New Policies that Can Protect and Restore the Right Whale Population Based on Acoustic Detection of the Species

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Introduction

- Current Status
    - Right whales are one of the most endangered large whale species whose primary habitat is in Atlantic coastal waters on the continental shelf. However, right whales are known to travel far offshore, over deep water (Fauquier et al., 2019)
    - Right whales were listed under the Endangered Species Act since 1970 and, currently, consist of fewer than 400 individuals with fewer than 100 breeding females left (Fauquier et al., 2019)
    - The number of new calves born in recent years has been below average and deaths are outpacing births in the population (Fauquier et al., 2019)
- Threats
    - By the early 1890s, commercial whalers had hunted right whales to the brink of the extinction (National Marine Fisheries Service, 2020)

    - Modern threats to the species are entanglement in fishing gear and vessel strikes that are the leading causes of right whale mortality (National Marine Fisheries Service, 2020)
    - Increasing noise levels from human activities interfere with right whale communication and increase their stress levels (National Marine Fisheries Service, 2020)
- Existing Policies
    - In established zones during certain months of the year, gear modifications and fishing closures have been implemented to protect right whales since 1997 (Hayes et al., 2019)
    - Vessels' speed limit is 10 knots (about 12 mph) in established areas during certain times of the year since 2008 (Hayes et al., 2019)
    - If a group of three or more whales is visually detected, the voluntary speed limit is 10 knots for a period of 15 days (Hayes et al., 2019)
- New policies
    - May be different from the existing ones because
        - Acoustic detections cover a broader area along the US east coast (Davis et al., 2017)
        - Visual detections rely on survey aircraft, which cover a small range in only the northeast US (Davis et al., 2017)
        - Visual detections rely on whales being at the surface, while acoustics recorders detect whales calling throughout the water column (Davis et al., 2017)

        - Static management zones risk being in effect when whales are not present, due to changing ecosystem conditions that are altering whale distribution. Conversely, static management zones risk not being in effect when whales are present for the same reason (Davis et al., 2017)

Thesis Statement

- This study examines how existing policies, through static zones and visual detections, protect the right whale population along the US east coast and how acoustic detection of whales can be used to improve upon existing policies and extend the range of protected zones.

Approach

- Review regulatory rules and compare detection data for right whale presence determined through visual identification versus acoustic identification

Methods

- Review of existing legal framework, policies, and regulations
    - Understand current status of legal protection of right whales
- Create geographic areas where right whales are frequently present based on acoustic data using GIS
    - Understand in what areas right whales are frequently present based on acoustic data
- Compare whale presence areas that are identified with current methods with whale presence areas that are identified by acoustic methods

    - Compare by how much acoustic detection areas of frequent whale presence differ from visual detection areas
- Use acoustic detection data to improve existing regulations
    - Incorporate acoustic detection data into the framework for drafting legal protections for right whales
- Create new approaches to policies to protect right whales from human interactions.

Work Plan

- Feb 1 – Feb 9: Background research
- Feb 4: Discussed senior thesis with advisor
- Feb 11: Outline of the thesis proposal handed in
- Mar 18: Draft of thesis proposal due (will be given to a mentor a few days before)
- Apr 15: Final thesis proposal due (will be given to a mentor a few days before)
- Oct 15: Thesis first draft handed to mentor and advisor
- Nov 12: Thesis second draft handed to mentor and advisor
- Dec 14: Final thesis submitted

Implication of Research

If successful, my research will shed light on how acoustic detections of whale calls can be used in drafting and implementing new regulations to protect the most endangered large whale species from modern threats that may risk driving right whales to extinction.

References

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