NOAA FISHERIES

State of the Ecosystem New England 2026

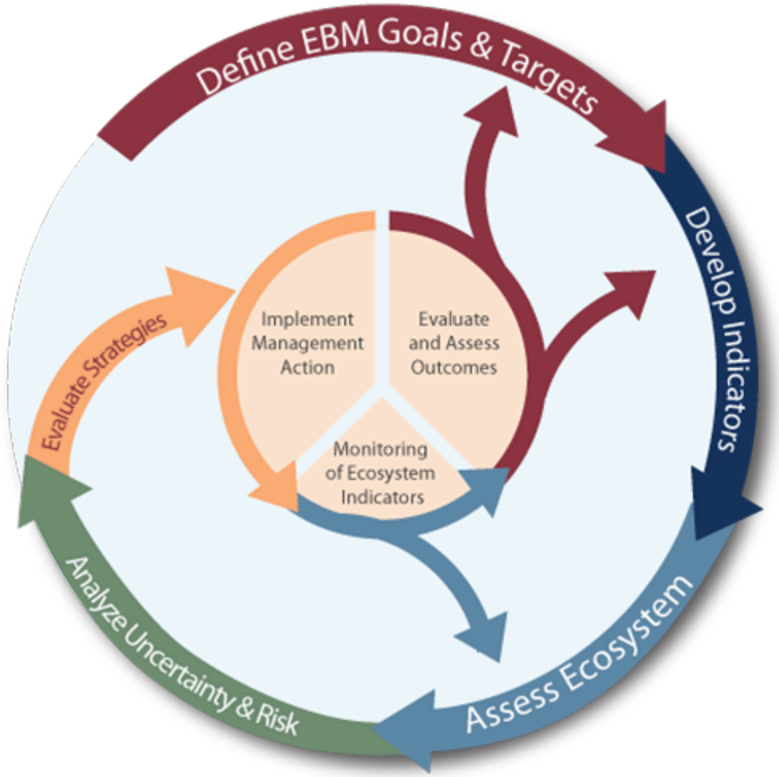
NEFMC SSC Update
March 25, 2026

Joe Caracappa, lead editor, NEFSC

State of the Ecosystem (SOE) reporting

Improving ecosystem information and synthesis for fishery managers

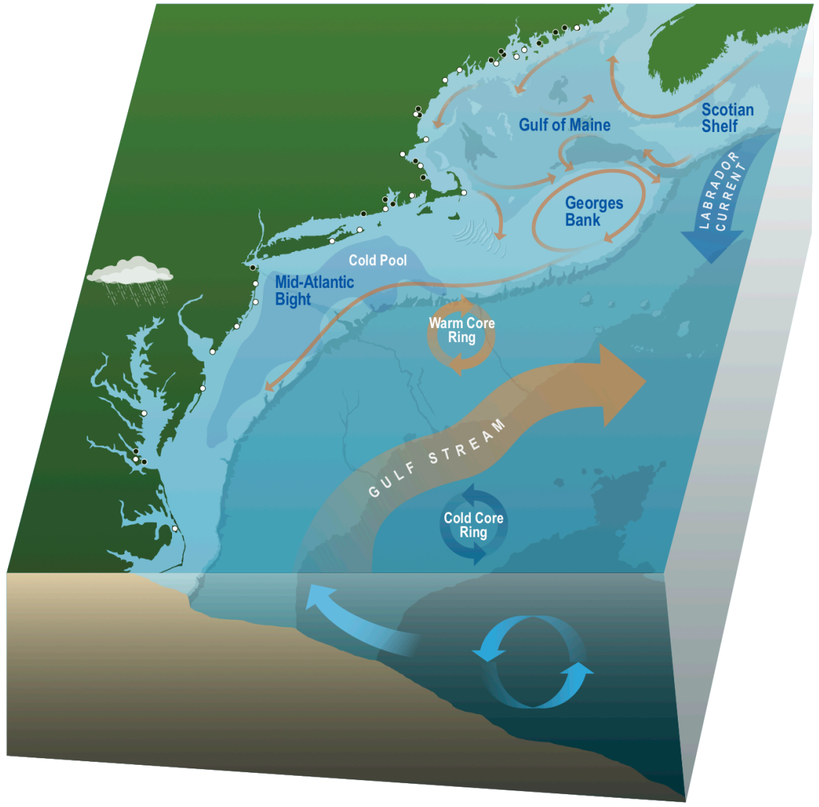
- Ecosystem indicators linked to management objectives (DePiper et al., 2017)
  - Contextual information
  - Report evolving since 2016
  - Fishery-relevant subset of full Ecosystem Status Reports
- Open science emphasis (Bastille et al., 2020)
- Used within Mid-Atlantic Fishery Management Council's Ecosystem Process (Muffley et al., 2020)



The IEA Loop[1]

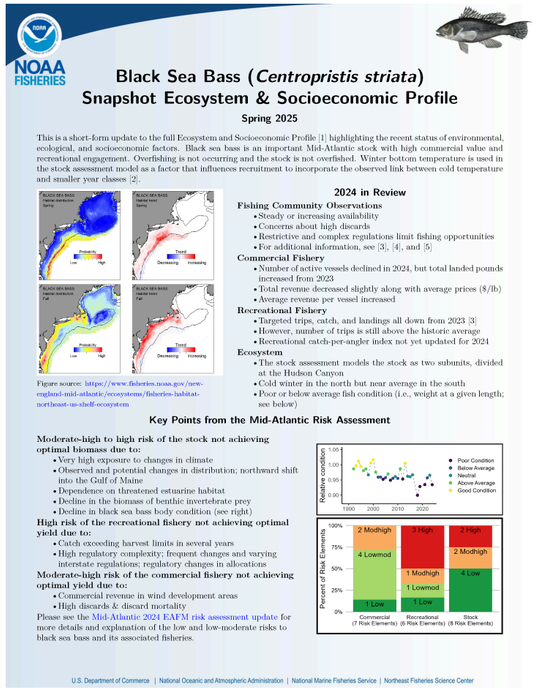
Ecosystem reporting at different levels of organization

The SOE provides information at the ecosystem level



Ecosystem and Socioeconomic Profiles (ESPs) provide information at the stock level

Ecosystem and Socioeconomic Profiles support fisheries science and management by providing additional context that can help inform the development of the stock assessment model, as well as by communicating contextual information to fisheries managers.



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Black Sea Bass (*Centropristis striata*)
Snapshot Ecosystem & Socioeconomic Profile
Spring 2025

This is a short-form update to the full Ecosystem and Socioeconomic Profile [1] highlighting the recent status of environmental, ecological, and socioeconomic factors. Black sea bass is an important Mid-Atlantic stock with high commercial value and recreational engagement. Overfishing is not occurring and the stock is not overfished. Winter bottom temperature is used in the stock assessment model as a factor that influences recruitment to incorporate the observed link between cold temperature and smaller year classes [2].

Figure source: https://www.fisheries.noaa.gov/new-england-mid-atlantic/ecosystems/fisheries-habitat-northeast-us-shelf-ecosystem

2024 in Review

Fishing Community Observations
- Steady or increasing availability
- Concerns about high discards
- Restrictive and complex regulations limit fishing opportunities
- For additional information, see [3], [4], and [5]

Commercial Fishery
- Number of active vessels declined in 2024, but total landed pounds increased from 2023
- Total revenue decreased slightly along with average prices ($/lb)
- Average revenue per vessel increased

Recreational Fishery
- Targeted trips, catch, and landings all down from 2023 [3]
- However, number of trips is still above the historic average
- Recreational catch-per-angler index not yet updated for 2024

Ecosystem
- The stock assessment models the stock as two subunits, divided at the Hudson Canyon
- Cold winter in the north but near average in the south
- Poor or below average fish condition (i.e., weight at a given length; see below)

Key Points from the Mid-Atlantic Risk Assessment

Moderate-high to high risk of the stock not achieving optimal biomass due to:
- Very high exposure to changes in climate
- Observed and potential changes in distribution; northward shift into the Gulf of Maine
- Dependence on threatened estuarine habitat
- Decline in the biomass of benthic invertebrate prey
- Decline in black sea bass body condition (see right)

High risk of the recreational fishery not achieving optimal yield due to:
- Catch exceeding harvest limits in several years
- High regulatory complexity; frequent changes and varying interstate regulations; regulatory changes in allocations

Moderate-high risk of the commercial fishery not achieving optimal yield due to:
- Commercial revenue in wind development areas
- High discards & discard mortality

Please see the Mid-Atlantic 2024 EAFM risk assessment update for more details and explanation of the low and low-moderate risks to black sea bass and its associated fisheries.

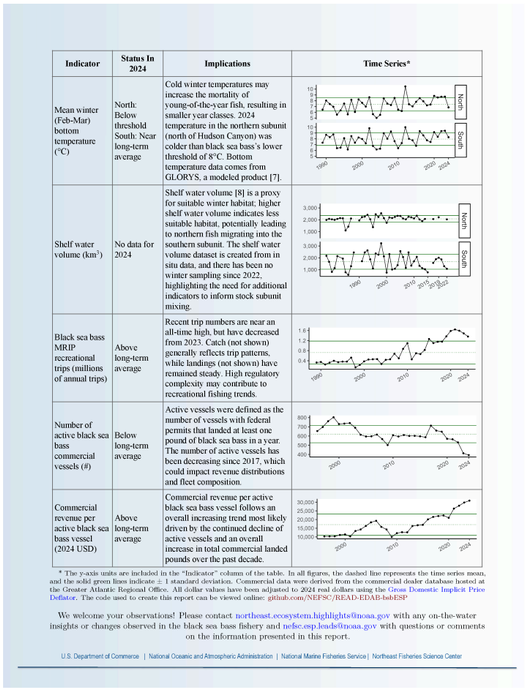
Relative condition

Poor Condition
Below Average
Neutral
Above Average
Good Condition

Percent of Risk Elements

Commercial (7 Risk Elements) | Recreational (6 Risk Elements) | Stock (8 Risk Elements)

U.S. Department of Commerce | National Oceanic and Atmospheric Administration | National Marine Fisheries Service | Northeast Fisheries Science Center



Indicator	Status In 2024	Implications	Time Series*
Mean winter (Feb-Mar) bottom temperature (°C)	North: Below threshold South: Near long-term average	Cold winter temperatures may increase the mortality of young-of-the-year fish, resulting in smaller year classes. 2024 temperature in the northern subunit (north of Hudson Canyon) was colder than black sea bass's lower threshold of 8°C. Bottom temperature data comes from GLORYS, a modeled product [7].	
Shelf water volume (km³)	No data for 2024	Shelf water volume [8] is a proxy for suitable winter habitat; higher shelf water volume indicates less suitable habitat, potentially leading to northern fish migrating into the southern subunit. The shelf water volume dataset is created from in situ data, and there has been no winter sampling since 2022, highlighting the need for additional indicators to inform stock subunit mixing.	
Black sea bass MRIP recreational trips (millions of annual trips)	Above long-term average	Recent trip numbers are near an all-time high, but have decreased from 2023. Catch (not shown) generally reflects trip patterns, while landings (not shown) have remained steady. High regulatory complexity may contribute to recreational fishing trends.	
Number of active black sea bass commercial vessels (#)	Below long-term average	Active vessels were defined as the number of vessels with federal permits that landed at least one pound of black sea bass in a year. The number of active vessels has been decreasing since 2017, which could impact revenue distributions and fleet composition.	
Commercial revenue per active black sea bass vessel (2024 USD)	Above long-term average	Commercial revenue per active black sea bass vessel follows an overall increasing trend most likely driven by the continued decline of active vessels and an overall increase in total commercial landed pounds over the past decade.	

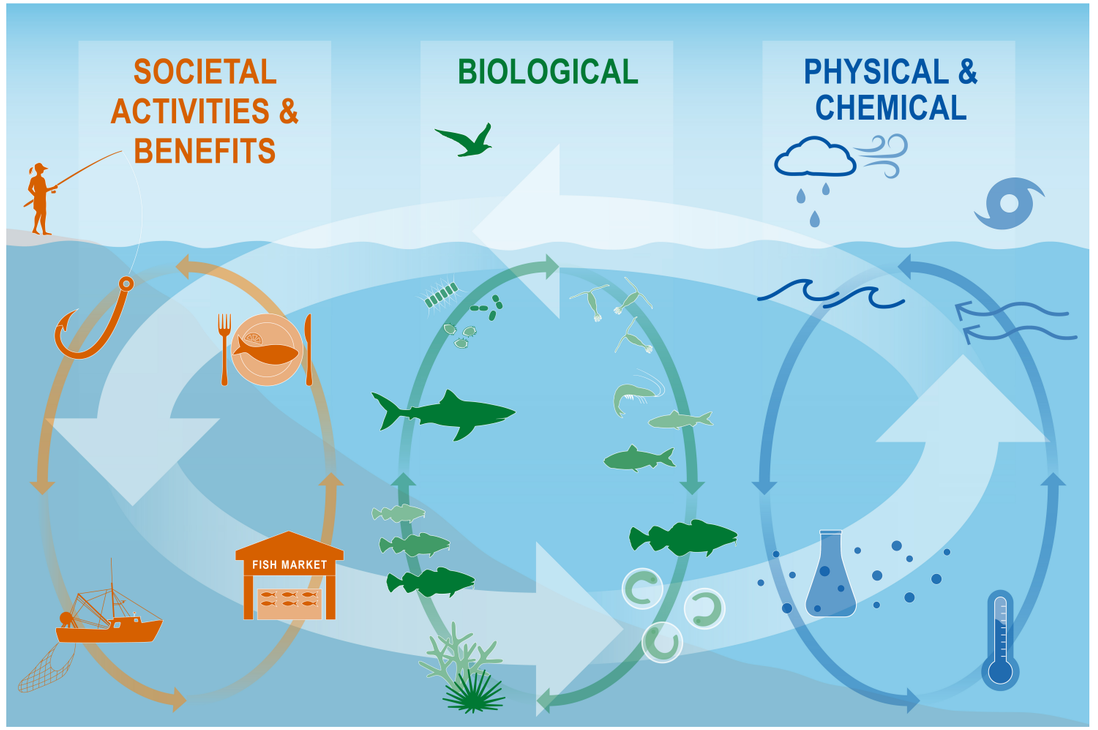
* The y-axis units are included in the "Indicator" column of the table. In all figures, the dashed line represents the time series mean, and the solid green lines indicate ± 1 standard deviation. Commercial data were derived from the commercial dealer database hosted at the Greater Atlantic Regional Office. All dollar values have been adjusted to 2024 real dollars using the Gross Domestic Implicit Price Deflator. The code used to create this report can be viewed online: github.com/NEFSC/READ-EDAB-bsbESP

We welcome your observations! Please contact northeast.ecosystem.highlights@noaa.gov with any on-the-water insights or changes observed in the black sea bass fishery and ne6c.esp.leads@noaa.gov with questions or comments on the information presented in this report.

U.S. Department of Commerce | National Oceanic and Atmospheric Administration | National Marine Fisheries Service | Northeast Fisheries Science Center

2026 Report Structure

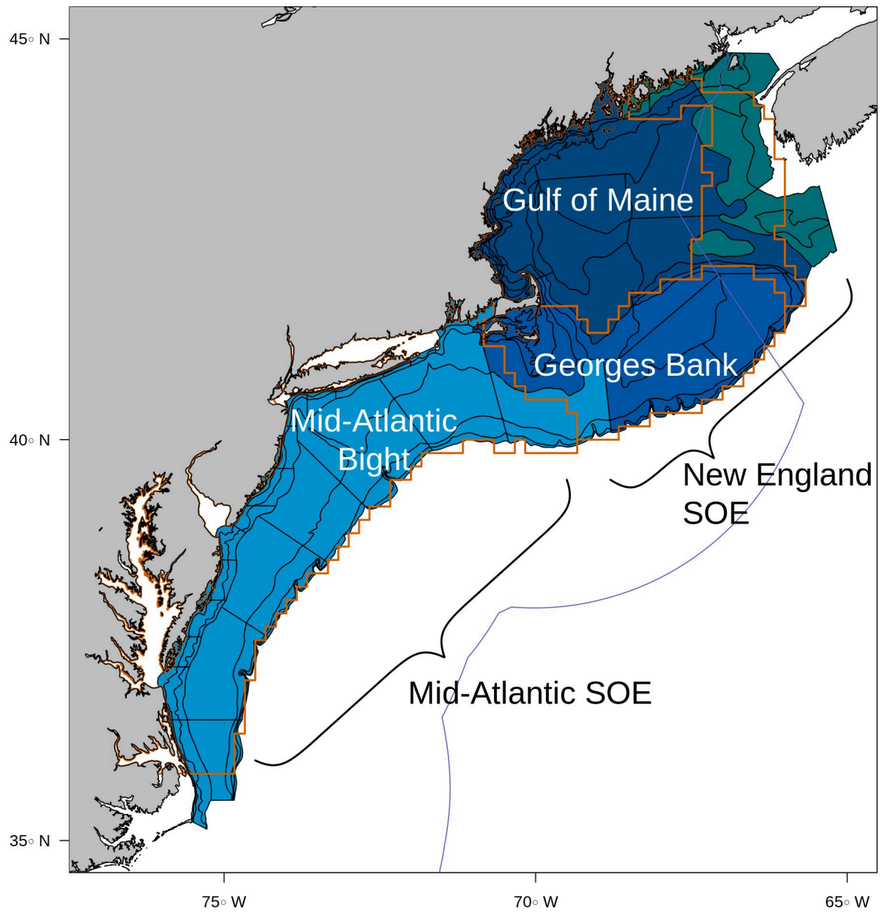
1. Graphical summary
    - Page 1 report card re: performance metrics
    - Page 2 risk summary bullets
    - Page 3 2025 snapshot
2. Performance relative to management objectives
    - *What* does the indicator say–up, down, stable?
    - *Why* do we think it is changing: explore drivers
3. Risks to meeting management objectives
    - Same *What* and *Why* as Performance Section
4. 2025 Highlights



Metrics, risks, drivers, and indicators

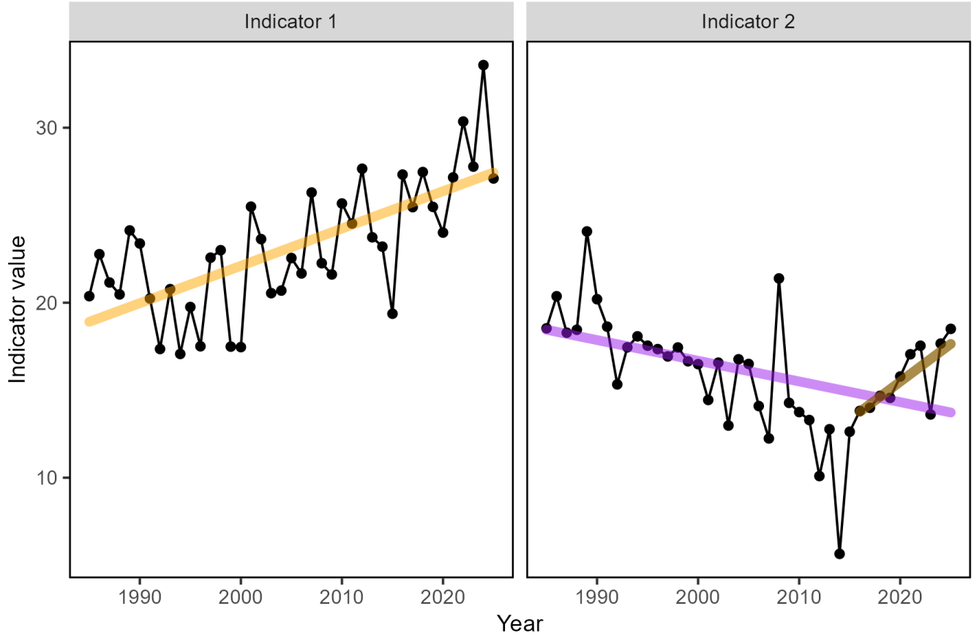
Objective Categories	Indicators reported
Performance Metrics	
Seafood Production	Landings; commercial total and by feeding guild; recreational harvest
Profits	Revenue decomposed to price and volume, profitability
Recreation	Angler trips; recreational fleet diversity; recreational catch diversity
Stability	Fishery and ecosystem volatility, adaptive capacity, and shifts from baseline
Social & Cultural	Community commercial fishing activity and risk factors
Protected Species	Bycatch; population (adult and juvenile) numbers, mortalities
Drivers of Performance	
Management	Stock status; catch compared with catch limits
Biomass	Biomass or abundance by feeding guild from surveys
Environment	Climate and ecosystem risk indicators listed below
Risks to Meeting Objectives	
Risks to Managing Spatially	Fish and cetacean distribution shifts
Risks to Managing Seasonally	Spawning and migration timing
Risks to Setting Catch Limits	Fish condition and recruitment
Other Ocean Uses	Fishery revenue and landings from wind lease areas by species and port
Drivers of Risks	
Habitat and prey quality	Benthic and pelagic forage distribution; ocean temperature; changes in currents and Cold Pool
Phenology	Habitat timing: length of ocean summer, cold pool seasonal persistence
Drivers of productivity	Benthic and pelagic forage quality and abundance; ocean temperature and acidification
Other Ocean Uses	Wind development map; protected species presence and hotspots

State of the Ecosystem report scale and figures



A glossary of terms (2021 Memo 5), detailed technical methods documentation and indicator data are available online.

Key to figures



Long-term trends assessed only for 30+ years: more information

Short-term trends assessed for last 10 years of data OR a full time series <30 years

Orange line = significant increase

Purple line = significant decrease

No color line = not significant or < 30 years

Grey background = last 10 years

Discussion Question: Management Objectives

Looking for feedback from SSC on performance objectives

1. Are the stated metrics well defined?

2. Are the metrics used appropriate to evaluate these objectives?

Georges Bank: Summary of Performance relative to management objectives

OBJECTIVE (indicator)		TREND	CURRENT STATUS
Seafood production (Total and NEFMC managed landings)	TOTAL	↘	–
	MANAGED	↘	–
	RECREATIONAL	↘	–
Commercial profits (Total revenue and NEFMC managed revenue/profitability)	TOTAL REVENUE	↔	–
	MANAGED REVENUE	↔	–
	PROFITABILITY	↔	–
Recreational opportunities (Effort and fleet and catch diversity)	EFFORT	↔	–
	DIVERSITY	⤮	≈

Stability (Change from baseline, adaptive capacity, and volatility)	FISHERY	✕
	ECOSYSTEM	✕
Social and cultural (Port activity, total community environmental variability risk indicators)	Total Community Environmental Variability	↗
	Varies by community	
Protected species (Coastwide bycatch, population numbers, mortalities)	BYCATCH	⤮
		✓ Harbor Porpoise; ✓ Gray Seal
	POPULATIONS	⤮
		− NARW; + Gray Seal

Gulf of Maine: Summary of Performance relative to management objectives

OBJECTIVE (indicator)	TREND	CURRENT STATUS
Seafood production (Total and NEFMC managed landings)	TOTAL	–
	MANAGED	–
	RECREATIONAL	–
Commercial profits (Total revenue and NEFMC managed revenue/profitability)	TOTAL REVENUE	≈
	MANAGED REVENUE	–
	PROFITABILITY	≈
Recreational opportunities (Effort and fleet and catch diversity)	EFFORT	–
	DIVERSITY	≈

Stability (Change from baseline, adaptive capacity, and volatility)	FISHERY	✕
	ECOSYSTEM	✕
Social and cultural (Port activity, total community environmental variability risk indicators)	Total Community Environmental Variability	↗
	Varies by community	
Protected species (Coastwide bycatch, population numbers, mortalities)	BYCATCH	⇄
	Harbor Porpoise	✓
	Gray Seal	✓
	POPULATIONS	⇄
	NARW	–
	Gray Seal	+

Summary of Risks to meeting fishery management objectives

Risks to Managing Spatially

- **Observations:** Species distributions are trending to the northeast and into deeper water.
- **Potential Impacts:** Spatial mis-allocation of quotas may lead to unmet quotas, increased discards, and/or miscalculated fishing targets.

Risks to Setting Catch Limits

- **Observations:** Productivity and fish condition have changed across the ecosystem because of ecological and environmental changes.
- **Potential Impacts:** Unaccounted for and unknown productivity changes may lead to misspecified quotas and rebuilding plans, especially if they are not considered in stock reference points and short-term stock projections.

Risks to Managing Seasonally

- **Observations**: Seasonal spawning and migration timing has changed for some Council-managed species and whales.
- **Potential Impacts:** Spawning closures, seasonal openings, and seasonal quota allocations may be less effective if mis-timed with biological events, resulting in decreased seafood production.

Risks of Marine Development

- **Observations:** Wind lease areas have historically been used for fishing and as habitat for North Atlantic right whales. Only 6 of 38 offshore wind leases in the Northeast are operational and/or under construction.
- **Potential Impacts:** Average annual revenue in active project areas is <5% for most ports and for most Council-managed species. Project areas overlap with North Atlantic right whale habitat.

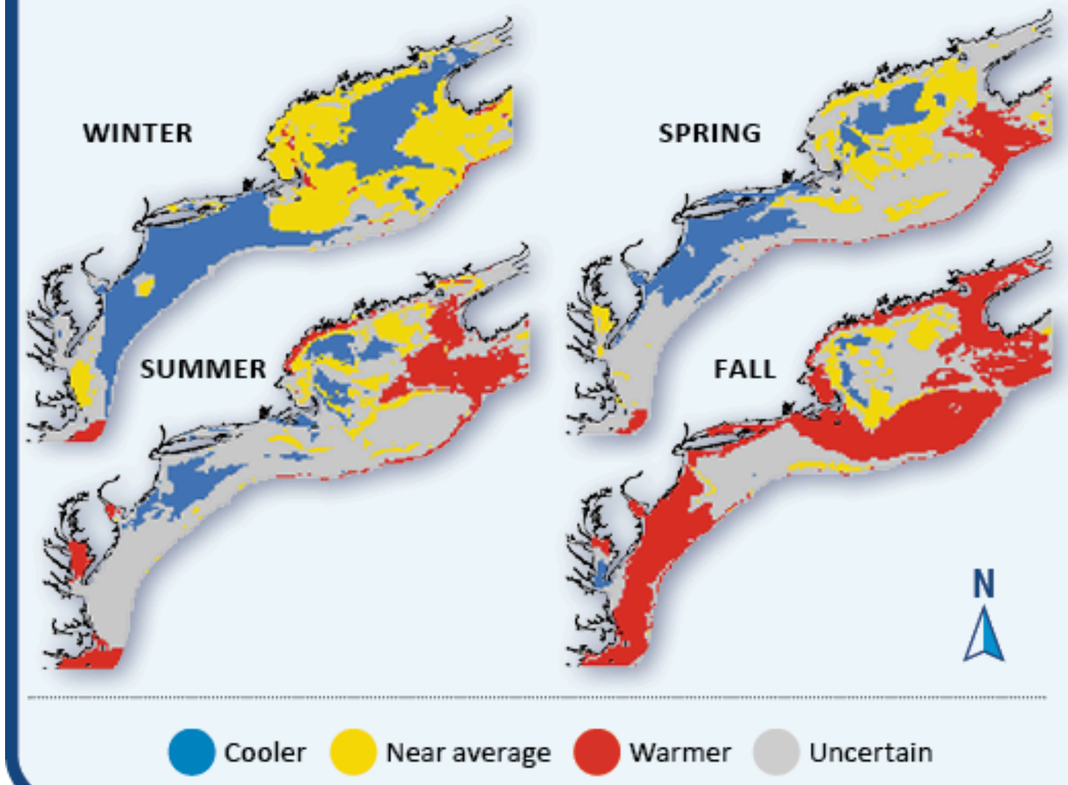
New this year: Ocean Forecasts

MOM6 Operational Ocean Forecasts
NORTHEAST U.S. SHELF

Seasonal and decadal forecasts from the NOAA MOM6 ocean model are intended to inform fisheries and protected species science and management.

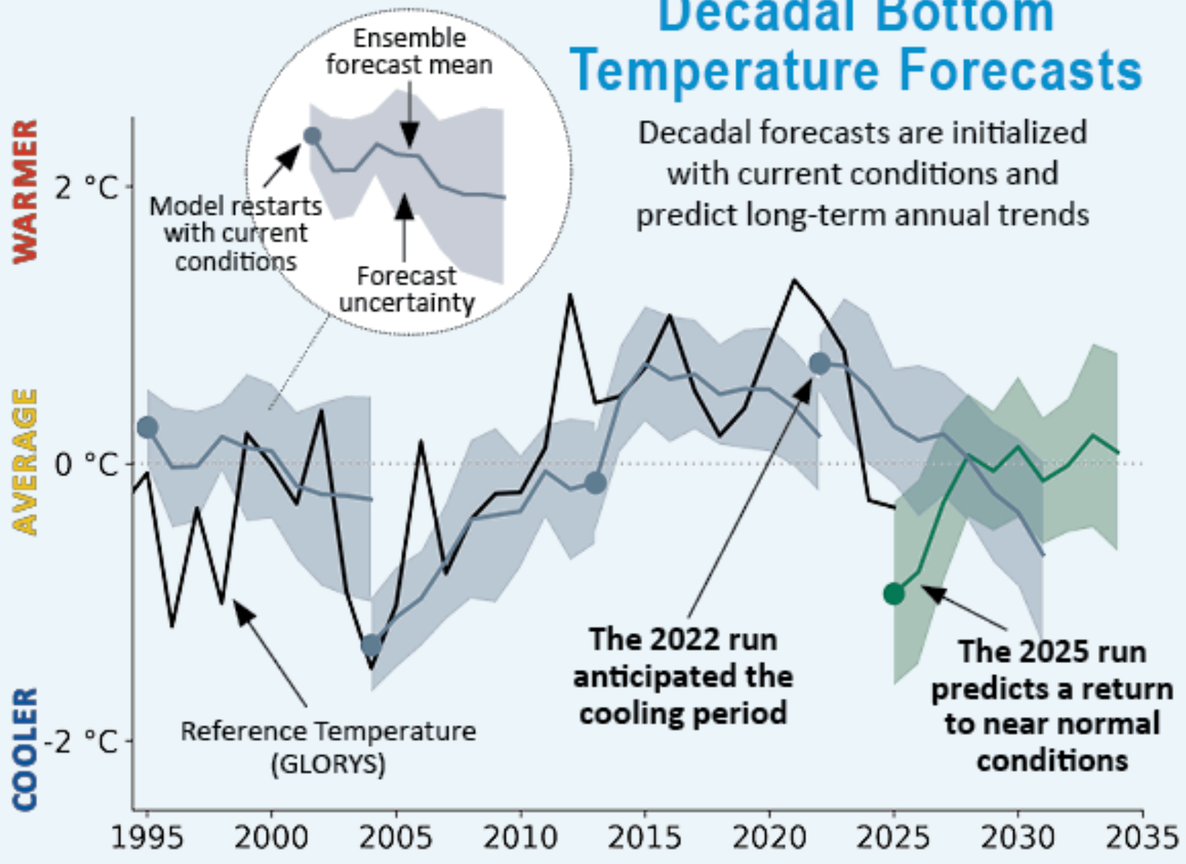
2026 Seasonal Bottom Temperature

Predicted likelihood of warmer or colder temperatures



Decadal Bottom Temperature Forecasts

Decadal forecasts are initialized with current conditions and predict long-term annual trends



2025 Highlights

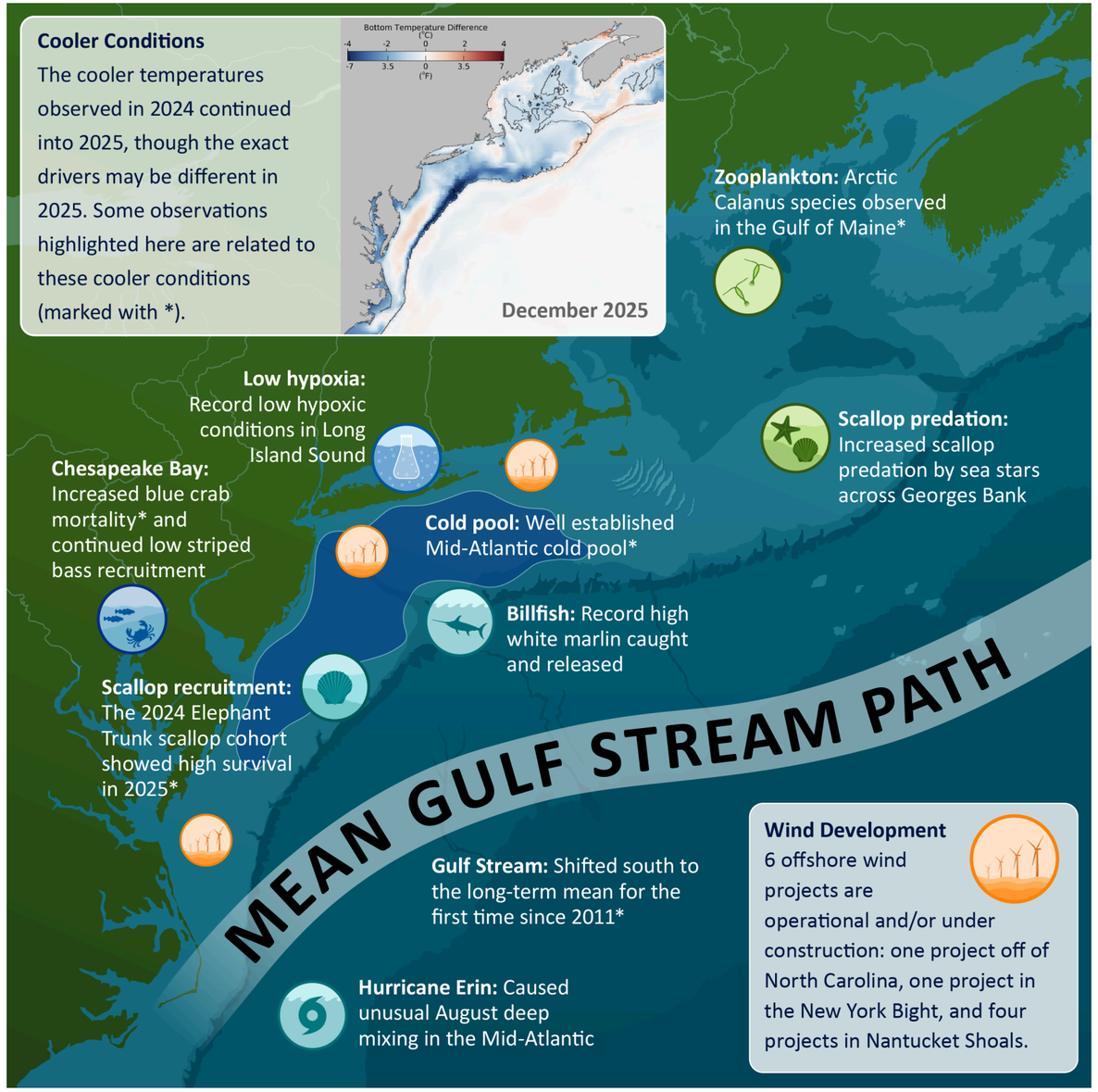
Ecosystem observations

Cooler conditions in the Northeast persisted despite another record warm year globally.

Fishing observations

- Reports of record levels of white marlin, and higher abundance of billfish, sandlance, Illex squid and Atlantic mackerel than in recent years.
- Observations of some species (Atlantic mackerel, striped bass, red drum, bluefish, and other gamefish) showed shifting distributions and unpredictable timing.
- Good hook and line fishing near the wind turbines.

We welcome your observations!
northeast.ecosystem.highlights@noaa.gov



Discussion Question: Forecasts

Looking for feed back from the SSC on using forecast information in the SOE

1. We're using deviations from the historical average temperature as the reference point for forecast probabilities. Is this a useful format for the Council?

2. Are there other "events" or reference points that could be used instead

3. How should uncertainty be discussed alongside observations? (Measurement error vs forecast uncertainty)

4. Are there specific research questions or Council decisions that forecasted ocean conditions could assist?

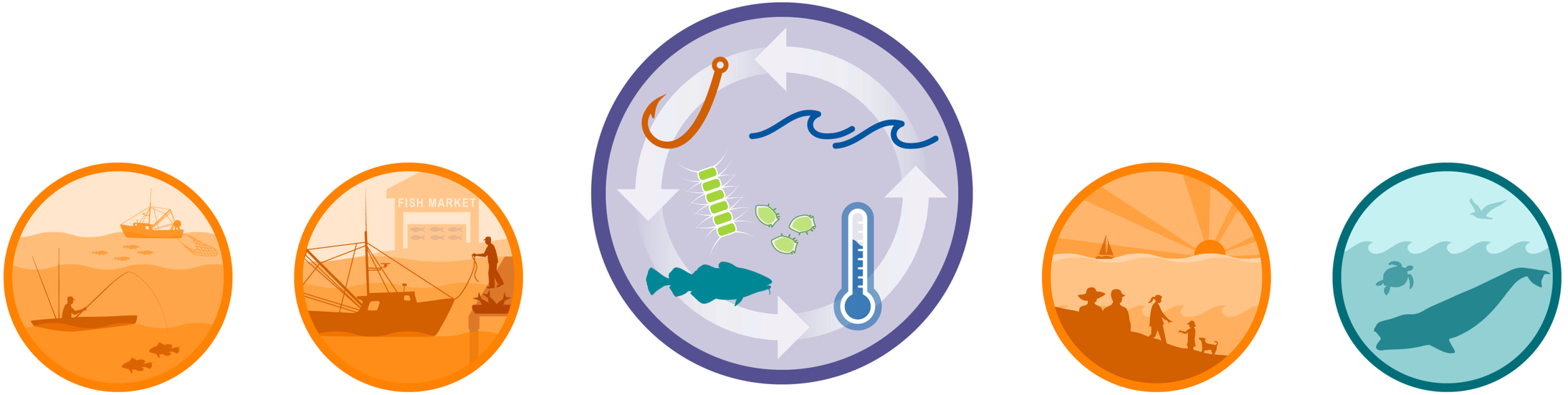
Request tracking memo: Completed requests

Request	Year	Priority
SOE admin		
Include estimates of inclusion years in request memo	2022	Lowest
System level thresholds/ ref pts		
Trend Analysis	2019 - 2024	Highest
Multiple system drivers		
Profits vs Revenue: net revenue indicator incomplete and different trend from gross	2023-2024	Highest
Clarify objectives, terminology and presentation for fishing community engagement/reliance/social indicators	2022, 2024	Highest
Time series of social indicators	2023-2024	Highest
Consider appropriate scale for social and economic indicators	2024	Highest
Add social and economic considerations in the Climate and Ecosystem risks section	2024	Highest
Clarify community definitions and consider indicators beyond landings to employment, subsistence	2024	Highest
Include community affordability in port level vulnerability	2024	High
Report changes in small fish and large fish biomass along with production anomalies	2024	Moderate
Relate OA to nutrient input; are there "dead zones" (hypoxia)?	2021	Low
Estuarine Water Quality	2020	Low
What determines a "risk"? Include aquaculture as a risk?	2022	Unranked

Request tracking memo: Highest priority requests

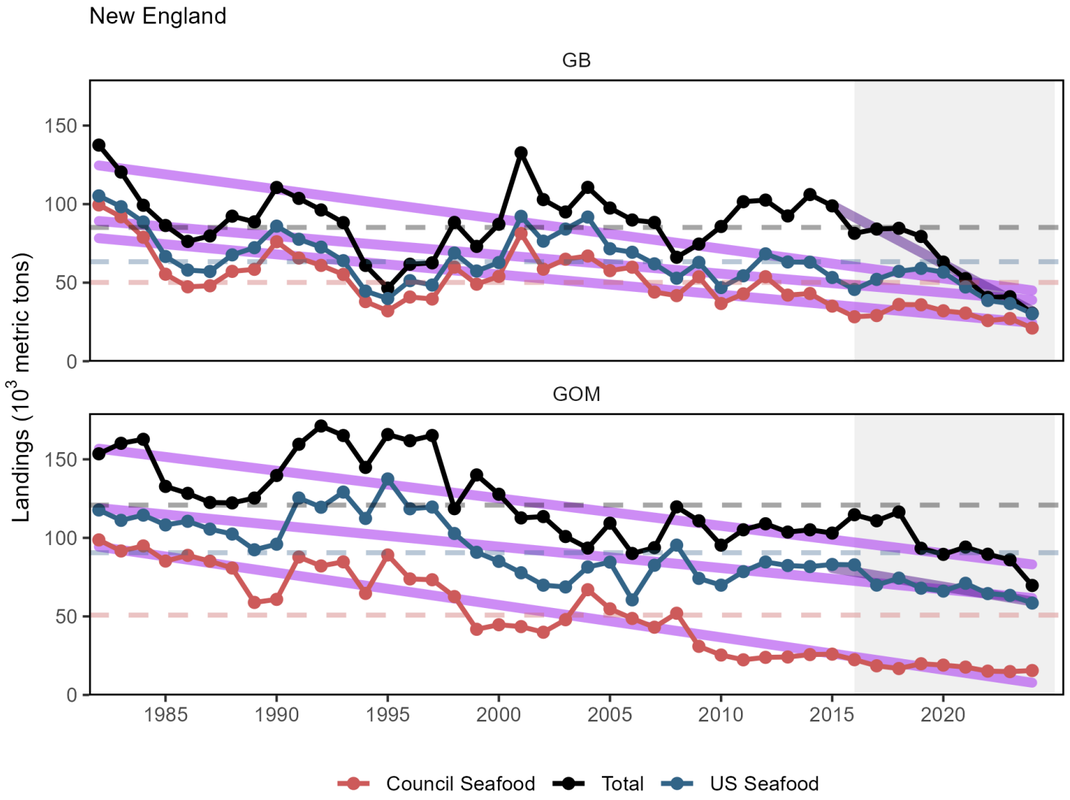
Request	Year	Status	Priority
Short term forecasts			
Short term forecasting from CEFI (water temp, productivity); Characterize current conditions in context of expected short term change	2022, 2024, 2025	In progress	Highest
Stock level indicators			
Include cross references to stock specific products (ECSA/ESP), ensure consistent approaches; Establish more links between events and consequences (e.g. temp ranges for more species)	2024	In progress	Highest
SOE admin			
Present relevant MA information in NE report	2025	In progress	Highest
Improve context and definitions of Management Objectives	2025	Not started	Highest
System level thresholds/ ref pts			
Ecosystem Overfishing Indicators: compare to empirical thresholds; assess informativeness of indicators using simulation analysis; assess impact of phytoplankton size composition on EOF thresholds; determine optimum yield	2021-2024	In progress	Highest
Develop regime shift analysis methods (e.g., inflection point analysis, influence statistics, break point analysis, early warning variance)	2019-2025	Not started	Highest
Conduct regime shift analysis of relevant indicators (e.g., zooplankton, forage fish, socioeconomic, etc). Use influence statistics to identify whether we are approaching tipping points.	2019-2025	Not started	Highest
Use community and port level information to inform fleet stability indicator	2025	In progress	Highest
Update CVA and explore trend changes when a new CVA is applied	2025	In progress	Highest
Include standardized language about uncertainty from e.g. IPCC or NCA applicable to each indicator or data input	2024	Not started	Highest

2025 Performance relative to management objectives



Objective: New England Seafood production

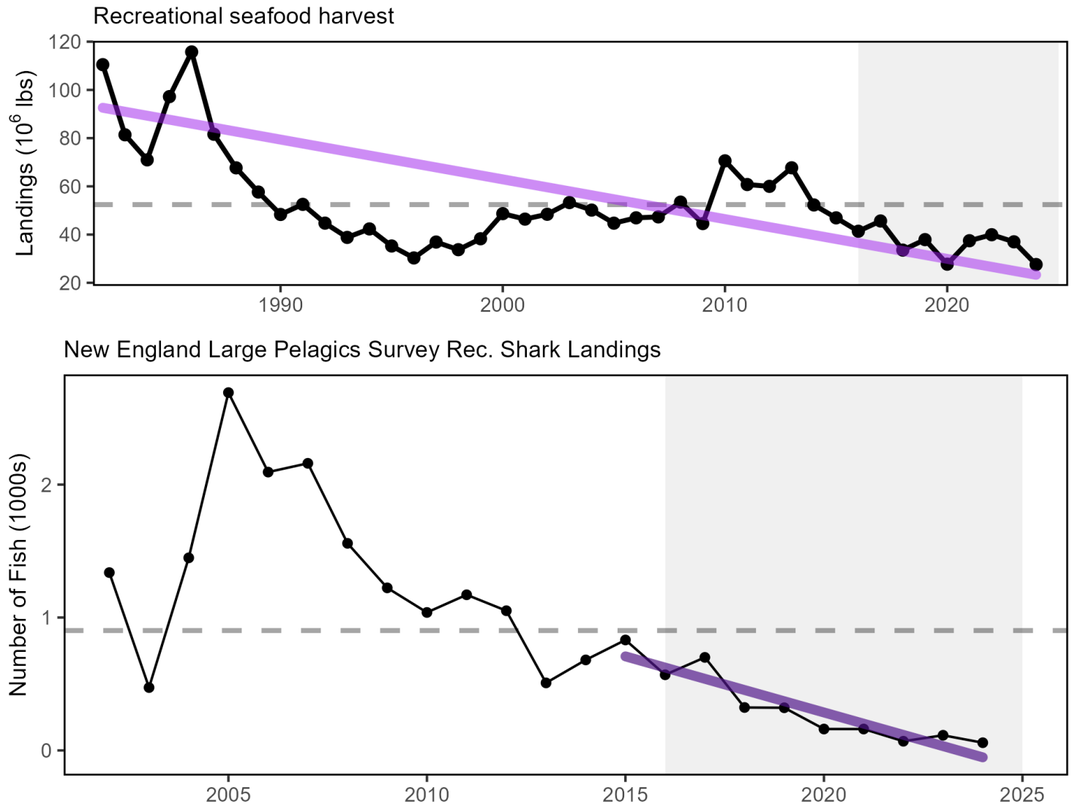
Indicators: Commercial landings, climate risk



Drivers: ecosystem and stock production, management actions (stock rebuilding), market conditions, and environmental change

New England community landings are *moderately dependent* on species sensitive to environmental variability, but this risk has been increasing.

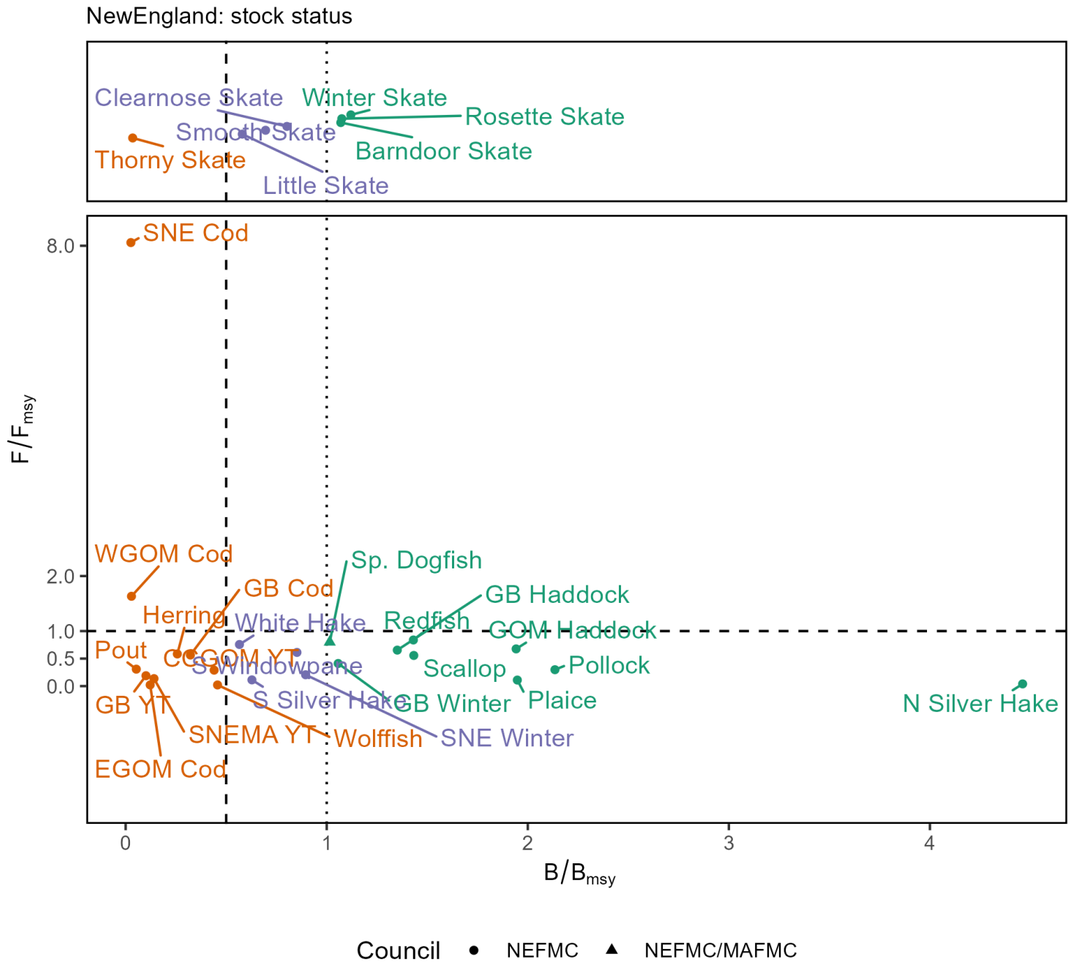
Indicators: Recreational harvest



Drivers: Shifts in fishing behavior (landed vs catch-and-release) and closure of mako fishery

New England drivers: Stock status?

Indicator: Stock status



Changes:

- B/Bmsy > 1 GB Haddock & Plaice
- F/Fmsy < 1 GOM Haddock

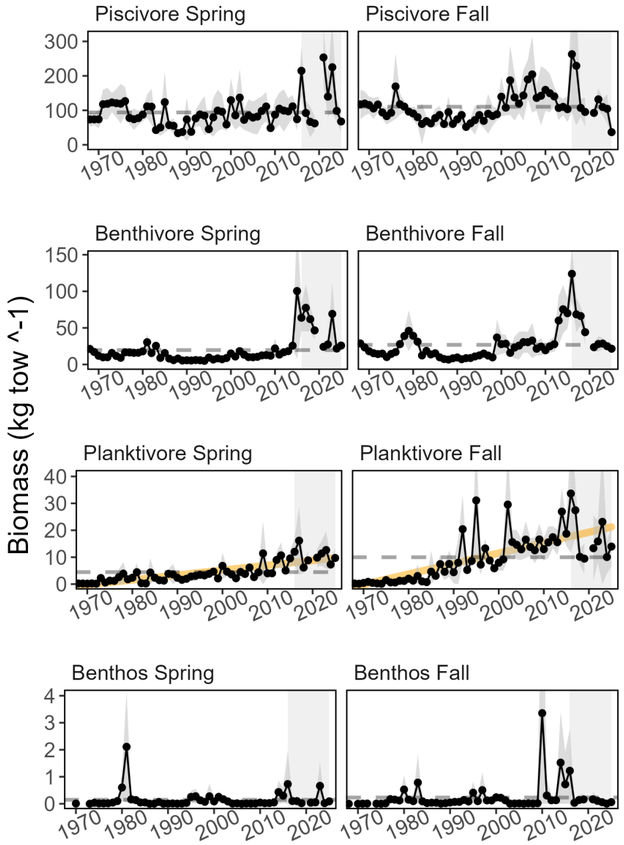
All Cod stocks have B/Bmsy < 1

17 stocks below target, 10 below thresholds, and 12 with unknown status

Stock status and required management actions still likely playing large role in seafood declines.

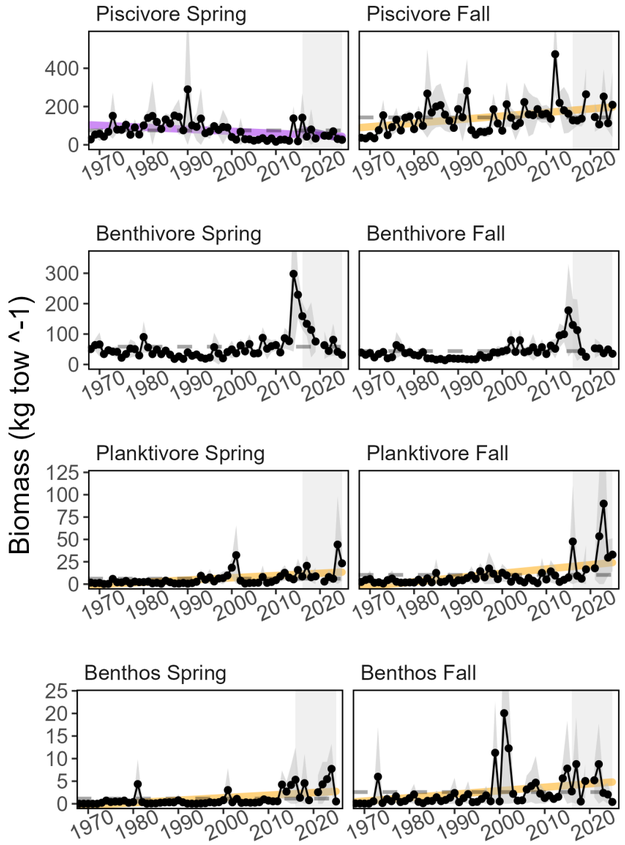
New England drivers: Survey biomass

Indicator: Survey Biomass



Gulf of Maine

Increasing guild biomass in planktivores & benthos *despite* declining landings and Piscivores more present in fall than spring survey



Georges Bank

System is *productive overall* just not for targeted species

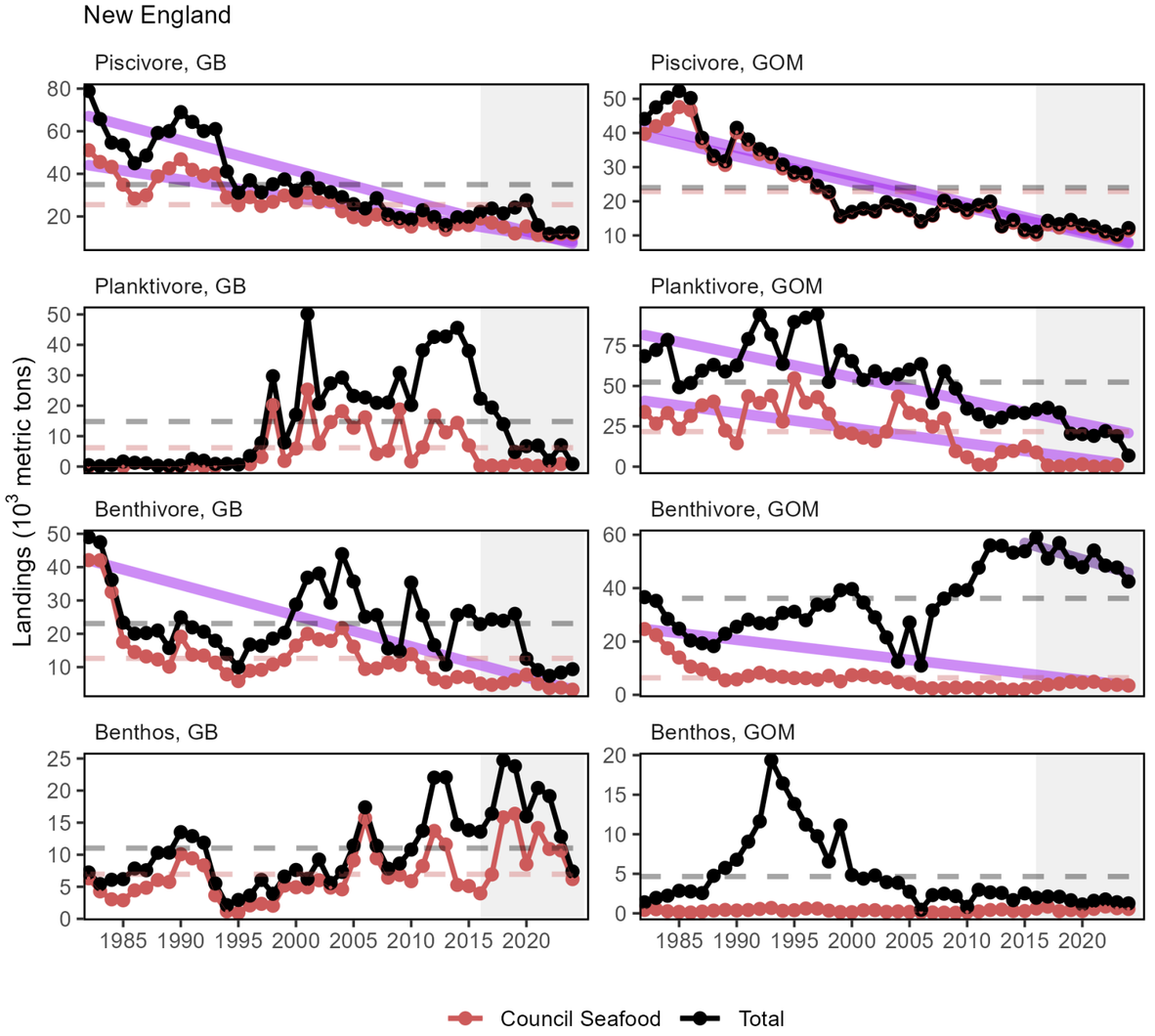
Implications: New England Seafood Production

Drivers:

- Decline in commercial landings is most likely driven by market dynamics and actions needed to rebuild individual stocks (lower quotas)
- Drivers of Recreational landings differ: tighter shark fishery regulations, changing demographics and preferences of anglers

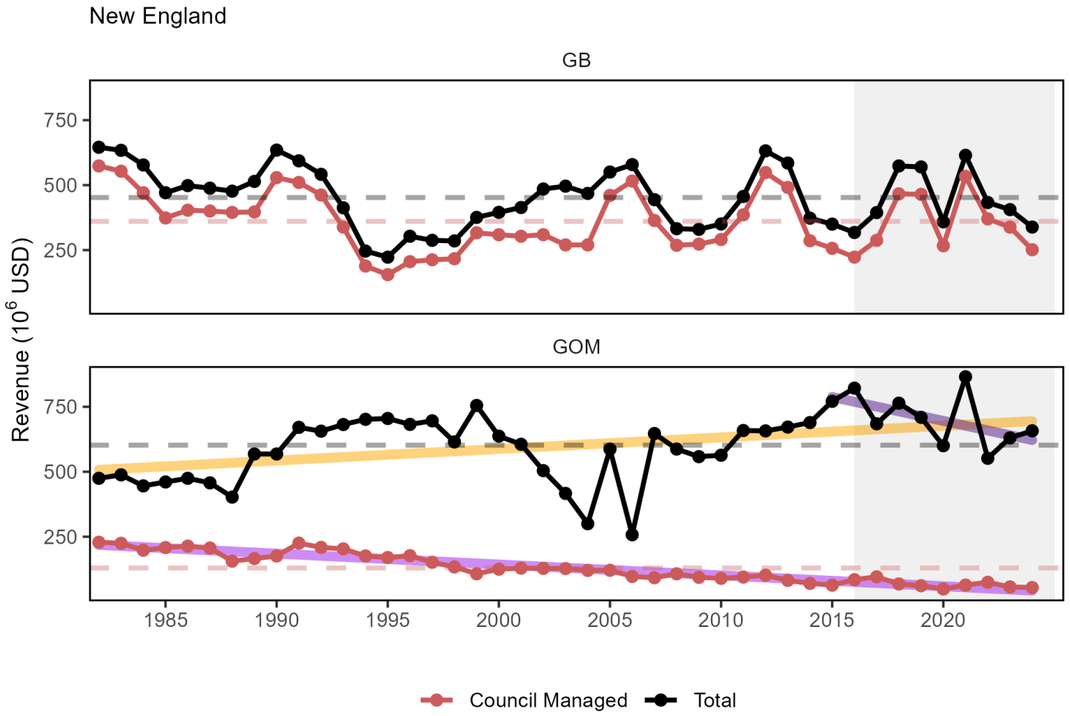
Monitor:

- Climate & environmental risks: shifting distributions, changes to seasonal timing, and changes in system productivity
- Changes to ecosystem composition and stability
- Fishing engagement and behavior



Objective: New England Commercial Profits

Indicator: Commercial Revenue

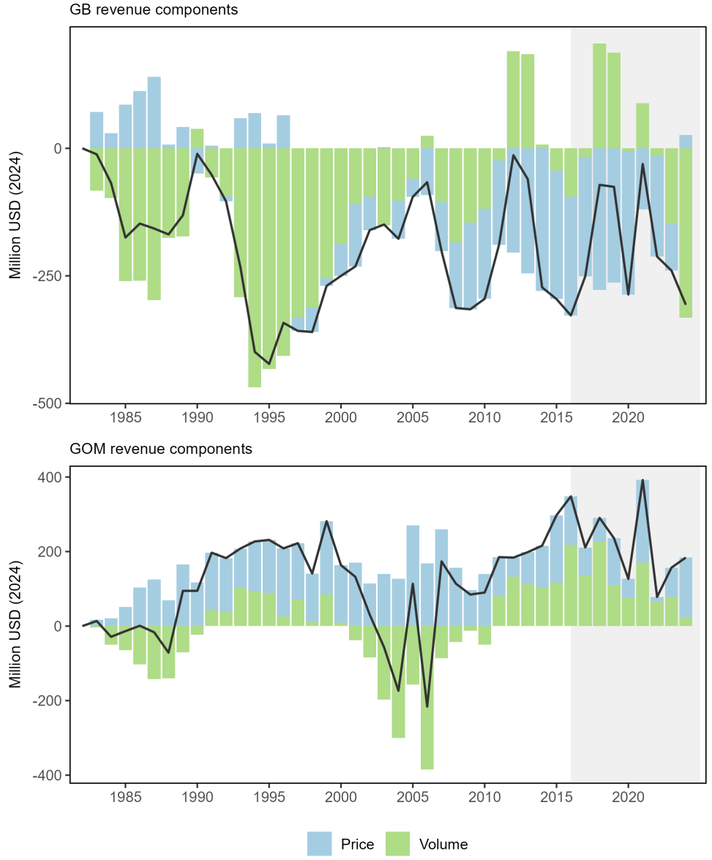


Both regions' revenue depends on a single species sensitive to environmental changes (scallop and lobster)

Lower percent of total GOM revenue is coming from NEFMC-managed species

New England community revenue is *moderately dependent* on species sensitive to environmental variability with no trend.

Indicator: Bennet–price and volume indices

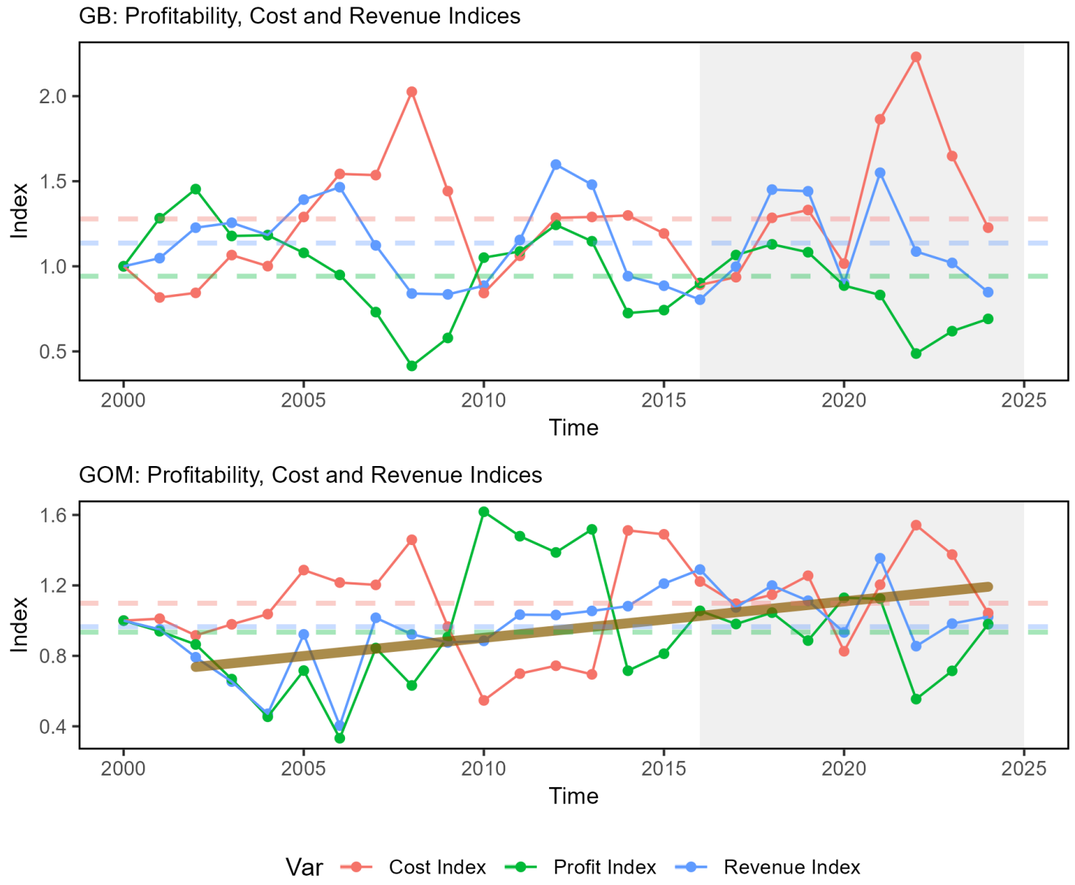


GB: Low 2023/2024 revenue driven by low volume of landings (benthos/shellfish)

GOM: Higher 2024 revenue driven by high prices (benthivores/lobster)

Objective: New England Commercial Profits

Indicator: Profit Index



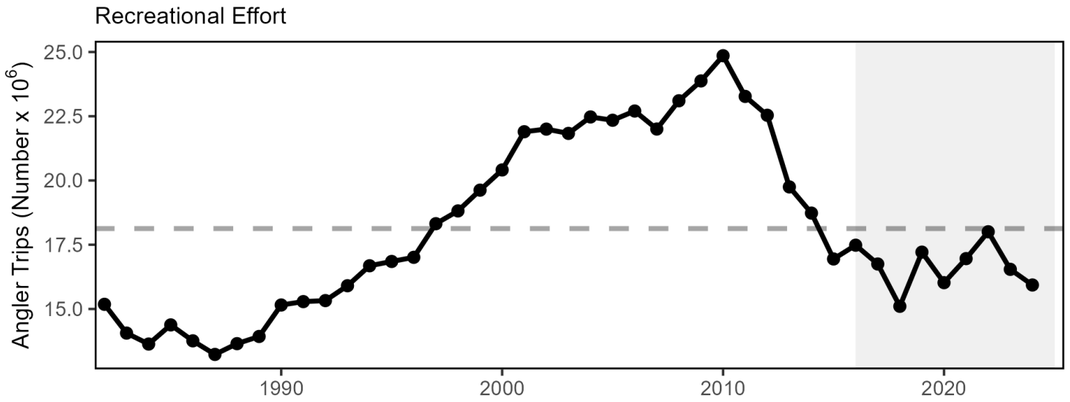
New Indicator: Index of Revenue, Costs, and Profits from *federal trips only*

GB: High costs since 2021, but recent decrease helps offset low revenue

GOM: Profit generally follows revenue. 2024 showed average costs and profitability

Objective: New England Recreational opportunities: Effort

Indicators: Recreational effort

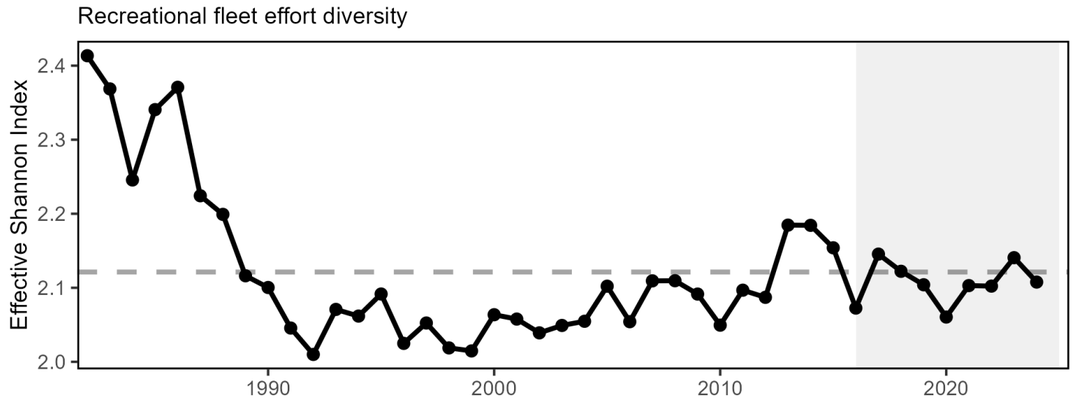


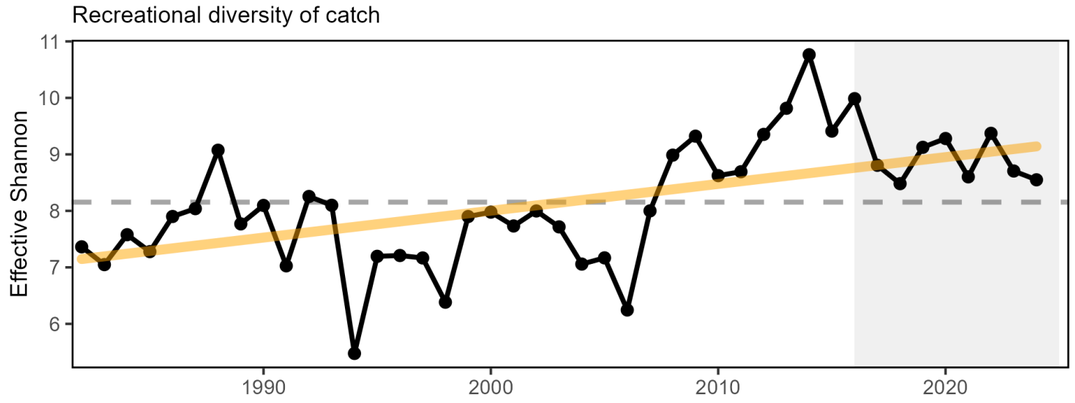
Implications

- Recreational effort peaked in 2010 but is now stable
- Lack of a long-term trend suggests a consistent amount of recreational opportunities in New England

Objective: New England Recreational opportunities: Fleet and Catch Diversity

Indicators: Recreational catch and fleet diversity



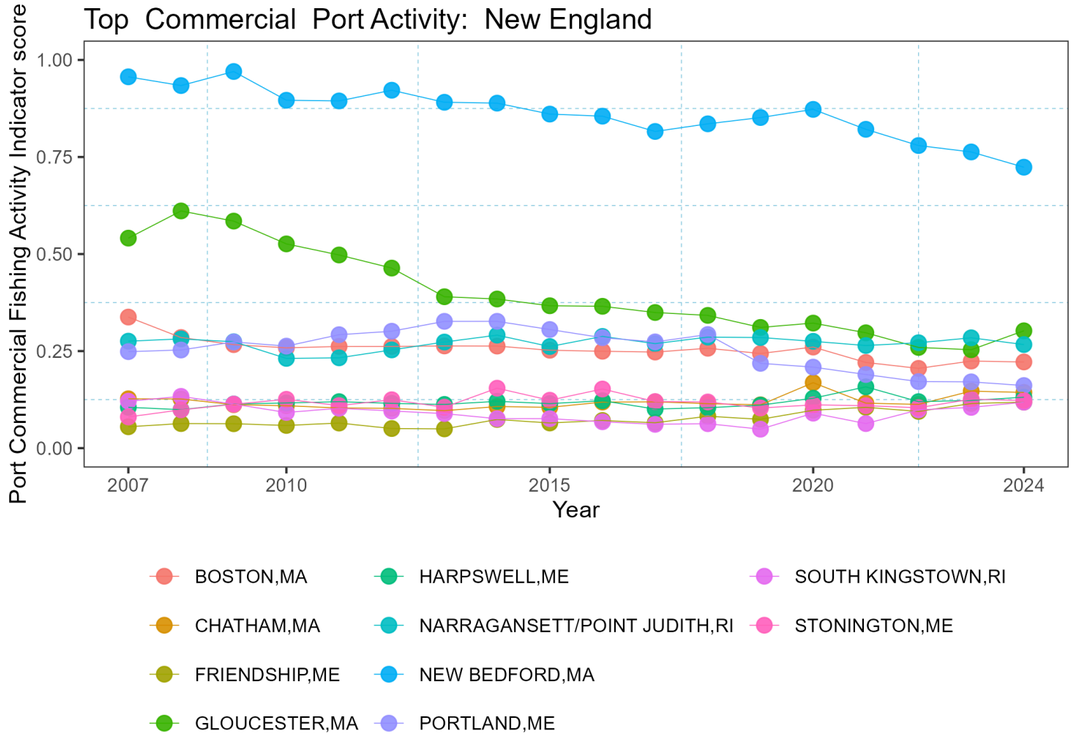


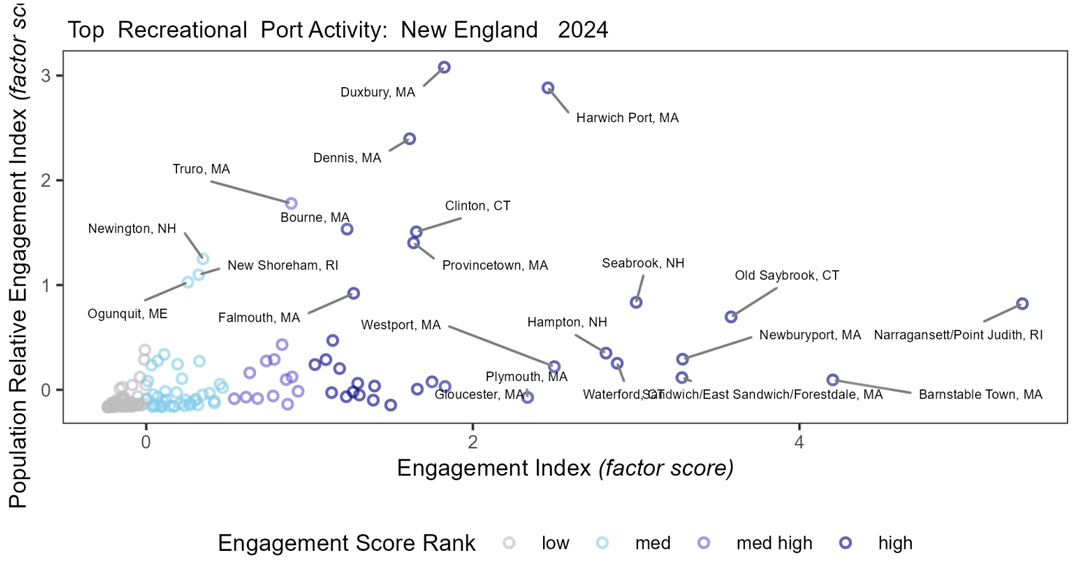
Implications

- No long-term change in types of recreational trips
- *But* there is an increase in diversity of species caught recreationally
- This suggests recreational fishers are catching a wider variety of species

Objective: Social and Cultural

Indicators: Commercial port activity and recreational engagement





Community	personal_disruption_rank	pop_composition_rank	poverty_rank
New Bedford, MA	high	med high	med high
Boston, MA	med	med high	med high
Gloucester, MA	low	low	med
Portland, ME	low	low	low
Narragansett/Point Judith, RI	low	low	low

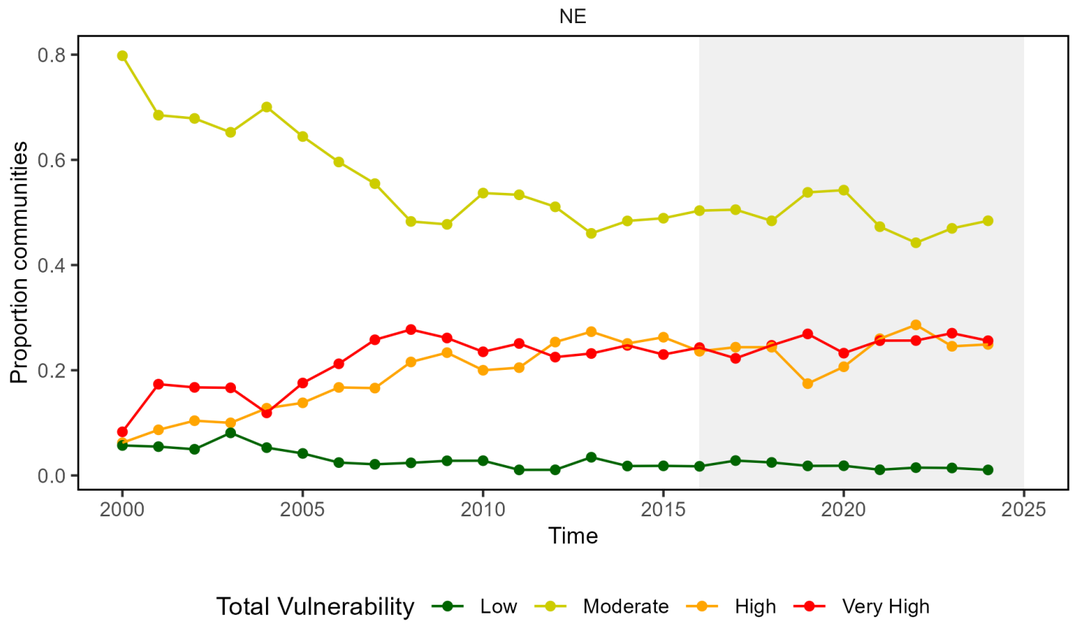
New Indicator: Port Activity based on dealers, landings, and permits

- New Bedford dominates but ports change in activity over time
- New Bedford and Boston still have high community vulnerability risk factors

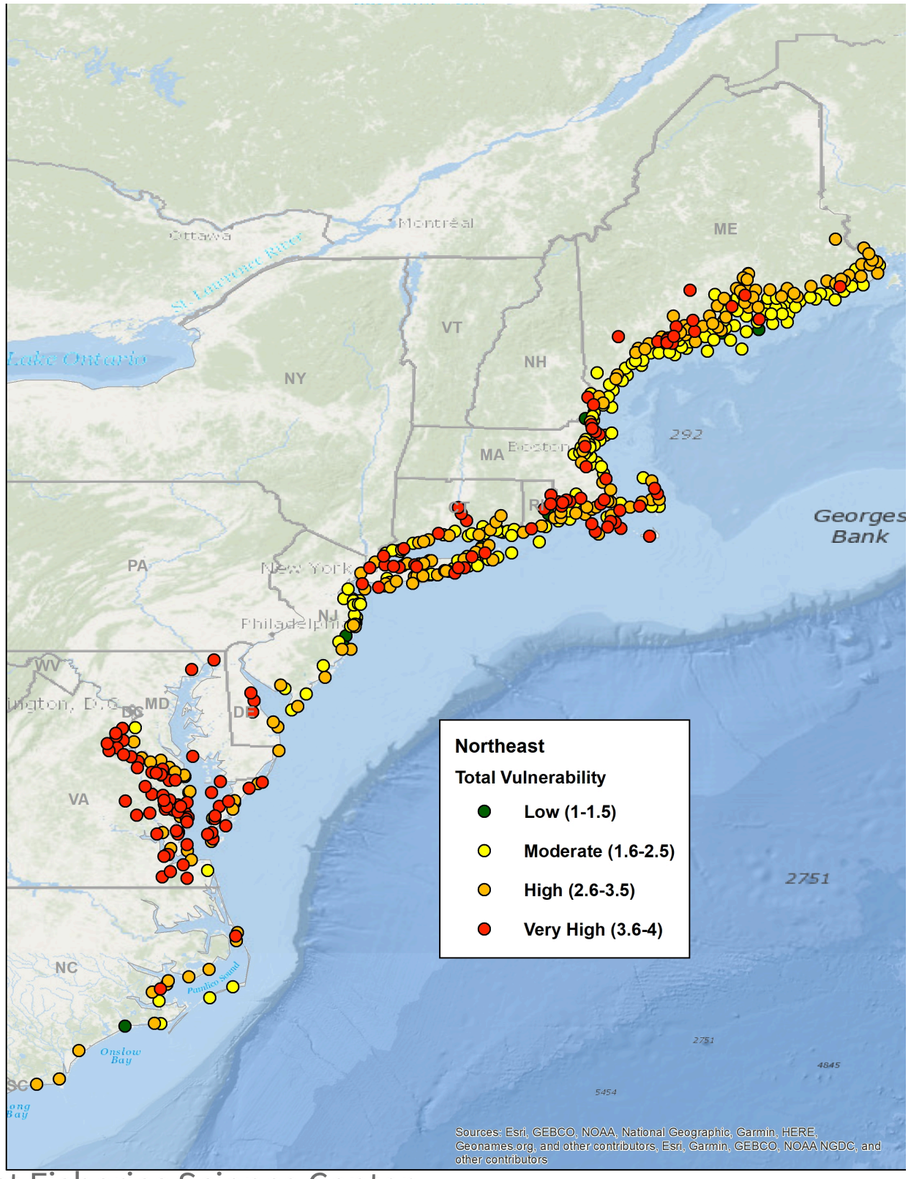
Recreational Community Engagement not updated from last year but will be adapted to Port Activity metrics

Objective: Social and Cultural

Indicators: Community Environmental Risk



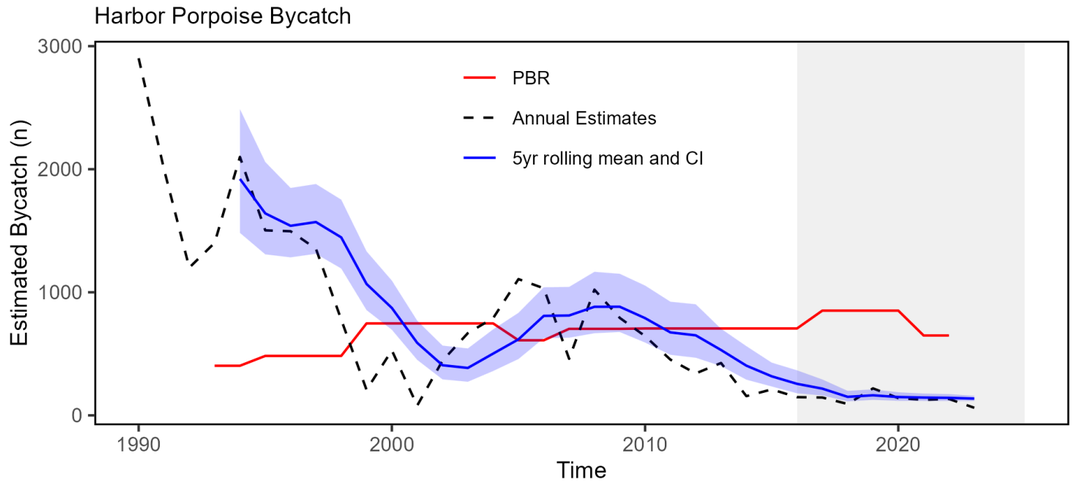
- Measures of how dependent communities are on species sensitive to environmental variability (temperature, acidifcation, etc.)
- Majority of communities in moderate risk level but more are shifting towards high/very high dependence on vulnerable species

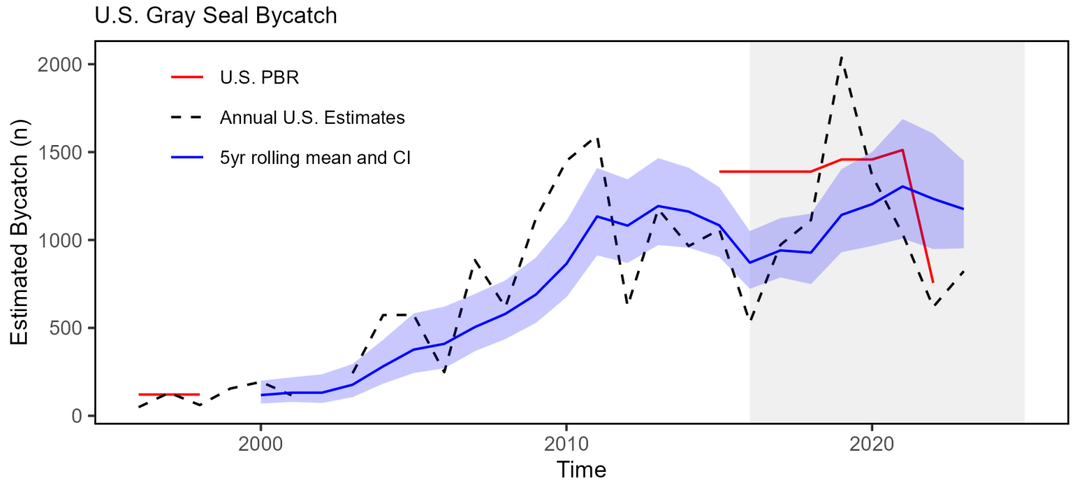


CCCVR map total vulnerability

Objectives: Coastwide Protected species *Maintain bycatch below thresholds*

Indicators: Harbor porpoise and gray seal bycatch



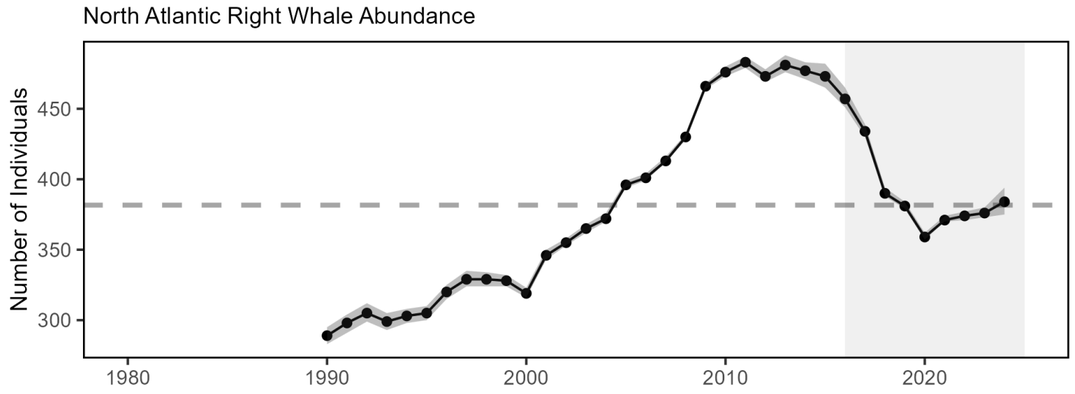


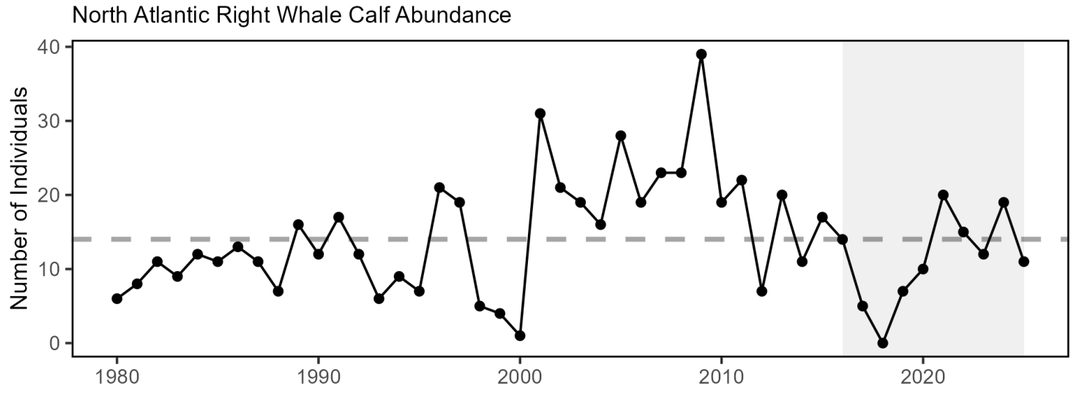
Implications:

- High uncertainty in gray seal bycatch estimates but considered meeting objectives
- Gray seal are among the highest bycatch of any U.S. marine mammal. The increasing trend in gray seal bycatch may be related to an increase in the gray seal population (U.S. pup counts).
- The downward trend in harbor porpoise bycatch can also be due to a decrease in harbor porpoise abundance in US waters, reducing their overlap with fisheries, and a decrease in gillnet effort.

Objectives: Coastwide Protected species *Recover endangered populations*

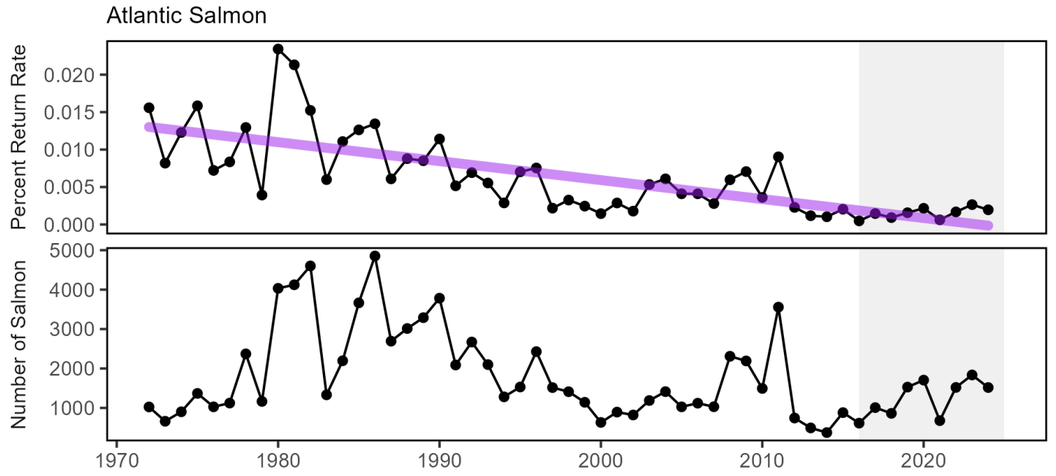
Indicators: North Atlantic right whale population, calf counts





Implications:

- No change in adult populations since 2020 but mortality still above recovery rate
- Interactions between North Atlantic Right Whales (NARW) and fixed gear fisheries and offshore wind development
- Distribution shifts driven by copepod availability.
- Unusual mortality events continue for 3 large whale species.
- Atlantic salmon return rates continue to decline



Objective: Fishery and Ecosystem Stability

In 2025 we moved from increasing/decreasing stability to stable/not-stable and have refined the criteria

Stability is measured by:

- Volatility: How much do we expect the system to change year to year and is it predicatable?
- Adaptive Capacity: How well can the system respond to changes?
- Shifts from Baseline: Is the system shifting to a new status where prior conditions may no longer be the norm?

"Not-stable" **doesn't** mean:

- we are experiencing a regime shift necessarily
- we are experiencing negative impacts

"Stable" **doesn't** mean:

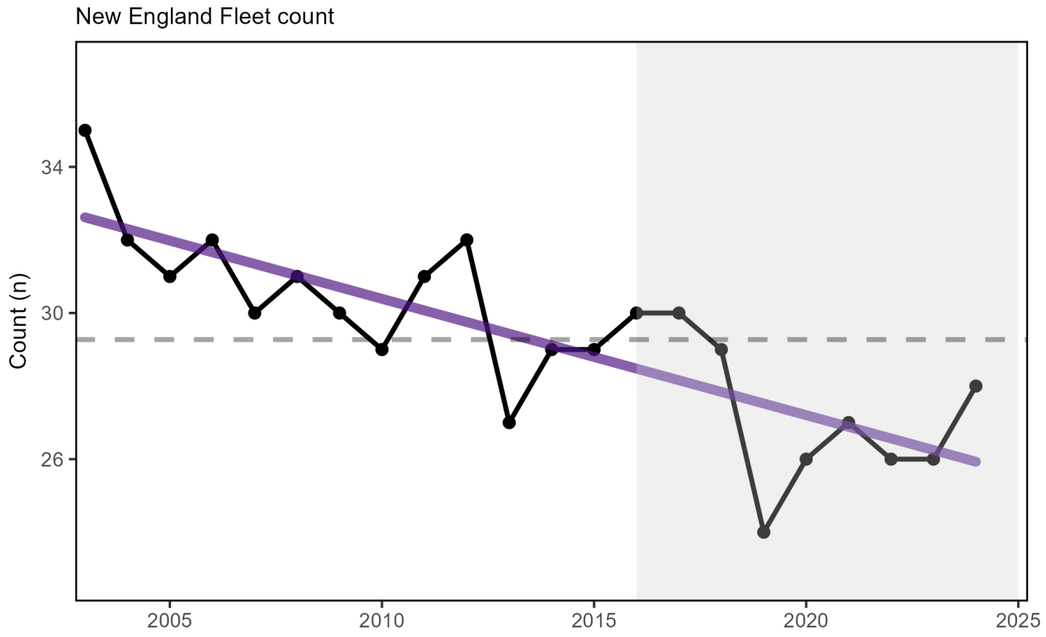
- There are no changes in the system
- All is well

"Not Stable" **does** mean:

- There are large changes in multiple ecosystem components
- These changes are altering the structure or function of the ecosystem

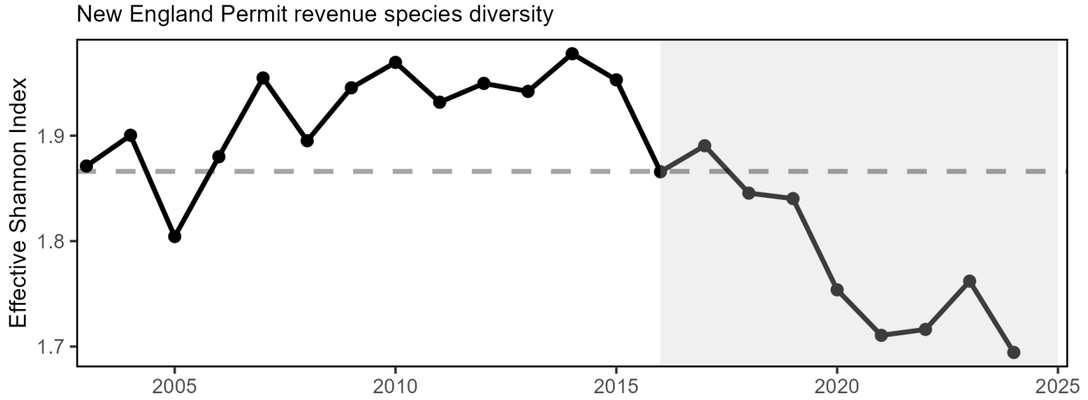
Objective: New England Fishery Stability: Not Stable

Fishery Indicators: Commercial fleet count, fleet diversity



Fishing Communities:

- Crews are aging and less satisfied with the predictability of earnings
- The size and activity of fishing communities are changing
- Some fishing communities have a decreasing ability to adapt to changes in resources

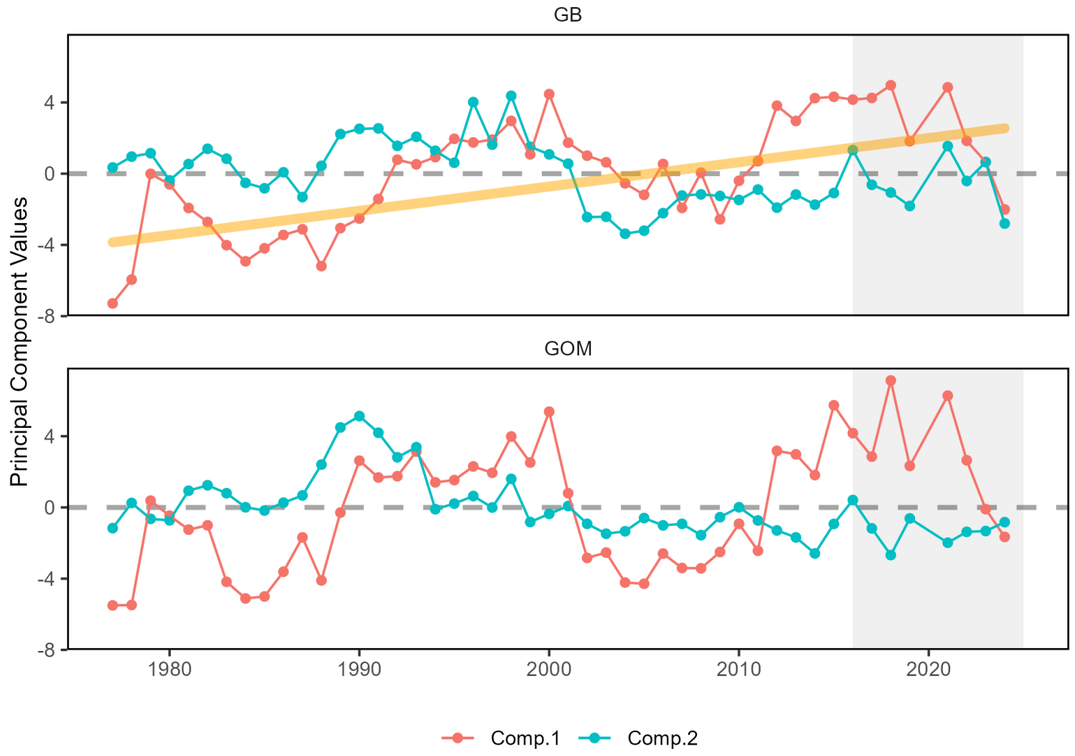


Fishing Patterns:

- Increase in revenue per unit effort but catch diversity is low -> more dependent on fewer species
- Rotational management of scallops can decrease predictibility of revenue
- Recreational fishing is changing with higher catch diversity

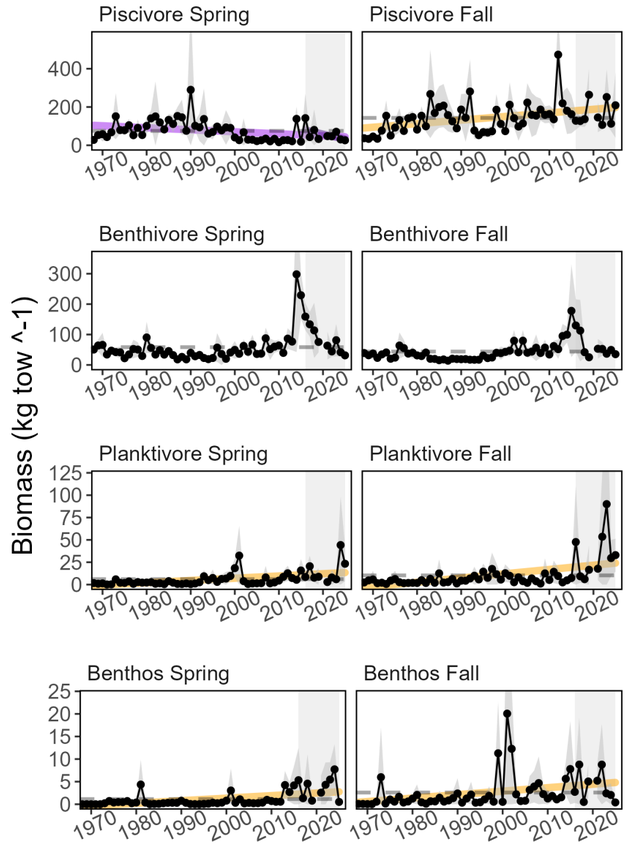
Objective: Georges Bank Ecological Stability: Not Stable

Ecological Indicators: zooplankton communities



- GB seeing large-scale shifts in the broad species that make up zooplankton communities

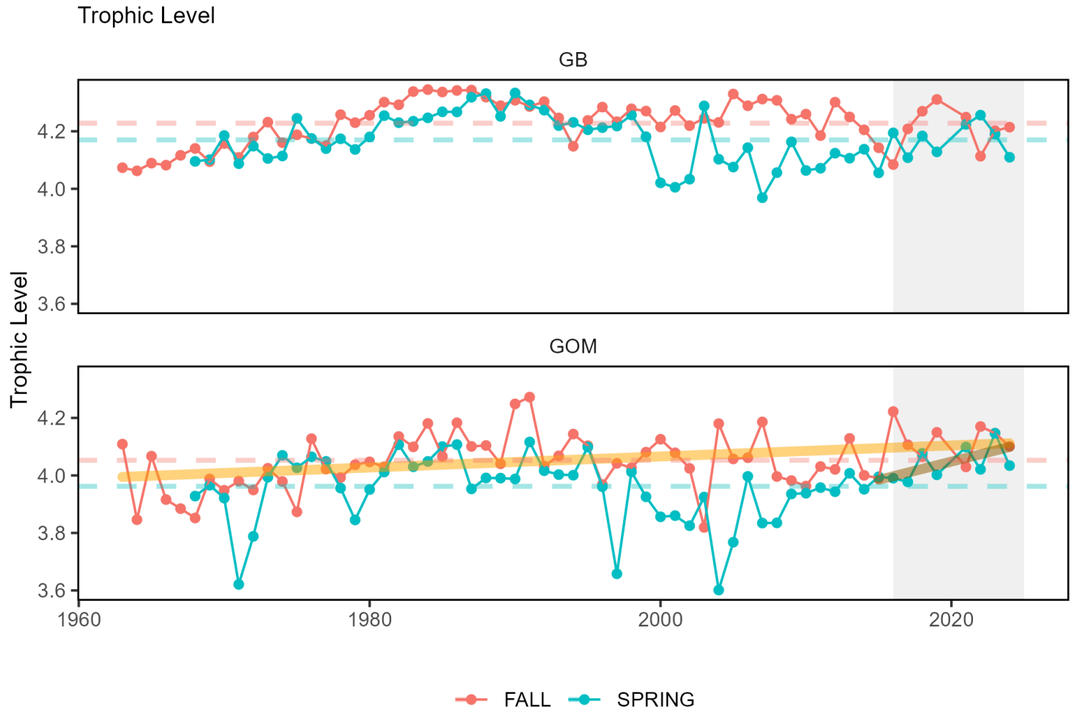
Ecological Indicators: Survey Biomass



- Biomass of large functional groups is changing for some but not all species suggesting a change in fish communities

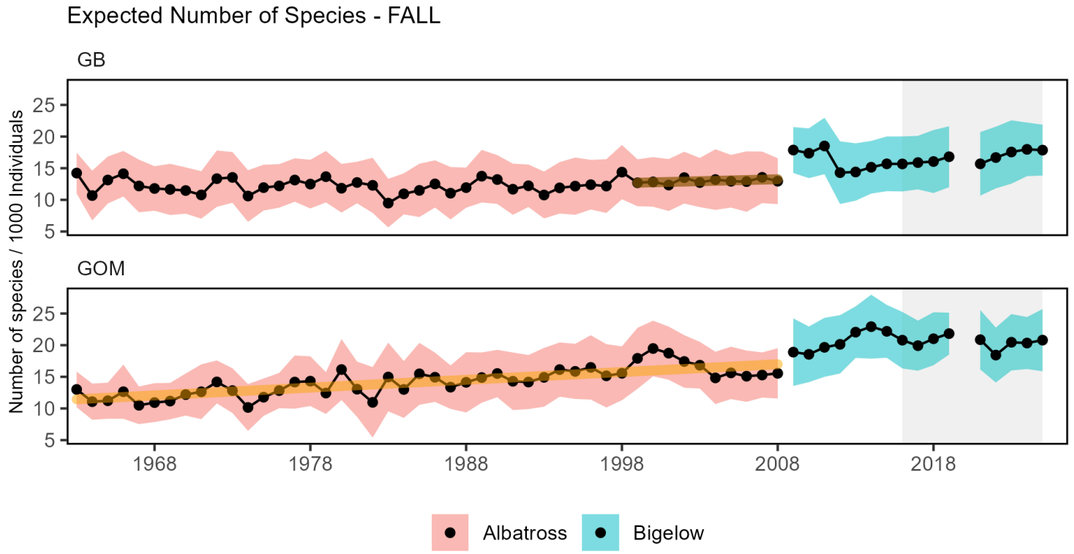
Objective: Gulf of Maine Ecological Stability: Not Stable

Ecological Indicators: fish traits



- Finfish with a higher trophic level in spring
- Finfish show a shorter length at maturity, lower fecundity, and faster growth rates.

Ecological Indicators: Survey Diversity



- Increase in number of species caught in trawl survey
- Fish communities are experience large-scale changes potentially changing structure and function of ecosystem

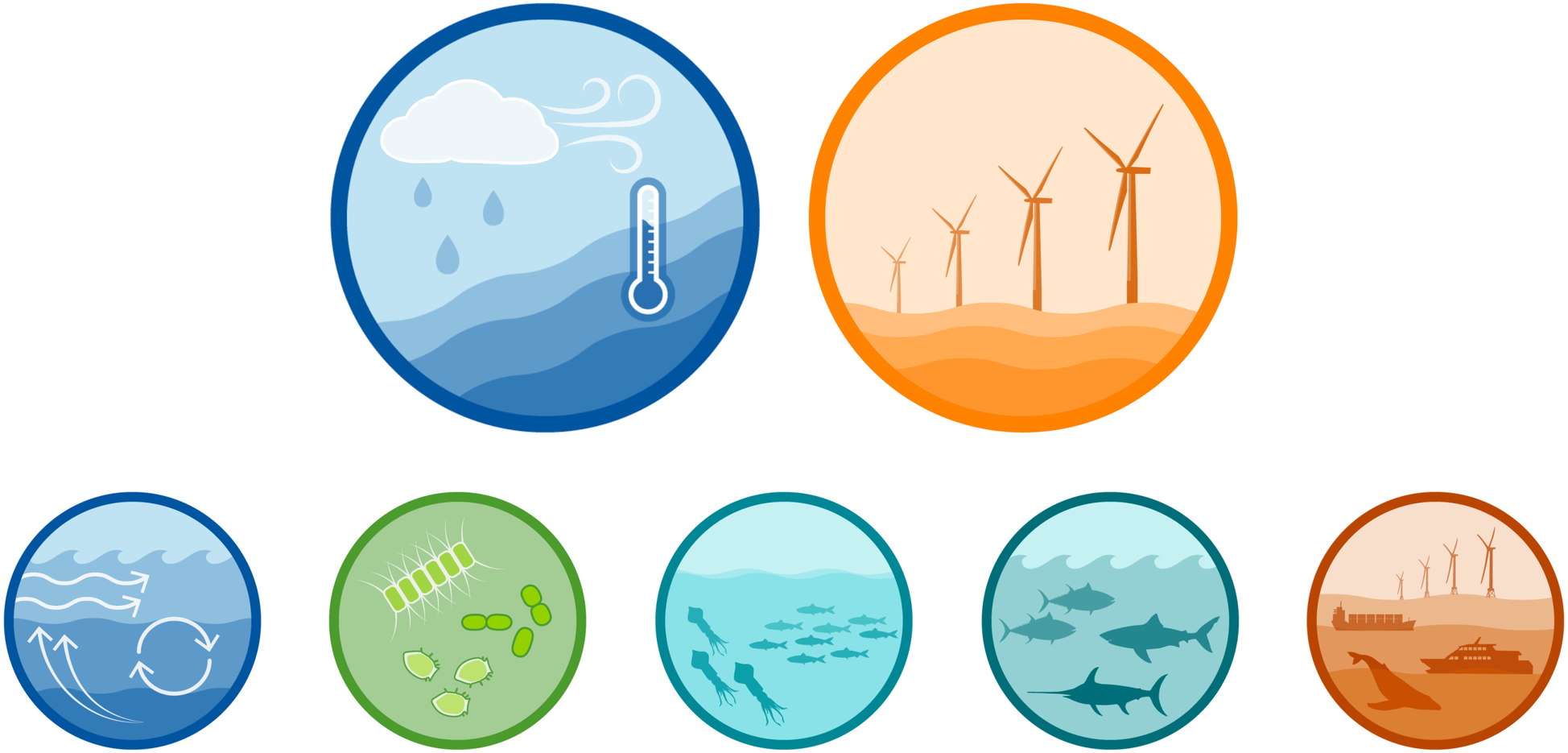
Discussion Question: Stability

Looking for feedback from the SSC on fishery and ecosystem stability

1. Does reframing of stability components as *Changes from Baseline*, *Adaptive Capacity* , and *Volatility* better address the Council's needs?

2. Are there suggestions for how these could be refined?

2025 Risks to meeting fishery management objectives



Revised Risks: Climate and Ecosystem Change

Risk categories	Observation indicators reported	Potential driver indicators reported
Climate and Ecosystem Risks		
Risks to Managing Spatially	Managed species (fish and cetacean) distribution shifts	Benthic and pelagic forage distribution; ocean temperature, changes in currents and cold pool
Risks to Managing Seasonally	Managed species spawning and migration timing changes	Habitat timing: Length of ocean summer, cold pool seasonal persistence
Risks to Setting Catch Limits	Managed species body condition and recruitment changes	Benthic and pelagic forage quality & abundance: ocean temperature & acidification
Other Ocean Uses Risks		
Offshore Wind Risks	Fishery revenue and landings from wind lease areas by species and port	Wind development map; Protected species presence and hotspots

Risks to Managing Spatially

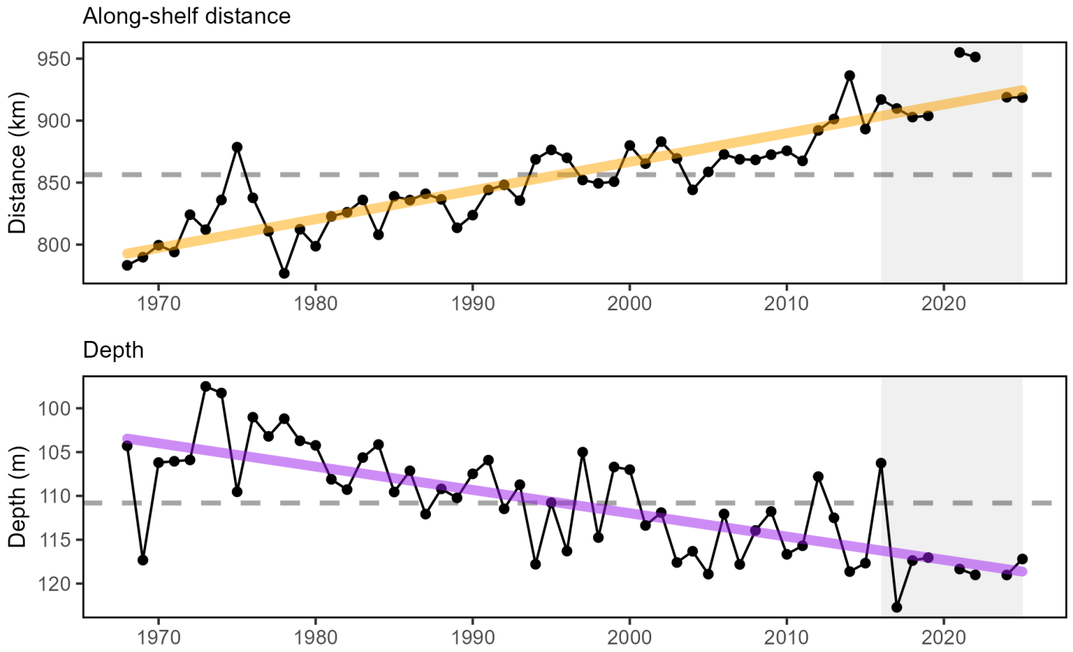
Potential Impacts: Spatial mis-allocation of quotas may lead to unmet quotas, increased discards, and/or miscalculated fishing targets. ### Risks to Managing Seasonally Potential Impacts: Spawning closures, seasonal openings, and seasonal quota allocations may be less effective if mis-timed with biological events, resulting in decreased seafood production.

Risks to Setting Catch Limits

Potential Impacts: Unaccounted for and unknown productivity changes may lead to mis-specified quotas and rebuilding plans, especially if they are not considered in stock reference points and short-term stock projections.

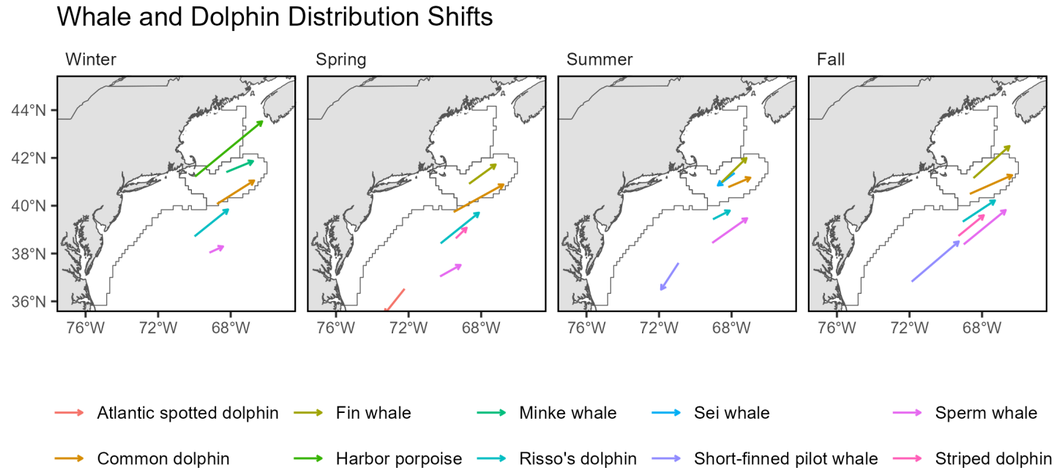
Risks to Managing Spatially: Indicators

Fish distribution shifts



Significant species distributions seen for fish, HMS, and mammals

Cetacean distribution shifts

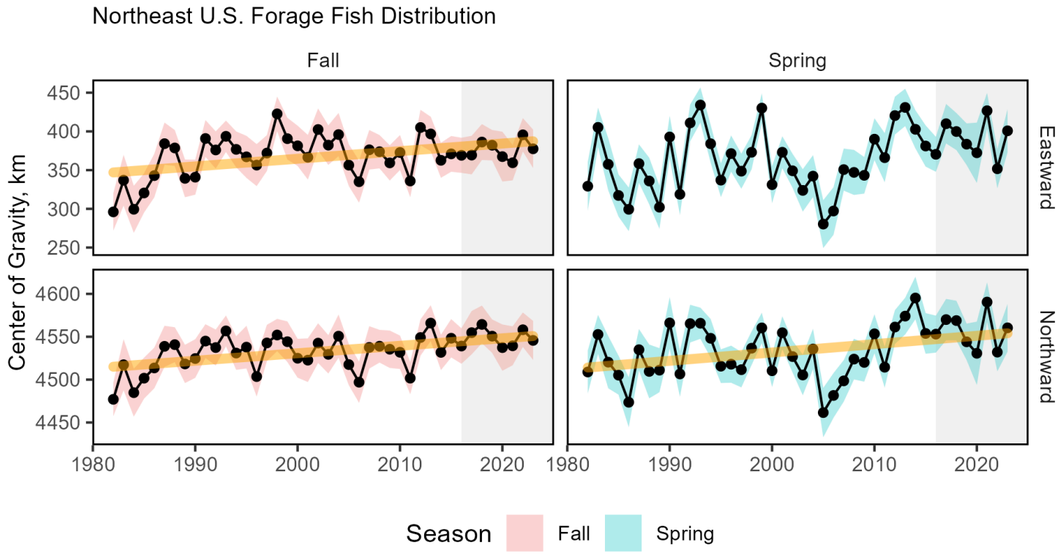


Changing distributions can impact:

- spatial allocation & cross-jurisdictional management
- effectiveness of bycatch reduction measures
- Availability to surveys and fisheries

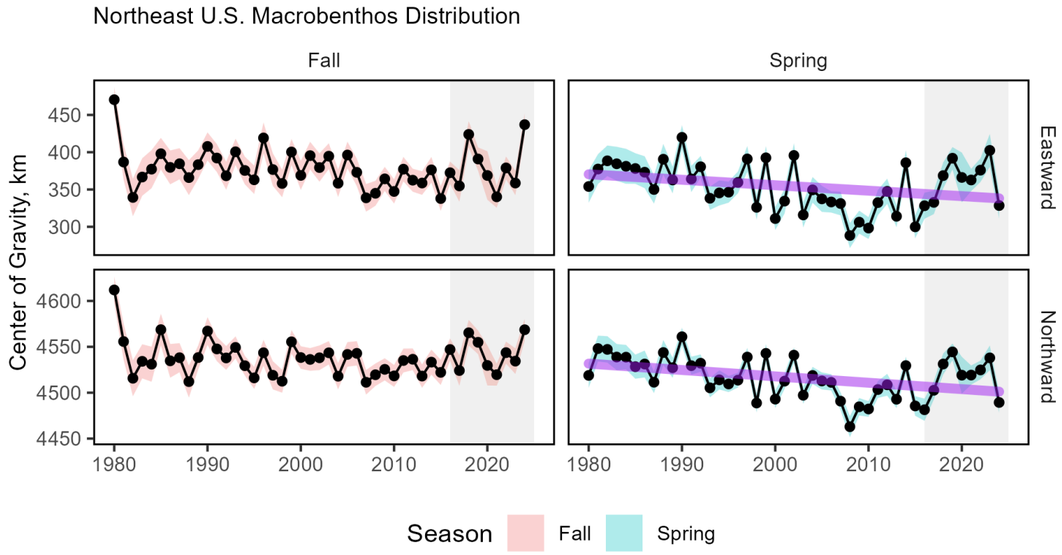
Risks to Managing Spatially: Biological Drivers

Forage fish distributions



Some species are following their food, but not all. Both pelagic and benthic prey are shifting towards the northeast

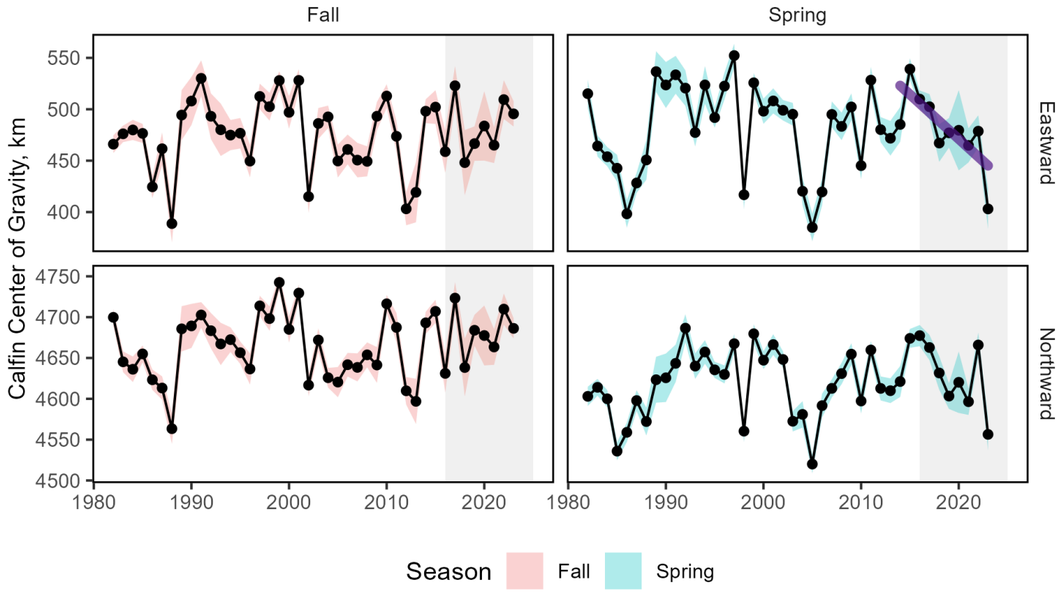
Macrobenthos (mid-size benthic species) distributions



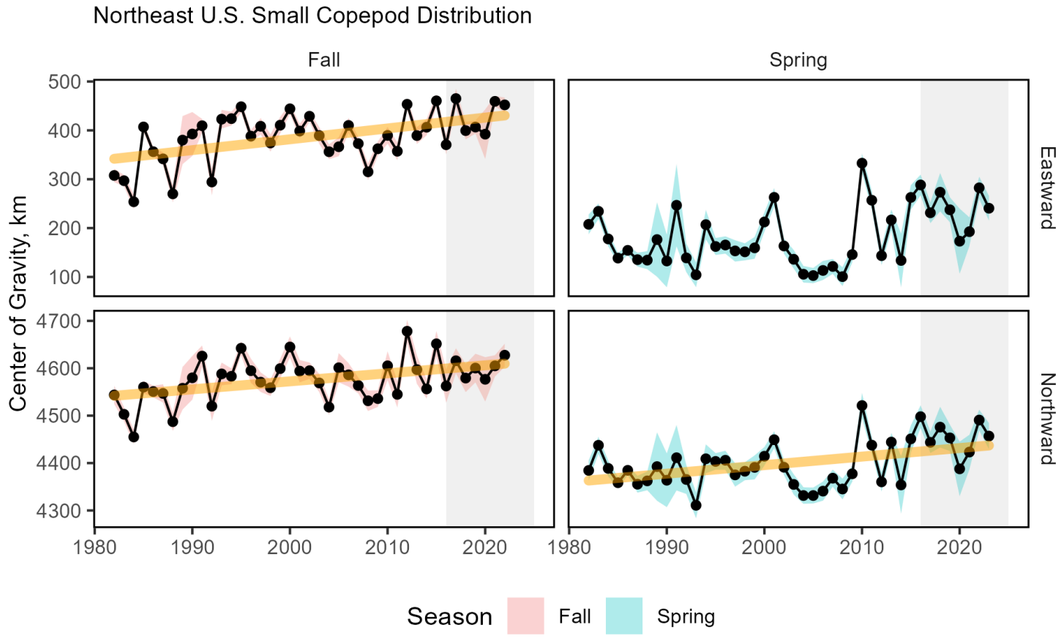
Not all species are as mobile as their prey. Can cause a mismatch between fish and their prey

Risks to Managing Spatially: Biological Drivers

Shifts in zooplankton (from ECOMON)



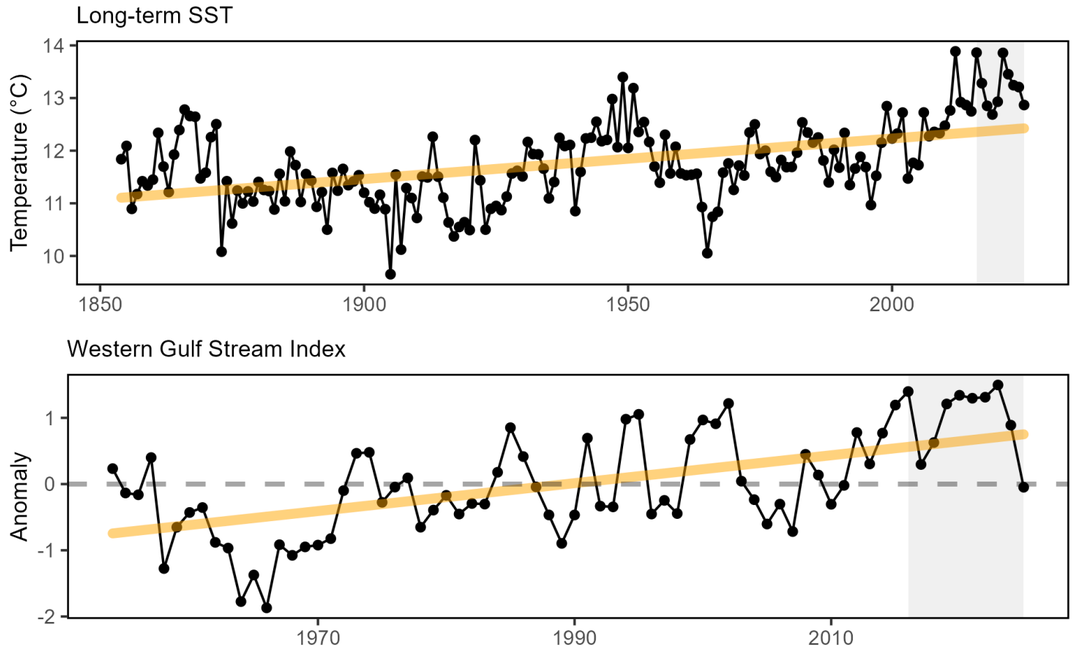
Calanus shifting westward in last decade



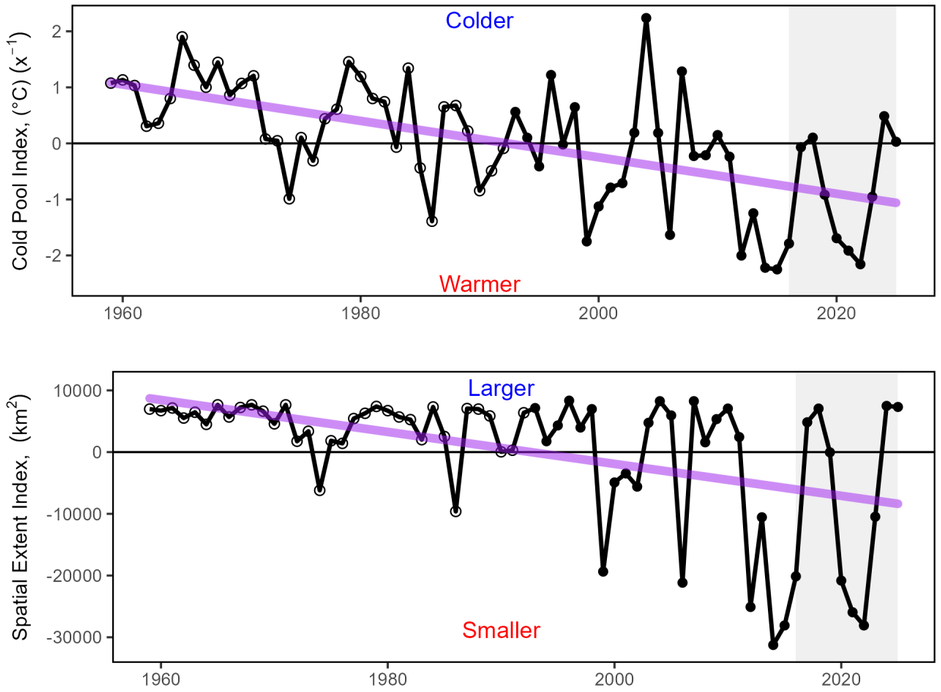
Long-term northeast shifts in Small copepods

Risks to managing spatially: Environmental Drivers

Thermal Habitat Changes



- The entire shelf is getting warmer with northward shifts in Gulf Stream
- Since 2023 - sharp drop in gulf stream and temperature
- Changes in currents and temperature can alter habitat suitability for species
- Mobile species can follow changes, but others cannot (i.e. scallops)



- Some changes can be local and variable
  - Mid-Atlantic Cold pool important regional feature that is shrinking and warming habitat
  - Last 3 years saw an improvement in cold pool conditions

Risks to Managing Spatially: Future considerations

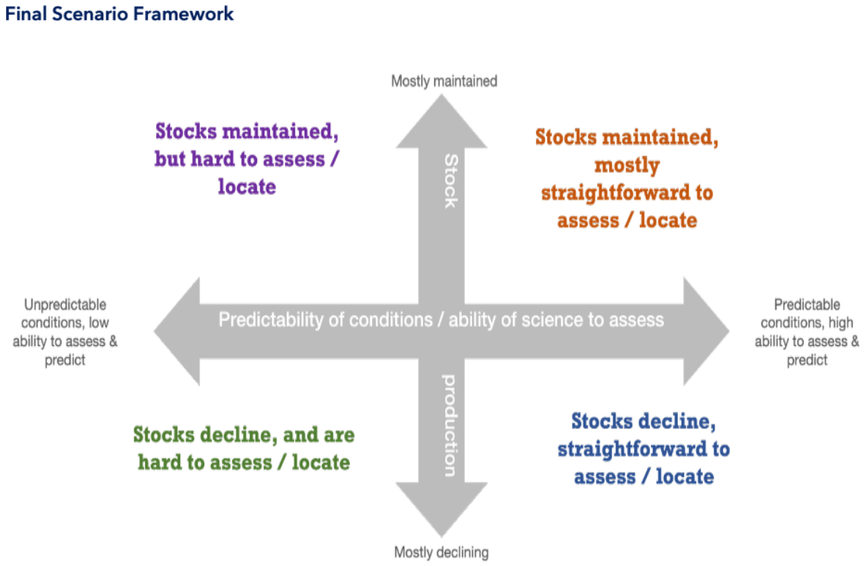
- Distribution shifts caused by changes in thermal habitat and ocean circulation are likely to continue as long as long-term trends persist.
- Episodic and short-term events (see 2025 Highlights) may increase variability in the trends.
- We need a better understanding of the drivers of distribution shifts to make predictions

Forecasts

- 10 year oceanographic projections forecast a temporary pause in warming resulting from variability in circulation and a southward shift of the Gulf Stream **not** a shift in the long-term patterns.
- Evaluating how well these forecasts can predict episodic and anomalous events that are outside of the long-term patterns.

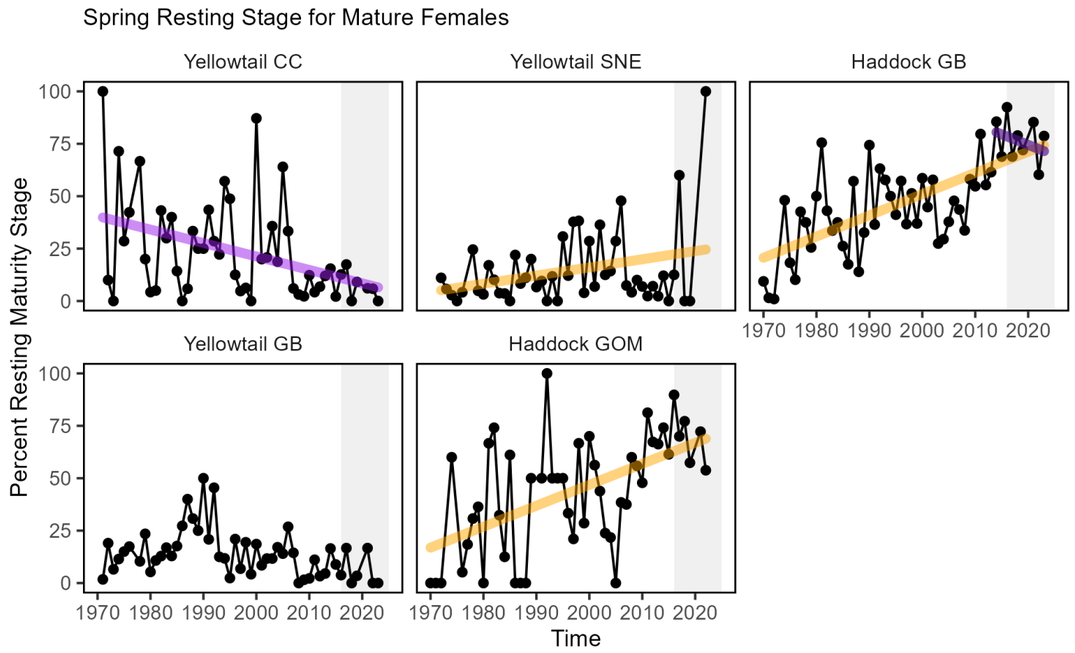
Management Considerations

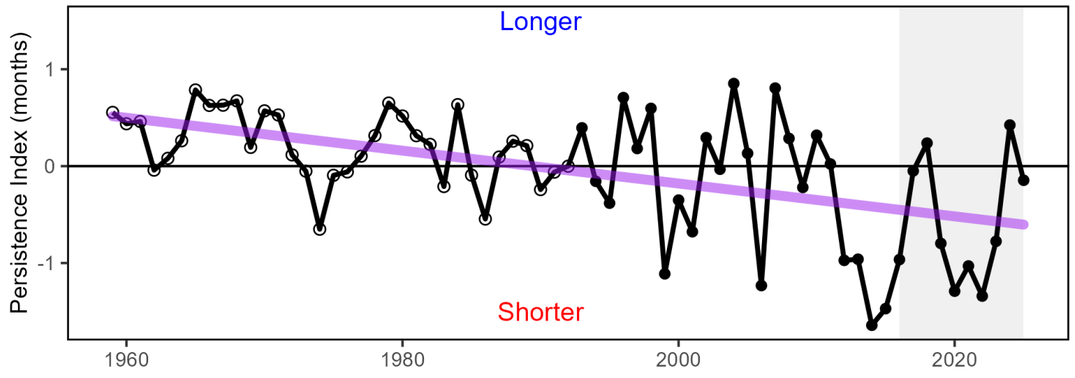
- Adapting management strategies to changing stock distributions and dynamic ocean processes
- Continued monitoring of populations in space and evaluating management measures against possible future spatial distributions.
- Use East Coast Climate Scenario Planning and the subsequent East Coast Coordination Group to help coordinate management responses to change.



Risks to Managing Seasonally: Indicators

Spawning timing & changes in migration patterns





Life Cycle Events

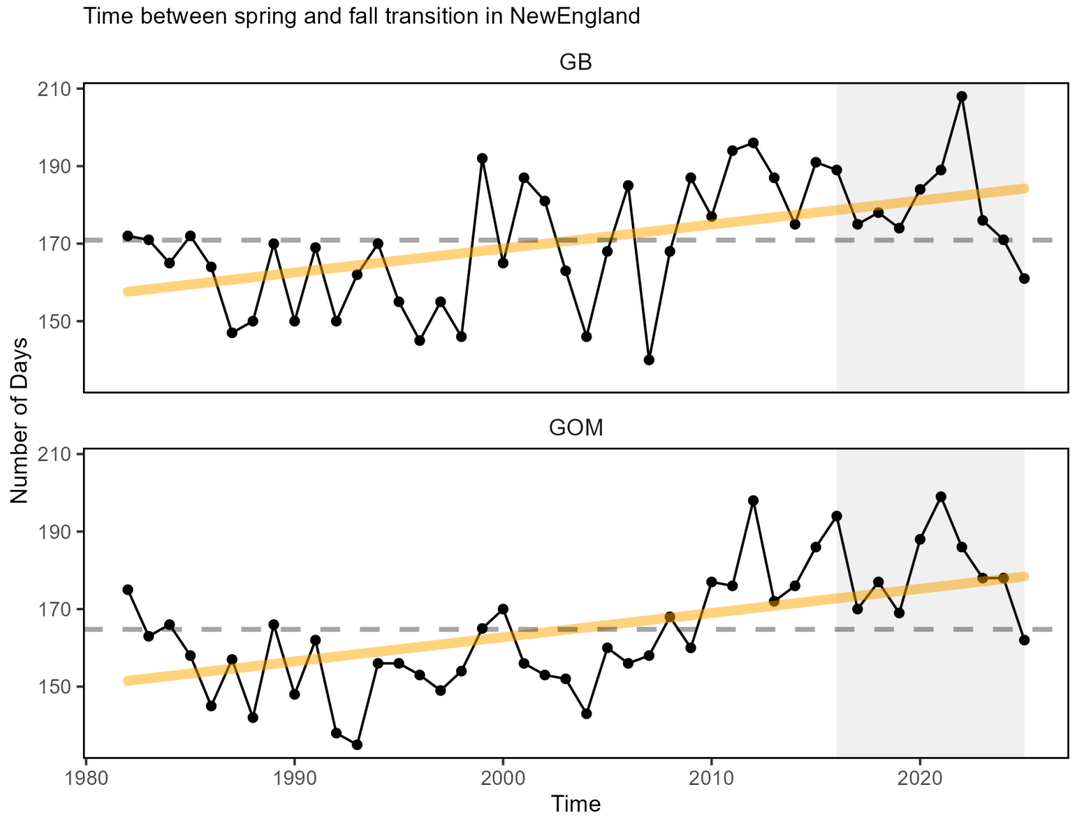
- Effective fishing seasons & openings/closing rely on alignment with seasonal events in fish stocks
- Though limited, evidence of large-scale changes in spawn timing

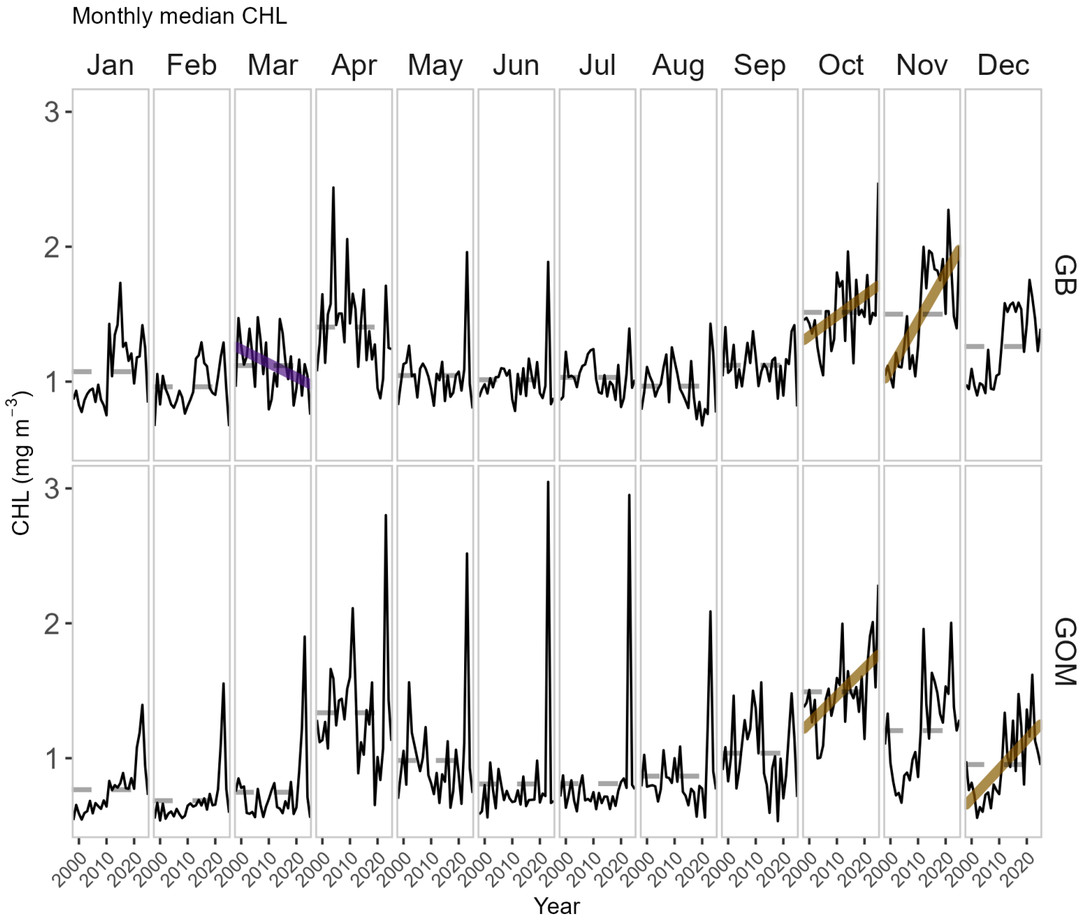
Migratory Species

- Recreational bigeye tuna caught 50 days earlier and bluefin tuna 38-80 days earlier (2002 to 2019).
- Right and humpback whale peak spring habitat has shifted 18-19 days later.
- Baseline information on large whale seasonal presence has been collected.

Risks to Managing Seasonally: New England

Drivers: Seasonal transitions, habitat persistence, bloom timing





Seasonal habitat cycles vary annually and show changes

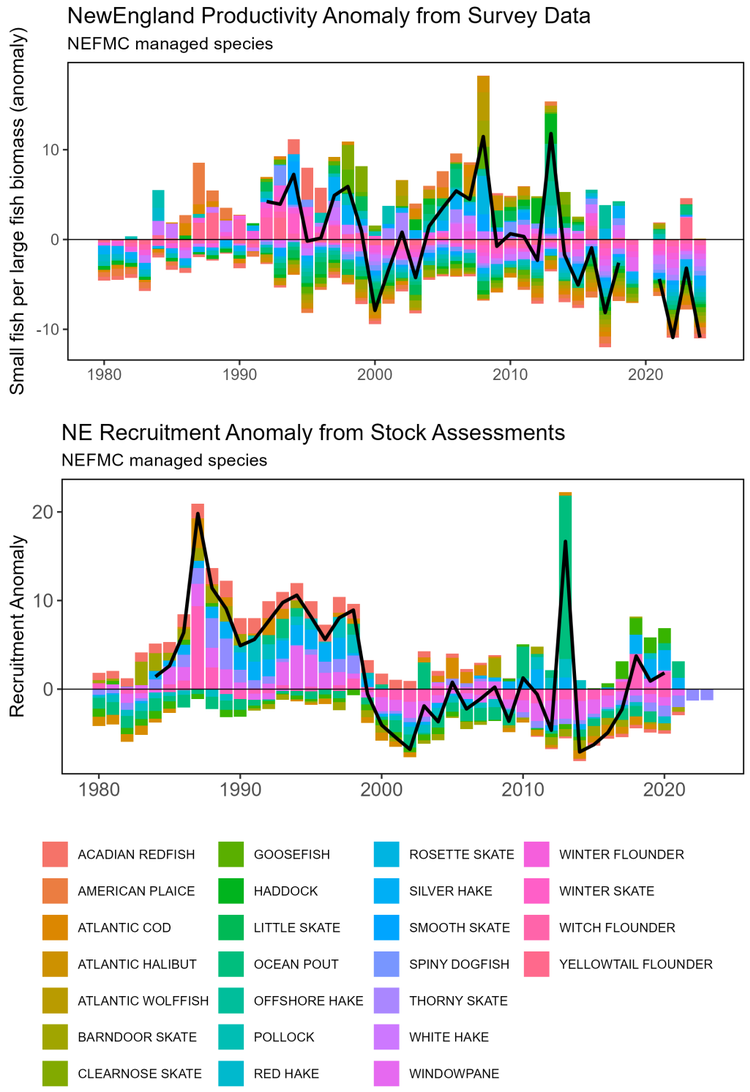
Fall blooms getting later (later peak)

Future considerations

- Do assumptions of seasonal timings still hold?
- Strong need for new indicators to be developed to monitor timing shifts for stocks.

Risks to Setting Catch Limits: Indicators

Fish productivity



Management Concerns

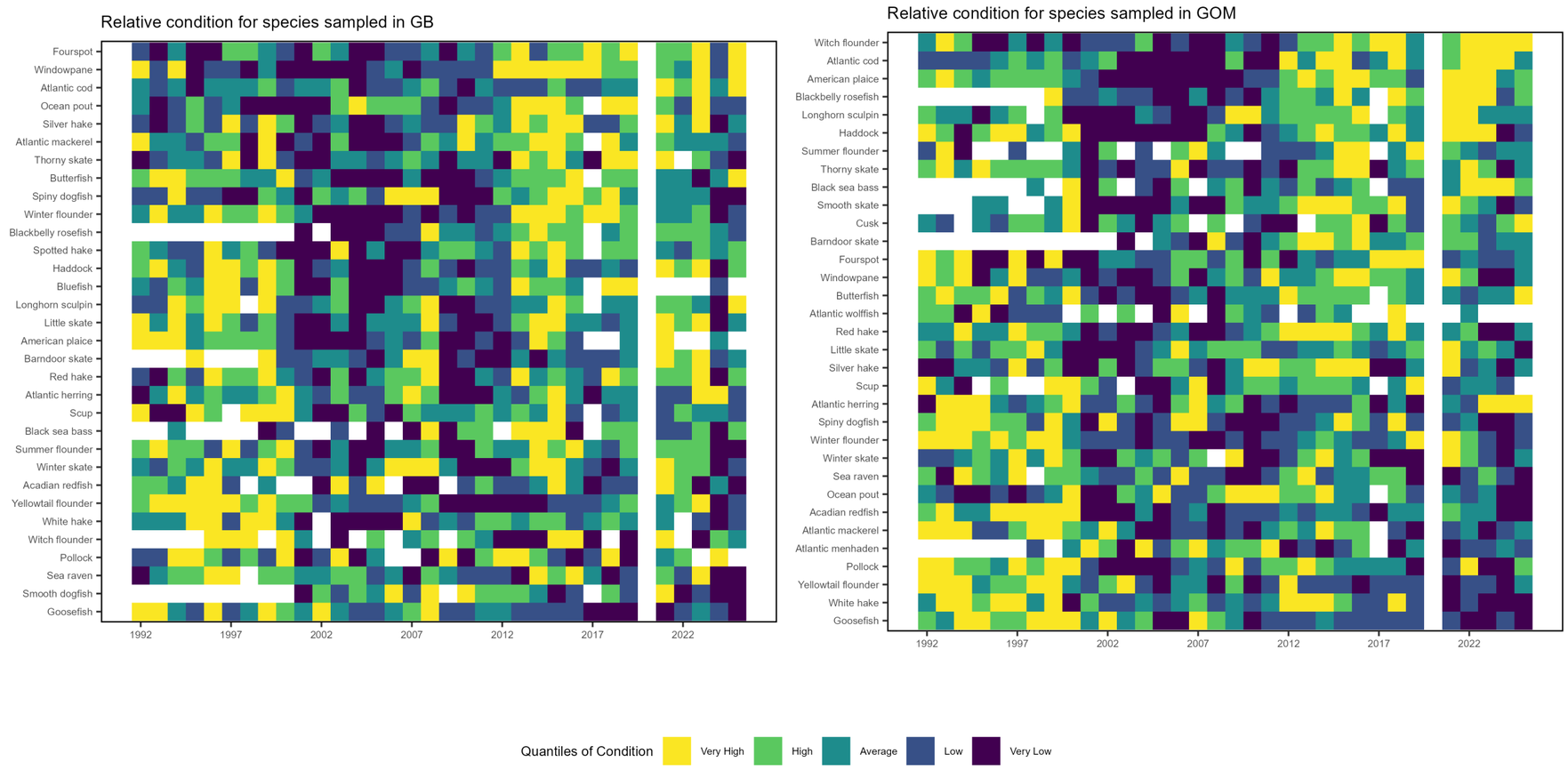
- Sustainable management and rebuilding plans rely on assumptions about fish productivity (growth, reproduction, and natural mortality)
- Even if not understood well, environmental changes can impact biological processes and reference points

Fish Productivity

- Productivity is the net result of growth, reproduction, and natural mortality
- Fish productivity had been low since 2020

Risks to Setting Catch Limits: Indicators

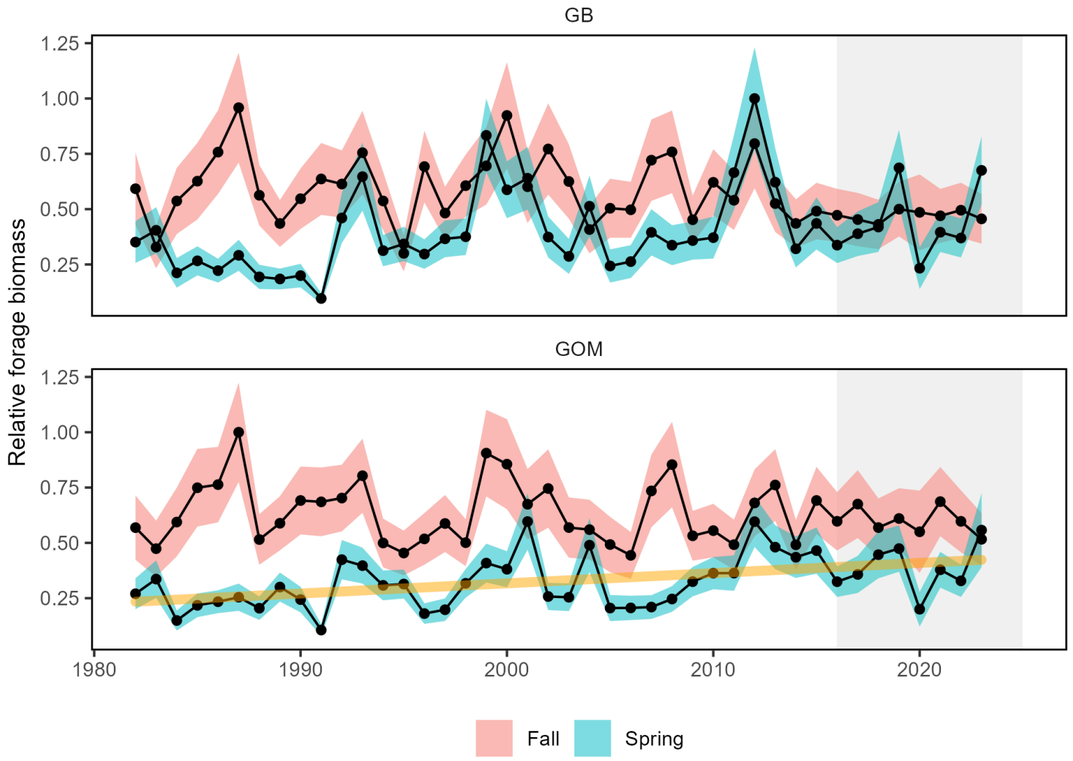
Fish Condition



Condition relates to reproduction potential and market quality. High variability but patterns emerge across species.

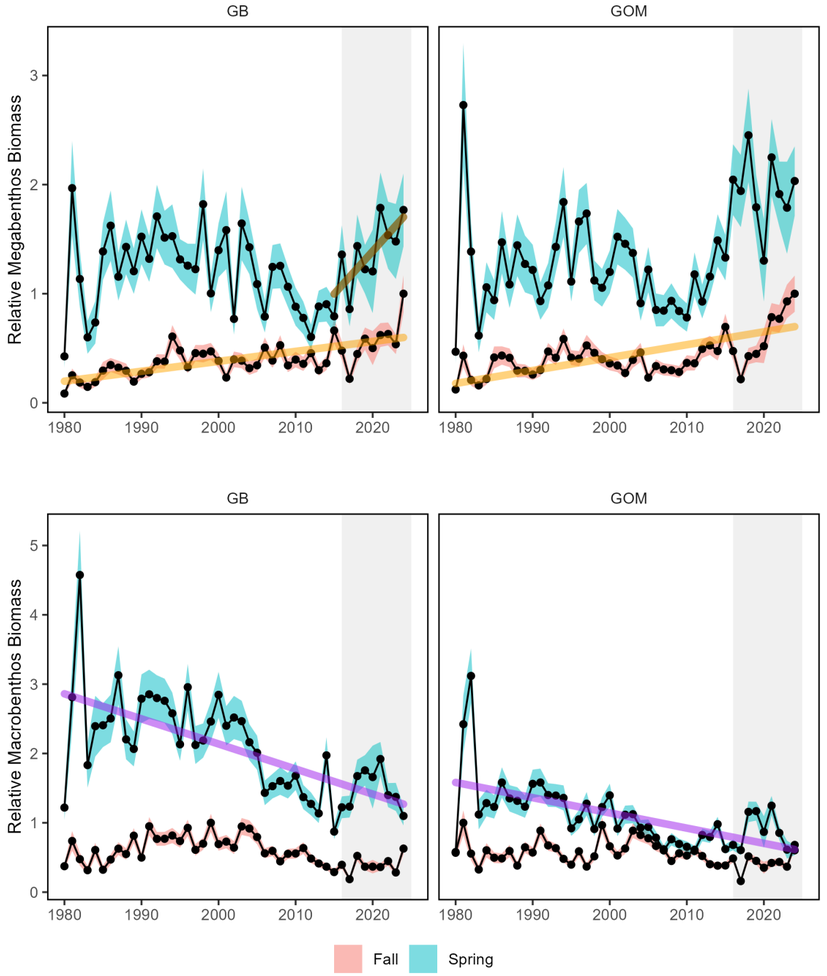
Risks to Setting Catch Limits: Drivers

Forage Quality and Abundance



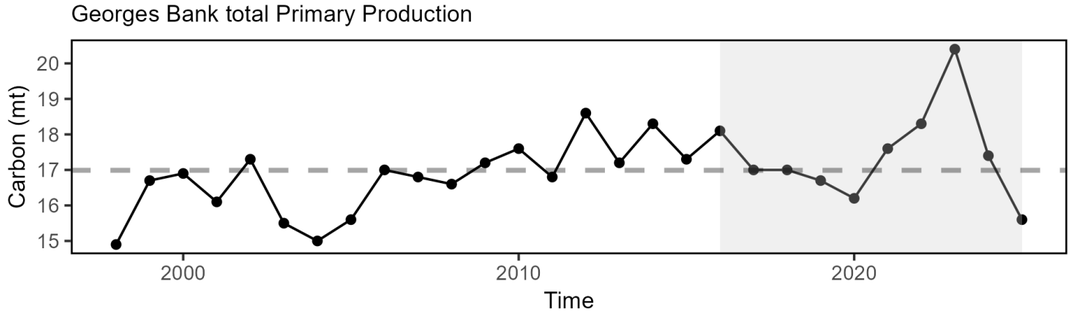
Forage fish abundance/quality and benthic prey changes annually.
Declines in spring macrobenthos may impact juvenile fish

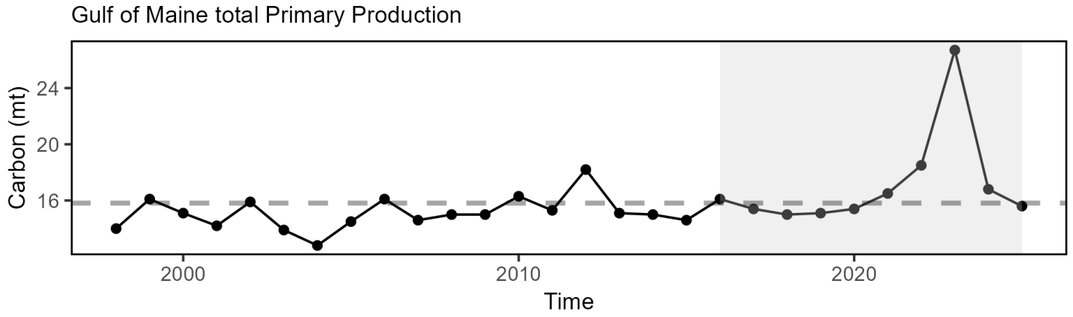
benthos abundance



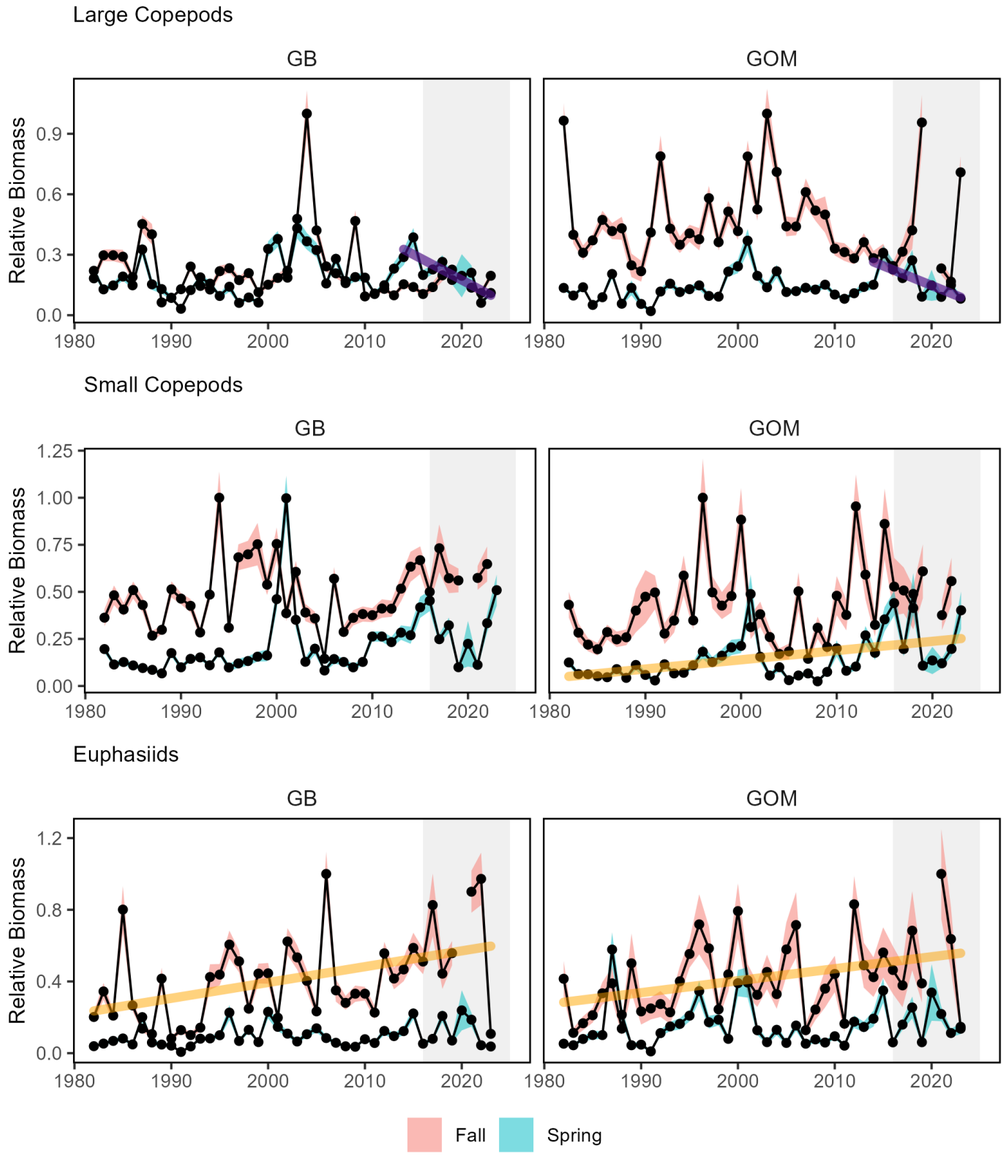
Risks to Setting Catch Limits: Drivers

Low trophic level processes





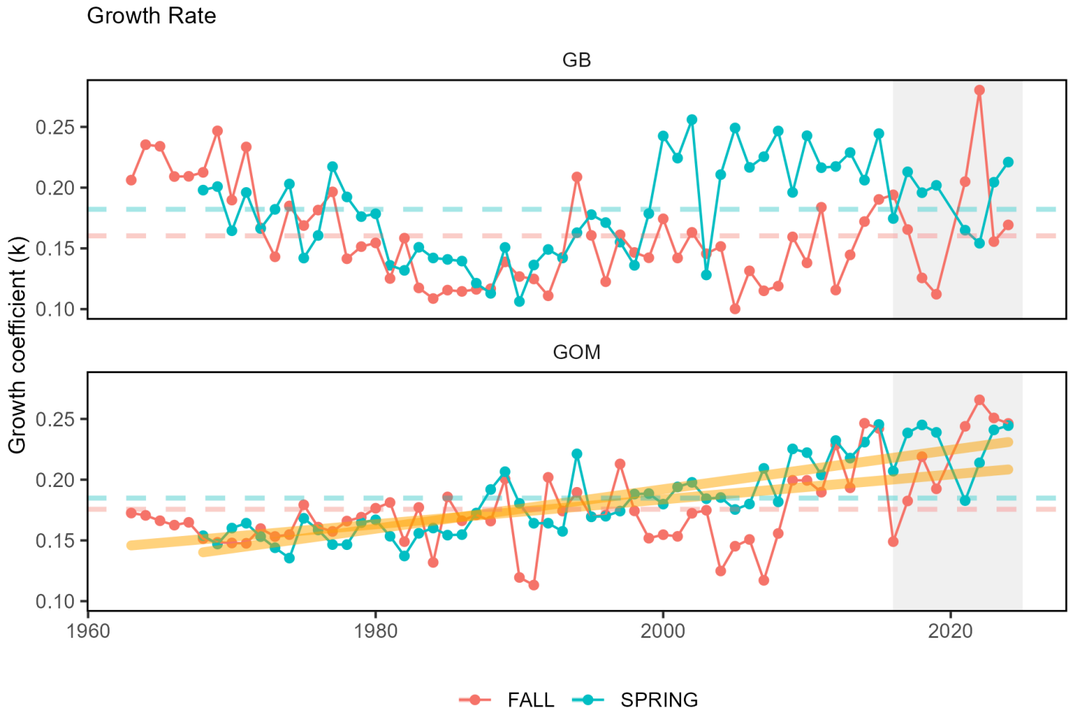
- Primary production determines the energy available to the ecosystem
- Forage and juvenile fish and marine mammals rely on zooplankton to grow. Shifts in zooplankton communities can change the overall quality of food.

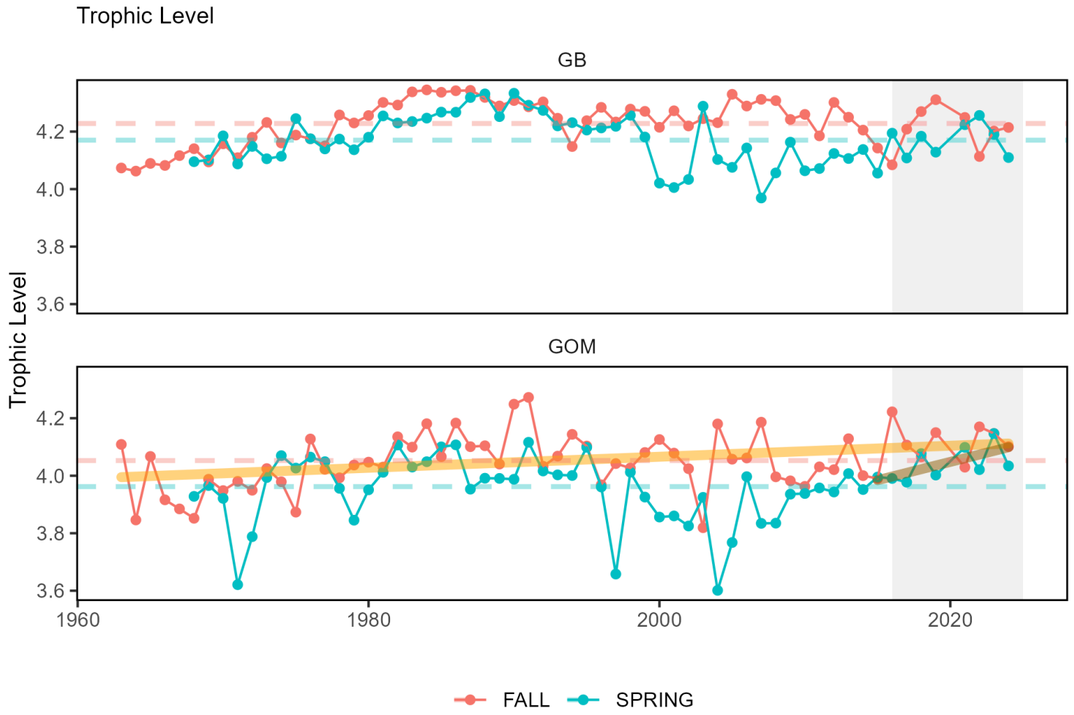


Risks to Setting Catch Limits: Drivers

Changes in fish traits

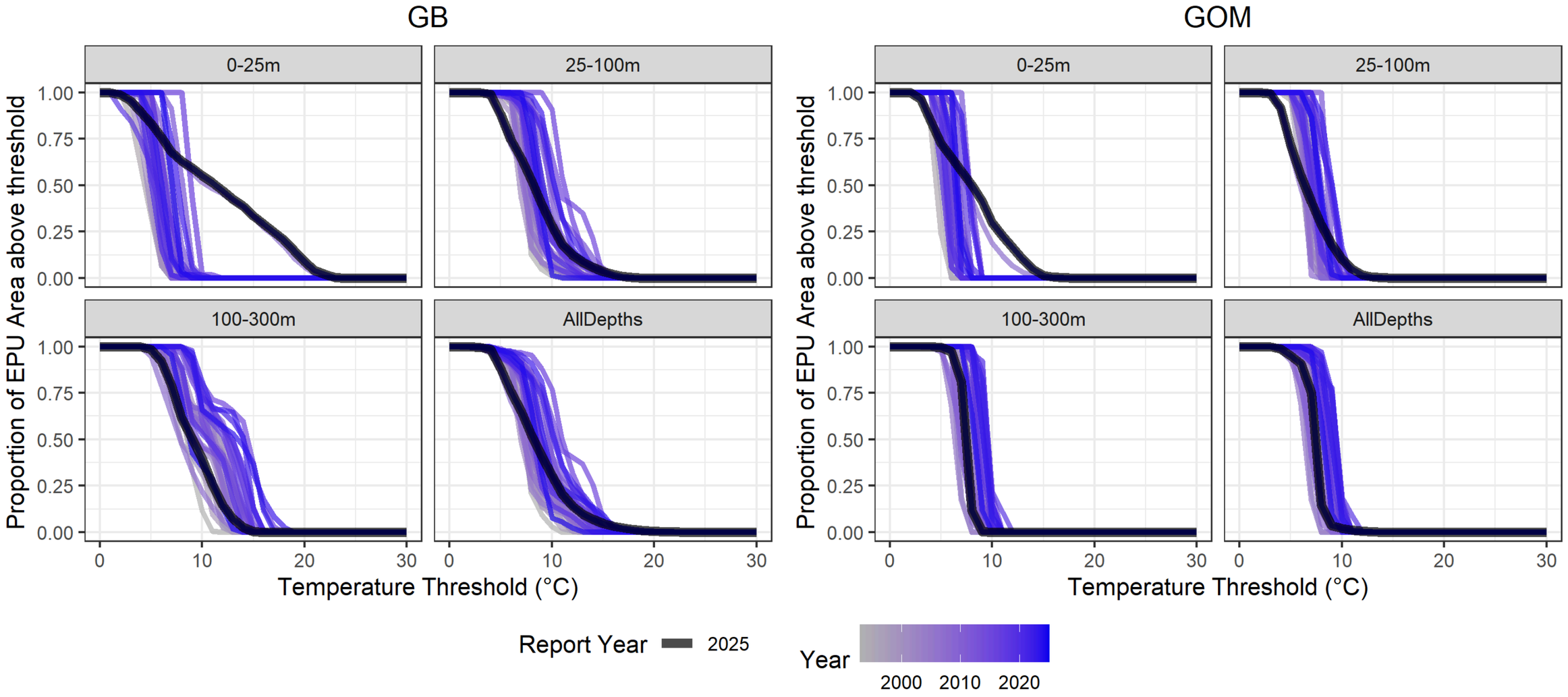
Finfish communities are changing in GOM towards species with higher trophic levels and faster growth rates





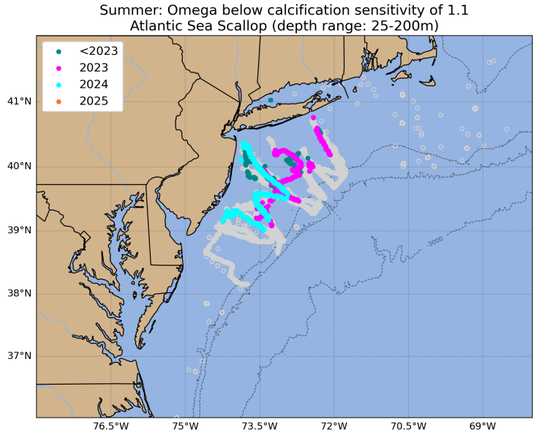
Risks to Setting Catch Limits: Drivers

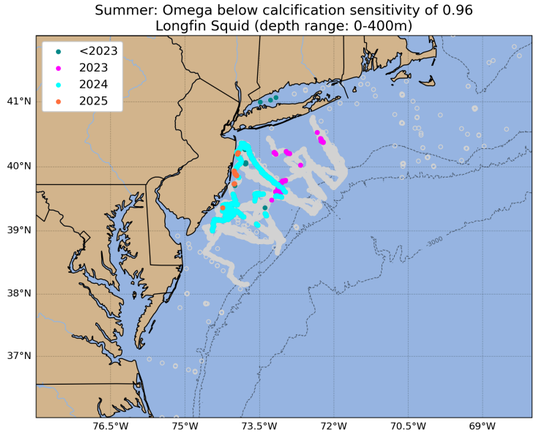
2025 Thermal habitat area by depth

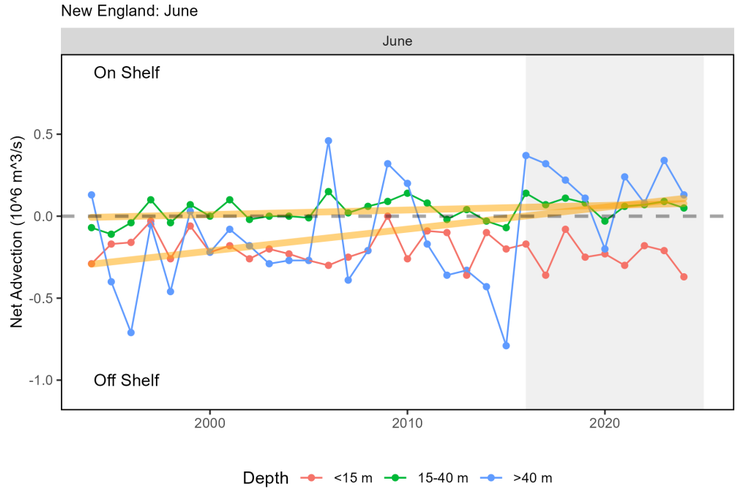


Risks to Setting Catch Limits: Drivers

Environmental: Habitat Quality and Circulation





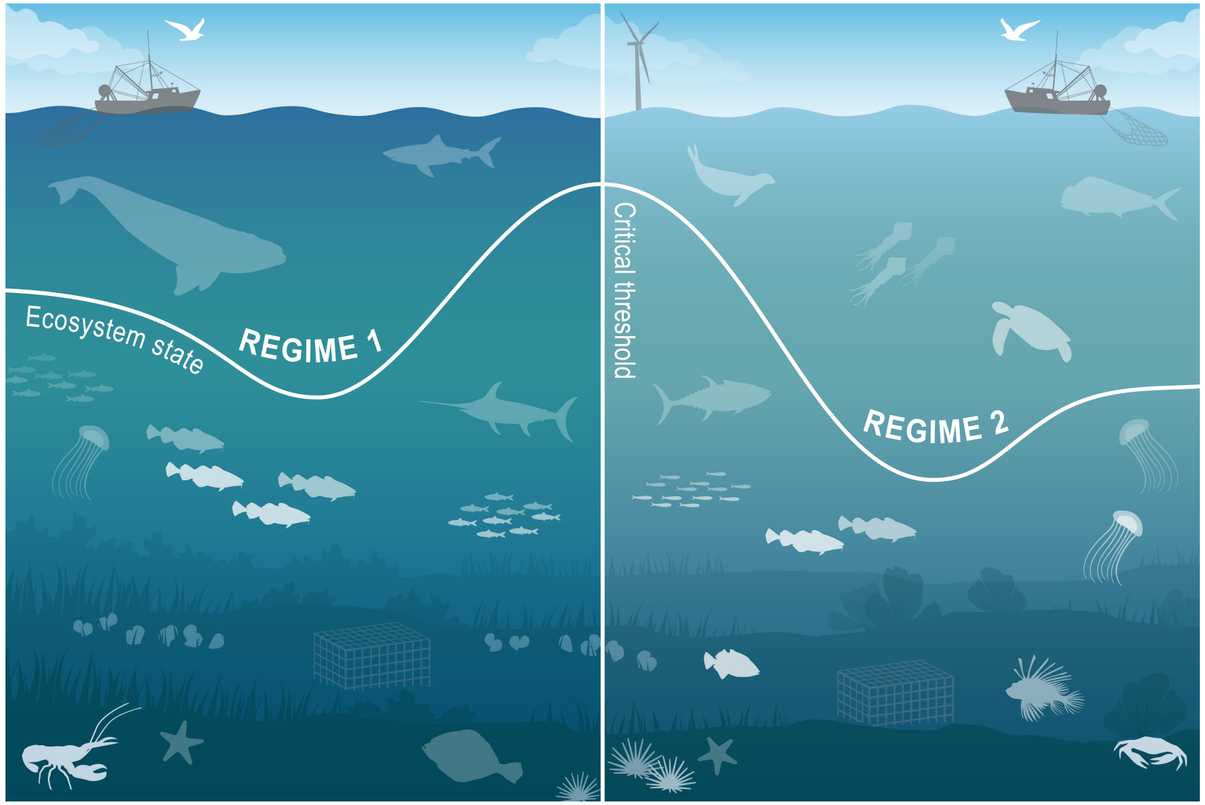


- Episodic habitat risk events for scallops and squid present but sparse in 2025
- New Indicator: Advection off shelf (how much are larvae getting carried offshore?)
  - Mid and Deep water more likely to leave shore in spring over time

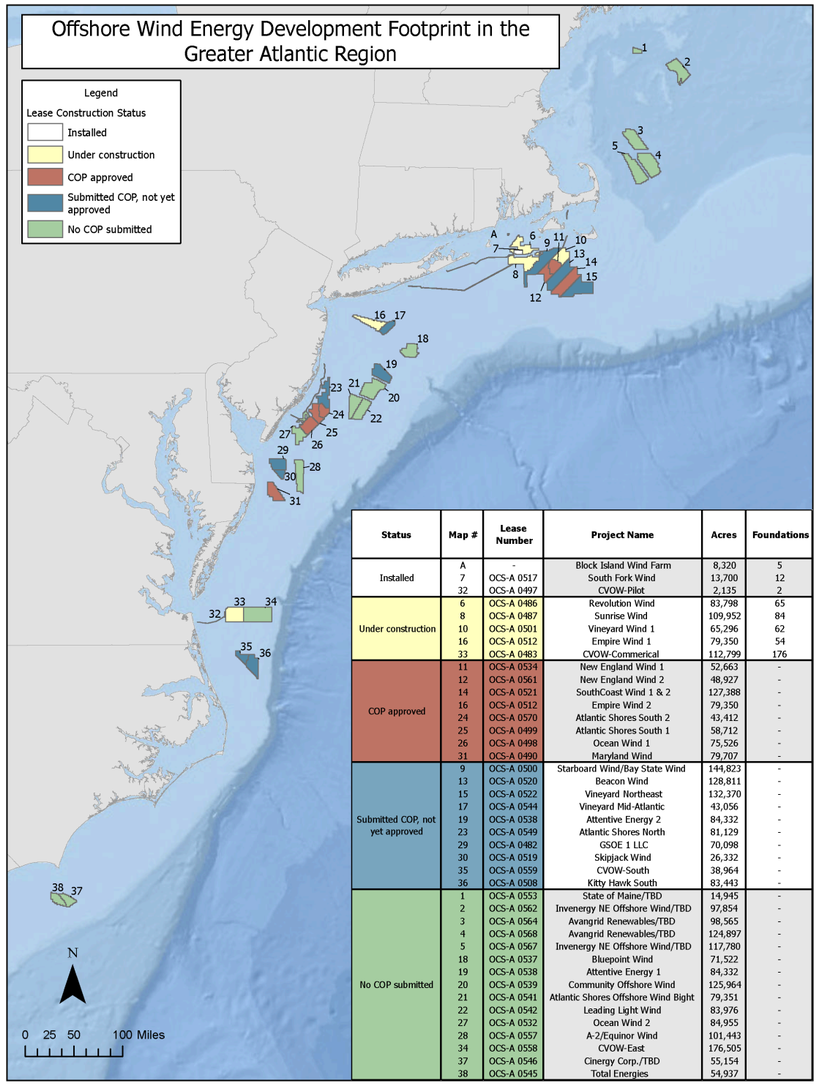
Risks to Setting Catch Limits

Future considerations

- Processes that control fish productivity and mortality are dynamic, complex, and are the result of the interactions between multiple changing system drivers.
- Managers should consider that historic environment conditions and productivity may no longer represent likely future scenarios.
- Assumptions for species' growth, reproduction, and natural mortality should continue to be evaluated for individual species.
- With observations of system-wide productivity shifts of multiple managed stocks, more research is needed to determine whether regime shifts or ecosystem reorganization are occurring, and how this should be incorporated into management.



Risks: Offshore Wind Development

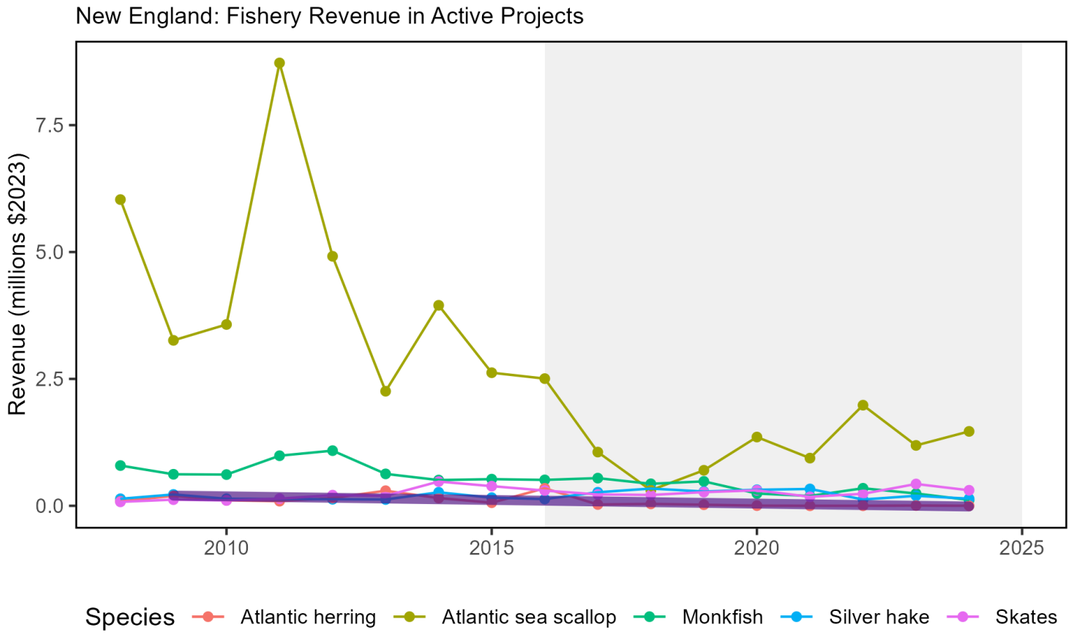


Status	Map #	Lease Number	Project Name	Acres	Foundations
Installed	A	-	Block Island Wind Farm	8,320	5
	7	OCS-A 0517	South Fork Wind	13,700	12
	32	OCS-A 0497	CVOW-Pilot	2,135	2
Under construction	6	OCS-A 0486	Revolution Wind	83,798	65
	8	OCS-A 0487	Sunrise Wind	109,952	84
	10	OCS-A 0501	Vineyard Wind 1	65,296	62
	16	OCS-A 0512	Empire Wind 1	79,350	54
	33	OCS-A 0483	CVOW-Commerical	112,799	176
COP approved	11	OCS-A 0534	New England Wind 1	52,663	-
	12	OCS-A 0561	New England Wind 2	48,927	-
	14	OCS-A 0521	SouthCoast Wind 1 & 2	127,388	-
	16	OCS-A 0512	Empire Wind 2	79,350	-
	24	OCS-A 0570	Atlantic Shores South 2	43,412	-
	25	OCS-A 0499	Atlantic Shores South 1	58,712	-
	26	OCS-A 0498	Ocean Wind 1	75,526	-
	31	OCS-A 0490	Maryland Wind	79,707	-
Submitted COP, not yet approved	9	OCS-A 0500	Starboard Wind/Bay State Wind	144,823	-
	13	OCS-A 0520	Beacon Wind	128,811	-
	15	OCS-A 0522	Vineyard Northeast	132,370	-
	17	OCS-A 0544	Vineyard Mid-Atlantic	43,056	-
	19	OCS-A 0538	Attentive Energy 2	84,332	-
	23	OCS-A 0549	Atlantic Shores North	81,129	-
	29	OCS-A 0482	GSOE 1 LLC	70,098	-
	30	OCS-A 0519	Skipjack Wind	26,332	-
	35	OCS-A 0559	CVOW-South	38,964	-
	36	OCS-A 0508	Kitty Hawk South	83,443	-
No COP submitted	1	OCS-A 0553	State of Maine/TBD	14,945	-
	2	OCS-A 0562	Invenergy NE Offshore Wind/TBD	97,854	-
	3	OCS-A 0564	Avangrid Renewables/TBD	98,565	-
	4	OCS-A 0568	Avangrid Renewables/TBD	124,897	-
	5	OCS-A 0567	Invenergy NE Offshore Wind/TBD	117,780	-
	18	OCS-A 0537	Bluepoint Wind	71,522	-
	19	OCS-A 0538	Attentive Energy 1	84,332	-
	20	OCS-A 0539	Community Offshore Wind	125,964	-
	21	OCS-A 0541	Atlantic Shores Offshore Wind Bight	79,351	-
	22	OCS-A 0542	Leading Light Wind	83,976	-
	27	OCS-A 0532	Ocean Wind 2	84,955	-
	28	OCS-A 0557	A-2/Equinor Wind	101,443	-
	34	OCS-A 0558	CVOW-East	176,505	-
	37	OCS-A 0546	Cinergy Corp./TBD	55,154	-
	38	OCS-A 0545	Total Energies	54,937	-

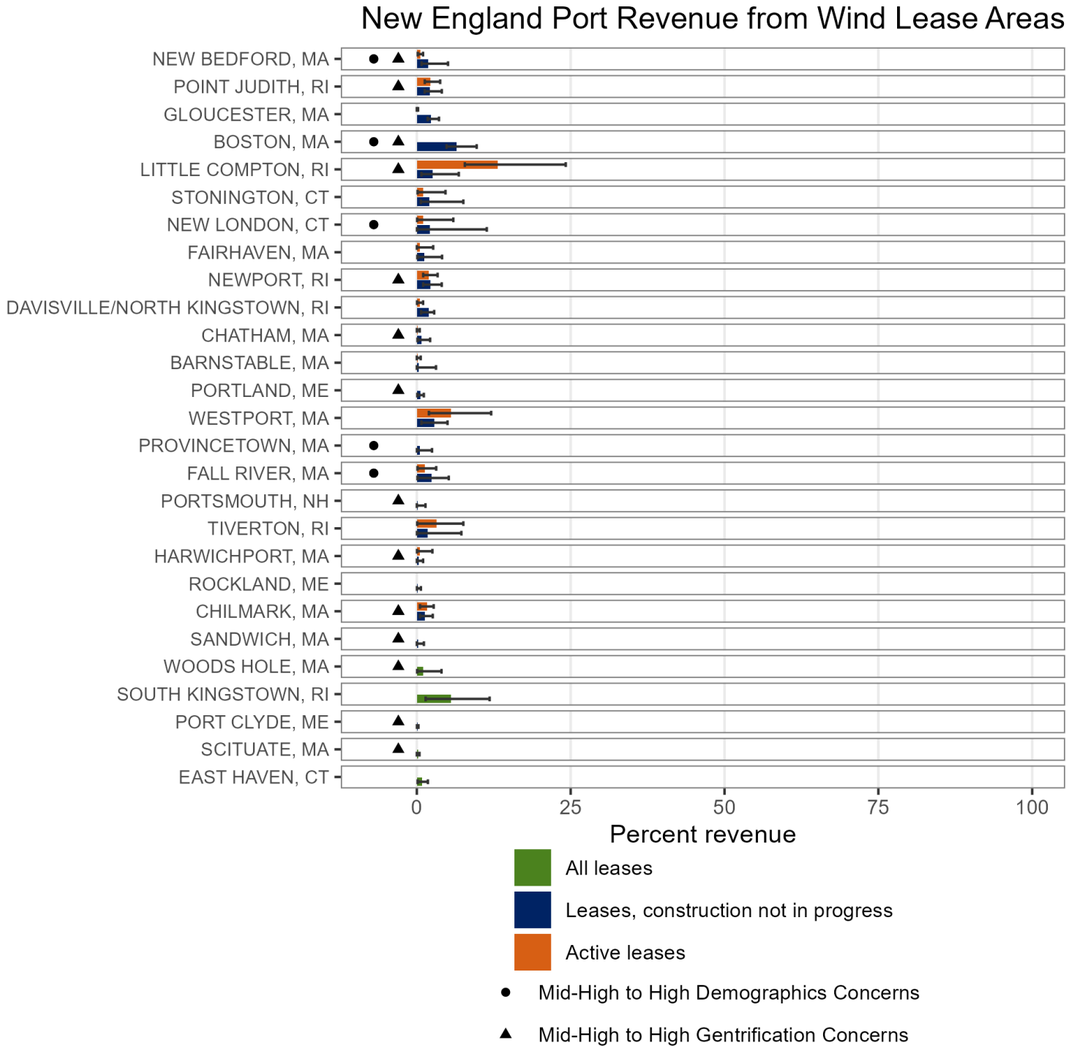
- Six “Active Projects”
  - One operational commercial-scale wind project (South Fork Wind Farm)
  - Two projects partially operational during construction (Vineyard Wind 1 and Revolution Wind)
    - Rev Wind came online after the report text was finalized
  - Three projects under construction (Sunrise Wind, Empire Wind 1, Central Virginia Offshore Wind)
- Most wind lease areas that have had construction activities are in the NY Bight and Southern New England
- 32 additional projects have not yet begun construction
- Construction timelines are uncertain

Risks: Offshore Wind Development

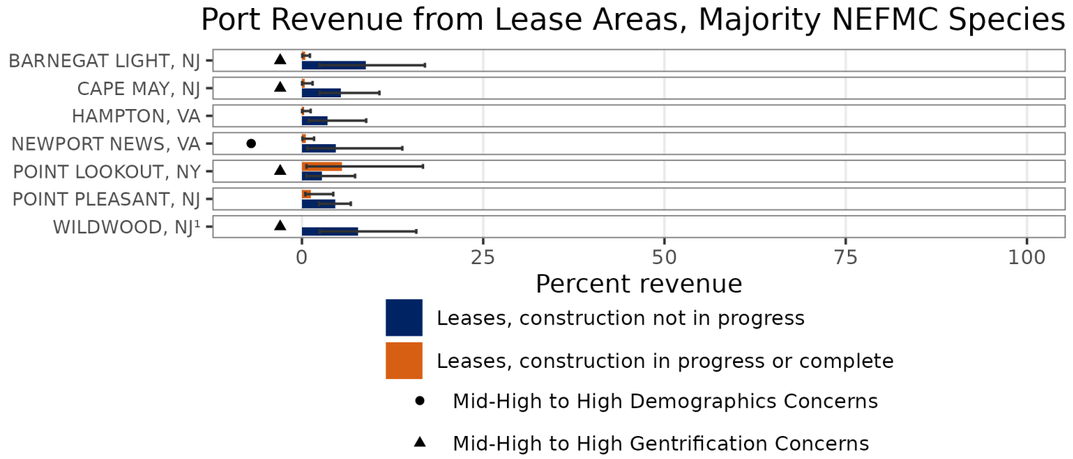
Indicators: fishery and community specific revenue in lease areas



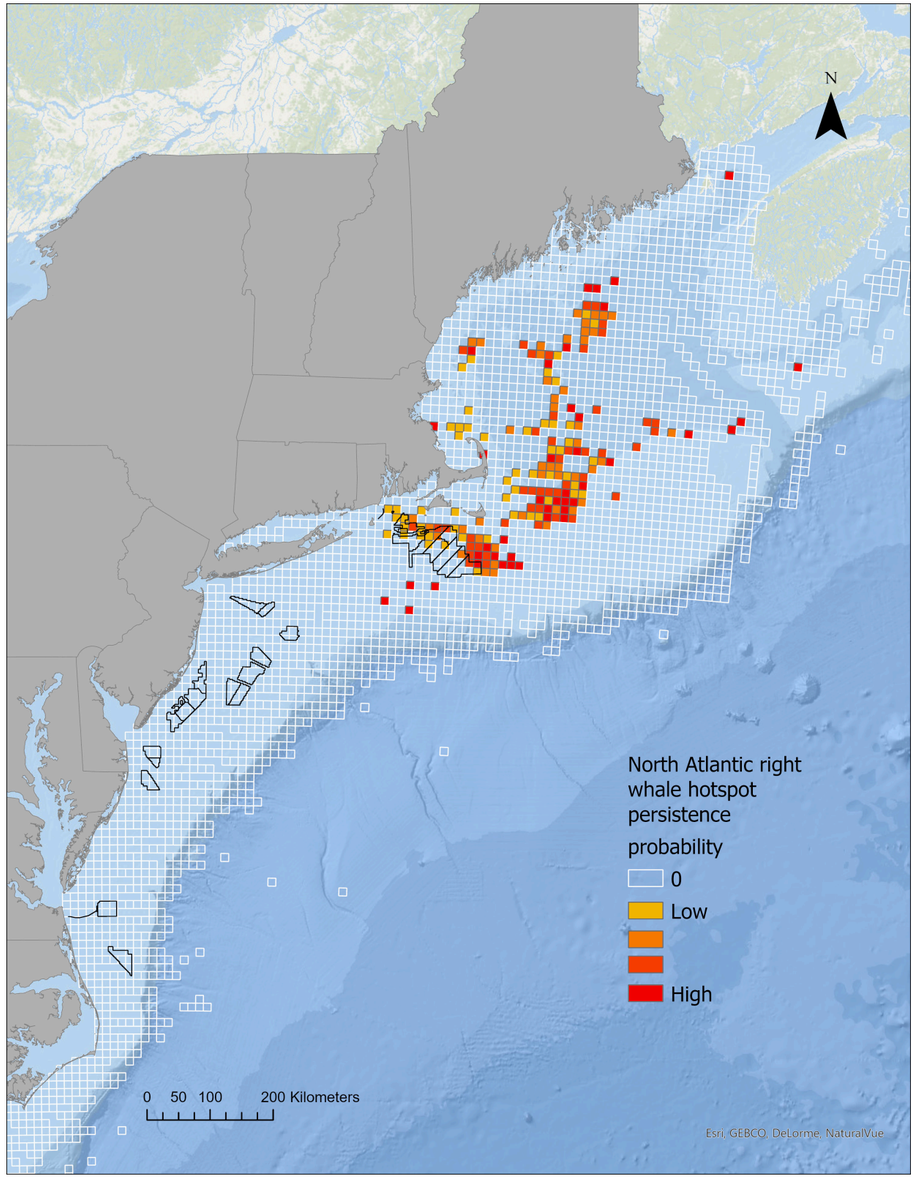
- Although sea scallops have the highest revenue in Active Project areas, it represents $\leq 1\%$ of the total revenue for the fishery.
- Some groundfish and skates have up to 13% of their revenue from Active Project areas, but these species have lower overall revenue than scallops.



Risks: Offshore Wind Development



- *Above:* Council request to look at Mid-Atlantic ports that are catching NEFMC-managed species in the wind lease areas
  - Ports shown have >50% of landings or revenue from NEFMC-managed species in the wind lease areas
- *Right:* Lease areas overlap with North Atlantic right whale habitat. Development may alter local oceanography and prey availability, increase vessel strike risk, and result in pile driving noise impacts.
- Current plans for buildout of offshore wind in a patchwork of areas spreads the impacts differentially throughout the region.



Highlights Methods

Observations solicited from:

- SOE contributors
- NEFSC colleagues
- Academic colleagues
- Management partners
- Fishing industry

Observations included if:

- Record high or low observations
- Different from recent conditions
- Reported by multiple sources
- Affecting fishery operations
- Newsworthy

Not exhaustive list; Full impacts remain to be seen

Please send observations to: northeast.ecosystem.highlights@noaa.gov

Fishing Industry Input Needed for Annual State of the Ecosystem Report

NOAA's Northeast Fisheries Science Center is preparing its annual State of the Ecosystem reports for the Mid-Atlantic and New England Fishery Management Councils. These reports are designed to give managers a complete picture of current ecosystem conditions in the Greater Atlantic.

Captain Sonny Gwin fishes onboard his boat, *F/V Skilligalee*

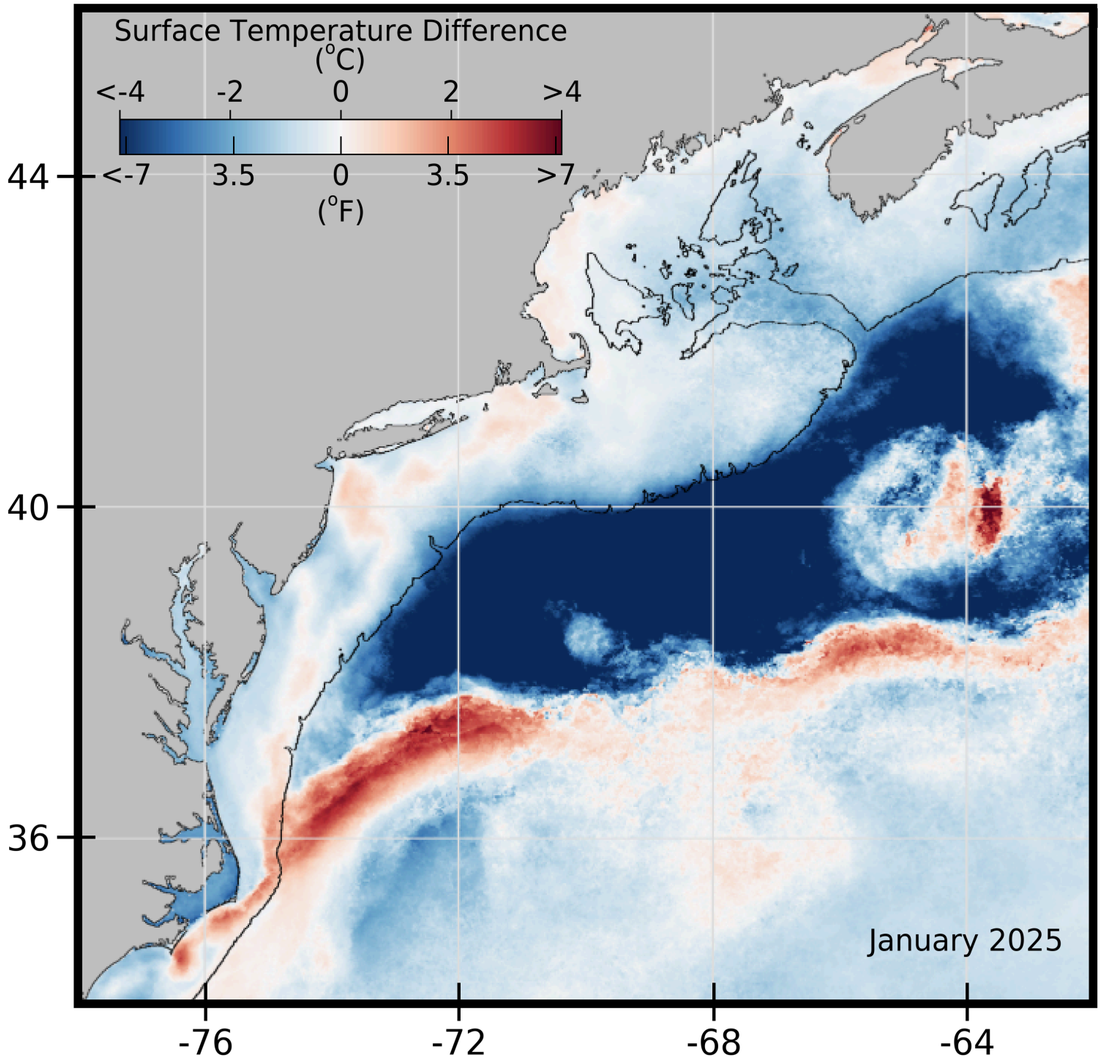
The Center is looking for industry input for the 2025 Highlights section, with a focus on unusual or unexpected conditions observed during the 2025 fishing season. Examples of helpful observations include:

- Did you see species in different places or at different times of the year than you normally see them?
- Were water temperatures warmer/colder than normal, or were there any other unusual conditions on the water that you observed?
- Are you catching anything unusual?

Last year, members of the fishing community reported a number of unusual conditions, including low abundance of some species (such as longfin squid) in traditional fishing areas, observations of some species (such as Atlantic mackerel) outside of typical fishing grounds, and delayed fishing activity due to later-than-usual seasonal migrations.

See the call here

Highlights: Generally cooler, fresher Northeast Shelf

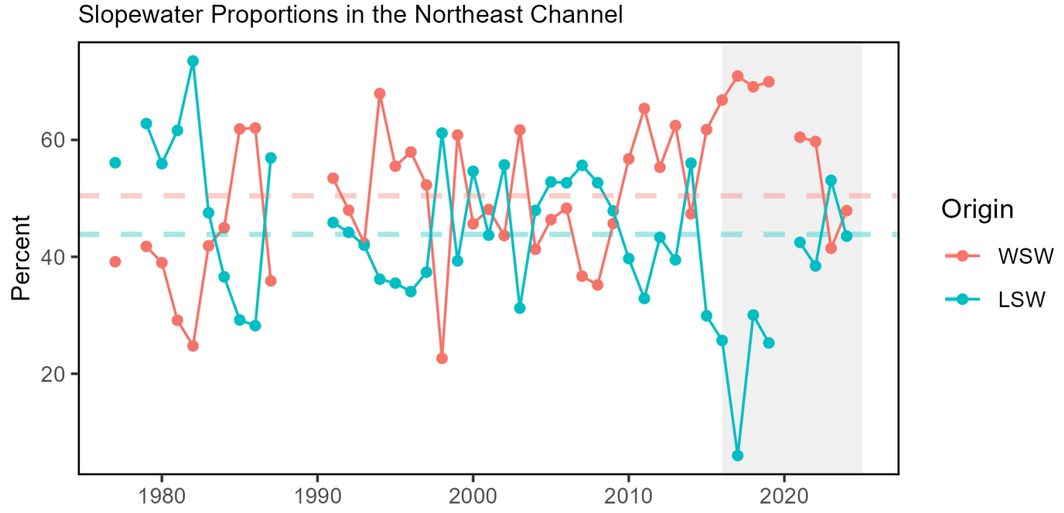


Globally, 2025 was the third warmest year on record

BUT, nearly all NE shelf seasonal surface and bottom temperatures were more similar to or cooler than the longer term average

The Cold Pool was well-developed and more similar to the long-term average in terms of extent and persistence

In 2024, relative contributions of Labrador Slope Water and Warm Slope Water more similar to the long-term averages



Highlights

Images from this NOAA webstory

Observations on timing, location, and abundance:

- Fishers reported delayed migration of black sea bass and the absence of bluefish off of Rhode Island
- Good year for billfish, with >23,000 white marlin caught and released
- Fishers reported low catch and cold stunned red drum and spotted sea trout
- Fishers reported higher abundance and wider distributions of Atlantic mackerel, Illex squid, and sandlance
- Good scallop survival in the Elephant Trunk region according to the scallop survey
- Arctic copepods in GOM observed in the EcoMon survey

THANK YOU! SOEs made possible by (at least) 88 contributors from 20+ institutions

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NOAA FISHERIES
National Oceanic and Atmospheric Administration

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Additional resources

- ecodata R package
- Indicator catalog
- SOE Technical Documentation
- SOE Reports on the web
- Slides available at https://nefsc.github.io/READ-EDAB-SOE_reports/
- Contact: joseph.caracappa@noaa.gov