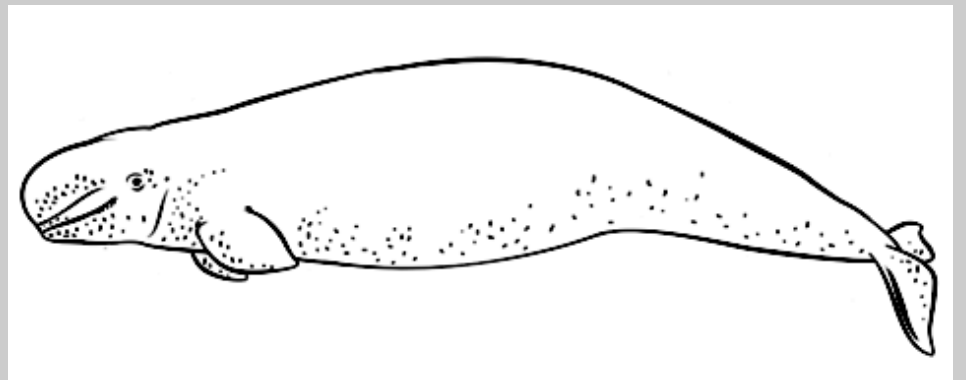


Beluga Whales in the St Lawrence Estuary

Analyzing the threats using MCDA

The Beluga Whale

St.Lawrence Estuary



Scientific Name: Delphinapterus leucas

Region: Quebec Province, Atlantic Ocean

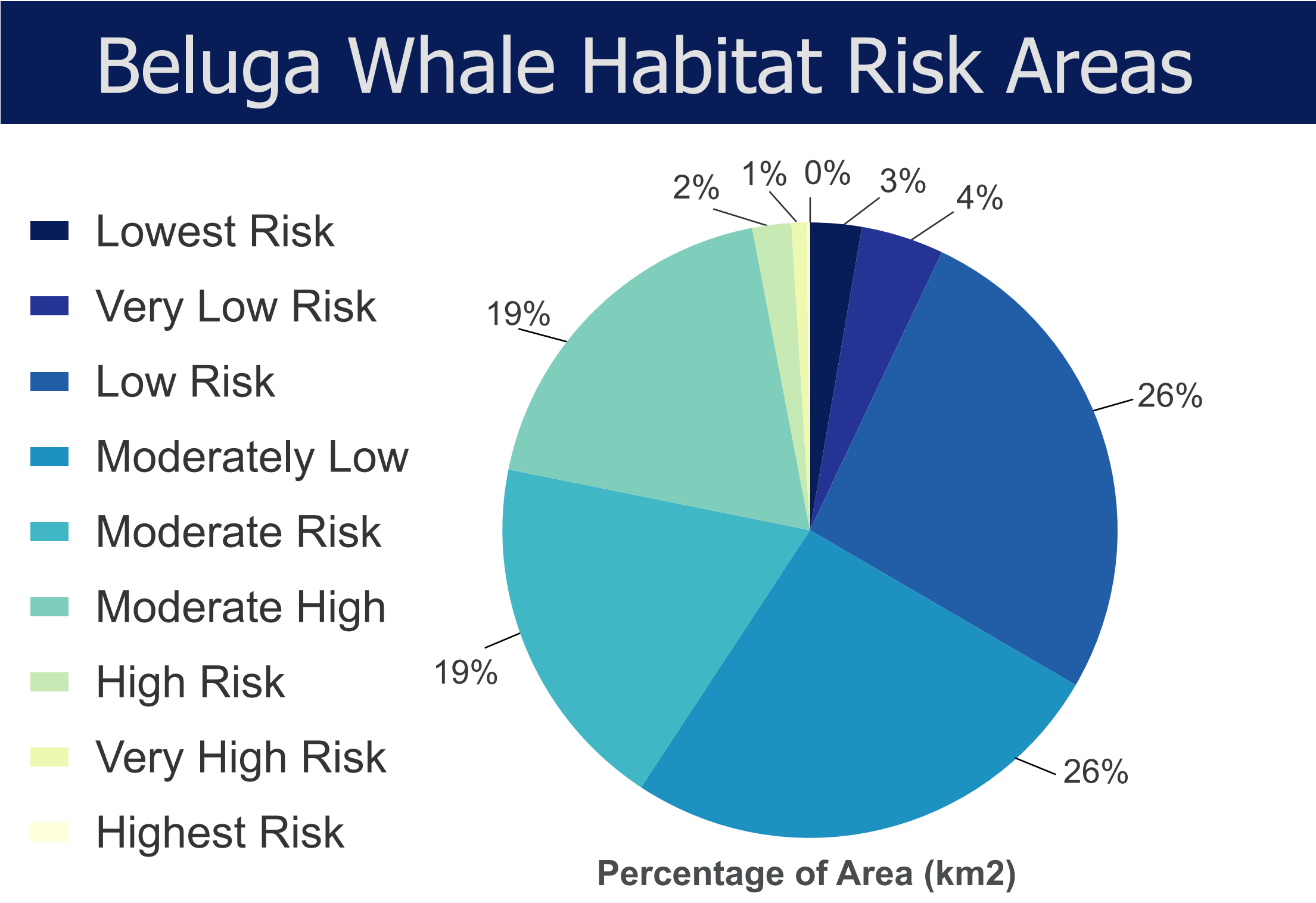
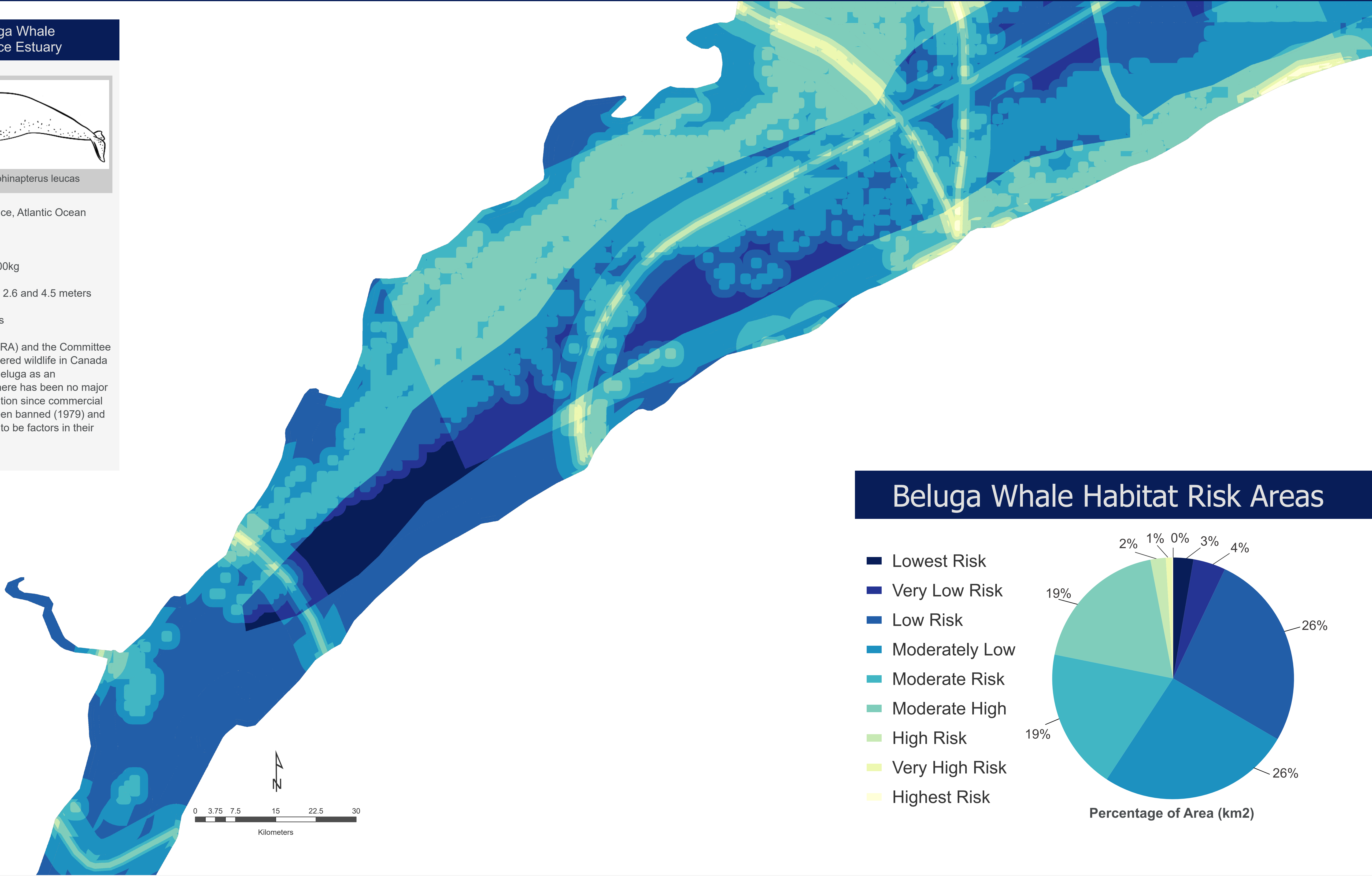
Status: Endangered

Adult weight: up to 1900kg

Adult Length: between 2.6 and 4.5 meters

Life Span: 35 - 50 years

Species At Risk Act (SARA) and the Committee on the status of Endangered wildlife in Canada (COSEWIC) class the Beluga as an endangered species. There has been no major recoveries in the population since commercial whaling for them has been banned (1979) and so other threats appear to be factors in their recovery.



Background

Beluga Whales (*Delphinapterus leucas*) are a cold-water marine mammal that are frequent visitors to Canadian waters. They are known for being vocal with high pitched whistles. They migrate between habitats depending on seasons, where in the summer months, one of the Canadian Beluga populations can be found in the St Lawrence Estuary of Quebec Province, in particular the Upper Estuary. This is declared as a critical habitat for the Beluga, offering many attributes that support their survival and population recovery.

The population is concentrated at the mouth of the Saguenay River making them the most southern population. In the winter months they move towards the northwest sector of the Gulf of St. Lawrence in order to avoid ice coverage that occurs in the Estuary.

Methodology

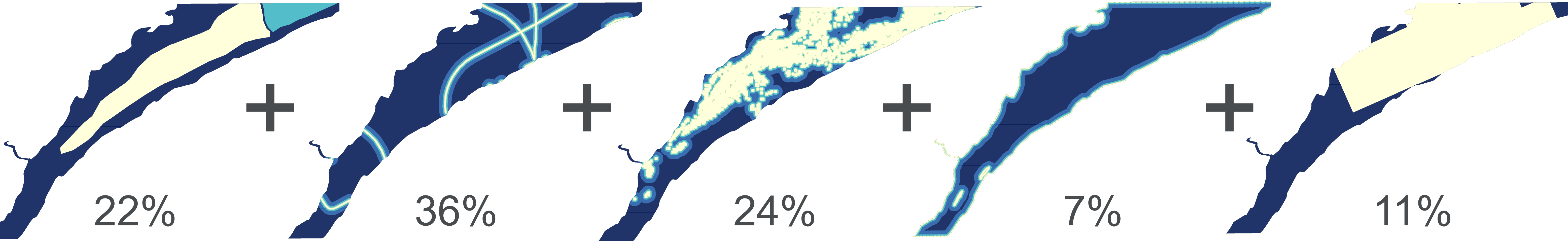
This Multi Criteria Decision Analysis focuses on the St Lawrence Estuary Beluga population and the risks present in their habitat. Some of the possible threats include reduced food sources, strikes by vessels and injury from fishing equipment.

The MCDA uses an analytic hierarchy process(AHP) to identify a rating and weighting schema for the risks. By using AHP in combination with Euclidean Distance, rated criteria surfaces are produced for the threats of vessel traffic, locations of fisheries and the distance to shorelines. The ice coverage and abundance of prey surfaces do not use Euclidean Distance, but instead are rated as areas present or not present. A Reclassification was performed on these Surfaces to distinguish between high and low risk areas. The final step combines these surfaces using a weighted sum which creates the final surface for the Multi-Criteria analysis.

Results

The final results of the Multi-Criteria Analysis are classified into 9 categories with 1 being the less risk and 9 being the highest risk. The final weighted surface displayed above shows the most suitable areas in St. Lawrence Estuary for the Beluga Whales and the areas that pose the biggest threat to them and their habitat.

The analysis results show that the highest risk areas make up about 3% of the area, however 45% of the ST Lawrence Estuary area analyzed is at a Moderately High risk and Moderate Risk to the Beluga habitat. The Lowest Risk areas only account for 3% of this habitat area. The biggest areas of threat and risk displayed in the weighted surface above are vessel routes followed by fisheries and ice conditions.



Abundance Of Prey

This Rated Criteria shows the areas where there is an abundance of prey. Beluga Whales are facing reduced food sources for a number of reasons including climate change, competition from other species, pollution and fisheries . In recent years the stocks of Eels and Cod have been at a low level.

Vessel Traffic

Vessel traffic is a major concern as ship strikes are a common threat. Boat traffic also disturbs the habitat by disrupting the Beluga's rest, communication, nursing of calves and search for food, which is key for their survival. The Rated Criteria surfaces shows the proximity to Vessel traffic routes.

Fisheries

Fisheries not only deplete food sources for the Beluga Whales but also pose the risk of entanglement and injury due to fishing equipment. Like other risk factors, fisheries can disturb the habitat with their vessels and noise pollution. This Rated Criteria shows proximity to the fisheries.

Shoreline

Distance to the shoreline can pose a threat for a number of reasons. Like all species of whales, beaching's can occur. However, the biggest issue is human activity and Inshore developments which can cause noise pollution and prey disruption that can affect the Beluga's due to their sensitivity to sound.

Ice Coverage

This Rated Criteria Surface demonstrates the risk of ice coverage locations. Beluga's prefer the colder waters and although their tough dorsal ridge can be used to help break through ice, there is still a risk of entrapment within ice covered areas.