NAVIGATING ONLINE PERCEPTIONS OF OFFSHORE WIND ON SOCIAL MEDIA: FACEBOOK DISCUSSIONS ON RECENT WHALE STRANDINGS

BY

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A DISSERTATION SUBMITTED IN PARTIAL FULFILLMENT OF THE

REQUIREMENTS FOR THE DEGREE OF

MASTER OF ARTS

IN

MARINE AFFAIRS

UNIVERSITY OF RHODE ISLAND

2025

MASTER OF ARTS IN MARINE AFFAIRS THESIS

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2025

ABSTRACT

The Biden-Harris administration implemented a goal to achieve 30 GW of offshore wind energy by 2030 (US Department of Interior, 2021). The rapid increase in offshore wind activity on the East Coast, combined with NOAA's declared unusual mortality event in 2016/2017, has sparked a discussion about offshore wind being a potential cause of whale deaths. This paper aims to analyze the discourse on offshore wind and whales through a content analysis of Facebook comments. Facebook pages from Massachusetts (The New England Aquarium), Rhode Island (Rhode Island DEM), New York (The Atlantic Marine Conservation Society), New Jersey (Marine Mammal Stranding Center), and Virginia (Virginia Aquarium and Marine Science Center) report and document whale strandings and deaths in their respective states. Comments under images of dead and beached whales related to offshore wind were collected and analyzed using inductive thematic coding and the Social Amplification of Risk Framework (SARF) to highlight areas in which the risks of offshore wind to whales are amplified.

A total of 662 comments were coded and further analyzed for areas of code occurrences and high volumes of discussion. Findings illustrate that the majority of commenters are either unsure about offshore wind's involvement in whale deaths (50% of collected comments) or believe offshore wind played a part in the whale deaths (39% of collected comments). The thematic analysis found that discussions around offshore wind and whales involve political elements, calling out specific political figures and highlighting the bipartisan nature of this

topic. The analysis revealed various interpretations of NOAA's statements and harassment permits. Sonar testing remains a concern regarding offshore wind, specifically its effects on marine mammals. Additionally, there is a lack of trust from commenters regarding donations and grants received by stranding organizations from offshore wind companies, with suspicions about the money being used with bad intent. Further research via social media is necessary to fully comprehend this discussion, but this work lays the foundation for future content analyses to increase understanding around this discussion.

ACKNOWLEDGMENTS

This thesis research could not have been done without all the people who guided and supported me along the way. I would like to thank my advisor, Dr. David Bidwell, for his wealth of knowledge, patience, guidance, and kindness throughout the process. I also want to thank my committee members, Dr. Diamond and Dr. Kim, for their support throughout the writing of this thesis. Thank you to my cohort; we might be small, but we are mighty, and I couldn't have made it through this program without you all! I want to thank my dad for gifting me Wall Street Journal articles and my mom for bringing me back down to earth after many late nights writing. To the marine affairs community, this program is special, and I am lucky to have taken classes from and worked with some amazing people. I also want to thank my best friend, Sam for being my co-coder. I am so grateful for my support system and hope you all know what an integral part you have played in this process.

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CHAPTER 1

INTRODUCTION

Climate change poses a huge threat to people, places, and the economy around the world (Dowling 2013; United Nations 2025; Vestrelli et al., 2024). Emerging energy technologies are crucial in combating climate change and reducing fossil fuel emissions into the atmosphere. Renewable energy is key to offsetting our emissions and mitigating the drastic impacts of climate change. On the East Coast, offshore wind is the only renewable resource that can be deployed, with current technologies, in a timeframe that will allow the US to reach the emissions targets suggested by scientists (Roberts et al., 2021). Other countries, such as Denmark, Sweden, the UK, and the Netherlands, have been deploying offshore wind turbines for three decades, but in the United States, it is a relatively new phenomenon (Orsted, 2019). However, the Biden Administration implemented an ambitious goal of deploying 30 gigawatts (GW) of offshore wind by 2030 (U.S. Department of Interior, 2024). This goal was set in motion during the Obama-Biden administration, when the U.S. committed to an increase in renewable energy (non-hydro) generation to 20% by 2030 (Obama Whitehouse Archives, 2015). The United States saw its first offshore wind farm completed in 2016, off Block Island, Rhode Island. Since the emergence of offshore wind in the US, social scientists have been studying public perceptions of the new technology

(Bidwell, 2017; Firestone et al., 2012; Russel et al. 2020; Smythe et al 2020; Sokoloski et al 2018). However, this technology has not been without controversy, with concerns ranging from viewshed impacts to fishing impacts to the effects on marine mammals (Haggett, 2011; Bidwell, 2023).

The growth in offshore wind energy activity along the Atlantic Coast rose significantly after the construction and completion of the Block Island Wind Farm, with an increase in leasing areas, ocean surveys and planning, and the award of contracts for South Fork in 2017 (South Fork Wind, 2019) and Vineyard Wind in 2021 (Commonwealth of Massachusetts, 2024). This increase in activity around offshore wind, coupled with NOAA declaring an unusual mortality event for Humpback Whales, Minke Whales, and North Atlantic Right Whales in 2016 and 2017, has led to many discussions on whether these two events are related (Macdonald, 2023). The discussion has manifested on social media and beyond. This paper aims to bridge the gap in our understanding of social media discourse on offshore wind and recent whale strandings. I aim to understand the major themes in discussions about offshore wind and recent whale deaths, using Facebook as a medium to gauge how this issue is framed in the public.

Facebook works as a location for amplifying the perception of risks to offshore wind and whales. Many Americans use social media as a medium to get their news; about one-third of U.S. citizens say they get news regularly from Facebook and YouTube (Pew Research Center, 2024b). Comments under images of dead or beached whales along the East Coast, posted by

stranding centers and state government agencies, involving offshore wind were collected and further analyzed. Along with identifying major themes, this paper strives to understand how the Social Amplification of Risk Framework (SARF) can be used to understand how communications amplify perceived risks around offshore wind for the whales. The research also aimed to identify which comments were generating the most interaction in terms of likes and replies. I ask the following questions as part of this research:

- What are the major themes in the discussion around offshore wind and whales, and what are the characteristics of these themes?
- From the collected comments, what were the overall summaries in terms of the comment stating that offshore wind is playing a part in whales dying, that offshore wind did not play a role in the whale's death, or that it is unclear or unknown what the comment is saying? How did these overall summaries differ in each state?
- What comments on this discussion are getting the most interaction, in terms of likes, interaction buttons, and comment replies?

The paper will review relevant literature around social media research, offshore wind public perceptions, and current concerns. The methods of the social media comment content analysis will follow the choices made throughout collecting and analyzing comments. The chapter after will dive into the results and discussion to answer the research questions.

CHAPTER 2

REVIEW OF LITERATURE

In this portion of this thesis, I will review various sources of pertinent literature on renewable energy in general, the specific perceptions around offshore wind and whales, how utilizing social media can illuminate issues and highlight misinformation, and finally, the framework used in coding alongside thematic analyses, the social amplification of risk framework (SARF).

2.1 Social Acceptance of Renewable Energy

In this section, I will review multiple streams of literature on the evolution of the social acceptance of renewable energy. The first portion will look at the evolution and themes within the social acceptance of renewable energy. The following paragraph will specifically look at the renewable energy source, offshore wind, and then communications around renewable energy and offshore wind.

As countries began to look deeper into renewable energy sources, there was, and has been, a recognition that overall social acceptance from people could be a difficult factor. Carlman first identified the social acceptance of wind energy at the 1982 European Wind Energy Conference (Carlman, 1982). She recognized the ‘non-technical’ barriers to wind energy, including public opinion, among other conflicts. Social acceptance was widely ignored as a concept during the 90s as support for renewable energy increased with the

Clinton administration's strong promotion of energy efficiency and renewable energy (Joskow, 2001). The concept was reintroduced when Wüstenhagen collected papers that were presented at a 2006 conference in which he identified components that influence social acceptance, including benefit/risk perception, trust, economic considerations, social/cultural norms, and stakeholder participation/engagement (Wüstenhagen et al., 2007). Social acceptance has gone through several phases, including social acceptance of renewables through alternative explanations, aside from NIMBY (not in my backyard), and our current phase of understanding people's responses to renewable energy now that we have examples (Batel, 2020). Ellis et al. (2023) used Wüstenhagen's original work to propose three additional components of social acceptance: time, power, and scale. Power dynamics are not confronted nearly enough in social acceptance studies, but it is necessary to understand power dynamics within the social acceptance of renewable energy (Ellis et al., 2023). Social acceptance has been criticized mostly at the individual and local scales, with not enough emphasis on other scales. Ellis et al. (2023) criticized that the original work produced by Wüstenhagen fails to recognize that social acceptance is not stagnant but rather very dynamic and requires an understanding of the dynamic processes of time, power, and scale.

Comprehensive reviews on social acceptance of offshore wind work specifically find that there are factors that influence responses to offshore wind. These include visual impact, place attachment, an absence of tangible

benefits, relationships with developers, the roles of decision-making systems and planning, and relationships with outsiders (Haggett, 2011).

Cape Wind, in 2001, was the first proposed offshore wind farm in United States, but its lease was relinquished in 2017 after permitting and litigation delays and losses proved the project near impossible (Cape Wind, 2018; Firestone et al., 2012). Early social science studies on acceptance found that when offshore wind is viewed as “transformative,” it can increase support (Firestone et al., 2009). These early studies on proposed Cape Wind in Massachusetts and Bluewater Wind in Delaware laid the foundation for future studies around offshore wind in the United States. The study found concerns regarding the impacts of wind developments on wildlife and environmental quality (Firestone et al., 2009), but support for offshore wind was generally high using descriptors like ‘beautiful’, ‘symbolic of progress towards clean energy’, and ‘impressive’ (Firestone et al., 2018). Progressive studies over time, as offshore wind has increased, have highlighted different areas of concern and support. There are several different values, personal characteristics, ocean beliefs, and perceived impacts that influence attitudes toward offshore wind and the Block Island Wind Farm (BIWF) (Bidwell, 2023). The attitudes of people have been more concrete since the installation of the wind turbines (Russell et al., 2020). However, although the majority seem to support BIWF, there is a portion of both coastal and BI residents who have concerns related to the aesthetic value and impact of the landscape. The foreseen impacts of offshore wind farms on ocean resources and

socioeconomics have the greatest influence on wind farm support, but values also hold significance (Bidwell, 2017).

The coverage of offshore wind in the media aids in the understanding of current discussions around offshore wind. Media coverage doesn't show the full picture when thinking about stakeholders involved in the creation of environmental policy (Smith et al., 2013). One stream of research seeks to understand how issues surrounding offshore wind and other renewables are framed, as this affects the public narrative around these technologies. Renewable energy has many different framing options, to name a few core frames: a positive frame that looks at the benefits, a frame that looks at the economic and technological issues, and finally, a frame that looks at the environmental and social problems (Rochyadi-Reetz et al., 2019). Specifically looking at communications and offshore wind, concerns around viewshed have been less central to the discussion, but rather risks are being framed with political conflict, lack of transparency, wildlife impacts, and fishing economic impacts (Diamond et al., 2024a). Who is being quoted and highlighted in the media is also important, and in the case of offshore wind, it is most frequently developers and political officials (Diamond et al., 2024a).

2.2 Current Events and Concerns Around Offshore Wind

Offshore wind has expanded immensely in the United States over the last few decades. Early projects, such as Cape Wind and Bluewater never made it to the construction process, facing challenges from the public (Firestone et al.,

2013). They demonstrate, however, how the United States has shown continued interest in offshore wind as a form of renewable energy, with projects being proposed in the early 2000s. Block Island was the first operational industrial offshore wind farm constructed, becoming operational in 2016. Block Island was the first of many leasing areas to pop up on the Atlantic coast. South Fork Wind acquired their leasing rights in 2018, followed by Vineyard Wind in 2021, and Revolution Wind in 2023 (Commonwealth of Massachusetts, 2024; Revolution Wind, 2023; South Fork Wind, 2019). There are currently multiple projects proposed on the eastern seaboard, as well as proposed floating turbine areas along the West coast (Northeast Ocean Data Portal, 2025). In this section, we will look at some of the current themes and perceptions associated with offshore wind, specifically partisan politics and community benefits, which were themes that arose in the results.

2.2.1. Partisan Politics and Renewable Energy

Renewable energy has an important aspect of political polarization that acts as an obstacle to perception and communication on renewable energy (Marcos et al., 2025). Specifically in the US, the installation and deployment of wind energy shows a divide in which Democrats tend to support the transition into wind energy for the sake of climate change. In contrast, Republicans tend to oppose it unless there are economic or political benefits as an outcome (Gustafson et al., 2020).

A poll conducted on New Jersey residents regarding support for offshore wind found the decline of support has been largely partisan. From 2019 to 2023, Republican backing of offshore wind dropped from 69% to 28%, and Independent support dropped from 77% to 52%. Democrats' support remained stable, going from 79% to 76%. Specifically, the poll questioned, "There have been a number of whales washing ashore on New Jersey beaches recently. Is the development of offshore wind energy contributing to these strandings - would you say definitely, probably, probably not, or definitely not?", 63% of Republicans surveyed answered definitely or probably, whereas 63% of Democrats surveyed answered probably not or definitely not (Macdonald, 2023). Republicans are generally more interested in supporting fossil fuels, whereas Democrats are more open to renewable sources of energy (Kennedy, 2017). The decrease in support found by the Monmouth University poll aligns with the gauge of public support on Block Island in 2018. Between political parties, the study found 65.6% of Republicans supported the Block Island project, and 84.5% of Democrats surveyed supported the Block Island project (Sokoloski et al., 2018). This high percentage of support in the Sokoloski et al. study differs from the low percentage of 28% Republican support of offshore wind found in the Monmouth University study (Macdonald, 2013).

2.2.2. Offshore wind public perceptions: Community Benefits and Drawbacks

Another area of divide in offshore wind perceptions and communications is the community benefits and drawbacks, specifically in the economic sector. This ranges from the cost of the turbines themselves, energy reduction costs, job security, the impact on fisheries, the negative effects on tourism, and funding/donations around research of offshore wind. The community identifications, the benefits, and the perceived impacts are all interconnected (Rudolph et al., 2017). Concerns arise from the intersection of benefits and bribes, as local communities could perceive the community benefits presented as an attempt to “buy” their support (Walker et al., 2014).

In 2017, representatives of the tourism sector around southern Rhode Island met for focus groups to discuss experiences with and observations of the Block Island Wind Farm. There was a lot of discussion of tradeoffs, specifically whether the wind turbines will produce enough energy to offset costs and disturbance (Smythe et al., 2020). The cost of electricity remains an issue. Block Island attitude surveys in 2018 found that 63% of respondents who had a negative shift towards offshore wind felt that the cost of electricity remained an important issue, alongside wildlife, landscapes, and the environment (Bingaman et al., 2023).

Alongside the cost issue, there are concerns over the donations and funding of organizations. Orsted, a known offshore wind and renewable energy company, has donated money to many institutions, universities, and

researchers. Half of the organizations whose Facebook pages were used in this study are non-profit groups that have accepted donations or grants from notable offshore wind energy companies, like Orsted and Dominion. The New England Aquarium has accepted a cumulative amount of over $1 million since its opening from both NOAA and Orsted (New England Aquarium, 2023). Many of these groups are responsible for the necropsy and response in the event of a dead whale washing up in an area of jurisdiction. NOAA partners with local groups to compose their marine mammal stranding network. New England Aquarium, Mystic Aquarium, MMSC, Atlantic Marine Conservation Society, and Virginia Aquarium & Marine Science Center are all part of this network.

2.3 Whales and Offshore Wind

This section reviews the literature on the possible effects of offshore wind on whales. BOEM and NOAA have both acknowledged the negative environmental concerns for offshore wind development and the possible impacts on human activities and marine life (NOAA Fisheries, 2024b). The average lifespan of an offshore wind farm is around 40-50 years; spending around 10 years in the survey site prospect phase, around 3 years in the construction phase including dredging and pile driving, the operation phase lasts around 20-30 years and then the decommission of the wind turbine lasts about 2 years. All four of these phases produce sounds of varying degrees (Mooney et al., 2020). The concern around the noise stems from marine

mammals that use sonar through echolocation to communicate, navigate, and locate food, a group of cetaceans including dolphins, porpoises, and other toothed whales, *Odontoceti*. All *Odontoceti's* are thought to produce pulse-like sounds in the environment to gain an 'image' of their surroundings, like bats (Hooker, 2018). Different species within the *Odontoceti* family echolocate at different frequencies; the bottlenose dolphins, belugas, and false killer whales use frequencies from 20 kHz to 60 kHz with lower ambient noise and pulses up to 130 kHz at higher noise levels, smaller dolphins and porpoises echolocate at frequencies greater than 100 kHz, and Sperm whales range from less than 100 Hz to 30 kHz (Hooker, 2018).

Similarly to different species, different seismic sources will produce different frequency ranges. Offshore wind farms generally use multibeam and side-scan sonar surveys to map the seafloor around potential offshore wind sites, which have a frequency range of 100-400kHz (Mooney et al., 2020). This type of noise, from the high-resolution geophysical sound sources, used in the site characterization phase is unlikely to have a large impact on the toothed whales in the area, particularly the North Atlantic Right Whales (NARW) population (Ruppel et al., 2022), which is the marine mammal population of most concern with. There are thought to be around 360 mature NARWs left, which makes them a priority environmental impact when discussing offshore wind projects, hence NOAA's specific plan to minimize the risks of offshore wind to the NARW (Hayes et al., 2023; NOAA Fisheries, 2024a).

The noise produced during construction poses more concern for whales than the sonar testing (Bailey et al., 2014). The broadband pulse generated during pile driving has a high source level and low-frequency sounds that can mask calls of communication between marine mammals, as they also produce lower-frequency sounds (Bailey et al., 2014; Dolman & Simmonds, 2010). NOAA and BOEM have established strategies to mitigate the effects that the construction and surveying process could have on marine mammals, like the use of bubble curtains. Along with noise exposure, there are other stressors at play for offshore wind construction and surveying. There are more vessels in an area when constructing and surveying a potential site; therefore, the risk of vessel strikes increases. An increased risk of entanglement is possible with the marine debris that offshore wind could produce or stir up (abandoned or discarded fishing gear). The last big stressor is the possible changes to the habitat for both the marine mammals and their prey (NOAA Fisheries, 2024a). The installation of offshore wind infrastructure can alter the ocean floor, and the operation of offshore wind turbines can affect hydrodynamics and ocean currents. Floating turbines pose a risk for entanglement of marine life and fisheries (United States Government Accountability Office, 2025).

When developers propose surveys and construction for an offshore wind site, they can request an incidental take authorization under the Marine Mammal Protection Act (MMPA) through NOAA's Fisheries Office. The MMPA defines *take* as the "means to harass, hunt, capture, or kill, or attempt to harass, hunt, capture, or kill any marine mammal" (16 US Code 1362)

(Congress, 2022). This includes the collection of dead marine mammals, the restraint of marine mammals, the tagging of marine mammals, the negligent or intentional operation of aircraft or vessels, any negligent or intentional activity that disturbs marine mammals, and attempting to or the feeding of marine mammals. The harassment part of NOAA's Takes and Harassments is split into level A and level B. Level A Harassment is defined as "any act if pursuit, torment, or annoyance which has the potential to injure a marine mammals", this that is considered level A harassment, "or has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering." (16 US Code 1362) (Congress, 2022). That second part is what is considered Level B Harassment. There are, however, sub-definitions for military activity or scientific research. NOAA makes it clear that when a wind farm project is issued takes, this does not necessarily equate to deaths. NOAA issues takes not just to offshore wind projects, but to all oil and gas activities, scientific research, and military operations that happen on or in the water.

Unusual mortality events (UMEs) are declared by NOAA when they notice an increase in marine mammal deaths in a certain area. For Humpback whales, a UME has been in effect since January of 2016, a UME for the North Atlantic Right whales has been in effect since the beginning of 2017, and for Atlantic Minke whales, a UME was implemented in January 2017. These are all in effect on the east coast of the US in the Atlantic Ocean, from Maine to

Florida. The cause of death for majority of these whales was suspected human interaction (entanglement or boat strike) or infectious diseases (2017–2024 North Atlantic Right Whale Unusual Mortality Event, 2024; 2017–2024 Minke Whale Unusual Mortality Event along the Atlantic Coast, 2024; 2016–2024 Humpback Whale Unusual Mortality Event Along the Atlantic Coast, 2024).

Whales are part of a group called charismatic megafauna, which is when species have “the ability to capture the imagination of the public and induce people to support conservation action and/or donate funds” (Walpole & Leader-Williams, 2002). People care about whales because of their role as a charismatic megafauna, hence the interest and concerns people have around whales in offshore wind construction and surveying.

2.4 Social Media

This section will go through the pros and cons of social media as a research medium and how social media has previously been used in renewable energy research. One of the cons that will be specifically addressed is the spread of misinformation on social media.

2.4.1 Social Media to Measure Public Opinions

Social media is relatively new in media evolution, but it is extremely unique in its ability to reach a large audience and its ease of functionality. Prior to social media, people had to go to great lengths to provide many people with

information, with the cost usually being the biggest barrier (Stieglitz et al., 2013). Social media has mostly removed these barriers, as roughly 95% (Pew Research Institute, 2024) of the U.S. population now has access to the internet and therefore has access to social media sites. Social media can have an influence on an individual's decision-making in many different contexts; thus the desire to increase news literacy so users can make informed decisions (Grover et al., 2022). Social media is not one-dimensional; rather, many moving parts and factors must be considered when understanding its role in society. Social media platforms have an intricate connection with the users of the platform, the technologies that run the platform, the economic assemblies that fund the platforms, and institutional bodies that have incorporated them (Van Dijk & Poell, 2013).

With the reach of large, diverse audiences comes the inevitable platform for controversy on social media. Scholars from Aalto University and Qatar Computing Research Institute released the first big study on quantifying controversy on social media. Quantifying controversy on social media is not a new subject, but Garimella et al. (2018) argue that these often are hand-picked topics in a specific domain, so they developed a three-step process to quantify controversy through a conversation graph partitioning and analysis. Social media plays a huge role in circulating misinformation into news consumption, and there is a push for media and news literacy education (Vraga & Tully, 2021). Misinformation is defined as false or inaccurate information that is purposely created and is either intentionally or