

COMANAGEMENT OF U.S. MARINE PROTECTED AREAS:  
CURRENT EFFORTS AND THEIR POTENTIAL IMPLICATIONS  
FOR SEAGRASS MANAGEMENT AT FISHERS ISLAND, NEW YORK

by

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## Executive Summary

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Comanagement is practiced in many countries and recommended as an appropriate, equitable and effective approach to place-based, marine resource management. However, few examples of collaboratively managed marine protected areas (MPAs) involving government and community partners are found in the United States (U.S.). Efforts to share management of MPAs by the state and local communities have emerged in Florida, Hawai'i, and California. These cooperative agreements demonstrate an alternative to the top-down, centralized government approach to natural resource management commonly practiced in the U.S. What conditions enabled or challenged the emergence of comanagement for these MPAs? How have local community norms, values and knowledge contributed to marine resource problem-solving in each case? Can experiences drawn from these cases inform or improve MPA management in other states?

Recent legislation requiring the State of New York to designate Seagrass Management Areas and consult with local community members to effectively protect, manage and restore seagrass provides an opportunity to investigate these questions. In this study, I examined MPAs in Rookery Bay in Florida, Hā'ena in Hawai'i, and Catalina Island in California, where the state and local community share management responsibilities. I focused on the processes whereby solutions to place-based marine resource management problems have emerged as a result of iterative collaboration and considered the potential implications of these efforts for seagrass management at Fishers Island, off the coast of New York in Long Island Sound.

In the **Introduction** to this study, I provide an overview of the history and status of marine resources in Long Island Sound, the current extent and condition of seagrass habitat in the Sound, and factors which have contributed to seagrass decline. I review the circumstances that led to the development of the New York Seagrass Protection Act and whereby comanagement may enhance its implementation at Fishers Island.

In **Understanding Comanagement**, I summarize the historical context, concepts and research underlying comanagement theory. This section includes definitions, types and phases of comanagement, as well as the goals and benefits of taking this approach.

In the next section, I introduce two frameworks for assessing comanagement and describe the **Methods** I used to incorporate these frameworks into a qualitative, comparative analysis of four case studies. I explain how I selected my cases, and used document analysis and semi-structured interviews to evaluate each case.

I present my findings in **Comanagement of U.S. Marine Protected Areas: Case Study Results**. For each case, I describe the development of MPAs and the collaborative agreement, reveal the conditions that gave rise to comanagement, and map its problem-solving functions in the context of the social-ecological system. Using a similar approach, in **Fishers Island, New York: The Case for Community**, I assess the existing preconditions and potential for comanagement by investigating

community members' perceptions, values, hopes and concerns regarding local marine resources and the prospect of Seagrass Management Areas.

In the **Discussion** section, I deliberate the key themes and insights that emerged from this work, and implications for community participation in seagrass management at Fishers Island. Drawing upon my analysis, I recommend five strategies to enhance MPA comanagement:

- Engage communities in human uses monitoring
- Create comanagement practitioner networks
- Establish liaison support for comanagement partners
- Provide flexibility for adaptive MPA management
- Promote a local knowledge 'paradigm shift'

Further, I propose four added conditions or drivers necessary for comanagement of MPAs:

- Connection to place
- A capacity 'crisis'
- Government willingness to partner
- A clear and just process

A well-designed, participatory process and collaborative capacity building by state and local actors are important factors for successful implementation of the New York Seagrass Protection Act. For Fishers Island, comanagement offers an inclusive and just means to achieve protection of local seagrass habitat.

This work is dedicated

to my grandmother, Mechtilde Isabella Amelia Collier,  
who, ever my champion, shared with me her love of nature  
and the meaning of connection to place;

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## Introduction

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Spanning 1300 square miles of water and encircled by 600 miles of coastline along the shores of Connecticut and New York, Long Island Sound is the largest estuary in the northeastern United States (U.S.). Over 20 million people depend on the ecological, social and economic benefits – including billions of dollars generated through fishing, recreation, tourism and other uses – the Sound provides to sustain their way of life. The waters of this shared resource are home to a diverse array of animals, plants and habitats. Notable denizens include four species of sea turtles and fishes ranging from anchovies to basking sharks. Salt marshes and seagrass meadows that fringe the edges of the Sound serve as nurseries and shelter for commercially and recreationally important species such as lobsters, flounder and bay scallops. However, two centuries of settlement and development of the Sound’s watershed, coastline, and benthos, persistent population growth, and attendant land-based sources of pollution have diminished the Sound’s ability to support these ecosystem functions and services.

Historically, seagrass meadows were abundant throughout the bays and harbors of the Sound; but today, decimated by disease and other stressors, less than 10 percent of their historic acreage remains, all of which is constrained to the easternmost reaches of the estuary (Department of Environmental Protection, Department of Agriculture, 2007; New York State Seagrass Task Force, 2009). Research led by The Nature Conservancy to identify the causes of seagrass decline across Southern New England revealed that warming water temperatures and nitrogen pollution – from sewage, fertilizers and the atmosphere – are the major threats to seagrass in the Sound (Short et al., 2012; Woods Hole Group, 2014). Physical disturbances and damage caused by boating, fishing gear, dredging, and coastal construction, and biological impacts caused by disease, invasive species, grazing, bioturbation, and loss of genetic diversity also threaten the persistence of seagrass in the Sound; although the extent and severity of these stressors is not well known (New York State Seagrass Task Force, 2009).

Of the 58 known kinds of seagrass, eelgrass (*Zostera marina*) is the primary species found in Long Island Sound (Short et al., 2007). Despite large-scale deterioration throughout the estuary, eelgrass has persisted where the mouth of the Sound opens to meet the Atlantic Ocean. Here, 98 percent of eelgrass in the New York waters of the Sound is found around Fishers Island (New York State Seagrass



Task Force, 2009). This habitat is in good condition as a result of better water quality, limited development and low population pressure on the island, but is at risk if nothing is done to protect and manage it. Recent modeling results indicate that in the island's East Harbor watershed, excess nitrogen from fertilizer application exceeds seagrass tolerance thresholds (Woods Hole Group, 2014). Physical disturbances from vessel anchoring, seawall and dock construction, submerged infrastructure (e.g. telecommunication cables) and other activities may also be adversely affecting seagrass habitat around the island (personal observations, 2014, 2015).

Seagrass meadows provide benefits for both nature and people. In addition to essential habitat for marine life, they generate oxygen, improve water quality by absorbing nutrients, reduce shoreline erosion by stabilizing sediments, and can store nearly twice as much carbon as terrestrial forests. Recognizing the need to protect and restore seagrass habitat on its underwater lands, in 2006, the New York Legislature established a Seagrass Task Force to examine and make recommendations to improve the state of this valued marine resource (New York State Seagrass Task Force, 2009). In response to the Task Force's recommendations, the Seagrass Protection Act was passed by the New York Legislature in 2012. This law requires the New York State Department of Environmental Conservation (DEC) to protect extant seagrass habitat and regulate coastal and marine activities that threaten seagrass habitat or restoration efforts by: 1) designating seagrass management areas (SMA), 2) developing and adopting a management plan for each SMA, and 3) consulting with local governments, recreational boaters, marine industries, fishermen, affected property owners and other stakeholders so as to effectively manage, protect and restore seagrass (New York Legislature, 2012).

The good condition and extent of its seagrass habitat make Fishers Island a leading candidate for SMA designation. However, in an era of diminishing government funding, and without a local presence or direct access to the island from New York, it is difficult for the DEC to implement this conservation opportunity. SMAs place an additional burden on state resources – already stretched to capacity – to effectively manage, monitor, enforce, and maintain them.

Increasingly, comanagement is recommended as an approach to protected area management wherein each partner contributes what they do best (Lane, 2001; Berkes, 2009; Ayers and Kittinger, 2014). The Fishers Island community has a long history of commitment to conservation and

stewardship of the island's natural resources (P. Rafferty, E. McCance, J. Kibbe, personal communication, July 23, 2015). It also has a proven track record of self-organizing with the vision and capacity to address local problems (Yale Urban Design Workshop, 2014). These factors, combined with the extensive, sound-wide loss of seagrass habitat and the enabling legislation described earlier, may present an opportunity for comanagement – in which the state and the island community share management authority – of Fishers Island's marine resources through implementation of the New York Seagrass Protection Act.

In this study, I consider how local community norms, values, and knowledge are incorporated into marine resource management. I examine efforts to share governance of marine protected areas (MPAs) in U.S. coastal waters to assess opportunities for increasing the participation of local people in marine resource management in western cultures, and sharing information about approaches used in other states. What conditions have enabled or challenged the emergence and success of comanagement in U.S. marine managed or protected areas? How can comanagement experiences drawn from other U.S. cases inform seagrass protection and management options at Fishers Island, New York?

To investigate these questions, I reviewed the history, concepts and research underlying comanagement theory; I studied three cases of comanagement currently underway in U.S. MPAs; and I identified community perceptions and factors that may support or hinder building the capacity needed to collaboratively protect and manage seagrass meadows around Fishers Island, New York for the people and wildlife that depend on them.

## Understanding Comanagement

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### Historical Context

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The origins and practice of comanagement have been traced back to fisheries management in Europe and Asia during the 19<sup>th</sup> century (Berkes, 2009; Pinkerton, 1989). Berkes (2007, 2009) recounts one of the first known cases, whereby the Norwegian government negotiated a legal agreement in the 1890's with the cod fishermen of Lofoten Island to resolve gear and allocation disputes. In another early example, after abolishing traditional fishery management systems and realizing it could no longer afford to regulate its nearshore fisheries, the Japanese administration formally sanctioned local community fisheries management rights in 1886 (Pinkerton, 1989; Makino and Matsuda, 2005).

Today, comanagement is recognized and practiced in many developing and developed countries as an easier and more cost-effective alternative to top-down, centralized management of fisheries, coral reefs, mangroves, wetlands and protected areas (Berkes, 2010; Granek and Brown, 2005; Gruby and Basurto, 2013; Katon et al., 2000; Pinkerton, 1989; Weeks and Jupiter, 2012). However, in the U.S., collaborative management of marine resources by local communities and state agencies is still a relatively recent phenomena that has emerged primarily in response to the call for alternative approaches to fisheries management and recognition of indigenous community rights (Acheson, 2001; Levine and Richmond, 2014; May, 2008, Pinto da Silva and Kitts, 2006). With the exception of Hawai'i, few examples of comanagement of marine managed or protected areas in the U.S. are found in the literature.

### Definitions and Theory

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Berkes et al. (1991) define comanagement as, "the sharing of power and responsibility between government and local resources users" (p.12). However, this definition fails to account for the variety of negotiated arrangements - ranging from sharing information to delegated governance - that fall under the comanagement banner. While no single description captures the full range of systems, the World Conservation Congress accounts for a broader spectrum of actors, situations and arrangements by defining comanagement as, "a partnership in which government agencies, local communities and resource users, non-governmental organizations and other stakeholders negotiate, as appropriate to each context, the authority and responsibility for the management of a specific area or set of resources" (IUCN, 1996, p.71).

The primary goals of comanagement are three-fold; to make natural resource management more appropriate, more efficient and more equitable (Armitage et al., 2007; Pinkerton, 1989). May (2008) makes the case for community-based governance over centralized government management as a means to increase the efficiency and efficacy of resource management because it is based on local norms, or informal rules, values and knowledge that are matched to, and derived from, situational factors. The objectives of comanagement are sought through agreements – legal or informal – negotiated between local communities or resource user groups and government. These agreements offer an array of potential benefits and solutions to natural resource management problems. They may foster local conservation and natural resource restoration or enhancement; improve data quality by incorporating local knowledge; reduce competition and conflicts among resource users and between users and government through participatory, democratic decision-making processes; and promote local economic development as communities move towards self-reliance and gain greater influence and control over their resource base (Armitage et al., 2007; Pinkerton, 1989). Grounded by the reality of ever-changing conditions, complexity and uncertainty, Armitage et al. (2007) underscore the importance of incorporating flexibility and learning from actions over time so that *adaptive comanagement* may emerge from and improve collaborative community-government partnership agreements.

Comanagement has evolved as a means to increase community and resource user participation in decision-making and highlights the pro-social aspects of collaboration among stakeholders. In his review, Berkes (2007) calls attention to the complexity of its evolutionary nature by classifying ‘seven faces’ of adaptive comanagement: as power sharing, as institution building, as trust building, as process, as social learning, as problem solving, and as governance. Adaptive comanagement then, evolves over time and involves collaboration among a flexible network of stakeholders, ranging from local communities and municipalities, to state, national or international government agencies and organizations (Berkes, 2007). Taking an alternative view, Carlsson and Berkes (2005) characterize comanagement as “a *process* of collaborative, iterative, problem-solving”. Through this lens, shared governance of natural resources is the result, rather than the starting point, of the emergence of comanagement (Carlsson and Berkes, 2005).

## Types and Phases of Comanagement

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McConney et al. (2007) describe three types of comanagement spanning a continuum from consultative to collaborative to delegated, depending on the extent to which management tasks are shared, as follows. At the consultative end of the spectrum, government exercises the greatest control, interacting with local communities, but retaining all decision-making authority. In a collaborative comanagement partnership, decision-making is shared and results from government and local communities working together. At the opposite end of the spectrum, local people exercise the most control when government formally delegates decision-making to a community or organized group. McConney et al. (2007) recognize the evolutionary nature of comanagement noting that negotiated arrangements develop in the pre-implementation phase, progress to trials and adjustments during implementation, and then are sustained through maintenance activities during the post-implementation phase. Comanagement partners often spend several years in each stage. Finally, comanagement systems may also be considered 'complete' when each of the various management functions is shared, or 'incomplete' when only certain tasks or activities are shared (Pinkerton, 1989). Efforts may begin with comanagement of one function and be expanded later to include additional tasks as the actors in the system gain experience, build trust and strengthen institutional capacity.

## Methods

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### Frameworks for Assessing Comanagement

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Plummer and Fitzgibbon (2004) reviewed and synthesized the literature on comanagement theory to identify six preconditions that may lead to the emergence of comanagement. These preconditions include:

1. a real or imagined natural resource crisis,
2. willingness by local users to contribute,
3. an opportunity for negotiation,
4. a legally mandated or brokered incentive,
5. leadership energy, and,
6. a common vision and existing networks.

To understand the problem-solving function of comanagement systems, Carlsson and Berkes (2005) proposed the following six-step research approach:

1. define the social-ecological system under focus, i.e. the group, community or resource system of interest,
2. map the essential management tasks to be performed and the problems to be solved,
3. clarify the participants and processes in comanagement activities related to problem-solving processes,
4. analyze linkages by comparing practices and levels of decision-making among cases,
5. evaluate capacity-building needs, and,
6. prescribe remedies that contribute knowledge to the process of problem solving and policy making.

For this research, I used a qualitative, case study-based approach to conduct a comparative analysis of U.S. MPAs in three states using Plummer and Fitzgibbon's (2004) criteria to identify the preconditions that contributed to the emergence of comanagement in each case and their potential implications for designating and managing SMAs at Fishers Island, New York. I applied Carlsson and Berkes' (2005) framework to evaluate those current or emerging cases – focusing on the function, as

well as the formal structure, of comanagement – and to reveal the factors that have contributed to, or impeded, the success of shared governance of marine managed or protected areas.

### Selection of Comanagement Cases

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I applied three criteria to select case studies where comanagement systems have already emerged. First, I identified current examples of comanagement located within the U.S. to ensure their socio-political context would be as relevant to Fishers Island, as possible. Second, I chose case studies involving clearly defined marine protected or managed area boundaries, analogous to the SMAs proposed for New York. Finally, I selected three case studies where marine habitat protection, including seagrass habitat, is a primary management objective.

### Data Collection and Analysis

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I used a mixed-method design to conduct this research: (1) document analysis, and (2) interviews. I examined peer-reviewed literature and non-academic source documents to explore the theory of comanagement, and to identify and select three U.S. cases – in Florida, Hawai'i and California – where institutional and social conditions, policies and other features have facilitated the emergence of comanagement systems. For the interviews, I developed two semi-structured protocols – one for my analysis of existing or emerging comanagement case studies (Appendix A) and one to assess options for seagrass management at Fishers Island (Appendix B).

McConney et al. (2003) define 'stakeholders' as "those whose interests, resources, power or authority suggest they are likely to substantially impact, or be impacted by, management or its absence" (p.7); and, Plummer and Arai (2005) highlight the inherent diversity of backgrounds, values and levels of understanding among stakeholders brought together through comanagement initiatives. Research by these and other authors stresses the importance of recognizing and including stakeholders with social and cultural differences, as well as common interests, in comanagement processes (McConney et al, 2003; Plummer and Arai, 2005; Sandersen and Koester, 2010). In this study, I captured a range of perspectives by selecting interview participants who represented different stakeholder sectors. In all four cases, I identified prospective individuals to interview by querying knowledgeable sources (community members, local environmental and government agency representatives), and reviewing news articles and internet sources between July and November 2015. On Fishers Island, I recruited additional participants through notices placed on community bulletin

boards. Participants also recommended potential interviewees. I purposefully selected individuals to interview who were consistently named by different sources as individuals who could provide information specifically relevant to my research objectives.

During October and November, 2015, I conducted 15 semi-structured, interviews lasting 30-80 minutes each with community members and key actors involved with coastal and marine resources or governance at Fishers Island, New York. From December 2015 to February 2016, I conducted 10 additional semi-structured interviews lasting 50-90 minutes each with community, government and non-governmental organization representatives experienced with comanagement efforts in the states of Florida, Hawai'i and California. In total, I conducted 25 interviews. Tables 1 and 2 display a count of interview participants by community, stakeholder sector and residency status. Primary affiliations indicate the sector in which interviewees work; secondary affiliations indicate volunteer or ancillary work associations.

**Table 1. Affiliation of interviewees (n=25) by community, primary and secondary sectors, defined as follows.** *Community organizations* are groups comprised of community members working on community issues or external organizations that support community groups. *Government* means local, state or federal agency representatives. *Business or service industry* includes private professionals or service providers. *Environmental organizations* are non-profit environmental advocacy or conservation groups. *Educational institutions* include schools, universities and museums.

Stakeholder Sector	Rookery Bay, Florida (n=2)		Catalina Island, California (n=5)		Hā'ena, Hawai'i (n=3)		Fishers Island, New York (n=15)	
	Primary	Secondary	Primary	Secondary	Primary	Secondary	Primary	Secondary
Community Organization	1	1		5	2	2		5
Government	1	1	1		1	1	2	6
Business or Service Industry			1				9	2
Environmental Organization			2					2
Educational Institution			1				4	



**Table 2. Residence status of interviewees (n=25) by community.**

<b>Residency</b>	<b>Rookery Bay, Florida</b>	<b>Catalina Island, California</b>	<b>Hā'ena, Hawai'i</b>	<b>Fishers Island, New York</b>
Year-Round	1	2		11
Seasonal				4
Previous			2	
Non-Resident	1	3	1	

I interviewed 14 people in person and conducted 11 interviews by telephone. Each interview was digitally recorded and then transcribed using f4 transcription software. Using Plummer and Fitzgibbon’s (2004) criteria and Carlsson and Berkes’ (2005) six-step evaluation process, I developed a coding framework to reveal the preconditions for, and the problem-solving mechanisms enabled by, comanagement in each case study. During my analysis, three additional themes emerged – 1) a deeply, personal identification with the case study location conveyed by participants in all four cases, 2) a sense of connection to Fishers Islanders voiced by islanders from Hā’ena and Catalina accompanied by an expressed desire to impart their local knowledge to other islanders, and 3) Fishers Islanders hopes and concerns regarding Seagrass Management Areas. I incorporated these supplemental themes as *connection to place*, *shared knowledge*, and *hopes and concerns* within my coding system. Interview transcripts were coded and analyzed with NVivo 11 Pro (QSR International) qualitative analysis software. Documents were coded manually. To compensate for the lower number of respondents for each reference case, I supplemented my primary interview findings with a review and an analysis of secondary information derived from peer-reviewed literature, institutional reports and policy documents available for each case, and combined my findings for all three comanagement cases to analyze the linkages and problem-solving considerations among them. Care was taken to incorporate multiple perspectives, to characterize both positive and negative views of comanagement, and to note instances where secondary sources differed with interviewee responses. Nonetheless, the findings presented in the results that follow are not intended to be representative of, or interpreted as, a quantitative survey approach.

I began the analysis of my three comanagement cases with an overview of the MPA designation process and development of associated comanagement agreements for each case. Next, I analyzed my coded data and documents by proceeding sequentially through the first three steps of Carlsson

and Berkes' (2005) research approach to illustrate the socio-ecological system, identify the resource management and governance problems, and reveal the participants and processes involved in each comanagement case. I examined interview participant responses to determine what human or environmental conditions had set the stage for comanagement in each situation in accord with the criteria identified by Plummer and Fitzgibbon (2004). Then, I used Carlsson and Berkes' (2005) last three steps to look across all three comanagement cases, analyzing the linkages among management actors and activities, evaluating capacity building needs, and revealing problem-solving functions and policy-making options that may be applicable to seagrass management at Fishers Island.

Finally, I used the first two steps of Carlsson and Berkes' (2005) approach and Plummer and Fitzgibbon's (2004) criteria to assess the potential for comanagement of seagrass habitat at Fishers Island. Options for implementing comanagement to protect seagrass resources at Fishers Island were derived via steps three through six of the problem-solving analytical process (Carlsson and Berkes, 2005). Direct quotes from interview participants are integrated throughout my results to highlight considerations for possible comanagement by the Fishers Island community and the New York DEC. Results are presented geographically, by each case study site. To protect the identity of individual interviewees, respondents were coded as Participants 1 through 25.

## Comanagement of U.S. Marine Protected Areas: Case Study Results

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### Florida

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#### Development and Implementation of MPAs with Comanagement Agreements

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Following the adoption of a 1969 resolution by the Governor and Cabinet of Florida to protect 18 water bodies as aquatic preserves, in 1975, the Florida Legislature passed the Aquatic Preserve Act to recognize and protect the aesthetic, biological, and scientific value of these and other state waters in their natural condition (Florida Legislature, 2015b). Aquatic preserves recognize the threats to natural resources associated with growing human populations and emphasize the protection of aquatic habitats – ranging from freshwater springs and estuarine salt marshes to seagrass meadows and mangrove forests – to sustain the wildlife species that depend upon them, Florida’s cultural heritage and recreational opportunities (Florida Legislature, 2015b). Today, the state boasts 41 aquatic preserves.

For more than 25 years, the Florida Department of Environmental Protection (FDEP) has formally partnered with local community members, including businesses, families and retirees to support the management goals of its aquatic preserves and state parks. Florida’s citizen support organizations (CSOs) are voluntarily formed and incorporated by community members, and sanctioned by the Florida Department of State as non-profit organizations, under section 258.015, Florida Statutes (Florida Legislature, 2015a). CSOs are organized and operated to protect and restore the state’s natural and cultural resources by conducting programs and activities, raising and administering funds, and making expenditures to, or for the benefit of, state parks and aquatic preserves (Florida Legislature, 2015a). The CSO legislation was originally created to support the management of the Florida’s state parks and expanded later to include aquatic preserves. Here, I evaluate the CSO model as a type of comanagement agreement (McConney et al., 2007).

#### The Rookery Bay Social-Ecological System<sup>1</sup>

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People have lived in southwest Florida since hunters and gatherers journeyed to the region over 10,000 years ago seeking a more hospitable winter climate; however, the earliest evidence of permanent settlements in the area dates back to 1880, when a few pioneers and Tallahassee

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<sup>1</sup> Carlsson and Berkes (2005) Step 1

businessmen came to the area now known as Collier County, establishing communities like the town of Naples along the coast, and ranches and farms in the county's interior (Collier County Museums, 2016). The 1920's brought a surge of development to the region, including roads and railroads to expand agricultural opportunities and introduce tourism (Collier County Museums, 2016). By 1950, oil exploration and logging interests increased the local population to more than 6000; and by 1980, these industries, coupled with real estate development, pushed the population to over 85,000 (Collier County Museums, 2016). Today, more than 300,000 people live in the coastal communities within the Naples-Marco Island Metropolitan Area, a region considered to be among the wealthiest in the nation (U.S. Census Bureau, 2010).

Located on the coast of Collier County, Rookery Bay and Cape Romano-Ten Thousand Islands are two of the oldest aquatic preserves in the state-wide system. Designated in 1969, the Cape Romano-Ten Thousand Islands Aquatic Preserve spans 51,470 acres of coastal backwater flats, bays, mangrove islands and open water adjacent to the western edge of the Everglades (FDEP, 2012). Bordered by undeveloped public lands and waters, access to this preserve is primarily limited to boats. East of Cape Romano-Ten Thousand Islands, the 58,076 acre Rookery Bay Aquatic Preserve, established in 1977, is comprised of three lagoonal bays, barrier islands that open to the Gulf of Mexico, and is flanked by the urban populaces of Naples and Marco Island (FDEP, 2012). Together, these two state preserves share closely coinciding boundaries with the aquatic portion – approximately 70 percent – of the area designated in 1978 as the Rookery Bay National Estuarine Research Reserve (RBNERR), hereafter referred to as the Rookery Bay Reserve-Preserve system (Figure 1).

As one of the few remaining, undisturbed mangrove estuarine systems in the U.S., Rookery Bay features oyster bars, salt marshes and seagrass meadows comprised of four species – Cuban shoal grass (*Halodule wright*), manatee grass (*Syringodium filiforme*), star grass (*H. engelmannii*), and turtle grass (*Thalassia testudinum*) (FDEP and NOAA, 2013). These natural resources provide essential habitat for numerous species, including 250 species of fish, 150 species of birds and other wildlife (FDEP and NOAA, 2013). Prehistoric Native American archeological sites and cultural resources are also found within the Rookery Bay Reserve-Preserve system.

Recreational use of the Rookery Bay Reserve-Preserve system – especially boating and sport fishing – is popular with both local community members and visitors. In the southern portion of the Reserve-Preserve system there is also some commercial harvesting around Ten Thousand Islands and emerging interest in hard clam mariculture. The benefits derived from Rookery Bay’s estuarine ecosystem and cultural resources sustain an \$859 million tourism, fishing and boating economy that attracts upwards of 3000 visitors to the region each day (FDEP, 2012). In 1987, a coalition of local community members established the Friends of Rookery Bay (FORB), through a CSO agreement with

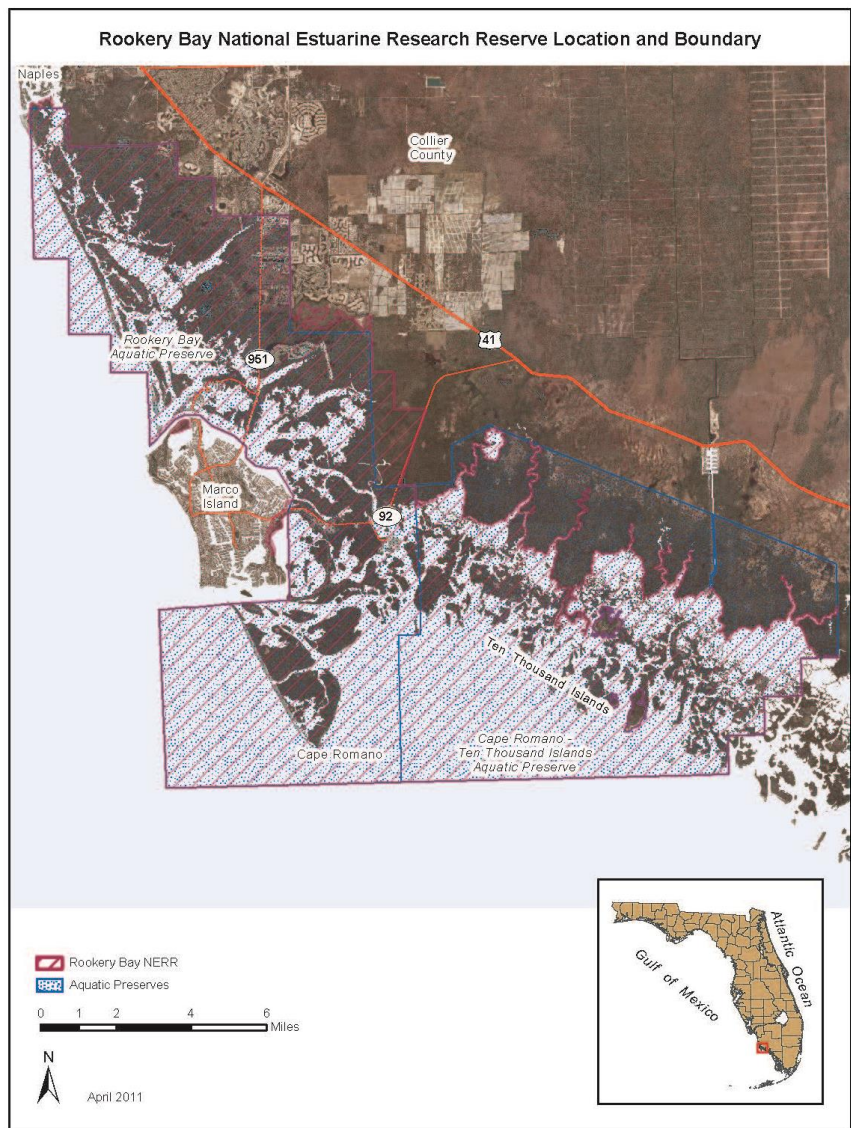


Figure 1. The Rookery Bay Reserve-Preserve system (Source: FDEP, 2012).

state managers at the Reserve-Preserve to help state staff manage the system’s coastal lands and waters (the CSO-Reserve-Preserve partnership). The significance of involving people who are connected to the place is highlighted by this quote from Participant 25, who I interviewed for this study.

“I think first and foremost, these were individuals that already had their own personal connection with the area. In other words, they had spent enough time out on the water and they recognized the value of Rookery Bay in their own lives....What brought them to the table was that they already had their own personal connection with the area and they knew what value it had. It's very powerful” (Participant 25). *Connection to place*

## Problems to Be Solved, Essential Management Tasks and Decisions <sup>2</sup>

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Using data coded from interview responses, I identified five major themes related to current natural resource management problems at Rookery Bay: water quality, recreational misuse/overuse, encroaching development, protected species and governance. Problem areas, sources, impacts and the management tasks proposed by interviewees to solve them are summarized in Table 3.

### *Natural Resource Impacts*

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Although most of the Naples-Marco Island area is sewerred, water quality impacts stemming from multiple sources continue to threaten Rookery Bay's habitats and species. Interview Participant 25 explained that septic systems on Marco Island used to be a serious environmental concern until Rookery Bay stakeholders successfully persuaded the city to replace those systems with advanced wastewater treatment. However, leaching and failing septic systems in other parts of the area are still a problem.

“We have trailer parks along Harrison Creek, for example, where they still haven't converted to advanced sewage treatment. So again, seasonal pulses, where we get a lot of bacteria, and raw sewage in some cases, when these systems overflow right into our tidal creeks and into the reserve” (Participant 25). *Water quality - Leaching and failing septic systems*

Degradation of seagrass habitat is also attributed to water quality problems associated with sediment that is transported into Rookery Bay by long shore currents from upstream beach renourishment projects at Naples and Marco Island.

“As you can imagine, with sea level rise and increasing coastal erosion, they're pumping more and more sand on the beaches. As that erosion continues, we're getting a lot of deposition of sediment. ... The seagrass areas in Cape Romano used to be some of the most robust seagrass areas that we have in the county and we've seen that area diminish significantly in the last 10 years or so” (Participant 25). *Water quality - Beach nourishment*

Appreciation for Rookery Bay's aesthetic and recreational value at the extreme can lead to overuse or misuse of popular areas, resulting in direct physical, and often cumulative, impacts and degradation of marine habitats in the bay from boating activities. Management of recreational boating has been hampered by reductions in state funding.

“As we get more and more people coming in with this new [development] boom, there are areas that I would say – the south end of Keewaydin Island and the surrounding submerged habitats around it – we literally get thousands of boats that come out there in season. And a

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<sup>2</sup> Carlsson and Berkes (2005) Step 2

**Table 3. Problems, sources, impacts and essential management tasks at Rookery Bay Reserve-Preserves.**

<b>Problem Area/Source</b>	<b>Impacts</b>	<b>Management Tasks</b>
<b>Water Quality</b>		
Leaching and failing septic systems	<ul style="list-style-type: none"> <li>Seasonal pulses of elevated bacteria, nutrient pollution and untreated solid waste</li> </ul>	<ul style="list-style-type: none"> <li>Promote advanced wastewater treatment</li> <li>Outreach to developers</li> <li>Work with trailer park managers</li> <li>Water quality monitoring</li> </ul>
Beach nourishment	<ul style="list-style-type: none"> <li>Sediment drift and deposition</li> <li>Seagrass degradation</li> </ul>	<ul style="list-style-type: none"> <li>Research to track sources</li> <li>Work with local governments – planning and sand quality</li> </ul>
Timing, volume and quality of fresh water flows	<ul style="list-style-type: none"> <li>Salinity fluctuations</li> <li>Polluted runoff</li> </ul>	<ul style="list-style-type: none"> <li>Work with local governments – planning and storm water management</li> <li>Work with agricultural sector</li> </ul>
<b>Recreational Misuse/Overuse</b>		
Boating	<ul style="list-style-type: none"> <li>Anchor damage on benthic communities</li> <li>Props scars on seagrass</li> <li>Cumulative impacts in intensive boating areas</li> </ul>	<ul style="list-style-type: none"> <li>Outreach marinas and boaters – especially rental boaters</li> <li>Damage assessment</li> <li>On the water education and enforcement</li> <li>Seagrass restoration</li> <li>Coastal cleanups</li> </ul>
<b>Encroaching Development</b>		
Dock construction	<ul style="list-style-type: none"> <li>Benthic habitat disturbance, shading</li> </ul>	<ul style="list-style-type: none"> <li>Land acquisition</li> <li>Outreach to local government, homeowners within aquatic preserve boundaries</li> </ul>
<b>Protected Species Impacts</b>		
People and pets on the beach	<ul style="list-style-type: none"> <li>Trampling sea turtle and shorebird nests</li> </ul>	<ul style="list-style-type: none"> <li>Education and outreach</li> <li>Protect nests (cages, signage)</li> <li>Wildlife monitoring</li> </ul>
Habitat Loss	<ul style="list-style-type: none"> <li>Species declines</li> </ul>	<ul style="list-style-type: none"> <li>Education and outreach</li> <li>Restoration –replanting seagrasses, mangroves, salt marshes</li> </ul>
<b>Governance</b>		
Changing state governors, administration and legislature	<ul style="list-style-type: none"> <li>May erode state funding sources and capacity</li> </ul>	<ul style="list-style-type: none"> <li>Education and advocacy</li> </ul>
Governor, state administration and legislature mistrust	<ul style="list-style-type: none"> <li>Undermines CSO-Reserve partnership</li> </ul>	<ul style="list-style-type: none"> <li>Education</li> </ul>
Limited CSO capacity to self-organize (some CSOs outside of Rookery Bay)	<ul style="list-style-type: none"> <li>May weaken or limit partnership potential or effectiveness</li> </ul>	<ul style="list-style-type: none"> <li>Strengthen CSO leadership</li> <li>Raise funds to hire CSO director</li> <li>Provide CSO training, guidance</li> <li>Involve NGOs</li> </ul>
Inadequate state funding	<ul style="list-style-type: none"> <li>Diminished resource management and administrative capacity</li> </ul>	<ul style="list-style-type: none"> <li>Increase, diversify membership</li> <li>Host fundraising events</li> <li>Develop innovative partnerships to generate sustainable funding</li> </ul>



lot of these are rental boats. Marinas will rent, and of course they typically won't allow their rental boats to go out on the Gulf [of Mexico], so they direct them to areas within the reserve because they are considered to be relatively safe. So we have a lot of cumulative impacts related to that kind of intensive boating – anchoring, prop scarring of seagrass, and those kinds of things that occur” (Participant 25). *Recreational misuse/overuse - Boating*

Acquisition of adjacent land has helped to buffer Rookery Bay from some of the impacts associated with nearby development pressure.

“Isolated areas, like Isle of Capri, where we do have [Reserve-Preserve] boundaries that come right into the urban areas, definitely we're looking at things like dock development. But it's not at the scale that I've seen, for example, in Tampa or Charlotte Harbor or even Estero. ...We're fortunate with the Rookery Bay Reserve that we were able to successfully secure a lot of the coastal lands within the boundaries in public ownership” (Participant 25). *Encroaching development - Dock construction*

However, development of the upstream watershed and areas where the urban landscape adjoins the Reserve-Preserve system continue to impact the health of Rookery Bay.

“Certainly in the past, we have had significant challenges with a development community that really didn't understand the connection between water flows and water quality, for example, and impacts downstream. I think that continues to be a challenge as we see more growth. The same thing with the agricultural community – lack of awareness and understanding of those watershed connections has led to impacts, and I think that continues to be a challenge” (Participant 25). *Water quality - Timing, volume and quality of fresh water flows*

### *Governance Decisions and Challenges*

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At the local level, the CSO-Reserve-Preserve partnership is strong. Interview respondents indicated that having a CSO contributes to positive relationships among community members and local state representatives. However, challenges remain at the highest level of Florida's administration. Changing administrations, disconnection from local people and places, distrust and funding cuts by leadership in the state capital can create challenges at the local level and limit the extent to which CSOs can contribute to management decisions.

“We saw a significant setback of investment by the state during the recession years. But as we've recovered from the recession and the budget has recovered, we've never recovered that budget. We need to have a state government and administration that understands the value of these areas and is willing to reinvest as the budget has recovered. Right now, it's like \$1.3B in surplus and we've got an administration that still wants to cut positions out of our programs. Ultimately, what you'd like to see is a nice balance there where the State of Florida steps back in, and they have a strong leadership role. We lost it” (Participant 25). *Governance - Inadequate state funding*



“We have a fantastic opportunity to bring in about \$5M from the private sector to help get a 64 acre mangrove site fully restored within the boundaries of the research reserve. Some private interests in China have stepped up because they are interested in learning about applying carbon credits, long-term, to the restoration of mangrove and forested wetlands in mitigating the impacts of carbon dioxide in the atmosphere and climate change. The FORB has been involved in these discussions and negotiations over the past year or so and part of it is what we've structured as an opportunity for the Friends to fund a full-time position at Rookery Bay for 5 years and everybody has been very supportive of that, with the exception of the administration in Tallahassee. Basically, what we have is not only lack of understanding, but a complete distrust of CSOs in Tallahassee” (Participant 25). *Governance - Governor, state administration, and legislature mistrust*

### Comanagement Participants and Processes<sup>3</sup>

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The FDEP is charged with protecting, conserving and managing Florida’s natural resources and enforcing the state’s environmental laws. The FDEP Coastal Office is responsible for managing the state’s aquatic preserves and coordinates management of its three National Estuarine Research Reserves, the Florida Keys National Marine Sanctuary and Florida’s Coral Reef Conservation Program with the National Oceanic and Atmospheric Administration (NOAA).

An important factor in the dual designation of Rookery Bay is that the NERR designation is made through the state’s Coastal Zone Management Act (CZMA), and thus does not convey any authority to the RBNERR to directly enforce protection of the resources within its boundaries. Under the CZMA, the federal role is to support the state’s lead in managing its coastal resources; the state must provide enforcement authority and management capacity within the boundaries of the reserve. In Rookery Bay, the aquatic preserve designations provide the necessary state enforcement authority to support the regulatory framework of the protected area. The Florida Fish and Wildlife Commission (FWC) provides enforcement of Florida’s aquatic preserves and other environmental and public safety laws, which is extended to the research reserve through Rookery Bay’s dual designation. The mission of the RBNERR is to promote and inform management decision-making through research and education, which inherently necessitates the engagement of its local communities.

Recognizing its social, ecological and economic benefits, the mission of the FORB, Rookery Bay’s CSO, is to support preservation and enhancement of the bay’s estuarine system. FORB gained official

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<sup>3</sup> Carlsson and Berkes (2005) Step 3

recognition by the state as a non-profit, community volunteer organization and has worked closely with state resource managers since its inception to enhance management of the Rookery Bay Reserve-Preserve system and connect people to its estuarine environment through education, engagement and stewardship (FDEP and NOAA, 2013). With the support of the FORB, the Rookery Bay's Research Reserve and Aquatic Preserve managers cooperate to protect, and educate visitors about, the estuary's cultural and natural resources.

“The CSOs are raising money, basically, and lobbying and that sort of thing, and providing volunteer efforts according to the direction of the researchers there” (Participant 24).

A formal written agreement outlines the roles and responsibilities of the CSO and the state. The relationship is a partnership, wherein the CSO and the Reserve-Preserve managers and staff work together to accomplish the management goals of the protected area. The CSO contributes volunteer and financial support, but it does not hold any authority to oversee management of the protected area or replace Reserve-Preserve management or staff. Florida Statutes require CSOs to incorporate as a not-for-profit, to establish bylaws and to be managed by a Board of Directors with elected officers.

“[The CSO officers] are term-limited but not capped. You can elect your president over and over again. State employees can join [the CSO], but they can't manage it” (Participant 24).

## Preconditions for Comanagement

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### *Crisis*<sup>4</sup>

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While the designations of the research reserve and aquatic preserves were made in response to local concerns about increasing development pressure on Rookery Bay, the formation of the FORB CSO was primarily driven by the need to improve local capacity to manage the Rookery Bay Reserve-Preserve system and develop programs after it was in place.

“Some of the area was slated for some heavy development. In fact, some of the canals were already dug and mangroves destroyed and all of that - the whole watershed rearranged. I remember some of the land acquisition was prompted by the need to protect that area” (Participant 24).

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<sup>4</sup> Plummer and Fitzgibbon (2004) Precondition 1

“I would say one of the bigger drivers at the time was just trying to get a stronger volunteer base for helping support our work. A little bit of it was also helping raise a little bit of money to help support a pretty thin budget at the time... But I would have to say it wasn't driven by any serious environmental concern. It was really more just the opportunity to help increase capacity” (Participant 25).

### *Willingness to Contribute*<sup>5</sup>

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The small group of community leaders who worked with the state to establish the FORB were already working together on local land conservation initiatives, and promoting stewardship and educational use of Rookery Bay.

“There was this core of activism that preceded [the designation of] Rookery Bay [Reserve-Preserves]. Some of the nucleus of that group spun into the Rookery Bay CSO” (Participant 24).

These individuals had gained experience with self-organizing and developed relationships within the community and with the state. These factors contributed to building trust, respect, capacity and a common vision within the community. However, ultimately, their willingness to contribute to the mission and management of Rookery Bay was borne out of their personal connection to the place.

“I think there is just a certain percentage of people that are, you know, living where they are because they love the place and they're going to want to do something to keep it that way. Some people are just that way” (Participant 24).

### *Opportunity for Negotiation*<sup>6</sup>

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The State of Florida requires creating a formal agreement to set up a CSO, which opens the door for negotiation by the prospective partners. The terms of the partnership between the local community and the Rookery Bay Reserve-Preserves are specified in their CSO Agreement. The relationship was formally established when the agreement was signed by the FORB President and the Reserve-Preserve Manager during the incorporation process. The provisions of the agreement outline the roles and expectations of how the partners will work together.

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<sup>5</sup> Plummer and Fitzgibbon (2004) Precondition 2

<sup>6</sup> Ibid, Precondition 3

### *Legal Mandate or Brokered Incentive<sup>7</sup>*

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In this case, by setting forth legislation enabling the establishment of CSOs, the State of Florida provided a brokered incentive for any group of interested community members to collaborate with the state and assist the FDEP Coastal Office in accomplishing its aquatic preserve management goals (Florida Legislature, 2015a).

“Rookery Bay was established in response to fairly strong public effort to get the land purchased and conserved and get a NERR established there. ... And then, once [the Reserve] was there, then followed the administrative part of organizing it and regulating it and that sort of thing, and directing it” (Participant 24).

### *Leadership Energy<sup>8</sup>*

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The leadership to develop a CSO for Rookery Bay originated with a staff member of the reserve and a small group of professional educators from the local community who were trying to develop educational marine science programs at the RBNERR.

“The original steering committee of the Friends was really mostly teachers. We had an Edison Community College faculty member. We had a couple of high school science teachers. I think we had an attorney who was a friend of one of the teachers, and that was our steering committee... [We] formed a small team of volunteers and some contract staff with the Friends of Rookery Bay to do all the work necessary... and then go out and recruit additional membership and local communities” (Participant 25).

Active, aligned leadership and close communication was and continues to be an essential for the success of the CSO-Reserve-Preserve partnership. Early leadership of the FORB was collegial and informal. Over time, as leadership responsibilities grew, the CSO governance structure became formal, business-oriented, and focused.

“I would say in the early days that process, the criteria back in the 80's and early 90's to get on the board of directors for the Friends, when it was a very small grass roots group, the criteria was if you had an interest and you had the time, and that was it. As we started growing the program and realizing we had broader, bigger goals, we started being much more strategic about the individuals we recruited to the board, so we started looking at leadership in the public/private sector - folks who had networks and ways that they could strategically help what the Friends of Rookery Bay was trying to accomplish. How they are accepted by the community? I think that really depends on the level of outreach into the community once you've established a Chair and a Vice Chair - how actively engaged they really are. I would say generally, because Friends groups are not seen as political...or working against a site, I think

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<sup>7</sup> Plummer and Fitzgibbon (2004) Precondition 4

<sup>8</sup> Ibid, Precondition 5

most coastal communities are very accepting of the leadership of these Friends groups because they generally accept what they are doing” (Participant 25).

### *Common Vision or Existing Networks<sup>9</sup>*

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CSOs have no direct resource management authority. However, they perform essential management functions including outreach and education, research support, administrative support, raising funds, and increasing the profile of the MPA on the basis of a shared vision and common goals for the Rookery Bay Reserve-Preserves.

“The [Friends] and Rookery are pretty tight, so they are not doing anything that Rookery doesn't want them to do. They are mostly partners with the Aps [aquatic preserves] and the staff of the NERR. APs are pretty heavily involved within the CSO themselves” (Participant 24).

“The general vision of the Friends is to work with the local community of southwest Florida to support the mission of the Rookery Bay [Reserve-Preserve system]. It's a very mission-focused vision; so the Friends rarely get involved in work that doesn't link back to the mission of the reserve in some way, shape or form” (Participant 25).

Partnerships with existing networks outside of the CSO and the Rookery Bay Reserve-Preserve system enhance management capacity for the protected area.

“Outside of the CSO, there are a lot of strategic partnerships. Good ones include with some of our local academic institutions – Florida Gulf Coast University, Florida Southwest College, and public schools – these are all the institutions that I think value, for example, the educational opportunities that Rookery Bay provides. Private sector, we've got organizations like the Marine Industries Association that represents something like 83 different local marine businesses – like marinas that rent boats, sell fuel, and those kinds of things – and they have been strong supporters of the Rookery Bay Reserve for a number of years” (Participant 25).

In addition to traditional MPA partners such as educational institutions, and recreational industries, Rookery Bay leaders have pursued support from non-traditional partners.

“I would also say, interestingly, the development community is becoming a lot more tuned in. I think these are pretty sharp business people and ultimately, coming into Collier County and putting in a new, large-scale development, for example, they are in the business of selling a perception of quality of life. ... They really want their clients, who they want to invest in buying homes in the area, to invest in the quality of life here in southwest Florida. So again, it becomes a matter of, as they understand a little bit more about what the Rookery Bay Reserve is all about, and that people can come in and enjoy this, have these great experiences in Rookery Bay, they become much more interested in supporting the work that we are doing” (Participant 25).

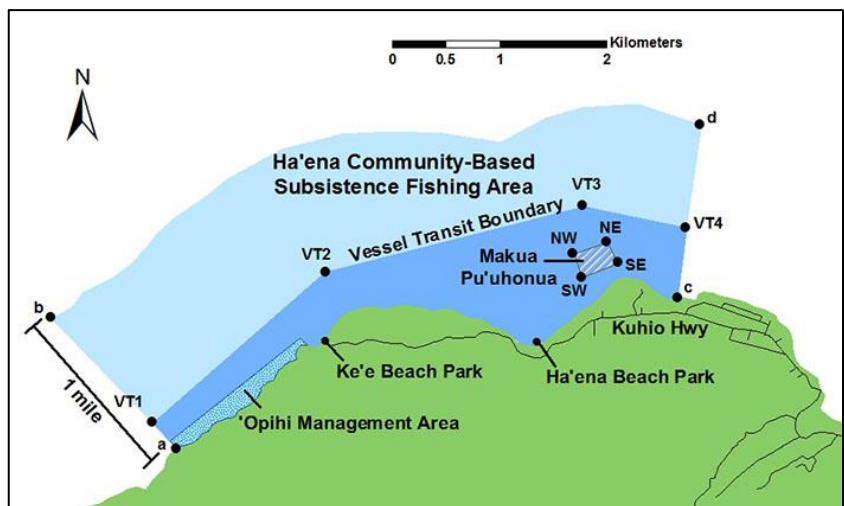
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<sup>9</sup> Plummer and Fitzgibbon (2004) Precondition 6

Development and Implementation of MPAs with Comanagement Agreements

In 1994, the State of Hawai'i passed legislation authorizing the designation of Community-Based Subsistence Fishing Areas (CBSFAs) to promote fisheries comanagement by the state in partnership with Native Hawaiian communities. Progress moving toward the confluence of traditional and western management systems in Hawai'i through comanagement has been slow - only two CBSFAs, including Hā'ena's in 2006, have been designated through separate legislation - and, until recently, state approval of community management plans had faltered (Kittinger et al, 2012; Levine and Richmond, 2014). However, in October 2014, the state approved the rules for the Hā'ena CBSFA on Kaua'i, and on August 4, 2015, the Governor of Hawai'i signed the Hā'ena CBSFA management plan into law, paving the way for implementation (Figure 2).

Comanagement in the Pacific Islands – including the U.S. Hawaiian Islands – and the term 'comanagement' itself, has evolved since its appearance over the past three decades (Berkes, 2009; Friedlander et al., 2013; Gruby and Basurto, 2013; Levine and Richmond, 2014; Weeks and Jupiter, 2012). In Hawai'i, the emergence of comanagement has been attributed to concerns related



**Figure 2.** The Hā'ena Community-Based Subsistence Fishing Area includes a no-entry area, the Makua Pu'uhonua, a special *ōpihi*, or limpet, management area, and a vessel transit area (Source: Division of Aquatic Resources, State of Hawai'i, 2016).

to marine resource depletion, conflicts associated with competition over resources and outsiders entering areas previously accessed only by nearby communities, and an interest in integrating traditional ecological knowledge (TEK) and customary practices into contemporary, or Western, resource management approaches (Ayers and Kittinger, 2014; Friedlander et al., 2013).



## The Hā'ena Social-Ecological System<sup>10</sup>

Located at the end of Kūhiō Highway, on the verdant, north shore of the island of Kaua'i, the 98 Native Hawaiian members of the small, rural, coastal Hā'ena community (population=431) sustained themselves by farming, fishing and managing their resources through their customary *ahupua'a* system – or holistic, ridge to reef, watershed-based management – until the 1960's (Friedlander et al., 2013; Vaughan, 2012; U.S. Census, 2010). (Figure 3). Although today, less than 21

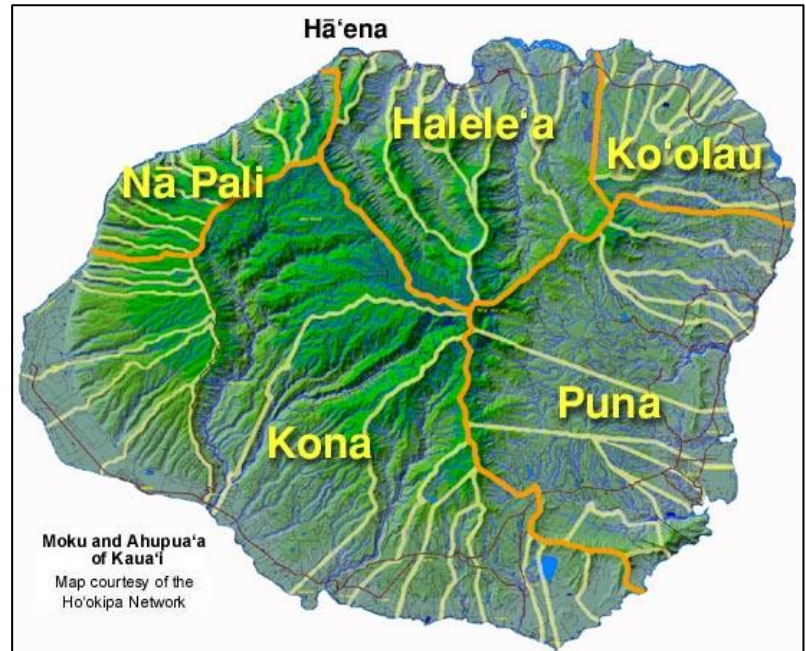


Figure 3. Kaua'i's *ahupua'a*, or watershed-based land divisions, are arranged in five *moku 'aina*, or districts. The Hā'ena *ahupua'a* is located in the Halele'a *moku* (Source: Ho'okipa Network 2000, as adapted by Pacific Worlds).

percent of the state's population is Native Hawaiian, cultural practices and TEK remain important and are woven into the social fabric of the islands (Levine and Richmond, 2014).

When referring to the marine resources of the area, Hawaiians take a holistic view, including everything in the water, as well as on the land, considering the life cycles of the species that live there, the places where those life cycles occur, and describe their stewardship obligations as extending from the mountain ridge to the seaward horizon. Important nearshore marine resources in Hā'ena include the extensive coral reef and lagoonal estuarine habitats, invertebrate and fish communities – including 80 species and many juvenile fishes inshore of the reef; *limu kohu* (*Aparagopsis taxiformis*), a marine algae; endangered Hawaiian monk seals (*Monachus schauinslandi*), and *honu* – or green sea turtles (*Chelonia mydas*) – a threatened species (PBR Hawaii, 2015). The endemic seagrass, *Halophila hawaiiiana*, also occurs along the north shore of Kaua'i (McDermid et al., 2003).

<sup>10</sup> Carlsson and Berkes (2005) Step 1

Located within the Hā'ena *ahupua'a*, and adjacent to the community, Hā'ena State Park is one of the busiest in the state park system. Together, the natural and cultural resources and scenic appeal of the village and the park have attracted real estate and tourism to the area. Several millionaires and celebrities have purchased property and built large houses in Hā'ena, and the location attracts upwards of 2000 visitors each day. Many newer residents only reside in the community for part of the year. Travelers typically arrive by car or tour boat, but with the exception of limited facilities in the state park, the area lacks the infrastructure to sustain the amount of tourism it attracts. Popular activities include beach going, swimming, fishing, snorkeling, diving, boating, windsurfing, kayaking, hiking and sightseeing. Some commercial fishing activity has also been reported in the area.

For more than 1500 years, the indigenous people of Hawai'i, the *kānaka maoli*, or, simply, Hawaiians, effectively supported themselves – a population of up to 800,000 – through their customary, watershed-based *ahupua'a* system, using their observations of the environment and oral knowledge transfer to manage their resources (Carl, 2009; Richmond, 2013). A core group of Hawaiian families in Hā'ena have been there for many generations, pre-dating the annexation of Hawai'i to the U.S. in 1898. For them and other Hawaiians, ocean fishing, taro cultivation and cooperation among fishermen and farmers have always been a way of life. Transmission of TEK has persisted in Hā'ena and, in 1998, led to the formation of the non-profit Hui Maka'āinana o Makana organization by community members with the goal of working with the state to restore Hawaiian stewardship practices in the area (Friedlander et al., 2013). In Hā'ena, TEK and customary natural resource management practices are rooted in the community's identification with the land and sea in their *ahupua'a*.

“For me, marine resources describe those things that humans require for their spiritual and physical sustenance. And I would probably add, and economies. Examples take me back to my childhood, which was, if you scraped your knee, if you had a sore throat, if you were having a hard day, if you wanted to celebrate something, if you were wanting to spend time with a certain person - all of that occurred in the ocean. It also occurred in the mountains, but it more easily occurred in the ocean. So for me, the ocean is the place to go for support and nurture and joy. And I think examples would include the fact that my husband fishes almost every day for our dinner table. And we, as elders now, we go there for gentle exercise to keep us healthy. But it is without a doubt also the place where we witness and experience the invasion from the outside world” (Participant 18). *Connection to place*



Five major themes emerged from interview respondents related to current natural resource management problems in Hā'ena: recreational misuse/overuse, consumptive misuse/overuse, water quality, protected species and governance. Problem areas, sources, impacts and the management tasks proposed by interviewees to solve them are summarized in Table 4.

### *Natural Resource Impacts*

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Trampling the reefs and harassing wildlife – especially *honu*, the green sea turtles – are resource impacts associated with tourism. However, interview respondents attributed the greatest threat to Hā'ena's marine resources – particularly the fisheries – not to tourism, but to overfishing by non-local subsistence fishermen and other people from elsewhere in Hawai'i.

“Family guys [are] coming in and taking more than they need and not respecting the old ways – that's stay in your own place” (Participant 18). *Consumptive misuse/overuse-Overharvesting*

“We have groups of people not from Kaua'i, not of Hawaiian descent, who form a line of six to seven people across and just tromp the reef, scrape all of the *limu* up, put it in coolers and ship it to Oahu to sell” (Participant 18). *Misuse - Walking on the reefs/Overharvesting*

Lack of clarity, awareness and enforcement of state regulations were also noted as contributing factors to natural resource impacts.

“There is always seemingly some kind of gray area where there are issues in communities that DLNR – the Department of Land and Natural Resources – is sometimes not handling very well or handling very productively. So there could be, you know, long periods of time where people who are boating are saying they can do it; and the people in [DLNR's Division of] Boating are saying they can't. But there is no rule that says that they can't” (Participant 16). *Recreational misuse/overuse – Boating*

### *Community Impacts*

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Interview respondents agreed that the sheer volume of tourists visiting the area and the lack of awareness among both visitors and local recreational users have significant impacts on the Hā'ena community. Visitors typically arrive by car and overwhelm the small, rural community with their vehicles and their presence.

“Often times when they [local subsistence-dependent families] would try to go out and fish, they would be either bothered themselves, or people would be bothering the fish. They're

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<sup>11</sup> Carlsson and Berkes (2005) Step 2

**Table 4. Problems, sources, impacts and essential management tasks in Hā'ena.**

<b>Problem Area/Source</b>	<b>Impacts</b>	<b>Management Tasks</b>
<b>Recreational Misuse/Overuse</b>		
Heavily concentrated tourism/walking on the reefs/sunscreen pollution	<ul style="list-style-type: none"> <li>• Coral reef damage</li> <li>• Fish habitat degradation</li> <li>• Ecosystem disturbance</li> <li>• Disruption/displacement of subsistence fishing</li> </ul>	<ul style="list-style-type: none"> <li>• Visitor education</li> <li>• Signage</li> <li>• Access planning and management (roads, parking, mass transit, restrooms)</li> </ul>
Boating	<ul style="list-style-type: none"> <li>• Over-running resources</li> </ul>	<ul style="list-style-type: none"> <li>• Boater education</li> <li>• Clarify rules and regulations</li> <li>• Enforcement</li> <li>• Monitoring</li> </ul>
Wind surfing	<ul style="list-style-type: none"> <li>• Ecosystem disturbance</li> </ul>	<ul style="list-style-type: none"> <li>• Windsurfer education</li> </ul>
<b>Consumptive Misuse/Overuse</b>		
Overharvesting	<ul style="list-style-type: none"> <li>• Resource depletion</li> </ul>	<ul style="list-style-type: none"> <li>• Outreach and education</li> <li>• Enable local management to build buy-in/compliance</li> <li>• Enforcement</li> <li>• Monitoring</li> </ul>
<b>Water Quality</b>		
Cesspools	<ul style="list-style-type: none"> <li>• Nutrient Pollution</li> </ul>	<ul style="list-style-type: none"> <li>• Identify locations, function, alternatives needed</li> <li>• Monitoring</li> </ul>
<b>Protected Species</b>		
People harassing sea turtles	<ul style="list-style-type: none"> <li>• Wildlife stress</li> </ul>	<ul style="list-style-type: none"> <li>• Visitor education</li> <li>• Signage</li> <li>• Enforcement</li> </ul>
<b>Governance</b>		
Changing state administrations	<ul style="list-style-type: none"> <li>• Loss of institutional knowledge at leadership level, delays and process errors</li> </ul>	<ul style="list-style-type: none"> <li>• Education and advocacy</li> </ul>
State agency division silos	<ul style="list-style-type: none"> <li>• Undermines management effectiveness</li> </ul>	<ul style="list-style-type: none"> <li>• Leadership direction and development</li> </ul>
Centralized government decision-making with inadequate staffing at local levels	<ul style="list-style-type: none"> <li>• Diminished resource management capacity</li> </ul>	<ul style="list-style-type: none"> <li>• Decentralize agency management</li> <li>• Increase local input in decision-making</li> </ul>
Apathy, delays, distrust, conflicts, disinterest (government and community)	<ul style="list-style-type: none"> <li>• Undermines management effectiveness</li> <li>• Perpetuates bad relations</li> <li>• Natural resource and community impacts persist</li> </ul>	<ul style="list-style-type: none"> <li>• Leadership development</li> <li>• Communication and conflict resolution training</li> <li>• Education</li> <li>• Secure external facilitation support</li> <li>• Improve collaboration</li> </ul>

stalking a school... and then someone walks by the shoreline and scares the fish away. You know, people don't understand the implications of their actions” (Participant 16). *Recreational misuse/overuse - Heavily concentrated tourism*

The lack of planning or information and infrastructure available to visitors and local users, either in Hā'ena or prior their arrival, were noted as major factors contributing to community impacts.

“When we were going through the [CBSFA] informational meetings and the hearings, the wind surfers said, ‘No, we need to go this way because the wind only blows that way and we need to go across this place that we are calling a no-activity zone’ – because it’s an estuary, because it’s a pool, a place of refuge, because it’s where the baby fish are born – and ‘I’m only there for 10 seconds because the wind gusts come around this point and [then] I’m out of there. I’m not bothering anybody.’ And the fisherman said, ‘You’re there for 10 seconds, but then it takes 45 minutes for the fish to come back’” (Participant 18). *Recreational misuse - Wind surfing*

### *Governance Decisions and Challenges*

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Resource and community impacts notwithstanding, interview respondents were most concerned about the lack of effective governance systems to address local resource management needs and support collaborative decision-making.

“The state wasn't doing anything. They're not even enforcing the rules that they already have, let alone looking at the resource as a dynamic changing thing and trying to figure out how they can predict and preserve it. The other thing, I mean, every area is different and has its different resources and different pressures, so when you make a blanket rule for the entire state, it isn't necessarily for the good of all these different areas” (Participant 16). *Governance - Government apathy/centralized decision-making*

While issues such as a lack of educational, enforcement and management capacity common to MPA management are present in Hā'ena; interviewees expressed greater concerns about their perceptions of distrust, disinterest, disassociation and hostility between state government and Hawaiian communities that have been exacerbated by a centralized state government system.

“[The main problems are] lack of enforcement and lack of education. Our state just doesn't have the capacity. But also the way decisions are made, yeah? Communities [need to] have more say over their place. All of the manager's influence is... aggregated in one place in Honolulu. You tend to not do, or overlook, things when everything is centrally done or decided” (Participant 17). *Governance - Centralized government decision-making*

“There have been cases - not necessarily in Hā'ena, but things that happen on a state level - that are described as vigilantism. There are community members who feel that they are defending a resource. There are cases where those community members really shouldn't be doing what they do. In some cases, their motives are questionable, but not in all. I don't think it's happened that much, but that's one of the common themes - that the state doesn't want

to work with vigilantes, and so they paint everybody as a vigilante. So like if something that has a tone of vigilantism happens in a community, but nobody knows who it was, they can just paint a broad brush and say, 'We don't want to work with that community at all'" (Participant 17). *Governance - Government distrust and disinterest*

The slow progress of the CBSFA process over many years has been further confounded by changes in the State of Hawai'i's administration and the resulting need to reeducate and reengage state leadership.

"It's fatiguing. It's annoying, and it's real, and we have to do it. So the first thing to reduce the conflict with the state is, 'Can everybody just understand what we are talking about here - the places? Can we get the place names right? Can we get the size of the no-take [area] right? Can we just get things correct and be talking about the same things? And can we be brave and work together and be inclusive'" (Participant 18)? *Governance - Changing state administrations*

Efforts on the part of many community and state representatives to collaborate through comanagement and CBSFAs have also been hampered by communication breakdowns, conflicts, resistance to change and uncertainty on both sides.

"Instead of explaining it to them, it's, you know, a lot of yelling, a lot of swearing.... So it's like there are very few people who even have the ability to interact with the general public in the first place and there's...that was always the biggest problem that I saw with the community was that here we're trying to have the community sort of self-police and then also deal with all these extra people. They don't really have the ability to do that" (Participant 16). *Governance - Conflicts*

"We had all these meetings and everybody talks about this and that, but they are not actually taking that next step to get things done" (Participant 16). *Governance - Community delays*

### [Comanagement Participants and Processes<sup>12</sup>](#)

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The *ahupua'a* system, or customary Hawaiian system of watershed-based natural resource management, persisted until the start of western colonization in 1778 led to Hawaiian population declines (attributed to the introduction of disease), land privatization and transition from a subsistence-based economy to a market-based economy (Levine and Richmond, 2014). Following the forced transfer of the Hawaiian Kingdom to the U.S. in 1887, dispossession of indigenous lands and the introduction of western institutions displaced Hawaiians, diminished their indigenous rights and altered their customary, cultural practices (Vaughan, 2012; Richmond, 2013). Many western marine

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<sup>12</sup> Carlsson and Berkes (2005) Step 3

resource management policies and practices conflict with customary practices and have contributed to declines in culturally important species, resulting in economic hardship and stewardship disincentives for subsistence-fishing dependent, indigenous communities (Richmond 2013).

Hawaiians continue to rely on marine resources, habitats and fishing for subsistence, recreation and cultural practices; and, recently, the State of Hawai'i began taking steps to uphold its 1978 constitutional proviso to protect customary and cultural Hawaiian rights (Kittinger et al., 2012; Richmond and Levine, 2012; Vaughan, 2012). In 1994, the state passed Act 271 authorizing the establishment of CBSFAs. Hawaiian communities can pursue CBSFA designation via one of two mechanisms, 1) working with the Department of Land and Natural Resources (DLNR) through its rule-making authority, or, 2) through the legislative process to pass a separate bill (DAR, 2015; Kittinger et al., 2012, Vaughan, 2012). In the latter process, communities still need to follow the state's administrative rule-making process to develop a management plan after CBSFA designation (Kittinger et al., 2012). The desire to reclaim traditional Hawaiian practices has led more than 20 communities to pursue CBSFA designation and comanagement of marine resources with the state; but for most, progress has lagged or faltered (DAR, 2015; Kittinger et al., 2012; Richmond and Levine, 2012).

Following passage of Act 241 by the state legislature, mandating designation of the Hā'ena CBSFA in 2006, and with help from Kua'āina Ulu 'Auamo (KUA) – a non-governmental organization that supports Hawaiian community-based initiatives – the Hui Maka'āinana o Makana spent five years developing a proposed management plan for the area. With codification of a community-based management plan into law in 2015, the community is poised, once again, to base protection and management of its resources on its traditional practices (DAR, 2015). The Hui Maka'āinana o Makana is governed by a board of directors and a family advisory board. The community also maintains a formal agreement with the Hā'ena State Park to manage cultural resources, such as an ancient burial area, and restore customary *lo'i*, or taro, cultivation practices within the park boundaries (Hā'ena Fisheries Committee, 2011).

## Preconditions for Comanagement

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### *Crisis*<sup>13</sup>

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Escalating concern about the declining condition of their nearshore fisheries – stemming from overharvesting, recreational overuse and misuse, development and associated water quality impacts – was the major driver that led the Hā'ena community to pursue the establishment of a CBSFA (Hā'ena Fisheries Committee, 2011). The displacement of customary resource management practices by contemporary, western management approaches and a growing recognition that communities needed to step up to protect their fisheries were also key, contributing factors.

“Hawaiian communities have a long-term memory of how the resources of that area are today and used to be and so a lot of it has to do with changing fisher patterns I guess, in terms of population and use or access to resources. So things like limpets, *ōpihi* - and they are very expensive, ironically - so things like that get depleted partly because the value of those are so high, and then you have a Hawaiian community that is already depressed. People will overharvest, yeah?” (Participant 17).

### *Willingness to Contribute*<sup>14</sup>

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The Hā'ena community's leadership and perseverance in the CBSFA designation and comanagement development process can be attributed to deep-seated values that are rooted in Hawaiian culture, customary practices and the community's relationship to the environment and itself. There is a strong will to keep these values alive today and for the next generation based on “a common value, a common motivation, and a common experience of the place” (Participant 18). Notably, one respondent extended these values to the part-time residents and local recreational users of the community as well.

### *Opportunity for Negotiation*<sup>15</sup>

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The key to the community's initiative to enter into comanagement negotiations with the state came with the passage of Act 241, mandating designation of the Hā'ena CBSFA. However, despite the law, interview respondents reported that the state did not seriously come to the table until the community had drafted and submitted its own management plan.

“I don't think the state has ever wanted this to happen. I think there are people, heroic individuals in the state, who know there is a problem and that the state is having a hard time addressing it, but those tend to be younger people and they tend to be...sadly, they tend to be

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<sup>13</sup> Plummer and Fitzgibbon (2004) Precondition 1

<sup>14</sup> Ibid, Precondition 2

<sup>15</sup> Ibid, Precondition 3

not in the union. And so, when these laws were passed in 1994...when the broad CBSFA law was passed... for about 10 years after that, nothing kind of resulted. Despite the law - as our state has a lot of laws it doesn't actually carry out - I don't think the state intended for an area to be created" (Participant 17).

#### *Legal Mandate or Brokered Incentive*<sup>16</sup>

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In this case, the mandate for comanagement begins with the State of Hawai'i's constitutional obligation to protect customary and traditional Hawaiian rights. Building upon this, legislation enacted in 1994 established the process for creating a CBSFA and designated authority for doing so to the DLNR (Hawai'i Legislature, 1994). This provided both incentivized and empowered the Hā'ena community to pursue designation of the Hā'ena CBSFA (Hā'ena Fisheries Committee, 2011).

#### *Leadership Energy*<sup>17</sup>

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Interview respondents consistently pointed to the leadership of a small group of community members, each with long-term ties to the area, though not all of Hawaiian descent, without whom they believed the effort to pursue CBSFA designation would not have been possible. The ability of these individuals to connect both with the Hā'ena community and with the governor and state administration were also important attributes. Humility, emotional stamina, and perseverance were identified as essential leadership qualities that have enabled the community to sustain its effort and work with the state over the ensuing years.

"The issue of trying to teach government a new way to do things is not for the faint of heart. It's not going to come from another kind of organization. In my opinion, it's not going to come from anybody but the people of that place because you need that emotional energy and emotional focus to keep you going. You need stamina. This is daunting work" (Participant 18).

#### *Common Vision or Existing Networks*<sup>18</sup>

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The vision for establishing a CBSFA in Hā'ena began to coalesce with development of the Hui Maka'āinana o Makana's mission to restore their *ahupua'a*, which specifically calls for the community to have a greater say over their ocean resources (Participant 17). While they are not there yet, interview participants stated that they believe the relationship between the community and the state is evolving and moving toward a shared vision.

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<sup>16</sup> Plummer and Fitzgibbon (2004) Precondition 4

<sup>17</sup> Ibid, Precondition 5

<sup>18</sup> Ibid, Precondition 6

In addition to the Hui, several existing networks have aided, and are expected to continue supporting, the development of the Hā'ena CBSFA. These include the Hanalei to Hā'ena Community Association, the Hawai'i Community Stewardship Network, Limahuli Garden and Preserve of the National Tropical Botanical Gardens, KUA, and Stanford University's Emmett Interdisciplinary Program in Environmental and Resources (Hā'ena Fisheries Committee, 2011).

“When Hā'ena had its hearing last year, at least 10-20 community representatives from around the state flew in or sent in testimony to support Hā'ena because they want to see the same thing in their community” (Participant 17).

## California

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### Development and Implementation of MPAs with Comanagement Agreements

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The 1999 Marine Life Protection Act (MLPA) mandated the State of California to designate a network of MPAs to protect ecosystem integrity and sustain marine life (California Legislature, 2004). Following a multi-year process that resulted in the designation of 124 MPA's, in 2013, the Ocean Protection Council (OPC), California's MPA leadership team, agreed on a partnership-based model, the *California Collaborative Approach* – a comanagement framework – to govern the new network. California's MPA collaboratives have been established to bring local community and government representatives together to address local management needs including outreach and education, enforcement and compliance, research and monitoring of the MPAs (California Ocean Protection Council, 2014).

### The Catalina Island Social-Ecological System<sup>19</sup>

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At 21 miles long, and eight miles at its widest point, Santa Catalina is the third largest of the eight Channel Islands located off the coast of southern California. The island was inhabited by Native Americans for more than 7000 years until the Spanish discovered and claimed it in 1542. Beginning in the 16<sup>th</sup> century, Spaniards settled the island, used it for ranching, otter hunting, mining and military operations, and then transferred it to Mexico. In 1846, the island was awarded as a Mexican land grant to the first in a series of private owners. In 1891, the Banning brothers established the Santa Catalina Island Company (SCIC) to develop the island as a resort destination. In 1975, the Wrigley family – the most recent private owners – deeded 88 percent of the island to the Catalina Island Conservancy to protect the undeveloped areas of the island in their natural state in perpetuity. The

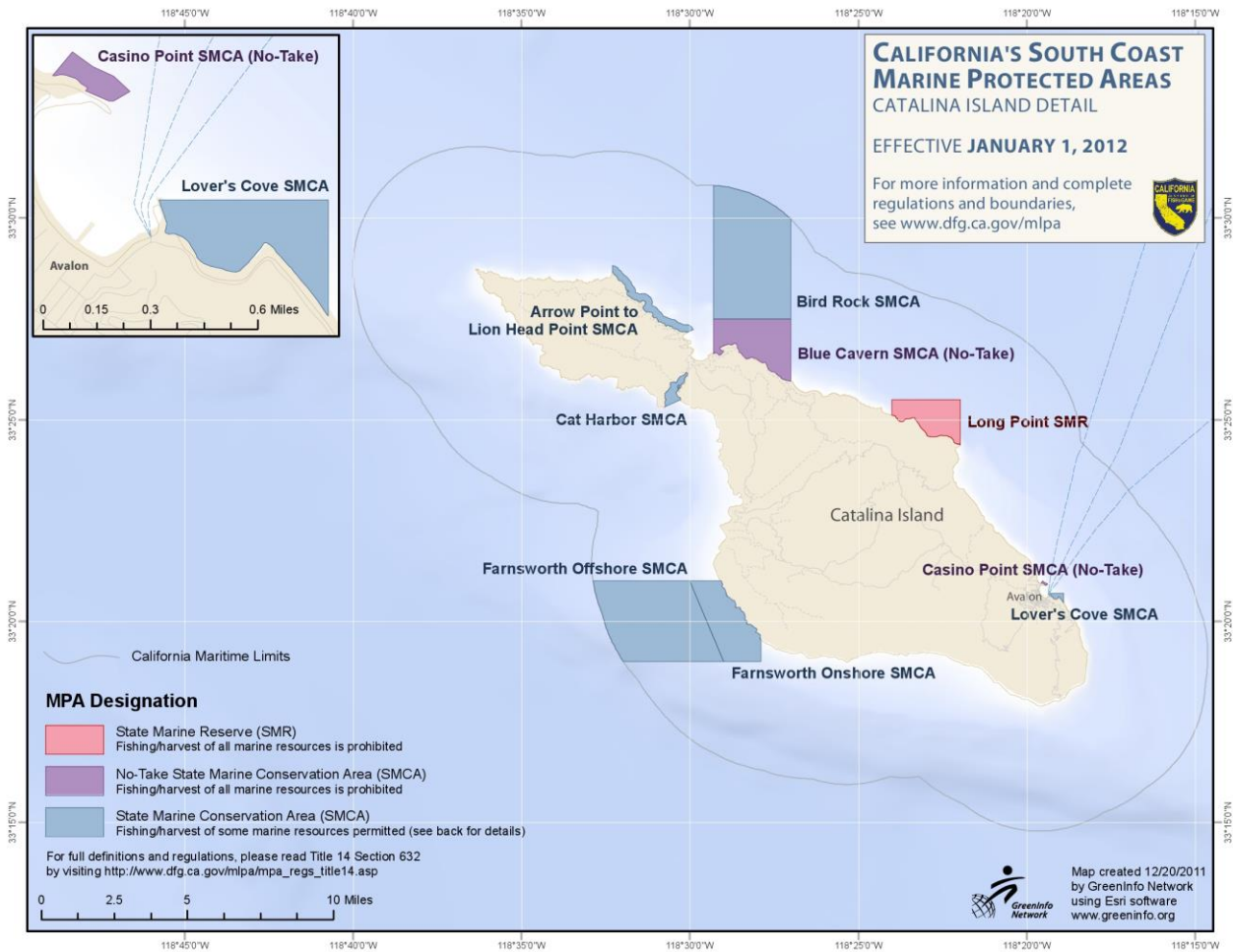
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<sup>19</sup> Carlsson and Berkes (2005) Step 1



SCIC continues to own and operate the island's resort and recreational properties. Today, the City of Avalon, incorporated in 1913, and the small, unincorporated Village of Two Harbors, are home to most of the island's 4000 residents (U.S. Census Bureau, 2010). With much of the island's land held in private trust by the Catalina Island Conservancy, new development is limited and centered in the Avalon area, which maintains an active waterfront with a pier, restaurants, inns and shops. The island has a K-12 school complex and the Catalina Island Museum houses an extensive collection of the island's cultural artifacts.

Catalina's abundant natural resources and island character make it a popular destination for tourism and recreation, the island's primary economic sectors. The island's marine environment is characterized by rocky reefs, kelp forests, sea mounts and eelgrass meadows (*Zostera marina*) that support numerous and diverse fish, marine mammal, invertebrate, sea turtle and avian species. As a result, scuba diving, snorkeling, boating (from kayaking to sailing), fishing, spear fishing, beach-going and swimming are among the most popular activities. The island receives approximately one million visitors each year who arrive by ferry, cruise ship, charter vessel, private boat or helicopter. The island's many youth camps bring thousands of children to the island each season. Commercial fisheries include lobster, sea urchin, sea cucumbers, squid and swordfish. Scuba diving and recreational fishing charter operators also frequent the island's waters. Hubbs-SeaWorld operates a sea bass farm in Cat Harbor, and the University of Southern California recently acquired a permit to initiate shellfish aquaculture research in the same harbor. Many islanders who live on the more remote west end of the island around Two Harbors also fish for subsistence, depending on the ocean to obtain most of their protein.



**Figure 4. Catalina Island has nine Marine Protected Areas with three types of protection (Source: County of Los Angeles Fire Department, 2016).**

In 1974, the designation of three Areas of Special Biological Significance - Lover's Cove, Arrow Point and Blue Caverns - created the island's first MPAs. On January 1, 2012, six additional MPAs were established through the MLPA process, bringing the total to nine MPAs around Catalina Island today (Figure 4). In 2014, the Catalina Island MPA Collaborative was established to raise awareness about the island's MPAs and raise compliance with MPA regulations (MPA Collaborative Network, 2015).

"[People on Catalina] want to protect the resource - especially a lot of the multi-generational families. There are fifth generation families on this island and they've seen the decimation of the abalone population. [Just in our] lifetime, it went from where you couldn't eat abalone because you ate so much - you just walked up to a rock and you grabbed it - to the fisheries being closed now. So they've seen things like that - the decline of the sheephead, the density of fish decline. Like I said, it's our front and our back yard, so I think having seen some of the decline of things, [we] hope that we could eat abalone again in our lifetime (Participant 23).  
*Connection to place*

Interview respondents identified five natural resource management problem categories on Catalina: recreational misuse/overuse, consumptive misuse/overuse, water quality, invasive species and governance. Problem areas, sources, impacts and the management tasks proposed by interviewees to solve them are summarized in Table 5.

### *Natural Resource Impacts*

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Declines in the size ranges of finfish species and lobster abundance were among the concerns that led to the designation of the six new, and re-designation of three existing, MPAs around Catalina.

“We've definitely seen some decline of some species that are popular for consumptive take. ... An example would be the Calico population, also known as the kelp bass. It's a very popular and highly targeted species, [by] both hook and line and spearfishing. There has been a big decline in trophy fish like sheephead. They are highly targeted, the larger fish. Those are the trophy takes. But those are a sex-changing fish, so [that leads to] midget males. They're changing [sex] too quickly and then their behavior has changed” (Participant 23). *Consumptive overuse - Overharvesting*

However, since the new MPAs were established, intentional illegal fishing has become a problem. Whether locals or mainlanders are responsible for poaching activities is a matter of active debate.

“Some people were saying all the poachers were local. Somebody else said ‘No, they're all coming from the mainland” (Participant 20). *Consumptive misuse - Poaching*

The introduction of the non-native, invasive algae, *Sargassum horneri*, to the California mainland in 2007, and its subsequent establishment on the leeward side of Catalina has caused rapid displacement of the island's infamous giant kelp (*Macrocystis pyrifera*) forests, and related changes in finfish behavioral patterns.

“That's been a big marine issue since about last year, but really gained momentum this past summer and fall. It seems it started in Two Harbors, because Isthmus Cove is a huge boating destination, so the theory – since that seems to be where it originated from or at least where we first observed it – is that it was likely brought over [from the mainland] on a recreational boat” (Participant 23). *Invasive species - Boating*

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<sup>20</sup> Carlsson and Berkes (2005) Step 2

**Table 5. Problems, sources, impacts and essential management tasks at Catalina Island.**

<b>Problem Area/Source</b>	<b>Impacts</b>	<b>Management Tasks</b>
<b>Recreational Misuse/Overuse</b>		
Lack of awareness/Boating	<ul style="list-style-type: none"> <li>Anchor damage</li> </ul>	<ul style="list-style-type: none"> <li>Boater outreach education</li> <li>Brochures</li> </ul>
Fish feeding	<ul style="list-style-type: none"> <li>Wildlife behavioral and ecological disturbance</li> <li>Human injury</li> </ul>	<ul style="list-style-type: none"> <li>Monitoring (where feeding is allowed)</li> </ul>
<b>Consumptive Misuse/Overuse</b>		
Overharvesting	<ul style="list-style-type: none"> <li>Resource depletion</li> </ul>	<ul style="list-style-type: none"> <li>Outreach and education</li> <li>Enable local management to build buy-in/compliance</li> <li>Enforcement</li> <li>Monitoring</li> </ul>
Ambiguous MPA Boundary Markers/ Lack of awareness	<ul style="list-style-type: none"> <li>Illegal harvesting or collection</li> </ul>	<ul style="list-style-type: none"> <li>Physical markers</li> <li>Outreach and education</li> <li>Interpretive and regulatory signage</li> <li>Brochures</li> </ul>
Poaching	<ul style="list-style-type: none"> <li>Resource depletion</li> <li>Undermines MPA management objectives</li> </ul>	<ul style="list-style-type: none"> <li>Outreach and education</li> <li>Enable local management</li> <li>Enforcement</li> <li>Monitoring</li> </ul>
<b>Water Quality</b>		
Deteriorating wastewater conveyance infrastructure	<ul style="list-style-type: none"> <li>Past problems with nutrient pollution and metal leaching in Avalon Harbor</li> </ul>	<ul style="list-style-type: none"> <li>Monitoring</li> </ul>
Boat sewage discharge	<ul style="list-style-type: none"> <li>Nutrient and bacterial pollution</li> </ul>	<ul style="list-style-type: none"> <li>Mooring policy/dye tab enforcement</li> </ul>
<b>Invasive Species</b>		
Boating	<ul style="list-style-type: none"> <li>Local species displacement</li> </ul>	<ul style="list-style-type: none"> <li>Education and outreach</li> <li>MLPA Amendment to allow take</li> </ul>
<b>Governance</b>		
State agency division silos	<ul style="list-style-type: none"> <li>Undermines management effectiveness</li> </ul>	<ul style="list-style-type: none"> <li>Leadership direction and development</li> </ul>
Inadequate funding/State employee travel restrictions	<ul style="list-style-type: none"> <li>Undermines management effectiveness</li> <li>Natural resource and community impacts persist</li> </ul>	<ul style="list-style-type: none"> <li>Leadership development</li> <li>Identify sustainable funding sources</li> </ul>
Misaligned expectations	<ul style="list-style-type: none"> <li>Undermines collaboration</li> <li>Predisposition toward management failure</li> </ul>	<ul style="list-style-type: none"> <li>Clarify roles, responsibilities, expectations</li> <li>Ensure regular communication between agencies/community</li> </ul>
Disregard for regulations	<ul style="list-style-type: none"> <li>Impacts resources</li> <li>Undermines management effectiveness</li> </ul>	<ul style="list-style-type: none"> <li>Outreach</li> <li>Anonymous reporting</li> </ul>

Participant 22 recalled that water quality impacts associated with vessels discharging sewage used to be a problem. However, this issue was successfully abated when the Avalon Harbor Patrol and Two Harbors Harbor Patrol began putting dye tabs in vessel holding tanks.

“Every time they hook up to a mooring buoy, [the Harbor Patrol] will go into the boat and drop the tabs into their system. ... It’s one of the policies to reserve a mooring. It’s worked really well because if you get caught, you are basically banned for two years from mooring in the bay.” (Participant 22) *Water quality – Boating discharges*

Two potential additional impacts on natural resources include concerns regarding the ecological and behavioral impacts associated with fish feeding, an activity allowed in some MPAs popular with scuba divers, and water quality problems attributed to Avalon’s wastewater conveyance system.

“Avalon Bay did previously have an issue with elevated nutrients in the bay caused by a decaying sewer system, but the sewer system over the last four years has pretty much been entirely replaced. We were annually among the worst rated bays in the state, but we have been off that list, thankfully, for the past two years” (Participant 23). *Water quality - Deteriorating wastewater conveyance infrastructure*

### Governance Decisions and Challenges

Initial Catalina Island Collaborative projects to address these resource impacts included developing and installing MPA boundary markers and regulatory signs, educational brochures and local law enforcement training (MPA Collaborative Network, 2015). However, governance deficiencies, including inadequate funding and state employee travel restrictions, pose real challenges to effective collaboration and decision-making among partners.

“MPA designation and collaborative meetings are difficult and costly to get to. Travel logistics can necessitate being off island for up to four days” (Participant 23). *Governance - Inadequate funding*

“Sometimes [state employees] get into trouble [for traveling to meetings], which I think is just crazy because if they are a [California Department of] Fish and Wildlife employee that also is a member of that community and knows everybody, then they need to be there” (Participant 20). *Governance - Inadequate funding/state employee travel restrictions*

Participant 20 identified the lack of communication between and within agencies as a major factor responsible for inadequate state support.

“I think that's a big part of the problem with our managing agency, Fish and Wildlife. They are so compartmentalized and they really don't talk to each other” (Participant 20). *Governance - State agency silos*

These governance challenges contribute to misaligned expectations that have surfaced among both state and community representatives. State expectations have included mismatched assumptions regarding how much responsibility communities are ready to assume and how much local funding communities can generate to support MPA management functions.

“Sacramento keeps saying, ‘You need to tell the [collaborative] chairs, these are their responsibilities.’ I’m like, ‘They’re doing it out of the goodness of their hearts’” (Participant 20). *Governance - Misaligned expectations*

“And what the state and the big state-wide non-profits are saying is that they [the communities] need to look at local funding sources..., but they are already tapping those local funding sources for everything else that they are doing. So to kind of add to keep tapping your local sources is, I think, a pretty tough ask. The state really says use local funding sources and they’re thinking, ‘God, all we’re doing is using local funding sources. These are state projects that we’re working on locally, where is the support from the state’” (Participant 20)? *Governance - Misaligned expectations*

Misaligned community expectations are related to state-based communications and processes.

“It can be a bit frustrating when we are waiting for six months to get approval on a template or with the Coastal Commission in trying to deploy those boundary markers. Some of the things that in the community’s eyes seem like a quick fix or an easy solution end up being a very lengthy process” (Participant 22). *Governance - Misaligned expectations*

Finally, above-the-law attitudes and behaviors exhibited by some community members threaten to undermine MPA management objectives.

“There’s a bit of a Wild West compliance with some of the environmental laws and regulations. Not everybody, but some of the people who want to live on an island are the type who are more libertarian, want to live on their own and don’t want to be told what to do or not to do” (Participant 21). *Governance - Disregard for regulations*

“Because it’s an island, a lot of the great environmental regulations that we have in California, many of them aren’t enforced on Catalina. So I know from an MPA perspective and human uses like poaching... a lot of the local law enforcement, they don’t want to be busting their neighbor. So enforcement is an issue because you have to live in a small community with people who might be doing illegal things” (Participant 22). *Governance - Poaching/disregard for regulations*

## Comanagement Participants and Processes<sup>21</sup>

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Members of California's MPA collaboratives primarily include local NGO's, municipalities, beach lifeguards, harbor patrol authorities and academics, a number of which were involved in the MLPA designation process. Additional local interests have been identified who have not engaged in the collaboratives. The MLPA Master Plan provides a framework for MPA implementation, including the role of management partners engaged through the collaboratives. Initial partnership efforts focused on education, outreach, and incorporating MPA enforcement within existing law enforcement authorities. The organizational structure and processes of the collaboratives have been somewhat casual to date. There has been some discussion about rotating co-chairs; but bylaws and term-limits have not been considered.

Participants in the Catalina Island Collaborative include representatives from the Catalina Island Conservancy, the University of Southern California's Wrigley Institute and Sea Grant program, the California Department of Fish and Wildlife (DFW), the City of Avalon Harbor Master, Descanso Beach Ocean Sports, Coastal Rangers, Los Angeles County Sheriff and Lifeguards, the Catalina Chamber of Commerce, the U.S. Department of Defense, and six island-based youth camps. Interview respondents identified the SCIC, the Two Harbors Harbor Master, fishermen and fishing boat charter boat operators, and the Catalina Express ferry management as additional groups they hope to involve or deepen engagement with. The collaboratives are expected to play an important role in the 5-year adaptive management assessment of the MPAs.

MPA Watch programs are now being established to engage community members in monitoring human uses to inform enforcement. Collaborative members are leading outreach to make sure people are aware of MPAs so they comply with protection of the marine resources. The MPA collaboratives are also applying for grants which they have received and used to develop educational materials and conduct enforcement training. State agency wardens and outreach personnel participation in collaborative meetings has been essential to developing agency-collaborative relations and expediting management project approvals.

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<sup>21</sup> Carlsson and Berkes (2005) Step 3

## Preconditions for Comanagement

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### *Crisis*<sup>22</sup>

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Since the MLPA addressed species declines by designating MPAs, the decision to pursue MPA collaboratives in California was borne out of a resource management dilemma rather than an environmental crisis. The state recognized it lacked sufficient resources to effectively manage all 124 of its newly designated MPAs – particularly in the areas of local outreach, education and enforcement. MPA collaboratives provide a mechanism to address these critical management gaps.

“The Department of Fish and Wildlife [was] saying, ‘We can't do this education on our own. We need help. We don't have the resources. We don't have the personnel.’ So I think the collaboratives really came from getting that response on – whether it is MPA signage, brochures or monitoring. So the collaboratives formed to fill those gaps where the Department doesn't have the bandwidth to work on them. And the collaboratives also have local expertise” (Participant 21).

### *Willingness to Contribute*<sup>23</sup>

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On Catalina, the strong sentiment of being unique – as an island community – provided the rationale and inclination to establish its own collaborative, rather than participate as a member of the Los Angeles County Collaborative. Interview respondents noted that the Catalina Island Collaborative's co-chairs prior involvement in resource management activities such as outreach and monitoring fostered a natural interest in the collaborative process. Access to management resources and connections, and the importance of having a local voice and using local expertise in the implementation of MPA management also promoted the willingness to contribute.

“Catalina didn't want people from the mainland speaking for them” (Participant 23).

### *Opportunity for Negotiation*<sup>24</sup>

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The Orange County Marine Protected Area Council (OCMPAC), established in 2001, set the precedent for the community collaboratives that later formed in the rest of the state. Funding from a state legislative proposal to develop resource management signage about crab trapping regulations provided a forum for OCMPAC members and the state to come together and develop consistent messages, enforcement training and docent training. Later, OCMPAC leadership's advocacy to expand the collaborative concept state-wide provided an entrée for three additional counties to establish

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<sup>22</sup> Plummer and Fitzgibbon (2004) Precondition 1

<sup>23</sup> Ibid, Precondition 2

<sup>24</sup> Ibid, Precondition 3



MPA collaboratives. A groundswell of interest from other coastal stakeholders, generated by word-of-mouth, eventually led to the formation of 14 collaboratives across the state. Time, the development of relationships between members of collaborative and state agency representatives, and a willingness on the part of the state to let local stakeholders lead were identified as essential to the process. On Catalina, the opportunity for local engagement and negotiation began even earlier, with the MPA designation process itself.

“We knew the process of the MLPA initiative was going to happen. It was going to happen and if you wanted to have your voice heard, you needed to get involved, go through an interview process and see if you could be accepted. There was a lot of thought, ‘Why do we need somebody from Catalina there because we’ll just make the decisions for them?’ And the Department of Fish and Wildlife was like, ‘No, you should really let them be involved in the process’” (Participant 23).

#### *Legal Mandate or Brokered Incentive*<sup>25</sup>

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No legal mandate existed to require local stakeholder participation in MPA management. Interview respondents reported that the MPA collaboratives resulted directly from a brokered incentive to address the state’s capacity limitations and empower community stewardship. An additional incentive for the communities was to ensure they were not left out of getting some of the available resources, and to make sure they had input on how management resources were used. Now that the MPA Collaborative Network is in place and functional, the Statewide Leadership Team, comprised of multiple resource management agencies, has formally recognized the MPA Collaborative Approach as essential to meeting its objectives.

#### *Leadership Energy*<sup>26</sup>

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The impetus for establishing MPA collaboratives came from OCMPAC leaders and other NGOs who advocated on behalf of community-based management to receptive state leaders. Then, in each county, a small group of well-informed stakeholders and key communicators representing varied interests – fishing, science, government, non-profit - was instrumental in bringing additional local stakeholders together. Initially, the Los Angeles County Collaborative took the lead to engage and support community participation in MPA management on Catalina until island-based leadership stepped forward. The co-chairs that lead each collaborative recognize themselves as “knowledgeable doers” (Participant 21). Personal convictions, a sense of responsibility to Catalina, and multi-

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<sup>25</sup> Plummer and Fitzgibbon (2004) Precondition 4

<sup>26</sup> Ibid, Precondition 5

generational familial ties to the island have been equally important leadership drivers. While participation and leadership in the collaborative is voluntary, linking the role to their full-time work has been a beneficial strategy for some. Island-based respondents also pointed to the essential coordination leadership energy provided by the director of the MPA Collaborative Network.

### *Common Vision or Existing Networks<sup>27</sup>*

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The existing OCMFAC network served as a model for the collaborative process to expand to other parts of the state. Today, the state-wide network of 14 collaboratives provides an opportunity for shared learning and peer-to-peer community support. In addition, the network of youth camps around Catalina Island and their marine educational programs help to foster island-wide interest and communication. Developing a vision statement for each collaborative is anticipated to be a component of strategic planning in 2016. On Catalina, respondents noted a general move towards a shared vision as an outcome of, rather than a precursor to, the collaborative process. They also indicated that some community members are still against MPAs because they were unhappy about the designation process. Participants credit the establishment of the island-based collaborative with enhancing communication and cooperation between the island and the California DFW.

“Catalina is at the forefront. About 16 percent of the state’s waters are within MPAs and here on Catalina we have 22 percent. So we very much recognize the significance of the marine environment and appreciate the support of the state. ... There is definitely cohesion between the state and the local collaborative as far as what is needed in terms of enforcement, outreach and monitoring” (Participant 22).

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<sup>27</sup> Plummer and Fitzgibbon (2004) Precondition 6

### Linkages among Cases<sup>28</sup>

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#### *Historical and Political Context*

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With nearly 30 and over 20 years of experience respectively, the Rookery Bay and Hā'ena cases illustrate the evolutionary nature of comanagement and its potential to grow progressively from a community-based initiative to a mutually respected and beneficial arrangement. The Catalina Island case is in a nascent stage; however, the state-wide California MPA Collaborative Network has a demonstrated model of success in the OCMPAC and is providing a unique network support system for Catalina and its other emergent local collaborative efforts. In each of these three cases, a small group of concerned and committed community members identified the need for a new or supplemental approach to protecting and managing the marine and coastal resources in their community. These individuals came together to propose and pursue a shared governance system with state agency resource managers that incorporates local knowledge, conditions and concerns. Each of these three cases has required state resource managers to recognize some of the limitations of western resource management and centralized government, and to consider the role that equity (through local stakeholder participation) and efficiency (by altering human, fiscal and technical capacity regimes) can play in natural resource management effectiveness.

“We have grown from a small, sort of grass-roots organization which started back in 1987 to about 800 members now, so I think it is probably one of the largest CSOs in the state of Florida” (Participant 25). *Florida*

In the U.S., comanagement represents a move away from contemporary, top-down, marine resource management practices and has led to the development of new state policies such as California's MPA Partnership Plan, or new legislation, as in the case of Florida's CSO statute and Hawai'i's CBSFA rules. Uniquely, the Hā'ena case illustrates an opportunity to consider how traditional, customary approaches to natural resource management can enhance or improve upon the western management model and help restore the community, as well as the ecosystem.

“Hā'ena is really based on a kind of a small community of close-knit Hawaiian families; and given Hawai'i's history and what has happened to those families - some self-imposed and some imposed from the outside, like loss of land – the families have their own issues that they have to deal with through this process. Sometimes you need to dig deep and really look inside

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<sup>28</sup> Carlsson and Berkes (2005) Step 4

your own and talk with your own people and make sure they are not going to come out and oppose [management] because they hate you or they hate your ancestor, and rather understand that the rules are good for the community. Some of that kind of stuff... has been the best and the worst part of the effort – that the Hawaiian community is already challenged by its history and that history is one that has divided them, even among each other as family members. That has to be addressed as part of the process of getting everyone back to the table and supporting the [CBSFA] effort” (Participant 17). *Hawai’i*

In each case, interview respondents stressed that effective local and state leadership has been essential to the success<sup>29</sup> of co-management efforts. In addition, all three cases illustrate the importance of state leadership at both local and state-wide administration levels. Environmental and community support organizations have also provided an essential bridging role between local community and state agency representatives in both MPA designation and comanagement implementation processes.

“The Collier County Conservancy, The Nature Conservancy and Audubon were all active in the early days” (Participant 24). *Florida*

“We have to build better bridges between our communities and our state or we are never going to be able to build the kind of management we want to see happen. So we've been helping the communities talk about how they can support each other. The Nature Conservancy also has a smaller network they facilitate” (Participant 17). *Hawai’i*

### *Types and Phases of Comanagement*

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Recalling the introduction to this study, comanagement may be characterized as consultative, collaborative or delegated, and evolves through three phases, beginning with pre-implementation, followed by implementation and then post-implementation (McConney et al., 2007). Table 6 sets forth the current types and phases of implementation in each case study.

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<sup>29</sup> See Rating Comanagement Experiences, p. 63

Table 6. Types and phases of comanagement by case study.

Case Study	Type of Comanagement	Phase of Comanagement
Rookery Bay Reserve-Preserve Citizen Support Organization	Consultative; elements of collaboration in some activities	Implementation; adjusting and open to opportunities for expanded role for user groups and community
Hā'ena Community-based Subsistence Fishing Area	Collaborative; challenged by bureaucratic process and limited capacity to self-organize	Transitioning from pre-implementation to implementation; negotiating management plan
Catalina Island Marine Protected Areas Community Collaborative	Consultative; elements of collaboration in some activities	Pre-implementation; meeting, discussing and developing new management capacity and projects

Florida's CSOs and California's MPA collaboratives were designed to follow a consultative approach to comanagement.

"The expectation is that the CSOs really don't get involved in day-to-day management of a protected area. That's the formal agreement" (Participant 25). *Florida*

"The idea is less helping to manage the resource and more trying to get people to know about them and comply with them" (Participant 23). *California*

However, while this arrangement holds true for most natural resource management activities in Florida, many essential financial, certain administrative and outreach functions essential to the management of the Rookery Bay reserve-preserve system are, in fact, being conducted by the CSO in collaboration with local state management. Similarly, while the DFW is mandated with enforcing California's MPAs, the Catalina Island Collaborative has taken the lead on local enforcement training and outreach activities. The development of a shared vision has been an essential factor in the transition from consultative to collaborative actions in both California and Florida.

"In reality, a lot of CSOs... have helped support policy decision and strategic direction for sites; but I would also say my experience has been that it's really important that the leadership of the CSO is in alignment with the leadership of the site... you have to invest the time to work with them to make sure they understood the goals and priorities of the site" (Participant 25). *Florida*

While none of the three cases presented has considered delegated comanagement, in Florida, representatives of the CSO and the local state agency office expressed interest in moving from a

consultative approach to shared governance to one that is more collaborative. However, the partners agree that this would require a change in current state leadership.

“From my perspective, we ultimately have to rely on public and private sector partnerships and raising awareness in these coastal communities because they are ultimately the users of these resources. They are the boaters, they are the people that get out and utilize these resources. They are the folks that are making decisions outside of our boundaries that ultimately have influence within the reserve. It would have to happen under a different administration, but if the opportunity comes along with a change in leadership, I definitely think the FORB would be an organization that could step in and play a stronger role for the reserve” (Participant 25). *Florida*

In Hawai‘i, the stated purpose of the Hā‘ena CBSFA legislation is to enable “culturally-rooted community-based management” and “substantive involvement of the community in resource management decisions” (DLNR, 2014, p. 1-2). While both the community and the state have expressed their commitment to collaborative comanagement, interview respondents reported that to date, actual collaboration is still more conceptual than practical.

“Well, the people of the place are working with government to make the rules together - kind of. There is a [state employee] coordinating, that has developed and written a management plan which we had no part of... that is going to come back to us and say, ‘Okay, here it is.’... So it hasn't been as collaborative as it needs to be” (Participant 18). *Hawai‘i*

### *Connection between Government, Local Actors and Decision Making*

Community members and state managers involved with comanagement efforts in Rookery Bay, Hā‘ena and Catalina acknowledged benefits derived from their respective state-local partnerships. In particular, respondents recognized that regular communication has led to greater willingness to support each other.

“The director of the community partnership does a great job of being a liaison between the government agencies and the local collaboratives and at least maintaining communication, so we are not just putting [an MPA management project] proposal out there and then not hearing anything back” (Participant 22). *Regular communication, California*

“The community itself is taking a strong role in... the area in the Hā‘ena State Park. The community group, Hui Maka‘āinana o Makana, which has... led this effort for the past 20 years is... continually connected to the DLNR and the county in some way in helping them manage” (Participant 17). *Regular communication, mutual support, Hawai‘i*

Improved working relationships among government and local actors were attributed to shared experience and trust built over time through comanagement efforts.

“The community has a program called Makai Watch. ... They work with DOCARE, the conservation and enforcement wing of our DLNR, to help better do outreach, to serve as the eyes and ears of enforcement so they can better enforce out there. I think the Hui has a good relationship with the head of DOCARE on Kaua’i” (Participant 17). *Improved working relationships, Hawai’i*

“We went to our CSO, and said ‘Look guys, we really need your help’... It was literally the FORB that stepped up and helped facilitate hosting a three-day visit by that multi-agency council so they could see what environmental values the reserve really had to offer. So the FORB were instrumental in helping us during incredibly important years and that’s when we were able to get that \$57M of funding to buy those uplands. The management team, staff, contract staff, the volunteers and the FORB - I think that level of coordination, communication and trust is very strong” (Participant 25). *Strong working relationships, Florida*

Ultimately, better communications, collaboration and improved relationships have fostered greater awareness of community dynamics and better decision-making,

“One of the great things about the collaborative is our membership is very diverse. So, we have educators; we have marine scientists; we have recreation outfitters; we have fishermen, so several different voices. [The] tendency is to be focused on conservation, but as a tourist destination, it's important that we have the voice heard of the chamber of commerce and kayak outfitters, and so we aren't just saying, ‘No’. It's been valuable to have everybody's voice heard so that we're making sure we're educating but not dropping the hammer on non-consumptive use” (Participant 22). *Greater awareness of community dynamics, better decision-making, California*

### *Factors Supporting Comanagement*

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Community members and state agency representatives alike identified many factors, or attributes, within the three MPA case studies that fostered the emergence of, and are expected to sustain, comanagement efforts. Several key recurring themes occurred across the three cases studies. These themes included, 1) community values related to their way of life and their association of the quality of that way of life with the natural resources of their place;

“A lot of the people in this community, as they begin to understand the work that we're doing, they can draw a pretty short line between the quality of life that brings them and keeps them here and the 110,000 acres that we are managing” (Participant 25). *Connection to quality of life, Florida*

2) community recognition and appreciation of their local knowledge and how their expertise can contribute to improved natural resource management;

“The communities... are really trying to change a broader ethical issue in the way our community and our government operates and bring back a sense of place to the way we manage resources. ... People describe the *konohiki* as a person who knew about fishing, but who also knew what the entire community was up to and was able to organize them, such that their relationship with their place was much healthier than it is today” (Participant 17). *Importance of local knowledge for improved governance, Hawai'i*

3) state agency recognition and acceptance of their resource management limitations, especially at local levels;

“It was the Department of Fish and Wildlife saying, ‘We can’t do this on our own. We don’t have the resources or the personnel. We need help, and the collaboratives have local expertise’” (Participant 21). *Recognizing state capacity limitations, California*

And, 4) each community’s demonstrated stewardship of its natural resources.

“The locals really like to take care of their resources. I call them consumptive conservationists. That's where their food comes from, so they want to make sure it’s still there for them to eat. So, when we did enforcement training, Avalon Harbor Patrol was all over it” (Participant 23). *Community stewardship, California*

### Challenges: Community and Organizational Capacity-Building Needs<sup>30</sup>

Along with enhanced capacity and the value attributed to comanagement arrangements within the three MPA cases studies, participants in each partnership acknowledged that additional challenges, especially capacity-building needs, remain. Three areas of difficulty that emerged from interviews with community and resource agency representatives included empowering the local community to act on management needs, building local management capacity, and incorporating adaptive management into comanagement. Some of the problems they identified are associated with factors beyond the control of the partnership participants.

#### *Empowering local community*

In Hā’ena, the high cost of living, limited local educational and employment opportunities, and an uneasiness with participating in natural resource education and outreach roles were identified as barriers to community participation in comanagement efforts.

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<sup>30</sup> Carlsson and Berkes (2005) Step 5



“I think there is a lot of potential within the community to be more engaged with the state... it’s hard when you have such a big socio-economic divide for there not to be any kind of jobs within the community outside of mowing lawns and cleaning vacation rentals” (Participant 16). *High cost of living, limited local opportunities, Hawai’i*

“The management challenge to me is the people that know stuff need to talk about it and teach it. And local people, native people, don't do that. They just don't. They talk among themselves and they're just dumb-founded that the rest of us don't just know that. ‘What do you mean you don't know that?’ And, ‘I just don't have time for you’” (Participant 18). *Uneasiness with education and outreach roles, Hawai’i*

### *Building local capacity*

Despite the best of intentions, interview participants revealed they were challenged by the limited amount of time, budgets, skilled individuals, MPA information, and training available to support local management efforts and efficacy. The most pressing needs identified by community members were public information about MPAs and skill-specific training to develop local management capacity.

“I hate signs, but I know we need signs. It's not right for me to go to somebody and say, ‘Hey, you're not supposed to do that there. Don't you know that?’ And they're going to go, ‘No. I don't know that. How would I know that?’” (Participant 18)? *MPA information to support education, outreach and compliance, Hawai’i*

“There needs to be a lot more boater education. It's primarily in the summer, but boaters come from all over California and spend weeks at the island and I doubt they know what the water quality or environmental regulations are, or what they should be doing around here” (Participant 21). *MPA information and individuals to support education, compliance and enforcement, California*

“Prior to the recession, when we had a pretty good state budget, there were actually a couple of paid ranger positions. These were non-law enforcement positions and at that time we were using these rangers to help engage the boating community and those were some of the first positions, unfortunately, that we lost” (Participant 25). *Budget and skilled individuals to support education, outreach and enforcement, Florida*

“A lot of times, unfortunately – at least in Hā’ena – a lot of people are very angry about things that have transpired with the state or within the community and can't necessarily express themselves in a way that is productive” (Participant 16). *Skilled individuals and training to support conflict resolution, Hawai’i*

### *Adaptive comanagement*

Processes to facilitate review and adaptation of MPA management in response to new or changing environmental and social conditions were also identified as a management need.

“That's one of the frustrations. As the regulations currently exist we can't take anything within some of our MPAs – particularly the no-take State Marine Conservation Areas – and that includes invasive species. So there are groups that would love to go in and remove the [invasive] *Sargassum*, but since it's a species within an MPA, they can't. It's a weird clause that got written in without a lot of foresight” (Participant 22). *Regulations, California*

### Options for Improving Problem-Solving and Policy-Making through Comanagement<sup>31</sup>

Community and agency partners identified numerous ways that they have, or plan to, put into action to address their capacity needs and other resource management challenges through comanagement. Interviewees described how comanagement has improved problem-solving and policy-making by improving stakeholder relationships, empowering the local community, building capacity, generating funding, providing MPA management leadership and coordination, fostering programmatic partnerships and encouraging adaptive management.

#### *Improving stakeholder relationships*

California's MPA Collaborative approach provides an instructive model for introducing a prospective resource management partnership and enhancing relationships among stakeholders through a participatory process. Five or six individuals representing a variety of interests – a non-profit, an agency person, a scientist, and a fishing representative – were identified in each community. Together they identified as many people as possible that might have local area expertise, a connection to the ocean environment or MPAs, and reached out to invite those stakeholders to attend a meeting. At the first meeting, state representatives introduced the MLPA, talked about MPAs and shared how they would like to partner with the community. At the second meeting, the state intentionally did not attend to allow the community to focus on and discuss their own issues.

“It was all local stakeholders contacting local stakeholders. We had three official meetings [in each community]. It was going to take at least that long for people to start feeling comfortable with each other because in a lot of these areas, they had been on opposite sides of the fence for so long. There was just this huge mistrust built up, especially from the fishing community and the conservation community. A lot of these groups also saw the agencies as non-players because they hadn't really engaged. So getting them involved and hearing their perspective was an eye-opener for a lot of the parties. A big part of those first meetings was just kind of getting to know each other, figuring out what the local resources were” (Participant 20). *Introducing comanagement through a participatory process, California*

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<sup>31</sup> Carlsson and Berkes (2005) Step 6

### *Empowering local community*

On Catalina Island and in Hā'ena, on the island of Kaua'i, community members spoke about the inherent, historical knowledge that exists in these places because so many people or their families have lived there for many generations. They have a vested interest in seeing marine resources conserved because of their connection to the place and because, for many of them, their way of life is tied to the marine environment. However, community members may not realize, or may downplay, their knowledge and its significance.

“Those people who don't think they know a lot often reveal what they know to themselves. I often advocate for them to have those conversations amongst themselves, maybe with the youth of their people, to remind them – and sometimes teach them anew – that some knowledge is in other formats with which they are more comfortable and familiar. It's not in the book that they didn't read. It's in the song that they did sing. It's in the story that grandma told” (Participant 18). *Value of local knowledge, Hawai'i*

“Things like water quality issues and things like the impacts of land-based pollutants are such natural concepts to a person of place. You don't have to explain that runoff is causing an issue. They totally know it” (Participant 18). *Value of local knowledge, Hawai'i*

Surfacing and finding ways to integrate local knowledge into resource management creates value and can empower local community members to participate in resource protection.

“Well the first [step] is to re-educate and then educate. The first is to re-engage, support and foster the people of the place to make sure that they recognize their value, their worth, their role, their power, their contribution to the place. People need to step up and say, ‘I need to know more about this,’ or, ‘Wait, I know about this,’ to establish or re-establish that knowledge base” (Participant 18). *Illuminating local knowledge, Hawai'i*

“[One idea] is to get some kind of a visitor center... into the park so the community could have a place to be employed within their community and also [use it for] practicing and perpetuating their culture and educating visitors to the area about how they can help bring back, and help support traditional knowledge and resource protection” (Participant 16). *Value of local knowledge/ educational outreach, Hawai'i*

Enhancing local knowledge through educational opportunities can support resource management objectives.

“One of the really valuable things that happened when we did the enforcement training is we had a marine scientist from Cal State Long Beach come and give a presentation. There are a lot of rumors about the effectiveness of MPAs and the science behind MPAs and he did a really great job explaining why they are designated and how they are effective at what they are meant to do” (Participant 22). *Enhancing local knowledge/educational outreach/enforcement, California*

### *Building capacity*

In all three cases, comanagement partners have implemented novel approaches to build local outreach, education, compliance and enforcement capacity. In California and Hawai'i, local community members are learning how to monitor human uses of the marine environment through state-sanctioned programs like MPA Watch (in California) and Makai Watch (in Hawai'i).

“We did a whole lot of human use [monitoring]. There is a Department of Land and Natural Resources website that has Makai Watch on it and that will give you the foundations for that. There's a training protocol that they've developed called *Ike Kai*. That is the protocol for training and how to do stuff. ... It gives volunteers in the community the sense that their voice matters and their information is valid. Makai Watch is currently housed in the [state] enforcement office [with a] state coordinator” (Participant 18). *Monitoring, compliance and enforcement, Hawai'i*

“MPA Watch is fostering a feeling of stewardship for these MPAs, rather than seeing them as impinging on people's freedom, trying to have them look at it as a shared resource that they have stewardship over” (Participant 21) *Monitoring, compliance and enforcement, California*

In Florida, trained community volunteers are out on the water educating boaters, and monitoring and protecting vulnerable species through the state-sanctioned Team Ocean Program. Monitoring data generated by participants in these programs has been used to inform a variety of management needs, from identifying MPA locations to determining where limited enforcement resources should be directed.

“We started looking at what the Florida Keys [National Marine Sanctuary] was doing with their Team Ocean [Volunteer] Program. We essentially adapted that concept to the Rookery Bay Reserve, and we've had good success with that. We now have maybe 70 or 80 Team Ocean volunteers that are basically recruited and trained boaters. We have two marked Team Ocean vessels that were donated by a local marine industry association and they are out working with the boaters to try to encourage good stewardship. So if they see things like prop dredging – the message in the Keys of course is [about not] anchoring on corals - up in the Rookery Bay Reserve it's about seagrass, it's water quality, it's not letting your dogs run loose in areas where we have shorebirds nesting and things like that” (Participant 25). *Education and outreach/compliance and enforcement, monitoring, Florida*

In Hawai'i and California, community members are also developing signage and land-based boundary markers to provide information to islanders and visitors alike about MPA locations and regulations. These materials are being developed in close collaboration with state resource agencies to augment education and outreach efforts.

“We're dealing with things like signage and stuff, which I abhor, but we have to do something to let people know that they are in a certain kind of place... so certain behaviors that are benign someplace else are probably not benign here” (Participant 18). *Education and outreach/signage, Hawai'i*

“We are working on signage and we actually had a couple of pilot projects.... And one is having a boundary marker - not buoys. ... Fish and Wildlife does not support buoys. ... So we tried to do a land marker. We had an "O" and a "K", so if you cross over it's a "K" and an "O", if you're [not] "OK". So for the people that go into Avalon and rent those little boats and cruise along the coast and throw out a line, they know. They all go into the MPAs, and would have no idea. And everyone says, 'Oh, but everybody has a GPS.' No, not when you rent a little dinghy for the afternoon” (Participant 20). *Education and outreach/signage/boundary markers, California*

In California, the Catalina Collaborative marshaled existing local, enforcement resources to support MPA compliance and enforcement by providing enforcement training opportunities.

“We did an enforcement training through the Collaborative where we brought [state] Department of Fish and Wildlife units out to the island to meet with the various [local] enforcement agencies on the island – so Harbor Patrol, Baywatch, the Sheriff's Department, the Conservancy's Rangers – to let them know what is within their authority, as well as, if it's not within their authority or they aren't comfortable acting on it, who to contact. They worked directly with wardens who taught them how to write warnings or cite individuals for [MPA regulation] infractions” (Participant 22). *Enforcement training, California*

To address the issues of poaching and disregard for regulations, the state established an anonymous reporting system called CALTIP to enable local citizens to support and direct enforcement capacity.

“The Department of Fish and Wildlife is in charge and mandated with enforcing MPAs. But with the efforts of the Collaborative, I think we've done a much better job at educating the civilian community on what they can do, letting them know that they do have a voice, particularly through CALTIP, which is an anonymous citizen enforcement tool. In the past, Fish and Wildlife was stretched so thin that they might only get to the island once a week or every other week. But through the CALTIP system, people can report frequent violations and then you can actually change the patrol routes so that we're assuring the Fish and Wildlife boats are hitting the sites that are most frequently violated, and we've also increased - at least during the peak season, during the summer – [how often] they might come out to the island now to four times a week” (Participant 22). *Enforcement capacity, California*

### *Providing MPA management leadership and coordination*

In all three comanagement cases, interview respondents stressed the importance of securing local MPA leadership – ideally for both the state and the community. Comanagement partners agreed that volunteers should support, not replace staff positions; and, where possible, full-time or part-time

paid local staff positions have been created for some of the MPAs. Still, these paid positions followed the designation of the MPAs, and often by many years. Examples of paid full-time positions include locally-based, government-funded, state managers for the three research reserves and many of the 41 aquatic preserves in Florida, and a non-locally-based, privately-funded MPA Collaborative Network Director and Coordinator for the 14 MPA collaboratives in California.

“Most [of the aquatic preserves] have managers, so you've got an individual that's a point person that knows the biology, knows the condition, knows the issues and if an individual is interested in Rookery Bay..., there is an individual they can call that knows the answer to that. Absent that, the public has no idea what the issues are and they're kind of grasping at straws if they don't have the background or knowledge to. ... They know when there is something wrong, but they don't know what it is or how to fix it. So having that [manager] may not do it directly, but they may wield enough information that it gets the public involved and the public fixes it” (Participant 24). *Role of locally-based state MPA manager, Florida*

In other cases, part-time positions, or dedicated volunteer positions, have been created. In Florida, the FORB supports a part-time director for its CSO through its private fund-raising efforts for Rookery Bay. However, the other CSOs in Florida are managed entirely by elected, volunteer officers. In California, each MPA Collaborative is led by two co-chairs, with each chair representing a different stakeholder sector. These are non-paid volunteer positions; however, in some cases, the co-chairs have been able to integrate some of their co-chair responsibilities into their full-time municipal, educational, or environmental jobs.

“Some MPA collaboratives have a city staffer who is a co-chair and that's a really good model. When we were putting in the MPA signs, city [participation] was key. Ultimately, I think one of the co-chairs has to be someone who has work on MPAs as a part of their job – who can devote time to getting work done” (Participant 21). *Role of MPA collaborative co-chairs, California*

Regardless of the position status or funding, participants emphasized the importance of strong leadership skills and alignment between state and community leaders.

“[It takes] forgiveness, humility, good leadership. [The community leader] is a very humble man. If he wasn't the face of the effort and its manifestation for the past four years and it was [some] other potentially more vocal, divisive leader in the community, some of the people who can see the goodness of the rules would have come out in opposition [to them] purely because they hated the leadership, and wanted to see that individual fail” (Participant 17). *Comanagement leadership, Hawai'i*

“My experience has been that it’s really important that the leadership of the CSO is in alignment with the leadership of the [reserve],... you have to invest the time to work with them to make sure they understand the goals and priorities of the site” (Participant 25). *Comanagement leadership, Florida*

### *Generating funding*

Even with volunteer efforts, funding to support resource management programs and projects is essential, but with shrinking government budgets, state and local community management partners have had to find and pursue alternative sources of support to manage their MPAs. With three decades of experience, the FORB has become a model for sustainable and innovative MPA funding. This CSO has created a diverse portfolio of funding sources drawing upon membership development, private donations, fundraising events, grants, bartered service partnership and international carbon offset projects to fund local habitat restoration. Key to the success of these efforts has been the use of funds to support two paid CSO staff positions, and the formation a team of volunteer CSO members to support membership development. Similarly, recognizing the need to pursue their own funding, each of California’s MPA collaboratives has established a fiscal sponsor, capable of receiving and administering funds. The collaboratives have begun pursuing grants and exploring opportunities to develop partnerships that support local MPA management objectives.

“Our signature event is *Batfish Bash for the Bay*, something we’ve been doing now for about six years. We started it bringing in about \$30,000, now about \$150,000 and we hope to bring in about \$200,000 in March for our next one” (Participant 25). *Local community fundraising, Florida*

“The collaboratives have been applying for mini-grants. We received a \$10,000 grant to work on education projects, printing and stuff like that” (Participant 21). *Local community fundraising, California*

### *Fostering programmatic partnerships*

In addition to funding, programmatic partnerships have generated scientific, educational, monitoring and enforcement support for comanagement efforts in Florida, and enforcement support for comanagement efforts in California.

“For example, Rookery Bay is working to develop a strong relationship with nearby Mote Marine Lab because of the capacity they have to provide scientific support [to the Reserve-Preserves]” (Participant 25). *Science, education, and monitoring, Florida*

“We have a very good working partnership with Fish and Wildlife Commission. We actually have the county FWC field station located within the boundaries of the reserve which gives us great law enforcement coverage. So I think that's a very important aspect of the enforcement side, but also on the education side of things, when we are dealing with the boating community. We meet with the captain of the FWC monthly and invite the officers that work in the county to the reserve on a regular basis. We worked really hard to keep that partnership going because these are the guys that are out on the water every day” (Participant 25). *Education and enforcement, collaboration, Florida*

### *Enabling adaptive comanagement*

Having identified the need to incorporate adaptive management into comanagement efforts, the Catalina Collaborative is leading the way to implement changes in its MPA regulations based on actual socio-political and environmental circumstances. Examples include working with the California DFW to amend MPA regulations to allow the removal of invasive species and working with the Natural Resources Agency and the District Attorney's office to amend the penalty for MPA violations.

“That's another one of the great achievements of the collaborative - we've changed the rule. It used to be that if you performed a violation within an MPA, it was a misdemeanor, and then those cases, almost 100 percent of the time, were dismissed in court, so it really didn't carry a lot of weight. ... Now, instead of issuing a misdemeanor, they issue a citation. Much like a traffic ticket, now there is actually a monetary value associated with these violations and it makes people a little bit more accountable” (Participant 22). *Adaptive management, California*

### *Shared Knowledge*

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In all three comanagement case studies, individual, and, often, generational connections to their singular places emerged as a common theme and driver for collaboration and shared governance among community members. Expanding upon this, island-based community members identified being an ‘islander’ as a distinct lifestyle. This identification contributes to group cohesion, providing a foundational imperative for engaging in decision-making that may affect the natural resources of their place or their way of life. Islanders from Catalina and Kaua'i were interested to learn about Fishers Islanders and to share their experience with them.

“[Living] on an island, I understand that each island is very unique in itself and that islands tend to not follow a lot of the same patterns as mainlanders do. It's very important for – especially the people who live on the island year-round – getting the buy-in from them, getting their input, asking them how they feel it should be managed. It might not go their way, but at least allowing them to have an option to have their voice heard – whether it's at town meetings or whatever – where people who are more [involved] in decision-making or land ownership positions, they can listen or have conversations with those who are essentially the



caretakers for the island, who are living there year-round. That's their home. I think that's it – one islander looking out for another islander” (Catalina Island resident).

“I think we all learn from each other, but I want the people of Fishers Island to know... what they are doing is timely. It's in the now and we don't have the answers except for experience of process and it isn't all pretty... Every step is valuable, so for process, it doesn't get much more difficult or rewarding than this kind of stuff, this stuff of taking care of our places. ... People of little places, like Fishers Island or Kaua'i, people of little, isolated places are indeed the leaders of this movement, ... the ones whose voices matter the most. We have the most at risk and we have the most skin in the game and it's our responsibility” (Kaua'i Island resident).

### *Rating Comanagement Experiences*

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Community and state representatives with experience in Hawai'i, California and Florida were asked to consider and rate the effectiveness of comanagement efforts at engaging the local community in marine resource management, on a scale from one to five, where one is unsuccessful (i.e. the community is not engaged) and five is completely successful (i.e. the community is fully engaged). Despite challenges, all 10 respondents agreed that taking a collaborative approach has engaged their community and provided a more effective means to identify and resolve local, marine resource management issues.

“I want to say like a 3.5 or 4. You can't expect 100 percent of the people to show up at every hearing over 20 years, you know. The state is – now that we have the law in place – asking the community to have another hearing for political reasons” (Participant 17). *Hawai'i*

“I think the biggest success is that the [communities and the state] are coming together and communicating. So at this point, only two to three years into it, they're just getting started. ... It's hard for them to fall off because they are starting to make so many webs and connections and they are being recognized at a state level. I don't think I'm overstating by saying that I think this is going to be a model for effective management moving forward... so I give it a high level of success. I'd give it a 4... It's not there yet; it's getting there” (Participant 20). *California*

Respondents also noted that collaborative processes require time. Efforts generally started at the lower end of the success rating scale, stayed low for the first few years, and only achieved a higher rating after a decade or longer. Comanagement offers an approach to improve place-based management planning and implementation over time.

“We're talking about over the span of 30 years now, because we've been around for a long time. I'd say while we may have started around a 2, we're probably now around a 4.5. I'm feeling like we're not quite fully there, but we've positioned ourselves. It's taken a long time, and a lot of effort to get to that point. It's not something that a CSO can achieve I think very readily, you know, in just a couple of years. ... It takes everybody working in the same direction, but it's fun” (Participant 25). *Florida*

## Fishers Island, New York: The Case for Community

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### The Fishers Island Social-Ecological System<sup>32</sup>

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Situated at the eastern edge of Long Island Sound, seven miles southeast of New London, Connecticut, Fishers Island is renowned for its natural beauty, limited development and absence of tourism. Nearly seven miles long and approximately one mile across at its widest point, the island is a geological extension of the North Fork of Long Island, New York, and politically, belongs to the Town of Southold, New York. However, while ferry transportation, utility and medical connections have been established between the island and nearby Connecticut, there are no direct connections between the island and New York.

Evidence of Native American hunters and gatherers seasonally camping on the island dates back more than 8000 years. In the 17<sup>th</sup> century, Fishers Island was settled by the Dutch and British who cleared and established farms on the largely forested island. Later, parts of the island were held by the U.S. federal government for coastal defense. The establishment of Fort Wright in 1898 on the west end of the island attracted new residents, and at the turn of the 19<sup>th</sup> century, the development of a yacht club, hotel, and ferry service brought seasonal tourism during the summer months. Today, the year-round island population is fewer than 250 people, most of which reside on the western end of the island where the small town center is located (U.S. Census Bureau, 2010). The eastern end of the island is privately held and operated by the Fishers Island Development Company (FIDCO), where access is restricted to residents (largely second home-owners) and their guests. During the summer, the seasonal island population swells upwards of 3000.

The Henry L. Ferguson Museum, founded in 1960, houses a permanent collection of artifacts documenting the island's cultural and natural history, conducts related educational programming, and is responsible for preservation of much of the island's undeveloped land through its Land Trust. In addition to the Museum, community cohesion and strong local institutions are evident in the Fishers Island Community Board (ICB), the Island Community Center, the Fishers Island Conservancy, the recreational clubs, and FIDCO (Yale Urban Design Workshop, 2014).

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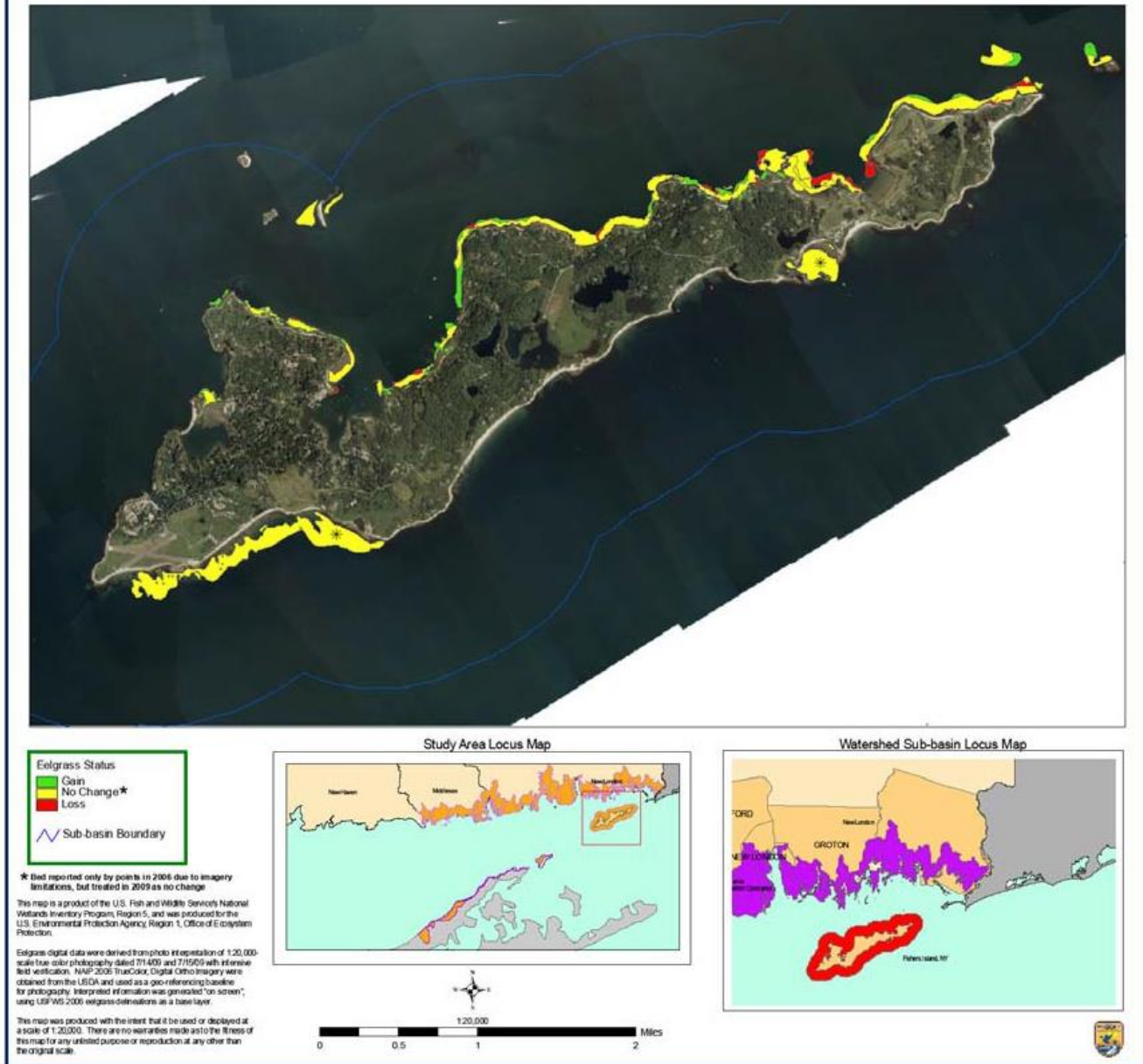
<sup>32</sup> Carlsson and Berkes (2005) Step 1

Fishers Island's varied and diverse habitats include rocky shorelines, sandy beaches, eelgrass meadows, salt marshes, brackish ponds, grasslands and coastal woodlands. The rarity and irreplaceability of these natural features, and the vulnerable species that depend on them – from ospreys (*Pandion haliaetus*) to wintering harbor seals (*Phoca vitulina concolor*) and grey seals (*Halichoerus grypus*) – earned the island designation as a *New York State Significant Coastal Fish and Wildlife Habitat* in 1987. The ecological and recreational value of the island's exemplary eelgrass meadows, which surround much of the island between the mean high tide line and depths up to 24 feet, led to designation of the entire Fishers Island coastline as a *Long Island Sound Study Stewardship Site* in 2005.

Fishers Islanders appreciate the unique ecological character of the island, and the value of its marine resources. For example, residents identified the island's eelgrass meadows (Figure 6) as essential habitat for lobsters (*Homarus americanus*), Atlantic bay scallops (*Argopecten irradians*) and winter flounder (*Pseudopleuronectes americanus*). Islanders also associate seagrass with shoreline protection, opportunities for recreation and observing wildlife. Human activities around the island are numerous. They include beach-going, fishing, boating, surfing, windsurfing, diving, snorkeling, and stand-up paddle boarding. Protection against storm-surge and coastal erosion is recognized as an important ecosystem service provided by the island's coastal habitats. Marine resources have played an important role in the island's economy and social fabric for decades. Until recently, commercial lobstering was an important island industry and supported at least one half-dozen year-round families. Today, only one lobsterman remains. Shellfish aquaculture is also an important local business and job provider.

Interview respondents' (n=15) perceptions of the condition of Fishers Island's marine resources were mixed. Some thought they were in good condition, while others felt they were not doing well. In the latter group, some expressed concerns about the potential for cascading effects associated with habitat degradation and species loss. Although none of the interview participants suggested they depend on fishing for their subsistence, several indicated that they supplement their diet by shoreline fishing and harvesting shellfish. The island's four beaches – South Beach, Isabella Beach, Chocomount Beach and the Fishers Island Club Beach – are the most popular. Water-based activities,

## Eastern Long Island Sound Eelgrass 2006 - 2009 Change in Distribution Fishers Island, New York



**Figure 6.** Extent of seagrass habitat around Fishers Island in 2009 illustrating changes in distribution between 2006-2009, and a concentrated area of habitat loss (shown in red) in the vicinity of East Harbor (Source: Tiner et al., 2010).

particularly boating, are more prevalent on the leeward, north shore, than the south shore, due to the location of the island's harbors – West Harbor, East Harbor and Hay Harbor. Flat Hammock, a sandy islet located about one mile northwest of West Harbor is a popular anchorage area. Year-round residents, in particular, are attuned to the connection between their quality of life and the condition of the island's marine resources.

“I think the community generally does feel very protective about the island, you know – all aspects of it – the people here, the marine life, the plant life, the look and feel of the housing that's here, the whole thing. You know, it's a very proprietary interest that people take in the place... People take care of the place. We love the beaches, we love fishing, and we love boating. People care. That's why they are on an island” (Participant 4). *Connection to place*

“People who are from a place, who were born and raised in a place feel a sense of ownership of the place” (Participant 15). *Connection to place*

“It's an island. I think a lot of our identity is formed through our intimate relationship with the ocean. The people around here know the ocean intimately. They know what tide it is” (Participant 12). *Connection to place*

### Problems to Be Solved, Essential Management Tasks and Decisions<sup>33</sup>

Interview respondents identified five natural resource management problem categories on Fishers Island: recreational misuse/overuse, consumptive misuse/overuse, water quality, climate change and governance. Problem areas, sources, impacts and the management tasks proposed by interviewees to solve them are summarized in Tables 7a and 7b.

### Natural Resource Impacts

Community members reported boating activities, overharvesting, poaching, degraded water quality and climate change as the biggest threats to marine resources at Fishers Island. Natural resource impacts associated with boating activities include anchoring and engine prop damage to habitats, and shoreline erosion.

“We seem to get a lot of tourists with boats that will anchor offshore and that seems to be a negative impact on a lot of areas” (Participant 2). *Recreational misuse/overuse - Boating*

“Fishers Island and Fishers Island Sound is very busy with boat traffic. And it's not just small boats, it's big boats. So there is just tons of boat chop that is eroding the shore and impacting sensitive areas, swamping them day in and day out” (Participant 13). *Recreational misuse/overuse - Boating*

“To the extent that there is eelgrass off of Flat Hammock - that's a really popular anchorage spot. There is a big buoy out there so everybody just sort of hangs out there and then goes and picnics on Flat Hammock” (Participant 9). *Recreational misuse/overuse - Boating*

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<sup>33</sup> Carlsson and Berkes (2005) Step 2

**Table 7a. Problems, sources, impacts and essential management tasks at Fishers Island.**

<b>Problem Area/Source</b>	<b>Impacts</b>	<b>Management Tasks</b>
<b>Recreational Misuse/Overuse</b>		
Boating	<ul style="list-style-type: none"> <li>• Anchor damage on benthic communities</li> <li>• Props scars on seagrass</li> <li>• Fuel and oil contaminants introduced to harbors</li> <li>• Cumulative impacts in intensive boating areas</li> <li>• Dockbuilding/replacement/shading habitats</li> </ul>	<ul style="list-style-type: none"> <li>• Outreach marinas and boaters – especially rental boaters</li> <li>• On the water education and enforcement</li> <li>• Monitoring</li> <li>• Review/amend mooring and dock permitting</li> </ul>
<b>Consumptive Misuse/Overuse</b>		
Overharvesting	<ul style="list-style-type: none"> <li>• Resource depletion</li> <li>• User conflicts</li> <li>• Displacement of local fishing community</li> </ul>	<ul style="list-style-type: none"> <li>• Implement regional planning, consistent rules and regulations (CT, NY and RI)</li> <li>• Outreach and education</li> <li>• Re-establish lobster conservation zone around</li> <li>• Enable local management to build buy-in/compliance</li> <li>• Enforcement</li> <li>• Monitoring</li> </ul>
Poaching	<ul style="list-style-type: none"> <li>• Resource depletion</li> </ul>	<ul style="list-style-type: none"> <li>• Outreach and education</li> <li>• Enable local management to build buy-in/compliance</li> <li>• Enforcement</li> <li>• Monitoring</li> </ul>
<b>Water Quality</b>		
Dredged material disposal	<ul style="list-style-type: none"> <li>• Introduction of toxic contaminants (e.g. PCBs)</li> <li>• Suspected link to lobster shell disease</li> <li>• Benthic habitat sedimentation</li> </ul>	<ul style="list-style-type: none"> <li>• Advocacy</li> </ul>
Leaching or failing septic systems	<ul style="list-style-type: none"> <li>• Nutrient pollution</li> </ul>	<ul style="list-style-type: none"> <li>• Create a certification process to assess and document onsite system condition and track maintenance</li> <li>• Identify alternative wastewater treatment solutions</li> <li>• Water quality monitoring</li> </ul>
Fertilizer runoff	<ul style="list-style-type: none"> <li>• Nutrient pollution</li> </ul>	<ul style="list-style-type: none"> <li>• Education</li> <li>• Switching from suburban lawn landscaping to more natural environments</li> </ul>
Marine debris	<ul style="list-style-type: none"> <li>• Beach and nearshore habitat impacts</li> <li>• Wildlife injuries</li> </ul>	<ul style="list-style-type: none"> <li>• Education and outreach – especially to day trippers and seasonal renters</li> <li>• Cleanup events</li> </ul>
<b>Climate Change</b>		
Bigger storms/seawall construction	<ul style="list-style-type: none"> <li>• Coastal erosion</li> <li>• Property destruction</li> </ul>	<ul style="list-style-type: none"> <li>• Wetland and seagrass protection</li> </ul>

The introduction of pollutants into coastal bays and harbors, and habitat impacts associated with dock building, maintenance and shading are also attributed to boating activities.

“Use of gas-powered motors, and their oils, is probably the largest source of pollutants that come into the harbor environment that is used as an active marina area” (Participant 3). *Recreational misuse/overuse - Boating*

“Although we don't have large marinas here on the island, I just kind of cringe when I'm seeing these guys pouring detergent all over their boats and washing their boats as they are in the slips in the water” (Participant 10). *Recreational misuse/overuse - Boating*

Community members perceive declines in the marine biodiversity at Fishers Island, reporting fewer numbers and smaller sizes of both fish and shellfish. Most respondents attributed these changes to overharvesting, but some people also expressed concerns with the effects of degraded water quality on fish and invertebrate habitats.

“The fisheries are less and less over the years. There was a pretty significant blue mussel population in the South Beach area that doesn't seem to be there anymore” (Participant 2). *Commercial misuse/overuse - Overharvesting*

“Our fishing season may open at a different time than the other one does and you see the charter boats out of Connecticut, where you have shoulder to shoulder men all along the boat and they're all fishing right at the edge of our island – fishing toward it and pulling out. ... It's just, it's difficult to be okay with that. You know? I would call it overfishing. I would call it mismanagement of a resource” (Participant 15). *Commercial misuse/overuse - Overharvesting*

Illegal fishing activity and poaching horseshoe crabs were also mentioned by more than one respondent.

“Because regulatory oversight is from a distance – there are opportunities to take advantage of the resources here – exceeding [allowed] quantities of fish or lobster or taking horseshoe crabs for profit” (Participant 6). *Commercial misuse/overuse - Poaching*

Although interviewees felt that Fishers Island's water quality is relatively good compared to the rest of Long Island Sound, they also raised numerous concerns about both exogenous and island-based sources of pollution. Concerns related to external influences were attributed to marine debris and toxic contamination associated with dredged material disposal in the Sound.

“The lobster environment has been wiped out. I don't know if that is from overfishing or when they dredged the Thames River when it was full of PCBs and didn't dump it very far [from here]... and after was a lobster blight” (Participant 3). *Water quality - Dredged material disposal; Commercial overuse - overharvesting*

Nutrient pollution from local septic systems and fertilizer use were identified as local sources of water pollution.

“Everything is a septic system out here, except for a small area down near the Fort which we call a sewer system, but it's basically a leaching field” (Participant 2). *Water quality - Leaching/failing septic systems*

“There is an awful lot of fertilizer that is used on the island. If you drive in a boat around, there is not much to see on the south side, but along the north side of the island, you can see these bright green, fluorescent lawns that are getting lots of fertilizer. A lot of that I'm sure ends up in the water” (Participant 10). *Water quality - Fertilizer runoff*

Fishers Islanders also shared concerns they have about the increasing frequency and intensity of storm events and the impacts of sea level rise associated with climate change.

“So when big storms come through, you know, Isabella and Chocomount [beaches] may not have sand. At some point, something's going to happen and we'll lose docks or something and there will be a bigger discussion. You know, are you allowed to replace them and how is it going to get done” (Participant 14)? *Climate change - Bigger storms/coastal erosion*

“The south shore of the island is under great strain by rising waters and heavier winter storms than we've had in the past” (Participant 13). *Climate change - Bigger storms/sea level rise*

## Community Impacts

Several interview respondents recounted socio-economic impacts to the Fishers Island community associated with the decline of the Long Island Sound lobster fishery, loss of the Fishers Island Conservation Zone in 2001 (NY ECL §§ 13-0329(2)(a), which had, since 1911, excluded non-New York residents from lobstering around Fishers Island), and the subsequent increased pressure on the local lobster population from Connecticut and Long Island fishermen. User conflicts and competition over local lobster fishing areas contributed to the loss of jobs and residents on the island.

“We lost a court battle where the Connecticut lobster folks said, ‘We want access to some of those rich environments.’ And we lost it. ... It rocked the community and took away a lot of what we were all about” (Participant 12). *Governance - Conflicting state laws/resource user conflicts*

“New York [State] did not protect our lobstermen when Connecticut came over here and started poaching and so we lost that battle and went from six to maybe one or two lobstermen. It just got overfished very aggressively” (Participant 3). *Governance - Conflicting state laws/overfishing*



## Governance Challenges

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Concerns regarding Fishers Island natural resource governance issues were voiced by every interview participant. Among the issues raised was a lack of consistent regulations and enforcement problems associated with conflicting state laws and Fishers proximity to the intersection of three state jurisdictional boundaries (Table 7b).

“One of the biggest problems that everybody is going to face is getting Connecticut, Rhode Island and New York to all agree on the same rules and regulations or practices. Every state has different rules and regulations, so people just go back and forth [across state lines]. There is just a tremendous lack of enforcement, of a visual presence, or someplace to go to ask a question. It’s very difficult to get [the DEC] out here, or get someone on the phone who knows what they are talking about” (Participant 1). *Governance - Conflicting state laws/enforcement*

In addition to challenges associated with conflicting state laws, some islanders voiced concerns regarding the applicability and practicality of some state laws to local circumstances.

“Because we are so small, you have these wide-sweeping mandates or directives and it doesn't always work out here. We just can't get it done” (Participant 3). *Governance - Centralized decision-making/rules*

Most community respondents perceived a general lack of state or town government presence on the island, which translated to a sense of isolation.

“There is no management” (Participant 2). *Governance - Inadequate local staffing*

Some individuals felt local governance challenges were exacerbated by a lack of information about natural resource laws and regulations, and not knowing where to go to obtain such information.

“[There is] no enforcement. And I believe, not a whole lot of knowledge because there is not anyone providing that information here” (Participant 6). *Governance - Inadequate government staffing locally/enforcement*

A need or preference for self-governance was noted by some respondents.

“I think there is kind of a general feeling that we know what's best for the environment and - maybe that's the wrong way to say it – we have the right to do whatever we want with our property and we live here because we value the natural environment, so we should be making our own decisions. DEC shouldn't be coming over here and bugging us about it” (Participant 10). *Governance - Inadequate government staffing locally/self-reliance*

“We are a hamlet of the Town of Southold, which is far removed from us, and Southold is limited in its ability to help us with administrative, managerial needs, so we do most of it ourselves. Most people like it that way” (Participant 4). *Governance - Inadequate government staffing locally/self-reliance*

Despite a recognized need for self-governance, interviewees felt that their current system of voluntarily managed and self-funded island institutions is inadequate, and poorly coordinated.

“The way we organize ourselves is around some 30 or so civic organizations. I'd say every one of them, in some way or another, might feel that they've got an oar in the water on this subject - marine conservation. So, it would entail a coming together of a bunch of, not disparate, but separate, independent groups and it gets complicated” (Participant 4). *Governance - Reliance on community volunteers/lack of coordination*

“I think we have broad leadership, but we don't have targeted leadership that is taking it on strategically, in a planned way. So there's a set of values around preserving what we have here, but there is no one whose primary responsibility is to help ensure we are being proactive, keeping us up to date with current methods and strategies for doing a better job” (Participant 6). *Governance - Reliance on community volunteers/lack of accountability*

“Now that we are down to [a population of] 250 in the winter, everyone is stretched a little too far to be able to take on more volunteer work” (Participant 3). *Governance - Reliance on community volunteers*

Some community members attributed incidents of failure to comply with state and local natural resource management laws to the lack of state or local government presence on the island.

“It seems like anybody can do whatever they want. There's not enough presence out here to actually monitor what is going on. Some of our wetlands are very small - both the fresh and salt water wetlands - and people have projects and they just disappear. And that has been going on for years” (Participant 10). *Governance - Inadequate government staffing locally/lack of awareness/disregard for regulations*

“There is a lot of looking the other way” (Participant 9). *Governance - Disregard for regulations*

**Table 7b. Problems, sources, impacts and essential management tasks at Fishers Island.**

Problem Area/Source	Impacts	Management Tasks
<b>Governance</b>		
Conflicting state laws	<ul style="list-style-type: none"> <li>Resource depletion</li> <li>Resource user conflicts</li> </ul>	<ul style="list-style-type: none"> <li>Develop consistent bi-state or tri-state rules and regulations</li> <li>Designate special resource management areas</li> </ul>
Centralized government decision-making with inadequate staffing at local levels	<ul style="list-style-type: none"> <li>Diminished resource management capacity</li> <li>State-wide mandates/rules that don't work at local scale</li> </ul>	<ul style="list-style-type: none"> <li>Decentralize agency management</li> <li>Increase local input in decision-making</li> </ul>
Reliance on community volunteers in lieu of staff	<ul style="list-style-type: none"> <li>Limited/overextended capacity</li> </ul>	<ul style="list-style-type: none"> <li>Targeted leadership development</li> <li>Strategic planning</li> </ul>
Lack of awareness/disregard for regulations	<ul style="list-style-type: none"> <li>Impacts resources</li> <li>Undermines management effectiveness</li> </ul>	<ul style="list-style-type: none"> <li>Education and outreach</li> <li>Anonymous reporting</li> </ul>

## Preconditions for Comanagement

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At the outset of this research, three of the preconditions for comanagement in Plummer and Fitzgibbon's (2004) framework appeared to be present at Fishers Island: 1) less than one percent of the historic extent of seagrass habitat remains in the New York waters of Long Island Sound, and around the Sound, this decline is recognized as a crisis; 2) a number of Fishers Island community members had expressed willingness to support the SMA process and islanders have successfully self-organized to address previous local issues; and, 3) DEC is legally mandated by the New York Seagrass Protection Act to consult with local communities in the SMA implementation and management planning process. These factors suggest comanagement may be a favorable approach to address seagrass protection and management at Fishers Island. During interviews with members of the Fishers Island community, I explored these three criteria further, and tested for the remaining three preconditions – the presence of an opportunity for negotiation, leadership energy, a common vision and networks.

## *Crisis*<sup>34</sup>

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Interview participants generally reported that Fishers Island's seagrass is in good condition. However, several also stated that they did not really know the locations or extent of the island's eelgrass meadows and few were aware of the severity of regional eelgrass declines. As a result, these individuals did not perceive a crisis in the eelgrass resource at Fishers. However, upon learning about the regional loss of eelgrass, interviewees agreed that the extent of loss is a serious concern, related the loss to the degraded health of western Long Island Sound, and indicated that actions are needed to prevent comparable losses at Fishers Island. Several participants identified seagrass as an important habitat for other species whose local populations they did deem to be in crisis, notably lobster and scallops.

"I'm shocked to learn that it's only one percent of what it used to be in New York waters [of the Sound], and I really feel strongly that there needs to be an aggressive program to re-establish seagrass" (Participant 15).

"Lobsters come immediately to mind as a population that's been decimated" (Participant 4).

"The western Sound is pretty dead. There are probably 100 reasons for it, but you know, we don't want that to happen at this end [of the Sound]" (Participant 3).

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<sup>34</sup> Plummer and Fitzgibbon (2004) Precondition 1

### *Willingness to Contribute*<sup>35</sup>

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Several community members self-identified as willing to contribute to protecting and managing Fishers Island’s seagrass habitat. Personal connection and an associated sense of responsibility to the island were cited as reasons to contribute. Others shared examples of the overall community’s willingness to engage and experience with past environmental issues and other island-wide matters of concern.

“The Island has an interesting way of everybody pulling together when there is a concerning issue that affects everybody. And I should say, not everybody, even a small group. The [Fishers Island] Conservancy, FIDCO, and seasonal residents all pulled together for the remaining lobstermen when we were battling [those] issues and [used] their own resources, money to fight something that should have never gotten to the point where it was. So there is a strong sense of helping one another and when something for the better of the island is needed (Participant 1).

“There are certainly people on the island that cherish the marine environment and would go out of their way to do anything they could to protect it” (Participant 10).

### *Opportunity for Negotiation*<sup>36</sup>

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The DEC has not yet initiated a formal SMA designation process at Fishers Island or any other possible New York location. However, the DEC Seagrass Coordinator has been meeting with various community members and groups, including the Town of Southold, to introduce the Seagrass Protection Act and the state’s intention to designate SMA’s. DEC outreach efforts also include the recent publication of an article in the Fog Horn, the Fishers Island community newsletter, inviting queries, suggestions and participation from the island community (Dahl, 2016).

### *Legal Mandate or Brokered Incentive*<sup>37</sup>

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The DEC is legally mandated by the New York Seagrass Protection Act to designate SMA and to consult with local communities in the designation and management planning process. No further guidance or detailed proviso for the form or process of consultation exists. A key objective of this research study is to provide the Fishers Island community, the Town of Southold and the New York State DEC a range of options, including the potential role and types of comanagement available, for consideration in the SMA implementation process.

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<sup>35</sup> Plummer and Fitzgibbon (2004) Precondition 2

<sup>36</sup> Ibid, Precondition 3

<sup>37</sup> Ibid, Precondition 4

### *Leadership Energy*<sup>38</sup>

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The Fishers Island community is comprised of many reputable and experienced leaders, many of whom have previously, or currently, directed community engagement on a variety of island issues, including environmental concerns.

“The Island was able to get legislation passed that put a no-trawl zone around the island, and I think it had a tremendous effect on the fish, the lobsters. That was an island effort” (Participant 1).

“The Museum, and also the Fishers Island Conservancy has been an advocacy group on the island for issues such as water pollution or lobstering rights, certainly the dredging and right now the dumping in Long Island Sound. [The Town of] Southold is also” (Participant 7).

However, the voluntary nature of these endeavors raised some community concerns about the accountability and sustainability of ongoing or new efforts necessitating strategic leadership.

“So many people involved in these efforts are volunteers. The problem is there is no leader” (Participant 6).

### *Common Vision or Existing Networks*<sup>39</sup>

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The people of Fishers Island share a set of common values associated with the importance of preserving the island’s natural resources and way of life. The focal point of these values is set in the broader socio-ecological context of the island, rather than a single habit or species, such as seagrass.

“Fishers treasures its natural resources” (Participant 7).

Expanding the community’s awareness of the role of seagrass meadows in their social-ecological system, and engaging in a strategic planning exercise with the state and the support of an external facilitator may enable the development of a shared vision for the protection of the island’s seagrass habitats and other marine resources among the community and between the community, the town and the state. Efforts are already underway to improve functionality of the ICB and broaden representation on the ICB from among the island’s many civic and community groups.

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<sup>38</sup> Plummer and Fitzgibbon (2004) Precondition 5

<sup>39</sup> Ibid, Precondition 6

## Hopes and Concerns Related to Seagrass Management Areas

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Fishers Islanders who participated in this study expressed interest in the Seagrass Protection Act and SMAs, as well as their desire to learn more about the extent and condition of the island's seagrass resources and how the health of their local marine resources in general can be sustained or improved. This curiosity was expressed in the form of both hopes and concerns about the implications of designating SMAs and how they would be managed.

Community members related hopes that their existing island stewardship efforts have effectively contributed to protecting seagrass habitats and that activities occurring on and around the island were not harming marine resources. They expressed enthusiasm and hope for the potential of SMAs to improve the conservation and productivity of their marine habitats.

“I would love to see more seagrass and have that come back, have the scalloping. That would be a major thing out here, [to] have the lobstering come back” (Participant 11).

“Whatever can be done to encourage a vibrant diverse marine habitat, I would be in favor of. I'm sure that where we are now is not where we possibly could be. I would personally be in favor of whatever restrictions would increase the strength of that diversity” (Participant 7).

Fishers Islanders stressed that it is important to them – especially the year-round residents - to have an active voice, role and opportunity to incorporate their local knowledge in the SMA designation process and that their participation in the process would give them greater say in how their marine resources are managed.

“I would want to feel a part of it. ... I think it's important to be able to feel that you are valued as a part of it. It's more than just, 'I like the idea, or no, I don't like the idea.' ... There's got to be an interaction. People who live in an area are a huge resource and an underutilized resource because they are really the eyes and ears of what is going on. I think they should play a very important role in how decisions are made, or why they are made” (Participant 15).

Community concerns about the Seagrass Protection Act and the creation of SMAs centered on how the process and resulting management would work.

“Who would they be? Would they live on the island? Would they be positioned to listen before they decide? Mine is the... normal, knee-jerk reaction to management from the top. I don't want that. ... So I think it begs the question as to what we really think needs to be managed” (Participant 4).

Some respondents voiced trepidation that the state would impose new regulations without considering the impact new rules might have on the remaining marine resource-dependent sectors – fishing, aquaculture, recreation – of the island’s economy.

“It is really important that whatever rules get put in place aren't quashing the [local] economic activity” (Participant 14).

Others worried that new rules might devalue and displace local stewardship efforts and that the state may not provide the necessary resources to support a participatory process or SMAs.

“I wouldn't want it to be in place of our own stewardship - the community's stewardship - understanding stewardship respect for the local environment. I wouldn't want people to then assume that they no longer have personal responsibility because now there is this outside entity that has it for their job” (Participant 6).

“The biggest issue for me that I think they really need to think carefully about if they are going to layer on another set of regulations, [is] that they really need to be able to service it. ... If you can't provide an adequate venue with transparency... to have discussions with the relative constituents, then you really shouldn't do it. It's not enough to just say, 'Oh, we'll have a public hearing 100 miles from here'” (Participant 14).

### Options for Implementing Comanagement at Fishers Island

In the U.S., state government agencies generally carry responsibility for the management of natural resources within their jurisdiction. In some cases, local governments also play a role. Increasingly, U.S. citizens and community groups are calling for expanded opportunities to contribute to resource management decisions – especially where those resources are central to their way of life (Acheson and Taylor, 2001; Berkes, 2007; Ayers and Kittinger, 2014). Comanagement, whereby the New York DEC could develop a cooperative relationship with Fishers Island stakeholders and share responsibility for the management of SMAs, offers a potential alternative to state-based natural resource management. It can integrate the unique character and complexity of the island’s social-ecological system into MPAs, address the community’s hopes and concerns, and account for the limitations of centralized government approaches to place-based management.

## Potential Comanagement Participants<sup>40</sup>

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Community members identified three categories of stakeholders they expect will have a vested interest in the designation and management of SMAs. These include individuals or institutions likely to affect or be affected by SMAs, the island institutions and actors most likely to play an active role in the process, and external institutions that could be engaged as potential partners to support the effort.

Interviewees agreed that both year-round and seasonal residents will want to be engaged in the SMA designation process. The stakeholder sectors they identified as most important to involve in the process include commercial and recreational fishermen, the aquaculture industry, the recreational boating community, coastal property owners and businesses, and the conservation community. Although not intended to be an inclusive list, specific institutions respondents named as representative of these sectors include fishing and lobstermen's associations, the Fishers Island Oyster Farm, the Fishers Island Yacht Club, the Harbor Committee, FIDCO, the Fishers Island Club, Hay Harbor Club, the Fishers Island Conservancy, the H.L. Ferguson Museum, the ICB, the Ferry District, the Waste Management District and the Fishers Island Utility Company, the Southold Town Trustees, Suffolk County, the U.S. Navy, and the U.S. Coast Guard.

“Realistically, everybody here is probably close enough so that they have some sort of area of effect” (Participant 3).

Island institutions and actors consistently named as most likely to have interest in playing a formal or leadership role in SMA designation and management, ensuring a participatory process and exploring a potential comanagement agreement with the state, include the ICB, Fishers Island Conservancy, Ferguson Museum, and the Harbor Committee.

“To get to that participatory process, I think you would probably end up going through ICB and the Conservancy, with help from the Museum” (Participant 7).

A number of external institutions were also identified by participants as potential supporters or programmatic partners. These include Cornell Cooperative Extension, Mystic Aquarium, and the Millstone Power Station, which have been, or are getting, involved in seagrass, Long Island Sound, and lobster and winter flounder research, respectively.

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<sup>40</sup> Carlsson and Berkes (2005) Step 3



## Possible Types of Comanagement<sup>41</sup>

As a means for collaborative problem-solving, comanagement may emerge as a power-sharing or decision-making arrangement between state and local partners from a continuous process of exchanging management information, building trust and institutional capacity, and negotiating who will hold responsibility for various resource management tasks (Carlsson and Berkes, 2005; Berkes, 2007). Table 8 summarizes three possible arrangements for cooperative governance of seagrass habitat at Fishers Island.

**Table 8. Three possible types of seagrass habitat comanagement at Fishers Island.**

Consultative	Collaborative	Delegated
<p><b>NY DEC:</b></p> <ul style="list-style-type: none"> <li>• seeks input from, and provides information to, the Fishers Island community</li> <li>• develops SMA process</li> </ul>	<p><b>NY DEC and the Fishers Island community</b> jointly develop ecological or social information needed to inform the SMA process</p>	<p><b>A Fishers Island group or community designee:</b></p> <ul style="list-style-type: none"> <li>• gathers information with guidance from NY DEC</li> <li>• develops SMA process</li> </ul>
<p>NY DEC is responsible for:</p> <ul style="list-style-type: none"> <li>• identifying SMA locations</li> <li>• developing a management plan</li> <li>• conducting management tasks</li> </ul>	<p>NY DEC and the Fishers Island community work together to:</p> <ul style="list-style-type: none"> <li>• identify SMA locations</li> <li>• develop a management plan</li> <li>• share management tasks</li> </ul>	<p>Fishers Island group or designee is responsible for:</p> <ul style="list-style-type: none"> <li>• identifying SMA locations</li> <li>• developing a management plan</li> <li>• conducting management tasks</li> </ul>
<p>NY DEC makes all the decisions</p>	<p>Decision-making is shared by NY DEC and the Fishers Island community</p>	<p>NY DEC entrusts authority to an organized group of Fishers Island stakeholders that accepts decision-making responsibility</p>

## Capacity-Building Needs<sup>42</sup>

In their review of international comanagement systems, Armitage et al. (2007) conclude that an iterative dialogue between the governance partners is necessary to account for the fact that neither the state nor the local community involved are likely to be prepared for their new partnership. From this interaction, a working relationship based on transparency, mutual understanding, respect for differences, and learning through trial and error may emerge (Berkes, 2007). As a first step toward initiating this dialogue, interviewees identified three areas they believe need to be addressed to help build capacity and foster a working resource management relationship between New York DEC and

<sup>41</sup> Carlsson and Berkes (2005) Step 4

<sup>42</sup> Ibid, Step 5

the Fishers Island community. First, there needs to be better communication – both between the DEC and the island population, and among island institutions.

“I think the communication aspect is missing from a lot of [island] boards. There is a lot of ‘We do things over here in our own world,’ and they might share with the people that are on their mailing list already but there’s not a lot of outreach to the wider community. There is a lot that could be done to communicate what people ought to be caring about” (Participant 9).

Second, the community needs help obtaining and disseminating information related to the natural resource and governance problems they identified (Tables 7a, b).

“[Leaching and failing septic systems are] something that hasn’t been documented very well. ... We need to get more serious about that, and our resources are limited, so I don’t know if the state can help us with that kind of thing – documenting who has what and when it is pumped and what can be done to make people adhere to a pumping schedule that we produce” (Participant 2).

“We need to have the ability to educate people. You don’t really change anything unless you can get the word to people on how, or what, they are supposed to be doing.” (Participant 8).

Third, a strategic plan is needed to ensure a clear process, adequate state resources, and local leadership are in place.

“I’ve seen a need for something a little more structured to be set up. A lot of times people aren’t sure what to do or what not to do” (Participant 15).

“[The state] has to have the resources. They have to have a travel budget” (Participant 14).

“I see that as being an issue. That lack of leadership - broad, strategic leadership - and direct responsibility, accountability impacts lots of island issues” (Participant 6).

### [Options for Problem-Solving and Policy-Making through Comanagement](#)<sup>43</sup>

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In addition to the efforts and resources needed to enhance resource management capacity, interviewees recommended specific actions they thought could address the resource management problems they had identified (Tables 7a, b). Most people agreed that management of Fishers Island’s marine resources was important and perceived that the island community would embrace community participation in marine resource management if an addition or adjustment to the current island governance system was made. Options proposed by community members to enable local

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<sup>43</sup> Carlsson and Berkes (2005) Step 6

marine resource management ranged from creating a new community group for that specific purpose to formally establishing a local township.

“It’s just my personal feeling that Fishers Island should be its own town, fully take measure of its own resources and staff it appropriately” (Participant 13). *Enabling local marine resource management*

However, regardless of the governance structure, respondents felt that improved island communication and community engagement are essential.

“To the extent that the community ought to know what is going on, the communications aspect is key. It would probably involve sending more stories, specifically about marine resources over to the Fog Horn to publish. I think the Island Community Board could do a better job as well. So [for example], the Conservancy and the Harbor Committee are not represented on the Island Community Board” (Participant 9). *Improved communication*

“Getting people more involved does make things better. The only way that's really going to happen is to make people feel like they are not just wasting their time. Have a way to know that their participation is not only important, but something that is where they are going to feel rewarded, valued” (Participant 15). *Meaningful community participation*

To address boating impacts on seagrass habitat and other marine resources, interviewees suggested initiating outreach to the boating community and working through existing permitting systems for docks and moorings.

“I think it has to be managed. I think we have to make people aware and I think that is done through permitting for docks and where you can put moorings” (Participant 3). *Boating/education and outreach/permitting*

“Presence or absence of eelgrass is not one of the considerations when a mooring is granted. That might be something that should be included” (Participant 10). *Boating/permitting*

Educating home and business owners about septic system maintenance, reducing fertilizer application, and identifying and replacing failing septic systems was recommended to improve local water quality. Interview participants suggested the community would benefit from weighing the pros and cons of current island practices to help them make healthier choices.

“I think education would go a long way. I don't think a lot of the property owners really understand what they are doing – what the tradeoff for that bright, green lawn is” (Participant 10). *Fertilizer runoff*

“Maybe one thing that we could change would be to reduce any kind of effluent that is coming out of septic tanks and we could do that by getting people to agree to do dye tests. Actually I suppose as it affects nitrogen input, we could encourage people to have less lawn” (Participant 10). *Leaching or failing septic systems/fertilizer runoff*

Finally, improving compliance, enforcement and monitoring were identified as ways to engage the Fishers Island community in marine resource protection.

“Wetlands protection would be a good thing to educate people on and actually enforce. It's really not enforced out here” (Participant 10). *Education/enforcement*

“I think it would be really important to consider Fishers Island almost like a benchmark area for a study and also to educate a core group of people on just how to collect data, exactly what to look for. I would like to do that” (Participant 15). *Monitoring*

## Discussion

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### Comanagement as a Process for Iterative, Collaborative Problem-Solving

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This study has focused on the processes whereby solutions to place-based, natural resource management problems have emerged over time as a result of collaborative, iterative problem-solving in the context of the social-ecological system of a marine protected area, as described by Carlsson and Berkes (2005). I looked across the case studies presented in this paper to identify the problem-solving functions – and for Fishers Island, the potential problem-solving functions – of comanagement. Table 9 summarizes the commonalities and differences in marine resource management problems and sources among the cases, as reported by interview participants, as well as the solutions and management tasks that have been developed and implemented - or proposed - through collaborative action.

Three marine resource management problems are present in all four cases – degraded water quality, recreational misuse or overuse, and difficulties associated with governance. Every site except Rookery Bay indicated resource depletion associated with consumptive overuse or misuse as a serious problem. Two cases, Rookery Bay and Hā'ena, are challenged by impacts to protected species, such as shore birds and sea turtles, respectively. In Rookery Bay, where builders construct homes and docks in surrounding waterfront areas, encroaching development also threatens marine resources. Catalina Islanders noted their concern regarding the invasive alga, *Sargassum horneri*, which was carried to the island by boat and is displacing native species and habitats. Singularly, Fishers Island called attention to climate change as a threat to the island's shoreline habitats, as the draw of constructing sea walls has grown in response to increasing storm frequency and intensity.

In addition to common problems among the four case studies, Table 9 illustrates the cross-site applicability of many solutions to these problems that may be implemented through comanagement. For example, using protocols similar to those in the state-sanctioned citizen monitoring programs, MPA Watch in California and Makai Watch in Hawai'i, the State of New York could train and engage Fishers Islanders to identify and monitor the locations and frequency of human uses occurring around the island. This information could enable the New York DEC and the Fishers Island community to collaboratively identify locations for SMAs, and what management issues need to be addressed at each site. Such a program could integrate local knowledge into the selection of

**Table 9. Summary of marine resource management problems (red shaded cells), solutions and tasks (actual shown in blue numbers, proposed in black numbers) across cases.**

Case Study/ Problems & Sources	Rookery Bay, FL	Hā'ena, HI	Catalina Island, CA	Fishers Island, NY	Case Study/ Management Solutions & Tasks
<b>Degraded Water Quality</b> Wastewater Fertilizer Beach nourishment Fresh water flows Dredged material disposal Marine debris	1,2,3,4,5,6	1,4	2, 4, 9	4,6,7  1,2,3	1. Identify pollution sources and alternatives needed 2. Promote alternatives practices (e.g. fertilizer use) 3. Education and outreach to issue-based audiences (e.g. tour operators, boaters, developers) 4. Water quality monitoring 5. Local government planning 6. Advocacy
<b>Recreational Misuse/Overuse</b> Motorized vessels Concentrated tourism Reef walking Windsurfing Fish feeding	3,7,8,9	3,9,10, 11,12, 14	3,9,11,12	7  3,9,11,13	7. Cleanup events 8. Damage assessment/habitat restoration 9. On-the-water education/enforcement (e.g. Team Ocean, Harbor Patrol) 10. Clarify and develop consistent regional rules/regulations
<b>Consumptive Misuse/Overuse</b> Overharvesting Poaching Ambiguous boundaries		3,11,15, 16,18	3,11,12,15, 16,17	3,10, 11,15,16,18	11. Human use monitoring (e.g. Makai Watch, MPA Watch) 12. Signage/brochures 13. Review/amend permitting (e.g. moorings, docks) 14. Access planning/management
<b>Encroaching Development</b>	3,19				15. Enable local management to build buy-in/compliance
<b>Protected Species Impacts</b> People/pets on beach People harassing wildlife in the water Habitat loss	3,8,20,21,12	3,12,16			16. Enforcement 17. Physical boundary markers 18. Create special management areas (e.g. <i>opihi</i> , lobster)
<b>Invasive Species</b> Boating			3,22		19. Land acquisition 20. Physical protection (e.g. nest cages with signage) 21. Wildlife monitoring
<b>Climate Change</b> Bigger storms/seawall construction				23	22. Amend laws/adaptive management (e.g. MLPA to allow take of invasive species, enforcement citations)
<b>Governance</b> Centralized gov't decisions Changing administrations State agency division silos Inadequate state capacity (funds, travel, local staff) Conflicting state laws Apathy, delays, mistrust, conflicts Limited community capacity/volunteer reliance Misaligned expectations Disregard for regulations	3,6,24,25, 26,27,28	3,6,24, 25,26, 29	3,6,24,25,28, 30,31	3,6,10,18,24, 27,31	23. Coastal habitat protection (e.g. salt marsh, seagrass) 24. Leadership development/direction 25. Training (e.g. communication, conflict resolution) 26. External facilitation/support (e.g. NGOs) 27. Community-based strategic planning, fundraising, membership, staffing 28. Develop innovative partnerships/funding 29. Decentralize management/increase local decision input 30. Clarify partnership roles, responsibilities, expectations 31. Anonymous violation reporting (e.g. CALTIP)

monitoring and SMA sites, increase local buy-in for the designation of SMAs, reduce mistrust between government and resource users, and improve compliance with resulting SMA rules, thereby reducing the need for enforcement. Where enforcement is necessary, the strategies employed by the Catalina Island Collaborative – enlistment and training of local law enforcement personnel to enforce local MPA regulations, amendment of state law to issue citations instead of misdemeanors for violations of MPA regulations, and promotion of CALTIP to enable anonymous reporting of MPA violations to state wildlife enforcement authorities – may work well at Fishers Island, which, like Catalina, is remotely located and has local law enforcement resources, but limited state environmental enforcement presence.

Rookery Bay's Team Ocean program provides another example of how community members can contribute to MPA management by putting trained, knowledgeable volunteers on-the-water to inform boaters about MPA regulations and promote natural resource protection. Team Ocean has been successfully replicated in other MPAs with high recreational vessel usage and may provide a useful model to create local outreach, education, compliance and enforcement capacity at Catalina Island, off Hā'ena, and at Fishers Island, where local residents are also boaters. As demonstrated by the Friends of Rookery Bay CSO, the costs of establishing and maintaining Team Ocean and other community-based management programs can be offset through vessel donations, grants and annual fund-raising events. Examining these case studies through a common framework – Carlsson and Berkes' (2005) problem-solving function of comanagement – provides a means to understand how local norms, values and knowledge were incorporated into MPA rules, regulations and management planning, and can construct a mechanism for sharing experiences and exchanging best practices among current and future comanagement practitioners.

### Recommendations for Enhancing Comanagement of MPAs

Drawing upon my analysis of the problem-solving functions of comanagement in each case study, I recommend five strategies to enhance comanagement of MPAs.

#### *1. Engage communities in human uses monitoring*

Natural resource management isn't about managing the environment as much as it is about empowering people to make appropriate decisions in their lives and places of residence, work, and recreation. Targeting limited management capacity where it is most needed entails knowing

what problems or rule violations are occurring where. Hence, effective MPA management requires monitoring human uses or activities at a site, as well as mapping and monitoring the extent and condition of natural resources there. Human uses monitoring is an effective and useful way to partner with community members to co-design site selection, develop monitoring protocols and identify MPA management needs prior to MPA designation, and to develop a MPA management plan, and increase awareness and compliance after MPA designation. Examples of state-sanctioned citizen monitoring programs include MPA Watch in California and Makai Watch in Hawai'i. Programs such as CALTIP in California can also improve MPA violation reporting and enforcement.

## *2. Create comanagement practitioner networks*

State-wide rule-making is often a poor fit for MPAs, but place-based rules and practices from one location may be applicable in other similar place-based contexts. Comanagement networks provide an opportunity for learning and exchange of local knowledge, experiences and norms among practitioners. California's MPA Collaborative Network provides an online platform, access to resources, hosts meetings, and facilitates coordination for the state's 14 community-based collaboratives. Similarly, the Florida Aquatic Preserve Society was recently established to foster the formation, development and coordination of citizen support organizations dedicated to the state's aquatic preserves.

## *3. Establish liaison support for comanagement partners*

Comanagement works best where a locally-based MPA manager is present, or the state regularly visits the MPA site and interacts with the community. In the absence of a local MPA manager or where travel restrictions preclude regular place-based interactions, establishing at least one liaison to manage the collaborative partnership and coordinate communication between the partners is recommended. Ideally, a locally-based job may be created – such as the Aquatic Preserve Manager and CSO Director positions at Rookery Bay in Florida, or the MPA Collaborative Network Director in California - to fulfill this function, with the ability to travel throughout the state. Alternatively, local co-leads - such as the Catalina MPA Collaborative Co-Chairs - may be designated to perform this function. The Catalina MPA Collaborative demonstrates that sharing local, community-based management leadership responsibilities by two people and selecting individuals who have related full-time jobs to perform this function is desirable. Enlisting an NGO to serve as a bridging



organization between community and the state representatives, as KUA did between the Hā'ena community and the Hawai'i DLNR, is another avenue for providing essential liaison support.

#### *4. Provide flexibility for adaptive MPA management*

As the introduction and establishment of the invasive alga, *Sargassum horneri*, at Catalina Island illustrates, the ability to amend laws, rules and regulations in response to environmental or social changes is important. In this case, an amendment to the MLPA is necessary to allow people to remove, or 'take', this species within an MPA. Similarly, as budget cuts forced elimination of the on-the-water ranger positions at Rookery Bay, flexibility in the MPA management plan enabled successful creation of a Team Ocean program to fill the resulting educational outreach and enforcement gap.

#### *5. Promote a local knowledge 'paradigm shift'*

Local knowledge is valuable and may exist in many forms – personal observations, cultural practices, oral tradition – but is often devalued or given short shrift by both government and communities themselves. Local knowledge that can only be gleaned by spending time in, and becoming familiar with, a place can enable the rapid identification of both environmental and social problems and contribute to the development of site-specific and appropriate solutions that may not otherwise be realized. Government agencies often assume the role of purveyors of environmental education and outreach to the public. However, communities have much to impart – both to government agencies and amongst themselves – that can improve natural resource management and enhance community well-being. A “paradigm shift” is needed in how both communities and governments view and value local knowledge.

### Preconditions for Comanagement

Table 10 summarizes the extent to which the six preconditions for comanagement outlined by Plummer and Fitzgibbon's (2004) were present in each of the three existing MPAs with comanagement agreements and which are currently present at Fishers Island. While none of the case studies exhibited all of the preconditions, two conditions – a legal mandate or brokered incentive and a willingness by local users to contribute – were exhibited in all four cases. In each case, a fundamental factor in local resource users' willingness to contribute to management functions is a

**Table 10. Plummer and Fitzgibbon's (2004) preconditions for the emergence of comanagement and the extent of their occurrence in Rookery Bay, Hā'ena, Catalina Island and Fishers Island. Green shaded cells indicate presence of a condition, red cells indicate absence of a condition, and grey cells indicate partial presence of a condition. Primary factors for each condition are noted within each cell; caveats are shown in italics.**

Case Study/ Precondition	Rookery Bay, Florida	Hā'ena, Hawai'i	Catalina Island, California	Fishers Island, New York
1. Crisis	Driver was capacity need	Declining fisheries	Driver was capacity need	Seagrass crisis not perceived locally
2. Willingness by Local Users to Contribute	<ul style="list-style-type: none"> <li>• Connection to place</li> <li>• Experience self-organizing</li> </ul>	<ul style="list-style-type: none"> <li>• Connection to place</li> <li>• Cultural values</li> </ul>	<ul style="list-style-type: none"> <li>• Uniqueness of place</li> <li>• Access to resources</li> </ul>	<ul style="list-style-type: none"> <li>• Connection to place</li> <li>• Experience self-organizing</li> </ul>
3. Opportunity for Negotiation	CSO-State agreement required by law	HI law required, <i>DLNR did not act</i>	MPA Partnership Plan	NY law requires consultation
4. Legal Mandate or Brokered Incentive	Brokered Incentive (enabled by law)	Legal Mandate (to collaborate)	Brokered Incentive (to build capacity)	Legal Mandate (to consult)
5. Leadership Energy	State employee & teachers	Hawaiian families & other locals	Linked to related job objectives/external network	General conservation, <i>not specific to SMA</i>
6. Common Vision or Existing Networks	<ul style="list-style-type: none"> <li>• Local State &amp; CSO share MPA vision</li> <li>• Networks exist</li> </ul>	<ul style="list-style-type: none"> <li>• <i>Moving toward a shared MPA vision</i></li> <li>• Networks exist</li> </ul>	<ul style="list-style-type: none"> <li>• <i>Moving toward a shared MPA vision</i></li> <li>• Networks exist</li> </ul>	<ul style="list-style-type: none"> <li>• Common vision to preserve resources</li> <li>• Networks exist</li> </ul>

strong personal connection to, or association with the unique qualities of, their place. Interview participants described this place-based connection as a responsibility and commitment to care for the natural environment and resources of their place. Contrary to the effect that a sense of personal responsibility can bring to the development of comanagement, legal mandates and brokered incentives had varying degrees of impact on the resultant action in each case. For example, despite the presence of a legal directive to create CBSFAs through Hawai'i's 1994 legislation, a willingness by native Hawaiian communities to contribute to management functions,

and a recognized fisheries decline, following a short-lived pilot effort, the DLNR failed to take further action and no CBSFAs have been designated under the original law. Even though Hā'ena achieved a CBSFA designation through separate legislation in 2006, ten years later, the state and the community are still negotiating the management plan for this MPA.

Conspicuously, the precondition of a real or perceived natural resource crisis was absent in all but one case - Hā'ena. Rather than acting in response to a marine resource crisis, the primary objective of Florida's Aquatic Preserve Act and California's Marine Life Protection Act was to protect the inherent and unique diversity and integrity of these states' respective marine ecosystems. Similarly, Rookery Bay's CSO and the Catalina MPA Collaborative were created in response to the real and recognized limitation of state agency resources available to manage MPAs, not in response to a natural resource crisis. Lastly, while community networks existed in all three MPA case studies, a common vision was lacking at the start of the collaborative effort in Hā'ena and Catalina Island and only began to take form only as each cooperative process evolved.

In summary, although at least four of Plummer and Fitzgibbon's (2004) six preconditions for comanagement were present in each of the three collaboratively managed MPAs evaluated in this study, other factors contributed to the emergence of comanagement in all three cases, and hindered the development of comanagement in Hā'ena. These factors suggest four additional conditions or drivers are necessary for the emergence of comanagement for MPAs.

### *1. Connection to place*

Vaughan (2012) identified Hā'ena residents' sense of responsibility as a characteristic that may be leveraged to support local management. My research corroborates that finding and expands it to three additional U.S. communities. This study also demonstrates that effective MPA management requires more than just laws, rules and enforcement. It requires understanding and integrating the unique social and ecological context of that place. Based on these findings, I posit that *connection to place* is an essential precedent for local users' willingness to contribute to natural resource management functions, and may be considered a stand-alone precondition, or driver, for comanagement.

## *2. A capacity 'crisis'*

As illustrated by the Rookery Bay and Catalina Island case studies, a government agency's acknowledgement of its limitations to effectively manage an MPA can prompt the pursuit of collaborative management. In both Florida and California, when faced with the reality of inadequate management resources, the state took the initiative to partner with local communities. Instead of a real or perceived natural resource crisis, these two cases show that a capacity crisis can serve as an alternative precondition for comanagement to safeguard extant marine resources.

## *3. Government willingness to partner*

The Hā'ena case study demonstrates that a local community's willingness to contribute to management and a legal mandate are not enough to foster a collaborative agreement. If trust is substantially compromised or government agency leadership perceives community-based management as a challenge to its authority rather than as a means to achieve its environmental protection objectives, comanagement is unlikely to emerge. Participatory and place-based interactions require willingness on the part of the government agency to partner with a community of resource users.

## *4. A clear and just process*

Before a collaborative effort can take root, terms and processes must be well-defined and crafted so that the roles, responsibilities, and expectations of each partner are clear and access to the process is equitable. Ambiguity can stall or even derail comanagement efforts, as occurred in Hā'ena. Processes that limit access by or to remote communities can also strain community-state relationships, as experienced in Hā'ena and Catalina Island. Management planning meetings and, whenever possible, hearings, need to occur at or near the site of a proposed or existing MPA, in locations and at times accessible to the community, and government administrations must enable their agency employees to travel to those sites.

### Implications for Community Participation in Seagrass Management at Fishers Island, New York

As the state of New York and the community of Fishers Island explore options for designating and implementing SMAs, the Rookery Bay, Hā'ena, and Catalina Island cases evaluated here offer

insights for the development of a collaborative, participatory process from which comanagement could emerge.

I identified the presence of four of Plummer and Fitzgibbon's (2004) preconditions for comanagement at Fishers Island: 1) the island community is willing to contribute to managing its marine resources, 2) New York DEC is legally mandated to consult with the community to designate and effectively manage seagrass habitat, 3) this required consultation provides an opportunity for negotiation, and 4) the state and community share a vision to preserve the island's seagrass habitat and networks exist within the community. The decline of seagrass habitat is widely recognized as a regional crisis across southern New England because of the detrimental effect this loss has on the ecosystem and the people who rely on it for their food, livelihood, shoreline protection and recreation. However, the good condition of this habitat at Fishers Island has largely precluded local perception of this natural resource crisis. Additionally, both the DEC and the Fishers Island community concede their respective management capacity limitations to the extent that each perceives a management capacity 'crisis' associated with the prospect of creating SMAs. As the Rookery Bay and Catalina Island cases demonstrate, in lieu of a perceived natural resource crisis, this situation may provide a driver for comanagement to arise as potential answer to the question, "Who will manage SMAs?" If the New York DEC is willing to work with the island community to jointly develop a clear, inclusive and accessible process, the community's strong sense of connection to Fishers Island as a place they value and feel a responsibility to care for may foster collaborative planning, decision-making and the potential for shared management of the island's marine resources.

In recognizing comanagement as an evolving process of iterative problem-solving, Carlsson and Berkes (2004) emphasize the significance of creating "the political space within which communities can develop the knowledge and skills to solve their own problems" (p.73). Berkes (2009) further ascertains that successful comanagement results from bridging different kinds and sources of knowledge among the actors in a collaborative relationship. Through this lens, Hawai'i's Makai Watch and California's MPA Watch programs can be viewed as way for state agencies and local communities to exchange scientific and local information, encourage the co-generation of new knowledge, and thereby promote two-way feedback that deliberately builds institutional capacity to support comanagement (Armitage et al., 2007; Berkes, 2009). As a first step in exploring the options for

seagrass management at Fishers Island, developing a state-sanctioned, human uses monitoring program could provide a means for community members to participate in documenting the types, frequency, and duration of activities that occur in or near seagrass habitat around the island. This information would contribute to the identification of locations where SMAs may be designated, what problems need to be solved in each location, and facilitate the design of locally appropriate management solutions.

## Conclusion

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Our oceans abound with examples of ‘paper parks’ – legally mandated protected areas that have been designated in writing and delineated on maps, but fail to meet marine resource protection objectives in the water. From the Western Pacific Ocean and the Gulf of California to the Caribbean and Mediterranean Seas, inadequate governance and a lack of community support or involvement have been established as primary reasons for MPA failures (Christie et al., 2009; Rife et al., 2013; Bustamente et al., 2014). Similarly, in their report on the status of 207 MPAs in U.S. coral reef ecosystems, Wusinich-Mendez and Trappe (2007) found that management capacity challenges and the absence of public support impeded effective management in more than half of the MPAs they surveyed. At the same time, comanagement has been recommended as an appropriate, efficient and equitable alternative to centralized management of marine resources that is well-suited to place-based social-ecological systems (Lane, 2001; Berkes, 2009; Armitage et al., 2007; Ayers and Kittinger, 2014). Despite these findings and recommendations, few studies have explored the potential for comanagement to build community support and enhance MPA management capacity in the U.S. In this study, I addressed this gap by investigating three existing cases of comanagement in the U.S. MPAs and considering their implications for the creation of new marine managed or protected areas and potential SMAs at Fishers Island in the State of New York.

To effectively achieve marine conservation objectives, Kareiva (2006) maintains that securing local community support trumps MPA design. Furthermore, Chuenpagdee et al. (2013) emphasize the importance of engaging local stakeholders right from the start of an MPA designation process. As U.S. managers strive to protect and restore ecosystem structure and function in the face of persistent environmental stressors and dwindling government funding, this research contributes to our understanding of how collaborative approaches to solving natural resource management problems

may develop, evolve and enhance both socio-ecological and socio-political well-being by integrating local knowledge, values, and participation into MPA management.

My analysis reveals that a well-designed, participatory process and collaborative capacity building by state and local actors are important factors for the successful implementation of the New York Seagrass Protection Act. As a process of collaborative, iterative decision-making, comanagement offers an inclusive and just means to achieve effective protection of seagrass habitat in designated management areas at Fishers Island. It may also provide a model for replicating successful SMAs across the state of New York and improving the efficacy of MPAs in other states.

#### EPILOGUE

*“At the end of it all,  
there are a thousand reasons why we need to take care of our marine resources;  
and on an island, sea level rise is certainly one of them.  
Some people don't know anything about fish, don't care about fish, don't get wet,  
but they don't want their highway to go away.  
And the vacationers care, because a lot of their houses are on the water.  
They're the first to notice, they're the first to lose it, and they're the first to care.  
Healthier [marine resources] are better protectors - we know that –  
so even if you don't eat fish, you need to care.  
Makai Watch is an opportunity for those people that want structure,  
that want a protocol;  
but there are lots of other ways that people can participate  
in the process of taking care of their place.*

*When people lose connection with their place ...  
they no longer have the fortitude, the energy, the focus to continue  
to care and be involved.*

*These are people of the place. I think that's what it's all about.  
It doesn't matter if you are born there or live there;  
but if you are identifying as a person of that place,  
then something has to matter to you.  
What matters to you?”*

— Community member, Hawai'i

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## Appendices

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### Appendix A: U.S. Marine Protected Area Interview Questions

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1. What does the term “marine resources” mean to you and can you give local examples?
2. What does the term “marine habitat” mean to you and can you give local examples?
3. What human uses or activities have you observed occurring in or near marine present at (*the study location*)?
4. Do you think there are negative impacts occurring near the (*study location’s*) marine habitats? If so, what are the most significant negative impacts?
  - a) What are the main problems contributing to these impacts that need to be solved?
  - b) What are the essential management activities/tasks that must be performed to address these or other problems?
5. How are the natural marine resources of (*study location*) currently managed and who is involved in managing them? How are management decisions made and who is entitled to make them?
6. Is it important for the (*study location*) community to be involved in managing its marine resources? If yes, why? If no, why not?
7. What prompted the (*study location*) community or the state agency to initiate discussions with each other about sharing the management of local marine resources? Was there a particular concern about the local marine resources, the community or the state agency?
8. What opportunity opened the door for the community and the state to discuss the possibility of comanagement and how it might work?
9. Which community groups or individuals were/are involved in discussions about comanaging the marine resources at (*study location*)?
  - a) Why do you think they were/are willing to contribute their time or funding toward a shared management arrangement for local marine resources?
  - b) Did (Is) a particular individual or group in the community lead(ing) the effort or advocate(ing) for comanagement?
  - c) How was that individual or group selected or accepted to lead by the community?
10. *HI question:* How has, or will, integrating traditional ecological knowledge (TEK) into contemporary (i.e. western) marine resource management improve the condition of the resource?
  - a) How is the community working with the state to reintroduce TEK in marine resource management?
  - b) Is the community engaging local non-native Hawaiians residents or property owner, or seasonal residents in the management of (*study location’s*) marine resources? If so, how are they involved?

11. What are some important factors in the (*community/agency*) that have contributed or may contribute to successful protection and management of marine resources?
  - a) Is there a shared vision within the community or between the community and the state?
  - b) What existing relationships or networks in the community can support marine resource management efforts?
  
12. What are some important factors in the (*community/agency*) that have created or may create challenges to protecting and managing marine resources?
  - a) How were/could these challenges be addressed? What was/is needed to enhance (*community/agency*) capacity to resolve these problems?
  
13. Do conflicts exist between the local community and state resource management agencies? If so, what are they?
  
14. Please describe the nature of interactions between the local community and the (*state natural resource agency*), including a brief description of any partnership objectives and activities.
  - a) Please rate how successful comanagement efforts have been thus far in engaging the local community in marine resource management, on a scale of 1 to 5, with 1 being “Not successful, our community is not engaged at all” and 5 being “Completely successful, our community has been fully engaged.”
  
15. Who are the key 2-3 people you think I should be talking to?
  
16. Is there any additional information you would like to share or discuss that you think is relevant to this study?

## Appendix B: Fishers Island, New York Interview Questions

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1. What does the term “marine resources” mean to you and can you give local examples?
2. What does the term “marine habitat” mean to you and can you give local examples?
3. Are the marine resources at Fishers Island doing well, or not, and why?
4. What three words come to mind when you hear “seagrass meadows”?
5. Do you think there is value in having marine habitats like seagrass meadows or reefs close to your community? If so, what are the most significant benefits?
6. What human activities have you observed occurring in or near seagrass meadows around Fishers Island? Where and when have you observed these activities taking place?
7. Do you think there are negative impacts occurring near Fishers Island marine habitats? If so, what are the most significant negative impacts?
8. How are the natural marine resources of Fishers Island managed and who is involved in managing them?
9. Do you think the condition of Fishers Island’s marine resources needs to change?
10. Is it important for the Fishers Island community to be involved in managing its marine resources? If yes, why? If no, why not?
11. Which organizations, groups or individuals in the Fishers Island community are most likely to express interest or concerns in the management of marine resources at Fishers?
12. Are any of these groups, or you yourself, involved with management of the marine resources at Fishers Island? If yes, in what ways are they/you involved? If not, would they/you be willing to participate in management decisions or activities?
13. Are there any marine conservation results that have been achieved by the Fishers Island community? If yes, what are they?
14. Are there ways that you think Fishers Island’s marine resources could be better managed? What would need to happen in order to make those changes and who would need to be involved?
15. If new management is proposed, what would be your biggest concern?
16. Please describe the nature of interactions between the local community and the NY State Department of Environmental Conservation.
17. What are some important factors in the *community* that have contributed or may contribute to successful protection and management of marine resources?
18. What are some important factors in the *community* that have created or may create challenges to protecting and managing marine resources?

19. Do any conflicts exist between the local community and state resource management agencies? If so, what are they?
20. Is there anyone else you think I should be talking to?
21. Is there any additional information you would like to share or discuss that you think is relevant to this study?