

January—April 2011

Volume 1; Round 1

---



# OCN-Canada Policy Briefs

A PUBLICATION OF THE:

Oceans and Coasts Network (OCN) - Canada

CONTENTS:

**Page 4** | M. Wiber, S. Young & L. Wilson

*Aquaculture-Traditional Fishery Interactions in Southwest New Brunswick:  
Implications for Future Research*

**Page 10** | M. Woodrow

*Overcapacity Issues in the Newfoundland and Labrador Fishery*

MEMBERS OF THE:

## Oceans and Coasts Network (OCN) - Canada



Ocean Management Research Network  
Réseau de recherche sur la gestion des océans

**Canadian Coastal Science And  
Engineering Association (CCSEA)**



**International Ocean Institute - Canada**

The Canadian Operational Centre of the International Ocean Institute



Atlantic Coastal Zone Information Steering Committee



**OCEAN NETWORKS CANADA**

Exploration • Innovation • Action  
for a Changing Planet

A University of Victoria Initiative



## OCN-Canada Background

Several organizations exist at present in Canada with overlapping mandates related to research and the monitoring of policy initiatives related to Canada's oceans and coasts. However, their efforts remain fragmented and largely uncoordinated. In March 2010 representatives of these oceans and coast focused organizations met in Ottawa, ON in a *Oceans and Coasts Networks Summit* to discuss the issues currently confronting their work. This meeting resulted in the formation of the Oceans and Coasts Network Canada (OCN-Canada).

The primary conclusion stemming from this meeting was the agreed upon need for coastal and oceans related groups to work more closely together as a 'network of networks'. OCN-Canada is envisioned to fulfill this role by providing a forum directed toward: (i) establishing greater communication among and across our Network memberships; and, (ii) achieving enhanced unity of purpose and direction within the context of our respective and overlapping mandates.

## OCN-Canada Policy Briefs

This publication is a result of the *OCN-Canada Policy Briefs Program*. Launched in November 2010 by the OMRN, the *OCN-Canada Policy Brief Program* is a joint initiative by all participating members of the OCN-Canada partner organizations and are intended to address fundamental policy issues. The policy briefs reflect the knowledge and views of their author(s) and not any one network. Each brief is subject to peer review and comment by members of the various networks before they are disseminated.

For more information on OCN-Canada and the policy brief program, or to contribute by writing a policy brief, please review the *OCN-Canada Vision Statement* and other documents posted on the OMRN-RRGO website at, [www.omrn-rrgo.ca/smc/home.php](http://www.omrn-rrgo.ca/smc/home.php).

For more information or questions about OCN-Canada please contact:

### Ocean Management Research Network Réseau de Recherche sur la Gestion des Océans

OMRN Network Secretariat	Secrétariat du RRG0
Telfer School of Management	École de gestion Telfer
University of Ottawa	Université d'Ottawa
55 Laurier Avenue East	55, avenue Laurier Est
Ottawa, ON K1N 6N5 Canada	Ottawa, ON K1N 6N5 Canada

(t) 613.562.5800 x.2933

(e) [omrn-rrgo@telfer.uottawa.ca](mailto:omrn-rrgo@telfer.uottawa.ca)

(w) [www.omrn-rrgo.ca](http://www.omrn-rrgo.ca)

# AQUACULTURE-TRADITIONAL FISHERY INTERACTIONS IN SOUTHWEST NEW BRUNSWICK: IMPLICATIONS FOR FUTURE RESEARCH

**Melanie G. Wiber** Department of Anthropology, University of New Brunswick, Fredericton, NB

**Sheena Young** Fundy North Fishermen's Association, St Andrews, NB

**Lisette Wilson** Marine Affairs Program, Dalhousie University, Halifax, NS

## Problem Statement

In the winter of 2009, many lobsters were once again found dead from pesticide poisoning in several locations in Southwest New Brunswick (SWNB). Subsequent testing determined that a pesticide (Cypermethrin) that was not approved for marine use, but could be used to control sea lice in salmon aquaculture, had killed these lobsters. Several other lobster kills followed, and the resulting tension between the two industries reinforced the need for research that targets environmental impacts of aquaculture with respect to the habitat and health of commercial fish stocks. Since 2006, members of the Coastal Community University Research Alliance (CURA), a Maritimes-wide alliance investigating the role of communities in integrated management, have been examining the interaction of finfish aquaculture and the inshore fisheries in SWNB. In order to gain some understanding of the fishermen's local ecological knowledge (LEK) on the problem, and to suggest directions for future targeted science, the Coastal CURA and Fundy North Fishermen's Association undertook a preliminary and small-scale study of ecological change in aquaculture areas as observed by inshore fishermen.

This project investigated fishermen's observations of recent environmental changes in their fishing grounds where aquaculture has been introduced. The study area was a stretch of coastline from Saint John to the U.S. Border and the waters on the New Brunswick side of the island of Grand Manan. This area contains significant habitat for key commercial species, including historic spawning areas for cod (*Gadus morhua*), haddock (*Melanogrammus aeglefinus*), and pollock (*Pollachius virens*) (Graham et al. 2002). It is also important for lobster (*Homarus americanus*) spawning and nursery areas. It contains at least two important herring (*Clupea harengus*) spawning grounds, and several rich scallop (*Placopecten magellanicus*) and sea urchin (*Strongylocentrotus droebachiensis*) beds (Southwest New Brunswick Marine Resource Planning Committee, [bofmrp.ca/home](http://bofmrp.ca/home)). The area also has the heaviest concentration of finfish aquaculture (largely Atlantic salmon, *Salmo salar*) in New Brunswick, and includes aquaculture Bay Management Areas 1, 2a and 3a (see Map).

The data was collected from active inshore, multispecies fishermen, who fish in areas both with and without aquaculture sites. Recruitment was also designed to capture fishermen in three specific areas, as aquaculture in this area of SWNB has been developed in several areas and through several phases of growth. The Deer Island area (including adjacent Letete and Back Bay) has the longest history and the heaviest concentration of sites (see Map). Campobello Island has a number of sites while the Maces Bay area has only recently been allocated aquaculture sites. Thus, two focus groups were conducted on Deer Island, two on Campobello

Island and one in the Maces Bay area. Three participants attended each meeting for a total of fifteen fishermen participated in the five focus groups. The most important species for these fishermen is lobster, followed by scallops, herring, groundfish and other species such as sea urchins. The average years of fishing experience among the fifteen men was 31 years. Two men had over 50 years of experience, four men had over 30 years, four men had over 20 years, three men had over 10 years, and two did not report their years of experience.

Fishermen were asked about any changes they have observed in the marine environment. They were then asked about their theories linking these changes to aquaculture. They were also asked if they thought these changes were affecting their fisheries or fishing practices and in what way. The focus groups took place over a two-week period in October 2010.

## The Opinion

### *Local Ecological Knowledge and Suggested Research Requirements*

Recent LEK literature suggests that fishermen's knowledge can be useful to managers in both data-poor and data-rich contexts (Hill et al. 2010), particularly where multiple users may be leading to deleterious interactions (Heaslip 2008). Fishermen's knowledge is "dynamic as it responds to changing circumstances" and is "time sensitive, location specific and holistic" (Hill et al. 2010:659). As a result, LEK can be used to "prioritize and focus limited scientific resources in the form of a knowledge partnership" (ibid.).

In this study, we adapted the Hill et al. characterization of LEK (see Figure 1), to acknowledge the complex relationship between types of fisher knowledge and the theories they generate about on-the-water observations. Fishermen are not only knowledgeable about fishing behavior, but also about the resources and the environment. In addition, they are knowledgeable about the management regimes that affect them, and of many scientific findings that are discussed at stakeholder meetings in support of various management measures. Finally, in developing their theories, they test much of this information against their ethical guidelines for appropriate behavior. Separating theory from direct observation and experience, as Hill et al. advise, is also an important first step to contextualizing LEK.

Several themes emerged from this study including: loss of species habitat; changes to health of commercial stocks; significant environmental problems and their indicators; displacement from fishing grounds; poor management of aquaculture sites; and the impact on commercial fish stocks. The last theme was organized around specific fisheries

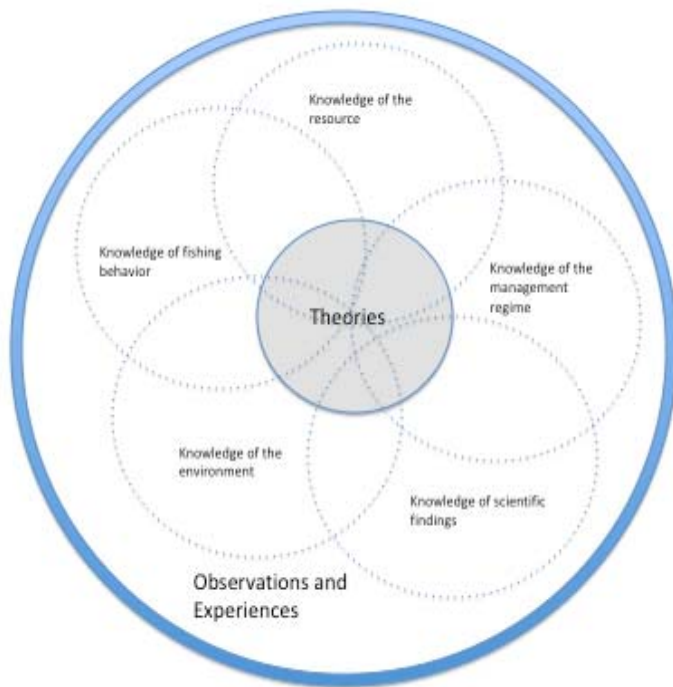


Figure 1. Characterization of Local Ecological Knowledge (adapted from Hill et al. 2010:664). Theories are based on observations and experiences, but components of LEK have various sources.

(lobster, herring, scallop, groundfish, sea urchins). A few fishermen also mentioned shrimp, crab and quahog. In this policy brief, we present only the most commonly reported or consensus response within these themes. A more complete report on findings is available on request. Fishermen’s observations with respect to general environmental change and specific concerns with aquaculture are summarized in Table 1, while concerns with respect to commercial species are summarized in Table 2.

*Fishermen’s Views on General Environmental Change*

Fishermen reported changes in the behavior of a number of marine species in the Bay of Fundy, particularly those that feed on krill or small copepods. Fishermen noted that in the past when the tide and winds were right, large numbers of krill would wash up on the beaches, but this has not been observed for three years. Whales are less frequently found feeding close to shore, and gulls and other birds are not observed feeding on shrimp as was usual in the past. Fishermen theorize that the food chain is being disrupted at the base.

There was consensus among fishermen about other environmental changes in areas of high aquaculture concentration. All fishermen reported loss of habitat for important commercial species. Fishermen reported that “good bottom” is “hard bottom”, or gravel areas, which are preferred by lobster, scallop and sea urchin. In those cases where hard bottom areas have been allocated to

aquaculture, fishermen reported that within two years, commercial species normally common in these areas were no longer found. Berried female lobsters that were regularly found in specific areas disappear once aquaculture is introduced. Herring weir fishermen uniformly reported that herring no longer enter areas close to aquaculture sites.

On the other hand, starfish are said to be more common than in the past. Sea urchin divers reported observing starfish “blooms” around aquaculture sites. These blooms are viewed as a sign of “the end of the fishery” as they are associated with “bad bottom”.

Fishermen report that some species of seaweed seem to be impacted by aquaculture operations, including rockweed, which fishermen believe to be a habitat for juvenile lobster. Green kelp and brown apron kelp are said to be less common in aquaculture areas; sea urchin fishermen reported that in areas without these kelp beds, sea urchin produce less roe.

*Other Concerns with Aquaculture*

*Management of Open Cage Finfish Aquaculture Sites/Feed/Waste/Chemical Substances*

Fishermen reported that aquaculture operations have increased the number of marine hazards. Fishermen from Deer Island and Campobello reported that some aquaculture operators run compensatory lines out hundreds of yards past their grid systems. There have been reports of divers getting caught up in old aquaculture nets or ropes. A few scallop draggers mentioned abandoned aquaculture sites with unmarked concrete anchorage still in place; they are concerned that this hazard will result in deaths or injuries. Fishermen also reported that some beaches and former aquaculture sites are littered with nets left “on the bottom”.

Fishermen also reported that aquaculture operators put materials (feed, chemicals, and disinfectants) as well as aquaculture waste (dead fish, discarded nets, plastics, rope, feed bags, blood water) into the marine environment. Fishermen reported hauling up gear that is entangled with such detritus from aquaculture operations. In the summer of

Environmental Degradation	Bottom around aquaculture cages is “mildewed”, “moldy”, “whitish”, a “dead zone” Aquaculture sites associated with the smell of “sewage” or “rotten fish”
Habitat Loss	Aquaculture has been located in important spawning grounds and/or nursery areas for commercial stocks, especially lobster Loss of overall species habitat for lobster, sea urchin and scallop through placement of aquaculture sites on “good bottom” (ie. hard gravel substrate) Declines of specific kelp (brown, apron) associated with healthy sea urchin with good roe production Declines of rockweed, which is thought to be preferred habitat for juvenile lobster Water clarity suggests loss of zooplankton, krill and other copepods
Change in Predator/Prey Relationships	Increased numbers of starfish observed around aquaculture sites Whales no longer feeding close to shore Herring no longer driven or attracted into near shore areas Krill no longer washing up on beaches Seabirds less frequently feeding on mud flats
Aquaculture Concerns	Operations extend beyond prescribed borders Safety hazards are associated with abandoned sites Aquaculture materials are fouling adjacent waters Appears to be a disregard of regulations such as proper disposal of dead salmon



2010, high salmon fish mortality due to sea lice infestation was said to foul adjacent waters. Scallop fishermen reported hauling up dead salmon in their scallop gear, and theorized that this is because disposal of dead or diseased salmon and of processing waste (‘blood water’) does not always follow regulations for secure land-based disposal. Fishermen believe this may lead to more spread of disease as well as destruction of viable habitat for other species.

#### *Use of Chemicals*

Tests on dead lobster have shown that lobster kills are the result of chemicals not approved for use in the marine environment (French 2010, Rayner 2009, 2010). Fishermen who have invested in lobster holding facilities note that lobster kills in lobster pounds have become frequent after the introduction of aquaculture in their area – lobstermen call this “shrink” (see Map for aquaculture sites located close to lobster pounds). Some lobster pounds have lost their entire holdings of lobsters, while surviving lobsters show symptoms that suggest nervous system dysfunction, including extreme lethargy. One man who owns a lobster pound reported that he has experienced tingling and numbness in his arms and hands after handling dead lobster. Given an ongoing investigation by Environment Canada, pound owners felt it is no longer safe to store lobster in pounds that are adjacent to aquaculture sites. They are concerned about losses on investment.

#### *Discussion*

These environmental changes are consistent with recent findings in other locations in the Canadian Maritimes.<sup>2</sup> Reported changes include broad ecosystem changes (Carroll et al 2003, Cabello 2006, King and Pushchak 2008), changes in the adjacent inshore fisheries, and changes in adjacent coastal communities. Significant eutrophication of waters around aquaculture sites has been recorded in the literature (Carroll et al. 2003, Lotze and Milewski 2004, Heaslip 2008). Other environmental changes as reported by fishermen have not been reported, including loss of kelp associated with good sea urchin roe production, the adverse effects on scallop and sea urchin shells, discoloration of meats and roe, lobster kills and kills of other marine species (crab and shrimp) that have been associated with use of various chemicals.

#### *Changes in General Condition of Commercial Species*

##### *Lobster*

Fishermen uniformly reported that while lobster landings are doing well now, there is concern for the future as the chemicals employed by aquaculture operators to kill sea lice are also fatal to lobster larvae (French 2010a, 2010b, Raynor 2009, 2010). Dead lobster have been found in traps, observed on the ocean bottom by urchin divers and found on local beaches in areas adjacent to aquaculture operations. Fishermen fear that future year classes could show sharp drops as a result of chemical use and due to loss of habitat in nursery areas. Fishermen theorized that it could take seven to eight years to see the impact. As lobster markets have recently been very sensitive to contamination problems, any trace of sea lice chemical in

the lobster could also lead to long-term damage to their industry (Sephton et al. 2007).

##### *Scallop*

Fishermen report that scallops are no longer found in areas with heavy concentrations of aquaculture and that in adjacent areas, there is a noticeable decline of healthy scallop stocks. The meat to shell ratio, quality of meat and the general appearance of shell all appear to be adversely affected by

**Table 2. Summary of Fishermen’s Concerns By Commercial Species**

<b>Lobster</b>	Displacement of lobster fishermen onto remaining fishing grounds leads to crowding
	Sea lice chemicals have resulted in lobster kills
	Lobsters avoid aquaculture sites, especially berried females
	Lobster pounds adjacent to aquaculture sites experience more “shrink” (ie. dead lobsters among those held for market)
	Lobster gear is lost or fouled by aquaculture waste
<b>Herring</b>	Potential for adverse affect on markets given traceability
	Displacement of fishing grounds as formerly productive herring weirs destroyed by placement of aquaculture sites adjacent to weirs
	Lights, odors and noise from aquaculture sites may be deflecting herring schools
<b>Scallop</b>	Herring do not appear to be feeding in the Bay, nor did they reach normal size over the 2010 season
	Displacement of fishing grounds as scallop habitat is lost to aquaculture
	Loss of fishing flexibility as a result of displacement, especially in winter conditions
	Meat to shell ratios are lower near aquaculture operations
	Within two years of aquaculture site establishment, scallop show thin shells and “mildewed” meats
<b>Sea Urchins</b>	Starfish “blooms” near aquaculture sites may prey on scallop
	Loss of kelp beds has resulted in less healthy roe
	Shells are brittle near aquaculture sites
	Roe is increasingly discolored and unmarketable, especially from beds near aquaculture sites
<b>Crab/Shrimp</b>	More dead urchins in beds near aquaculture sites
	Dead shrimp and crabs observed near well boat operations in summer 2010

proximity to aquaculture operations. In Friar’s Bay, for example, where there is now two salmon sites, previously thick scallop shells are now very thin, and appear to have been eroded from the outside, black or discolored matter (described as “mildewed”) is sometimes found inside the shell and thin shells are hard to process (shuck). Fishermen have changed their fishing grounds to avoid such affected scallop areas, but this puts them at greater risk in the winter fishery, since it takes them out of sheltered areas. Fishermen theorize that with starfish blooms there could also be increased predation of scallops.

##### *Herring*

Formerly productive herring weirs and shut off coves in inshore waters close to Deer Island, Campobello Island and Grand Manan are no longer productive or accessible. One fisherman has documented over 67 coves lost to weir fishermen due to aquaculture site placement. Weir fishermen have observed that the herring avoid any areas where there is a trace of aquaculture feed. Fishermen theorize that the smell of feed travels long distances in the water and as herring can sense this, the economic viability of weirs with adjacent aquaculture sites is directly affected.

In addition, fishermen theorize that aquaculture sites block or

deflect the passage of herring schools because of the lights and noise associated with aquaculture operations; their experience is that the herring will take another path, which affects the viability of traditional herring weir locations.

Also, herring weir fishermen reported that in the summer of 2010, herring did not fatten up in the normal way. Fat content on harvested herring normally averages around twelve percent but this year it was averaging around three percent (lean fish are sometimes called “slinks”). Herring are also failing to achieve their normal length and herring caught in weirs did not have to be held in the weir to empty their digestive tracts before going to market for canning or freezing. Fishermen theorized that this is because they have not been feeding.

### *Sea Urchins*

Sea urchin divers reported that sea urchins appear to be less healthy in aquaculture areas. For example, sea urchins near aquaculture cages often have very thin shells and the roe is not a healthy orange color. Sea urchin divers in Deer Island and in Campobello report that they are more frequently finding poor quality roe that is not marketable as it is discolored (grayish/whitish and not vibrant orange). They theorize that the quality of sea urchin roe is affected by proximity to aquaculture sites. Sometimes the roe looks diseased, cancerous, mildewed, or black.

Divers are concerned that sea urchins will also be vulnerable to sea lice chemicals and that the future of the resource stock may be affected by accidental kills, which divers have observed near aquaculture sites. Fewer urchins have good roe production, even where urchin beds are highly populated.

### *Discussion*

This study suggests that more targeted scientific research should examine the relationship between aquaculture and commercial species important to the inshore fishery in the Canadian Maritimes. As in other places in the Canadian Atlantic Provinces, the inshore fishery has been resilient despite dramatic downturns in key commercial stock because lobster, scallop and herring remained viable fisheries. Thus, scientific research is needed into the effects of aquaculture operations on loss of key habitat and consequences for nursery or spawning grounds. Some fishermen reported that they would like to see the aquaculture companies absorbing some of the costs of environmental monitoring, including water quality testing and cumulative impact studies on sediment under the sites and on marine species. Fishermen also suggest that independent socio-economic analysis of the aquaculture industry should be undertaken to assess the real contribution of aquaculture to coastal communities.

Fishermen accept that aquaculture is here to stay, but the consistent message we received from all involved in this study is that aquaculture should be conducted in a sustainable way, and not at the cost of other viable coastal fisheries.

## **Recommendations and Follow Up**

### *Research Needs*

In 2005, the province of New Brunswick recorded total seafood exports at 832 million dollars.<sup>3</sup> Lobster is the most important export by value (401.8 million dollars). Fishermen argue that the significant role of the inshore fishery to the regional

economy should be protected as aquaculture expands in the region (Stephenson 1990). Fishermen feel that more research is needed to better understand the many environmental impacts of finfish aquaculture and its interaction with other commercial species (see Cubbit et al. 2010, Milewski 2001). Little is known, for example, about how the effects of aquaculture on other organisms are mitigated by currents, seawater temperature, season and storm events and management strategies (see Abgrall et al. 2000, Boudreau et al. 1993, Chang et al. 2007, Findlay et al. 1995).

Future targeted research designed with input from fishermen could better address several of their concerns. For example, fishermen want information on the cumulative impacts of repeated use of pesticides and other chemicals (see also Cabello 2006). Fishermen suggest that not only pesticide treatments but also consumption of infeed pesticides be evaluated for impact on commercial species. In particular, fishermen are very concerned with sub-lethal effects of pesticides on lobster. They suggest a long-term study with at least a year or more of monitoring individual animals that are repeatedly exposed to pesticides. With pesticide treatments ongoing, the situation is urgent. In the meantime, use of sea lice chemicals should be rigorously controlled within three kilometers of lobster pounds (see Map).

Aquaculture sites have proven incompatible with herring weirs and research to establish the reasons for this should be carried out. Scientific study should also be undertaken into the significant environmental changes around aquaculture sites (Wu 1995), especially sites of long duration. Studies could target the changes in habitat for berried female lobsters, for lobster mortality, reproductive success and changes in growth rate and development (following on Haya et al 2001). Similar research should target the patterns of change in scallop and sea urchin shells, meat and sea urchin roe.

Also, fishermen are concerned about herring. Herring that enter the bay are not growing during the summer, and are not found with bellies full of krill. Fishermen expressed concern that sea lice pesticides may be killing the copepods on which herring feed. They would like the species that herring feed on to be included in the laboratory studies of pesticide effects.

Fishermen also argue that the aquaculture industry should be monitored (by a responsible third party) and that both federal and provincial laws should be better enforced.<sup>4</sup>

### *The Need for Effective Integrated Management Institutions*

Some fishermen believe that an effective regional integrated management planning process, one that gives local communities a serious say in planning, could resolve some of the conflicts between aquaculture and the inshore fishery (see Lane et al. 2010). A working group that brought the inshore fishermen and the aquaculture industry together to discuss conflicts has met for several years in southwest New Brunswick. This group was effectively at dealing with some problems such as gear entanglements, but has recently foundered through distrust, misinformation, and lack of sound scientific information. The Southwest New Brunswick Marine Resources Planning Committee has also done a great deal of research, and recently filed a report to the provincial government making recommendations. However, at the moment this committee seems to have little momentum for future deliberations. Government support for such grassroots integrated management institutions is vital.

Finally, federal and provincial responsibilities and jurisdiction should be clarified in the light of the February 2009 British Columbia Supreme Court (Morton) decision, and provincial and federal regulatory bodies should work more closely together to effectively resolve environmental issues such as the recent lobster poisonings.

### Endnotes

- <sup>1</sup> In 1996 a similar even is said to have killed 50,000 lobsters in St. George, NB.
- <sup>2</sup> For example, see the Friends of Port Mouton Bay website, [www.friendsofportmoutonbay.ca](http://www.friendsofportmoutonbay.ca).
- <sup>3</sup> See [www.gnb.ca/9999/Industry-Profile-SAG-Report-Annex-EN.pdf](http://www.gnb.ca/9999/Industry-Profile-SAG-Report-Annex-EN.pdf), accessed January 27, 2011.
- <sup>4</sup> For the New Brunswick Aquaculture Act see [www.gnb.ca/0062/PDF-regs/91-158.pdf](http://www.gnb.ca/0062/PDF-regs/91-158.pdf), accessed March 2011. See also the federal *Oceans Act* (1986) and the *Fisheries Act* (1985).

### References

- Abgrall, P., R.W. Rangeley, L.E. Burrige, P. Lawton 2000 Sublethal effects of azamethiphos on shelter use by juvenile lobsters (*Homarus americanus*). *Aquaculture* 181:1–10.
- Boudreau, B., E. Bourget, Y. Simard 1993 Behavioural responses of competent lobster postlarvae to odor plumes. *Marine Biology* 117:63-69.
- British Columbia (Agriculture and Lands), 2009 BCSC 136 Date: 20090209Docket: S083198 Registry: Vancouver.
- Cabello, Felipe C. 2006 Heavy use of prophylactic antibiotics in aquaculture: a growing problem for human and animal health and for the environment. *Environmental Microbiology* 8(7):1137–1144.
- Carroll, M.L., Sabine Cochrane, Reinhold Fielner, Roger Velvin, Patrick White 2003 Organic enrichment of sediments from salmon farming in Norway: environmental factors, management practices, and monitoring techniques. *Aquaculture* 226: 165–180.
- Chang, B. D., F.H. Page, R.J. Losier, P. Lawton, R. Singh, and D. A. Greenberg 2007 Evaluation of Bay Management Area Scenarios for the Southwestern New Brunswick Salmon Aquaculture Industry: Aquaculture Collaborative Research and Development Program final project report. *Canadian Technical Report of Fisheries and Aquatic Sciences* 2722, Biological Station, St. Andrews, New Brunswick.
- Cubitt, Fiona, Kevin Butterworth and Robert S. McKinley 2010 A synopsis of environmental issues associated with salmon aquaculture in Canada. In Keith Culver and David Castle, eds., *Aquaculture, Innovation and Social Transformation*. Springer. Pp. 123-162.
- Culver, Keith and David Castle, editors. 2010 *Aquaculture, Innovation and Social Transformation*. Springer.
- Ernst, W., P. Jackman, K. Doe, F. Page, G. Julian, K. MacKay and T. Sutherland 2001 Dispersion and Toxicity to Non-target aquatic organisms of pesticides used to treat sea lice on salmon in net pen enclosures. *Marine Pollution Bulletin* 42(6):433-444.
- Findlay, Robert H., Les Watling, Lawrence M. Mayer 1995 Environmental Impact of Salmon Net-Pen Culture on Marine Benthic Communities in Maine: A Case Study. *Estuaries* 18(1):145-179.
- French, Edward 2010a Lobster Deaths Raise Questions After Traces of Pesticide Found. *The Quoddy Tides*, February 26, 2010:A1 and 34.
- French, Edward 2010b Fish Farmers Challenged by Sea Lice Outbreaks. *The Quoddy Tides*, September 24, 2010: A1.
- Government of Canada 1996 *Canada Oceans Act*, RSC (1996). Bill C-26, Chapter 31.
- Government of Canada 1985 *The Fisheries Act*, R.S. c. F-14, s.1.
- Graham, Jennifer, Stephen Engle and Maria Recchia 2002 *Local Knowledge and Local Stocks. An Atlas of Groundfish Spawning in the Bay of Fundy*. The Center for Community Based Management, Antigonish, Nova Scotia.
- Haya, K., L. E. Burrige, and B. D. Chang 2001 Environmental impact of chemical wastes produced by the salmon aquaculture industry. *ICES Journal of Marine Science* 58: 492–496.
- Heaslip, Robyn 2008 Monitoring salmon aquaculture waste: The contribution of First Nations' rights, knowledge, and practices in British Columbia, Canada. *Marine Policy* 32:988–996.
- Hill, Nicholas, Keith P. Michael, Allen Frazer, Stefan Leslie 2010 The utility and risk of local ecological knowledge in developing stakeholder driven fisheries management: The Foveaux Strait dredge oyster fishery, New Zealand. *Ocean & Coastal Management* 53:659-668.
- King, Sarah and Ronald Pushchak 2008 Incorporating cumulative effects into environmental assessments of mariculture: Limitations and failures of current siting methods. *Environmental Impact Assessment Review* 28 (8):572-586.
- Lane, Daniel, Wojtek Michalowski, Robert Stephenson and Fred Page 2010 Integrated Systems Analysis for Marine Site Evaluations and Multicriteria Decision Support for Coastal Aquaculture. In K. Culver and D. Castle, eds., *Aquaculture, Innovation and Social Transformation*. Springer. Pp. 255-264.
- Lotze, Heike and Inka Milewski 2004 Two centuries of multiple human impacts and successive changes in a North Atlantic food web. *Ecological Applications* 14(5):1428-1447.
- Milewski, I. 2001 Impacts of Salmon Aquaculture on the Coastal Environment: A Review. In Tlusty, M.F., D.A. Bengston, H.O. Halvorson, S.D. Oktay, J.B. Pearce, and R.B. Rheault, Jr. (eds.) *Marine Aquaculture and the Environment: A Meeting for Stakeholders in the Northeast*. Cape Cod Press, Falmouth, Massachusetts. Pp. 166-197.
- Neis, Barbara and L. Felt, eds. 2000 *Finding Our Sea Legs: Linking Fisheries People and Their Knowledge with Science and Management*. St. John's, NFLD: ISER Books.
- Rayner, Barb 2009 Lobster Fishermen Concerned About Pesticide Use. *Courier Weekend*, June 12, 2009, page A2.



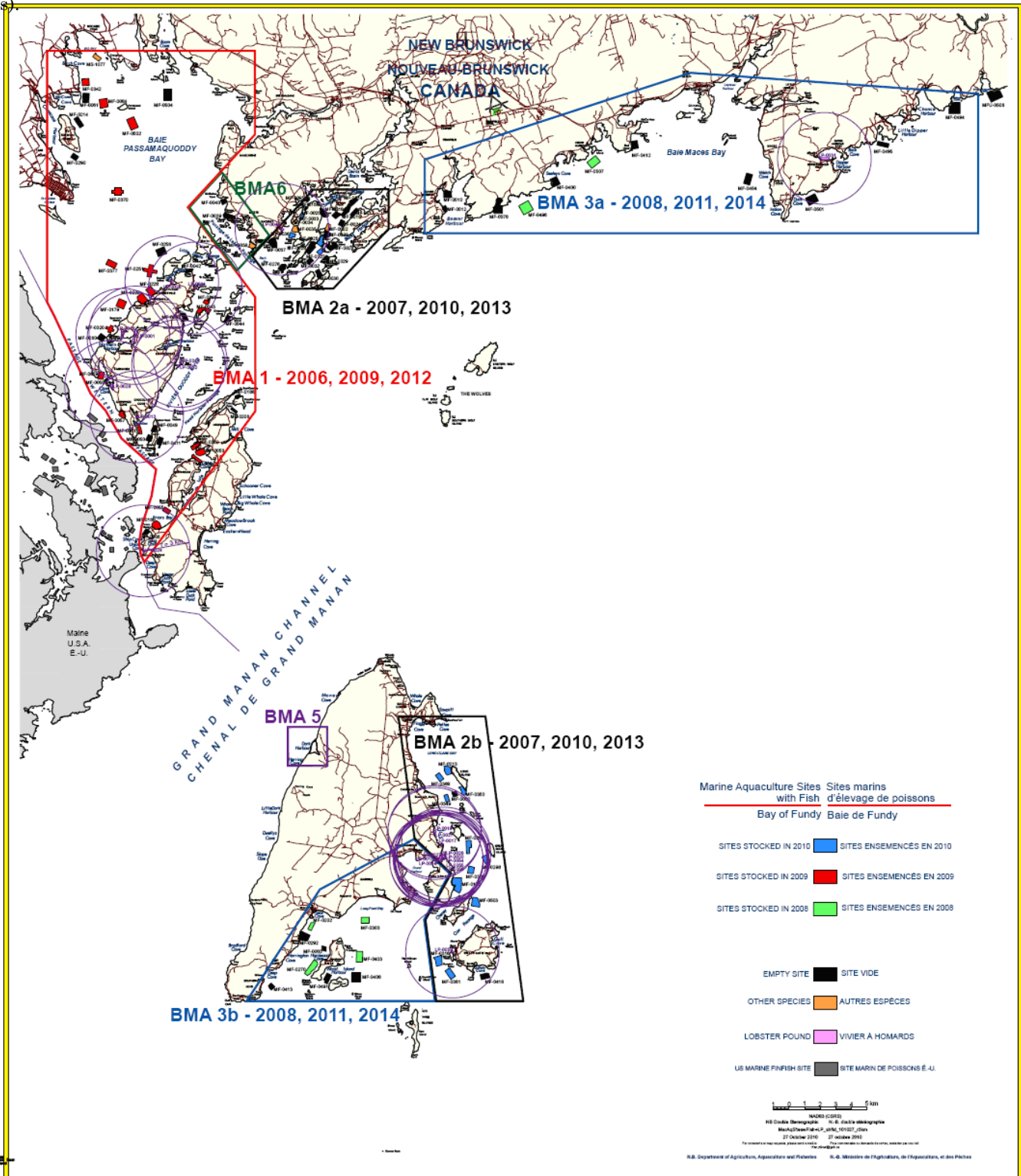
Rayner, Barb 2010 Officials Checking Dead Lobsters. The Saint Croix Courier, January 12, 2010, page 6.

Sephton, D.H., K. Haya, J.L. Martin, M.M. LeGresley, and F. H. Page 2007 Paralytic shellfish toxins in zooplankton, mussels, lobsters and caged Atlantic salmon, *Salmo salar*, during a bloom of *Alexandrium fundyense* off Grand Manan Island, in the Bay of Fundy. *Harmful Algae* 6(5):745-758.

Stephenson, R. 1990. Multiuse conflict: Aquaculture collides with traditional fisheries in Canada's Bay of Fundy. *World Aquaculture*, 21(3): 34-45.

Wu, R.S.S. 1995 The Environmental Impact of Marine Fish Culture: Towards a Sustainable Future. *Marine Pollution Bulletin*, Vol. 31, Nos 4-12, pp. 159-166.

**Map:** Bay of Fundy Southwest New Brunswick marine aquaculture sites with fish stocking dates and within three kilometers of a lobster pound (used with permission from the Province of New Brunswick Department of Agriculture, Aquaculture and Fisheries).



## OVERCAPACITY ISSUES IN THE NEWFOUNDLAND AND LABRADOR FISHERY

**Maureen Woodrow**

woodrow@telfer.uottawa.ca

Telfer School of Management, University of Ottawa, Ottawa, ON

**Derek Smith**

Geography and Environmental Studies, Carleton University, Ottawa, ON

**Kelly Vodden**

Department of Geography, Memorial University, St. John's, NL

### Problem Statement

Overcapacity was raised as an issue in the Atlantic Fishery in each decade since the 1960s, including the Royal Commission on the Economic Prospects of Newfoundland and Labrador in 1969, a provincial study on the future of the fishery published in 1978 (*Setting a Course: A Regional Strategy for the Development of the Newfoundland Fishery to 1985*), and the 1982 Kirby Task Force on the Atlantic Fisheries. Following the cod moratorium and the closure of the cod fishery, the Federal Task Force on Income and Adjustments in the Atlantic Fishery (1993) chaired by Richard Cashin attributed the fundamental problem of the fishery to three issues: overdependence on the fishery, pressure on the resource, and industry overcapacity.

The problem of overcapacity remains a major structural challenge facing the fishing industry in the province of Newfoundland and Labrador. There is no agreement between key stakeholders – the Fish Food and Allied Workers Union (FFAW), the processing sector through the two major producers associations, Association of Seafood Producers of Newfoundland and Labrador (ASP NL) and the Seafood Producers Newfoundland and Labrador (SPNL), and the two levels of government both federal and provincial, regarding how to manage the overcapacity issue within both the fishing fleet and the processing sector. Strategies used in Canada and elsewhere to reduce capacity have included government-funded buy-back and retirement programs, and industry self-rationalization approaches such as enterprise combining and transferable quotas.

This policy brief presents analysis of the issue of rationalization, based on a review of government and other policy documents and various statistical sources, combined with field research carried out in the community of Change Islands, NL during the summer of 2009. Achieving a balance between the use and conservation of marine resources and sustaining vulnerable coastal communities over the long term is the aim of all stakeholders. The goal of this brief is to provide clarity and suggestions for the future.

In October 2006, the federal and provincial governments released a discussion paper on Fishing Industry Renewal (Newfoundland and Labrador, 2006). The report outlines the external and internal challenges to the industry. External challenges included the increased value of the Canadian dollar; greater competition; unstable market prices; and tariffs and other market barriers. Among the internal or domestic challenges, the report highlighted problems with resource fluctuations and decline; the seasonality of employment; lack of dependability and the timing of supply; and marketing problems including distress selling. Overcapacity in the harvesting and processing sectors was also highlighted.

In April 2007, a joint Ministerial press release from the Federal Minister Loyola Hearn and the Provincial Minister Tom Rideout announced the outcomes of the fishing industry renewal strategy with a number of policy changes and new investments for the industry.

The commitment to the preservation of the inshore fishery of both Ministers responsible led to the implementation of measures such as enterprise combining, allowances for larger vessel length, workforce adjustment measures, improved access to financing and capital gains exemptions allowed the fleet to rationalize itself. This led to the exit of 400 fishing enterprises or 5% of the total fleet. Other measures targeted the elimination of trust agreements to enhance the independence of the inshore fleet. The provincial government also set up a special review to consider ways in which a seafood marketing council could help address the key marketing challenges faced by the Newfoundland and Labrador fishing industry (aquaculture excluded). The Seafood Marketing Review Panel Report of the Chair released in February 2008 recommended the establishment of a Seafood Marketing Council for the province since there were too many processors, too much dependence on brokers and inadequate promotion and positioning of the products. Results, from a mail in vote during the month of January 2009 were released on 14 February 2009, revealed that the industry did not accept the proposal and the province has not acted unilaterally on the recommendation. In July 2009 an MOU was signed by the FFAW, ASP and the government of Newfoundland and Labrador (Federal government choose not to participate) “*to provide the level of analysis required to inform the debate on the rationalization and restructuring of initiatives necessary to ensure long term stability of the province’s fishing industry*” Four working groups (financial analysis of fishing industry, seafood marketing strategy, rationalization of harvesting sector and rationalization of processing sector) and a six member steering committee with an independent chair were established to oversee the implementation of that fishing Industry Renewal Strategy. The committee reported in late February 2011 and recommended a reduction of between 30-80% depending on the sector of the fishing industry involved and the establishment of a seafood marketing council (Newfoundland and Labrador, 2011). In spite of the fact that the provincial government in conjunction with the FFAW and ASP were signatories to the document and participated in the various working groups no one seems to be happy with the end product. The human dimensions of these cut back for example up to 80% in the inshore fishery in certainly coastal area was not addressed. Does rationalization of the fishery mean, as it does for example in Norway and British Columbia, concentration of benefits in the hands of a few enterprises in fewer communities? The report is a well done one but the sad reality is that it is yet another missed opportunity to develop a

plan for a future sustainable fishery for rural Newfoundland and Labrador.

An announcement of government rationalization, renewal or restructuring of the fishing industry to improve its efficiency is rarely a positive one for fishers. It signals another regulation designed to frustrate and eventually get rid of them. As of the summer of 2009, there were 34 fishers in Change Islands, 23 core and 11 additional level 1 or Level 2 workers, who act as crew on fishing boats. The Change Islands fish plant was leased for a three-year period (2008-2010) to Seabay Fisheries but operations were limited in the summer of 2009. However, in the 2008-2010 operations permitted approximately thirty plant workers to obtain unemployment insurance. Rationalization, renewal or restructuring of the fishing industry (interchangeable terms for harvesters) was mentioned by those interviewed as being one of the major concerns in the inshore fishery. Fishers on mid-sized boats in Change Islands considered themselves to be part of the inshore fishery since they live in and fish from the community. Most felt that renewal not only implied more downsizing efforts on the part of governments but also represented a conscious effort to destroy their communities. Further, fishers felt that each new policy or regulation is tagged onto previous ones without any vision of the future of the fishery and fishing communities.

Harvesters suggested that government policy favors larger vessels. A disproportionate reduction in the number of inshore fishers, without measures to restrict further capitalization among those remaining, may have significant impacts on employment and the viability of fishery-dependent coastal communities without corresponding reductions in industry capacity. Various studies of rationalization policies and programs demonstrate that the equity implications are often not taken into account, highlighting the importance of considering how different groups will be affected (i.e. who wins and who loses) by rationalization policies and measures in Newfoundland and Labrador.

Harvesters interviewed were concerned about the union and many felt that it no longer represented the inshore fishers – FFAW's interests are now focused on fishers in larger vessels and the 'big time' processors. The inshore fishers who gave life to the union, they suggest, no longer have a voice within it. The youngest core fishers on Change Islands are 40 years of age, and they see themselves as the end of the line. The future of the fishery and community are uncertain.

## Opinion

As a result of the problem statement and analysis above, and in consultation with the inshore fishermen of Change Islands, it is our opinion that what are needed to address the issue of rationalization of the fishery are the following:

*Develop a vision for the fishery of the future* – It has been nearly 20 years since the 1992 Northern Cod Moratorium. All parties involved should develop a common sustainable vision for the industry's future. Whether the type of fishery is industrial, small scale/artisanal, commercial, or traditional/subsistence, managed through total allowable catches, using individual transferable or community based quotas, or days at sea, an organized discussion and presentation of the governance framework by which the fishery is managed is advised to ensure the management objectives support the vision.

*Regional balance* – Efforts to downsize the inshore fishery should balance the demographics of those in the fishery, including harvesters and processors in each NAFO region in the province, with due concern for regional equity. The provincial government recognizes the notion of regional balance but presents no statement of how to put into action. Concepts such as regional fish plants and regional quotas as in the example of the St. Anthony Basin Resources Inc (SABRI) should be examined.

*Co-management mechanisms* – DFO has been criticized for its top-down management style. Its commitment to co-management is clearly stated but what this means in terms of fisheries is far from clear. If harvesters want to play an active role in how the fishery is managed, how can this be done while respecting the vision chosen for the future of the inshore fishery? It is time that DFO passed some of its responsibilities and authority to people involved in the (local) industry as well as rural communities who depend on it. Science decisions regarding species status and conservation measures are critical and must remain the foundation for a future management framework. Examples of co management do exist in eastern Canada for example in parts of Quebec and New Brunswick the crab fishery is managed through an integrated fisheries management plan.

*Inclusive process* – Some mechanisms have to be put in place to ensure that stakeholders at both government and regional levels are involved. It is difficult to see how the process can be successful without federal government participation but also the voice of the communities, independent processors and inshore fishers must be included. If there is to be a future for the fishery, youth participation is critical.

*Innovation* – Rules and regulations are often inflexible and allow little room for innovation – more partnerships with governments and more creativity within both the inshore/community fishery and the offshore fishery are needed. More local involvement would permit the fishery to evolve and adapt to local conditions. This may be the last opportunity to redefine a fishery that respects not only its attachment to community but also the chance for a livelihood for those who remain in the industry. The fishery remains the key to the survival of much of outport Newfoundland and Labrador.

## Recommendations

This *OCN-Canada Policy Brief* on Overcapacity Issues in the Newfoundland and Labrador Fishery seeks to build upon community knowledge to mobilize and improve management measures for local inshore fisheries. The *OCN-Canada Policy Brief* is intended to provide policy inputs and knowledge dissemination on aspects of fisheries and coastal community viability outlined below.

In 2004, fish harvesters of Change Islands reported that their key issues facing the inshore fishery today, and the term "rationalization of the fishery" often came up. For Change Islanders, "rationalization" represents a multifaceted effort to eradicate small-scale fish harvesters in favor of larger, corporate fishing enterprises. Not only are individual livelihoods at stake in their view, but also the traditions that go along with them, the cultural heritage they represent, and even the survival of coastal communities in the province. Achieving a balance between the use and conservation of marine resources and sustaining vulnerable coastal



communities over the long term is the aim of all stakeholders. To this end, it is recommended to:

- organize discussion and presentation of the governance framework by which the fishery of the future is to be managed
- define and operationalize “co-management” whereby local communities and fisheries groups realize an increased authority to act in their best interests, and
- encourage innovative fisheries co-management projects to emerge at the community level that promotes local sustainable fishing practices from ocean to plate.

### Follow-up

Realizing the above recommendations for the inshore fishery requires the involvement of the Province of Newfoundland and Labrador, Fisheries and Oceans, Canada, and community members. As a follow up, the following time frame for action is recommended:

Action 1: Monitor the results of the Steering committee established to implement the fishing industry renewal strategy to ensure that the interests of inshore fishery and their rural coastal communities are taken into account.

Action 2: The Federal Government is not a partner in the MOU signed in mid July 2009 and the subsequent Steering committee established for implementation. Every effort should be made to ensure active federal participation in any strategies agreed upon by negotiating parties.

### References

- Fisheries and Oceans Canada. 1993. *Charting a New Course: Towards the Fishery of the Future* (Final Report). Task Force on Incomes and Adjustment in the Atlantic Fishery. Communications Directorate, Ottawa.
- Fisheries and Oceans Canada. 2007. Renewing the Newfoundland and Labrador Fishing Industry. News release, 12 April 2007. Available at: [www.dfo-mpo.gc.ca/media/npress-communique/2007/nl-tnl12-eng.htm](http://www.dfo-mpo.gc.ca/media/npress-communique/2007/nl-tnl12-eng.htm).
- Kirby, M. 1982. *Navigating Troubled Waters: A new policy for the Atlantic Fisheries*. Report of the Task Force on Atlantic Fisheries, December.
- Newfoundland and Labrador. 1978. *Setting a Course: A regional Strategy for the Development of the Newfoundland Fishery to 1985*.
- Newfoundland and Labrador. 2006. Fishing Industry Renewal Initiative: A Discussion Paper. Canada-Newfoundland and Labrador, St John's, NL. Available at: [www.fishaq.gov.nl.ca/publications/index.html](http://www.fishaq.gov.nl.ca/publications/index.html).
- Newfoundland and Labrador. 2011. Fishing Industry Rationalization and Restructuring. Report of the Independent Chair: MOU Steering Committee. 75p.
- Final Report of the Fish Processing Policy Review (Eric Dunne, 2003).
- New Beginnings: Bringing Stability and Structure to Price Determination in the Fishing Industry. Report of the Task Force on Fish/Crab Price Settlement Mechanisms in the Fishing Industry Collective Bargaining Act (1998).
- Report of the Chairman RMS Review Committee (Richard Cashin, 2005).
- Report of the Special Panel on Corporate Concentration in the Newfoundland and Labrador Fishing Industry (Leslie Dean, 2002).
- Seafood Marketing Review Panel Report of the Chairman (Alexander Roche, 2008).
- Fisheries and Oceans Canada news releases and Ministerial Statements dating back to 2003, are available at: [www.dfo-mpo.gc.ca/media/news-presse-eng.htm](http://www.dfo-mpo.gc.ca/media/news-presse-eng.htm). Key reports include:
- Fisheries and Oceans Canada, 2007. Renewing the Newfoundland and Labrador Fishing Industry. News release, 12 April 2007.
  - Associated backgrounders on Canada-Newfoundland and Labrador Fishing Industry Renewal Changes to DFO Vessel Replacement Policy and Canada-Newfoundland and Labrador Fishing Industry Renewal – Fleet Self-Rationalization Enterprise Combining.
  - Implications of the *Saulnier* decision for DFO Licensing Policies (December 2009).
- Annual statistics on the number of fishing licenses and species quotas, catches, and landed value for the commercial fishery for Newfoundland and Labrador and other provinces are available dating back in some cases to the 1980s from the Department of Fisheries and Oceans website at [www.dfo-mpo.gc.ca/stats/commercial-eng.htm](http://www.dfo-mpo.gc.ca/stats/commercial-eng.htm).
- News releases and links to reports from the Province of Newfoundland and Labrador on various aspects of the fish processing industry dating back to 1996 are available online at, [www.releases.gov.nl.ca/releases/](http://www.releases.gov.nl.ca/releases/) and include:
- Media Advisory: Ministers Hearn and Rideout to Announce Outcomes of the Fishing Industry Renewal Initiative Renewing the Newfoundland and Labrador Fishing Industry April 2007: [www.releases.gov.nl.ca/releases/2007/faq\\_n2007.htm](http://www.releases.gov.nl.ca/releases/2007/faq_n2007.htm)
  - Agreement Reached on Long term Development of the Fishing Industry 14 July 2009: [www.releases.gov.nl.ca/releases/2009/fishaq/0714n06.htm](http://www.releases.gov.nl.ca/releases/2009/fishaq/0714n06.htm)
  - [www.fishaq.gov.nl.ca/publications/annual\\_report08\\_09.pdf](http://www.fishaq.gov.nl.ca/publications/annual_report08_09.pdf)
  - [www.fishaq.gov.nl.ca/publications/annual\\_report\\_2007\\_08.pdf](http://www.fishaq.gov.nl.ca/publications/annual_report_2007_08.pdf)
  - [www.fishaq.gov.nl.ca/publications/archives/annual\\_report06\\_07.pdf](http://www.fishaq.gov.nl.ca/publications/archives/annual_report06_07.pdf)
  - [www.fishaq.gov.nl.ca/publications/archives/finalannualreport05.pdf](http://www.fishaq.gov.nl.ca/publications/archives/finalannualreport05.pdf)
  - [www.fishaq.gov.nl.ca/publications/archives/finalannualreport04.pdf](http://www.fishaq.gov.nl.ca/publications/archives/finalannualreport04.pdf)
  - [www.fishaq.gov.nl.ca/publications/archives/annual\\_report03.pdf](http://www.fishaq.gov.nl.ca/publications/archives/annual_report03.pdf)

### Resources

Numerous recent and archived reports published by the Department of Fisheries and Aquaculture of the Province of Newfoundland and Labrador that deal with issues raised in this policy brief are available at [www.fishaq.gov.nl.ca/publications/](http://www.fishaq.gov.nl.ca/publications/). Some of the key reports include: