

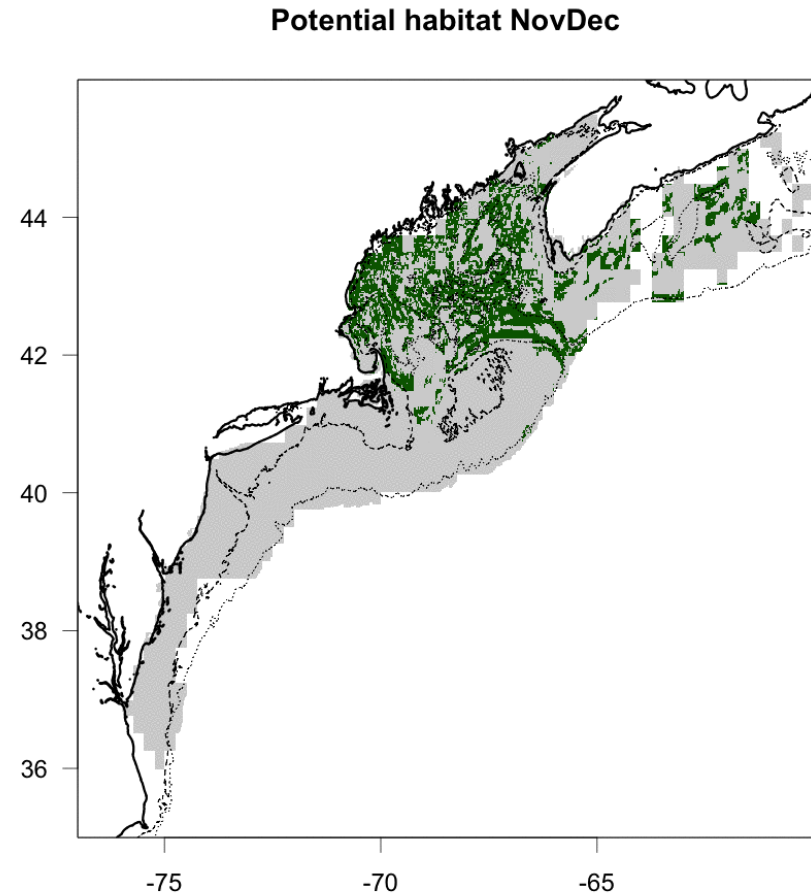
# Climate Modeling and Impact Assessments: A Fish Eye View

- How does your community use climate models?
  - Use temperatures in statistical models to estimate the population and range of different species
  - As boundary conditions to a high resolution dynamical model and a hierarchy of biological models
- How would your field benefit from closer direct collaboration with the climate community?
  - Due complexity of research in different fields direct involvement critically important
  - Done effectively with teams (NOAA fisheries, University Scientists) and an iterative process
- From an impacts perspective, what do you think the climate models are doing right and wrong?
  - Wrong: mean position of Gulf Stream and other Western Boundary Currents; Lack of upwelling
  - Right: The inclusion of most major modes of variability (ENSO\*, NAO, PDO, etc.)
- What aspects of climate models most in need of progress to address the concerns in your community?
  - Horizontal resolution comes repeatedly: “don’t talk to me until you are at 10 km resolution”
- Where are climate modeling groups under-emphasizing development and have to get right?
  - Accurate simulation of coastal ocean regions (e.g. bottom temperature)
- What is the right mix of scenarios versus single model ensembles for your impacts community?
  - Lean more towards realistic simulations
  - large ensembles from single as well as a diversity of model are very useful

# Connectivity in Cusk Habitat

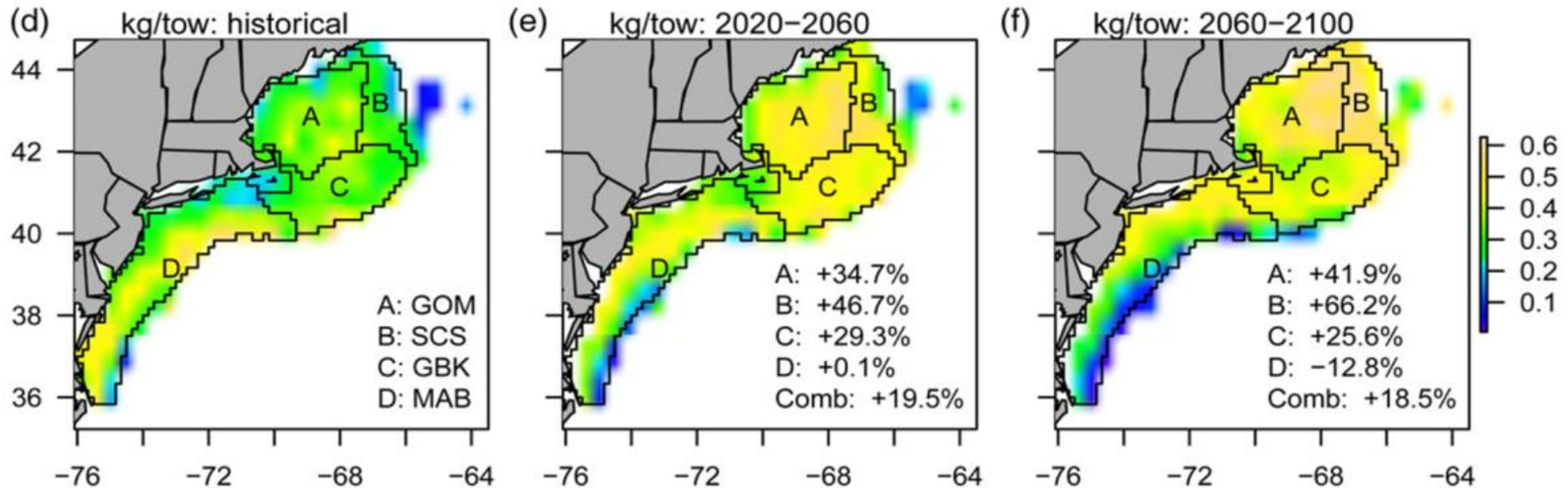


- Simulated Cusk habitat
- Statistical Species Niche Model
- Depends on temperature and bottom roughness (rocky)
- Movie shows habitat at  $0.1^{\circ}\text{C}$
- A1B Scenario
  - Mid Century  $1.0^{\circ}\text{C}$
  - End century  $1.8^{\circ}\text{C}$
- *Hare et al. 2012, Journal of Marine Science*



# River Herring (Alewife & Blueback)

- Population decreased rapidly in the 1970s
- NOAA established a recovery plan in 2013



- Warming causes northward shift spring
- but large decrease in fall (not shown)
- *Lynch et al. 2014; ICES Journal of Marine Sciences*