

Whale population recovery and forage fish in a Northeast Pacific ecosystem

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Introduction

- some whales feed largely on forage fish
- individual masses, metabolic rates high
- exert top-down control when abundant?
- consequences of depletion & recovery?



Whales and herring

recovering humpback whales, few herring

- Haida Gwaii, W Vancouver Island (BC)
- Lynn Canal, Prince William Sound (AK)

causal link between these trends?

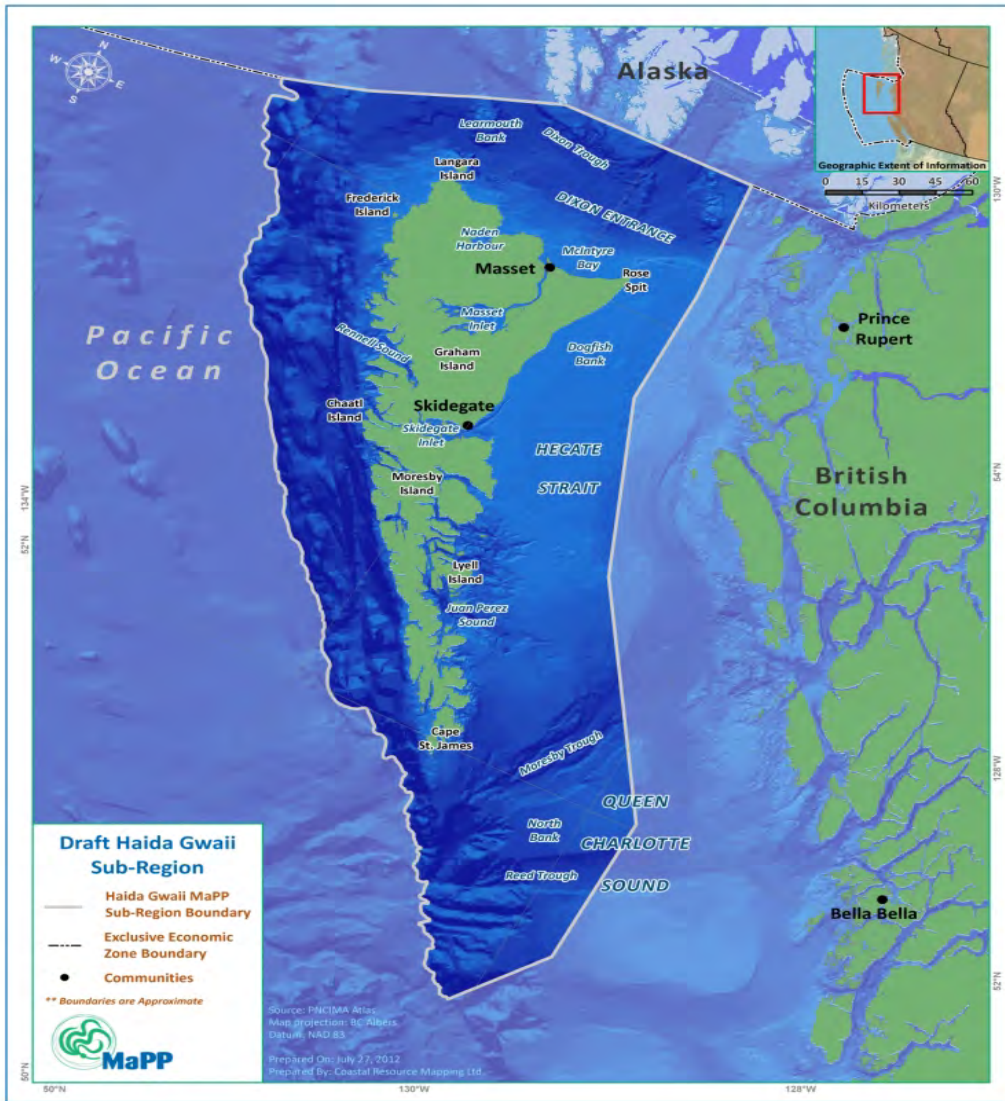


Research question

How will Northeast Pacific whale population recovery affect:

- 1) forage fish?
- 2) other predators?
- 3) local fisheries?



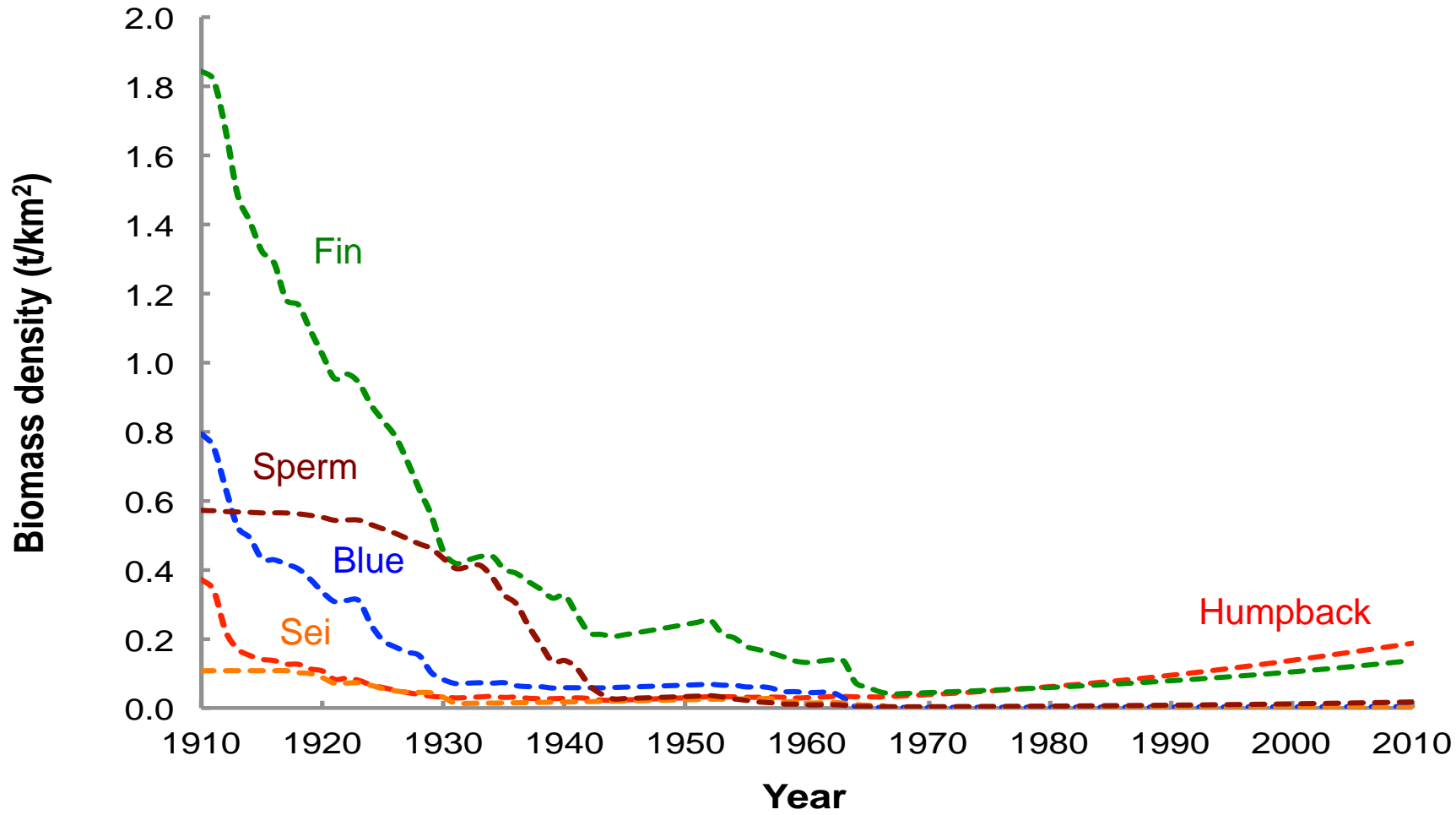


Study area

Whale modelling

- Schaefer model (logistic growth - catch)
- N_0 from: current N , recorded annual catch
- assumed: $N_0 = K$ and r_c species-specific
- output: N_0 estimates and N trajectories



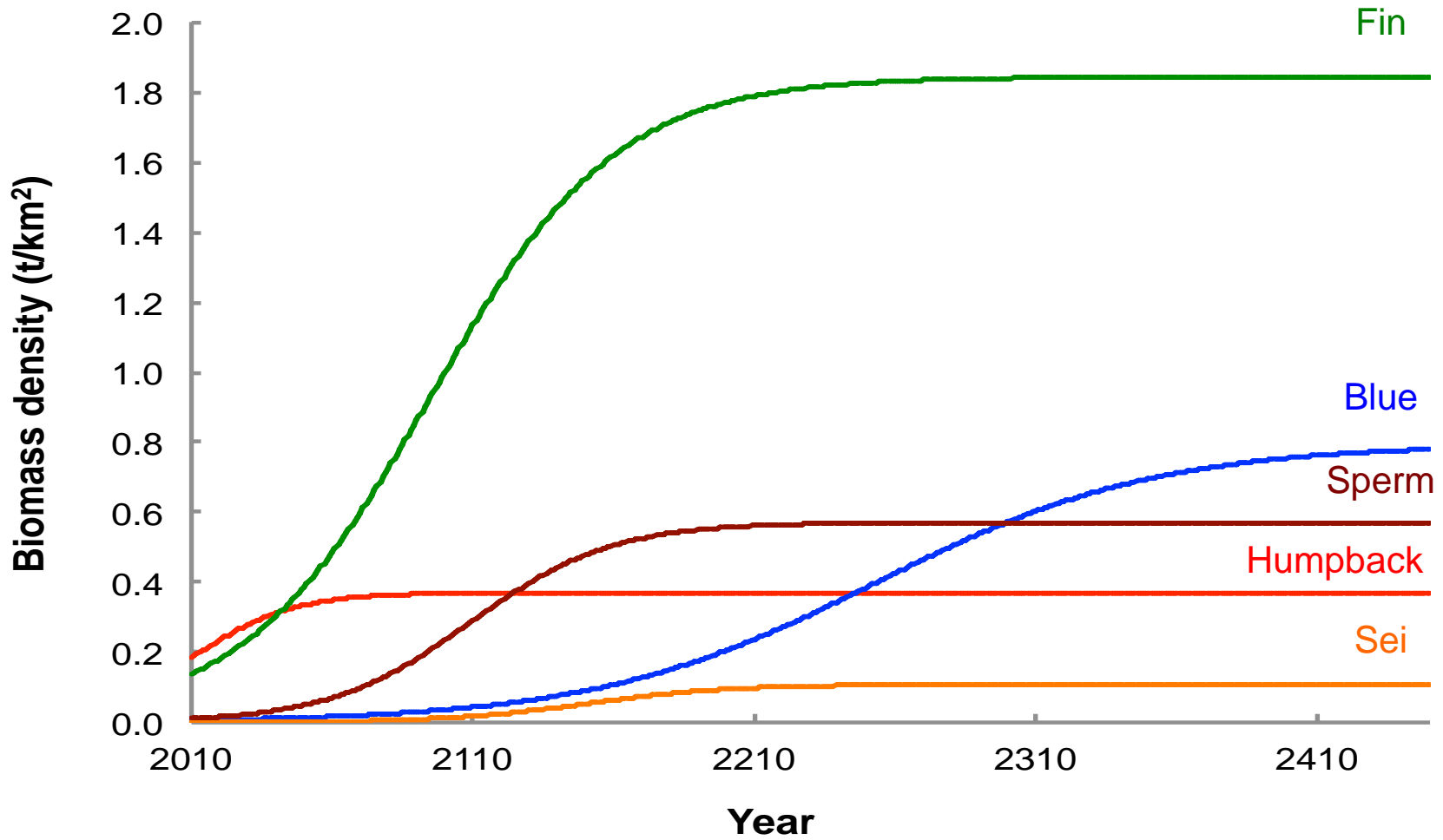


Food web modelling

Ecopath with Ecosim (EwE)

- mass balance principle
- Ecopath: static snapshot
- Ecosim: dynamic simulation

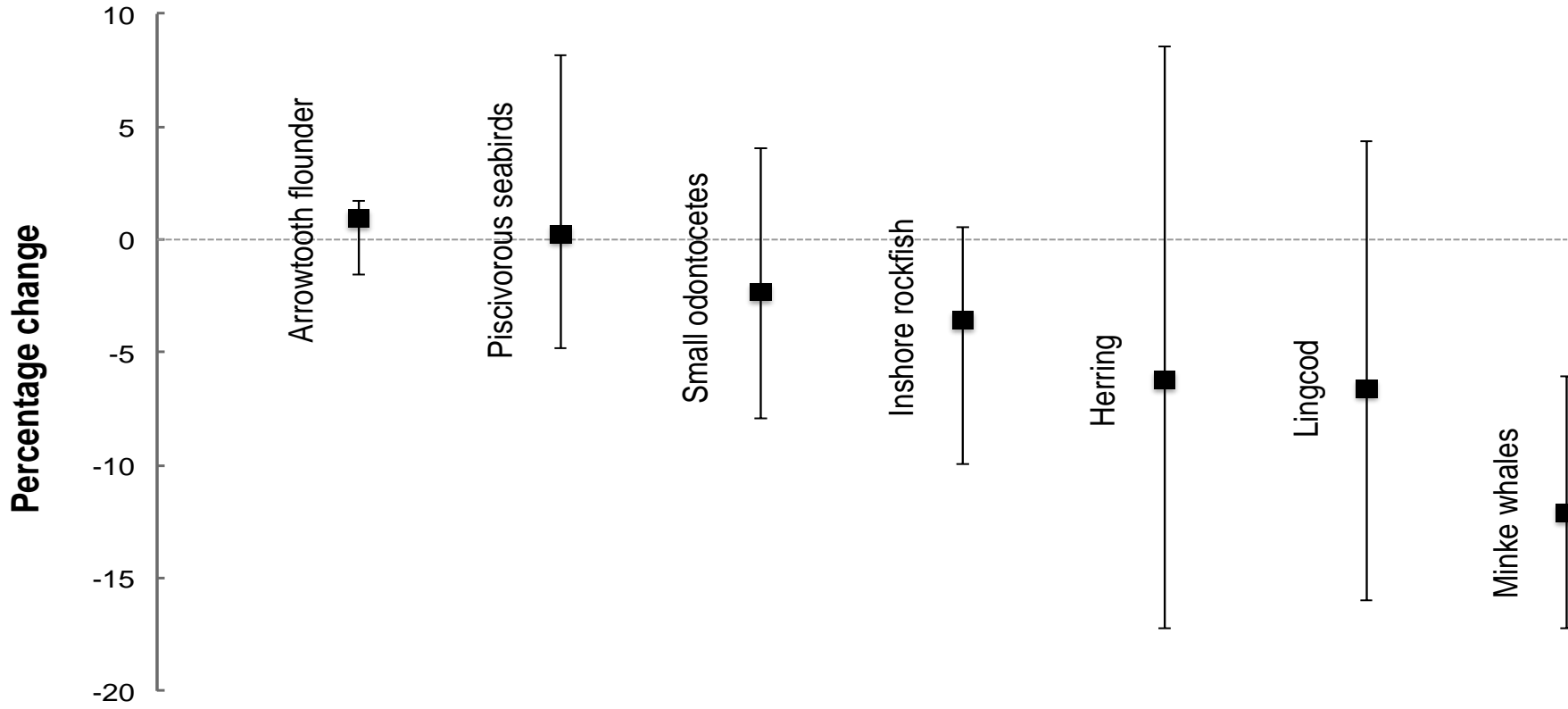


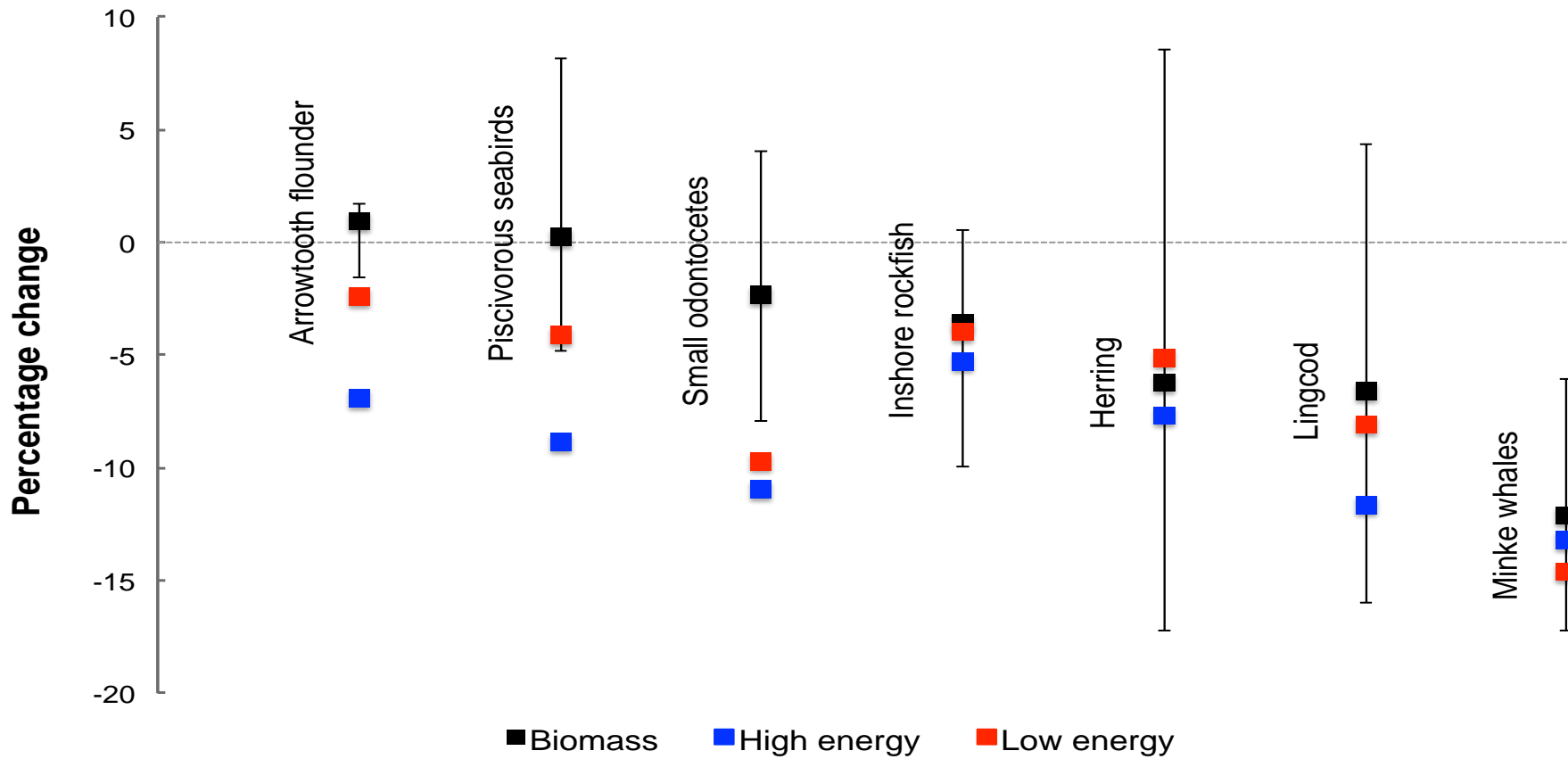


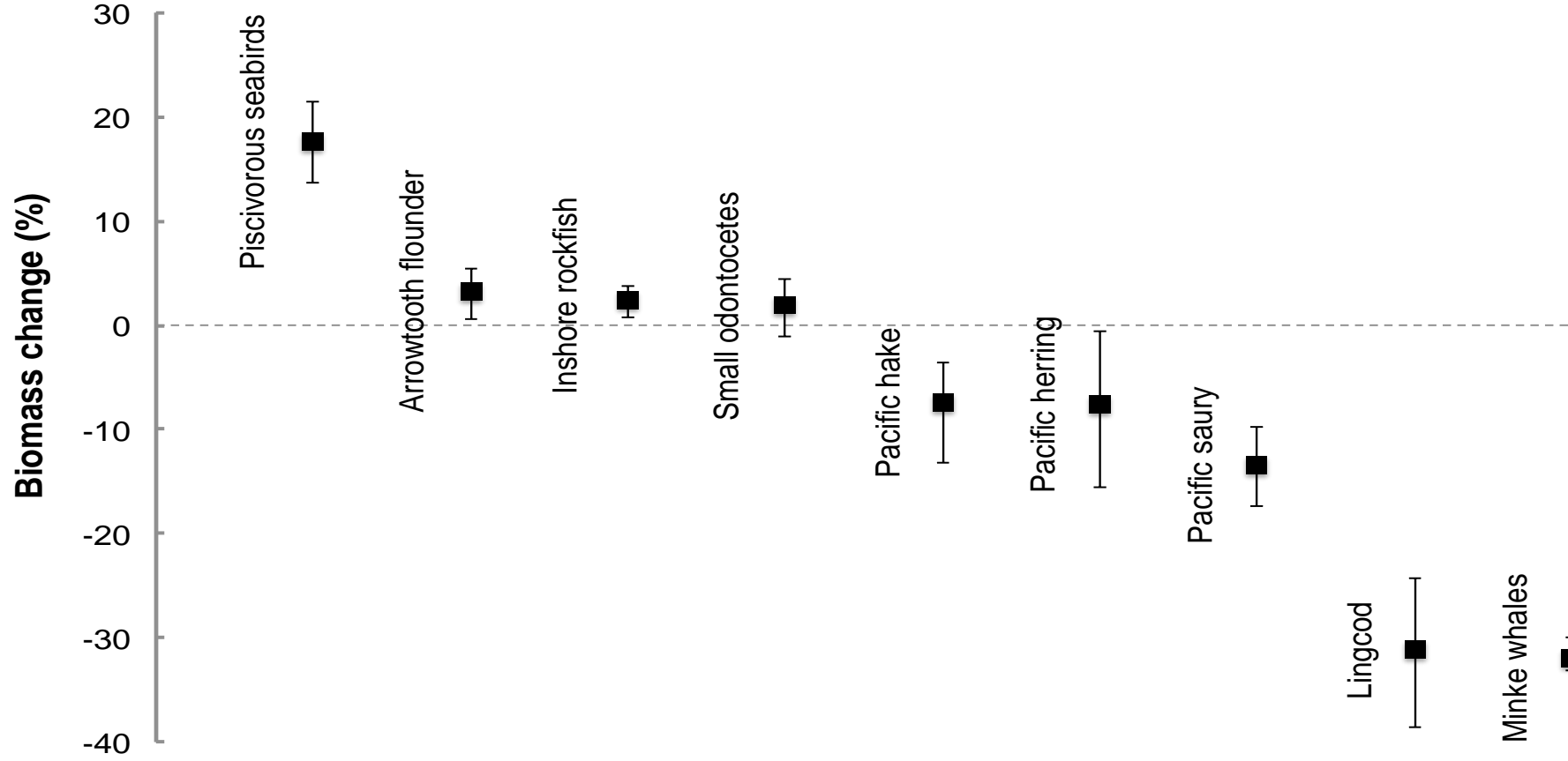
Model runs

- 1) with Monte Carlo sensitivity analysis
- 2) with energy-based model comparison
- 3) with bottom-up forcing simulations









Conclusions

humpback and fin whale recovery may:

- increase predation on herring, saury
- adversely affect some piscivores
- slightly affect some local fisheries

somewhat sensitive to parameter uncertainty



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Questions?

