# Introduction

The role of oceanographic and other environmental or ecosystem parameters on the productivity of the world’s fish stocks has long been established. Increasingly, such parameters are explicitly incorporated into fisheries stock assessments (Holsman et al. [2016](#ref-Holsman2016), Marshall et al. [2019](#ref-Marshall2019)), risk assessments (Gaichas et al. [2014](#ref-Gaichas2014)); ecosystem reports (**???**, **???**, **???**), or other documents used by the U.S. Regional Fishery Management Councils to guide decision making. Meanwhile, a growing trend in the development of dynamic ocean management tools seeks to incorporate environmental information in near real-time to inform stakeholders for bycatch avoidance (Hazen et al. [2018](#ref-Hazen2018), Breece et al. [2021](#ref-Breece2021)), harmful algal blooms (Harley et al. [2020](#ref-Harley2020)), avoiding interactions with protected species (<https://oceanview.pfeg.noaa.gov/whale_indices/>), and more. Thus, as NOAA moves towards a broader adoption of ecosystem-based fisheries management and dynamic ocean management, the accessibility of ecosystem information becomes increasingly critical.

One of the most fundamental ecosystem parameters considered in fisheries is water temperature. Temperature regulates the timing and intensity of primary production, which has ripple effects on secondary producers and on to higher trophic levels. Temperature directly impacts fish growth and other metabolic processes in addition to regulating the location and abundance of prey. Thus, for most mobile fish species, temperature often defines the habitat of the species, and subsequently, the location of the fishing fleets that target them (Haynie and Pfeiffer [2012](#ref-Haynie2012), Watson and Haynie [2018](#ref-Watson2018), Rogers et al. [2019](#ref-Rogers2019)).

As global climate changes, water temperatures have been among the most easily measured metrics by which to understand how ocean ecosystems are responding. Broad warming trends are leading to poleward shifts in the distributions of fish species and the fleets that target them (Kotwicki and Lauth [2013](#ref-Kotwicki2013), Rogers et al. [2019](#ref-Rogers2019), Pinsky et al. [2020](#ref-Pinsky2020), Fredston et al. [2021](#ref-Fredston2021)), while anomalously warm periods or marine heatwaves are driving protracted impacts on ecosystems (Suryan et al. [2021](#ref-Suryan2021)) and commercial fish stocks (Barbeaux et al. [2020](#ref-Barbeaux2020)). Such dynamics underscore the need for reliable access to near real-time water temperature data.

Satellite-derived sea surface temperature data have been available since the early 1980s and a proliferation of new technologies, sensors, and data products have led to increasingly frequent and spatially resolved information with latencies as little as one day (Liu et al., 2015; Maturi et al., 2017; Minnett et al., 2019). Moreover, the development of programs like NOAA’s CoastWatch and data technologies like ERDDAP servers (Simons 2020) have facilitated easier access to these data worldwide in near real-time and via a suite of data formats. While such technologies have improved data access, challenges still exist for some end users due to the large file sizes of high spatial and temporal resolution data sets, difficulty subsetting data within irregular polygons (custom spatial strata), and the need for data infrastructure that supports operationalization and automation of data ingestion (Welch et al., 2019).

After assessing the needs of a suite of fisheries biology, stock assessment, and socio-ecological modeling efforts at the Alaska Fisheries Science Center (NMFS-NOAA), we developed an automated and operational framework for serving satellite environmental data products for a suite of spatial strata used for fisheries management and research in Alaska. The framework we present uses daily sea surface temperature data but can easily be extended to other environmental data products like chlorophyll, wind, ROMS model extractions, or other data identified by stakeholders. We describe the data used, the process for joining the data to spatial strata, backend database merges with fishery dependent data (e.g. observer and fish ticket data), and data access through customized web services (data queries via URL).

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