(Abbreviated) Ecosystem Status Report: Gulf of Alaska 2025

Bridget Ferriss

Alaska Fisheries Science Center, NOAA Fisheries

With contributions from:

Kelia Axler, Kerim Aydin, Brenda Ballachey, Lewis Barnett, Sonia Batten, Shaun Bell, Piper D. Bishop, James Bodkin, Nick Bond, Matt W. Callahan, Allison Carl, Reuben Cash, Shannon Cellan, Wei Cheng, Heather Coletti, Christina Conrath, Daniel Cushing, Seth Danielson, Isaiah Dela Cruz, Lauren Divine, Alexandra Dowlin, Sherri Dressel, Brie Drummond, Kelly Drummond, George Esslinger, Stacie Evans, Thomas Farrugia, Will Fennie, Emily Fergusson, Bridget Ferriss, Teresa Fish, Sarah Friedman, Christine Gabriele, Sarah Gaichas, Jeanette Gann, Tom Gelatt, Alicia Godersky, Scott Hatch, Claudine Hauri, Kyle Hebert, Gwenn Hennon, Tyler Hennon, Russell Hopcroft, Katrin Iken, Darin Jones, Robert Kaler, Parkes Kendrick, David Kimmel, Kim Kloecker, Brenda Konar, Gulce Kurtay, Elizabeth Labunski, Jesse Lamb, Kari Lanphier, Emily Lemagie, Mike Levine, Rosie Masui, Jackie McConnell, Sara Miller, Janet Neilson, Jens Nielsen, Ivonne Ortiz, Clare Ostle, Zack Oyafuso, Remi Pages, Kendrick Parkes, Melanie Paquin, John Piatt, Andrew Piston, Meredith Pochardt, Steven Porter, Bianca Prohaska, Maya Reda-Williams, Heather Renner, Patrick Ressler, Bruce Robson, Lauren Rogers, Sean Rohan, Nora Rojek, Joshua R. Russell, Kim Schuster, Margaret Siple, Adam Spear, William Stockhausen, Wesley Strasburger, Florence Sullivan, Robert Suryan, Katie Sweeney, Rick Thoman, James T. Thorson, Troy Thynes, Sarah Traiger, Chris Tran, C. Turner, Scott C. Vulstek, Andy Wall, Muyin Wang, Sophia Wassermann, Shannon Whelan, George A. Whitehouse, Carrie Worton, Bruce Wright, Stephani Zador

Purpose of Abbreviated Ecosystem Status Report for 2025 & this presentation

Risk Table Ecosystem Considerations & Population Dynamics

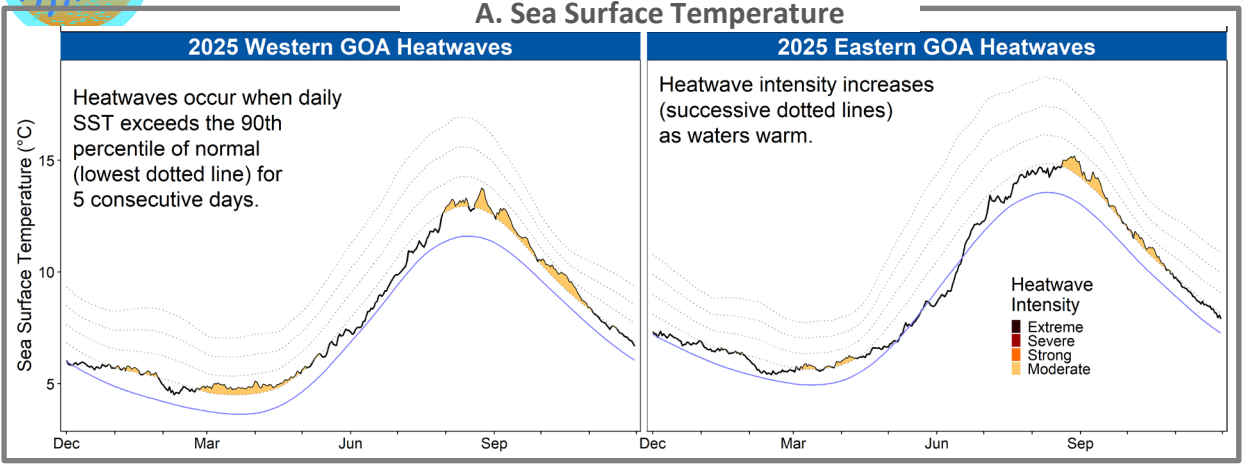
1. Pacific cod (*+ESP*)
2. Cook Inlet coho salmon

Not included in this ESR

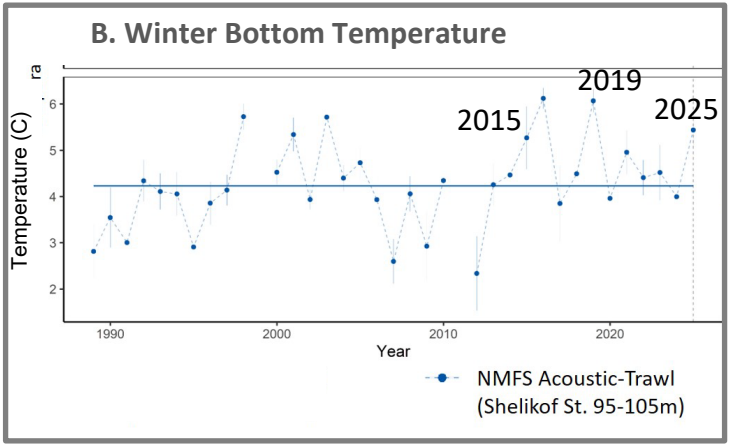
- Contributions: marine mammal strandings, groundfish diet, groundfish community indices, temperatures, ecosystem trends
- Report card, Noteworthy, Appendices (Responses to SSC and GPT comments)
- ***The evaluation of risk table factors for GOA P. cod was not impacted by these missing components.***

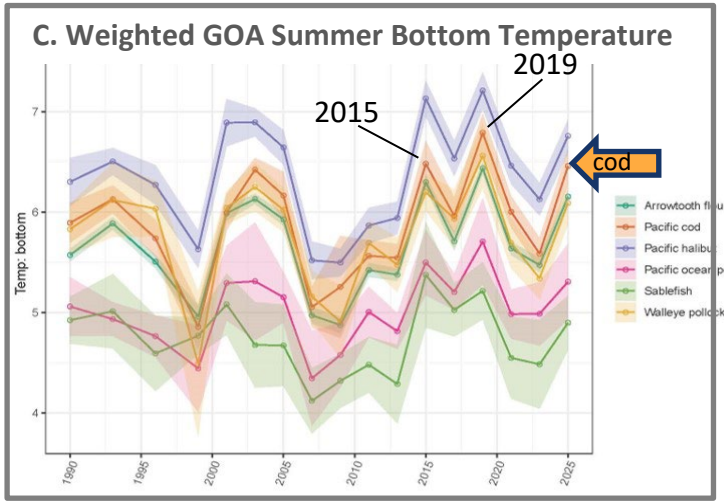
1. Warm throughout the year and water column

Jones, Callahan, Rohan, Kendrick, Lemagie

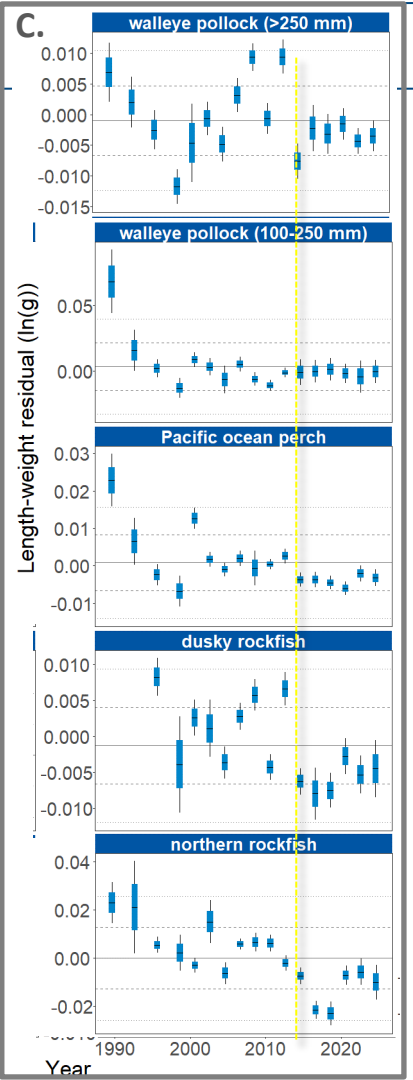


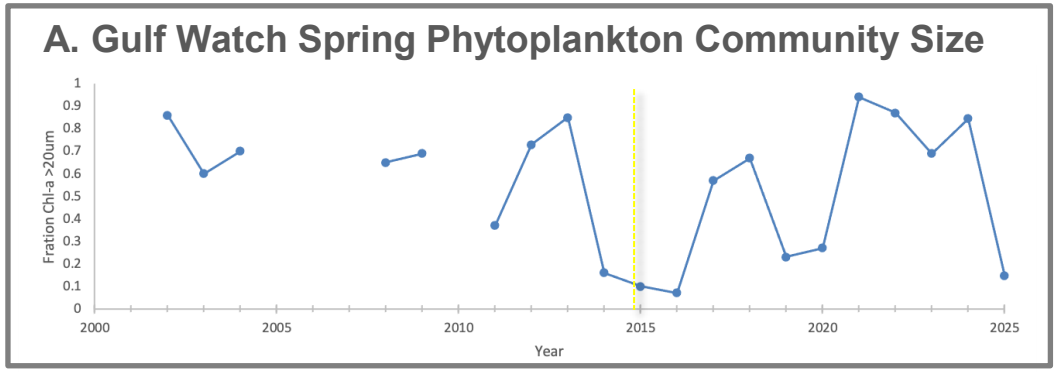
- At or near MHW conditions at surface winter, spring, fall
- Warm at depth on shelf (incl. winter & summer)
- Similarities to 2015

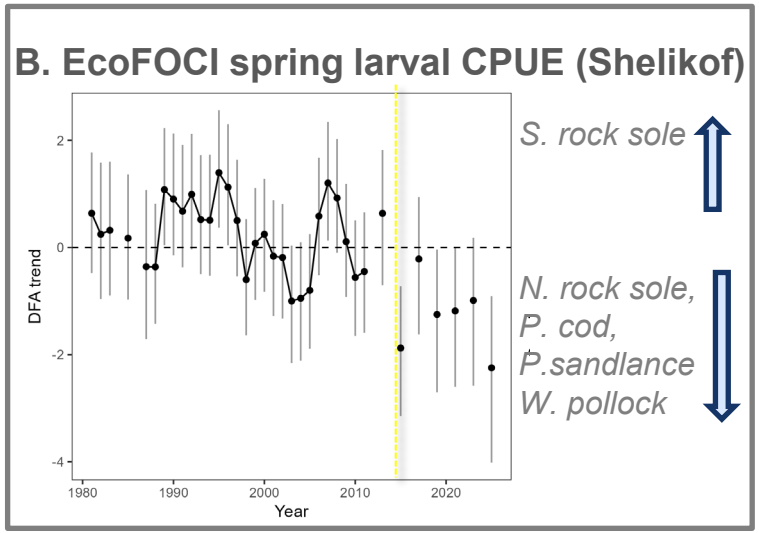




2. Reduced lower trophic productivity





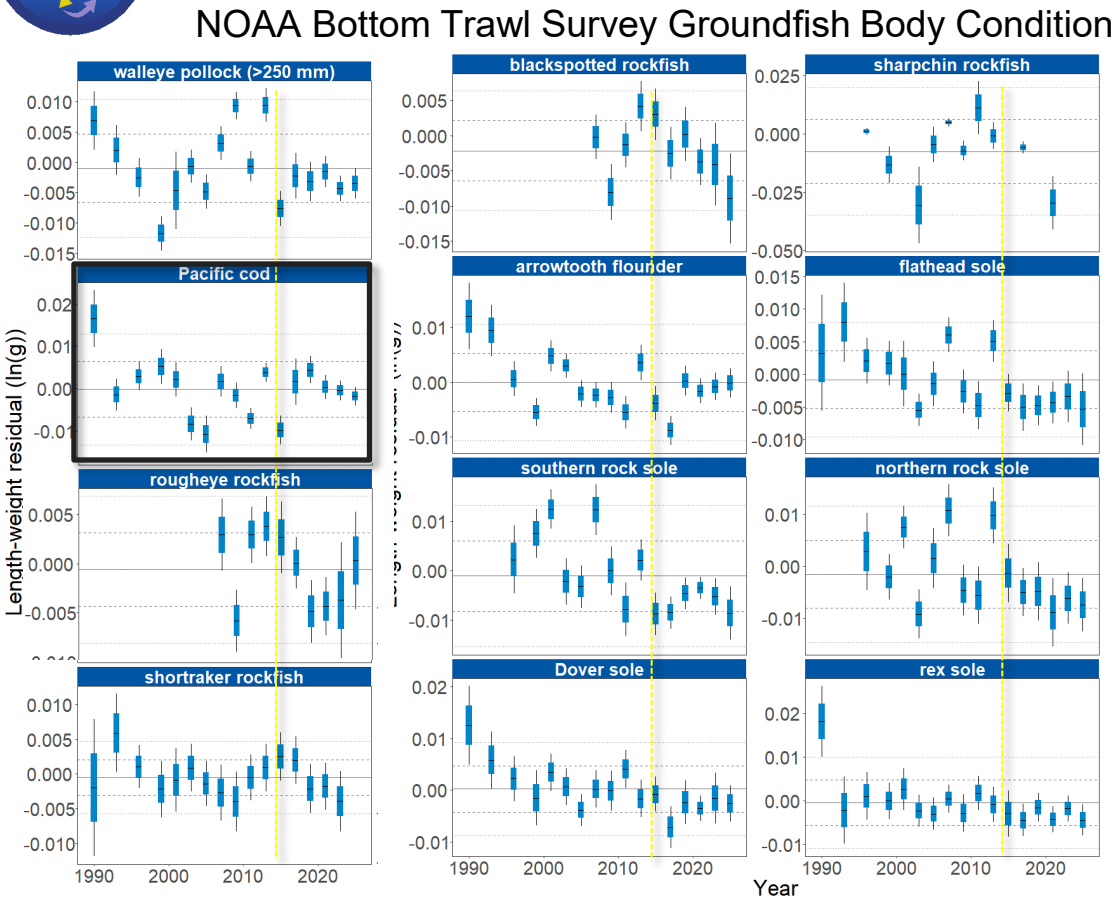


Rogers et al.
Hennon & Batten
Prohaska et al.

- Smaller size phytoplankton
- Incr. smaller copepods; decr. larger copepods
- Decr. larval groundfish CPUE
- Reduced body condition for zooplanktivorous groundfish
- Similarities to 2015

3. Mixed upper trophic productivity

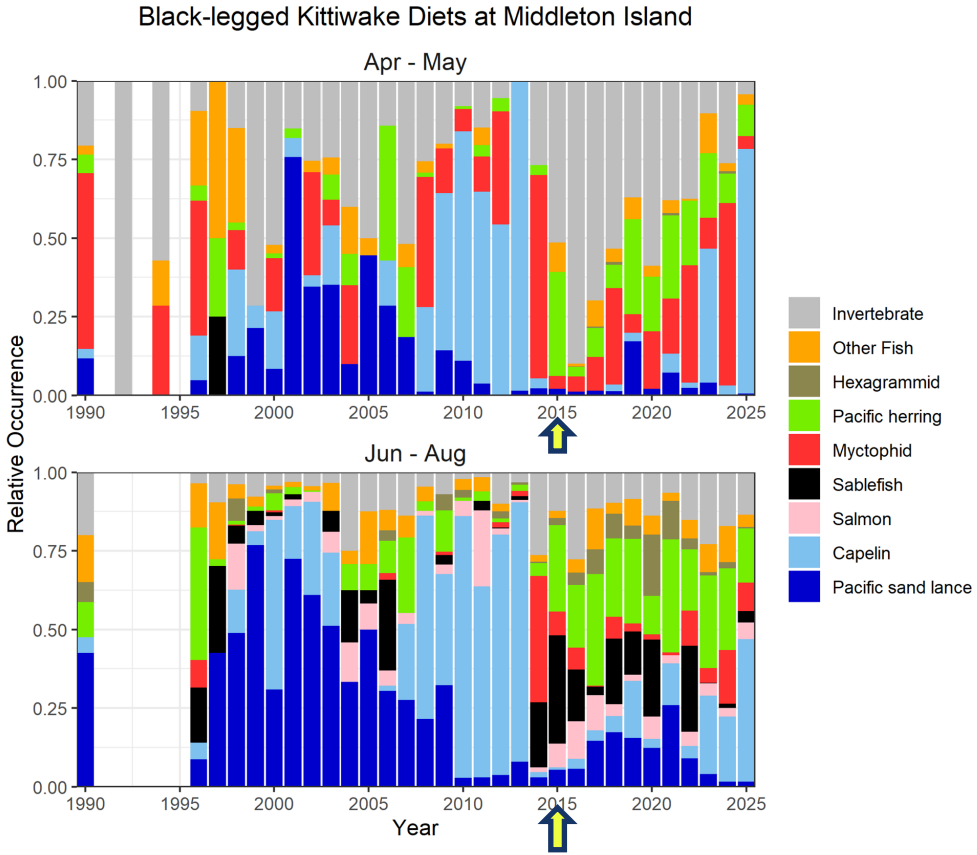
Prohaska et al.
Gabriele et al.



- Summer body condition (weight at length residuals) below average for many groundfish (with exceptions)
- Poor body condition for Glacier Bay adult female humpback whales (feed on krill, herring)

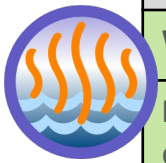
3. Mixed upper trophic productivity

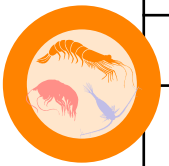
Whelan et al., Drummond et al., Prohaska et al., Hebert et al., Friedman et al., Whitehouse et al.

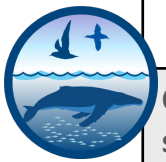


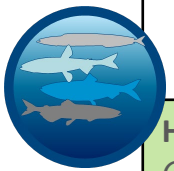
- Middle of pelagic food web present
- Capelin and herring present in seabird diets (but not sandlance)
- Good seabird reproductive success
- Average groundfish condition for some species
- Average to below-average biomass of brittle stars and echinoderms, pandalid shrimp
- Different from 2015

4. GOA 2025 has some physical & lower trophic similarities to 2014-2016







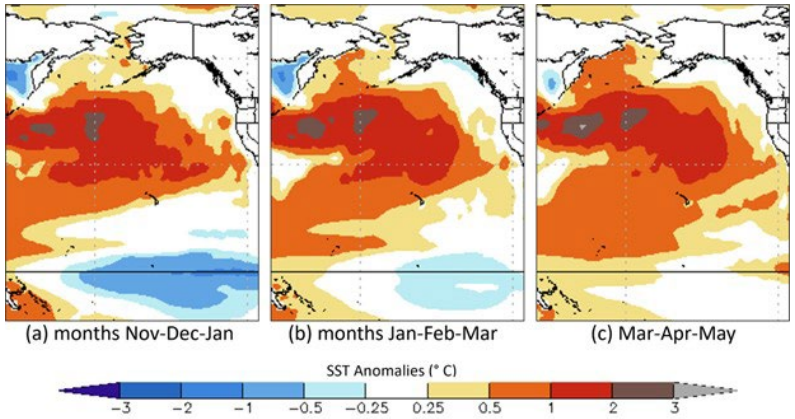


2014	2015	2025
Warm winter/year (*Bond et al., 2015*)	**Warmth** at depth on shelf (*Bond et al., 2015*)	Yes
Phytoplankton decline mean body size of community (*Batten et al., 2018*)		Yes
	Euphausiids decline & community shift to warm water species (*McKinistry & Campbell 2018*)	Mixed
	HABs increase (*Vandersea et al., 2018*)	Yes
	Low CPUE **larval groundfish** (spring Shelikof EcoFOCI) (*Rogers et al, ESR*) biennial survey	Yes
	***Fucus*, sea stars** decline and **mussels** increase (algal dominate to invert dominate) (*Weitzman et al., 2021*)	No
Capelin declined in surface seabird diets, **sand lance** missing (continued trend), **herring** present (*Arimitsu et al., 2021*)		No
	Seabird reproductive failure and common murre population die-off (*Piatt et al., 2020*); seabirds to nearshore habitats	No
Humpback whale calf rates decline (*Neilson & Gabriele, 2019*)		Yes*

5: Cooling in 2026 but residual heat?

E. Lemagie, S. Bell, T. Hennon

- National Multi-Model Ensemble predict average/cooler sea surface temperatures in winter/spring 2026 (baseline: 1991-2020)
- La Niña winter 2025/2026
- Concern over residual heat in the GOA water column and cumulative ecosystem impacts from 2025



GOA 2025: Key Messages

[implications for P. cod]

1. Warm at surface and depth, winter, spring and fall

- [*winter spawning; egg/larval survival; incr. demand for prey*]

2. Reduced lower trophic level productivity

- [*less productive food web to directly and indirectly support cod prey]*

3. Moderate upper trophic level productivity

- [*cod body condition below average but some prey base and upper trophic indicators ok]*

4. Some similarities 2014-2016 in physical and lower trophic levels

- [*elevated concerns of cumulative ecosystem response to warm year*]

5. Cooling in 2026 but concerns of residual heat & cumulative ecosystem effects

- [*potential increased thermal and food web stress for cod]*