The Scales of Ocean and Coastal Governance: How International, National, and Local Governments are Preparing for Global Environmental Change and a Growing Population

by

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Abstract

Coastal and ocean governance is a complex topic that requires an equally complex management structure. Governments around the world and at every scale have varying degrees of authority and resources to effectively manage their coastal and ocean ecosystems. Historically, coastal and ocean governance in the United States has been carried out in a siloed and reactionary manner following natural disasters or in reaction to changes in the political sphere. National and subnational governments have recently attempted to proactively and comprehensively manage the coastal and ocean environment in the wake of a changing climate and growing population. To date, no research has investigated how differing scales of government enact coastal and ocean management policy through a policy-making framework. Here I demonstrate that coastal and ocean governance that is anticipatory and comprehensive requires multiple scales of government to collaborate in a way that allows for impacted stakeholders to have a meaningful seat at the table. To investigate the best way for multi-government collaboration and meaningful stakeholder involvement to occur, I perform a literature review of international coastal policy in developing countries, compare federal ocean policy initiatives in the United States, and uncover the most pressing environmental challenges in two local estuarine communities in the Florida Panhandle. I find that at the international level, coastal and ocean governance is difficult due to rapidly growing populations and a changing climate coupled with limited resources in developing countries. In the United States federal government, inefficient and duplicative management are seen as the most pressing issues, while two presidential administrations sought to shift authority to subnational levels of government. At the local level, diverse stakeholders in estuarine communities were able to identify the three most

pressing environmental challenges and how policies to address them needed to be updated and better enforced. These findings are important because they highlight how differing levels of government face different challenges in coastal and ocean management. I identify the most practical and effective way to combat these challenges is for all levels of government to collaborate, share resources, and meaningfully involve all impacted stakeholders in a proactive and comprehensive way. This research lays out a path forward for how a complex natural resource management issue can be distilled down to a few key components that will more likely lead to comprehensive and proactive management to prepare for a continually growing global population and changing climate.

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Table of Contents

List of Tables

List of Figures

Chapter 1 - Vulnerable Nations and Communities: Accounting for those most dependent on the seas

1.1 Introduction

Perhaps nowhere is human dependence on nature more evident than in coastal and marine environments, where ecosystems and biodiversity are being lost and degraded at an alarming rate (MEA, 2005). Environmental governance systems can help prevent this loss by setting rules on how the extraction of natural resources occurs and by balancing competing economic uses to deliver value to society (Burroughs, 2011). For example, environmental governance systems can set limits on competing economic sectors such as energy production, fisheries, tourism, aquaculture, and conservation, with interests mediated by laws and regulations (Bellanger et al., 2020). Environmental governance can be defined as the processes and institutions (including cultural norms and rules) that enable effective decision-making related to protecting the environment (Pittman and Armitage, 2016). Major actors (i.e., decision-makers, non-governmental organizations (NGOs), businesses, and scientists), institutions, power centers, and bodies of knowledge are all important parts of the process (Van Assche et al., 2020).

This chapter will survey environmental governance of coastal and marine systems in vulnerable nations, as well as the implications for the governance of global environmental change. Coastal communities are the focus because of the strong relationship between social systems (e.g., economies, food systems, and cities) and ecological systems (e.g., beaches, coral reefs, and wetlands). Governance cognizant of the relationship between social and ecological systems can enable communities to make decisions that steer themselves away from danger (Van Assche et al., 2020). Take a hypothetical example of a coastal policy created to prevent developers from

building homes in a flood zone. The homes are exposed because they are adjacent to ecosystems like beaches that experience storms, floods, and erosion. Coastal policymakers can use historical flood data, predictions about future climate change impacts, and public preferences to determine when that exposure is too severe to permit development in certain zones on a landscape. This policy is, therefore, cognizant of the relationship between social systems of spatial planning, housing, and ecological systems of beaches and natural hazards. Governance limits human uses of resources, in this case, space on coastal landscapes, to steer home buyers and wider communities from dangers, such as losing lives and property in a flood.

Global governance systems are being created to respond to climate change impacts. Some of these impacts include rising seas, increasing storm intensity, threats to fisheries and other coastal livelihoods, and the loss of coastal resources like wetlands that protect coastal populations. New ways of integrating different governmental agencies, scientific data, and grassroots actors, all for the common purpose of enacting governance at local and national scales, are being used worldwide to respond to global environmental change. In this chapter, I aim to provide an overview of the merits and challenges of these governance responses.

1.2 Vulnerable geographies

Vulnerability is caused by two factors: *exposure* to a potential hazard, such as communities existing in an area with frequent tropical storms, and *sensitivity* to hazards, or the degree of damage caused by hazards (Adger et al., 2006; Cutter et al., 2008). An example of sensitivity is how severely tropical storm damage impacts a community. Damages can range from minor wind damage as a result of stronger building standards to catastrophic damage in which a town

becomes unrecognizable and basic services are lost. Resilience is the capacity of a social or

ecological system to absorb this disturbance and retain its essential features (Adger et al., 2005).

To select the case studies of coastal governance reviewed in this chapter, I used the United

Nations Development Policy and Analysis Division's *World Economic Situation and Prospects*

classification system, which is based on income and growth (United Nations, 2020). I focused

primarily on low-income, least developed countries (LDCs) because of their resource-dependent

communities, with high levels of vulnerability stemming from direct reliance on ecosystems

(Fischer, 2018). These cases demonstrate the strong link between social and ecological systems

and how governance cognizant of those links can reduce harm to coastal societies.

1.3 Africa

Given Africa's high concentration of LDCs, vulnerability is high, as low household incomes tend

to increase vulnerability to hazards for much of the population. For example, low incomes may

force large portions of the population into flood-prone areas with informal housing or settlements

not in compliance with planning and building regulations. Informal housing, when exposed to

hazards like major storms and floods, may suffer catastrophic, community-wide damage. One

important way that African decision-makers are addressing vulnerability in coastal communities

is through governance systems that focus on spatial planning for coastal zones. Often, this

planning process is called *integrated coastal zone management* because it integrates, or

considers, trade-offs between the conservation of natural resources and resource extraction for

economic growth. Integrated coastal zone management must bring together (or integrate)

different government agencies working towards a shared goal, different scales of government

(community/local, regional, and national), and different types of knowledge (scientific and

traditional), all the while working to use limited coastal space for numerous social and economic activities (Hassanali, 2015).

The integrated coastal zone management process begins when actors (such as governments), universities, and NGOs, study, and map natural resources (such as fisheries and habitats) and human social systems (such as low elevation housing vulnerable to storms and floods). In Central Africa, decision-makers are implementing ecosystem mapping of important coastal biodiversity areas to inform a spatial planning process (Ngoran and Xue, 2017; Trew et al., 2019). Similarly, Mauritania is using data collection to industrialize its coastal economy, and it is deploying a novel system of science-based fisheries management to accomplish this goal (Trégarot et al., 2020). This means that decision-makers are assessing the conservation status of key habitats and collecting biological data on commercially important species of fish to inform policy. In Mauritania, scientists are also collecting data to inform decisions on where to place marine protected areas (MPAs) or conservation zones in coastal and other marine environments, which limit the extraction of resources. For example, they are using data on the location of [fish] nurseries, like coral reef habitat, that sustain commercial fisheries (Trégarot et al., 2020). Thus, consideration of fishing-focused economic growth and protected areas for conservation are integrated. In another example, in Gabon, biodiversity-rich estuarine ecosystems located near major cities such as Libreville and Port Gentil are being mapped for the first time. Findings showcase an urgent need for officials to plan and implement protected areas as fewer than 33% of wetlands are protected and remain at risk of being lost to development (Aldous et al., 2021, p. 64).

In addition to examining important biodiversity areas, officials and researchers are also mapping human systems to study social vulnerability. In West Africa, a particularly vulnerable region where most countries are classified as LDCs, global environmental change is causing major disturbances that governance systems must address. For example, coastal erosion, worsened by sea-level rise and increased storm intensity from climate change, is creating significant vulnerability to flooding in places like Benin, Senegal, and The Gambia (Gomez et al., 2020; Ndour et al., 2018). Officials are beginning to understand the urgent need for governance responses to lessen this vulnerability. In The Gambia, for example, as many as 90% of households are vulnerable to coastal erosion, which is increasing in intensity due to climate change (Gomez et al., 2020, p. 9). With 74% of households lacking any capacity to bear these impacts of environmental change, erosion is threatening housing security and livelihoods by forcing a process known as adaptation, wherein locals are forced to alter their way of life to overcome unforeseen threats (Gomez et al., 2020, p. 9). Adaptation options could include the ability to transition into a new job or relocate to a less vulnerable home. Possible governance responses in The Gambia could include physical interventions like the construction of breakwaters and spatial planning interventions like integrated coastal zone management, both accompanied by increased education. Education and outreach could increase popular support for integrated coastal zone management efforts. Such programs could focus on so-called *win-win policies* that protect natural resources like mangroves, which can protect coastal communities from erosion while increasing biodiversity.

Decision-makers can use maps and scientific data on coastal resources and social vulnerability to assess the impacts of the pressures we place on resources (such as fishing, oil and gas extraction,

and coastal development). Then, they can create integrated coastal zone management plans with rules for resource extraction grounded in law. In North Africa, governments are balancing the interests of major economic sectors such as oil and gas (Maitig et al., 2018), water scarcity to meet the needs of a growing population (Soula et al., 2021), and the need for the development of pristine habitat to support tourism in coastal cities (Mohamed and Rachid, 2019). Balancing so many interests poses significant challenges to planning efforts in coastal zones, namely, how these plans are implemented. For example, coastal communities impacted by major planning decisions on Algerian coasts are asking for a greater role in decision-making, claiming their voices are not heard and that enforcement of laws and policies does not occur in practice (Khelil et al., 2019). In Ghana, by contrast, vulnerability to global environmental change enables some communities and grassroots actors to innovate and adapt in the face of hazards. Climate change is significantly impacting small-scale fisheries in Ghana, which increases the vulnerability of human communities due to lost livelihoods and diminished nutrition from declining catches (Freduah et al., 2019). In response, these communities are lobbying Ghana's government to enforce fishing laws, build local leadership focused on climate change impacts, and use of natural resources like sand to shore up defenses against erosion. Similar grassroots efforts to implement coastal governance are happening in Tanzania, where beach management plans, MPAs, and protected estuarine areas are being created collaboratively with coastal communities and governmental actors (Katikiro et al., 2017).

In East Africa, integrated coastal zone management is taking place with some contrasting results. For example, Kenya is implementing a similar integrated coastal zone management plan to Ghana and Tanzania and faces similar challenges with grassroots inclusion in decision-making,

the enforcement of laws, and a lack of data on how climate change impacts will look on the ground (Khelil et al., 2019; Ojwang et al., 2017). Key differences are seen in the depth and strength of Kenyan laws aimed explicitly at managing global environmental change. Specifically, Kenya has a Climate Change Response Strategy (2010), a Climate Change Act (2016), and a National Adaptation Plan (2016) with Climate Change Policy in the process of being created. However, these do not necessarily guarantee resilience at the local scale, where there exists a lag between climate change adaptation programs and implementation (Ojwang et al., 2017).

1.4 Asia

Like in Africa, the greatest challenge for decision-makers involved in Asian coastal governance is responding to global environmental change. Questions on vulnerability in this region are focused on how nations can withstand the impacts of climate change on their rapidly urbanizing coasts, which are home to over 300 million people in large population centers, termed 'mega-cities', such as Hong Kong and Singapore (Chan et al., 2018, p. 576). Mega-cities, like Singapore, are mitigating flash flood impacts through drainage projects by supplementing or replacing traditional concrete infrastructure with experimental "green infrastructure." Green infrastructure includes projects like vegetated drainage channels, constructed in place of concrete channels in the hopes of increasing plant and animal habitat and biodiversity. For example, the Kallang River was restored from a straight, open, concrete channel to a vegetated floodplain, with decision-makers targeting 100 additional projects like this to complete before 2030 (Chan et al., 2018, p. 584). Similar to Africa, Asia faces challenges with limited community participation in coastal governance. For example, as part of its integrated coastal zone management, Malaysia

began creating MPAs in the 1990s. Local communities were not included, and fishing villages were stripped of their livelihoods overnight, which led to a lack of support in many communities adjacent to MPAs and a general skepticism for conservation (Dunning, 2018). Governance that enhances opportunities for grassroots community participation in MPAs can help remedy this by helping decision-makers create and enforce fisheries regulations, which increase compliance with the rules governing MPAs (Islam et al., 2017). Communities are also significant sources of novel governance ideas, or innovations that respond to global environmental change. For example, in 2016, community groups in Indonesian MPAs noticed increased coral reef stress from rising sea surface temperatures, a biological process known as coral bleaching (see Chapter 15). In response, they worked with local officials in the dive and tourism sectors to build artificial reefs for divers to visit, which reduced pressure on bleached, stressed reefs while increasing tourism opportunities (Dunning, 2021).

Uncertainty over the future impacts of global environmental change in some Asian countries has been shown to limit integrated coastal zone management efforts. For example, in South Asia, the most densely urbanized coasts have limited social and ecological data to inform planning efforts and governance responses. India's Andhra Pradesh coastline has a population of 50 million people with a high density of over 800 people per square mile (Kantamaneni et al., 2019, p. 393). People there have vulnerabilities to hazards like storm surges from cyclones, exacerbated by sea-level rise. Decision-makers have not implemented coastal governance strategies to cope with these vulnerabilities. Yet, data gathering techniques such as unmanned aerial vehicles are being tapped to study natural and social systems as the possible foundation for efforts aimed at coastal planning (Kantamaneni et al., 2019). Similarly, Iranian officials face an information gap

regarding how to enact governance responses to climate change, namely sea-level rise. Climate change and sea-level rise may, according to Iranian land cover change models, convert immense stretches of mangrove forests into open water (Etemadi et al., 2018). This is worrisome to decision-makers because mangroves shelter human communities from coastal storms and floods while providing carbon storage to lessen the greenhouse gas emissions causing climate change. The Indian and Iranian cases show how gaps in data can create significant uncertainty that delays efforts at integrated coastal zone management.

1.5 Latin America and the Caribbean

Latin American officials are also responding to global environmental change through integrated coastal zone management, similar to those in Asia and Africa. Rapidly urbanizing coasts and increased tourism throughout Latin America and the Caribbean have caused trade-offs between development and protecting natural resources such as water quality, fisheries, beaches, and MPAs (Banerjee et al., 2018; Cortés-Useche et al., 2021; Goulart et al., 2018; Hassanali, 2015). The region is wrestling with global environmental change as climate change crosscuts and increases problems and makes coastal populations vulnerable to hazards (Cortés-Useche et al., 2021; Goulart et al., 2018; Hassanali, 2015). Integrated coastal zone management attempts have been studied in Trinidad and Tobago, Ecuador, the Galapagos Islands, and Brazil, with varying results in implementation (Hassanali, 2015; Pazmiño Manrique et al., 2018). Two challenges have emerged in the region: the integration of agencies tasked with governance and a weak legal framework for coastal governance. Integration, defined here as coordination and communication between decision-makers, remains weak between agencies responsible for environmental regulations. This is specifically true for tourism regulations in Ecuador and MPA regulations in

Mexico. These regulations should protect coastal systems from over development and overfishing, but they suffer lagging implementation (Mancha-Cisneros et al., 2018; Mestanza-Ramón et al., 2020). There is also a lack of appropriate laws to address environmental issues that impact vulnerable communities. For example, in Chile, there are no laws regulating water quality or invasive species (Anbleyth-Evans et al., 2020).

Challenges to grassroots participation in decision-making are present in this region. For example, Trinidad and Tobago's potential for integrated coastal zone management is limited by the lack of pathways for communities to participate in decision-making. Integrating the actions of local and national governmental agencies is also lagging, lessening their ability to collaborate to create and implement policy (Hassanali, 2015). The U.S.-Mexico Joint Gulf of Mexico Assessment and Management Project provides an effective example of governance that enhances grassroots participation. The project includes mangrove wetland restoration through community engagement, education, and participation (Zaldívar-Jiménez et al., 2017). Sometimes, grassroots participation in governance is costly for vulnerable people as it takes away from time that could be spent fishing and earning an income. For example, small-scale fishers in Uruguay emphasized that costs outweighed the potential benefits from participating in meetings and decision-making processes, calling for capacity-building programs led by state agencies to assist in expanding participation (Gianelli et al., 2018). Another noteworthy example, Ecuador, lacks a legal framework that would enable integrated coastal zone management and has weak institutions to implement it compared to the Kenyan case outlined above. However, there is potential for community participation, specifically by competent local governmental agencies that have

shown administrative competence to enact some forms of integrated coastal zone management at the community level in Ecuador (Pazmiño Manrique et al., 2018).

A governance response to global environmental change worth noting is that of the large marine ecosystem (LME) governance frameworks that have been implemented in Latin America and the Caribbean. LME governance frameworks situate unsustainable fishing, pollution, and habitat degradation as major problems requiring coordinated governance responses, with climate change as a cross-cutting problem that worsens others. Ecosystems within these zones include the Humboldt Current LME in Mexico, the Gulf of Mexico LME, and the Wider Caribbean Region. These initiatives aim to address the interconnectedness of marine ecosystems, termed 'transboundary ecosystems', in order to make policies to recover fisheries and marine habitats undergoing environmental change (Fanning et al., 2021; Muñoz Sevilla and Le Bail, 2017; Villamizar and Cervigón, 2017; Zaldívar-Jiménez et al., 2017). These governance frameworks are an innovative way to strengthen management institutions for marine ecosystems. However, they face significant challenges such as a lack of funding, regional coordination, community engagement at global and local scales, and national-level supporters (Fanning et al., 2021).

Similar to African cases, one of the main governance issues in the Latin American and Caribbean region is enforcement and implementation of integrated coastal zone management policies, seen in the example of Guyana's Sustainable Development Goals. Guyana lacks the capacity for strengthened enforcement required to meet its obligations under the Convention on Biological Diversity, a treaty that requires setting aside important biodiversity areas for conservation (Elias-Roberts, 2020). An example of difficulties in implementation includes enforcing no fishing rules

within MPAs. The Dominican Republic and Jamaica face similar issues (Chan et al., 2019; Cortés-Useche et al., 2021). One proposed solution is through a 'seascape approach', which is a novel institution where governments at different scales (national and local), businesses, NGOs, and communities work together in a network to make decisions for integrated coastal zone management, as has been seen in the Atlántida seascape in Honduras (Steadman, 2021). Another strategy in Costa Rica is through the government granting grassroots actors like communities the legal authority to form and implement Marine Areas of Responsible Fishing. These areas follow the Small-Scale Fisheries Guidelines outlined by the United Nations, but because of their robust inclusion of grassroots actors who actually fish the reserves, support for implementation is higher (Chavez-Carrillo et al., 2019).

1.6 Vulnerable groups

1.6.1 Climate change, refugees, and climate justice

Climate refugees and stateless people show how coastal and marine governance, global environmental change, and vulnerability intersect. Global environmental change and impacts such as heatwaves, droughts, and sea-level rise, among others, all play a role in what could become a humanitarian crisis for vulnerable communities in Asia, Latin America and the Caribbean, and Africa (Ahmed, 2017; Biermann and Boas, 2010). For example, when agriculturalists lose their livelihoods from drought and their homes and farms from sea-level rise, they may be forced to leave their country and seek refugee status elsewhere. Current institutions, organizations, and funding mechanisms are not prepared to respond to this emerging crisis (Biermann and Boas, 2010). Bangladesh is an example of the Asian climate refugee experience, namely in its densely populated urban centers along the coast. Recent estimates suggest that one

in every seven people in Bangladesh will be displaced and forced to migrate either internally or internationally due to climate change (Government of Bangladesh, 2014, p. xvii). The refugee crisis in the Mediterranean region also demonstrates how low-lying coastal regions of Northern Africa, due to experiencing climate change, and currently embroiled in domestic strife, may produce refugees seeking safety in Europe (Biermann and Boas, 2010).

1.6.2 Gender, vulnerability, and marine governance

The importance of inclusion of gender in marine governance has become conventional wisdom among scholars and managers, yet it is notably lacking in documentation and implementation (Bradford and Katikiro, 2019; Koralagama et al., 2017; Lawless et al., 2021). Nowhere is the importance of gender inclusion in governance of marine resources more important than in small-scale fisheries, a sector employing millions of women all over the world (Koralagama et al., 2017). Small-scale fisheries are experiencing unprecedented and irreversible changes brought on by global environmental change (Hanich et al., 2018). The International Union for Conservation of Nature (IUCN) promotes the benefits of a form of integrated coastal zone management that includes stated goals of gender equality and sustainable small-scale fisheries management (Siles et al., 2019). The IUCN argues that decision-makers must create a gender action plan and strategize interventions to address gender gaps in fisheries (Siles et al., 2019). In African cases, the exclusion of women in decision-making led to discriminatory barriers for women in the fishing sector (Baker-Médard, 2017; Bradford and Katikiro, 2019). In Indonesia, although donor-funded development projects reached out to women to increase their participation, 40% of projects did not include people of all genders in implementation (Stacey et al., 2019, p. 366). Inclusive management, in which people of all genders are included in coastal resource

management, is one possible solution. This means the decision-makers must (1) explicitly invite

people of all genders to participate in decision-making, (2) create roles and activities for people

of all genders related to decision-making, (3) create opportunities for economic empowerment,

and (4) create opportunities for people of all genders to be involved in environmental protection

(De la Torre-Castro, 2019).

1.6.3 Indigenous people, vulnerability, and coastal governance

Historically, in most countries, indigenous peoples have not been afforded explicitly recognized

rights over marine areas, a lack of self-determination which makes them vulnerable to social and

natural problems (Shapovalova, 2020). Indigenous communities have also experienced extended

periods of overexploitation and contamination of their coastal areas due to overdevelopment

through aquaculture and fisheries (Araos et al., 2020). Global environmental change is emerging

as a major threat to indigenous ways of life. For example, in Bangladesh, indigenous

communities such as the Jummas, face climate change impacts of drought, water shortages,

pests, diseases, and human-wildlife conflict. Indigenous Bangladeshis are responding to global

change by enacting their own governance responses, ranging from land management (e.g.,

changing drainage facilities for crops), to rebuilding infrastructure (e.g., roads after landslides),

to water supply management (e.g., installing diesel-powered water pumps), and others. Scientists

and decision-makers are beginning to study and adopt Bangladeshi indigenous knowledge as

trusted governance responses to climate change (Rahman and Alam, 2016). Novel governance

responses by decision-makers in Latin America and the Caribbean have given indigenous

communities stewardship over coastal and marine environments. In Chile, for example, the

creation of Marine and Coastal Areas for Indigenous Peoples (or MCAIPs) has resulted in 91

areas (totaling 32,000 square kilometers) being recognized as MPAs with cultural conservation components, with management rights held by indigenous communities (Hiriart-Bertrand et al., 2020, p. 4).

1.7 Conclusion

This chapter highlights the vulnerability of global coasts to a range of human and natural stressors. I have shown a wide range of governance responses intended to diminish vulnerability. In the African and Latin American and Caribbean contexts, despite resilient governance responses such as emerging integrated coastal zone management and LME management zones, challenges with the inclusion of grassroots level actors in decision-making remain. In both regions, where implementation and enforcement of governance responses meet comparable challenges, community inclusion may increase support for coastal regulations. Asian, East African, and South American cases of MPAs, where communities decide where MPAs are situated and how they are implemented, may be cases to learn from on this issue. On a global scale, marine and coastal systems face immense threats under global environmental change, demonstrating the need for new governance systems and institutional frameworks to inventory resources, study social vulnerability, and balance competing economic interests in the face of natural hazards. Governance responses to global environmental change are becoming increasingly complex, with outcomes that are difficult to predict. Climate change makes coastal communities, already characterized by high exposure and sensitivity, even more vulnerable. Thus, flexible governance systems for managing coastal ecosystems and human societies, especially those that draw on both scientific and traditional knowledge, such as that of indigenous communities in Bangladesh, are required. Marginalized groups, such as stateless

people, refugees, indigenous communities, people of all genders, and others, will need to be

included in a meaningful way if the world's most vulnerable people are to be part of the solution

to marine governance amidst global environmental change.

Chapter 2 - National Ocean Policy in the United States: Using Framing Theory to highlight policy priorities between presidential administrations

2.1 Introduction

The creation of the National Ocean Policy in the United States (U.S.) was unprecedented, addressing a significant gap in the American policy system–the lack of a single, unified strategy to manage coastal and ocean ecosystems. The coastal U.S. is home to one of the world's longest coastlines, largest economies, and largest populations in the world. If the country's coastal counties were their own country, they would have the world's third largest economy and would make up 40% of the country's population (*Economics and Demographics*, n.d.). And yet, there has never been a comprehensive policy for managing the coastal and ocean ecosystems prior to the Obama administration.

The National Ocean Policy would balance diverse interests like biodiversity conservation and economic development. To develop the administration's policy priorities, former president Barack Obama's administration created the Interagency Ocean Policy Task Force (hereafter "Task Force"). The Task Force engaged the American public through an unprecedented 180-day online comment period, six regional public meetings, and 38 expert roundtables (The White House Council on Environmental Quality, 2010). This process synthesized approximately 5,000 public comments and expert input, ultimately sending the *Final Recommendations Of The Interagency Ocean Policy Task Force* to the president in 2010. Upon receipt of the Task Force's final recommendations, and building off eight years of progress made by the George W. Bush

administration[1], Obama signed Executive Order 13547 *Stewardship of the Ocean, Our Coasts,*
and the Great Lakes (hereafter National Ocean Policy).

Historically, coastal and ocean policy in the United States has been carried out in a siloed way.
Federal agencies often implement laws and policies pertinent to their mandate without
communicating with other agencies working in the same geographical ocean space or without
sharing technical expertise and other resources to facilitate cohesive management. The first
major ocean policy was the Coastal Zone Management Act of 1972. The act allowed for states to
voluntarily participate in a partnership with the federal government for the purpose of
"protecting, restoring, and responsibly developing" the coastal and ocean environment (NOAA
Office for Coastal Management, n.d.). The National Oceanic and Atmospheric Administration
administers the Coastal Zone Management Act highlighting the siloed nature of previous
management strategies.

In 2004, President Bush released the U.S. Ocean Action Plan, which outlined 88 goals and
priorities to "better coordinate U.S. ocean policy" (U.S. Department of Interior, 2004). While it
did aim to increase funding for ocean science research and broadly discussed conservation, it
failed to explicitly describe how conservation would happen. Additionally, it failed to describe
how the plan would balance competing uses and a changing climate. The plan broadly mentioned
establishing partnerships with state, local, and tribal governments, but did not explicitly state

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[1] The National Ocean Policy was partly based on the U.S. Ocean Action Plan Implementation Update, a George W.
Bush administration report based on recommendations provided by Congress, specifically its U.S. Commission on
Ocean Policy (House Natural Resources Committee, 2011).

who would have management and decision-making authority. Bush's plan was never implemented via executive order, nor did it ever make its way through the legislative process.

Given how recent and unprecedented the creation of National Ocean Policy was, and the changes that it underwent between the Obama and Trump administrations, my research asks the following question: how has National Ocean Policy changed in the U.S. from the recommendations made by the Task Force in 2009 and its subsequent implementation in the Obama and Trump administrations? Understanding how ocean policy changes between presidential administrations is essential for understanding modern nuances of American natural resource policy, concentrated in the executive branch and implemented by federal agencies.

The Obama-era National Ocean Policy and the subsequent Trump Administration's policy were both implemented via executive order. Executive orders are a unique way of implementing policy priorities. They have become more commonplace and stand in contrast to the way that we normally define lawmaking (e.g., the Endangered Species Act enacted through the Congressional lawmaking process in 1973) (University of California Santa Barbara, 2023). In the U.S., executive orders are policies that manage operations of the federal government, specifically the agencies that make up the executive branch. Executive orders are not the same as legislation passed through Congress and Congress cannot overturn them (American Bar Association, 2021). The U.S. Constitution does not explicitly mention a presidential power to issue executive orders (Rudalevige, 2021). In a political era of increasing polarization in which legislative action in Congress is harder to achieve, executive orders are one way to bypass gridlock (Rudalevige, 2021). Because the National Ocean Policy was created and then changed via executive order, my

research studies the difference in these policies between two presidential administrations beginning with the Obama Administration and following changes through the Trump administration.

2.2 Data and Analysis

This research adopts a case study design because it covers contemporary events and relevant behaviors that cannot be manipulated (Yin, 2017). Case studies allow for the consideration of many kinds of evidence: documents, artifacts, interviews, and direct observations (Yin, 2017). I analyze changes and differences to the National Ocean Policy between the Obama and Trump administrations. I do this as a comparative case study between the administrations and use comparative analysis according to theoretically relevant variables, which include varying priorities in National Ocean Policies (Yin, 2017). I use the priorities of the National Ocean Policy of the Obama administration as a case of ocean policy priorities for the Democratic Party and compare that to the priorities of the National Ocean Policy of the Trump Administration and the Republican Party.

I adopt Framing Theory to determine the policy priorities of decision-makers. I use Framing Theory as an approach for investigating diverse policy priorities between the Obama and Trump administrations. Framing Theory instructs us on how to characterize the presentation of issues from multiple perspectives (Chong & Druckman, 2007). It sheds light on how politicians emphasize certain aspects of a policy, while purposely excluding other aspects, which might lead to people interpreting issues differently (Ardèvol-Abreu, 2015; Borah, 2011). Framing Theory illustrates policy priorities because policy-makers frequently choose the frame that is consistent

with their values or principles (Chong & Druckman, 2007). Framing Theory therefore helps us to compare competing Democrat and Republican policy priorities for National Ocean Policy. The way that issues are framed appeals to the partisan beliefs of the audience (Chong & Druckman, 2007). Politicians will often frame issues along certain lines in an attempt to mobilize voters. They accomplish this by highlighting very specific aspects of an issue that appeals to certain values (Jacoby, 2000). Frames in communication also serve as a way to promote certain definitions and interpretations of policies, which I use as a proxy for priorities (Shah et al., 2002).

Most literature on Framing Theory details how the media frames issues (Carragee & Roefs, 2004). De Vreese and Lecheler (2016) note that public policies and politics can be defined in different ways by traditional news media. There is a gap in the literature into how different types of political actors (e.g., politicians, organizations, or social movements) create and use frames to their benefit (Borah, 2011). My research aims to fill that gap as well as a case-related gap, analyzing how politicians, government officials, various private and public organizations, and news outlets frame ocean management issues in the U.S.

To compare policy priorities, I used qualitative methods to characterize priorities in policy-maker statements. I collected and analyzed the statements of policy entrepreneurs (e.g., members of Congress, NGO leaders, private sector actors, and federal and subnational government leaders) when describing National Ocean Policy priorities from 2009 to January 2021, just before

President Joseph Biden took office[2]. Additionally, I analyzed the policy documents associated with National Ocean Policies that were published by federal agencies and the White House. To collect the statements, I searched the Nexis Uni database using specific keywords and collected official policy documents from the archived documents on each administration's websites (Appendix 1). As of the date of this writing, Trump's executive order is still an active order.

I used the Grounded Theory Methodology to code data that were separated into five main policy priorities (Table 1). Grounded Theory Methodology involves the construction of codes and categories directly from the collected data and "not from preconceived logically deduced hypotheses" (Charmaz, 2014). Inductive coding was used during this research as a way to find "emergent, data-driven" codes (Saldaña, 2015). I used the In Vivo coding method which uses the exact words and phrases from speakers and not the researchers' interpretations of speakers' words (Saldaña, 2015). After separating statements by policy priorities, I further separated each policy priority by what I refer to as sub-codes (more specific policy priorities). This categorization of data pairs well with Framing Theory because it highlights emphasis frames in the data. I use an emphasis frame to investigate how policy priorities are thematically portrayed, which help to provide a clear picture of the problems that were addressed by the two policies (Shulman & Sweitzer, 2018). After categorizing statements into sub-codes (*n=20)* (e.g., *oil, gas, and energy* as a specific policy priority of the *economic* broad policy priority), I was able to highlight in detail the focus of each message in the broader context of Framing Theory. I also employed the Focused Coding Method, a second cycle method that commonly follows In Vivo

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[2] The study period officially ended in January 2021 after the creation of the Ocean Policy Committee at the White House following the 2021 National Defense Authorization Act, a now permanent committee at the federal level that coordinates policy across agencies and serves as a way to engage with ocean stakeholders broadly.

coding (Charmaz, 2014; Saldaña, 2015). Focused Coding is a way to find the most important or

frequently used codes to develop the most important categories. This enabled me to theorize how

ocean policy changes in the U.S. between Democrat and Republican administrations.

Table 1: Policy Priorities shared between Obama and Trump Administrations

Policy Priorities (themes)	Information contained in policy-maker statement to assign theme	Additional Context
Strategic and efficient ocean policy	Information about whether the federal government is efficiently managing the ocean ecosystem and adopting a unified, strategic approach to balancing use of ocean resources and conservation.	Reducing duplication of bureaucracy; Ocean zoning framed as either a best management practice OR a federal land grab
Ecosystem Stewardship	Information about the main environmental issues and how they're addressed in the ocean policies	What environmental systems are being conserved; How managers are conserving environmental systems; Damages/Impacts to environmental systems
Economic	Information about how the ocean policies impact the American economy	Statements that broadly deal with the economy; Statements that deal specifically with the oil/gas/energy, recreation, or fisheries sectors
Federal/Subnational Control	Information about whether the ocean policies give authority to states, increase federal authority, and how these entities cooperate	Giving authority to state/subnational governments; Federal overreach/oversight; Keeping regulations the same; Federal government transparency; Coordination between different levels of government; Regional planning bodies
Stakeholder Involvement	Information about how stakeholders are meaningfully involved in the planning, implementation, and execution of ocean ecosystem management	Decisions are made after consultation with stakeholders (bottom-up); Decisions are made by experts in positions of power (top-down); A collaborative process that involves stakeholders in a meaningful way

This process was a multiple coder effort. The lead researcher coded 250 data points and four

other researchers coded the remaining 198 data points after receiving detailed instruction and

having access to the codebook. As the four additional researchers were coding data, the first

author coded every tenth observation separately to check for intercoder reliability. Additional

information on how I obtained intercoder reliability and quality control methods on the data can

be found in Appendix 2.

2.3 Findings

2.3.1 Data Summary

I compiled $n=448$ statements from policy-makers, of which $n=379$ were from the Obama-era

policy and $n=69$ were from the Trump-era policy. Obama-era policy statements occurred

between 2009-2018 and Trump-era policy statements between 2018-2021 (the end of the study

period). The Obama-era policy statements occurred outside his administration because the policy

remained active until the Trump-era policy was implemented in 2018.

The three largest sources of messages from both administrations came from Congress (e.g.,

testimonies, committee hearings, and opening statements by members of Congress), NGOs (e.g.,

press releases), and news outlets (see Table 2). NGOs represented environmental, business, and

economic interests, such Ocean Conservancy and National Homebuilders Association. The

majority of the news outlets were national news sources such as the Associated Press, but there

were also state and local news outlets represented. Sources of messaging during the Obama-era

policy were evenly distributed between the three primary sources. Sources of messaging during

the Trump-era policy were skewed towards news articles. The amount of Congressional

messaging between the two administrations was the only significant difference between the two administrations (p-value=.004). Congressional stakeholders mentioned the Trump-era policy in *n*=8 (12%) of the total messages, while Congressional stakeholders doubled that percentage for the Obama-era policy (*n*=92, 24%).

Table 2 Breakdown of messages by the three largest sources in our data set. Numbers outside the parentheses are raw numbers and proportions are inside the parentheses. The numbers and proportions represent each administration independently

	Congress	**NGOs**	**News**	**Other**	**Total**
Obama Policy	92 (.24)	90 (.24)	113 (.30)	84 (.22)	379
Trump Policy	8 (.12)	21 (.30)	26 (.38)	14 (.20)	69
Totals	100 (.22)	111 (.25)	139 (.31)	98 (.22)	448

2.4 Qualitative Findings: Policy Priorities Shared Between Administrations

I identified five policy priorities shared between both administrations in the qualitative data, and explored differences in later quantitative data. The five policy priorities of the U.S. National Ocean Policy include: 1) strategic and efficient ocean policy, 2) ecosystem stewardship, 3) economic, 4) federal vs. subnational control, and 5) stakeholder involvement. These policy priorities and the sub-codes appear in Appendix 3 with more detailed definitions and examples.

2.4.1 National Ocean Policy and Anticipatory Management

The Obama-era policy focused on balancing its core policy priorities of strategic and efficient ocean policy, ecosystem stewardship, stakeholder involvement, and the economy. It did this by introducing its most signature policy priority and with it, the administration's most sweeping

political change: to make ocean policy anticipatory. The administration did this by creating a new policy system, intentionally designed to foresee social, economic, and environmental challenges, and make efforts in advance to mitigate environmental change and conflict between resource users. The Obama-era policy did this by creating Regional Planning Bodies. They were the power centers that made sure that the unique social, economic, and ecological aspects of each U.S. region would be prioritized in a management plan (*The Nation's First Ocean Plans*, 2016)[3]. The plans formally describe how states will coordinate with each other, engage the public, and implement coastal and marine spatial planning. Historically, coastal and ocean policy was reactionary (e.g., the response to the Exxon Valdez spill off the coast of Alaska in 1989 and the Deepwater Horizon Oil Spill in the Gulf of Mexico in 2010).

The most important example of institutions for the shift to anticipatory management can be found in the Northeast and Mid-Atlantic Regional Planning Bodies. The Regional Planning Bodies gathered stakeholders in state, federal, and tribal governments; fisheries decision-making organizations from the regions; and representatives from private industry[45]. Planning processes required public participation, the use of science in decision-making, and using an ecosystem-based approach to management that considers the whole system. Each region could plan and implement policies for regionally specific needs. For example, the Northeast's Ocean Plan included attempts at balancing the world-famous Maine Lobster and New England scallop

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[3] In total, nine regions were identified in the executive order: Alaska/Artic, Caribbean, Great Lakes, Gulf of Mexico, Mid-Atlantic, Northeast, Pacific Islands, South Atlantic, and West Coast regions.
[4] The states included Connecticut, Rhode Island, Massachusetts, New Hampshire, Maine, and Vermont. Along with these states, there were six federally recognized tribes, nine federal agencies, and the New England Fishery Management Council included in the planning and writing of the plan.
[5] The states included Delaware, Maryland, New Jersey, New York, Pennsylvania, and Virginia. Along with these states, there were eight federal agencies, two federally recognized tribes, and the Mid-Atlantic Fishery Management Council included in the planning and writing of the plan.

industries with competing interests such as infrastructure (e.g., port dredging) and science (e.g., seafloor mapping projects). An example from the Mid-Atlantic Ocean Plan was the need to balance the $18 billion-dollar yearly fishing industry with future plans for ocean-based wind farms. By including all relevant regional stakeholders, the plans allowed for more flexible management, tailored to regional and local needs, that anticipates environmental change and user conflict.

Implementing anticipatory public policy in such a complex coastal nation required an equally complex implementation document to coordinate across scales, jurisdictions, and sectors. The complex, multi-stakeholder process of anticipatory management was codified in the 2013 National Ocean Policy Implementation Plan. This plan provided direction to governments and was the product of three years of input from stakeholders. It focused on anticipating change and user conflict in five areas: 1) the ocean economy, 2) safety and security, 3) coastal and ocean resilience, 4) prioritizing local choices, and 5) the use of science in decision-making (*National Ocean Policy Implementation Plan*, 2013).

2.4.2 Policy Changes During the Trump Administration

The Trump administration effectively ended American efforts at anticipatory and comprehensive ocean planning at the federal level and with it eight years worth of policy prioritization of a unified approach to ocean management. The Trump administration shifted its focus squarely on economic policy priorities. Trump's executive order eliminated seven key federal entities established by Obama's executive order. The most important being the National Ocean Council because it was essential to enacting a unified approach to ocean management. The Trump-era

policy also eliminated the core institution responsible for ocean planning: Regional Planning

Bodies[6]. Federal agency involvement was not prohibited explicitly from the Trump

administration, but there was a lack of financial support and technical assistance was optional,

which left states to accomplish planning on their own or abandon it altogether (Goelz, 2022). A

memo was also published shortly after Trump's executive order that formally revoked the

National Ocean Policy Implementation Plan, all formal documentation that provided the step-by-

step implementation procedures[7], and the already approved regional Ocean Plans for the

Northeast and Mid-Atlantic (*Guidance for Implementing Executive Order 13840, Titled "Ocean*

Policy to Advance the Economic, Security, and Environmental Interests of the United States,

2018).

With the elimination of Obama's National Ocean Council and other initiatives, Trump's

executive order began its shift to focusing on its policy priorities of economic growth, energy

production, and national security. To accomplish this, the Trump-era policy created the Ocean

Policy Committee. This committee was largely made up of components from the Department of

Defense, economic advisors, and cabinet agencies. An example of the prioritization of economic

development is found in Trump's creation of a national strategy for mapping and exploring the

Exclusive Economic Zone of the U.S. with the hope that untapped natural resources would be

discovered for future extraction (Trump*, 2019). As this committee did not produce an

implementation plan similar to the Obama-era National Ocean Council's plan, it is difficult to

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[6] Also eliminated were: The National Ocean Council Deputies Committee, National Ocean Council Senior Policy
Contact Committee, Governance Coordinating Committee, Ocean Resource Management Interagency Policy
Committee and sub-committees, and the Ocean Science and Technology Interagency Policy Committee.
[7] The step-by-step implementation procedures were contained within the National Ocean Policy Technical
Appendix.

know how the policy was carried out aside from their mandated objectives contained in the executive order (*Exec. Order No. 13840, 83 Fed. Reg. 29431*, 2018).

At the point that Trump left office in January 2021, minimal analysis has been done on the accomplishments of the Trump administration executive order and minimal analysis comparing the two administrations, which the following data aims to address.

2.5 Quantitative Findings

I analyzed statistically significant differences between policy priorities of the two administrations (see Table 3), using the frequency of the different policy themes detected and coded as a proxy for policy prioritization in the two administrations. Statistically significant differences between the Obama and Trump administrations include policy priorities of 1) Strategic and efficient ocean policy (appearing in 48% of Obama Administration statements and 27% of Trump Administration statements, p=.001); 2) the economy (appearing in 23% of Obama Administration statements and 55% of Trump Administration statements, p=0.001), and 3) stakeholder involvement (appearing in 24% of Obama Administration statements and 9% of Trump Administration statements, p=.001). I conclude that the key changes to ocean policy between the two administrations were an Obama Administration's focus on an anticipatory and efficient ocean policy as well as on stakeholder involvement. By contrast, the Trump Administration focused on economic uses of U.S. oceans.

I found there to be no statistically significant difference between Obama and Trump administration focus on ecosystem stewardship (appearing in 45% of Obama Administration

statements and 46% of Trump Administration statements). I also found there to be no statistically significant difference between Obama and Trump administration focus on federal versus subnational control.

Table 3: Number (and proportion) of policy themes detected between Obama and Trump policy entrepreneurs and statistical differences

	Strategic and Efficient Ocean Policy		Ecosystem Stewardship		Economic		Federal/ Subnational Control		Stakeholder Involvement	
Administration	Obama	Trump	Obama	Trump	Obama	Trump	Obama	Trump	Obama	Trump
# times code used by administration	183	19	170	32	87	38	158	22	90	6
Total messages using this code	202		202		125		180		96	
Total messages	379	69	379	69	379	69	379	69	379	69
% code used in all messages	.48	.27	.45	.46	.23	.55	.42	.32	.24	.09
t-score	-3.48		.23		5.05		-1.59		-3.73	
p-value	.001***		.816		.001***		.112		.001***	

***Significance at the α = 0.01
**Significance at the α = 0.05
*Significance at the α = .1

2.5.1 Strategic and Efficient Ocean Policy

The Obama administration prioritized strategic and efficient ocean policy more, with 48% of its statements focused on this issue versus 27% from the Trump administration, making it the most frequently used policy priority (*n=202*). That said, actual implementation of this priority, such as

decreasing jurisdictional overlap and ensuring strategic and efficient ocean policy in the many agencies managing the oceans, was nearly indistinguishable. The following examples from the data show how creating an efficient, unified, anticipatory ocean policy was a challenge for both administrations. An example from the Obama administration on reducing duplication comes from a senior member of the National Ocean Council during Congressional testimony: "The [National Oceanic and Atmospheric Administration] sits at the table with departments and agencies that have not traditionally been in close coordination on ocean issues" (Lubchenco, 2011). A similar example from the Trump administration comes from a White House press release that stated the Trump-era policy "would streamline coordination of the many government agencies that have an interest in the oceans by establishing a new interagency Ocean Policy Committee," suggesting that there still remained significant progress to be made on this priority issue (*Exec. Order No. 13840, 83 Fed. Reg. 29431*, 2018).

2.5.2 Ecosystem Stewardship

The Obama and Trump administrations prioritized ecosystem stewardship equality, with 45% of Obama-era statements and 46% of Trump-era statements focused on this issue. Ecosystem stewardship was the most frequently used policy priority alongside strategic and efficient ocean policy (*n*=202). Despite a similar level of prioritization, real differences existed in how the two administrations actually implemented ecosystem stewardship policies. The Obama administration enacted stewardship through its Coastal and Marine Spatial Planning Program, defined by a high-ranking Obama administration official as "[A program that] facilitates a thoughtful, inclusive approach to harmonizing uses and minimizing adverse environmental impact" and that it would "replace the stove-piped, reactive approach now in place" (Lubchenco,

2011). Conversely, the Trump administration focused on managing ocean and coastal

ecosystems to increase economic benefit and national security. An example of this goal was the

Trump administration's efforts at conducting scientific exploration of the ecosystems of the sea

floor of the U.S. Exclusive Economic Zone to better understand American natural resources at

sea.

2.5.3 Economy

The Trump administration prioritized the economy more, with 55% of its statements focused on

this issue versus 23% from the Obama administration. Additionally, implementation of economic

policy priorities were also very different, albeit with one important overarching theme between

the two administrations. Both administrations made it clear that they understood the importance

of a healthy and robust ocean and coastal economy for the U.S. economy broadly. The

differences rest in how the two administrations achieved that goal. The Obama administration

focused on finding a way to balance economic growth with conservation. A private business

representative in Congressional testimony highlights this priority by stating that the Obama-era

policy "seeks to promote industry development that is sustainable and complements the variety

of development activities already occurring in the ocean" (Lanard, 2016). Conversely, The

Trump administration was focused on increasing offshore oil and gas drilling to become energy

independent and increase U.S. security. A representative example of this priority comes from the

executive order that states "domestic energy production from Federal waters strengthens the

Nation's security and reduces reliance on imported energy" (*Exec. Order No. 13840, 83 Fed.

Reg. 29431,* 2018).

2.5.4 Federal and subnational control of ocean and coastal management

The Obama and Trump administrations prioritized federal versus subnational control of ocean and coastal management in similar ways, with 42% of Obama-era statements and 32% of Trump-era statements focused on this issue. Additionally, it was the third most frequently used policy priority in all of the data. The differences were, again, in how the two administrations implemented policy priorities. The Obama administration increased coordination between scales of government by creating the Governance Coordinating Committee. A representative example from a member of Congress stated that because of the Obama-era policy "for the first time ever, [states are] working with each other and with the federal government to better coordinate" (Natural Resources Defense Council, 2016). The Trump administration's main policy priority was shifting authority on ocean-related matters back to the states. To accomplish this, the Trump-era policy disbanded the Governance Coordinating Committee. The Trump-era policy has been labeled "cooperative federalism" whereby state governments have more responsibility (Flescher, 2018). Beyond the dissolution of the Governance Coordinating Committee, policy documents contained no specific initiatives that detail how the Trump-era policy would implement the state empowerment priority.

2.5.5 Stakeholder Involvement

The Obama administration prioritized stakeholder involvement more, with 24% of its statements focused on this issue versus 9% from the Trump administration. The Obama administration included stakeholders by conducting 24 listening sessions across the country in conjunction with the open comment period. A member of Congress highlighted this effort by stating in a hearing that "National Ocean Policy is merely a commonsense way to facilitate multi-stakeholder

collaboration on complex ocean issues" (Lowenthal, 2017) . Conversely, there was no mention of meaningful stakeholder involvement in the Trump-era policy. A White House press release only mentioned "engaging with stakeholders" with no specific outline of what the process would be like in practice. A national environmental magazine noted that the Trump-era policy "eliminate[d] the requirement for involving indigenous groups in decision-making" (Wei-Haas, 2019).

2.6 Discussion

Framing theory literature tells us that policy proponents and critics will purposely highlight certain aspects of a problem. At the same time, they will ignore other aspects to highlight a frame that is consistent with their values or principles (Borah, 2011; Chong & Druckman, 2007). For example, the Trump-era policy focused on robust offshore oil and gas drilling while ignoring previous oil spills. Meanwhile, the Obama-era policy focused on offshore renewable energy applications even though pursuing them might force thousands of people out of work. Additionally, Sniderman & Theriault (2004) noted that in political contexts, audiences are often exposed to multiple competing frames for a single issue (e.g., Obama-era policy attempting to lessen bureaucracy while critics were claiming it had actually increased bureaucracy). Specifically, the literature demonstrates that members of Congress carefully frame their messaging to advance their own personal policy preferences (Bergquist, 2020).

In this case study, I compare policy priorities for comprehensive ocean management between Democrat and Republican administrations. This research proposes a novel theoretical framework for how a future National Ocean Policy could be implemented with bipartisan support, leading to

enduring legislation. I find that message framing around comprehensive ocean management varies in five key ways: 1) strategic and efficient ocean policy, 2) ecosystem stewardship, 3) economic, 4) federal versus subnational control, and 5) stakeholder involvement.

Perhaps the most significant finding was that both administrations, their policies, and their supporters communicated regularly about the importance of a productive ocean economy. The Obama-era policy prioritized conserving coastal and ocean ecosystems for future generations. Conversely, the Trump-era policy prioritized increasing offshore oil and gas drilling to promote energy independence. While the two policies took different approaches to growing the coastal and ocean economy, both recognized its importance to the strength of the broader U.S. economy.

Increasing strategic and efficient ocean policy was another similarity between the two administrations. Both administrations recognized that current efforts at coastal and ocean management were often being carried out in a siloed way, which led to duplicative and overly bureaucratic management. For example, a prominent environmental NGO noted that 20 federal agencies, with often conflicting goals, carry out more than 140 laws that manage American coasts and oceans (Ocean Conservancy, 2009). The Obama administration focused on reducing duplicative work by creating lines of communication between federal agencies, allowing them to share resources and expertise. The Trump administration focused on shifting authority back to the states. Even though the two administrations implemented this policy priority in different ways, both understood the importance of increasing strategic and efficient ocean policy as a way of better managing U.S. coasts and oceans.

The final significant similarity between the two administrations concerned state and regional empowerment. While these concepts were categorized differently in the dataset, they ended up being used in similar ways. Maack et al. (2014) noted that economic and personal ties to a region (e.g., the Gulf of Mexico) can create a culture in which people believe that it greatly impacts their local economy and everyday lives. Devolving authority from the federal government to subnational governments may be a way for states and regions to take more ownership of policy that impacts coastal livelihoods and local economies. The Obama-era policy focused on shifting decision-making and planning authority to the Regional Planning Bodies. Alternatively, Trump's state empowerment policy priority was framed as a way of decreasing the overall size and authority of the federal government. Both administrations recognized the importance of subnational control of the coastal and ocean environments.

2.6.1 Governance via executive order

It is important to highlight that lawmaking in the U.S. has become increasingly difficult due to increased polarization in American politics (Heltzel & Laurin, 2020; Lee, 2016). Due to this, presidents often rely on executive orders to shift policy priorities (Howell, 2003). National Ocean Policy between the Obama and Trump administration were enacted via executive orders. Executive orders can be implemented and rescinded without input from Congress. The Trump and Obama administrations had different visions for a comprehensive ocean policy, which led to the Trump administration rescinding the Obama-era policy. The switch from the Obama-era policy to the Trump-era policy meant that eight years of planning and implementing ocean management objectives stopped and, in many cases, shifted in new directions. As goals shifted

with the Trump-era policy, issues with efficient governance were exacerbated as agencies had to start implementing new policies. Deere (2021) noted that executive orders make sense during a natural disaster due to the speed at which they can be implemented. Additionally, Deere (2021) states that legislatures should implement laws and policies following normal legislative processes for issues that do not require immediate action. Fluharty (2012) notes that if Congress fails to make National Ocean Policy law through the legislative process, other efforts (e.g., executive orders) will likely never get the support or funding necessary to be effective long term. Lack of congressional support and funding was a noted issue in the Obama-era policy, which led to a number of priorities not being implemented.

2.6.2 Bipartisanship for future policy-making

Deere (2021) suggests that Congress should be the branch of government that implements comprehensive ocean management policy at the federal level. It is important to note that legislation through the current Congress would likely require some degree of bipartisanship. As of the 2022 elections, there are thin margins in the U.S. House of Representatives and Senate for at least the next two years. Lee (2016) suggests that when control is within reach for either party in the next election, bipartisan legislation is less likely because the minority party will not gain an advantage by working with the majority party. Conversely, bipartisanship is something that most Americans want from their representatives (Harbridge et al., 2014). If significant coastal and ocean management legislation is to be passed through traditional legislative processes, it will require Republicans and Democrats to work across the aisle and compromise. To achieve this, Van Boven et al. (2018) suggests that politicians need to look past their opposition to policy based on party membership and look at the policy itself. Additionally, Van Boven et al. (2018)

notes the importance of environmental policy being enacted through traditional legislative methods due to the volatility of presidential directives between administrations (e.g., Trump rescinding the Obama-era policy in favor of his own, followed by Biden rescinding Trump policies in favor of his own). The Land and Water Conservation Fund of 2020 and the Clean Water Act of 1972 highlight that precedent exists for bipartisan agreement on environmental legislation.

This research focuses its findings and recommendations on how future policy-makers might be able to reach bipartisan consensus. I believe that Congress should focus on the three main areas of similarity between the Obama and Trump-era policies: 1) the reduction of duplicative work within federal agencies that work on ocean and coastal issues, 2) empowering states and regional bodies to plan and implement policies they deem to be most important for their areas, and 3) an understanding that a strong ocean and coastal economy that prioritizes conservation is imperative to the strength of the broader U.S. economy. If bipartisanship is necessary for the future of a comprehensive coastal and ocean policy, then these three areas may allow members of Congress to reach across the aisle and pass lasting legislation.

2.7 Conclusion

This research suggests that Framing Theory is a useful framework for identifying policy priorities between presidential administrations. As demonstrated in my analysis, Framing Theory provides a structure for uncovering nuanced policy positions for complex natural resource management issues. It also allows for complex issues and policies to be broken down into the primary issues needing to be addressed and how policy addresses those issues (Tewksbury &

Scheufele, 2019). The inductive coding approach allows for discovery of policy priorities that can then be analyzed between administrations.

Exploration of policy preferences between different administrations may help to generate approaches for bipartisan cooperation in future attempts at comprehensive federal ocean policy. This research shows that the Obama and Trump administrations used three policy priorities in similar ways. Both administrations regularly communicated the importance of a robust ocean and coastal economy to the broader American economy. The two administrations also placed an emphasis on increasing strategic and efficient management of marine resources to lessen bureaucracy and create open lines of communication between levels of government. Lastly, both administrations took steps to shift decision-making authority from the federal government to state and regional management structures. They recognized that the complexity and diversity of issues in American waters are best addressed at the subnational scale.

This research contributes to Framing Theory by expanding its insights into how government actors frame messages to the public and to other high-level stakeholders to garner support for complex issues. Future research into natural resource management issues in the U.S. can further our understanding of potential areas of agreement between partisan government actors. As political polarization makes it difficult to pass meaningful legislation at the federal level, finding areas of bipartisan agreement will be an essential tool for conserving natural resources in the face of climate change and growing coastal populations.

Chapter 3 – Stakeholder perceptions of coastal environmental stressors in the Florida Panhandle

3.1 Introduction

In recent years, increasing coastal community resilience to climate change has become an important priority for public policy in the U.S. Perhaps the best example of this was the unprecedented investment in coastal communities made by the Biden-Harris Administration in 2023. Through the Bipartisan Infrastructure Law and Inflation Reduction Act, federal leadership dedicated $562 million to bolster the ability of coastal communities to withstand climate change impacts (The White House, 2023; *Bipartisan Infrastructure Law*, 2023). This policy priority addressed not only future impacts from climate change, such as sea level rise, but also current impacts to coastal communities from land use conversion. Land-use conversion may interact with climate change to increase vulnerability of coastal communities (Cabral et al., 2019; Hernández-Delgado, 2015; Romieu et al., 2010; Serrao-Neumann et al., 2015). For example, previously forested land that has been converted into a subdivision will be more susceptible to flooding during extreme precipitation events, which can lead to harmful chemicals and other pollutants making their way to coastal waters.

Before suitable policies can be identified and implemented, it is essential to understand the cumulative threats facing coastal communities. My case study contributes to this understanding for two economically and ecologically important coastal areas in the Florida Panhandle. The Florida Panhandle, and the Gulf of Mexico broadly, are important to investigate because this area represents an exploding and diverse population on the front line of climate change impacts, which provides an example to other fast-growing, coastal communities (United States Census

Bureau, 2019). Specifically, I used qualitative methods to determine which threats were most important to these coastal communities based on the perspectives of stakeholders from a diverse group of organizations and backgrounds.

3.1.1 Study Area

My study focused on two locations in the Florida Panhandle, which is located in the northern region of the Gulf of Mexico: (1) Perdido and Pensacola Bays and (2) St. Andrew and St. Joseph Bays (Figure 1). Perdido and Pensacola Bays are situated on the Alabama and Florida state line. They are a combined 8,000 square miles and are home to nearly 600,000 full-time residents (Pensacola and Perdido Bays Estuary Program, 2023). St. Andrew and St. Joseph Bays are in Florida and cover nearly 1,200 square miles with 200,000 full-time residents (U.S. Census Bureau Quick Facts, 2022). St. Andrew and St. Joseph Bays are largely rural, with minimal development, and are considered two of the most biologically diverse estuaries in North America (*St. Andrew and St. Joseph Bays Estuary Program*, n.d.). Most of the development in the two sites are in Panama City and Pensacola, which both rely on tourism to fuel their economies. Both regions have been growing in recent decades and are expected to experience high levels of urban sprawl[8] and land conversion (Smart, 2017). Both regions are projected to grow nearly 20% over the next 20 years (Northwest Florida Water Management District, 2021).

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[8] Urban sprawl can be characterized as low-density, single-family housing that continually expands outward from major cities and urban centers. Urban sprawl has negative impacts on surrounding environments and ecosystems (e.g., via habitat fragmentation and water and air pollution) (Spirkova et al., 2020).

Figure 1: Maps of study sites and two largest cities
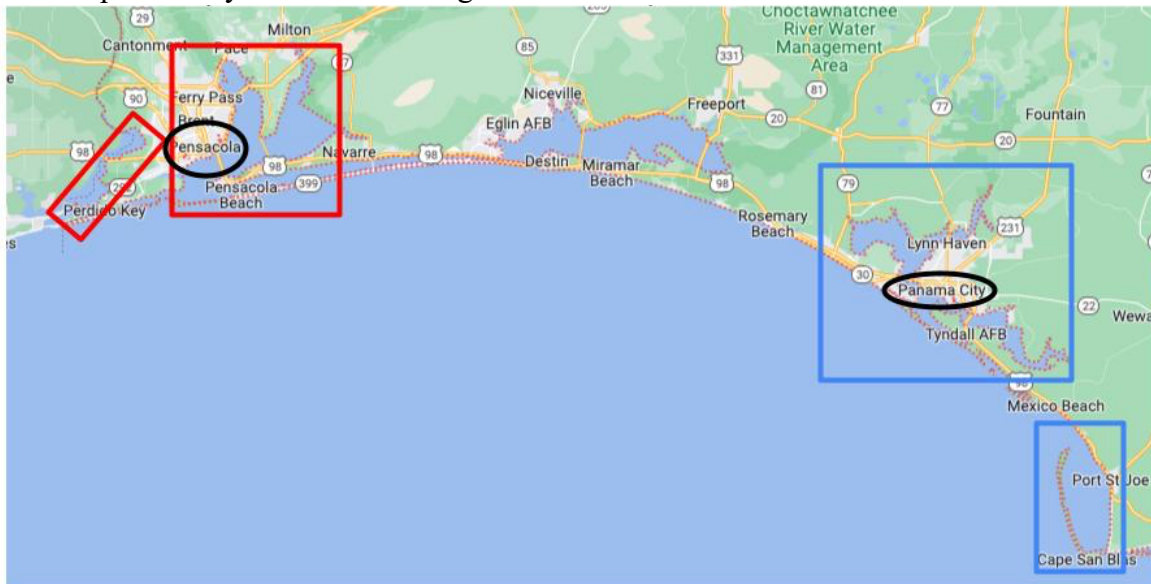
3.1.2 Why Are Estuaries Important to Study?

Estuaries are characterized as coastal environments that are partially enclosed and protected from

the full force of waves, winds, and storms by barrier islands and peninsulas (Environmental

Protection Agency, 2023). They are areas where the freshwater from rivers and streams mix with

saltwater and are important to both terrestrial environments and the broader marine environment.

Estuarine waters are significant because they support unique plant and animal communities by

providing diverse and productive habitats (e.g., shallow open water, marshes, swamps, beaches,

oyster reefs, river deltas, and seagrass beds) (NOAA, 2019).

Estuarine environments are also valuable to the U.S. economy. Coastal watershed counties

provided 69 million jobs and contributed almost $8 trillion to the U.S. Gross Domestic Product

in 2007 (National Ocean Policy Ensure Economic Growth, Security, and Resilience, 2011).

Known as the Emerald Coast for its clear water, this stretch of the Florida Panhandle brings in

millions of tourists for vacation and recreation every year. Pensacola, Florida, which is located on Pensacola Bay, drew in over 2.5 million visitors in 2022, who spent more than $1.3 billion on tourism-related activities (Pensacola News Journal, 2023). Similarly, Panama City, Florida in the St. Andrew and St. Joseph Bays brings in an average of 4.5 million people yearly (Panama City Beach Florida, n.d.). In 2022, Panama City saw 17 million visitors who contributed over $3 billion in direct spending through the tourism sector alone and supported 35,000 local jobs (Smith, 2023).

Estuaries also perform a number of ecosystem services[9]. Commercial fishermen rely on healthy estuaries to provide valuable seafood for the restaurant industry. Recreational fishermen rely on healthy estuaries for recreation and sustenance. Tourists are more drawn to areas with clean and clear water to experience their natural beauty and recreate. When upland water drains towards the coast, it is filtered through forests, swamps, and salt marshes, thus providing cleaner water as sediment and pollutants are removed (National Oceanic and Atmospheric Administration, 2023). When upland water enters the coast, it is often further filtered by submerged aquatic vegetation and oyster reefs. Salt marsh plants also help to prevent erosion and stabilize shorelines (Environmental Protection Agency, 2023).

These areas are important to study because human migration to the coast and climate change are ongoing phenomena that stress coastal and ocean ecosystems (Environmental Protection Agency,

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[9] Ecosystem services are values that nature brings to people and are often broken down into four categories: provisioning, regulating, cultural, and supporting services. Provisioning services are any service that can be physically extracted (e.g., food and water). Regulating services moderate the environment (e.g., pollination and water purification). Cultural services are those that have a non-material benefit (e.g., creativity from interaction in nature). Supporting services include underlying natural processes (e.g., photosynthesis, nutrient cycling, and the water cycle).

2022; U.S. Census Bureau, 2021). With 40% of the U.S. population living in coastal counties, a number that continues to increase, these areas are clearly important to study and protect (National Ocean Service, 2023). These two study sites are important representations of how linked threats (e.g., land conversion and subsequent water pollution) will be worsened with climate change.

3.1.3 Important Organizations in the Study Area

There are several organizations in the two study areas that focus on estuarine health. These organizations range from government agencies (e.g., the National Oceanic and Atmospheric Association and U.S. Fish and Wildlife Service), NGOs (e.g., Ocean Conservancy and The Nature Conservancy), academic institutions (e.g., Florida State University and Auburn University), and private businesses (e.g., tourism and commercial fisheries). Additionally, I partnered with the Pensacola and Perdido Bays Estuary Program and the St. Andrew and St. Joseph Bays Estuary Program. Both programs were in the beginning phases of identifying board members and hiring staff. Local estuary programs focus on educating the public on estuarine issues, conducting research to promote policy initiatives, and funding programs to protect the estuarine ecosystem. All of these organizations often provide funding, technical knowledge, research, and direct support for restoration projects in the estuaries. Additionally, every type of organization is represented on advisory councils and boards in the two local estuary programs.

3.1.4 Anthropogenic Stressors Impacting the Study Area

There are major anthropogenic stressors impacting the estuaries in my study areas. Both study areas, and the Gulf Coast in general, are experiencing rapid increases in population (Northwest

Florida Water Management District, 2021). Pensacola, St. Andrew, and St. Joseph Bays all experienced more than 30% growth from 1990 to 2010 and are expected to experience 20% more growth by 2030. Perdido Bay grew by 13% over the same period and is projected to grow another 10% over the next 20 years.

As more people move to the coast, there is a need for more homes and development. As city centers begin to reach housing capacity, people and developers buy land and build homes in urban and rural areas. This urban sprawl contributes to the degradation of habitats and landscapes vital to the quality of water being fed into estuarine ecosystems. As people expand their footprint, increases in impervious surfaces can also lead to water pollution, which further degrades water quality and clarity, known as urban stream syndrome (Walsh et al., 2005)[10].

Estuaries are diverse ecosystems with competing demands for the economy and overall quality-of-life for coastal communities. The importance of these systems to the economy and the biological health of the region, coupled with the projected population growth and land-use changes, demonstrates the importance for cooperation between stakeholder groups. My study strives to understand how all of these actors perceive the most pressing environmental issues in the two study sites.

Up to this point, there has been minimal analysis of the regional issues and perceptions of water quality and water clarity issues at the local level. This study aims to fill these important

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[10] Impervious surfaces are surfaces such as highways, parking lots, and roofs that prohibit water from being absorbed into the ground naturally. Impervious surfaces force water to run off into storm sewers and then into local waterways, oftentimes transporting trash and other pollutants with the water.

knowledge gaps by applying the Multiple Streams Framework (MSF) from public policy (Kingdon, 2013) to a real-world case. In this case study, I assess stakeholders' perceptions of which environmental stressors pose the greatest threat to the coastal communities in which they live and work.

3.1.5 Multiple Streams Framework

The MSF posits that public policies are created through a process with three independent streams (problems, policies, and politics). Within the streams, there are people or organizations, referred to as policy entrepreneurs, that invest their resources to move a policy onto the governmental agenda. Lastly, the MSF tells us that there is a moment in time, called the policy window, in which the three streams are coupled and a policy is most likely to be implemented.

My case study develops one stream of the process in a real-time case study, an application that is currently absent in the literature. I take an in-depth look at the problem stream, which contains the main conditions that policy seeks to address, to understand how issues develop into recognized problems at the local level and use qualitative methodology to inform problem formulation.

3.2 Material and Methods

How do perceptions of water quality and clarity issues come to be recognized as problems? I apply Kingdon's MSF (2013) to provide context and clarification to this question. Here, I provide a general overview of the MSF with an in-depth exploration of the problem stream.

3.2.1 Multiple Streams Framework

Kingdon (2013) positions policy-making as a constantly evolving process that can be understood as happening in three independent streams. The problem stream contains the main conditions that stakeholders want to be addressed through a new or alternative policy. At any given point in time, there are a large number of conditions and policy-makers have a finite amount of time, money, and other resources to address them. As policy-makers decide to address a condition and devote resources to it, the condition then becomes a recognized problem and moves its way up the governmental agenda (Allwood et al., 2018; Herweg et al., 2015; Liu et al., 2016; Weber, 2014). The full framework is represented by Figure 2 below.

Three factors can provide the push needed for a condition to be recognized as a problem: 1) indicators 2) focusing events or 3) feedback. The recognition of certain indicators (e.g., measurable changes in water chemistry) allows them to become recognized problems because "policy-makers consider a change in an indicator to be a change in the state of a system" (Kingdon, 2013). Focusing events sometimes act as the extra push needed for problems to receive attention from policy-makers. Focusing events, in the context of this research, can include: 1) large oil spills that impact water quality and clarity (e.g., the Deepwater Horizon oil spill in 2010) or 2) hurricanes that destroy forested land near coasts (e.g., Hurricane Michael in 2018) (Liu et al., 2010). Pot et al. (2019) note that decisions to invest in coastal resiliency in small municipalities (such as my two main study sites) typically happen when there is a combination of focusing events and engaged political leaders. Feedback, which is often informal

in nature, is when government officials receive data from monitoring efforts, noticing issues in a

policy, or receiving complaints from the public (Howlett et al., 2017).

The second stream in the MSF is known as the policy stream, commonly referred to by Kingdon

(2013) as the "policy primeval soup of ideas". The policy stream is where policy alternatives and

proposals are constantly being created and altered (Kingdon, 2013). The people or organizations

that work on policy alternatives and proposals in the policy stream are policy specialists (e.g.,

academics, congressional staffers, or interest groups). The specialists typically operate in

specialized communities that transform abstract ideas to concrete policies (Clark, 2004).

The political stream makes up the third stream of the MSF. It is where policy-makers explore the

national mood, election results, composition of legislative bodies, and changes in presidential or

gubernatorial administrations. It is at the intersection of having a recognized problem and a

viable policy alternative that the political stream provides the enabling conditions for policy

change (Goncalves & De Santo, 2021). The political stream is not always an enabling force,

though. While the political stream can serve as a facilitator for policy change, it can also be a

constraint (Yusuf et al., 2016).

According to the MSF, there are specific times in which policy entrepreneurs can couple the

previously independent three streams and attempt to implement a new policy alternative

(Kingdon, 2013). When a policy entrepreneur recognizes that a window has opened, there are

three steps that must have already occurred: 1) a problem must already be recognized, 2) a policy

alternative has to be viable and softened up, and 3) the political climate must be ready for a

change in policy (Kingdon, 2013). Without these three conditions being met, it is likely that the policy window will close without a change in policy.

The final piece to the MSF concerns policy entrepreneurs and their role in the policy-making process. Kingdon (2013) states that policy entrepreneurs are individuals or organizations that are willing to use their resources (e.g., money, time, reputation, connections) to advance their choice of policy alternative through the policy-making process. One of the main functions of a policy entrepreneur is to couple the three independent streams. Kingdon (2013) states that successful policy entrepreneurs are those that can accomplish three main tasks: 1) they are prepared and waiting with a viable solution that can be attached to a recognized problem, 2) they can take advantage of political momentum or a focusing event that has opened a policy window, and 3) they have the resources and credibility to present their chosen policy solution to policy-makers.

Figure 2: Conceptual diagram of the Multiple Streams Framework for new policy formation (based on Kingdon, 2013).
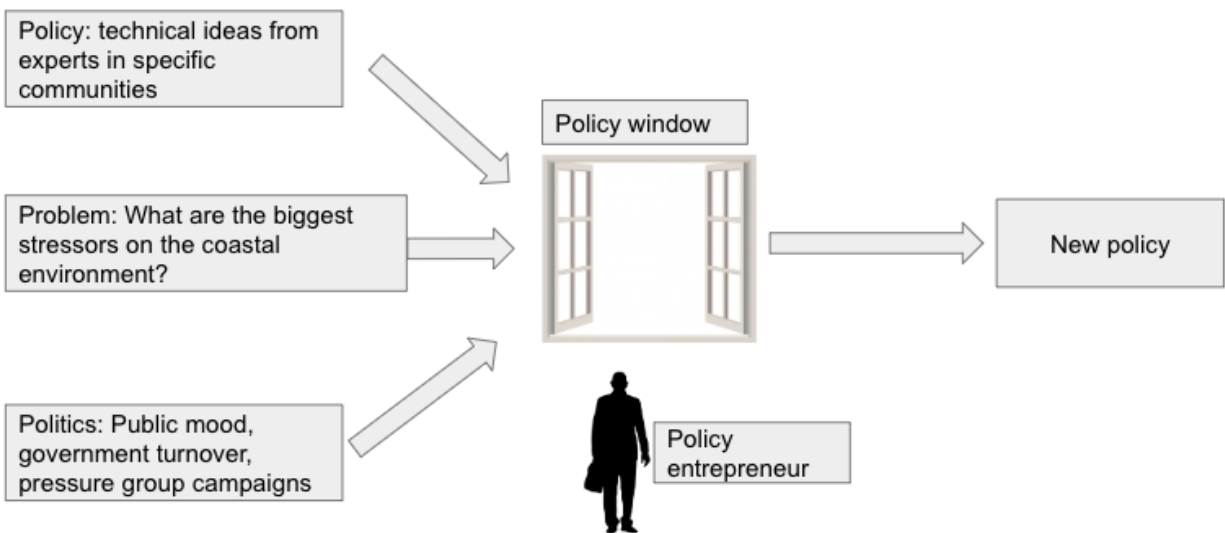
I will demonstrate in this research how local actors at government agencies, NGOs, private businesses, and academic institutions perceive local coastal problems as they relate to water quality and clarity in my two study sites. The MSF provides a useful lens to examine the complexity and dynamics of local level problem formulation (Weible & Sabatier, 2018).

3.2.2 Case Study Design

I chose a case study design because the research looks at contemporary events that the research team cannot impact or manipulate (Yin, 2017). There are five main rationales for choosing to implement a case study: it is 1) critical, 2) unusual, 3) uncommon, 4) revelatory, and/or 5) longitudinal (Yin, 2017). My study is unique because it fulfills two of these criteria; it is both critical and revelatory. My case study is critical because it strengthens our understanding of the MSF and will continue building upon our understanding of the conditions in which public policies are changed and implemented (Yin, 2017). My case study is also revelatory because it is the first of its kind in my study area (Yin, 2017). There is no research to date that investigates stakeholder perceptions of water quality and clarity issues in the northern Gulf of Mexico.

In this research, I analyze the perceptions of water quality and clarity issues among important stakeholder groups at two main study sites. I comparatively analyze their perceptions according to theoretically relevant variables (Yin, 2017). The theoretically relevant variables are drawn from the MSF to consider how the components of the problem stream may be understood among stakeholders.

The survey was built with a free online platform that allowed for anonymity. The survey was built using perceptions as a key concept (Stone, 1988). It was then piloted amongst graduate students and faculty of Auburn University and revised based on their recommendations. The survey was intended to identify local stakeholder perceptions of environmental stressors, policy issues, and data availability. I targeted local stakeholders for their intimate knowledge and experience in the study sites. I identified these stakeholders through an internet search of local NGOs, academic institutions, and government agencies and officials. Additionally, the two local estuary programs helped me to identify more stakeholders through their list of contacts from previous workshops and research activities.

I collected a total of 46 surveys and conducted 12 key informant interviews. The interviews were conducted with survey respondents that wanted to expand on their answers but did not feel they could address their concerns in writing and preferred to expand on their thoughts in an interview format. These were conducted at the time of in-person survey collection during breaks or lunch. Responses were confidential and anonymous. Respondents were only identified by the type of institution to which they belong (e.g., federal agency or environmental NGO). Key informant interviews were transcribed in real time and later coded using the MSF. I used qualitative methods to sort and characterize the most common themes in the survey responses. I used the In Vivo coding method which uses the exact phrasing from survey respondents and not our own interpretations of the respondents' words (Saldaña, 2015).

To collect this data, I administered surveys at two stakeholder workshops in October and November 2021 at local meeting venues. I administered the workshops to share the larger

research project that was in its early stages. The research project sought to develop climate and land-use change scenarios in the study sites to help inform local policy-makers on issues around water quality, climate change, and land conversion. One venue was the Perdido Key Community Center and the other was at the Florida State University Panama City campus. These locations were easily accessible and well known by the local stakeholders. I chose to hold the workshops at the study sites so I could capture as many local stakeholders as possible. Additionally, the two local estuary programs sent out the survey to their email contact lists to capture more survey responses from those that were not able to attend. I kept the survey active for three months after each workshop. Lastly, the surveys were available in print and via QR code at the workshops for ease of use.

Beyond the two stakeholder workshops held in the study sites, I also surveyed relevant stakeholders at two other events in the northern Gulf of Mexico. I attended the Southeast Data Assessment and Review workshop in Gulfport, Mississippi in May 2022. This event brings together commercial and recreational fishing groups, environmental NGOs, academics, and government agencies to discuss red snapper (*Lutjanus campechanus*) management in the Gulf of Mexico. I distributed surveys between sessions and also conducted in-depth individual interviews with select stakeholders during breaks and networking sessions.

The second event was the Alabama Deep Sea Fishing Rodeo in July 2022 that was held on Dauphin Island, Alabama. It is the largest fishing tournament in the country and brings commercial and recreational fishermen from all over the country, although most attendees are from the southeastern U.S. Fishermen received the surveys at this event by using the intercept

survey method (Henley & McCoy, 2018). All fishermen that entered fish they had caught into the tournament were required to release their fish to scientists that were collecting data for research. Surveys were administered while fishermen were waiting to receive their fish back from the research groups. While the majority of these stakeholders were not residents or workers in the two main study sites, their insights around coastal issues from a fishermen's perspective were important to capture.

The stakeholders involved in the workshops were from a variety of sectors and fields, including local, state, and federal government actors, academic researchers, NGO representatives, and private business interests. The most common stakeholders at the two events outside the workshops were commercial and recreational fishermen. I collected $n=21$ surveys from the workshop at the Perdido Key Community Center and $n=9$ surveys from the Florida State University Panama City campus workshop. I collected $n=10$ surveys from the fishing rodeo and $n=6$ surveys from the red snapper management workshop.

The survey results were analyzed using an inductive approach. Inductive coding allows for the identification of "emergent, data-driven" codes (Saldaña, 2015). The In Vivo coding method was used by using the respondents' exact language to ensure that the exact meaning of a respondent's words were honored and ensured that researcher bias is not a factor during data analysis. In Vivo coding allowed me to extract the most common responses and then Focused coding was used to develop the categories. Focusing coding is a common second cycle method following In Vivo coding (Charmaz, 2014). It allowed for the respondents' phrases to be organized in categories, which allowed me to identify the most pressing environmental issues.

3.3 Results

Private business interests were the most common respondent, representing nearly a quarter of total respondents (*n*=11, 24%). State agency representatives were the second most represented group with nine respondents (20%). Academia, local government officials, and NGO groups all had eight respondents (17% per category). The federal government was the least represented with only two respondents, but this was attributed to their inability to travel due to COVID-related travel restrictions. In the survey responses, respondents most commonly mentioned three problems facing their estuaries and coastal communities (Table 1). The primary issue was the rate at which previously forested land is being converted to agriculture, residential, or commercial uses. The second most commonly mentioned problem was pollution, which was discussed in three primary ways: 1) sedimentation, 2) stormwater overflow, and 3) wastewater seepage. The third most commonly mentioned problem was climate change and its associated impacts, such as sea level rise. Additionally, the identified stressors and their ranking were similar between the two study sites, the fishing tournament, and the management workshop. It is also important to highlight that my findings align with the findings from a community survey administered by the Pensacola and Perdido Bays Estuary Program. Their survey targeted community citizens and was completed by 754 participants. Their survey results highlighted coastal development, sewage treatment, and industrial pollution as the biggest environmental stressors. Lastly, although not an environmental stressor, an issue with the adequacy of scientific data was noted by half of respondents (Table 2).

Table 4. Number (and percent) of survey responses that identified three environmental stressors (land conversion, pollution, and climate change) as either the biggest stressor or in the top three biggest stressors, along with sample sizes for each response.

	Land conversion	Pollution (sedimentation, stormwater, wastewater)	Climate change (or its associated impacts like sea level rise)
Biggest environmental stressor	18 (39%)	17 (37%)	3 (7%)
Top 3 biggest environmental stressors	15 (33%)	14 (30%)	11 (24%)
Totals (*n*=46 total survey respondents)	33 (72%)	31 (67%)	14 (31%)

I will discuss each issue below and will break pollution down into the three main forms mentioned by respondents. I will also discuss how respondents view these issues in the context of broader water quality and clarity issues and what they mean for the quality of life of coastal communities. Lastly, I will discuss the availability of scientific data and how it impacts the ability for decision-makers to make informed decisions. These issues represent a fraction of the total issues in the problem stream that policy entrepreneurs (survey respondents) are trying to get recognized by decision-makers.

3.3.1 Land Conversion

Land conversion around the estuaries was identified as the preeminent environmental stressor by survey respondents. 67% (*n*=12) of respondents that identified land conversion as the biggest stressor were government employees or private business representatives. Over the last decade, Florida's gulf coast contained five of the 10 most rapidly expanding housing markets in the U.S. (Berdychowski & Liebson, 2022). To accommodate this growth, forested land is being

developed along the Florida Panhandle to accommodate increasing human populations. This significantly alters the natural environment's capacity to filter water and provide other ecosystem services. Without these ecosystem services, the clear water these estuaries are known for may be degraded. A representative statement by a state agency employee highlighted that "significant population growth on the coast is projected to continue which will exacerbate issues associated with [changes in land use/land cover]."

3.3.2 Sedimentation

Increased sedimentation in coastal waters is becoming a bigger issue as land development increases. Some amount of sediment is necessary for healthy ecosystems, but high rates of sediment transportation to coastal waters can lead to degraded water quality and clarity. This was the case in Perdido Key in 2022 when construction site runoff significantly impacted a wetland and the broader Perdido Bay (McLaughlin, 2022). Survey respondents noted that sediment control regulations are likely outdated and too relaxed for the increasing levels of development. One local environmental NGO representative stated that "there are engineered systems which catch the sediment, but maintenance is lacking." In addition to issues with sediment control regulations, respondents also mentioned the sheer volume of sediment pollution in their areas. One state agency representative succinctly noted that "sediment is the number one contributor to [water] pollution."

3.3.3 Stormwater

The increasing frequency and severity of coastal storms are becoming an issue for the infrastructure that manages stormwater. Additionally, increased development along the coast has led to an increase in impervious surface cover. This means that more stormwater is being funneled to outdated infrastructure. As stormwater infrastructure overflows with accumulated debris and chemicals, it often finds its way into waterways that lead to estuaries. An environmental NGO representative stated that a key issue with stormwater management is that there are not "enough features (such as retention ponds and natural filtration services) with enhanced abilities to reduce nutrients" which can lead to water quality issues as nutrient loads increase. Increased nutrient levels in coastal and estuarine waters are a major concern because they can lead to algal blooms, which pose a risk to human health and beach closures.

3.3.4 Wastewater

Wastewater management is an increasing concern as more infrastructure is needed to compensate for the increasing population along the Florida Panhandle. When wastewater leaks from septic systems, it can seep into waterways and end up in estuaries. This can lead to a buildup of toxic chemicals that influence water chemistry and increase the potential for harmful algal blooms. These can lead to closed beaches, which impacts the livelihoods of tourists, residents, and businesses. Algal blooms can also cause fish populations to decrease as fish either leave the area in search of healthier water or die. A representative statement from a state agency employee highlighted that "wastewater effluent disposal increases nutrient loading into the system and wastes a precious resource."

3.3.5 Interconnected Issues

Respondents frequently mentioned that many of these water quality issues are connected. For example, one respondent noted that an increase in the size and number of home lawns from land conversion can lead to increased sedimentation and buildup of toxic chemicals from fertilizer use. This highlights the preeminent issue of land conversion and its associated downstream impacts. Land conversion is viewed as the primary cause for increased sedimentation, stormwater overflows, and wastewater seepage. These issues are exacerbated due to lax permitting and enforcement at construction sites. A federal agency representative noted that "[land conversion] is the primary driver of declining ecosystem services like water filtration."

Respondents are in agreement that the local economy and society would be severely threatened if water quality or clarity were to be degraded. This is evident in the survey results as 100% ($n=46$) of respondents noted that poor water quality is a major threat to their livelihoods and the coastal economy. Known as the Emerald Coast, clean and clear water makes this an attractive place to live and visit and is a primary driver of tourism. A local agency representative highlighted the importance of clean water by succinctly stating that "our ability to fish, swim, and enjoy the water drives so many sectors of our local economy, without it, we're toast". This representative statement highlights how the interconnected issues of land conversion and pollution can have wide-ranging negative impacts to the livelihoods and economy of coastal communities.

3.3.6 Climate Change

Coastal communities are vulnerable to diverse natural hazards from climate change, such as hurricanes, sea-level rise, and increased precipitation. These hazards can cumulatively increase because of human-induced land conversion. It is interesting to note that no government

employees from any level of government selected climate as the biggest stressor. The three respondents that identified climate change were affiliated with an NGO, an academic, and a private business representative. One respondent that identified climate change as the biggest environmental stressor noted that climate change is an international problem and another mentioned changing rainfall patterns. These examples were the only two that mentioned climate change as an independent issue and all other examples mentioned climate change in the context of how it interacts with land conversion. For example, an environmental NGO representative highlighted the cumulative nature of stressors by stating that "climate change, increased development, and increased impervious surfaces lead to increased stormwater runoff." Additionally, responses commonly mentioned how outdated stormwater management systems coupled with increased levels of impervious surface cover alter the natural environment's resilience to flooding after a hurricane.

3.3.7 Adequacy of Scientific Data

Scientific data is a vital component of the policy decision-making process. However, data adequacy and accessibility are two major concerns for government officials and other stakeholders involved in the policy-making process. Even if the data are adequate enough to inform decision-making, they are often inaccessible. Inaccessibility can mean that data are physically located in multiple areas and not available to the general public. Inaccessibility can also mean that data are too difficult to understand for non-technical audiences, making it useless for policy-making. One representative from an international environmental NGO highlighted these issues by stating that data need to be "more available to the public and decision-makers, as well as more digestible."

Table 5. Respondents' perceptions of available scientific data to make informed decisions regarding natural resource management. Table shows the number (and percent) of survey responses in each category.

	More than adequate	Adequate	Less than adequate	Significantly below adequate	No data available
Amount of data available to make decisions	4 (9%)	18 (39%)	20 (43%)	3 (7%)	1 (2%)

3.4 Discussion

My case study of two coastal communities in the Florida Panhandle used a framework for public policy-making and focused on one of the framework's major components. I found that it is not possible to discuss the problems faced in these estuaries without also mentioning the policy entrepreneurs that are involved in the process. In this section, I briefly review my case study's findings, situate them in relevant policy-making literature, and identify the policy entrepreneur contributions to the case study.

Based on survey responses from local stakeholders, I found that land conversion was the preeminent issue tied to water quality and clarity degradation. I found that in the case of these estuaries, pollution was caused by increasing levels of land conversion and lax enforcement of permitting regulations. The result is a threat of degraded water quality and clarity to the coastal communities that rely on tourism to fuel their economy (Baldwin County, 2020).

Studies suggest that these human-caused issues occur in a cumulative way and can often be synergistic or additive in nature (Cabral et al., 2019; Huang et al., 2018). The survey

responses support these findings. Survey respondents noted that land conversion is the primary

cause for increased sedimentation, stormwater overflows, and septic seepage. Stakeholders in

these areas noted that as populations continue to grow along the coast that these issues will be

exacerbated. Meaning that as more land is developed for housing and infrastructure, more

sediment, waste, and chemicals are going to end up in estuaries. Meanwhile, the capacity to deal

with these issues are considered outdated and overworked and permitting regulations and

enforcement are considered too lax.

Previous research has indicated that there are two prerequisites to successful problem recognition

at the local level: 1) the participation of a local policy entrepreneur that is able to invest their

personal resources (Celliers et al., 2020; Kingdon, 2013) and 2) partnerships between

government agencies and non-governmental stakeholders (Celliers et al., 2020). The premier

example of intergovernmental partnership is the Chesapeake Bay Estuary Program. The

governors of the six states on the Chesapeake Bay signed a partnership agreement in 2014 with

the estuary program to address environmental issues (Chesapeake Bay Estuary Program, n.d.).

Since that agreement, the Chesapeake Bay partnership agreement has served as the model used

by the National Estuary Program. Additionally, since the signing of the agreement, the

Chesapeake Bay has found that long-term pollution trends have been decreasing (Chesapeake

Bay Estuary Program, n.d.).

My case study provides support for the first assertion for a local policy entrepreneur willing to

invest their resources, but lacks formal official partnerships. Local stakeholders from

environmental NGOs use their resources (e.g., money, time, and political capital) to attempt

making problems known to decision-makers, but respondents noted that there have been no formal partnerships between government agencies and environmental groups. An environmental NGO representative noted that they work to raise community support and inform government officials on issues they identified through independent research, but that these efforts have not led to a formal partnership. They highlighted this informal process, stating that "there is a lack of formal partnership between stakeholders and decision-makers making it difficult for stakeholders to bring issues to decision-makers." Another respondent noted that they were attempting to build partnerships with local government officials. They indicated that partnership building was a slow process in which their first focus was relationship building before broaching the conversation of formal partnerships.

My study demonstrates the importance of policy entrepreneurs as major actors in the policy-making process. Kingdon (2013) notes that policy entrepreneurs have a defining characteristic, which is their "willingness to invest their resources" (e.g., time or money). Knaggård (2015) further differentiates policy entrepreneurs by highlighting specialized problem brokers that frame issues as public problems to gain decision-maker attention. Respondents from environmental NGOs and academia mentioned how much time and effort their organizations put into researching issues. One environmental NGO produces a comprehensive management plan that identifies all of the issues presented in my findings. This plan is presented to local government officials in an effort to shift their attention to water quality issues by framing them as threats to the quality of life and economic vitality of the area.

According to local and state decision-makers, the issues facing coastal communities in the estuaries are numerous and complex. Due to the complexity and volume of issues, decision-makers are often required to choose specific issues to address and to ignore others. Without healthy, clear waters, decision-makers worry that their local economies will collapse. They noted that local businesses rely on a vibrant tourism industry, but that the tourism industry also relies on a healthy ecosystem. Their primary concern is how to best balance the tourism industry with ecosystem health. Kingdon (2013) states that issues identified through feedback is one of the primary ways that they can come to be addressed by policy-makers. Rossiter and Price (2013) also noted that feedback is an essential link between the problem and policy streams. Often this feedback comes to government officials and other important stakeholders informally. Citizens voice their concerns to their elected representatives in hopes that they might address them. Feedback was often perceived as a difficult task for stakeholders and organizations because of inadequate funding and personnel. Government officials also become aware of issues during the normal administration of a policy or program.

Another component of issues and decision-makers in the problem stream is how problems fade from the governmental agenda. There are finite resources available to government officials to address problems, and the agenda is constantly shifting (Howlett et al., 2015). Respondents often noted that there is a lack of political will among local government officials to address some of these issues proactively due to their perceived ambiguity. Additionally, respondents noted that necessary projects to address these issues are costly and time-intensive, which leads decision-makers to focus on projects that can be accomplished with less time and money.

I also compared my case study's findings with the findings of a much larger survey completed by the Mobile Bay National Estuary Program in 2011 (Mobile Bay National Estuary Program, 2011). Mobile Bay is about roughly 50 miles west of Perdido Bay in Alabama. This survey measured the perceptions of residents on an array of topics, including infrastructure projects, recreational preferences, and how well the estuary program is protecting the health of Mobile Bay. Residents around Mobile Bay noted that excess fertilizer (16%), pollution from private companies (35%), septic and wastewater pollution (16%), and population growth (13%) were issues negatively impacting Mobile Bay (Mobile Bay National Estuary Program, 2011). These issues align with my findings and are of interest because both surveys highlight common issues that coastal communities face in the northern Gulf of Mexico. Similarities in these survey results, which were conducted over a decade apart from each other, should provide a clear signal to decision-makers that these issues need to be addressed.

Lastly, the problems identified here using the MSF Problem Stream as a theoretical framework are place-based and not able to be directly applied globally to other coastal communities. My application of the MSF does allow for other coastal communities to explicitly identify their own perceptions of problems and highlights how formally engaging with diverse stakeholders can lead to a consensus to present to decision-makers. My case study has demonstrated that the MSF is able to provide a structured method for highlighting key stakeholders and determining the most prevalent issues. The degree to which these stakeholders contribute and how their contributions influence problem recognition by decision-makers is an area for future research.

3.5 Conclusion

The contribution of this study is to demonstrate how the MSF can provide real-world applications for policy-makers and other high-level stakeholders in the study areas. Additionally, I applied the MSF in a real-time policy-making scenario as stakeholders work to bring issues up the governmental agenda. This application of the MSF is absent in the environmental policy-making literature. My case study provides an example on how applying the MSF in the analysis of a survey can lead to real-world applications. This allows for a growing body of literature on the MSF. Additionally, it allows for the many government officials, NGO groups, and concerned citizens to have a consolidated product for their planning and management of coastal resources.

My study identified four problems for coastal communities in the Florida Panhandle. First, land conversion is the preeminent issue and is the impetus for many other problems, namely pollution. Acknowledgement of land conversion first almost always led to acknowledgement of pollution and vice versa, highlighting their interconnected nature. Coastal stakeholders in the study sites seem to understand how the two issues were interconnected and led to cumulative impacts in the estuaries.

Second, water pollution is a complex issue caused by a variety of sources. Respondents stated that sedimentation is the primary pollutant in these two estuary ecosystems. Other common forms of pollution are stormwater overflows and wastewater seepage. These pollution issues stem directly from increased land conversion in the face of growing populations. Third, climate change poses a number of threats to coastal communities and their growing population, such as sea level rise. Those impacts are exacerbated by increased land conversion through an additive

process. Lastly, scientific data are often inadequate and inaccessible, making the policy-making process more difficult.

The use of MSF in this case study is the first of its kind for coastal communities. To make the findings of this study more robust, more research is needed to determine if public policy priorities address the identified problems. Additionally, the extent to which stakeholders use their resources needs more research to determine where policy-making influence lies. Lastly, a greater number of case studies in other coastal communities may increase the robustness of the MSF in real-world applications.

Chapter 4: Policy priorities in a vulnerable coastal zone: a case study from the northern Gulf of Mexico

4.1. Introduction

Healthy estuaries are vital to overall coastal health. They provide a number of ecosystem services (e.g., water filtration and fishing opportunities) and play a large role in the coastal economy, which is heavily dependent upon tourism and commercial fishing. Estuaries have been supporting human life for as long as humans have lived near the coast (Middlebury Institute of International Studies, 2021). Today, estuaries support large population centers, commercial fisheries, trade, recreation, and tourism. Estuaries are also vulnerable to the hazards of climate change, such as increased precipitation. Coupled with changes to LULC that increases water pollution, estuaries are susceptible to nutrient buildup, which degrades water quality and can impact ecosystem and human health (Martinich, 2012; Montefiore et al., 2023; Nagy et al., 2011)[11].

One of the most important estuary management institutions in the United States (U.S.) is the National Estuary Program. The federal government formally recognized estuaries as important ecosystems in 1987 when Congress created the National Estuary Program dedicating $11 million annually to estuary conservation, gradually increasing funds up to $27 million annually in 2019. The National Estuary Program is a place-based program that is managed by local stakeholders in communities where estuaries occur. Each estuary in the program publishes a 10-year

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[11] Land use and land cover are often used interchangeably, but have distinct differences. Land use refers to human activity, such as agriculture. Land cover references specific characteristics of a landscape, such as the percentage of forests and residential property on the landscape (U.S. Department of Agriculture, 2022). To highlight the difference in the two terms, consider a forest that is harvested for timber. The land cover has changed once all the timber has been harvested, but that does not mean its land use will change if new trees are planted.

Comprehensive Conservation Management Plan that highlights local policy priorities and actions to address them (*Estuaries and the National Estuary Program,* 2023). These Comprehensive Conservation Management Plans are roadmaps to protecting vulnerable, valuable, and productive ecosystems balancing the needs of humans and nature.

The National Estuary Program has been the subject of significant amounts of policy and financial attention in recent years, making a scholarly examination of these changes important and timely. In January 2021, the Trump administration signed into law the Protect and Restore America's Estuaries Act. With bipartisan support in Congress, the law nearly doubled the annual funding for the National Estuary Program to $50 million beginning in 2022 (Grosso, 2021; Piscataqua Region Estuaries Partnership, 2021). This law expanded the types of projects and funding available to Estuary Programs, such as projects to improve coastal resiliency, manage stormwater, and address LULC change (*Protect and Restore America's Estuaries Act*, 2021). These recent policy priorities ensure that management strategies consider the interacting effects of climate change, which include increased storms and compounding factors that come with development, such as LULC change (Intergovernmental Panel on Climate Change, 2021).

As the federal government prioritizes preparing coastal communities for climate change with increased policy-maker attention being paid to National Estuary Programs, it is essential to understand how managers in coastal communities perceive policy alternatives in the context of their most pressing issues. To do this, I examined two study sites in the Florida Panhandle that highlight estuarine communities preparing for a growing population and a changing climate. The goal of this case study was to identify how local-scale estuary managers perceive coastal policy

priorities during a state of increased funding and attention from federal policy-makers directed at the most important estuary management institution, the National Estuary Program and other emerging Estuary Programs. Understanding these policy priorities is important because they are changing in the face of emerging anthropogenic and natural impacts, and they represent the direction that estuary conservation is going in the coming decades. Using survey responses and key informant interviews with stakeholders, I addressed the following question: which coastal policies do local estuary managers perceive need to be reformed or enacted to more effectively manage estuaries with multiple stressors?

4.1.1 Estuary Stressors

Two of the most important challenges facing estuary managers are water quality and LULC change. Changes in LULC are often driven by the need to create infrastructure, housing, and agricultural lands for growing populations. Changes to LULC have the potential to impact water quality (Ferin et al., 2021). Kennicutt (2017) found that human activities (e.g., development) were the primary driver of degraded water quality in the Gulf of Mexico. A significant problem in my study sites is how forest landowners attempted to recover from Hurricane Michael. In 2018, Hurricane Michael made landfall along the Florida Panhandle and destroyed more than a billion dollars in timber. The hurricane set back the industry's ability to combat climate change impacts and perform ecosystem services for 10-15 years. Although not a lot of research has been conducted on water quality directly after Hurricane Michael, Dwivedi (2019) noted that water quality was likely affected. Increased rainfall carries the risk of nutrient pollution as rainwater moves through lawns picking up fertilizers and animal waste and makes it way to waterways unfiltered. Ni et al. (2021) found that changes in LULC, primarily in the agricultural industry, were the primary influencers to coastal water quality in the Gulf of Mexico due to alterations of

runoff regimes that carry more sediment and excess nutrients to coastal waters. Volk et al. (2017) noted that changes in LULC for residential and commercial purposes have been a major driving force in water quality impairment along Florida's Gulf coast which impacts important commercial and recreational fish habitat and other recreational opportunities.

4.1.2 Theoretical Framework

I sought to answer this question by using Kingdon's (2013) Multiple Streams Framework (MSF) to analyze the perceptions of managers two estuary case sites undergoing rapid growth and change (a more detailed description is found in Chapter 3). The MSF posits that the policy-making process is made up of three independent streams: problems, policies, and politics (Kingdon, 2013). The problem stream is where a host of issues wait to be addressed. An infinite number of issues can exist at any time and only certain ones grab the attention of decision-makers while others are ignored (Weber, 2014). The policy stream is where experts formulate new or alternative policies to address issues in the problem stream. The politics stream considers how the national (or constituent) mood, influences from interest groups, and government turnover impact the ability for policy to be implemented (Herweg et al., 2015). Sometimes a focusing event in the problem or politics streams (i.e., a policy window) allows a policy entrepreneur to facilitate a policy proposal through the process.

Howlett et al. (2017) noted that researchers, advocates, and other experts in a policy community use their expertise and subject matter authority to propose policy solutions. In this case study, I identified the key estuary managers, the policy experts, in two coastal policy communities and measured their expertise by how many years they have worked on coastal policy priorities. Allwood et al. (2018) found that decision-makers are more likely to accept policy proposals

when the policy community reaches a consensus. Through stakeholder workshops, I investigated whether a diverse policy community can organically reach a consensus on policies to address the most pressing coastal policy priorities.

Experts in the policy stream cannot create random policy alternatives. A problem must exist that needs to be solved. Policy experts spend time looking for problems and begin building policy proposals to solve them (Teisman, 2000). I used this theoretical insight to highlight the most pressing coastal policy priorities identified by policy experts and the policies they suggest to solve them. Creating public policy is often a long and ambiguous process (Saurugger & Terpan, 2016). Policy experts will often use pre-existing policy proposals and alter them, so the proposals become more agreeable to decision-makers to save time and resources (DeLeo & Duarte, 2021). I expand on this finding by investigating if survey respondents suggest brand new policies or alter existing policies.

Dolan (2021) found that local policies addressing climate change issues are complex and novel. Climate change policy proposals historically have been researched at national and international scales, whereas studies rarely look at how climate change policy impacts local communities. I expand on this by investigating if local estuary managers consider climate change when they recommend policy proposals. Inter-jurisdictional coordination (e.g., neighboring counties working together) is a key component of environmental policy community collaboration at the local level (Jones, 2014; Jones et al., 2016). Water quality impacts from pollution cross jurisdictional boundaries, making it imperative that policies are built collaboratively. I

investigate this component of local policy-making by determining if local government officials mention coordinating with neighboring governments.

Other studies have found that extreme weather events in the problem stream can lead to policy change, but few of the policy proposals were innovative (Giordono et al., 2020). Instead, the proposals often only made incremental changes to existing policies. I expand on this finding by investigating whether trends that build over time (e.g., LULC change) lead to novel policy proposals. Issues in the problem stream can sometimes be categorized as "creeping crises." These issues build over time and fluctuate in their severity and impact. Vince (2022) finds that a creeping crisis, such as pollution, gives policy communities time to build coalitions while crafting sophisticated policies. However, they may have a difficult time getting decision-makers to recognize their policy solutions as other urgent, time-sensitive issues push creeping crises down the governmental agenda. Similarly, I investigated whether estuary managers highlight time-sensitive issues which present urgent problems over longer-term issues which may not have impacts for decades to come.

The MSF posits that policy windows open in the problem and political streams. Lee (2019) found that when an unwanted policy is viewed as inevitable by local stakeholders, a policy window can open in the policy stream, meaning that a change to policy will be enacted. This was the case when former President Obama signaled he would designate a national monument in the Boulder-White Cloud Mountains in rural Idaho under the Antiquities Act unless the state and local government could pass their own legislation that solved LULC conflicts. The designation would alter historical LULC in the area, which could impact the area's economy. The threat of

federal executive action to alter LULC rallied local decision-makers to seek a policy proposal that better aligned with their values. Researchers have found the most successful way of addressing complex and sometimes contentious issues, like LULC change, is to appeal to the negative economic impacts if policies remain status quo (Storch & Winkel, 2013). I expand on this finding by investigating if estuary managers use economic impacts in their reasoning for alternative policy proposals.

In this study, I focus on the MSF's policy stream to better understand how estuary managers perceive current coastal policies in the two estuaries. To do this, I investigate the narratives used by estuary managers to describe their policy priorities. Narratives are defined as the strategies used by stakeholders to influence the policy process (Shanahan et al., 2018). Narratives during policy formulation are seen as cause-and-effect stories and evolve from abstract ideas into concrete policy proposals (Ceccoli, 2019; Clark, 2004). Additionally, local policy formulation is often influenced by volunteers in NGO groups making my study sites consequential to the development of the MSF at the local level (Allred et al., 2021). Thus, based on the literature, I expect that estuary managers will focus on urgent problems due to their ability to work with policy-makers that may have little time and resources available. Conversely, I hypothesize that estuary managers will work to develop strategies to address creeping crises and other longer-term problems prior to presenting their ideas to policy-makers. This study will demonstrate how the MSF can be used in real-world situations to better understand the policy-making process at the local level.

4.2. Methods

4.2.1 Study Area

In this study, I examine the Perdido and Pensacola Bays and the St. Andrew and St. Joseph Bays (Figure 3). Figure 4 shows the greater Gulf of Mexico region for context. Perdido and Pensacola Bays are located along the Alabama-Florida state line and are home to nearly 600,000 full-time residents. St. Andrew and St. Joseph Bays are ~100 miles east of Perdido and Pensacola Bays and are home to more than 200,000 full-time residents. These populations are expected to continue growing at some of the fastest rates in the country (Biernacka-Lievestro & Fall, 2023). From 2021-2022, Florida ranked first in the country for domestic migration with more than 1,200 people moving to Florida every day (Tampa Bay Economic Development Council, 2023). Study site population growth is detailed in Chapter 3. These areas are defined by their tourism industry and uniquely emerald waters, which are a highlight and primary tourist attraction for this region of the Gulf of Mexico. The two study sites brought in over a combined nearly $4 billion from the tourism industry and nearly 20 million visitors between 2016 and 2017 (Baccum, 2017; Bay County Chamber of Commerce, 2017).

Figure 3: Maps of the study sites. The blue box indicates the Pensacola and Perdido Bays region. The red box indicates the St. Andrews and St. Joseph Bays region.
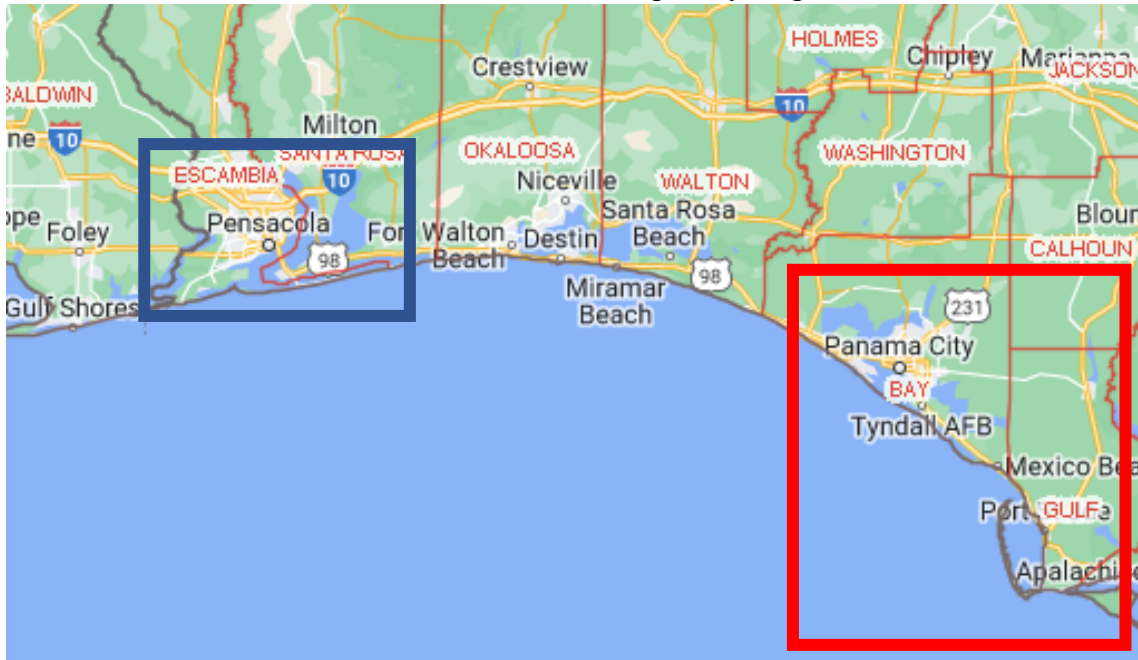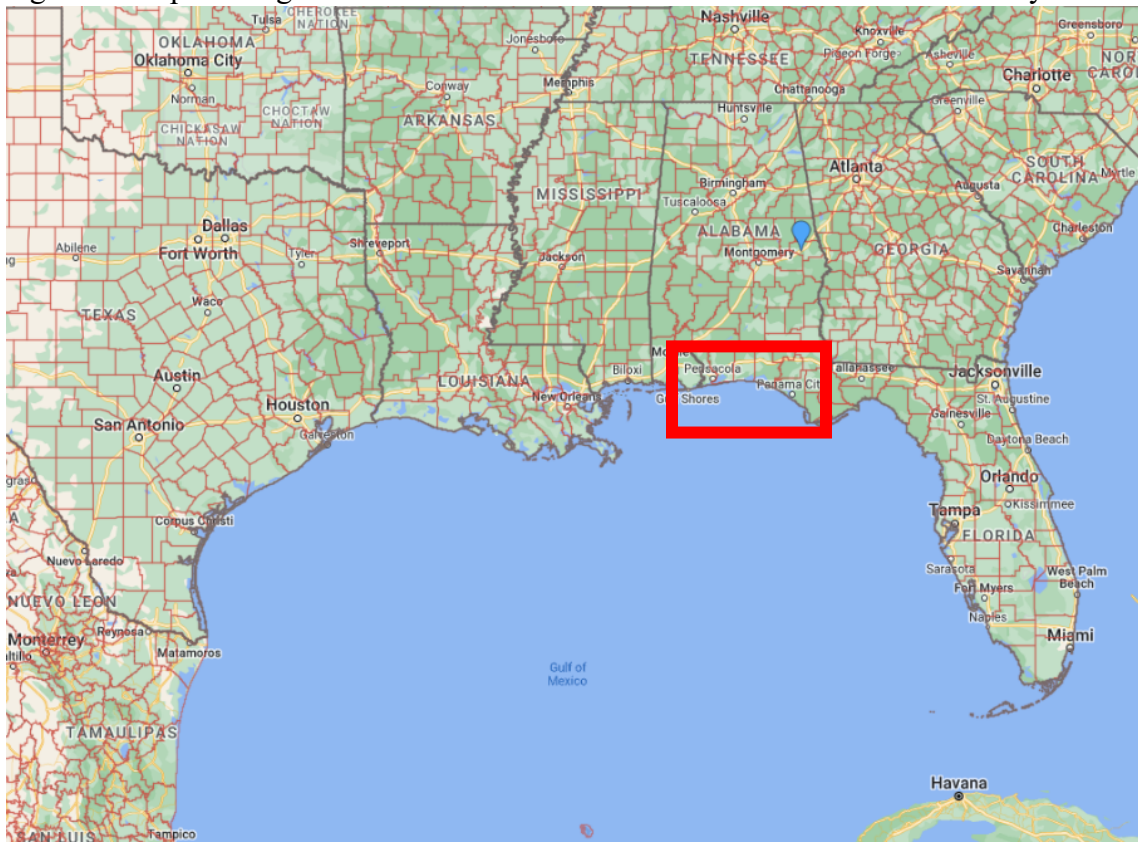

Figure 4: Map of the greater Gulf of Mexico. The red box indicates the two study sites.

Specifically, my case study sought key informant estuary managers from the Estuary Programs for Pensacola and Perdido Bays and St. Andrews and St. Joseph Bays, along with these programs' partners and volunteers (hereafter, I will refer to all respondents as "estuary managers"). Estuary managers included policy experts, academics, environmental non-governmental organization (NGO) representatives, and private business owners. These stakeholders serve on advisory committees in the Estuary Programs and work on a volunteer basis. The Estuary Programs in the study sites are important because they are new institutions for resource management and they are both in the process of publishing their management plans, which highlight conservation policy priorities for the region (Estuary Programs are detailed in Appendix 4). The Estuary Programs allow for robust stakeholder involvement during the management plan development process. This gives us the opportunity to survey diverse coastal stakeholders on the state of current coastal policy, asking them to detail their recommendations for future policy. As management plans are made public, I will be able to see if local stakeholders and government agencies agree on the most pressing coastal policy priorities.

4.2.2 Study Design

My research qualified as a case study because I studied contemporary events that cannot be manipulated (Yin, 2018). This case study is valuable because it uses two of the criteria for choosing to do a case study: unusual and revelatory. It is an unusual case because of the two newly formed Estuary Programs that began at nearly the same time. Their formation at the time of my research allowed me to interact with local estuary managers as they were developing 10-year Comprehensive Conservation Management Plans. Their involvement in this process gave me insight into real-time policy perceptions and the consensus-building process that would not have otherwise been available. I consider this a revelatory case for much of the same reason. The

real-time access to the estuary manager community in the study sites have been "previously inaccessible to social science inquiry" (Yin, 2018).

4.2.3 Qualitative Methods

This research was conducted through the use of a survey aimed at key stakeholders in the area, namely those that work and volunteer in the estuaries (a more detailed description of the survey is provided in Chapter 3). I conducted two stakeholder workshops in partnership with the Estuary Programs. Additionally, I attended the 2022 Southeast Data Assessment and Review Workshop in Gulfport, Mississippi and the 2022 Alabama Deep Sea Fishing Rodeo in Dauphin Island, Alabama to meet with key informant stakeholders in the Estuary Programs. At these events, I administered surveys (n = 46) and conducted key informant interviews (n = 12). The interviews were an extension of the surveys where respondents wanted to expand on answers because they often thought the space available to write was insufficient. The interviews were informal in nature and often happened during breaks or lunch. I followed Auburn University's compliance policies with an approved Institutional Review Board (#20-257 EX 2009). Varied data sources are a key aspect of case study research because they enhance the study's credibility (Baxter & Jack, 2015). I targeted stakeholder workshop participants due to their involvement in developing the management plans with the Estuary Programs and for their expertise in coastal policy. Through these workshops, I targeted stakeholders from every level of government, environmental NGOs, academia, and private industry to ensure I obtained a robust collection of perspectives.

I used qualitative methods to sort and characterize the most common themes discussed by policy-makers when discussing the MSF policy stream. I performed In Vivo coding, a method of coding that uses the exact language in a respondent's answer, when organizing qualitative survey results. I did this to maintain the true meaning of the respondents' voices and to reduce bias introduced by the research team's preconceived notions (Saldaña, 2015). I discovered the codes through an inductive process that allowed for a narrative to emerge from the raw data. The process involved carefully reading the data multiple times, which allowed me to recognize patterns in the data and develop themes around these patterns. I then used these themes for broader categorization and analysis (Fereday et al., 2006).

To facilitate analysis, I asked workshop participants how many years they had worked on coastal policy priorities, which gave me an idea as to how experienced stakeholders were in the area. The median number of years of coastal policy experience was 10 years, which I used as the threshold for categorizing the experience level of the estuary managers in my study (Table 6). Estuary managers with greater than 10 years of experience were categorized as more experienced and those with fewer than 10 years were categorized as less experienced.

Table 6: Respondents' experience levels

Experience level	Number of respondents
>10 years (more experienced)	22 (48%)
<10 years (less experienced)	19 (41%)
=10 years (median)	5 (11%)
Total	46

4.3. Findings

I analyzed the policy priorities of estuary managers to discover the future of estuary management in a vulnerable area. In survey responses, only 30% of estuary managers respondents agreed that current policies are suitable to prevent declines in water quality (Table 7). Nearly 90% agreed that current policies need to be reformed, and estuary managers believe that upland development policy is the most important coastal policy priority for estuaries (Table 8; Table 9). Additionally, I measured levels of experience and separated the respondents by those I considered "more experienced" (>10 years of coastal policy experience) and "less experienced" (<10 years of coastal policy experience) (Table 6).

Table 7: Survey responses to the statement: Current policies, laws and regulations are suitable to prevent declines in water quality.

Study sites	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	Total
Perdido/Pensacola Bay	2	3	5	9	2	21
St. Andrew/St. Joseph Bay	0	1	2	2	4	9
Other events combined	0	1	0	9	6	16
Total	2 (4%)	5 (11%)	7 (15%)	20 (44%)	12 (26%)	46

Table 8 - Survey responses to the statement: Reform is necessary in current policies, laws, and regulations to prevent declines in water quality.

Study Sites	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	Total
Perdido/Pensacola Bay	5	12	4	0	0	21
St. Andrew/St. Joseph Bay	4	4	1	0	0	9

Other events combined	11	4	0	0	1	16
Total	20 (44%)	20 (44%)	5 (11%)	0 (0%)	1 (2%)	46

Table 9 - Survey responses to the statement: Upland development is an urgent policy problem that needs addressed.

Study sites	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	Total
Perdido/Pensacola Bay	9	10	1	1	0	21
St. Andrew/St. Joseph Bay	2	5	2	0	0	9
Other events combined	11	4	1	0	0	16
Total	22 (48%)	19 (41%)	4 (9%)	1 (2%)	0 (0%)	46

4.3.1 Policy priorities of estuary managers

I used the MSF policy stream to identify the policy priorities of estuary managers, focusing on

policies deemed insufficient, outdated, or poorly enforced (Table 5 and explained in greater

detail in subsection 4.3.2 below). The most important policy priority for estuary managers is

LULC policy which is currently viewed as being insufficient for handling the continued

population growth (n = 20, 43%). The second-most commonly mentioned policy priority for

estuary managers (n = 13, 28%) was how to account for the increased stress on the ecosystem

caused by pollution and outdated Best Management Practices aimed at addressing pollution. The

third most commonly mentioned policy priority for estuary managers (n = 9, 20%) was

permitting policy and enforcement. The estuary managers described the permitting issues as

being outdated and limited by their case-by-case approval process. Only four (9%) estuary

managers mentioned something more pressing than these three policy priorities. I have

summarized the policy priorities of estuary managers and offered recommendations for new

policy in Figure 5.

4.3.2 The role of experience in determining policy priorities of estuary managers

The average number of years working on coastal policy priorities among all survey respondents

was 13 years. Private business representatives were the most represented group and fell right in

line with the average of 13 years. The second most represented group was employees of state

agencies, who had the least amount of average experience at just under 10 years. Members of

environmental NGOs were the third most represented group with an average of nearly 15 years

of experience. The workshops also included five local government officials, who had been

working on coastal policy priorities for an average of 25 years.

Respondents with more experience in coastal policy efforts were the only group that reached a

consensus on any policy priority. Almost two-thirds of the more experienced estuary managers

(64%, n = 14) identified LULC policy as the most pressing policy priority (Table 5). In contrast,

respondents with less experience in coastal policy priorities did not reach a consensus on any one

policy priority as being the most important. Instead, the less experienced group identified three

policy priorities as important. There was also an "other" policy category that was selected by

four total respondents with less experience, whereas none of the more experienced respondents

chose "other." Respondents mentioned in interviews that LULC change is a high-level priority

that impacts Best Management Practices and permitting policies. This might indicate that as policy experts spend more time working on coastal policies, their priorities shift to higher level issues, such as LULC change.

Table 10: Estuary managers experience levels and top three policy priorities

Experience level	LULC policy	Best Management Practices	Permitting policy	Other	Total
More experienced	14 (64%)	5 (23%)	3 (14%)	0 (0%)	22
Less experienced	4 (21%)	7 (37%)	6 (32%)	2 (11%)	19
Median	2 (40%)	1 (20%)	0 (0%)	2 (40%)	5
Total	20	13	9	4	46

Table 11: Top three policy priorities identified by estuary managers in the study, including the definitions of these priorities and examples of how managers discussed them

Policy priority	Definition of priority	Estuary manager response example
LULC	Statements about how land use is changing, how coastal population growth leads to more development, and how forests are being logged for subdivisions or commercial use	"There needs to be reform of land use and zoning codes to make compact mixed-use development easier, and sprawl harder"
Best Management Practices	Statements about how (1) guidelines for managing pollution around construction, (2) buffer requirements near water sources, and (3) agricultural fertilizer runoff need to be updated or enforced	"Construction site Best Management Practices are not well enforced. There are always violations with heavy rain events because the policies are outdated"
Permitting	Statements about how the permitting process does not consider holistic impacts, how the permitting process is done on a project-by-project basis, and the perception that some projects	"There needs to be implementation of a watershed model to examine individual and cumulative impacts of development activities prior to

	are approved automatically without proper considerations	permitting"

4.3.3 LULC change as the most important policy priority

Estuary managers viewed policies for managing LULC change as insufficient and outdated for dealing with continually increasing coastal populations. They believed that regulations, such as zoning codes, that deal with how land is developed, need to be updated by local zoning boards and city councils. Estuary managers noted that current land development regulations do not consider how quickly the area is growing and only consider the economic benefits of development. Estuary managers said that new policy needs to be forward-looking and should balance ecological health with economic development. Estuary managers had three primary concerns linked to rapid development, increased sedimentation, stormwater overflows, and wastewater seepage, which was consistently cited as the three major impacts to water quality. An environmental NGO representative stated that the "science is overwhelmingly clear that compact mixed-used development uses far less land and generates far less runoff."[12]

4.3.4 Best management practices outdated and under-enforced

Best Management Practices for subdivision developers were one of the most commonly mentioned policies needing updating with estuary managers noting repeatedly that LULC changes are damaging the ecology of the study site estuaries.[13] Estuary managers stated that Best Management Practices include ideas like policies requiring larger buffer zones, or areas of land

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[12] Mixed-use development provides more than use within one building. Mixed-use development may combine residential and commercial uses in a single building. For example, retail shopping may be on the street level with multi-family housing on the upper levels. Compact development refers to land use planning to prioritizes efficient public transportation and smaller residential footprints and mixed land uses.
[13] Subdivisions in the American context are large parcels of land that are divided into smaller parcels often for the purpose of building single family homes.

designated for environmental protection around development sites, and stormwater and wastewater management policies such as permeable pavements need to be updated to account for increased development and urban sprawl. One of the most important policy priorities for estuary managers was to increase buffer zone requirements around construction sites, or zones that help to control runoff of sediment and chemicals from construction and lawns. This is especially important in new subdivisions that frequently discharge excess lawn care chemicals into waterways. A member of a prominent local environmental NGO emphasized that their organization is "working to improve subdivision regulations and create buffer zones around streams to help reduce pollution from entering waterways."

Another policy priority for Best Management Practices was concern over a lack of enforcement mechanisms. Several respondents noted that they do what they can to share Best Management Practices with developers and logging companies, but no government agency has the resources to enforce these practices. An environmental NGO representative stated that "local code enforcement is insufficient to keep up with demand; meanwhile current fines for pollution discharge are dated and considered as part of the cost of doing business." Estuary managers noted that the fines don't deter bad practices during development and haven't been raised in decades. Additionally, estuary managers raised the issues that there is a lack of transparency over what the fines pay for. Additionally, when developers are fined, they aren't required to undo any damage they have caused, causing a disconnect to exist between actions and consequences.

4.3.5 Case-by-case permitting a major impact to environment

Estuary managers stated that the permitting process for construction projects is likewise outdated. Permitting at the local level is often not considered in a holistic way. Rather, projects are considered on a case-by-case basis, and the negative impacts from these projects can be cumulative. Estuary managers noted that this happens because local permitting offices are understaffed and underfunded. In the words of a state environmental agency representative, "alterations to habitat through development are considered on an individual basis, without regard for cumulative impacts." Future permitting policy needs to mandate holistic considerations when permit requests are submitted while at the same time increasing support for enforcement efforts.

4.3.6 Absence of climate change as a policy priority

I must also highlight that the federal legislation for Estuary Programs specifically mentions "recurring extreme weather events" and "adaptation strategies", which are phrases commonly used when talking about climate change. Notably, survey respondents did not mention climate change or any other common climate change phrases when referencing policies that need to be updated or implemented. This is interesting because respondents indicated that climate change was one of the biggest environmental stressors on the estuaries. Yet, respondents focused their responses on policy priorities primarily to LULC change and its associated impacts (e.g., pollution and increased impervious surfaces), rather than on climate change policy, demonstrating that short term management priorities are most important.

Figure 5: Recommendations for policy reform in coastal communities over the next decade based on the findings of the case study.
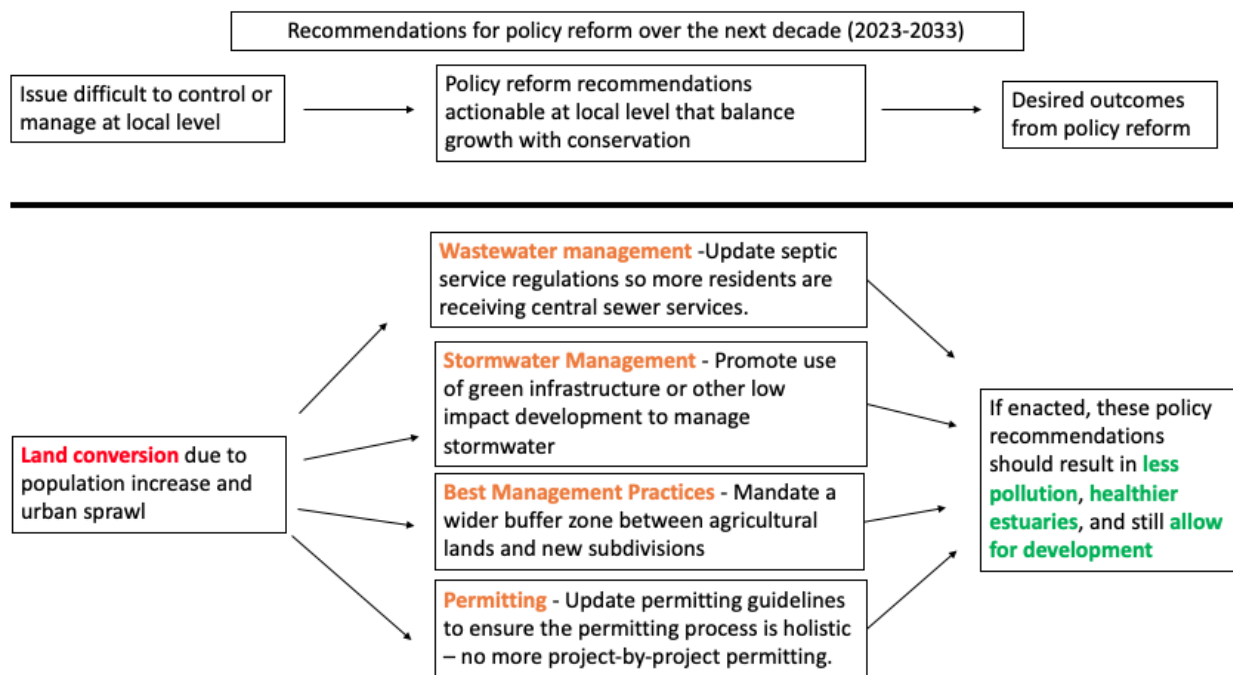
4.4. Discussion

Using the MSF policy stream allowed me to explore the three most important coastal policy priorities identified by estuary managers: 1) LULC change, 2) Best Management Practices, and 3) permitting. Estuary managers reported that each of these policy priorities are outdated, insufficient, and/or poorly enforced. Categorizing estuary managers by those with more versus less experience allowed me to identify the most pressing policy priorities at differing levels of experience. Nearly two-thirds of the more experienced estuary managers noted that LULC policy was the most pressing policy priority. Conversely, those with less experience did not reach a

consensus on any single policy priority, perhaps signaling a shift in priorities that comes with more experience.

During key informant interviews, respondents commonly noted that LULC change leads to pollution in multiple forms (e.g., stormwater and wastewater) and builds up over time in estuaries. Statements like these comport with quantitative studies that suggest LULC changes over time can increase vulnerability to both water quality degradation and climate change impacts (Lerner & Harris., 2009). Studies in expert elicitation found that sedimentation and pollution in coastal and estuarine environments are key stressors stemming from changes to LULC (Singh et al., 2017). The Tampa Bay Estuary Program has focused on pollution issues by implementing the EPA's Trash Free Waters initiative. Through this initiative, the program has deployed 12 litter collection devices and begun developing a Litter Management Plan to reduce marine debris at its many sources. Feedback from estuary managers in my case study highlighted similar stressors stemming from increased LULC change. Serrao-Neumann et al. (2015) note that limited funding and institutional uncertainty around climate change planning act as restraints to long-term planning. Although National Estuary Programs publish 10-year management plans, the programs do not have regulatory authority, so their management plans are often seen as suggestions, although some Estuary Programs do have agreements in place with local governments, such as the Pensacola and Perdido Bays Estuary Program agreements with local governments in surrounding towns and counties.

Climate change policy has historically been researched and implemented at the national and international scales (Dolan, 2019). Along these lines, I did not find that local estuary managers

explicitly considered climate change when mentioning policy reform. The omission of climate change in policy reform is surprising because these same local estuary managers reported that climate change is one of the biggest stressors to the local ecosystems. Other studies have noted that management decisions often have cumulative impacts to the marine environment (Halpern et al., 2008; Lonsdale et al., 2020; MacDonald, 2000). Halpern et al. (2008) suggest that there must be a shift to a more holistic planning style that accounts for ecosystem service function and LULC planning. I found similar sentiments from estuary managers that commonly expressed the need for permitting reform. Current permitting processes do not account for anything other than the specific project requesting a permit, which leads to cumulative impacts over time. The San Francisco Bay Estuary Partnership has focused on permitting issues by establishing a monitoring program that sought to improve efficiency in the permitting process by standardizing environmental indicators and centralizing data management for regulators.

Other studies have investigated how coastal communities could respond to increasing populations through policy intervention. Fraser et al. (2017) developed a GIS planning tool that allows land-use planners to restrict development in areas that are especially sensitive to erosion. A tool like this would be useful to the study sites because of the increased pollution from LULC change noted by estuary managers. Land development in California faces similar project-by-project permitting issues that the study sites face (Tang, 2008). Tang (2008) suggests that local governments need to implement an integrated process that considers long-term impacts over project-specific impacts. A process like this can improve ecosystem health by targeting problems (e.g., construction site runoff) early in the planning process. This finding was a significant point of concern in the study sites and was one of my policy recommendations for the coming decade

(Fig. 2). Norton (2005) found that population growth considerations were not prioritized in coastal North Carolina, which led to degraded natural resource health.

Norton (2005) found that land-use plans gave significant attention to economic goals while environmental concerns were often vague and lacking substance. My findings indicate that estuary managers understand the importance of the local economy on residents' quality of life, but that there is also a strong desire for resource protection. The Puget Sound National Estuary Program has tackled the issue of population growth and protection of coastal resources by investing over $300 million dollars to acquire 15,000 acres for the conservation and protection of salmon hatcheries, a $134 million dollar industry in Washington state. This initiative highlights how balancing conservation can also improve economic goals.

Estuary managers in my case study perceived the state of current policy in similar ways. Only 30% agreed that current policies are suitable to address water quality issues, while 90% agreed that current water quality policies need to be reformed and upland development policy needs to be addressed. Comprehensive Conservation and Management Plans from National Estuary Programs often derive their policy priorities from community-wide and policy expert surveying, similar to the methods used in my survey. Survey results such as these are a proxy of the "soup of ideas" from the MSF at the local level (Kingdon, 2013). Once policy priorities are synthesized, National Estuary Programs hold workshops and outreach events to educate other stakeholders on their policy priorities. An environmental NGO representative noted that as the public participates in surveys and roundtables, estuary managers will "match the public's priorities and issues against the science" to ensure perceptions and science are in agreement.

Interestingly, the representative noted that "it's not uncommon for the general public to be on the same side of science around this area."

Policy community fragmentation (e.g., sectors of stakeholders that may not work together such as tourism and aquaculture) is an important issue to consider in the policy-making process. This is especially true for ecosystem service policy, which is often made by competing actors with differing values and preferences (Dunning, 2021). When there is fragmentation in the community of experts, there is fragmentation in policy (Sotirov & Arts, 2018). Policy for one sector can have profound impacts on another sector. It is vitally important to have extensive stakeholder engagement and outreach because more closely connected policy communities generate "common outlooks, orientations, and ways of thinking" (Kingdon, 2013). Susskind (2009) and Matsuura and Schenk (2016) found that when policy-makers and other stakeholders engage in collaborative fact-finding, it can often lead to consensus decision-making on controversial natural resource management topics. Additionally, Susskind et al. (2011) found that when stakeholders set clear goals, facilitate participation, and foster collaboration, the odds of successfully managing a natural resource increase. Related to this issue, I found that when diverse estuary managers collaborated at the workshops, they were able to largely agree on three primary priorities facing their estuaries, highlighting an informal fact-finding process that could be further strengthened by engaging in formal and well-defined joint fact-finding processes.

Fragmented policy also occurs when neighboring government institutions fail to work together (Amezaga & Santamaría, 2000). For example, Amezaga & Santamaría (2000) found that even though neighboring European countries implemented wetland protections, the full potential of

protection was unrealized because they did not work together to make one cohesive policy. During the workshops, I found that policy recommendations were cohesive. The workshops are an example of local government officials and management agencies from neighboring municipalities came together to address policy priorities with a transboundary resource. Meanwhile, Cormier et al. (2010) found that policy fragmentation was a leading impediment to marine and terrestrial resource management. They found that resources like estuaries often experience issues with fragmented policy because of the numerous authorities with overlapping jurisdiction. Cormier et al. (2010) suggest the formation of a planning body with key stakeholders from impacted jurisdictions. The Estuary Programs in my study already bring together varied stakeholder groups but generally lack the authority to make and enforce policy. Other studies have found that the devolution of estuarine policy from national to subnational governments has perpetuated fragmentation issues in the United Kingdom (Ballinger & Stojanovic, 2010). This speaks to one of the more significant aspects of my study. National Estuary Programs are a unique institution in that they are authorized under the U.S. Environmental Protection Agency. The Environmental Protection Agency provides support and funding, but they shift management responsibility to the individual Estuary Programs. This is important because estuaries are dynamic and complex systems requiring a subnational management approach (Sorenson, 1997; Wescott, 2004).

By holding workshops with diverse groups of stakeholders and including government officials, I accomplished a key component of the MSF: "softening up" of policy priorities (Kingdon, 2013). In this process, invested stakeholders and policy experts need to introduce their preferred policy with decision-makers (e.g., National Estuary Program scientists share policy priorities with

government officials). This process familiarizes decision-makers with new or alternative policy options for when a policy window opens, making the policy more likely to be accepted (Wenzelburger & Hartmann, 2021). Herweg et al. (2015) argues that the softening up process is most likely to take place inside political parties. I found that the softening up process took place in the policy community, but it can only happen if government officials are present. Both of my workshops included local government officials that engaged in discussions, which allowed for policy proposals to be introduced in an informal setting.

4.5. Conclusion

The study contributes to the broader policy-making literature by demonstrating how the MSF can provide a real-world framework for estuary managers and policy-makers in the study sites. The MSF is commonly criticized for being difficult to test in real-world applications because of its figurative language and lack of explicit hypotheses (Mucciaroni, 2013; Sabatier, 2019). The use of MSF in the case study is the first real-world application for local governments and coastal policy priorities. Through survey administration and stakeholder workshops, the case study provides an example at the local level for how government officials and other stakeholders can systematically work as a cohesive policy community.

I found that LULC policy was the most important policy priority to be addressed by more experienced estuary managers and by 43% (n = 20) of all survey respondents. These policies were described as insufficient for dealing with a rapidly growing population and need to be addressed by local zoning boards and city councils. The second and third most commonly mentioned policies were those that deal with Best Management Practices and permitting, respectively. Estuary managers noted that the policies for Best Management Practices were

outdated and do not consider urban sprawl and growing populations. Estuary managers often

noted that the permitting process is carried out on a case-by-case basis and also should be

updated to reflect the cumulative impacts increased development has in the study areas. A

common feeling among estuary managers was how these policy priorities needed to be addressed

to keep the estuaries healthy and the quality-of-life high. In the words of a county agency

representative, "our ability to fish, swim, and enjoy the water drives so many sectors of our local

economy. Without it, we're toast."

Future research of this nature at other estuaries around the country would give the insight

necessary to determine if local policy expertise aligns with federal and state understanding of

policy priorities. This could help to decrease policy fragmentation between levels of government

and the overall ambiguity of the policy-making process. Additionally, future research focusing

on policy priorities at other estuaries would highlight how policy perceptions differ regionally.

This insight would allow federal agencies to better allocate resources based on local policy

expertise.

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Appendices

Appendix 1: Search terms
1. "Obama" AND "National Ocean Policy"
2. "Obama" AND "ocean policy
3. "Trump" AND "National Ocean Policy"
4. "Trump" AND "ocean policy"

Appendix 2: Intercoder Reliability Testing
All four of the additional coders had experience qualitatively coding data and worked independently to avoid discussing coding disagreements until the end of the coding process (Cheung & Tai, 2021). I used the percentage of agreement for its simplicity and found that my coding and the other researchers' coding were in agreement 93.7% of the time. To further strengthen the intercoder reliability testing, I used a Cohen's kappa test. This statistical testing method was specifically designed to test for intercoder reliability. Cohen recognized that percent agreement does not account for the chance that coders could simply take a random guess if they were not sure about certain codes, which could lead to false agreement (McHugh, 2012). The output of Cohen's kappa test ranges from -1 to 1 where 1 represents perfect agreement and values below 0 potentially indicate a serious problem in the collection of data or the need to retrain coders. Positive numbers in a Cohen's kappa test indicate the level of agreement between coders. For the purpose of this research, I compared the primary researcher's coding with that of the four assistant coders. The four Cohen's kappa outputs were .81, .82, .87, and .89. These results indicate a strong level of agreement rating, bordering on an "almost perfect" level of agreement (McHugh, 2012). This suggests that the results of the two intercoder reliability tests indicate that coding between all researchers was consistent.

Appendix 3: Detailed breakdown of qualitative tables
Table 2.1 Strategic and efficient ocean policy

Strategic and efficient ocean policy		
Sub-codes	Sub-code description	Example
Reducing duplication	Any mention of the reduction of duplicative work between federal agencies or how to manage competing demands between agencies	"The National Ocean Council will coordinate the work of the many federal agencies involved in conservation and marine planning." - Julie Pace, Associated Press
Bureaucracy	Any mention of adding or taking away layers of bureaucracy, untangling of the federal government web, or the cutting of red tape	"Defunding important programs and throwing up roadblocks for the National Ocean Policy entrenches inefficient federal bureaucracy" - John Podesta, Center for American Progress (former Counselor to Obama and former White House Chief of Staff to Clinton)

Ocean zoning as a best management practice or federal land grab	Any mention of ocean zoning as a best management practice and/or the federal jurisdiction to implement it. Any mention of ocean zoning as a federal land grab	*"Coordinated ocean planning makes common sense and is a good economic policy for our coastal communities. It allows for a comprehensive mapping of existing ocean uses that helps to identify and resolve conflicts between stakeholders before they play out in specific permitting processes" - Don Beyer, US Congressman for Virginia*

Table 2.2 Ecosystem Stewardship

Ecosystem Stewardship		
Sub-codes	**Sub-code description**	**Example**
What ecosystem stewardship protects	Any mention of what environmental systems were being conserved (e.g., species, oceans, coasts, fisheries) national security, and food or energy security	*"National Ocean Policy upholds our stewardship responsibilities, ensures accountability for our actions, and serves as a balanced model of efficient and sustainable ocean, costal, and Great Lakes management and conservation" - NOAA Press Release*
How ecosystem stewardship protects a resource	Any mention of specific methods for conservation including: ocean zoning, adaptive management, climate change adaptation, biodiversity protection, ecosystem services protection, conservation, preservation, sustainable use, science-based management, marine spatial planning, ocean mapping, natural resource protection/extraction	*"[The] Obama administration's proposal creates a governance structure for the management of the oceans and sets out a program for marine spatial planning -- which, like zoning on land, would designate certain areas for diverse uses such as drilling, fishing, shipping, and protection" - Center for Biological Diversity Press Release*
Damages/Impacts	Any mention of stressors such as ocean acidification, sea level rise, increased storm frequency/severity, increased ocean water temperatures, loss of species, loss of biodiversity	*"The tragedy in the Gulf is a wake-up call. We would have [been] much better prepared to deal with this disaster had a national ocean policy been in place before the spill. Overfishing and ocean acidification are also evidence of the urgent needs to ensure wise stewardship of our coasts, our oceans, and the Great Lakes" - Lois Capps, US Congresswoman for Wisconsin (1998-2017)*

Table 2.3 Economic

Economic		
Sub-codes	**Sub-code Description**	**Example**
Statements on the broad U.S. economy	Any mention of the economy broadly, statement does not mention a specific sector	*"The National Ocean Policy was a common-sense plan that was good for the economy, jobs, and local communities" - The Ocean Conservancy Press Release*
Oil/Gas/Energy	Any mention of the oil/gas/energy sector	*"NOIA (National Ocean Industries Association) believes a national ocean policy is incomplete without greater recognition for how increased access to the Outer Continental Shelf might help realize national policy objectives of job creation, greater energy security and reliability, and greater federal revenues from increased oil and gas activities" - Randall Luthi, of National Ocean Industries Association*
Fisheries	Any mention of the commercial fisheries industry	*"National Ocean Council and its partners have coordinated and strengthened efforts to address issues including illegal, unreported, and unregulated fishing that threatens U.S. fisheries and fishermen" - White House Council on Environmental Quality Press Release*
Recreation	Any mention of the recreation (recreational fishing, diving, tourism) sector	*"Credit is due to the administration for improving significantly on past National Ocean Policy policy documents and we appreciate the fact that they have been listening to us and other recreational fishing and boating groups" - American Sportfishing Association Press Release*

Table 2.4 Federal/Subnational Control

Federal/Subnational Control		
Sub-codes	**Sub-code Description**	**Example**
Coordination between levels	Any mention of coordination or cooperation between the federal government and subnational agencies	*"[National Ocean Policy] tears down the silos that exist between all levels of government, private industries, and the public" - Sam Farr, US Congressman for California (1993-2017)*

Federal government transparency	Any mention of the federal government being open in the planning, decision-making, or implementation process	*"Despite the fact that this whole National Ocean Policy is supposed to be conducted in a transparent manner, this body has met in closed session a number of times. I am unaware of any notice of the meetings being published and there are no transcripts or notes available from any of the meetings"* - Doc Hastings, US Congressman for Washington (1995-2015)
Federal overreach/oversight	Any mention of overreach, use of a heavy-handed approach, oversight and control, or separation of powers by the federal government	*"Instead of getting input and statutory authority from Congress, the Obama administration has decided that the president's signature alone is all that's needed to make major changes to policies governing ocean activities"* - Doc Hastings, US Congressman for Washington (1995-2015)
Regional Planning Bodies	Any mention of the Regional Planning Bodies or their regional plans	*"We have no [Regional Planning Body] in the Gulf of Mexico and do not need one"* - National Association of Charterboat Operators
State empowerment	Any mention of the states gaining authority to do what is best for their regions	*"Empowers local and state governments and stakeholders to work together in coordinating on ocean management through coastal and marine spatial planning"* - The Ocean Conservancy press release
Status quo regulations	Any mention of National Ocean Policies not creating new restrictions or regulations	*"In reality, the [National Ocean Policy] does not grant any agency additional powers to close fisheries, or to create marine reserves or any other type of protected areas"* - Terry Gibson, private industry representative

Table 2.5 Stakeholder Involvement

Stakeholder Involvement		
Sub-codes	**Sub-code Description**	**Example**
Bottom-up/top-down process	Any mention of the planning/decision-making/implementation process as being top-down (decisions by experts in positions of power) or bottom-up (decisions made after consultation with stakeholders)	*"I do not think that this is Federal top-down. In fact, I think this is better decision-making, bottoms-up (sic), not top-down"* - Chellie Pingree, US Congresswoman for Maine

Statements on collaborative relationships	Any mention of the general public, environmental NGOs, private sector, and/or academia being involved in the planning/decision-making/implementation process	*"In order to ensure that any policy takes the concerns of all stakeholders into account, the Task Force will continue to solicit and consider suggestions from the public and other stakeholders as to the substance of its proposals" - Thad Allen, US Coast Guard Commandant (2006-2010)*

Appendix 4: National Estuary Programs

The National Estuary Program is a place-based program whose goal is to protect and conserve water quality and other estuarine ecological attribute in the country's most significant estuaries. There are currently 28 recognized National Estuary Programs. The U.S. Environmental Protection Agency provides funding and technical support for the NEPs. Additionally, there are non-EPA recognized Estuary Programs all over the country. Most of them are working to become official EPA NEPs, but it is a long process that often involves support from Congress. Our two study sites are relatively Estuary Programs that have not yet received federal recognition as National Estuary Programs. Both programs do collaborate and coordinate with federal agencies and receive some federal funding.

Appendix 5: Survey for coastal stakeholders

Water Quality Survey

1. What scale of government do you work at?

Mark only one oval.

- ◯ Federal
- ◯ State
- ◯ Local: City
- ◯ Local: County
- ◯ Combination of any of the above
- ◯ NGO
- ◯ Academia
- ◯ Private
- ◯ business Other:

_____

_____

2. Please write the name of your organization [optional]

_____

3. For how many years have you worked on coastal issues?

_____

4. In terms of coastal environmental management, what are the biggest environmental problems/stressors that your agency works to solve? (e.g., habitat loss, pollution, etc.) Please list them in order of greatest to lowest priority (1 being the greatest, 5 being the lowest):

5. In your opinion, why is the problem you placed in the #1 spot the biggest problem?

_____

_____

_____

_____

6. Poor water quality, defined as an impairment of the physical, chemical, and/or biological condition of a water body relative to its designated use (e.g., fishable and swimmable) is a major threat to local economy/society.

Mark only one oval.

◯ Strongly agree

◯ Agree

◯ Neutral

◯ Disagree

◯ Strongly

◯ Disagree

Other:

7. Can you explain why you selected the answer that you did for #6?

_____

_____

_____

_____

8. Reduced water clarity, defined as a reduction in the depth that light can penetrate the water, is a major threat to the local economy/society.

Mark only one oval.

⬭ Strongly Agree

⬭ Agree

⬭ Neutral

⬭ Disagree

⬭ Strongly

⬭ Disagree

Other:

_____

9. Can you explain why you selected the answer that you did for #8?

_____

_____

_____

10. What policies/laws are currently in place to protect or restore water quality in your jurisdiction (e.g., pollution rules, environmental laws)?

11. If your organization works on these water quality policies/laws in any capacity (e.g., scientific, enforcement, awareness raising), please explain how:

12. What policies need to be enacted/reformed to enhance water quality in your jurisdiction?

13. Please explain your rationale to #12

14. Please select an answer to the following statement: Current policies, laws, and regulations are suitable to prevent declines in water quality.

Mark only one oval.

◯ Strongly Agree

◯ Agree

◯ Neutral

◯ Disagree

◯ Strongly

◯ Disagree

Other:

15. Please select an answer to the following statement: Reform is necessary in current policies, laws, and regulations to prevent declines in water quality.

Mark only one oval.

○ Strongly Agree

○ Agree

○ Neutral

○ Disagree

○ Strongly

○ Disagree

Other:

16. Please select an answer to the following statement: Upland development is an urgent policy problem causing changes to water quality.

Mark only one oval.

○ Strongly Agree

○ Agree

○ Neutral

○ Disagree

○ Strongly

○ Disagree

Other:

17. What policies/laws are currently in place to protect or restore water clarity in your jurisdiction (e.g., land use management policies, zoning ordinances)?

18. If your organization works on these water clarity policies/law in any capacity (e.g., scientific, enforcement, awareness training) please explain how:

19. What policies need to be enacted/reformed to enhance water clarity in your jurisdiction?

20. Please explain your rationale to #19

21. Please select an answer to the following statement: Current policies, laws, and regulations are suitable to prevent declines in water clarity:

Mark only one oval.

○ Strongly Agree

○ Agree

○ Neutral

○ Disagree

○ Strongly

○ Disagree

Other:

22. Please select an answer to the following statement: Reform is necessary in current policies, laws, regulations to prevent declines in water clarity.

Mark only one oval.

○ Strongly Agree

○ Agree

○ Neutral

○ Disagree

○ Strongly
Disagree

23. Please select an answer to the following statement: Upland development is an urgent policy problem causing changes to water clarity.

Mark only one oval.

○ Strongly Agree

○ Agree

○ Neutral

○ Disagree

○ Strongly

○ Disagree

Other:

24. Do you work on outreach to the public in order to advocate for policies on coastal water quality or clarity?

Mark only one oval.

◯ Yes

◯ No

◯ Unsure

25. If you answered "Yes" to #24, please describe your outreach program or strategy by answering: A) Who is it aimed at? B) How do you enact it? C) What have the results been?

_____

_____

_____

_____

_____

26. Do you work on outreach to decision-makers in order to advocate for policies on coastal water quality or clarity?

Mark only one oval.

◯ Yes

◯ No

◯ Unsure

27. If you answered "Yes" to #26, please describe your outreach program or strategy by answering: A) Who is it aimed? B) How do you enact it? C) What have the results been?

28. Please select an answer to the following statement: Public outreach on the impacts of upland development and its link to coastal waters is necessary.

Mark only one oval.

- ◯ Strongly Agree
- ◯ Agree
- ◯ Neutral
- ◯ Disagree
- ◯ Strongly
- ◯ Disagree

Other:

_____

29. Please choose an answer to the following statement: I use scientific data in order to make decisions.

Mark only one oval.

- ◯ Strongly agree
- ◯ Agree
- ◯ Neutral
- ◯ Disagree
- ◯ Strongly
- ◯ disagree

Other:

_____

30. Please choose an answer to the following statement: I use scientific data in order to influence or advocate for decisions.

Mark only one oval.

◯ Strongly agree

◯ Agree

◯ Neutral

◯ Disagree

◯ Strongly

◯ disagree

Other:

_____

31. Please choose an answer to the following statement: The amount of scientific data required for decision-making is:

Mark only one oval.

◯ More than adequate (e.g., there's almost too much data to be useful)

◯ Adequate (e.g., there's a good amount of data for decision-making)

◯ Less than adequate (e.g., there is slightly less data than what is required for decision-making)

◯ Significantly below the amount required for decision-making

◯ There is no data to base the decisions required for today's problems

◯ Other:

_____

32. How can the use of scientific data in decision-making be improved in the context of our local bays and estuaries?