

# Report of the Atlantic Seal Science Task Team

*April 2022*

## FOREWARD

*On behalf of the Atlantic Seal Science Task Team, we present this final report which includes recommendations pertaining to the Department of Fisheries and Oceans (DFO) seal science priorities, with a focus on harp and grey seals, and how DFO can increase opportunities for collaboration with the fishing industry. The Task Team members worked, on a volunteer basis, to generate this report and series of recommendations to address these objectives.*

*The Task Team's recommendations are focused on the need to address knowledge gaps related to seal diet, distribution and migration patterns, on better understanding the relationship between seals and commercial fish stocks and on working more collaboratively with the fishing industry, academia, Indigenous partners and other countries on seal science research activities. The recommendations also make concrete suggestions for improving DFO's communication of seal science to the fishing industry and general public.*

*To help inform these recommendations, and despite the challenges posed by the COVID-19 pandemic, the Task Team heard directly from seal science researchers and as well as representatives from the fishing industry. The Task Team also invited contributions and perspectives from Indigenous organizations and considered public and stakeholder written submissions in their deliberations and recommendations. Task Team members developed these recommendations based on their individual experience and expertise and not necessarily as representatives of member affiliations or associations.*

*We hope that this report and recommendations will be considered by the Department as it develops its research priorities and plans future pinniped-related science activities.*

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## Introduction

The Atlantic Seal Science Task Team (ASSTT) was announced on March 5<sup>th</sup>, 2020 to gather input on the Department of Fisheries and Ocean's (DFO) science activities and programs related to seals and their role in the Northwest Atlantic ecosystem. The ASSTT is a direct response to the concerns raised by commercial fish harvesters in Eastern Canada about the impact seal predation is having on fish stocks.

The ASSTT acknowledges and appreciates the support provided by DFO in arranging seal science presentations describing the Department's research activities pertaining to grey seals, harp seals and related interactions with fish stocks. In addition, at the request of the Task Team, DFO arranged presentations with Norwegian researchers on seal research and management in Norway. The Task Team also invited perspectives from industry and Indigenous groups. Due to the COVID- 19 pandemic, the Task team held all meetings virtually.

The ASSTT recognizes the scientific work DFO has done in estimating the population size of harp and grey seals. However, the ASSTT considers the food, feeding and migration data for the harp and grey seal populations in Atlantic Canada<sup>1</sup> to be woefully inadequate to accurately determine the role seals play in the Northwest Atlantic Ecosystem and the impacts on other ecosystem components.

In response to longstanding evidence from the fishing industry that seals are having significant impacts on groundfish stocks, pelagic stocks, shellfish and salmon, and with the exception for some groundfish species in NAFO zone 4T, the response from DFO Science has been that there is no *scientific* evidence that seals are having any measurable impact on fish populations. The ASSTT believes that the lack of current comprehensive data collection on feeding, diet and migration throughout the seasonal and spatial range of seals, especially the harp seal population, is likely contributing to the lack of credible scientific evidence.

It is the view of the ASSTT members that the high population abundance of grey seals and harp seals, which are at or approaching historic levels, are having a serious impact on the ocean ecosystem in Atlantic Canada. The extent of the impacts cannot be determined with the limited information held by DFO Science.

### *Key conclusions:*

- There is no conservation concern for grey seal or harp seal populations.
- All seal populations must be included in the effective management of ocean ecosystems.

### COD AGGREGATION AND SEAL PREDATION IN 4T

Cod can aggregate in certain places and seasons.

Dedicated sampling of grey seals in Cabot Strait in winter showed that male seals were targeting such cod aggregations, consuming large cod at high rates.

Grey seal predation in 4T is preventing recovery of Southern Gulf cod and under current conditions local extinction of this stock is likely.

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<sup>1</sup> For the purpose of this report, Atlantic Canada refers to Quebec, NB, NS, NL and PEI.

- Studies on hooded seals, harbour seals, bearded seals and ringed seals also need to be conducted by DFO and industry. The 2001 Eminent Panel on Seal Management (<https://waves-vagues.dfo-mpo.gc.ca/Library/260100.pdf>) recommended that priority be given to the assessment of the Hooded Seal population, as well as additional diet sampling work (particularly in the offshore area), due to the fact that they may be consuming large quantities of northern cod in Divisions 2J3KL.
- The grey seal population has increased from around 15,000 in the 1960's to 424,300 animals in 2016<sup>2</sup>. This is the largest population of grey seals in the world<sup>3</sup> and has been expanding its geographic range throughout Eastern Canada.
- The harp seal population has increased from approximately 2 million animals in the 1970's to 5.5 million in 2001 to an estimated 7.6 million in 2019<sup>4</sup>. This is the largest harp seal population in the world and is the largest Northwest Atlantic harp seal population in recorded history.
- Total prey consumption by harp seals in 2J3KL during 2014 was estimated to be approximately 3.2 million metric tonnes (95% CI 2.1 mt – 4.9 mt)<sup>5</sup>. The same year, all commercial landings in Newfoundland and Labrador totalled around 256,000 tons<sup>6</sup>.
- Groundfish stocks in Atlantic Canada are at or near the lowest level ever observed and are experiencing very little recovery due to very high levels of unexplained natural mortality which has been attributed to seals in some regions, but not in other regions.
- Commercial finfish fisheries are at an all time low, driven by low stock productivity resulting from, in part, high rates of unexplained natural mortality.
- Similarly, Canada's Atlantic salmon populations are at or near their historic low levels, despite having been under commercial fishing moratorium for more than 30 years, resulting in reduced access for Indigenous fishers and significant restrictions for recreational fishers. Significant restrictions resulted in lack of access. Additionally, significant investments in salmon conservation by the federal government, First Nations and conservation organizations have not been successful in recovering the species.
- The current level of food requirements and feeding studies is not adequate to determine the diet of harp or grey seals throughout the year and/or throughout their habitat range.
- The importance of a full understanding of the diet and feeding patterns of seals (grey seals) is best seen in the southern Gulf of St Lawrence cod stock where a focused research program re-shaped the perspective of the impacts of seal consumption on the productivity of the population.

*Seal management considerations - although the following considerations are not within the scope of the ASSTT mandate, members felt it was important that they be conveyed:*

- Clear management objectives need to be established and followed by both Government and industry for all seal species in Eastern Canada.

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<sup>2</sup> DFO. 2017. Stock assessment of Canadian Northwest Atlantic Grey seals (*Halichoerus grypus*). DFO Can. Sci. Advis. Sec. Sci. Advis. Rep. 2017/045.

<sup>3</sup> <https://nammco.no/topics/grey-seal/>

<sup>4</sup> DFO. 2020. 2019 Status of Northwest Atlantic Harp Seals, *Pagophilus groenlandicus*. DFO Can. Sci. Advis. Sec. Sci. Advis. Rep. 2020/020.

<sup>5</sup> NAFO. 2015. <https://www.nafo.int/Portals/0/PDFs/sc/2015/scs15-19.pdf>

<sup>6</sup> <https://www.dfo-mpo.gc.ca/stats/commercial/land-debarq/sea-maritimes/s2014aq-eng.htm>

- Where science gaps have been addressed and levels of impact have been quantified, resource managers must be willing to move forward with seal population reduction strategies aimed to rebuild impacted stocks.
- The Government of Canada must consider seals as a resource and support the development of new opportunities and markets for seals. This needs to be prioritized in partnership with industry, Indigenous groups and provincial governments.
- Similarly DFO, along with Global Affairs and International trade need to work to open markets and reduce trade restrictions for the species.
- DFO should review recommendations of the Eminent Panel on Seal Management and specifically re-evaluate and implement the concept of seal exclusion zones as proposed by the Eminent Panel on Seal Management in 2001.
- DFO should support capacity development of stakeholders to improve their understanding and ability to engage in science advisory processes and improve stock assessment science.

## Recommendations

The following nine recommendations and suggestions represent the perspective of the ASSTT. They have been organized according to the Task Team’s three objectives as described in Appendix 3 and are relevant to all regions in Atlantic Canada, including the North where relevant.

**Objective #1: Gaps in the existing scientific body of knowledge and DFO science activities as it relates to grey and harp seals, as well as the application of technology advancements to seal research.**

**Recommendation #1: DFO should urgently work towards addressing gaps in seal diet information throughout their range and throughout the year**

- A full seasonal and spatially representative assessment of the diet of grey and harp seals is needed to address profound data gaps that presently preclude, with the exception of the Southern Gulf of St. Lawrence, any accurate assessment of the impact of pinniped predation on other ecosystem components (including commercially important and depleted fish species). Existing data sets on pinniped diets are heavily biased both spatially, sexually, temporally and by life stage. For example, harp seal diet samples are focused away from the core habitat area of the seal herd, leading to highly questionable (and likely inaccurate) assessments of ecosystem impacts, as appropriate levels of sampling have not been available for near two decades.

### Recommendation #1

A fulsome understanding of the diet throughout the range and across seasons is key to evaluating the potential impacts of seal herds. Some herds and areas are more easily sampled than others, leading to accidental bias in data collection and understated impact assessment. For example, between 1986 and 2014, over 4000 harp seals stomachs were collected and assessed for diet. Of these, 95% were sampled from inshore areas which represent less than 20% of the herd’s distribution (while the remainder of the herd resided on ice in the far offshore areas overlapping with cod, capelin and turbot populations). Between 1986 and 2010, samples to determine the Winter offshore harp seal diet in Newfoundland NAFO zone 2J3KL numbered *239 samples over 14 years*, meaning that the true picture of the harp seal diet in the winter cannot be determined with any degree of confidence. This makes any defensible or believable conclusions of the impacts of seal predation on offshore ecosystem components impossible, including understanding the relationships between harp seals and commercially important species such as capelin, cod, redfish and turbot.

- Updated comprehensive annual diet information representative of the seal herd should be incorporated in the assessment of impacts on other ecosystem components, realizing that pinniped diets will vary with the availability of preferred food items, leading to uneven impacts depending on the health, productivity, and abundance of commercially important and depleted fish species (i.e. cod). For example, in the absence of capelin in offshore areas (due to low capelin stock levels), harp seals may switch to other commercially important fish species that co-occur in the same area (cod, turbot, redfish), leading to short, but not insignificant downward pressures on the productivity and status of those alternate prey items on a punctuated basis that may not be detectable during extended time series analysis, but are nonetheless very significant in shaping the productivity and mortality of those stocks.
- Where suitable and in areas where significant impacts are expected but cannot be fully assessed by existing diet sampling methodologies, alternate methods of assessing diet should be considered by DFO, such as expanding the use of emerging technologies (e.g. cameras attached to seals) to complement the existing diet studies. This is especially important in local areas where seals regularly appear and interact with ecosystem components not generally assessed by existing studies, such as river entrances, rivers and near fishing gear and aquaculture sites.

**Recommendation #2: DFO should work towards determining harp and grey seal distribution and migration patterns throughout the year**

- This could be achieved through various means, including GPS tracking, tagging and compilation of sightings and areas where seals are observed, with special focus where they interact with important identified ecosystem components (e.g. during herring spawning periods, capelin aggregations, migratory mackerel schools, spawning cod aggregations, estuarine salmon migrations).
- A quick access seal reporting system available for use by harvesters and the public should be put in place to allow rapid reporting and compilation of occurrences to inform the assessment of seal distributions. DFO should consider use of smartphone technology to allow for an automated and validated geo-tagged data sources to augment existing DFO survey information.
- DFO should work with First Nations, conservation organizations and academia to monitor the presence and feeding behavior of seals in salmon rivers during peak migration periods. Seal stomach analysis conducted during the peak periods of salmon smolt and adult migrations would fill an important knowledge gap and this may include the alternate methods of assessment described above.
- To help inform the future distribution of seal herds in light of climate change, DFO should support more analysis of ice coverage in regional areas, including presence, thickness, and duration, including involvement of stakeholders in these efforts.
- Given the extensive harp Seal range throughout Inuit Nunangat and Greenland, DFO should prioritize this species for Arctic research.

**Recommendation #3: DFO should work towards better understanding the relationship between seals and the dynamics of important fish stocks and the marine ecosystem as a whole.**

- A better understanding of the predation relationship between seal population and fish stocks is needed and will be informed by improved diet information recommended above.
- Focused interaction studies in known areas of co-occurrence of seals with other defined important ecosystem components (i.e. salmon) will help assess whether seals are depressing already low stocks. This work is important from an ecosystem perspective as well as to inform the development and implementation of Integrated Fisheries Management Plans (IFMP), fish stock rebuilding plans and to inform the Sustainable Fish Stock Provisions.
- DFO should include a section on seal impacts (i.e. predation, food competition, depredation) in Fish Stock Rebuilding Plans and Integrated Fisheries Management Plans throughout the Atlantic region. Significant gaps in seal science (i.e. diet and distribution) should be described.
- DFO science should include the testing of “Alternative hypotheses” regarding the possible impacts of seal predation on ground fish, pelagic, and shellfish stocks. This could begin as a simple spatial overlap which would inform modelling efforts. DFO should also ensure that seal scientists attend key science advisory processes, such as Atlantic cod, Atlantic herring, Northern shrimp, Capelin, mackerel and Snow crab
- The impact of harvesting seals at different life stages (i.e. number of adults vs juveniles) on the projected seal herd population trajectories should be undertaken to inform future possible management approaches .
- DFO should perform ecosystem modelling to provide an assessment of ecosystem state with seal populations at current levels vs one where the various trophic states are more balanced (i.e. seal biomass is scaled to trophic production at other levels relative to historic past meaning key fish stocks may experience increased productivity).
- Where there are acknowledged negative impacts of seal predation on fish stocks, DFO should provide an estimate during each stock assessment and/or every 5 years on what level of seal removals would be needed to mitigate those effects to a long-term average.

**Recommendation #4: DFO should consider undertaking research on seal species other than harp and grey seals, particularly with regards to their roles in the ecosystem.**

- While the focus of the ASSTT discussions were on harps and greys, other pinniped species should also receive additional attention. For example, a higher priority should be placed on Ringed seal research in Labrador, Harbour seals throughout Atlantic Canada, Bearded seals and Hooded seals.

**Recommendation #5: DFO should establish and permanently fund a social sciences research unit to complement natural science research**

- DFO should establish and permanently fund a social sciences research unit to capture the human dimensions of the ecosystem. This unit would be primarily tasked with developing standardized methods and documenting a) seal harvester knowledge, b) Indigenous knowledge, and c) collaborating with the DFO Economics unit (e.g. on the impacts of seal to coastal communities), and the DFO Ecosystem and Oceans Science unit. Social sciences projects may be carried out in collaboration with Indigenous groups, seal harvesters, communities, industry, and academia. These social science efforts, should be presented along with all other available knowledge for management consideration and decisions.



**Objective #2: Increasing the involvement of the fishing industry, and other potential partners and experts, in seal science projects.**

**Recommendation #6: DFO should take advantage of opportunities to increase sampling by working with members of industry and other potential partners.**

- DFO should develop an effective diet sampling plan in conjunction with industry to address gaps in seal diet information that are widely accepted by the industry.
- DFO should support the training of fish harvesters. The participation of additional harvesters could potentially address gaps identified above.
- DFO should engage salmon conservation organizations, community groups and interested stakeholders to address the glaring absence of information of seal diet in freshwater and estuarine environments.
- DFO should consider supporting industry vessels of opportunity to expand data collection efforts to fill data gaps.

**Recommendation #7: DFO should establish a multi-stakeholder, externally facilitated, seal science forum.**

- This focused seal forum, with an independent chair, would help foster a collegial environment where respectful and action-oriented discussions would be held between experts in seal research and stakeholders.
- The objectives of the forum are as follows;
  - a. to overcome seal science gaps (identified in recommendations #1-6) for important commercial fisheries and ecologically important stocks
  - b. to improve the use of industry information and involvement in seal science research, assessments, and management.
- This collaborative science process would facilitate seal science discussions which have been difficult to achieve through various other platforms. The forum would be accepting seal science questions brought forward by various stakeholders and Advisory Committees. Given the range of stakeholders involved, questions could lead to the identification of potential case studies or research projects either directly through DFO seal science teams and/or partnering with interested stakeholders.
- The forum should maintain a transparent process by clearly identifying project deliverables and timeframes as well as ensuring regular communication with stakeholders on seal science research progress and outcomes.
- The forum could provide the platform for discussions on the development of standardized methods for documenting seal observations by fish harvesters across Atlantic Canada and subsequently how this data collection could be incorporated into the DFO seal science program. Avoiding the discussion on how to incorporate this increasing data set, would be a missed opportunity of meaningful collaboration.

**A NEW FORUM**

The gap between fish harvester perspectives on seal and DFO's scientific understanding is too wide to close using the long standing and existing DFO advisory processes. This ecosystem problem needs a new forum, with ideas and approaches (e.g. systematically understand, track, and monitor fish harvester knowledge) to rebuild trust and generate momentum toward a stronger blue economy.

**Recommendation #8: DFO should work towards accessing additional scientific capacity.**

- More involvement from Academia in pinniped research activities would be beneficial and could help address gaps in pinniped science. DFO should investigate the potential for collaborations among DFO, industry and Indigenous groups. Funding opportunities should be created to support these collaborations including for the testing of new technology, development of applications, and modernizing equipment.
- DFO should investigate seal science processes and methodologies used by other countries, collaborate with international partners and apply lessons learned to DFO seal research programs.
- DFO should reassess its role/involvement in NAMMCO (North Atlantic Marine Mammal Commission).

**Recommendation #9: Improved seal depredation research**

- Efforts should be made to document and regularly update the economic impact of the depredation of seals on fishing catch, marketability and gear damage in Canadian fisheries.
- DFO should aim to provide a consistent approach to seal depredation data collection and analysis on all annual fisheries science surveys across DFO Regions and across fisheries particularly in areas with increased seal observations.

**Objective #3: How DFO could better communicate its scientific findings to the fishing industry.**

- Effective communication consists of two parts: speaking/writing clearly and listening/reading actively. DFO's seal science findings are complex and not always accessible or understandable for the general population. If one cannot interpret and understand seal science information, one cannot transmit this information to other groups/stakeholders/communities. DFO should make efforts to better tailor its communication material to specific audiences, including fishery managers, fish harvesters, the media and the public. Training should be made available to those DFO individuals who are responsible for communicating to external parties and facilitating meetings to help foster a respectful and collegial environment.
- DFO should encourage fishing industry involvement in DFO science advisory processes. This could be done by including a day dedicated to harvester knowledge. Harvesters should be given time for dialogue at the start of the science advisory process, as opposed to the end. With the implementation of recommendation #5, ongoing harvester knowledge will also be available through various human dimensions and fish harvest knowledge studies. DFO should also offer science advisory process attendees, including those from industry, with basic training/overview of new modelling systems and complex assessment tools.
- DFO should provide an updated seal science summary annually with consistent and clear messaging through a variety of outlets, including publicly through government websites, distributed documentation at Fisheries Advisory Committee meetings, and to the fishing industry (e.g. virtual sessions). Virtual sessions with industry could be similar to the Seal

**SHIPS PASSING IN THE NIGHT**

These recommendations cannot be successful without a commitment to a communications strategy with sustained dialogue, training, and the latest available information.

Technical Briefing in NL, but with discussions on ongoing programs, outcomes and publications available. Planned DFO pinniped Science work should also be shared publicly.

- DFO should provide accurate, objective and up-to-date messaging in its reports, websites and communication material in relation to seals, seal science and seal interactions (i.e. how much commercial fish are being consumed by seal herds and what those impacts could be?). For example, the selection of appropriate seal photos that includes those outside of the white-coat stage is an important part of this messaging.

## Appendix 1: Task Team Members

The Atlantic Seal Science Task Team is co-chaired by Fisheries and Oceans Canada (DFO), which provided secretarial support, and Glenn Blackwood, recently retired Vice President of Memorial University (Marine Institute).

Members were appointed based on their broad range of expertise and fisheries experience relevant to the Task Team's mandate, as well as their geographical provenance. Members were not meant to be representatives of all the Atlantic fisheries and seal organizations having an interest in Atlantic seal science. They include:

- Ginny Boudreau, Guysborough County Inshore Fishermen's Association
- Robert Hardy, Fisheries Consultant
- Laura Ramsay, PEI Fishermen's Association
- Jamie Snook, Torngat Joint Fisheries Board
- Bill Taylor, Atlantic Salmon Federation
- Kris Vascotto, Atlantic Groundfish Council

Jocelyn Thériault from the *Regroupement des pêcheurs professionnels des Îles-de-la-Madeleine* was appointed as a member of the task force. Scheduling conflicts unfortunately led to his resignation from this committee.

## Appendix 2: Task Team Mandate

**Purpose** - Fisheries and Oceans Canada (DFO) has convened an Atlantic Seal Science Task Team to gather fishing industry and stakeholder input on science activities related to Atlantic seals, in particular as it relates to ecosystem interactions and predation on commercial fish stocks.

### **Objectives**

1. This Task Team will seek to bring the perspective of the fishing industry and other stakeholders on gaps in the existing scientific body of knowledge and DFO science activities as it relates to grey and harp seals. The Task Team will also provide input on the priorities of the DFO Atlantic seal science program and consider the application of technology advancements to seal research.
2. The Task Team will provide input on how to increase the involvement of the fishing industry in science projects.
3. Finally, the Task Team will provide advice on how DFO could better communicate its scientific findings to the fishing industry.

The mandate of the Task Team does not overlap with that of DFO's existing Atlantic Seal Advisory Committee (ASAC), which is the primary consultative body between the Department and sealing stakeholders. ASAC provides seal industry advice on seal management issues.

**Duration** - The Task Team is expected to be in place for a maximum period of one (1) year.

**Composition** - The Task Team will consist of 6-10 individuals, drawn from the fishing industry and other stakeholder groups. The individuals will have broad expertise and experience in Atlantic fisheries and fisheries issues. The Task Team was established by the Minister of Fisheries, Ocean, and the Canadian Coast Guard and will report to the Deputy Minister. The Task Team will be Co-chaired by DFO and an external research partner (Glenn Blackwood, Marine Institute). Participants are expected to serve as individuals rather than formal representatives of their organizations. Members are expected to respect the intent of the Task Team and refrain from commenting on its deliberations until report is concluded. Members will be appointed for the entire one (1) year duration of the Task Team and alternates will not be accepted. The Task Team may invite input from external advisors such as academic and research organizations as required, to fulfill their objectives.

**Organization and Reporting** - The co-chairs will be responsible for developing meeting agendas and managing the discussions. DFO will provide a secretariat support and take minutes of meetings. The Task Team may meet in person or by telephone or using other meeting technology. It is expected that a consensus report for Objective #1 will be generated by the Task Team and made public. For Objectives #2 and #3, no consensus will be required and Task Team members will be invited to share their views directly. External input from additional

stakeholders will be received via email using the following address: [DFO.SealTaskTeam-Groupedetravailduphoque.MPO@dfo-mpo.gc.ca](mailto:DFO.SealTaskTeam-Groupedetravailduphoque.MPO@dfo-mpo.gc.ca) Inputs via this process will be provided to Task Team members for consideration.

**Funding** - DFO will provide funding for travel (per Treasury Board policies and National Joint Council Travel Directive) if requested by the participants. DFO will be responsible for any meeting expenses.

## Appendix 3: Information sessions provided to Task Team

The Atlantic Seal Science Task Team attended three separate seal science information sessions presented by DFO's seal science researchers:

- DFO seal science information session: harp seals
  - June 25<sup>th</sup>, 2020
- DFO seal science information session: grey seals
  - July 23<sup>rd</sup>, 2020
- DFO seal science information session: Ecosystem interactions of Atlantic seals
  - October 15<sup>th</sup>, 2020

In addition to the seal science information sessions given by DFO, the Task Team also participated in three other sessions with Norwegian seal science researchers, the Fish, Food and Allied Workers (FFAW) and Mr. Bob Hardy, a member of the Task Team and fisheries consultant:

- Information session from Norwegian seal science researchers
  - February 23<sup>rd</sup>, 2021
- Information session from Mr. Bob Hardy, Fisheries Consultant, Newfoundland and Labrador
  - March 12<sup>th</sup>, 2021
- Information session from Fish, Food and Allied Workers (FFAW)
  - May 11<sup>th</sup> 2021

Presentations delivered at the above mentioned sessions are available upon request to the following email address: [DFO.SealTaskTeam-Groupedetravailduphoque.MPO@dfo-mpo.gc.ca](mailto:DFO.SealTaskTeam-Groupedetravailduphoque.MPO@dfo-mpo.gc.ca)

## Appendix 4: Summary of written submissions received by the Task Team

The Task Team received a total of 25 email submissions through their official email address ([DFO.SealTaskTeam-Groupedetravailduphoque.MPO@dfo-mpo.gc.ca](mailto:DFO.SealTaskTeam-Groupedetravailduphoque.MPO@dfo-mpo.gc.ca)). The originators of the email submissions included members of the fish and seal industry, fish and seal harvesters and other interested individuals/groups. Below is a summary of key messages included in these submissions. The full submissions were reviewed by Task Team members but note that the summary includes only those key messages that relate specifically to the mandate of the Task Team.

### **#1 Key messages pertaining to scientific research priorities**

- DFO should focus its seal research on establishing seal feeding patterns/consumption rates, and incorporating these findings into scientific stock assessments for commercial species such as cod, northern shrimp, capelin and snow crab.
- Every reasonable effort should be made to understand the cod-capelin-seal interactions, and to incorporate appropriate data into cod population assessments.
- The seal population has been increasing and they are now being observed in areas where they have never been seen before and are having an impact on salmon and trout stocks.
- Over the past 50 years, seal range has changed from their traditional regions to nearshore and up rivers and in lakes, causing pressure on inland commercial fish stocks such as trout and salmon. Many observations were communicated of seals in rivers, sometimes year-round.
- The estimated rate of fish consumption by seals may be underestimated as a result of seals fatally wounding fish by “belly biting”.

### **#2 Key message pertaining to involving the fishing industry in the collection of scientific data**

- Personal use and commercial harvesters could get involved in the seal data gathering process by checking the stomach content of harvested seals to collect information on the fish species consumed and to report this information to DFO during the hail-in along with seal species, weight, age and area in which they were harvested, as is required already.

### **#3 Key messages pertaining to communicating science**

- DFO should communicate its scientific findings to sealers, fishing industry and stakeholders so that they can better understand the direct or indirect impact of seals on our fish stocks.



## Appendix 5: Background Provided to the Task Team by DFO with regards to Atlantic seal populations and their impact on fish stocks

<https://www.dfo-mpo.gc.ca/science/mammals-mammiferes/atlantic-seal-phoque-atlantique/appendix5-annex5/index-eng.html>