

## Summary: DRAFT Eastern Shore Islands Area of Interest (AOI) Ecological Risk Assessment Results

Marine Protected Areas (MPAs) are designated as a tool to protect biodiversity so tolerance for risk within an MPA is lower than for other areas. Thus, the risk levels determined for the Eastern Shore Islands AOI do not necessarily represent DFO’s assessment of risks for the same activities elsewhere in the Scotian Shelf bioregion (See Figure 1 for an illustration of normal vs low tolerance risk matrices).

It is important to note that the risk assessment findings are not prescriptive and do not represent final decisions about how activities would be managed in a future Eastern Shore Islands MPA. Rather, the assessment provides a structure for considering information about the ecological effects of activities in a systematic manner to help inform discussions and decisions. Other factors, including the precautionary approach, social and economic considerations, and feedback from consultations will also be taken into account in determining proposed design and management measures.

### Ecological Risk Assessment Matrices

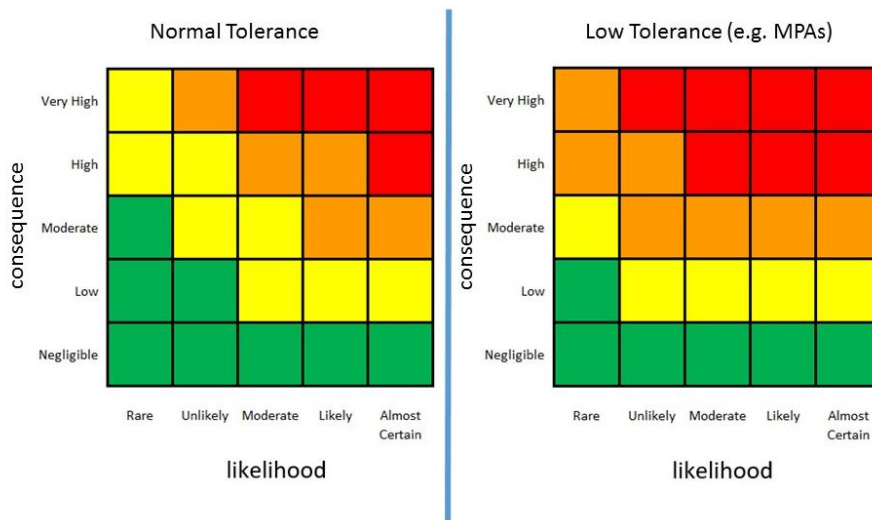


Figure 1. As part of the risk analyses, consequence and likelihood scores (determined through literature review and expert opinion) are plotted on a risk matrix. For regular ocean space, a normal tolerance matrix is used. For areas identified as more ecologically or biologically sensitive or significant (e.g., Ecological and Biologically Significant Areas, MPAs, AOIs, Species at Risk), a low tolerance matrix is used. In this way, consequence/likelihood scores for an activity assessed in similar environments within vs outside of an MPA setting may result in differing overall risk scores. Tolerance matrices are taken from the draft National Oceans Management Risk Module, and the low tolerance matrix is used in the ecological risk assessment for ESI AOI.

The ecological risk assessment approach for the Eastern Shore Islands AOI aligns with the draft national guidance for ecological risk analyses developed for DFO’s Oceans Management Program. Activities considered in the assessment were limited to those that currently occur within the AOI (fisheries, aquaculture, and marine transportation) and those which may occur within the near future (aquaculture expansion). Risk levels were determined by assessing the consequence and likelihood of interactions between activity/pressures and conservation priorities for the site. Consequence was determined by estimating the magnitude of each interaction (i.e., exposure based on the expected level of human

activity) and the sensitivity of the ecological component to the pressure. Once the consequence level was determined it was combined with the likelihood (i.e., probability) of the interaction to determine the overall level of risk.

The first draft of the Eastern Shore Islands AOI has now been completed. The next step towards finalizing the risk assessment is review and revision. This involves sharing the chapters of the draft document with relevant subject matter experts in a multi-stage review process, including: 1) internal (other relevant DFO branches and federal government departments); 2) targeted external reviews (relevant provincial departments, First Nations, industry, and environmental organizations with specific expertise, such as the salmon association); and 3) the Advisory Committee.

Below are tables summarizing the preliminary results of the Eastern Shore Islands Area of Interest Ecological Risk Assessment. Tables are provided for each category of activity (fisheries, marine transportation and aquaculture; see tables 2-5). See the full document for an explanation of the risk approach and details on how each risk level was determined. Definitions for each risk level, along with guidance on management recommendations, are provided in Table 1.

**It is important to note that these draft results are subject to change pending review by subject matter experts. This document is intended to provide information on draft results to support discussion.**

**Table 1. Risk level descriptions.**

Risk Level	Description	Management Recommendation
<b>High</b>	<p>A risk where:</p> <ul style="list-style-type: none"> <li>• there is potential, even unlikely, for a severe long-term impact to an ecosystem component to occur</li> <li>• it is likely that a significant or detectable moderate impact will occur</li> </ul>	<p>Additional management measures<sup>1</sup> required to ensure adequate protection of ecosystem component.</p>
<b>Moderately High</b>	<p>A risk where:</p> <ul style="list-style-type: none"> <li>• it is likely that a detectable moderate impact to an ecosystem component will occur</li> <li>• a significant or severe long-term impact could occur, but it's unlikely or rare</li> </ul>	<p>In general, additional management measures should be considered based on the nature of the risk.</p>
<b>Moderate</b>	<p>A risk where:</p> <ul style="list-style-type: none"> <li>• it is likely that a detectable but minimal impact to an ecosystem component will occur</li> <li>• a detectable moderate impact could occur, but it's rare</li> </ul>	<p>In general, additional management measures may or may not be considered, based on the nature of the risk.</p>
<b>Low</b>	<p>A risk where:</p> <ul style="list-style-type: none"> <li>• a negligible or non-detectable impact to an ecosystem component could occur</li> <li>• a detectable but minimal impact could occur, but it's rare</li> </ul>	<p>In general, no additional management measures required.</p>

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<sup>1</sup> For example: spatial or temporal restrictions, gear or equipment restrictions, or complete exclusion from the MPA. This does not preclude the need for monitoring/data collection for activities that are allowed to continue in the site.

**Table 2. Summary of draft risk assessment results for Fisheries.\***

<b>Conservation Priority</b>	<b>Fishery (Pressure)</b>	<b>Risk Level</b>	<b>Management Options</b>
<b>eelgrass</b>	Lobster pot (bottom disturbance)	Low	No additional management measures suggested.
<b>Kelp</b>	Lobster pot (bottom disturbance)	Moderate	No additional management measures suggested due to the low sensitivity score.
	Groundfish longline (bottom disturbance)	Low	No additional management measures suggested.
	Herring gillnet (bottom disturbance)	Low	No additional management measures suggested.
<b>Atlantic Salmon</b>	Herring gillnet (bycatch)	Moderate	No additional management measures suggested due to the relatively low sensitivity score.
	Herring/mackerel bait gillnet (bycatch)	Moderately High	Limit this fishery in the spring when post-smolt salmon are most likely in the AOI.
<b>Juvenile groundfish habitat (Atlantic Cod)</b>	Lobster pot (bycatch)	Moderate	No additional management measures suggested due to the relatively low sensitivity score.
	Herring gillnet (bycatch)	Moderate	No additional management measures suggested due to the relatively low sensitivity score.
	Herring/mackerel bait gillnet (bycatch)	Moderately High	Bycatch monitoring.
<b>Juvenile groundfish habitat (White Hake)</b>	Groundfish longline (bycatch)	Moderate	No additional management measures suggested due to the relatively low sensitivity score.
<b>Atlantic Herring spawning area</b>	Lobster pot (bottom disturbance)	Moderate	No additional management measures suggested due to the low sensitivity score.
	Hagfish pot (bottom disturbance)	Low	No additional management measures suggested.
	Groundfish longline (bottom disturbance)	Moderate	No additional management measures suggested due to the low sensitivity score.

<b>Conservation Priority</b>	<b>Fishery (Pressure)</b>	<b>Risk Level</b>	<b>Management Options</b>
	Herring gillnet (bottom disturbance)	Moderately High	Monitoring to understand the interaction and vulnerability of stock, and application of regional fisheries management measures as appropriate.
<b>Seabird foraging areas (Common Eider)</b>	Herring gillnet (bycatch)	Low	No additional management measures suggested.
	Herring/mackerel bait gillnet (bycatch)	Moderate	No additional management measures suggested due to the relatively low sensitivity score.
<b>Seabird foraging areas (Harlequin Duck)</b>	Herring/mackerel bait gillnet (bycatch)	Moderate	Bycatch monitoring.
<b>Seabird foraging areas (Roseate Tern)</b>	Groundfish longline (bycatch)	Moderate	No additional management measures suggested due to the low sensitivity score.

\*Did not assess fisheries that use mobile bottom-contacting gears due to new minimum standards for *Oceans Act* MPAs.

**Table 3. Summary of draft risk assessment results for pressures associated with Marine Transportation.**

<b>Conservation Priority</b>	<b>Pressure</b>	<b>Risk Level</b>	<b>Management Options</b>
<b>Eelgrass</b>	Physical alteration of habitat (propeller wash/boat wake)	Moderately high	Avoid maneuvering vessels through known eelgrass bed areas in shallow waters (e.g., during low tide).
	Physical alteration of habitat (propeller scarring)	Moderately high	Avoid maneuvering vessels through known eelgrass bed areas in shallow waters (e.g., during low tide).
	Physical alteration of habitat (mooring)	Moderately high	Avoid use of swinging chain moorings in known eelgrass beds. If a mooring is required in the vicinity of a known bed, consider more environmentally friendly mooring designs.
	Physical alteration of habitat (anchoring)	Moderately high	Avoid anchoring in known eelgrass beds.
	Introduction/establishment of non-indigenous species (hull fouling)	Moderately high	Explore options in collaboration with Transport Canada to reduce risk (e.g. develop management measures for hull fouling for domestic vessels).
	Small volume incidental oil discharge	Low	No additional management measures suggested.
	Diesel spill (1500 L)	Moderately high	An emergency oil spill response plan should be developed for the Eastern Shore Islands area to mitigate impacts from accidental spill events.
	Large crude oil spill	Moderately high	An emergency oil spill response plan should be developed for the Eastern Shore Islands area to mitigate impacts from accidental spill events.
<b>Kelp</b>	Physical alteration of habitat (mooring)	Moderately high	Avoid use of swinging chain moorings in known kelp beds. If a mooring is required in the vicinity of a known bed, consider more environmentally friendly mooring designs.
	Physical alteration of habitat (anchoring)	Moderately high	Avoid anchoring in known kelp beds.

<b>Conservation Priority</b>	<b>Pressure</b>	<b>Risk Level</b>	<b>Management Options</b>
	Introduction/establishment of non-indigenous species (hull fouling)	Moderately high	Explore options with Transport Canada to reduce risk (e.g. develop management measures for hull fouling for domestic vessels).
<b>Atlantic Salmon</b>	Noise from large commercial vessels	Moderate	No additional management measures suggested based on a low sensitivity score.
	Noise from small motorized vessels	Moderate	No additional management measures suggested based on a relatively low sensitivity score.
	Diesel spill (1500 L)	Moderately high	An emergency oil spill response plan should be developed for the Eastern Shore Islands area to mitigate impacts from accidental spill events.
	Large crude oil spill	Moderately high	An emergency oil spill response plan should be developed for the Eastern Shore Islands area to mitigate impacts from accidental spill events.
<b>Juvenile groundfish habitat</b>	Noise from large commercial vessels	Low	No additional management measures suggested.
	Noise from small motorized vessels	Moderately high	No additional management measures suggested at this time based on a relatively low sensitivity score. Additional monitoring of noise levels could be beneficial.
	Diesel spill (1500 L)	Moderately high	An emergency oil spill response plan should be developed for the Eastern Shore Islands area to mitigate impacts from accidental spill events.
	Large crude oil spill	Moderately high	An emergency oil spill response plan should be developed for the Eastern Shore Islands area to mitigate impacts from accidental spill events.
<b>Atlantic Herring spawning area</b>	Physical alteration of habitat (mooring)	Moderate	Avoid use of swinging chain moorings in the Atlantic Herring spawning area. If a mooring is required in this area, consider more environmentally friendly mooring designs.

<b>Conservation Priority</b>	<b>Pressure</b>	<b>Risk Level</b>	<b>Management Options</b>
	Artificial light	Moderately high	Additional monitoring to better understand the interaction and vulnerability of spawning herring to light.
	Noise from small motorized vessels	Moderately high	Additional monitoring to better understand the interaction and vulnerability of spawning herring to vessel noise.
	Introduction/establishment of non-indigenous species (hull fouling)	Moderately high	Explore options in collaboration with Transport Canada to reduce risk (e.g. develop management measures for hull fouling for domestic vessels).
	Diesel spill (1500 L)	Moderate	An emergency oil spill response plan should be developed for the Eastern Shore Islands area to mitigate impacts from accidental spill events.
	Large crude oil spill	Moderately high	An emergency oil spill response plan should be developed for the Eastern Shore Islands area to mitigate impacts from accidental spill events.
<b>Seabird foraging areas</b>	Vessel presence	Moderately high	Avoidance of known high use areas for Common Eider during nesting season or when ducklings are present.
	Artificial light (vessel collisions)	Moderately high	Avoid or limit speed in Common Eider foraging areas at night, especially during summer months when highest numbers are found in the AOI.
	Small volume oil discharge	Moderate	An emergency oil spill response plan should be developed for the Eastern Shore Islands area to mitigate impacts from accidental spill events, including measures for treatment of oiled birds.
	Diesel spill (1500 L)	Moderately high	An emergency oil spill response plan should be developed for the Eastern Shore Islands area to mitigate impacts from accidental spill events, including measures for treatment of oiled birds.
	Large crude oil spill	Moderately high	An emergency oil spill response plan should be developed for the Eastern Shore Islands area to mitigate impacts



Conservation Priority	Pressure	Risk Level	Management Options
			from accidental spill events, including measures for treatment of oiled birds.

**Table 4. Summary of draft risk assessment results for pressures associated with Finfish Aquaculture.<sup>2</sup>**

<b>Conservation Priority</b>	<b>Pressure</b>	<b>Risk Level</b>	<b>Management Options</b>
<b>Eelgrass</b>	Physical alteration of habitat	Moderately high	Avoid siting finfish aquaculture overtop of or immediately adjacent to eelgrass habitat.
	Release of chemicals	Moderate	Avoid siting finfish aquaculture overtop of or immediately adjacent to eelgrass habitat.
	Release of nutrients and organic material	Moderately high	Avoid siting finfish aquaculture within one kilometer of eelgrass habitat.
<b>Atlantic Salmon</b>	Physical alteration of habitat	Moderately high	Determine and apply appropriate minimum distance of finfish aquaculture from rivers important for Atlantic Salmon.
	Introduced light	Low	No additional management measures suggested.
	Noise	Low	No additional management measures suggested.
	Release of chemicals	Low	No additional management measures suggested.
	Escape of fish	High	Determine and apply appropriate minimum distance of finfish aquaculture from rivers important for Atlantic Salmon.
	Release of pathogens (sea lice)	High	Determine and apply appropriate minimum distance of finfish aquaculture from rivers important for Atlantic Salmon. Consider management thresholds defining the level of on-farm sea lice per fish that trigger the

<sup>2</sup> The two existing finfish leases in the AOI (Owls Head and Wolfes Island) are owned by Snow Island Salmon Inc. This company proposed an additional three sites in 2011 and 2012 on the Eastern Shore (Shoal Bay, Spry Harbour, and Beaver Harbour). The existing leases plus the three proposed sites make up the scenario created for the purposes of this risk assessment. This was chosen to approximate a reasonable future scenario for finfish aquaculture on the Eastern Shore based on existing information (i.e. the three proposed sites plus two existing leases). Based on the intensity of finfish aquaculture in Southwest New Brunswick and in southern Newfoundland, this represents a comparably low-intensity future scenario. The determination of risks posed by finfish aquaculture is specific to this scenario and the identified conservation priorities in the context of a potential future marine protected area. If more finfish aquaculture sites were added to the scenario for assessment, the risks would likely increase.

Conservation Priority	Pressure	Risk Level	Management Options
			application of non-chemical control measures for managing sea lice infestations.
<b>Atlantic Herring spawning areas</b>	Noise	Low	No additional management measures suggested.
	Escape of fish	Low	No additional management measures suggested.
	Release of pathogens (sea lice)	Moderately high	Determine and apply appropriate minimum distance of finfish aquaculture from known Atlantic Herring spawning areas. Consider management thresholds defining the level of on-farm sea lice per fish that trigger the application of non-chemical control measures for managing sea lice infestations.
<b>Juvenile Atlantic Cod</b>	Introduced light	Low	No additional management measures suggested.
	Noise	Low	No additional management measures suggested.
	Release of chemicals	Moderate	No additional management measures suggested at this time based on a low sensitivity score.
	Escape of fish	Moderate	No additional management measures suggested at this time based on a low sensitivity score.
<b>Harlequin Duck foraging areas</b>	Noise	Low	No additional management measures suggested.
	Release of chemicals	Moderate	No additional management measures suggested at this time based on a low sensitivity score.
<b>Common Eider foraging areas</b>	Physical alteration of habitat	Low	No additional management measures suggested.
	Introduced light	Low	No additional management measures suggested.
<b>Roseate Tern foraging areas</b>	Physical alteration of habitat	Moderately high	Determine and apply appropriate minimum distance of finfish aquaculture from key Roseate Tern foraging areas and nesting sites.



**Table 5. Summary of draft risk assessment results for pressures associated with Shellfish Aquaculture.**

<b>Conservation Priority</b>	<b>Pressure</b>	<b>Risk Level</b>	<b>Management Options</b>
<b>Eelgrass</b>	Physical alteration of habitat	Moderately High	Avoid siting shellfish aquaculture leases overtop eelgrass bed habitat.
	Release of nutrients and organic material	Moderately High	
<b>Atlantic Herring spawning area</b>	Release of chemicals	Low	No additional management measures suggested.
	Release of nutrients/organic material	Low	No additional management measures suggested.
<b>Seabird foraging areas</b>	Physical alteration of habitat	Moderate	Avoid siting mussel leases near sea duck foraging areas; consider stocking scallops or oysters given the potential mutual benefits due to the farming structure.
	Release of chemicals	Low	No additional management measures suggested.
	Release of pathogens	Moderately High	Lower threshold for acceptable risk associated with introductions and transfers in the context of an AOI.
	Removal of nutrients/organic material	Moderate	Conduct ecological carrying capacity modeling prior to siting leases within Common Eider foraging area and ensure acceptable thresholds are not exceeded.

**Marine Plant aquaculture:** not enough information on proposed operational practices for this developing industry to adequately conduct a risk assessment. A brief literature review of existing practices and potential environmental pressures has been drafted and will be included in the aquaculture chapter.