

# 2020 Gulf of Alaska Ecosystem Status Report:

## IN BRIEF

### Overview

Conditions in the Gulf of Alaska were close to average in 2020.

Key observations include:

- Sea surface temperatures returned to the long-term mean after 2014-2016 and 2019 heatwave years, with a warm summer and fall.
- Forage conditions were average or improved over past years. This may have contributed to the increased reproductive success of some seabird and humpback whale populations.
- Some species continue to be affected by past marine heatwaves and elevated ocean temperatures.



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## Sea Surface Temperatures About Average in 2020

This year, sea surface temperatures returned to the long-term mean after 2014-2016 and 2019 heatwave years, with a warm summer and fall.

Last year's (2019) marine heatwave persisted throughout the year and ended December, 2019. **Sea surface temperatures** then cooled to near-long term averages in the winter and spring of 2020. This was followed by warmer temperatures in the summer in the western Gulf of Alaska, and in the fall in the western and eastern Gulf of Alaska.

Western Gulf of Alaska temperatures fluctuated around the marine heatwave threshold (above the 90th percentile for five consecutive days) in the summer. Heatwave conditions have persisted from September through present (November 2020). Sea surface temperatures during winter and spring of 2021 are predicted to be average or cooler than average, with the arrival of **La Niña**. The average temperatures in the first half of the year provided improved later winter/spring conditions for groundfish who spawn on the continental shelf (e.g., Pacific cod, **walleye pollock**, and northern rock sole), relative to 2019. We expect the current heatwave conditions will have a reduced impact on the Gulf of Alaska groundfish community because of the late onset and predicted cooling in 2021.

## Increased Food Availability in 2020

Forage conditions were average or improved over past years. This may have contributed to the increased reproductive success of some seabird and humpback whale populations. Specifically, seabird breeding success on Middleton Island, Kodiak, and Cook Inlet (e.g., fish-eating surface feeders: **black-legged kittiwakes** and **rhinoceros auklets**) and for the Glacier Bay/Icy Strait humpback whale population suggest improved forage fish availability and abundance in 2020. However, some key prey species such as **capelin** are still at low abundance.



## Previous Marine Heatwaves Continue to Impact Some Species

Effects of the 2014-2016 and the 2019 marine heatwave years are still evident in the Gulf of Alaska.

Deeper shelf waters (100-200m), observed from nearshore to offshore of Seward, continue to have elevated temperatures. This has potential implications for the early survival of groundfish that use these habitats for spawning (e.g., Pacific cod).

While some forage fish conditions have been improving, others, such as capelin, have remained at low levels since the 2014-2016 heatwave.

Seabird and whale populations continue to be affected by previous warm years. This includes the decreasing common murre population counts in Cook Inlet, abandoned nesting colonies of black-legged kittiwakes around Kodiak, and low numbers of humpback whales observed in Prince William Sound.



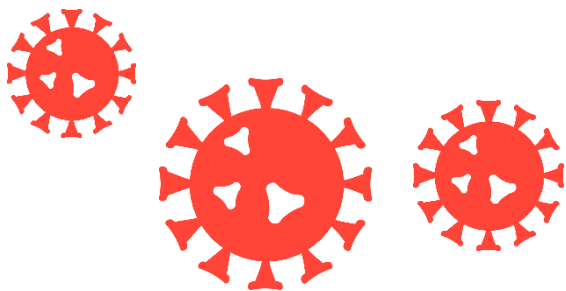
Forage conditions (availability of high fat content zooplankton and forage fish) for groundfish and higher trophic level species were generally average or above average in 2020. Zooplankton biomass (abundance by weight) was above the long-term average. An increase in **large calanoid copepod** biomass was observed around the Seward Line and Icy Strait. At the same time, there was a decrease in the biomass of **smaller copepods** and about average biomass of **euphausiids** around Icy Strait. However in the inside waters of the Strait, euphausiid biomass was lower than previous years.

Limited data on forage fish suggest improving forage conditions, since the 2014-2016 marine heatwave years, for

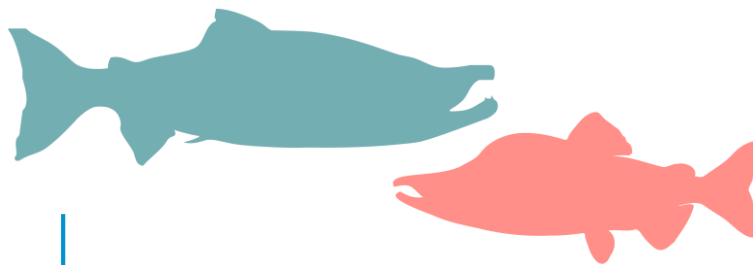
piscivorous groundfish, some fish-eating seabirds (e.g., black-legged kittiwakes and rhinoceros auklets on Middleton Island) and **humpback whales** (Glacier Bay/Icy Strait). Abundance of mature (age 3+) **Pacific herring** increased in 2019 to highest levels in the time series in Sitka Sound (since 1980) and Craig (since 1988). Other regions across the Gulf of Alaska (including Prince William Sound) also saw increased abundance, although overall herring stock sizes remain low. Preliminary 2020 data show similar elevated herring abundance.

**Juvenile salmon** in Southeast Alaska continue to increase from low abundance levels in 2017. However, **juvenile sockeye** and **coho** decreased from 2019 levels.

## Hot Topics



**COVID-19:** Fishing and harvesting businesses in Alaska were considered essential businesses under 2020 COVID regulations. They proceeded, at a substantial cost, while striving to maintain a safe working environment for their employees and minimize spread to local community residents. Impacts on harvesting and processing businesses included a reduction in transportation options, limited ability to switch crews throughout the fishing seasons, and market shifts (e.g., from food service to shelf stable products).

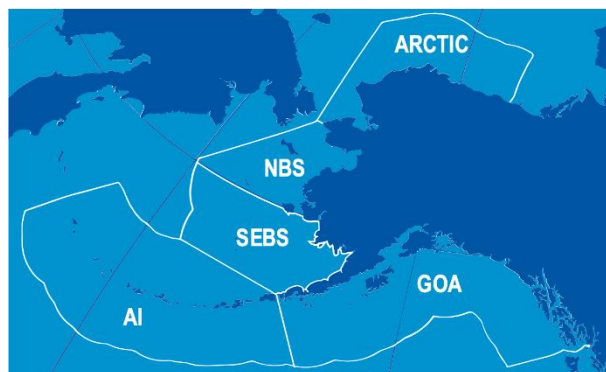


### Low Commercial Salmon Catch

**in Gulf of Alaska:** In 2020, commercial salmon catches were the lowest in Gulf of Alaska since 1985 and the lowest in Southeast Alaska since 1976 (driven by pink, sockeye, and chum salmon). These low adult returns in Southeast Alaska reflect low early marine survival of juvenile salmon observed in 2017-2019. They pose a social economic concern for 2020.

## Management Uses

Ecosystem information was formally considered in seven groundfish stock assessments for Gulf of Alaska stocks, and one statewide stock (sablefish) in 2020. There were no ecosystem-related reductions from the maximum acceptable biological catch (ABC) for Gulf of Alaska groundfish stocks. Precautionary measures already incorporated into setting catch levels were considered sufficient to address uncertainty. Elevated ecosystem concerns were documented for the Alaska-wide sablefish, including variable ocean temperatures and prey resources in the Gulf. A combination of these ecosystem concerns and considerations related to the assessment, population dynamics, and fishery performance, led to a 44% reduction from ABC for sablefish.

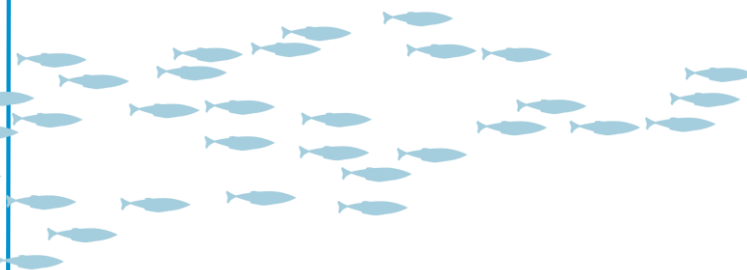


*More information on these and other topics can be found on the Ecosystem Status Report website.*

<https://www.fisheries.noaa.gov/alaska/ecosystems/ecosystem-status-reports-gulf-alaska-bering-sea-and-aleutian-islands>

**Reference:** Ferriss, B.E. and S. Zador 2020. Ecosystem Status Report for the Gulf of Alaska, Stock Assessment and Fishery Evaluation Report. North Pacific Fishery Management Council, 1007 West Third, Suite 400, Anchorage, AK 99501.

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