

ESSAS through the decades: High-latitude marine ecosystems in a time of transition

Naomi Harada^{1*}, Franz Mueter², Benjamin Planque³

¹ Atmosphere and Ocean Research Institute, The University of Tokyo, 5-1-5 Kashiwanoha Kashiwa-shi 277-8564, Japan

² College of Fisheries and Ocean Sciences, University of Alaska Fairbanks, Juneau, Alaska, 99801, USA

³ Institute of Marine Research, P.O box 1870 Nordnes, NO-5817 Bergen, Norway

*** Correspondence:**

Naomi Harada

naomi.harada@aori.u-tokyo.ac.jp

Abstract

The Ecosystem Studies of the Subarctic and Arctic Seas (ESSAS) program was established in 2005 as a regional program of GLOBEC to compare, quantify and predict the impact of climate variability on the productivity and sustainability of Subarctic marine ecosystems in both North Atlantic and North Pacific. Following the conclusion of GLOBEC, ESSAS joined IMBER in 2009 and has since expanded its geographic scope to include the Arctic and its disciplinary focus to encompass economic and socio-economic dimensions. Through annual meetings, open science meetings (once a couple of years) workshops, and working group activities, ESSAS has fostered information exchanges and scientific collaborations across the circumpolar north, resulting in numerous special issues and synthesis publications.

Maintaining a consistent focus on high-latitude marine systems, ESSAS-facilitated collaborations have contributed to scientific progress along at least three axes. First, they have advanced our ability to model and project climate-driven changes, informing both global climate assessments and regional ecosystem forecasts. Second, they have deepened our understanding of ecosystem responses — from the effects of ocean acidification and borealization to the development of more effective, ecosystem-based approaches to management. Third, they have broadened the temporal and cultural dimensions of Arctic science, incorporating paleo-ecological perspectives and fostering dialogue between Western and Indigenous knowledge systems to guide future stewardship of Subarctic and Arctic ecosystems.