

Atlantic Region Species at Risk Research Paper

Dr. Heidi Weigand & Shelley Price
March 31st, 2020



Overview

Focus on three species at risk in the research efforts to determine what policy and advocacy efforts are needed to support marine ecosystem sustainability for our Atlantic Harvesters and Communities

Species included are the

- American Eel,
- Atlantic Salmon, and
- North Atlantic Right Whale.

TABLE OF CONTENTS

Project Background	3
Project Purpose:	3
Project Objectives	3
Key Activities for Project	3
Project Methodology	4
Proposed Management and Sustainability Processes	5
Field Experts and Best Practices	7
Indigenous Knowledge Use	9
Identified Gaps	12
Recommended Sustainability Practices	14
Recommended Policy and Advocacy	14
Scientific and Political Processes	15
Field Experts and Best Practices	16
Indigenous Knowledge Use	19
Identified Gaps	20
Recommended Sustainability Practices	22
Recommended Policy and Advocacy	23
Governance Practices and Structure	23
Field Experts and Best Practices	26
Indigenous Knowledge Use	26
Identified Gaps	27
Recommended Sustainability Practices	28
Recommended Policy and Advocacy	28
Key Organizations and Partnerships	29
Summary of Identified Gaps	31
Recommendations	33
Conclusion	34
Appendix A – Recommended Action Plan Worksheet	35
Appendix B – Recommended Influencer & Decision-Maker Worksheet	35
Appendix C – Database Workbook for SAR Literature Review	35
Appendix D – Images	35

Project Background

Project Purpose:

The overall project focus is to conduct research around species at risk in the Atlantic Region. The intent is to provide guidance and recommendations to the Atlantic Policy Congress of First Nation Chiefs Secretariat to help communities develop awareness and practices to support their needs.

Project Objectives

- Conduct research to understand the marine protected areas in the Atlantic Region. (Now)
- Focus on three species at risk in the research efforts to determine what policy and advocacy efforts are needed to support the sustainability.
- Species include:
 - American Eel;
 - Atlantic Salmon, and
 - North Atlantic Right Whale.
- Determine the role that APCFNC can play in the efforts to manage the species at risk in order to support our harvesters and communities.
- Provide policy and advocacy recommendations for APCFNC to support the Atlantic Harvesters and Communities.

Key Activities for Project

The activities in this section include:

- Identify current and proposed management and sustainability processes
- Understand key organizations and partnerships
- Understand the scientific and political processes
- Identify governance practices and structures
- Identify the field experts and best practices
- Identify how Indigenous knowledge is being used to manage the species and what more can be done.
- Identify the gaps in the Atlantic Region
- Benchmark sustainability practices that could work for these species
- Assess the policy development and advocacy needed to maintain or increase the survival of these species.

Project Methodology

A secondary research approach will be used to collect and analyze the information using a 2-step process.

- 1) Database – a database of scholarly literature on Species at Risk has been organized into themes of the foci of the literature (i.e. species, knowledge gathering techniques, methodologies, rights, management frameworks, sustainability objectives, threats, and place) the species at risk in the study, and any organizations, governments, or institutions affiliated with the studies. The database includes international species at risk studies, Canada specific and Atlantic specific searches for any scholarly work in the last five years on any species at risk (SAR) not limited to marine SAR, then extend out to each of the specific species: Atlantic Salmon, American Eels, and North American Right Whales. We also explore fisheries specific literature that includes search terms species at risk. There are over 190 species at risk articles in the database.
- 2) Appendix – an appendix to the database includes 43 pages of tables, figures, and frameworks sourced from the literature review.
- 3) Report of findings through the literature review which includes recommendation and key findings relating to the key activities for this project
 - Proposed management and sustainability processes
 - Key organizations and partnerships
 - Scientific and political processes
 - Governance practices and structures
- 4) Within each of the key activities the following are highlighted.
 - Field experts and best practices
 - Indigenous knowledge use
 - Identified gaps
 - Sustainability practices
 - Policy and advocacy recommendations.

Proposed Management and Sustainability Processes

“What will the ecological repercussions be...you can’t take too much without compromising the ecological integrity of the area...everything is so dependent on something else which is traditional knowledge, it is not just philosophical, it does have a practical application” (Elder Albert Marshall, UINRTV, Eel Tradition, 0:20 – 3:02min)

"Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs." (Bruntland Commission Report, 1987)

Marine ecosystem protection in Canada is regulated through various Acts. The purpose rests primarily under the realm of conservation and protection of marine species, habitats, and ecosystems. From an ecosystems perspective of conservation and protection, everything is dependent on something else within the ecosystem, and we cannot add a threat, or remove a species without compromising the ecological integrity of an area.

Figure 1: Federal, Provincial, and Territorial Tools for Marine Protection in Canada

TABLE 1 Federal, provincial, and territorial tools for marine protection in Canada

Legislation/regulation	Type of area	Department/agency	Purpose
Federal Government			
Oceans Act, 1996, c. 31	Oceans Act Marine Protected Area (OAMPA)	Fisheries and Oceans Canada	To conserve and protect fish, marine mammals, and their habitats; unique areas; areas of high productivity or biological diversity
Fisheries Act, 1985 c.43	Fishery closure	As above	To conserve and protect fish and fish habitat; to manage inland fisheries (among other purposes)
Canada National Marine Conservation Areas Act, 2002, c. 18	National Marine Conservation Area (NMCA)	Parks Canada Agency	To conserve and protect representative examples of Canada's natural and cultural marine heritage and provide opportunities for public education and enjoyment
Canada National Parks Act, 2000, c. 32	National Park	As above	To protect representative examples of Canada's natural heritage for the benefit, education and enjoyment of Canadians
Canada Wildlife Act, R.S., 1985, c. W-9	National Wildlife Area (NWA)	Environment Canada	To conserve and protect habitat for a variety of wildlife, including migratory birds and species at risk
Migratory Birds Convention Act, 1994	Migratory Bird Sanctuary (MBS)	As above	To conserve and protect habitat for migratory bird species
Species at Risk Act, 2002	Protected critical habitat	Fisheries and Oceans Canada, Parks Canada Agency and Environment Canada	To protect and recover wildlife species at risk in Canada

The academic literature on human interactions or anthropogenic threats that are most commonly explored are identified in Figure 2. These findings suggest that APCFNC in its policies on conservation and protection efforts of marine species may want to establish involvement in management and sustainability, science, and political processes related to the mitigation of these threats. Rather than focusing exclusively on fisheries, and species at risk, APCFNC can take a

holistic approach and advocate in science-policy processes that involve any marine ecosystem threats.

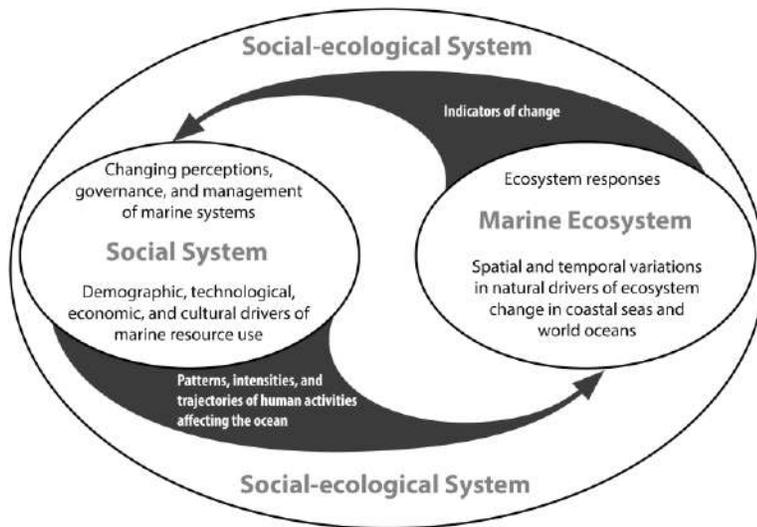
Figure 2: Anthropogenic threats identified in the literature

Anthropogenic threat	# of times appeared*
Pollution and biomagnification	14
Climate change	12
Invasive and predatory species	12
Commercial fisheries	10
Ship strikes	7
Energy – tidal, river, offshore oil (including seismic testing)	7
Habitat transformation and loss	7
Acidification	3
Global tourism	3
Aquaculture	2
Entanglements	2
Governance complexity and knowledge gap	2
Recreational fisheries	1
Infectious diseases	1
Marine Algae	1

*The numbers represent the number of times the anthropogenic threat appears in the literature review, indicating that the anthropogenic threats that were the foci of research in the sample of literature was weighted more heavily to those at the top of the list and less heavily on the bottom. Nevertheless all were identified in the literature as threats to the ecosystem. This indicates that APCFNC in the species at risk process should also establish policy in scientific and political processes involving these threats to the Atlantic marine ecosystem.

Ecosystems approaches to conservation and protection respect the interconnectedness of the social, cultural, environmental, political, economic, and spiritual. Holistic research approaches are needed at each of **the species listing, recovery, and action and implementation plan stages** and an integrated view of marine systems that is evolving towards an ecosystem-based approach with a long-term, historical perspective to ecosystem conservation is mutually beneficial.

Figure 3: Integrated view of human interactions with marine ecosystems (source: <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0101466>)

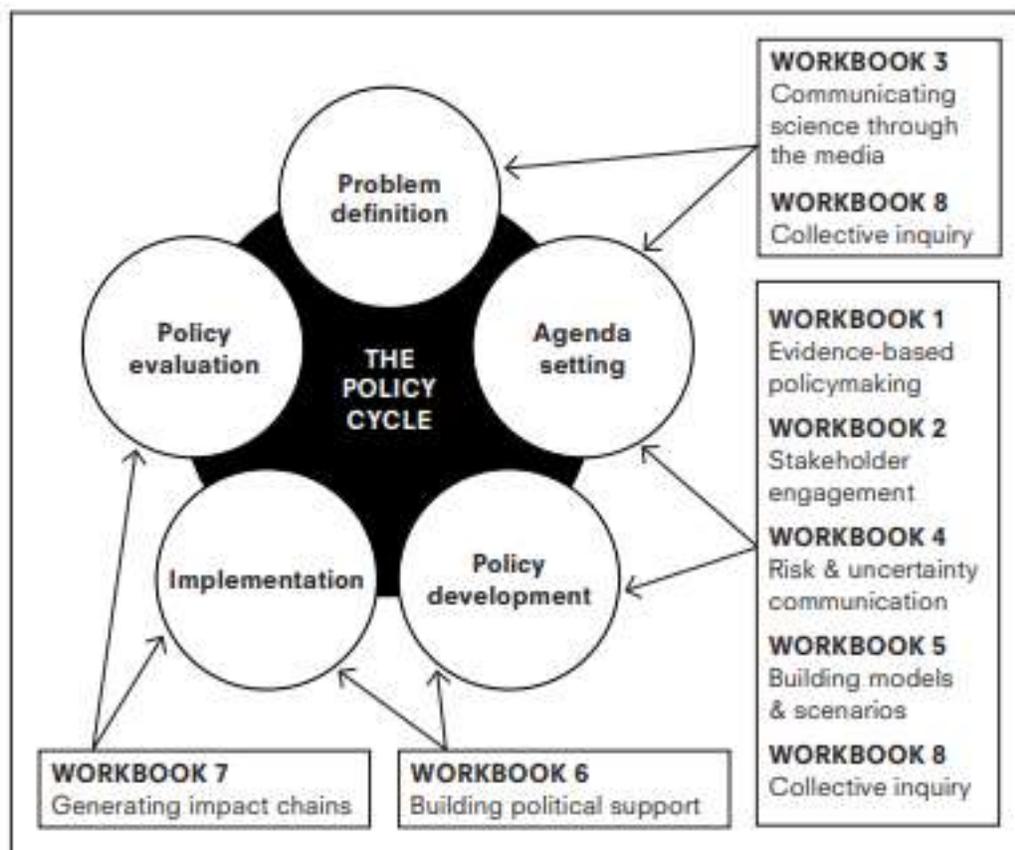


Field Experts and Best Practices

At the Collective Leadership Institute¹ a multi-stakeholder model for developing partnerships through collective dialogue was developed for sustainability. This model recognizes that collaboration requires a foundation of mutual respect and shared interest. The quality of dialogue between the parties can lead to trust forming between the parties and ultimately establishing ways of working together to develop co-learning systems, co-management plans, and co-governance structures. Paschke, Pfisterer, Hirschi, Last, Pauli, Studer, Schubert, Herrendörfer, & Mc Nally (2019) identify eight (8) ways to engage in science-policy dialogue to produce productive partnerships. They emphasize participative approaches to research and policy development. The best practices in management and sustainability highlight the importance of collective dialogue between science and policy makers.

¹ <https://www.collectiveleadership.de/>

Figure 4: The Science-Policy Cycle



The National Indigenous Fisheries Institute² as part of a review of the Atlantic Integrated Commercial Fisheries Initiative, identified through a community approach that a shift towards an Indigenous definition of success is necessary for sustainable development (Figure 5). Whereas fisheries are identified as one of the greatest anthropogenic threats to ecosystems, shifting towards sustainable models of fisheries fits within the Atlantic Indigenous Fishers vision of success. A best practice in sustainable fisheries begins with a redefinition of success.

“It is a shift from the way the commercial fishery has largely functioned across Canada; from being solely based on profits, to one that is based on ecology, research, multiple users, and the specific life-cycle needs of species” (page 7).

² www.indigenousfisheries.ca

Figure 5: Vision of Atlantic Commercial Fishing Enterprises

Vision of Atlantic Commercial Fishing Enterprises

“We want to create opportunities for employment through this business. We want to use the profits to diversify, to give back to the community, and to buy more licences to be able to create more employment, and continue this cycle.”



Figure 5 outlines research performed by the National Indigenous Fisheries Institute³, which establishes a clear definition of success that maintains a healthy fish stock, while assuring community employment benefit. This vision can be possible through a true co-management process through sustainable development partnerships and knowledge partnerships.

Indigenous Knowledge Use

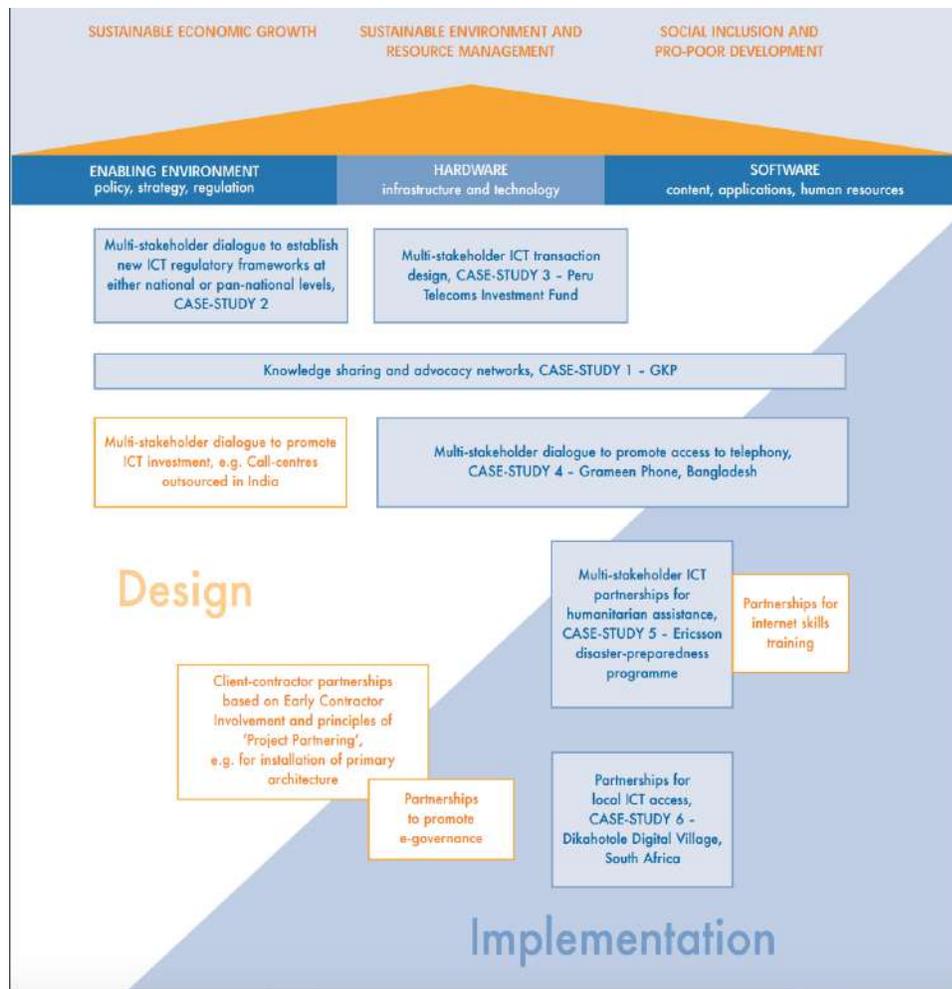
The University of Waterloo⁴ in their discussions on forming partnerships (Figure 6), identified five key aspects to forming and sustaining community partnerships. We recommend that the APCFNC enhance its existing capacity for partnership developments between fishers, harvesters, scientists, research agencies, research institutions, and conservation agencies. The United Nations Global Knowledge Partnership Secretariat also discusses multi-stakeholder partnerships as a holistic approach to sustainable development and better governance⁵ (Figure 7). While this model represents a global knowledge partnership, it can offer a process opportunity for a local knowledge partnership opportunity.

³ www.indigenousfisheries.ca
⁴ <https://uwaterloo.ca/implementing-sustainable-community-plans/dissemination/partnership-approach>
⁵ <https://sustainabledevelopment.un.org/content/documents/1741Multi-%20Stakeholder%20Partnerships.pdf>

Figure 6: Sustainable Community Partnerships

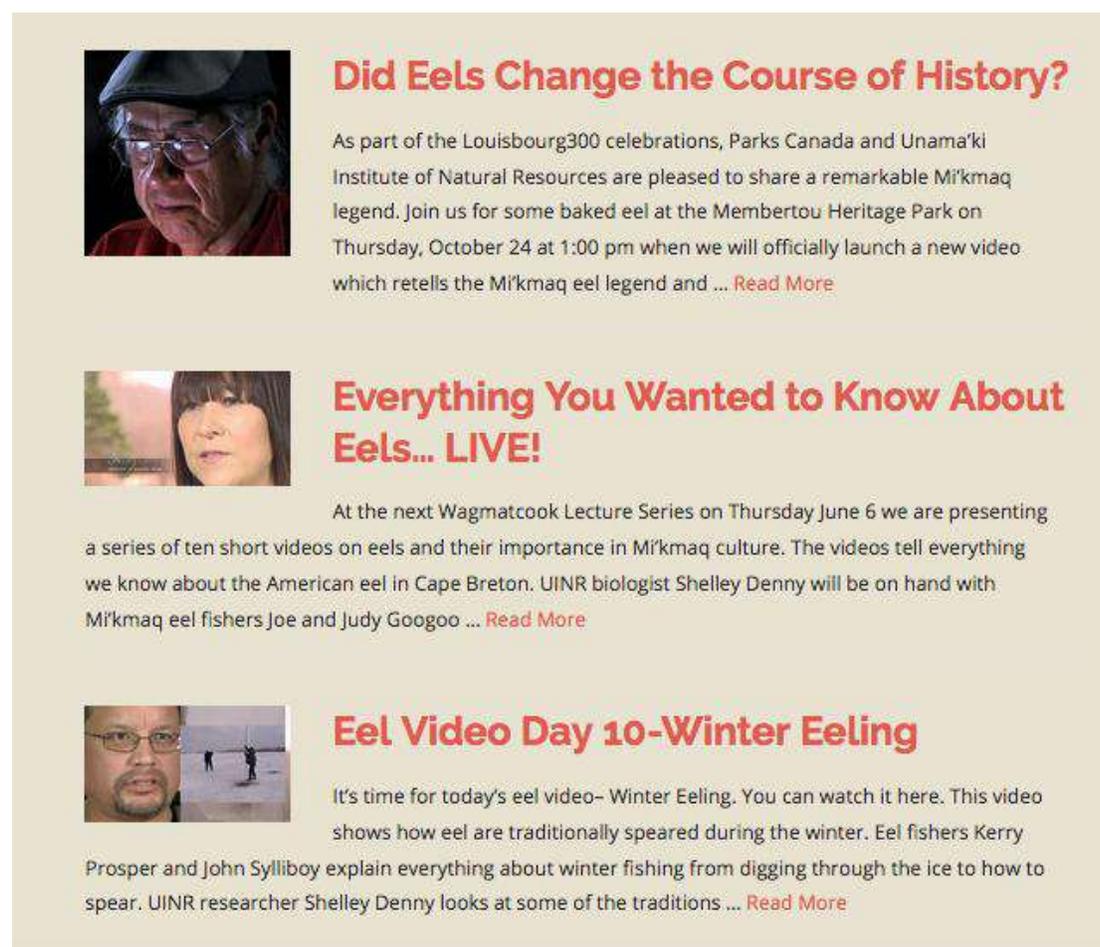


Figure 7: UN Global Knowledge Partnerships



To further highlight the potential of this type of knowledge partnership at the local level, the American Eel is a success example. A potentially valuable opportunity is available to adopt a similar model of local knowledge partnerships from a holistic approach perspective to marine ecological sustainable management. An example of a local partnership between UINR, Parks Canada, and Cape Breton University exists to support co-learning on science and traditional knowledge together to support the American Eel⁶. They co-produced a video series on Eel that speaks to the value of the partnership to enhance local knowledge by combining science and traditional knowledge. The two-eyed seeing approach⁷ to co-learning journey was used in this local example to demonstrate that co-learning supports sustainability and management practice.

Figure 8: American Eel Lecture Series on UINRTV (source: <https://www.uinr.ca/?s=eel>)



Did Eels Change the Course of History?

As part of the Louisbourg300 celebrations, Parks Canada and Unama'ki Institute of Natural Resources are pleased to share a remarkable Mi'kmaq legend. Join us for some baked eel at the Membertou Heritage Park on Thursday, October 24 at 1:00 pm when we will officially launch a new video which retells the Mi'kmaq eel legend and ... [Read More](#)

Everything You Wanted to Know About Eels... LIVE!

At the next Wagmatcook Lecture Series on Thursday June 6 we are presenting a series of ten short videos on eels and their importance in Mi'kmaq culture. The videos tell everything we know about the American eel in Cape Breton. UINR biologist Shelley Denny will be on hand with Mi'kmaq eel fishers Joe and Judy Googoo ... [Read More](#)

Eel Video Day 10-Winter Eeling

It's time for today's eel video- Winter Eeling. You can watch it here. This video shows how eel are traditionally speared during the winter. Eel fishers Kerry Prosper and John Sylliboy explain everything about winter fishing from digging through the ice to how to spear. UINR researcher Shelley Denny looks at some of the traditions ... [Read More](#)

⁶ <https://www.uinr.ca/?s=eel>

⁷ Bartlett, C., Marshall, M., & Marshall, A. (2012). Two-eyed seeing and other lessons learned within a co-learning journey of bringing together indigenous and mainstream knowledges and ways of knowing. *Journal of Environmental Studies and Sciences*, 2(4), 331-340.

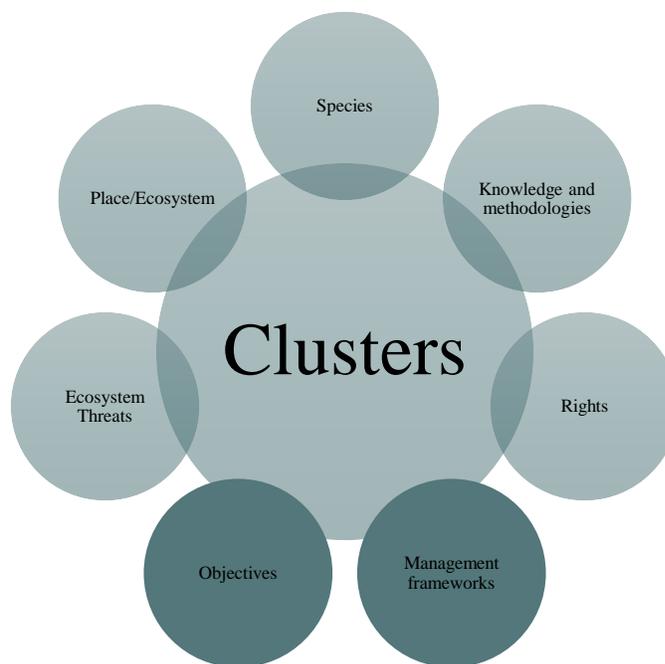
Identified Gaps

Within this section, we would like to share findings from the database document analysis. The database includes 190+ articles on species at risk. The database is organized by

1. APA style citation for the article.
2. Hyperlink to the article
3. Abstract describing the focus of the article
4. Thematic foci (4 cells)
5. Whether the article focuses on an Indigenous research perspective
6. Other comments where appropriate

Each of the thematic foci for the articles were compiled in an analysis and offers seven clusters of themes depicted in Figure 9 below.

Figure 9: Clusters of themes emerging from literature on Species at Risk



The focus herein is specifically on a comparative analysis of Objectives and Management frameworks from literature that primarily uses a Western knowledge system and those that focus or centres Indigenous knowledge systems. While they are different, a blended approach with both Indigenous and Western knowledge can offer a more comprehensive practice that respects both perspectives. With the first analysis, you will notice that the sustainability objectives identified consisted of a long list of objectives. The larger the word, the more commonly the articles addressed that particular aspect of sustainable objective. With the second analysis, you will notice that the focus is on management frameworks. The larger and more central clusters of themes were identified

more commonly within the research that centralized Western or Indigenous knowledge perspectives⁸.

Figure 10: Language describing the **sustainability objectives**

Indigenous – Central Focus

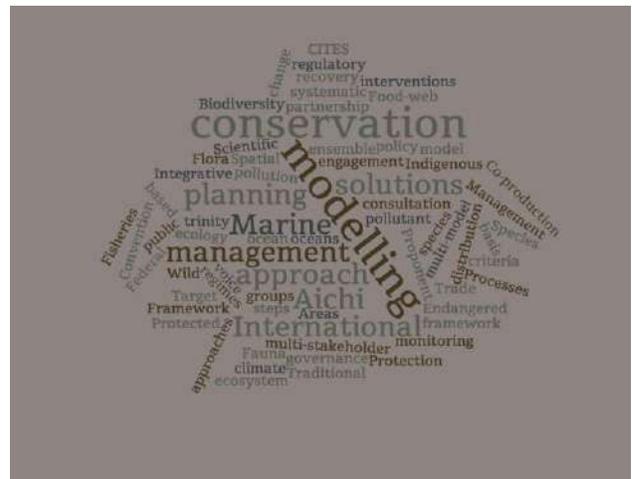
Western Central Focus



Figure 11: Language describing the **management frameworks**

Indigenous – Central Focus

Western Central Focus



⁸ The database has the full list in alphabetical format.

Recommended Sustainability Practices

The literature on sustainability practices lean toward an ecosystem-based approach that is co-managed and draws on integrative knowledge. Furthermore, it would consider all aspects of fisheries interactions within the ecosystem. Elder Albert Marshall in a UINRTV Lecture Series on the American Eel outlines the importance of considering all interactions within an ecosystem as affecting the health of the ecosystem.

1. A cluster of sustainability considerations emerged from the literature. These suggest that sustaining ecosystem health and fair or equitable resource distribution is important for community health and identity. The anthropogenic threats that are affecting the biodiversity of species are vast, APCFNC involvement in science and policy processes on a holistic basis.
2. Commercial, livelihood, and subsistence fisheries from large-scale to small-scale to take an ecosystems perspective on reductions of anthropogenic threats.
3. Sustainability considers respecting the needs of the present and taking only as much as is needed and protecting future generations ability to meet their needs. “Bycatch” and “habitat loss” phenomena in the commercial large-scale fisheries perspective is an example where high rates of mortality occurs unnecessarily. A sustainable co-learning summit to co-produce ideas on ways to reduce bycatch mortality rates and habitat loss is a sustainability practice recommendation.

Recommended Policy and Advocacy

The recommended policy focus areas include:

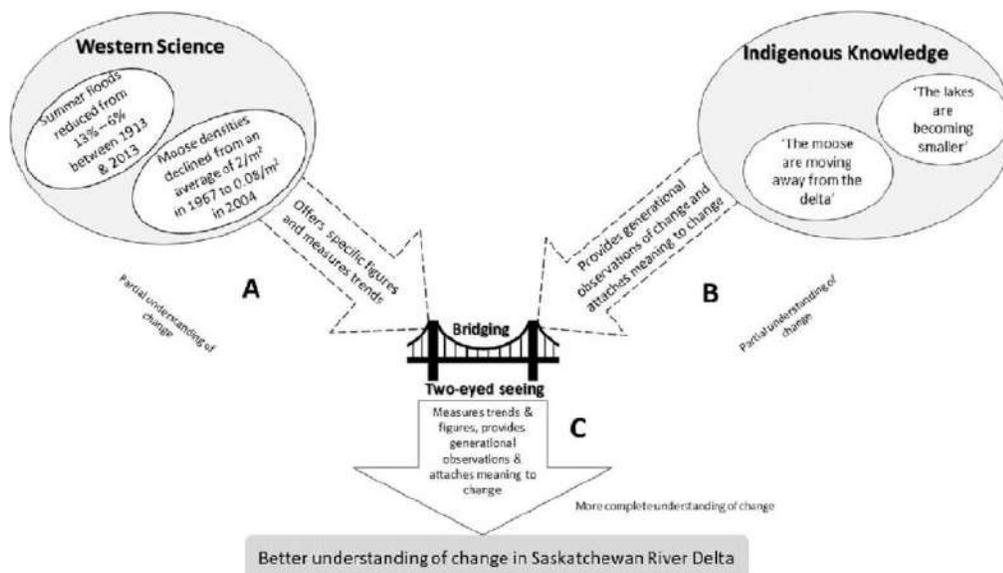
1. Engagement of indigenous and non-indigenous academic researchers, knowledge keepers, harvesters, and marine protection organizations to create mutual interest around the centering of the ecosystem. Become the coalitional agency for Indigenous and non-indigenous Atlantic marine sustainable management knowledge experts through the development of local knowledge partnerships.
2. Engagement of organizations and technology that help to monitor and improve current practices with a focus on a common sustainability vision. Become the coalitional agency for bringing together the Indigenous and non-indigenous Atlantic marine ecosystem sustainable management organizations to engage in collective dialogue, co-learning, co-management, and co-governance.

Scientific and Political Processes

“In 2005, NACOSAR held its first meeting with the Minister and has been meeting on a regular basis since that time. At a 2006 meeting with the Minister, NACOSAR presented four key points to guide SARA with regards to Aboriginal peoples: 1) Aboriginal traditional knowledge is equivalent to western science; 2) NACOSAR can help government avoid infringing on Aboriginal rights and interests; 3) Engaging NACOSAR must not be construed as consultation, and, 4) Engagement of Aboriginal peoples must begin early in the SARA cycle of activities, like assessment and listing (Annual Report 2006 - 2007). Those recommendations served as an early warning to the federal government that the creation of NACOSAR itself was not enough - that if Canada wants to meaningfully include Aboriginal knowledge in the conservation of biodiversity then the country must be prepared to take all the necessary steps” (Olive, 2012)⁹

Western science has long been touted as an evidence-based approach for decision making, but it can only offer partial understandings of the needed changes. Indigenous knowledge systems are equal to western science and both are needed together to offer a holistic evidence-based ecological approach and better understanding of much needed changes.

Figure 12: Indigenous knowledge and Western knowledge



⁹ Olive, A. (2012). DOES CANADA'S SPECIES AT RISK ACT LIVE UP TO ARTICLE 8 (J)? The Canadian Journal of Native Studies, 32(1), 173.

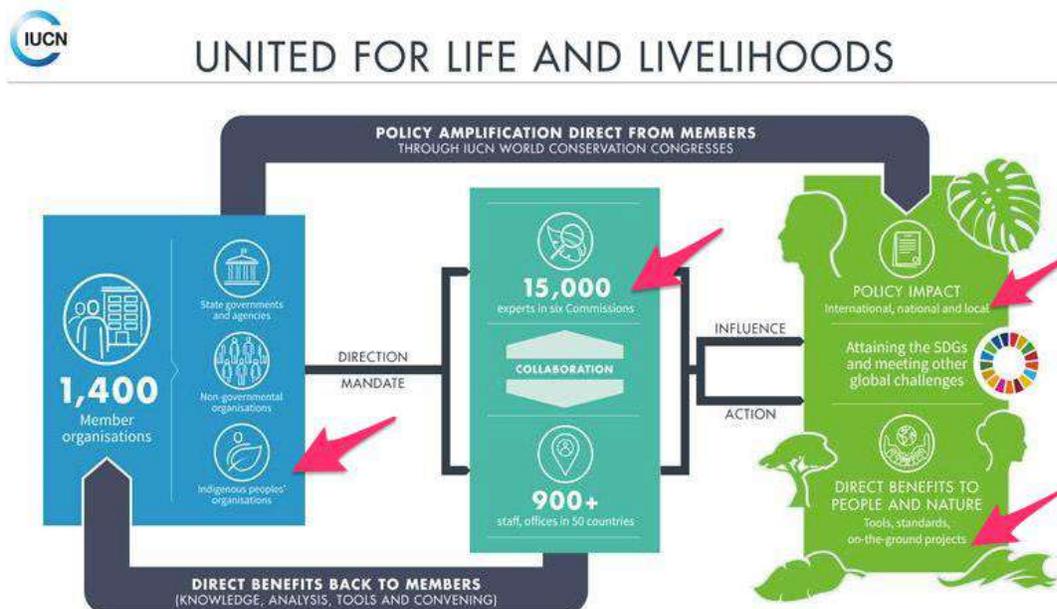
Field Experts and Best Practices

Experts in best practices for marine ecosystem science and Indigenous marine ecosystem knowledge exist at the international, national, and local levels. For this report, we will focus on one international, national, and local level science and policy process. All of these offer opportunities for engagement and influence in both science and political processes for the conservation of marine ecosystems in the Atlantic region.

International

First, let us look at the influence from a global or international science and policy perspective, the International Union for Conservation of Nature (IUCN). This collective comprises 1400-member organization and over 15,000 science and policy experts in over 160 countries all with the goal of sharing expertise and resources to measure the status of marine ecosystems and develop safeguards toward the conservation of marine ecosystems. The IUCN member organizations establish mandates considering the knowledge, analysis, tools shared in co-learning conventions that attempt to directly benefit people and nature. The IUCN has three specific areas where Indigenous people's organizations can influence the development of mandate, collaborate in knowledge production and sharing, and policy and project implementation. The four areas of influence are represented by the four arrows in Figure 13 below.

Figure 13: IUCN and locations where Indigenous peoples' organizations can influence marine ecosystem mandate, knowledge, policy, and projects. (source: <https://www.iucn.org/about>)



These offer four areas where Indigenous peoples' organizations can influence conservation at the International level.

1. Participate as a member organization
2. Indigenous, Science, and Policy Marine Ecosystem Expert collaboration

- a. Connect Atlantic Indigenous Marine Ecosystem experts to the IUCN Marine Commission
 - b. Collaborate with Conservation Experts
3. Impact marine policy internationally, nationally, and locally, and
4. Engage in ecosystem conservation projects.

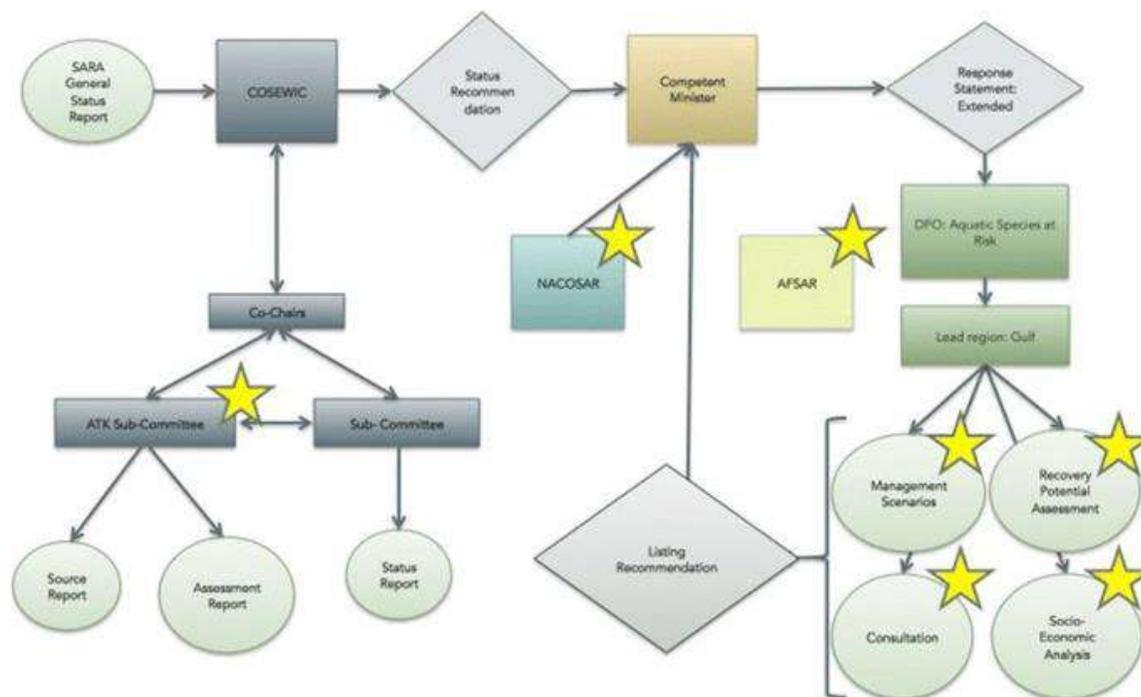
National

Second, on a national level, Giles, Fanning, Denny, & Paul (2016) identified seven places within the national species at risk process where Indigenous peoples' organizations can influence the marine ecosystem conservation efforts. The stars represent the seven areas:

1. Representation on the ATK Sub-committee – or maintaining close collaboration with ATK sub-committee members.
2. Representation on the National Aboriginal Council on Species at Risk (NACOSAR) – or maintaining close collaboration with NACOSAR members.
3. Collaboration with and promotion of awareness of the Aboriginal Fund for Species at Risk (AFSAR) for funding recovery projects.
4. Four more ways of engaging in Marine Conservation Policy on involvement in:
 - a. Identifying local success management scenarios and co-learning within the region
 - b. Identifying local success recovery assessments and co-learning within the region
 - c. Gathering APCFNC member communities for co-learning on consultation and partnership successes in marine ecological conservation
 - d. Identify local success on socio-economic analysis processes and co-learning within the region.

Each of these seven areas offers policy opportunities from an Atlantic perspective to have voice on species at risk at a national level.

Figure 14: Species at Risk Process in Canada (source: Giles, Fanning, Denny, & Paul, 2016)



Local

Third, on a local level, the Listuguj Mi’gmaq First Nation Fishing Plan – Atlantic Salmon¹⁰ is an example of a local level conservation and harvest management plan that offers harvesting techniques, monitoring, rules, provisions, protected areas, and timing management. The multi-stakeholder partnerships¹¹ and collaborative processes used in this local level example is an example of a successful process that allows for science, traditional knowledge, and fisher knowledge to be shared to support the Salmon and its habitat. At a local level, bringing together local parties in partnership agreements to work collaboratively in sharing conservation ideas is a way that APCFNC can support marine ecosystems at a local level.

As noted on the Listuguj Mi’gmaq Government website¹², a Salmon Summit is offered on an annual basis to establish partnerships and strengthen relations for all interested in the Restigouche River Atlantic Salmon. This is an example on a local level where the solidarity of diverse groups came together in co-learning. They “formulated a vision statement during the workshop and it aim[ed] at fostering relationships built on mutual respect of diverse cultures to enhance Atlantic salmon and its

¹⁰ Source: <http://listuguj.ca/atlantic-salmon-unites-migmaq-anglophone-and-francophone-organizations-of-the-restigouche-river-watershed/>

¹¹ Hemmati, M., Dodds, F., Enayati, J., & McHarry, J. (2002). *Multi-stakeholder processes for governance and sustainability: beyond deadlock and conflict*. Routledge.

¹² Source: <http://listuguj.ca/atlantic-salmon-unites-migmaq-anglophone-and-francophone-organizations-of-the-restigouche-river-watershed/>

habitat for future generations.”¹³ The co-learning within the Atlantic region on such successful fisheries management plans is another way that APCFNC can support marine ecosystem management at the local level.

Figure 15: Salmon Management Plan Meeting (source: <http://listuguj.ca/project-salmon-management-plan/>)



Indigenous Knowledge Use

According to Giles, Fanning, Denny & Paul (2016)¹⁴, Indigenous and governmental approaches to eel fisheries differ in their underpinned values. Specific to Mi'kmaq Knowledge System, values are related to kinship, sustainability, respect, and generosity. Whereas, governmental values are science, processes, science-based knowledge, compartmentalization, economic benefits, and conservation. Within this local example, we see that there are ontological or worldview differences that affect collaborations on eel specific fisheries between Indigenous communities and government departments. It is inappropriate to generalize that these differences in values exist across nation-to-nation relations through various marine ecosystems. That said, this offers an opportunity to explore values differences from a distinctions-based approach. The Maliseet Nation Conservation Council and Wolastoqey Nation New Brunswick outlines in their overview and perspective on the collection of Maliseet Traditional Knowledge (2020)¹⁵ that pan-Indigenous knowledge perspective does not recognize that knowledge is distinct, unique, and specific to each nation, and any decision-making

¹³ Source: paragraph 3, retrieved at <http://listuguj.ca/atlantic-salmon-unites-migmaq-anglophone-and-francophone-organizations-of-the-restigouche-river-watershed/>

¹⁴ Giles, A., Fanning, L., Denny, S., & Paul, T. (2016). Improving the American eel fishery through the incorporation of indigenous knowledge into policy level decision making in Canada. *Human ecology*, 44(2), 167-183.

¹⁵ Maliseet Nation Conservation Council (WNCC) and Wolastoqey Nation New Brunswick (WNNB) (2020). Overview and Perspective on the collection of Maliseet Traditional Knowledge (MTK). Presentation at Indigenous Knowledge Workshop on February 26, 2020. Hosted by the Atlantic Policy Congress of First Nations Chiefs Secretariat.

process that requires the use of Indigenous knowledge must allow for a distinction-based approach. This means that a policy respecting a distinctions-based approach to the use of Indigenous knowledge is critical. A part of the co-learning, co-production, and collaboration journey is to recognize the contextuality of nation-to-nation relations on a distinctions-basis. Each of the 600+ nations/communities across the colonial jurisdiction of Canada is distinct. This recognizes that Indigenous knowledge systems are place-based, and knowledge emerges holistically from place-based relations. Policy at an Atlantic level can identify the ways in which Indigenous knowledge holders and Indigenous marine ecosystem experts can be included at the local, national, and international levels.

Secondly, it is important to establish a process that positions Indigenous knowledge as equal to Western knowledge. Processes that allow for Indigenous knowledge inclusion is necessary, but also it must be recognized that in the processes people enact votes. If the people enacting the votes do not value Indigenous knowledge on an equal basis to Western knowledge, then the motions forwarded will be imbued with the values of the Western system rather than the Indigenous values. It is important to not only include Indigenous knowledge within the decision-making process, but also to advocate for equitable voting representation. What was learned from the Atlantic Salmon Plan is that when centring the Atlantic Salmon and its habitat in the process, the parties approached the partnership from the perspective of fostering relationships of mutual respect toward the conservation and harvest management.

Identified Gaps

The focus in this section of the report is on a comparative analysis of the rights and laws, and the knowledge and methodologies that were primarily referenced in the Western knowledge system and those articles that focused or centred Indigenous knowledge systems. While they are different, a blended approach with both Indigenous and Western knowledge systems can offer a more comprehensive practice that respects both perspectives. With the first analysis, you will notice that knowledge and methodologies are identified consisted of a long list of objectives. The larger the word, the more commonly the articles addressed that particular aspect of sustainable objective. With the second analysis, you will notice that the focus is on respect for rights (inherent, treaty, negotiated, legislative rights). The larger and more central clusters of themes were identified more commonly within the research that centralized Western or Indigenous knowledge perspectives¹⁶.

¹⁶ The database has the full list in alphabetical format.

Figure 16: Clusters of themes emerging from literature on Species at Risk

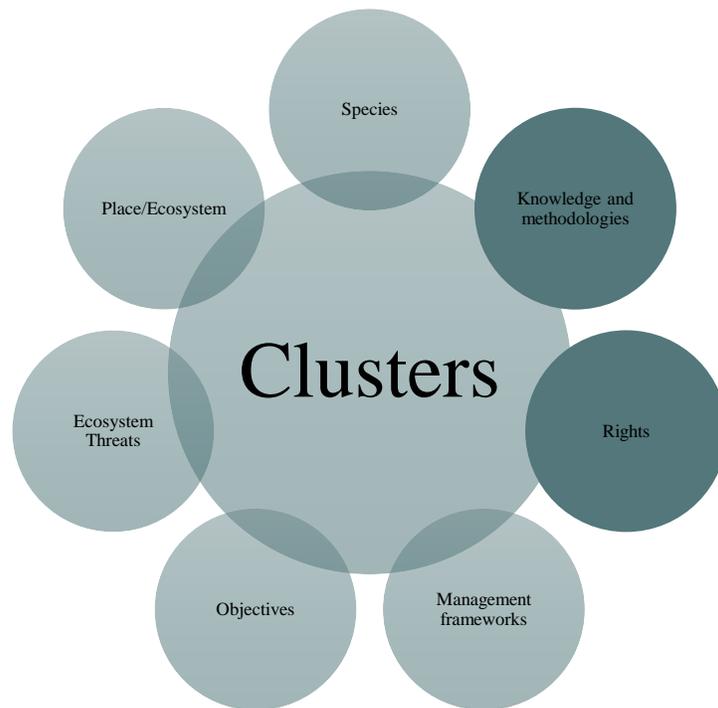


Figure 17: Language describing the **Knowledge - Methodologies**

Indigenous – Central Focus

Western Central Focus

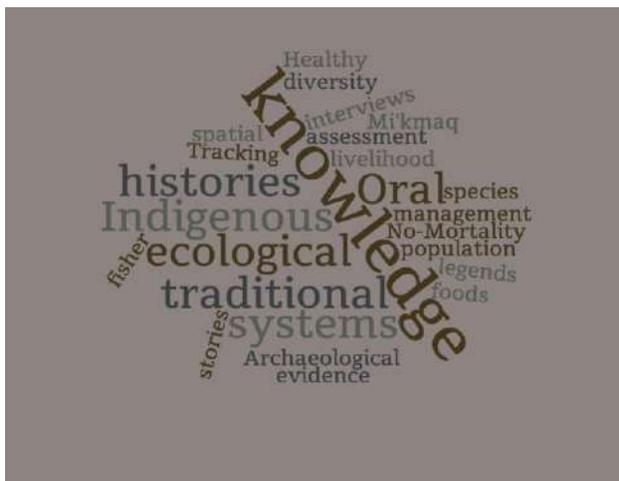


Figure 18: Language describing the **Rights**

Indigenous – Central Focus



Western Central Focus



Recommended Sustainability Practices

Sustainable integration of science and political practices requires involvement at as many international, national, and local level policy development and co-learning forums on an ongoing basis. NACOSAR identified four areas that create policy and advocacy on the importance of Indigenous peoples in the Atlantic region as integral to the SAR listing, recovery, and action plan processes.

1. International partnership with IUNC: APCFNC can continue to promote that traditional ecological knowledge is equivalent to western science and help government avoid infringing on Aboriginal rights and interests. They can do this through integration in the science and policy processes. Policy emerges from evidence-based approaches and processes. Become a member of the International Union for Conservation of Nature.
 - a. Participate as a member organization
 - b. Engage Indigenous, Science, and Policy Marine Ecosystem Experts by
 - i. Connecting Atlantic Indigenous Marine Ecosystem experts to the IUCN Marine Commission
 - ii. Collaborating with Conservation Experts at the IUCN
 - c. Impact marine policy internationally, nationally, and locally, and
 - d. Engage in ecosystem conservation projects.
2. National partnerships within SARA process: APCFNC can assist in the SAR process to assure Indigenous communities, scientists, traditional knowledge holders, harvesters are

represented at the international, national, and local levels in the seven spaces identified by Giles, Fanning, Denny & Paul (2016).

3. National partnership through National Indigenous Fisheries Institute: APCFNC to continue to assist the National Indigenous Fisheries Institute with the mobilization of recommendations for changes with relations with the Department of Fisheries and Oceans.
 - a. Invest in relationship building (Science to Science Partnerships) where Indigenous knowledge studies are funded alongside and equally to Western science
 - b. Build co-management capacity (Increase networking opportunities, co-learning, co-management)
 - c. Promote Indigenous definitions of success
 - d. Establish an Indigenous-led management committee
 - e. Engage in ecosystem restoration plans.
4. Local partnerships: APCFNC can advocate for enhanced funding to support Knowledge partnerships between Indigenous knowledge holders, researchers, conservationists, harvesters, and fishers.

Recommended Policy and Advocacy

Advocacy and policy for inclusion to support each of the following in science and political practices.

1. A memorandum of understanding can be drafted between APCFNC and funding agencies supporting marine ecosystem research in Atlantic Canada.
2. A memorandum of understanding can be drafted between APCFNC and research institutions (i.e. universities) in Atlantic Canada.

International, national, and local level involvement in marine ecosystem conservation as outlined within this section.

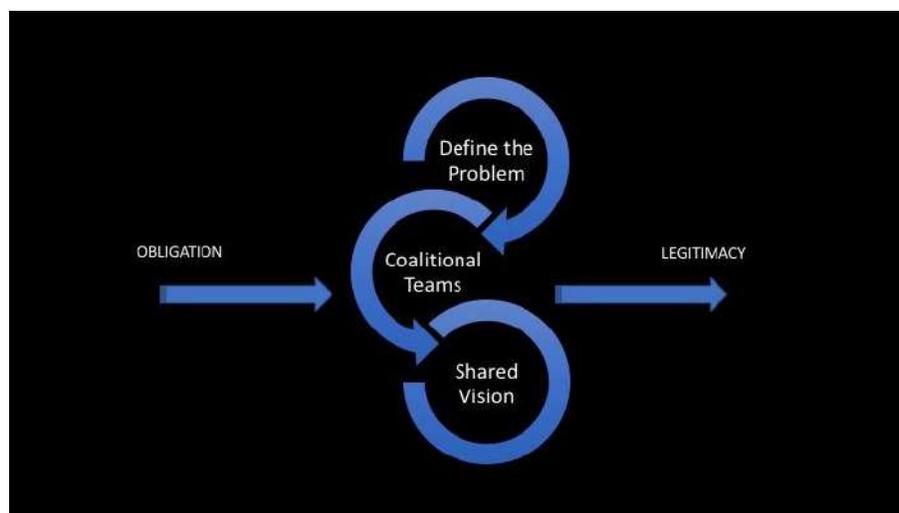
Governance Practices and Structure

Governance focuses on commonly agreed upon decision-making structures and authorities: how a decision is made, by whom, and what level of authority is given at different levels of an organization in private, public, and community contexts¹⁷. The strength of governance structures and practices

¹⁷ O'Malley, P. (1996). Indigenous governance. *International Journal of Human Resource Management*, 25(3), 310-326.

provides stability during mundane daily operations; a process for innovation during growth periods; and a presence of calm during times of crisis. However, governance can also create exclusion if diversity, equity, and inclusion is not sought at the earliest point of problem identification¹⁸ and on an ongoing basis throughout the process. Key change models indicate the importance of bringing the experts and stakeholders together to define the scope of the problem and impact. John Kotter developed one of the most widely used change models¹⁹ with 8 steps. The first phase includes generating a sense of urgency, building coalitional teams, and developing a vision. Similarly, appreciative inquiry, a four-stage model, includes define and discover as the first two steps with an emphasis on building on the strengths of the organization. Lastly, Lean Six Sigma (LSS) focuses on a blended model to reduce errors and redundancy. It has five (5) steps starting with define, and measure before moving to analysis, solution, and control²⁰. The common focus is the involvement of key stakeholders in the definition (e.g., scope and impact) of the problem. The second emphasis is on equality and coalitional approaches, working together towards a common goal.

Figure 19: The Path from Obligation to Legitimacy



According to Riege and Lindsey (2006), a stakeholder is any person or organization who may be positively or negatively affected or who can positively or negatively affect a process (p. 27). However, a common approach is to include the voice of stakeholders in the final stages of the analysis or solution as a form of courtesy, not legitimacy. This creates conflict on the agreement with the vision and goal of the task or project, and in lean six sigma research, quite often without a full review of the problem, the wrong problem is identified resulting in a lack of buy-in, which can start

¹⁸ Wilson, N. J., Mutter, E., Inkster, J., & Satterfield, T. (2018). Community-Based Monitoring as the practice of Indigenous governance: A case study of Indigenous-led water quality monitoring in the Yukon River Basin. *Journal of environmental management*, 210, 290-298.

¹⁹ Kotter, J. P., & Cohen, D. S. (2012). *The heart of change: Real-life stories of how people change their organizations*. Harvard Business Press.

²⁰ Arnheiter, E. D., & Maleyeff, J. (2005). The integration of lean management and Six Sigma. *The TQM magazine*.

with passive resistance in the form of avoidance or resignation from the process to active resistance in the form of conflict. The need for co-learning, co-production and co-management facilitates the desired outcome for a common vision and strategy to address the problem. In 2020, we can see the impact of cohesive governments working together during the COVID-19 pandemic. The governing structures of Canada include health, and economics, as well as recognition of Indigenous government organizations (e.g, Assembly of First Nations, First Nation Communities, Inuit Tapiriit Kanatami) to come together to implement the tactics needed to reduce the impact of the crisis. When we get past the pandemic there will be researchers focused on how organizations and leaders responded to the crisis (SMU Kelloway) providing insights on “what to do next time”. This approach recognizes the value of “science” as a method of learning. If we apply this model to the Marine Ecosystem Conservation Strategy in Canada, and look specifically at Species at Risk, we can identify multiple gaps in the “who” and “when” stakeholders are engaged in the strategy development.

Table 1: CANADA’S OCEANS STRATEGY²¹

Governance Core Commitments	Strategic Areas of Focus	Policy Objectives
Work collaboratively within the federal government, and among levels of government;	Institutional governance mechanisms;	Understanding and Protecting the Marine Environment;
Share responsibility for achieving common objectives;	Integrated Management planning;	Supporting Sustainable Economic Opportunities;
Engage Canadians in oceans-related decisions in which they have a stake.	Promoting stewardship and public awareness.	International Leadership.

Core concepts in table 1 demonstrate the “written” alignment with the change models: Work collaboratively, share responsibility, and engage Canadians. The intent behind engagement can be the crux of the governance problem. Meaningful engagement recognizes the value and legitimacy of Indigenous knowledge, an obligation based on legal and historical treaty rights. These legal and treaty rights have helped to establish the “need” for consultation without which the involvement would likely not exist in most cases. There is a need to stretch to the next level to create a “need” for Federal and Provincial governments not just to recognize obligation to “seek out” Indigenous organizations and knowledge holders as experts, but also to recognize that Indigenous knowledge

²¹ <https://www.dfo-mpo.gc.ca/oceans/publications/cos-soc/index-eng.html#id6>

is equal to scientific knowledge in its ability to offer practical solutions, to define the scope of the species at risk problem, and develop recovery and action plans.

Field Experts and Best Practices

Who are defined as the experts? Scientists, policy makers, Indigenous knowledge keepers, the harvesters, the advocacy agencies, and many more. Who and when are they engaged at the problem identification stage? These are the questions that are needed to be explored and a common vision of sustainability. The harvester does not benefit from eroded fish stocks but without their voice in the early stages, the risk of lack of buy-in and resistance is high.

We look to the Maori and the New Zealand Oceans Management Strategy as an example of a phased co-management partnership. The initial engagement started with a “Maori and Oceans Policy” working paper to identify Maori interests. However, the Maori identified that their views were not being valued by the Crown, specifically that there were no rules for Consultation; the issue of resource limitations for the Maori to contribute meaningfully especially around consultation; that absolute protection of marine environments would not match the Maori worldview but instead sustainability was a better fit; Maori ability to share in economic benefit of better space allocations and technologies; the key was trying to develop policy that provides both flexibility and certainty. One of the main issues identified was the lack of awareness of decision-makers to understand the Maori interests and perspectives. The focus was on removing the issue of constituency and instead focus on developing a world leading model of sustainable development in action. A shared common purpose built on co-learning, co-production, and co-management²².

Indigenous Knowledge Use

Species at risk is a broad problem with many stakeholders. Science plays a leading role in determining the nature and source of the problem. However, science is bound by ethical practices to demonstrate the limitations in the research. Quantitative studies commonly identify generalizability issues to broader populations, small sample sizes from attrition, and points of time as both cross sectional and longitudinal studies are limited to the who, what, and when of the data collection process. Qualitative studies engage in the process of understanding and exploring but encounter significant resistance in the empirical “science” world for lack of rigidity of the analysis. However, these methods are still commonly used to explore the problem. Indigenous knowledge keepers use stories to convey the knowledge from one generation to another creating a form of longitudinal study through oral and image translation. This is a blended approach of qualitative and longitudinal studies, yet the quality of the “information” is judged based on the lack of institutional buy-in to the storytelling methodology. This is evolving as chapters of scientists in mainstream educational institutions are recognizing the power of stories to drive change through leadership, so in essence traditional knowledge is a form of change leadership and should be included at the problem definition stage to help with an “understanding” of scope and impact.

²² <https://www.beehive.govt.nz/speech/oceans-policy-maori-engagement>

Identified Gaps

The identified governance process gaps focus on strong organizational culture values of inclusion, respect, and sustainability. The need for being part of the problem definition stage is critical. Current practices, as shown in the species at risk section of this report, commonly engage Indigenous knowledge keepers, harvesters, leaders, and policy makers at the solution or implementation stage. Consultation is a form of involvement, but the limitations arise from the meaningfulness of the engagement and who. Hill, Schuster and Bennett (2019) conducted a meta-analysis of the involvement of indigenous perspectives in the species at risk process. The Atlantic region was noted as having one of the highest rates of involvement on fish. However, when analyzing the data, a high degree of representation or consultation on species at risk is represented by one organization, the Maritime Aboriginal Peoples Council. The organizations membership consists of the Native Council of Nova Scotia²³, the Native Council of Prince Edward Island²⁴, and the New Brunswick Aboriginal Peoples Council²⁵, self-governing authority of the Indigenous peoples living off-reserve. A large population of Indigenous peoples in Atlantic Canada are on-reserve²⁶ with the knowledge of the commercial fisheries, food, social, and commercial, and moderate livelihood fisheries at the community and individual family level based on treaties and rights. Their perspective would need to be included to be representative of the Indigenous knowledge perspectives. This demonstrates a fundamental flaw if the consultation process is viewed as an obligation to consult without valuing the content of the contribution to help solve problems. The power is in viewing involvement as a valuable coalitional approach to define the problem and gain agreement on a vision. The latter is a form of legitimacy, leading to stronger buy-in, stronger enforcement, and improved outcomes as seen with the COVID-19 pandemic outbreak. The coalitional team includes a diverse team of experts, and distributes certain authorities across provincial, municipal, and indigenous authorities.

“...legitimacy is based on three things. First of all, the people who are asked to obey authority have to feel like they have a voice--that if they speak up, they will be heard. Second, the law has to be predictable. There has to be a reasonable expectation that the rules tomorrow are going to be roughly the same as the rules today. And third, the authority has to be fair. It can't treat one group differently from another.”
Malcolm Gladwell, David and Goliath: Underdogs, Misfits, and the Art of Battling Giants.

²³ Native Council of Nova Scotia, <http://ncns.ca/>

²⁴ Native Council of Prince Edward Island, <http://www.ncpei.com/>

²⁵ New Brunswick Aboriginal Peoples Council, <https://nbapc.org/home/>

²⁶ <https://www12.statcan.gc.ca/census-recensement/2016/dp-pd/abpopprof/index.cfm?Lang=E>

Recommended Sustainability Practices

Table 2: ATLANTIC INDIGENOUS MARINE ECOSYSTEM STRATEGY

Governance Core Commitments	Strategic Areas of Focus	Policy Objectives
Work collaboratively with the federal government, and among levels of indigenous government, and communities;	Institutional governance mechanisms; Become the agency for coalitional knowledge gathering between Indigenous and non-Indigenous experts.	Understanding and protecting the marine environment;
Share responsibility for achieving common objectives with communities;	Integrated Management planning with researchers, harvesters, and knowledge keepers.	Supporting sustainable harvester economic opportunities, and food social and ceremonial;
Engage communities in marine ecosystem-related decisions in which they have a stake.	Promoting stewardship and public awareness.	Atlantic Indigenous marine ecosystem leadership; create the need for meaningful engagement in Canada’s Ocean Strategy.

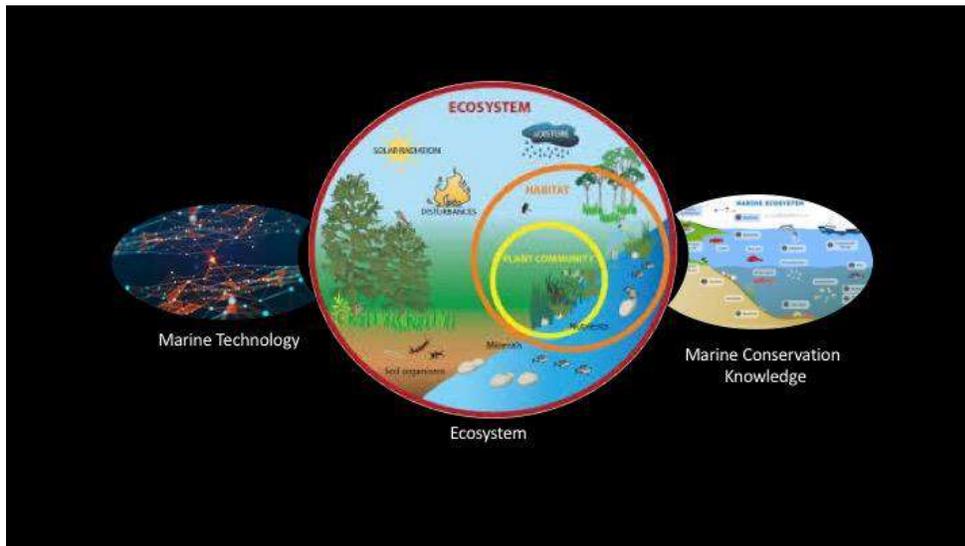
Recommended Policy and Advocacy

The recommended policy focus areas include:

1. Engagement of Indigenous and non-indigenous academic researchers, knowledge keepers, harvesters, and marine protection organizations to define ecosystem impact, stretching beyond the quantitative science baseline measures. A focus on developing new ways of defining the scope of impact and sustainability. Become the coalitional agency for Indigenous and non-indigenous Atlantic ocean’s management knowledge experts.
2. Engagement of organizations and technology that help to monitor and improve current practices with a focus on a common sustainability vision. Become the coalitional agency for bringing together the Indigenous and non-indigenous Atlantic ocean’s technology and innovation experts.

- Engagement of Atlantic region stakeholders that help to define the role that fisheries places in the ecosystem . Become the coalitional agency for the Indigenous and non-indigenous Atlantic ecosystem protection movement.

Figure 20: Policy Development Areas of Focus



Key Organizations and Partnerships

APCFNC has an opportunity to play a significant role in advancing the Indigenous involvement in the species at risk management by reflecting on the bigger scope of the issue which the marine strategy in the Atlantic region. With economic, social, cultural, and technical impacts of the species at risk, APCFNC is positioned to play multiple roles to help guide the Indigenous narrative in the marine strategy. Similar to the governance context of being a part of the problem definition, it is important to be a key contributor to the development of the strategy. The economic impact to the harvesters and communities broadens the scope of the species at risk to marine at a grand scale.

With science as a leader in identifying species at risk taxonomies, processes, and practices with government, there is an opportunity for APCFNC to play the role of the **facilitator**. Similar to AAEDIRP, APCFNC can bring together scientists and knowledge keepers, and technical agents embracing two-eyed seeing **co-learning** opportunities. These **collaborations** create environments for sharing and building on each other’s knowledge and practices to **co-produce** a Marine Strategy for the Atlantic Region. Partners include indigenous and non-indigenous individuals and organizations.

With the advancements of social communication technologies, there is a greater opportunity for APCFNC to play a larger role in global discussions about marine sustainability. Sharing the Atlantic region story with global partners and gathering new ideas and practices from nations and organizations around the world places APCFNC as a key **connector** of new knowledge and practices.

Costs are a barrier to travel and restrictions on funding can limit the scope of reach, but with innovative virtual technologies APCFNC can be part of any world forum and share the Atlantic progress. This is a pivotal shift in the traditional practices. By reaching to global forums APCFNC can leverage the growth and size of the Atlantic Marine scope to be and **influencer** for Canadian policy and programs.

With a toolkit comprised of indigenous knowledge, science, industry practices, and global affairs, APCFNC can take the lead in developing **policy** to help grow and sustain the Atlantic Marine Sector. This requires continued commitment to maintain and grow relationships with “expert” from provincial and territorial agencies, harvesters, and communities by **coordinating** forums for knowledge sharing and best practice sharing. The holders of the knowledge and science are at the core of the process but need help to bring their findings to a larger audience to make change happen and impact the sustainability goals.

The community must be at the core of the **support** mechanisms, engaging, guiding APCFNC through direct and indirect opportunities for shared voice. Collectively the mission is to sustain the marine ecosystem for seven generations. We lean in to hear the knowledge shared by the Maori ocean **co-management** narrative. No one can understand our perspective, we must be a part of the process of co-understanding, co-learning, co-producing, and co-managing. It must be done as a partnership.

Understanding and developing roles and responsibilities is at the core of the collaborations. Technical bodies develop the knowledge through science and understanding. Rights based engagements are critical for setting boundaries through consultation and negotiation. Laws are set standards, principles, and procedures that must be followed in society. Policies can be called a set of rules that guide any government or any organization. However, policies can become laws and create opportunities for co-production and co-management.

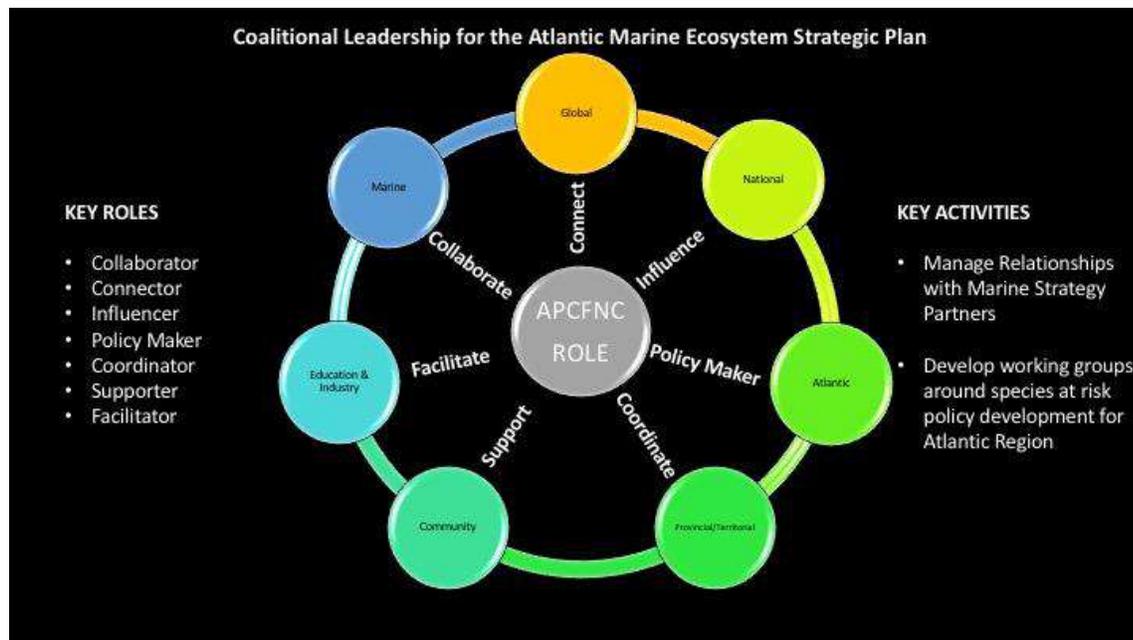
The Moose Management Strategy is a success story in co-management in Nova Scotia. However, the journey, required connection, policy, negotiation, consultation, facilitation, collaboration, and started with the community voice in September 2008. The shared vision of the sustainability of the moose population for conservation, harvesting, and the ecosystem was at the core of the process.

The following is an example where government, industry, funders, and fishers are working together to respond to an endangered species. According to Sean Brilliant (2019)²⁷, while the Canadian government may not be adequately protecting its most endangered species, it has demonstrated that it responded quickly to attempt to reduce North Atlantic Right Whale mortality rates in Northern New Brunswick during the snow crab fishery season. Furthermore, the snow crab fisheries industry has received \$2Million over the next three years to implement a series of initiatives designed to reduce the risk of endangered North Atlantic right whales becoming entangled in fishing gear²⁸.

²⁷ Brilliant, S. (2019). Is Canada Protecting Its Marine Species at Risk?. In the Future of Ocean Governance and Capacity Development (pp. 293-297). Brill Nijhoff.

²⁸ <https://www.cbc.ca/news/canada/new-brunswick/snow-crab-right-whale-fishing-gear-research-1.5143321>

Figure 21: Coalitional Leadership for the Atlantic Marine Strategic Plan



The Key to Successful Coalitions is when members share responsibility, goals, decisions, and leadership and energetically and enthusiastically work toward a common goal, the coalition has the potential for great success²⁹.

Summary of Identified Gaps

The following is a summary of the central gaps identified in the analysis with a reflection on the issue presented. In the next section we highlight recommendations to help APCFNC prioritize activities and determine the role to help foster growth and sustainability in the Atlantic Marine Ecosystem.

²⁹ https://www.orau.gov/cdcynergy/web/ba/Content/activeinformation/resources/Coalition_Building_Primer.pdf

Table 3. Summary of Identified Gaps

	Gap	Reflection
Management and Sustainability Practices Skewed to one viewpoint	Strong need for inclusion of the Indigenous voices in the science for species at risk	Frameworks from the literature primarily use Western knowledge with references to management and modelling
Indigenous Research Central Focus Missing	Lack of leveraging the co-learning approaches of two-eyed seeing	Indigenous central focus in the literature focuses on livelihood and co-management and responsibility.
Consultation versus Collaboration Not at the Right Table	The timing and nature of the involvement of Indigenous perspectives is generally centred in the solution and implementation stages.	Indigenous perspectives are included but not as part of the problem definition stage.
Science over Story The issue of Understanding	Value-based involvement is missing in the engagement and inclusion processes of species at risk. Science seen as the priori without reflecting on the limitations of cross-sectional and longitudinal research that does not include “understanding”	The Indigenous perspectives are largely obligation based due to treaty rights and title without reflection on the importance of change over time data and stories collection by knowledge keepers.
One Voice – False Perceptions of Involvement	Representation issues with who is participating in the decision for Indigenous Peoples.	A meta-analysis conducted indicated the Atlantic Indigenous had the strongest involvement in Fish across Canada, but it was one organization with limited scope of representation.
Are we at the right level of focus?	The focus is on species at risk management, but this is difficult to separate from the economic and sustainability impacts of the Marine Strategy.	Are we engaging in the broader discussion with a focus on all Indigenous perspectives, including livelihood and commercial interests affected by a broader Marine Strategy?

Recommendations

The following is a summary of the recommended actions from the analysis with a reflection on the issue presented. The focus is to help APCFNC prioritize activities and determine the role to help foster growth and sustainability in the Atlantic Marine Ecosystem.

Table 4. Summary of Identified Gaps

GAP	Recommendation	Reflection
Management and Sustainability Practices Skewed to one viewpoint	There are many international, national, and local level ways to create partnerships and co-learning opportunities.	Indigenous traditional knowledge includes the philosophical and the practical ways of co-managing ecosystems.
Indigenous Research Central Focus Missing	Establish MOU's with research funding agencies and research institutions to centre Indigenous knowledge systems in SAR research.	Advocacy and co-learning opportunities with SAR researchers on two-eyed seeing as a collaborative approach
Consultation versus Collaboration Not at the Right Table	Advocate and establish policy on the inclusion of Indigenous perspectives on SAR at as many points of the process as possible.	Listing stage, recovery stage, and action and implementation stage. Involved in research, collaboration and policy.
Science over Story The issue of Understanding	The narrative of science over story needs to change. There are success stories where partnerships have forms between traditional knowledge holders, fishers, and scientists. Continue to publish and promote these stories.	Anthropogenic threats to species and ecosystems. The literature demonstrates a resounding number of threats to ecosystems. The habitat loss, over-fishing, "bycatch", climate change, shipping patterns and speeds, pollution, barriers and dams.
One Voice – False Perceptions of Involvement	Processes for Atlantic Indigenous peoples and communities regional representation in national and international forums.	Identify areas where Atlantic regions Indigenous peoples and communities are underrepresented in international and national SAR processes.
Are we at the right level of focus?	Promote and create policy around ecological approach to social, cultural, environmental, political,	Human interactions in the ecology are a part of the holistic ecological approach, whether that is for

GAP	Recommendation	Reflection
	economic and spiritual focus on sustainable co-management of species at risk.	commercial, moderate livelihood, or subsistence purposes.

*see Appendix A: Recommended Action Plan Worksheet & Appendix B: Key Influencer Worksheet

Conclusion

In addition to the recommendations, four appendices have been added to complement the findings.

- The first is an action plan worksheet to help the APCFNC director and staff implement the recommended actions over a five (5) year period.
- The second is a template to explore the critical influencer and decision-maker positions in Atlantic Canada to increase the credibility of the position power needed to direct the Marine Ecosystem Strategy in the Atlantic; and influence National and International practices.
- The third and fourth are a database in an MS Excel format with 190+ literature review source documents, and an MS Word document with key images and tables as references from the list of database entries. These databases will enable APCFNC to search experts and organizations in the fields of Marine species and risk and ecosystem management.

See appended files to report

Appendix A – Recommended Action Plan Worksheet

See appended file to report

Appendix B – Recommended Influencer & Decision-Maker Worksheet

See appended file to report

Appendix C – Database Workbook for SAR Literature Review

See appended file to report

Appendix D – Images

See appended file to report