

## Abstract for NOAA's Subseasonal and Seasonal Applications Workshop

### Authors:

Kris Holderied, NOAA/NOS/NCCOS Kasitsna Bay Laboratory, [kris.holderied@noaa.gov](mailto:kris.holderied@noaa.gov)

Kristen Thyng, Axiom Data Science

Title: Enhancing NOAA Cook Inlet ocean models for marine resource management applications

Coastal ocean conditions and water currents affect the distributions, reproduction and survival of Alaska marine species, including plankton, fish, shellfish, and marine mammals. Ocean habitat information is needed for climate informed Alaska marine resource management, including in the large, subarctic Cook Inlet estuary, which has an extreme tidal range and is strongly influenced by changes in freshwater inputs and estuary-shelf water exchanges. To support marine resource management, oil spill response planning, shellfish and kelp mariculture, harmful algal bloom forecasting, and coastal climate change adaptation, 3-D ocean model information is needed to assess how environmental conditions change in response to near-term, seasonal, and longer-term climate variations, such as recent Pacific marine heat waves. NOAA's National Ocean Service operates the Cook Inlet Operational Forecast System (CIOFS), with 6-hour nowcasts and 48-hour forecasts from a high-spatial resolution, 3-D ocean model. To evaluate model use for marine resource management needs, a 24-year (1999-2022) hindcast product was developed and evaluated with ocean observing data. The CIOFS model generally captures the highly-variable bathymetry and tides of Cook Inlet, but has limited freshwater forcing and does not represent temperature and salinity patterns accurately enough for many resource management applications. New freshwater forcing parameterizations are being tested to help develop improved Cook Inlet retrospective hindcast products and future efforts are needed to develop subseasonal and seasonal ocean model projections at high spatial resolution, and with realistic freshwater forcing, to inform fishery and other marine resource management in Alaska near-shore and estuarine waters.