

## Sustainable aquaculture in Canada: Lost in translation

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# Sustainability of aquaculture

## *Background*

- Canada and many other countries have signed a series of international agreements to promote sustainable development
- Sustainable development is defined as.....

*“development that meets the needs of this generation while not diminishing the ability of future generations to meet their own needs”*  
(Brundtland 1987)

- Sustainable development has three pillars – social, economic, and environmental and is sometimes referred to as the 3 Ps – people, planet and profits





# Sustainability of aquaculture

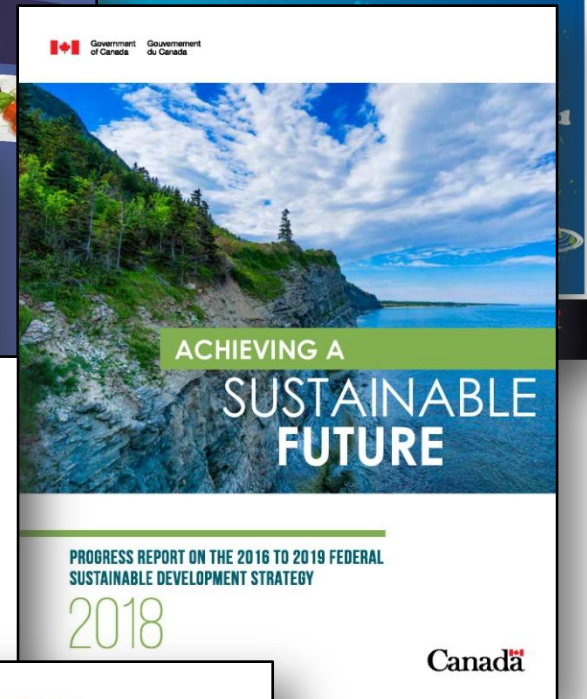
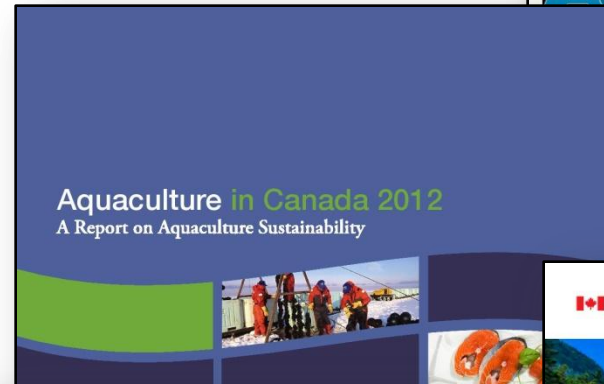
## *Sustainability Indicators*

- Indicators are a measure or gauge of the state, level or trend of something.
- Government policies rely on indicators to show movement towards or away from a policy objective (e.g. Canada's Healthy Coasts and Ocean policy which has a goal or target to protect 10% of coastal and marine areas through a networks of protected areas).
- We did a study to examine what indicators the federal government is using to: 1) assess the social, economic and environmental sustainability of aquaculture production; 2) whether these indicators adequately measure policy outcomes; and 3) whether national-level indicators are appropriate or relevant to assessing aquaculture's sustainability at the community-level.



# How did we do the study?

- We examined the published literature on sustainability indicators (SI) and what makes a good indicator.
- We examined the sustainability indicators (SI) developed by the federal government to assess the sustainability of the aquaculture sector.
- We then combine our more than 10 years of research in Port Mouton Bay with that of other researchers and provincial government data to examine how federal sustainable aquaculture policies and programs have been experienced at the community level.



# Results

- DFO outlined 11 potential sustainability indicators (see Table 1) in 2012 but does not use them to measure aquaculture's sustainability.
- DFO's sustainability measure for aquaculture is compliance with regulations.
- Compliance means reporting benthic sulphides levels or percentage of the sea bottom covered by bacterial mats, amount of drug and pesticides used and any dead marine life outside of the cages if drugs or pesticides are used.
- There are more than 900 aquaculture operations in Canada. Not all are inspected and some operations can be inspected more than once.
- In 2017-2018, 409 inspections took place and compliance was 100%

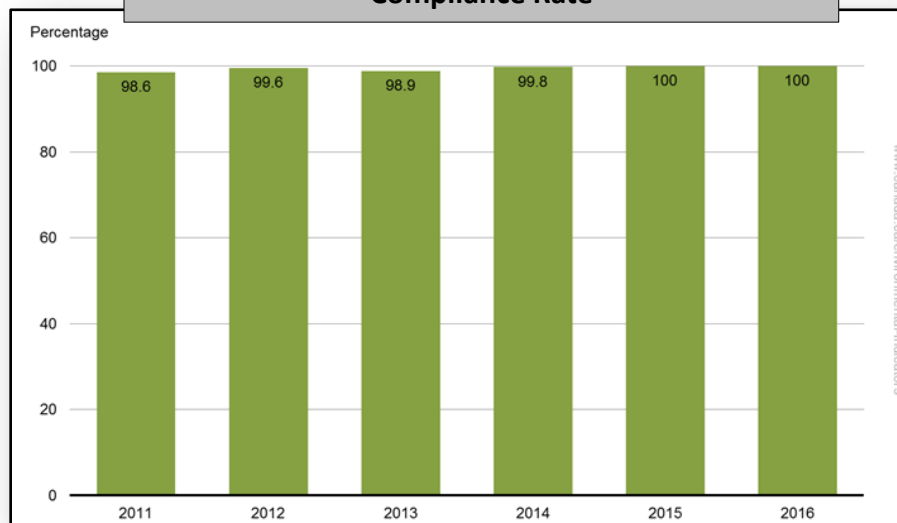
**Table 1**

Summary of Canadian aquaculture sustainability themes, objectives and indicators as outlined in DFO (2012).

Sustainability Pillar	Themes	Objectives	Potential SI <sup>a</sup>
Environment	Maintaining healthy productive ecosystems	Protecting fish and fish habitat through site allocation processes, managing organic waste, controlling introductions and transfers of fish, escape prevention	Escaped fish Water quality Benthic monitoring
	Using resources efficiently	Feed management, water and energy conservation and production-area optimization	Responsible sourcing of marine raw materials Marine ingredients in aquaculture feed Disease incidence
	Maintaining animal health and welfare	Minimizing stress and reducing disease and pest risks	
Economic	Economically viable and successful sector	Delivering economic growth in rural development, job creation and domestic and international trade	Labour income generated Return on investment
Social	Encouraging social responsibility	Respecting local communities, Indigenous and labour rights, safe workplaces	Employment
	Ensuring safe and healthy aquaculture products	Meeting nutritional needs	Value-chain traceability Voluntary certification

<sup>a</sup> All sustainability indicators (SI) identified in the 2012 *Aquaculture Reporting Initiative* were designated as being "under development".

**DFO Sustainable Aquaculture Indicator Compliance Rate**



*Compliance Rate is measured as percentage of inspected aquaculture operations that comply (no charges laid) with Fisheries Act regulations*



# Results

- In 2016 and 2017, marine finfish operators used 16.8 metric tonnes (mt) and 14.4 mt of antibiotics and 617mt and 439mt of pesticides (hydrogen peroxide) respectively .
- Monitoring and reporting cumulative, and far-field (beyond the farm lease) effects of repeated exposure to antibiotics and pesticides on non-target species is not required.
- Reporting benthic sulfide levels and the percentage of the bottom covered by bacterial mats on or near fish farms does not measure the cumulative and far-field impacts of waste discharges.
- Federal *Aquaculture Activity Regulations* do not address the lobster catch decreases, eelgrass loss, metal (copper) contamination or nutrient loading reported in the studies done in Port Mouton Bay.



# Results

- DFO's social sustainability goal of generating meaningful employment in rural, remote and coastal communities has not occurred.
- Between 2007 and 2016, overall Canadian aquaculture production increased 18% but direct employment in the sector dropped 32%.
- Finfish aquaculture production in Nova Scotia has increased 1000% between 1995 and 2017, but employs the same number of full-time people and there has been an 86% drop in part-time employment.
- DFO has yet to develop an objective measure or indicator of social license to operate (SLO) which is a process by which industry attempts to acquire the informal consent of a community to operate in the community.



# Conclusions

- No progress has been made on developing a broad range of sustainability measures for Canadian aquaculture policies .
- The case study in Port Mouton Bay reveals Canada's single measure of aquaculture's sustainability, compliance with regulations, is inadequate to address all the potential environmental impacts of aquaculture on fish and fish habitat and highlights the discrepancy between national estimates of the economic benefits of aquaculture and community-level reality.
- Canada's approach to selecting aquaculture SI repeats several pitfalls associated with selecting meaningful indicators such as measuring what is easier to measure (compliance with regulations) rather than what is important (e.g. environmental impacts), selection bias in favor of a particular policy objective (global commodity chain), and using national-level indicators to divert attention from local-level experience.
- Sustainability indicators need to:
  - provide measures that account for different scales (e.g. spatial, jurisdictional, knowledge)
  - avoid over-aggregating data
  - measure what is important rather than what is easy to measure
  - include all sustainable development policy objectives not just a particular policy objective or sector interest



# Thank you

- Friends of Port Mouton Bay
- OceanCanada Partnership

