Timeline

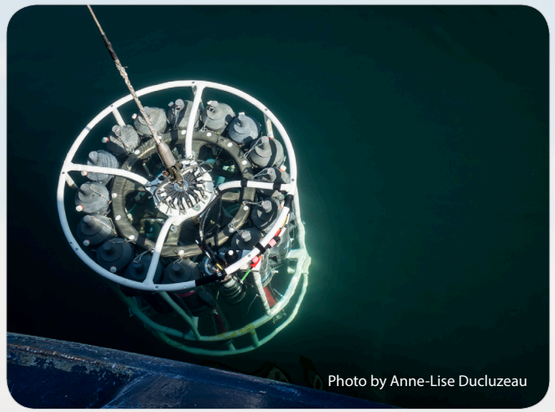
Photo by Anne-Lise Ducluzeau

- **1970:** Oceanographic station GAK1 was established, with monthly sampling of temperature and salinity (via CTD) that continues to this day. In the early 1970s, the Seward Line was established from GAK1 to past the continental shelf break, over 150 nautical miles.
- **1997–2004:** The US GLOBEC program (NSF/NOAA) supported intense observational and process studies of physics, chemistry, and biology, while EVOSTC funded the monthly CTD time series and consecutive moorings at GAK1.
- **2005:** The North Pacific Research Board began funding a streamlined Seward Line program, with expanded observations supported by NPRB's Integrated Ecosystem Research Program during 2011 and 2013.
- **2010–present:** A consortium of NPRB, NOAA, and AOOS funds sampling. EVOSTC (through Gulf Watch Alaska) joined in 2012. Each additional member of the funding consortium has expanded the Seward Line sampling effort.
- **2017:** The Seward Line program was selected by NSF as an important LTER site, representative of the ecosystem in the northern Gulf of Alaska.

Additional LTER Components

Information Management

Axiom Data Science (https://axiomdatascience.com) provides our data management via a system developed and supported by its partner, AOOS. Axiom and AOOS maintain a DataONE member node and the Gulf of Alaska data portal (https://portal.aoos.org/gulf-of-alaska.php) through which data will be publicly available within a year of collection.

Education

To enhance the limited opportunities students and teachers have to directly experience the Gulf of Alaska, our Schoolyard Program features virtual field trips that allow teachers and students to meet scientists and learn about their fieldwork and the NGA ecosystem. Virtual field trips for the LTER project include videos, scientist interviews, related lesson plans, and information to help students understand the project hypotheses, methods, and results. Additional educational resources are accessible through our project website, the LTER Network website, and Alaska Sea Grant's *Alaska Seas and Watersheds* program website.

For more information:

nga.lternet.edu

UAF COLLEGE OF FISHERIES AND OCEAN SCIENCES
University of Alaska Fairbanks

AOOS Alaska Ocean Observing System

Sea Grant Alaska

NSF

North Pacific Research Board

GulfWatch Alaska

Northern Gulf of Alaska, LTER
College of Fisheries and Ocean Sciences
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Northern Gulf of ALASKA

Abbreviations

AOOS—Alaska Ocean Observing System

CTD—Conductivity–Temperature–Depth profiling instrument package

EVOSTC—Exxon Valdez Oil Spill Trustee Council

LTER—Long Term Ecological Research

NOAA—National Oceanic and Atmospheric Administration

NGA—Northern Gulf of Alaska

NPRB—North Pacific Research Board

NSF—National Science Foundation

US GLOBEC—U.S. Global Ocean Ecosystem Dynamics Program

Photo by Anne-Lise Ducluzeau

Long Term Ecological Research

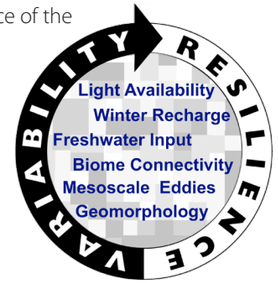
Research

NGA LTER research illuminates marine ecosystem responses to environmental variability. This includes how seasonal and decadal variability in nutrients, light, temperature, freshwater, and wind influences productivity and promotes ecosystem resilience.

The NGA LTER hypotheses focus on how the physical environment influences the ecosystem's structure, properties, resilience, and responses to variability. These hypotheses center on the characteristics arising from the NGA ecosystem as a whole—in other words, its emergent properties.

Specific topics of interest include:

- Regulation and influence of the spring bloom
- The role of freshwater inputs (like rivers) in structuring the ecosystem
- Hot spots of high summer primary and secondary production
- Trophic match between producers and consumers — is food available when it is needed?
- Distribution and composition of biological communities



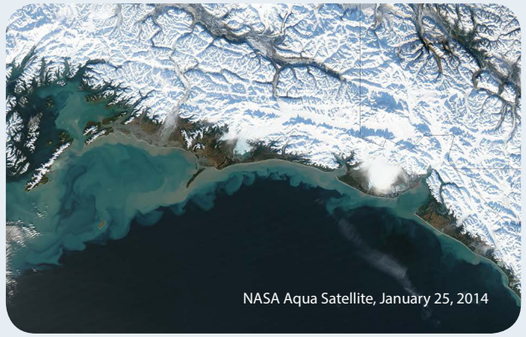
The NGA LTER integrated research program includes:

- **Seasonal time series studies** that address short- and long-term environmental and ecosystem variability through an observational program. Spring-to-fall field cruises and year-round mooring-based measurements build on the existing Seward Line time series and leverage existing collaborations.
- **Process studies** that focus on mechanisms leading to variability and enhancement of NGA production.
- **Physical and biogeochemical modeling studies** that complement observations. These provide a framework both for testing hypotheses and for predicting ecosystem responses to environmental change.
- **Data management components** that provide a public platform for data visualization and synthesis by LTER colleagues, educators and students, and resource managers.

Northern Gulf of ALASKA

Long Term Ecological Research

The LTER program is a National Science Foundation–funded network of 28 sites nationwide with long and rich histories of sustained data collection and experimentation. The NGA LTER site builds upon decades of oceanographic sampling along the Seward Line transect and the Gulf of Alaska mooring site (GAK1), while expanding parameters measured at each station and introducing several new sampling lines.


NASA Aqua Satellite, January 25, 2014

Research Site

In the NGA study area, the biological community is highly productive. The lower levels of the food chain (phytoplankton and zooplankton) support the iconic fish, crabs, seabirds, and marine mammals of Alaska. Large increases in phytoplankton during the spring and sustained production during the summer support zooplankton that transfer energy up the food chain. Substantial amounts of this organic matter also sink to feed animals on the sea bottom.

Our research team investigates the features, mechanisms, and processes that drive NGA ecosystem production and foster its resilience.

History of the Research Site

In the northern Gulf of Alaska, multidisciplinary researchers have performed oceanographic observations at established station locations for more than 45 years. Most observations have been made offshore of Resurrection Bay, a fjord that connects Seward, Alaska, to the North Pacific Ocean. The Seward Line observations stretch from the inner shelf (GAK1) into oceanic waters well past the continental shelf break. These observations have been critical in defining the oceanic current systems that characterize the NGA and biological regimes that span the coast-to-offshore habitats.


Photo by Dr. Russ Hopcroft