Using long-term ecosystem observations to understand trophic responses to ocean change in the central California Current

Jaime Jahncke, Meredith Elliott, Lala Movsesian,
Pete Warzybok, Michael Johns;
Point Blue Conservation Science

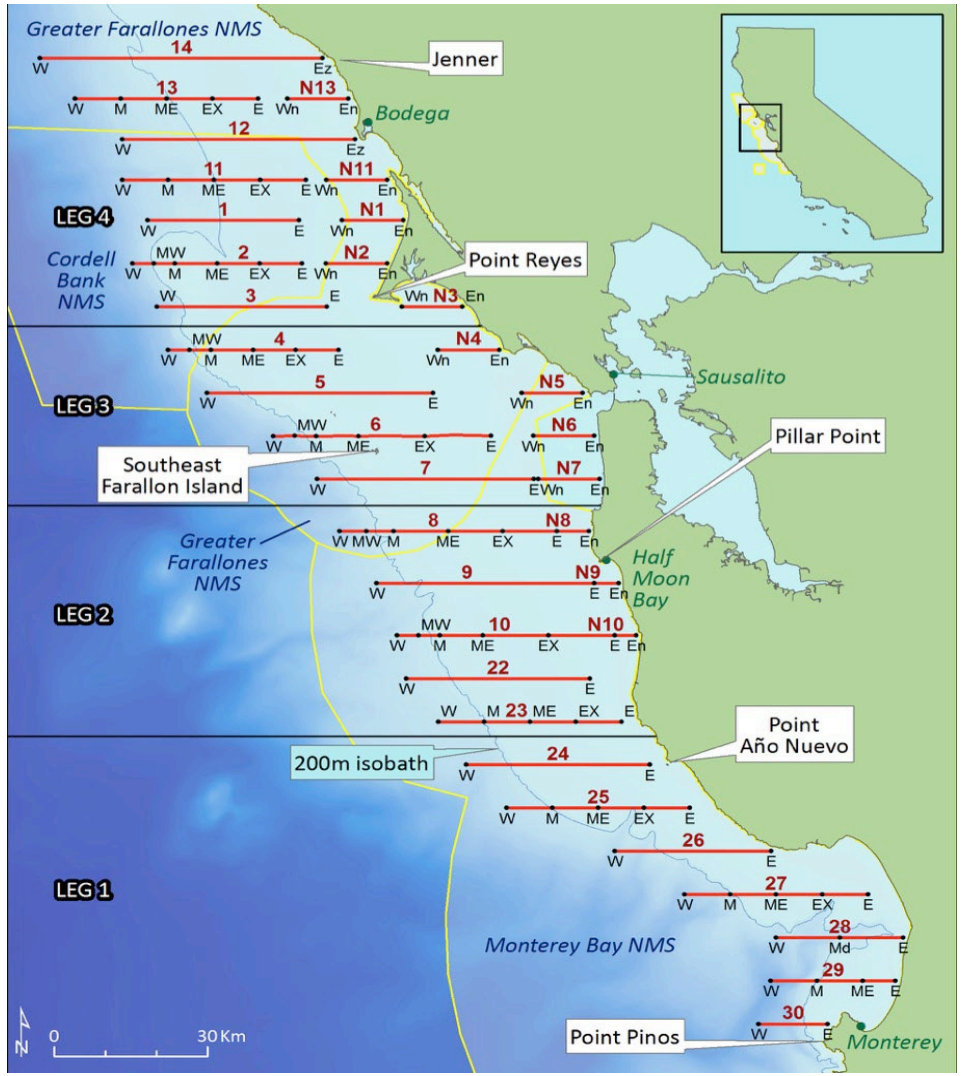
Jan Roletto, Dani Lipski,
Greater Farallones and Cordell Bank National Marine Sanctuaries

October 29, 2026

Point Blue
Conservation science
for a healthy planet

Two Decades of Ecosystem Monitoring

- Monitoring the central California Current since 2004.
- Integrating ocean conditions, prey, and marine predators.
- Linking ocean variability to prey and predator responses.
- Informing management of changing wildlife habitats.



Point Blue Conservation Science

NOAA National Oceanic and Atmospheric Administration U.S. Department of Commerce

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CENTRAL & NORTHERN CALIFORNIA OCEAN OBSERVING SYSTEM

OCEAN PROTECTION COUNCIL

MBARI

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GREATER FARALLONES ASSOCIATION

Ocean Change Restructures Food Webs

Climate Drivers

Marine Heatwaves

- warmer surface waters
- increased stratification

El Niño / Upwelling

- changing productivity
- shifting prey habitat

Prey Field (Krill)



Reduced biomass, patchier distributions, smaller adults. Krill mediate ecosystem responses.

Predator Responses

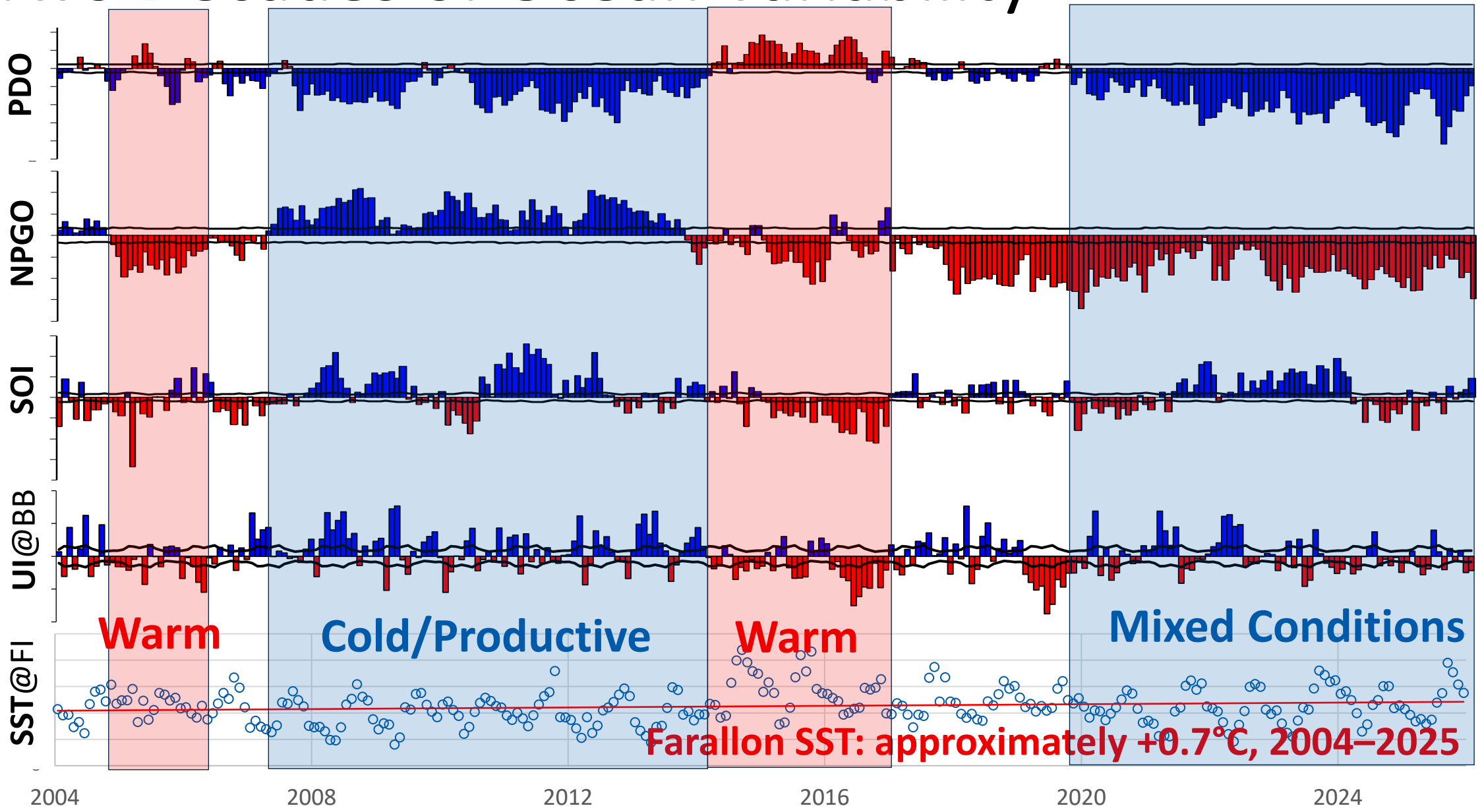
Seabirds

- reduced breeding success
- altered distributions

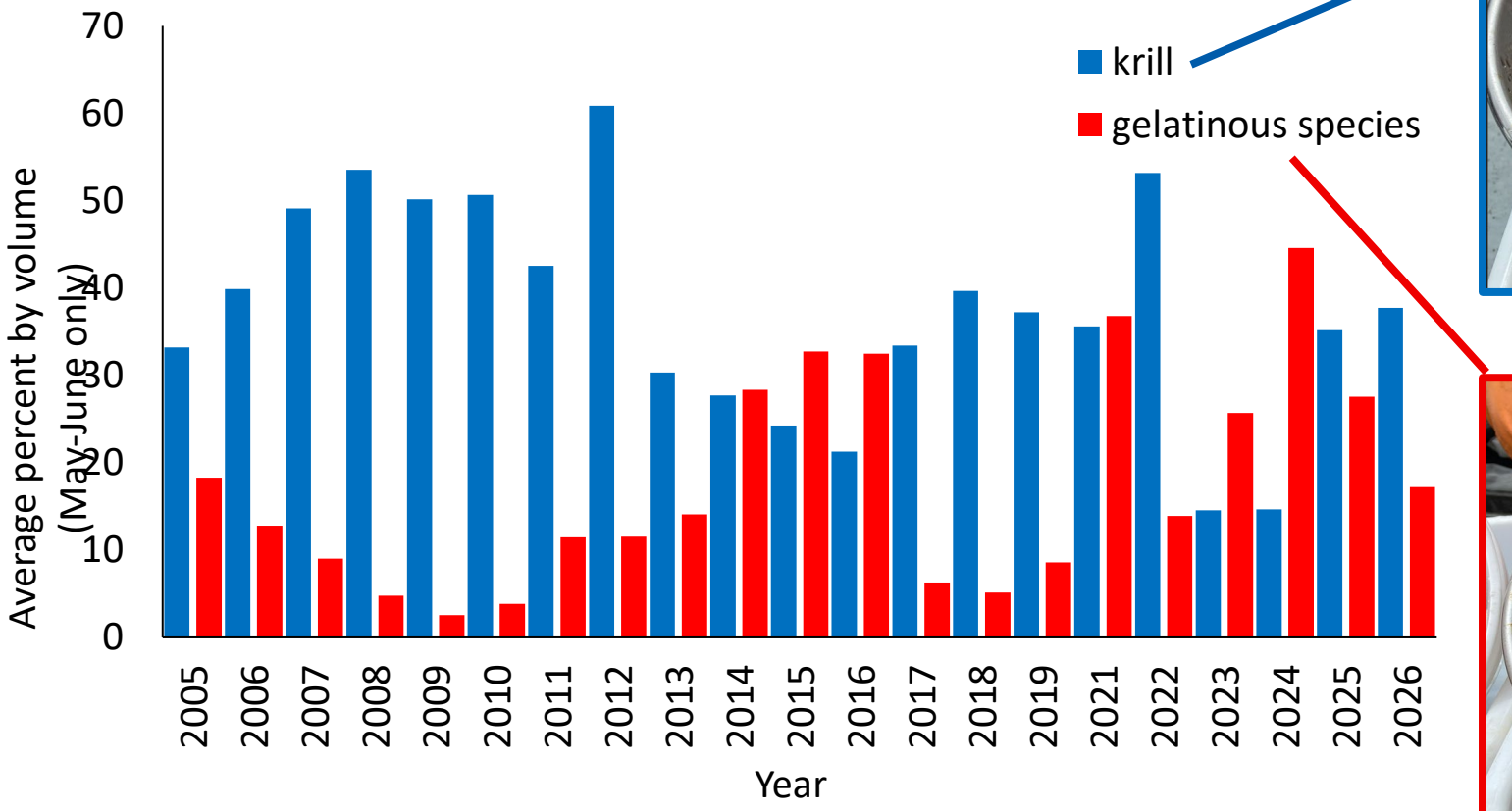
Whales

- nearshore habitat shifts
- increased overlap with fisheries

Two Decades of Ocean Variability



Warm Years Restructure Zooplankton





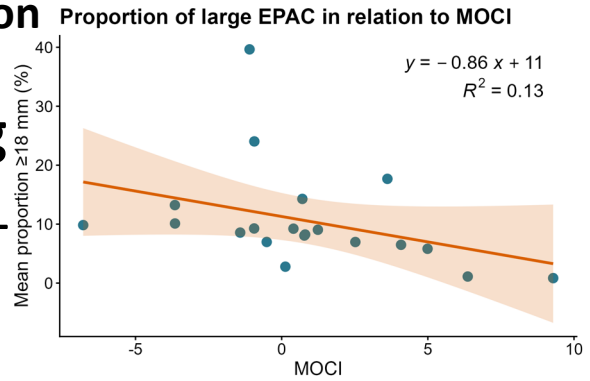


2026: May only, Preliminary

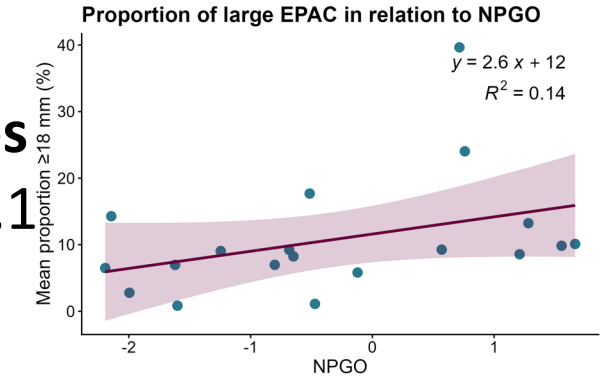
Krill Size Responds to Warming

Pearson

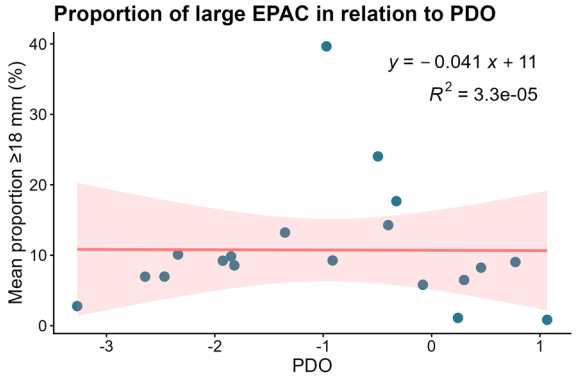
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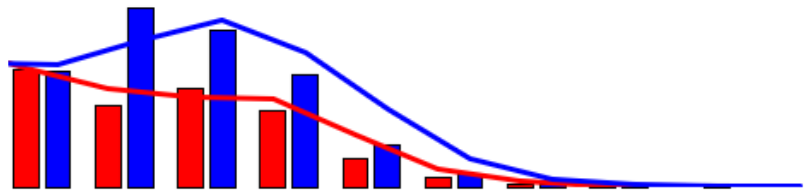


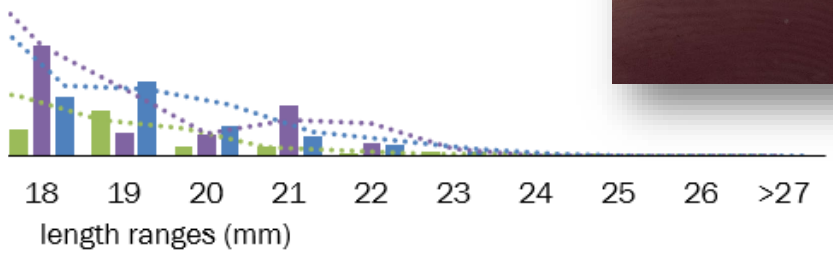
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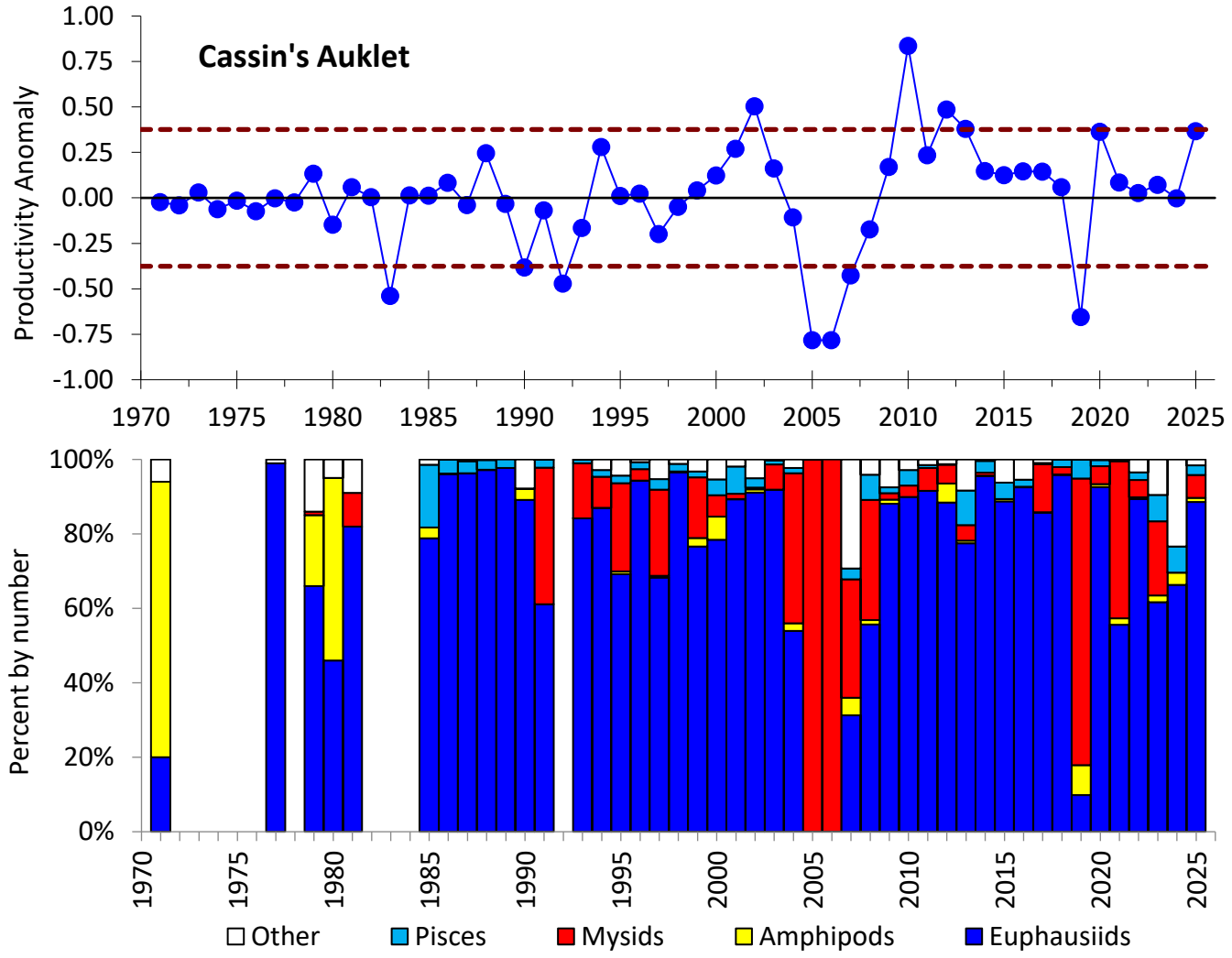






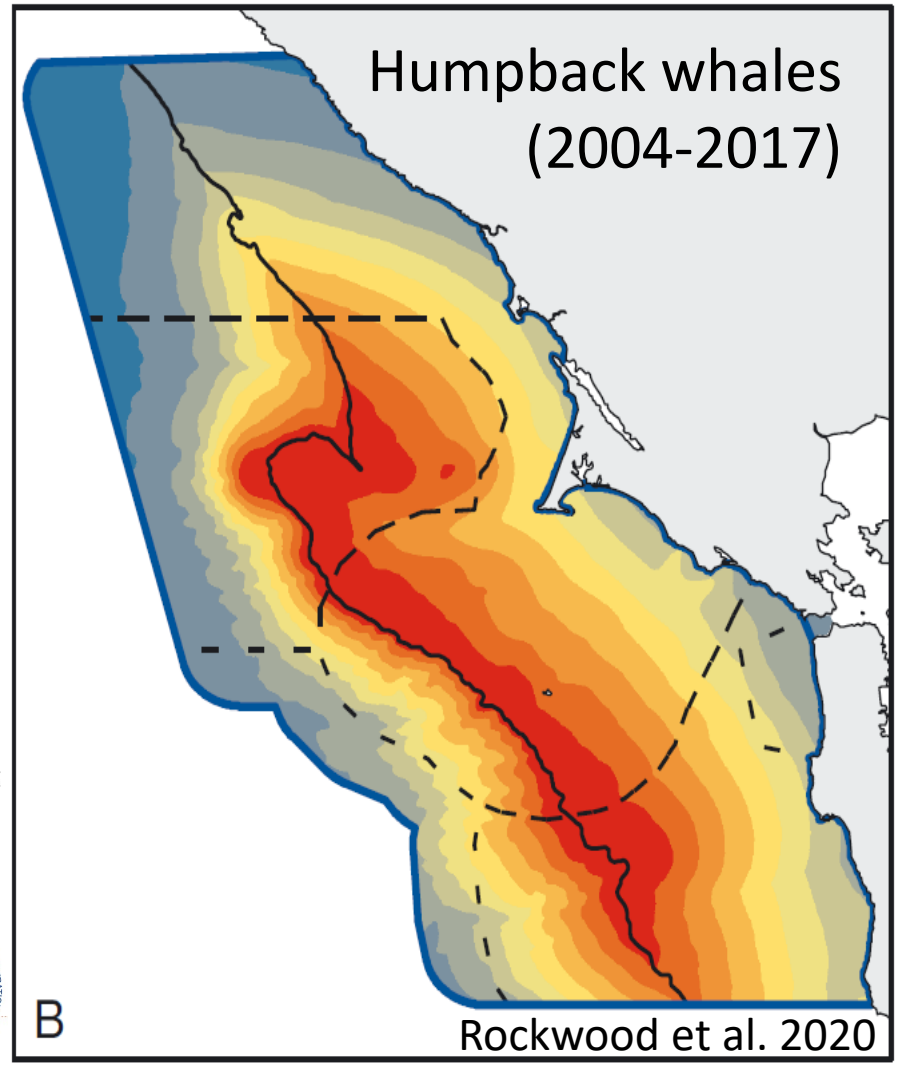


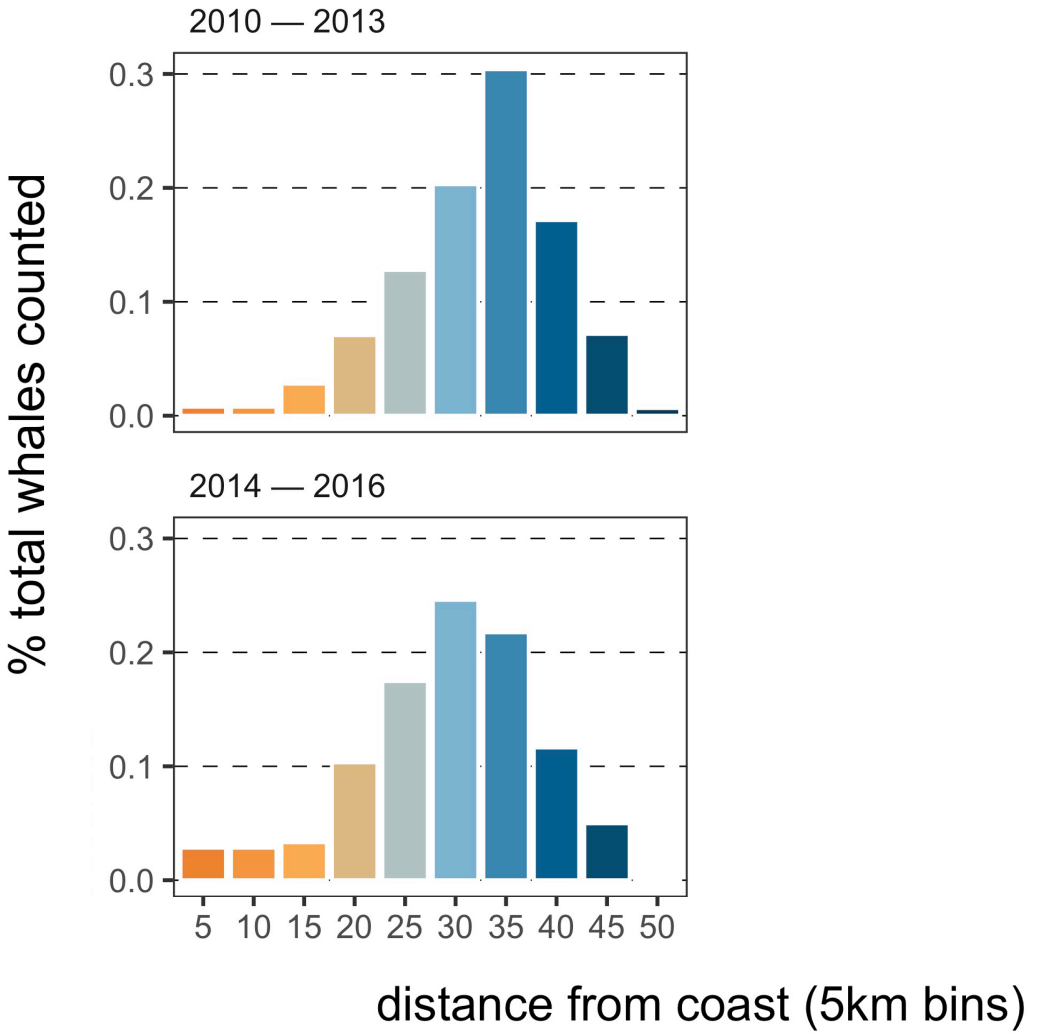
Seabirds Track Prey Changes



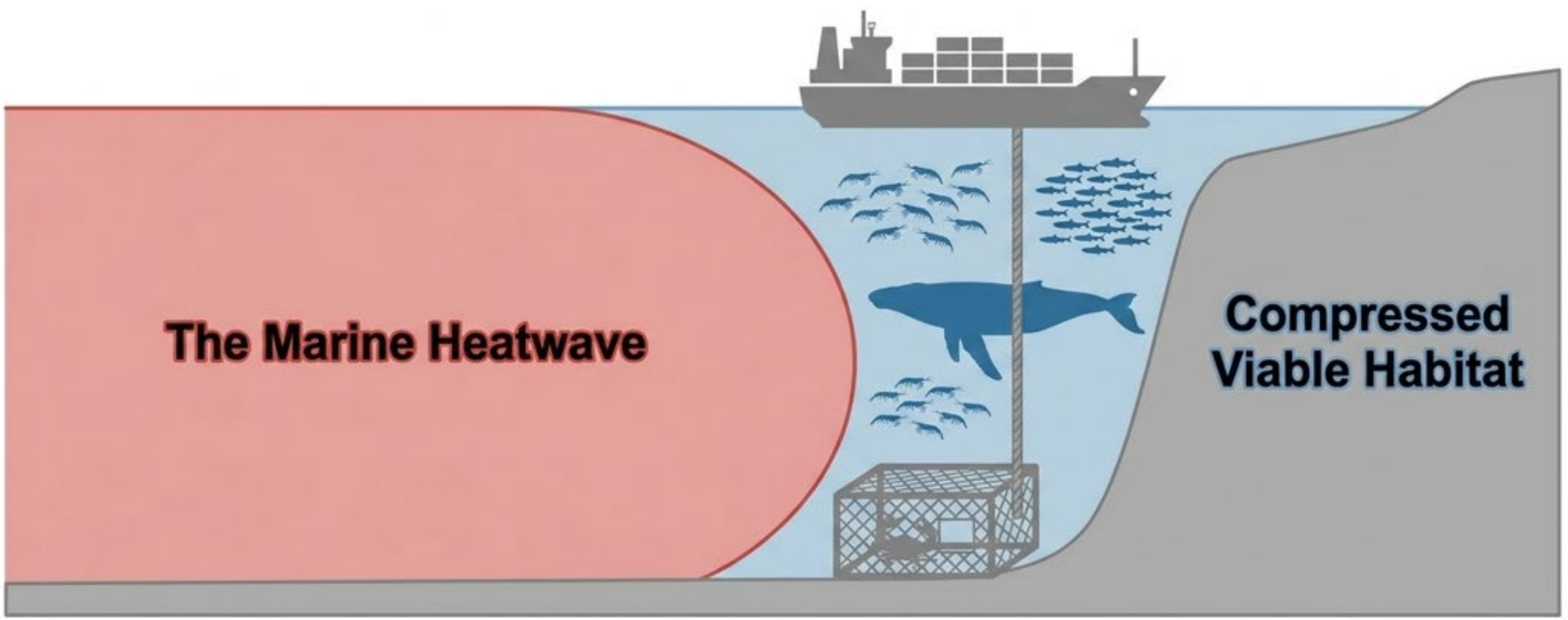


Whale Habitats Shift Nearshore





Climate Variability Can Compress Predator Habitats



Oceanographic warming physically pushes remaining prey and predators into a narrow nearshore corridor, forcing direct spatial overlap with human industry.

Climate Extremes Can Increase Ecological Risk

WARM OCEAN CONDITIONS

↓

KRILL HABITAT COMPRESSION

↓

WHALE NEARSHORE AGGREGATION

↓

GREATER HUMAN OVERLAP

↓

INCREASED ECOLOGICAL RISK



ECOLOGICAL CONSEQUENCES

- Nearshore habitat compression
- Increased predator aggregation
- Reduced prey availability
- Altered ecosystem structure
- Lower ecosystem resilience

MANAGEMENT IMPLICATIONS

- Higher entanglement risk
- Greater ship-strike exposure
- Increased overlap with fisheries and shipping
- Need for adaptive management
- Inform marine sanctuary decision-making

Changing Habitats, Emerging Conflicts

- Shifting whale habitats can increase overlap with vessels and fishing gear.
- Understanding these changes helps identify potential conflicts.



Monitoring to Anticipate Change

- Integrated observations connect ocean conditions, prey, and predators.
- Fine-scale monitoring supports adaptive management and mitigation.



Lessons from Two Decades

- Ocean variability restructures prey communities and predator habitats.
- Sustained ecosystem monitoring provides a foundation for adaptive management.



Physical observations tell us how the ocean is changing.
Biological observations tell us what it means.

Acknowledgments

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Point Blue Conservation Science

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