

Food Safety and the Aquaculture Supply Chain in Canada

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Farming Canadian waters with care.



Aquaculture Supply Chain – Canada

1. Aquaculture in Canada

- Markets
- Types of farming

2. Shellfish food safety

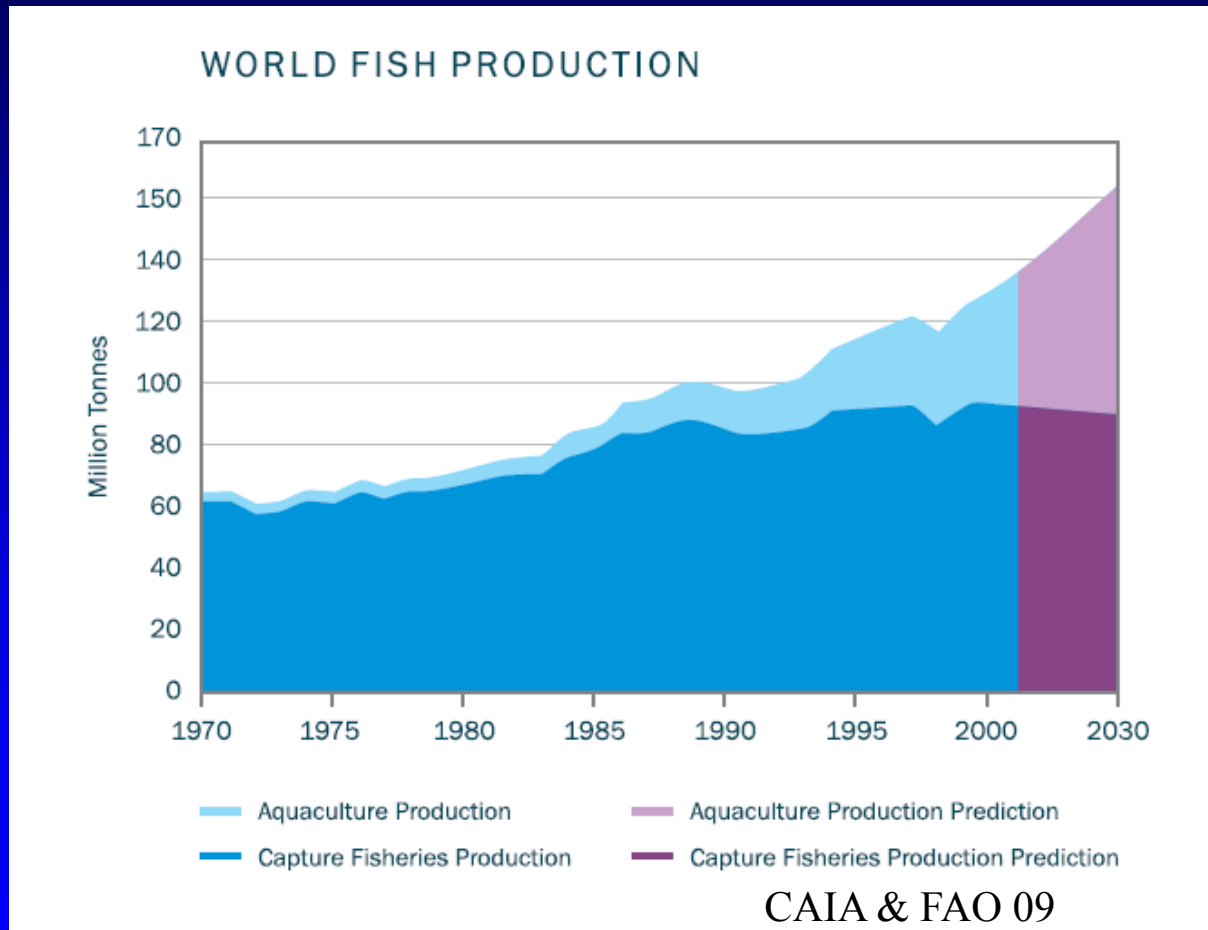
3. Finfish food safety

4. Aquaculture food safety – proving it!

5. Certification and standards

6. Summary and conclusions

Based on current consumption levels (15-16 kg per capita) there is expected to be a gap of 30 MMt by 2030 - the opportunity for aquaculture is good, but there are challenges



Aquaculture Is the Fastest Growing Food Production Activity in the World (UN FAO)

In 2010, 50%+ of consumed seafood is farmed

25% fed, non-extractive species
75%+ non-fed, extractive species

THE BLUE REVOLUTION

Aquaculture Feeding Humans with Healthy and Cost-Effective Foods

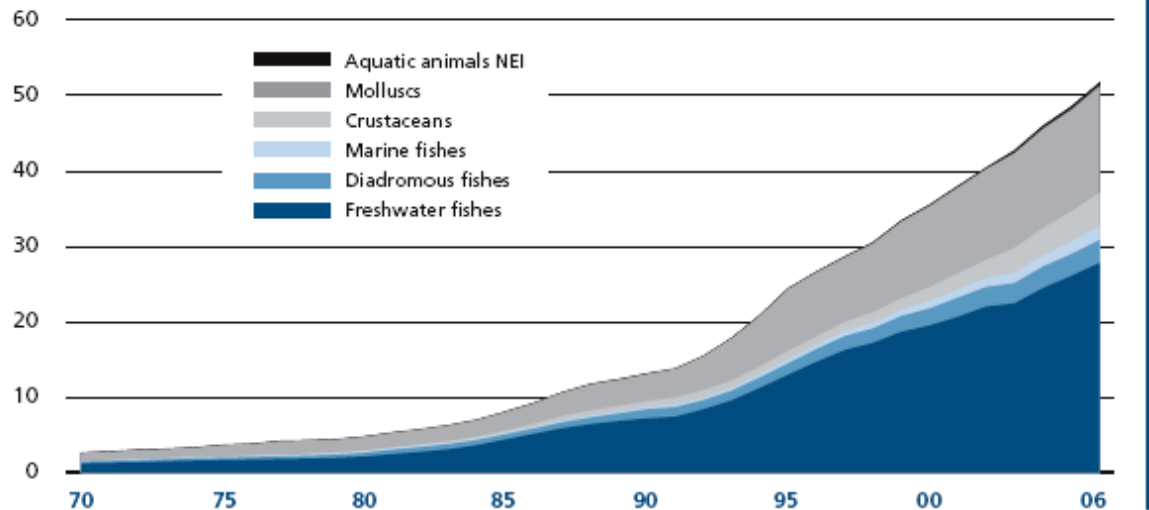
Orr Couturier, Research Scientist and Chair, MSc Aquaculture Program, Centre for Aquaculture and Seafood Development, School of Fisheries, Marine Institute, Box 4020, St. John's, NL, A1B 5R3. Email: orr@mi.mun.ca

Dive inspection of feed silo and ballast system (middle cylinder) of submersible, fully-closed marine fish cage deployed in deep waters off of Hawaii.

Profiling and Feeding Systems, Vol. 2, No. 2, 2007, 1

Trends in world aquaculture production: major species groups

Million tonnes



Note: NEI = not elsewhere included.

FAO 2009

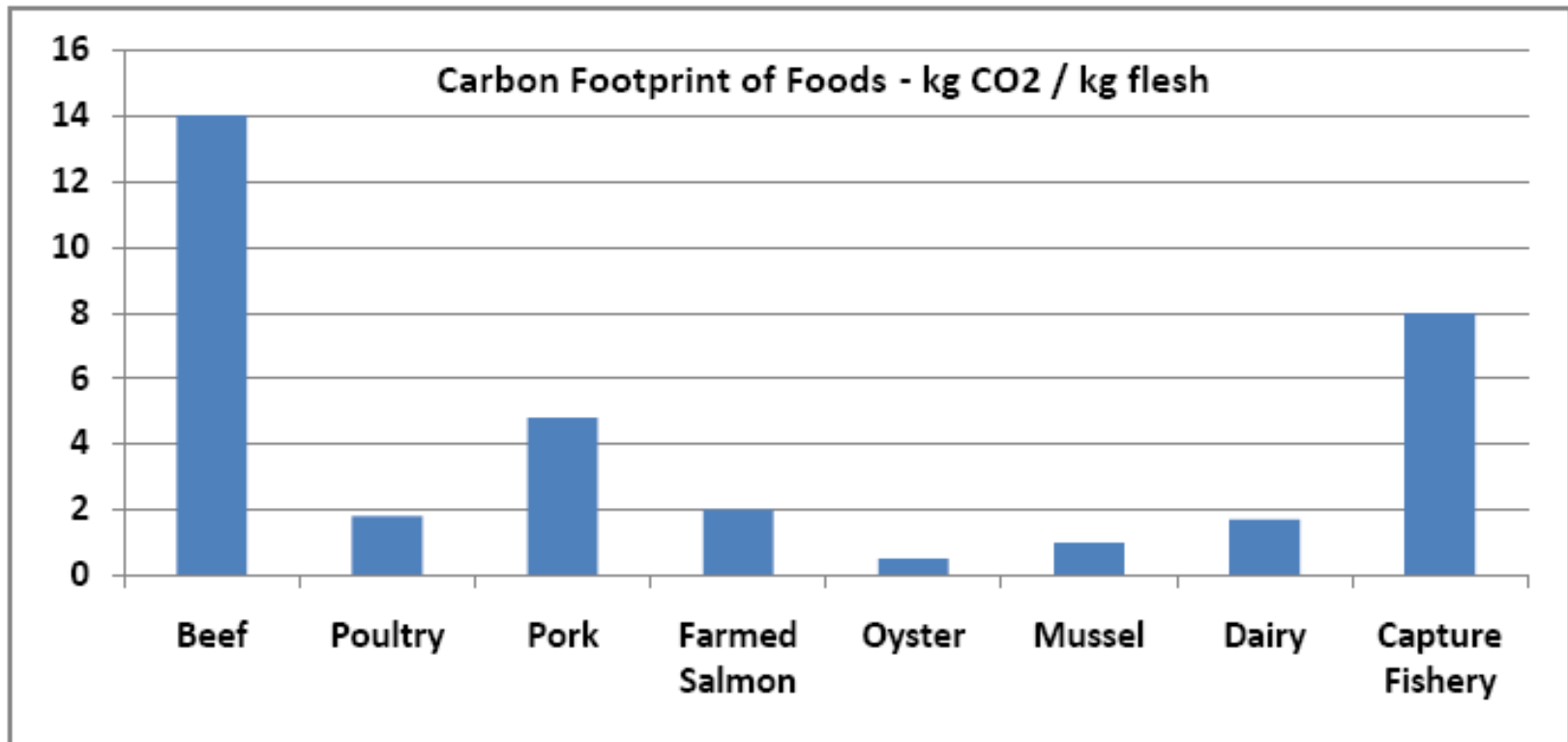


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Feed conversion for fish, poultry and swine - Less carbon output for fish production

	<u>Species group</u>	<u>feed (energy) conversion ratio</u>
1.	salmonids & marine fish	1.0-1.3
2.	shrimp	1.5-2.5
3.	carp	2.0-3.0
4.	poultry	1.9-2.2
5.	swine	3.2-3.8
6.	<i>Ronald W. Hardy, Director, Hagerman Fish Culture Experiment Station, University of Idaho</i> _____	

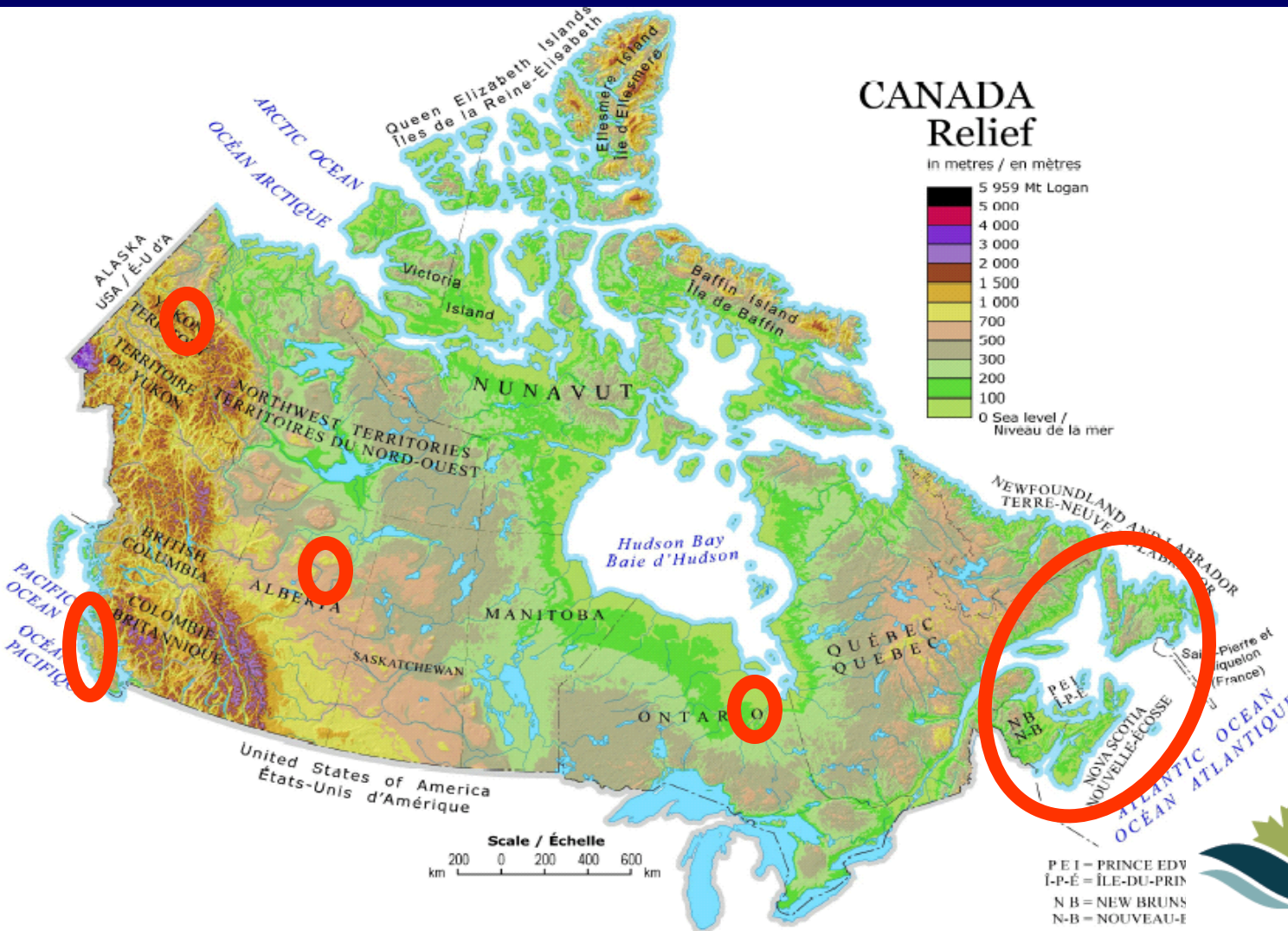
The "Green" imperative



Canadian Production Figures

- **Canada produced ca. 150,000 tonnes in 2008 (10,000 t in 1988)**
- **Employed 18,000 full and part time**
- **Value in 2008 exceeded \$2.1 B to Canadian economy (\$800 M farm gate)**
- **2008 Canadian production < 0.3% of world; ranked 21st or 22nd**

Statistics: >5,000 km wide; >50,000 km of coastline; production limited to a few small areas (< 100 km)



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Chart 1
Canadian finfish production

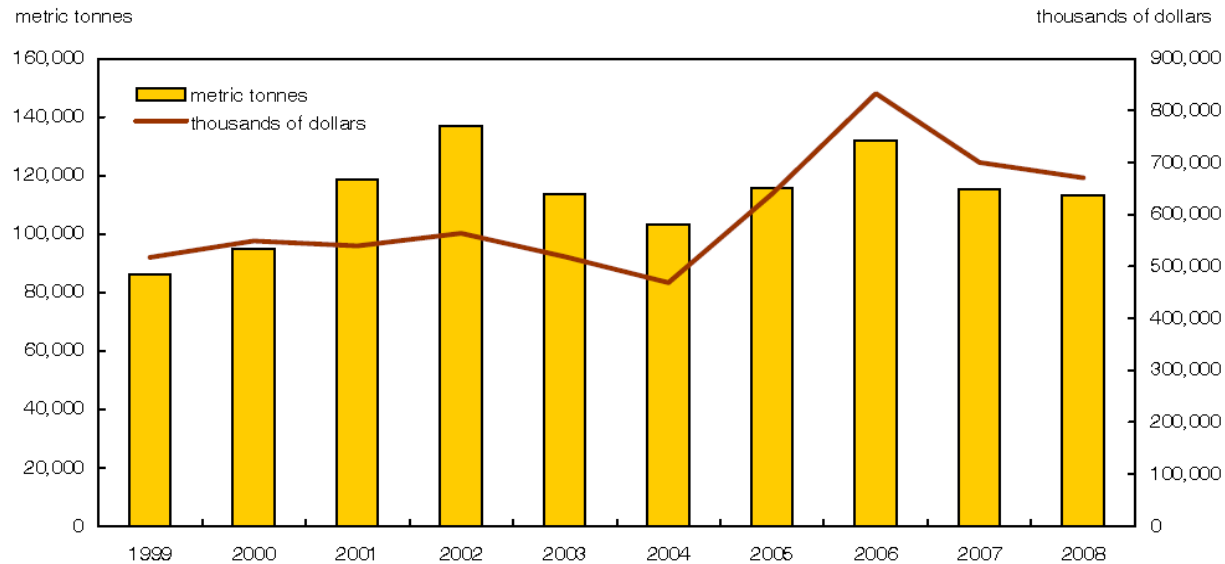
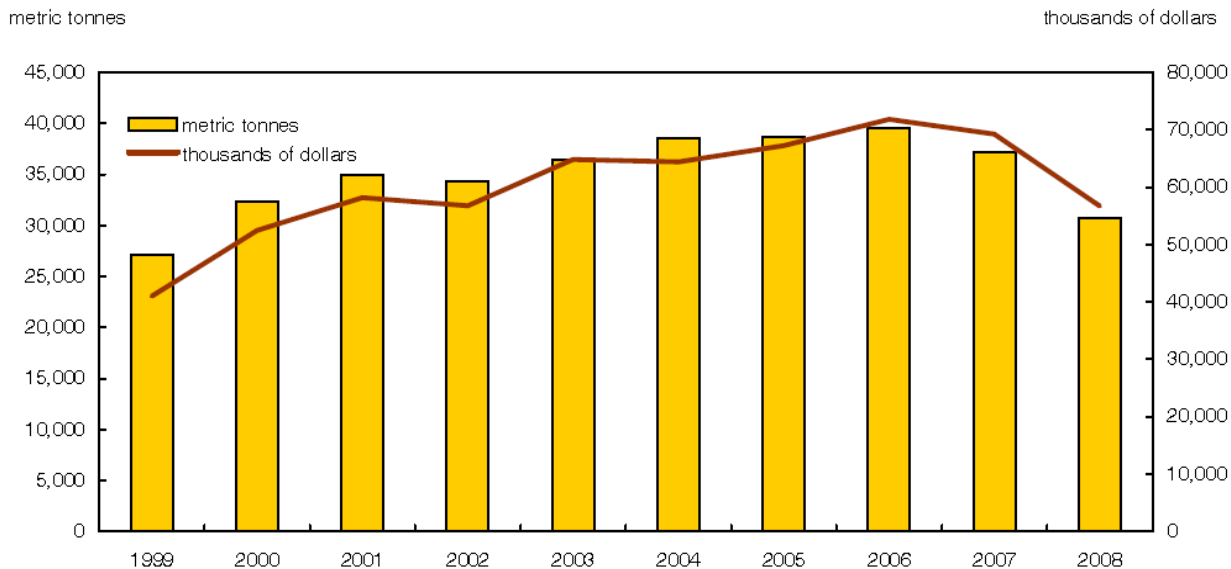


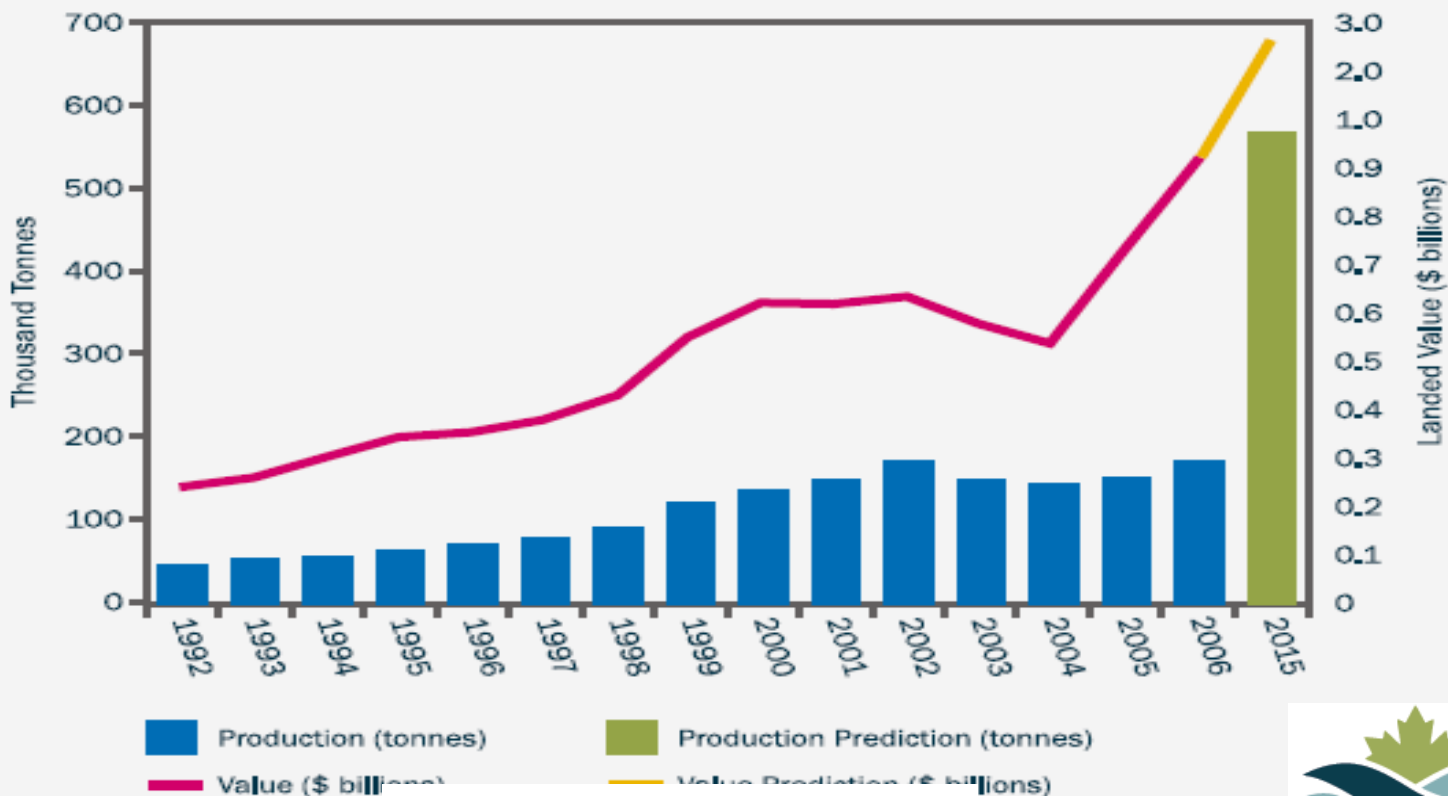
Chart 2
Canadian shellfish production



***Production
levelling off in
the past 3
years – limited
sites,
cumbersome
regulatory
environment,
& competitive
markets***

- production in all 10 provinces and 1 territory
- Requires provincial and federal permits to operate
- governed by up to 73 pieces of legislation (many FS)
- The potential is to triple in volume and value in 7-8 years with leadership from gov't & industry

CANADIAN AQUACULTURE PRODUCTION



Adapted from CAIA 2008, Stats Can 2006



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Markets:

- **export 65% of seafood products (\$3 billion)**
 - **3X the value of beef (as food) export**
 - **farmed bivalve exports 55% of volume**
 - **farmed finfish exports 70% of volume**
-**food safety is of paramount importance and is everyone's business!**



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Canadian farmed seafood markets

Primary Markets: USA (85%), Taiwan, France, China & Canada. 20+ other countries

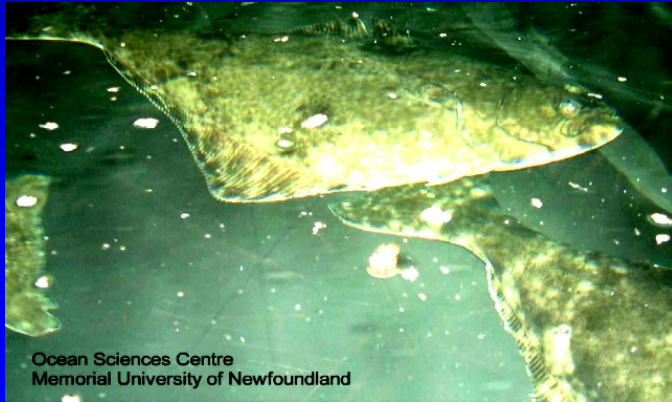


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Aquaculture in Canada: Finfish Farming



Ocean Sciences Centre
Memorial University of Newfoundland

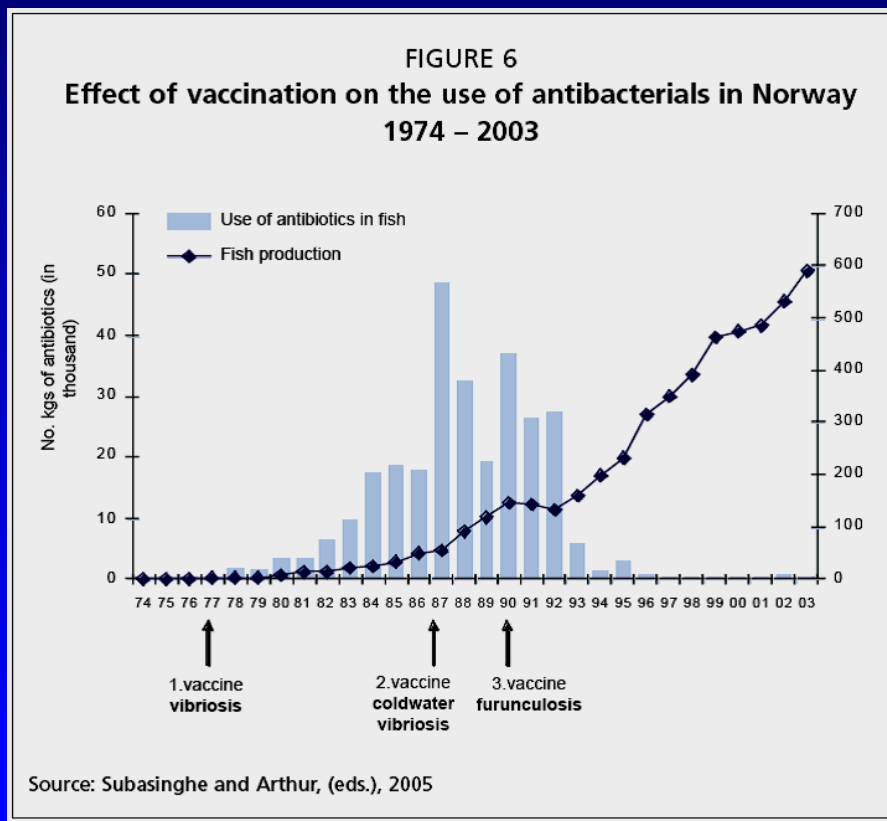


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Salmon farming – juveniles – vaccines

All have CoP or BMP guidelines

e.g., vaccines reduce antibiotic useage

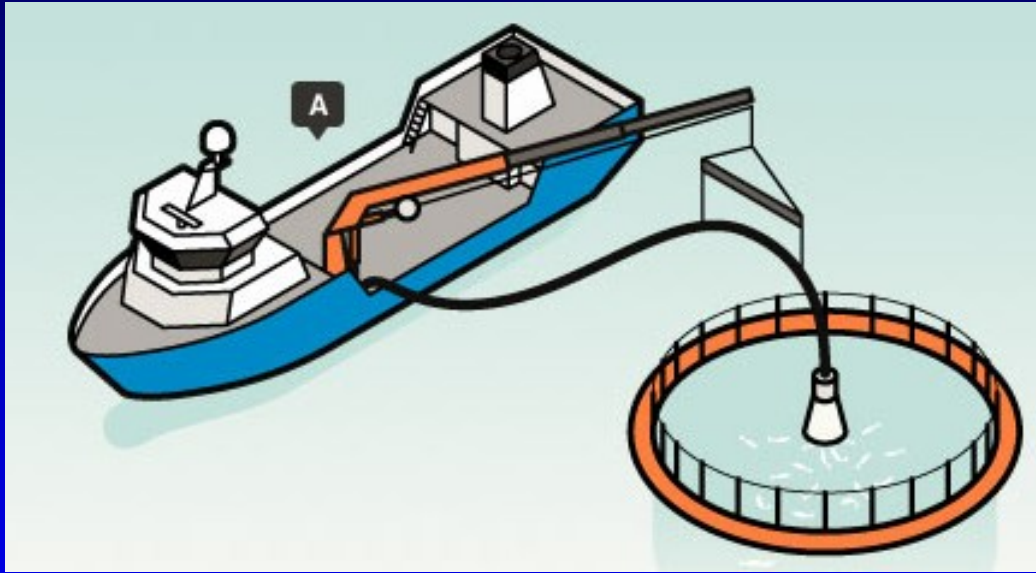


Salmon farming – production

BMPs for farms



Salmon farming - harvest, processing, & distribution – full trace to pen



Aquaculture in Canada: Shellfish Farming



T. Magesen



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Mussels – farming

BMPs for farms



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Mussels - harvesting

- 30 tonne harvester
- single or continuous droppers



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Mussels – processing & distribution \

Full trace to farm area



Sold in many product forms, mostly fresh or frozen



- Examples:**
- MAP shellfish and finfish
 - Frozen products
 - Kabobs
 - Prepared meals
 - Portions

Modified Atmosphere Packaging (MAP)



Herbs / Fines herbes

Preparation / Préparation	Temp	Time / Durée
Method / Méthode	160°C / 325°F	8-10 minutes
Task / Tâche	Preparation / Préparation	15-20 minutes
Preparation / Préparation	160°C / 325°F	8-10 minutes
Task / Tâche	Preparation / Préparation	15-20 minutes

Nutrition Facts / Valeur nutritive	
Per 100g (3.5oz) (per 1 portion 120g)	
% Daily Value	
Calories / Calories 240	
Fat / Lipides 15 g	30 %
Saturated / saturés 4 g	8 %
Trans / trans 0 g	0 %
Polysaturated / polyinsaturés 4 g	8 %
Omega 3 / oméga 3 2 g	4 %
Cholesterol / Cholestérol 5 mg	1 %
Sodium / Sodium 200 mg	11 %
Carbohydrate / Glucides 4 g	8 %
Fiber / Fibre 0 g	0 %
Sugars / Sucres 3 g	6 %
Protein / Protéines 2 g	4 %
Vitamin A / Vitamine A	2 %
Vitamin C / Vitamine C	2 %
Calcium / Calcium	2 %
Iron / Fer	4 %



Food Safety – Shellfish

- **Canadian Shellfish Sanitation Program (CSSSP)**
- **Audited by EU, USFDA, and importers**
- **Managed by 3 federal departments**



- **Food safety standards set by Health Canada**
- **Approach: growing water classification (<14 MPN/100mL), harvest regulations, meat testing (<230 MPN / 100g) on-farm & processing plant**
- **Veterinary inspection (province)**
- **Regular employee training**
- **Plant QMP (HACCP-based)**

FISHERIES DIVERSIFICATION PROGRAM

Project Report: FDP AMM – 4037730-1

QUALITY ASSURANCE GUIDELINES
for the
Newfoundland Mussel Industry



Newfoundland Aquaculture Industry Association
20 Mount Scio Place
P. O. Box 23176
St. John's, NL
A1C 4J9

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MI MARINE INSTITUTE  CANADIAN CENTRE FOR FISHERIES INNOVATION  DEPARTMENT OF FISHERIES AND AQUACULTURE Aquaculture Branch  COLD HARVEST

Food Safety – Finfish

- **Full integration in the value chain (feed, seed, farm, processing, distribution)**
- **Farm-based HACCP & BMPs**
- **Independent MRL verification e.g., Healthy Salmon Program**
- **Feed stock testing, Supplier QA programs**
- **Contaminants, metals, microbiological verification (3rd party / gov't)**
- **Veterinary inspection**
- **Regular training for employees**
- **Plant QMP (HACCP-based)**

Regulatory oversight:

- **Canadian Food Inspection Agency**
- **All seafoods must go through a federally registered plant**
- **Quality Management Program (QMP)**
HACCP-based
- **Frequently inspected, regularly audited**
- **Audited by trading partners (EU, USFDA)**
- **Bilateral agreements on equivalency**

Finfish food safety – proving it!

From egg to plate

- Feed supplier agreements
- Independent verification of specs
- Records for movements, on-growing, harvest declarations, transport sign off
- Plant QMP with lot ID by cage

Shellfish food safety – proving it!

- **Growing water records & licences**
 - **Harvest declarations for suppliers (approved site, licence, area)**
 - **Transportation records**
 - **Plant QMP with mandatory lot identification (harvest date, location)**
 - **End user required by law to maintain ID code for 4 months+**
-many operations integrated**



Certification & Standards



GLOBALG.A.P.

Integrated Farm Assurance Standard
(IFA)



International
Organization for
Standardization

ISO 22000

ISO 65

ISO 17025



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Trade relations

- **Science-based, demonstrable FS standards**
- **Full traceability, from egg to plate**
- **FS sanctions very few**
- **Generally good trade relations, but occasional variances in import / export requirements not clear and result in trade barriers that are not FS related though disguised as such**

Summary and Conclusions

- 1. Robust regulatory regime for Exp/Imp**
- 2. Aquaculture industry best practices exceed regulatory requirements**
- 3. Full traceability from egg to plate (in most cases)**
- 4. Continuous improvements to minimize risks for food safety**
- 5. Very few product recalls, & illnesses due to farmed Canadian seafood**

謝謝您的關注
Thank you for your attention!
Merci de votre attention!
Gracias!

