



Integrated Oceans Management for Sustainable Aquaculture

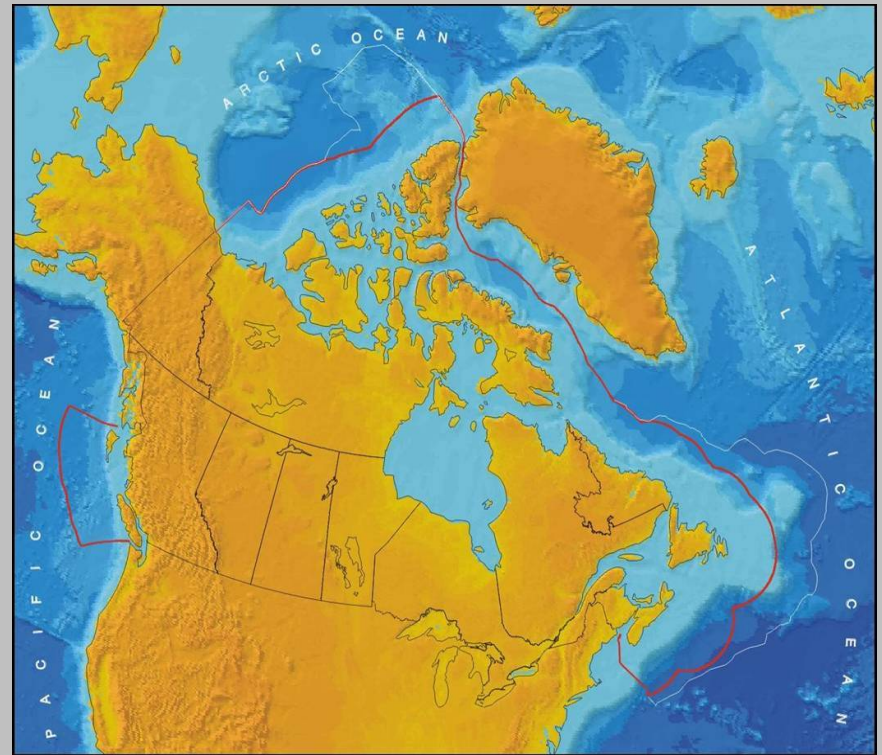


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Puerto Montt, Chile
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CANADA: A Maritime Nation

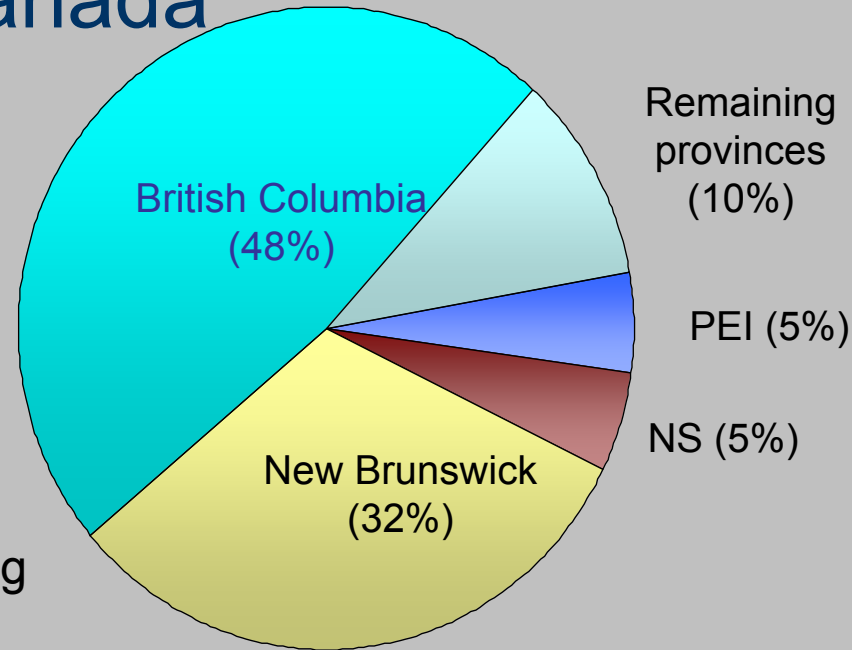
- Canada is a maritime nation bordering three of world's oceans, with a coastline of 243,792 km.
- Canada's ocean regions total almost 6 million Km²: equal to almost 60% of Canada's land mass.
- The oceans provide recreation and employment to over 7 million Canadians who live in coastal communities.





Aquaculture Industry in Canada

- 27th in terms of world production
- 4th in farmed salmon
- Predominated by the culture of salmon, Trout, Halibut, Cod and some marine plants
- Growing Polyculture sector: finfish, bivalves and marine plants)
- Approximately 14,000 full time jobs providing sustainable income to coastal communities
- Aquaculture production must be integrated with existing activities in accordance with legislation and policy requirements





Sustainable Management for the Future

- Many challenges face the World's oceans:
 - Increasing commercial pressures
 - Growing conflicts/competing interests among users
 - Changes in populations of commercial species are occurring at the ecosystem level

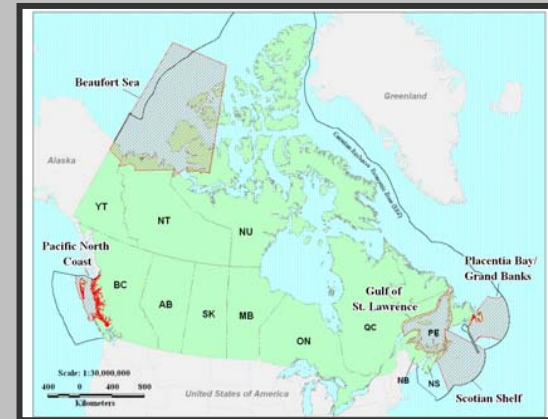
- As a maritime nation, Canada is meeting these challenges:
 - Addressing foreign over-fishing and through international governance frameworks: NAFO and UN High Seas Conventions on Straddling Fish Stocks and Biological Diversity
 - Bilateral/ Multilateral Oceans Management Plans: Gulf of Maine/ Bay of Fundy and Arctic Marine Strategic Plan
 - Large Oceans Management Areas and Marine Protected Areas: Eastern Scotian Shelf Integrated Management planning





Canada's Oceans Strategy

- In 1997, Canada's *Oceans Act* came into force, followed by **Canada's Oceans Strategy** in 2002, providing a framework for the sustainable development of marine resources and the protection of marine ecosystems
- This **Strategy** consists of four pillars:
 1. International Leadership, Sovereignty and Security
 2. Integrated Oceans Management for Sustainable Development
 3. Oceans Health
 4. Oceans Science and Technology
- Oceans Action Plan was announced in 2005 to provide funding for each of the four pillars





Integrated Oceans Management and Oceans Health

- A series of Oceans Management Areas and Marine Protected Areas are under various stages of development and involve:
 - Analysis of marine ecosystem health
 - Mapping of the seabed to better understand the ocean ecosystem
 - Identification of sensitive marine areas for conservation, management and protection
 - Establishment governance frameworks between Government, First Nations, Industry and the Public

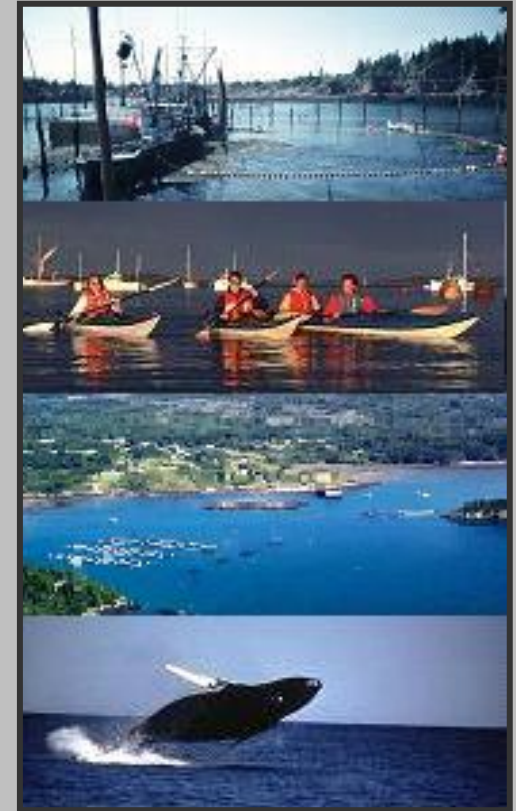




Integrating Aquaculture into an Oceans Management Framework

OBJECTIVES:

- Conserve and protect fish habitat, biodiversity and health of marine ecosystems
- Coherent and transparent management based on science that provides a predictable decision making process for all resource users
- Sustainable development through ecosystem based management
- Address competing or conflicting interests amongst stakeholders





Federal Legislation for Sustainable Aquaculture

Through legislation such as the *Fisheries Act*, *Canada's Oceans Act*, *Species at Risk Act* and the *Canadian Environmental Assessment Act*, a thorough environmental assessment is undertaken that considers all Marine Valued Ecosystem Components

- Waste Management
- Farmed and wild fish health
- Escape Prevention
- Food safety
- Fish and fish habitat
- Water quality
- Safe navigation
- Deleterious substances
- Marine mammals
- Commercial and recreational use
- Cultural values (archeological)
- Migratory birds
- First Nations use
- Cumulative effects





Policy for Sustainable Aquaculture

- Aquaculture Policy Framework and the Policy for the Management of Fish Habitat

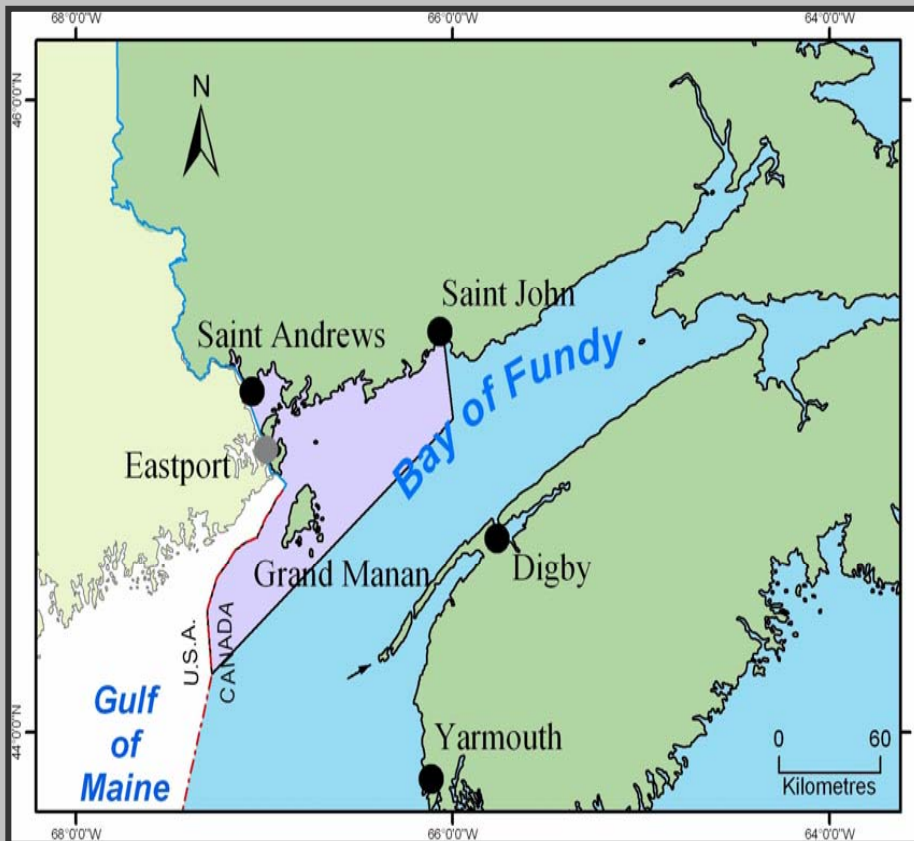
ESSENTIAL ELEMENTS:

- Sustainable development
- Coherent and predictable regulatory framework
- Risk management: value and sensitivity of ecosystem
- Industry competitiveness
- Public confidence



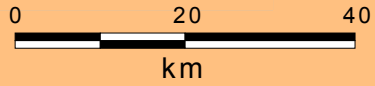


CASE STUDY: Bay of Fundy

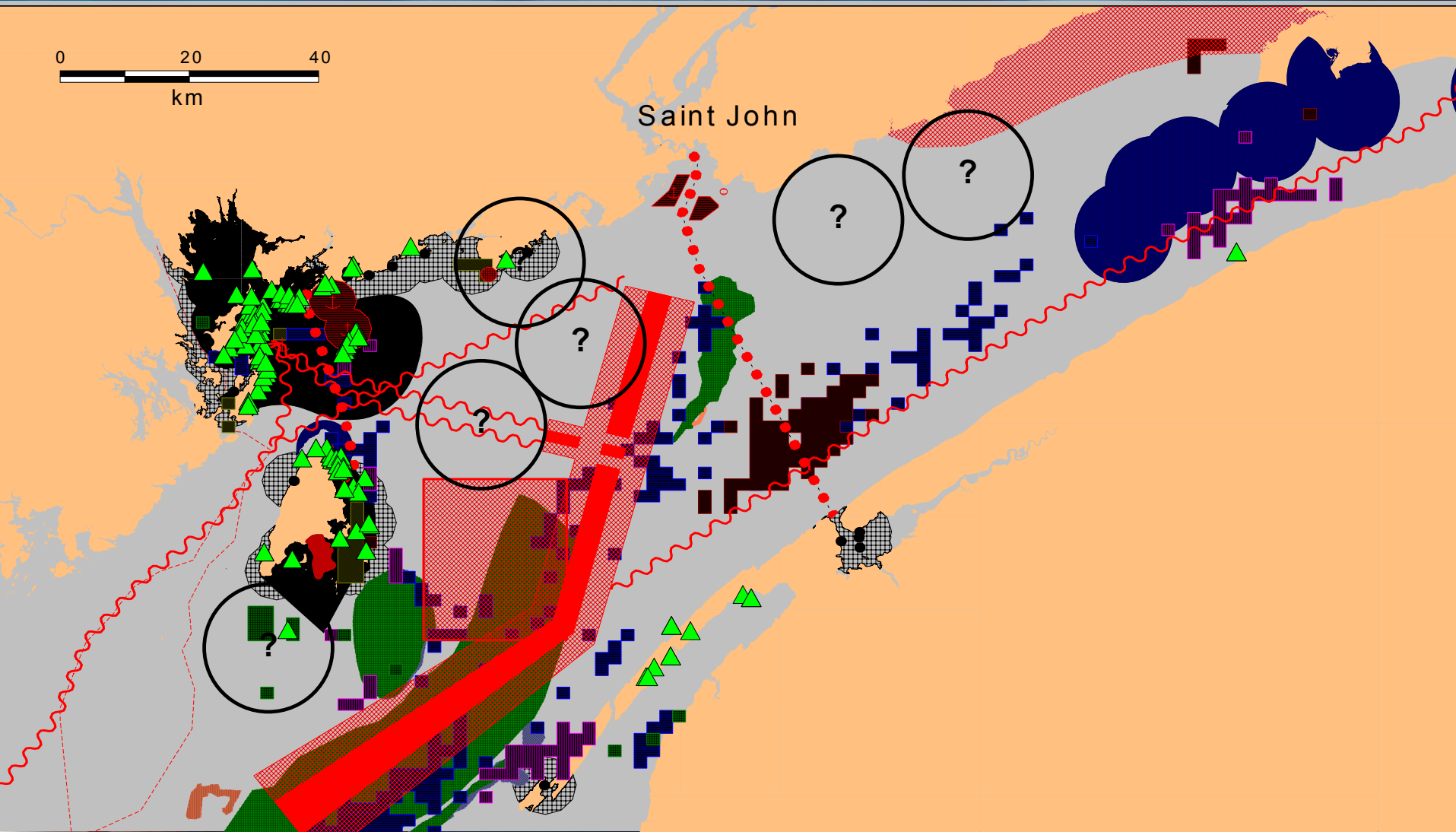


- From the Southern limits of Saint John Harbor to the U.S. border
Approximately 35% of Canada's Aquaculture production occurs in the Bay of Fundy
- The area has a long history of diverse marine resource use
- Aquaculture emphasizes the need for an Oceans management plan to ensure that conflicts are minimized and resources are sustained for present and future generations of Canadians

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Saint John





Decision Support Systems: Sustainable Siting

Marine Finfish Aquaculture Decision Support System

Window

Application Assessment

Save Cancel / Close Print Relevant Web Links

Ecosystem Variables

Have there been shellfish closures in the area? What is the distance from the proposed lease site? No closures = 0.	<input type="text" value="0"/> km	
Are any species (fish or invertebrates) harvested for food or macroalgal beds within 300 m?	<input type="text" value="Y"/> (Y or N)	
Is there a finfish aquaculture lease site within 3 km?	<input type="text" value="N"/> (Y or N)	
Is there a Marine Protected Area, Marine Park or other protected area within 5 km?	<input type="text" value="N"/> (Y or N)	
Are there any endangered fish, mammal or bird species at the site or within 5 km for which mitigation cannot be applied?	<input type="text" value="N"/> (Y or N)	
Is there river discharge into the inlet/bay system or other factors to create stratification at any time in the year?	<input type="text" value="N"/> (Y or N)	
Is there a sill at any location within the inlet/embayment system?	<input type="text" value="Y"/> (Y or N)	
Is there any industry (e.g. pulp and paper, logging, fish processing, marina) within 5 km of the site?	<input type="text" value="N"/> (Y or N)	
How many people live within 1 km of the site?	<input type="text" value="6"/>	
Is there a critical fish habitat (e.g. spawning or nursery area, migration route) at or within 1 km of the site?	<input type="text" value="Y"/> (Y or N)	
Ecosystem Index		

Siting Variables

If the location is within an inlet or bay give the area (headland to headland)	<input type="text" value="2"/> km ²	
LLWV water depth (CHS Chart Datum)	<input type="text" value="20"/> m	
Tidal amplitude (spring tide depth variation)	<input type="text" value="6"/> m	
Mean peak current speed for current meter record duration	<input type="text" value="20"/> cm/s	
Percent saturation of dissolved oxygen in surface water in late summer/early fall months (or annual minimum)	<input type="text" value="100"/> %	
Secchi disc depth	<input type="text" value="4"/> m	
Percent sediment dry weight as silt + clay	<input type="text" value="4"/> %	
Sediment organic matter content (% weight loss on ignition)	<input type="text" value="10"/> %	
Sediment total sulfide	<input type="text" value="90"/> uM	
Sediment Eh potential	<input type="text" value="288"/> mV	
Number of sediment sampling locations in potential lease area	<input type="text" value="7"/>	
Current Meter Length	<input type="text" value="21"/> days	
Site Index		

Decision by EI/SI

Ecosystem Index		<input type="text" value="EI Unacceptable"/>
Site Index		<input type="text" value="SI Acceptable"/>

Net Decision

FRM-40400: Transaction complete: 1 records applied and saved.

Record: 1/1



Successes



- Harmonization and streamlining of regulatory processes between federal and provincial governments
- Integration of Oceans Management plans for industry development thereby minimizing user conflicts and potential environmental effects
- Development of a strong, science based, environmental management framework to promote sustainable development of the sector
- Better understanding of potential cumulative effects and management of the ecosystem



In Conclusion

Ongoing Efforts Include:

- Improving public confidence in the sustainability of the aquaculture production
- Engagement of First Nations, environmental groups, stakeholders and academics in discussions related to aquaculture
- Increasing level of knowledge and investment in science research related to potential environmental interactions, particularly at the ecosystem level
- Continue proactive planning through integrated coastal zone management to decrease user conflicts

