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Title: Ecosystem-based stock management of krill in the Gulf of St. Lawrence, Canada

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The Gulf of St. Lawrence is the southern-most region in the northwest Atlantic with seasonal sea-ice and is directly influenced by Arctic and deep Atlantic waters. The resident krill stock is dominated by the northern *Meganyctiphanes norvegica* as well as the Arctic *Thysanoessa raschii* and *T. inermis* and, to a lesser extent by the oceanic *T. longicaudata*. In Canada, commercial interest in a potential, new krill fishery focusses on the biochemical composition of northern and Arctic krill for the nutraceutical, cosmetic and pharmaceutical industries. However, the ecological resilience of these krill species in the St. Lawrence ecosystem, particularly in the context of future climate change is unknown, such knowledge being a prerequisite before allowing any human exploitation. Therefore, a research program launched with the objective to evaluate the productivity of *M. norvegica* and *T. raschii* and their key role as forage species in the ecosystem. Our research is a combined effort by university and government researchers along with an industrial partner. It will provide new understanding of biological processes and population dynamics of these two sympatric krill species, through a complementary approach including field observations, laboratory experiments and modelling. Most importantly, by coupling individual-based models of krill population dynamics and productivity to the 3D dynamics of the bio-physical environment, and by modelling the krill stock biomass in the framework of a mass-balanced food web model, our research will go beyond the descriptive level and will provide an integrated management tool useful to establish a fact-based foundation for decision makers.

Keywords: krill, stock assessment, forage species, consumption, production

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