

2020 Aleutian Islands Ecosystem Status Report:

IN BRIEF



Current Conditions

Throughout the Aleutian Islands, sea surface temperatures have been warmer than average since 2013, and 2020 was no different. However, the 2020 temperatures were cooler relative to last year, particularly in the eastern Aleutians where there was close to a year-long moderate heatwave. The North Pacific atmospheric-ocean climate system returned to near-average or average conditions during fall 2019 to summer 2020 but warm temperatures persisted in the 100-250 m subsurface waters. The central and western Aleutians have been cooler than the eastern Aleutians, offering a potential thermal refuge for fish and other animals farther east.

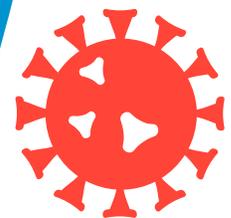


There was relatively high sea level pressure in the region displaced to the northwest, over Siberia, from fall 2019 into 2020. Consequently, the Aleutians Islands region experienced less storminess through fall and winter 2019/2020, with predominant winds from the southwest. The Alaska Stream current continues to be relatively weak on the south side of the eastern Aleutian Islands, as it has since 2013. This period coincides with several other physical and biological processes in the region, including weaker eddies and lower flow through the passes, which might decrease the volume of heat, nutrients and salinity through them. Overall, the archipelago appears to have experienced less extreme climate events in recent years compared to other marine regions of Alaska.



COVID-19 Impacts

The COVID-19 pandemic led to the cancellation of several key annual fish, crab and ecosystem surveys. As a result, most of the data included here refers to 2019. Data for 2020 is restricted to sea surface temperatures, marine heatwaves, subsurface temperatures, seabird die-offs, marine mammal strandings, fish stock sustainability, and groundfish discards.



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How did the system respond?

Aleutian-wide and multi-year trends

In general, when ocean temperatures are warmer, fish require more food to develop and grow. These increased bioenergetic costs and consumption demands may partly explain why, since 2012, several commercial groundfish (adult pollock, Pacific cod, Atka mackerel, northern rockfish and Pacific Ocean perch) have been skinnier than the longterm average. This has negative implications for seabirds, marine mammals and apex fish predators like Pacific cod and arrowtooth flounder, who prey on these species and have been skinnier as well.

At the same time, **Pacific Ocean perch** have increased in recent bottom trawl surveys, while **Atka mackerel** and pollock have declined. Also, Kamchatka pink salmon reached record abundance in 2019 following their increasing trend over the past decade. These potential changes in the balance of the food web may indicate that there is more competition between species for food. In general, **Kamchatka pink salmon** abundance is higher in odd years, and this generally correlates with a lower copepod abundance. In 2019 however, there was an increase in the mean size of the copepod community and decreased abundance of large diatoms (phytoplankton) which suggests copepods were eating more **diatoms**. An increase in copepods would have potentially benefitted plankton-feeding species, young-of-year fish and, in turn, groundfish.

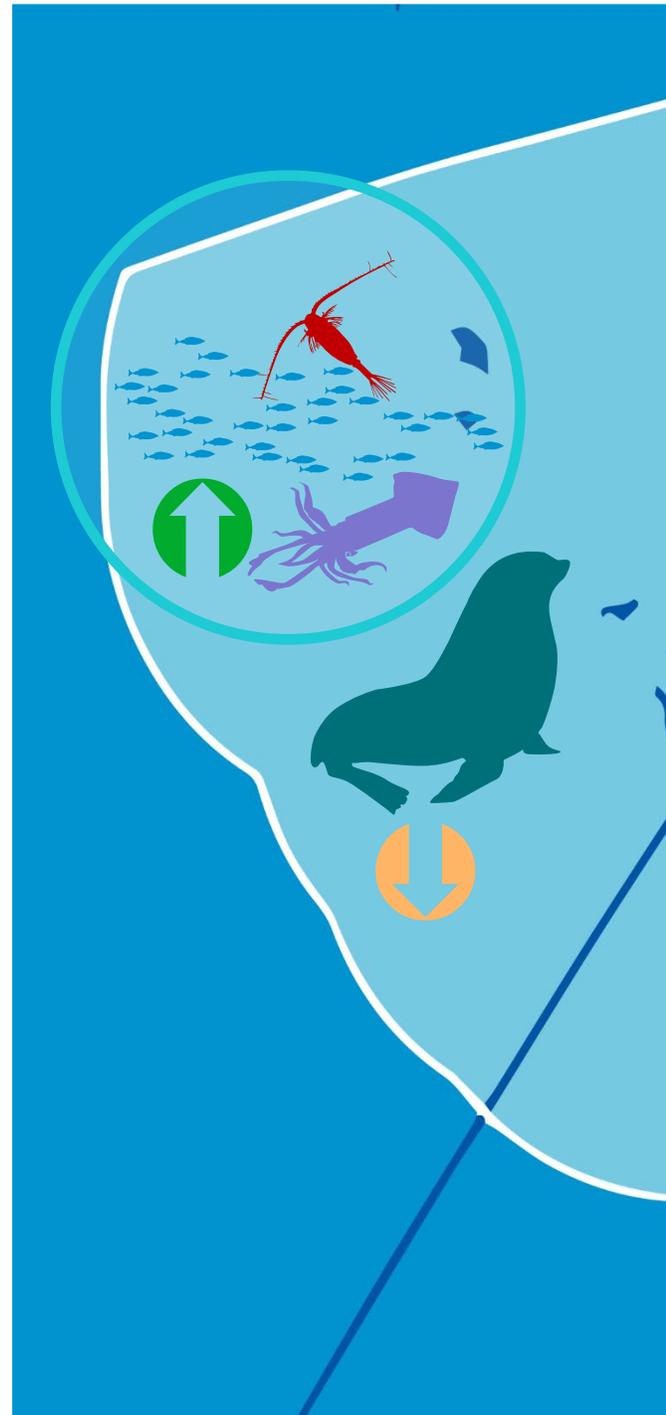
Other indicators of abundant **copepods** and more favorable conditions in 2019 include seabird productivity. For example, seabirds (both plankton and fish-eating species) had earlier to average hatch dates and average to above-average reproductive success in 2019. The increased copepod size and early hatching dates for some seabird species together might signal an earlier spring bloom in 2019. Higher diversity of fish prey in tufted puffin chick diets suggest limited availability of favored prey but enough alternative **forage fish** and **squid**; chick-provisioning patterns suggest puffins are responding to changes in forage fish availability. There were no major seabird die-off or marine mammals stranding events in either 2019 or 2020. In the combined eastern, central, and western AI regions, **Steller sea lion** counts remained stable between 2002 and 2018 for nonpups and pups.

Regional Differences

In the western Aleutians temperatures have been consistently cooler than the eastern Aleutians and less subject to marine heatwaves. Eddy activity in this area, south of the islands, tends to be of moderate strength, and can be driven by either multi-year or consecutive heatwave events. **Pacific ocean perch** and **Atka mackerel** are the main pelagic, mostly planktivorous, foragers.

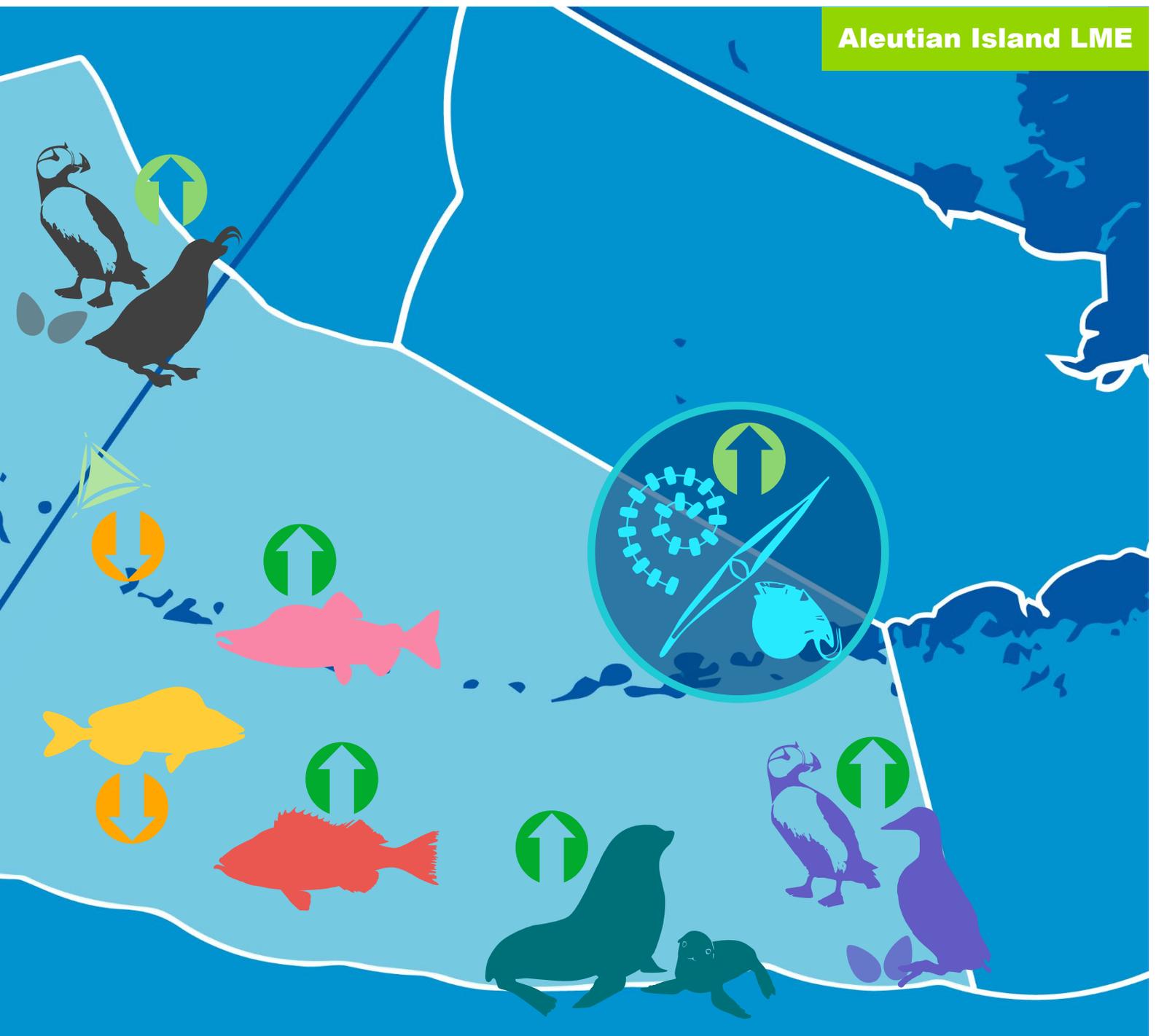
The **reproductive success of planktivorous auklets** was high or average during 2019. Least and crested auklets hatched chicks earlier than the longterm average. Fish-eating seabirds had mixed reproductive success: high for **horned puffins** and Glaucous-winged gulls, average for thick billed murre and tufted puffins (this last following two years of complete failure) and failed for common murre. The higher number of hexagrammids seen in tufted puffin chick diets in 2013 and 2014 did indicate high numbers of age-1 Atka mackerel, based on stock assessment estimates; hexagrammids in 2019 were low in chick diets.

Steller sea lion non-pup estimates continue to decline in the western Aleutians, with the lowest estimated numbers yet in 2019. Steller sea lions feed primarily on commercially fished species and their declining trends in numbers and birth rates are topics of active research; prey quality may play a role in their lack of recovery.



In the central Aleutians, sea surface temperatures are cooler than average compared to the eastern Aleutians, but slightly warmer than in the western Aleutians. Eddy activity north of the islands is the lowest on average compared to other ecoregions, characterized by multi-year or consecutive events. Increases of **Steller sea lions** in some rookery complexes are offset by declines in others. Still, slight increases in non-pup estimates in 2019, have been consistent since 2015.

School enrollment was slightly higher, pointing perhaps to more stable conditions for families in the area. The increase was driven by both students in Adak and Atka.



In the eastern Aleutians, eddies are discrete intense events and sea surface temperature is higher. Since 2006, pollock and Pacific ocean perch comprised more than half the pelagic foraging fish biomass observed in the bottom trawl survey, as opposed to pollock and Atka mackerel. Proportionately, this ecoregion is where **Pacific ocean perch** has increased the most; there are almost no northern rockfish in this area.

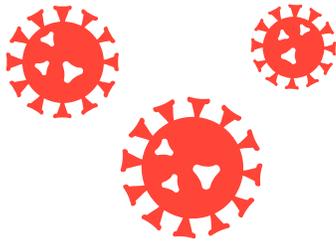
Fish-eating seabirds (e.g. **puffins**) hatched chicks early or on average in 2019 and **reproductive success** (e.g. **murre**s) was high or average, signaling favorable foraging conditions despite the low availability of hexagrammids as suggested by the 2019 diets of tufted puffin chicks; pollock, sand lance, and **squid** were the dominant prey. The diversity of fish prey in puffin diets increased, as in the west. Plankton-eating auklets are not as numerous here and are not monitored. **Steller sea lions** continue increasing.

School enrollment dropped slightly in 2019 compared to 2018, but is still above the long-term mean, possibly indicating more stable conditions for families.

Winter/early Spring Forecast

Forecasts of sea surface temperatures show a continued large region of warm water between Alaska and the Hawaiian Islands through the end of 2020. The Sea Level Pressure pattern forecasted is similar to that of this past winter but of considerably weaker amplitude. Coming out of the winter of 2020-2021, slightly warm SSTs are forecasted for the central and western Aleutian Islands. It is expected these conditions will still be favorable for seabird foraging and potentially for groundfish foraging as well.

Hot Topics



COVID

Alaska Governor Dunleavy declared a state of emergency due to COVID-19 on 11 March 2020. Closure of restaurants, bars etc. in the state may have limited seafood sales in some communities, but restaurant closures throughout the lower 48 and globally are more likely to impact Alaska seafood sales. The seafood industry has been fairly successful in Alaska limiting virus spread; however it has had to deal with reduced transportation options in many Western Alaska and Aleutian Islands communities, as well as limited ability to switch crews.



Harmful algal blooms (HABs)

No events have been recorded extensively in the islands, but **HABs** of high toxicity occurred at both ends of the archipelago. In Unalaska, consumption of **blue mussels** and snails resulted in a community member fatality in July 2020. A sample of the blue mussels in the area was 140 times the regulatory limit, while the snails were 3. Later, in September and west of the Aleutians along the Kamchatka Peninsula, there was a major die off of octopi, seals, and other fauna due to another high toxicity HAB. People surfing and/or swimming in the area experienced sickness and corneal burns.

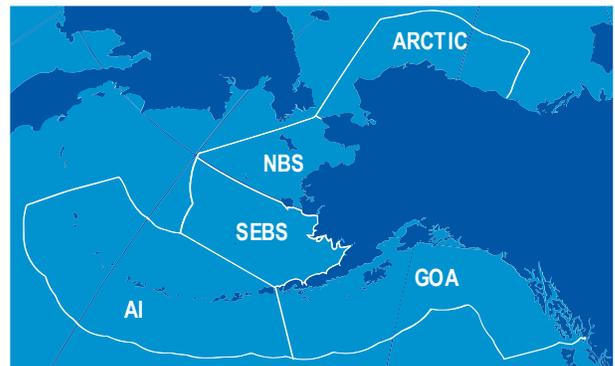
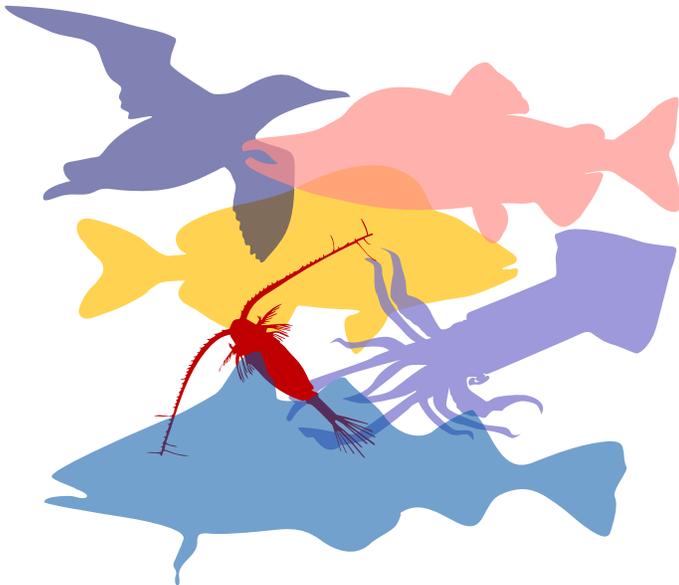


Adak Fish Processing Plant Closed

The fish processing plant on Adak was previously operated by Seattle-based Icycle Seafoods but closed in 2013. The city bought the processing equipment at auction to keep it on the island. However the plant was closed again in 2020. The potential for reopening the plant will depend on the current development of a BSAI **Pacific cod** trawl catcher-vessel cooperative style Limited Access Privilege Program. The closure may set back the stability needed in the central and western Aleutians to maintain services, a stable population, and attract long-term residents.

Management Uses

Leave this space blank for results from the December Council meeting.



Reference: Ortiz, I. and Zador, S., 2020. Ecosystem Status Report 2020: Aleutian Islands, Stock Assessment and Fishery Evaluation Report. North Pacific Fishery Management Council, 1007 West Third, Suite 400, Anchorage, AK 99501.

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



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