ADAPTIVE ALLOCATION OF SHIFTING FISH STOCKS

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FISH ARE MOVING ALL OVER THE WORLD

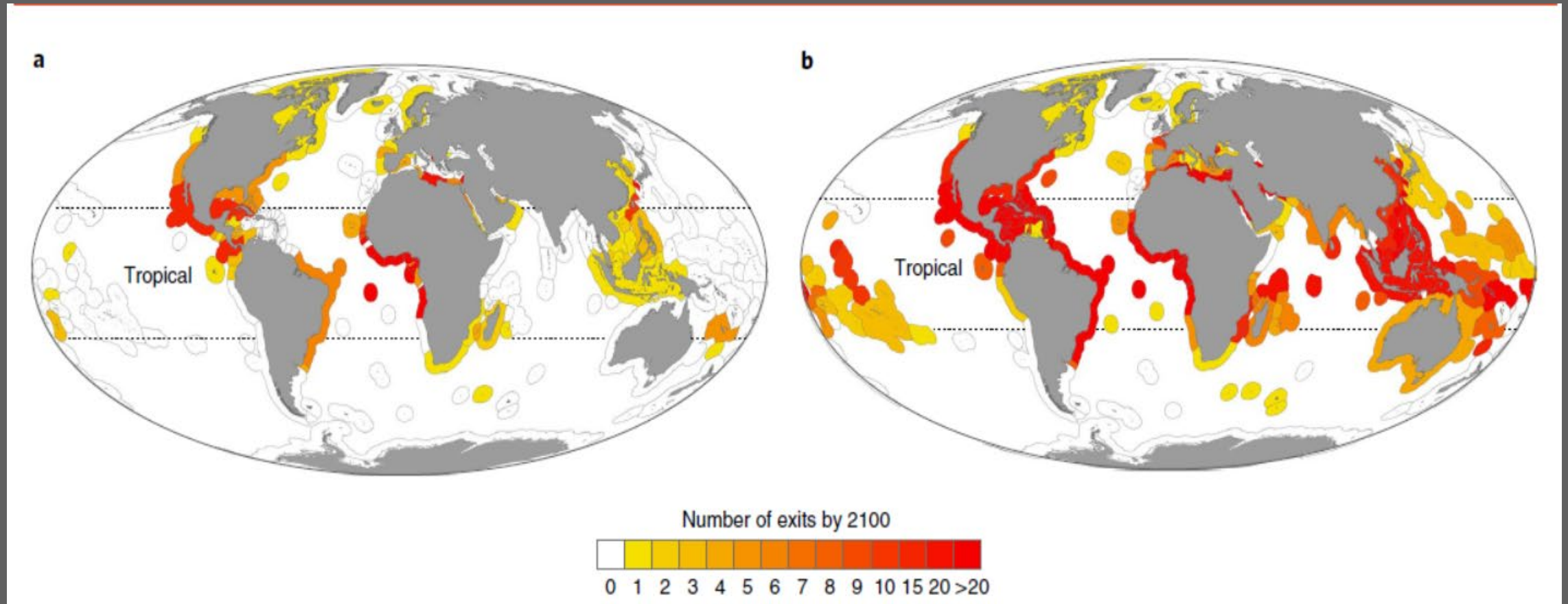
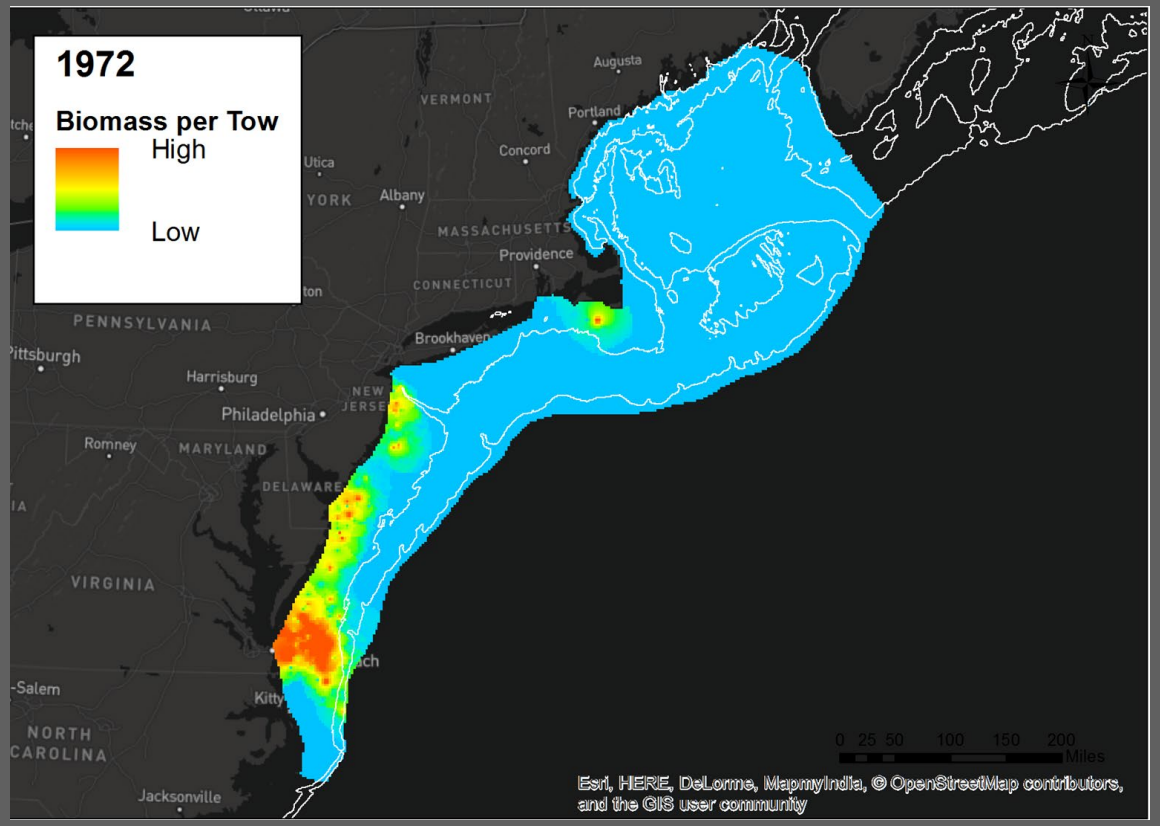
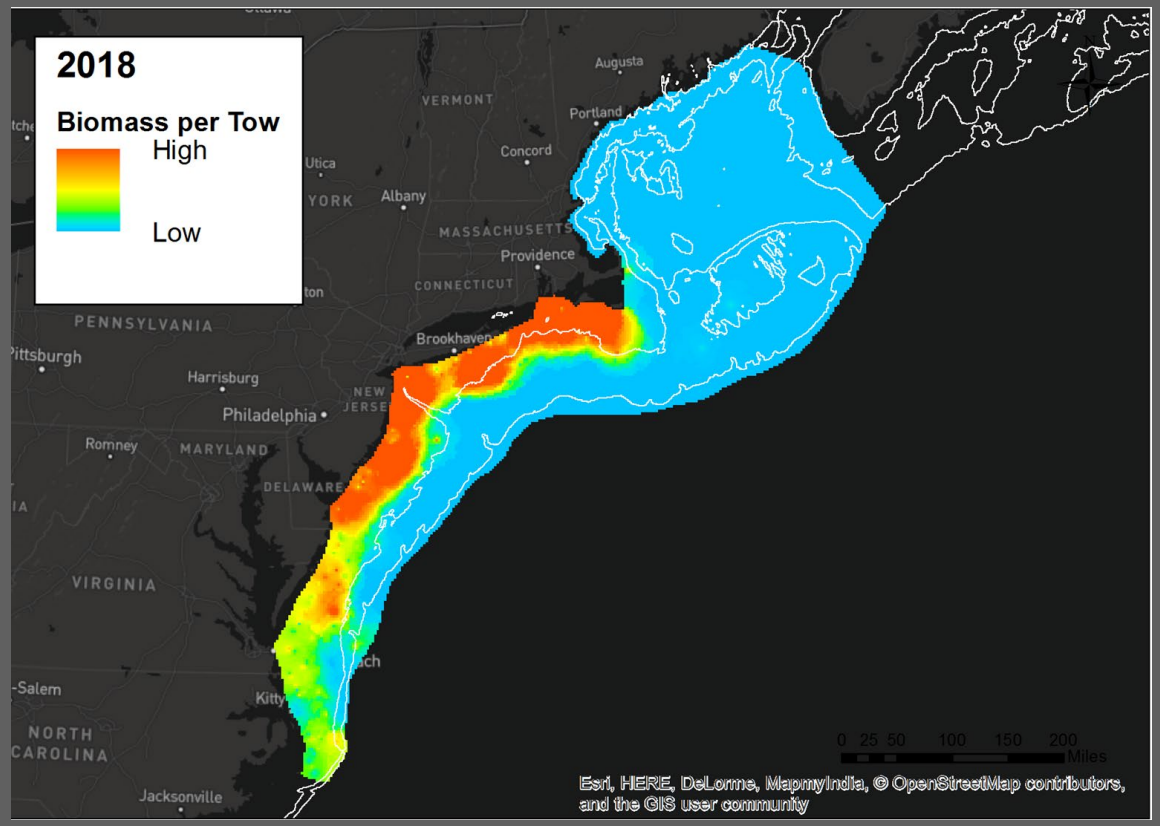


Fig. 1 | National loss of species. a,b, The number of species shifting out of each EEZ by 2100 under RCP 4.5 (**a**) and RCP 8.5 (**b**).

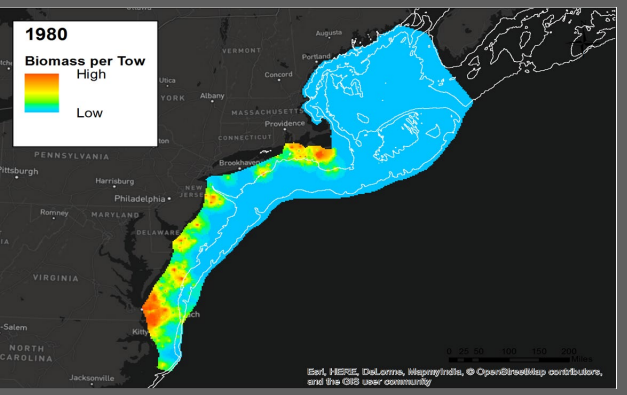
Oremus *et al.* 2020

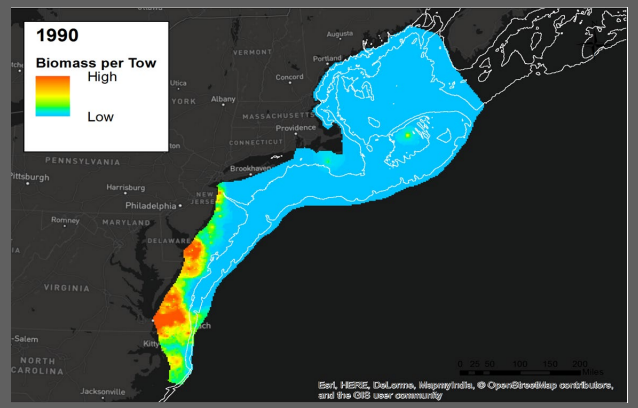
THE US EAST COAST IS NO EXCEPTION

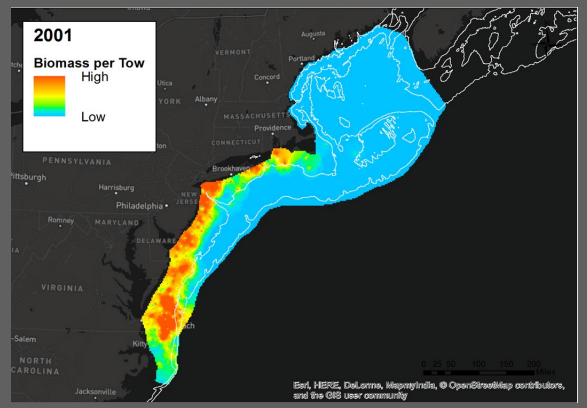


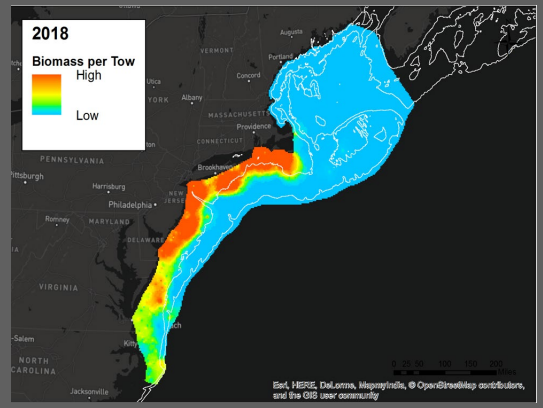


MANY CATCH ALLOCATIONS WERE BASED ON CATCHES FROM 1980 - 2001 (e.g. BSB)

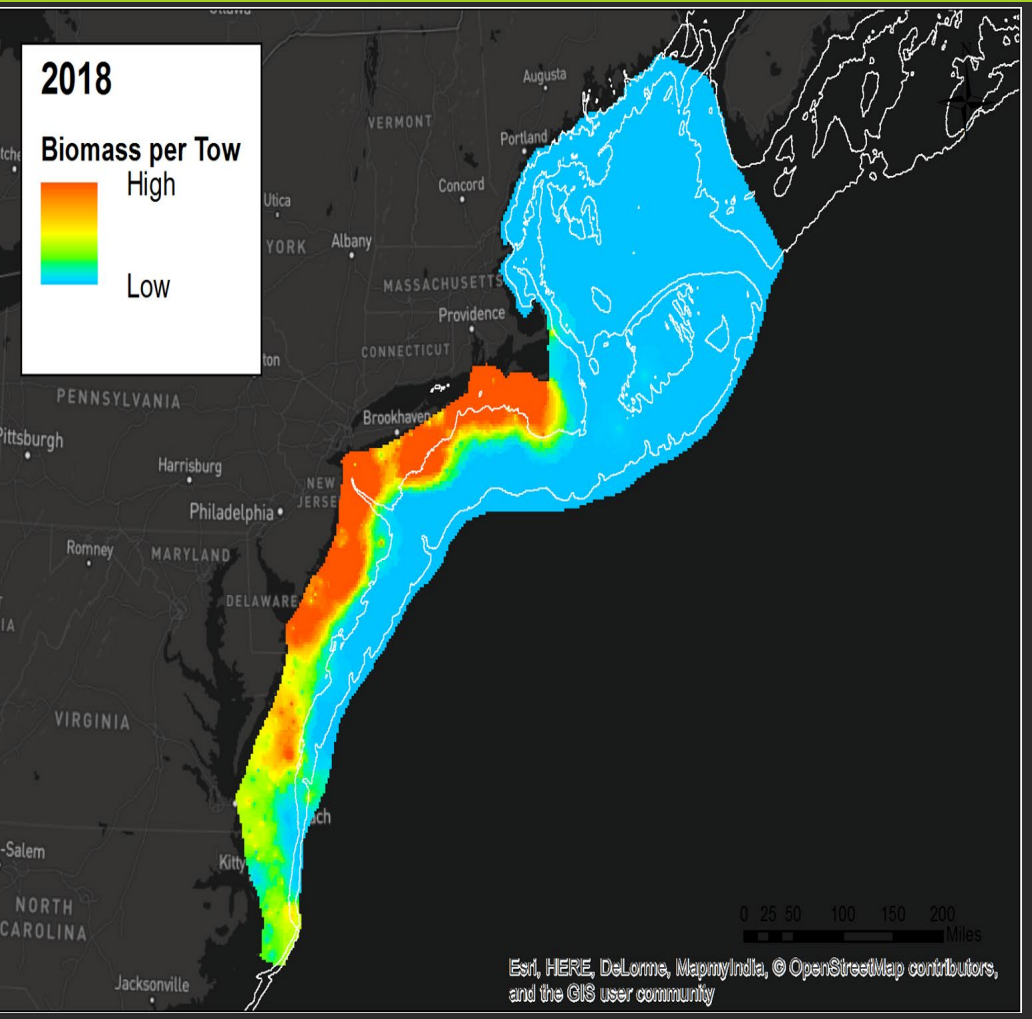








POLEWARD SHIFT OR RANGE EXPANSION COULD CREATE PROBLEMS



Catches appear to be decreasing in trailing part of range

Fishermen in trailing part of range appear to be burning more fuel to chase the fish

Catches are increasing in leading part of range

This is resulting in discarding because allocations are too small relative to fish availability

OUR PROJECT

- Goal: provide a scientific basis for making difficult allocation decisions
- Hard to predict future, easier to predict past: retrospective analysis
- Approach:
  - model distribution of stocks in the past based on scientific survey data
  - test different allocation formulas that vary in weights given to historical landings and stock distribution (static vs rapid, moderate, and slow adaptive allocation)
  - compare social and economic impacts associated with the allocation formulas
- Focus on black sea bass and summer flounder
- Look for other situations that could benefit from adaptive allocation (hot spots)

Modeling allocations retrospectively

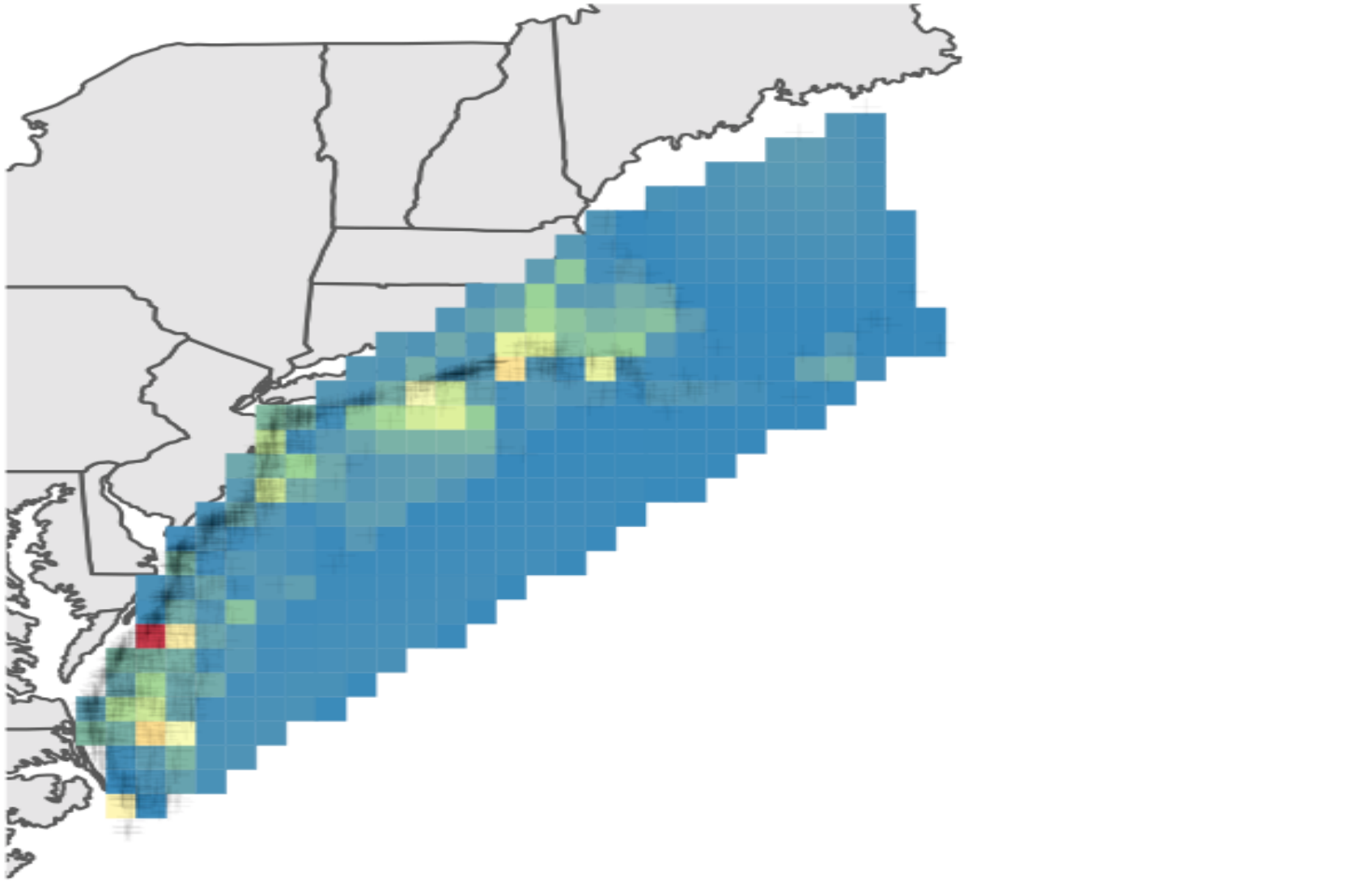
Data sources

- National Marine Fisheries Service Trawl Survey (NMFS)
- Northeast Area Monitoring Assessment Program (NEMAP)

Estimate spatial distribution

- Based on an expansion of state waters
- Based on the expansion of ports

Distribution estimated by using Triangular Irregular Surface method



Socio-economic Effects of Alternative Allocation Policies

Examples of Alternative "Straw Man" Allocation Policies:

- Historical Baseline -- 100% historical / 0% based on biomass shift
- Dynamic Reallocation (DARA) -- 0% historical / 100% based on biomass shift
- Intermediate (Fifty-Fifty) --50% historical / 50% based on biomass shift
- Gradual Shift (Phase In) -- 100% historical in year 1, 0% historical in final year

Socio-economic Effects of Alternative Allocation Policies

Advantages of an explicit, "automated" allocation policy:

- increased transparency
- reduced negotiation/transactions costs
- reduced uncertainty about future allocations

However, important uncertainties remain:

- which allocation formula produces the most benefits?
- how will different allocation formulas affect stakeholders?

Retrospective Analysis Approach

- Compare alternative policies for past time period

Across Boundaries About Information Quota allocation

Control panel

Select Survey(s)

- [x] Northeast US Fall
- [ ] Northeast US Spring

Northeast US Fall

Select Species

Centropristis striata

Black Sea Bass

Scale of Hist./Dist. allocation (%)

0 20 100

0 10 20 30 40 50 60 70 80 90 100

NA

Select Year Range

1972 2019

1972 1982 1992 2002 2012 2019

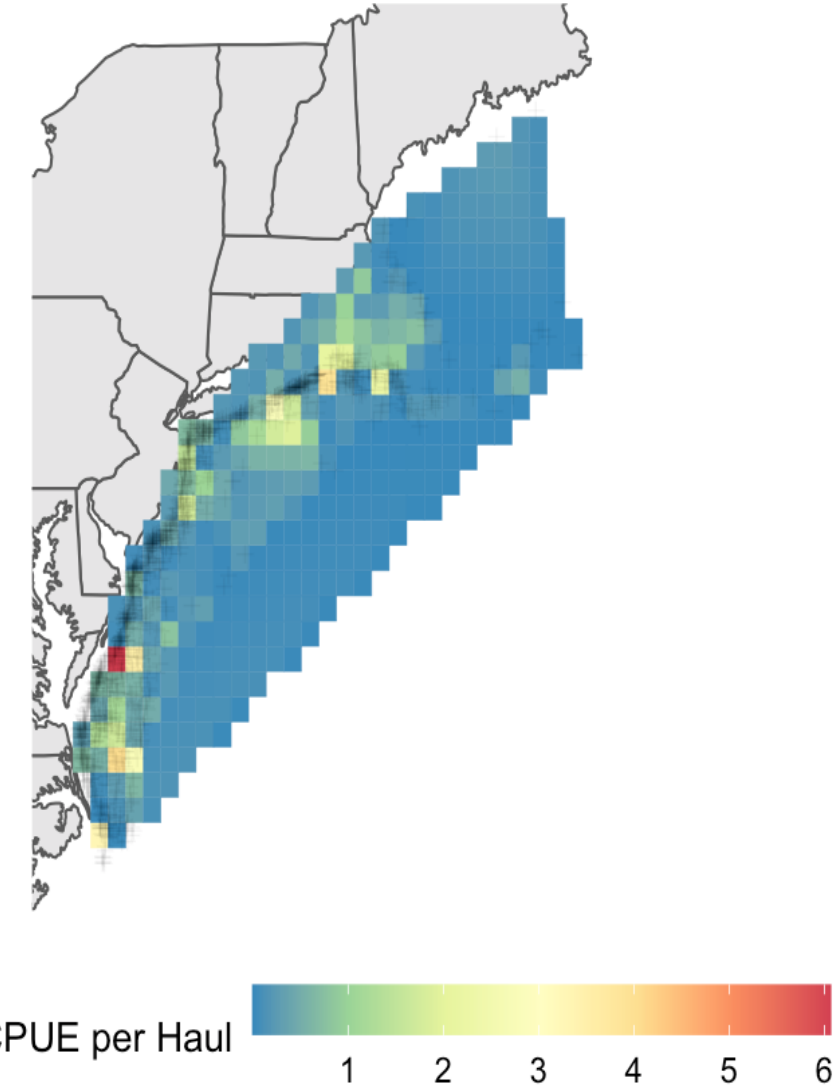
1972 to 2019

Select Result

- [ ] Latitudinal Shift
- [ ] Survey Point
- [x] Distribution Map
- [ ] Allocation Area

Distribution map

Distribution estimated by using Triangular Irregular Surface method



Economic Effects of Alternative Allocation Policies

IMPLAN input-output modeling system software

Data Sources

- Commercial fishing cost/earnings surveys, MAFMC Fishery Info Documents, NOAA Marine Angler Expenditure Surveys, 2010 Summer Flounder Allocation Analysis

"Direct" economic impacts

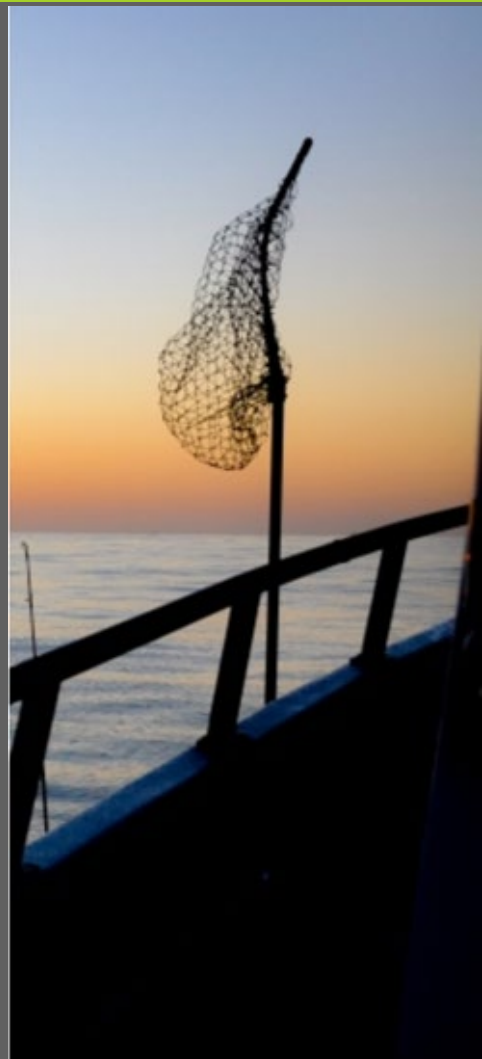
- fishing costs
- fishing earnings

"Multiplier" Impacts

- Supply chain: fuel, vessels, engines, electronics, bait, ice, etc.
- Distribution chain: seafood processors, packers, transportation, wholesale, retail (restaurants, seafood markets, and grocery stores)

Co-creating an understanding of social impact

- Present results to managers and stakeholders
- Seek feedback on social implications of policy option outcomes
- Co-create solutions to reduce hardships or inequities



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Thank You

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https://www.lenfestocean.org/en/research-projects/