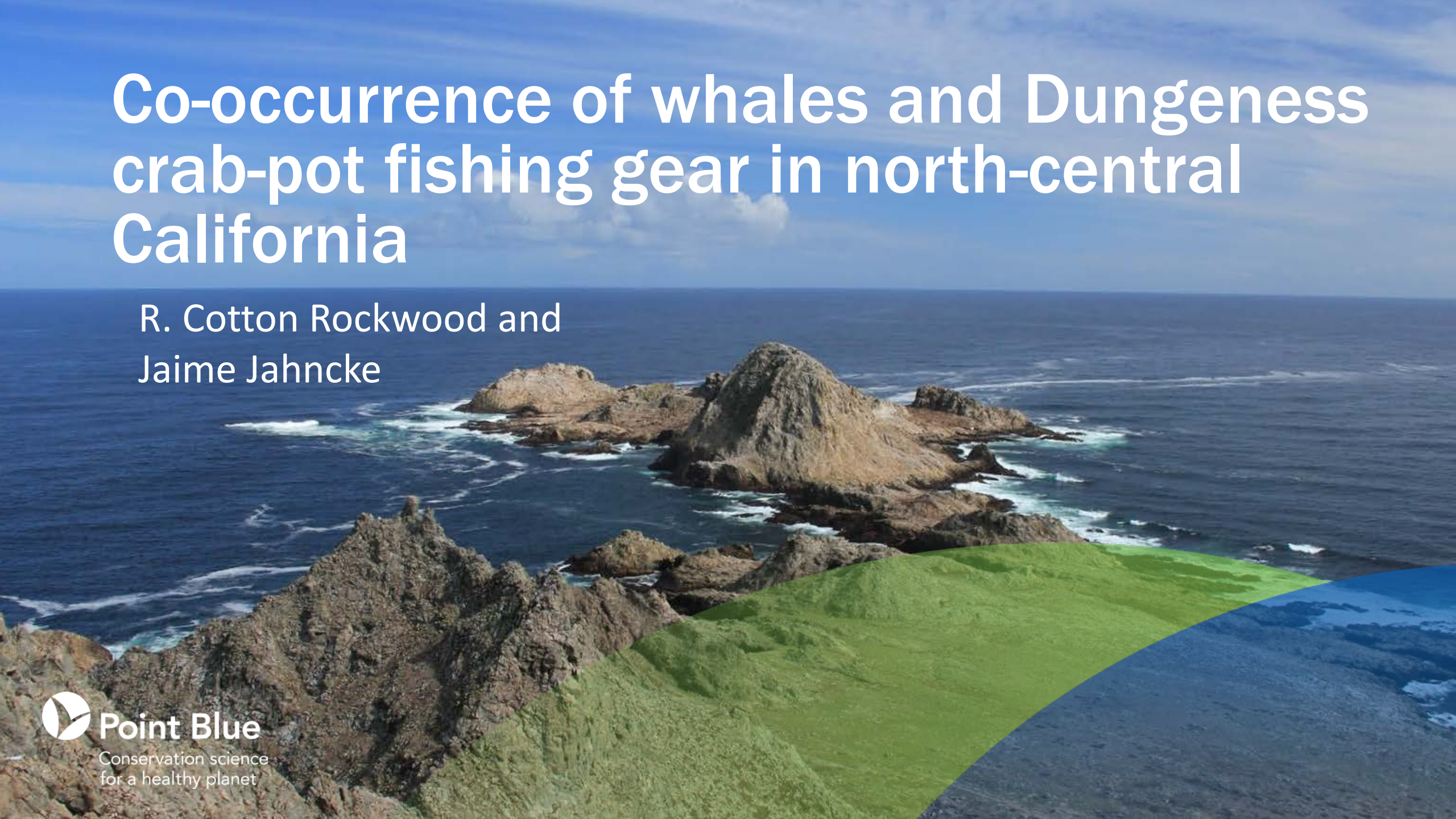
Co-occurrence of whales and Dungeness crab-pot fishing gear in north-central California

R. Cotton Rockwood and
Jaime Jahncke



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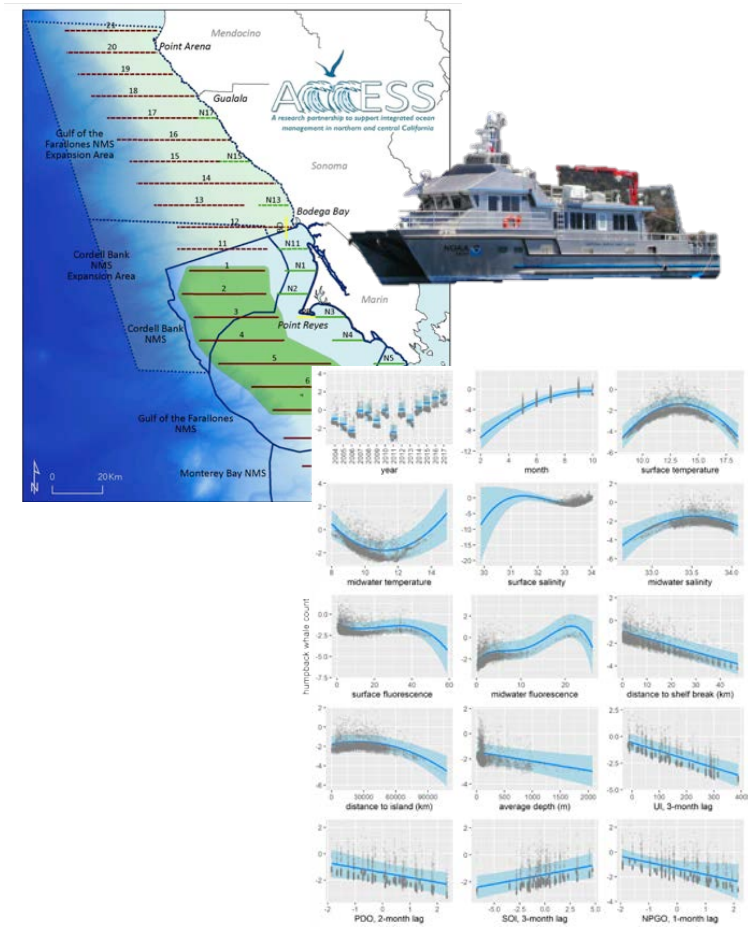
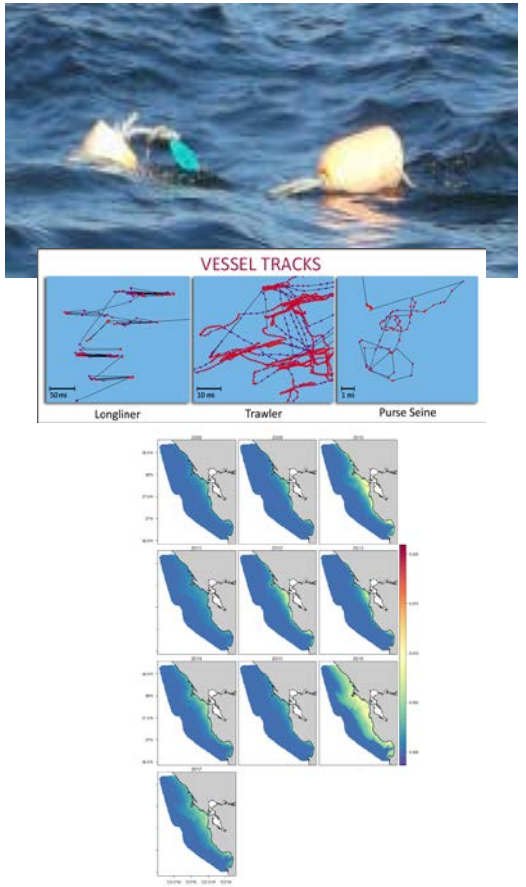
Conservation science
for a healthy planet

Rationale

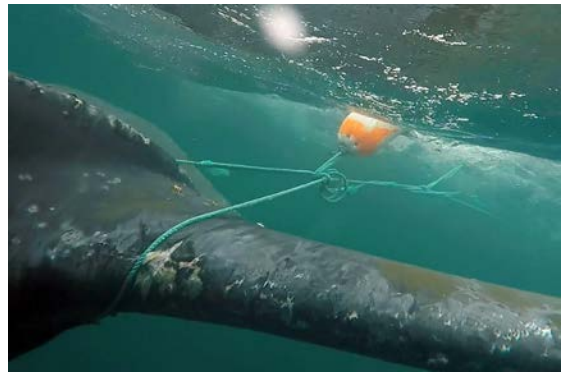
Whale density + distribution (models)



Fishing intensity



Co-occurrence
(a proxy for entanglement risk)



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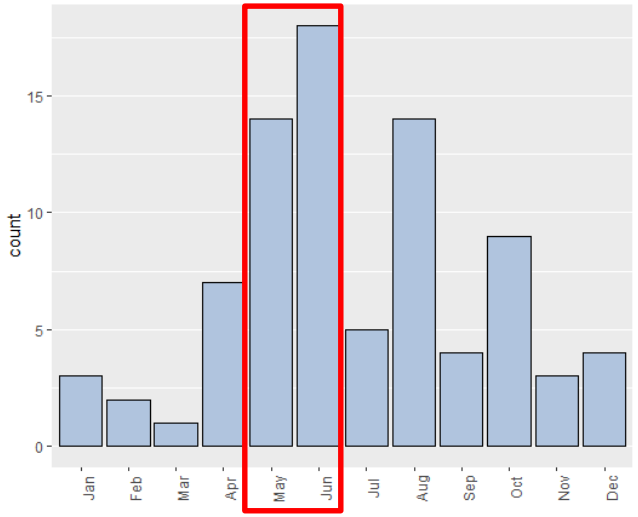
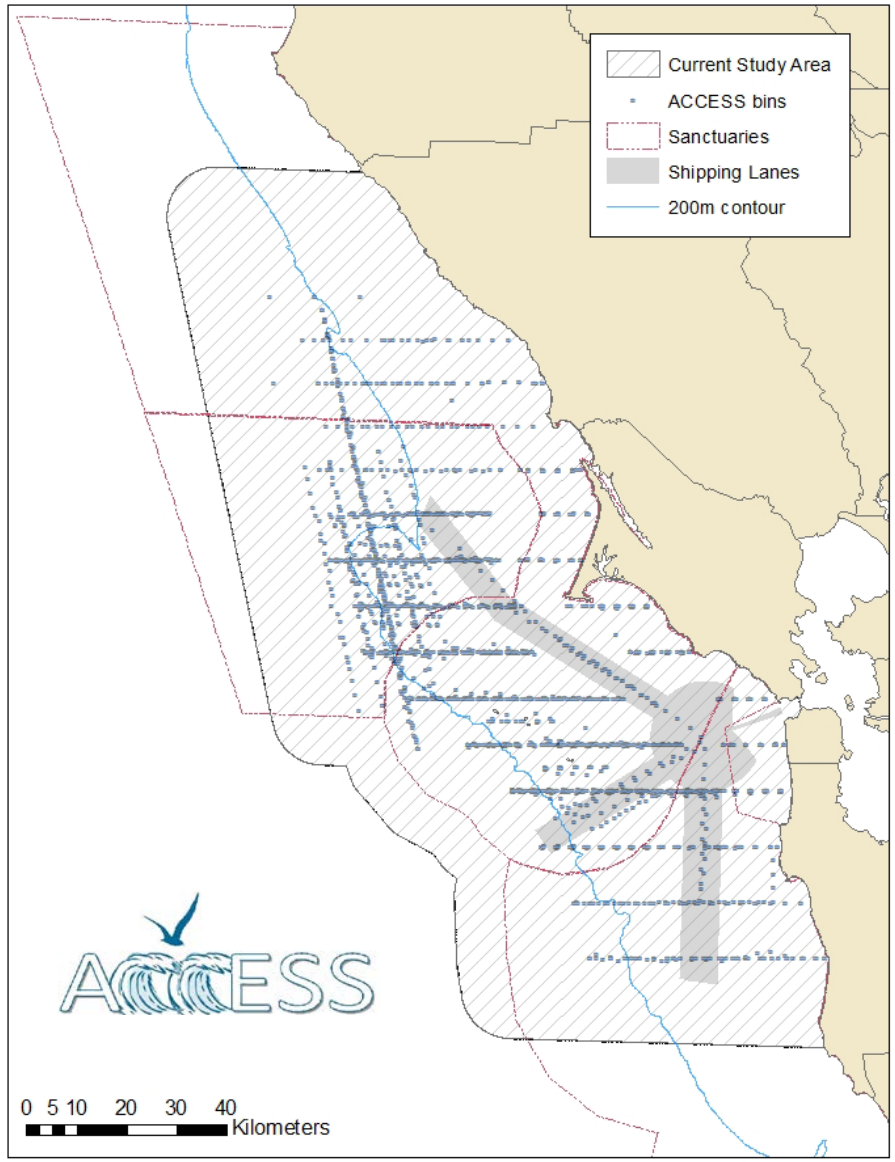
Methods

- ACCESS (Applied California Current Ecosystem Studies) cruises
  - Whale counts (2004 – present)
  - Crab pot counts (2008 – present)
  - Environmental variables
- May-July + September
  - Only partial overlap with fishery

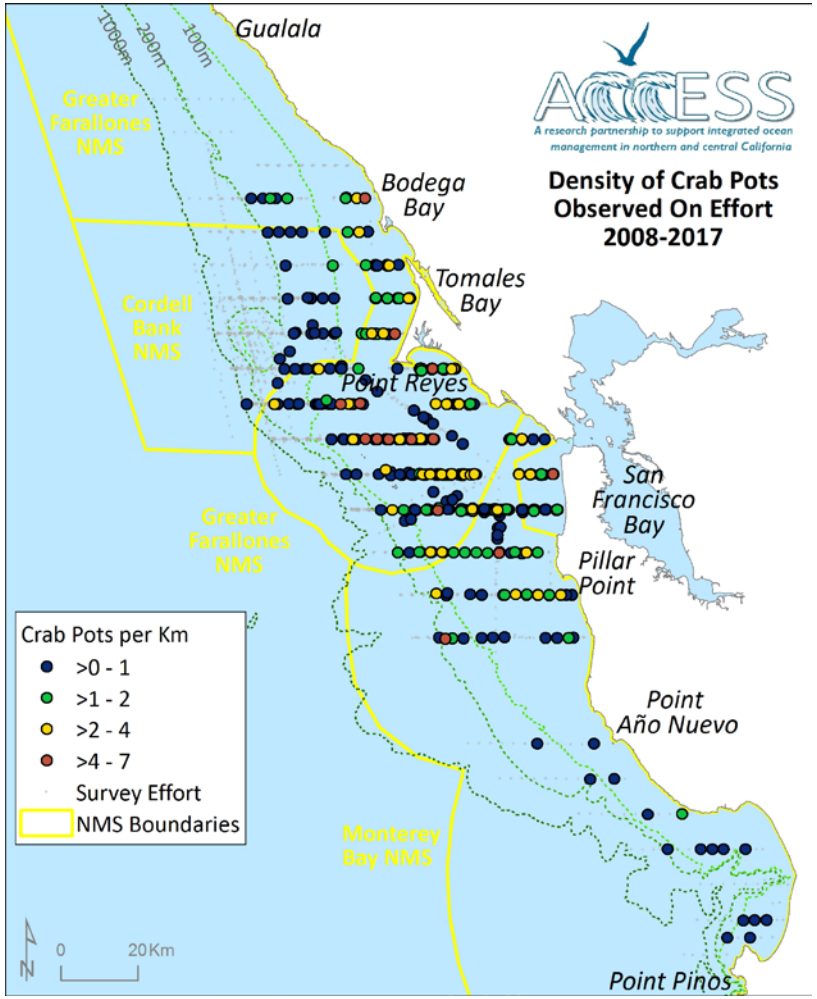




Methods

Proof of concept approach for May and June 2008-2017

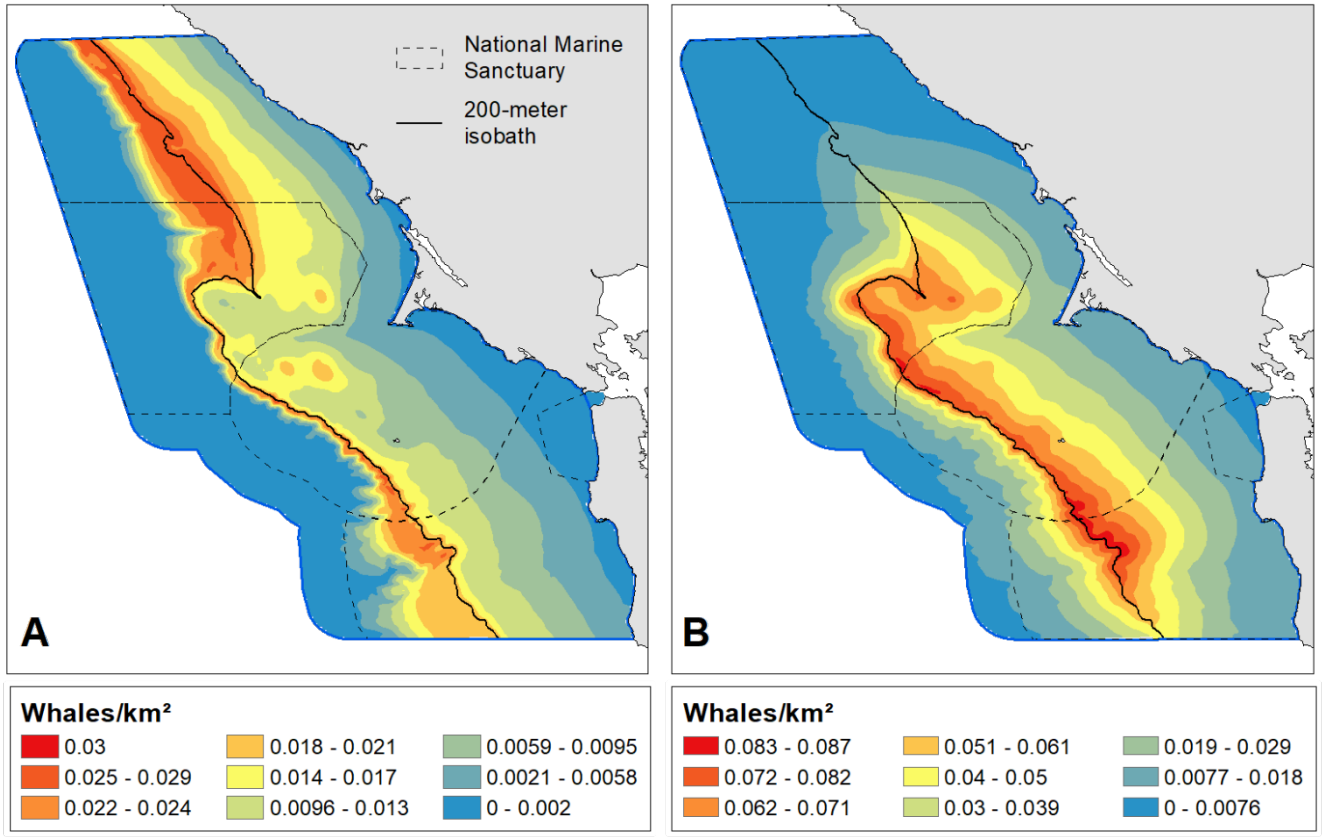
1. Model whale density/distribution
2. Model crab pot density/distribution
3. Calculate co-occurrence



Whale density

Blue Whale

Humpback Whale



Modeling predator and prey hotspots: Management implications of baleen whale co-occurrence with krill in Central California

R. Cotton Rockwood, Meredith L. Elliott, Benjamin Saenz, Nadav Nur, Jaime Jahncke

https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0235603

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Crab Pot Density ~

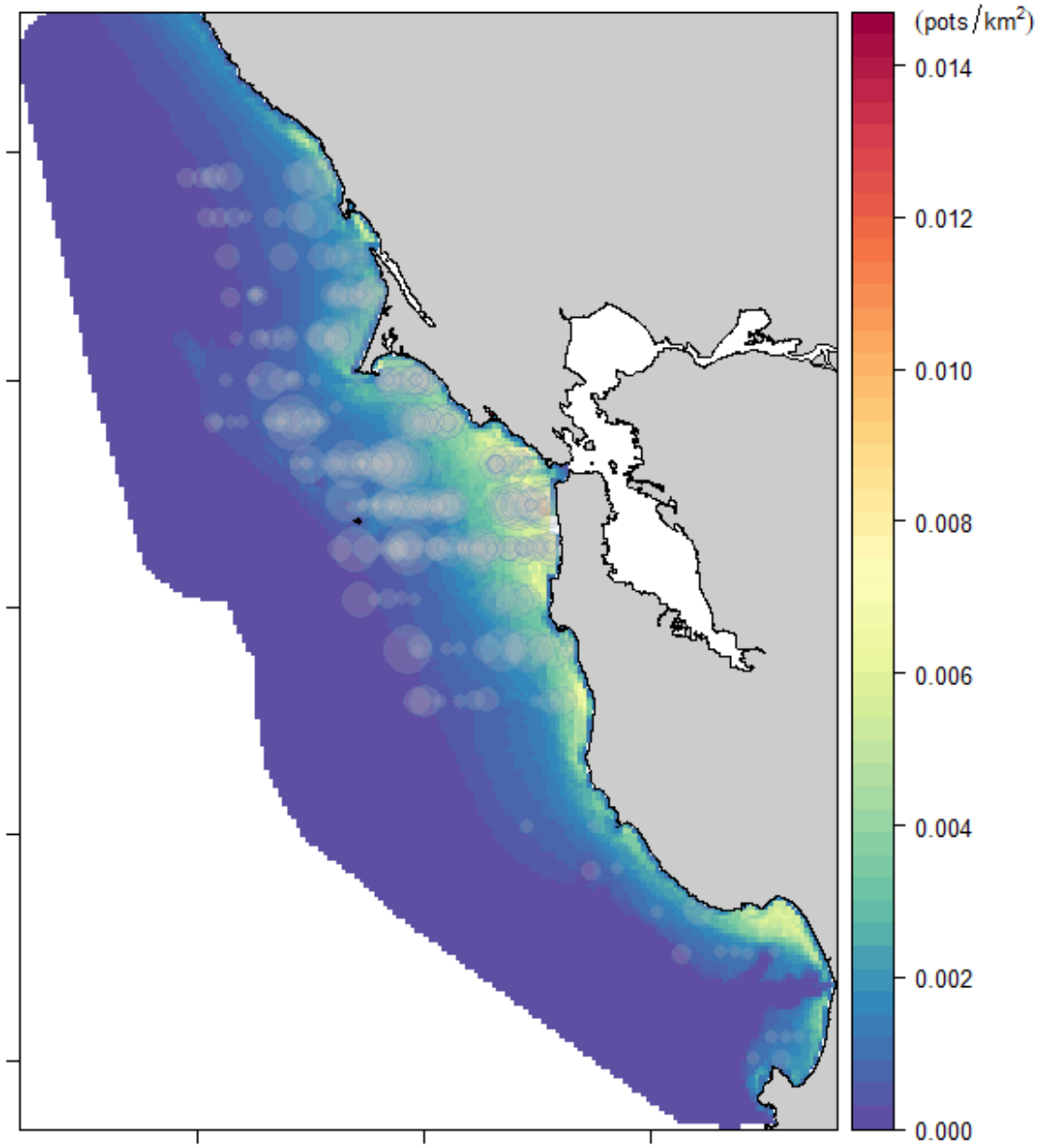
Year + Month +

Year:Average Depth + Bottom Contour Index + Distance to Land +

Upwelling Index (1-mo lag) +

Southern Oscillation Index (3-mo lag) + Pacific Decadal Oscillation (1-mo lag)

Crab pot model mean prediction



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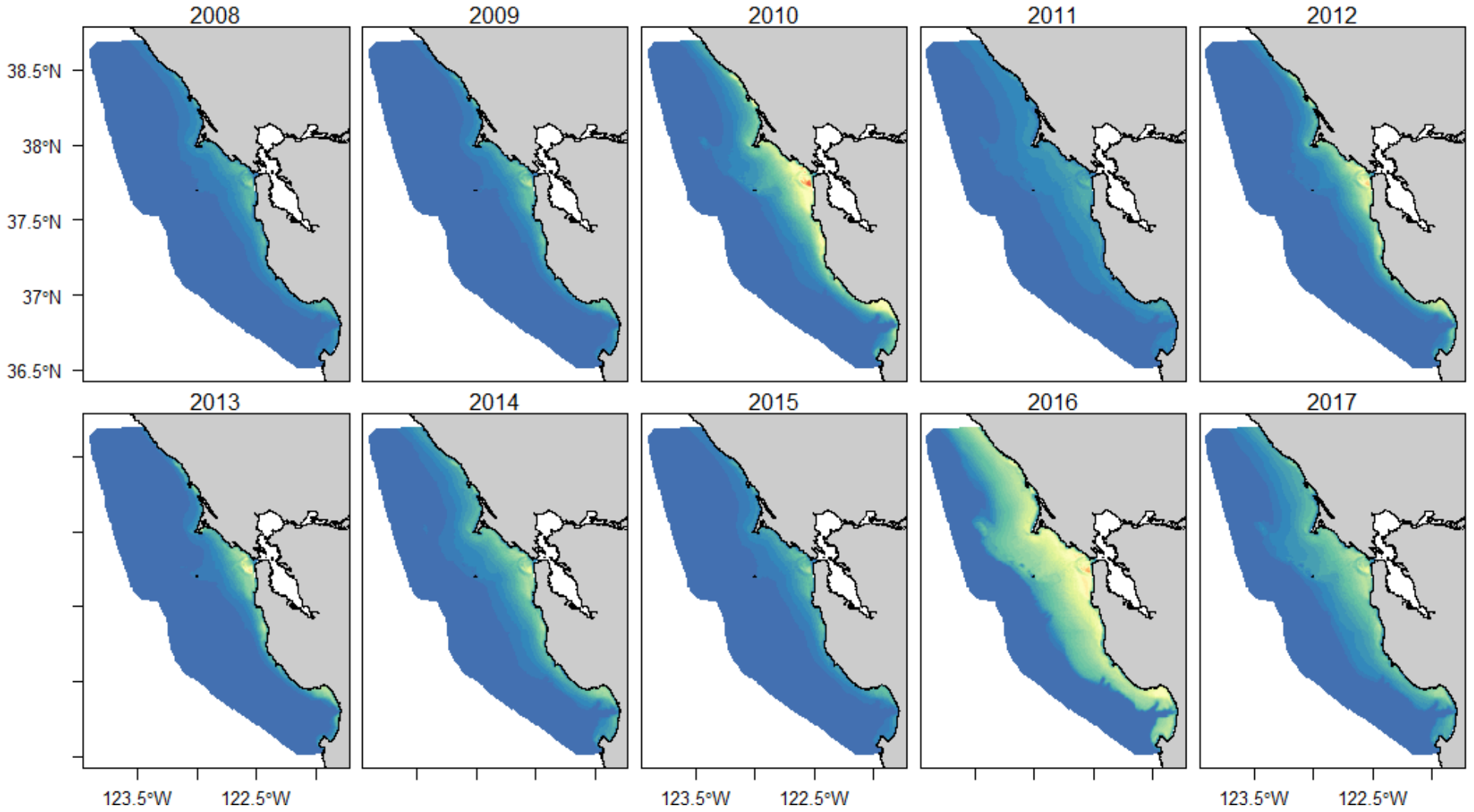
Annual model predictions



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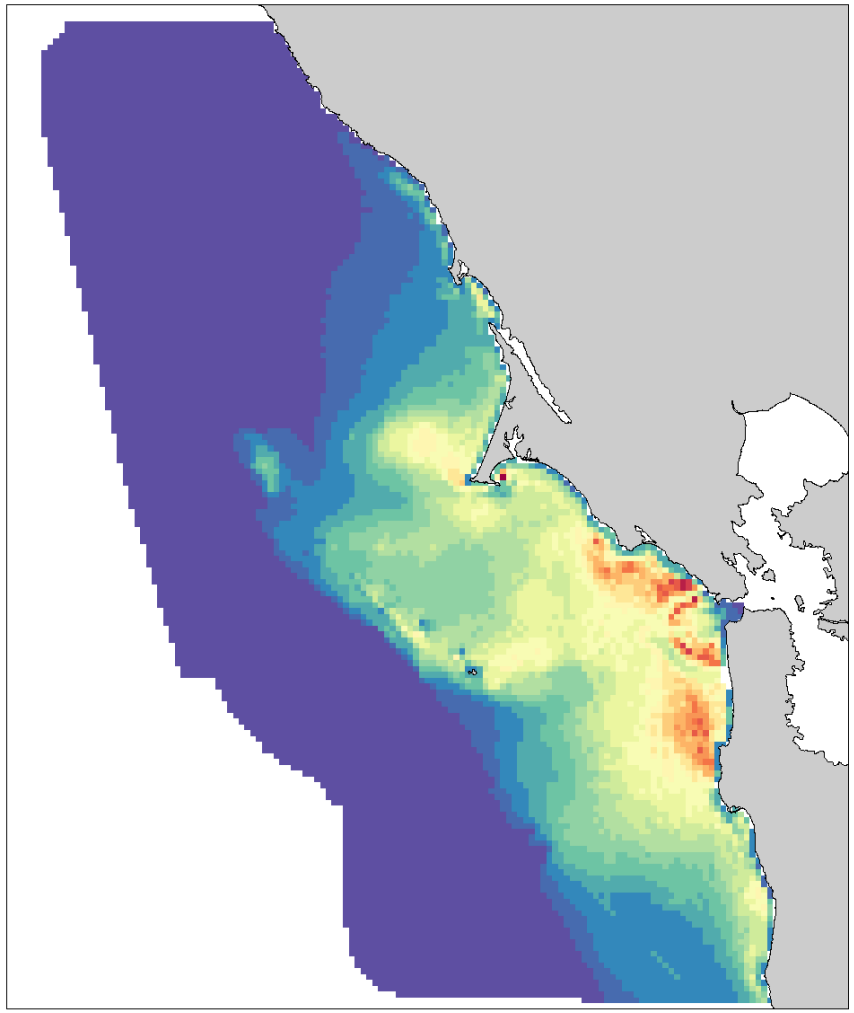
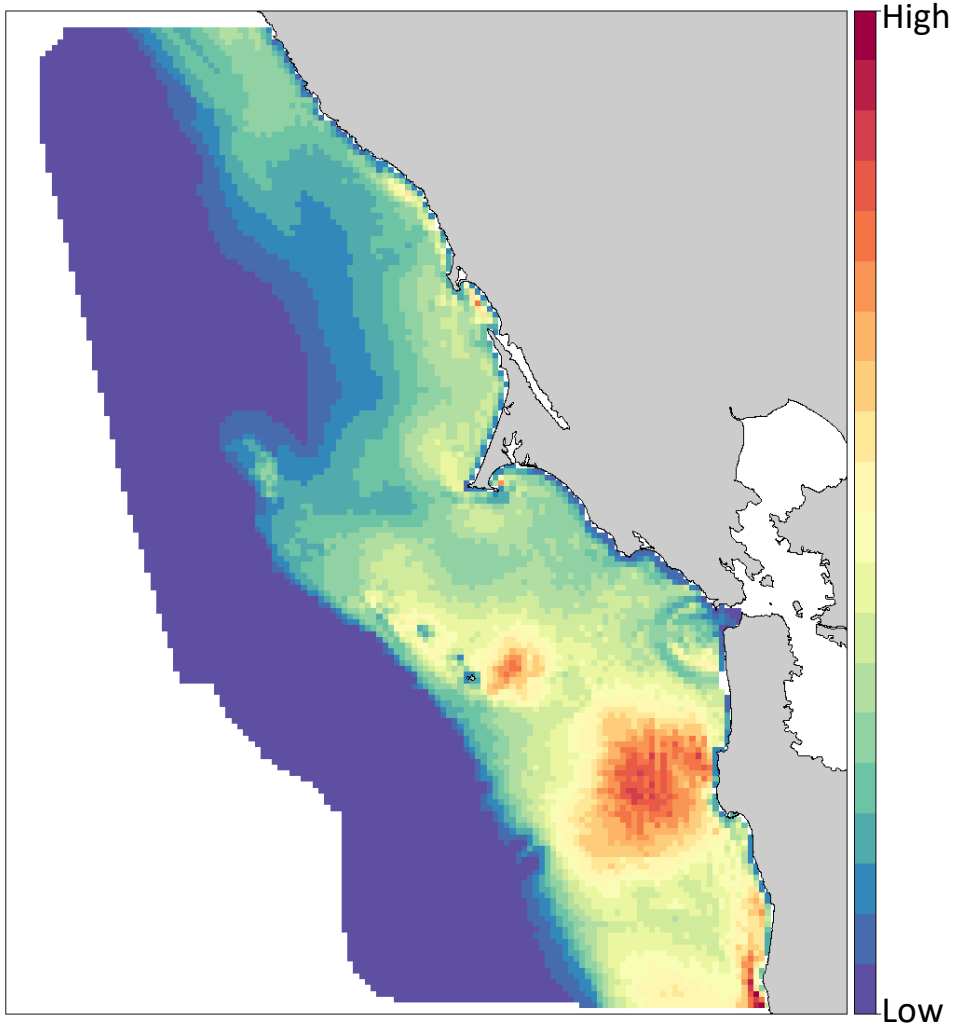
Mean entanglement co-occurrence

Humpback whale



Blue whale



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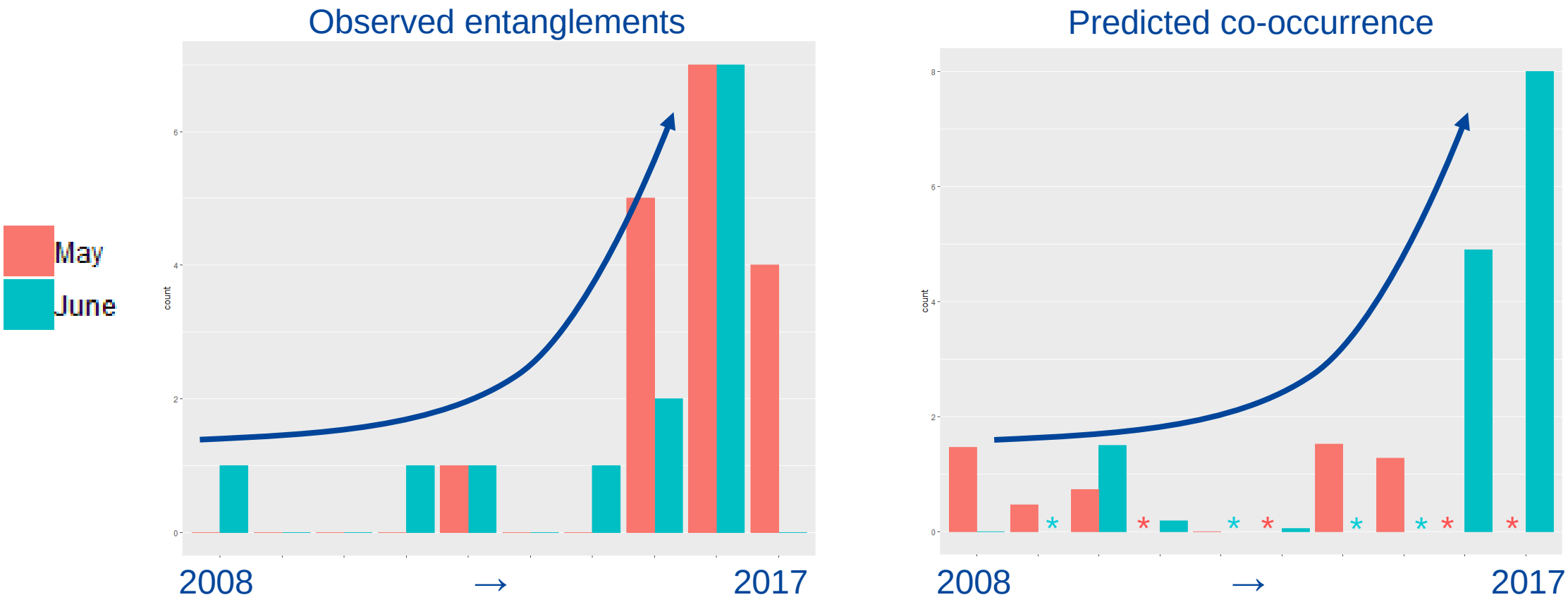
Annual model predictions vs entanglements



* Missing data

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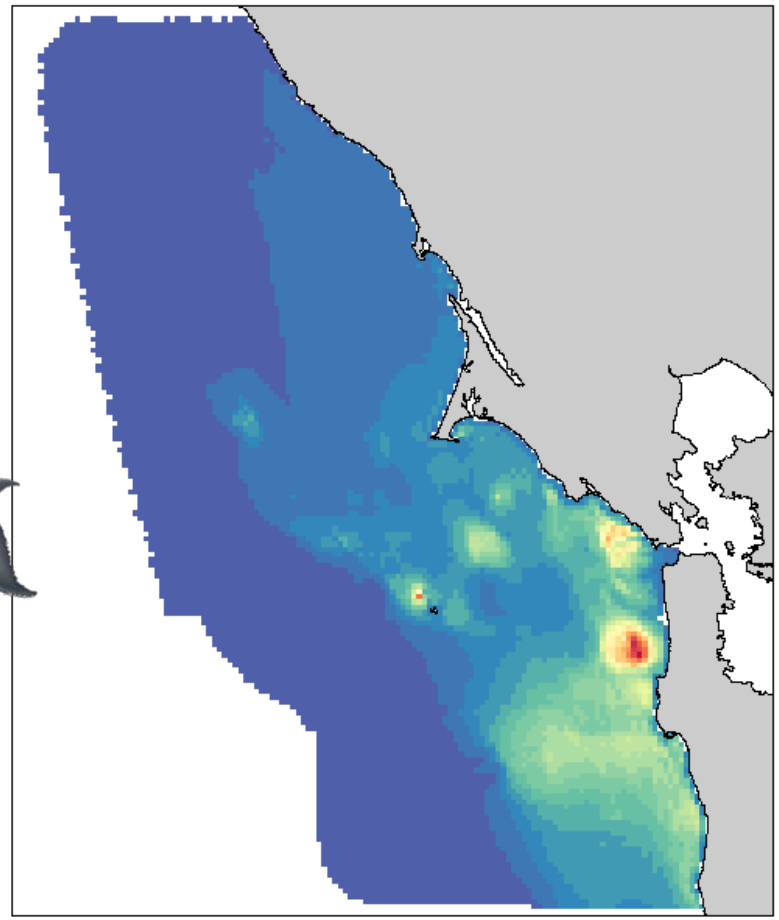
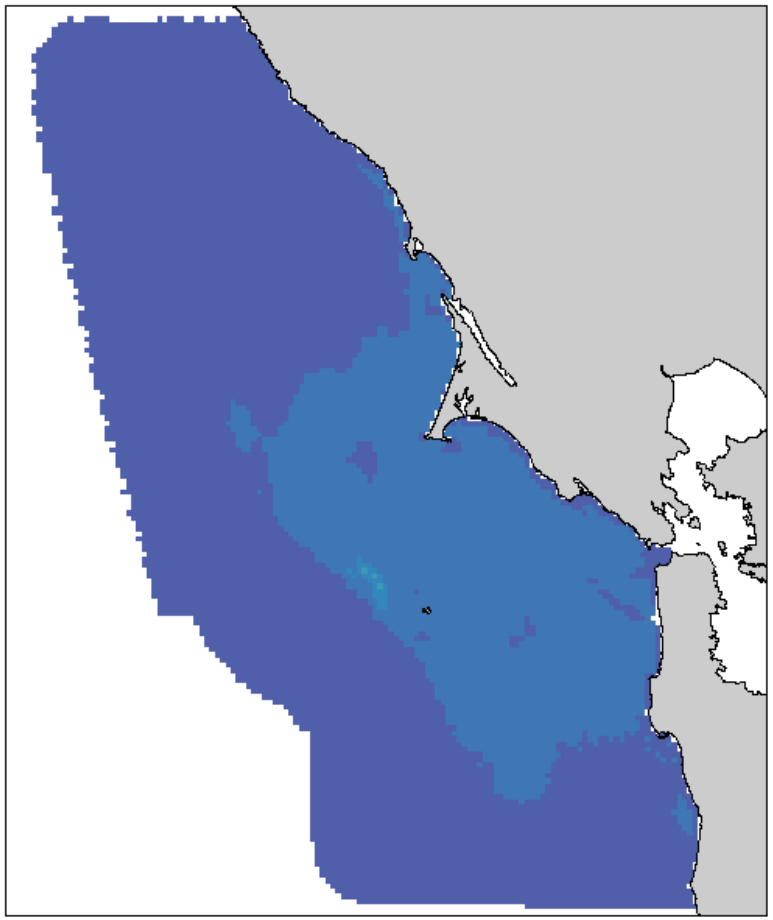
Humpback Whale warm vs. cold years

Warm/poor years



Cold/good years



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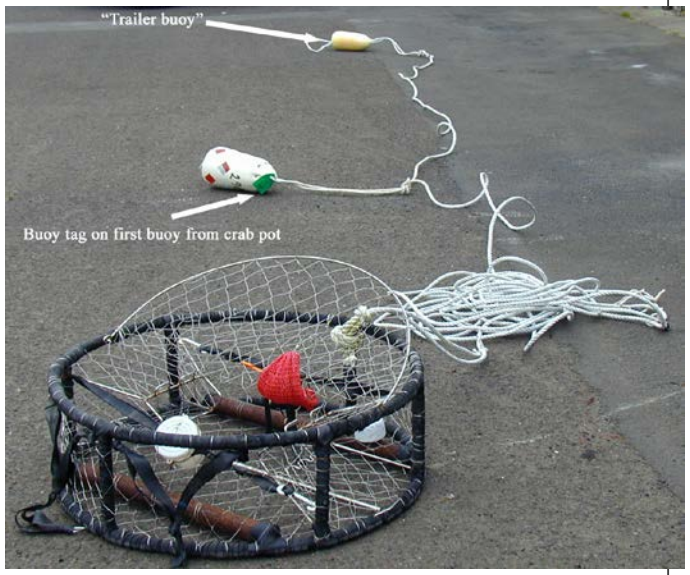
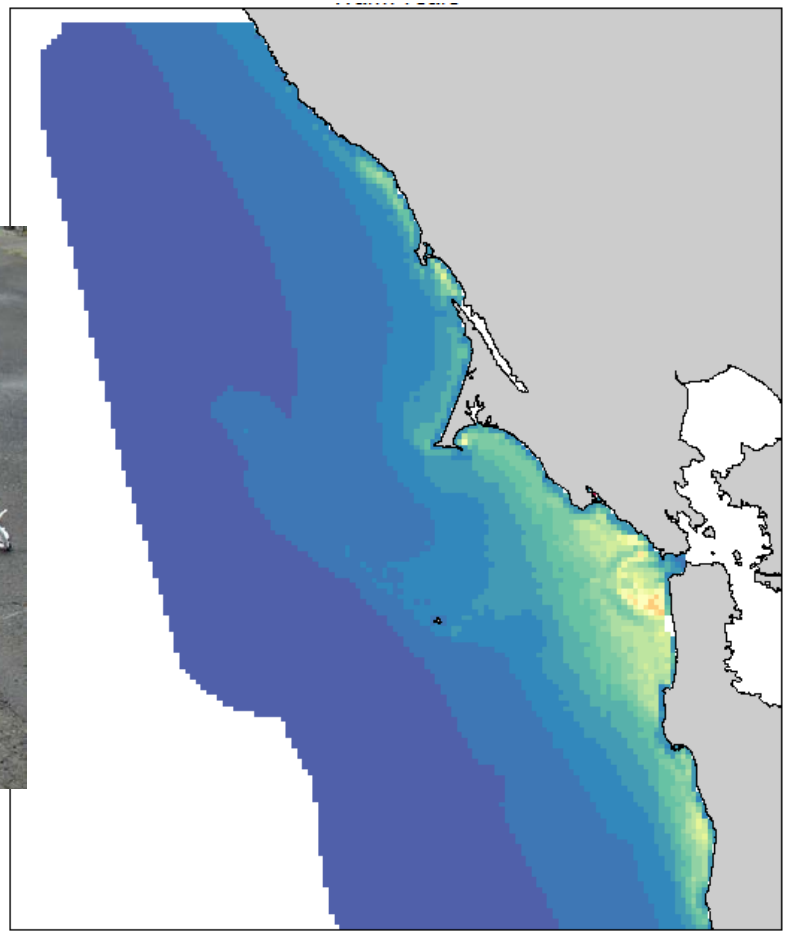
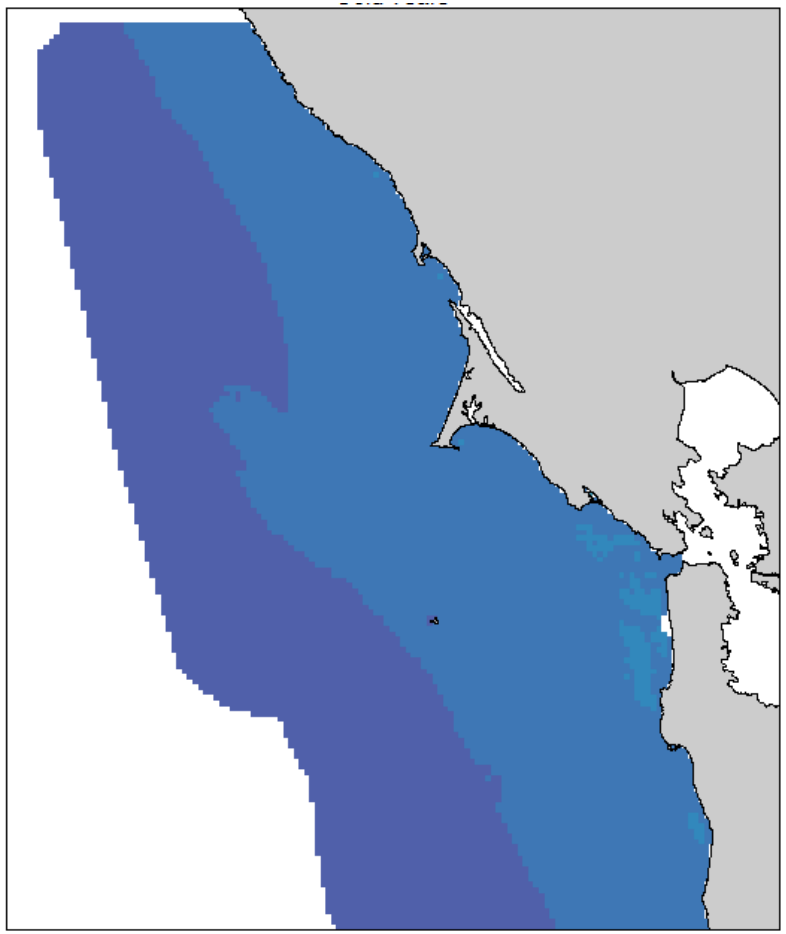
Crab pot gear in warm and cold years



Warm/poor years



Cold/good years



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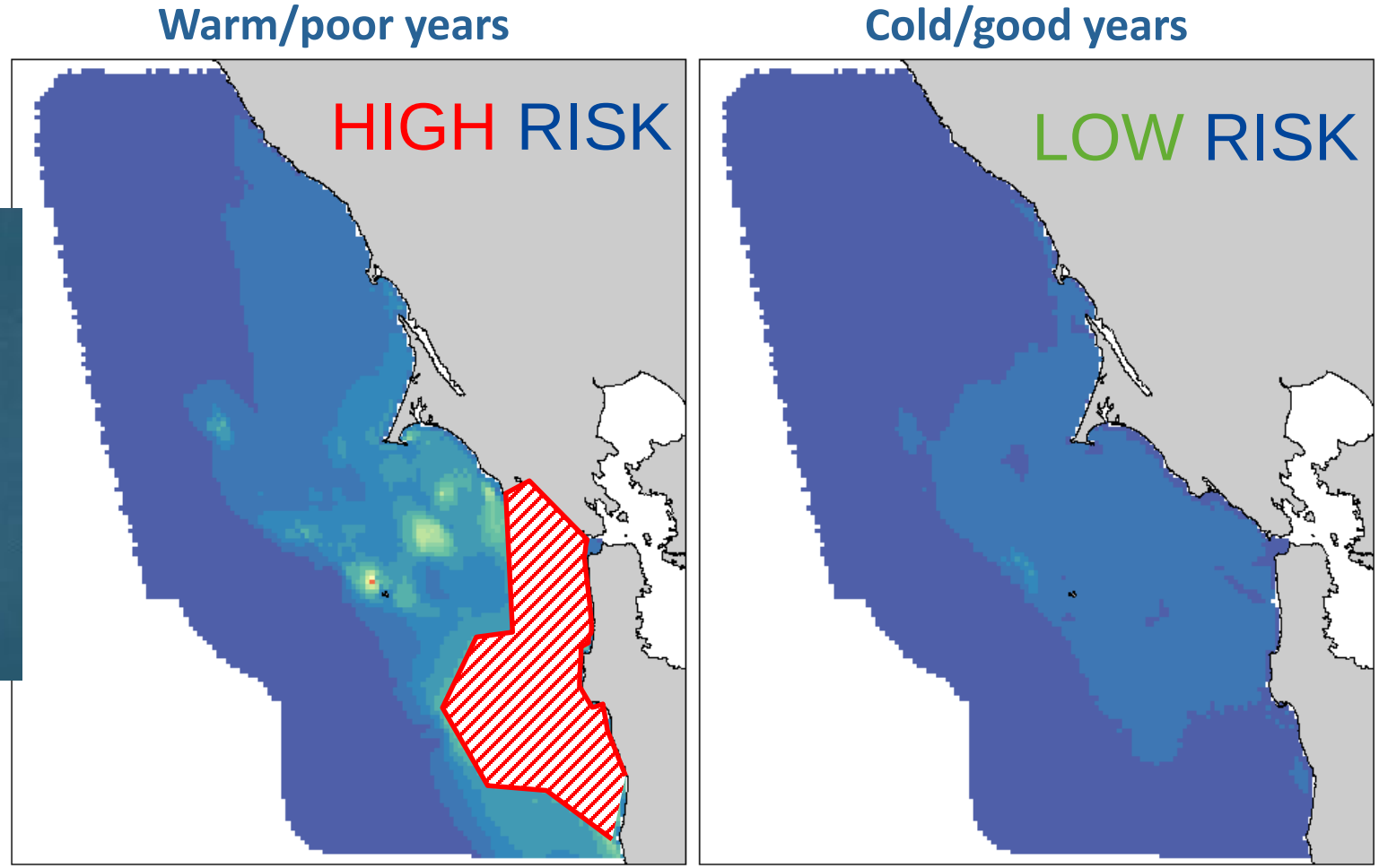
Entanglement risk is greater in warm years

Entanglement risk is greater in warm years and when fishing effort in spring is high



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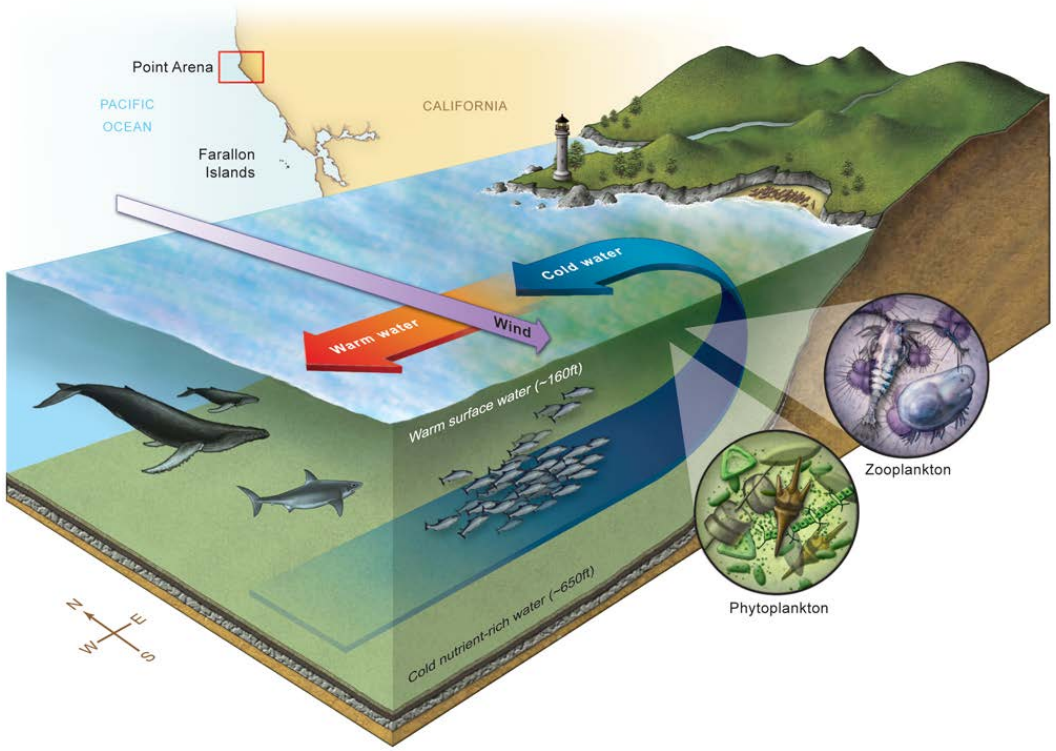
Time series are important!



Point Blue Conservation Science

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