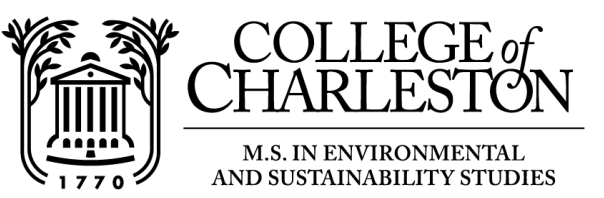




Perceptions and Adaptations to Bag Limit Sale Prohibition Among Charter Boat Anglers in the South Atlantic



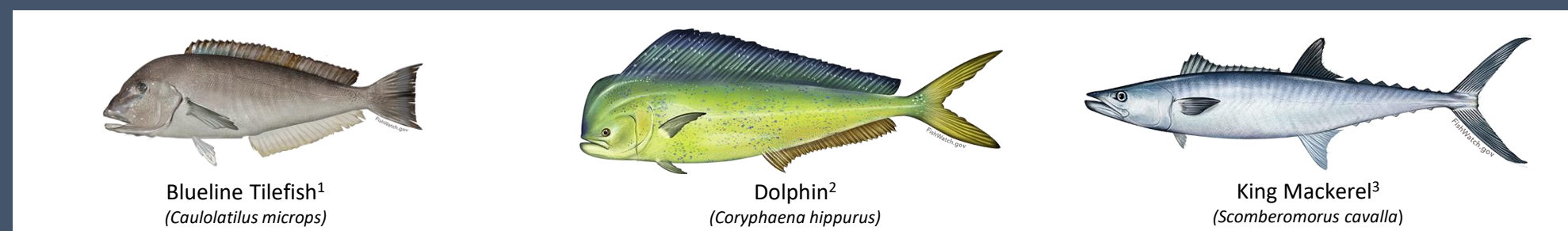
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Introduction

Despite the existence of fisheries management throughout history, the combined complexity and uncertainty surrounding population dynamics and human behavior can cause management to be ineffective. As the human population continues to grow, the world's fisheries are faced with increasing pressure to provide a sustainable and reliable food source to consumers, thereby causing further strain on management to maintain healthy fish stocks. **This study examined the effectiveness of one management technique in the recreational sector – a prohibition of bag limit sales – on three fisheries in the South Atlantic from 2005 until 2018.**

Study Area: Dare County, NC and Monroe County, FL
Focal Sector: Charter boats | *Key Stakeholders:* Recreational and commercial anglers
Management Authority: South Atlantic Fishery Management Council
Species of Interest:

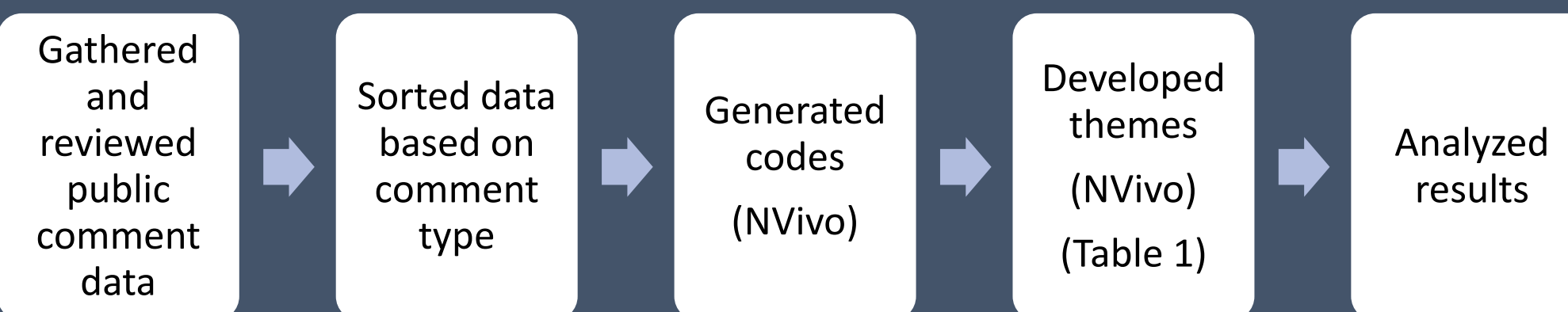


Research Questions

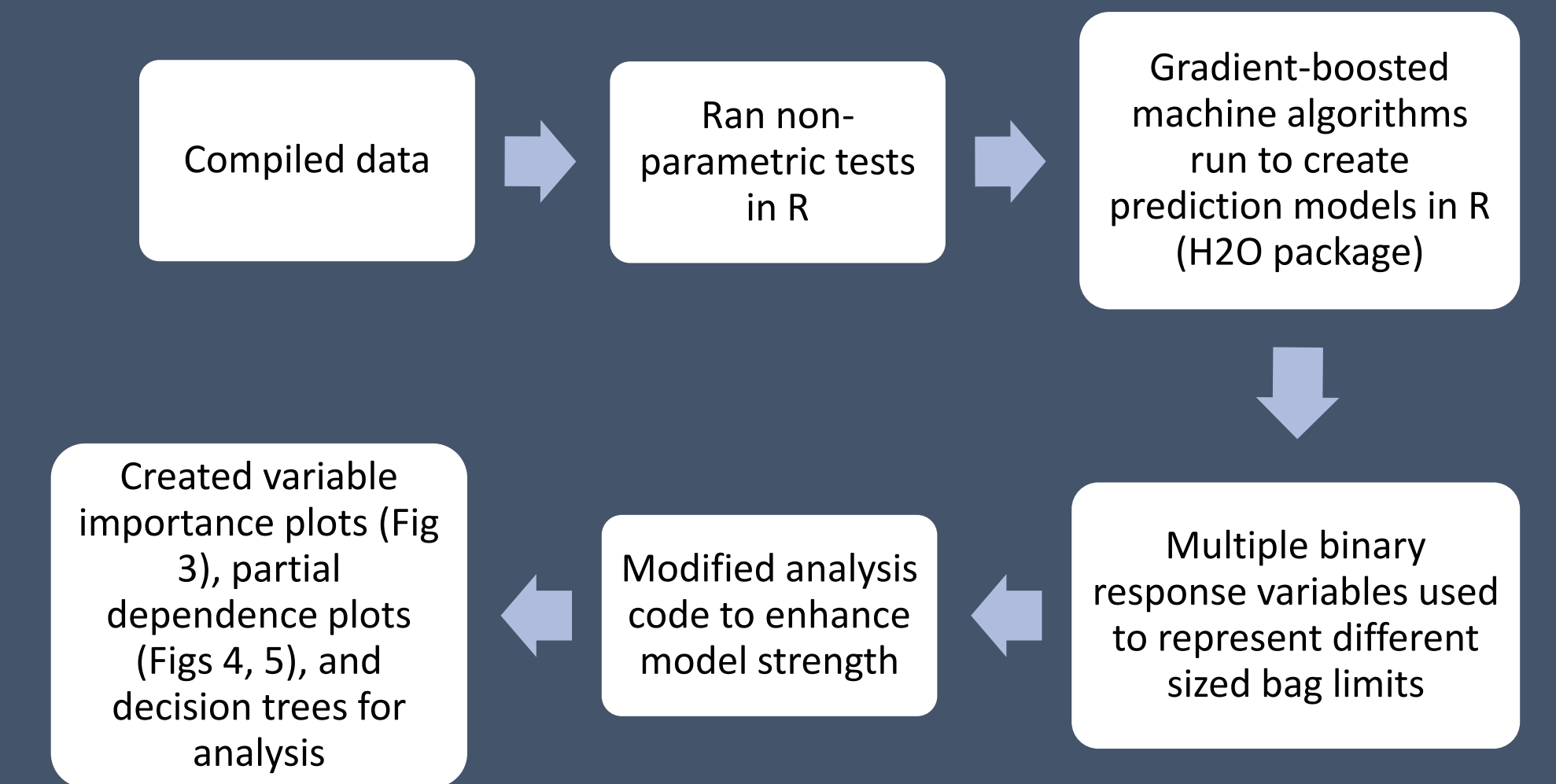
1. How did stakeholders perceive the prohibition of bag limit sales?
2. Did the prohibition of bag limit sales affect catch by charter vessels?
3. How did the charter sector respond to bag limit regulatory changes in the blueline tilefish, dolphin, and king mackerel fisheries between 2005 and 2018?

Methods

Thematic Analysis via Grounded Theory



Boosted Regression Trees



Results

Thematic Analysis

Direct Opinions on Bag Limit Sales

Threats to the Status Quo

- Personal Threats
- Business Threats
- Community Threats

Recreational vs Commercial by Division

- Monetary
- Management

Efficacy of Current Management Practices

- Fishery Health
- Accuracy of Fisheries Data
- Strength of Enforcement

Indirect Opinions on Bag Limit Sales

- Flawed Science
- Threats to Coastal Economy
- Fishery Survival

Table 1. The six themes and eight sub-themes identified via thematic analysis, broken down based on direct and indirect opinions. Direct opinions were given in direct reference to a prohibition of bag limit sales. Indirect opinions were given in reference to alternative actions proposed for dolphin alongside a prohibition of bag limit sales, thereby indirectly stating stakeholder opinion towards bag limit sales. Themes are identified in the white boxes with sub-themes listed as bullet points beneath.

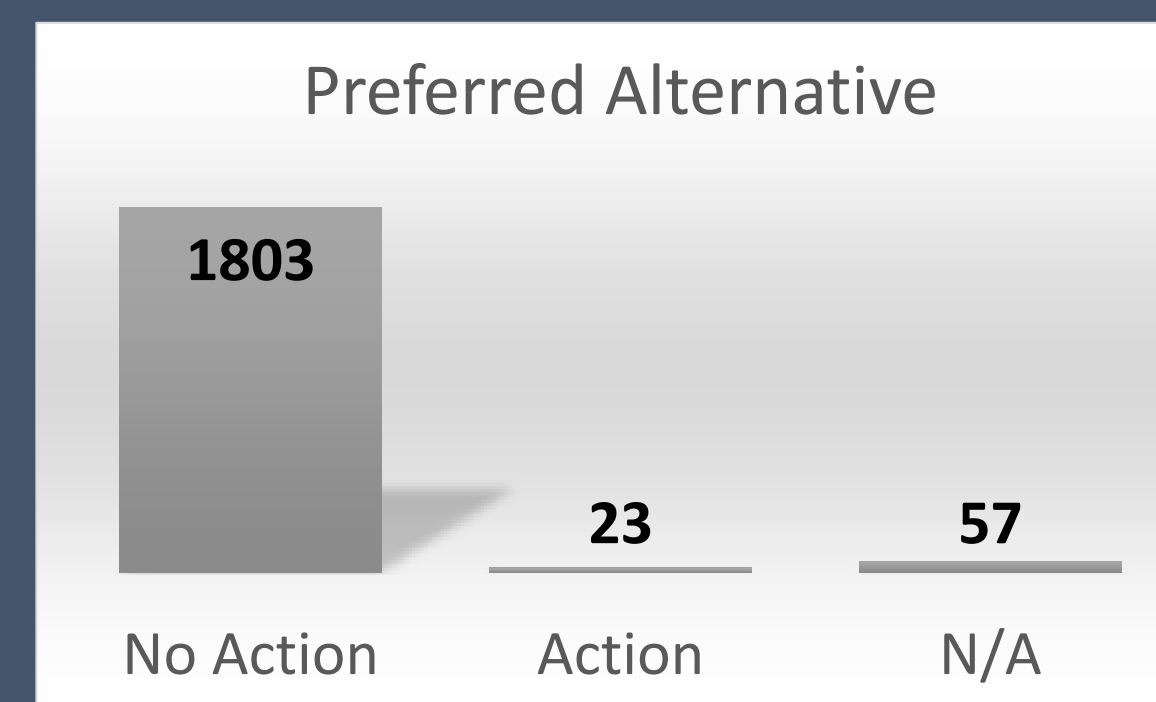


Figure 1. Stakeholder opinion towards the prohibition of bag limit sales. "No Action" indicates a preference to maintain existing management, thereby not implementing a prohibition of bag limit sales. "Action" indicates a preference for changing management; specific actions are species-specific and identified in the proposed amendment. "N/A" indicates stakeholders who did not make their preference toward a prohibition of bag limit sales known.

Boosted Regression Trees

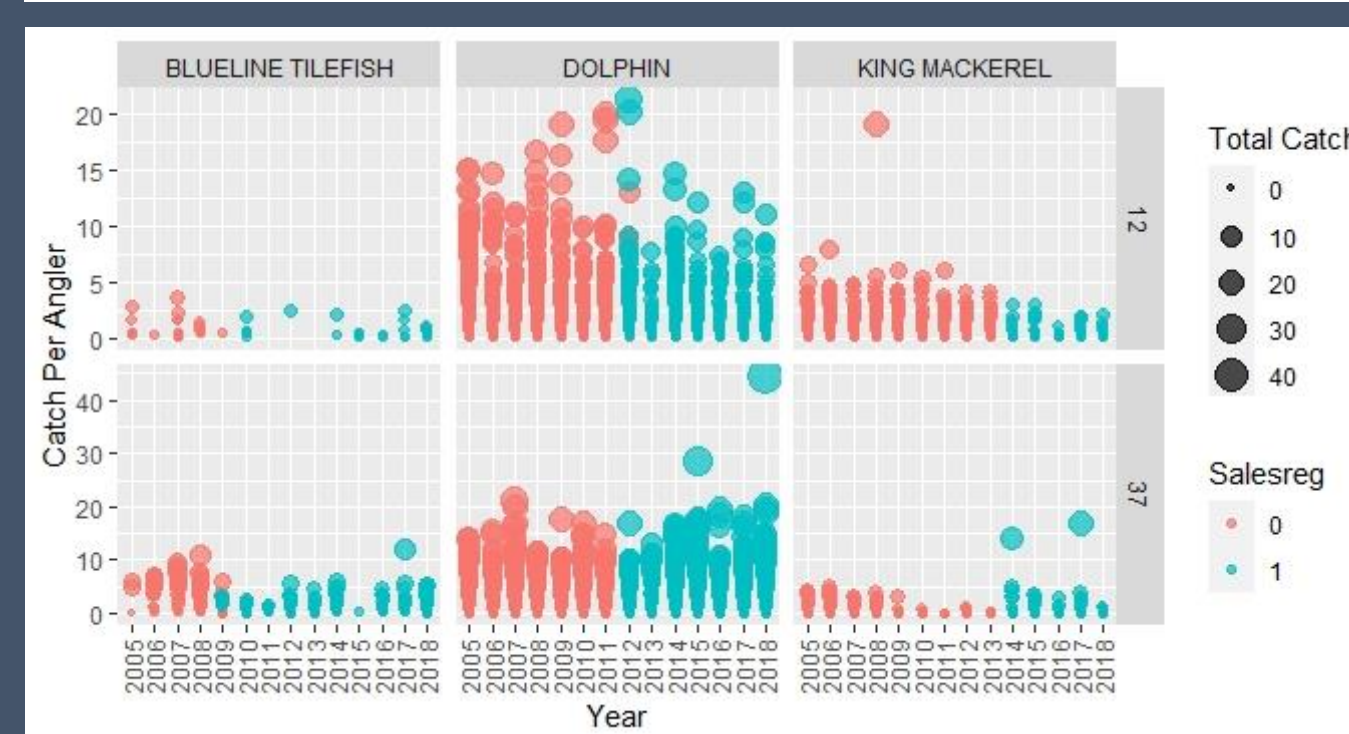


Figure 2. Number of fish caught per angler from 2005 through 2018 by species. "Salesreg" signifies whether a prohibition of bag limit sales had been implemented. 0 represents the time before the regulation was implemented; 1 represents the time after the regulation was implemented.

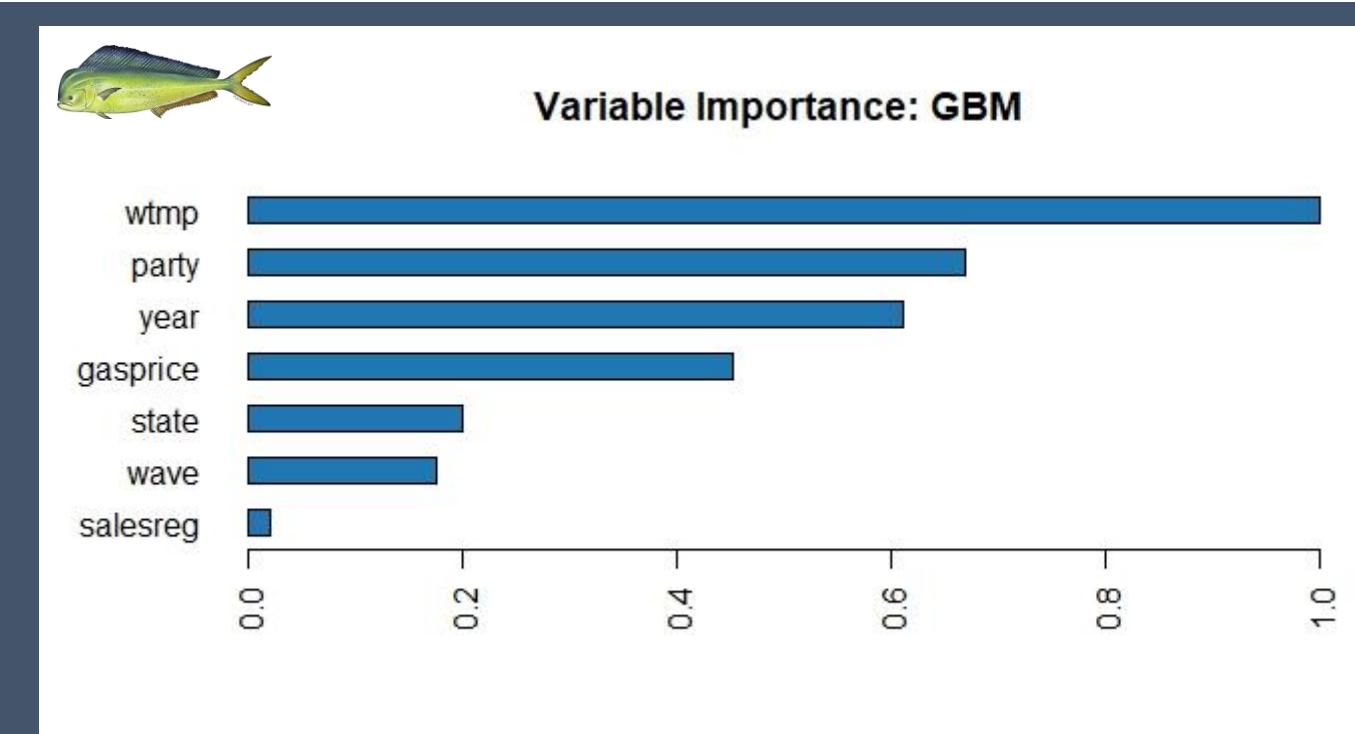


Figure 3. Dolphin variable importance plot under the current bag limit (i.e., 10 fish per person per day). The higher the scaled score, the more important the variable was in determining catch quantities.

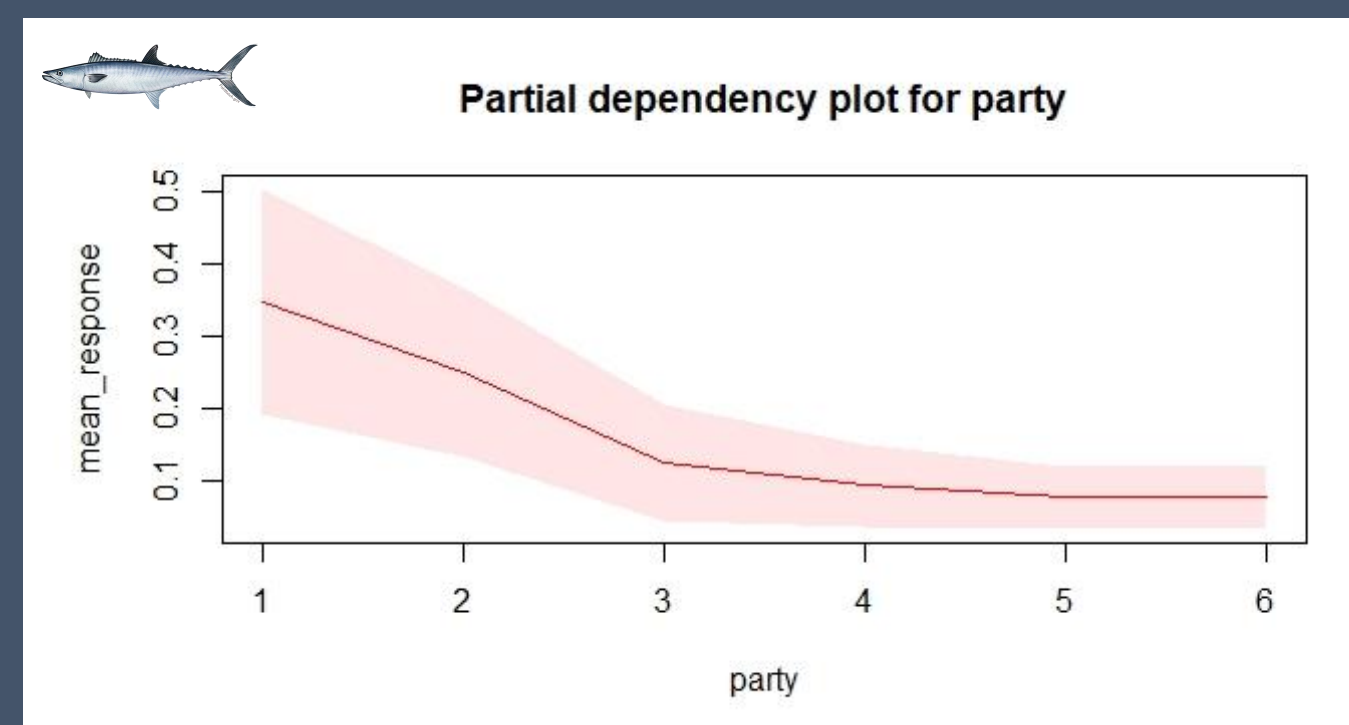


Figure 4. King mackerel partial dependence plot for "party" under the current bag limit. Party represents the number of paying guests on board a charter. The decline in mean response demonstrates that smaller parties are more likely to catch up to the bag limit than larger parties.

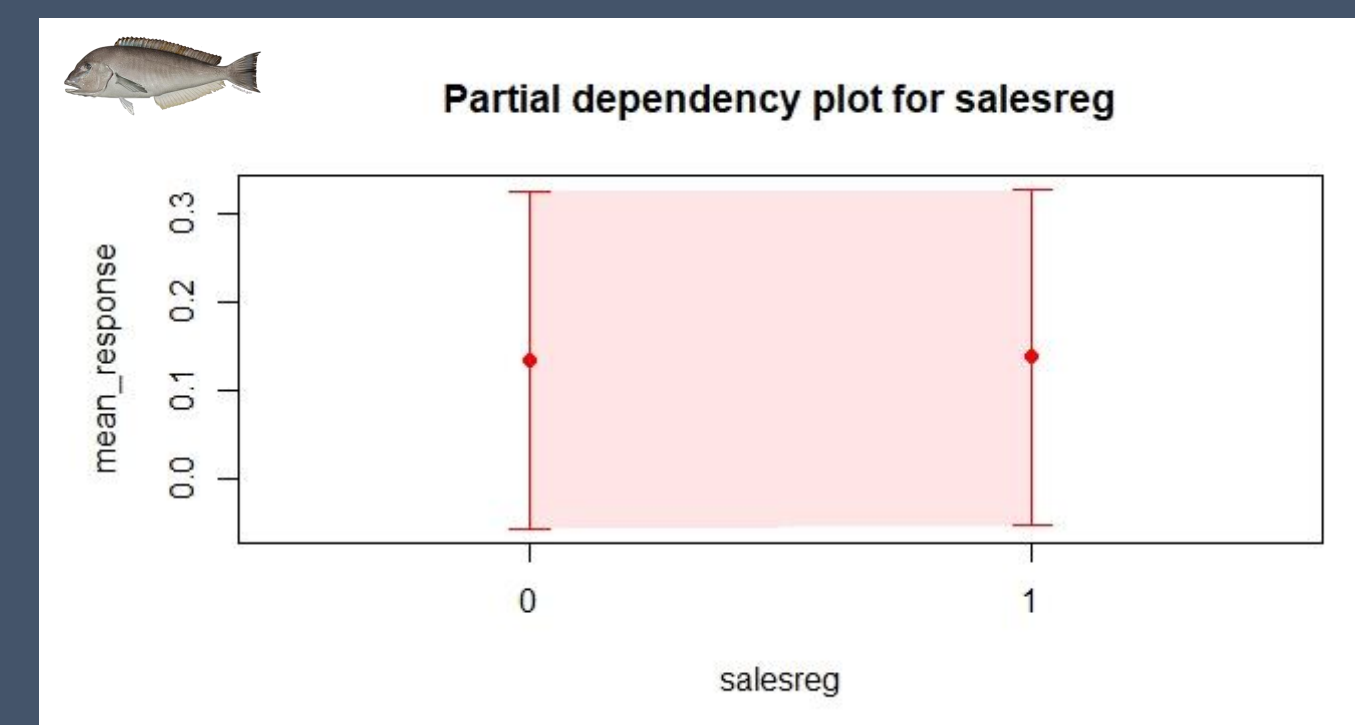


Figure 5. Blueline tilefish partial dependence plot for "salesreg" under the current bag limit (i.e., 3 fish per person per day between May and August). The lack of change between the two indicates that mean catch did not change after the regulation was implemented.

Discussion

- **Largely negative perception towards a prohibition of bag limit sales (Q1).**
- Stakeholders are more likely to comment on regulation they disagree with (Q1).
- Interest groups are more invested in complex amendments.
- The most represented stakeholder group to comment was anglers (Q1).
- **Changes in charter catch are not due to a prohibition of bag limit sales (Q2).**
- No single variable is solely responsible for changes in charter catch (Q2).
- Impacts of each variable are specific to the species and bag limit under analysis (Q2).
- Larger parties are less likely to catch up to the bag limit.
- North Carolina charters are more likely to catch up to the bag limit than Florida charters (Q2).
- **Charters did not change catch behavior due to the regulation (Q3).**

Conclusion

Management Impacts

Stakeholder support is imperative to achieving conservation and management goals.⁴ The lack of support shown by the charter sector could negatively impact management efforts in the long-term.

Next Steps

- Expand efforts to engage the charter boat sector in management decisions. One possibility is a targeted outreach effort where captains gain further education to encourage a shift in perception and subsequent behavior.
- Conduct interviews or surveys with charter captains to determine why they did not change behavior in response to the regulation and to learn how they feel about the regulation post-implementation.

Acknowledgements & References

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¹FishWatch.gov (n.d.) "Blueline tilefish" [Image]. NOAA FishWatch. <https://www.fishwatch.gov/profiles/blueline-tilefish>
²FishWatch.gov (n.d.) "Pacific Mahimahi" [Image]. NOAA FishWatch. <https://www.fishwatch.gov/profiles/pacific-mahimahi>
³FishWatch.gov (n.d.) "King Mackerel" [Image]. NOAA FishWatch. <https://www.fishwatch.gov/profiles/king-mackerel>
⁴Rees, S. E., Attrill, M. J., Austen, M. C., Mangi, S. C., & Rodwell, L. D. (2013). A Thematic Cost-Benefit Analysis of a Marine Protected Area. *Journal of Environmental Management*, 114, 476–485. <https://doi.org/10.1016/j.jenvman.2012.10.048>