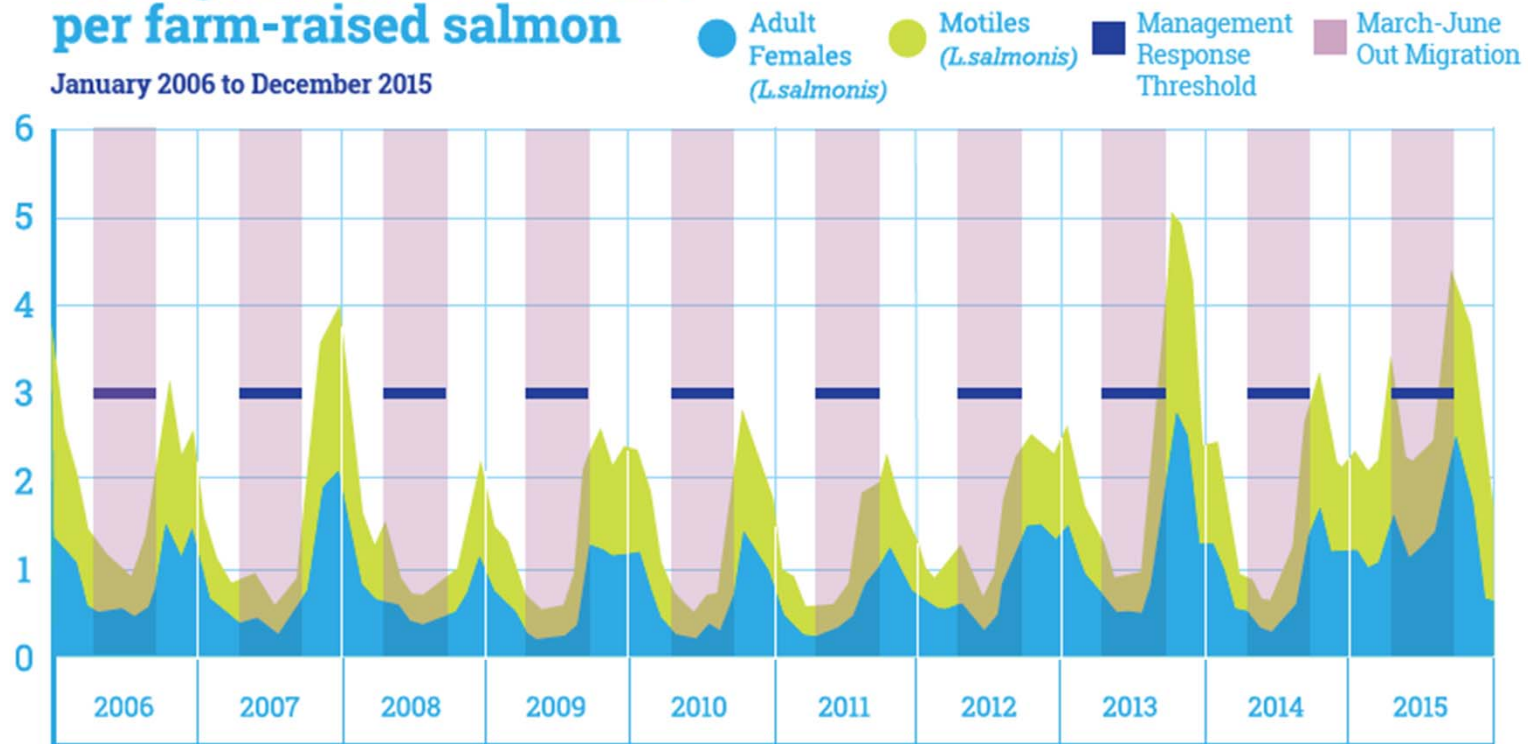


# SEA LICE MANAGEMENT

- Sea lice occur naturally in the marine environment around the world. Juvenile salmon (wild and farm-raised) arrive at sea free of sea lice
- Sea lice have evolved to attach to migrating salmon as they travel through the ocean
- Thrive in warm and salty conditions, consistent with the marine environmental conditions experienced in many areas in 2015
- Farmers work to minimize sea lice on farms particularly during the out-migration time for juvenile wild salmon (March to June).

## Average number of sea lice per farm-raised salmon

January 2006 to December 2015



Average number of salmon louse (*L. salmonis*) life stages (motiles and females) counted per B.C. farm-raised Atlantic salmon compared with the regulatory threshold (3 motiles per fish) for management response (from March 1 to June 30). Seasonal peaks in sea lice prevalence are linked to annual wild salmon returns. (DFO, 2016c)

- Transparency in sharing information concerning sea lice and management actions
- Updates on sea lice counts available on company websites
- Harvest or therapeutants - SLICE© and Paramove 50©.





# SEA LICE AND CULTURED SALMON

- In 2015, therapeutic use in B.C. farm-raised salmon averaged 1.4 treatments per production cycle
- ↓ to 0.25g of active ingredient per tonne of salmon in 2015 compared to 0.35g in 2014
- Research on alternative, nonmedicinal treatment methods is being driven through a global industry effort.



# SEA LICE AND WILD FISH

- Wild fish are natural carriers of sea lice
- B.C. salmon farmers are proactive and interested in knowing the status of sea lice conditions on wild salmon in areas where they farm

## *Wild Sea Lice Monitoring Programs*

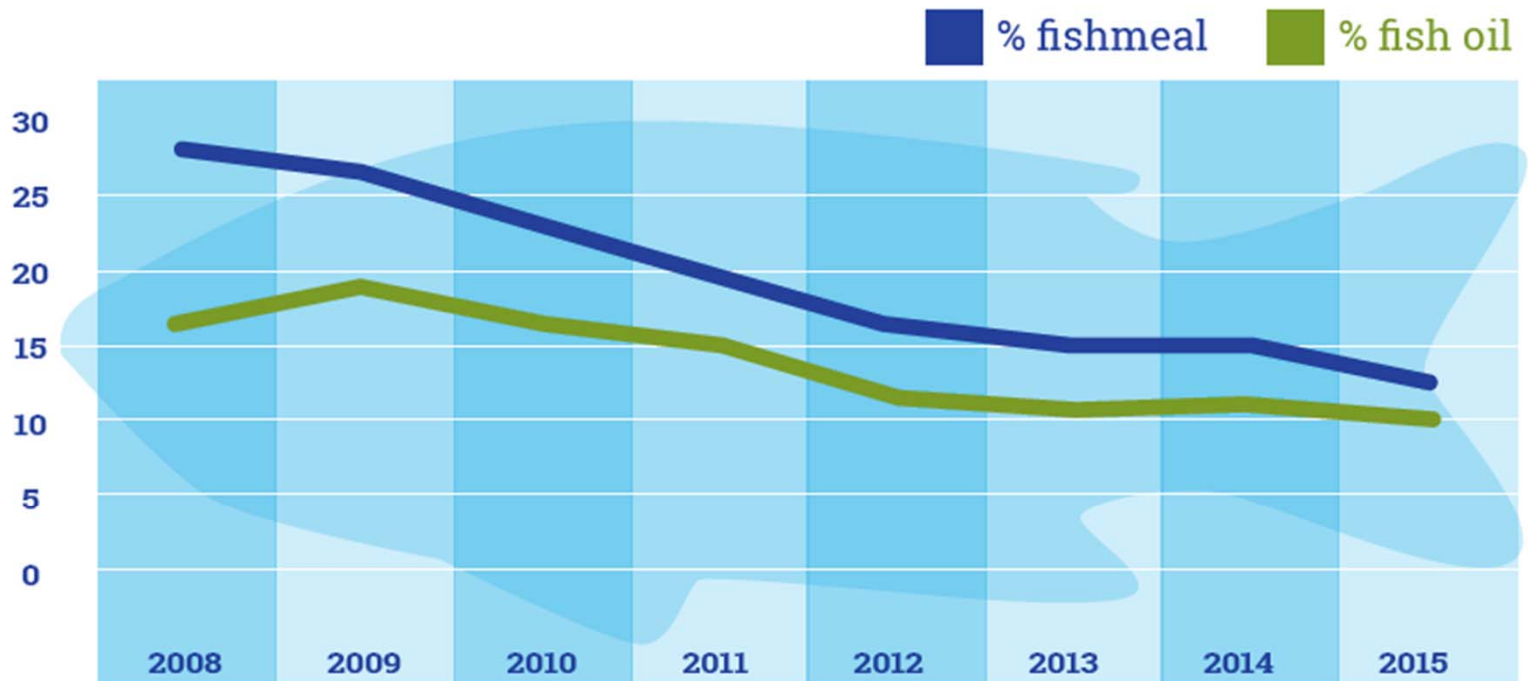
- Broughton Archipelago
- Clayoquot Sound
- Discovery Islands
- Klemtu
- Nootka Sound
- Port Hardy
- Quatsino Sound
- Sechelt Inlet





# FEEDING OUR FISH

## Salmon Feed: Average % of fishmeal & fish oil used by B.C. salmon feed producers (2008-2015)

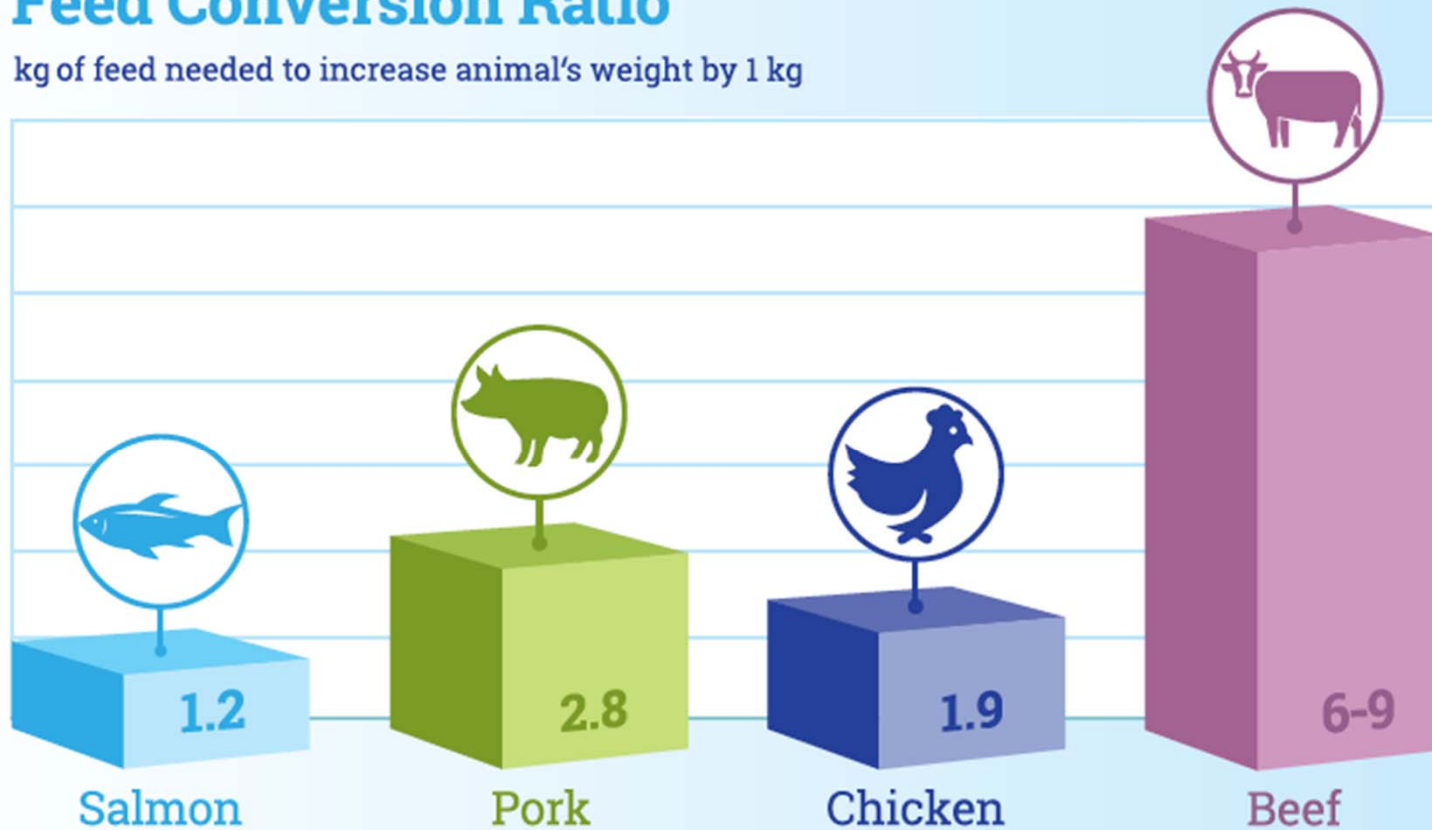


Feed companies have steadily decreased the amount of fishmeal and fish oil in their feeds, thereby reducing impacts on marine resources.



## Feed Conversion Ratio

kg of feed needed to increase animal's weight by 1 kg



For farm-raised salmon, pork, chicken and beef. (Adapted from Global Salmon Initiative, 2016)



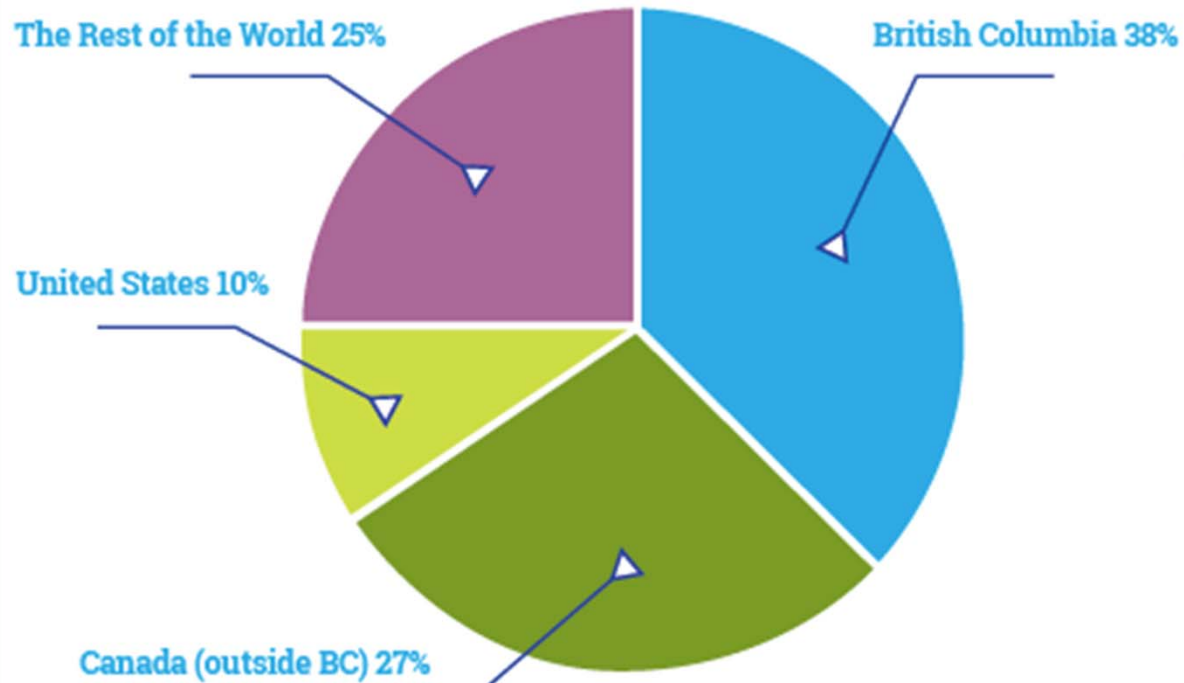
# TRACEABILITY AND QUALITY ASSURANCE

- Ensure food safety, quality of ingredients, handling, and processing methods used
- Modern machinery and advanced technology
- Feed companies servicing the B.C. salmon farming industry have very comprehensive traceability programs
- Complete visibility and control from the raw material supply chain, through all phases of production, to the customer's facilities
- Third party chain of custody
- Fresh salmon delivered to market 365 days / year within 36 hours of harvest

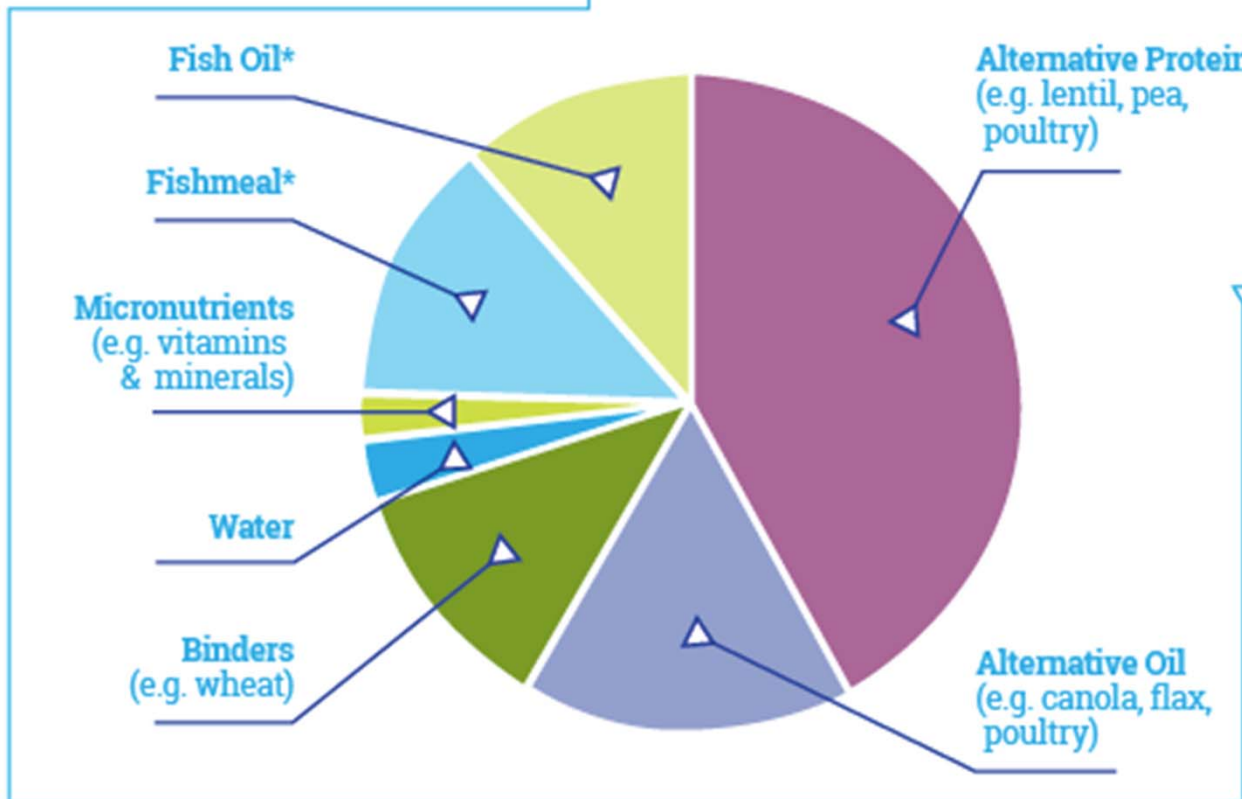


# LOCAL SOURCING

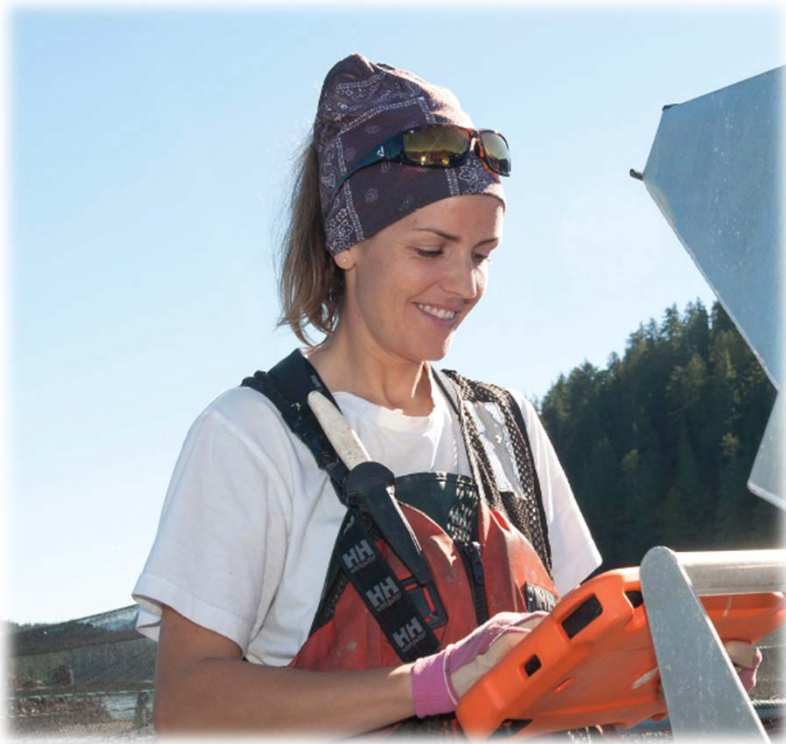
## Breakdown of raw material sourcing by B.C. salmon feed producers.



## Components of salmon feed<sup>1</sup>



# FARM TECHNOLOGY AND INNOVATION



- Improved technology has led to advances
- High quality, more sustainable food
- Automated feeding and surveillance systems
- Improved containment structures
- Innovations in fish health



## Freshwater

- Early life stages of salmon
- Recirculating aquaculture system (RAS)
  - Recirculates 98% of water
  - Reduces water consumption

## Marine

- In place of copper-based anti-foulants, Remote Operated Net Cleaners (RONCs)
  - High pressure water and scrubbing discs safely clean nets



## Marine

- Feed delivery and underwater monitoring
  - Cutting edge feed systems with real time data
  - Underwater cameras for 360° immersive pen monitoring



## Worker Safety

- Satellite-based systems
- Lone worker policies

Photo courtesy: Skretting





# MANAGING CONTAINMENT

## Escapes

- Zero tolerance policy; 100% containment of stocks
- In 2015, three escape incidents – **total fish lost: 1 Chinook and 2 Atlantic salmon**
- Reporting on escapes - public website of Fisheries and Oceans Canada



# MARINE ENVIRONMENTAL RESEARCH PROGRAM

- \$1.5 million to fund competitive research programs between 2015 and 2020 that address one or more of the four key research priorities





# MARINE ENVIRONMENTAL RESEARCH PROGRAM

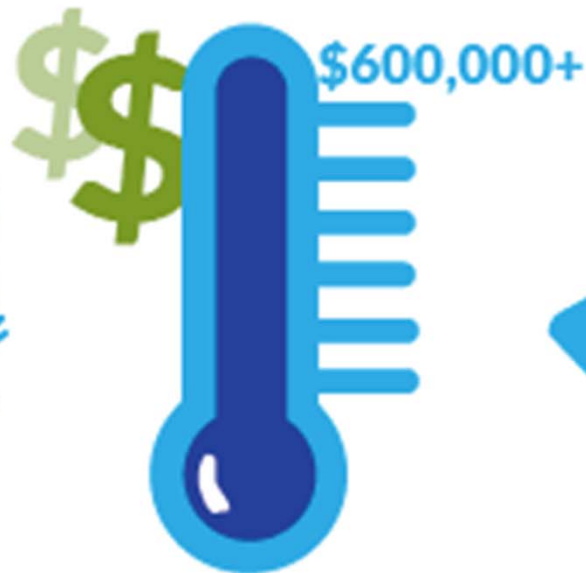
## **A few MERP funded projects...**

1. Acoustic Tags and Analyses: Use of acoustic tagging methods to study juvenile salmon within the Strait of Georgia and Johnstone Strait (2015 – 2019)
2. Use of hydro-acoustic methods to assess the migration timing and distribution of juvenile salmon in Discovery Islands and Johnstone Strait (2015-2019)
3. An examination of the potential use of perch to clean sea lice infested Atlantic salmon (2016 – 2017)



# SOCIAL SUSTAINABILITY – Community Contributions

## Community Contributions by B.C. Salmon Farmers (2015)





## OUR COMMITMENTS

- By 2020, all salmon grown by BCSFA members will meet the requirement of Gold Standard environmental programs, including all Atlantic salmon farms certified to the ASC standard.
- B.C. salmon farmers are committed to furthering leadership in the environment through dedicated research to learn more about wild salmon.
- B.C. salmon farmers are committed to growing the coastal economy through creating lasting partnerships with First Nations.



**There is an important opportunity for B.C to benefit from responsible growth of sustainable aquaculture production.**

