The northern shrimp (Pandalus borealis) is one of the most important exploited species in eastern Canada with 489 million dollars of exports in 2014 (MAPAQ, 2015). It is a driver of economic development for many coastal communities in eastern Canada that are far from major economic centres. In recent years, northern shrimp populations appear to be declining, particularly in the southern part of their geographic range (Maine, New Brunswick, Nova Scotia). Climate and global changes, including the combined effects of increased temperature, decreasing pH and lower dissolved oxygen concentrations in the marine habitat of northern shrimp, could affect the viability, profitability and sustainability of this fishery. The vulnerability of the northern shrimp and its capacity to respond are currently little known and do not allow us to predict the evolution of this fishery in a context of global change.

OBJECTIVES

- Develop sound knowledge on the vulnerability of northern shrimp populations to climate and global change along the latitudinal gradient in Québec;
- Identify the socio-economic impacts and adaptation solutions for coastal populations.

METHODOLOGY

- Measure the individual sensitivity of different shrimp stocks to the combined effect of warming, acidification and hypoxia;
- Experimentally determine the sensitivity thresholds of northern shrimp to the isolated and combined effects of temperature, pH and oxygen levels;
- Model the distribution and abundance of northern shrimp under future climate and global change scenarios;
- Identify the socio-economic impacts on coastal communities that will result from the effects of climate and global changes on the shrimp fishery;
- Consult with the various stakeholders involved in this fishery to identify long-term management and conservation strategies that address the challenges of climate and global change;
- Transfer and mobilize knowledge within eastern Canada’s coastal communities and the scientific community.

EXPECTED RESULTS

Using an integrated and multidisciplinary approach, this project will generate the knowledge needed to understand the ecological risks and socio-economic implications of climate and global change on the northern shrimp fishery in Canadian Arctic and Atlantic waters. Adaptation solutions should also emerge from this project.

This project will generate new robust knowledge, making it possible to raise awareness among key stakeholders of the expected effects of global ocean changes on shrimp populations and fisheries. It will also mobilize stakeholders to identify solutions to adapt to these impacts, while preserving this economically, culturally and socially valuable resource that is essential to the development of coastal populations, including First Nations, and the economic development of Québec and Arctic and Atlantic Canada.