

# Appendix F: GIS Methods

January 23, 2025

Committee for the Regional Assessment of Offshore Wind Development in Newfoundland and Labrador

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## *Acknowledgement Note*

*This appendix is largely attributed to notes provided to the Committee by Fever's Lane (GIS Consultant retained by the Committee), detailing their work.*

# 1. Purpose

This report outlines technical steps and data used during the Regional Assessment of Offshore Wind Development in Newfoundland and Labrador (Regional Assessment) to:

- identify the Focus Area,
- identify Initial Offshore Wind Energy Licencing Areas for Consideration, and
- develop thematic maps throughout the Report.

The project team used GIS software to complete this work.<sup>1</sup> Early work was completed by the Committee and Secretariat. In summer 2024, the Committee retained the services of Feaver's Lane Enterprises, GIS Consulting. Feaver's Lane completed GIS work for the draft and final Regional Assessment Report, following the Committee's direction.

Readers should refer to Section 5 and 6 of the Regional Assessment Report for further details on the Committee's approach and constraints analysis used to identify the Focus Area and initial offshore wind energy licencing areas.

# 2. Focus Area

## 2.1. Step 1: Removing Areas with Icebergs

The following steps were applied to the "Study Area" data layer:

1. A grid comprising 35 km<sup>2</sup> hexagons was overlaid on the Study Area.
2. A point in polygon analysis identified any hexagons with at least 1 medium or larger iceberg as per the International Ice Patrol (IIP) Iceberg Sightings Database.
3. Northern and eastern boundaries for the Focus Area were delineated by the Committee such that most portions of the Study Area where medium or larger iceberg sightings were recorded between 2002-2021 were removed.

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<sup>1</sup> The Committee used ArcGIS Pro Version 3.1.0, ArcGIS Pro Version 3.0.2 and ArcMap10.8.2 to complete the constraints analysis and develop thematic maps.

The following data was used in this step:

- Iceberg sightings: International Ice Patrol. (1995). International Ice Patrol (IIP) Iceberg Sightings Database, Version 1, 2002-2021 [Dataset]. Boulder, Colorado USA. National Snow and Ice Data Center. <https://doi.org/10.7265/N56Q1V5R..> Date Accessed 10-31-2023.
- Study Area: IAAC. (2023b). Study Area for the Regional Assessment of Offshore Wind Development in Newfoundland and Labrador [Shapefile]. Government of Canada, Impact Assessment Agency of Canada (IAAC). Open Government. <https://osdp-psdo.canada.ca/dp/en/search/metadata/NRCAN-FGP-1-e7dec0ae-f1dc-49ac-8230-5cb1a3b39c54> .

## **2.2. Step 2: Removing Areas Where Depth Exceeds 300 m**

The following steps were applied to the results from Step 1 (above) and the GEBCO (2023) bathymetry data layer:

1. The ocean depth data from GEBCO was reclassified according to the categories:
  - a. Water depth less than 300 m
  - b. Water depth greater than 300 m
2. The GEBCO raster data was converted to vector.
3. Areas with water depth greater than 300 m were removed from the Step 1 results.

The following data was used in this step:

- Ocean Depths: GEBCO Compilation Group. (2023). *GEBCO 2023 Grid* [Dataset]. GEBCO Compilation Group. doi:10.5285/f98b053b-0cbc-6c23-e053-6c86abc0af7b
- Results from Step 1 (above).

## 3. Offshore Wind Energy Licencing Areas for Consideration

### 3.1. Step 1: Creating Coastal Buffers

The following steps were applied to the “Focus Area” data layer:

1. A 10 km coastal buffer was created around the islands of Newfoundland and Ramea.
2. A 5 km buffer was created around bird colonies adjacent to the Focus Area.
3. A 65 km buffer was created around Cape St. Mary’s bird colony.
4. A 3 km buffer (nearshore fisheries) was created around all islands with shoreline adjacent to the Focus Area (excluding Saint Pierre-Miquelon).
5. Areas within any of the above buffers were removed from the Focus Area data layer.

The following data was used in this step:

- Bird Colonies: ECCC. (2016a). Atlantic Colonies: Density Analysis [Dataset]. Government of Canada, Environment and Climate Change Canada (ECCC), NRCan, Federal Geospatial Platform. Version Modified 2022-06-15. <https://open.canada.ca/data/en/dataset/87bf8597-4be4-4ec2-9ee3-797f5eafbd97>
- Shoreline: NRCan. (2023). Topographic Data of Canada - CanVec Series: CanVec 50K [Dataset]. Government of Canada, Natural Resources Canada (NRCan). <https://open.canada.ca/data/en/dataset/8ba2aa2a-7bb9-4448-b4d7-f164409fe056>
- Focus Area: IAAC. (2023a). Focus Area for the Regional Assessment of Offshore Wind Development in Newfoundland and Labrador [Shapefile]. Government of Canada, Impact Assessment Agency of Canada (IAAC). Open Government. <https://open.canada.ca/data/en/dataset/81560d1e-8394-4b51-8212-2bbe4d8a5ea2>

The following data layers resulted from this step<sup>2</sup>:

- Newfoundland and Ramea Buffer: Committee for the Regional Assessment of Offshore Wind Development in Newfoundland and Labrador. (2024). Newfoundland and Ramea Buffer [Shapefile]. Committee for the Regional Assessment of Offshore Wind Development in Newfoundland and Labrador (Regional Assessment Committee). Available upon request.
- Nearshore Fisheries Buffer: Committee for the Regional Assessment of Offshore Wind Development in Newfoundland and Labrador. (2024d). Nearshore Fisheries Buffer [Shapefile]. Committee for the Regional Assessment of Offshore Wind Development in Newfoundland and Labrador (Regional Assessment Committee). Available upon request.

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<sup>2</sup> These data will be available on the Open Government Portal following report completion.

- Bird Colony Buffer: Committee for the Regional Assessment of Offshore Wind Development in Newfoundland and Labrador. (2024a). Bird Colony Buffer [Shapefile]. Committee for the Regional Assessment of Offshore Wind Development in Newfoundland and Labrador (Regional Assessment Committee). Available upon request.
- Cape St. Mary’s Buffer: Committee for the Regional Assessment of Offshore Wind Development in Newfoundland and Labrador. (2024b). Cape St. Mary’s Buffer [Shapefile]. Committee for the Regional Assessment of Offshore Wind Development in Newfoundland and Labrador (Regional Assessment Committee). Available upon request.
- Step 1 Resulting Area: Committee for the Regional Assessment of Offshore Wind Development in Newfoundland and Labrador. (2024h). Step 1 Resulting Area [Shapefile]. Committee for the Regional Assessment of Offshore Wind Development in Newfoundland and Labrador (Regional Assessment Committee). Available upon request.

### 3.2. Step 2: Removing Marine Critical Habitat

The following steps were applied to the “Step 1 Resulting Area” data layer:

1. Critical habitat for fish species at risk was removed.
2. It was verified that critical habitat for other species at risk do not overlap the Step 1 Resulting Area.

The following data was used in this step:

- Critical Habitat: DFO. (2024g). Critical Habitat of Species at Risk [dataset]. Government of Canada, Department of Fisheries and Oceans (DFO), Open Government. <https://open.canada.ca/data/en/dataset/db177a8c-5d7d-49eb-8290-31e6a45d786c>
- Critical Habitat: ECCC. (2015a). Critical Habitat for Species at Risk National Dataset [Dataset]. Government of Canada, Environment and Climate Change Canada (ECCC). Open Government, Version Modified 2024-06-14. <https://open.canada.ca/data/en/dataset/47caa405-be2b-4e9e-8f53-c478ade2ca74>

The following data layers resulted from this step:

- Step 2 Resulting Area: Committee for the Regional Assessment of Offshore Wind Development in Newfoundland and Labrador. (2024i). Step 2 Resulting Area [Shapefile]. Committee for the Regional Assessment of Offshore Wind Development in Newfoundland and Labrador (Regional Assessment Committee). Available upon request.

### 3.3. Step 3: Removing Marine Protected Areas

The following steps were applied to the “Step 2 Resulting Area” data layer:

1. Marine Protected Areas were removed.

The following data was used in this step:

- Marine Protected Areas: DFO. (2023aa). Oceans Act Marine Protected Areas [Dataset]. Government of Canada, Department of Fisheries and Oceans (DFO). Open Government. <https://open.canada.ca/data/en/dataset/a1e18963-25dd-4219-a33f-1a38c4971250>

The following data layers resulted from this step:

- Step 3 Resulting Area: Committee for the Regional Assessment of Offshore Wind Development in Newfoundland and Labrador. (2024j). Step 3 Resulting Area [Shapefile]. Committee for the Regional Assessment of Offshore Wind Development in Newfoundland and Labrador (Regional Assessment Committee). Available upon request.

### 3.4. Step 4: Removing Marine Traffic Routes

The following steps were applied to the “Step 3 Resulting Area” data layer:

1. Marine traffic routes were removed.
  - a. A 500 m buffer was applied around ferry routes and removed. This small buffer was used because ferry routes are represented linearly in the dataset and could not be removed without a buffer. The 500 m buffer is not reflective of the distance that should be maintained between ferry routes and wind farms.

The following data was used in this step:

- Marine Traffic Routes: Canadian Hydrographic Service. (2024). Vessel Traffic Routes [Dataset]. Government of Canada, Fisheries and Oceans Canada (DFO). Open Government. <https://open.canada.ca/data/en/dataset/6ab2803a-aace-4e60-83ed-44a7e0ccd1d8>

The following data layers resulted from this step:

- Step 4 Resulting Area: Committee for the Regional Assessment of Offshore Wind Development in Newfoundland and Labrador. (2024k). Step 4 Resulting Area [Shapefile]. Committee for the Regional Assessment of Offshore Wind Development in Newfoundland and Labrador (Regional Assessment Committee). Available upon request.

### 3.5. Step 5: Removing Areas with High Vessel Traffic

The following steps were applied to the “Vessel Traffic AIS” and “Step 4 Resulting Area” data layers:

1. Vessel Traffic AIS raster data (1 km resolution) was converted to vector and classified into 4 classes using the following intervals:
  - Less than or equal to 0.3
  - 0.3 to 0.5
  - 0.5 to 0.7
  - Greater than 0.7
2. Areas with greater than 0.3 vessels per day were removed from the Step 4 Resulting Area data layer.

The following data was used in this step:

- Vessel Traffic AIS: DFO. (2024p). Vessel Density Mapping of 2023 AIS Data in the Northwest Atlantic [Dataset]. Government of Canada, Department of Fisheries and Oceans (DFO). <https://open.canada.ca/data/en/dataset/5b86e2d2-cec1-4956-a9d5-12d487aca11b>

The following data layers resulted from this step:

- Step 5 Resulting Area: Committee for the Regional Assessment of Offshore Wind Development in Newfoundland and Labrador. (2024l). Step 5 Resulting Area [Shapefile]. Committee for the Regional Assessment of Offshore Wind Development in Newfoundland and Labrador (Regional Assessment Committee). Available upon request.

### 3.6. Step 6: Removing the South Coast Fjords National Marine Conservation Study Area

The following steps were applied to the “Step 5 Resulting Area” data layer:

1. The proposed South Coast Fjords NMCA Study Area was removed.

The following data was used in this step:

- Study Area: Parks Canada. (2024). South Coast Fjords NMCA Study Area (Unpublished raw data). Government of Canada, Parks Canada. Retrieved January 31, 2024, from Parks Canada.<sup>3</sup>

The following data layers resulted from this step:

- Step 6 Resulting Area: Committee for the Regional Assessment of Offshore Wind Development in Newfoundland and Labrador. (2024m). Step 6 Resulting Area [Shapefile]. Committee for the Regional Assessment of Offshore Wind Development in Newfoundland and Labrador (Regional Assessment Committee). Available upon request.

### 3.7. Step 7: Removing Areas Near National Parks and World Heritage Sites to Reduce

The following steps were applied to the “Gros Morne National Park” and “Step 6 Resulting Area” data layers:

1. An 80 km buffer was created surrounding Gros Morne National Park. The resulting buffer was modified so it only included areas perpendicular to the park’s coastal boundary.
2. The modified buffer was removed.

The following data was used in this step:

- Gros Morne National Park: NRCan. (2022a). National Parks and National Park Reserves of Canada Legislative Boundaries [Dataset]. Government of Canada, Natural Resources Canada (NRCan), Open Government, Record ID: 9e1507cd-f25c-4c64-995b-6563bf9d65bd. <https://open.canada.ca/data/en/dataset/9e1507cd-f25c-4c64-995b-6563bf9d65bd>

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<sup>3</sup> Publicly available static image of the proposed NMCA Study Area: Parks Canada. (2023, June 2). South Coast Fjords Study Area. Government of Canada, Parks Canada. <https://parks.canada.ca/amnc-nmca/cnamnc-cnnmca/fjords-cote-sud-south-coast-fjords>

The following data layers resulted from this step:

- Gros Morne Buffer: Committee for the Regional Assessment of Offshore Wind Development in Newfoundland and Labrador. (2024c). Gros Morne 80km Buffer [Shapefile]. Committee for the Regional Assessment of Offshore Wind Development in Newfoundland and Labrador (Regional Assessment Committee). Available upon request.
- Step 7 Resulting Area: Committee for the Regional Assessment of Offshore Wind Development in Newfoundland and Labrador. (2024n). Step 7 Resulting Area [Shapefile]. Committee for the Regional Assessment of Offshore Wind Development in Newfoundland and Labrador (Regional Assessment Committee). Available upon request.

### **3.8. Step 8: Removing High Density Fishing Areas**

The following steps were applied to the “Fishing Density” and “Step 7 Resulting Area” data layers:

1. The DFO Fish Landings by Weight data was clipped to the Focus Area.
2. The clipped data was classified according to 10 classes using the quantile method. Classes were:
  - < 400 kg or Unknown
  - 400 to 1000 kg
  - 1000 to 1900 kg
  - 1900 to 3200kg
  - 3200 to 5500kg
  - 5500 to 9600 kg
  - 9600 to 16,700 kg
  - 16,700 to 31,800 kg
  - 31,800 to 78,300 kg
  - > 78,300 kg
3. Areas in the highest 90% quantiles (400 kg to > 78,300 kg) were removed from the Step 7 Resulting Area data layer.

The following data was used in this step:

- Fishing Density: DFO. (2023gg). Eastern Canada Commercial Fishing [dataset]. Government of Canada, Department of Fisheries and Oceans (DFO), Open Government. <https://open.canada.ca/data/en/dataset/502da2ef-bffa-4d9b-9e9c-a7425ff3c594>
- Focus Area: IAAC. (2023a). Focus Area for the Regional Assessment of Offshore Wind Development in Newfoundland and Labrador [Shapefile]. Government of Canada, Impact Assessment Agency of Canada (IAAC). Open Government. <https://open.canada.ca/data/en/dataset/81560d1e-8394-4b51-8212-2bbe4d8a5ea2>

For the fishing density data, the ‘all species data’ was used. This data includes catch density for all species/gear types in kg from 2012 to 2021 (sum of all weights). It is represented by 10 km<sup>2</sup> grids. All landings are from Canadian vessels greater than 35-ft and does not include information pertaining to international fishing vessels (i.e., Saint Pierre-Miquelon).

The following data layers resulted from this step:

- Step 8 Resulting Area: Committee for the Regional Assessment of Offshore Wind Development in Newfoundland and Labrador. (2024o). Step 8 Resulting Area [Shapefile]. Committee for the Regional Assessment of Offshore Wind Development in Newfoundland and Labrador (Regional Assessment Committee). Available upon request.

### 3.9. Step 9: Removing Community-based Coastal Resources

The following steps were applied to the “CCRI (1996 to 2007)”, “CCRI (2021 to 2024)” and “Step 8 Resulting Area” data layers:

1. Merged all CCRI Polygons
2. Used the “Select by Location” tool on the CCRI points and lines to identify any features outside of the merged polygons (Relationship = Intersect, Check the box “invert spatial relationship”). No CCRI points or lines were identified outside of the merged polygons.
3. The merged CCRI polygon layer was removed.

The following data was used in this step:

- CCRI (1996 to 2007): DFO. (2023ff). Community-Based Coastal Resource Inventory—Open Government Portal [Open Government Portal]. Government of Canada, Department of Fisheries and Oceans (DFO). <https://open.canada.ca/data/en/dataset/9d4d922e-0c92-4410-8411-7dea058a2288>
- CCRI (2021-2024): DFO. (2024t). *Community-Based Coastal Resource Inventory – Unpublished Update* [Unpublished Data]. Government of Canada, Department of Fisheries and Oceans (DFO). Retrieved August 2024, from DFO.

The Committee used the published Community-Based Coastal Resource Inventory (1996 to 2007) of points, polylines and polygons where species and features have been found, harvested or detailed. Fisheries and Ocean Canada were also contacted to obtain groundfish data from the new 2021-2024 unpublished dataset. All acquired CCRI data was used.

The following data layers resulted from this step:

- Step 9 Resulting Area: Committee for the Regional Assessment of Offshore Wind Development in Newfoundland and Labrador. (2024p). Step 9 Resulting Area [Shapefile]. Committee for the Regional Assessment of Offshore Wind Development in Newfoundland and Labrador (Regional Assessment Committee). Available upon request.

### **3.10. Step 10: Cleaning Resulting Areas**

The following steps were applied chronologically to the “Step 9 Resulting Area” data layer. Each step is described below.

1. Small, isolated polygons were removed.
2. Sliver/narrow polygons were removed.
3. Small holes within larger polygons were filled.

This work was based on professional judgement. These guiding principles were followed wherever practical:

- Adjustments to the final constraint polygon/boundary should not substantially change the results.
- A precautionary approach should also be applied, such that reducing areas is preferred over restoring an area that has already been removed because of constraints. For very small holes, this may be impractical to apply.

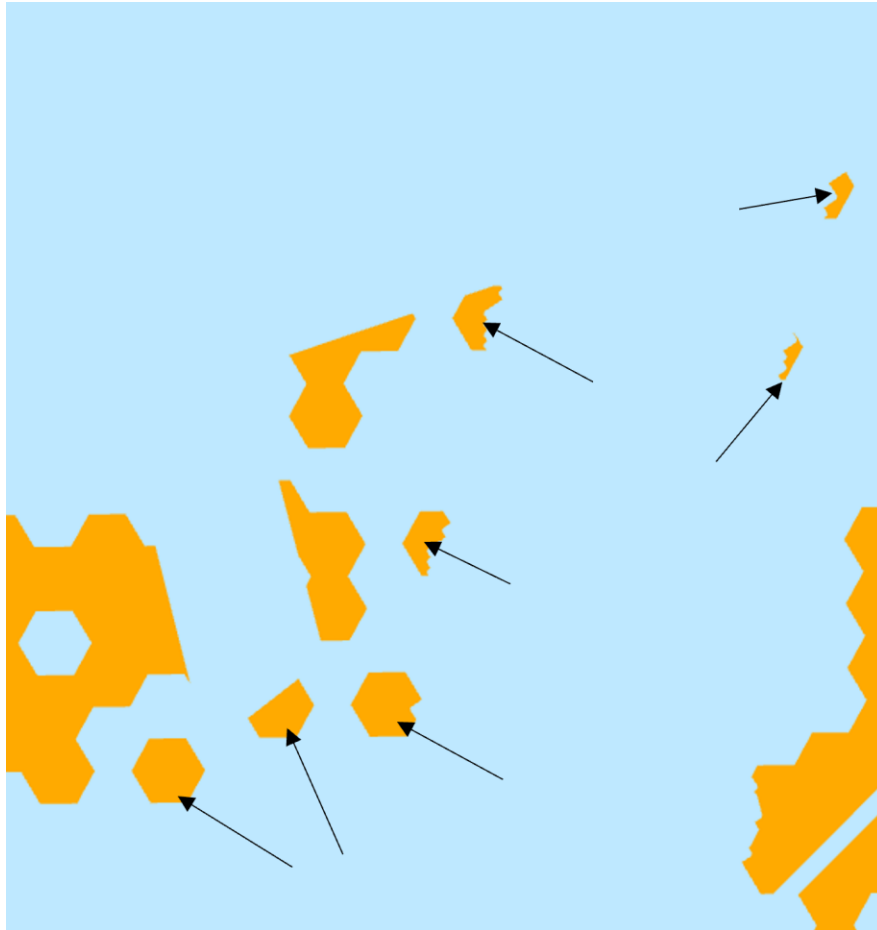
The following data layers resulted from this step and Step 11:

- Initial Offshore Wind Energy Licensing Areas: Committee for the Regional Assessment of Offshore wind Development in Newfoundland and Labrador. (2024). Initial Offshore Wind Licencing Areas [Shapefile]. Available upon request.

### 3.10.1. Removing Small Polygons

The Committee initially decided to remove small polygons under 10 km<sup>2</sup>. A larger threshold of 10.32 km<sup>2</sup> was ultimately used to ensure single hexagonal polygons (see Filling Small Holes, below) were also removed. The hexagonal polygons had small variations in area due to projection changes, and the new threshold included all single hexagonal polygons in the removal process.

**Figure 1. Removing Small Polygons**



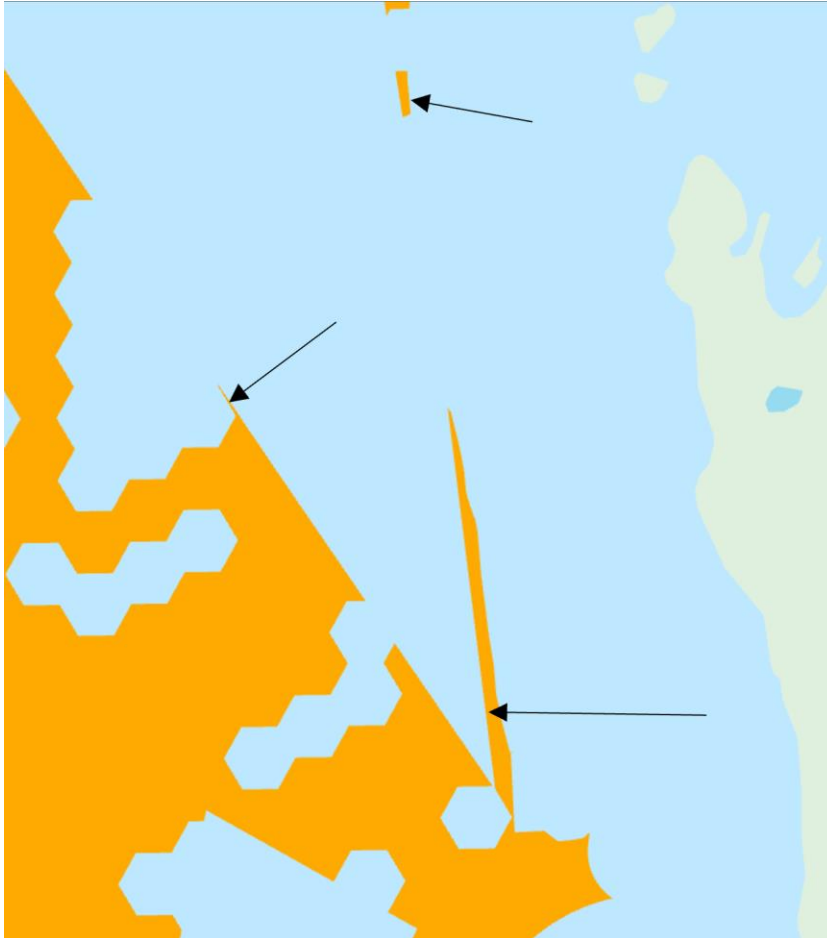
**Figure Description:** This figure shows examples of polygons less than 10.32km<sup>2</sup> that were removed from the Step 9 Resulting Area.

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### 3.10.2. Removing Sliver Polygons

Very narrow slivers of polygon were manually removed using a threshold of approximately 1 km in width.

**Figure 2. Removing Sliver Polygons**



**Figure Description:** This figure shows examples of narrow slivers of polygons that were manually removed.

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### 3.10.3. Filling Small Holes

All small holes in the Step 9 Resulting Area originated from Step 8: Removing High Density Fishing Areas. The Eastern Canada Commercial Fishing dataset (DFO, 2024),<sup>4</sup> is represented by 10 km<sup>2</sup> hexagonal grids. Therefore, holes included hexagonal polygons (or portions of said polygons) measuring approximately 10 km<sup>2</sup> (the hexagonal polygons had small variations in area due to projection changes). Each of these could be overlaid with

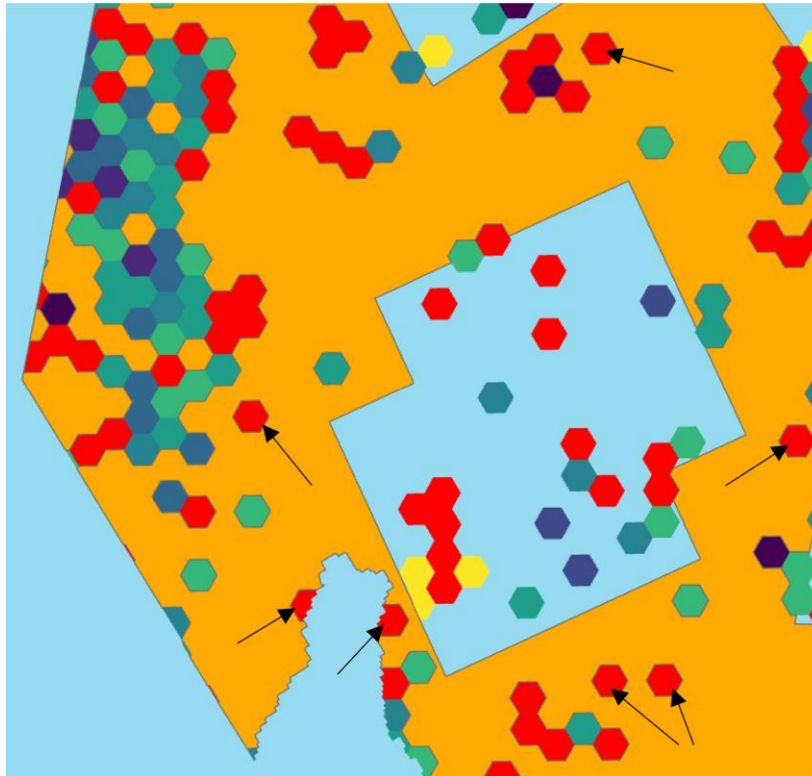
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<sup>4</sup> See full reference under data used in Step 8: Removing High Density Fishing Areas.

the Eastern Canada Commercial Fishing dataset (DFO, 2024) to identify corresponding fishing density.

Isolated polygons within the 2<sup>nd</sup> and 3<sup>rd</sup> quantile of the classified Eastern Canada Commercial Fishing dataset (values 400 -1900 kg) were filled if they occurred within larger polygons. This included isolated hexagonal polygons along larger polygon borders. Small holes with higher fishing density were not filled.

**Figure 3. Filling Small Holes**



**Figure Description:** This figure shows examples of isolated hexagonal polygons representing values 400 to 1900 kg (red) that were added back into the Step 9 Resulting Area (orange).

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### 3.11. Step 11: Delineating Suitable Technology Depths

The following steps were applied to the “Step 9 Resulting Area” data layer after completing step 10 above. Each step is described below.

1. Polygons were split based on water depth.
2. Polygons were assigned depth categories.

This involved spatial analysis and manual review.

The following data was used in this step:

- Ocean Depths: GEBCO Compilation Group. (2024). *GEBCO 2024 Grid* [Dataset]. GEBCO Compilation Group. doi: 10.5285/1c44ce99-0a0d-5f4f-e063-7086abc0ea0f

The following data layers resulted from this step:

- Recommended Offshore Wind Licensing Areas: Committee for the Regional Assessment of Offshore wind Development in Newfoundland and Labrador. (2024). Offshore Wind Licencing Areas [Shapefile]. Available upon request.

### **3.11.1. Splitting Polygons**

1. The ocean depth data from GEBCO was reclassified according to the categories:
  - Water depth up to 60 m
  - Water depth greater than 60 m and up to 80 m
  - Water depth greater than 80 m
2. The GEBCO raster data was converted into vector and overlaid with results from Step 10.
3. The polygons (i.e., results from Step 10) were manually split (“Split” in editor toolbar) according to depth category changes and the following rules:
  - Avoid making narrow areas (less than 1 km).
  - Areas should be a minimum of 2 hexagonal polygons wherever possible.

### **3.11.2. Assigning Depth Categories to Each Polygon**

After splitting polygons based on depth categories (above), resulting polygons still included multiple depths. Further splitting polygons would result in impractical, small areas and was unnecessary due to the accuracy and resolution of existing bathymetry data.

Depth categories were assigned based on professional judgment (Feaver's Lane) and reviewed by the Committee's Secretariat to enhance credibility. The project team clearly defined how to handle cases with similar percentages to ensure consistency for depth assignments.

The following steps were used to assign depth categories to individual polygons:

1. Three separate layers, corresponding to each of the depth categories, were created.
2. The area corresponding to each depth category was calculated for each polygon using the "Summarize Within" tool.
3. With the calculated area of each depth category within a polygon, new fields were created to calculate the proportions of depth category per polygon. For example, if a polygon was 15 km<sup>2</sup>, and the amount of "60 m depth" within the polygon was 12 km<sup>2</sup>, the polygon's proportion of "60 m depth" was 80%.
4. Final depth categories were assigned manually based on visualization and review of polygon depth category summaries. Generally, polygons were assigned the depth category which made up the highest proportion of the polygon. Where polygons had similar percentages (i.e., 60:40) of multiple depth categories polygons were split further (if this would not result in an impractically small area) or assigned the higher depth category.

## 4. Thematic Maps

### 4.1. Aerofauna Areas of Importance

Spatial Analysis: N/A

Mapping Methods:

1. Download datasets, “Atlantic Colonies - Density Analysis”, “Sea Duck Key Habitat Sites Atlas”, “Canada’s Important Bird and Biodiversity Areas”, and “Provincial Protected Areas”.
2. Filter Provincial Protected Areas using the field “PROTYPE” to only include “Provincial Reserve”.
3. Symbolize all data layers accordingly.

The following data was used:

- Atlantic Colonies – Density Analysis: ECCC. (2016a). Atlantic Colonies: Density Analysis [Dataset]. Government of Canada, Environment and Climate Change Canada (ECCC), NRCan, Federal Geospatial Platform. Version Modified 2022-06-15. <https://open.canada.ca/data/en/dataset/87bf8597-4be4-4ec2-9ee3-797f5eafbd97>
- Sea Duck Key Habitat Sites Atlas: Sea Duck Joint Venture. (n.d.). Sea Duck Key Habitat Sites Atlas. Sea Duck Joint Venture. Retrieved February 2, 2024. <https://seaduckjv.org/science-resources/sea-duck-key-habitat-sites-atlas/>
- Canada’s Important Bird and Biodiversity Areas: IBA Canada. (2024). Important Bird and Biodiversity Areas in Canada. Important Bird Areas (IBA) Canada. Last Accessed: May 27, 2024. Available at: [https://www.ibacanada.ca/explore\\_how.jsp?lang=en](https://www.ibacanada.ca/explore_how.jsp?lang=en)
- Provincial Protected Areas: Department of Environment and Climate Change. (2022). Provincial Protected Areas Newfoundland (Version 2024) [Dataset]. Government of Newfoundland and Labrador, Department of Environment and Climate Change (DOECC). <https://www.gov.nl.ca/ecc/natural-areas/gis-data/>

## 4.2. American Plaice

Spatial Analysis: N/A

Mapping Methods:

1. Download “American Plaice” species data from Ocean Biodiversity Information System (OBIS).
2. Download “Community-Based Coastal Resource Inventory”.
3. Filter “Community-Based Coastal Resource Inventory” (CCRI\_Groundfish\_Point\_Poisson\_De\_Fond\_Point\_1996to2007, CCRI\_Groundfish\_Point\_Poisson\_De\_Fond\_Point\_1996to2007, CCRI\_Groundfish\_Polyline\_Poisson\_De\_Fond\_Polyligne\_1996to2007) using the field “Species” for “American Plaice”.
4. Clip all data to the focus area.
5. Symbolize the data.

The following data was used:

- American Plaice: OBIS. (2024). Ocean Biodiversity Information System. Intergovernmental Oceanographic Commission of UNESCO, Ocean Biodiversity Information System (OBIS). [obis.org](https://obis.org)

## 4.3. Colony Centered Prediction Density for Atlantic Puffin

Spatial Analysis: See Ronconi (2022).<sup>5</sup>

Mapping Methods:

1. Download Atlantic Sea Bird Colony Centered Distribution Version 3.
2. Use “Extract by Mask” tool on “Kernal\_ATPU\_ALL” data layer to only marine areas.
3. Symbolize extracted raster data layer (symbology “stretch”, stretch type “Standard Deviation”, “20” deviations).
4. Symbolize Atlantic Puffin Colony data (“colonies\_ATPU”).

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<sup>5</sup> Ronconi, R.A., Lieske, D.J., McFarlane Tranquilla, L.A., Abbott, S., Allard, K.A., Allen, B., Black, A.L., Bolduc, F., Davoren, G.K., Diamond, A.W., Fifield, D.A., Garthe, S., Gjerdrum, C., Hedd, A., Mallory, M.L., Mauck, R.A., McKnight, J., Montevecchi, W.A., Pollet, I.L., ... & Wilhelm, S.I. (2022). Predicting Seabird Foraging Habitat for Conservation Planning in Atlantic Canada: Integrating Telemetry and Survey Data Across Thousands of Colonies. *Frontiers in Marine Science*, 9. <https://www.frontiersin.org/articles/10.3389/fmars.2022.816794>

The following data was used:

- Atlantic Sea Bird Colony Centered Distribution Version 3: Lieske, D.J., McFarlane Tranquilla, L., Ronconi, R.A., & Abbott, S. (2020b). Atlantic Canada Seabird Distribution, Threat and Risk Data. (Version 3) [Dataset]. <https://doi.org/10.5281/zenodo.3631467>

#### **4.4. Colony Centered Predicted Density for Black Guillemot**

Spatial Analysis: See Ronconi (2022).

Mapping Methods:

1. Download Atlantic Sea Bird Colony Centered Distribution Version 3.
2. Use “Extract by Mask” tool on “Kernal\_BLGU” data layer to only marine areas.
3. Symbolize extracted raster data layer (symbology “stretch”, stretch type “Standard Deviation”, “20” deviations).
4. Symbolize Atlantic Puffin Colony point data (“colonies\_BLGU”).

The following data was used:

- Atlantic Sea Bird Colony Centered Distribution Version 3: Lieske, D.J., McFarlane Tranquilla, L., Ronconi, R.A., & Abbott, S. (2020b). Atlantic Canada Seabird Distribution, Threat and Risk Data. (Version 3) [Dataset]. <https://doi.org/10.5281/zenodo.3631467>

#### **4.5. Colony Centered Predicted Density for Black-legged Kittiwake**

Spatial Analysis: See Ronconi (2022).

Mapping Methods:

1. Download Atlantic Sea Bird Colony Centered Distribution Version 3.
2. Use “Extract by Mask” tool on “Kernal\_BLKI” data layer to only marine areas.
3. Symbolize extracted raster data layer (symbology “stretch”, stretch type “Standard Deviation”, “20” deviations).
4. Symbolize Atlantic Puffin Colony point data (“colonies\_BLKI”).

The following data was used:

- Atlantic Sea Bird Colony Centered Distribution Version 3: Lieske, D.J., McFarlane Tranquilla, L., Ronconi, R.A., & Abbott, S. (2020b). Atlantic Canada Seabird Distribution, Threat and Risk Data. (Version 3) [Dataset]. <https://doi.org/10.5281/zenodo.3631467>

#### **4.6. Colony Centered Predicted Density for Common Eider**

Spatial Analysis: See Ronconi (2022).

Mapping Methods:

1. Download Atlantic Sea Bird Colony Centered Distribution Version 3.
2. Use “Extract by Mask” tool on “Kernal\_COEI” data layer to only marine areas.
3. Symbolize extracted raster data layer (symbology “stretch”, stretch type “Standard Deviation”, “20” deviations).
4. Symbolize Atlantic Puffin Colony point data (“colonies\_BLKI”).

The following data was used:

- Atlantic Sea Bird Colony Centered Distribution Version 3: Lieske, D.J., McFarlane Tranquilla, L., Ronconi, R.A., & Abbott, S. (2020b). Atlantic Canada Seabird Distribution, Threat and Risk Data. (Version 3) [Dataset]. <https://doi.org/10.5281/zenodo.3631467>

## 4.7. Colony Centered Predicted Density for Common Murre

Spatial Analysis: See Ronconi (2022).

Mapping Methods:

1. Download Atlantic Sea Bird Colony Centered Distribution Version 3.
2. Use “Extract by Mask” tool on “Kernal\_COMU” data layer to only marine areas.
3. Symbolize extracted raster data layer (symbology “stretch”, stretch type “Standard Deviation”, “20” deviations).
4. Symbolize Atlantic Puffin Colony point data (“colonies\_COMU”).

The following data was used:

- Atlantic Sea Bird Colony Centered Distribution Version 3: Lieske, D.J., McFarlane Tranquilla, L., Ronconi, R.A., & Abbott, S. (2020b). Atlantic Canada Seabird Distribution, Threat and Risk Data. (Version 3) [Dataset]. <https://doi.org/10.5281/zenodo.3631467>

## 4.8. Colony Centered Predicted Density for Great Black-backed Gull

Spatial Analysis: See Ronconi (2022).

Mapping Methods:

1. Download Atlantic Sea Bird Colony Centered Distribution Version 3.
2. Use “Extract by Mask” tool on “Kernal\_GBBG” data layer to only marine areas.
3. Symbolize extracted raster data layer (symbology “stretch”, stretch type “Standard Deviation”, “20” deviations).
4. Symbolize Atlantic Puffin Colony point data (“colonies\_GBBG”).

The following data was used:

- Atlantic Sea Bird Colony Centered Distribution Version 3: Lieske, D.J., McFarlane Tranquilla, L., Ronconi, R.A., & Abbott, S. (2020b). Atlantic Canada Seabird Distribution, Threat and Risk Data. (Version 3) [Dataset]. <https://doi.org/10.5281/zenodo.3631467>

## 4.9. Colony Centered Predicted Density for Herring Gull

Spatial Analysis: See Ronconi (2022).

Mapping Methods:

1. Download Atlantic Sea Bird Colony Centered Distribution Version 3.
2. Use “Extract by Mask” tool on “Kernal\_HERG” data layer to only marine areas.
3. Symbolize extracted raster data layer (symbology “stretch”, stretch type “Standard Deviation”, “20” deviations).
4. Symbolize Atlantic Puffin Colony point data (“colonies\_HERG”).

The following data was used:

- Atlantic Sea Bird Colony Centered Distribution Version 3: Lieske, D.J., McFarlane Tranquilla, L., Ronconi, R.A., & Abbott, S. (2020b). Atlantic Canada Seabird Distribution, Threat and Risk Data. (Version 3) [Dataset]. <https://doi.org/10.5281/zenodo.3631467>

## 4.10. Colony Centered Predicted Density for Leach's Storm Petrel

Spatial Analysis: See Ronconi (2022).

1. Mapping Methods:

2. Download Atlantic Sea Bird Colony Centered Distribution Version 3.
3. Use “Extract by Mask” tool on “Kernal\_LESP” data layer to only marine areas.
4. Symbolize extracted raster data layer (symbology “stretch”, stretch type “Standard Deviation”, “20” deviations).
5. Symbolize Atlantic Puffin Colony point data (“colonies\_LESP”).

The following data was used:

- Atlantic Sea Bird Colony Centered Distribution Version 3: Lieske, D.J., McFarlane Tranquilla, L., Ronconi, R.A., & Abbott, S. (2020b). Atlantic Canada Seabird Distribution, Threat and Risk Data. (Version 3) [Dataset]. <https://doi.org/10.5281/zenodo.3631467>

## 4.11. Colony Centered Predicted Density for Northern Gannet

Spatial Analysis: See Ronconi (2022).

Mapping Methods:

1. Download Atlantic Sea Bird Colony Centered Distribution Version 3.
2. Use “Extract by Mask” tool on “Kernal\_NOGA” data layer to only marine areas.
3. Symbolize extracted raster data layer (symbology “stretch”, stretch type “Standard Deviation”, “20” deviations).
4. Symbolize Atlantic Puffin Colony point data (“colonies\_NOGA”).

The following data was used:

- Atlantic Sea Bird Colony Centered Distribution Version 3: Lieske, D.J., McFarlane Tranquilla, L., Ronconi, R.A., & Abbott, S. (2020b). Atlantic Canada Seabird Distribution, Threat and Risk Data. (Version 3) [Dataset]. <https://doi.org/10.5281/zenodo.3631467>

## 4.12. Colony Centered Predicted Density for Razorbill

Spatial Analysis: See Ronconi (2022).

Mapping Methods:

1. Download Atlantic Sea Bird Colony Centered Distribution Version 3.
2. Use “Extract by Mask” tool on “Kernal\_RAZO” data layer to only marine areas.
3. Symbolize extracted raster data layer (symbology “stretch”, stretch type “Standard Deviation”, “20” deviations).
4. Symbolize Atlantic Puffin Colony point data (“colonies\_RAZO”).

The following data was used:

- Atlantic Sea Bird Colony Centered Distribution Version 3: Lieske, D.J., McFarlane Tranquilla, L., Ronconi, R.A., & Abbott, S. (2020b). Atlantic Canada Seabird Distribution, Threat and Risk Data. (Version 3) [Dataset]. <https://doi.org/10.5281/zenodo.3631467>

### 4.13. Colony Centered Predicted Density for Tern

Spatial Analysis: See Ronconi (2022).

Mapping Methods:

1. Download Atlantic Sea Bird Colony Centered Distribution Version 3.
2. Use “Extract by Mask” tool on “Kernal\_TERN” data layer to only marine areas.
3. Symbolize extracted raster data layer (symbology “stretch”, stretch type “Standard Deviation”, “20” deviations).
4. Symbolize Atlantic Puffin Colony point data (“colonies\_TERN”).

The following data was used:

- Atlantic Sea Bird Colony Centered Distribution Version 3: Lieske, D.J., McFarlane Tranquilla, L., Ronconi, R.A., & Abbott, S. (2020b). Atlantic Canada Seabird Distribution, Threat and Risk Data. (Version 3) [Dataset]. <https://doi.org/10.5281/zenodo.3631467>

### 4.14. Colony Centered Predicted Density for Thick-billed Murre

Spatial Analysis: See Ronconi (2022).

Mapping Methods:

1. Download Atlantic Sea Bird Colony Centered Distribution Version 3.
2. Use “Extract by Mask” tool on “Kernal\_TBMU” data layer to only marine areas.
3. Symbolize extracted raster data layer (symbology “stretch”, stretch type “Standard Deviation”, “20” deviations).
4. Symbolize Atlantic Puffin Colony point data (“colonies\_TBMU”).

The following data was used:

- Atlantic Sea Bird Colony Centered Distribution Version 3: Lieske, D.J., McFarlane Tranquilla, L., Ronconi, R.A., & Abbott, S. (2020b). Atlantic Canada Seabird Distribution, Threat and Risk Data. (Version 3) [Dataset]. <https://doi.org/10.5281/zenodo.3631467>

### 4.15. Commercial Fishing Density All Species

Spatial Analysis: N/A

Mapping Methods:

1. Download “Eastern Canada Commercial Fishing” (All Commercial Data)
2. Clip data to focus area
3. Symbolize by landings weight, field “weight” (graduated colors, method “manual interval”, classes “10”).

Symbol	Upper value	Label
Yellow	≤ 400	< 400 kg or Unknown
Light Green	≤ 1000	400 to 1000 kg
Green	≤ 1900	1000 to 1900 kg
Dark Green	≤ 3200	1900 to 3200 kg
Teal	≤ 5500	3200 to 5500 kg
Blue-Teal	≤ 9600	5500 to 9600 kg
Blue	≤ 16700	9600 to 16,700 kg
Dark Blue	≤ 31800	16,700 to 31,800 kg
Very Dark Blue	≤ 78300	31,800 to 78,300 kg
Purple	≤ 1371450	> 78,300 kg

The following data was used:

- Eastern Canada Commercial Fishing: DFO. (2023gg). Eastern Canada Commercial Fishing [dataset]. Government of Canada, Department of Fisheries and Oceans (DFO), Open Government. <https://open.canada.ca/data/en/dataset/502da2ef-bffa-4d9b-9e9c-a7425ff3c594>

## 4.16. Commercial Fishing Density Angling Rod and Reel

Spatial Analysis: N/A

Mapping Methods:

1. Download “Eastern Canada Commercial Fishing” (Commercial Data by Gear Type).
2. Clip data layer (“Angling\_Rod\_Reel\_Pêche\_sportive\_à\_la\_canne\_et\_au\_moulinet”) to focus area.
3. Apply Definition Query,
4. “weight > 0”.
5. Symbolize by landings weight, field “weight” (graduated colors, method “manual interval”, classes “10”).

Symbol	Upper value	Label
Yellow	≤ 400	< 400 kg or Unknown
Light Green	≤ 1000	400 to 1000 kg
Green	≤ 1900	1000 to 1900 kg
Dark Green	≤ 3200	1900 to 3200 kg
Teal	≤ 5500	3200 to 5500 kg
Blue-Teal	≤ 9600	5500 to 9600 kg
Blue	≤ 16700	9600 to 16,700 kg
Dark Blue	≤ 31800	16,700 to 31,800 kg
Very Dark Blue	≤ 78300	31,800 to 78,300 kg
Purple	≤ 1371450	> 78,300 kg

The following data was used:











- Eastern Canada Commercial Fishing: DFO. (2023gg). Eastern Canada Commercial Fishing [dataset]. Government of Canada, Department of Fisheries and Oceans (DFO), Open Government. <https://open.canada.ca/data/en/dataset/502da2ef-bffa-4d9b-9e9c-a7425ff3c594>

## 4.17. Commercial Fishing Density Atlantic Cod

Spatial Analysis: N/A

Mapping Methods:

1. Download “Eastern Canada Commercial Fishing” (Commercial Data by Species).
2. Clip data layer (“Atlantic\_Cod\_Morue\_franche”) to focus area.
3. Apply Definition Query,
4. “weight > 0”.
5. Symbolize by landings weight, field “weight” (graduated colors, method “manual interval”, classes “10”).

Symbol	Upper value	Label
	≤ 400	< 400 kg or Unknown
	≤ 1000	400 to 1000 kg
	≤ 1900	1000 to 1900 kg
	≤ 3200	1900 to 3200 kg
	≤ 5500	3200 to 5500 kg
	≤ 9600	5500 to 9600 kg
	≤ 16700	9600 to 16,700 kg
	≤ 31800	16,700 to 31,800 kg
	≤ 78300	31,800 to 78,300 kg
	≤ 1371450	> 78,300 kg

The following data was used:











- Eastern Canada Commercial Fishing: DFO. (2023gg). Eastern Canada Commercial Fishing [dataset]. Government of Canada, Department of Fisheries and Oceans (DFO), Open Government. <https://open.canada.ca/data/en/dataset/502da2ef-bffa-4d9b-9e9c-a7425ff3c594>

## 4.18. Commercial Fishing Density Atlantic Halibut

Spatial Analysis: N/A

Mapping Methods:

1. Download “Eastern Canada Commercial Fishing” (Commercial Data by Species).
2. Clip data layer (“Atlantic\_Halibut\_Flétan\_de\_l’Atlantique”) to focus area.
3. Apply Definition Query,
4. “weight > 0”.
5. Symbolize by landings weight, field “weight” (graduated colors, method “manual interval”, classes “10”).

Symbol	Upper value	Label
	≤ 400	< 400 kg or Unknown
	≤ 1000	400 to 1000 kg
	≤ 1900	1000 to 1900 kg
	≤ 3200	1900 to 3200 kg
	≤ 5500	3200 to 5500 kg
	≤ 9600	5500 to 9600 kg
	≤ 16700	9600 to 16,700 kg
	≤ 31800	16,700 to 31,800 kg
	≤ 78300	31,800 to 78,300 kg
	≤ 1371450	> 78,300 kg

The following data was used:

- Eastern Canada Commercial Fishing: DFO. (2023gg). Eastern Canada Commercial Fishing [dataset]. Government of Canada, Department of Fisheries and Oceans (DFO), Open Government. <https://open.canada.ca/data/en/dataset/502da2ef-bffa-4d9b-9e9c-a7425ff3c594>

## 4.19. Commercial Fishing Density Atlantic Herring

Spatial Analysis: N/A

Mapping Methods:

1. Download “Eastern Canada Commercial Fishing” (Commercial Data by Species).
2. Clip data layer (“Atlantic\_Herring\_Hareng\_de\_l’Atlantique”) to focus area.
3. Apply Definition Query,
4. “weight > 0”.
5. Symbolize by landings weight, field “weight” (graduated colors, method “manual interval”, classes “10”).

Symbol	Upper value	Label
Yellow	≤ 400	< 400 kg or Unknown
Light Green	≤ 1000	400 to 1000 kg
Green	≤ 1900	1000 to 1900 kg
Dark Green	≤ 3200	1900 to 3200 kg
Teal	≤ 5500	3200 to 5500 kg
Blue-Teal	≤ 9600	5500 to 9600 kg
Blue	≤ 16700	9600 to 16,700 kg
Dark Blue	≤ 31800	16,700 to 31,800 kg
Very Dark Blue	≤ 78300	31,800 to 78,300 kg
Purple	≤ 1371450	> 78,300 kg

The following data was used:

- Eastern Canada Commercial Fishing: DFO. (2023gg). Eastern Canada Commercial Fishing [dataset]. Government of Canada, Department of Fisheries and Oceans (DFO), Open Government. <https://open.canada.ca/data/en/dataset/502da2ef-bffa-4d9b-9e9c-a7425ff3c594>

## 4.20. Commercial Fishing Density Beach and Bar Seine

Spatial Analysis: N/A

Mapping Methods:

1. Download “Eastern Canada Commercial Fishing” (Commercial Data by Gear Type).
2. Clip data layer (“Beach\_Bar\_Seine\_Pêche\_à\_la\_senne\_de\_plage\_ou\_senne\_barrage”) to focus area.
3. Apply Definition Query,
4. “weight > 0”.
5. Symbolize by landings weight, field “weight” (graduated colors, method “manual interval”, classes “10”).

Symbol	Upper value	Label
Yellow	≤ 400	< 400 kg or Unknown
Light Green	≤ 1000	400 to 1000 kg
Green	≤ 1900	1000 to 1900 kg
Dark Green	≤ 3200	1900 to 3200 kg
Teal	≤ 5500	3200 to 5500 kg
Blue-Teal	≤ 9600	5500 to 9600 kg
Blue	≤ 16700	9600 to 16,700 kg
Dark Blue	≤ 31800	16,700 to 31,800 kg
Very Dark Blue	≤ 78300	31,800 to 78,300 kg
Purple	≤ 1371450	> 78,300 kg

The following data was used:











- Eastern Canada Commercial Fishing: DFO. (2023gg). Eastern Canada Commercial Fishing [dataset]. Government of Canada, Department of Fisheries and Oceans (DFO), Open Government. <https://open.canada.ca/data/en/dataset/502da2ef-bffa-4d9b-9e9c-a7425ff3c594>

## 4.21. Commercial Fishing Density Bottom Otter Trawl

Spatial Analysis: N/A

Mapping Methods:

1. Download “Eastern Canada Commercial Fishing” (Commercial Data by Gear Type).
2. Clip data layer (“Bottom\_Otter\_Trawl\_Pêche\_au\_chalut\_de\_fond\_à\_panneaux”) to focus area.
3. Apply Definition Query,
4. “weight > 0”.
5. Symbolize by landings weight, field “weight” (graduated colors, method “manual interval”, classes “10”).

Symbol	Upper value	Label
	≤ 400	< 400 kg or Unknown
	≤ 1000	400 to 1000 kg
	≤ 1900	1000 to 1900 kg
	≤ 3200	1900 to 3200 kg
	≤ 5500	3200 to 5500 kg
	≤ 9600	5500 to 9600 kg
	≤ 16700	9600 to 16,700 kg
	≤ 31800	16,700 to 31,800 kg
	≤ 78300	31,800 to 78,300 kg
	≤ 1371450	> 78,300 kg

The following data was used:











- Eastern Canada Commercial Fishing: DFO. (2023gg). Eastern Canada Commercial Fishing [dataset]. Government of Canada, Department of Fisheries and Oceans (DFO), Open Government. <https://open.canada.ca/data/en/dataset/502da2ef-bffa-4d9b-9e9c-a7425ff3c594>

## 4.22. Commercial Fishing Density Capelin

Spatial Analysis: N/A

Mapping Methods:

1. Download “Eastern Canada Commercial Fishing” (Commercial Data by Species).
2. Clip data layer (“Capelin\_Capelan”) to focus area.
3. Apply Definition Query,
4. “weight > 0”.
5. Symbolize by landings weight, field “weight” (graduated colors, method “manual interval”, classes “10”).

Symbol	Upper value	Label
	≤ 400	< 400 kg or Unknown
	≤ 1000	400 to 1000 kg
	≤ 1900	1000 to 1900 kg
	≤ 3200	1900 to 3200 kg
	≤ 5500	3200 to 5500 kg
	≤ 9600	5500 to 9600 kg
	≤ 16700	9600 to 16,700 kg
	≤ 31800	16,700 to 31,800 kg
	≤ 78300	31,800 to 78,300 kg
	≤ 1371450	> 78,300 kg

The following data was used:

- Eastern Canada Commercial Fishing: DFO. (2023gg). Eastern Canada Commercial Fishing [dataset]. Government of Canada, Department of Fisheries and Oceans (DFO), Open Government. <https://open.canada.ca/data/en/dataset/502da2ef-bffa-4d9b-9e9c-a7425ff3c594>

## 4.23. Commercial Fishing Density Danish or Scottish Seine

Spatial Analysis: N/A

Mapping Methods:

1. Download “Eastern Canada Commercial Fishing” (Commercial Data by Gear Type
2. Clip data layer (“Danish\_Scottish\_Seine\_Pêche\_à\_la\_seine\_danoise\_ou\_écossaise”) to focus area.
3. Apply Definition Query,
4. “weight > 0”.
5. Symbolize by landings weight, field “weight” (graduated colors, method “manual interval”, classes “10”).

Symbol	Upper value	Label
Yellow	≤ 400	< 400 kg or Unknown
Light Green	≤ 1000	400 to 1000 kg
Green	≤ 1900	1000 to 1900 kg
Dark Green	≤ 3200	1900 to 3200 kg
Teal	≤ 5500	3200 to 5500 kg
Blue-Teal	≤ 9600	5500 to 9600 kg
Blue	≤ 16700	9600 to 16,700 kg
Dark Blue	≤ 31800	16,700 to 31,800 kg
Very Dark Blue	≤ 78300	31,800 to 78,300 kg
Purple	≤ 1371450	> 78,300 kg

The following data was used:

- Eastern Canada Commercial Fishing: DFO. (2023gg). Eastern Canada Commercial Fishing [dataset]. Government of Canada, Department of Fisheries and Oceans (DFO), Open Government. <https://open.canada.ca/data/en/dataset/502da2ef-bffa-4d9b-9e9c-a7425ff3c594>

## 4.24. Commercial Fishing Density Dredge Boat

Spatial Analysis: N/A

Mapping Methods:

1. Download “Eastern Canada Commercial Fishing” (Commercial Data by Gear Type).
2. Clip data layer (“Dredge\_Boat\_Pêche\_à\_la\_drague\_bateau”) to focus area.
3. Apply Definition Query,
4. “weight > 0”.
5. Symbolize by landings weight, field “weight” (graduated colors, method “manual interval”, classes “10”).

Symbol	Upper value	Label
Yellow	≤ 400	< 400 kg or Unknown
Light Green	≤ 1000	400 to 1000 kg
Green	≤ 1900	1000 to 1900 kg
Dark Green	≤ 3200	1900 to 3200 kg
Teal	≤ 5500	3200 to 5500 kg
Blue-Teal	≤ 9600	5500 to 9600 kg
Blue	≤ 16700	9600 to 16,700 kg
Dark Blue	≤ 31800	16,700 to 31,800 kg
Very Dark Blue	≤ 78300	31,800 to 78,300 kg
Purple	≤ 1371450	> 78,300 kg

The following data was used:











- Eastern Canada Commercial Fishing: DFO. (2023gg). Eastern Canada Commercial Fishing [dataset]. Government of Canada, Department of Fisheries and Oceans (DFO), Open Government. <https://open.canada.ca/data/en/dataset/502da2ef-bffa-4d9b-9e9c-a7425ff3c594>

## 4.25. Commercial Fishing Density Fixed Gear

Spatial Analysis: N/A

Mapping Methods:

1. Download “Eastern Canada Commercial Fishing” (Commercial Data by Gear Type).
2. Clip data layer (“Gear\_Type\_Fixed\_Type\_dengin\_fixe”) to focus area.
3. Apply Definition Query,
4. “weight > 0”.
5. Symbolize by landings weight, field “weight” (graduated colors, method “manual interval”, classes “10”).

Symbol	Upper value	Label
	≤ 400	< 400 kg or Unknown
	≤ 1000	400 to 1000 kg
	≤ 1900	1000 to 1900 kg
	≤ 3200	1900 to 3200 kg
	≤ 5500	3200 to 5500 kg
	≤ 9600	5500 to 9600 kg
	≤ 16700	9600 to 16,700 kg
	≤ 31800	16,700 to 31,800 kg
	≤ 78300	31,800 to 78,300 kg
	≤ 1371450	> 78,300 kg

The following data was used:

- Eastern Canada Commercial Fishing: DFO. (2023gg). Eastern Canada Commercial Fishing [dataset]. Government of Canada, Department of Fisheries and Oceans (DFO), Open Government. <https://open.canada.ca/data/en/dataset/502da2ef-bffa-4d9b-9e9c-a7425ff3c594>

## 4.26. Commercial Fishing Density Gillnet

Spatial Analysis: N/A

Mapping Methods:

1. Download “Eastern Canada Commercial Fishing” (Commercial Data by Gear Type).
2. Clip data layer (“Gillnet\_Pêche\_au\_filet\_maillant”) to focus area.
3. Apply Definition Query,
4. “weight > 0”.
5. Symbolize by landings weight, field “weight” (graduated colors, method “manual interval”, classes “10”).

Symbol	Upper value	Label
Yellow	≤ 400	< 400 kg or Unknown
Light Green	≤ 1000	400 to 1000 kg
Green	≤ 1900	1000 to 1900 kg
Dark Green	≤ 3200	1900 to 3200 kg
Teal	≤ 5500	3200 to 5500 kg
Blue-Teal	≤ 9600	5500 to 9600 kg
Blue	≤ 16700	9600 to 16,700 kg
Dark Blue	≤ 31800	16,700 to 31,800 kg
Very Dark Blue	≤ 78300	31,800 to 78,300 kg
Purple	≤ 1371450	> 78,300 kg

The following data was used:

- Eastern Canada Commercial Fishing: DFO. (2023gg). Eastern Canada Commercial Fishing [dataset]. Government of Canada, Department of Fisheries and Oceans (DFO), Open Government. <https://open.canada.ca/data/en/dataset/502da2ef-bffa-4d9b-9e9c-a7425ff3c594>

## 4.27. Commercial Fishing Density Greyscale Witch Flounder

Spatial Analysis: N/A

Mapping Methods:

1. Download “Eastern Canada Commercial Fishing” (Commercial Data by Species).
2. Clip data layer (“Greyscale\_Witch\_Flounder\_Plie\_grise”) to focus area.
3. Apply Definition Query,
4. “weight > 0”.
5. Symbolize by landings weight, field “weight” (graduated colors, method “manual interval”, classes “10”).

Symbol	Upper value	Label
Yellow	≤ 400	< 400 kg or Unknown
Light Green	≤ 1000	400 to 1000 kg
Green	≤ 1900	1000 to 1900 kg
Dark Green	≤ 3200	1900 to 3200 kg
Teal	≤ 5500	3200 to 5500 kg
Blue-Teal	≤ 9600	5500 to 9600 kg
Blue	≤ 16700	9600 to 16,700 kg
Dark Blue	≤ 31800	16,700 to 31,800 kg
Very Dark Blue	≤ 78300	31,800 to 78,300 kg
Purple	≤ 1371450	> 78,300 kg

The following data was used:











- Eastern Canada Commercial Fishing: DFO. (2023gg). Eastern Canada Commercial Fishing [dataset]. Government of Canada, Department of Fisheries and Oceans (DFO), Open Government. <https://open.canada.ca/data/en/dataset/502da2ef-bffa-4d9b-9e9c-a7425ff3c594>

## 4.28. Commercial Fishing Density Hand Line Baited

Spatial Analysis: N/A

Mapping Methods:

1. Download “Eastern Canada Commercial Fishing” (Commercial Data by Gear Type).
2. Clip data layer (“Hand\_Line\_Baited\_Pêche\_à\_la\_ligne\_à\_main\_appâtée”) to focus area.
3. Apply Definition Query,
4. “weight > 0”.
5. Symbolize by landings weight, field “weight” (graduated colors, method “manual interval”, classes “10”).

Symbol	Upper value	Label
	≤ 400	< 400 kg or Unknown
	≤ 1000	400 to 1000 kg
	≤ 1900	1000 to 1900 kg
	≤ 3200	1900 to 3200 kg
	≤ 5500	3200 to 5500 kg
	≤ 9600	5500 to 9600 kg
	≤ 16700	9600 to 16,700 kg
	≤ 31800	16,700 to 31,800 kg
	≤ 78300	31,800 to 78,300 kg
	≤ 1371450	> 78,300 kg

The following data was used:

- Eastern Canada Commercial Fishing: DFO. (2023gg). Eastern Canada Commercial Fishing [dataset]. Government of Canada, Department of Fisheries and Oceans (DFO), Open Government. <https://open.canada.ca/data/en/dataset/502da2ef-bffa-4d9b-9e9c-a7425ff3c594>

## 4.29. Commercial Fishing Density Harpoon and Spear

Spatial Analysis: N/A

Mapping Methods:

1. Download “Eastern Canada Commercial Fishing” (Commercial Data by Gear Type).
2. Clip data layer (“Harpoon\_and\_Spear\_Pêche\_au\_harpon”) to focus area.
3. Apply Definition Query,
4. “weight > 0”.
5. Symbolize by landings weight, field “weight” (graduated colors, method “manual interval”, classes “10”).

Symbol	Upper value	Label
Yellow	≤ 400	< 400 kg or Unknown
Light Green	≤ 1000	400 to 1000 kg
Green	≤ 1900	1000 to 1900 kg
Dark Green	≤ 3200	1900 to 3200 kg
Teal	≤ 5500	3200 to 5500 kg
Blue-Teal	≤ 9600	5500 to 9600 kg
Blue	≤ 16700	9600 to 16,700 kg
Dark Blue	≤ 31800	16,700 to 31,800 kg
Very Dark Blue	≤ 78300	31,800 to 78,300 kg
Purple	≤ 1371450	> 78,300 kg

The following data was used:

- Eastern Canada Commercial Fishing: DFO. (2023gg). Eastern Canada Commercial Fishing [dataset]. Government of Canada, Department of Fisheries and Oceans (DFO), Open Government. <https://open.canada.ca/data/en/dataset/502da2ef-bffa-4d9b-9e9c-a7425ff3c594>

### 4.30. Commercial Fishing Density Longline Groundfish

Spatial Analysis: N/A

Mapping Methods:

1. Download “Eastern Canada Commercial Fishing” (Commercial Data by Gear Type).
2. Clip data layer (“Longline\_Groundfish\_Pêche\_à\_la\_palangre\_poissons\_de\_fond”) to focus area.
3. Apply Definition Query,
4. “weight > 0”.
5. Symbolize by landings weight, field “weight” (graduated colors, method “manual interval”, classes “10”).

Symbol	Upper value	Label
Yellow	≤ 400	< 400 kg or Unknown
Light Green	≤ 1000	400 to 1000 kg
Green	≤ 1900	1000 to 1900 kg
Dark Green	≤ 3200	1900 to 3200 kg
Teal	≤ 5500	3200 to 5500 kg
Blue-Teal	≤ 9600	5500 to 9600 kg
Blue	≤ 16700	9600 to 16,700 kg
Dark Blue	≤ 31800	16,700 to 31,800 kg
Very Dark Blue	≤ 78300	31,800 to 78,300 kg
Purple	≤ 1371450	> 78,300 kg

The following data was used:











- Eastern Canada Commercial Fishing: DFO. (2023gg). Eastern Canada Commercial Fishing [dataset]. Government of Canada, Department of Fisheries and Oceans (DFO), Open Government. <https://open.canada.ca/data/en/dataset/502da2ef-bffa-4d9b-9e9c-a7425ff3c594>

### 4.31. Commercial Fishing Density Longline Pelagics

Spatial Analysis: N/A

Mapping Methods:

1. Download “Eastern Canada Commercial Fishing” (Commercial Data by Gear Type).
2. Clip data layer (“Longline\_Pelagics\_Pêche\_à\_la\_palangre\_poissons\_pélagiques”) to focus area.
3. Apply Definition Query,
4. “weight > 0”.
5. Symbolize by landings weight, field “weight” (graduated colors, method “manual interval”, classes “10”).

Symbol	Upper value	Label
	≤ 400	< 400 kg or Unknown
	≤ 1000	400 to 1000 kg
	≤ 1900	1000 to 1900 kg
	≤ 3200	1900 to 3200 kg
	≤ 5500	3200 to 5500 kg
	≤ 9600	5500 to 9600 kg
	≤ 16700	9600 to 16,700 kg
	≤ 31800	16,700 to 31,800 kg
	≤ 78300	31,800 to 78,300 kg
	≤ 1371450	> 78,300 kg

The following data was used:











- Eastern Canada Commercial Fishing: DFO. (2023gg). Eastern Canada Commercial Fishing [dataset]. Government of Canada, Department of Fisheries and Oceans (DFO), Open Government. <https://open.canada.ca/data/en/dataset/502da2ef-bffa-4d9b-9e9c-a7425ff3c594>

## 4.32. Commercial Fishing Density Mackerel

Spatial Analysis: N/A

Mapping Methods:

1. Download “Eastern Canada Commercial Fishing” (Commercial Data by Species).
2. Clip data layer (“Mackerel\_Maquereau”) to focus area.
3. Apply Definition Query,
  - a. “weight > 0”.
4. Symbolize by landings weight, field “weight” (graduated colors, method “manual interval”, classes “10”).

Symbol	Upper value	Label
	≤ 400	< 400 kg or Unknown
	≤ 1000	400 to 1000 kg
	≤ 1900	1000 to 1900 kg
	≤ 3200	1900 to 3200 kg
	≤ 5500	3200 to 5500 kg
	≤ 9600	5500 to 9600 kg
	≤ 16700	9600 to 16,700 kg
	≤ 31800	16,700 to 31,800 kg
	≤ 78300	31,800 to 78,300 kg
	≤ 1371450	> 78,300 kg

The following data was used:

- Eastern Canada Commercial Fishing: DFO. (2023gg). Eastern Canada Commercial Fishing [dataset]. Government of Canada, Department of Fisheries and Oceans (DFO), Open Government. <https://open.canada.ca/data/en/dataset/502da2ef-bffa-4d9b-9e9c-a7425ff3c594>

## 4.33. Commercial Fishing Density Mobile Gear

Spatial Analysis: N/A

Mapping Methods:

1. Download “Eastern Canada Commercial Fishing” (Commercial Data by Gear Type).
2. Clip data layer (“Gear\_Type\_Mobile\_Type\_dengin\_mobile”) to focus area.
3. Apply Definition Query,
  - a. “weight > 0”.
4. Symbolize by landings weight, field “weight” (graduated colors, method “manual interval”, classes “10”).

Symbol	Upper value	Label
Yellow	≤ 400	< 400 kg or Unknown
Light Green	≤ 1000	400 to 1000 kg
Green	≤ 1900	1000 to 1900 kg
Dark Green	≤ 3200	1900 to 3200 kg
Teal	≤ 5500	3200 to 5500 kg
Blue-Teal	≤ 9600	5500 to 9600 kg
Blue	≤ 16700	9600 to 16,700 kg
Dark Blue	≤ 31800	16,700 to 31,800 kg
Very Dark Blue	≤ 78300	31,800 to 78,300 kg
Purple	≤ 1371450	> 78,300 kg

The following data was used:

- Eastern Canada Commercial Fishing: DFO. (2023gg). Eastern Canada Commercial Fishing [dataset]. Government of Canada, Department of Fisheries and Oceans (DFO), Open Government. <https://open.canada.ca/data/en/dataset/502da2ef-bffa-4d9b-9e9c-a7425ff3c594>

#### 4.34. Commercial Fishing Density Pot All Types

Spatial Analysis: N/A

Mapping Methods:

1. Download “Eastern Canada Commercial Fishing” (Commercial Data by Gear Type).
2. Clip data layer (“Pot\_All\_Types\_Pêche\_à\_la\_nasse\_tous\_les\_types”) to focus area.
3. Apply Definition Query,
  - a. “weight > 0”.
4. Symbolize by landings weight, field “weight” (graduated colors, method “manual interval”, classes “10”).

Symbol	Upper value	Label
Yellow	≤ 400	< 400 kg or Unknown
Light Green	≤ 1000	400 to 1000 kg
Green	≤ 1900	1000 to 1900 kg
Dark Green	≤ 3200	1900 to 3200 kg
Teal	≤ 5500	3200 to 5500 kg
Blue-Teal	≤ 9600	5500 to 9600 kg
Blue	≤ 16700	9600 to 16,700 kg
Dark Blue	≤ 31800	16,700 to 31,800 kg
Very Dark Blue	≤ 78300	31,800 to 78,300 kg
Purple	≤ 1371450	> 78,300 kg

The following data was used:











- Eastern Canada Commercial Fishing: DFO. (2023gg). Eastern Canada Commercial Fishing [dataset]. Government of Canada, Department of Fisheries and Oceans (DFO), Open Government. <https://open.canada.ca/data/en/dataset/502da2ef-bffa-4d9b-9e9c-a7425ff3c594>

## 4.35. Commercial Fishing Density Purse Tuck Seine

Spatial Analysis: N/A

Mapping Methods:

1. Download “Eastern Canada Commercial Fishing” (Commercial Data by Gear Type).
2. Clip data layer (“Purse\_Tuck\_Seine\_Pêche\_à\_la\_senne\_coulissante\_ou\_seine\_tuck”) to focus area.
3. Apply Definition Query,
  - a. “weight > 0”.
4. Symbolize by landings weight, field “weight” (graduated colors, method “manual interval”, classes “10”).

Symbol	Upper value	Label
	≤ 400	< 400 kg or Unknown
	≤ 1000	400 to 1000 kg
	≤ 1900	1000 to 1900 kg
	≤ 3200	1900 to 3200 kg
	≤ 5500	3200 to 5500 kg
	≤ 9600	5500 to 9600 kg
	≤ 16700	9600 to 16,700 kg
	≤ 31800	16,700 to 31,800 kg
	≤ 78300	31,800 to 78,300 kg
	≤ 1371450	> 78,300 kg

The following data was used:

- Eastern Canada Commercial Fishing: DFO. (2023gg). Eastern Canada Commercial Fishing [dataset]. Government of Canada, Department of Fisheries and Oceans (DFO), Open Government. <https://open.canada.ca/data/en/dataset/502da2ef-bffa-4d9b-9e9c-a7425ff3c594>

## 4.36. Commercial Fishing Density Queen Snow Crab

Spatial Analysis: N/A

Mapping Methods:

1. Download “Eastern Canada Commercial Fishing” (Commercial Data by Species).
2. Clip data layer (“Queen\_Snow\_Crab\_Crabe\_des\_neiges”) to focus area.
3. Apply Definition Query,
  - a. “weight > 0”.
4. Symbolize by landings weight, field “weight” (graduated colors, method “manual interval”, classes “10”).

Symbol	Upper value	Label
Yellow	≤ 400	< 400 kg or Unknown
Light Green	≤ 1000	400 to 1000 kg
Green	≤ 1900	1000 to 1900 kg
Dark Green	≤ 3200	1900 to 3200 kg
Teal	≤ 5500	3200 to 5500 kg
Blue-Teal	≤ 9600	5500 to 9600 kg
Blue	≤ 16700	9600 to 16,700 kg
Dark Blue	≤ 31800	16,700 to 31,800 kg
Very Dark Blue	≤ 78300	31,800 to 78,300 kg
Purple	≤ 1371450	> 78,300 kg

The following data was used:

- Eastern Canada Commercial Fishing: DFO. (2023gg). Eastern Canada Commercial Fishing [dataset]. Government of Canada, Department of Fisheries and Oceans (DFO), Open Government. <https://open.canada.ca/data/en/dataset/502da2ef-bffa-4d9b-9e9c-a7425ff3c594>

### 4.37. Commercial Fishing Density Redfish

Spatial Analysis: N/A

Mapping Methods:

1. Download “Eastern Canada Commercial Fishing” (Commercial Data by Species).
2. Clip data layer (“Redfish\_Sébaste”) to focus area.
3. Apply Definition Query,
  - a. “weight > 0”.
4. Symbolize by landings weight, field “weight” (graduated colors, method “manual interval”, classes “10”).

Symbol	Upper value	Label
Yellow	≤ 400	< 400 kg or Unknown
Light Green	≤ 1000	400 to 1000 kg
Green	≤ 1900	1000 to 1900 kg
Dark Green	≤ 3200	1900 to 3200 kg
Teal	≤ 5500	3200 to 5500 kg
Blue-Teal	≤ 9600	5500 to 9600 kg
Blue	≤ 16700	9600 to 16,700 kg
Dark Blue	≤ 31800	16,700 to 31,800 kg
Very Dark Blue	≤ 78300	31,800 to 78,300 kg
Purple	≤ 1371450	> 78,300 kg

The following data was used:











- Eastern Canada Commercial Fishing: DFO. (2023gg). Eastern Canada Commercial Fishing [dataset]. Government of Canada, Department of Fisheries and Oceans (DFO), Open Government. <https://open.canada.ca/data/en/dataset/502da2ef-bffa-4d9b-9e9c-a7425ff3c594>

## 4.38. Commercial Fishing Density Scallop

Spatial Analysis: N/A

Mapping Methods:

1. Download “Eastern Canada Commercial Fishing” (Commercial Data by Species).
2. Clip data layer (“Scallop\_Pétoncle”) to focus area.
3. Apply Definition Query,
  - a. “weight > 0”.
4. Symbolize by landings weight, field “weight” (graduated colors, method “manual interval”, classes “10”).

Symbol	Upper value	Label
	≤ 400	< 400 kg or Unknown
	≤ 1000	400 to 1000 kg
	≤ 1900	1000 to 1900 kg
	≤ 3200	1900 to 3200 kg
	≤ 5500	3200 to 5500 kg
	≤ 9600	5500 to 9600 kg
	≤ 16700	9600 to 16,700 kg
	≤ 31800	16,700 to 31,800 kg
	≤ 78300	31,800 to 78,300 kg
	≤ 1371450	> 78,300 kg

The following data was used:

- Eastern Canada Commercial Fishing: DFO. (2023gg). Eastern Canada Commercial Fishing [dataset]. Government of Canada, Department of Fisheries and Oceans (DFO), Open Government. <https://open.canada.ca/data/en/dataset/502da2ef-bffa-4d9b-9e9c-a7425ff3c594>

## 4.39. Commercial Fishing Density Shrimp Trawl

Spatial Analysis: N/A

Mapping Methods:

1. Download “Eastern Canada Commercial Fishing” (Commercial Data by Gear Type).
2. Clip data layer (“Shrimp\_Trawl\_Pêche\_à\_la\_crevette\_au\_chalut”) to focus area.
3. Apply Definition Query,
  - a. “weight > 0”.
4. Symbolize by landings weight, field “weight” (graduated colors, method “manual interval”, classes “10”).

Symbol	Upper value	Label
Yellow	≤ 400	< 400 kg or Unknown
Light Green	≤ 1000	400 to 1000 kg
Green	≤ 1900	1000 to 1900 kg
Dark Green	≤ 3200	1900 to 3200 kg
Teal	≤ 5500	3200 to 5500 kg
Blue-Teal	≤ 9600	5500 to 9600 kg
Blue	≤ 16700	9600 to 16,700 kg
Dark Blue	≤ 31800	16,700 to 31,800 kg
Very Dark Blue	≤ 78300	31,800 to 78,300 kg
Purple	≤ 1371450	> 78,300 kg

The following data was used:

- Eastern Canada Commercial Fishing: DFO. (2023gg). Eastern Canada Commercial Fishing [dataset]. Government of Canada, Department of Fisheries and Oceans (DFO), Open Government. <https://open.canada.ca/data/en/dataset/502da2ef-bffa-4d9b-9e9c-a7425ff3c594>

#### 4.40. Commercial Fishing Density Shrimp

Spatial Analysis: N/A

Mapping Methods:

1. Download “Eastern Canada Commercial Fishing” (Commercial Data by Species).
2. Clip data layer (“Shrimp\_Crevette”) to focus area.
3. Apply Definition Query,
  - a. “weight > 0”.
4. Symbolize by landings weight, field “weight” (graduated colors, method “manual interval”, classes “10”).

Symbol	Upper value	Label
Yellow	≤ 400	< 400 kg or Unknown
Light Green	≤ 1000	400 to 1000 kg
Green	≤ 1900	1000 to 1900 kg
Dark Green	≤ 3200	1900 to 3200 kg
Teal	≤ 5500	3200 to 5500 kg
Blue-Teal	≤ 9600	5500 to 9600 kg
Blue	≤ 16700	9600 to 16,700 kg
Dark Blue	≤ 31800	16,700 to 31,800 kg
Very Dark Blue	≤ 78300	31,800 to 78,300 kg
Purple	≤ 1371450	> 78,300 kg

The following data was used:











- Eastern Canada Commercial Fishing: DFO. (2023gg). Eastern Canada Commercial Fishing [dataset]. Government of Canada, Department of Fisheries and Oceans (DFO), Open Government. <https://open.canada.ca/data/en/dataset/502da2ef-bffa-4d9b-9e9c-a7425ff3c594>

## 4.41. Commercial Fishing Density Trap Gear All Types

Spatial Analysis: N/A

Mapping Methods:

1. Download “Eastern Canada Commercial Fishing” (Commercial Data by Gear Type).
2. Clip data layer (“Trap\_Gear\_All\_Types\_Pêche\_au\_casier\_tous\_les\_types”) to focus area.
3. Apply Definition Query,
  - a. “weight > 0”.
4. Symbolize by landings weight, field “weight” (graduated colors, method “manual interval”, classes “10”).

Symbol	Upper value	Label
	≤ 400	< 400 kg or Unknown
	≤ 1000	400 to 1000 kg
	≤ 1900	1000 to 1900 kg
	≤ 3200	1900 to 3200 kg
	≤ 5500	3200 to 5500 kg
	≤ 9600	5500 to 9600 kg
	≤ 16700	9600 to 16,700 kg
	≤ 31800	16,700 to 31,800 kg
	≤ 78300	31,800 to 78,300 kg
	≤ 1371450	> 78,300 kg

The following data was used:

- Eastern Canada Commercial Fishing: DFO. (2023gg). Eastern Canada Commercial Fishing [dataset]. Government of Canada, Department of Fisheries and Oceans (DFO), Open Government. <https://open.canada.ca/data/en/dataset/502da2ef-bffa-4d9b-9e9c-a7425ff3c594>

## 4.42. Commercial Fishing Density Trap Net

Commercial Fishing Density Troller Lines\ Spatial Analysis: N/A

Mapping Methods:

1. Download “Eastern Canada Commercial Fishing” (Commercial Data by Gear Type).
2. Clip data layer (“Trap\_Net\_Pêche\_au\_filet\_trappe”) to focus area.
3. Apply Definition Query,
  - a. “weight > 0”.
4. Symbolize by landings weight, field “weight” (graduated colors, method “manual interval”, classes “10”).

Symbol	Upper value	Label
Yellow	≤ 400	< 400 kg or Unknown
Light Green	≤ 1000	400 to 1000 kg
Green	≤ 1900	1000 to 1900 kg
Dark Green	≤ 3200	1900 to 3200 kg
Teal	≤ 5500	3200 to 5500 kg
Blue-Teal	≤ 9600	5500 to 9600 kg
Blue	≤ 16700	9600 to 16,700 kg
Dark Blue	≤ 31800	16,700 to 31,800 kg
Very Dark Blue	≤ 78300	31,800 to 78,300 kg
Purple	≤ 1371450	> 78,300 kg

The following data was used:

- Eastern Canada Commercial Fishing: DFO. (2023gg). Eastern Canada Commercial Fishing [dataset]. Government of Canada, Department of Fisheries and Oceans (DFO), Open Government. <https://open.canada.ca/data/en/dataset/502da2ef-bffa-4d9b-9e9c-a7425ff3c594>

#### 4.43. Commercial Fishing Density Troller Lines

Spatial Analysis: N/A

Mapping Methods:

1. Download “Eastern Canada Commercial Fishing” (Commercial Data by Gear Type).
2. Clip data layer (“Troller\_Lines\_Pêche\_à\_la\_traîne”) to focus area.
3. Apply Definition Query,
  - a. “weight > 0”.
4. Symbolize by landings weight, field “weight” (graduated colors, method “manual interval”, classes “10”).

Symbol	Upper value	Label
Yellow	≤ 400	< 400 kg or Unknown
Light Green	≤ 1000	400 to 1000 kg
Green	≤ 1900	1000 to 1900 kg
Dark Green	≤ 3200	1900 to 3200 kg
Teal	≤ 5500	3200 to 5500 kg
Blue-Teal	≤ 9600	5500 to 9600 kg
Blue	≤ 16700	9600 to 16,700 kg
Dark Blue	≤ 31800	16,700 to 31,800 kg
Very Dark Blue	≤ 78300	31,800 to 78,300 kg
Purple	≤ 1371450	> 78,300 kg

The following data was used:











- Eastern Canada Commercial Fishing: DFO. (2023gg). Eastern Canada Commercial Fishing [dataset]. Government of Canada, Department of Fisheries and Oceans (DFO), Open Government. <https://open.canada.ca/data/en/dataset/502da2ef-bffa-4d9b-9e9c-a7425ff3c594>

## 4.44. Commercial Fishing Density Turbot Greenland Halibut

Spatial Analysis: N/A

Mapping Methods:

1. Download “Eastern Canada Commercial Fishing” (Commercial Data by Species).
2. Clip data layer (“Turbot\_Greenland\_Halibut\_Flétan\_noir\_du\_Groenland”) to focus area.
3. Apply Definition Query,
  - a. “weight > 0”.
4. Symbolize by landings weight, field “weight” (graduated colors, method “manual interval”, classes “10”).

Symbol	Upper value	Label
	≤ 400	< 400 kg or Unknown
	≤ 1000	400 to 1000 kg
	≤ 1900	1000 to 1900 kg
	≤ 3200	1900 to 3200 kg
	≤ 5500	3200 to 5500 kg
	≤ 9600	5500 to 9600 kg
	≤ 16700	9600 to 16,700 kg
	≤ 31800	16,700 to 31,800 kg
	≤ 78300	31,800 to 78,300 kg
	≤ 1371450	> 78,300 kg

The following data was used:











- Eastern Canada Commercial Fishing: DFO. (2023gg). Eastern Canada Commercial Fishing [dataset]. Government of Canada, Department of Fisheries and Oceans (DFO), Open Government. <https://open.canada.ca/data/en/dataset/502da2ef-bffa-4d9b-9e9c-a7425ff3c594>

## 4.45. Commercial Fishing Density Whelk

Spatial Analysis: N/A

Mapping Methods:

1. Download “Eastern Canada Commercial Fishing” (Commercial Data by Species).
2. Clip data layer (“Whelk\_Buccin”) to focus area.
3. Apply Definition Query,
  - a. “weight > 0”.
4. Symbolize by landings weight, field “weight” (graduated colors, method “manual interval”, classes “10”).

Symbol	Upper value	Label
	≤ 400	< 400 kg or Unknown
	≤ 1000	400 to 1000 kg
	≤ 1900	1000 to 1900 kg
	≤ 3200	1900 to 3200 kg
	≤ 5500	3200 to 5500 kg
	≤ 9600	5500 to 9600 kg
	≤ 16700	9600 to 16,700 kg
	≤ 31800	16,700 to 31,800 kg
	≤ 78300	31,800 to 78,300 kg
	≤ 1371450	> 78,300 kg

The following data was used:

- Eastern Canada Commercial Fishing: DFO. (2023gg). Eastern Canada Commercial Fishing [dataset]. Government of Canada, Department of Fisheries and Oceans (DFO), Open Government. <https://open.canada.ca/data/en/dataset/502da2ef-bffa-4d9b-9e9c-a7425ff3c594>

## 4.46. Community-based Coastal Resource Inventory

Spatial Analysis: N/A

Mapping Methods:

1. Download “Community-Based Coastal Resource Inventory” (1996-2007).
2. Obtain draft 2020+ Community-based Coastal Resource Inventory dataset for Groundfish from DFO. This data layer is currently not published but will be in the future.
3. Symbolize all the point, line and polygon layers appropriately.

The following data was used:

- DFO. (2023ff). Community-Based Coastal Resource Inventory—Open Government Portal [Open Government Portal]. Government of Canada, Department of Fisheries and Oceans (DFO). <https://open.canada.ca/data/en/dataset/9d4d922e-0c92-4410-8411-7dea058a2288>
- DFO. (2024t). *Community-Based Coastal Resource Inventory – Unpublished Update* [Unpublished Data]. Government of Canada, Department of Fisheries and Oceans (DFO). Retrieved August 2024, from DFO.

## 4.47. Coral Presence

Spatial Analysis: N/A

Mapping Methods:

1. Download coral species data from Ocean Biodiversity Information System (OBIS) that include these scientific names,

- Scleractinia
  - Alcyonacea
  - Malacalcyonacea
2. Clip data to the focus area.
  3. Symbolize based on each coral group.

The following data was used:

- Coral: OBIS. (2024). Ocean Biodiversity Information System. Intergovernmental Oceanographic Commission of UNESCO, Ocean Biodiversity Information System (OBIS). [obis.org](https://obis.org)

#### 4.48. Ecologically and Biologically Significant Areas

Spatial Analysis: N/A

Mapping Methods:

1. Download “Ecologically and Biologically Significant Areas”.
2. Symbolize each Ecologically and Biologically Significant Areas polygon that overlap with the focus area using the field “Name” (Laurentian Channel, Placentia Bay, South Coast, Southwest Slope and West Coast of Newfoundland). Symbolize all other polygons as one colour and list as “Others”.

The following data was used:

- Ecologically and Biologically Significant Areas: DFO. (2021d). Ecologically and Biologically Significant Areas [Data set]. Government of Canada, Department of Fisheries and Oceans (DFO). <https://open.canada.ca/data/en/dataset/d2d6057f-d7c4-45d9-9fd9-0a58370577e0>






#### 4.49. ECSAS Seasonal All Species Density (Apr to Jul)

Spatial Analysis: Summary Statistics

Mapping Methods:

1. Download “Atlas of Seabirds at Sea in Eastern Canada 2006 – 2020” .
2. Clip “Species\_Density” data to focus area.
3. Apply “Summary Statistics” Tool, (each species has its own polygon and the numbers for all species per polygon is needed)

- Statistic field = “Mean density (birds/km2) - Densité moyenne (oiseaux/km2)” and statistic type = “Sum”
  - Case Field = “Species code - Code d'espèce”, “Month – Mois”, “Cell ID - Identifiant de la cellule”
4. Join tabular results of summary statistics back to the Atlas of Seabirds at Sea in Eastern Canada 2006 – 2020 polygon layer with the “Add Join” tool using “Cell ID”
  5. Apply Definition Query,
    - Species\_Density\_Stats.SUM\_density > 0 (Statistic created from step 3) AND Species\_Density\_Stats.Month = “April-Jul”
  6. Symbolize by density, field “SUM\_Density” (graduated colors, method “manual interval”, classes “5”).

Symbol	Upper value	Label
	≤ 3	< 3 birds/km <sup>2</sup>
	≤ 6	3 to 6 birds/km <sup>2</sup>
	≤ 12	6 to 12 birds/km <sup>2</sup>
	≤ 24	12 to 24 birds/km <sup>2</sup>
	≤ 35.706938	> 24 birds/km <sup>2</sup>

The following data was used:






- Atlas of Seabirds at Sea in Eastern Canada 2006 – 2020: ECCC. (2023c). Atlas of Seabirds at Sea in Eastern Canada 2006—2020 [Dataset]. NRCAN, Federal Geospatial Platform. Government of Canada, Environment and Climate Change Canada (ECCC), Canadian Wildlife Service (CWS), Quebec Region. <https://osdp-psdo.canada.ca/dp/en/search/metadata/NRCAN-WIND-1-8BD470B6-1D79-44B1-8C44-F69C8A961F92/metadata/NRCAN-FGP-1-f612e2b4-5c67-46dc-9a84-1154c649ab4e>

## 4.50. ECSAS Seasonal All Species Density (Aug to Nov)

Spatial Analysis: Summary Statistics

Mapping Methods:

1. Download “Atlas of Seabirds at Sea in Eastern Canada 2006 – 2020”.
2. Clip “Species\_Density” data to focus area.
3. Apply “Summary Statistics” Tool,
  - Statistic field = “Mean density (birds/km2) - Densité moyenne (oiseaux/km2)” and statistic type = “Sum”
  - Case Field = “Species code - Code d'espèce”, “Month – Mois”, “Cell ID - Identifiant de la cellule”
4. Join tabular results of summary statistics back to the Atlas of Seabirds at Sea in Eastern Canada 2006 – 2020 polygon layer with the “Add Join” tool using “Cell ID”
5. Apply Definition Query,
  - Species\_Density\_Stats.SUM\_density > 0 (Statistic created from step 3) AND Species\_Density\_Stats.Month = “Aug-Nov”
6. Symbolize by density, field “SUM\_Density” (graduated colors, method “manual interval”, classes “5”).

Symbol	Upper value	Label
	≤ 3	< 3 birds/km <sup>2</sup>
	≤ 6	3 to 6 birds/km <sup>2</sup>
	≤ 12	6 to 12 birds/km <sup>2</sup>
	≤ 24	12 to 24 birds/km <sup>2</sup>
	≤ 35.706938	> 24 birds/km <sup>2</sup>

The following data was used:



- Atlas of Seabirds at Sea in Eastern Canada 2006 – 2020: ECCC. (2023c). Atlas of Seabirds at Sea in Eastern Canada 2006—2020 [Dataset]. NRCAN, Federal Geospatial Platform. Government of Canada, Environment and Climate Change Canada (ECCC), Canadian Wildlife Service (CWS), Quebec Region. <https://osdp-psdo.canada.ca/dp/en/search/metadata/NRCAN-WIND-1-8BD470B6-1D79-44B1-8C44-F69C8A961F92/metadata/NRCAN-FGP-1-f612e2b4-5c67-46dc-9a84-1154c649ab4e>

## 4.51. ECSAS Seasonal All Species Density (Dec to Mar)

Spatial Analysis: Summary Statistics

Mapping Methods:

1. Download “Atlas of Seabirds at Sea in Eastern Canada 2006 – 2020”.
2. Clip “Species\_Density” data to focus area.
3. Apply “Summary Statistics” Tool,
  - Statistic field = “Mean density (birds/km2) - Densité moyenne (oiseaux/km2)” and statistic type = “Sum”
  - Case Field = “Species code - Code d'espèce”, “Month – Mois”, “Cell ID - Identifiant de la cellule”
4. Join tabular results of summary statistics back to the Atlas of Seabirds at Sea in Eastern Canada 2006 – 2020 polygon layer with the “Add Join” tool using “Cell ID”
5. Apply Definition Query,
  - Species\_Density\_Stats.SUM\_density > 0 (Statistic created from step 3) AND Species\_Density\_Stats.Month = “Dec-Mar”
6. Symbolize by density, field “SUM\_Density” (graduated colors, method “manual interval”, classes “5”).

Symbol	Upper value	Label
	≤ 3	< 3 birds/km <sup>2</sup>
	≤ 6	3 to 6 birds/km <sup>2</sup>
	≤ 12	6 to 12 birds/km <sup>2</sup>
	≤ 24	12 to 24 birds/km <sup>2</sup>
	≤ 35.706938	> 24 birds/km <sup>2</sup>

The following data was used:






- Atlas of Seabirds at Sea in Eastern Canada 2006 – 2020: ECCC. (2023c). Atlas of Seabirds at Sea in Eastern Canada 2006—2020 [Dataset]. NRCAN, Federal Geospatial Platform. Government of Canada, Environment and Climate Change Canada (ECCC), Canadian Wildlife Service (CWS), Quebec Region. <https://osdp-psdo.canada.ca/dp/en/search/metadata/NRCAN-WIND-1-8BD470B6-1D79-44B1-8C44-F69C8A961F92/metadata/NRCAN-FGP-1-f612e2b4-5c67-46dc-9a84-1154c649ab4e>

## 4.52. ECSAS Seasonal Survey Effort (Apr to Jul)

Spatial Analysis: N/A

Mapping Methods:

1. Download “Atlas of Seabirds at Sea in Eastern Canada 2006 – 2020” .
2. Clip “Effort” data to focus area.
3. Apply Definition Query,
  - Km > 0 AND Month= “Apr-Jul”
4. Symbolize by number of kilometres, field “Number of km – Nombre de km” (graduated colors, method “manual interval”, classes “5”).

Symbol	Upper value	Label
	≤ 30	< 30 km
	≤ 60	30 to 60 km
	≤ 120	60 to 120 km
	≤ 240	120 to 240 km
	≤ 2332.73	> 240 km

The following data was used:






- Atlas of Seabirds at Sea in Eastern Canada 2006 – 2020: ECCC. (2023c). Atlas of Seabirds at Sea in Eastern Canada 2006—2020 [Dataset]. NRCAN, Federal Geospatial Platform. Government of Canada, Environment and Climate Change Canada (ECCC), Canadian Wildlife Service (CWS), Quebec Region. <https://osdp-psdo.canada.ca/dp/en/search/metadata/NRCAN-WIND-1-8BD470B6-1D79-44B1-8C44-F69C8A961F92/metadata/NRCAN-FGP-1-f612e2b4-5c67-46dc-9a84-1154c649ab4e>

## 4.53. ECSAS Seasonal Survey Effort (Aug to Nov)

Spatial Analysis: N/A

Mapping Methods:

1. Download “Atlas of Seabirds at Sea in Eastern Canada 2006 – 2020” .
2. Clip “Effort” data to focus area.
3. Apply Definition Query,
  - Km > 0 AND Month= “Aug-Nov”
4. Symbolize by number of kilometres, field “Number of km – Nombre de km” (graduated colors, method “manual interval”, classes “5”).

Symbol	Upper value	Label
	≤ 30	< 30 km
	≤ 60	30 to 60 km
	≤ 120	60 to 120 km
	≤ 240	120 to 240 km
	≤ 2332.73	> 240 km

The following data was used:






- Atlas of Seabirds at Sea in Eastern Canada 2006 – 2020: ECCC. (2023c). Atlas of Seabirds at Sea in Eastern Canada 2006—2020 [Dataset]. NRCAN, Federal Geospatial Platform. Government of Canada, Environment and Climate Change Canada (ECCC), Canadian Wildlife Service (CWS), Quebec Region. <https://osdp-psdo.canada.ca/dp/en/search/metadata/NRCAN-WIND-1-8BD470B6-1D79-44B1-8C44-F69C8A961F92/metadata/NRCAN-FGP-1-f612e2b4-5c67-46dc-9a84-1154c649ab4e>

#### 4.54. ECSAS Seasonal Survey Effort (Dec to Mar)

Spatial Analysis: N/A

Mapping Methods:

1. Download “Atlas of Seabirds at Sea in Eastern Canada 2006 – 2020”.
2. Clip “Effort” data to focus area.
3. Apply Definition Query,
  - Km > 0 AND Month= “Dec-Mar”
4. Symbolize by number of kilometres, field “Number of km – Nombre de km” (graduated colors, method “manual interval”, classes “5”).

Symbol	Upper value	Label
	≤ 30	< 30 km
	≤ 60	30 to 60 km
	≤ 120	60 to 120 km
	≤ 240	120 to 240 km
	≤ 2332.73	> 240 km

The following data was used:

- Atlas of Seabirds at Sea in Eastern Canada 2006 – 2020: ECCC. (2023c). Atlas of Seabirds at Sea in Eastern Canada 2006—2020 [Dataset]. NRCan, Federal Geospatial Platform. Government of Canada, Environment and Climate Change Canada (ECCC), Canadian Wildlife Service (CWS), Quebec Region. <https://osdp-psdo.canada.ca/dp/en/search/metadata/NRCAN-WIND-1-8BD470B6-1D79-44B1-8C44-F69C8A961F92/metadata/NRCAN-FGP-1-f612e2b4-5c67-46dc-9a84-1154c649ab4e>

## 4.55. Legislated Protected Areas

Spatial Analysis: N/A

Mapping Methods:

1. Download “Canadian Protected and Conserved Areas Database (CPCAD)”.
  - Symbolize based on field “PROTYPE” (Conservation Land Trust, Federal Marine Protected Area, Federal Protected Area, Fishery Closure Area, Municipal Protected Park, National Park, Provincial Park, Provincial Reserve).
2. Download the “Proposed Protected Areas Plan for the Island of Newfoundland Sites (2020)” (NASP\_2020\_official\_data\_publicly\_released\_ESRI\_Shapefile\_Format)
  - Symbolize based on the Field “NASP\_Statu” (Provincial Proposed Reserve, Provincial Proposed Transitional Reserve)
3. A static image of the proposed South Coast Fjords Study Area is publicly available on the Parks Canada Agency website. Contact [bcg-gco@pc.gc.ca](mailto:bcg-gco@pc.gc.ca) for access to the shapefile created.
  - Symbolize the data.

The following data was used:

- Canadian Protected and Conserved Areas Database: ECCC. (2023g). Canadian Protected and Conserved Areas Database (CPCAD) [Data set]. Government of Canada, Environment and Climate Change Canada (ECCC), Candian Wildlife Services (CWS). Open Government. <https://open.canada.ca/data/en/dataset/6c343726-1e92-451a-876a-76e17d398a1c>
- Proposed Protected Areas Plan for the island of Newfoundland Sites: Department of Environment and Climate Change. (2023). Ten Proposed Sites 2023 [Dataset]. Government of Newfoundland and Labrador, Department of Environment and Climate Change (DOECC). <https://www.gov.nl.ca/ecc/natural-areas/gis-data/>

## 4.56. Lobster Harvested Within the Focus Area

Spatial Analysis: N/A

Mapping Methods:

1. Download Lobster Proxy Mapping data from Open Government.
2. Symbolize the data.

The following data was used:

- DFO. (2024s). Lobster Proxy Mapping – Newfoundland and Labrador [dataset]. Government of Canada, Department of Fisheries and Oceans (DFO), Open Government. <https://open.canada.ca/data/en/dataset/e6f6a4c7-a334-4cf4-adc0-5323f2593b09>

## 4.57. Marine Bioregions

Spatial Analysis: N/A

Mapping Methods:

1. Download “Federal Marine Bioregions”.
2. Apply a Definition Query,
  - “LEGEND” includes the value(s) (10. Newfoundland-Labrador Shelves / Plates-formes de Terre-Neuve et du Labrador, 11. Scotian Shelf / Plate-forme Scotian, 12. Gulf of Saint Lawrence / Golfe du Saint-Laurent)
3. Symbolize based on the field “LEGEND”.

The following data was used:

- Federal Marine Bioregions: NRCan. (2024a). Bathymetric compilation for Scotian Shelf and Newfoundland-Labrador Shelves bioregions, offshore Atlantic Canada [Dataset]. Government of Canada, Natural Resources Canada (NRCan). <https://open.canada.ca/data/en/dataset/335408ab-e7c9-581f-09fe-44487e1fd213>

## 4.58. Marine Species at Risk Critical Habitat

Spatial Analysis: N/A

Mapping Methods:

1. Download “Critical Habitat for Aquatic Species at Risk - Canada”.
2. Symbolize the data based on the field “Common Name EN”.

The following data was used:

- Critical Habitat for Aquatic Species at Risk – Canada: DFO. (2024g). Critical Habitat of Species at Risk [dataset]. Government of Canada, Department of Fisheries and Oceans (DFO), Open Government. <https://open.canada.ca/data/en/dataset/db177a8c-5d7d-49eb-8290-31e6a45d786c>

## 4.59. Marine Traffic Density (AIS)

Spatial Analysis: N/A

Mapping Methods:

1. Download “Vessel Density Mapping of 2023 AIS Data in the Northwest Atlantic” (incorporates 10 years of AIS data, 2013-2022 into a single raster layer)
2. Symbolize the density data using “classify”, “manual interval” and the following 4 classes,
  - 0.1 to 0.3
  - 0.3 to 0.5
  - 0.5 to 0.7
  - > 0.7

The following data was used:

- Vessel Density Mapping Series in the Northwest Atlantic: DFO. (2024p). Vessel Density Mapping of 2023 AIS Data in the Northwest Atlantic [Data set]. Government of Canada, Department of Fisheries and Oceans (DFO). <https://open.canada.ca/data/en/dataset/5b86e2d2-cec1-4956-a9d5-12d487aca11b>

## 4.60. Military Firing Practice and Exercise Areas

Spatial Analysis: N/A

Mapping Methods:

1. Download “Atlantic\_DND\_PracticeExerciseAreas\_2019”.
2. Apply a Definition Query,
  - “SEA\_AREAS” Include (PAPA,QUEBEC ONE,QUEBEC THREE,QUEBEC TWO,SIERRA ONE,SIERRA THREE,SIERRA TWO)
3. Symbolize based on the field “SEA\_AREAS”.

The following data was used:

- Atlantic\_DND\_PracticeExerciseAreas\_2019: DND. (2023). *Department of National Defence Firing Practice and Exercise Areas, Atlantic Canada* [Data set]. Government of Canada, Department of National Defense.  
<https://open.canada.ca/data/en/dataset/73111c78-298b-4be9-97f1-7aaa73cab477>

## 4.61. Mysticete Sightings

Spatial Analysis: N/A

Mapping Methods:

1. Download Mysticete (baleen whales) species data from Ocean Biodiversity Information System (OBIS) that include these scientific names,
  - Eubalaena glacialis, North American Right Whale
  - Balaenoptera acutorostrata, Minke whale
  - Balaenoptera physalus, Fin whale
  - Balaenoptera borealis, Sei whale
  - Balaenoptera musculus, Blue whale
  - Megaptera novaeangliae, Humpback whale
2. Download “Community-Based Coastal Resource Inventory”,
  - a. Filter “Marine\_Mammals\_Mammifères\_Marins” points, lines and polygons to include the above species.
    - i. NOTE: Spelling may not always be correct in CCRI database.
3. Download “Marine mammal records collected by the At-Sea Observer program in Arctic, Newfoundland and Labrador and Maritimes regions”,
  - a. Filter “MarineMammalRecords” using field “Common.Name” to include the above species.
4. Merge all datasets based on species.
5. Clip to focus area.
6. Symbolize based on species.

The following data was used:

- Mysticete: OBIS. (2024). Ocean Biodiversity Information System. Intergovernmental Oceanographic Commission of UNESCO, Ocean Biodiversity Information System (OBIS). [obis.org](https://obis.org)
- Marine Mammals: DFO. (2023ff). Community-Based Coastal Resource Inventory—Open Government Portal [Open Government Portal]. Government of Canada, Department of Fisheries and Oceans (DFO). <https://open.canada.ca/data/en/dataset/9d4d922e-0c92-4410-8411-7dea058a2288>
- Marine mammal records collected by the At-sea Observer program in Arctic, Newfoundland and Labrador and Maritimes regions: DFO. (2024k). Marine mammal records collected by the at-sea observer program in Arctic, Newfoundland and Labrador, and Maritimes regions. Government of Canada, Department of Fisheries and Oceans (DFO), NRCan, Federal Geospatial Platform. <https://osdp-psdo.canada.ca/dp/en/search/metadata/NRCAN-FGP-1-faba93b8-b9d4-4181-94cd-44c33a0388e2>

## 4.62. NAFO Divisions and Subdivisions

Spatial Analysis: N/A

Mapping Methods:

1. Download “NAFO Subareas, Divisions, and Subdivisions”.
2. Create 2 copies of “NAFO\_Divisions\_2021\_poly\_clipped”.
3. Apply Definition Query to first “NAFO\_Divisions\_2021\_poly\_clipped”,
  - a. “NAFO\_Division” includes the value(s) (3L,3O,4R,4S,4T)
    - i. These are the NAFO Divisions
4. Apply Definition Query to second “NAFO\_Divisions\_2021\_poly\_clipped”,
  - a. “NAFO\_Division” includes the value(s) (3P,4V)
    - i. These are the NAFO Subdivisions
5. Symbolize the data.

The following data was used:

- NAFO Subareas, Divisions, and Subdivisions: DFO. (2021g). NAFO Subareas, Divisions, and Subdivisions [Data set]. Government of Canada, Department of Fisheries and Oceans (DFO). <https://open.canada.ca/data/en/dataset/59af1c96-fc8f-4fa0-b398-d65e953eadaa>

## 4.63. Northern Shrimp

Spatial Analysis: N/A

Mapping Methods:

1. Download Northern Shrimp (*Pandalus borealis*) species data from Ocean Biodiversity Information System (OBIS).
2. Download “Community-Based Coastal Resource Inventory”,
  - a. Filter “CCRI\_Shellfish\_Point\_Mollusques\_Et\_Crustacés\_Point\_1996to2007” and “CCRI\_Shellfish\_Polygon\_Mollusques\_et\_crustacés\_polygone\_1996to2007” lines and polygons to include northern shrimp
    - i. NOTE: Spelling may not always be correct in CCRI database.
3. Merge all datasets.
4. Clip to focus area.
5. Symbolize the data.

The following data was used:

- Northern Shrimp (*Pandalus borealis*): OBIS. (2024). Ocean Biodiversity Information System. Intergovernmental Oceanographic Commission of UNESCO, Ocean Biodiversity Information System (OBIS). [obis.org](https://obis.org)
- Community-Based Coastal Resource Inventory: DFO. (2023ff). Community-Based Coastal Resource Inventory—Open Government Portal [Open Government Portal]. Government of Canada, Department of Fisheries and Oceans (DFO). <https://open.canada.ca/data/en/dataset/9d4d922e-0c92-4410-8411-7dea058a2288>

## 4.64. Odontocete Group 1 Sightings

Spatial Analysis: N/A

Mapping Methods:

1. Download Odontocete (toothed whale) species data from Ocean Biodiversity Information System (OBIS) that include these scientific names,
  - Globicephala melas, Long-finned pilot whale
  - Orcinus orca, Killer whale
  - Phocoena Phocoena, Harbour porpoise
  - Delphinapterus leucas, Beluga whale
  - Mesoplodon bidens, Sowerby's Beaked Whale
  - Ziphius cavirostris, Cuvier's beaked whale
  - Physeter macrocephalus, Sperm whale
  - Hyperoodon ampullatus, Northern bottlenose
2. Download "Community-Based Coastal Resource Inventory",
  - a. Filter "Marine\_Mammals\_Mammifères\_Marins" points, lines and polygons to include the above species, including unknown or general "whale/porpoise".
    - i. NOTE: Spelling may not always be correct in CCRI database.
3. Download "Marine mammal records collected by the At-Sea Observer program in Arctic, Newfoundland and Labrador and Maritimes regions",
  - b. Filter "MarineMammalRecords" using field "Common.Name" to include the above species including unknown or general "whale/porpoise".
4. Merge all datasets based on species.
5. Clip to focus area.
6. Symbolize based on species.

The following data was used:

- Odontocete (toothed whale): OBIS. (2024). Ocean Biodiversity Information System. Intergovernmental Oceanographic Commission of UNESCO, Ocean Biodiversity Information System (OBIS). [obis.org](https://obis.org)
- Community-Based Coastal Resource Inventory: DFO. (2023ff). Community-Based Coastal Resource Inventory—Open Government Portal [Open Government Portal]. Government of Canada, Department of Fisheries and Oceans (DFO). <https://open.canada.ca/data/en/dataset/9d4d922e-0c92-4410-8411-7dea058a2288>
- Marine mammal records collected by the At-sea Observer program in Arctic, Newfoundland and Labrador and Maritimes regions: DFO. (2024k). Marine mammal records collected by the at-sea observer program in Arctic, Newfoundland and Labrador, and Maritimes regions. Government of Canada, Department of Fisheries and Oceans (DFO), NRCAN, Federal Geospatial Platform. <https://osdp-psdo.canada.ca/dp/en/search/metadata/NRCAN-FGP-1-faba93b8-b9d4-4181-94cd-44c33a0388e2>

## 4.65. Odontocete Group 2 Sightings

Spatial Analysis: N/A

Mapping Methods:

1. Download Odontocete (toothed whale) species data from Ocean Biodiversity Information System (OBIS) that include these scientific names,
  - Delphinus delphis, Short-beaked common dolphin
  - Grampus griseus, Risso's dolphin
  - Lagenorhynchus acutus, Atlantic white-sided dolphin
  - Lagenorhynchus albirostris, White-beaked dolphin
  - Stenella coeruleoalba, Striped dolphin
  - Tursiops truncatus, Common bottlenose dolphin
2. Download “Community-Based Coastal Resource Inventory”.
  - a. Filter “Marine\_Mammals\_Mammifères\_Marins” points, lines and polygons to include the above species.
    - i. NOTE: Spelling may not always be correct in CCRI database.
3. Download “Marine mammal records collected by the At-Sea Observer program in Arctic, Newfoundland and Labrador and Maritimes regions”,
  - a. Filter “MarineMammalRecords” using field “Common.Name” to include the above species.
4. Merge all datasets based on species.
5. Clip to focus area.
6. Symbolize based on species.

The following data was used:

- Odontocete (toothed whale): OBIS. (2024). Ocean Biodiversity Information System. Intergovernmental Oceanographic Commission of UNESCO, Ocean Biodiversity Information System (OBIS). [obis.org](https://obis.org)
- Community-Based Coastal Resource Inventory: DFO. (2023ff). Community-Based Coastal Resource Inventory—Open Government Portal [Open Government Portal]. Government of Canada, Department of Fisheries and Oceans (DFO). <https://open.canada.ca/data/en/dataset/9d4d922e-0c92-4410-8411-7dea058a2288>
- Marine mammal records collected by the At-sea Observer program in Arctic, Newfoundland and Labrador and Maritimes regions: DFO. (2024k). Marine mammal records collected by the at-sea observer program in Arctic, Newfoundland and Labrador, and Maritimes regions. Government of Canada, Department of Fisheries and Oceans (DFO), NRCan, Federal Geospatial Platform. <https://osdp-psdo.canada.ca/dp/en/search/metadata/NRCAN-FGP-1-faba93b8-b9d4-4181-94cd-44c33a0388e2>

## 4.66. Other Recognized Areas of International Importance

Spatial Analysis: N/A

Mapping Methods:

1. Download “World Heritage List” data.
2. Download “Key Biodiversity Areas” data.
  - a. Map included Newfoundland and Labrador KBA’s as well as a KBA in Quebec (Les Îles-de-la-Madeleine)
3. Get coordinates from the Ramsar Sites Information Service for “Grand Codroy Estuary” to create a data point in map.
4. Download the “Important Bird Areas” data.
5. Symbolize the data.

The following data was used:

- World Heritage List: UNESCO World Heritage Centre. (n.d.). World Heritage Interactive Map. UNESCO World Heritage Centre. <https://whc.unesco.org/en/interactive-map/>
- Key Biodiversity Areas: KBA Canada. (2024a). Map Viewer. Key Biodiversity Areas Canada. <https://kbacanada.org/explore/map-viewer/>
- Ramsar Sites Information Service: Ramsar Convention. (2001, January 1). Grand Codroy Estuary. Ramsar Sites Information Service. <https://rsis.ramsar.org/ris/364>

## 4.67. Petroleum Activity

Spatial Analysis: N/A

Mapping Methods:

1. Download “NL Offshore Basins”.
  - a. Symbolize using the field “Age”.
2. Download “Active Exploration Licences, Newfoundland and Labrador, Canada”.
  - a. Symbolize the data.
3. Download “Active Areas of Interest, Call for Nominations or Call for Parcels, Newfoundland and Labrador, Canada”.
  - a. Symbolize the data.

The following data was used:

- C-NLOPB. (2024). Canada-NL Offshore Activity Map. Canada-Newfoundland and Labrador Oil and Petroleum Board (C-NLOPB). <https://home-cnlopb.hub.arcgis.com/apps/204203be862b4b76adf0e337ae747413/explore>

## 4.68. Pinniped Sightings

Spatial Analysis: N/A

Mapping Methods:

1. Download Pinnipeds (Seal) species data from Ocean Biodiversity Information System (OBIS) that include these scientific names,
  - *Pagophilus groenlandicus*, Harp seal
  - *Phoca vitulina*, Harbour seal
  - *Cystophora cristata*, Hooded seal
  - *Halichoerus grypus*, Grey seal
2. Download “Community-Based Coastal Resource Inventory”
  - a. Filter “Marine\_Mammals\_Mammifères\_Marins” points, lines and polygons to include the above species, including unknown or general “seal”.
    - i. NOTE: Spelling may not always be correct in CCRI database.
3. Download “Marine mammal records collected by the At-Sea Observer program in Arctic, Newfoundland and Labrador and Maritimes regions”,
  - a. Filter “MarineMammalRecords” using field “Common.Name” to include the above species including unknown or general “seal”.
4. Merge all datasets based on species.
5. Clip to focus area.
6. Symbolize based on species.

The following data was used:

- Pinnipeds (Seal): OBIS. (2024). Ocean Biodiversity Information System. Intergovernmental Oceanographic Commission of UNESCO, Ocean Biodiversity Information System (OBIS). <https://obis.org/>
- Community-Based Coastal Resource Inventory: DFO. (2023ff). Community-Based Coastal Resource Inventory—Open Government Portal [Open Government Portal]. Government of Canada, Department of Fisheries and Oceans (DFO). <https://open.canada.ca/data/en/dataset/9d4d922e-0c92-4410-8411-7dea058a2288>
- Marine mammal records collected by the At-sea Observer program in Arctic, Newfoundland and Labrador and Maritimes regions: DFO. (2024k). Marine mammal records collected by the at-sea observer program in Arctic, Newfoundland and Labrador, and Maritimes regions. Government of Canada, Department of Fisheries and Oceans (DFO), NRCan, Federal Geospatial Platform. <https://osdp-psdo.canada.ca/dp/en/search/metadata/NRCAN-FGP-1-faba93b8-b9d4-4181-94cd-44c33a0388e2>

#### 4.69. Protected Areas Import for Viewscapes

Spatial Analysis: Buffering to include an 80 km buffer perpendicular to the coastal boundary of Gros Morne National Park and World Heritage Site.

Mapping Methods:

1. Download “Canadian Protected and Conserved Areas Database (CPCAD)”.
  - a. Apply Definition Query “PROTOTYPE” is not null And “Name-English” = (Sandbanks Provincial Park) Or “Name-English” =(Gros Morne National Park of Canada).
2. A static image of the proposed South Coast Fjords Study Area is publicly available on the Parks Canada Agency website.
  - a. Contact [bcg-gco@pc.gc.ca](mailto:bcg-gco@pc.gc.ca) for access to the shapefile created.
3. Symbolize the data, including the Gros Morne National Park buffer polygon.

The following data was used:

- Canadian Protected and Conserved Areas Database (CPCAD): ECCC. (2023g). Canadian Protected and Conserved Areas Database (CPCAD) [Data set]. Government of Canada, Environment and Climate Change Canada (ECCC), Canadian Wildlife Services (CWS). Open Government. <https://open.canada.ca/data/en/dataset/6c343726-1e92-451a-876a-76e17d398a1c>

## 4.70. Sea Cucumber Presence

Spatial Analysis: N/A

Mapping Methods:

1. Download Sea cucumber (Holothuroidea) species data from Ocean Biodiversity Information System (OBIS).
2. Clip to focus area.
3. Symbolize the data.

The following data was used:

- Sea cucumber (Holothuroidea): OBIS. (2024). Ocean Biodiversity Information System. Intergovernmental Oceanographic Commission of UNESCO, Ocean Biodiversity Information System (OBIS). <https://obis.org/>

## 4.71. Sea Pen Presence

Spatial Analysis: N/A

Mapping Methods:

1. Download Sea pen (Pennatulacea) species data from Ocean Biodiversity Information System (OBIS).
2. Clip to focus area.
3. Symbolize the data.

The following data was used:

- Sea pen (pennatulacea): OBIS. (2024). Ocean Biodiversity Information System. Intergovernmental Oceanographic Commission of UNESCO, Ocean Biodiversity Information System (OBIS). <https://obis.org/>

## 4.72. Sea Turtle Sightings

Spatial Analysis: N/A

Mapping Methods:

1. Download Turtle species data from Ocean Biodiversity Information System (OBIS) that include these scientific names,
  - a. *Caretta caretta*, Loggerhead
  - b. *Dermochelys coriacea*, leatherback sea turtle
2. Download “Community-Based Coastal Resource Inventory” ,
  - a. Filter “Marine\_Mammals\_Mammifères\_Marins” points, lines and polygons to include the above species, including unknown or general “turtle”.
    - i. NOTE: Spelling may not always be correct in CCRI database.
3. Clip to focus area.
4. Symbolize the data.

The following data was used:

- Turtle species: OBIS. (2024). Ocean Biodiversity Information System. Intergovernmental Oceanographic Commission of UNESCO, Ocean Biodiversity Information System (OBIS). <https://obis.org/>
- Community-Based Coastal Resource Inventory: DFO. (2023ff). Community-Based Coastal Resource Inventory—Open Government Portal [Open Government Portal]. Government of Canada, Department of Fisheries and Oceans (DFO). <https://open.canada.ca/data/en/dataset/9d4d922e-0c92-4410-8411-7dea058a2288>

## 4.73. Seafood Processors and Aquaculture Licences

Spatial Analysis: N/A

Mapping Methods:

1. Download “Licenced Seafood Processors”.
2. Download “Aquaculture License”.
3. Symbolize the data.

The following data was used:

- Department of Fisheries, Forestry and Agriculture. (n.d.b). GeoHub: Fisheries and Aquaculture Licensed Fish Processors and Aquaculture Sites [Dataset]. Government of Newfoundland and Labrador, Department of Fisheries, Forestry and Agriculture (FFA). <https://geohub-gnl.hub.arcgis.com/maps/15586c5ed02f465fb6c141cf72fdb175/about>

## 4.74. Severe Storm Tracks

Spatial Analysis: N/A

Mapping Methods:

1. Download “Historical Hurricane Tracks” using all years
2. Apply Definition Query,
  - a. “SEASON” > (1984) AND “CMA\_PRES” > (990)
    - i. “CMA\_PRES” is Minimum pressure (hPa) near the TC center and is in mb units
3. Symbolize based on field “USA\_SSHS” (Saffir-Simpson Hurricane Scale information based on the wind speed provided by the US agency wind speed).

The following data was used:

- Historical Hurricane Tracks: National Centers for Environmental Information. (n.d.). International Best Track Archive for Climate Stewardship (IBTrACS) [Data set]. National Centers for Environmental Information (NCEI), National Oceanic and Atmospheric Administration. <https://www.ncei.noaa.gov/products/international-best-track-archive>

## 4.75. Significant Benthic Areas

Spatial Analysis: N/A

Mapping Methods:

1. Download “Delineation of Coral and Sponge Significant Benthic Areas in Eastern Canada (2016)”
2. Symbolize based on field “Legend” (Gorgonian Corals (large), Gorgonian Corals (small), Sea Pens, Sponges, Multiple Organisms).

The following data was used:

- Delineation of Coral and Sponge Significant Benthic Areas in Eastern Canada (2016): DFO. (2024h). Delineation of Coral and Sponge Significant Benthic Areas in Eastern Canada (2016) [Data set]. Government of Canada, Department of Fisheries and Oceans (DFO). <https://open.canada.ca/data/en/dataset/6af357a3-3be1-47d5-9d1f-e4f809c4c903>

## 4.76. Small Craft Harbours

Spatial Analysis: N/A

Mapping Methods:

1. Download “Small Craft Harbours Locations and Information”.
2. Symbolize the data.

The following data was used:

- Small Craft Harbours Locations and Information: DFO. (2023r). Small Craft Harbours Locations and Information [Data set]. Government of Canada, Department of Fisheries and Oceans (DFO). <https://osdp-psdo.canada.ca/dp/en/search/metadata/NRCAN-FGP-1-262451e7-6416-47b5-8453-f31d212ea657>

## 4.77. Sponge Presence

Spatial Analysis: N/A

Mapping Methods:

1. Download Sponge (Porifera) species data from Ocean Biodiversity Information System (OBIS).
2. Clip to focus area.
3. Symbolize the data.

The following data was used:

- Sponge (Porifera): OBIS. (2024). Ocean Biodiversity Information System. Intergovernmental Oceanographic Commission of UNESCO, Ocean Biodiversity Information System (OBIS). <https://obis.org/>