Using NOAA's Marine Recreational Information Program Data for Policy Analysis: Applications and Opportunities for Measuring Ecosystem Services

Roger von Haefen
North Carolina State University

Background

- BEA Outdoor Recreation Satellite Account:
  - Outdoor Rec = 2.2 percent of GDP (2016)
- Roughly one-half the benefits from water quality improvements arise in the context of outdoor recreation (Freeman, 1986)
- Most recreation studies have limited spatial / temporal scope (data limitations)
- Federal policies are likely to have large-scale impacts over multiple years

Marine Recreation Information Program (MRIP)

- NOAA's survey to measure recreational catch and effort
- Collected continuously from the early 1980s to the present in bi-monthly waves
- Spatial coverage from Maine to Louisiana
- Emerging research has shown how to estimate travel cost models and generate policy relevant benefit estimates
  - Methods may be of use to USDA and other agencies

Today's Talk

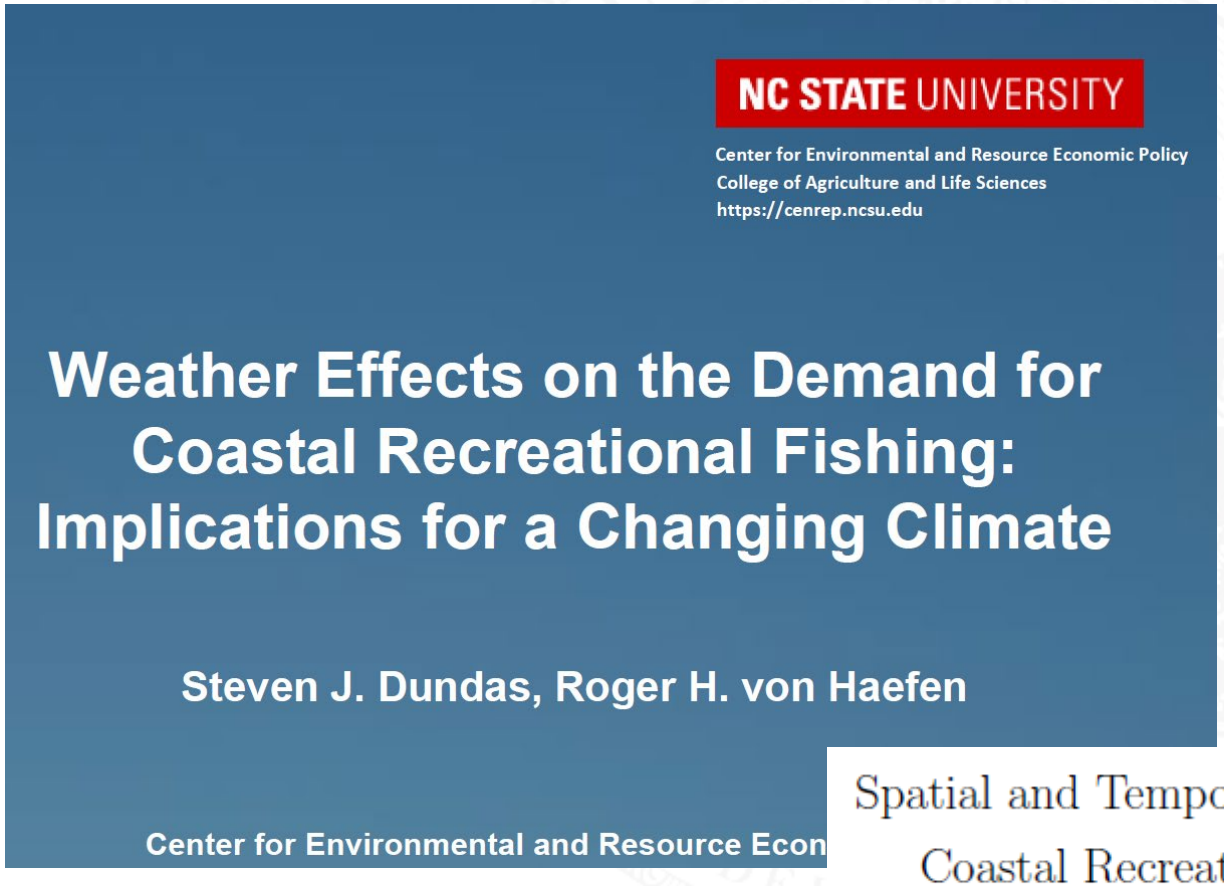
NCEE Working Paper

Commercial Fishing and Outdoor Recreation Benefits of Water Quality Improvements in the Chesapeake Bay

David M. Massey, Chris Moore, Stephen C. Newbold, Tom Ihde and Howard Townsend

Working Paper 17-02
July, 2017

Today's Talk



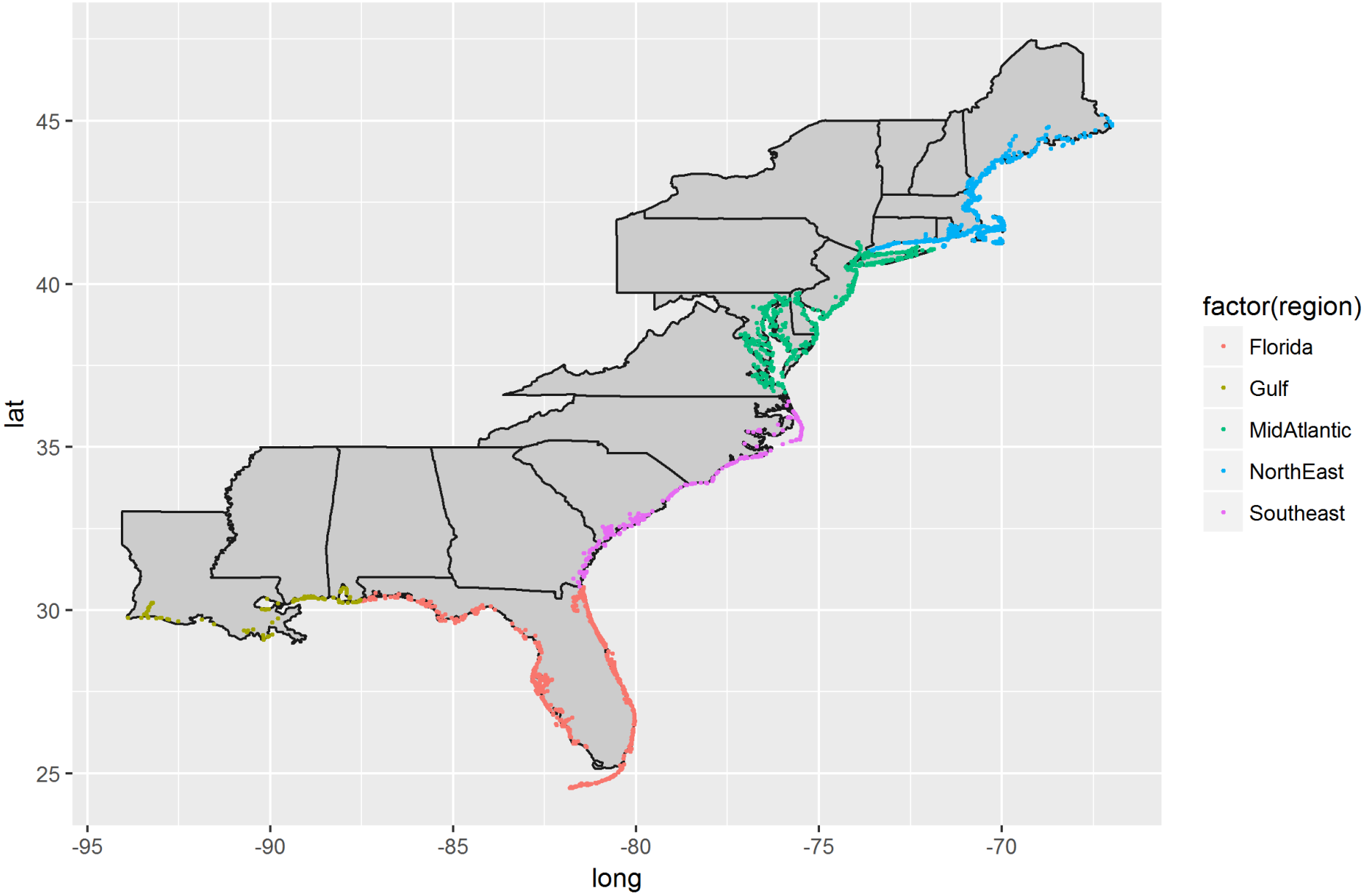
Spatial and Temporal Dimensions to the Value of Coastal Recreational Fishing in US Waters

Alexandra Naumenko

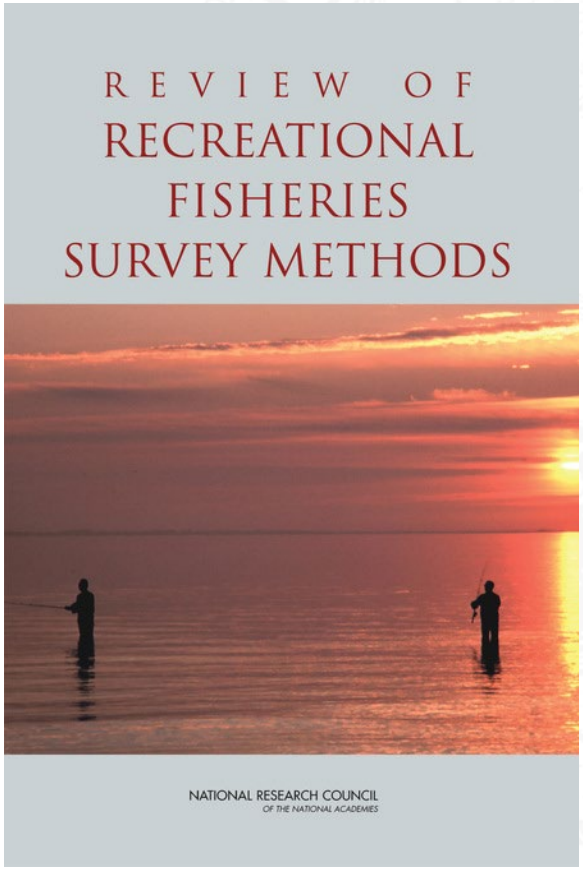
November 29, 2018

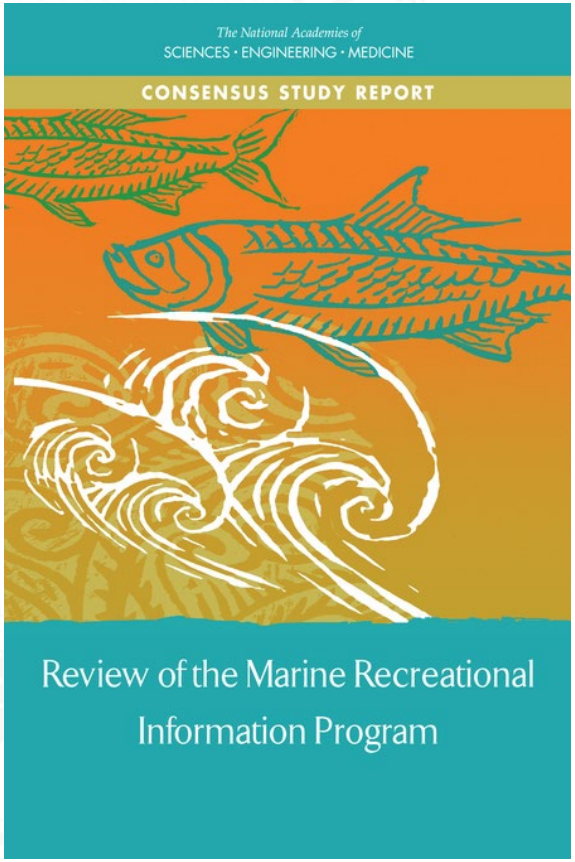
MRIP Data

- Formerly MRFSS
- Fielded in bimonthly waves continuously from early 1980s
- Shoreline, private/rental boating, charter boating
- Primary purpose – measure total recreational catch
  - Total Catch = Catch Per Unit Effort x Effort
- Two main surveys
  - Intercept
  - Phone (mail starting 2018)


lat
45
40
35
30
25
-95
-90
-85
-80
-75
-70
long
factor(region)
Florida
Gulf
MidAtlantic
NorthEast
Southeast

MRIP Data


REVIEW OF
RECREATIONAL
FISHERIES
SURVEY METHODS
NATIONAL RESEARCH COUNCIL
OF THE NATIONAL ACADEMIES


The National Academies of
SCIENCES • ENGINEERING • MEDICINE
CONSENSUS STUDY REPORT
Review of the Marine Recreational
Information Program

Key Changes / Limitations

- Intercept survey – choice-based
  - MRIP now publishes designed-based weights
- Shift from phone to mail survey suggests historical undercounting
  - New weights are forthcoming
- Limited information on anglers
  - Census / ACS data often used
  - Or economic add-on data
- Site choice and participation data collected in separate surveys
  - Innovative methods have been developed

NCEE Working Paper

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Chesapeake's Pollution Diet

- TMDL's established December 2010
- Recreational benefits watershed wide, but authors focus on benefits in the Bay
- Using 2008-2010 shoreline and boating data, link recreational participation and site choice to changes in water quality and induced changes in catch rates
- Estimate aggregate benefits for Chesapeake

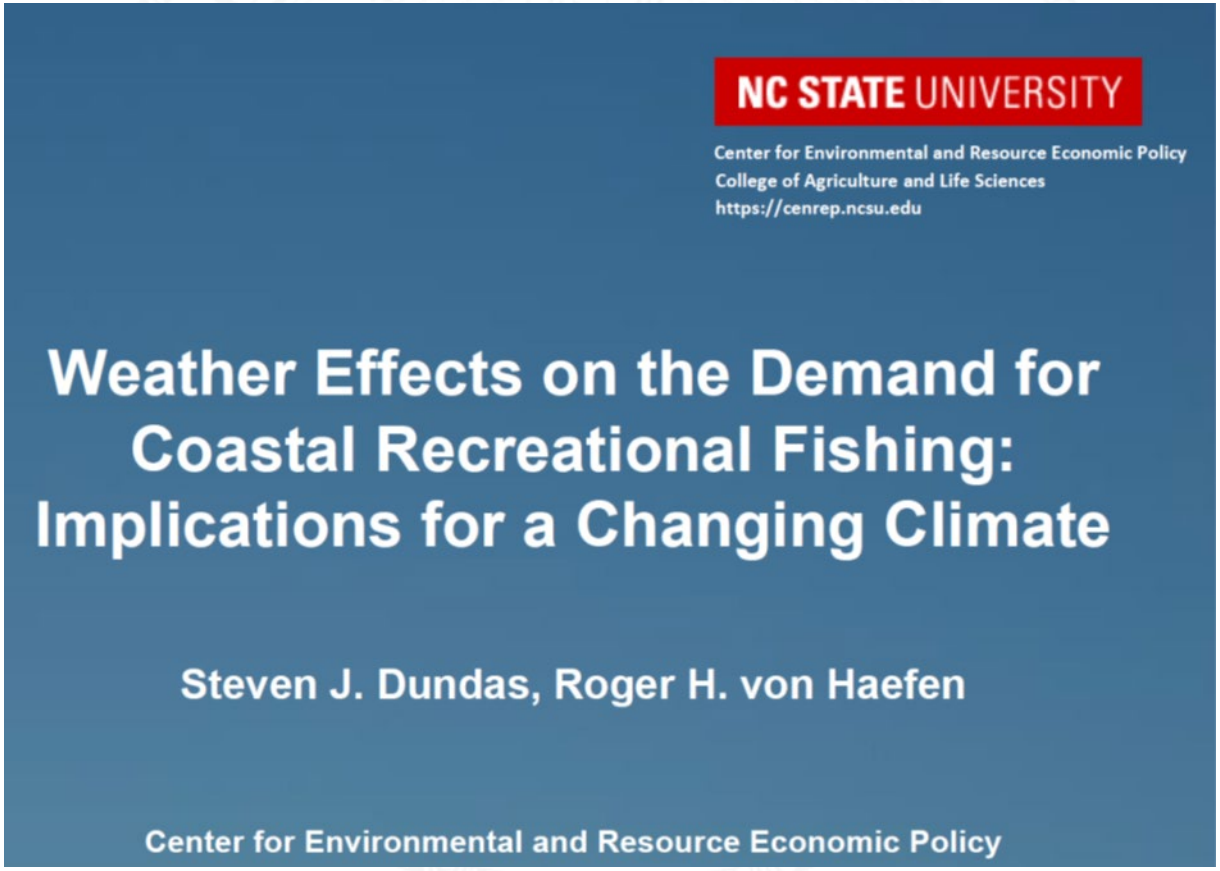
Chesapeake's Pollution Diet

- **Key Finding:**

- Recreational fishing benefits between $10 and $90 million annually

Chesapeake's Pollution Diet

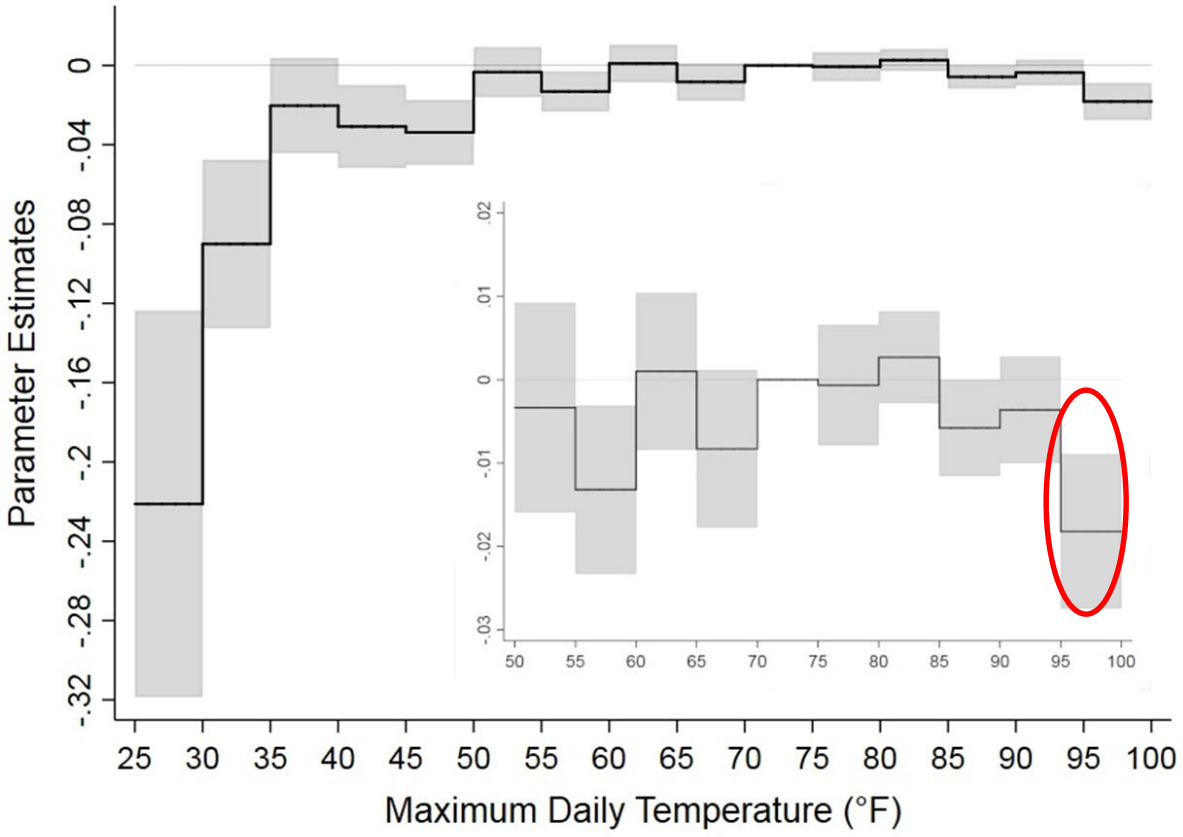
- **Key Finding:**
- Recreational fishing benefits between $10 and $90 million annually
- **Implications for USDA:**
- Similar methods can be used to estimate recreational benefits of large scale agro-environmental policies


NC STATE UNIVERSITY
Center for Environmental and Resource Economic Policy
College of Agriculture and Life Sciences
https://cenrep.ncsu.edu
Weather Effects on the Demand for Coastal Recreational Fishing: Implications for a Changing Climate
Steven J. Dundas, Roger H. von Haefen
Center for Environmental and Resource Economic Policy

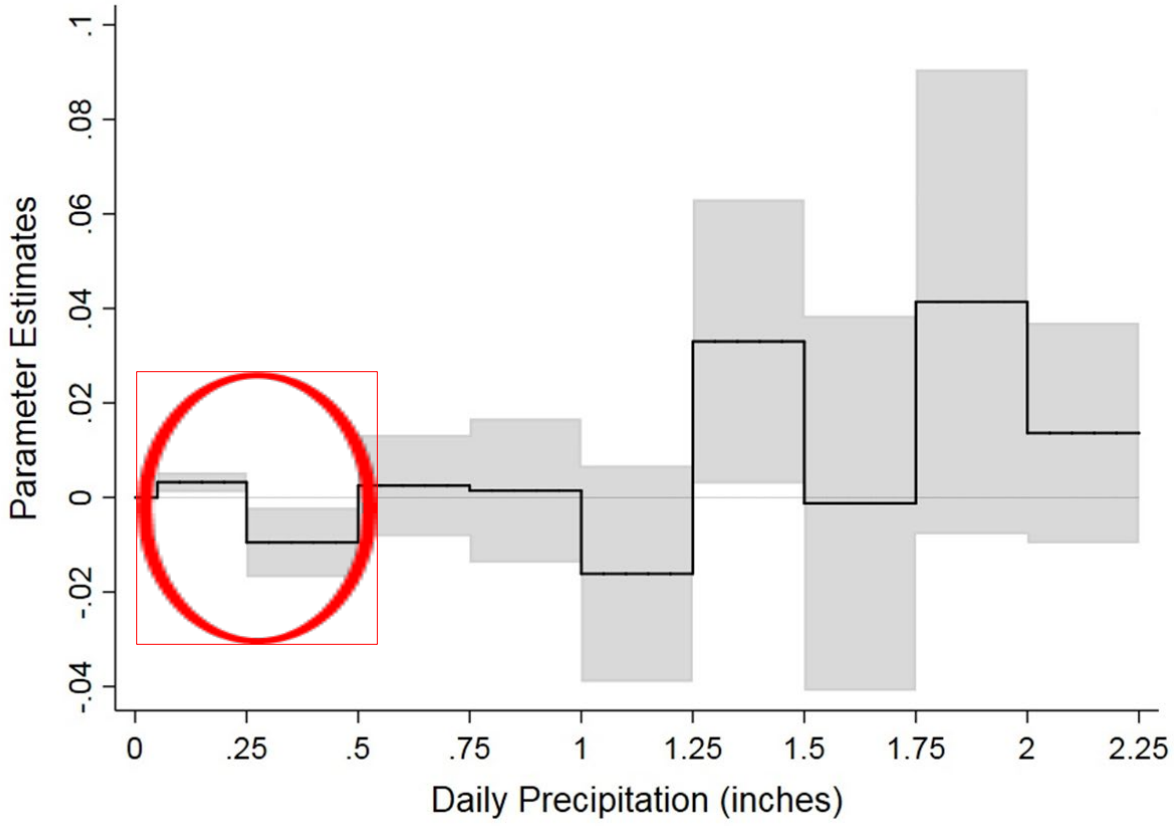
Climate Change and Coastal Angling

- Combine six years (2004-2009) of MRIP shoreline fishing data w/ weather data from PRISM
- Consider the long-run implications of climate change on angler participation and welfare
  - 132 GCMs
  - 3 predictions (2.6, 4.5, 8.5)
  - 3 time scales (2020-2049, 2050-79, 2080-99)

Effects of Temperature on Participation

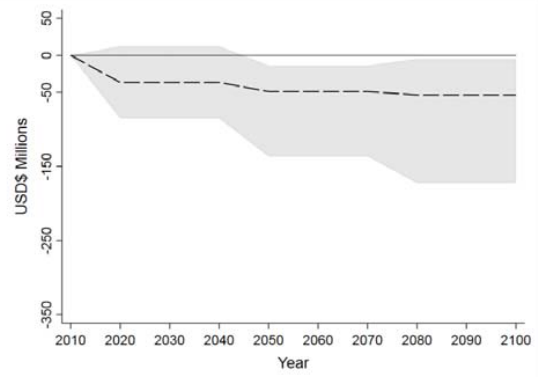


Effects of Precipitation on Participation

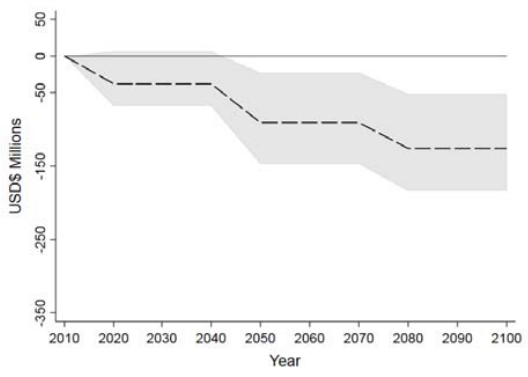


Welfare Effects of Different Scenarios

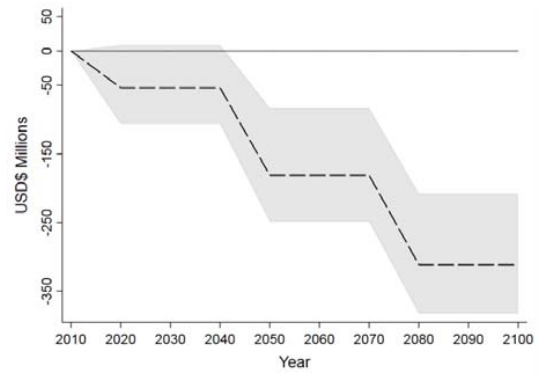
Panel A: RCP 2.6



Panel B: RCP 4.5



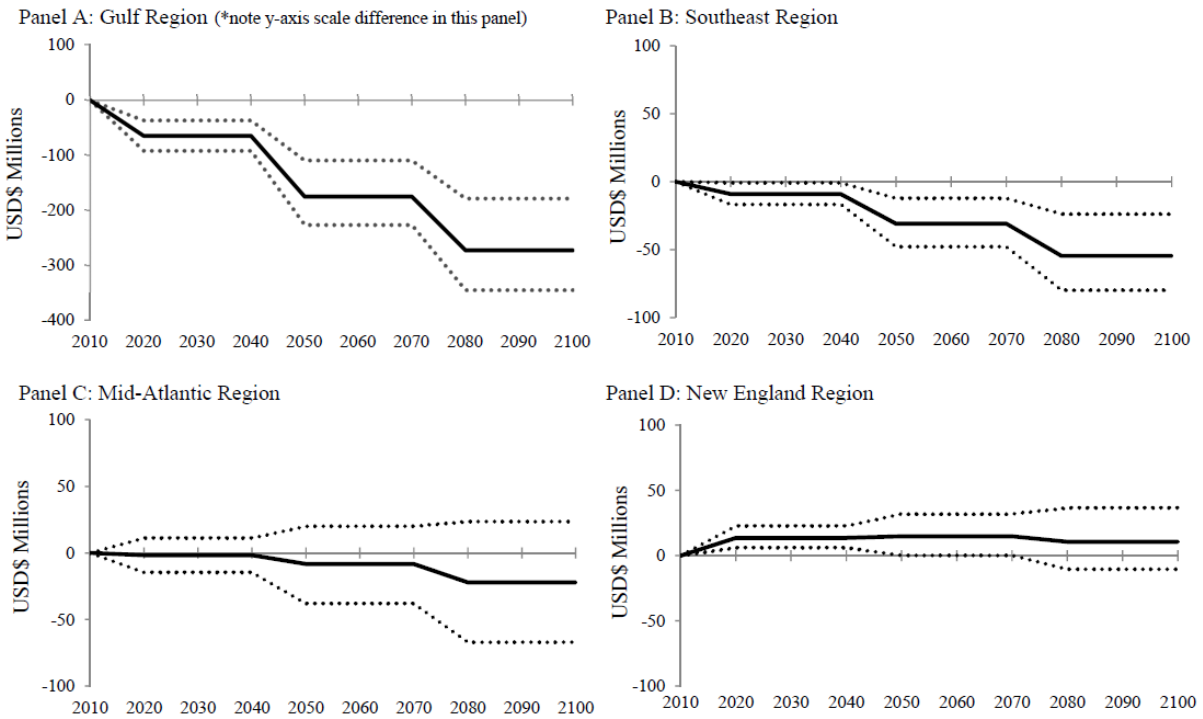
Panel C: RCP 8.5



Note: For RCP 2.6 (4.5, 8.5), we used 36 (42, 41) different GCMs. The dashed line shows the average of those models and the gray area represents the full range (i.e., highest and lowest welfare estimates) from all tested GCMs for each RCP scenario.

Spatial Heterogeneity

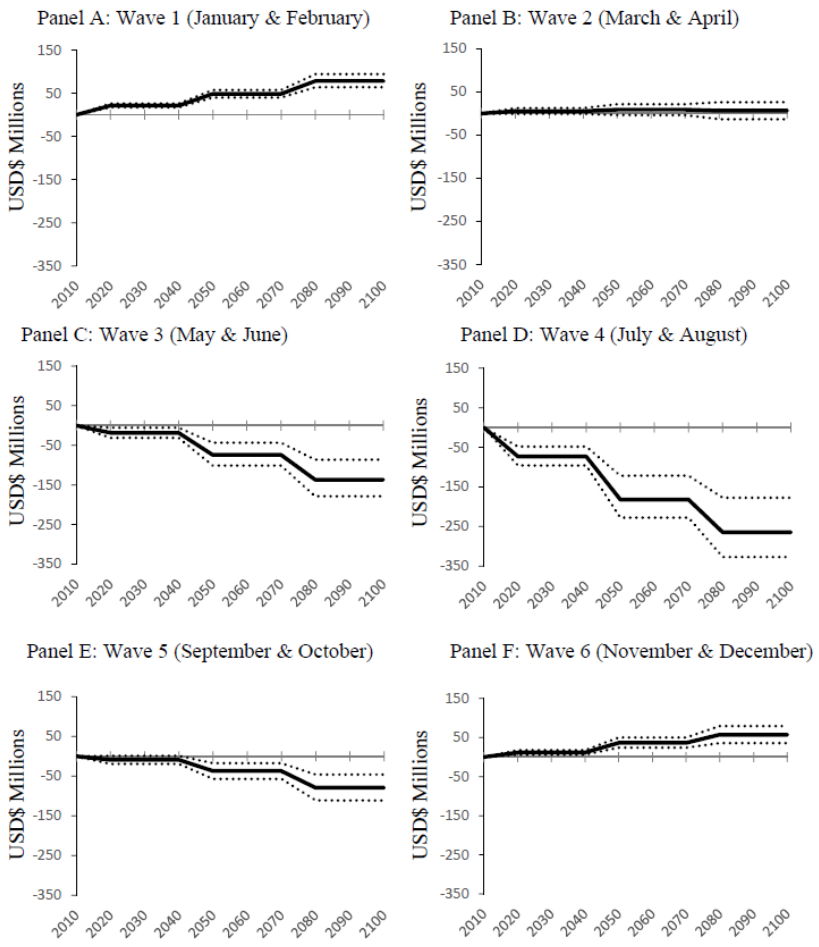
Figure 6: Regional Welfare Effects under RCP 8.5



Note: To better visualize the estimated impacts for Panes B, C, and D, please note that we used a different scale for the y-axis than Panel A (Gulf). The solid lines represents the average of all 41 RCP 8.5 predictions for each region and the dotted lines indicate the 95% confidence intervals estimated using a parametric bootstrap (Krinsky and Robb 1986) with 200 draws.

Seasonal Heterogeneity

Figure 7: Temporal Welfare Effects under RCP 8.5



Note: The sold lines represents the average of all 41 RCP 8.5 predictions for each wave and the dotted lines indicate the 95% confidence intervals estimated using a parametric bootstrap (Krinsky and Robb 1986) with 200 draws.

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November 29, 2018

Value of a Lost Trip (VOLT)

- Often used in benefit transfer policy contexts (e.g., oil or CAFO spills)

$$\text{Damages} = \text{VOLT} \times \Delta\text{Trips}$$

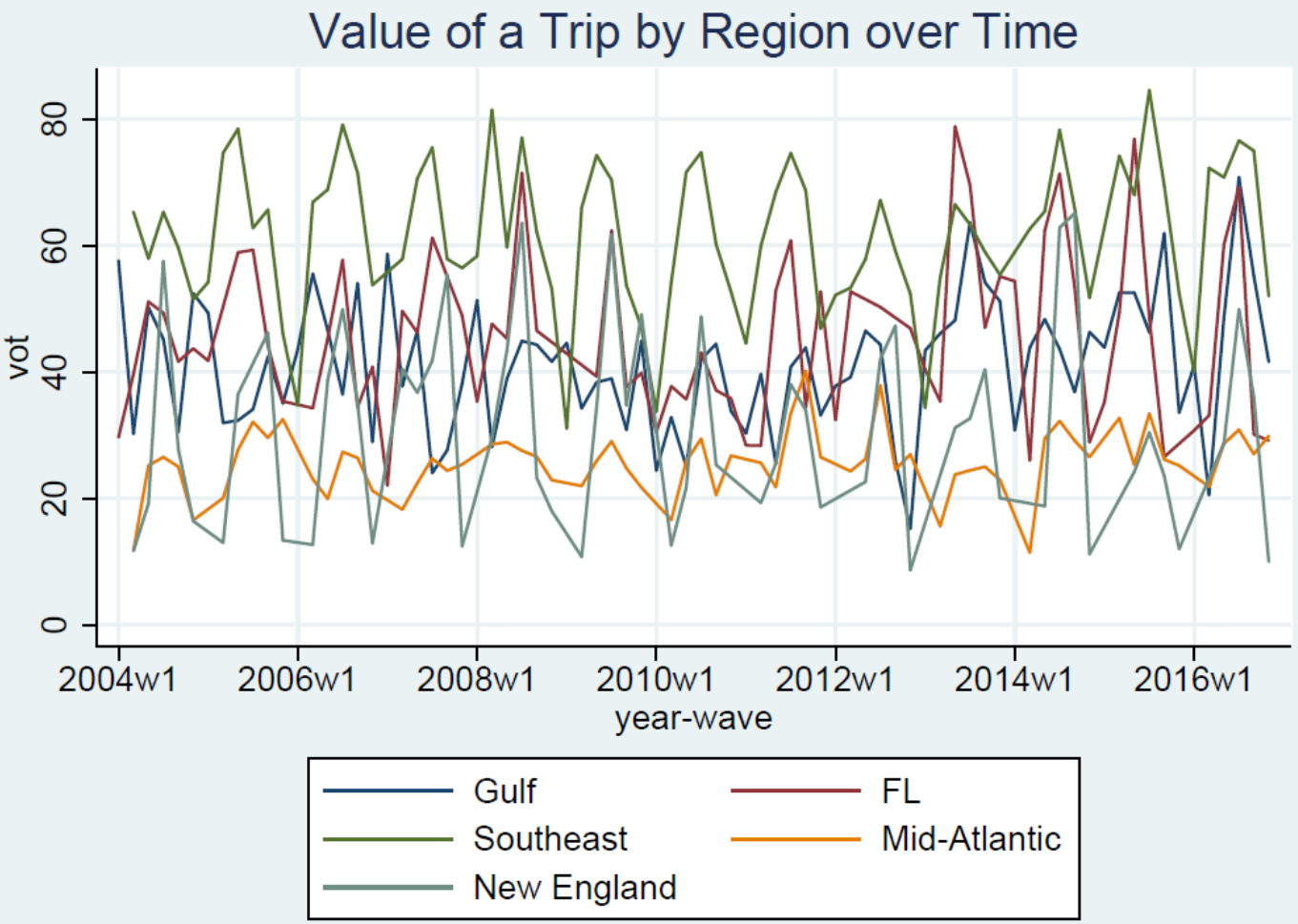
Q:How does the VOLT vary across time and space?

- Using 16 years of MRIP data (2004-2016) from Maine to Louisiana (i.e., 300k trips), estimates 344 separate VOLT across:
  - Years
  - Seasons
  - Regions

Key Findings

- Average VOLT = $42 (2012 dollars)
  - Varies between $9 and $85
- Significant heterogeneity across:
  - Regions (most valuable = Carolinas/Virgina)
  - Season (most valuable = summer)
- Little heterogeneity across years
  - But some evidence of higher values after Great Recession

Key Findings



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Conclusions

- Because of its spatial and temporal coverage, MRIP represents a valuable resource for applied benefit-cost analysis
- Benefit estimates for several policy scenarios can be generated
  - Water quality improvements
  - Climate impacts
  - Lost trips
- Due to MRIP's complexity, its use will generate methodological innovations

Thank you!

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- Papers cited:
  - https://www.epa.gov/sites/production/files/2017-08/documents/2017-02_1.pdf
  - https://cenrep.ncsu.edu/publications/weather-effects-on-the-demand-for-coastal-recreational-fishing-implications-for-a-changing-climate/
  - https://sites.google.com/ncsu.edu/avn-econ/research?authuser=0