Fisheries and Oceans Canada | Pêches et Océans Canada
Ecosystems and Oceans Science | Sciences des écosystèmes et des océans

Arctic Region and Ontario and Prairie Region

Canadian Science Advisory Secretariat
Science Response 2024/019

SCIENCE ADVICE ON THE ECOLOGICAL RISK ASSESSMENT FOR THE SOUTHAMPTON ISLAND AREA OF INTEREST (AOI)

Context

On behalf of the Government of Canada, the Minister of Fisheries and Oceans and the Canadian Coast Guard is responsible for leading the development of Marine Protected Areas (MPAs), under the *Oceans Act*. Undertaking an ecological risk assessment to identify risks to the conservation priorities (or conservation objectives) of an MPA is a fundamental step in the MPA establishment process. DFO and the Kivalliq Inuit Association (KIA) have partnered to advance the Southampton Island Area of Interest (AOI) for potential designation as a new *Oceans Act* MPA. An Ecological Risk Assessment (ERA) is needed to inform the regulatory approach to determine which activities will be allowed or restricted in the area.

The ERA is a systematic and transparent process for gathering, evaluating, and recording information on the risks posed by human activities to ecologically significant components within a study area. The risk assessment for Southampton Island AOI is based on a draft Arctic Region Ecological Risk Assessment Framework (ERAF), which provides a consistent approach for calculating risk of impact to Arctic ecosystems from single stressors. The ERAF was developed by DFO Marine Planning and Conservation (MPC) Arctic Region, with input from a regional working group with membership from MPC, DFO Science, and Fisheries Management. The rationale and scores reviewed through this CSAS process will draw on previous Science advice (DFO 2020a,b), a draft Pathways of Effects (PoE) report developed for the area, and are focused on activities that are existing or foreseeable within the next 10 years.

DFO MPC Arctic Region requires Science advice to review the ERA to ensure that findings are consistent with existing literature and scientific knowledge of the area. This information is necessary to guide the establishment of an *Oceans Act* MPA by Governor-in-Council, should one be recommended in Southampton Island AOI.

This Science Response Report results from the regional peer review of November 1–3, 2022 on the Review of the Science Advice on Ecological Risk Assessment for the Southampton Island Area of Interest (AOI).

Background

The Southampton Island Area of Interest (SI AOI) is located within the Kivalliq region of Nunavut and provides important habitat for marine mammals, marine and anadromous fishes, seabirds, invertebrates, and macroalgae (Figure 1). This is a culturally significant region to Kivalliq communities that include Chesterfield Inlet (Igluligaarjuk) and Coral Harbour (Salliq) that are found adjacent to the boundaries of the AOI, and Rankin Inlet (Kangiqłiniq), Naujaat and Baker Lake (Qamani'tuaq) that are located nearby. The ERA reviewed here was prepared by LGL Limited and DFO MPC. As part of this process, a scoping exercise was conducted by DFO MPC to determine which interactions from the PoE report may result in a measurable impact and which of those can be regulated through an MPA. Focusing on specific interactions identified

through the scoping exercise allows for a more efficient assessment given the volume of all possible interactions. As well, given the likelihood of redundancy, proxy assessments were used in some instances to increase the efficiency of the risk assessment.

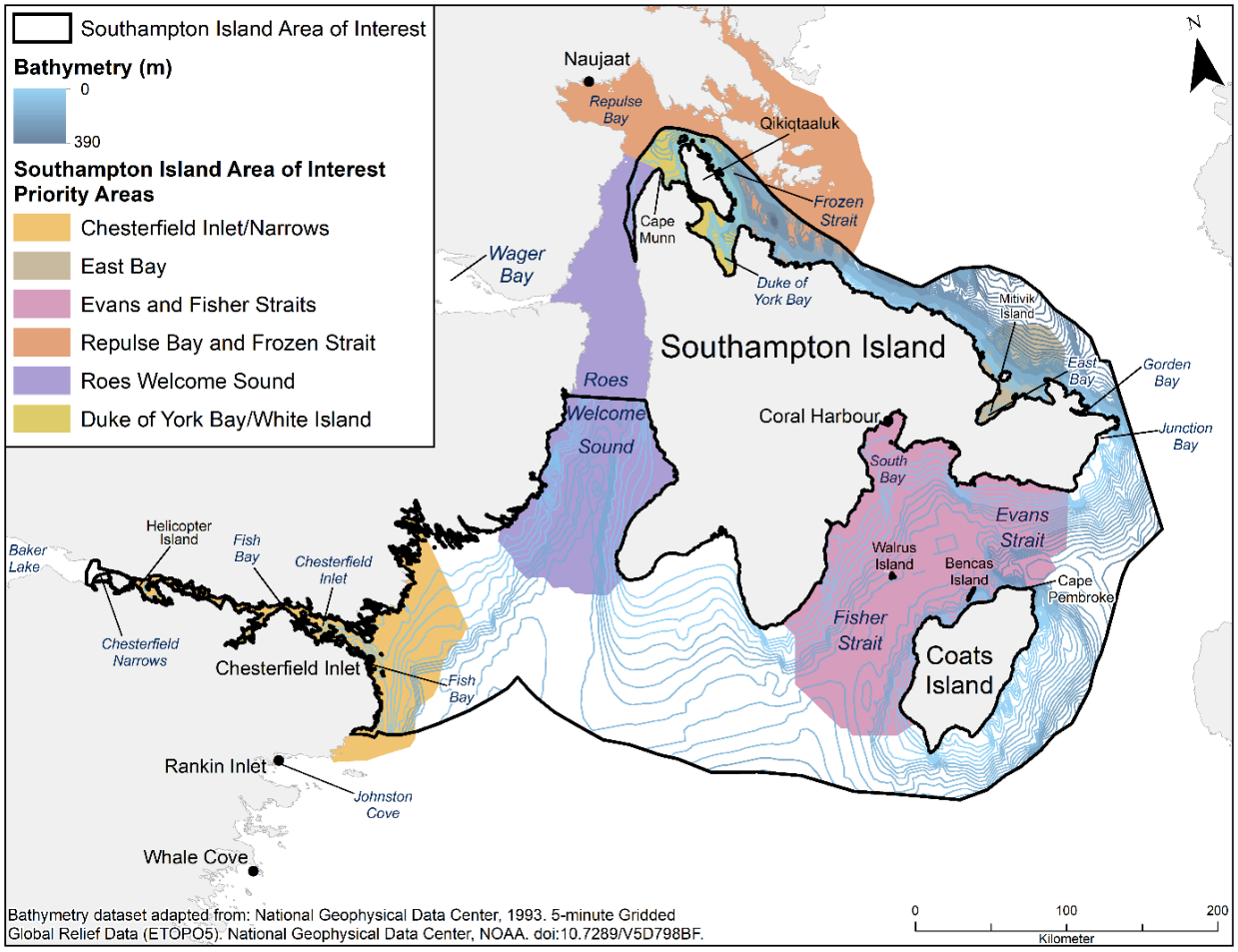

Figure 1. Priority Areas for the SI AOI (extending outside the AOI boundary) identified in DFO (2020 a,b): Chesterfield Inlet/Narrows, Roes Welcome Sound, Duke of York Bay extending around White Island, Repulse Bay/Frozen Strait extending to Lyon Inlet, Fisher and Evans straits, and East Bay. Duke of York Bay extending around White Island and RB/FS extending to Lyon Inlet Priority Areas overlap along the Northeast-Southeast side of White Island (included in ERA).

The objectives of this CSAS process are to peer review:

1. the information used to assess interactions involving ecologically significant subcomponents and identified stressors in their identified priority areas (i.e., has the most relevant and appropriate information been used, has it been correctly interpreted, and are there places where local expert knowledge might strengthen the assessment);
2. the resulting risk scores associated with each interaction; and,
3. the level of uncertainty for each interaction (i.e., has it been appropriately characterized/assessed).

Ecologically Significant Components (ESC)

Ecologically Significant Components (ESCs) of the SI AOI are described in DFO (2020 a,b). The ERA discusses the linkages between ESC subcomponents and their distribution and use of priority areas. As the conservation objectives for the SI AOI are not yet finalized, the risk assessment approach was focused on evaluating ESCs (i.e., the conservation priorities) by their individual subcomponents (Table 1).

Table 1. Ecologically Significant Components (ESC) and subcomponents of the Southampton Island Area of Interest (SI AOI).

Ecologically Significant Component (ESC)	Applicable ESC subcomponents
Intersection of several water masses	• Southward inflow of Arctic Ocean water from Fury and Hecla Strait • Westward inflow of Arctic Ocean water via northern Hudson Strait • Eastward outflow of water to the Atlantic Ocean via southern Hudson Strait • Mixing of water masses • Wind forcing • Deep water formation
Winter habitat in Roes Welcome Sound Polynya, including the coastal polynya at the mouth of Chesterfield Inlet	• Open water associated with polynya • Ice-edge • Phytoplankton • Sea ice • Polynya habitat
Migration corridor for beluga, bowhead, narwhal, and harp seal	• Beluga • Bowhead • Narwhal • Harp seal
Marine mammal (beluga, narwhal, bowhead, and polar bear) seasonal residence (feeding) and calving denning areas	• Beluga • Narwhal • Bowhead • Polar bear
Year-round resident marine mammals (walrus, bearded seal, ringed seal, and polar bear) and their prey species	• Walrus • Bearded seal • Ringed seal • Polar bear • Arctic Cod • Other forage fish
Anadromous fish species and other subsistence foods	• Arctic Char • Marine mammals (Beluga, Narwhal, Bowhead, Walrus, Bearded seal, Ringed seal) • Other forage fish • Barren-ground caribou

Ecologically Significant Component (ESC)	Applicable ESC subcomponents
Seabirds and their prey species	• Common eider • Thayer's gull • Thick-billed murre • Other seabirds • Arctic Cod • Other forage fish • Benthic invertebrates • Zooplankton
Macroalgae as habitat, including kelp beds	• Macroalgae
Benthic biodiversity	• Benthic invertebrates • Macroalgae • Benthic substrate

Priority Areas

The assessment of risk for each interaction uses a precautionary approach, in which priority areas identified in DFO (2020a,b) were designated as encompassing key habitats used by ESC subcomponents. This approach avoided diluting the assessment of risk within an area as large as the SI AOI (93,087 km^2). There were six priority areas identified within (and extending beyond) the SI AOI boundary: Chesterfield Inlet, East Bay, Evans and Fisher straits, Repulse Bay and Frozen Strait, Roes Welcome Sound, Duke of York Bay and White Island (DFO 2020a,b). Participants were asked to review the selected priority areas and confirm these areas were in fact the places in which ESC subcomponents would be most sensitive and/or exposed to a particular stressor (i.e., resulting in the highest level of risk, with the understanding that risk scores would be relatively lower in other areas within the AOI).

Analysis and Response

Shipping and Vessel Traffic

Vessel Underway

The risk assessment included four stressors associated with the vessel underway activity which were identified through the PoE and reviewed by meeting participants: noise disturbance, habitat alteration, vessel strikes, and water displacement. It was noted that the average number of transiting vessels between 2017 and 2020 is likely to be substantially higher than the number documented in the ERA. This would need to be factored into the intensity rationale for vessel related activities.

Noise Disturbance

The potential impact of noise generated by vessels to marine fauna, including marine mammals, fishes, and sea birds in the risk assessment was reviewed by meeting participants. Among ESC subcomponents, the impact of noise on marine mammals was discussed in the most depth, given the resulting risk scores were higher relative to other ESC subcomponents.

Consensus was reached that any activity that occurs in the marine environment and that has the potential to impact ESCs should be assessed, rather than disregarding an interaction if the

subcomponent is found above the water line (i.e., haulouts). Consideration was given to the habituation of walrus to vessel traffic, with specific reference to Round Island, Alaska (Stewart et al. 2012) and Baffinland activities. The potential for this habituation was not incorporated into the risk scores, however, in order to maintain a precautionary approach as habituation may not occur consistency among Pacific and Atlantic walruses, populations or individuals.

Habitat Alteration

It was discussed that confined, shallower areas, such as Chesterfield Narrows, may be more sensitive as a result of more intense sedimentation. However, it was also mentioned the vessels are expected to have less of an impact on habitat relative to the intensity of tides on sedimentation in these areas. It was noted that a more severe example of benthic sedimentation has been referenced in the chronic change rationale and that this may not be relevant to the level of vessel traffic-induced sedimentation expected in the SI AOI. It was suggested to remove the interaction table between macroalgae and propellors, given that they are unlikely to come in contact with one another since macroalgae would occur at a greater depth. Similarly, it was suggested that the impact to benthic invertebrates could also be negligible since they do occur at a greater depth; however, the sediment overload due to vessels underway may still interact with invertebrates and therefore the interaction should remain in the assessment.

Recovery factors were identified as an area of uncertainty since it is unknown how long it would take for the benthic community to recover. It may not be possible to give a score due to the level of uncertainty. For example, red coralline algaes and macroalgae that are found at shallower depths, may be more impacted than other species of algae found in deeper habitats. Soft corals were also identified as a good indicator of disturbance, but there is high uncertainty around their distribution within the SI AOI.

Water Displacement

The only ESC subcomponent that was assessed for this section was seabirds, in that vessel-generated waves may impact nesting sites. It was determined that the impact of water displacement due to shipping would likely be negligible relative to storm events or wind-generated waves.

Icebreaking

There is limited information on the extent of ice breaking that occurs in the SI AOI, and if it occurs at all in some areas. Participants reviewed the assessment of potential stressors that could impact ESC subcomponents as a result of icebreaking, under the assumption that it does occur. Only the activity of breaking ice was reviewed here; activities involving ice-reinforced or ice breaking vessels transiting when no ice is present were covered in the vessels underway section. It was suggested to look at ice formation and Automatic Identification System (AIS) data together to provide more accurate information on the intensity of ice breaking occurring in the SI AOI.

Noise Disturbance

There is expected to be substantive noise disturbance when icebreaking occurs in the SI AOI. Many of these interactions were assessed in the vessel underway section, therefore the activity of breaking ice was assessed in addition to the sounds of a vessel underway (i.e., engines, propellor, etc.).

The risk posed by noise disturbance was assessed for all marine mammals identified as ESC subcomponents, though their level of risk varied from low to moderately high. It was recommended by participants to ensure that the interactions among subcomponents include

juveniles and adults, given that ice breaking can impact all life stages, particularly for walrus, and to also update this information in the vessels underway section. Ringed and bearded seals were identified to be low risk based on the information available. However, it was recommended that local knowledge should be used to inform this assessment, given the lack of published information available on the magnitude of disturbance to ringed seals and bearded seals by this activity.

Vessel Strikes

The report assessed two ESC subcomponents for risk posed by vessel strikes from icebreaking: ringed seal and bearded seal. There were no additional comments to this section, with the exception of updated references to be incorporated into the ERA.

Habitat Alteration

The activity of icebreaking changes the sea ice habitat, resulting in fragmentation and creation of channels that would not have otherwise been formed. It was reiterated here that these channels have the potential to entrap marine mammals, resulting in mortalities. This is anticipated to have a significant impact on narwhal, given that their population is larger in the SI AOI relative to other whales. Ice habitat (i.e., landfast ice) is also critical for seals to pup, nurse, and forage, and any disturbance to it has the potential to have a negative impact on ringed and bearded seals. It was suggested that walruses would not readily adapt to icebreaking, since they also require ice habitat for calving, breeding and foraging; there are limited data to suggest that they could be trapped in breaking paths. Local expert knowledge could inform the sensitivity of ESC subcomponents (e.g., walrus and other marine mammals) to the interaction. It was noted that there is still limited scientific information available related to impacts on Arctic marine mammals as a result of icebreaking.

The activity of icebreaking is expected to have an impact on Arctic Cod, a species that has life history characteristics tightly linked to the under-ice habitat, and therefore, an interaction table should be added for cod.

Although not covered in this ERA, it was acknowledged that the activity of icebreaking and increased cracks in the ice may result in a greater risk for humans who use traditional routes to travel across the ice. Use of the ice for travel should be captured in the socio-economic overview and considered in the risk treatment step of the MPA establishment process.

Vessel at Rest

Vessel at rest was an activity that was assessed in cases where vessels are stationary or adrift and could pose implications for ESC subcomponents in the SI AOI. There were few comments related to this activity, given that many impacts were already discussed in the vessel underway and icebreaking sections. However, there was a comment to include biofouling as a separate interaction table in this section and that biofouling from vessels that are at rest may be more intense than from grounding since all vessels would transit through/stop and have the potential for biofouling. Any time a vessel is at rest or underway there is potential for pathogens or non-indigenous species (NIS) to be introduced and generally this is considered to be a higher probability when a vessel is stopped.

Grounding and Foundering

Pathogen/NIS Introductions

Grounding and foundering refers to the temporary impact of a vessel coming into contact with the seafloor and having a potential interaction with benthic ESC subcomponents. The ESC subcomponents and priority areas reviewed by meeting participants included macroalgae and

benthic invertebrates in Chesterfield Inlet/Narrows. Consensus was reached that risk posed by grounding and foundering to both of those ESC subcomponents should be ranked as moderately high. It was recommended to consider that NIS larvae may spread more broadly by currents in that region when they are released by ballast water. Once NIS are established, it was also suggested that the chronic consequences may be higher, since an established NIS may result in persistent negative impacts to the marine environment whereas acute change may be lower, given that there is minimal impact until establishment occurs. Stochastic elements and the persistent nature of a species should also be considered in the life history of NIS, and captured in the likelihood section, particularly for those that are asexual and may establish on their own. There may also be information available through Northern Canada Vessel Services Zone Regulations (NORDREG) on the number of grounding events that have occurred that could be included in the assessment.

Anchoring and Mooring

Anchoring and mooring was reviewed by meeting participants with few comments to the ERA, which assessed the risk to macroalgae, benthic invertebrates and benthic substrates. It was noted that more research is needed to better understand the speed of recovery for macroalgae in the Arctic.

Vessel Discharge

It is unclear how frequently ballast exchange occurs, and clarity is needed to adequately address the risk associated with this activity. It was recommended that Transport Canada may be able to supplement this information, namely how frequently it occurs, and where and if it is done by domestic and international vessels. It was also noted that many vessels that come into the communities are loaded with supplies, and leave taking in ballast rather than discharging it.

Biological Material

The interactions between ESC subcomponents and biological material from vessel discharge and the information associated with their risk scores were reviewed. It was recommended that an interaction table be included for Arctic Cod, in addition to forage fishes, given that they are more representative of the pelagic environment. Among forage fishes, it was also noted that sculpin be selected as the representative species for this subcomponent for vessel discharge, as they are more tightly coupled with the benthos and they generally have a smaller home range than other pelagic species. Additional information in the recovery factor section is needed that is specific to sculpin, as the current recovery factor table is focused on more pelagic species (i.e., Capelin and Sandlance). Biological material introduced due to vessel discharge is likely to have a negative impact on the macroalgae, and it is unlikely that there would be an increase in kelp habitat used by fishes. It was recommended that the priority area be changed to Chesterfield Inlet/Narrows for the phytoplankton ESC, instead of Roes Welcome Sound, as there is updated information now available in Kitching et al. (2022). This recently published paper expresses reservations about concluding that Roes Welcome Sound is a critical production site, given that this would be based on measurements taken from one site. It was also recommended that the introduction of the ERA provide background that treats the phytoplankton ESC subcomponent recovery factors relative to phytoplankton aggregations, similar to how habitats are treated, which would be more reflective of the characteristics and cycle of phytoplankton blooms and senescence, than the fecundity/reproduction of an individual phytoplankton.

Pathogens and Non-Indigenous Species

It was suggested for interactions with pathogens and NIS associated with vessel discharge that intensity be considered in the same manner as for an oil spill, given that they persist in the environment in a similar scenario. For example, the first record of highly pathogenic avian influenza virus was documented on Coats Island in the summer of 2022, which could cause high mortality in the near term if it were to persist in the environment. A recommendation was also made to ensure the risk assessment includes non-indigenous zooplankton and phytoplankton as part of the information informing the NIS assessments because they have the potential to negatively impact native taxa.

Petroleum Product Leaks/Spills

The ERA considered the risk posed by vessel source oil spills in the event of small and large spills. It was recommended that there could be more information in the introduction to include both winter and summer spills, given that there is likely to be temporal differences in their impact, particularly with ice algae. It was also recommended that the marine mammal tables include placenta/in utero transfer of contaminants, as this is known to negatively impact young. The impact of oil fouling on the baleen plates of Bowhead Whales should also be considered and included in the rationale for acute change for that ESC subcomponent.

Contaminants (Scrubber Effluent)

The only ESC subcomponents that were assessed in the ERA were phytoplankton and zooplankton; however, this stressor may impact other ESC subcomponents by way of bioaccumulation. Contaminants, including those from scrubber effluent, can bioaccumulate in small fish and be magnified up the food chain. Participants requested clarification that the phytoplankton and zooplankton subcomponents were used as the base for bioaccumulation relative to higher trophic species, and consensus was reached that this approach was appropriate.

Atmospheric Emissions

There were no comments from meeting participants on the atmospheric emissions section of the ERA.

Submarine Cables

There were no substantive comments to the ERA related to submarine cables. Generally, it was agreed that the score could be low for macroalgal habitat alteration, and video surveys were recommended before installation of any cables to better understand the impact of the disturbance.

Scientific Research

Participants recognized that there may be more appropriate places than the ERA to consider the risk posed by scientific activities given that each research project proposed to take place in an MPA would require its own activity plan/approval process.

Noise Disturbance

There were few additional comments to noise disturbance from scientific research from meeting participants, and much of the discussion here was directed at aerial surveys and the risks to marine mammals. The importance of clear definitions was reiterated. Consideration of the frequency of an activity should be factored into the assessment of Exposure (intensity and

temporal subfactors) and not in Sensitivity (acute and chronic change factors). The assessment of these two factors should be made independent of each other. With respect to sensitivity, participants commented that while acute change may be high for the interaction, the chronic change should be low. With respect to scientific moorings, the overall footprint is small and there is a low overlap of frequencies used that could be heard by marine mammals so noise disturbance to marine mammals is not expected, and supports not scoping the interaction into the ERA.

Biota Encounters/Handling

There are many research projects that require the handling and capture of ESC subcomponents, and as a result there was substantial discussion on which ESC subcomponents should be included since many of them are studied or impacted directly by scientific activity. It was suggested that Arctic Char also be included in this section, as handling them is necessary to conduct projects using telemetry. It was cautioned that there should be a distinction between commercial and scientific trawling since the activities are considerably different, with different objectives, though both have the potential to remove substantial biomass from the environment. Some scientific activities such as gill netting and box coring were not assessed and it was recommended that these be assessed outside of the ERA based on details in their respective activity plans/scientific license applications.

Habitat Alteration/Removal

The interaction with macroalgae and trawling should be added here since it can be destructive, especially in coastal areas. Area covered needs to also be considered with regards to the habitat altered, and the extent of repeated sampling at set transects or locations.

Recreation and Tourism

Noise Disturbance

A participant confirmed that cruise ships have anchored near Walrus Island, where smaller boats (e.g., zodiacs) are then utilized to approach closer. It was noted that for walrus the effects of these smaller boats up close could be similar or even more impactful than larger vessels operating at a further distance, especially if repetitive. It was advised to consult with communities for more input on the effects of recreation and tourism.

Biota Encounters/Handling

There were no comments from meeting participants on the biota encounters/handling from recreation and tourism section of the ERA.

Additional Considerations

Thresholds

The rationale for assigning scores would be improved by the establishment of associated thresholds specific to each risk factor (e.g., ranges of values that correspond to low, medium, and high), though it was noted that this is challenging due to the diversity of activities investigated and general lack of information available for the ESC subcomponents. This would be particularly useful for the scoring of recovery factors and would remove some of the subjectivity associated with the scores. Ranges that include life history strategies, such as r- or K-selected species, would help to better define thresholds with respect to fecundity, mortality, and recruitment.

Transferability

The framework used for the ecological risk assessment of the SI AOI is transferable to other areas of interest in the Arctic Region. The assessment of individual risk factors associated with each interaction, however, is unique to this assessment and would not necessarily be transferable to other areas with similar interactions.

Naturally Occurring Stressors and Variability

Resuspension of sediment resulting from shipping was assessed based on the scenario of a ship passing through a constricted or shallow waterway, which may have a similar impact on resuspension as natural tidal currents. In this and similar instances, it would be informative to include a description of any known ecosystem impacts from naturally occurring stressors, and if the ecosystem is already adapted to respond to such stressors (e.g., in the case of recurring tidal currents). This would provide useful context for understanding the recovery factor of a given species, particularly in cases where ambient variability may be greater than any disruption from human activities (i.e., tidal influence versus resuspension of sediment from shipping).

Cumulative Effects

It was not the intent of this ERA to assess cumulative effects, though there was recognition they should be considered in the development of proposed mitigation measures. It was suggested to include a section in the introduction of the ERA to illustrate that the cumulative impact of multiple activities may lead to higher risk for particular ESC subcomponents. Review of individual activities and their risk is required as a first step in this process, one approach for calculating and presenting cumulative impact can be found in Rubidge et al. (2018). If a more robust methodology becomes available in the future, however, cumulative effects could be considered directly in the risk assessment.

Projections

The assessment focused on activities that are currently occurring in the AOI or are ‘foreseeable’ in the next 10 years. Existing activities were assessed at their current extent and density, without making projections about future trends (e.g., activity increases). The risk assessment was not intended to extrapolate to future scenarios for increasing/decreasing anthropogenic activities, as there is limited utility in doing so with limited baselines. Where the extent or density of a given activity is expected to increase over time, it was recommended that adjusting intensity be used as a basis for re-calculating the risk of that activity.

Assessing Chronic Change

Assessing chronic change was difficult for some threats because different interpretations of the risk equation resulted in variation of the resulting risk score. Participants reiterated the importance of clearly defining each term in the risk equation, and consistently applying those definitions across ESC subcomponents and activities. Participants acknowledged the challenge of defining terms such as chronic change and likelihood across different ESC subcomponents and activities. Concerns were expressed that inclusion of the frequency of the activity in the investigation of chronic change suppresses the overall risk score due in large part because this factor is already considered in the exposure calculation and should not be counted twice. The concern was first raised during the discussion on noise disturbance from vessel traffic, and reiterated during the discussion on noise disturbance from aerial scientific surveys wherein the difficulties in assessing biological effects (i.e., acute and chronic change) without a reference

activity density were acknowledged. Although application of the risk assessment framework should make all efforts to keep risk factors independent, this is complicated by the approach of assessing activities at their current extent and intensity, which is generally low at present in the AOI.

Assessing Likelihood

There was some confusion around the definition of likelihood, and it was suggested that this should be clarified in the introductory section of the ERA. The confusion was addressed by members of the risk assessment team during the meeting, whereby two fundamental assumptions for planned activities were explained: 1) that the activity is taking, or is anticipated to take, place, and 2) that any interaction will have some minimal level of impact on the ESC subcomponent as interactions without an expected impact were not assessed. As these assumptions exclude unintended activities (e.g., probability of an oil spill, which clearly are not planned, but may occur), these unintended activities were assessed with respect to their likelihood of occurring. The definition of likelihood and scores should be reviewed and, if necessary, revised to reflect these considerations.

Temporal Overlap

Temporal overlap is defined as the proportion of total time the ESC subcomponent is present in the AOI when the activity/stressor is also present. Meeting participants expressed concerns regarding the approach taken for calculating temporal overlap because it has the potential to dilute the assessed exposure and risk for species present year-round. The current approach uses the amount of time when the activity/stressor is present at the same time that the ESC subcomponent is present, and is quantified as a percentage of time the overlap occurs in a year. For example, for interactions involving shipping, which was deemed to be present in the AOI for three months a year, the temporal overlap with walrus, which are present year-round, was calculated at 25%. For narwhal, which are only present in the AOI for the same three months as the shipping activity, the overlap was calculated at 100%, resulting in an increased exposure and assessed risk for narwhal, when in reality, both narwal and walrus are being exposed to shipping for the same amount of time in the AOI on an annual basis. This example highlights the challenge associated with selecting a single approach to define temporal overlap, and consistently applying it to both migratory and resident species.

Unreviewed Activities

There are additional activities that occur or may foreseeably occur in the SI AOI that were not reviewed during this CSAS process as they required additional information gathering with community partners and stakeholders. These activities include fisheries and harvesting (stressors include direct harvesting of marine mammals and fishes, bycatch and entanglement, and habitat loss/alteration), and oil and gas operations. These activities will be assessed in the future with engagement from partners and stakeholders. The interaction between vessel noise disturbance and caribou was not reviewed during this meeting, given that an expert in this area was not invited to participate.

Conclusions

The purpose of the Southampton Island Area of Interest Ecological Risk Assessment is to systematically evaluate risk posed by human activities to ESC subcomponents. The development of an ERA and assigning scores to the various risk factors described in the ERAF for each interaction is a large undertaking. Consideration of this scientific peer review of the risk

assessment will help to ensure the rationale and risk scores are appropriate for each interaction, and that uncertainty is adequately captured.

Contributors

- Jason Stow, DFO Science, Ontario and Prairie Region (Chair)
- Laurissa Christie, DFO Science, Ontario and Prairie Region (Rapporteur)
- Allison Drake, DFO Science, Ontario and Prairie Region (Rapporteur)
- Darcy McNicholl, DFO Science, Ontario and Prairie Region
- Kayla Gagliardi, DFO Science, Ontario and Prairie Region
- Karen Dunmall, DFO Science, Ontario and Prairie Region
- Bryden Bone, DFO Marine Planning and Conservation, Arctic Region
- Charlotte Sharkey, DFO Marine Planning and Conservation, Arctic Region
- Joclyn Paulic, DFO Science, Ontario and Prairie Region
- David Yurkowski, DFO Science, Ontario and Prairie Region
- Meike Holst, LGL Limited environmental research associates
- Val Moulton, LGL Limited environmental research associates
- Tony Lang, LGL Limited environmental research associates
- Sarah Penney-Belbin, LGL Limited environmental research associates
- Luis Manzo, Kivalliq Inuit Association
- Alan Sexton, consultant to Kivalliq Inuit Association
- Jose Audet-Lecouffe, DFO – FFHPP, Ontario and Prairie Region
- Christopher Shapka, DFO – FFHPP, Ontario and Prairie Region
- Matt Martens, DFO Fisheries Management, Arctic Region
- David Capelle, DFO Science, Ontario and Prairie Region
- Marianne Marcoux, DFO Science, Ontario and Prairie Region
- Cory Matthews, DFO Science, Ontario and Prairie Region
- Kimberly Howland, DFO Science, Ontario and Prairie Region
- Tracey Loewen, DFO Science, Ontario and Prairie Region
- Magali Houde, ECCC
- Evan Richardson, ECCC
- Laura Harris, Government of Nunavut
- Zoya Martin, Government of Nunavut
- Colleen Turlo, Oceans North
- Camille Lavoie, Laval University
- David Babb, University of Manitoba
- CJ Mundy, University of Manitoba
- Kyle Elliot, McGill University
- Alec Aitken, University of Saskatchewan

Approved By

Tricia Mitchell, Regional Director of Science, Ontario and Prairie Region

Chantelle Sawatzky, A/Division Manager, Arctic and Aquatic Research Division, Ontario and Prairie Region

(September, 2023)

Sources of Information

Chan, F.T., Stanislawczyk, K., Sneekes, A.C., Dvoretsky, A., Gollasch, S., Minchin, D., David, M., Jelmert, A., Albretsen, J., and Bailey, S.A. 2018. Climate change opens new frontiers for marine species in the Arctic: Current trends and future invasion risks. Glob. Change Biol. 2019; 25: 25–38.

DFO. 2020a. Identification of Ecological Significance, Potential Conservation Objectives, Knowledge Gaps and Vulnerabilities for the Southampton Island Ecologically and Biologically Significant Area. DFO Can. Sci. Advis. Sec. Sci. Advis. Rep. 2020/057.

DFO. 2020b. Supplement to the Biophysical and Ecological Overview for Southampton Island (SI) EBSA to include Additional Areas within the Southampton Island Area of Interest (AOI). DFO Can. Sci. Advis. Sec. Sci. Resp. 2020/055.

Kitching, E. 2022. Physical processes driving phytoplankton production around Southampton Island, Nunavut in late summer 2018 and 2019. Thesis (M.Sc.) University of Manitoba, Winnipeg, MB. 76 p.

Rubidge, E., Thornborough, K., and O, M. 2018. Ecological Risk Assessment for the Effects of Human Activities on the SGaan Kinghlas-Bowie Seamount Marine Protected Area. DFO Can. Sci. Advis. Sec. Res. Doc. 2018/012. viii + 98 p

Stewart, R.E.A., Lesage, V., Lawson, J.W., Cleator, H., and Martin, K.A. 2012. Science Technical Review of the draft Environmental Impact Statement (EIS) for Baffinland's Mary River Project. DFO Can. Sci. Advis. Sec. Res. Doc. 2011/086. vi + 62 p.

This Report is Available from the:

Center for Science Advice (CSA)
Ontario and Prairie Region
Fisheries and Oceans Canada
501 University Crescent
Winnipeg, Manitoba R3T 2N6

E-Mail: xcna-csa-cas@dfo-mpo.gc.ca
Internet address: www.dfo-mpo.gc.ca/csas-sccs/

ISSN 1919-3769
ISBN 978-0-660-70795-2 Cat. No. Fs70-7/2024-019E-PDF

Correct Citation for this Publication:

DFO. 2024. Science Advice on the Ecological Risk Assessment for the Southampton Island Area of Interest (AOI). DFO Can. Sci. Advis. Sec. Sci. Resp. 2024/019.

Aussi disponible en français :

MPO. 2024. Avis scientifique sur l'évaluation du risque écologique pour le site d'intérêt de l'île Southampton. Secr. can. des avis sci. du MPO. Rép. des Sci. 2024/019.