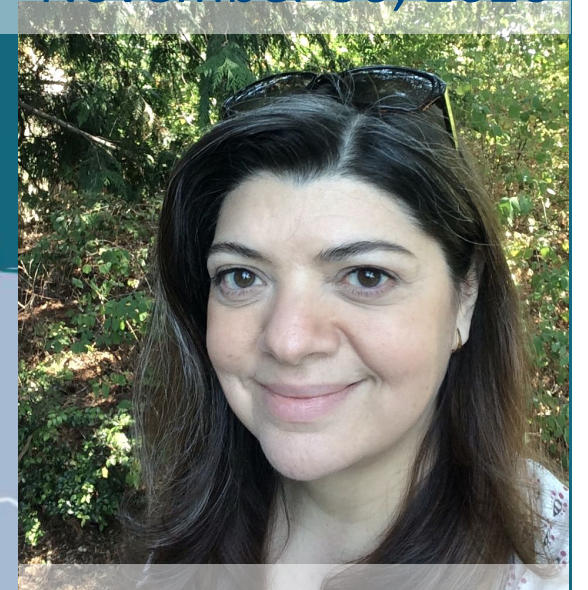











Aleutian Islands Ecosystem Status Report

North Pacific Fishery
Management Council
SSC presentation
November 30, 2020



Ivonne Ortiz &
Stephani Zador

Outline

Index Category		2019-2020
Physical Oceanography		2019-2020
Primary producers		2019
Zooplankton		2019
Salmon		2019
Groundfish		2018 updated
Seabirds		2019
Marine Mammals		2019
Ecosystem Indicators		2019
Fishing and Human Dimensions		2019-2020

- Response to SSC comments
- Contributors
- Noteworthy
- Multi-year Patterns, Regional Coherency
- Regional Differences
- 2019-2020
- Summary/ Implications
- Questions and/or Comments?

Responses to SSC comments 2018-2019*

- **“...the SSC recommends that there be a single, short, but comprehensive (integrated) contribution on sea temperatures in each region.”** A new Physical Environment Synthesis provides an overview of Climate, Regional Highlights, Winds, SST and Heat Waves, Mid Water Temperature, and Eddies.
- **Integrated Seabird Section: “The SSC commends the authors and editors in assembling this section.”** Now included for the AI ESR 2020.
- **“The SSC strongly supports the production of the ‘In Brief’ versions of the ESRs...”** Available now for the Aleutian Islands, 2020.
- **“There continue to be concerns about the western region of the Aleutian Islands. It would seem prudent to assemble the full range of information...” “The SSC encourages the authors to consider whether new data could be collected ...”** We added new indicators with ecoregion-specific information when possible (Physical Environment Synthesis, Kamchatka pink salmon, marine mammal strandings, expanded Steller Sea Lion and seabird information). Processes/responses were synthesized for each ecoregion in an effort to provide insights to ongoing trends.

*Detailed responses to all SSC comments from Dec 2019 and Dec 2018 are provided in the Appendix of the 2020 AI ESR.

Individual Contributors

*Thank
you!*

Sonia Batten, Nick Bond, Hillary Burgess, Benjamin Fissel, Cate Jenipher, Tim Jones, Stephen Kasperski, Mandy Keogh, Joseph Krieger, Kathy Kuletz, Carol Ladd, Ned Laman, Jean Lee, Jackie Lindsey, Calvin Mordy, Clare Ostle, Noel Pelland, Heather Renner, Melissa Rhodes-Reese, Sean Rohan, Nora Rojek, Greg Ruggerone, Kim Sparks, Phyllis Stabeno, Katie Sweeney, Jordan Watson, George Whitehouse, Sarah Wise, and Stephani Zador

photos: photolib.noaa.gov

2020 Ecosystem Status Reports

Contributing Partners



PRINCE WILLIAM SOUND
SCIENCE CENTER



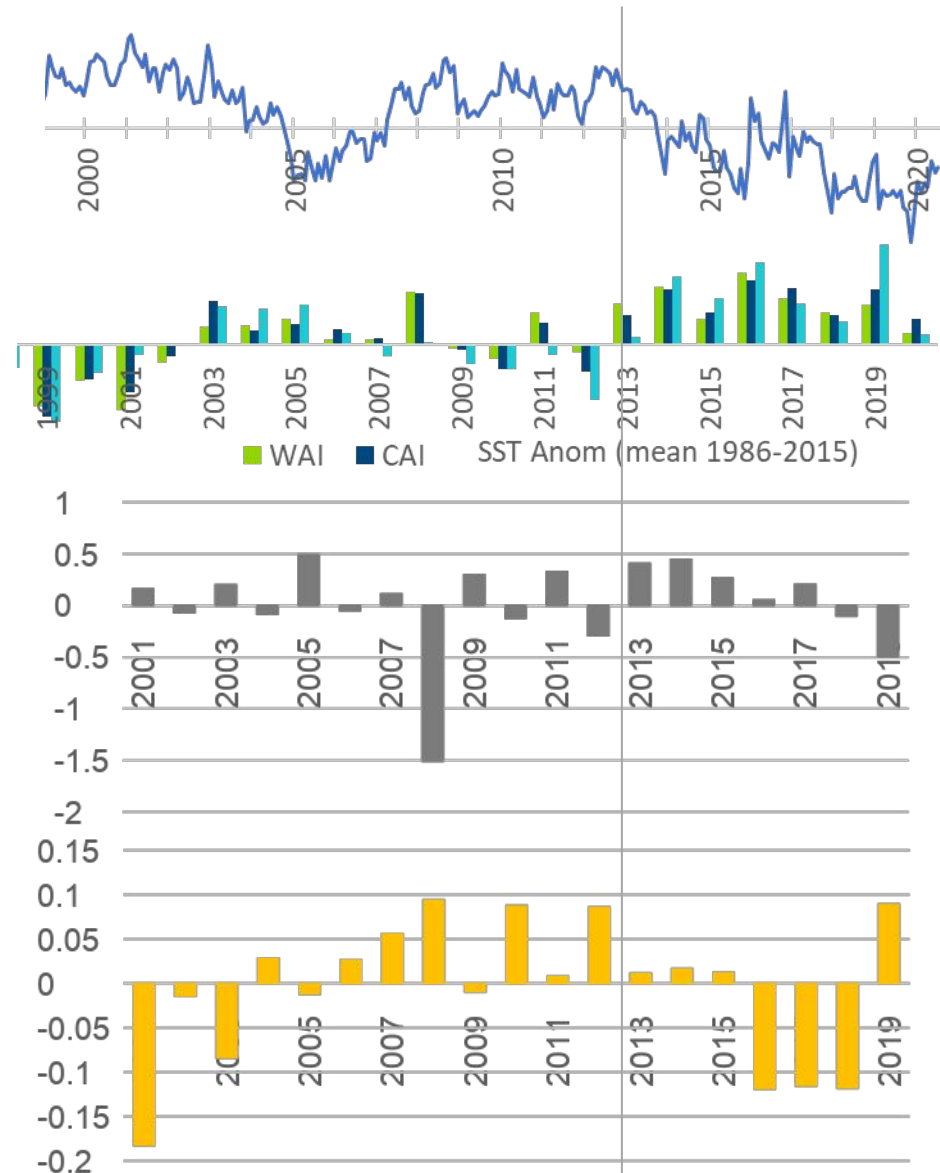
COAST



Noteworthy

- COVID19 year: Industry spent over \$50 million to reduce the risk of COVID-19 transmissions. There were no biological surveys for fish, marine mammals or seabirds in the Aleutians; surveys were canceled or postponed.
- HABS: high toxicity in Unalaska (140 shellfish 140x above regulatory limit) where consumption of blue mussels and snails resulted in a community member fatality in July. In the Kamchatka Peninsula an extreme event (Sep '20) resulted in dead seals, octopi, benthic invertebrates, sickness in humans).
- Processing plant closes in Adak, previously closed in 2013 operated by Icicles Seafoods. The closure may set back the stability needed to maintain services, a stable population, and attract long-term residents.

Multi-year Patterns

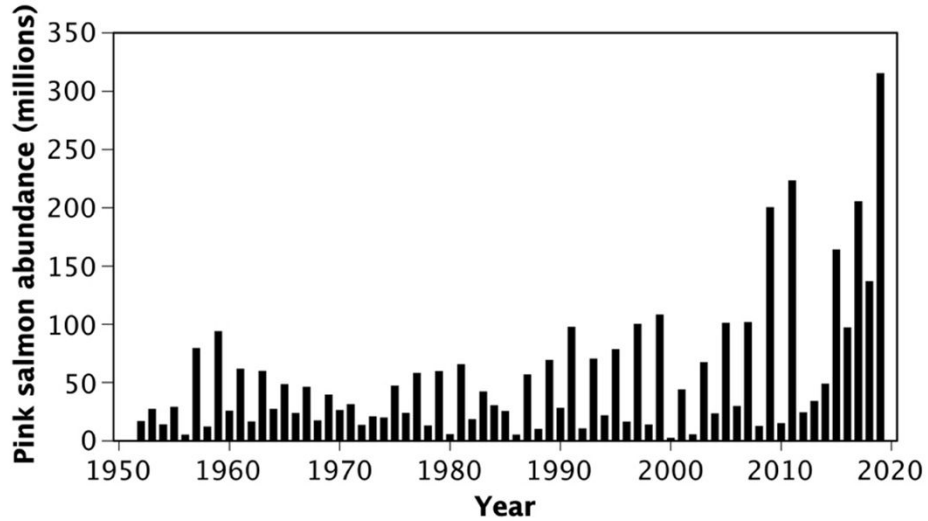


Multiple biophysical indicators showing consistent conditions since 2013-2014 across the entire Aleutians chain:

- NPGO: below long-term average since 2013-2014.
- Summer Sea Surface Temperatures (SST) above long-term mean.
- Decreasing trend in large diatom abundance
- Decreasing trend in copepod community size

NPGO, Nick Bond; Sea Surface Temperature, Jordan Watson; Diatom and Copepod Community Size, Clare Ostle and Sonia Batten ⁷

Multi-year Patterns

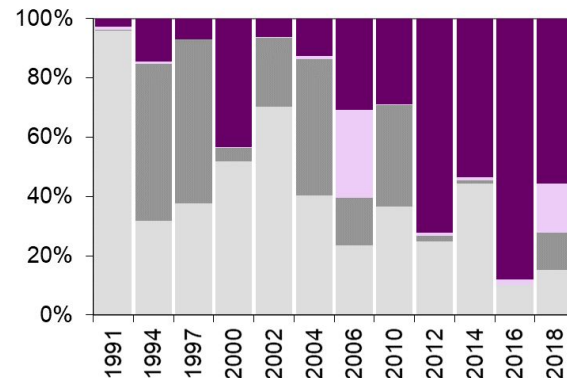
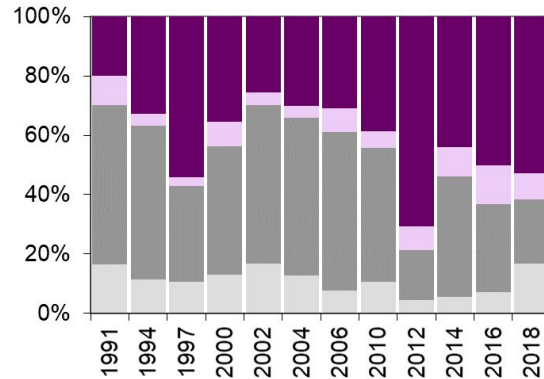
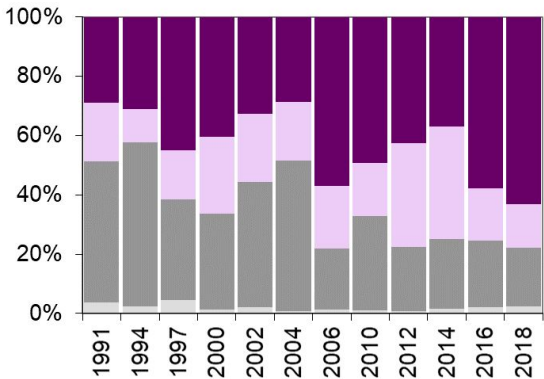


- Biomass of Kamchatka pink salmon and Pacific ocean perch (POP), primarily planktivorous species, has increased and stayed high in the last few years, while Atka mackerel has decreased.
- Area occupied by POP has also increased (Spencer et. al., POP SAFE)

Pelagic Foragers: Western AI

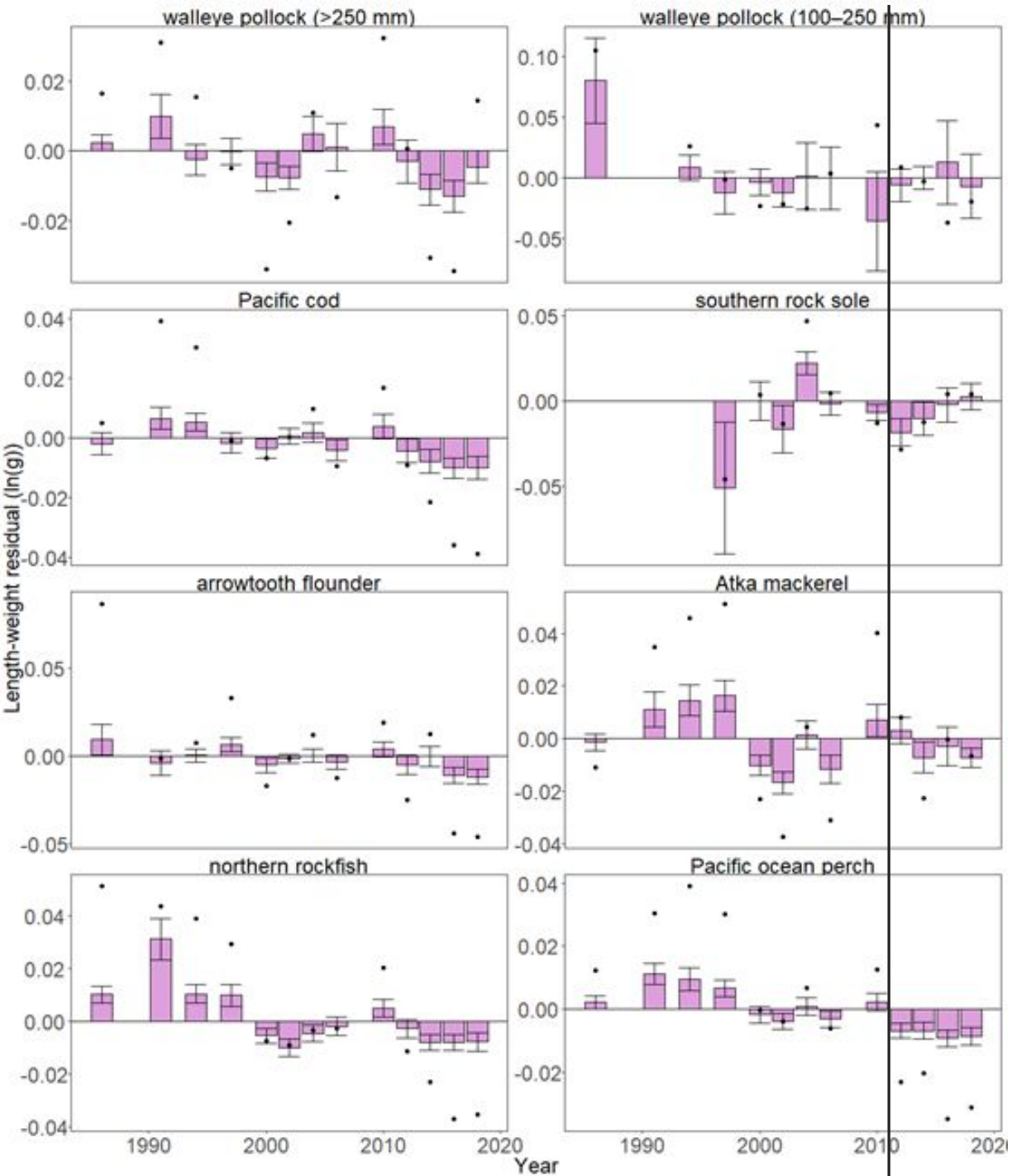
Central AI

Eastern AI



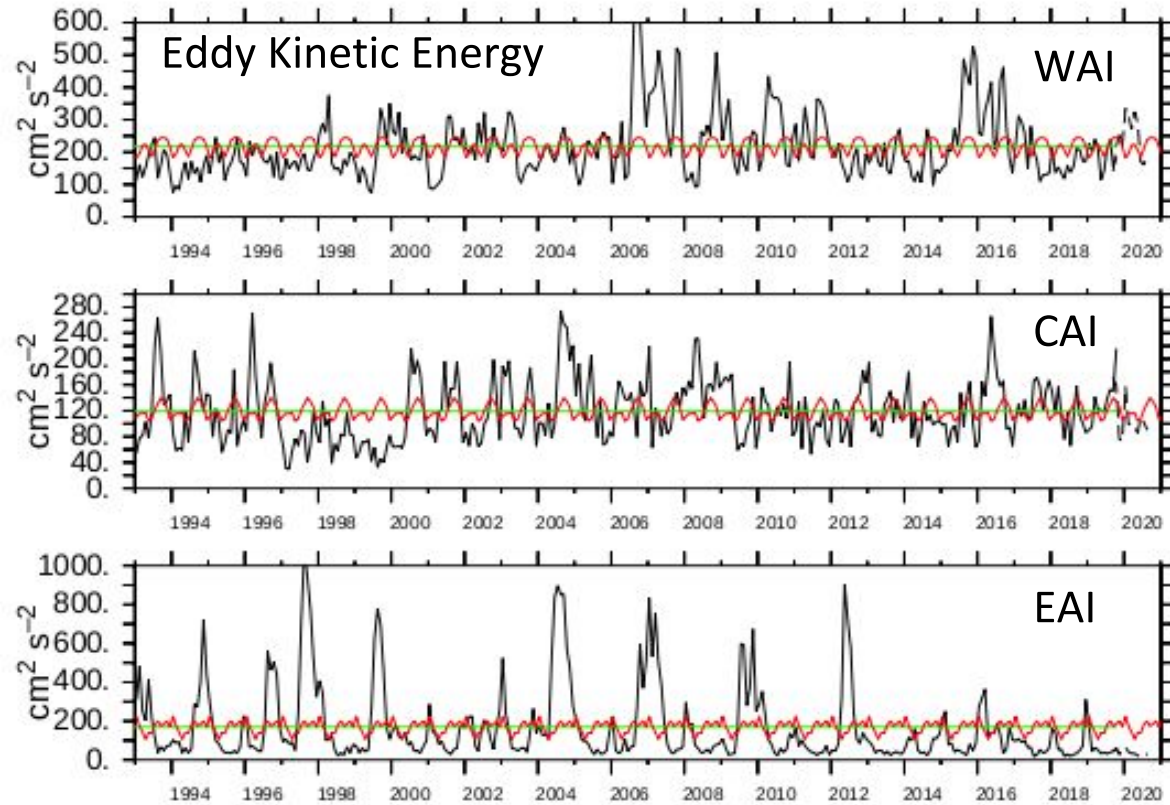
■ POP
■ Northern Rock
■ Atka mackerel
■ W. pollock

Kamchatka pink salmon.
 Greg Ruggerone;
 Pelagic Foragers Biomass,
 Ivonne Ortiz

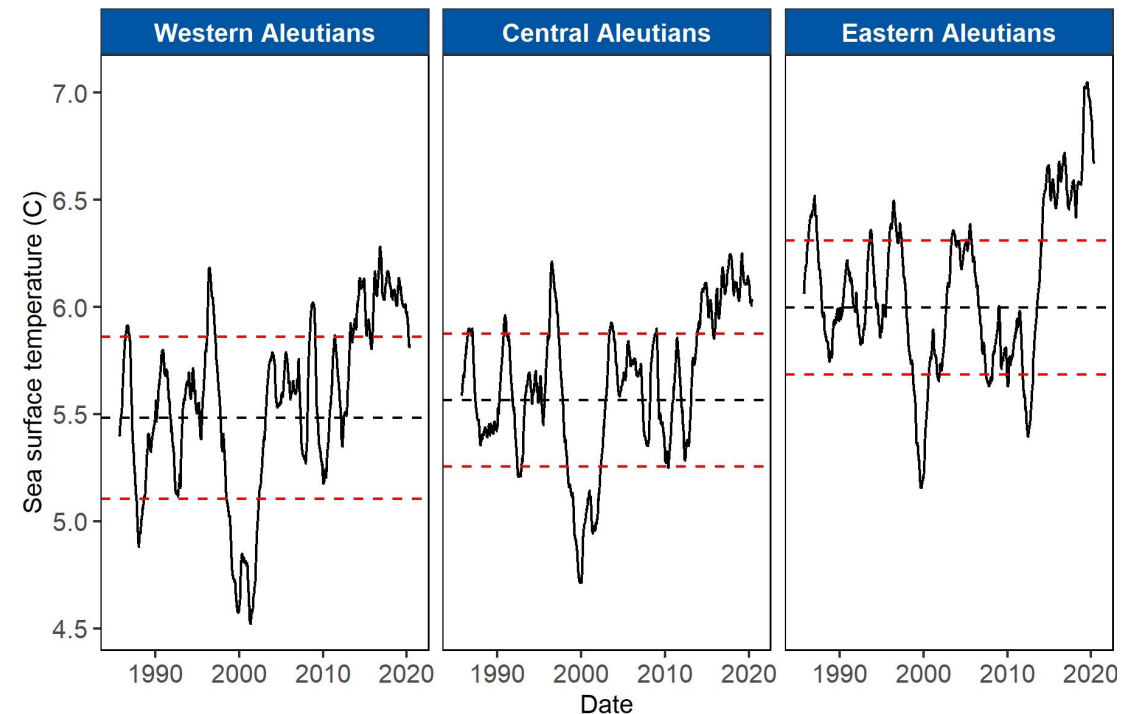


- Coinciding lower than average fish condition since 2012 for several commercially important groundfish

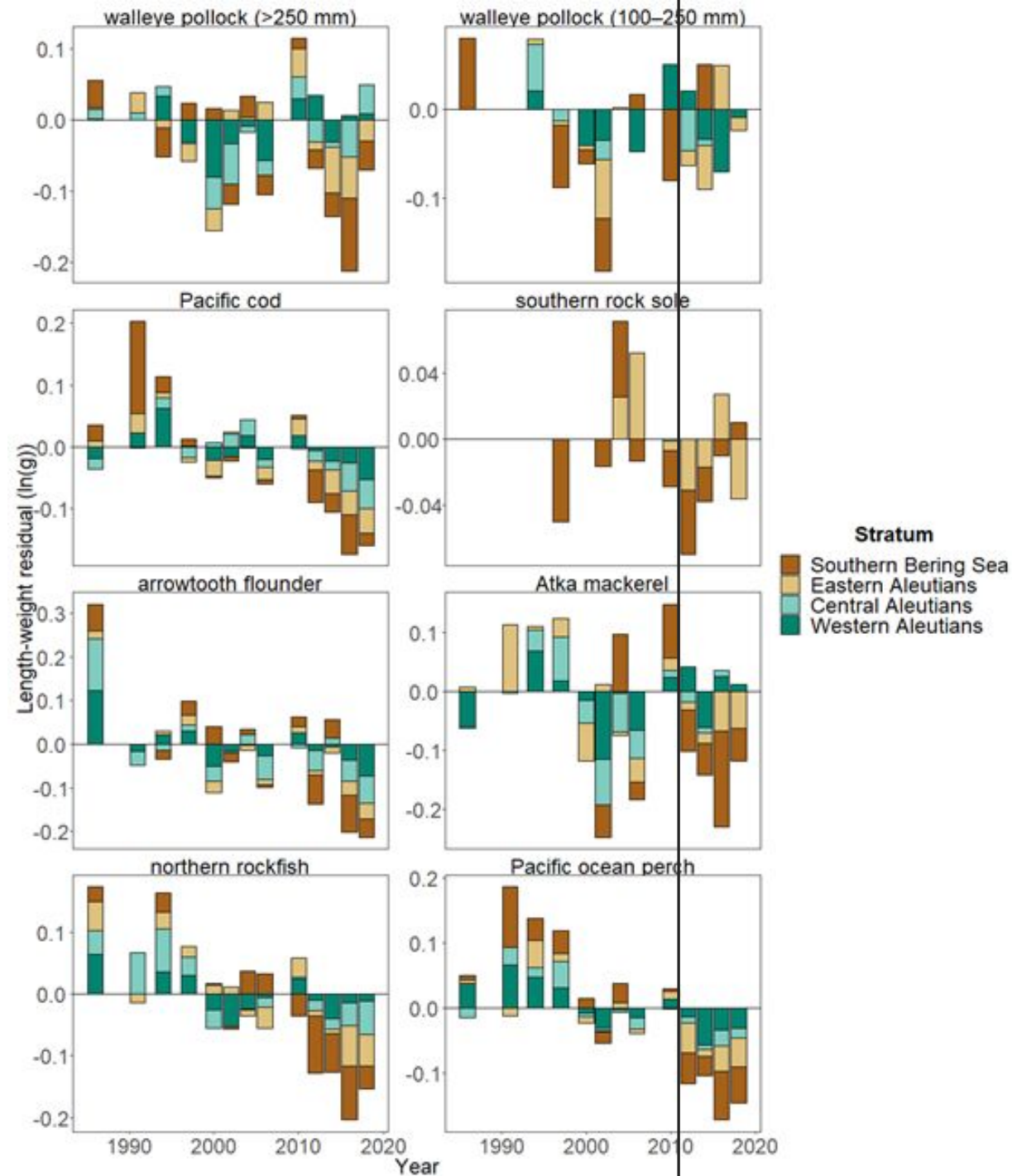
Regional Differences



- **WEST:** Multi-year or consecutive eddies of lower intensity; lower temperatures
- **EAST:** Discrete intense eddy events; higher temperatures



Eddy Kinetic Energy (EKE) Carol Ladd; Satellite-derived Sea Surface Temperature, Jordan Watson

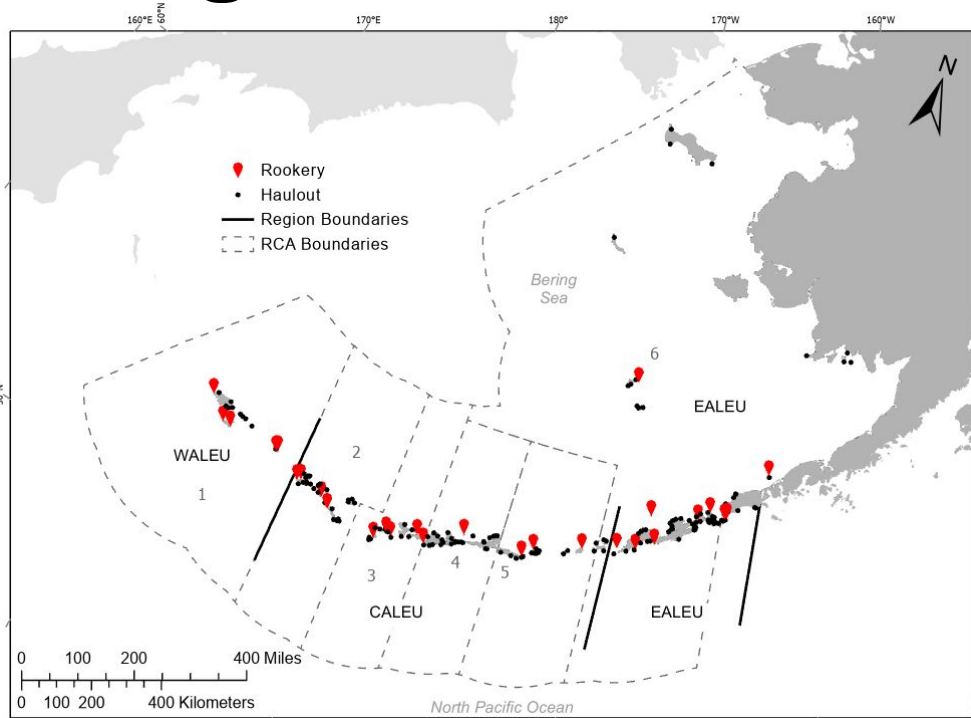


- **WEST:** Fish condition above long-term average in Atka mackerel and large pollock
- **EAST:** Above long-term average condition of small pollock and rock sole

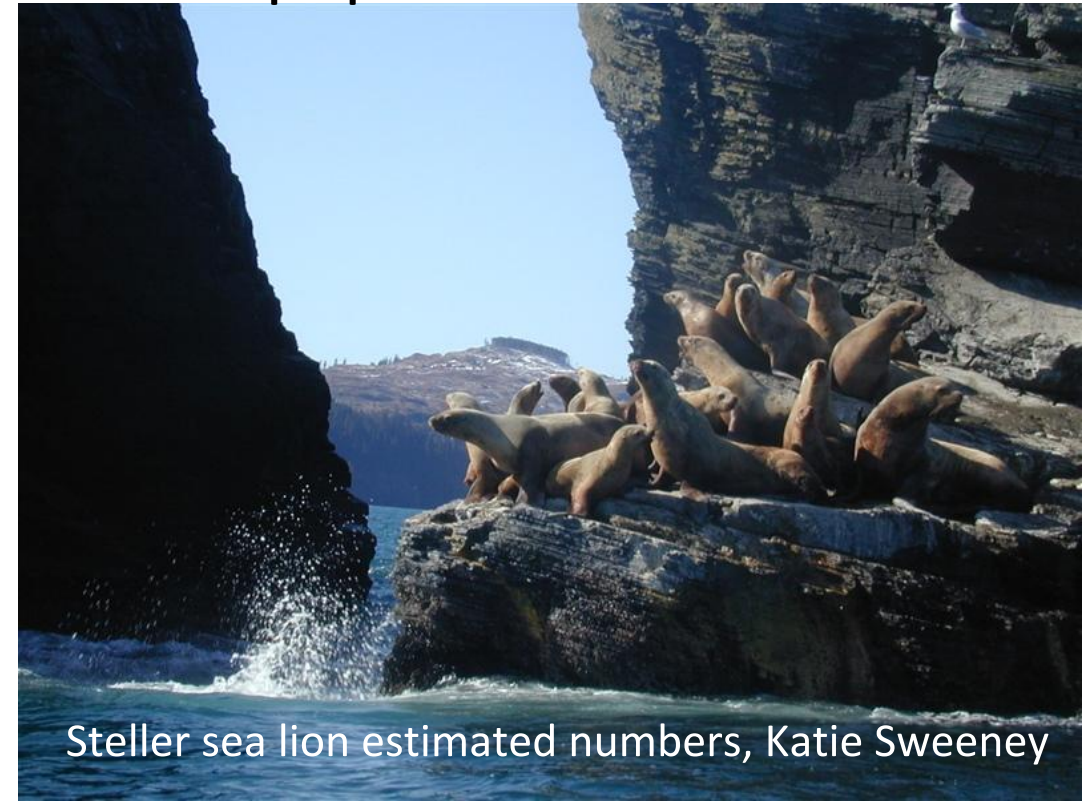
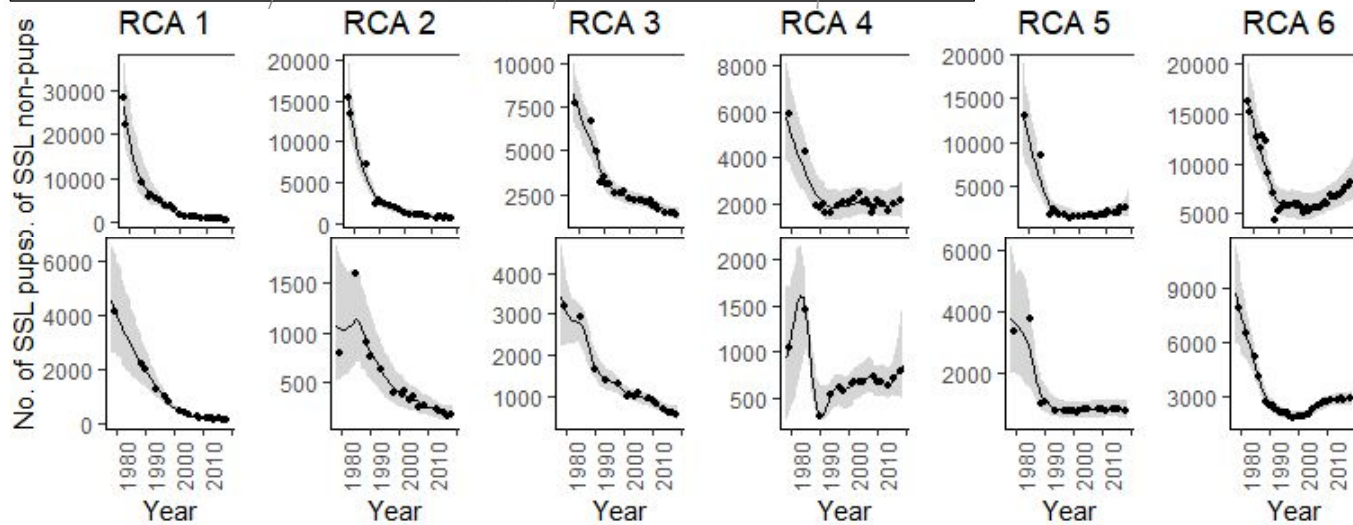
*note strata refer to:

Southern Bering Sea = Eastern AI east of 170°W;
 Central and Eastern = Central AI 170°W-177 ° E

Regional Differences



















- **WEST:** Declining numbers of pups and non-pups
- **EAST:** Increasing estimated numbers of pups and non-pup



2019 Seabirds

- **WEST & EAST:** Average or earlier hatching chronology of plankton and fish-eating seabirds, and larger copepod size, may signal early spring bloom.

		Species											
		Primarily fish species -----						Primarily zooplankton eaters					
Site		glaucous winged gull	thick billed murre	horned puffin	tufted puffin	black-legged kittiwake	fork-tailed storm-petrel	Leach' s storm-petrel	ancient murrelet	parakeet auklet	least auklet	whiskered auklet	crested auklet
Aiktaq		.			.				
Buldir									.				



2019 Seabirds

- **WEST & EAST:** Average or above average reproductive success of plankton and fish-eating seabirds compared to previous failure of fish-eating seabirds

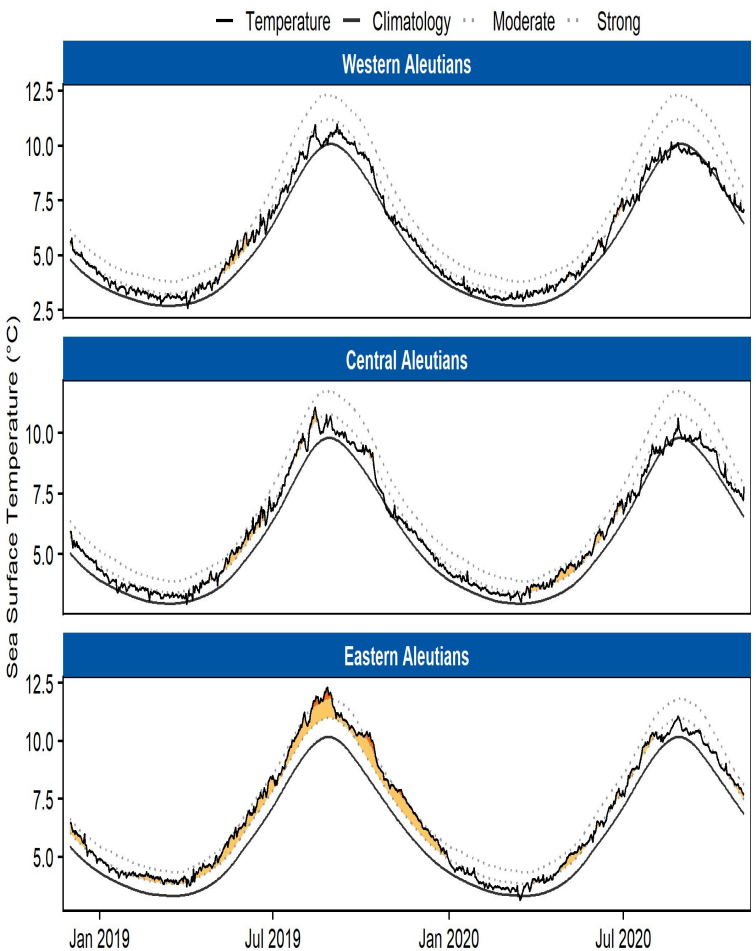
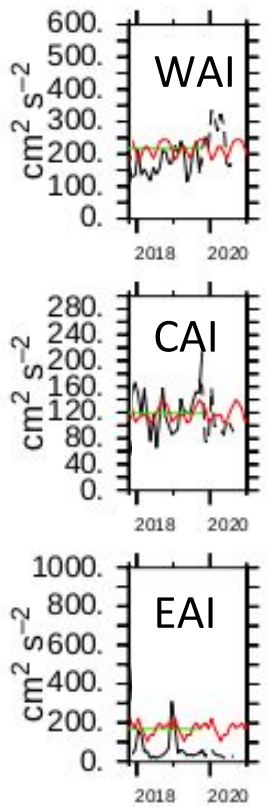
	Species														
	Primarily fish eaters - - - - -							Primarily zooplankton eaters							
Site	red-faced cormorant	glaucous winged gull	Common murre	thick-billed murre	horned puffin	tufted puffin	red-legged kittiwakes	black-legged kittiwakes	fork-tailed storm-petrel	Leach' s storm-petrel	ancient murrelet	parakeet auklets	least auklets	whiskered auklets	crested auklets
<u>Aiktak</u>	😊	😊	😊	😊	😊	😊	-	-	😊	😊	😊	-	-	-	-
<u>Buldir</u>	-	😊	🥚	😊	😊	😊	😞	😊	😞	😊	-	😊	😊	😊	😊



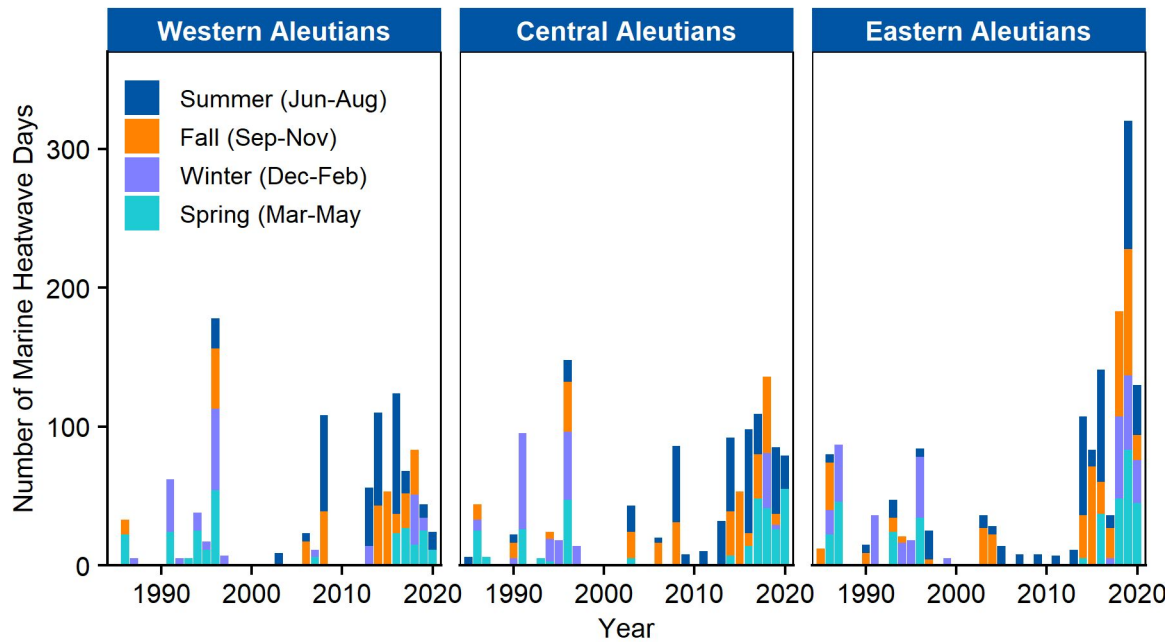
Hatching chronology, Nora Rojek, Heather Renner

2020

Eddy Kinetic Energy



- **WEST & EAST:** Low eddy kinetic energy (EKE), lower sea surface temperature (SST) but still above long-term average; less number of Marine Heatwave days.



Summary and Implications- Multi-year trends

- Extended period of **above average sea surface temperatures** and subsurface temperatures with lower volume of heat, salt and nutrient flow through passes coincides with decreasing trend in large diatom abundance and copepod size.
- Higher temperatures increase bioenergetic costs, which may have **increased prey consumption**. Actual effect of higher temperatures depends on the thermal tolerance of each species.
- The **lower fish condition** may indicate a detrimental effect of temperature. Higher biomass of Kamchatka pink salmon and POP signal **potentially higher competition for available prey**. This may have contributed to the decrease in Atka mackerel biomass and lower groundfish condition; **lower prey availability and quality** would also cascade to apex predators.
- Western Aleutians have the lowest SST and the lowest proportion of Atka mackerel and pollock with respect to rockfish. These might make them less available as prey than in the central and eastern Aleutians.

Summary and Implications: 2019

- Together, the **increased copepod size and early hatching chronology in 2019 might signal an earlier spring bloom**, to which surface feeding seabirds as well as seabirds with long breeding seasons are more sensitive to than diving species and those with short breeding seasons (Descamps 2019). The **decrease in large diatom abundance supports a higher abundance of large copepods**.
- Average or above average reproductive success of seabirds in the western and eastern Aleutians signals **favorable foraging conditions for rearing chicks**, potentially also **favorable foraging for groundfish in 2019**, despite the almost year long heatwave in eastern Aleutians.

Summary and Implications: 2020 and forecast

- The Aleutians Islands region experienced **suppressed storminess through fall and winter 2019/2020** across the region, **favoring seabird foraging**. La Niña conditions are present, most climate indices are near long-term average, lower SST in 2020 compared to 2019 but still above long-term average.
- HABS, **high toxicity at both ends of Aleutian chain** during summer 2020 — in Unalaska and Kamchatka Peninsula — **impacted marine mammals, fish, as well as subsistence harvest and human health**.
- **Sea surface temperatures are forecasted to increase slightly in Winter - early Spring 2021** in the central and western Aleutians.

Questions and/or comments?

