


Recreational fisheries as indicators of change:

Species range shifts from NOAA's Marine Recreational Information Program paired with economic trends

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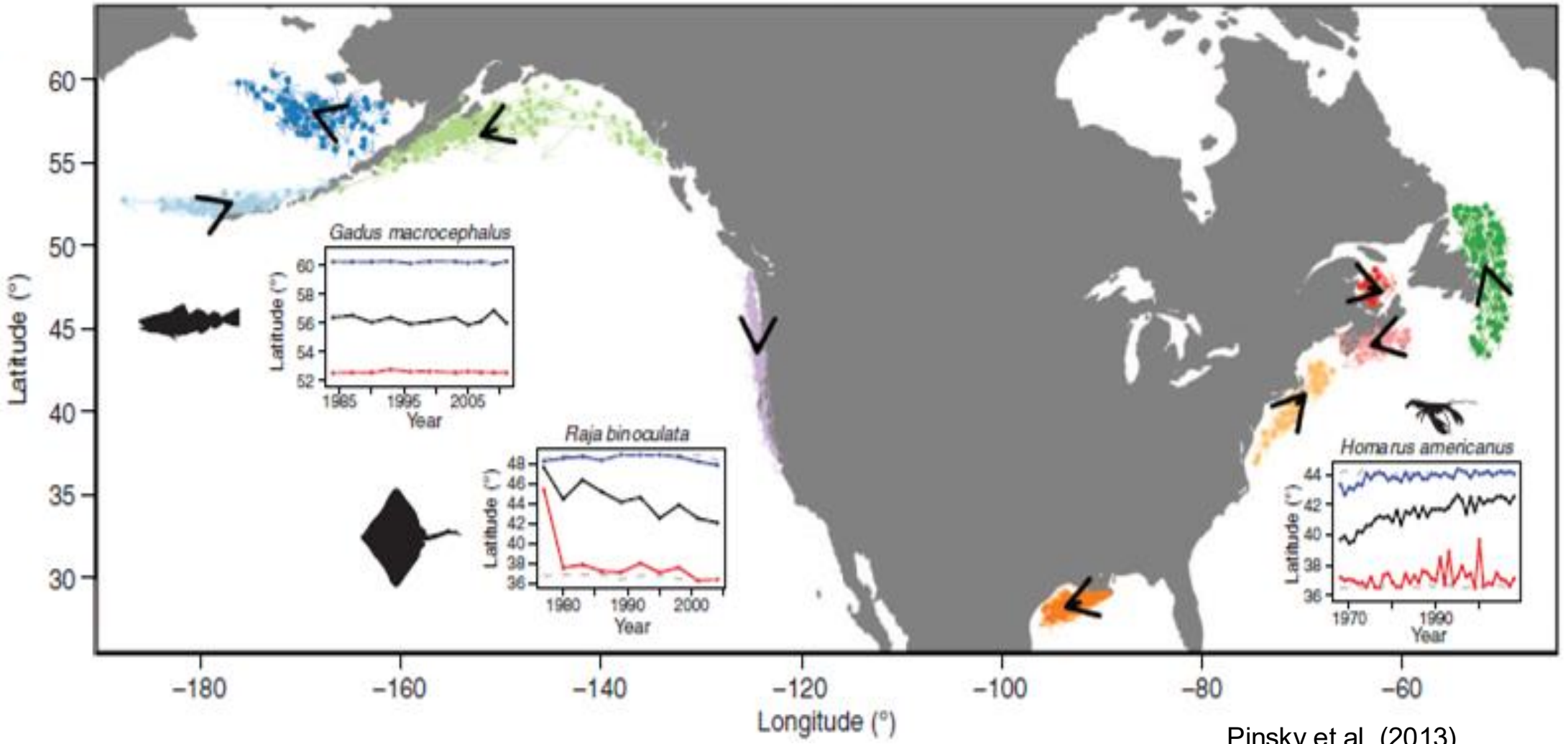
Marine species are experiencing shifts in range and distribution



Pinsky et al. (2013)

Shifting fisheries has implications for GDP, subsistence fishing, law, and stock health

600k people

Participation increasing

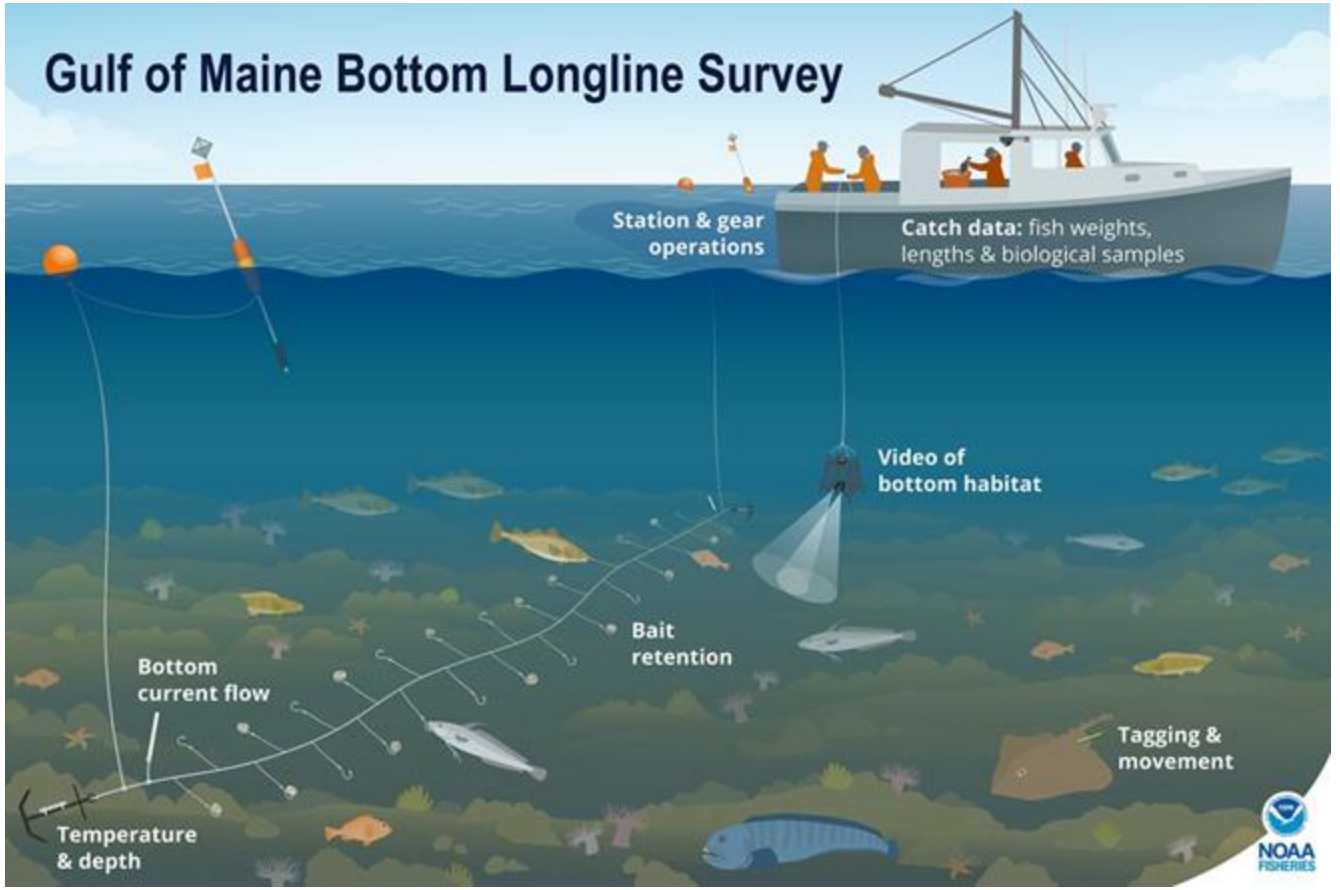
$150 billion

187 million trips

Traditional way to study distribution changes in fisheries is through surveys

- Commercial surveys
- Standardized survey

- Often lack recreational fishing input
  - As a consequence, surveys may leave out structure-associated fish



Can you use **recreational catch data** to determine shifts in range and center of distribution (COD)?

Do these results corroborate findings from a **standardized trawl**?

What economic impact might this have across state jurisdictions?

Recreational catch is surveyed by NOAA

- Marine Recreational Information Program (**MRIP**)
- Partnership between NOAA Fisheries and regional/state partners
- NOAA Fisheries implements survey and data standards and produce recreational fisheries statistics for end users utilizing the program
    - Intercept Survey at docks and via phone
    - East Coast and Gulf Coast
    - Collected in 6 waves
    - Continuous dataset since 1980
    - Publicly accessible
    - Used in regional quota setting of fisheries
    - Not used in ecosystem-wide application until recent (Williams 2025)

Recreational Fisheries Statistics Queries

NOAA Fisheries' Marine Recreational Information Program maintains a searchable database of its recreational fisheries statistics. Known as the MRIP Query Tool, this database allows users to filter recreational fishing data by time series, geographic area, species, mode, and other characteristics.

Public-use datasets and statistical analysis programs are available on our Recreational Fishing Data Downloads page. If the information you need is not available through the MRIP Query Tool or these public-use datasets, you may submit a custom data request. Requests

Catch Data

Select a Catch Query

Goto Query

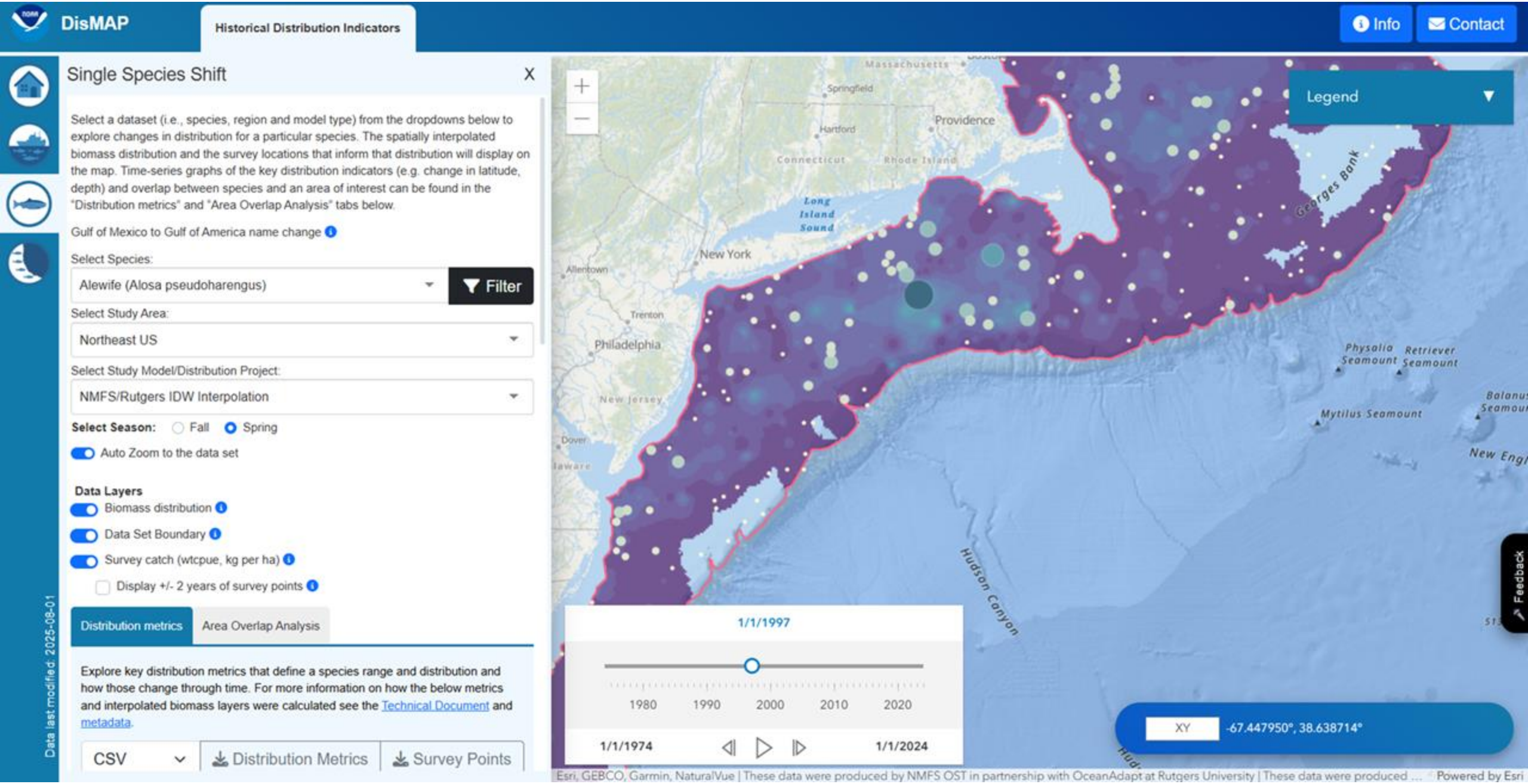
Effort Data

Select an Effort Query

Goto Query

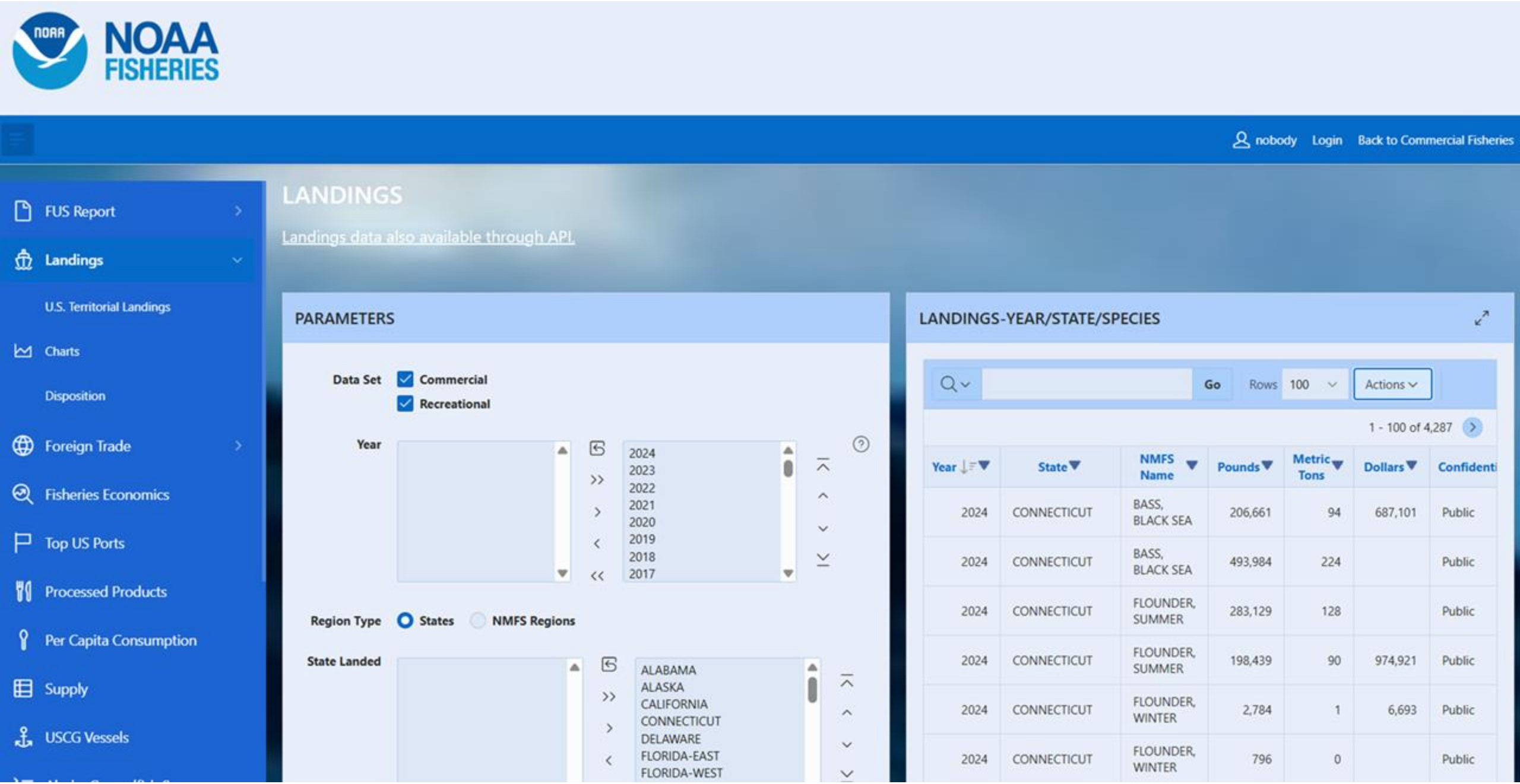
Fishery Independent Data is surveyed by NOAA

- ex) Northeast Bottom Trawl
  - Groundfish survey
  - Run only in Spring and Fall
  - Raw data can be publicly downloaded
    - Distribution Mapping and Analysis Portal Tool: DisMAP
      - summarizes NOAA's trawl surveys into spatial indicators like range, minimum latitude, and center of distribution.
      - Has a subsequent R package to download metrics*


DisMAP
Historical Distribution Indicators
Info
Contact
Single Species Shift
X
Select a dataset (i.e., species, region and model type) from the dropdowns below to explore changes in distribution for a particular species. The spatially interpolated biomass distribution and the survey locations that inform that distribution will display on the map. Time-series graphs of the key distribution indicators (e.g. change in latitude, depth) and overlap between species and an area of interest can be found in the "Distribution metrics" and "Area Overlap Analysis" tabs below.
Gulf of Mexico to Gulf of America name change
Select Species:
Alewife (Alosa pseudoharengus)
Filter
Select Study Area:
Northeast US
Select Study Model/Distribution Project:
NMFS/Rutgers IDW Interpolation
Select Season:
Fall
Spring
Auto Zoom to the data set
Data Layers
Biomass distribution
Data Set Boundary
Survey catch (wtcpue, kg per ha)
Display +/- 2 years of survey points
Distribution metrics
Area Overlap Analysis
Explore key distribution metrics that define a species range and distribution and how those change through time. For more information on how the below metrics and interpolated biomass layers were calculated see the Technical Document and metadata.
CSV
Distribution Metrics
Survey Points
Data last modified: 2025-08-01
Legend
Massachusetts
Springfield
Hartford
Providence
Connecticut
Rhode Island
Long Island Sound
Georges Bank
New York
Allentown
Trenton
Philadelphia
New Jersey
Dover
Physalia Seamount
Retriever Seamount
Mytilus Seamount
Hudson Canyon
1/1/1997
1980
1990
2000
2010
2020
1/1/1974
1/1/2024
XY
-67.447950°, 38.638714°
Feedback
Esri, GEBCO, Garmin, NaturalVue | These data were produced by NMFS OST in partnership with OceanAdapt at Rutgers University | These data were produced ...
Powered by Esri

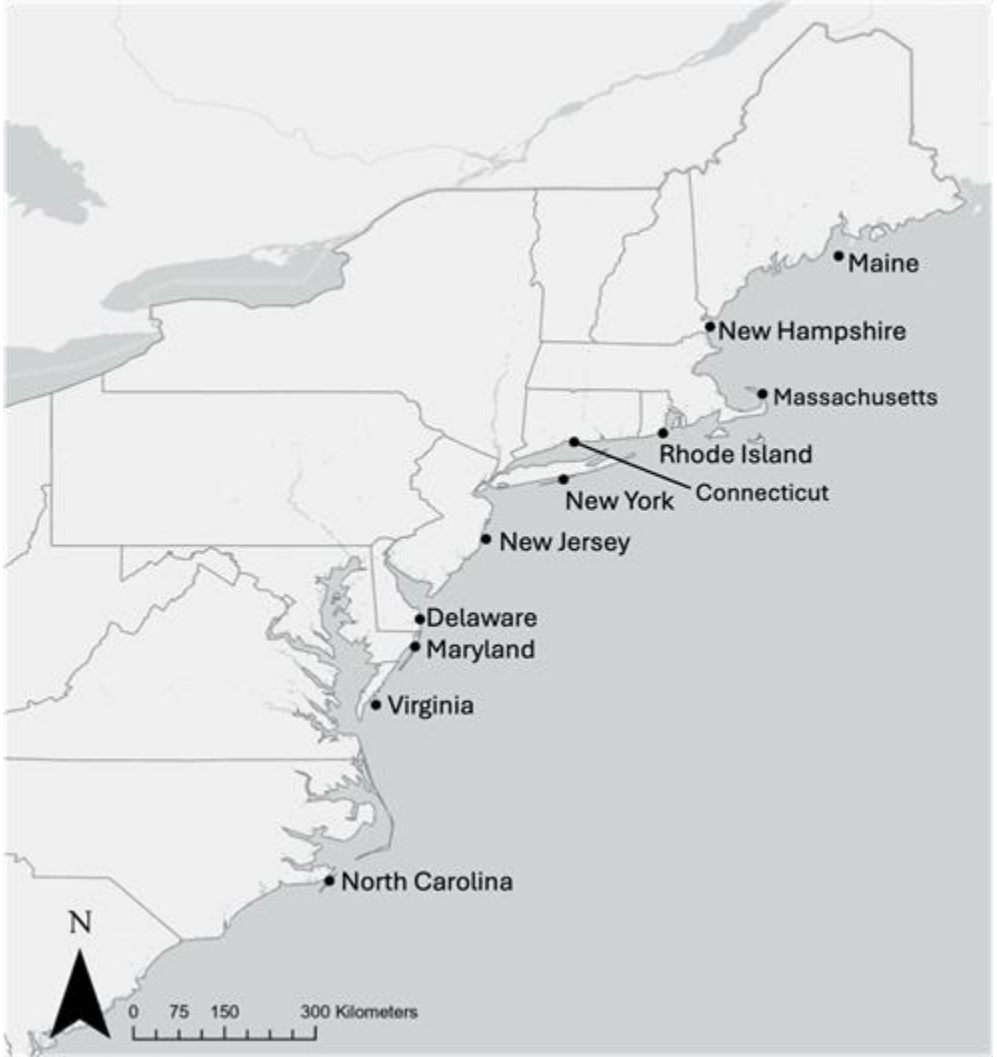
Economic data compiled by NOAA - Fisheries One Stop Shop (**FOSS**)

- Fishery-dependent data
- Aggregate landings and economic value of commercial and recreational fishing in US coastal states
- Publicly available


NOAA FISHERIES
nobody
Login
Back to Commercial Fisheries
FUS Report
Landings
U.S. Territorial Landings
Charts
Disposition
Foreign Trade
Fisheries Economics
Top US Ports
Processed Products
Per Capita Consumption
Supply
USCG Vessels
LANDINGS
Landings data also available through API
PARAMETERS
Data Set
Commercial
Recreational
Year
2024
2023
2022
2021
2020
2019
2018
2017
Region Type
States
NMFS Regions
State Landed
ALABAMA
ALASKA
CALIFORNIA
CONNECTICUT
DELAWARE
FLORIDA-EAST
FLORIDA-WEST
LANDINGS-YEAR/STATE/SPECIES
Go
Rows
100
Actions
1 - 100 of 4,287
Year
State
NMFS Name
Pounds
Metric Tons
Dollars
Confidenti
2024 CONNECTICUT BASS, BLACK SEA 206,661 94 687,101 Public
2024 CONNECTICUT BASS, BLACK SEA 493,984 224 Public
2024 CONNECTICUT FLOUNDER, SUMMER 283,129 128 Public
2024 CONNECTICUT FLOUNDER, SUMMER 198,439 90 974,921 Public
2024 CONNECTICUT FLOUNDER, WINTER 2,784 1 6,693 Public
2024 CONNECTICUT FLOUNDER, WINTER 796 0 Public


Species


- **Black Sea Bass**: structure associated, strong poleward movement already documented
- **Scup**: migrate between inshore and offshore habitats
- **Summer Flounder**: move northward and inshore as waters warm
- **Winter Flounder**: resident



MRIP Download

- State specific catch and effort data Maine – North Carolina
- 1981–2024, in waves (2 and 5)
- 4 Species
  - Query details: All oceans combined, all modes of fishing combined
  - Associated error value (PSE)

DisMAP Download

- Time-series of the key distribution indicators/metrics
  - Range, minimum latitude, maximum latitude, COD
- 1981–2024, seasonal
- 4 species (same as MRIP)



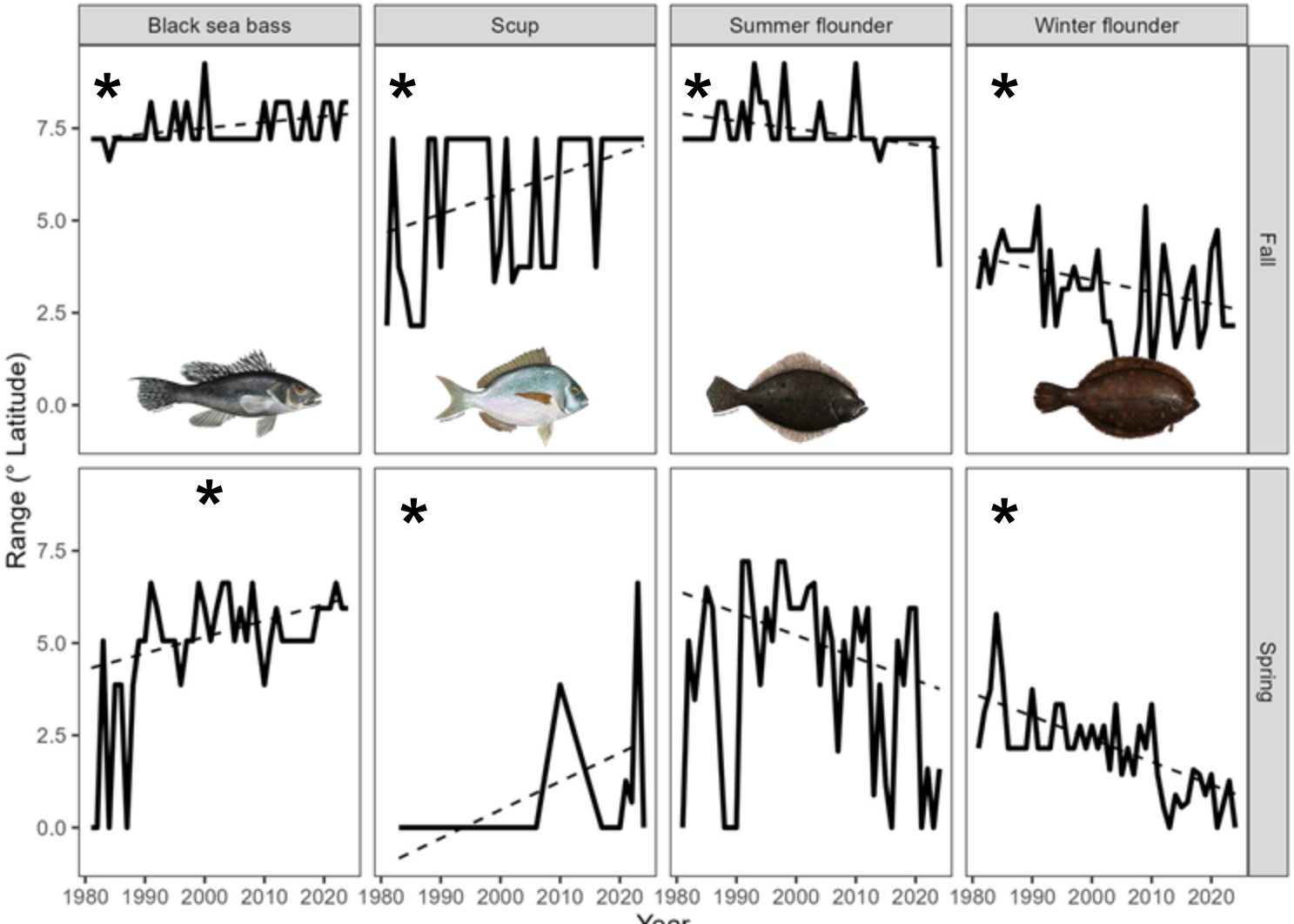

Analysis

$$\overline{COD} = \frac{\sum_{i=1}^{n} c_i Lat_i}{\sum_{i=1}^{n} c_i}$$

- **Recreational data from MRIP**
  - Assigned midpoint latitude to each state
  - Calculated catch per unit effort
  - Calculate Center of Distribution (COD)
  - Shapiro-Wilk test and Mann-Kendall monotonic trend tests on time series in R ($\alpha = 0.05$)
  - Calculated extent of range and COD changes (in degrees) for significant trends using 1981 and 2024 as temporal references
- **Survey data from disMAP**
  - Spring and Fall metrics + Mann-Kendall
- **Economic metrics from FOSS**
  - Aggregated by state and year, calculated COD value + Mann-Kendall

Two species experienced a range expansion from 1981–2024

Roday et al. 2025 (*In Review*)



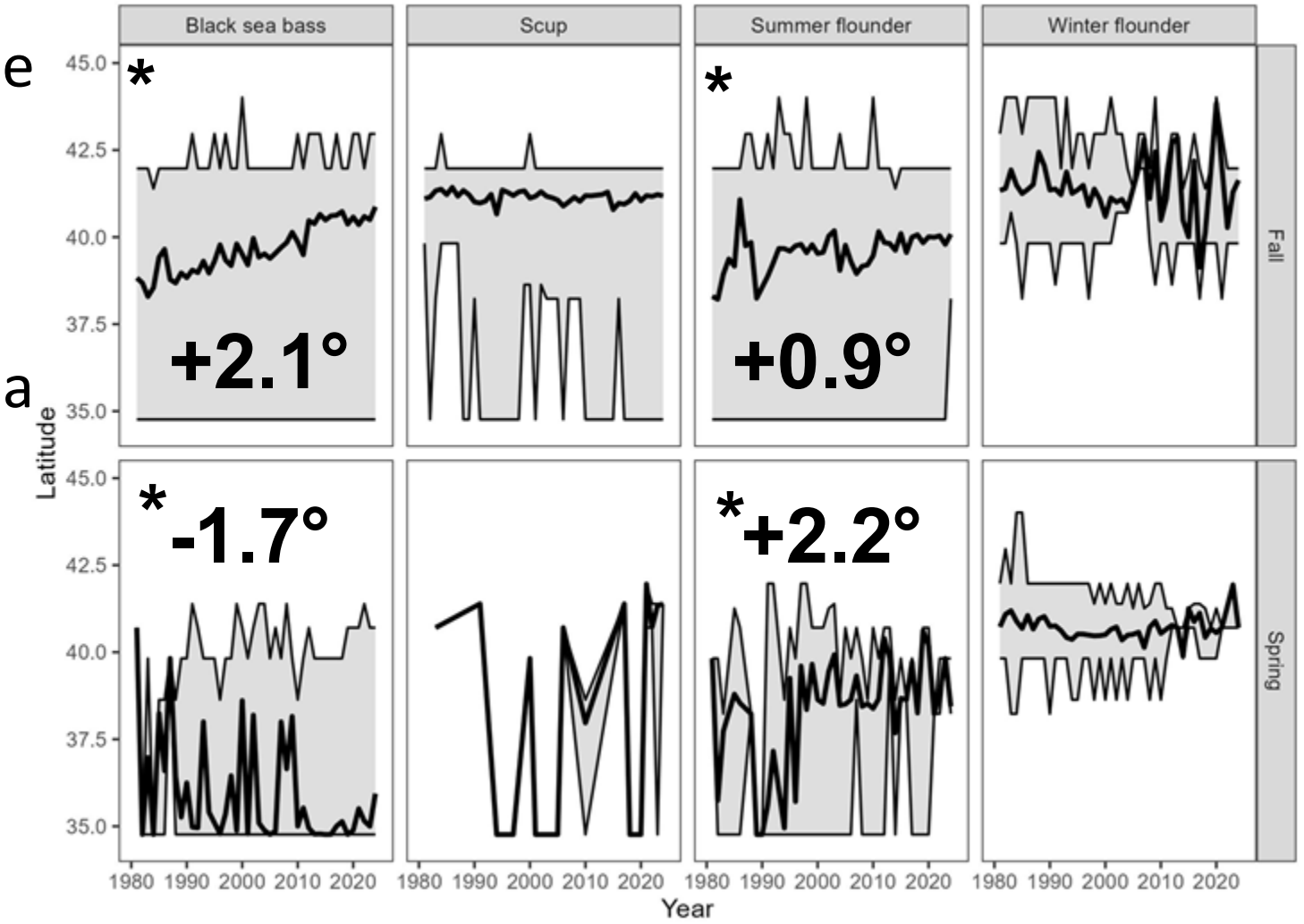
WF experienced range constriction

Two species experienced a COD shift in fall from 1981–2024

Roday et al. 2025 (*In Review*)

Maine

N. Carolina

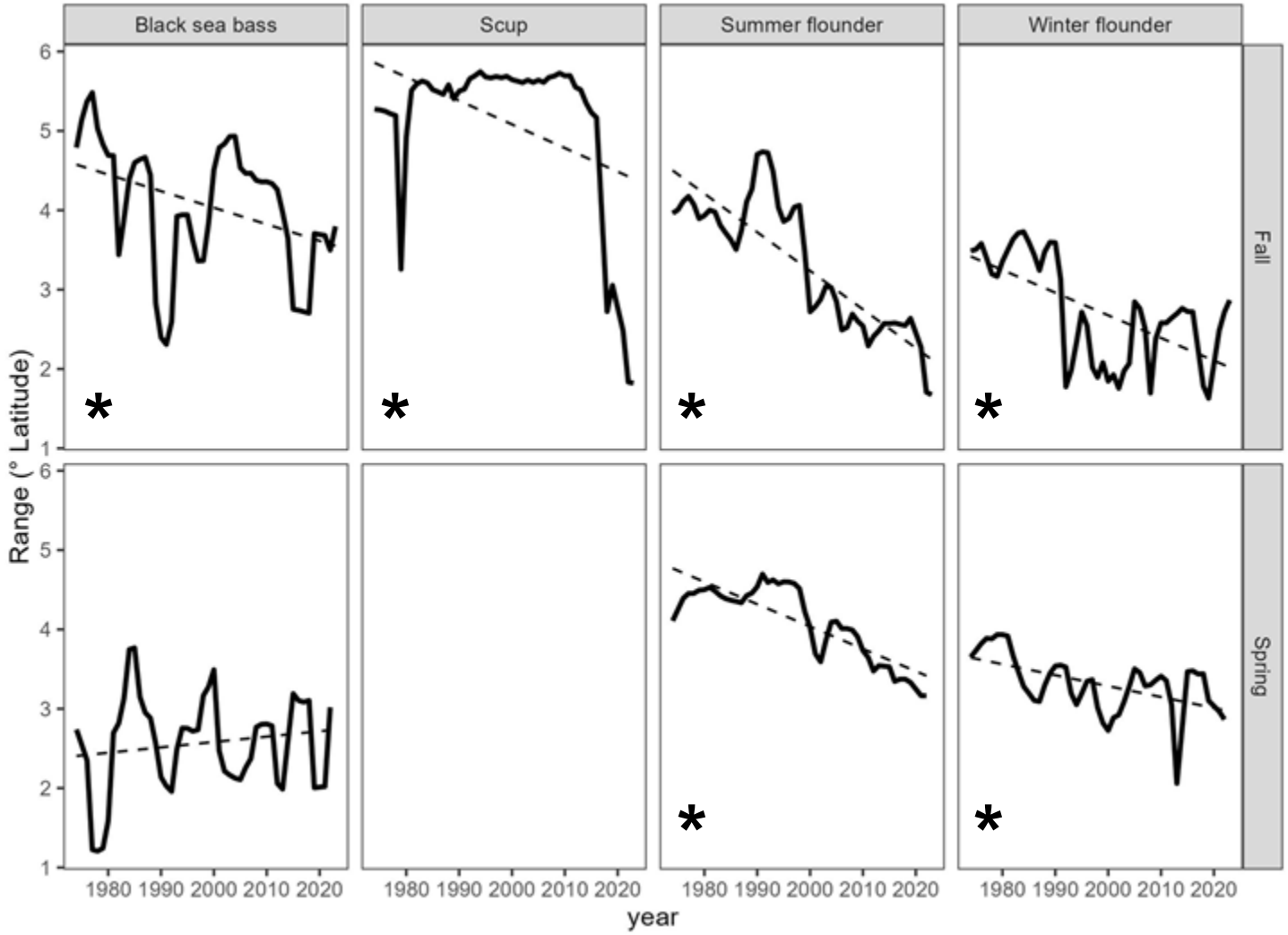


Range

COD

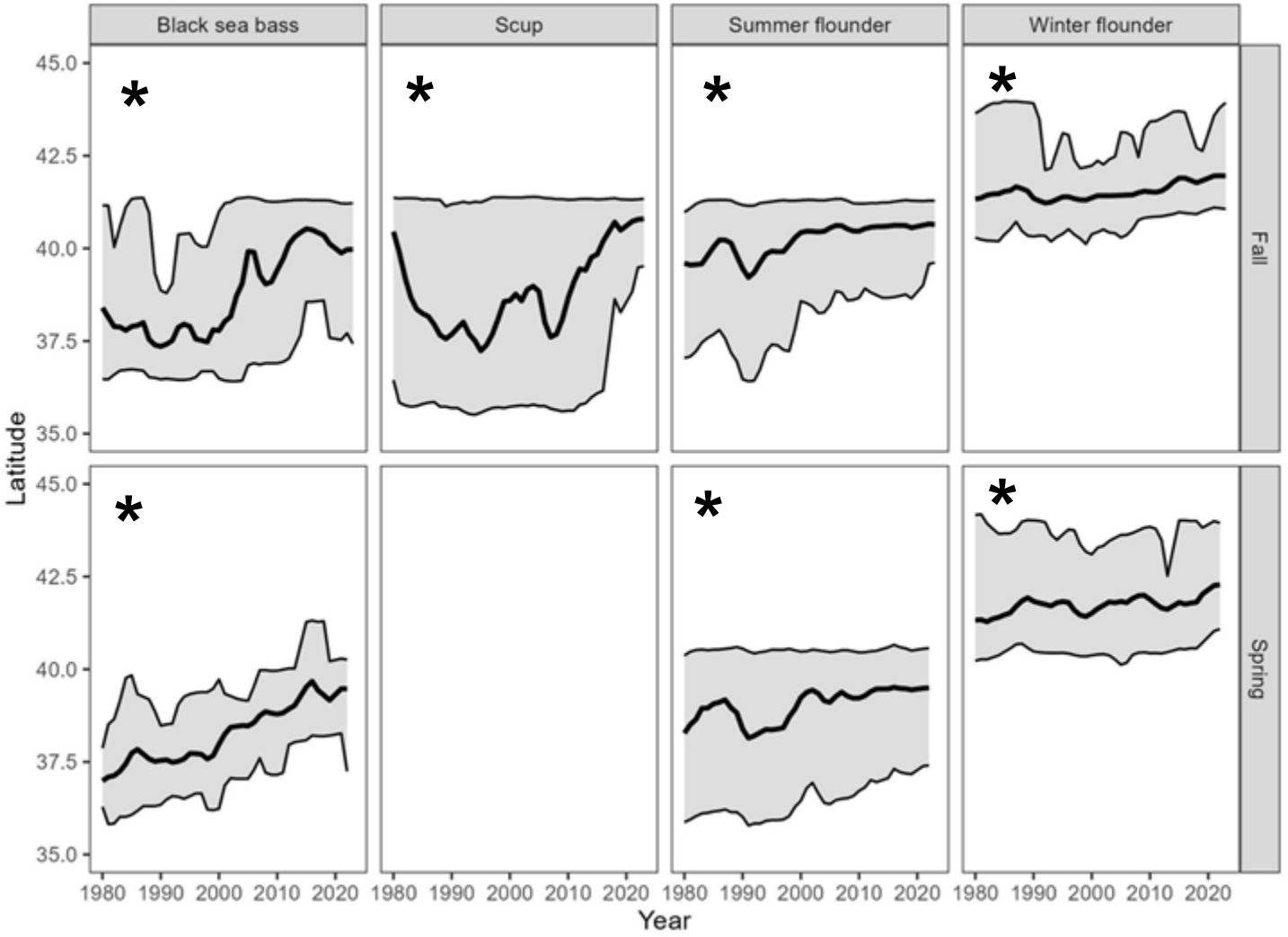
All four species experienced range constriction in Fall

Roday et al. 2025 (*In Review*)



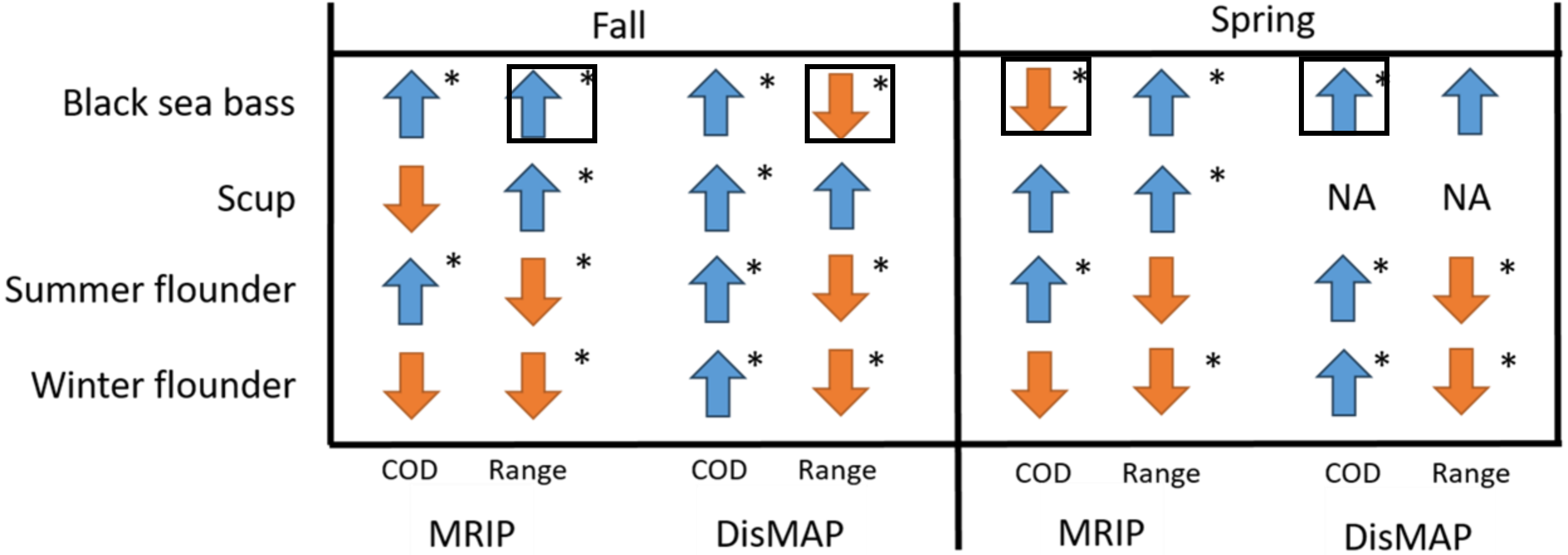
All four species experienced a northward COD shift from 1981–2024 (when data were available)

Roday et al. 2025 *(In Review)*

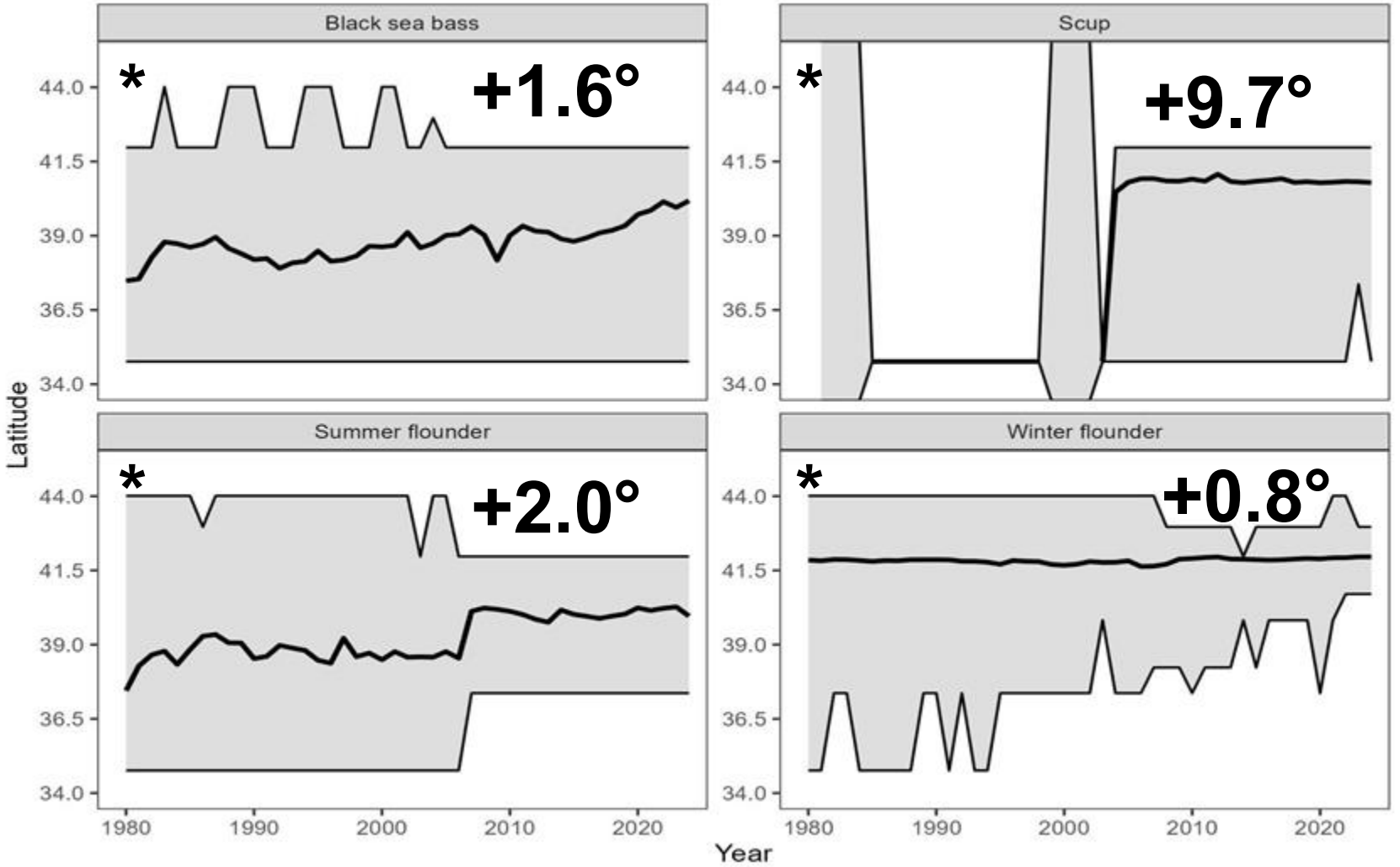



Summary

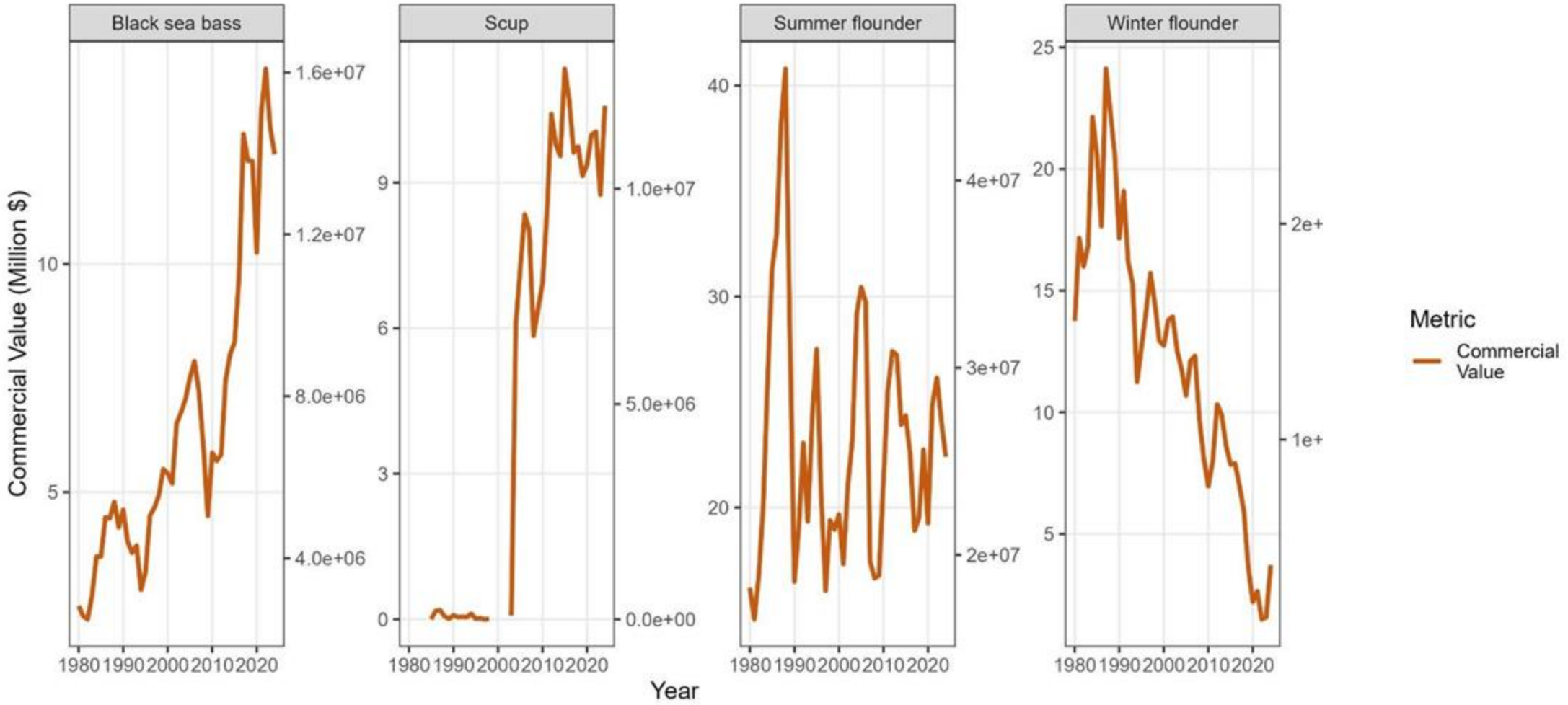

Roday et al. 2025 (*In Review*)



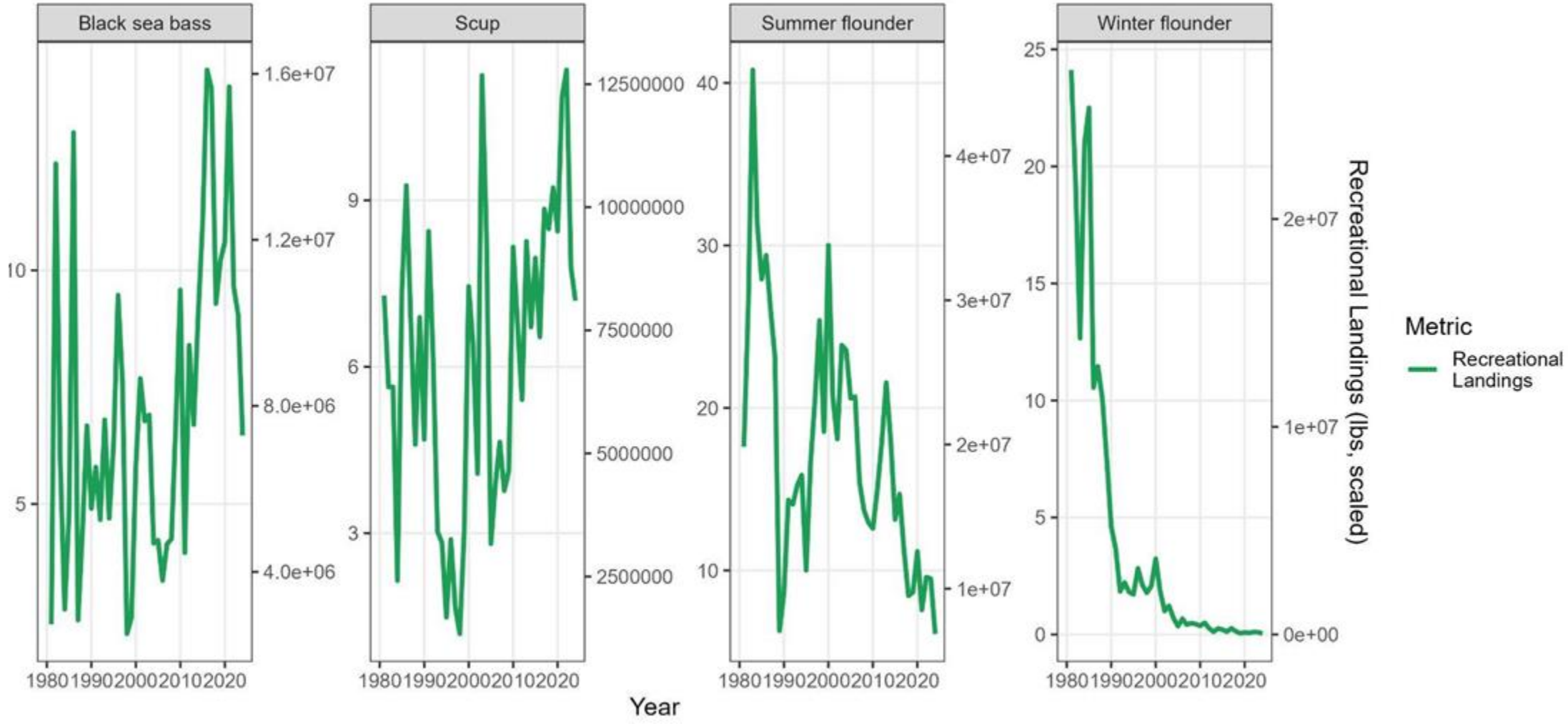
FOSS Commercial Value moves northward for all four species



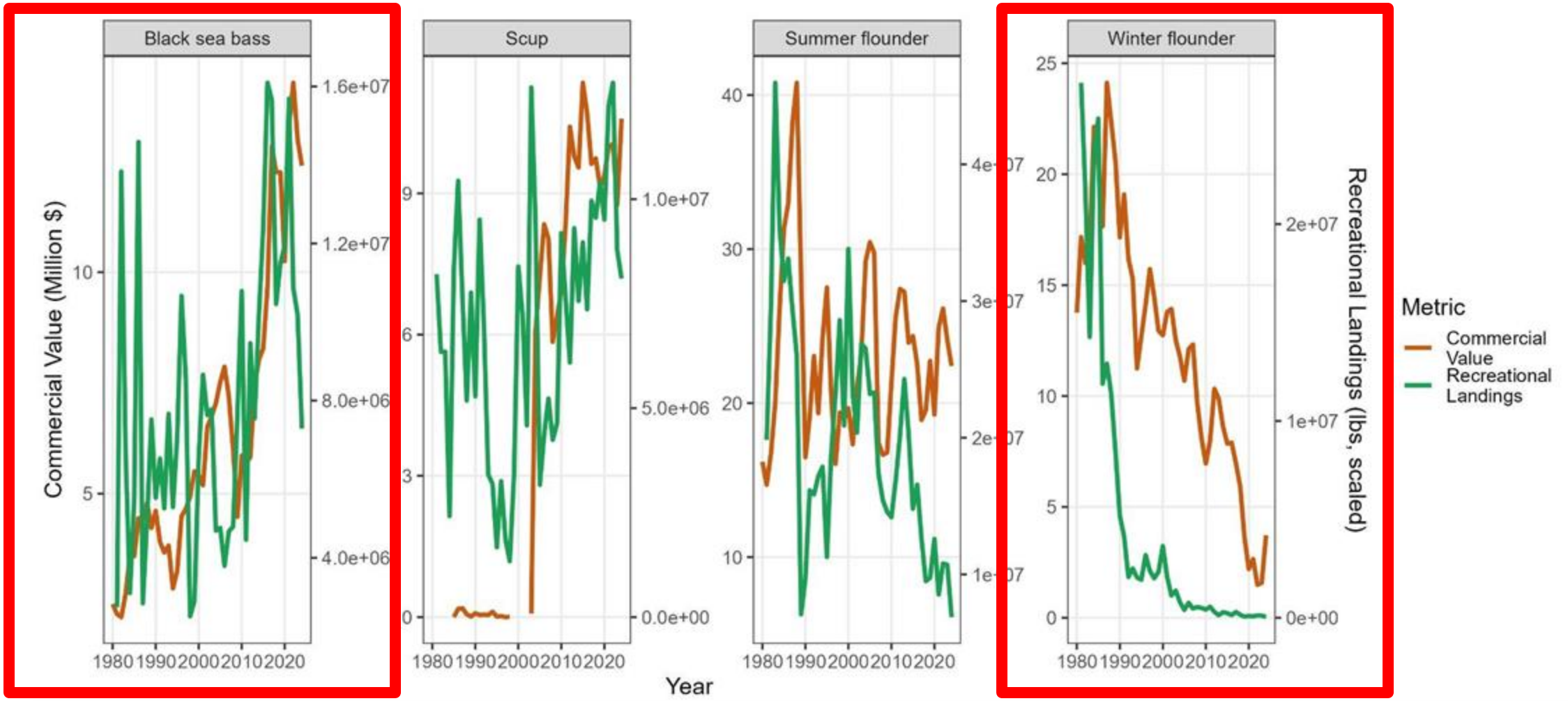
FOSS Commercial Value - aggregated by year



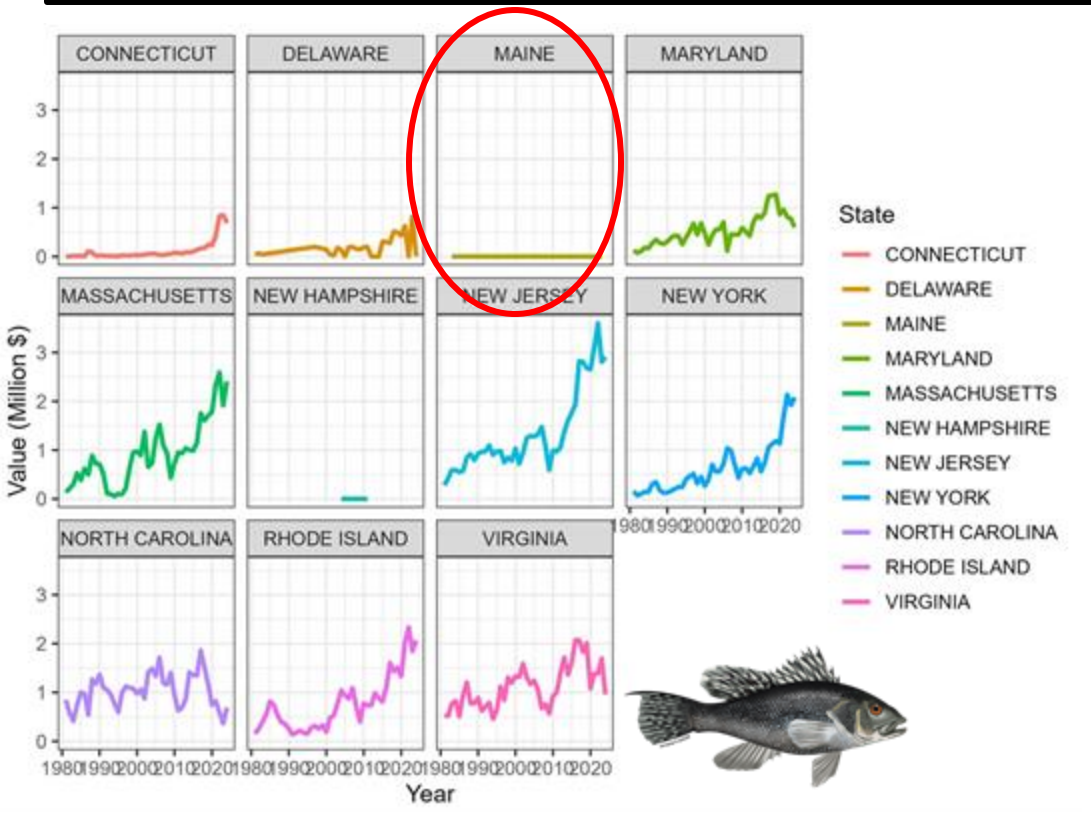
FOSS Recreational Landings (scaled)

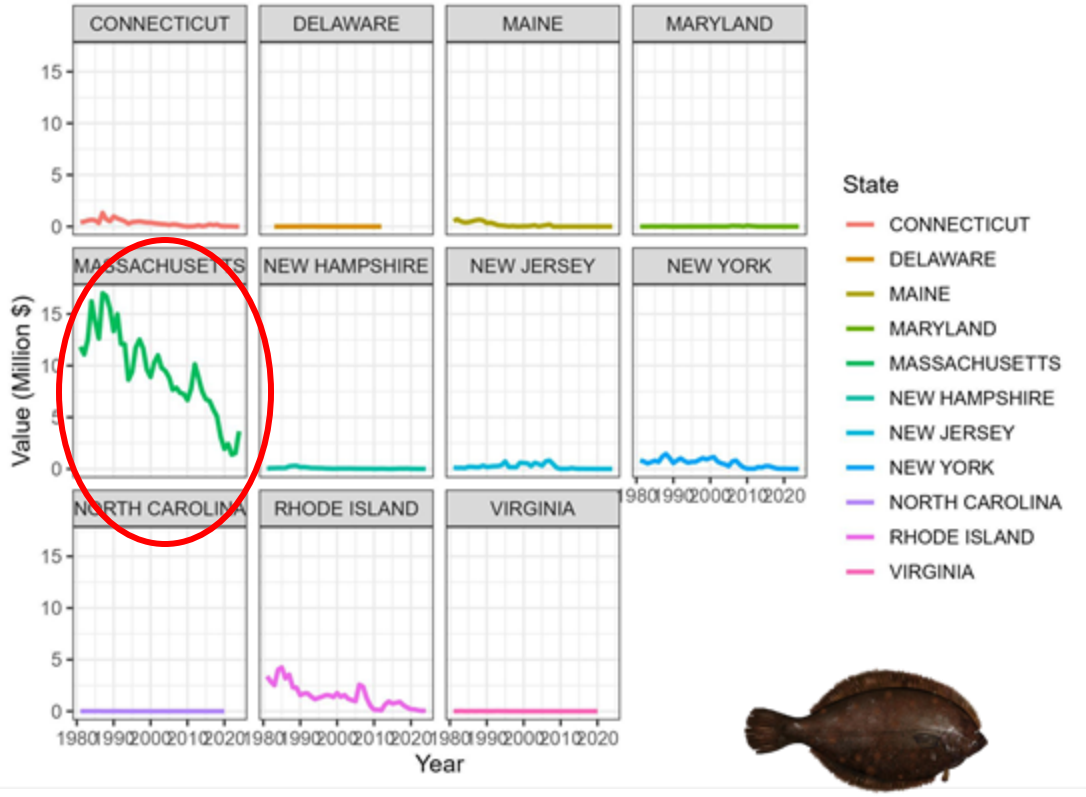


FOSS **Rec landings** vs **Com value**



While **rec landings** and **com value** are moving northward, we see increased value and increased catch for BSB and decreased value and decreased catch for WF



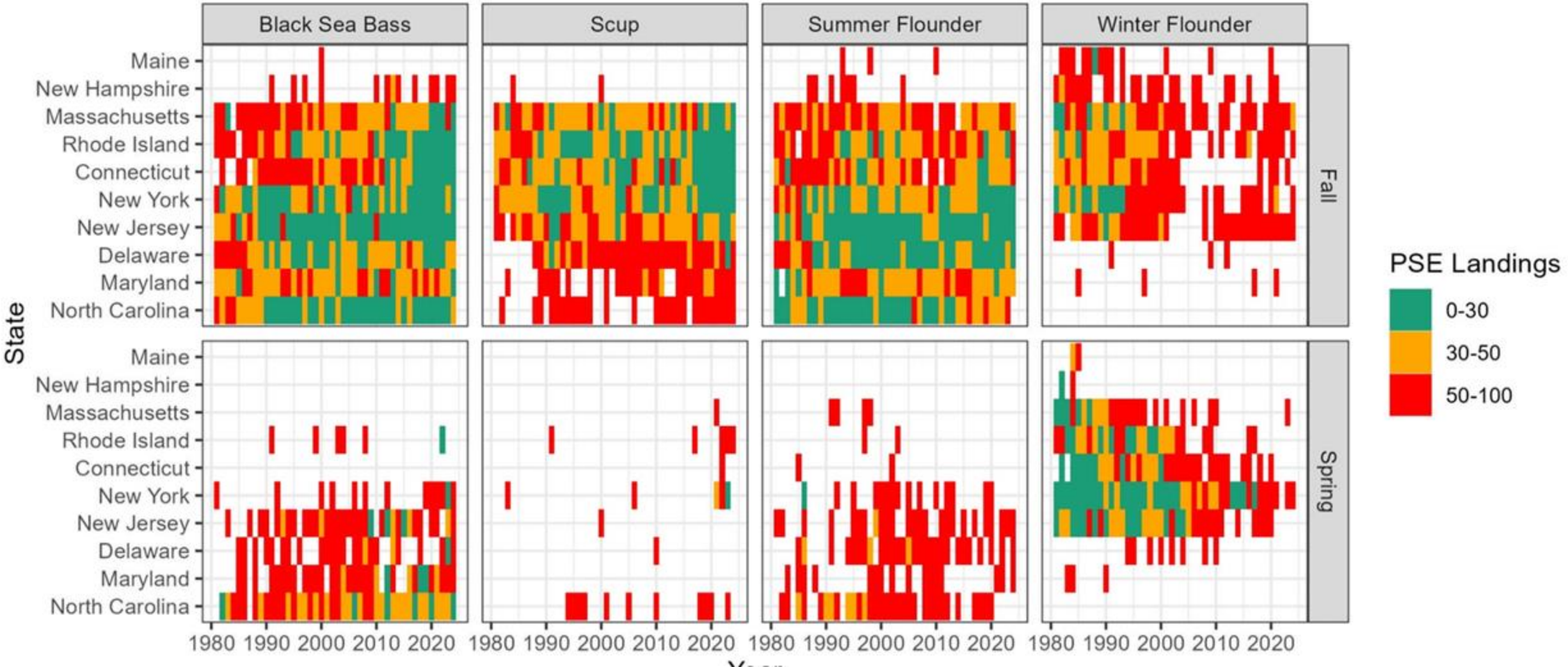


Discussion

- Scup were data poor in Spring for both recreational (MRIP) and fishery-independent data (DisMAP)
- Quota allocations are often historical, not real-time, so lag between species distribution and economic value is expected
- Value per unit catch may differ by species and market demand, so decreased value could also reflect price shifts, not just biomass.
- Recreational catch may reflect availability to anglers, but commercial value may be constrained by quotas, gear, and market logistics

High percent standard error associated with **MRIP**

Roday et al. 2025 (*In Review*)



Take aways

- Marine species are moving, and people are moving with them
- Recreational data, though often underused, can reveal these trends, especially where surveys or commercial data are limited
- Combining biological and economic indicators offers a powerful, integrative view of climate-driven change

NEXT STEPS:

- Expand the analysis to other species and regions
- Explore more advanced modeling using Generalized Additive Models to link environmental drivers with shifts
- Find recreational value from NOAA's Fisheries Economics of the United States (FEUS)

Thanks to:
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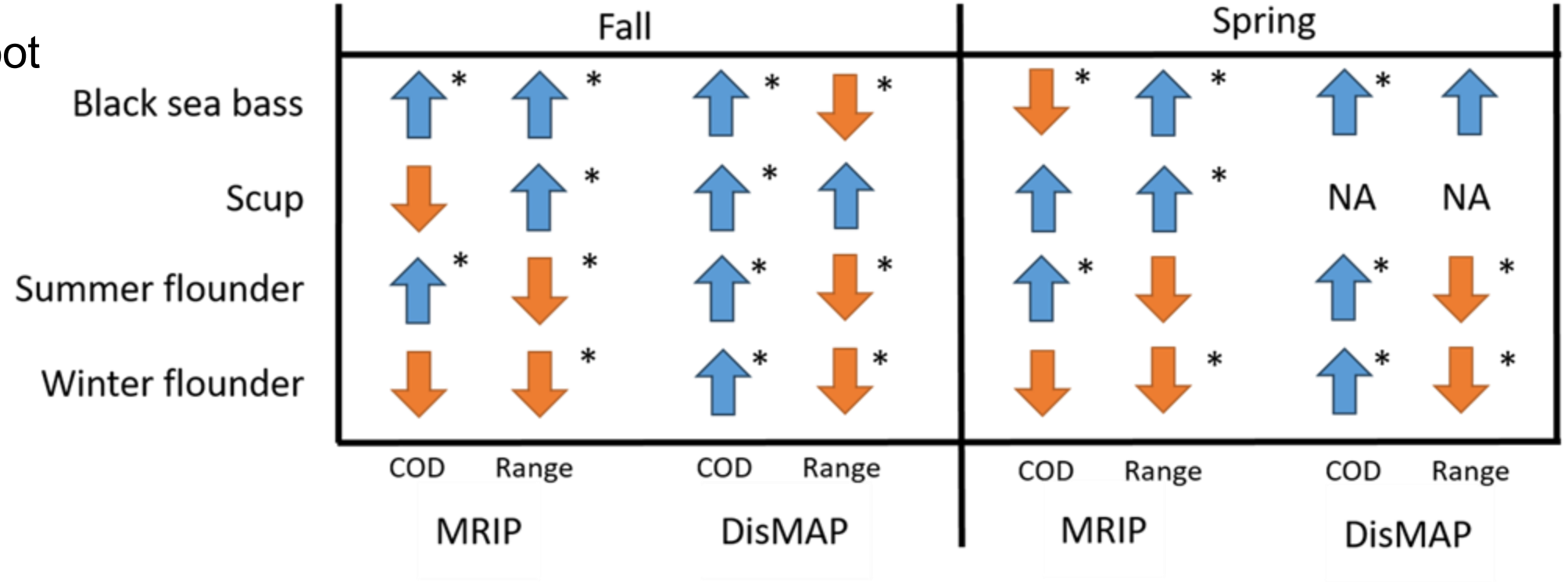

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