

Project information

Project title

Climate-mediated increases in organic matter export to Arctic coastal waters: Effects on lower food web structure and contaminant bioaccumulation

Year

2015

Project leader

Amanda Poste

Participants

NIVA: Amanda Poste, Ian Allan, Anders Ruus

Akvaplan-niva: Guttorm Christensen, Eva Leu

UiT: Lena Seuthe, Marit Reigstad

NPI: Maria Granberg

SALT: salt.nu

Advisory committee: Derek Muir (Environment Canada), Dag Hessen (UiO)

Flagship

Hazardous Substances

Funding Source

The project is planned as a 2-year project, and began in 2015, funded by the Fram Centre Flagship for Hazardous substances.

Summary of Results

This project is ongoing. The following milestones have been achieved:

- recruited a MSc student (currently carrying out a 6 month research internship and co-supervised by Poste (NIVA) and Seuthe (UiT))
- developed detailed plans for fieldwork, lab analyses and data treatment
- general water chemistry analysis completed
- submission of samples for dietary marker and contaminant analyses
- bacterial production measurements completed
- outreach visit to Bardufoss ungdomskole with plans made for an ongoing student research project in 2016
- Hg analysis of water samples and biota are underway, as is initial data analysis

Our early work has shown that Målselva-Målselv fjord is a highly dynamic system, with rapidly shifting and highly seasonally variable freshwater, organic matter, nutrient and contaminant inputs to the coast. We observed strong spatial heterogeneity in salinity, chlorophyll (as a measure of phytoplankton biomass), bacterial production, and contaminant concentrations. We are currently waiting for results of contaminant and dietary marker analyses in order to assess the influence of terrestrial inputs on lower food web structure and contaminant dynamics in the fjord.

For the Management

Contaminants in aquatic food webs and climate change are both key topics of concern for the general public, as well as for policy makers and managers, particularly considering the potential for these stressors to exert wide-ranging environmental, economic, health and social effects. Given current trends and future projected increases in terrestrial organic carbon export to the arctic aquatic environment, this project will contribute essential and timely information about how these changes are likely to affect contaminant concentrations in aquatic food webs. The results and conclusions that will arise from this project will be highly relevant for current and future risk assessment for contaminants in arctic organisms (including fish, seabirds, marine mammals and polar bears), as well as implications for ecosystem health and the health of those who rely on marine food resources.

Published Results/Planned Publications

Since this project is ongoing, results have not yet been published. However, we do plan peer-reviewed publications in well-respected international journals. Specifically, we plan at least one publication on the importance of terrestrial energy sources for the pelagic food web in a sub-Arctic fjord, and at least one publication on the effects of terrestrial organic matter inputs on contaminant uptake and trophodynamics.

Communicated Results

In this project, we have partnered with SALT (salt.nu), to create a strong platform for results communication to key audiences. One of our key outreach activities is the involvement of students from Bardufoss ungdomskole in collection of river water samples. We recently held a highly interactive one-day introduction facilitated by SALT, where students discussed the ideas and initial results of the project, learned about scientific methods, met the project leader, and made plans for further project involvement. We are working to use SALT's communication channels and local and regional press to allow for broader coverage of the students participation in the project, and of the project as a whole.

Interdisciplinary Cooperation

This is a highly interdisciplinary and integrative project, which links climate change effects on terrestrial biogeochemistry and C export to effects on coastal lower food web structure and contaminant transport, bioaccumulation and trophic transfer. As such, this project has involved a broad range of scientists with expertise including catchment biogeochemistry, Arctic marine ecology, analytical chemistry, and ecotoxicology.

Budget in accordance to results

The budget and outputs for 2015 are in agreement with the timeline and budget of the project as outlined in the proposal for 2015.

Could results from the project be subject for any commercial utilization

No

Conclusions

Since this project is ongoing, we do not have any conclusions to report at this time. The work outlined in the proposal for the second year of funding for this project (budget year 2016) will allow for the successful completion of the project and publication of project results.