

**Consultations on
Ecosystem Overview and Assessment Report (EOAR)
for the Northumberland Strait**

February 28, 2006



Report on Consultations

Prepared for:

The Northumberland Strait Ecosystem Initiative Working Group

By:

GTA Consultants

ACKNOWLEDGEMENTS

GTA consultants would like to thank everyone who took the time to express their views on the state of the marine resources and environment of the Northumberland Strait through the consultation meetings, or through oral or written submissions. We believe that the points raised are extremely important. There is in fact a broad consensus that significant new efforts are needed to reduce threats to the Strait ecosystem that are serious and advanced.

GTA Consultants would also like to thank the Members of the Northumberland Strait Ecosystem Initiative Working Group and the following individuals for their valuable contributions to planning, organization, facilitation and/or report production for these consultations:

- For the organization and conduct of the New Brunswick consultations:
 - ✧ Patrick Emond, Bassin Versant de Cap Pelé
 - ✧ Eric Arsenault, Maritime Fishermen's Union
 - ✧ Bernadette Robichaud, Office Manager, GTA Consultants
- For the organization and conduct of the Prince Edward Island consultations:
 - ✧ The organizing committee
 - Ed Frenette, PEI Fishermen's Association
 - Irene Novaczek, Institute of Island Studies, University of PEI
 - Tim Hainer, Maritime Aboriginal Aquatic Resources Secretariat
 - Barry MacPhee, PEI Department of Agriculture, Fisheries and Aquaculture
 - Laura Fanning, UPEI
 - Florence Larkin, Project Coordinator
 - ✧ Facilitators and Recorders

<ul style="list-style-type: none"> ▪ Irene Novaczek ▪ Tim Hainer ▪ Laura Fanning ▪ Florence Larkin, Project Coordinator ▪ Arja Page ▪ Sandy Kowalik 	<ul style="list-style-type: none"> ▪ Judy Gallant ▪ Frances White ▪ Leah MacLeod ▪ Margie Loo ▪ Judy Bayliss
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- For the organization and conduct of the Nova Scotia consultations:
 - ✧ Kay Wallace, Coordinator, Gulf Nova Scotia Fleet Planning Board
 - ✧ Ronnie Heighton, President, Gulf Nova Scotia Fleet Planning Board
 - ✧ Karen Lam, Administrator & Researcher, PRAXIS Research & Consulting Inc.

- For coordination, resource persons and technical advice:
 - ✧ Dave Dunn, Oceans and Habitat, Gulf Region DFO
 - ✧ Pierre Mallet, Oceans and Habitat, Gulf Region DFO
 - ✧ Wade Landsburg, Oceans and Habitat, Gulf Region DFO
 - ✧ Delly Keen, DFO
 - ✧ Krista Peterson, Communications, Gulf Region DFO
- Regional coordination and report production
 - ✧ Gilles Thériault, President, GTA Consultants en pêche, Moncton, NB
 - ✧ Hank Scarth, Consultant, Moncton, NB
 - ✧ Rick Williams, President, PRAXIS Research and Consulting Inc., Halifax, NS

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EXECUTIVE SUMMARY

In response to dramatic declines in commercial fish landings in recent years, in the spring of 2005 the Department of Fisheries and Oceans (DFO) brought together key stakeholder groups and government agencies to establish the Northumberland Strait Ecosystem Initiative (NSEI) Working Group. The Working Group subsequently agreed on an action plan to address the problems in the Strait. The first major task was the development of an Ecosystem Overview and Assessment Report (EOAR) to bring together all the available knowledge about the Strait ecosystem as a basis for identifying both appropriate action steps and knowledge gaps where new research is required. Work on the EOAR will begin in March 2006 and be completed by March 2007.

To assist in preparing clear terms of reference for the upcoming EOAR, the Working Group initiated a series of public consultations in communities around the Strait in the period from December 2005 to February 2006. Stakeholders were asked to provide input on the nature, extent and causes of the changes they observe in the Strait ecosystem, and to share their views on priorities for new research and remedial action. Over 200 people participated in the 13 consultation sessions. Members of the public also submitted written presentations to the Working Group.

This report presents summaries of the information and ideas presented by stakeholders in the consultation sessions and through other communications.

OUTCOMES OF THE CONSULTATIONS

Participants in the consultation meetings identified a wide range of issues related to the environmental health of the Northumberland Strait. Many expressed profound concerns about the future of fisheries and of other commercial, cultural and recreational activities occurring in and along the Strait. They provided important insights into the causes of environmental degradation and fisheries decline as well as advice on solutions and research needs.

As a general statement, it can be reported that participants believe that the Northumberland Strait is an ecosystem that, by its very nature, is particularly vulnerable to stresses from human activity. They also believe that the health of the Northumberland Strait ecosystem is failing rapidly and that meaningful and prompt intervention is essential.

Stakeholders described many serious impacts of the decline of the fisheries in terms of loss of fishing enterprises and employment, the accelerating out-migration of young people from the region, falling living standards and increased stress within families, and loss of socio-economic viability for many coastal communities.

Stakeholders from around the Strait reported that water quality is deteriorating and that this trend is accelerating. They also noted dramatic increases in sediment build-up and in the presence of suspended solids in the Strait. In combination, these changes are seen to be having profoundly negative impacts on fish populations and habitat in the Strait and its tributaries, estuaries and bays. Participants in the consultations also shared their observations regarding climate change, invasive species and expansion of predator populations -- all factors that they believe are compounding the stresses on the local ecosystem.

Stakeholders identified what they see as the key threats to the ecosystem. Most felt that the construction and placement of the Confederation Bridge has had significant impacts on the ecosystem, noting that the fish stock declines began at the time of construction and have continued since. The Strait of Canso and Pictou Harbour causeways and the Boat Harbour abatement facility were also identified as critical situations where thorough impact assessments are needed.

There were two key problem areas where almost all groups indicated that new research and remedial action should be undertaken on a high priority basis:

- Changes to the seafloor in the Strait and general build up of sediments related to the Bridge, more extensive coastal erosion, and changes in tides and current flows;
- Increased contaminants in the water column related to runoff and effluent from land-based activities.

There were some issues where almost all stakeholders held strong views but where there were important differences of opinion. Chief among these is the question of the extent to which over-fishing and particular fishing methods have contributed to the decline of fish stocks in the Strait. There was general agreement however that the EOAR should evaluate conservation methods and recommend a coherent strategy to rebuild stocks and establish sustainable harvesting levels.

Stakeholders frequently expressed frustration with a lack of focus and commitment by government on the problems in the Strait. They describe a lack of political will

to enforce pollution and effluent controls, to regulate and control farming and forestry practices, and to promote conservation in the fishery. It was frequently asserted that government too often makes decisions based on short-term economic objectives at the expense of the long-term health of the ecosystem. Participants also noted that government action is sometimes constrained by disagreements and competition among fish harvesters and other groups.

First Nations communities and Aboriginal peoples' representative organizations emphasized the need to manage the natural environment as an integrated system for the benefit of many generations to come. They pointed to the need for all stakeholders and users of the Northumberland Strait to have a respect for their living environment and its finite resources. Like other stakeholder groups, they called for continuing consultations during the actual EOAR process and for a meaningful role in planning and implementing subsequent action steps.

Most participants expressed support for the Northumberland Strait Ecosystem Initiative and for the upcoming EOAR. They emphasize, however, that time is running out for the Northumberland Strait ecosystem and therefore for the people who depend on the Strait for their livelihoods and their way of life. There is a clear demand for meaningful and immediate action, for a transparent process, and for effective collaboration among all the stakeholders.

1. INTRODUCTION

1.1. The Consultation Process

This report has been prepared under the auspices of the Northumberland Strait Ecosystem Initiative Working Group (NSEIWG). In August 2005, the Working Group decided that a thorough consultation with community stakeholders would be an essential undertaking in support of the preparation of the Northumberland Strait Ecosystem Overview and Assessment Report (EOAR). The Working Group concluded that an up-to-date record of the observations, views and advice of those interested in the environmental health of the Strait would assure that those working on the EOAR were fully informed of the issues and, consequently, all of these issues would be considered in the preparation of the EOAR.

1.2. The Engagement Process

In all, 13 consultations were held in communities around the central Northumberland Strait. They were preceded by a promotional campaign involving news releases, media interviews and paid advertising of meeting times and places. Additionally, personal contact was made with key stakeholder and Aboriginal organizations by telephone, letter or email. Appendix B lists the meetings held during the consultations, noting the target audiences.

Provincial Coordinators led off the meetings with overview presentations of the Northumberland Strait Ecosystem Working Group (NSEI) and the EOAR process. Participants were then invited to speak to changes they had observed in the ecosystem, to discuss the impacts of these changes on communities and resource users, and to offer their views regarding possible causes and potential solutions. They were also asked to identify important research and consultation priorities that should proceed immediately, noting that resources for this purpose were available in the short-term. The meetings were structured to gain views and opinions, and not to debate whether individuals' observations or conclusions were correct. Detailed notes were kept and meeting reports were prepared. The meetings on PEI also featured brief introductory overviews by three representatives of the local aquaculture, fishery and Aboriginal organizations, as well as the use of smaller facilitated working groups.

The public was also invited to submit written or verbal presentations to the Regional Coordinator. In total, 14 written submissions were received. An overview of each presentation can be found in Appendix C. Additionally, some people contacted the Regional Coordinator by telephone to pass on their views. The points raised in these submissions and conversations have been integrated into this report.

Over 200 people, representing themselves or a wide array of fishery, agriculture, watershed groups, environmental and other NGOs, industrial sectors, municipal, provincial and federal governments, etc., took part in the 13 meetings or submitted written or verbal presentations. Appendix A of this report provides a compendium of all the issues raised and discussed during the 14 meetings, as well as from written and verbal submissions. Reports from each of the consultation meetings held are available through the Northumberland Strait Ecosystem Initiative Working Group web site at: www.glf.dfo-mpo.gc.ca/sci-sci/northumberland/index-e.jsp. The reports and the written submissions can be obtained by contacting Mr. Pierre Mallet at the address below. These reports provide information on the number of participants from the various communities of interest. They also make it possible to link the specific observations and views captured in this report with the sector making the points.

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2. POINTS OF BROAD AGREEMENT OR CONCERN ON ISSUES AND ACTION PRIORITIES

In this section the consultants provide a summary overview of the main themes or points of emphasis from the consultations to date. In some instances there is broad consensus on the importance of an issue, research need or action priority. In other cases there are different points of view, and some disagreement, but virtually all participants identify the topic as one that must be addressed by the EOAR.

In identifying these themes or areas of common concern, the consultants do not suggest that particular issues or action priorities that were not broadly supported were less important or less relevant to the overall inquiry. The purpose is simply to recognize that some points are more widely emphasized than others, and that they seem to reflect concerns or points of view that are shared across a wider community of stakeholders. Readers are urged to read through the more detailed summaries of stakeholder input presented in Appendix A.

2.1. Process and Implementation Issues

2.1.1. The EOAR Process

- It appears to the consultants that there is broad acceptance of the EOAR approach; i.e., stakeholders understand and support the value of pulling together and synthesizing all the available information in a systematic way to identify what is known and not known. Given the complexity of the ecosystem issues in the Strait, they accept that this is, over the longer term, an effective way to develop action plans based on the available evidence, and to set out research priorities to fill strategic knowledge gaps.
- Participants also understand that action on ecosystem issues in the Strait is of necessity a multi-stakeholder undertaking, and that the development of the Working Group and completion of an EOAR are essential steps in building the capacity to address these problems over the longer term.
- Many participants in the consultations feel that immediate action is needed on certain high priority issues without waiting for completion of the full EOAR. There are two issues in particular where the majority of participants want to see new research and perhaps remedial action in the short-term:

1. Bathymetric mapping, measurement of suspended solids and other research to assess changes to the Strait resulting from coastal and up-stream erosion and from scouring and sedimentation related to the construction and operation of the Confederation Bridge. Immediate remedial action around the piers of the Confederation Bridge (e.g., placement of armour rock) may be justified;
 2. Measurement of the impacts on water quality and subsequently on fish abundance and reproduction rates resulting from run-off of fertilizers, herbicides, pesticides, human or animal waste and other contaminants generated by onshore activities. Participants emphasized the need to conduct such research during critical periods in terms of farming and forestry activities and the migratory and reproductive cycles of fish species.
- Reflecting general concerns about the credibility and transparency of the process, there was strong emphasis by fish harvesters and other groups on the need for constant and effective communication of research plans, activities and outcomes to stakeholders, and for research methods that optimize stakeholder participation in data collection, analysis and interpretation. Linked to this is an emphasis on the value of utilizing the traditional knowledge and experiential observations of fish harvesters and other long-time users of the Strait environment.

2.1.2. Governance, Lines of Responsibility, Jurisdiction, Capacity to Manage the Ecosystem

- In their economic development decisions governments must place greater priority on environmental protection, enhancement and sustainability and not sacrifice these objectives for short-term employment goals.
- Government should adopt the precautionary principle in considering both fisheries management plans and other economic development initiatives that impact on the Strait ecosystem.
- All government agencies involved in managing fisheries and in environmental protections must enforce current regulations and standards.
- Environment Canada, Public Works Canada and the Department of Fisheries and Oceans must become visible and proactive in addressing the issues.
- There must be better coordination and cooperation among government agencies, between government agencies and stakeholder groups, and among the stakeholder groups themselves.

- Governments have a responsibility to consult First Nations and to involve them in decision-making that impacts on their territories and rights.
- Conflict and competition among fish harvester groups is a serious constraint on fisheries conservation and orderly management. Harvester organizations and governments must work harder to promote better communications and a more cooperative spirit among harvester communities.

2.2. Socio-Economic Impacts

- The current process to review the state of the Northumberland Strait ecosystem was initiated because of concerns about the fishery. Statistical data provided by DFO reveals the scale of the fishery collapse in the Strait. The following table shows the decline in landings of lobster between 1990 and 2003.¹

Zone	Landings 1990	Landings 2003	Per Cent Change
1 Western Strait	4,100	2,200	- 46%
2 Central Strait	1,800	700	- 61%
3 Eastern Strait	1,500	750	- 50%

- Lobster is the most important fishery in the Strait, and the sharp fall-off in landings has impacted heavily on enterprise viability in the industry. The following DFO data on licenses, gross incomes from fishing and operating costs in 2003 reveals that the majority of inshore enterprises are operating at a financial loss.

Zone	Number of Licenses	Income per Licenses	Operating Cost
1 Western Strait	533	\$38,907	\$41,189
2 Central Strait	251	\$22,457	\$41,189
3 Eastern Strait	201	\$40,651	\$41,189

- Participants in the consultations described the serious impacts of these trends on the fish harvester themselves, their families and their communities.

¹ Zone 1 includes lobster districts 75, 76, 77 and 82. Zone 2 includes districts 78, 80, 45, 46, 10, 83 and 85. Zone 3 includes districts 11, 12 and 86.

- ✧ Things are currently at a critical stage in terms of survival of the inshore fishing industry. Several fishery-dependent communities lost half or more of the vessels operating out of their harbours over past 15 years.
- ✧ Many harvesters cannot hold out much longer and are looking for a way out, but their children are less willing to take over to keep the business going.
- ✧ The impacts of reduced landings on fishing enterprises are made worse by sharp rises in fuel prices, license fees and other operating costs.
- ✧ Fishing families are under stress because of falling incomes and family members having to work out of the province for several months to bring money home.
- ✧ There is a lot less work in fish processing as well as harvesting.
- ✧ Young people are leaving the communities, many leaving the region, to find less seasonal, better-paying work, or to pursue careers that have a future.
- ✧ It is more and more difficult to find crew to go fishing.
- ✧ Institutions such as churches, schools, recreation facilities and co-op stores are losing their viability because of lack of money in the community and the outflow of young people.
- ✧ Older fish harvesters want to retire, but cannot afford to because of the falling value of their enterprises when they go to sell out.
- ✧ The decline of the Strait ecosystem will also have negative impacts on the tourism industry because of poor water quality, erosion of beaches and other changes.
- ✧ The decline of the fishery particularly devastating for Aboriginal communities that are just starting to get access back into the industry.
- ✧ Governments do not enforce environmental regulations in order to protect employment in certain industries. They are sacrificing long-term, sustainable employment for short-term jobs in industries that are damaging the environment.

2.3. Causes and Core Problems

2.3.1. Water Quality

- There is a deep-seated and near unanimous view that the water quality of the central Northumberland Strait has deteriorated significantly in recent years and that the rate of degradation is accelerating.
 - ✧ Significant water quality deterioration was noted in rivers and estuaries where fish kills have become more common and where algal growth has often resulted in oxygen depletion and anoxic events. Many rivers, harbours and bays were noted as being “dead” or at immediate risk.
- In the Strait, fisher harvesters report declining visibility, increased sedimentation and a variety of concerns about contaminants.

- The causes for the decline in water quality were linked to a wide variety of sources, the most important of which were general population growth, inappropriate farming, forestry and road building practices, industrial effluents, and municipal sewage flows and inadequate private septic systems. Concerns were also expressed about the practices of fish harvesters, aquaculturalists, boaters and large vessel operators.

2.3.2. Physical Environment, Habitat, Climate, etc.

- Throughout the central Northumberland Strait, participants reported a startling increase in sediment build-up and resulting changes to the sea bottom generally and fish habitats and fishing grounds in particular. Perceived causes include soil erosion from poor farming and forestry practices, shoreline erosion as a result of climate change.
- Virtually all stakeholders believe that physical impacts resulting from the construction and presence of the Confederation Bridge play a significant role in the decline of ecosystem health and, consequently the fishery resources of the central Strait. They note that the steep declines in water quality and the equally sharp increases in sedimentation took place over the same period as the construction and operation of the bridge.
- Climate change was also highlighted at all consultation meetings. Perceived changes include greater tidal range, stronger currents, reduced winter ice-cover, lower water temperatures in the spring and higher temperatures through most of the year, increased wind strengths, more frequent and more severe storms, etc. Such changes are seen to increase shore erosion and to affect the life cycles and movement of fish.
- There were references made in almost all consultation meetings to possible long-term impacts of such human interventions in tidal and current flows as the Canso Causeway and the Pictou Harbour causeway. Many stakeholders felt that these changes, along with the impacts of the Confederation Bridge, need to be examined in much greater depth than has been done in the past, and that options for remedial action need to be identified and evaluated.

2.3.3. Fish Biology, Food Supplies, Interspecies Relationships, etc.

- Virtually all commercially and recreationally exploited species are in decline with the most severe reductions being in the central Strait area in the vicinity of the Confederation Bridge. The critically important lobster has been in decline throughout the 1990s until the present day. Scallops, herring, the flatfish and other species are virtually absent from the central portions of the Strait.

- It is widely observed that certain non-commercial species, some considered to be “invasive”, are increasing in numbers, bringing additional stresses on commercial stocks. In particular, seal populations are reported to have exploded in the past 25 years to the point that they are found throughout the Strait in larger numbers than ever before. Fish harvesters are concerned about perch (or “cunners”) that prey on other species in the egg, larval and juvenile stages and take lobster bait. There are concerns in some areas about expanding populations of cormorants and about their impacts on fish stocks.
- The decline of groundfish stocks in the Strait is seen as a possible reason why other fish species that predate on lobster larvae – notably cunners/perch and pelagics -- are much more abundant.
- While virtually all participants agree that the species mix in the Strait is changing, and that specific areas are less and less able to support abundant fish life, there is disagreement about whether these trends represent symptoms or causes of the wider crisis in the ecosystem. Many fish harvesters blame seals, cormorants and perch for declines in key commercial stocks. However many harvesters together with environmentalists and Aboriginal spokespersons feel that there is no guarantee that culling of such non-commercial species will by itself help bring lobster or groundfish back.

2.4. Research and Consultation Issues

2.4.1. Historical Trend Analyses

- An over-arching concern, expressed by most categories of stakeholders, is the need for comprehensive and long-term trend data on critical changes in the Strait ecosystem. Participants feel that without such knowledge going back to before key human interventions such as the Canso and Pictou Harbour causeways, the Abercrombie pulp mill and related Boat Harbour facility, expansion of shore-line habitation and recreational activities, changes in fishing methods and technologies, changes in farming and forestry practices, and the construction of the Confederation Bridge, it is not possible to make sound judgments about cause and effect linkages. They see the need for such long-term trend analysis on variables such as:
 - ✧ Fish stock abundance levels and species mix;
 - ✧ Water temperature;
 - ✧ Presence of particular contaminants in the water and in the air;
 - ✧ Tides flows and levels;
 - ✧ Current strength and direction;
 - ✧ Rates and levels of erosion and sediment build-up in particular areas; and
 - ✧ Extent and duration of winter ice cover.

2.4.2. Socio-Economic Issues

- Discussion of socio-economic impacts of the declining Strait eco-system focussed on two key action priorities:
 - ✧ Fish harvesters living in the vicinity of the Confederation Bridge want to see a definitive assessment of the impacts of the construction and operation of the Bridge on their livelihoods as a basis for determining fair and reasonable long-term compensation.
 - ✧ Industry leaders throughout the Strait describe the need for a comprehensive approach to facilitating the retirement of older harvesters and, in the process, “right-sizing” the fleet relative to the need to rebuild stocks and establish sustainable harvesting levels.

2.4.3. Water Quality

- There is a strong demand for water quality testing. There is a need to develop an overall portrait of the current situation and of the longer term trends that got us where we are now. As well, there is a need to document the sources, the content and quantities of contaminants entering the Strait; and, there is need to do ongoing site-specific sampling.
- There is an urgent need to do research to understand more about how specific contaminants (e.g., pesticides, nonylphenol) affect fishery resources and, most importantly, at larval stages.
- It is important to assess current buffer zone regulation and enforcement for agriculture, forestry and construction and to develop new standards to minimize erosion and chemical/nutrient run-off.

2.4.4. Physical Environment, Habitat, Climate, etc.

- The most urgent and important research relates to the need to complete a detailed mapping of the bottom of the Strait to establish a baseline and document changes. Particular emphasis is on the area of the Confederation Bridge to determine the amount of scouring that has occurred around the pier bases and to assess sediment build up.
- A comprehensive study of suspended solids in the central Strait is also urgently needed (a follow up on Dr. J. Ollerhead’s 2005 study) given the threat posed to marine resources by high levels of suspended solids.
- There is a need to better understand the effects of climate change (warmer water, higher sea levels, stronger currents and tides, no ice cover, etc) on fishery resources and on fish habitat.

2.4.5. Fish Biology, Food Supplies, Interspecies Relationships, etc.

- It is a priority to map out current fish habitat and species abundance and compare it with the baseline work done by Hurley Consultants prior to the construction of the Confederation Bridge.
- It is critical to find out what is happening to stage 3 and 4 lobster larvae.
- It is important to study the impacts of cunner-perch and cormorant predation as well as options for controlling seal populations.

2.4.6. Fishing Practices, Technology, Management Plans, etc.

- There are differing views among fish harvesters in different areas on the extent to which over-fishing has caused the declines in key commercial stocks. Some see it as the most important factor, while others identify environmental changes that they feel are more important. There is, however, general agreement on the need for more reliable data on sustainable harvesting levels, and appropriate fleet size, for lobster and other key species.
- There needs to be further work toward understanding the impacts of heavy fishing pressure in the lobster fishery to support future management controls and effort reduction programs.
- On the socio-economic side, there is interest in some areas in new approaches to capacity reduction and the facilitation of retirement of harvesters whose enterprises are no longer viable because of falling catches and revenues.
- Some fish harvesters criticize DFO for promoting a wide variety of options for lobster conservation without clear direction on what will work in a given area. They identify the need for rigorous evaluation of the various options so they will know how best to protect and rebuild endangered stocks.
- It is important to assess damage being done by scallop dragging and to develop less destructive options for harvesting and or growing scallops.
- Studies should be done to assess the effectiveness of marine buffer zones and closed areas to protect fish habitat and regulate scallop dragging and other fishing impacts.

2.4.7. Attitudes and Education

- There is a need for comprehensive public education programs to build awareness about the state of the Northumberland Strait ecosystem to foster

the political and cultural changes and shifting priorities that are needed to make meaningful progress.

- Almost all groups called for expanded public education to build understanding and support in the communities surrounding the Strait regarding the changes that need to take place to protect and rebuild the ecosystem.
- Some stakeholders proposed that the attitudes and awareness levels of fish harvesters and other users of the Strait environment be surveyed to establish a “scientific” baseline analysis for the current levels of support for ecosystem improvements, changes in fishing and farming practices, etc. The survey findings would make it possible to develop and target effective public education programs and to track changes in attitudes over time.

3. CONCLUSION

The consultants feel confident that the consultations reported on in this document were open and effective, and that they provided good opportunities for a wide range of stakeholder interests to express their views and be heard. (We again urge readers to review the full summaries of stakeholder inputs in the appendices in addition to the syntheses presented above.) Despite constraints of scheduling and weather, participation levels were excellent and the discussions were lively, well informed and far-reaching.

We are confident, therefore, that the information provided in this report provides a solid foundation for the development of the EOAR and the targeting of future research and consultation activities. While there are far more questions than answers, we are confident that they are the right questions, and that there will be broad stakeholder support for, and hopefully participation in, the ongoing effort to find answers.

A concluding thought, drawn from the many excellent commentaries provided by stakeholders during the consultations, is that the situation in the Northumberland Strait provides an excellent opportunity to do pioneering work in the development of participatory ecosystem management approaches. It is a relatively small and self-contained area, with finite numbers of resource users and a limited mix of industries impacting on the local ecosystem. There are challenges involved in working across three provinces and with multiple agencies and stakeholder groups, but this is true of most ecosystem management processes. Perhaps most importantly, there is a high level of consensus in the fishing industry and among community leaders that the Northumberland Strait ecosystem is under severe threat and that immediate and far-reaching changes are needed.

We encourage the Working Group, the EOAR contractors and other decision-makers to approach their work in the Strait as an important experiment in the development of ecosystem management that will have implications and benefits for such processes in many other environments. We are confident that such an approach will be actively supported by the communities and resource users whose futures so depend on the outcomes of this initiative.

4. APPENDIX A – STAKEHOLDER INPUT

The following is a summary presentation of the personal observations, viewpoints and advice offered by participants in the public consultations and in written submissions. As much as possible the actual words and expressions used by the participants have been retained.

The issues are presented have been grouped under five thematic areas to facilitate review by the reader. The points appearing at or near the first of each section and sub-section are, generally, those that were emphasized most strongly during multiple meetings and in written and verbal submissions.

4.1. Water Quality

4.1.1. History, Nature and Extent of Changes Observed

Note: “Water Quality” in this report includes issues associated with chemical and organic contamination. Issues related to sedimentation are presented in the following section “Physical Environment, Habitat, Climate, etc”.

- Participants at all meetings reported an ongoing and accelerating decline in water quality in many watersheds, bays, and estuaries and in the Northumberland Strait and believe there are a wide number of reasons for the decline.
 - ✧ Various participants suggested that the Northumberland Strait has reached a breaking point and may be dying. The central area, in particular, is not able to disperse toxins and pollution as easily due to the ebb and flow of tides.
- An increasing variety and amounts of contaminants from various sources (sewage treatment, industrial plants, hospitals, etc.) containing chemical contaminants (e.g., nonylphenols), pharmaceuticals, household cleaners, etc, are entering the Strait. There are unknown and worrisome impacts on fish reproduction and life stages. Often outfalls are located at depths preferred by female lobsters.
- Run-off from the land and urban areas is increasing, bringing pesticides, salt from roads, windshield wiper fluid, etc; all of which pose dangers to the fishery.
 - ✧ The pollution control requirements for the Confederation Bridge were never fully installed, there was supposed to be a system of pipes carrying run-off to the shore.

- ❖ Fish harvesters report visible streams of contaminants as a result of run-off from the bridge.
 - ❖ Dead lobsters in an advanced state of decay were found on opening day of the scallop fishery in 2005, suggesting a cause other than by the drags.
- Pesticides and herbicides from farming, blueberry growing (e.g., Wallace River, NS), forestry and golf courses all around the Strait are believed to be significant threats to eggs and larvae and particularly to lobsters, given their similarity to insects.
 - ❖ A comment noted that studies conducted by manufacturers of pesticides and herbicides are not considered credible (conflict of interest).
 - ❖ Third party testing was also recommended for water analysis due to conflict of interest for provincial agencies.
- In rivers and estuaries:
 - ❖ Siltation has made rivers shallower, resulting in poorer flushing and reduced oxygen levels.
 - ❖ Increased presence of sea lettuce and algae in many systems (particularly where circulation is restricted and often around golf courses) resulting in decreasing oxygen levels often to the point of anoxia.
 - ❖ Increased incidence of fish kills (shellfish and finfish) – 30 in the past 15 years on PEI; including a 50-80% loss of oysters in the Wilmot River in 2003 (smelts and eels were also killed).
 - ❖ Fish are forced out of the rivers or are stressed (seen at the surface taking oxygen in hot, dry weather).
 - ❖ There is less water running out of rivers to the Strait due to forestry and construction practices among other factors, and the water that is too often running is polluted with pesticides, fertilizers, manure etc.
 - ❖ Oyster beds are being greatly impacted.
 - ❖ Bacterial contamination of rivers and clam/oyster beds has been increasing (e.g. Coleman River, PEI, Amherst Head, NS) and resulting in more closures.
 - ❖ There is a significant water quality problem in the Robichaud NB area where there are surface deposits, increases in algae and a decline in shellfish populations.
 - ❖ Areas of significant water quality decline were noted in specific rivers and estuaries on PEI:
 - The Wilmot River has experienced fish kills (50%-80% oyster mortality, plus smelts and eels in 2003), followed by the absence of fish-eating birds (eagles & ospreys).
 - The “Death” of the Cardigan Rivers (70s), Murray Harbour (70s-80s) and St. Peters Bay (late 80s); there used to be lobster, trout, smelts and perch. Decline in these species began 20 years ago until

they no longer exist. Johnston's River quahog and oyster stocks destroyed by run-off after a rain and windstorm last year.

- Pinette, Vernon River, Mount Stewart and West River have particularly poor water quality behind bridges and causeways. Where openings have been increased, there were down-stream problems.
 - ◇ The East River, NS is highly polluted through leachate from the old town dump, effluent leaks from the Trenton car plant and overflow of sewage from the abatement plant. There are also impacts from the warm water discharge from the power plant.
 - ◇ Pictou Harbour is "shot":
 - In a study, shellfish were put in the harbour; a few months later, they had leukemia.
 - Sewage goes into the East River with overflows in rainfall events over 10 mm. As soon as you hit the abatement, there is nothing that lives there: oysters, shellfish and eels are all dead.
 - ◇ Excessive nitrates in ground water (e.g., in western Prince Co., PEI, following a major increase in potato production in recent years).
 - ◇ Toxins in man-made ponds are filtering into waterways.
 - ◇ Manure spreading in winter resulting in run-off.
 - ◇ Snakes, toads, frog populations are disappearing.
- In the Strait
- ◇ "Dirty water" is fouling nets even in deep water, where it was not the case in the past.
 - The Irish moss went black near the McCain outfall.
 - In the past 2 years fishers have started to see a red slime looking like wool that gets caught in the webbing of their traps.
 - ◇ Visibility is very poor, down to 2-3 feet, compared to 30' on the north shore of PEI.
 - ◇ The darker water will heat up faster.
 - ◇ All major communities are discharging sewage and contaminants into the Strait and plumes of effluent from sewage lagoons can be seen out into the Strait.
 - ◇ In the past 2 years, fish harvesters have started to see a solid red/brown slime looking like wool that gets caught in the webbing of their traps.
 - ◇ There are major water quality issues and concerns related to the pulp mill pulp mill and its Boat Harbour lagoon in Pictou, NS.
 - ◇ Air pollution from the Trenton car plant, some of which will eventually enter the Strait.
 - ◇ Pesticides can be tasted in the air three miles offshore on a calm day from May-October.
 - ◇ Increased amounts of oil on the water from vessels and land sources.
 - ◇ Cadmium in sediments in Pictou Harbour.

- ✧ Children no longer go fishing in the Souris area as the water stinks from sewage.
 - ✧ Swimming in some coastal areas being prohibited due to poor water quality (e.g. LeClair's Pond, PEI).
 - ✧ Water quality is poor in Souris near the fish plant with no lobster for 30'.
 - ✧ The Irish moss went black near the McCain outfall in Borden, PEI.
 - ✧ The Strait of Canso is brown and filthy from heavy industry.
 - ✧ In 1972, Canso Chemicals lost 1,200 lbs. of mercury, it was later found in a holding pond.
- Other observed changes:
 - ✧ Increasing population pressures.
 - ✧ More intensive agriculture with increased acreage and clear-cutting in recent years.
 - ✧ Increased large vessel traffic (cruise ships).
 - ✧ Decrease in air quality (contributes to water quality degradation).
 - ✧ Large increases in cottages on the shore.
 - ✧ Golf courses development along rivers and bays.
- Increased industrial, municipal and private outfalls:
 - ✧ Established and new plants adding effluent to the Strait (e.g., McCains at Borden), where even state-of-the-art treatment is viewed with concern.
- Numerous abandoned landfill sites and dumps containing toxic substances.
- A concern was expressed about the effectiveness of water quality testing in that tests are rarely done at the right time or place (e.g., after rainfall events or directly at the outfall pipes).
- Concerns were noted about the possibility of ammunition or shells at the former Tracadie and Point Sapin marine firing ranges.
- Concerns were noted about chemical weapons (e.g., mustard gas) dumps sites at numerous locations around the southern Gulf.

4.1.2. Perceived Causes

- Principle causes of water quality degradation noted as coming from land-based sources; worsening as a result of population pressures and ineffective regulation and enforcement:
 - ✧ Chemical contamination from industrial sources (fish and other processing plants, heavy industry, pulp mills, hospitals, sewage treatment plants, pesticides from farming, blueberry growing and golf courses, run-off from roads, etc.).

- Nonylphenols noted as particularly lethal to larval lobsters and were reported to be at high levels in Charlottetown municipal discharge and of concern from a variety of other sources.
- ❖ The Pictou pulp mill and Boat Harbour lagoon:
 - It is an environmental hazard that is killing off the environment and the fishery (e.g., lobsters and herring) to the point that there will be no fishery for the next generation.
 - It is particularly damaging for the local First Nation that has seen fishery earnings drop to where people are barely breaking even since entering the fishery under the Marshall decision five years ago.
 - Toxic chemicals are being emitted from the mill through air pollution (some of which will enter the Strait) and wastewater discharge into Boat Harbour. Particular concerns regarding the chlorine plant in the mill were noted.
 - Lighthouse Beach eroded because the dam separates the lagoon from the ocean. The water has nowhere to go and now, effluent is sitting right on the shoreline.
 - The effluent sits under the ice, is embedded in the ice. When the ice breaks up and drifts, it distributes effluent over a wide area of the Strait.
- ❖ Sites of concern:
 - The Atlantic Beef Producers, McCain's and the Confederation Cove mussel plant (outfall area is visibly slimy; also creates a fog that leaves a greasy residue) in Borden, processing plants in Souris, PEI and Oxford, NS.
 - The pewter plant and the salt mine in Pugwash, NS.
- ❖ Air transport of toxic chemicals from distant sources as well as local industry (e.g., Pictou pulp mill, Trenton car plant, Maritime Steel), portions of which eventually enter the Strait. Also may affect human health (study conducted by Dr. Dan Reid showed that Pictou County has the highest rates of cancer in Canada).
- ❖ Nutrient enrichment from farming, golf courses, food processing plants, sewage treatment, etc.
- ❖ Insufficient or ineffective (primary only) municipal treatment and private septic systems.
 - Concern that treatment is not filtered for contaminants such as paints, glues, heavy metals, pharmaceuticals (e.g., birth control pills), (e.g., Richmond Waste Watch).
 - Flushing of cleaning chemicals down toilets and drains with unknown impacts on fish at all life stages (possibly including PEI provincial parks).
- ❖ Leachate from active landfills and abandoned dump sites:

- Reported leachate from Waste Watch, Richmond, PEI, entering drainages and being dumped directly into Summerside Harbour.
 - Many abandoned sites (e.g., St-Ignace, NB) contain toxic chemicals that may now be entering waterways.
- Poor farming practices (some recent improvements noted):
 - ✧ Run-off of nutrients from farming leading to eutrophication.
 - ✧ Insufficient or unenforced buffer zones.
 - ✧ Mono-farming, factory farming; increasing acreage and pesticide use.
 - ✧ Spraying before rainfall or in high winds.
 - ✧ Some chemicals seen to destroy the structure of the soil causing faster erosion (e.g., Roundup).
 - ✧ Late fall harvests and plowing resulting in increased run-off of chemicals and sediments.
 - ✧ Deep tilling.
 - ✧ Vertical plowing on slopes.
 - ✧ Less crop rotation.
 - ✧ Some cattle still in ponds.
 - ✧ Millions of gallons of liquid hog manure being spread on fields (e.g., between Borden and Summerside, PEI.)
 - ✧ Manure spreading taking place year-round, even on frozen ground in the winter that promptly runs off (e.g., in eastern NB.).
 - ✧ GMO crops.
 - Habitat destruction affecting fish and amphibians.
 - Clear-cutting degrading stream systems and leading to warmer water.
 - Bacterial contamination from cattle and ineffective sewage treatment and septic systems.
 - Chemical weapons dumps leaking highly toxic agents.
 - Aquaculture is seen to be affecting water quality:
 - ✧ Reduced oxygen levels due to stocking densities.
 - ✧ Density of mussel sites and of stocking may be impeding flushing action.
 - ✧ Depletion of nutrients needed for productivity in other fishery resources.
 - ✧ Deterioration of seabed from mussel wastes.
 - ✧ Lime is used to treat for tunicates and starfish.
 - ✧ Nitrate levels are high.
 - Road bridges and causeways prevent flushing leading to poor water quality with 70-80% of rivers on PEI being partially blocked by these structures.
 - Runoff from urban areas and the Confederation Bridge (de-icers, oils and fluids, etc.).
 - Septic sludge spread on the land near the shore.

- From the fishery:
 - ✧ Boats are bigger and more polluting than they need to be.
 - ✧ Wet exhausts create obvious pollution, leaving a yellow haze/film on the water.
 - ✧ Dumping of trash, contaminants, wastewater, bilge water, etc. over the side.
 - ✧ Pressure/chemically treated traps.
 - ✧ Use of 2-stroke engines (in all marine industries)
- Dumping of trash, contaminants, wastewater, bilge water, etc. over the side by cruise ships and other vessel operators.
- Dredging spoils from Grahams Pond, Wood Islands.
- Creosote use on bridges.

4.1.3. Solutions

- Beef up enforcement of, and penalties for, violations of environmental regulations: (agriculture, fishery and marine (e.g. dumping at sea), industrial and public facilities).
- Establish more restrictive standards on what can be released from sewage treatment facilities, factories and fish/food processing plants.
- Install state of the art treatment facilities at all industrial sites and water treatment plants
 - ✧ Summerside, PEI needs new treatment facility.
 - ✧ Some companies reported to be (e.g. McCain) leading the way.
 - ✧ Improvements and new investments in sewage treatment in some PEI communities were recognized.
 - ✧ The impacts of the Pugwash salt mine were reduced when the government spent \$4 million to make a settling pond; then the lobster came back.
- Install state of the art treatment for the Pictou pulp mill. Do not pump Boat Harbour, Pictou, NS, out into the Strait; it will ruin the whole Gulf, having already ruined a 5-mile radius.
- Ban chemicals toxic to fish (e.g., nonylphenols) found in cleansers and consumer products; otherwise consumers will see them as “approved” and will continue using them. Europe and Japan have already taken this step.
- Improved farming practices would reestablish healthy systems as demonstrated in Germany, Switzerland and Holland:
 - ✧ Increase on-land buffer zones, including the planting of trees/hedges to reduce chemical run-off and wind erosion. Include marine shores with an up to ½ km buffer.
 - ✧ Greater use of berms and contour plowing to prevent run-off.

- ✧ Expand and promote good progress seen on some farms (providing winter cover, stripped cropping, grass waterways, 3-4 year crop rotation, etc).
 - ✧ Establish specific controls on how, where and when manure can be spread.
 - ✧ Provide tax benefits and support other to farmers to encourage larger buffer zones and effective implementation of Environmental Farm Plans. Aid needs to be targeted towards farmers and fishermen, not corporations.
 - ✧ Education to increase farmers' awareness of the effects of pesticides on lobsters (and, thereby on fish harvesters' livelihoods), of the benefits of environmental farm plans and to increase public understanding of progress made.
 - ✧ Stop late fall harvests and plowing.
 - ✧ Reduce nitrate application, extra fertilizer benefits only 5% of the crop and is not worth the environmental costs.
 - ✧ Increase farm nitrogen credits, especially manure and legumes – there is far more nitrogen in the soil than is required by crops.
 - ✧ Ban pesticides and change PEI to an organic Island; follow with promotion.
 - ✧ Mine mussel mud and apply to fields to increase pH and organic content.
 - ✧ PEI Round-table on Land-use Commission Report needs to be revisited.
 - ✧ Increase holding capacity for manure.
 - ✧ Better monitoring, stricter enforcement and increased fines.
- Create a “natural rewards” system to encourage production and purchase of organically grown products.
 - Install piping system to carry run-off from the Confederation Bridge ashore.
 - Establish regulatory standards for boats similar to cars for emissions and pollution control; include filters for diesel wet exhaust motors; (Magdalene Islands do not allow wet exhaust).
 - Widen or redesign bridges/causeways to allow for improved water exchange in rivers.
 - Open the Pictou Harbour Causeway.
 - Regarding aquaculture:
 - ✧ New methods to treat for tunicates and starfish larvae (aquaculture industry is exploring options).
 - ✧ Reduce the size of sites and/or density of mussel stocking through legislation or voluntary methods as was done in St. Peter's Bay.
 - ✧ Moving mussel farms to the Strait may relieve pressures, but that raises questions regarding impact on the Strait and the marine resources.

- ❖ Shellfish aquaculture and wild stocks consume nutrient and reduce sea lettuce and algae.
- An ongoing oyster fishery improves water quality.
- Dump dredging spoils on land.
- Move to 4-stroke engines.
- Develop an action plan with different industries.
- Stop dumping of leachate from the Waste Watch (Richmond PEI) directly or indirectly into the water.
- Public education:
 - ❖ Broad public awareness campaign – everyone should be made aware of how various industrial, public and household practices affect the environment (e.g. nonylphenol) and impact on those dependent upon it for their livelihoods.
 - ❖ Distribute marine stewardship video to the public, including the Federation of Municipalities.
 - ❖ Information on the damage caused by 2-stroke engines.

4.1.4. Priorities for Research and Consultation

- Extensive water quality monitoring and testing in rivers, bays and in the Strait to give an overall portrait of water quality and to support the collection of clear and comprehensive baseline data on the ecosystem. The work should identify and quantify chemicals, metals, organics and other contaminants whether from industry, municipalities, private homes, farms, golf courses, etc., and the work should be ongoing.
 - ❖ What is being discharged by major contributors and where does it go: e.g., Pictou area heavy industry (pulp mill, Trenton car plant, Maritime Steel), McCain, and Atlantic Beef Producers in Borden?
 - ❖ What are the sources of nonylphenol, how much is being released?
 - ❖ What is the effect of the Confederation Bridge on water quality?
 - ❖ Number & volume of effluents discharged from urban areas along the Strait.
 - ❖ Priority to do sampling after rainfall, pesticide spraying and fish kills.
 - ❖ Take samples directly from facility outfall pipes.
 - ❖ Sample at the mouths of rivers and streams.
 - ❖ Deep soil sampling across the Island at different times of year to track changes; connect the data to particular communities, fields, crops and pesticide usage.
 - ❖ Test municipal sewage treatment plants and processing plants as well estuarial run-off from farms.
 - ❖ Compare results with 1995.
 - ❖ Hire students to do sampling.

- Conduct research to develop a clear understanding of the current attitudes and beliefs of stakeholders (in particular, fish harvesters) regarding the issues and to what lengths they are willing to go to address the challenges.
- Need to develop a better understanding of what constitutes the “dirty water” referred to by fish harvesters.
- Need to map impacts on water quality from land-based operations.
- Related to contamination issues:
 - ◇ Conduct research to understand how contaminants including mill and plant effluents, cleansers, pesticides, herbicides and hormone mimicking chemicals are affecting fish in all life stages (especially stage 4 lobsters), amphibians and the health of consumer food products. Is there a link between low larvae numbers and proximity to heavy agricultural spraying (e.g., Hillsborough Bay)?
 - ◇ Determine how much and what kinds of contamination are contributed by air pollution, particularly from local sources (e.g., Pictou area heavy industry).
 - ◇ Look at the relationship between the water temperature and the toxicity of contaminants.
 - ◇ What is the impact of having contaminated bivalves on the rest of the food chain?
 - ◇ Test lobsters for toxins to ensure public health.
 - ◇ Are Strait fish affected after upstream fish kills?
 - ◇ Determine status and potential threats to water quality from former DND Tracadie and Point Sapin marine firing ranges as well as from other chemical weapons dumps throughout the southern Gulf.
 - ◇ Does Great Lakes contamination affect the Strait’s ecosystem?
- Related to physical factors:
 - ◇ Will the darker dirty water accelerate increase in water temperature?
 - ◇ Are water temperatures affected by the decomposition of dredge spoils deposited along rivers and coves?
 - ◇ Assess the impact that cottage, road, and other development projects have on water quality.
- Related to sewage, landfill and processing plant waste-water treatment:
 - ◇ How do treatment plants in all three provinces reduce the amount of chemicals in their waste and how and where are they disposing of it? What is the impact on the environment?
 - ◇ Explore recent developments in the use of certain bacteria in sewage treatment that eliminate the need for the use of chemicals in sewage lagoons.
 - ◇ Assess impacts of large processing and treatment plants on water quality.

- ◇ Where has liquid waste from the Richmond Waste Watch site been dumped? How much? To what effect?
 - Related to farming, forestry, golf courses and aquaculture:
 - ◇ Assess whether buffer zones need to be modified by adding trees or increasing their size in order to improve current and develop new techniques to reduce erosion.
 - ◇ What is the effect on Nitrogen levels and nutrient loading from the following sources?
 - Agricultural runoff.
 - Treated/untreated waste.
 - Seafood processing plants (e.g., Souris).
 - Dredge spoils stored along rivers.
 - ◇ Compare NB, NS and PEI, given apparently different agricultural run-off issues.
 - ◇ Research in support of improving nutrient management practices on farms.
 - ◇ Where does the hog manure and septic sludge go after it is spread on the land? How does it affect the oyster fishery?
 - ◇ Is there research on how much coliform there is in aged versus new manure?
 - ◇ Assess impacts of golf course run-off.
 - ◇ Is there a correlation between increased mussel lines and the decrease in lobster catches?
 - ◇ Are mussel stocks contributing to waste and toxicity levels in the Strait, particularly in the Murray River area?
 - ◇ What is the impact of GMO products (e.g., salmon and potatoes) and their effluents on the Strait fisheries?
 - Other research needs:
 - ◇ There should be a bay-EOAR done for the Pugwash area given the water quality issues.
 - ◇ Investigate how large ships (e.g. tankers and cruise ships) handle ballast water, bilge water, waste oils, etc.; what pollutants are released; what are the laws, how are they enforced?
 - ◇ Test toxicity of concrete dumped in the Strait near the bridge.
 - ◇ Study the impact of deep water wells and use of condensers and outflows re-routed into brackish waters (e.g., Montague Cold Storage).

4.2. Physical Environment, Habitat, Climate, etc.

4.2.1. History, Nature and Extent of Changes Observed

- Participants at all meetings reported an alarming and growing rate of increase in sediment and silt in the Strait and in bays and estuaries:

- ◇ Sediment is fouling gear quickly and building up in lobster traps between sets, even far from shore. At one time, herring nets could be left in the water until June with little silt, but they now have to be taken out every day. They are covered with silt like a blanket.
 - ◇ The Strait is no longer flushing out.
 - ◇ It is very noticeable when the wind picks up.
 - ◇ Visibility is down to 2'-3' compared to 30' on north side of PEI.
 - ◇ In the spring, the whole Strait is red including in depths of up to 90'.
 - ◇ Seabed is now flat in areas it used to be rocky.
 - ◇ Recent studies show current high levels of silt are over acceptable levels for survival of many gill-fish.
 - ◇ Silt is covering rocks so lobster can't find a place to hide – vulnerable to predators, forcing them to move to new locations; scallops' settlement and growth is limited or negated by siltation.
 - ◇ Depletion of moss beds in numerous locations from sediment run-off.
 - ◇ Oyster beds are being damaged by sedimentation.
 - ◇ East of Toney River there is nothing in 40'-50' of water due to sedimentation, places that used to be 55' are now 40'; eliminating fishing.
 - ◇ The Causeway is silting up, too.
 - ◇ Sediment at the Montague Marina has increased by 20' over 100 years.
 - ◇ Murray River boat channel now only wide enough for one boat.
 - ◇ Highway construction techniques have improved.
- Erosion of banks along the shore of the Strait and islands, rivers and bays continues at an alarming rate, with up to 25' of loss in some locations.
 - ◇ Particularly noticeable in past 7 years or so.
 - ◇ Erosion is a major problem on PEI First Nations reserves where 4-6' of shorefront land has been lost from an already very small land base.
 - ◇ Erosion also results in a loss of arable land (e.g., Crown Point and Governor's Island, PEI, where half the land has been lost).
 - ◇ Example of 20' of shoreline lost in Lower Tatamagouche, NS.
 - ◇ Small islands are eroding and disappearing in the eastern Strait.
- In the area of the Confederation Bridge:
 - ◇ Clean water until the Bridge was built; continually increasing sedimentation and suspended solids all through the central Strait since the construction.
 - ◇ Extreme sedimentation in area of the Confederation Bridge indicated by:
 - The bottom has become "caked" with sediment, eliminating lobster fishing.
 - Change evident since about 1999.
 - Burial of McCain's outfall diffusers on what was rocky bottom between piers 3 & 4 of the bridge.
 - Sounders do not work.

- One comment noted that the sedimentation caused by the bridge is not as bad as now as when it was built.
 - ◇ Erosion around pier bases (especially the 44 mid-Strait piers). There is no rock/gravel bed around the bridge pillars as there is supposed to be.
 - ◇ Dead lobsters in an advanced state of decay were found on opening day of the scallop fishery in 2005; suggesting a cause other than by the drags.
 - ◇ Bridge dredge spoils were dumped on herring spawning beds/fishing areas and on productive moss beds.
 - ◇ Temperature of deep water close to the bridge is similar to surface temperatures.
 - ◇ Coastal erosion has increased since the bridge was built (25' of shoreline lost).
 - ◇ Concrete was dumped on the bottom during bridge construction period.
 - ◇ Increased currents near the Bridge (central Strait), with notable “backwash” at the bridge.
- Degraded lobster habitat, (e.g., from Egmont to Victoria, fish harvesters “are starving” for fish/lobster; “the bottom is dead”).
 - Concern registered about the survival rates of juvenile lobsters being released in the Pointe à Bouleau and Pointe du Chêne areas, given the high rate of siltation linked to the Bridge.
 - There has been infilling of coastal marshes, adding to erosion and sedimentation.
 - More litter and non-biodegradable garbage in the water.
 - Increased presence of mussel beds in some areas and losses in others.
 - Water from streams not coming down any more – choked by silt and erosion - 70% of PEI rivers now choked by causeways and bridges.
 - ◇ Reduced habitat in Tryon River.
 - Climate/environmental changes noted:
 - ◇ Water temperature changes:
 - Used to be more stable; now there can be daily spikes; a change of 4 degrees within a day in 80 ft of water was recorded.
 - Up 10% in last two years (71 degrees in 100') versus 50 degrees west of West Point. (Robert MacMillan study).
 - The north side of the Island is now warmer than the south side; the cold-water current used to go off the north side of PEI, now comes down the Strait.
 - Last week of May-first of June (usually best week of fishing)– a cold current comes through and closes down fishery.
 - Water temperatures staying warm into the fall and winter.

- Warmer water temperatures in summer and fall force herring deeper (used to set nets at 25', now 95').
- Aquaculture industry still operating from vessels in early February 2006 instead of on the ice.
- Changes in water temperature impacting where lobster is found – water colder in central part of Strait where lobster like to be – but if it is too warm we also lose lobster.
- Affects fish stocks and fish movement.
- Increased water temperatures in rivers and streams.
- Concern that the darker, dirtier water will cause water temperatures to go up even faster.
- Shore erosion is made much worse by lack of winter ice cover (worst in 60 years), colder water in the spring because of loss of ice insulation, warmer water during other seasons, and more severe storms.
- ◇ Higher water levels.
- ◇ Increase in currents (1.5-4 knots) and in tidal range; gone from 5' to 9' in some areas:
 - Concerns that currents may be dragging larvae out of the Strait before it can settle.
 - In Egmont Bay, known historically for slack tides, currents are much stronger now.
 - Drags buoys under and requires more buoy line.
- ◇ The Strait is no longer flushing out.
- ◇ Changes in seasons; winter is arriving later, spring is longer and wetter and summer extends later into the year.
- ◇ Increase in wind and change in the direction of the wind, which impacts tides, water temperature and overall quality, as well as the movement of fish stocks.
- ◇ Some think there are now more storms but others remember lots of big storms in the past too, including some worse than have occurred recently.
- ◇ Increase in tidal surges in cold seasons.
- ◇ Fewer big storms in warm seasons to flush out silt.
- More intensive farming and clear-cutting and resulting wind and water erosion (e.g., Dunk and Wilmot River, PEI areas).
- Cruise ships are operating out of traffic lane and cutting off traps – resulting in ghost fishing and creating a safety risk.
- Concern raised about the impacts of peat moss harvesting on coastal and marine environments.
- Concern about the dumping of plastics, old cars, etc., 25 miles and more out to sea.

- Boaters and fish harvesters on PEI are losing access to shores for launching boats because of shoreline development.
- Ever since waste management came into effect on PEI, more garbage on fields, river banks etc- people don't want to be bothered sorting.

4.2.2. Perceived Causes

- Poor farming, forestry and road construction practices (some improvement noted in some areas in recent years; but “may be too little, too late”):
 - ✦ More intensive agriculture on larger farms.
 - ✦ Insufficient or unenforced buffer zones (particular issue in the Wilmot and Dunk rivers, PEI).
 - ✦ Late fall harvesting, plowing and deep tilling resulting in sedimentation and chemical run-off.
 - ✦ Exposed soils subject to wind and water transport to waterways (e.g. Feb. 6, 2006).
 - ✦ Plowing vertically on slopes.
 - ✦ Less crop rotation.
 - ✦ Clear-cutting of some 150,000 acres in recent years without sufficient buffer zones, leading to wind and water erosion.
 - ✦ Road construction (hi-macs) through woods for cutting trees has cut up the streams, drying the forests.
 - ✦ Not sodding exposed banks in road construction contributing to sedimentation.
 - ✦ Bridges and causeways constrict water flow in numerous watersheds.
 - ✦ Buffer zones in forestry don't make sense as the wind comes and flattens trees when they are not protected by a larger forest.
- Scallop dragging is seen to be destroying lobster habitat by flattening out the bottom:
 - ✦ Situation worsening as gear becomes heavier and boats more powerful.
 - ✦ Ledges, rocks and boulders are pulverized; the bottom is flattened out.
 - ✦ Divers who dive near the bridge describe dragger tracks as clearly defined barrens, “like a road”.
 - ✦ Also results in mortality of lobsters, other species, benthic animals and marine plants.
- The Confederation Bridge is perceived as a significant contributor to physical changes impacting severely on marine resources over the 10-year period since its construction (i.e., fishery and environmental declines occurred since construction).
 - ✦ Built without baseline environmental assessments; despite DFO and fisher organizations' requests that this be done.
 - ✦ Many promises were made but not kept when it came to ensuring the bridge did not harm fisheries.

- ✧ The construction of the approach and the installation of the piers have had the effect of narrowing the channel (6-8%) and increasing currents, worsening sedimentation and making lobsters untrappable.
 - ✧ Scouring and resulting erosion around piers are seen to be the principal causes of sedimentation in the central Strait.
 - ✧ Dynamiting and related early work, seen to have a profound impact on fish habitat, with no compensation paid.
 - ✧ The bridged caused gyres to change and then the sea dies; the gyres stir up and distribute nutrients to all species.
 - ✧ 500,000 cubic metres of sediment were moved during construction.
 - ✧ Silt up 8 times from pre-bridge to now – from 4 to 30 milligrams per litre.
 - ✧ Cape Jourimain causeway still washing out.
 - ✧ The heat coming off the bridge piers is causing water temperatures to be the similar in deep water as at the surface.
 - ✧ Vibrations down the bridge piers and/or electrons travelling down the rebar may be creating sonic or electro-magnetic barriers to fish.
 - ✧ Significant amounts of concrete dumped on the Strait floor during construction.
 - ✧ Dumping of pier excavation spoils on moss and herring spawning/fishing habitat.
 - ✧ The use of rock walls in front of properties in the vicinity of the Confederation Bridge is adding to the erosion problem.
- Climate change:
 - ✧ Weather changes are increasing silt and run-off incidence.
 - ✧ Higher tides, stronger winds and storms and reduced or no ice cover leads to significantly increased shoreline erosion.
 - ✧ Mixed opinions on water temperature – no one knows, as there is no testing.
 - ✧ Lobster usually migrate in and out of Strait, water is now too warm in middle of Strait so they don't go there and that is where most of fishing is done.
 - ✧ Hurricane Juan reported to have stirred up sediment accelerating the decline in the fishery.
 - A suggestion that the building of the Canso Causeway was the originating cause of environmental change in the Northumberland Strait, the effects of which are now being felt.
 - Aquaculture contributing to sedimentation problem by the use of sand bags that are left on the bottom (depth reduced by 2') and leaving train wheels, engine blocks on the bottom as well.
 - Infilling of coastal marshes.
 - Canso Causeway implicated in the loss of haddock and halibut and a decline in mackerel. The Strait is colder after the causeway.

- Linking Melmerby Beach, NS to the island has changed water flow.

4.2.3. Solutions

- Better monitoring, stricter enforcement and increased fines for environmental, agriculture, fishery and marine regulations (e.g., dumping at sea, infilling of coastal marshes and other habitat destruction activities).
- Develop a remediation plan respecting deficiencies in armouring the Confederation Bridge piers. Initiate this action immediately (i.e., do not wait for conclusion of the EOAR). Appropriate engineering study and environmental assessment will be required before stone can be placed. This will also create rocky habitat.
- Improve farming, forestry and road construction practices:
 - ✧ Increase on-land buffer zones, including the planting of trees and hedgerows to reduce wind erosion.
 - ✧ Establish 60 m to 500 m marine shore buffer zones.
 - ✧ Expand and promote good progress seen on some farms (providing winter cover, stripped cropping, grass waterways, 3-4 year crop rotation, etc).
 - ✧ Provide tax benefits and other assistance to farmers to encourage larger buffer zones and effective implementation of Environmental Farm Plans.
 - ✧ Stop late fall harvests and plowing (or minimize the depth of fall plowing).
 - ✧ Increase enforcement and penalties.
- Stop scallop dragging (and other mobile gear fisheries) or greatly control its activity (rotational openings; expanded buffer zones) and create alternate harvesting methods.
 - ✧ First Nations on PEI have voluntarily refrained from activating their scallop licenses in respect of concerns of damaging the fish habitat.
- Open up causeways; could use North River and West River, PEI causeway removals as test sites to compare to areas still impacted by causeways; be aware of short-term, downstream affects. There is evidence that suggests fish stocks return quickly once causeways are removed.
- Build artificial reefs; use the 30t counterweights that were used in the building of the bridge; used buses have been used elsewhere, etc.
- Explore the use of dredging spoils for sandblasting, cement, highway and other uses; and use the proceeds to finance projects.
- Shellfishing increases flushing of rivers/decreases siltation.
- Increase communications on studies involving ice cover/trends/erosion, etc.

- Cruise ships could go around the other way in summer; shipping lanes should be published on maps – need to revisit this and find a way for ships to see buoys in the dark so they can stay in the lane.
- Remove the Canso Causeway.
- Allow nature to take its course regarding shoreline erosion (do not place rock walls) and the transport of sand (e.g., at Parlee Beach).
- Ban breakwaters.
- Dredge watersheds (e.g., Tryon, Victoria).

4.2.4. Priorities for Research and Consultation

- Document and characterize siltation in the Strait to support the collection of clear and comprehensive baseline data on the ecosystem:
 - ✦ Need information from before the construction of the Confederation Bridge, before the use of heavy gear in the scallop fishery and before scallopers became abundant. (Note: McCain's in Borden has video documenting increasing sedimentation over time at their outfall).
 - ✦ Refer to the recent study on suspended solids in the Northumberland Strait in October 2005 by Dr. Jeff Ollerhead of Mount Allison University.
 - ✦ Refer to expanded sampling carried out by DFO in 2005.
 - ✦ Initiate this action immediately (i.e., do not wait for conclusion of the EOAR).
- Do a baseline habitat and species distribution study in the Strait using the methodology used by Hurley Consultants, which was done before the construction of the bridge; compare the results.
- Do a bathymetric study of the Strait and compare results with past studies to document change; make use of the vessels and expertise available at the Bedford Institute. (Note: it was reported that current plans call for such a study to be done by the Canadian Hydrographic Service in 2006).
- Are ocean-based models appropriate for use in the Strait environment?
- Research the impacts of siltation on fish habitat and marine resources including stage 4 lobster and other filter feeders.
- Given the tremendous amount of erosion along all three provincial coasts:
 - ✦ Can the amount of sediment in the Strait as compared to the Gulf side of PEI be analyzed?
 - ✦ Can there be an analysis of watershed drainage basins from NS and NB draining into the Strait?
- What is the water velocity flow into the Strait versus water flow out?

- Regarding the Confederation Bridge, there is an urgent need to conduct a thorough assessment of the impacts of the bridge:
 - ✧ What is the impact of the Confederation Bridge on tides, siltation, fish stocks (e.g., scallops, lobster, oyster beds) environment, and erosion? Compare with impacts at similar bridges around the world.
 - ✧ Do a bathymetric study with side-scan SONAR and a thorough physical inspection of the bridge pier bases and the areas around the bridge; compare to baseline data.
 - ✧ Develop a remediation plan respecting deficiencies in armouring the bridge piers. Initiate this action immediately (i.e., do not wait for conclusion of the EOAR). Appropriate engineering study and environmental assessment will be required before stone can be placed.
 - ✧ What is causing the increase in tide flows, and where is the flow faster. Does the water slow on the other side of bridge?
 - ✧ Has there been any research; is there any way to test the effect on fish behaviour caused by vibrations or electro-magnetic impulses down the piers?
 - ✧ What is the fate of the spoil pile from the bridge dumped in the Strait (in the Augustine Cove area)?
 - ✧ Revisit and follow-up on data and results from existing reports (e.g., Public Works), done before the construction.
 - ✧ Is there more silt or mud on the east or west of the Bridge?
- Respecting scallop dragging impacts:
 - ✧ Develop alternatives to scallop dragging such as diving and culture.
 - ✧ Take videos on damage done by scallop dragging and otter trawling.
 - ✧ Test hypothesis: “Without the buffer zones in the east, the fisheries would all have collapsed”. Fish harvesters agreed that there has been noticeable recovery of scallop, kelp & sea urchins in the buffer zones (although some dissenting opinions recorded).
- On climate change:
 - ✧ Develop benchmark measures to monitor global warming effects.
 - ✧ Conduct research to look at the geo-spatial aspects of the Strait
 - Categorize what changes are the result of the natural progression of climate change versus the impact of human intervention; and focus on the man-made impacts.
 - What did the Strait look like at various times in the past?
 - What have been the long-term trends in water temperatures?
 - ✧ Document changes to water temperature and salinity; compare north and south shores of PEI; including short-term temperature spikes.
 - ✧ Research into what physical measures might be taken to minimize the effects of shoreline erosion.
 - ✧ Develop adaptive management measures to assist communities in adjusting to what is seen as inevitable outcomes (rising sea levels and erosion).

- ◇ Predictive modeling based on an evaluation of past performance of various models and using the most accurate of those models to predict future impacts from climate change. MCPEI has developed a proposal along these lines.
 - ◇ Measure tidal speed and height and compare to past data.
 - ◇ Need geographical study of ocean bottom to determine effects of no ice cover and cold water.
 - ◇ If climate change is causing the decline in the Strait, why is it not the same for the north shore?
 - ◇ What is impact of weather changes (surges, less ice cover, warmer weather) and water temperature on species?
 - ◇ Will the increasing dirtiness/darkening of the water accelerate water temperature increases?
- Assess the impact that cottage, road, and other development projects have had on erosion since the 1940's.
- Assess the impact of the Canso Causeway on species composition, temperatures and water movement through the Northumberland Strait.
- Regarding farming, forestry, peat moss harvesting and road construction practices:
 - ◇ Compare agricultural run-off between PEI and NS and NB given differences in farming intensity.
 - ◇ Improve current, and develop new techniques to slow erosion.
 - ◇ Assess whether buffer zones need to be modified by adding trees or increasing their width.
 - ◇ What impact is clear-cutting having on erosion and water warming?
 - ◇ Assess impacts of peat moss harvesting on the marine environment.
 - ◇ Revisit the conclusions and recommendations of the PEI Round Table on Land Use Report.
- Determine status and potential threats from the former DND Tracadie and Point Sapin marine firing ranges.
- Explore the use of dredging spoils for sandblasting, cement, highway and other uses; and use the proceeds to finance projects.
- Study the impacts on the coastal environment of rock walls placed on shorelines in attempts to slow erosion.
- Do more analysis on the artificial movement of sand with bulldozers at Parlee Beach to determine impacts.
- Investigate what is being dumped in offshore waters (e.g., 25 miles).
- Broad public awareness campaign
 - ◇ Everyone should be made aware of how various industrial, public and household practices affect the environment.

- ✧ Make wider distribution of scientific studies (e.g., the Ollerhead report on suspended solids in the Northumberland Strait).
- ✧ Education to increase farmers' awareness of the benefits of environmental farm plans.
- ✧ Public education/promotion to highlight to the public positive changes farmers have incorporated into their farms.

4.3. Fish Biology, Food Supplies, Interspecies Relationships, etc.

4.3.1. History, Nature and Extent of Changes Observed

- Stakeholders from all areas reported reduced diversity and overall declines in all commercially and recreationally important species in the Strait and watersheds.
 - ✧ Particularly severe declines in the central Strait around the Confederation Bridge.
 - ✧ An observation by an eastern Strait, NS diver that sandy areas are like a desert, no life.
- There have always been cycles in catches, but this problem is beyond just a downward dip. (One dissenting voice saying that there is no need to panic; it will come back as part of a cycle).
- Abundance of fish species has varied greatly over the years (40's good, 50's slack, 60's good, 70's disaster, 80's good, 90's ongoing decline until today).
- Respecting lobster specifically:
 - ✧ Steady decline in lobster landings beginning in the early 90s, beyond usual cycle of highs and lows.
 - ✧ In 1998, caught about 25,000 lbs per boat per season in the western central Strait, now it is half of that.
 - ✧ In 1997, caught 30,000 lbs. per boat in the Toney River, N.S. area, last year 3,300 lbs.
 - ✧ No stage 3 or 4 lobster larvae present (or DFO isn't sampling deep enough to find them).
 - ✧ First Nations fish harvesters removed their gear after only two weeks of fishing in LFA 25 (Howard's Cove, PEI) in 2005.
 - ✧ Very little lobster recruitment - egg production has increased – larger carapace size.
 - ✧ Used to land 80% canners – 20% markets; now 75% markets and 25% canners (not catching more markets, just less canners). (Western central Strait).
 - ✧ Very few canners this year signaling lack of recruitment into the fishery.
 - ✧ Lobsters are breeding at a smaller size.
 - ✧ Dead and rotting lobsters found in scallop gear near the Confederation Bridge early in the season in last two springs.

- ✧ Lobsters no longer at the head of rivers
 - ✧ Some recovery noted in lobsters and other key species in areas protected by buffer zones (other than in the protected offshore areas between Souris and Murray Harbour).
 - ✧ Black spot shell disease reported for the first time in eastern PEI.
 - ✧ Big crabs may be preying on small lobster; and there are large numbers of crabs.
 - ✧ Cape Egmont lobsters are not molting in this area for the past 5-6 years.
 - ✧ Changes in water temperature impacting where lobster is found.
- Respecting other species:
- ✧ Cod, hake, haddock, flatfish, skates and halibut were abundant 70 years ago, now commercially gone.
 - An increase in white hake observed over the past 2-3 years in the Petit-Cap, NB area.
 - Flatfish have been absent in the central Strait in the vicinity of the Confederation Bridge since the construction of the bridge.
 - ✧ Herring in decline, particularly toward the central Strait, and completely absent in the area of the Confederation Bridge since its construction.
 - ✧ Bait becoming harder to get, get most of it from Madeleine Islands.
 - ✧ Eel populations down dramatically or no longer present in many systems (e.g., Boughton River, PEI).
 - ✧ Tommy cod populations down.
 - ✧ Trout and salmon have declined in rivers and streams around the Northumberland Strait (e.g., to 10-15% of 15 years ago); with even some of the best rivers no longer having runs; angling has gone downhill and continues to worsen. Aboriginal peoples see the decline as a good indicator of a river's state.
 - ✧ Gaspereau and blueback herring are all but gone in eastern NS rivers (e.g., one report or a decline in catches from 500,000 to 10,000-15,000).
 - ✧ Mackerel have been down in numbers since the Canso Causeway was built.
 - ✧ Scallops in decline
 - Eastern Strait scallop fleet at 1/30th of former size.
 - More empty shells in scallops; poor meat quality last year.
 - In 1985-86 the scallop draggers worked Egmont Bay. Their catch was good and so was the lobster catch. However, in following years the draggers found mostly clappers (empty shells). In the late 80s and early 90s some fish harvesters detected pink spots on scallop meats, from which they deduced that the fish in Egmont Bay had some disease. As far as they know it was never investigated.
 - ✧ Oyster larvae difficult to recruit in Shediac Bay.
 - ✧ Conchs, moon snails fewer in traps generally but up in buffer zones.
 - ✧ Silverside landings have been decreasing each year.

- ✧ Sea urchins in decline.
 - ✧ No jellyfish in 2005.
 - ✧ Smelt stocks in decline. There have been no big runs in past 40 years and the smelts being caught now are very small.
 - ✧ Starfish species and numbers in decline as noted in drags and lobster traps in eastern Strait in recent years.
 - ✧ Irish moss abundant 25-30 years ago, has disappeared in various places (e.g. Borden, St. Chrysostome, PEI).
 - ✧ General loss of eel grass:
 - Notable losses in the Wilmot River, PEI.
 - Some rebuilding reported in some areas (Charlottetown meeting).
 - ✧ Fish harvesters reported declines six years ago during interviews to develop the Traditional Knowledge Atlas.
- Steady or increasing species noted:
- ✧ Seal populations up markedly in past 25 years (especially in past 4-5 years):
 - Increase of 10 fold of 1979 levels of 35,000 suggested.
 - Even in the harbours now.
 - 50-70 seals on Pugwash Reef in the summer time.
 - 200-300 seals in Fox Harbour.
 - Linked to reduction in predators (sharks and whales).
 - Causing major problems for the lobster fishery by eating bait and lobsters and other fish in the traps.
 - Lack of ice for haul out and birthing has seals in harbours and on islands.
 - New local wisdom is that where you find seals there is likely good bottom.
 - ✧ Cunner/perch are increasingly numerous, substantially so.
 - ✧ Rock crab increasing. Fishing is still good. Crab sizes vary from year to year. A quota can be filled in 14-15 days.
 - ✧ White hake numbers showing some rebound in the past 2-3 years in the Petit-Cap area.
 - ✧ Increasing presence of invasive species with many fisheries and aquaculture being negatively impacted:
 - Green crab has spread rapidly throughout most of the Strait (although one comment suggesting that cold water had caused them to disappear in some areas last year).
 - Tunicates (4 species); recently introduced to Borden Harbour.
 - Drill snails.
 - Oyster thief (codium), typically a significant issue in oyster production, is now being seen on scallop shells from 80' of water from Egmont Bay-West Point.
 - Black-spot lobster disease reported for the first time in eastern PEI.

- Skeleton shrimp.
 - A new invasive species (unidentified) reported in Borden area.
- ✧ Increase in bore snail and starfish (reddish-purple) population in Western Strait.
- ✧ Sand fleas seem more numerous (because of sandy bottom?) in the eastern Strait.
- ✧ Unusual species noted: two turtles were caught by accident in the Richibucto and Robichaud areas and a blue shark was sighted in inshore water in the eastern Strait.
- ✧ Oysters levelling out; although at low levels; a lot more oyster shells are soft because of some boring organism (not worms).
- In the past 2 years, fish harvesters have started to see a red slime looking like wool that gets caught in the webbing of their traps.
- Ferry track (Borden-Tormentine) used to be excellent lobster bottom, no longer (silt)
- Used to be good fishing inshore but this is no longer the case.
- Reductions in fish-eating birds in Wilmot River.
- Significant increases in cormorants. They have now established themselves where they were never found in the past.
- Mussel aquaculture a relatively recent addition to the coastal area.

4.3.2. Perceived Causes

- Sedimentation (see preceding sections on Physical Environment and Water Quality).
 - ✧ Hurricane Juan reported to have stirred up sediment accelerating the decline in the fishery.
- Degraded water quality (see preceding section on Water Quality).
- Climate change (see preceding section on Physical Environment)
 - ✧ There was a spike in temperatures after Hurricane Juan that may have affected lobster (loss of eggs) and scallops (dead scallops found afterward).
 - ✧ Cold water appears to have caused the mackerel to move away.
- Destruction of seabed by scallop and groundfish dragging (see previous section on Physical Environment).
- Too many fish harvesters on the water using heavier gear, more powerful boats and improved electronics (see following section on Fishing Practices); some disagreement on this point by some individuals.

- Impacts of the Confederation Bridge over the past 10 years. (See previous sections on Physical Environment and Water Quality).
- Fishing rock crab is affecting lobster stocks.
- Predation by large populations of cunners/perch. They eat lobster bait, fish spawn, larvae and juveniles of many species (lobster, herring, mackerel, groundfish, flatfish, etc.).
- Predation by seals; they eat all year around.
- Predation by cormorants:
 - ◇ Thousands seen at a time eating smelts (Wallace, NS area).
 - ◇ One study found a small lobster in the stomach of a cormorant.
 - ◇ Pictou Causeway is a man-made nesting ground.
 - ◇ In Pictou Harbour, they are now moving out of the harbour and nesting on buildings.
- Pair seines and draggers targeting hake wiped out hake stocks.
- Importation of mussels and other species not native to PEI.
- Some moss beds are smothered in Ulva; on other beds the moss has been replaced by Furcellaria; in others (in shallows, 10-15 ft depth), Ascophyllum has taken over; perhaps due to warming waters.
- Increases in invasive species, likely from ballast water dumping and hull fouling:
 - ◇ Tunicates, linked to the movement of mussels and oysters from other areas for processing (e.g., mussel plant at Borden).
 - ◇ Green crabs preying on shellfish and linked to eel decline.
 - ◇ Oyster thief removing oysters from beds and now found on scallop shells in 80' of water (western PEI).
 - ◇ Lobster black-spot shell disease potentially from lobsters brought in from Maine for processing.
 - ◇ Skeleton shrimp.
- Concern expressed that declines in lobster landings coincide with the growth of mussel aquaculture.
- Increase in cormorants that kill vegetation, eat fish stocks and increase toxin levels in the water.
- Irish moss dragging is killing lobsters.
- Different fishing restrictions/practices in different areas around the southern Gulf.
- The Canso Causeway stopped the flow of fish.

4.3.3. Solutions

- Develop alternative harvesting methods for scallops (e.g., diving, culture).
- Stop scallop fishing in the fall when they are spawning.
- We need to be cautious; interventions to manage for one species or to control one species may have unexpected consequences (e.g., the ecosystem changed forever once the cod were eliminated).
- Control seal populations; establish a bounty.
- Develop a commercial gray seal harvest.
- Control cormorant populations (by removing their eggs for two years).
- Issue licenses for cunners/perch (can be selectively caught in traps) and develop harvesting techniques and markets.
- Develop harvesting techniques and markets for green crabs.
- Be more proactive concerning potential introduction of invasives through shipping, transfer of mussels and oysters from other areas, the importation of lobsters, etc.
- More enforcement, bigger fines.
- Reduce fishing pressures on key species.
- Increase the number of rock crab licenses.
- Buy-back fishing licenses (full enterprises).
- Enhancement, hatcheries for lobster, bass and other species (conflicting views on the potential for success). If hatcheries are built, place stage 4 lobsters directly on the bottom.
- An ongoing oyster fishery improves water quality and oyster production.

4.3.4. Priorities for Research and Consultation

- It is important to look at the problems from an ecosystem point of view and not just blaming who/what is eating marketable fish. No-one really knows, for example, if seals or cormorants are the main problem.
- Do a study to map out changes in fish habitat and species abundance now and compare to the study by Hurley et al done before the construction of the Confederation Bridge.
- Regarding lobsters:
 - ✧ We need research to understand reasons for the lobster decline.
 - ✧ Need to know what is happening to lobster larvae:

- There was lots of spawn in past years. Why are there no recruits and no stage 3 and 4 larvae? A Maine study found that locations for stage 4 nursing beds change each year due to currents.
- Review how testing is done to determine numbers of stage 4 lobsters (may need to go deeper in water column).
- Follow up on the lobster larvae abundance study last done by DFO in 1979.
- ◇ Study what has caused mature lobsters to die in the spring in the central Strait in the area of the Confederation Bridge in the past two years.
- ◇ Assess the impact of the Confederation Bridge on lobsters
- ◇ What is causing lobster to breed smaller/younger? A survival response to over-fishing; climate change?
- ◇ Does the presence of remnant cod stocks on the north shore help maintain lobsters by keeping intermediate predators such as cunner in check?
- ◇ Why do catches remain high in the Gulf, but so poor in the Strait?
- ◇ What was the effect of taking female lobsters prior to the ban and are we focusing on the right female carapace size?
- ◇ Research the impacts of the importation of lobsters from Maine (disease implications). Could they bring an invasive species or disease?
- ◇ How has the rock crab fishery affected lobsters (e.g., reduced food supply)?
- ◇ Do research to determine how many lobsters the Strait can support (as is done for salmon rivers).
- ◇ Is there a correlation between increased mussel lines and the decline in lobsters?
- Gather statistical information from older fish harvesters who have good data and who remember how things were in the past.
 - ◇ “The Aboriginal Peoples’ representatives indicated that Aboriginal Tradition Knowledge should be sought before it is lost.”
- Assess the impact of the Confederation Bridge on scallops and other species.
- Test hypothesis: “Without the buffer zones in the east, the fisheries would all have collapsed.” Fish harvesters agreed that there has been noticeable recovery of scallop, kelp & sea urchins in the buffer zones (one dissenting opinion).
- What is the extent of increased numbers of cunner, and what is the impact on lobster, scallop and other species?
- What is the impact of taking just male crabs?
- Test nutrient levels in estuaries before and after mussel beds to see if anything left for the lobster once the water has passed through the mussels.

- Regarding invasive species:
 - ✧ Research to control invasive species (e.g., codium).
 - ✧ Study impact of tunicates coming from Confederation Cove mussel plant and going into Strait (each year there is a further spread of tunicates).
- Regarding seals:
 - ✧ Can DFO come up with proof of seal population numbers that fish harvesters will believe?
 - ✧ Will the oily flesh of dead baby seals around Pictou Island make lobsters sick?
 - ✧ How and what do seals eat? Are there more of them or are they moving inshore? Is there a need for a cull to restore balance?
- Are starfish contributing to scallop depletion?
- What has caused various species of starfish to disappear?
- It might be time to reconsider the timing of fishing seasons as the spring is coming much earlier recently.
- Assess impacts of mussel aquaculture on other marine resources.
- Research to understand why oyster larvae are difficult to recruit in Shediac Bay.
- What is the impact of cormorant increases on fish populations?
- Are there more sand fleas? And if yes, have they increased because of the increase in sandy sediments on the bottom?
- Seek out Aboriginal traditional knowledge before it is lost.
- See preceding sections on Water Quality and Physical Environment.

4.4. Fishing Practices, Technology, Management Plans, etc.

4.4.1. History, Nature and Extent of Changes Observed

- Fish harvesters have put much more pressure on fish stocks with new technology; advancing from a compass to now having sounders and plotters. Some disagreement by some fish harvesters on this point, believing fishing pressure has been more or less constant in recent times.
- With respect to Lobster fishing:
 - ✧ Increases in fishing gear – traps are heavier, physically harder to work gear because of tides and weight of gear.
 - ✧ Concern that fish harvesters are now taking more and more large lobsters given that small lobsters have disappeared.

- ✧ Lobster carapace size increases have helped the situation; they worked because they were phased in gradually.
 - ✧ Fish harvesters in the central Strait, no longer able to make a living on their grounds, tended to move to areas with more lobsters, increasing pressure there.
 - ✧ Ghost fishing by lost lobster traps remains a problem.
- Impacts of scallop dragging noted (see preceding section on Physical Environment).
 - ✧ Scallop gear has gotten larger.
 - ✧ Scallop harvesters from NB will avoid their own lobster habitat and fish on PEI lobster bottom.
 - ✧ Buffer zones to protect lobster habitat create congestion of lobster harvesters in the smaller protected areas, while the scallop harvesters fish around them.
 - ✧ In the eastern Strait, lobster buffer zones were put in place where scallopers cannot drag. Many report increases in populations of lobsters, other species and marine plants (some disagreement).
 - ✧ There's no money in scalloping, but, with lobsters down, fish harvesters have to do whatever they can.
- In the herring fishery:
 - ✧ Ghost fishing by herring gear and dumping of fish by gill-netters on Fisherman's Bank.
 - ✧ Since the rules were changed and by-catch could be sold, large seiners have gone to smaller mesh, increasing fishing pressure to satisfy the market.
- Fish harvesters may not be reporting all their catches
- Gear is being transferred to existing fish harvesters who have their own gear – people from north side where fishing is good come over to south side and buy up the gear – then they sell it and fish on both sides with the boat they already have.
- Young people can't get into fishing because cost of gear is too high – cheaper for existing fishermen to buy gear and allows them to monopolize the market.
- Aboriginal food fishery means extra fishing effort. Aboriginal fish harvesters now more aware of conservation issues.
- Shovels are damaging in the clam fishery.

4.4.2. Perceived Causes

- Management practices are destroying the fishery; out of 35 species, 17 have moratoriums on them (also includes salmon); herring seine vs fixed gear

seen as an example of misguided management practices. Fish harvesters are paying the price by facing more restrictive regulations.

- Quota management has largely been a failure. Effort based systems, supported by effective size limits, such as in the lobster fishery, have been more successful.
- Fisheries management targeted on specific species has not been effective.
- Excessive fishing pressures (including foreign overfishing) and too many fish harvesters leading to overfishing; worsened by the fact that fish harvesters have to fish harder (scallops and lobsters) to survive due to low stocks and increasing costs:
 - ◇ Boats & motors unnecessarily large.
 - ◇ Improved technology.
 - ◇ Better fishing gear.
 - ◇ Too many lobster licenses.
 - ◇ Too many scallop licenses.
 - ◇ Scallop gear too big & heavy, dangerous to crew.
 - ◇ Lobster traps too big – heavy & difficult to use.
 - ◇ There are 57 smelt box nets in Summerside harbour alone. Looks like over-fishing and there is not enough monitoring & enforcement. This is an indiscriminate technology; catches lots of different fish (including trout) and juveniles (flounder, eel, bass), most of which are killed and dumped.
- Mobile gear (scallop and groundfish draggers and seiners) seen as wasteful and destructive.
 - ◇ Draggers wiped out hake stocks.
 - ◇ However it was noted scallop dragging is not the only reason for poor fishing. Between Summerside and Egmont there hasn't been any dragging, yet there are no lobsters to speak of either. Also, there is heavy dragging off West Point, PEI and that is where many lobster boats go to fish.
- Regarding herring:
 - ◇ Herring seiners taking the whole school of herring, leaving nothing to spawn and come back next year.
 - ◇ The herring have no chance of recovery at the rate they are currently being fished.
 - ◇ Sometimes gill nets too long and too many – described as “walling the whole Strait”.
 - ◇ Sound waves from blasting at the Pugwash salt mine and at the Confederation Bridge caused the herring to go; in these two areas there have been no herring since.
- Ghost fishing by herring and lobster gear.

- When fish harvesters reduced moss-harvesting effort to focus on the more lucrative lobster fishery, it is speculated that the condition of the moss beds deteriorated as they were not being maintained.
- Bar clam pump and dredge gear has been tested for impact on sandy bottom. Since sand bars are by nature mobile the gear doesn't have a discernable impact.
- Small lobsters thrown back in the Strait drift to the east benefiting fish harvesters in George's Bay.

4.4.3. Solutions

- Move quickly to a fully integrated ecosystem approach (as is planned under the NSEI).
- Use the Northumberland Strait as a model for the integrated ecosystem-integrated oceans management approach. Given the current state of the Strait, fish harvesters and other stakeholders may be willing to support this strategy.
- Institute a fair and effective buy-back for scallops and lobsters; include full enterprise and involvement of government and the industry:
 - ✦ So far, federal and provincial governments say they don't have the money for it (despite one NS associations modest \$50,000-\$80,000 program).
- There needs to be a capital gains exemption for those selling their enterprises, just like exists for farmers. Bring in a capital gains exemption for retiring fish harvesters to foster transfer of enterprises.
- Compensation for fish harvesters affected by the bridge.
- Strengthen and enforce existing conservation measures.
- Manage for future generations; need to get away from current fish harvester mentality of "take it all now". Need to show fish harvesters the long-term benefits.
- Management plans have to start from "square one".
- Marine Protected areas is a last-ditch effort.
- Respecting the lobster fishery:
 - ✦ Reduce lobster trap sizes and openings.
 - ✦ Make sure all traps have decomposable latches.
 - ✦ Fish multiple trap lines (i.e., eliminate single trap fishing).
 - ✦ Reduce trap limits, although that might make fish harvesters fish harder.
 - ✦ Leave the small and the largest lobsters.

- ✧ Increase carapace size (eliminate cannery from the harvest suggested in one meeting).
 - ✧ Consider closing one or more seasons to see the impacts.
 - ✧ Strengthened conservation measures would need to be southern Gulf-wide so that everyone contributes and benefits equally.
- Non-selective gears should be abolished.
- Fishing gears that destroy habitat should be abolished (e.g., scallop drags).
- Expand, adjust marine buffer zones to protect lobster habitat.
- Respecting herring:
 - ✧ Eliminate herring seining; assuming proper management, gill nets are preferred to mobile gears (herring & mackerel).
 - ✧ Herring spawn at night and should not be fished at that time.
 - ✧ Reduce herring quotas by half.
 - ✧ Limit net numbers in the herring fishery.
 - ✧ Increase enforcement e.g., on net limits, dumping, exceeding quota limits and catch reporting.
- Transfer access to, and put fisheries management in the hands of, First Nations.
- Improve fishery statistics as they are essential for effective decision making:
 - ✧ Have fish harvesters involved in data collection.
 - ✧ System must capture all landings including those sold privately.
- Abegweit agreed not to participate in their food fishery.
- Develop new tools for harvesting clams.
- DFO needs to stop the practice of north side buying south side gear.
- Compensate scallop harvesters who lost livelihoods when the spring fishery was closed (e.g., provide crab allocation).
- Cancel all inactive scallop licenses.
- Revisit scallop season timing.

4.4.4. Priorities for Research and Consultation

- What long-term impact on sustainability does heavy fishing pressure have on the industry? How do we balance effort with stocks (buy-backs, seasons, quotas)?
 - ✧ We have learned in northern cod and Peruvian anchovy fisheries that heavy fishing pressure at the low end of the cycle can result in catastrophic collapse.
- Assess damage being done by scallop dragging.

- Study alternatives to scallop dragging e.g. summer diving and/or cultivation.
- Research lobster buffer zones; compare to dragged bottoms.
- Compare fishing practices with the Magdalene Islands as the stocks there seem to be well managed.
- Quantify by-catch and waste in smelt box-net fishery.

4.5. Governance Issues, Lines of Responsibility, Jurisdiction, Capacity to Manage the Ecosystem

4.5.1. History, Nature and Extent of Changes Observed

- Issues of trust and transparency:
 - ✧ There is significant distrust of government agencies as reported by all stakeholder groups.
 - ✧ There is distrust between researchers and fish harvesters and suspicion about the way science has been conducted in the past and who has benefited.
 - ✧ There is disappointment about the commitment of DFO and the Maritime Fishermen's Union on the Confederation Bridge file. They seem to believe that the issue is simply not a priority.
 - ✧ DFO is seen as lacking responsiveness and sensitivity on various matters (e.g., efforts to deal with exploding seal population and certain watershed group issues).
 - ✧ The Department of Fisheries and Oceans appears to be in a conflict of interest as both a steward of resources and a revenue generator. This governance issue must be recognized as it has the potential to direct resource management decisions made by the DFO, affecting all persons surrounding the Northumberland Strait.
 - ✧ Results of some studies (e.g. Confederation Bridge, treatment plants, potatoes) stay hidden.
 - ✧ A complaint that the Maritimes Fishermen's Union was not representing fish harvesters effectively, to the point that fish harvesters were getting blamed for mistakes made during the construction of the Confederation Bridge.
- Issues of politics and priorities:
 - ✧ There is a lack of political will to address commercial pollution, habitat destruction (e.g., scallop dragging, excessive fishing effort, Confederation Bridge, spreading of manure on frozen ground, clear-cutting to the shore) and other environmental threats.
 - ✧ Some studies are political; whoever has the most clout gets the resources and studies (e.g., farming and tourism); sometimes government is our worst enemy.

- ❖ Government development decisions are almost always based on politics and job creation first, longer term environmental and fishery sustainability considerations are lost:
 - Heavy industry (e.g., Pictou and Canso Strait areas) provides jobs but takes away from jobs in the fishery and other industries dependent on a healthy environment and that have been around for generations.
 - Preventing seal control measures in fear of tarnishing political image.
 - Seine fishery off eastern PEI is allowed to continue to sustain jobs in NB.
 - ❖ Constant switching of Ministers is not good, nothing ever gets done; have to start all over again.
 - ❖ There is a conflict of interest by having a provincial minister in PEI responsible for both agriculture and fisheries.
 - ❖ DFO does not act because there is no agreement among the fish harvesters; it's too political.
 - ❖ Why have there been so many studies to assess the removal of the Petitcodiac River, while there was little done prior to the construction of the Confederation Bridge?
 - ❖ It was pointed out that DFO was doing a socio-economic analysis; however the view was expressed that the Working Group doesn't need to do any more research to draw important conclusions of the socio-economic impacts of the Confederation Bridge on the fishery.
 - ❖ Seems to be a consensus for change among fish harvesters, but no one will stand up for change.
 - Issues of performance and capacity:
 - ❖ After all that has been done in the past 15 years to try to improve the situation, very little has changed. Management has been ineffective and now fish harvesters are paying the price by facing more restrictive regulations.
 - ❖ There has been lots of talk and many meetings, but no action. Fish harvesters are tired of the inaction by government agencies and want answers as soon as possible.
 - ❖ Government agencies are not doing their jobs in enforcement (e.g., fish kills, effluent inspections, etc.).
 - Key conditions governing the construction of the Confederation Bridge were not enforced by the regulatory agencies (e.g., Piping to carry run-off of the bridge).
 - Federal and provincial governments not doing their jobs to protect the environment and habitat because job creation wins out.
 - DFO does not enforce its own regulations on habitat protection (e.g., scallop dragging) or conservation (e.g., undersized lobsters).

- A failure to address foreign over-fishing has resulted in fish stock declines.
- ◇ Centralized decision-making in DFO often leads to disproportionate impacts on sub-regions and communities.
 - ◇ There is unfairness in the application of environmental protection regulations (e.g., individual homeowners must put in effective septic systems, yet municipalities such as Pictou, NS continually dump raw sewage).
 - ◇ Frustration noted that efforts made to clean up one in one area yet another area keeps dirtying it.
 - ◇ Transport Canada, Environment Canada, Public Works, and Strait Crossing conspicuous by their absences in this process.
 - ◇ There is unbalanced and insufficient commitment to enforcement among different fisheries (lobsters get all the attention, more needed for shellfish, and for lobsters, too).
 - ◇ There has been a decrease in DFO Conservation and Enforcement.
 - ◇ There is a lack of capacity by DFO for management and enforcement.
 - ◇ Fish harvesters have to have the will to do something; the conservation option is contentious.
 - ◇ DFO seen as heavy handed by some stakeholder groups.
 - ◇ DFO has too many employees in Ottawa, not enough in science and enforcement.
- Issues regarding collaboration and coordination between government agencies and between and with stakeholders:
 - ◇ Many agencies at all levels of government are responsible for fisheries and environmental protection, but there is a lack of coordination leading to inefficiency and ineffectiveness.
 - ◇ The lofty and appropriate intentions of the Oceans Act can never be met due to the division of responsibilities between DFO and Environment Canada
 - ◇ Fish harvesters between the provinces are very fractured and are not working together.
 - ◇ There is a frustrating lack of cooperation on issues between industries that impact each other.
 - ◇ Importance of Aboriginal traditional knowledge in decision-making.
 - ◇ Leadership and persistence by an individual fisher recognized as having significant impact in getting important information, responses to questions, issues addressed and research under way.
- Issues regarding public awareness:
 - ◇ Studies are generally poorly advertised and distributed.
 - ◇ Public not aware of extent of the problems or of their contribution to the problems and their role in restoration.
 - ◇ Public awareness is key to mobilizing political will.

4.5.2. Solutions

- Regarding trust and transparency:
 - ✧ NGOs, universities or other independent organizations or enterprises should conduct the research.
 - ✧ There is need for better publication and sharing of research results and standards (e.g., the Dr. Jeff Ollerhead study on suspended Sediments in the Strait; protocols if high levels of toxins or pesticides are found in the water).
 - ✧ Academia needs to acknowledge and respect fish harvesters' and Aboriginal knowledge and experience.
 - ✧ DFO needs a forensic audit.
- Regarding politics and priorities:
 - ✧ Political will and leadership to support enforcement of existing environmental and fishery laws (including safe levels of pollutants) despite short-term impacts, is required.
 - ✧ Ministers for agriculture and fisheries need to be two different people.
 - ✧ Don't play politics with fishery regulation and management decisions; be fair between NB, NS and PEI.
- Regarding performance and capacity
 - ✧ Government agencies should be increasing enforcement programs and doing their jobs by enforcing environmental and fishery laws.
 - ✧ Government agencies should be taken to task and held accountable for not fulfilling their responsibilities (e.g., not demanding the construction of piping to remove run-of from the Confederation Bridge to the shore).
 - ✧ DFO should protect fish habitat by allowing only the least damaging gear available for catching any species.
 - ✧ DFO should be forcing the province to act on fish kills – they are ultimately responsible for water.
 - ✧ DFO should act to conserve the fishery. They should not just talk about it, but set the priorities and act.
 - ✧ Use DFO resources more carefully and strategically.
 - ✧ DFO needs half as many people.
- Regarding coordination and collaboration:
 - ✧ High-level representatives of Transport Canada, Public Works Canada, and Environment Canada must become actively involved and accountable in this process.
 - ✧ Improve communications and working relationships between provinces and the fish harvesters in the three provinces.
 - ✧ Create an Oceans Department in order to truly advance on integrated oceans management.
 - ✧ Move decision-making in the management of a fishery as close to the stakeholders as possible.

- ✧ Conduct research to develop a clear understanding of the current attitudes and beliefs of stakeholders (in particular, fish harvesters) regarding the issues and what lengths they are willing to go to address the challenges.
- ✧ Develop consensus for change and then for action among fish harvesters.
- ✧ Develop and support structures to build communication, cooperation and action between stakeholders involved in the issues.
- ✧ There is a need for more, better and coordinated policing of environmental and fishery laws by all levels of government.
- ✧ DFO should truly practice co-management and not just give it lip service. They would have to accept liability as well.
- ✧ Conduct socio-economic and anthropological research to determine how to draw the various sectors of the economy, First Nations and government agencies together to make meaningful progress on ecosystem issues.
 - Study consultative and consensus-building traditions used effectively in First Nations Communities to truly engage stakeholders in the process.
 - The Tri-partite process also provides important lessons for building trust through “without prejudice“ discussions that result in effectively bringing diverse points of view to common understanding and, thereby allowing for progress.
- Regarding Public Awareness:
 - ✧ Greater education of the general population regarding farming and fishing is needed to create a better understanding of how everything is connected and how everyone contributes to the problems and can contribute to solutions. Such communications work to build political will and necessary commitment of resources.

4.6. Socio-Economic Impacts

- Harvester incomes have dropped sharply. Economically and socially, things are at a critical stage now and time is running out.
 - ✧ Greater reliance on Employment Insurance.
 - ✧ Used to be able to fish steady April through September. Now maybe 2 months plus herring.
 - ✧ 80% drop in fishing income from Egmont to Point Prim.
 - ✧ Most are barely scraping by – harvesters don’t buy new gear anymore but fix what they have which could be a safety issue.
 - ✧ The costs of fishing going up.
 - ✧ Fishers have to travel farther to fish, which has increased the cost of fishing as well as creating longer work days.
- Communities are losing long-term losing family businesses.

- ❖ Many lobster fishers have sold their gears, a loss of the potential of the community for the future.
 - Summerside used to have 7 licences and now 0.
 - Cape Egmont went from 28 (40 yrs ago) to 7 today.
 - In Egmont Bay there were more than 30 boats not long ago; now there are 14 left.
 - In 3 harbours on Egmont bay there is used to be 70 fishers in now there are 35 (last 20 years).
 - Oyster fishers down – especially since 2003 – Bedeque and Wilmot rivers main fishing areas and they have gone down.
 - Only 40-60 fishers left in Wilmot oyster fisher following 2003 oyster kill.
 - ❖ A lot of fishermen on the edge – barely making a living; fishers in West Point down to 24 from 65.
 - ❖ Young people don't want to take up fishing because they can see it's hard work and no money.
 - ❖ Primary industries generate new money; when they fail, entire communities feel the effects; as is now the case in the fishery. There are predictions that there will be no fishery in the Strait within 20 years.
 - ❖ Costs of fishing are going up (bait and travel distances), decreasing viability.
 - ❖ Spin-off benefits of fishery greatly decreased; it shows in slow local economy (less spending, fewer jobs).
 - ❖ Some community rinks and halls are closing because there isn't the money to support and maintain them anymore.
- There are increasing difficulties recruiting and retaining crew.
 - ❖ The former helpers have shifted to various occupations including woodcutting and shell fishing, while many have left the province to find work.
 - ❖ It is harder to get help as reduced fisheries have shortened fishing activity to 14-15 weeks.
 - ❖ Deck hands are being laid off early or only working every second day.
 - ❖ Lot of people going west for work; the wages here are ½ of what they are in other provinces so it is hard to keep workers here.
- Many community institutions and businesses are no longer viable.
 - ❖ A co-op store has closed.
 - ❖ A church will have to come down because there is not enough money in the community to repair it.
 - ❖ Processing plants are closing down putting people out of work while fish is going off island to be processed?
- Stresses for families and communities increasing:
 - ❖ Wives take the brunt at banks, etc., as they often handle the finances.
 - ❖ Some scallop fishers lost their homes when spring fishery was closed.

- ✧ Increase in people going west to work – if they don't come back, there may not be enough people to work on the boats.
 - ✧ Standard of living going down in families as income is lost.
 - ✧ Whole communities are being damaged because of fishing people moving out west in winter to pay off their boats and survive.
- Licenses for depleted lobster, scallop, groundfish have lost their market value.
- Tourism depends on the ecosystem and aesthetic health of rivers.
 - ✧ Areas of Montague Wharf are inaccessible due to sediment build up.
 - ✧ Tourism affected by damage to beaches, aggressive green crabs, declining water quality.
 - ✧ Homes and cottages have to be moved due to erosion.
- Increasing fishing pressure in some areas:
 - ✧ Fishers in central strait have sold out; licenses moved east and west, adding pressure to crowded grounds elsewhere.
 - ✧ There's no money in scalloping any more but with lobsters down, fishers have to do whatever they can.
 - ✧ High cost of fuel, gear and bait means more fish needed.
- There is a need for a comprehensive analysis of the impacts of the Bridge on costs and earnings of fish harvesters in the Strait
 - ✧ The industrial plants are providing jobs but they are taking away from jobs that have been around for generations.
 - ✧ We need solid scientific evidence; what's the mortality rate in this area?
 - ✧ Government should look at the long run: jobs in the fisheries and people in the communities instead of the short-term gain of a few plants being here.
- We have no idea of what aquaculture sites will have on long-term effects on the eco-system. They were just giving people a \$100,000, saying go out and make a fish farm and give three or four people a job. How does the eco-system balance and work? We need to understand it. Have to develop real eco-system knowledge as a basis for effective conservation management.

4.7. Process Issues Associated with the EOAR

- Process:
 - ✧ The process is long overdue.
 - ✧ There is a need for action, now; people are tired of waiting. If nothing happens, it will be even worse, as in the next round there will be less participation and interest, as parties will feel they wasted their time.
 - ✧ Be clear on the desired end result; is it to have fish harvesters have a viable fishery?
 - ✧ Have timeline for actions.

- ◇ It is important to begin the process by doing a survey to benchmark key attitudes. Do people understand and support ecosystem and precautionary approaches. Do fish harvesters report honestly? Are people willing to pay more to clean up pollution, etc? By understanding where people really are on these issues, we can better select priorities and strategies for next steps and we can mount a public education campaign to change attitudes and create a climate of support for positive change.
 - ◇ There must be more transparent, timely and complete access to ongoing developments, studies, minutes of meetings, decisions, results, etc. Specifically, there needs to be access to studies done and data collected by Strait Crossing and Public Works.
 - ◇ Issues must be addressed in all three provinces if it is to work.
 - ◇ There is interest in knowing how long the process will take and what the costs would be.
 - ◇ There is need to be clear on what happens in the process after March 2007 when the EOAR is completed. Who decides which research priorities will be acted on?
 - ◇ A concern was registered that the process may be delayed or cancelled by the new government.
 - ◇ The process received cautious approval from most participants although one concern registered that it appears front-end-loaded.
 - The NSEI Working Group
 - ◇ High-level representatives of Transport Canada, Public Works Canada, Environment Canada and Strait Crossing must become actively involved and accountable in this process, including active participation on the Working Group (an often repeated point).
 - ◇ There should be actual fish harvesters on the Working Group (currently, there are only fish harvesters' organizations' representatives). (A frequently repeated point).
 - ◇ The Central Northumberland Strait Fisherman's Association is not represented on the Working Group (a repeated point).
 - ◇ There is an interest in fish harvesters attending Working Group meetings.
 - ◇ A question if L'Association des Amis de la Kouchibouguacis was a member of the Working Group.
 - ◇ A watershed group in NB objected to how members of the Working Group were appointed (but not to the person selected); stating they would have preferred a consultative process on selection.
 - Engagement
 - ◇ Aboriginal representatives have asked for in-community consultations with community members to assure that their traditional knowledge and viewpoints are effectively heard and integrated into the process.

- ✧ The views and interests of Aboriginal Peoples living on traditional homelands are to be distinct from the First Nations and other stakeholder groups.
 - ✧ More fish harvesters must be involved in the study and in follow up research (including “on the water”) and in decision-making.
 - ✧ Involve fish harvesters and other stakeholders directly and transparently in all the discussions and decisions that will take place during this process.
 - ✧ There must be an active outreach effort to involve fish harvesters and other stakeholders.
 - ✧ The Working Group should present any proposed action plans to fish harvesters for review.
 - ✧ One sector objected to DFO not having representation at one meeting.
- The EOAR
 - ✧ The Area of Study should include the “Boundary Zones”, (a frequently repeated point) as that could be used for a control
 - ✧ More fish harvesters must be involved in the study and in follow up research (including “on the water”) and in decision-making.
 - ✧ Much is already known and should be acted on right now; do more research only where necessary.
 - ✧ DFO should treat different areas of the Strait separately with separate sections within the overall report.
 - ✧ Concern expressed that the process would not be taken seriously and that scientists would make their decisions without taking traditional knowledge into account.
- Anticipated Outcomes:
 - ✧ There must be proactive, long-term solutions, not just band-aids.
 - ✧ There must be a multi-stakeholder action plan.
 - ✧ The report needs to produce comprehensive, long-term trend data on key variables – erosion, water flows, water temperature, water quality, fish landings, inter-species relationships, etc. This is the basis for good planning and remedial action, not just knee-jerk reactions.
 - ✧ The report must specify conservation actions to follow in order to rebuild fish stocks.
 - ✧ There should be conclusive evidence on impacts of the Bridge given the significance of the issue.
 - ✧ There must be results that reflect and respect fish harvesters’ concerns.
 - ✧ There is a need for a public education campaign to support restoration
 - ✧ A concern was registered on a number of occasions that the EOAR process may lead to more restrictive controls (closures, quota reduction) on fish harvesters.

5. APPENDIX B - MEETINGS HELD

PRE-ECOSYSTEM OVERVIEW AND ASSESSMENT REPORT CONSULTATIONS		
Date	Location	Target Group
November 28, 2005	Murray Corner, NB	Fish Harvesters
January 30, 2006	Buctouche, NB	Fish Harvesters
January 30, 2006	Shediac, NB	General Public
January 30, 2006	Toney River, NS	Fish Harvesters
January 30, 2006	Wallace, NS	Fish Harvesters
January 31, 2006	Stellarton, NS	General Public
February 2, 2006	Charlottetown, PEI	General Public
February 3, 2006	Poole's Corner (Montague), PEI	General Public
February 6, 2006	Summerside, PEI	General Public
February 7, 2006	Wellington, PEI	General Public
February 17, 2006	Shediac, NB	Eastern NB Watershed Groups
February 20, 2006	Summerside, PEI	Mi'kmaq Confederacy of PEI
February 20, 2006	Amherst, NS	Maritimes Aboriginal Peoples Organizations

6. APPENDIX C - OVERVIEW OF WRITTEN SUBMISSIONS

INTRODUCTION

Members of the public were invited to submit written presentations to the Northumberland Strait Ecosystem Working Group on their views regarding environmental, fishery and related changes in the Strait.

The following summarizes the submissions received up to February 24, 2006. Copies of the submissions are available by contacting:

Pierre Mallet
Oceans and Habitat Division
Department of Fisheries and Oceans
343 University Avenue
P.O. Box 5030
Moncton, NB
E1C 9B6

Leo Patrick J. Cheverie, Private Citizen, PEI

- Mr. Cheverie comes from a fishing family on PEI.
- He cannot believe that the decline of biodiversity in the Strait and the introduction of the Confederation Bridge are two unrelated incidents given the concurrent timing.
- He believes global warming is also a factor.
- He recommends research into both these factors as well as the level of exploitation of various fishery stocks by the various gear types.
- Mr. Cheverie notes that oil and gas exploration may also have negative impacts and recommends that a moratorium be put in place.

Shelton Barlow, Fisher and long time leader in the Prince County Fishermen's Association, Springfield, PEI

- The author notes the following changes:
 - ◇ All the moss beds between Howard's Cove and Wood's Cove have been covered over by silt.
 - ◇ Lobster traps set within 15' of water come up with an inch of sand in the bottom.
 - ◇ The tide has become much stronger, requiring longer buoy lines.
 - ◇ The water is much dirtier now. One can see the run-off coming off the capes, as there are no buffer zones.

- He expresses concern about pollution coming from NB and various point sources on PEI (including run-off from the Confederation Bridge) and is looking for water quality monitoring and testing and enhanced enforcement.

Dave and Elaine Baglole, Bonshaw, PEI

- Mr. and Mrs. Baglole have been fishing in District 25 (western Northumberland Strait) since 1985.
- They are working to engage fellow fish harvesters and others to deal with what they see as lobster habitat destruction by scallop dragging.
- They note that there have been many new regulations to attempt to deal with lobster conservation, but that evident habitat damage is being ignored by DFO even though it is contrary to section 35(1) of the Fisheries Act.
- They state that the scallop drags must be removed from the fishery (noting that scallop dragging has not been allowed on parts of the north shore) followed by the establishment of artificial reefs.
- They stress that their efforts are to protect and rebuild the fisheries and not an attack on scallopers.
- Mr. and Mrs. Baglole note that time is running out to protect and rebuild the fishery and note that the loss of the fishery will be felt by all in the community.

Lesley Dubey, Artist, Charlottetown, PEI

- Mrs. Dubey is an artist who has taken a particular interest in the Northumberland Strait with a focus on the garbage that is dumped in, or near, the Strait.
- Mrs. Dubey collected, by herself, ¼ tonne of garbage along six kilometers of shoreline and notes that that amount would only be a small fraction of what is on and in the water and on the seabed. The more common components included parts of Styrofoam buoys, plastic bait bags, oil and transmission fluid containers, fast food containers and other non-biodegradable materials.
- In an effort to create awareness about the problem, Mrs. Dubey created an exhibit, “Garbage Collection – From Store to Shore” that was displayed in Tignish and Charlottetown.
- Included with her submission were several newspaper clippings about her exhibit, including an editorial in the Journal-Pioneer lauding her work in support of drawing attention to the issue and providing an extensive list of the items recovered.

- Mrs. Dubey has volunteered to document on film or video the garbage on an offshore sand dune off Hebron, PEI. The resulting video could also be used as an awareness and educational tool.

George MacLeod, Fisher, Beach Point, PEI

- Mr. MacLeod has fished out of the Beach Point area for 35 years. He has witnessed the decline of the lobster fishery, which he blames largely on the “devastation” of the lobster habitat by scallop dragging.
- He notes that lobster harvesters have been crowded into the few remaining protected lobster grounds.
- He stresses that the issue of scallop dragging must be addressed very soon or the lobster industry will be set back even further. He observes that the north shore continues to have healthy lobster catches, noting that there are approximately three licensed scallopers who have very restricted areas in which they can fish.
- He recommends the closure of the scallop fishery to protect the more valuable lobster fishery.
- Mr. MacLeod recommends research into alternative methods of harvesting scallops and into research to support the rebuilding of lobster fisheries.
- He notes the scallop fishery has been reduced over the past few years from 200-300 active licenses to about 50-60.
- Mr. MacLeod notes that water quality degradation and siltation also have to be addressed.

Ronald MacLean, Scallop Harvester Representative, Murray Harbour, PEI

- Mr. MacLean has been a long time representative of single scallop license holders and a member of the Scallop Advisory Committee.
- He is working with a variety of organizations and fish harvesters on projects to diversify opportunities for scallop license holders in Scallop Area 24 (Eastern Northumberland Strait).
- The “Northumberland Strait Diversification Sea Scallop Research Project” proposes four components:
 - ◇ Sea Scallop Cage Project
 - ◇ Sea Scallop Commercial Diving
 - ◇ Exploratory Research Lease Site for Sea Scallop/Mussels
 - ◇ Sea Scallop Enhancement
- Mr. MacLean is seeking financial support for the projects, which would serve to reduce scallop dragging pressures.

- The submission includes a wealth of information on the history of the scallop fishery, impacts of scallop dragging on lobster habitat, nutrient enrichment and crab allocation issues.

Bruce and Deneen Ferguson, The Underwater Council of PEI

- The authors note they are well positioned to observe the negative impacts of sedimentation and eutrophication resulting from nutrient run-off from large-scale agriculture.
- They note that they have been advised that Northumberland Strait shore estuaries have greater flushing action and thus less eutrophication than north shore PEI. This leads them to fear that sediments and nutrients are being more widely dispersed in the Strait resulting in widespread impacts.
- They note that they see first-hand how important relief and vegetation on the sea floor is for a wide variety of animals and express concern about the destructive nature of practices such as scallop dragging. Divers can easily witness the marked difference in abundance of life forms between a sea floor that is flat and covered with silt and one that has been better protected from human activities.
- They note that their group could represent a valuable resource for scientists monitoring the state of the habitat in the Strait. They are prepared to assist by recording observations and data under protocols provided by researchers.
- They propose the development of small artificial reefs at strategic points in the Strait, noting the success of such structures elsewhere in creating productive habitat for diverse marine organisms.

David Daughton, Mermaid, PEI

- Mr. Daughton notes there were no jellyfish in front of their home in the Hillsborough River from early spring to late fall 2005 for the first time ever.

Rory Hart, Private Citizen, PEI

- The author speaks of climate/weather change. He understands warmer temperatures and less ice-cover (among other climate changes) may be due to the polar air mass shifting to the east and affecting Europe. He wonders about the impacts of Great Lakes water temperatures on the Strait.

James Acorn, Fisher, Abney, Kings Co., PEI

- Mr. Acorn is a long time fisher in the Murray Harbour area.
- He submitted a series of articles about cod, cunner and seal-fisheries interactions as background to the concerns he raised during the consultation.

Donald Martin, Fisher, long time representative of fish harvesters, Cap St Louis, NB

- Mr. Martin provides a long and detailed reflection on the history of the fishery from its ability to sustain modest fishing pressure and support coastal communities through generations until finally being overwhelmed by modern technology.
- He writes of the history of the organization of fish harvesters in the southern Gulf as well as the entry of Aboriginal fish harvesters in to the fisheries.
- He provides overviews of the development, history and current status of the lobster, groundfish, scallop, herring and snow crab fisheries, each with their unique stories and ongoing declines.
- He describes the beginnings of the Maritimes Fisherman's Union as well as its successes, despite the challenges of the past 29 years as well as of his fears for its future.
- He touches on the problems associated with pollution and with the effects of the Confederation Bridge.
- He notes that the average fisher has probably doubled his effort over 25 years, and that there are probably too many fish harvesters. He feels the government has the responsibility of bringing forward a buy-back program.
- He stresses that poaching has become a major problem and now resembles organized crime in its practices and it needs everyone's attention.

Heather Barnick, Researcher, PEI

- Ms. Barnick provided a copy of a research report she conducted for Earth Action on the impacts of the ban of cleaners in the PEI oyster fishery.
- The report discusses the original decision and provides insight into whether or not the cleaners were a threat to conservation and as to what benefits their position might have provided economically, environmentally and socially.
- The report studies how fish harvesters and communities were affected by the ban and how fishing practices were altered. She explores the consequences of these changes on the resource, the fish harvesters and the community at large.

Stewart Field, Fisher, Oyster Grower, Bayfield, NB

- Mr. Field provided extensive background concerning losses he suffered on his oyster leases following the construction of the Confederation Bridge.
- The file describes the extensive work and financial investment made in the 10 years before construction of the bridge and establishes a record of concern being registered with the proponents before construction began.
- Mr. Field, in verbal comments given with the submission of the package, is thoroughly convinced that significant observed changes in the Strait, and, particularly, in proximity to the bridge where his leases are located (sedimentation, tide and current changes - “backwash” at the bridge) were responsible for his losses.
- Mr. Stewart feels that the compensation program and representatives of government and the proponents have failed to respond fairly to his situation.

Eric Clements, Coordinator, Mill River Wildlife Federation, O’Leary, PEI

- Mr. Clements expresses concern about surface water contamination in west Prince County, PEI.
- In verbal comments made with his submission, Mr. Clements notes alarming increases in nitrate levels in surface water and in ground water that is entering local waterways and the Northumberland Strait. He also is concerned about sediments, pesticides and herbicides entering the Strait.
- Mr. Clements will be providing additional material for the EOAR review.

7. APPENDIX E - LIST OF PARTICIPANTS ATTENDING CONSULTATIONS