

Where's my fish?

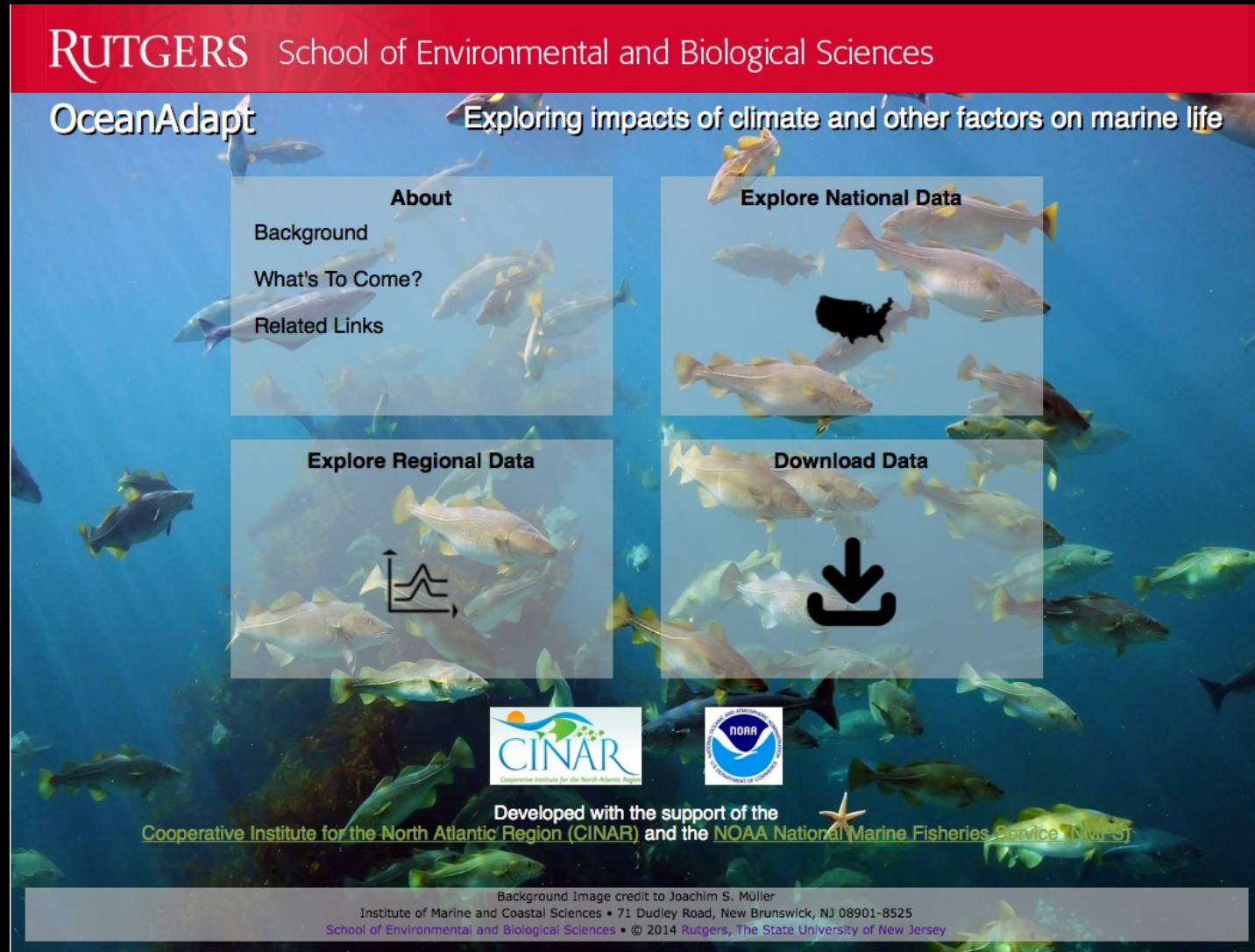
New tools to visualize climate and other impacts on marine animals



Malin Pinsky and Jon Hare



OceanAdapt: Data to aid climate adaptation



RUTGERS School of Environmental and Biological Sciences


OceanAdapt

Exploring impacts of climate and other factors on marine life


About

- Background
- What's To Come?
- Related Links


Explore National Data





Explore Regional Data



Download Data





Developed with the support of the
Cooperative Institute for the North Atlantic Region (CINAR) and the NOAA National Marine Fisheries Service (NMFS)

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Outline

1. Climate impacts on marine fishes

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2. Implications for management

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3. OceanAdapt website

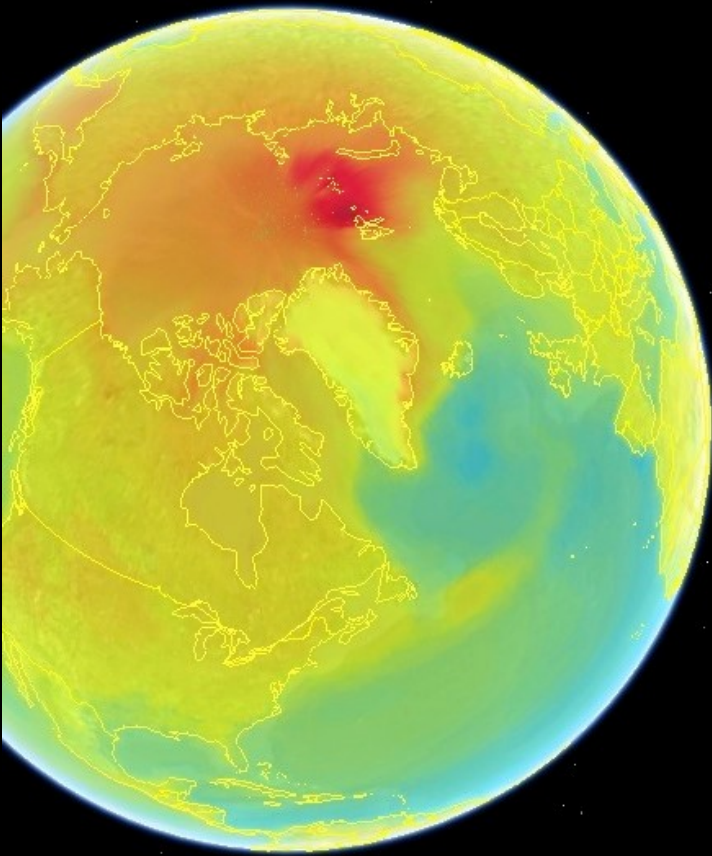
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4. Relevance to NOAA (Jon Hare)

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The challenge of climate change



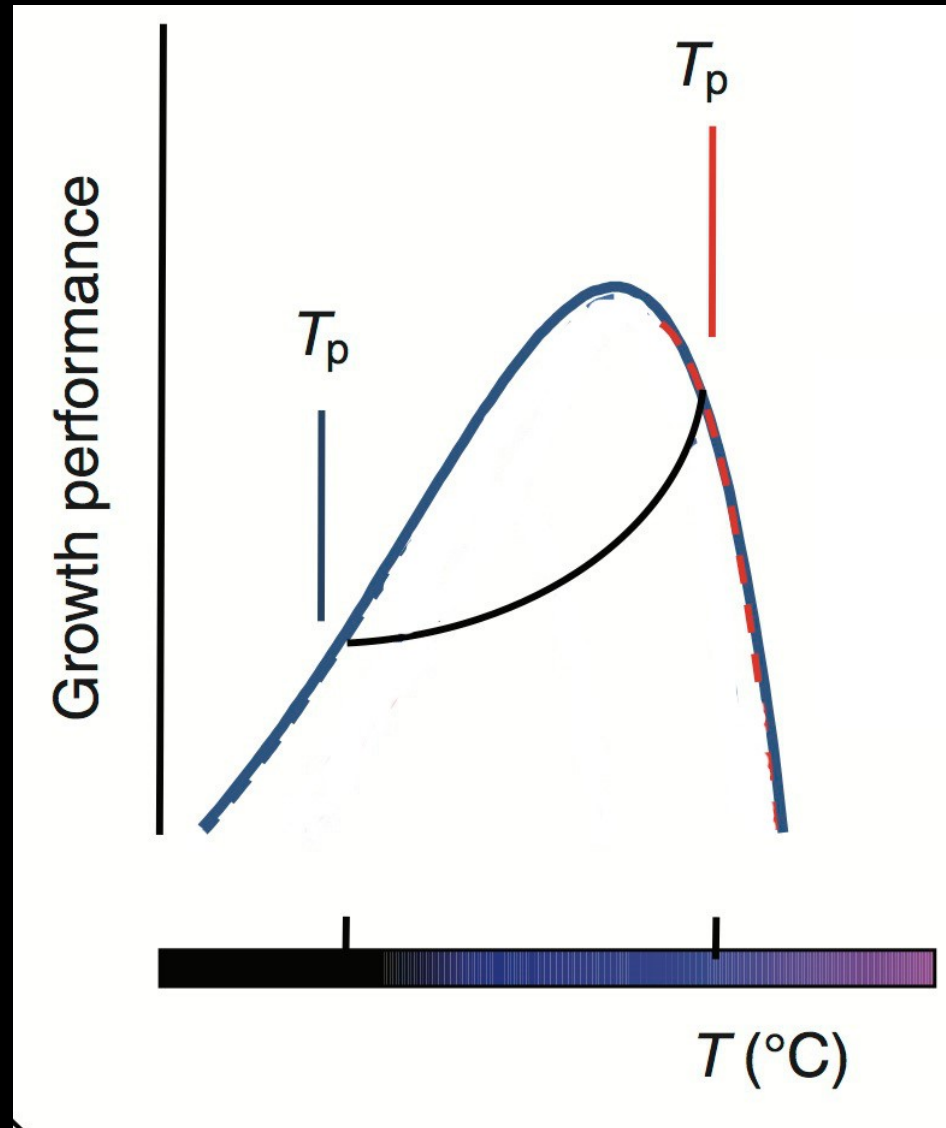
Colonize

Tolerate

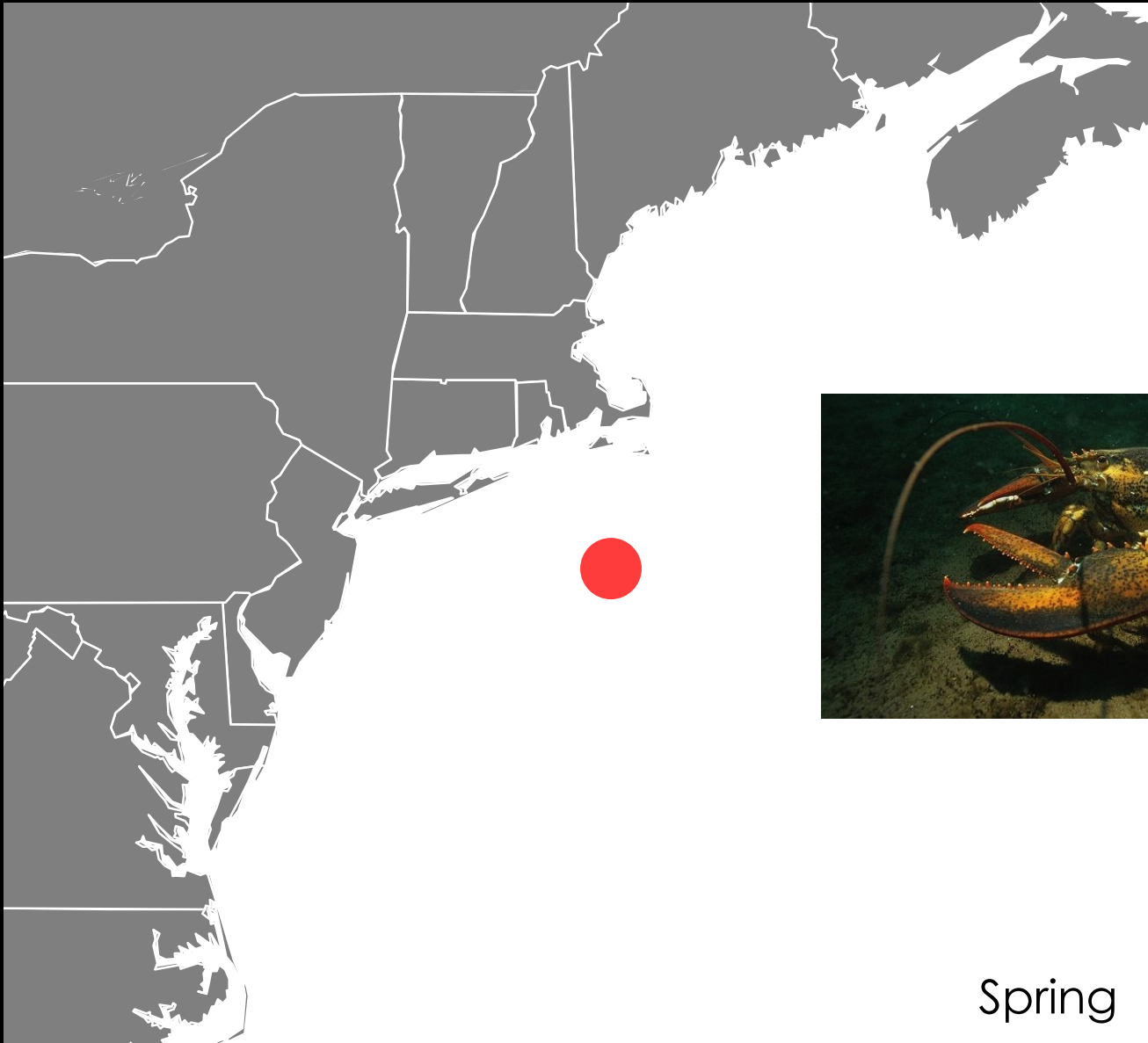
Evolve

Extinct

Temperature affects physiology



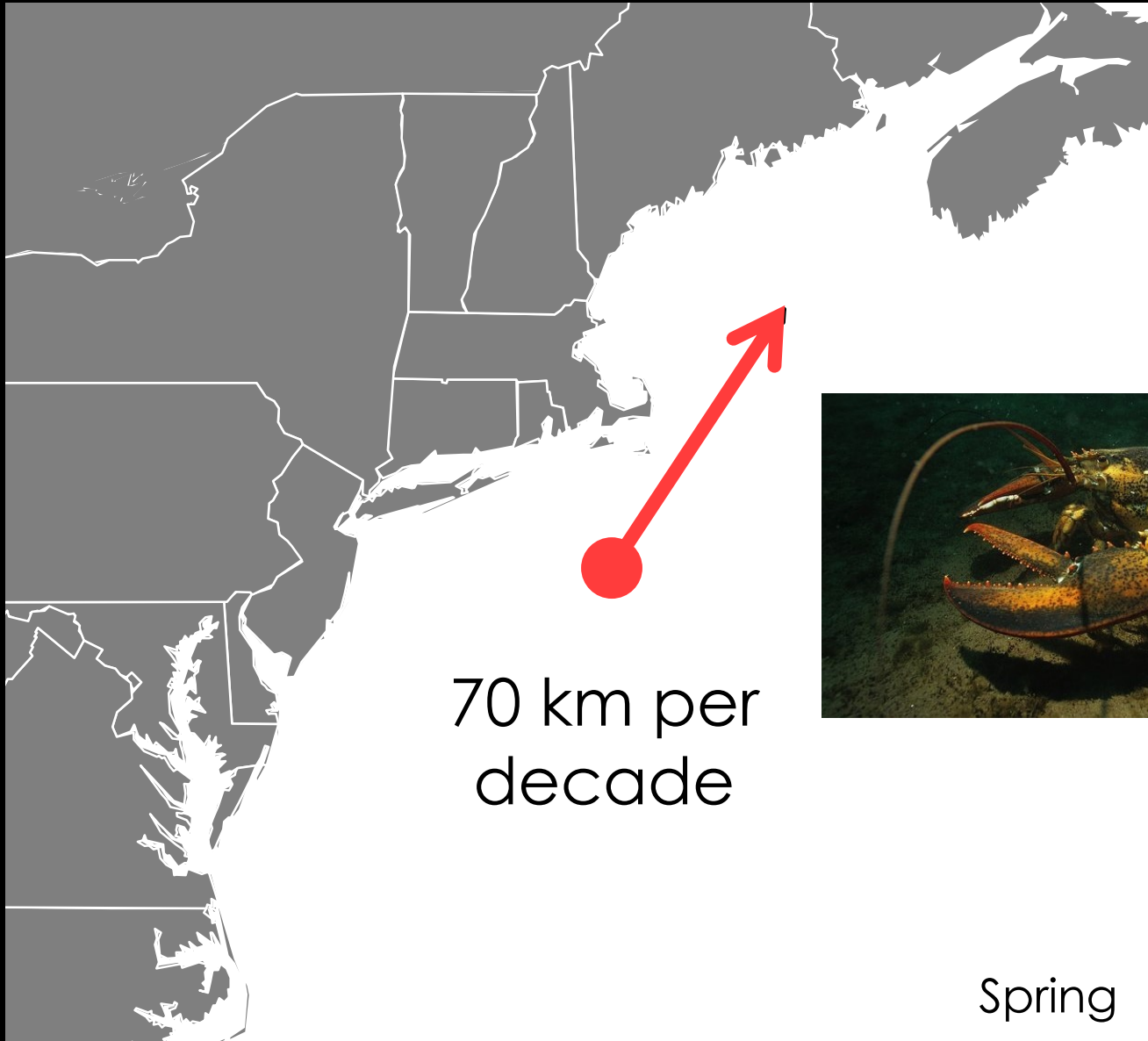
Distribution shifts 1968-2008



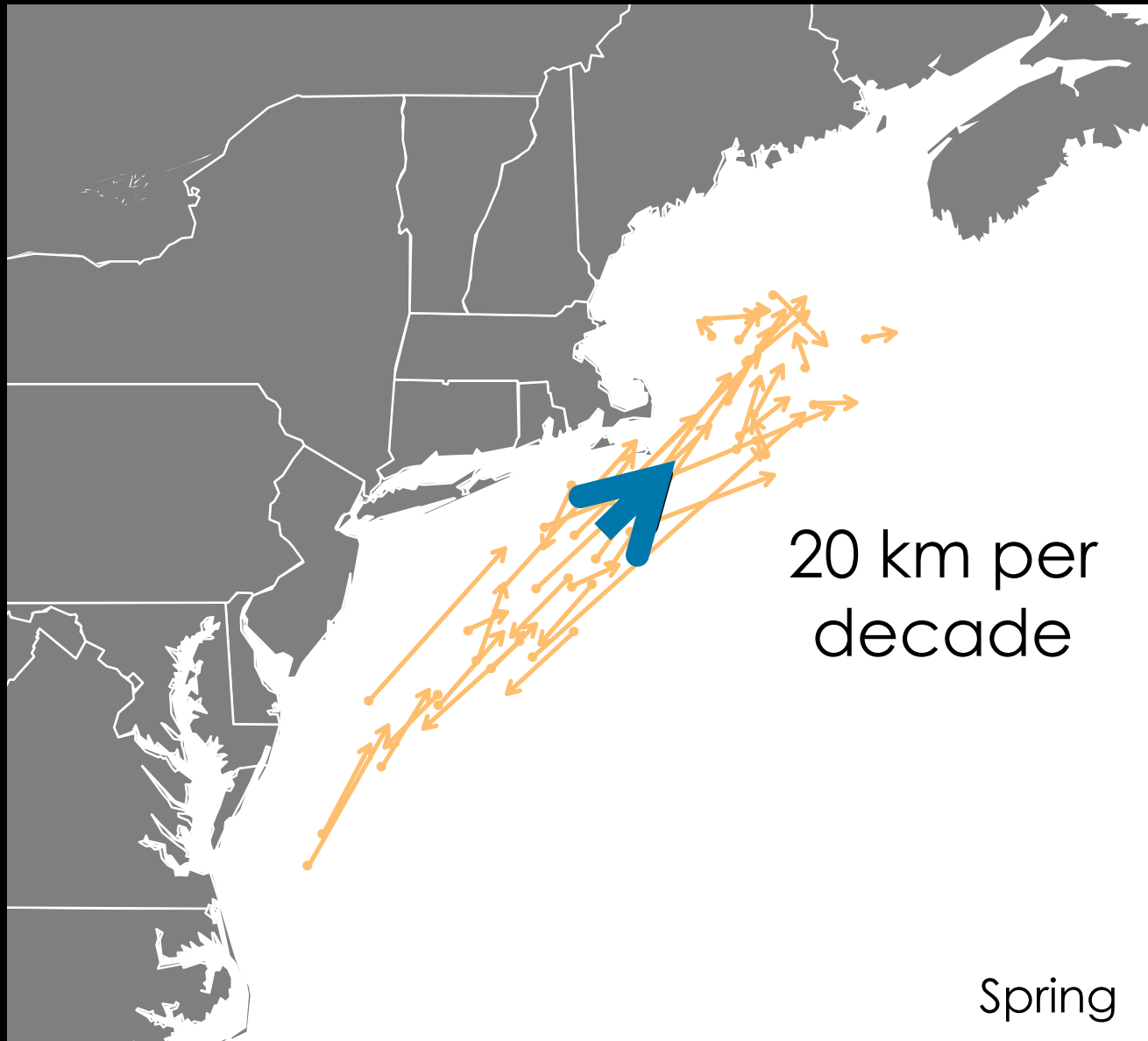
© Peter Scoones / naturepl.com

Spring

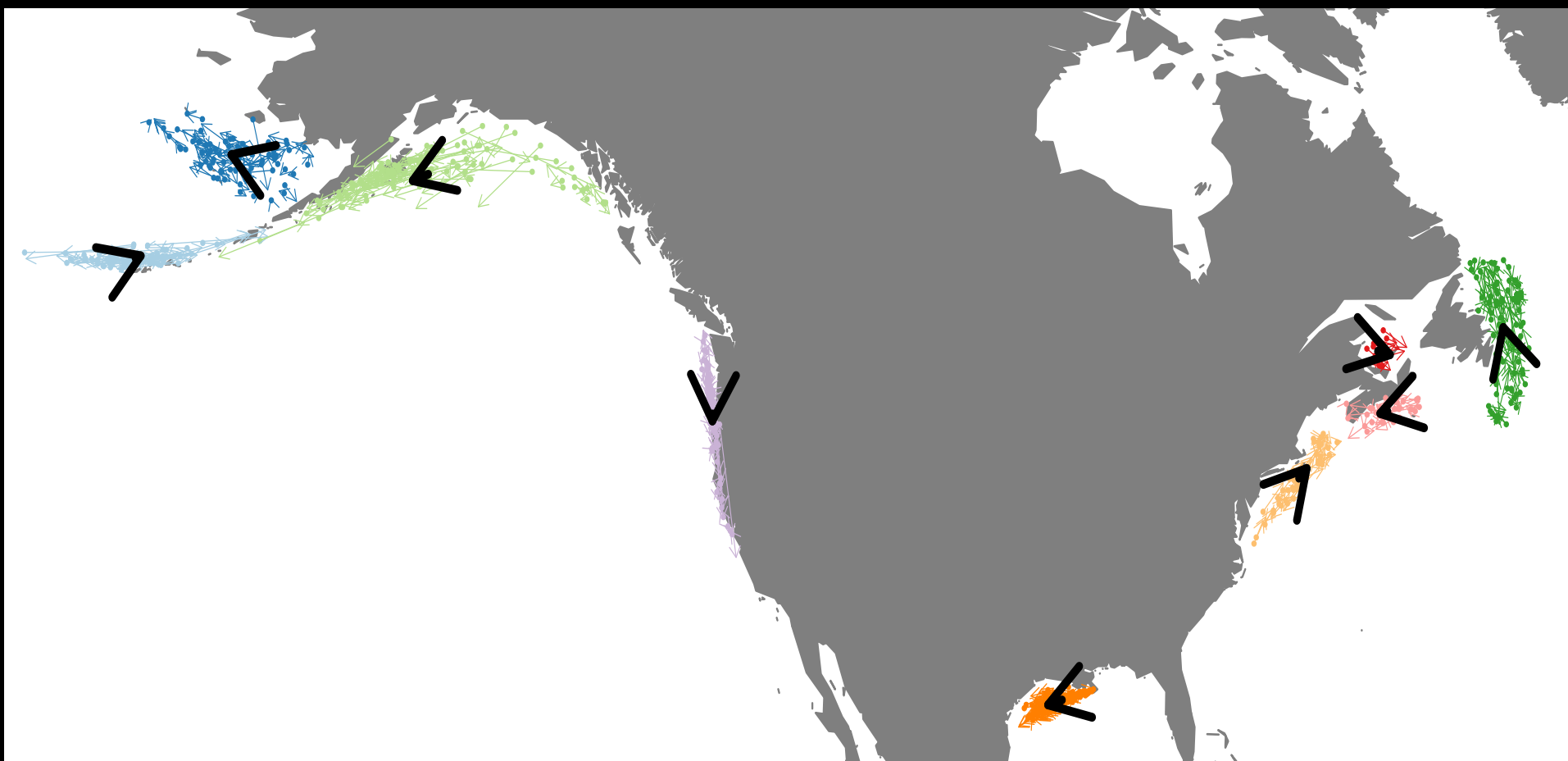
Distribution shifts 1968-2008



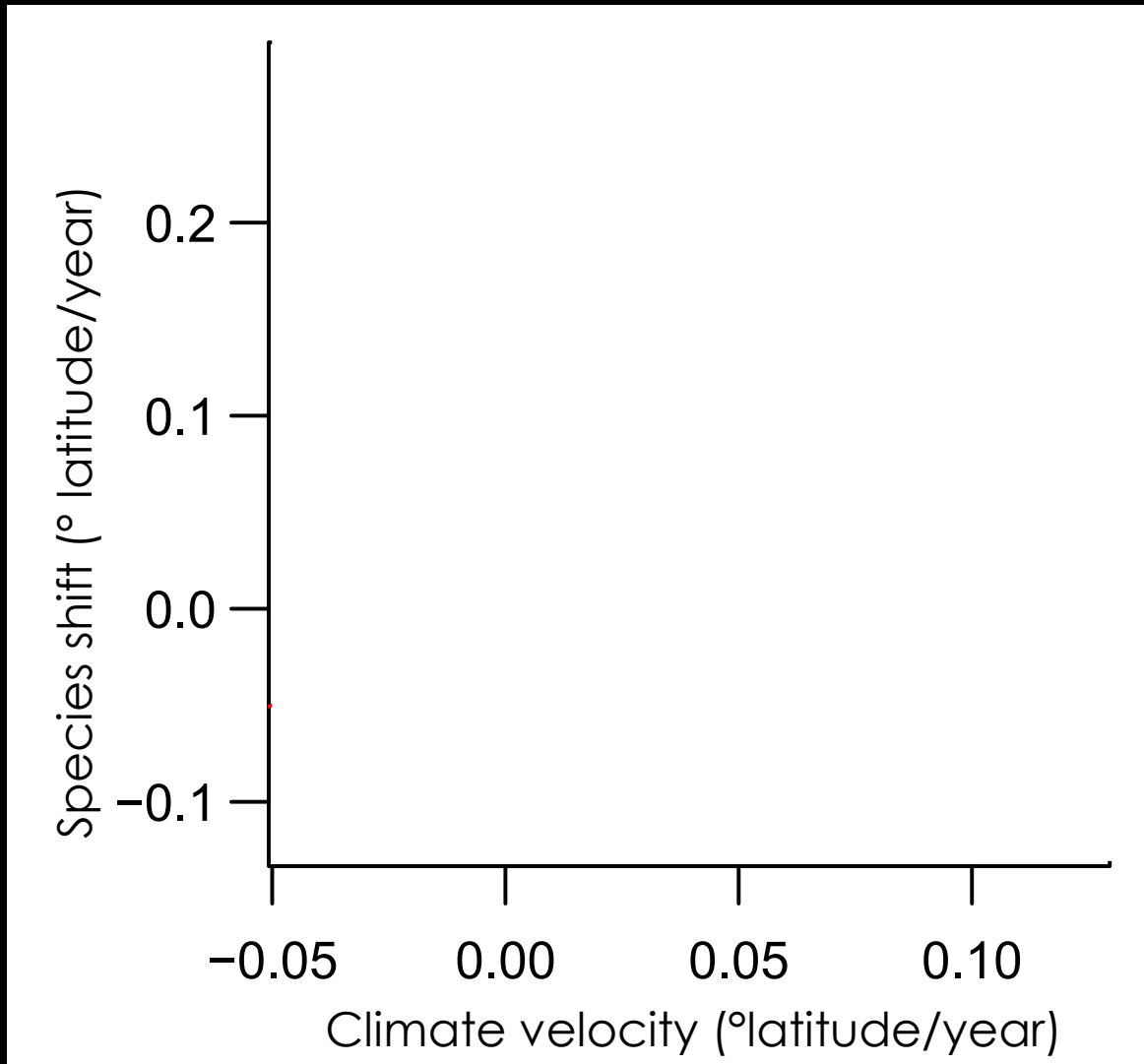
Distribution shifts 1968-2008



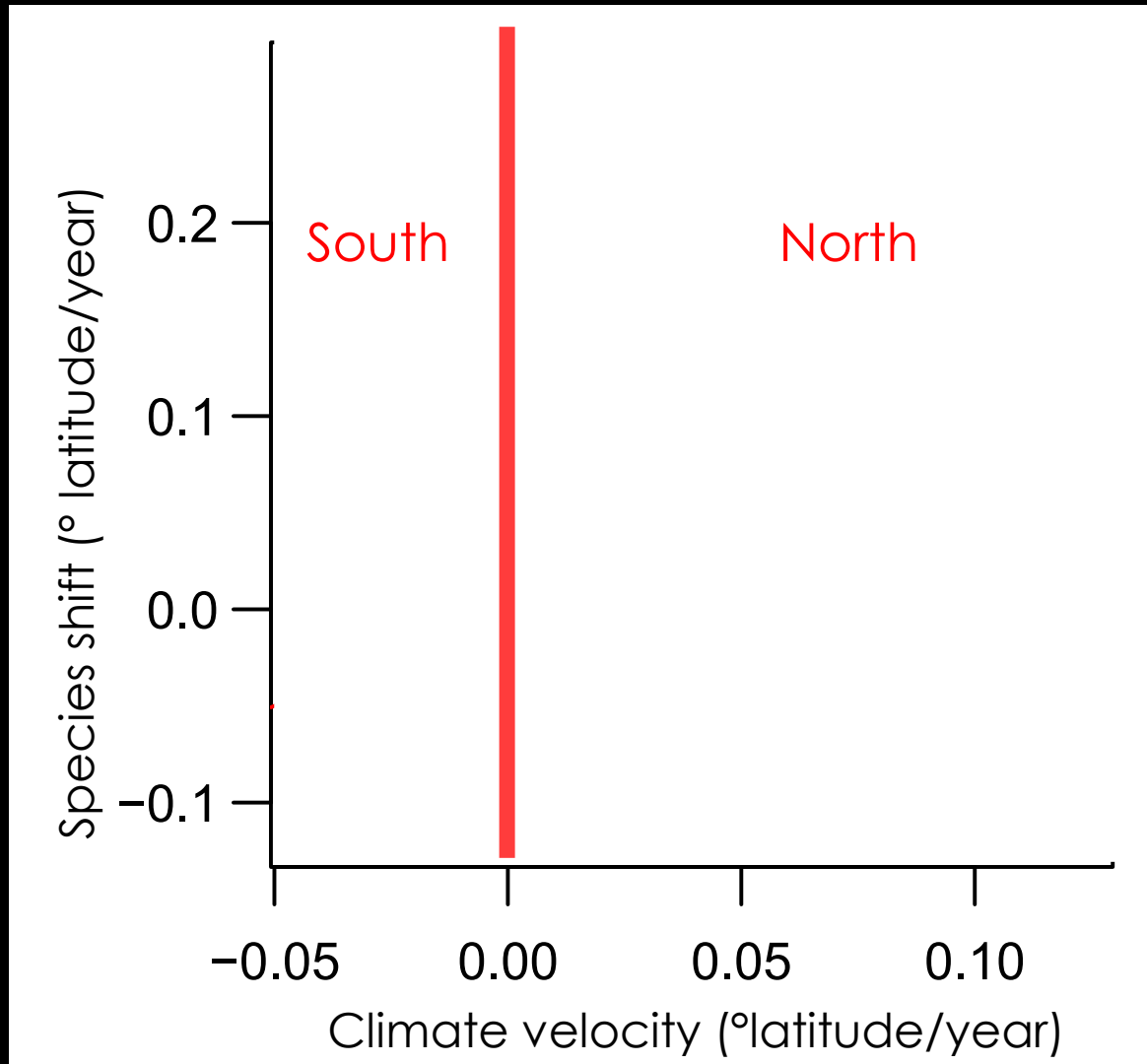
Many shifting species



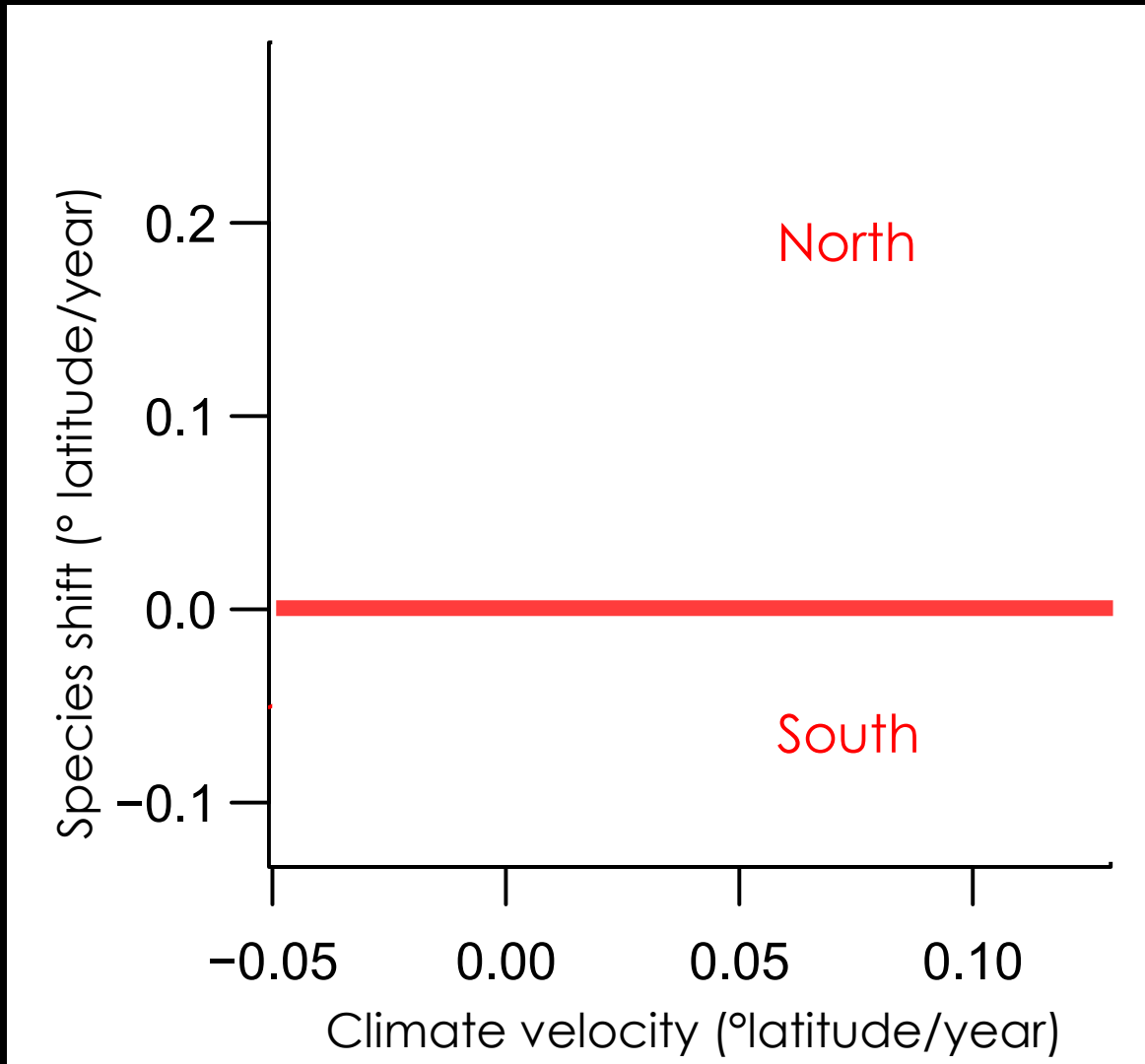
Climate velocity



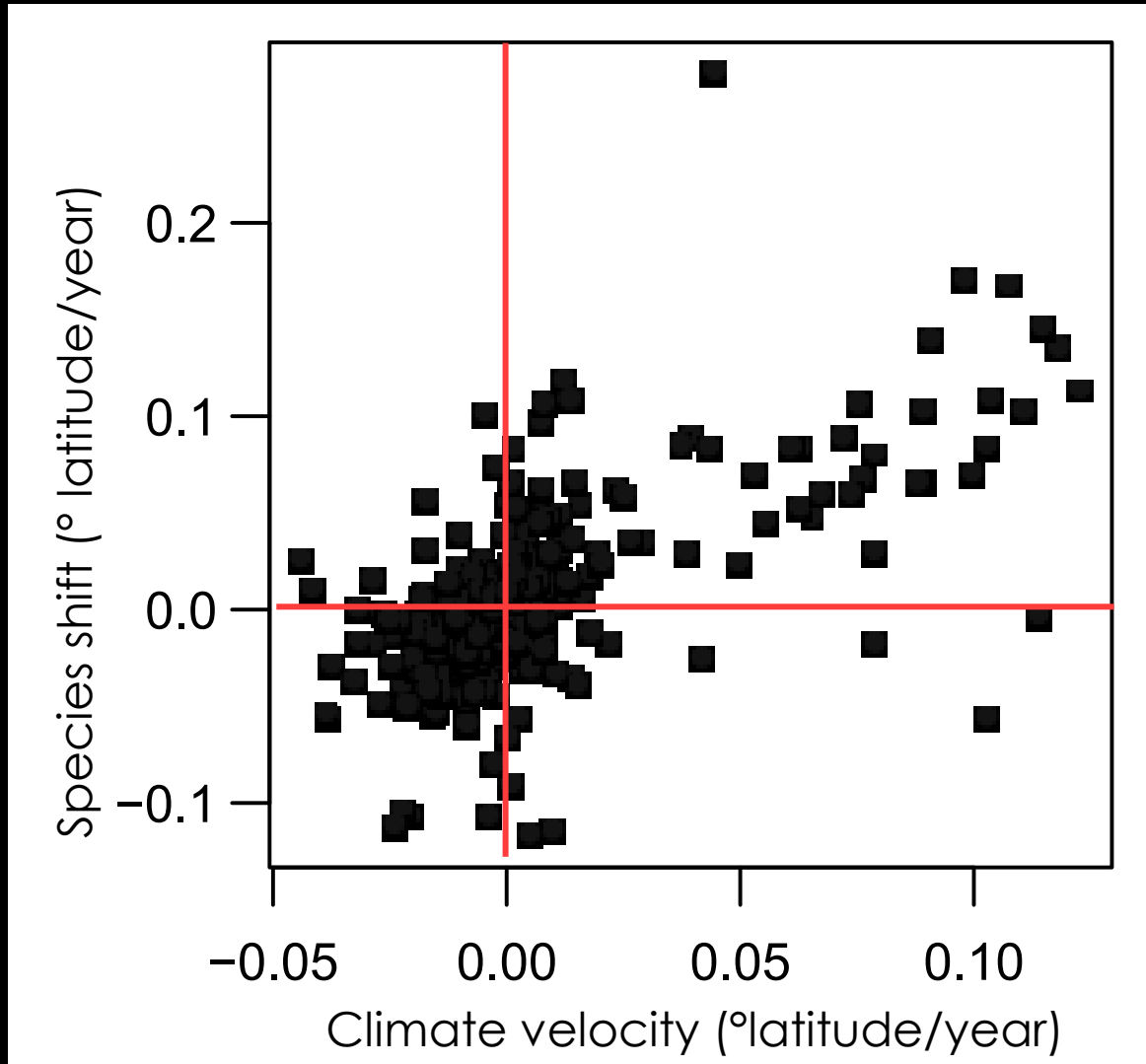
Climate velocity



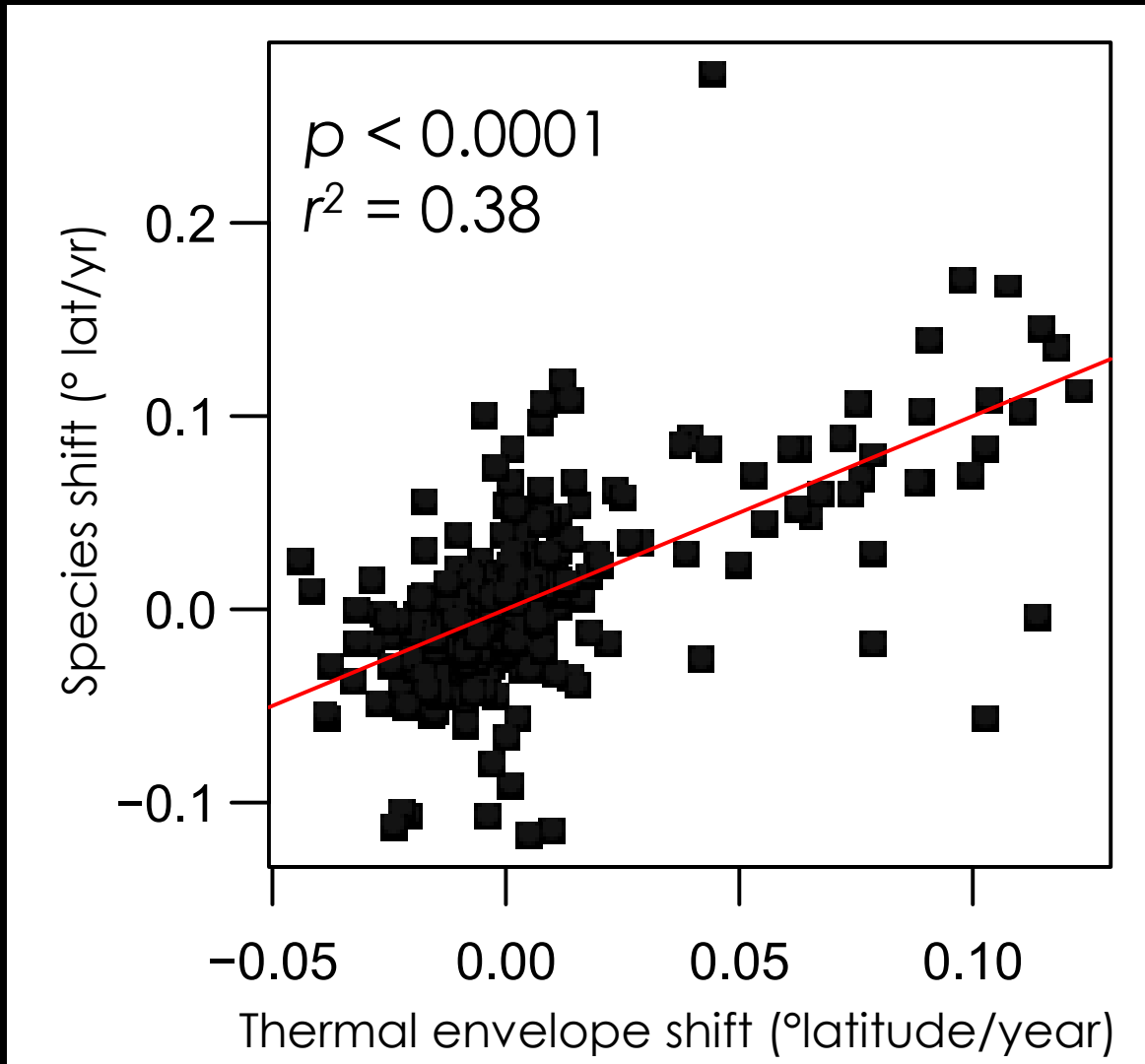
Climate velocity



Species follow climate velocity

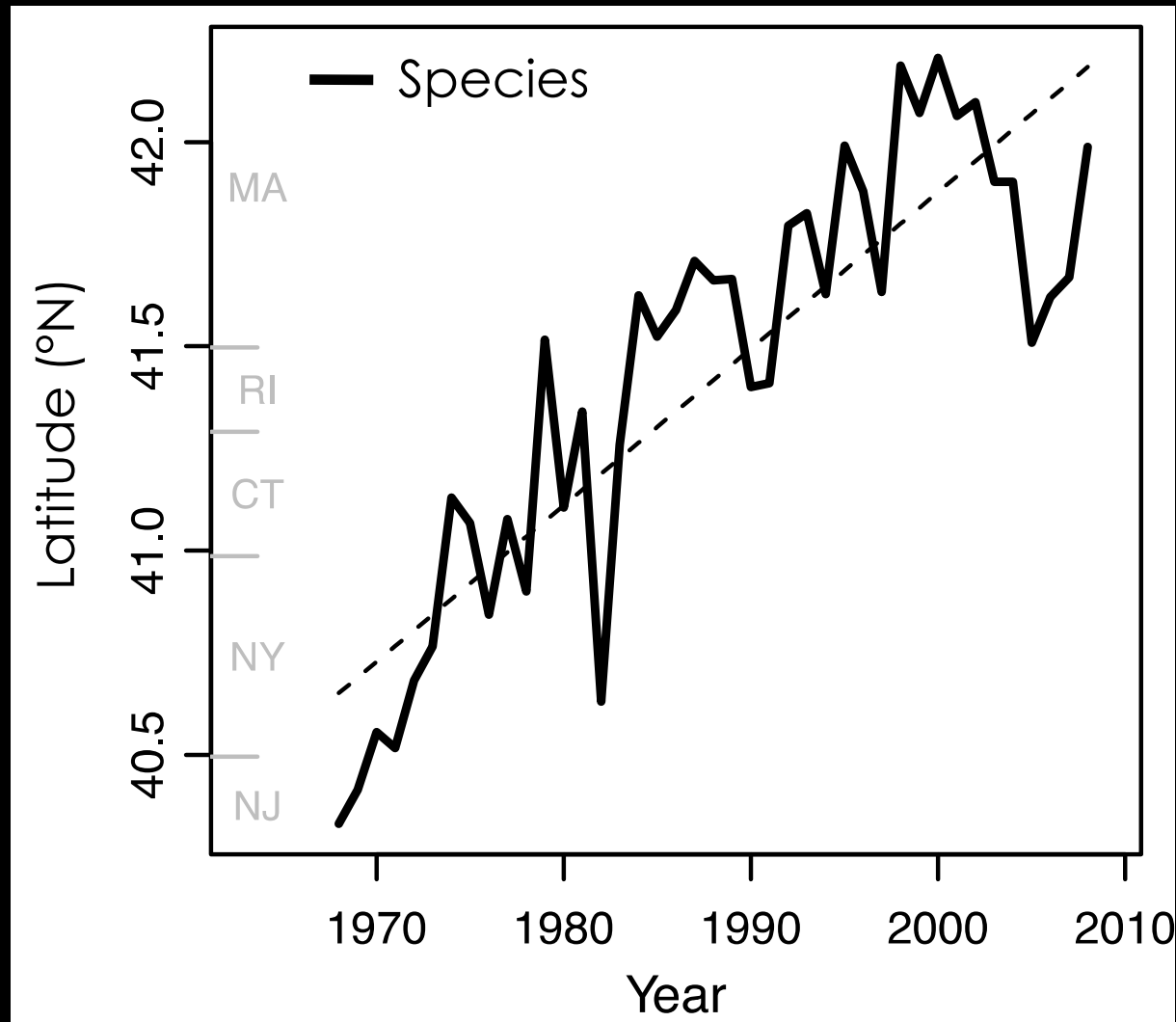


Species follow climate velocity



Fisheries?

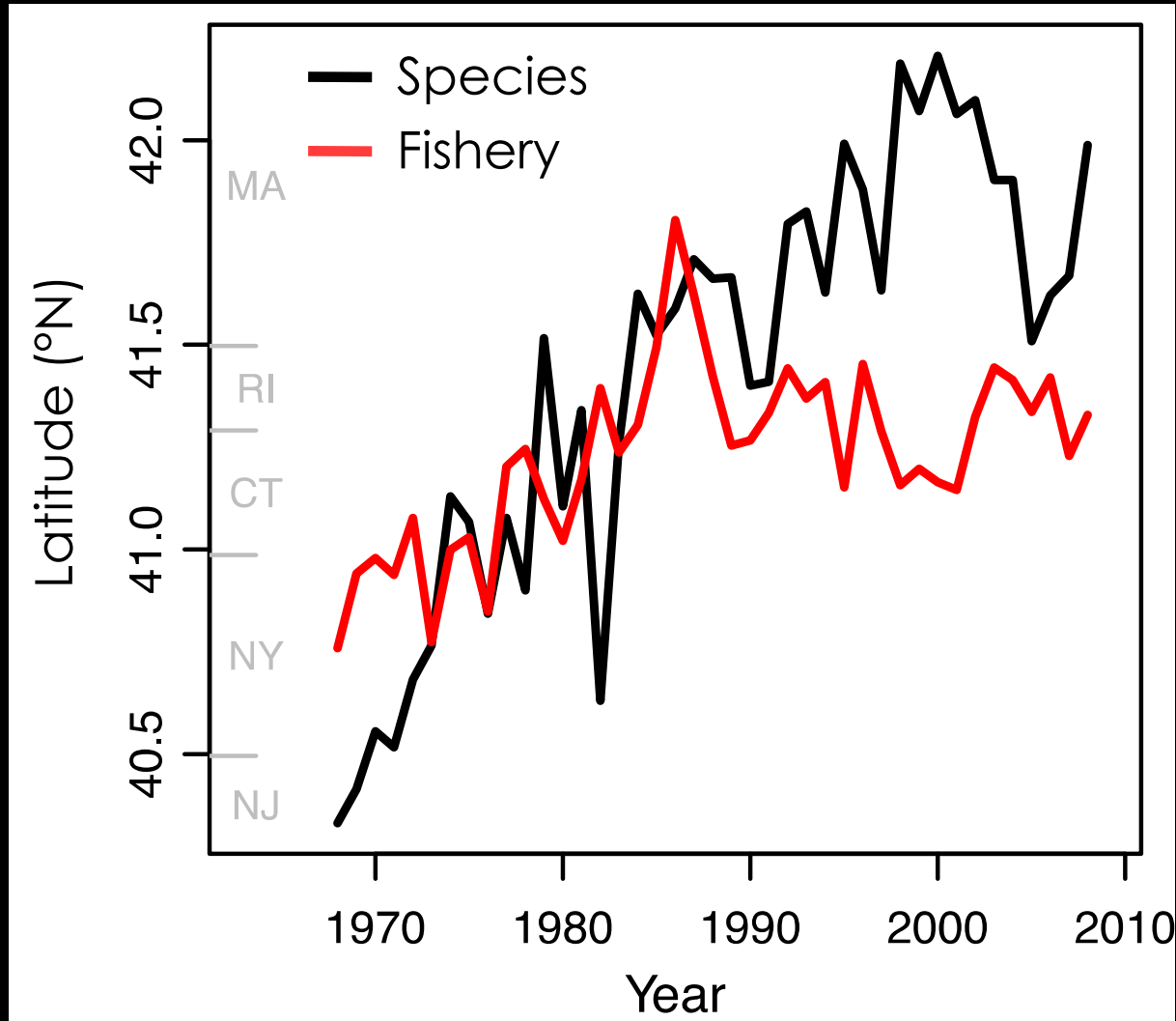
Rapid poleward shift of red hake



Urophycis chuss



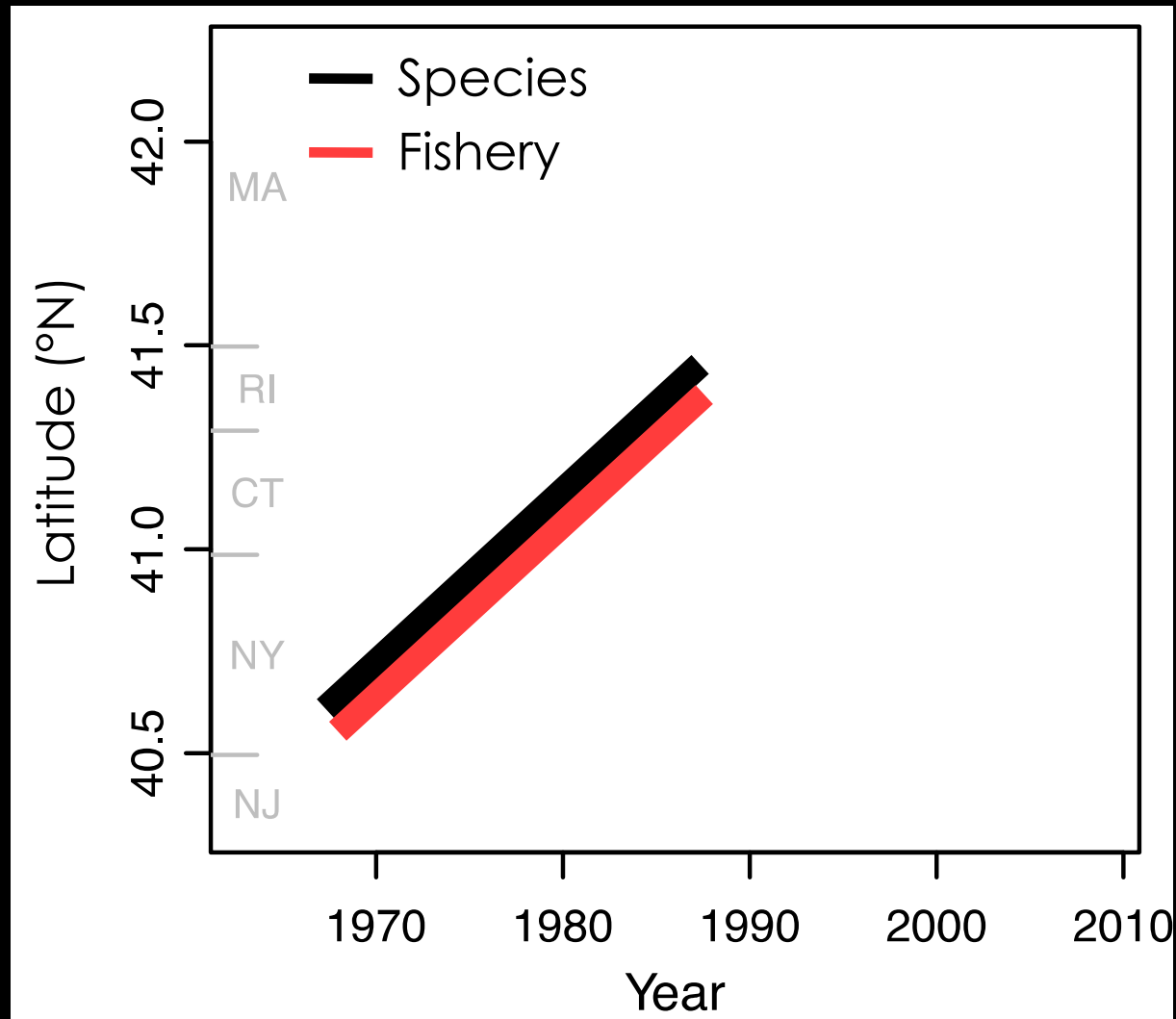
Fishery landings shift as well



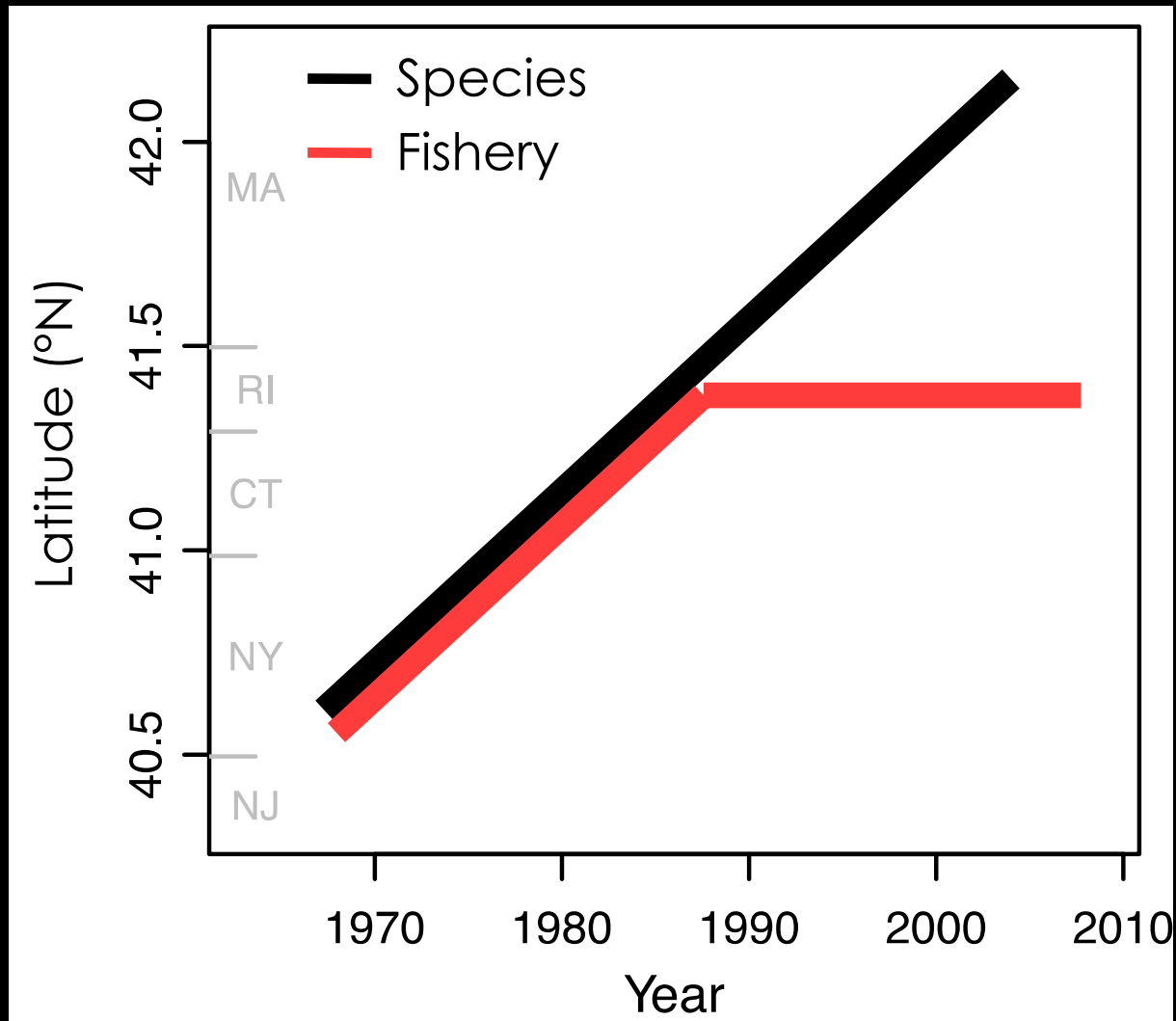
Urophycis chuss



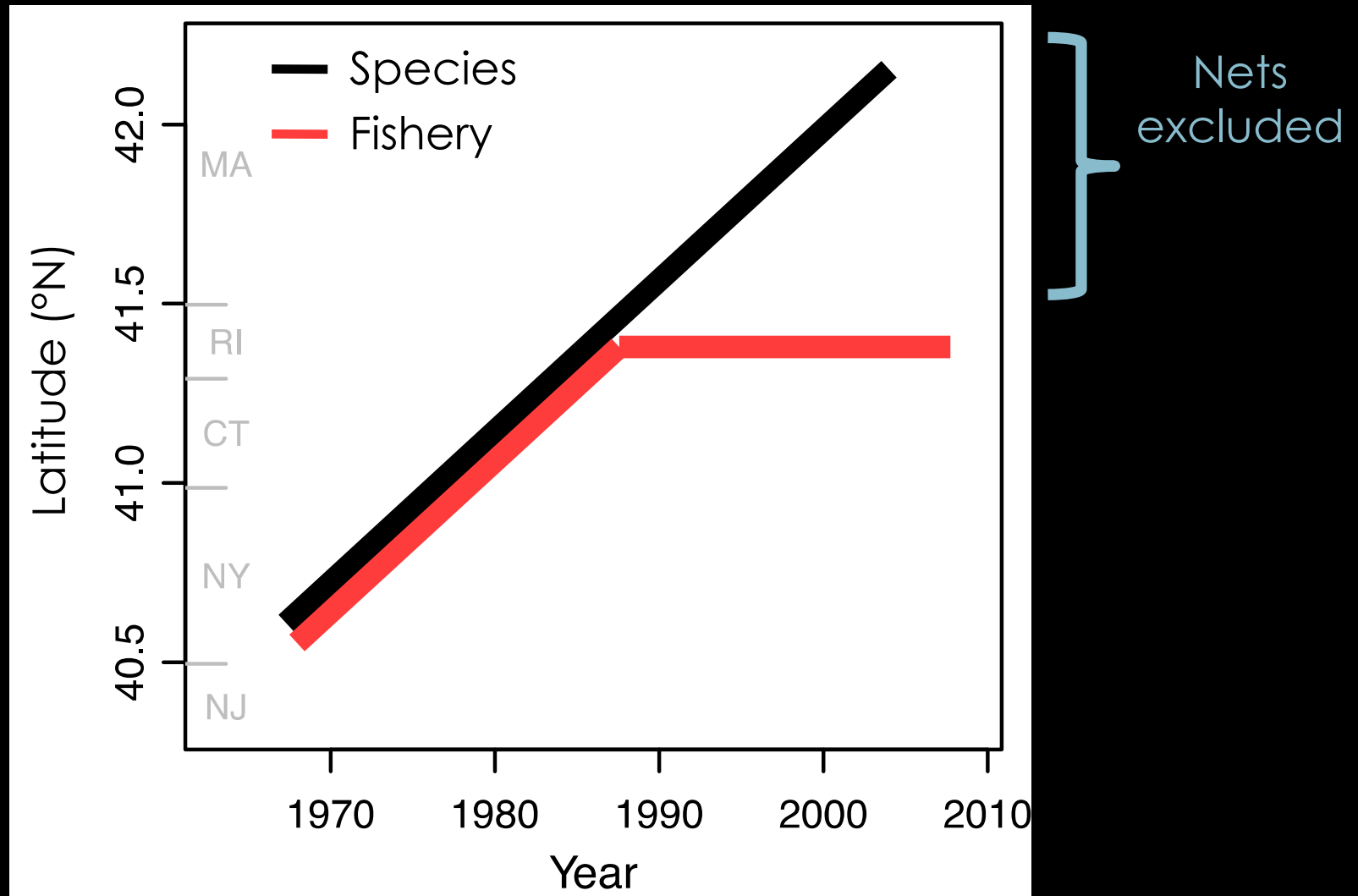
Fishery landings shift as well



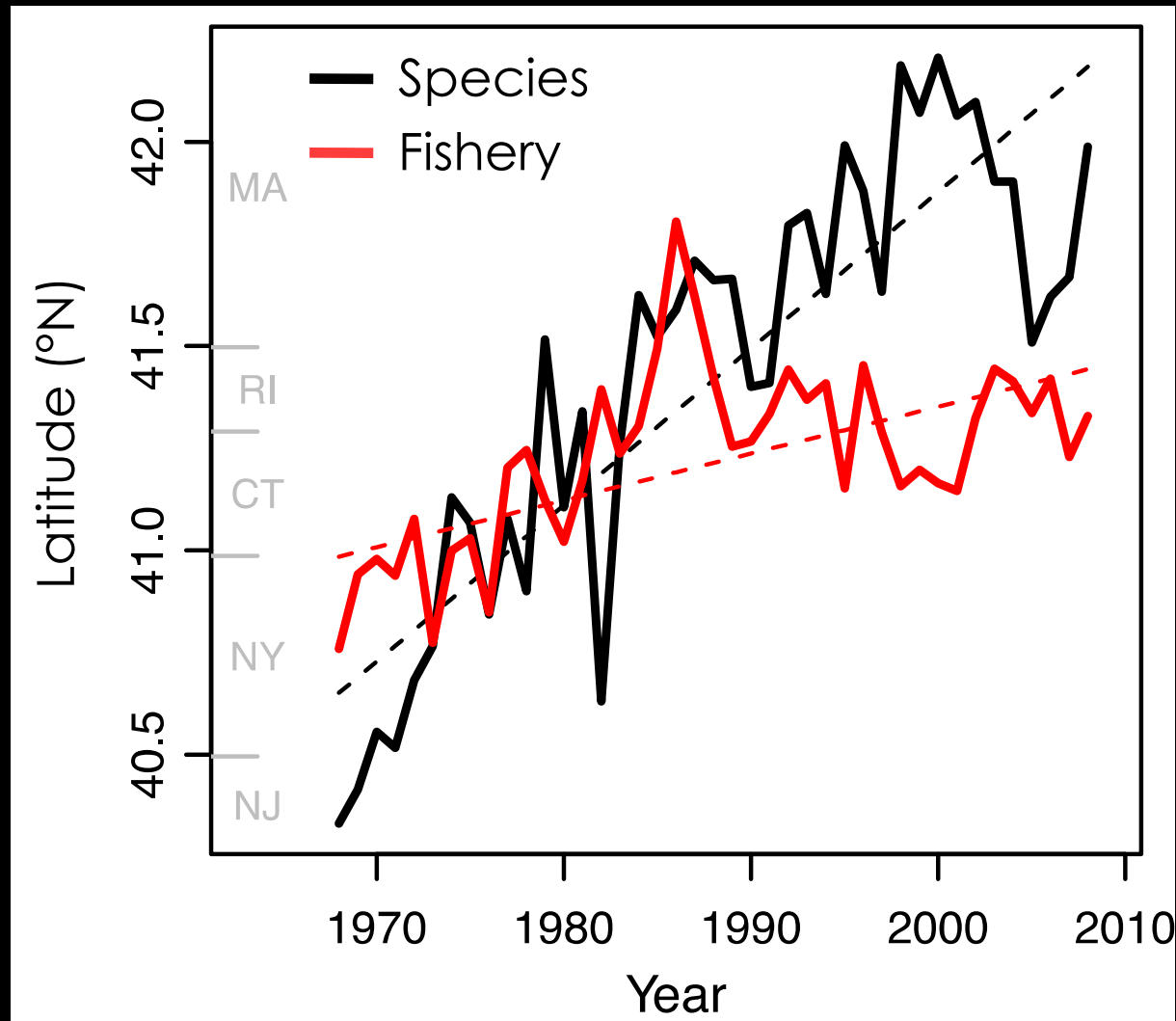
Fishery landings shift as well



Social, economic, and regulatory constraints



Fishery landings shift more slowly



75%
slower

Fisheries lag behind fish

Red hake	75% slower
Summer flounder	68% slower
American lobster	87% slower
Yellowtail flounder	85% slower

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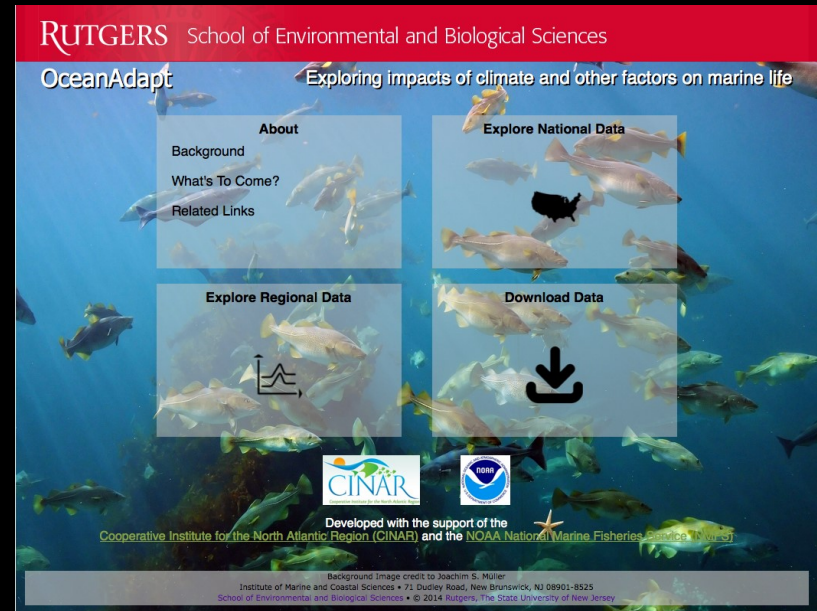
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Data to guide adaptation?

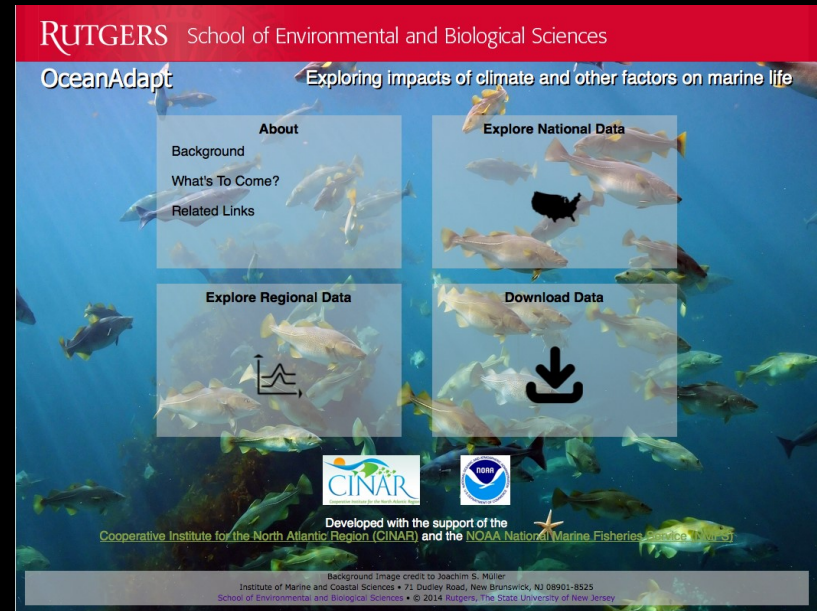
<http://oceanadapt.rutgers.edu>

- Tracks shifts in distribution of U.S. marine fish and invertebrates



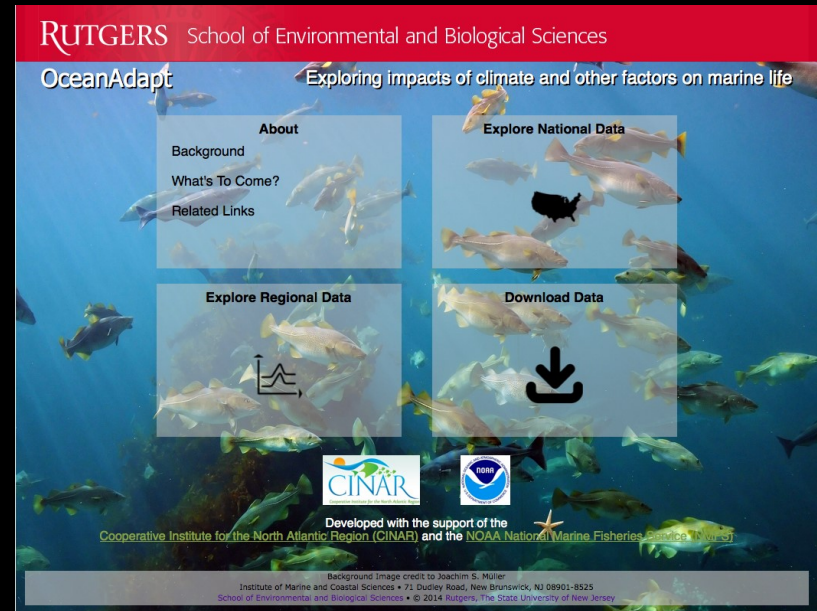
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- Operational



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- Tracks shifts in distribution of U.S. marine fish and invertebrates
- Operational
- Open science



In support of...

- Global Change Information System
- National Fish, Wildlife, and Plant Climate Adaptation Strategy
- President's Climate Action Plan
- U.S. Climate Resilience Toolkit

Planned expansions (short-term)

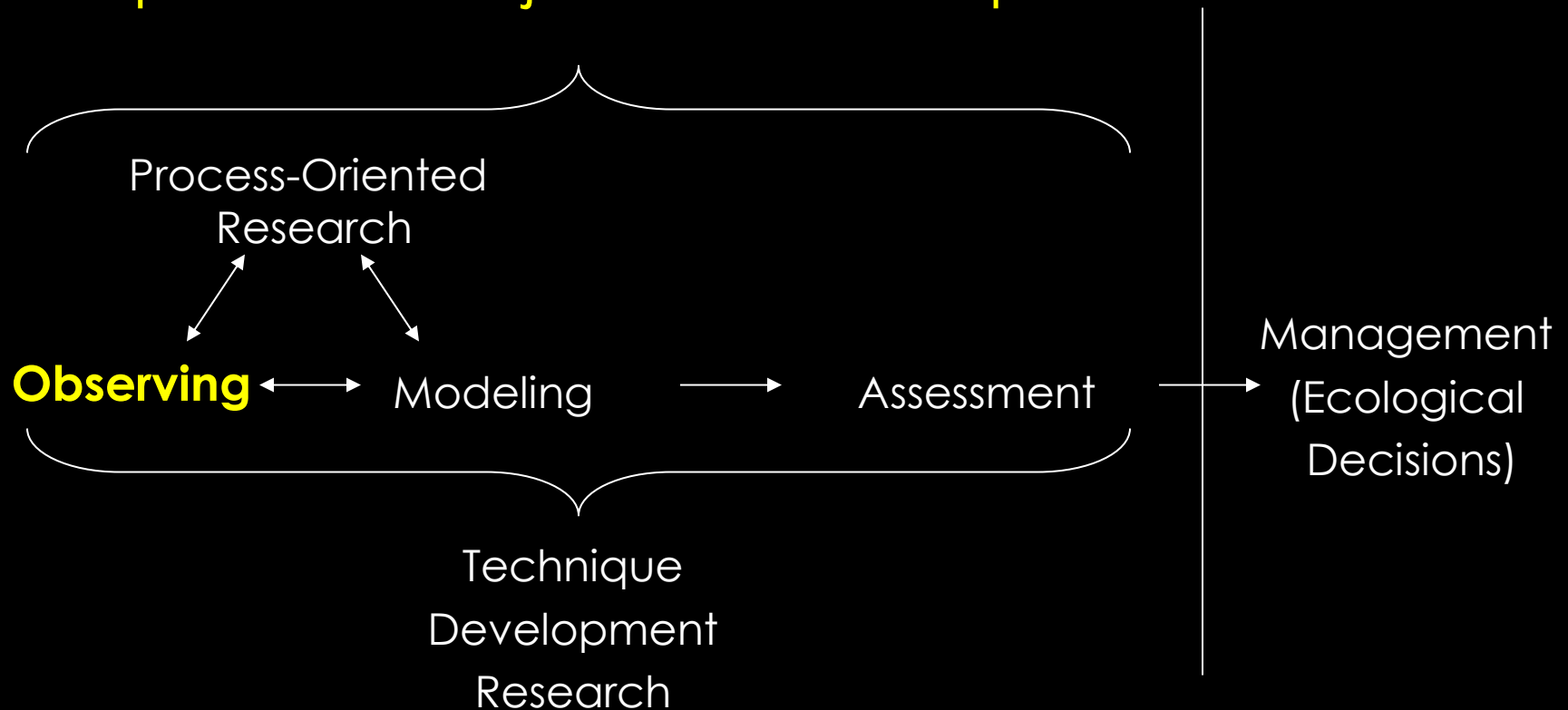
- Data
 - Southeast U.S. (SEAMAP-SA)
 - Others?
- Visualizations
 - Maps
- Content
 - Feature stories and videos

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Open Data Initiatives (Executive Order 13642)

Open data is just the first step



Summary

1. Marine fish and fisheries are shifting in response to climate
2. Management can adapt to climate impacts
3. OceanAdapt website provides data to aid adaptation