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Non-commercial Fishing in Policy, Practice, and Culture: Insights from the Papahānaumokuākea Marine National Monument

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Executive Summary

In 2016, Presidential Proclamation 9478 expanded the boundaries of the Papahānaumokuākea Marine National Monument (PMNM, or original Monument), thereby creating a new Monument Expansion Area (MEA) that extends from 50 nautical miles out to the seaward boundary of the U.S. exclusive economic zone (200 nautical miles) west of the 163° W line of longitude. Presidential Proclamation 9478 prohibits commercial fishing in the MEA and allows the potential for permitting non-commercial fishing. The development of a management plan and complementary fishing regulations for the MEA will specify conditions under which non-commercial fishing may occur. As of this writing, the regulations have yet to be drafted. Once completed, they will be promulgated in coordination between the Western Pacific Regional Fishery Management Council and the NOAA National Marine Fisheries Service. This study examined existing documents to better understand non-commercial aspects of multiple types of fishing in policy and practice in the Northwestern Hawaiian Islands that may be useful in developing the PMNM MEA management plan.

Rigorous efforts to document commercial fishing practices were conducted prior to and following the establishment of the original Monument. Since then, numerous other studies have described the difficulties associated with clearly separating commercial and non-commercial fishing motives and values throughout Hawaiʻi. The findings of these studies indicate that the cultural and other values and meanings people ascribe to their fishing activities could have implications for the development of non-commercial fishing regulations. Therefore, we reviewed available studies of diverse fishing experiences in the Northwestern Hawaiian Islands, including commercial fishing, to identify important non-commercial fishing motives, values, and sociocultural meanings.

We found that although current Monument regulations allow for sustenance and subsistence fishing associated with permitted activities such as Native Hawaiian cultural practices, other important non-commercial practices are not included. These include harvesting fish for home use or for sharing with local communities. Contributing to food security in the main Hawaiian Islands, accessing better quality fishing opportunities, finding fulfillment and pleasure, and reinforcing cultural and fisher identities also emerged as important non-commercial fishing contributions, although they were often secondary to the primary purpose of the trip. These aspects may be important to consider in managing non-commercial fishing in the PMNM MEA.

The available documents analyzed for this report focused on fishing experiences within the original Monument boundary from existing studies that were not specifically designed to examine non-commercial fishing. Future studies that focus on the MEA and collect additional primary data (e.g., through interviews specifically focused on non-commercial dimensions of fishing) are needed to fully illuminate the diverse meanings, values, and practices associated with non-commercial fishing in U.S. marine protected areas in the western Pacific region.

Introduction

The Northwestern Hawaiian Islands (NWHI) have a long history of human interaction (Kikiloi 2010; Kikiloi et al. 2017), resource use (Clapp, Kridler, and Fleet 1977), and protection (Kittinger, Duin, and Wilcox 2010; NOAA, USFWS, Hawaiʻi DLNR, and Office of Hawaiian Affairs, n.d.). Beginning in the early 1900s, numerous protection measures for the NWHI sought to conserve its marine life and native and endemic birds and vegetation. These included the establishment of state and federal wildlife refuges, fishery regulations, and protections for reefs and sensitive marine areas. Later, during the 1980s, Fishery Management Plans were established for precious corals, crustaceans, bottomfish, and pelagic fishes. In 1991, a Protected Species Zone was established, prohibiting commercial longline fishing within 50 nautical miles of the NWHI. In 2000, the Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve was established over the same area via Executive Order 13178 (as amended in 2015 by Executive Order 13196). In 2001, the Reserve was declared an active candidate for sanctuary designation (National Ocean Service 2001) and extensive research and public involvement was conducted by interagency partners towards designation and management of the area as a sanctuary (see NOAA, USFWS, and Hawaiʻi DLNR, 2008, for review).

In 2006, the aforementioned Reserve was designated as a Marine National Monument through Presidential Proclamation No. 8031 (Executive Office of the President 2006) and regulations were codified in 50 C.F.R. Sect. 404 (2013). The new monument included 139,793 square miles of the NWHI and was subsequently named Papahānaumokuākea Marine National Monument (PMNM, or original Monument) through Presidential Proclamation 8112 in 3 C.F.R. Sect. 8112 (2008). The final regulations in 50 C.F.R. Sect. 404 (2013) named three management Co-Trustees: Department of Interior through U.S. Fish and Wildlife Service, the Department of Commerce through the National Oceanic and Atmospheric Administration, and the State of Hawaiʻi. The Western Pacific Regional Fishery Management Council (WPRFMC), the NOAA National Marine Fisheries Service, and the NOAA Office of National Marine Sanctuaries engaged fishing communities and conducted rigorous studies to document the various types of fishing in the Monument (e.g., Maly and Maly 2003a; Maly and Maly 2003b; NOAA, USFWS, and Hawaiʻi DLNR 2008; National Marine Sanctuary Program 2004; NOAA 2006). Presidential Proclamation 8031 and subsequent regulations included the phase-out of commercial fishing (3 C.F.R. Sect. 8031), and by 2010, all commercial fisheries were excluded. Presidential Proclamation 9478 (Executive Office of the President 2016) established the Monument Expansion Area (MEA), effectively expanding the boundary from 50 nm offshore to the seaward boundary of the U.S. Exclusive Economic Zone (EEZ) west of the 163° W line of longitude, for a total area of 582,578 mi^2 (Figure 1). In 2017, the Office of Hawaiian Affairs (OHA) was added as a fourth PMNM Co-Trustee agency (State of Hawaiʻi DLNR, OHA, USFWS, and NOAA 2017).

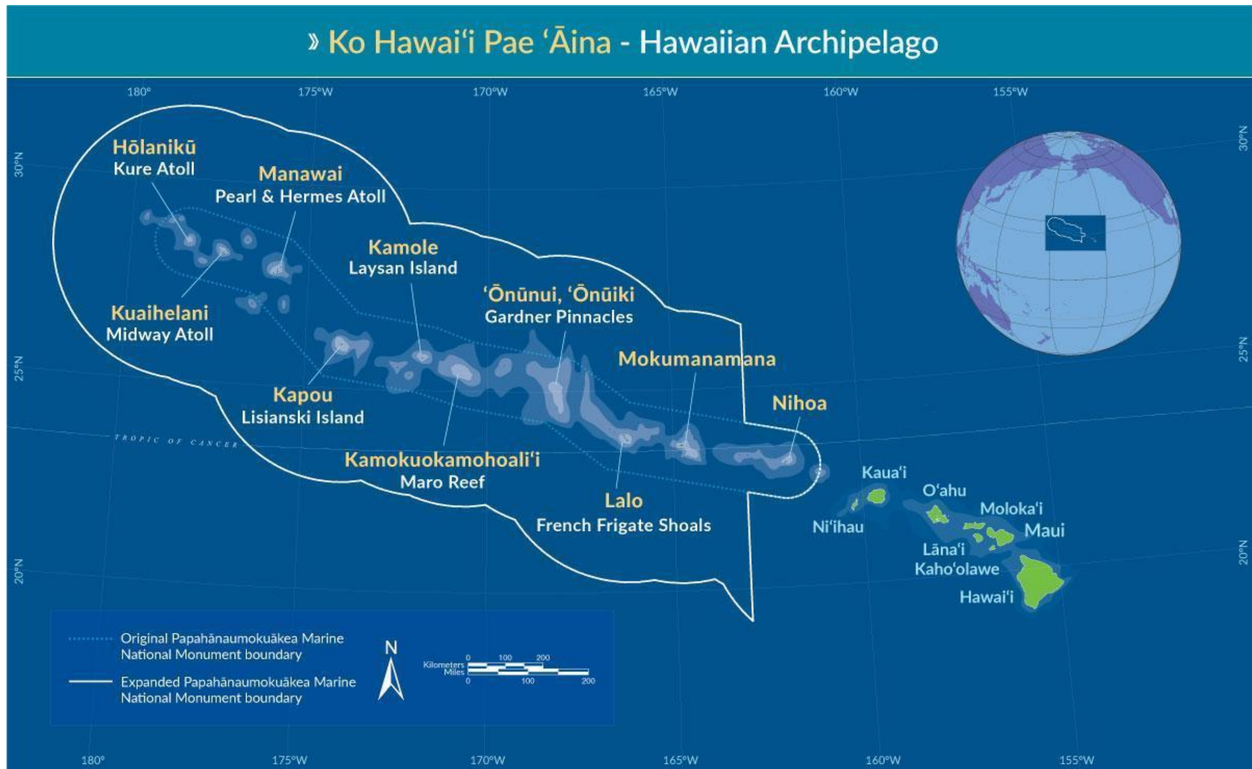

Figure 1. Map showing the original PMNM boundary and Monument Expansion Area boundary. Reprinted from Papahānaumokuākea Marine National Monument, by National Ocean Service Office of National Marine Sanctuaries, 2019.[1]

PMNM is the largest Marine Protected Area in the United States. Within the Monument there are 1,700 known endemic species, 23 of which are protected under the U.S. Endangered Species Act, and over 3.5 million acres of coral reefs. PMNM also holds sites sacred to Hawaiian cultural heritage and cosmology, as well as more recent historically significant maritime heritage and military sites.

The NWHI's significance to Hawaiian culture finds one representation in the most well-known Hawaiian creation chant Kumulipo[2] which tells of the birth of the natural world from Pō, the primordial darkness, and a conceptual reference to the origins of time and space of Hawaiian cosmology. The beginning of the chant describes a primordial time of darkness when the earth was hot and the sky was violent. The primal energies of this time produced the first forms of life of which the coral polyp is the first acknowledged in the Kumulipo. The coral polyp is then followed by many plants and animals in a succession of births that represents an evolutionary and historical development of the Hawaiian universe which eventually includes humans. Hawaiian culture regards these atolls, islands, and surrounding waters as an ʻāina akua[3] from which life springs and to which ancestral spirits return after death (Kikiloi 2006). These religious

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[1] Retrieved from https://www.papahanaumokuakea.gov/.

[2] Hawaiian word translations taken from the Pukui and Elbert, 1986. Translation of Hawaiian phrases and contextual insights provided through personal communications with K. Quiocho, December 2019.

[3] Sacred region.

and spiritual beliefs are foundational aspects of Hawaiian culture and a source of reverence for the NWHI and its diverse life forms, connected through time, space, and spiritual energy.

The Monument's vast size, distinct geographical and biological features, and irreplaceable cultural and historical significance create unique opportunities and challenges for management. One such challenge and opportunity is developing and finalizing a management plan and fishery regulations for the MEA. The Proclamation that established the MEA (Executive Office of the President 2016) prohibits commercial fishing and allows for non-commercial fishing as a regulated activity. These restrictions and allowances are similar to those outlined in the original Monument designation (Executive Office of the President 2006) after phase-out of commercial fishing. Specific commercial and non-commercial fishing regulations for the original Monument were codified in 2013 (50 C.F.R. Sect. 404.10(b)3 and 50 C.F.R. Sect. 404.11(h), respectively). The development of a management plan and complementary fishing regulations for the MEA will, among other things, specify conditions under which non-commercial fishing may occur in the expansion area.

I. Formal Fishing Definitions

Certain types of fishing relevant to the management of non-commercial fishing in the Western Pacific have been defined at various levels of law, policy, and regulation (see Leong et al. 2020, Appendix B for full review). At the national level, the Magnuson-Stevens Fishery Conservation and Management Act (Fishery Conservation and Management, 16 U.S.C. 1801 – 1891(d)) defines commercial fishing as, "...the entry of catch into commerce through sale, barter, or trade" (16 U.S.C. Sect. 1802 (4)) and recreational fishing is defined as, "...fishing for sport or pleasure" (16 U.S.C. Sect. 1802 (37)). Both of these definitions apply at the regional and Monument levels.

For fisheries in the Western Pacific a broad definition of non-commercial fishing was established in the Code of Federal Regulations in 2010 and expanded in 2013 to:

> fishing that does not meet the definition of commercial fishing in the Magnuson Stevens Fishery Conservation and Management Act, and includes, but is not limited to, sustenance, subsistence, traditional indigenous and recreational fishing (50 C.F.R. Sect. 665.12).

The term non-commercial fishing appears in the regulations for the Marianas Trench, Pacific Remote Islands, and Rose Atoll Marine National Monuments (50 C.F.R. Sect. 665.903-5; 50 C.F.R. Sect. 665.933-5; 50 C.F.R. Sect. 665.963-5).

The terms sustenance, subsistence, and traditional indigenous are not defined in this section of the Code of Federal Regulations, and where definitions exist, they do not apply uniformly across the Western Pacific. Sustenance fishing is defined only in the regulations for the Papahānaumokuākea original Monument as "...fishing for bottomfish or pelagic species in which all catch is consumed within the Monument, and that is incidental to an activity permitted under this part" (50 C.F.R. Sect. 404.3) and applies in federal waters of PMNM. Subsistence fishing is defined by the State of Hawaiʻi Department of Land and Natural Resources Title 13 as "...harvesting for direct personal or family consumption and not for commercial purposes" (H.A.R. Sect. 13-60.5-3) and applies in state waters of PMNM. Subsistence fishing is also defined in Fishery Ecosystem Plans for each archipelago in the Western Pacific region as

"Fishing to obtain food for personal and/or community use rather than for profit sales or recreation" (WPRFMC 2009 a–d). Traditional indigenous fishing is not defined in law or policy.

Another relevant term defined for fisheries in the western Pacific is customary exchange, defined as the following:

> the non-market exchange of marine resources between fishermen and community residents… for goods and/or services for cultural, social, or religious reasons…. [It] may include cost recovery through monetary reimbursements and other means for actual trip expenses… that may be necessary to participate in fisheries in the western Pacific. (50 C.F.R. Sect. 665.12)

Under this definition, customary exchange allows for the provision of non-commercial fishing benefits to the community, while also recognizing the potential monetary costs of fishing. Since it was codified in 2010, regulations for the Marianas Trench and Rose Atoll Marine National Monuments include customary exchange as a permitted non-commercial fishing activity (50 C.F.R. Sect. 665.905; 50 C.F.R. Sect. 665.965). Customary exchange is prohibited in the Pacific Remote Islands Marine National Monument (50 C.F.R. Sect. 665.935).

Though existing and developing PMNM regulatory frameworks are necessarily place-based and rooted in Hawaiian cultural values, the regulatory language of other marine national monuments defined above provides helpful context to consider potentially relevant management approaches. That some of the terms are not clearly defined indicate that non-commercial fishing is not a clearly defined concept and warrants further attention. These definitions also reflect the importance of considering fishing in part as a cultural activity, which shaped our research design.

II. Report Objective

Regulations developed for the original Papahānaumokuākea Marine National Monument address the purpose of PMNM to preserve nature and Hawaiian culture. The objective of this report is to begin to explore NWHI fishing histories to better understand key elements of non-commercial fishing, both in practice and from a values perspective that could be useful in current and future Monument management planning.

Recent studies have described the widespread nature of non-commercial dimensions of fishing throughout the Pacific region (Kleiber and Leong 2018; Leong et al. 2020). In Hawaiʻi, it is not unusual for both commercial and non-commercial fishers to have non-commercial motivations, many related to local cultural traditions (Chan and Pan 2017; Madge, Hospital, and Williams 2016; WPRFMC 2017a). Therefore, we included commercial fishing in our review. This approach allows us to mine the diverse meanings of non-commercial fishing from all available sources and to consider how this important context could inform current and future management.

Methods

We first met individually with PMNM staff of each of the four co-trustee agencies to learn more about the development of fishing regulations for the original Monument. Agency staff identified people known to have experience fishing in the NWHI as potential project interviewees. They also shared existing resources related to fishing and the NWHI, including existing transcripts of oral history projects documenting fishing practices and other studies that had been conducted leading up to the original Monument designation. These studies and transcripts included concepts related to non-commercial fishing in the NWHI but had not yet been analyzed through this lens. Given that the majority of potential interviewees identified by the staff of the co-trustee agencies had already participated in interviews, we decided to focus our limited resources on first systematically analyzing those existing interview transcripts and other study results for concepts that could inform thinking about non-commercial fishing. This approach would allow any future data collection to be more targeted and less redundant for potential interviewees. No new interviews were conducted for this report.

To describe historical fishing practice and experience in the NWHI, we reviewed and coded existing media published by PMNM management agencies, peer reviewed reports, and existing transcripts of oral history interviews with fishermen. Coding was performed using NVivo 11 software (NVivo qualitative data analysis Software 2017). To examine non-commercial dimensions of fishing, a preliminary coding schema was adapted from a cultural fishing framework developed from work in American Samoa (Kleiber and Leong 2018). Codes were then developed and refined using an inductive and iterative approach.[4]

Additionally, Papahānaumokuākea has been shared with the public through photography, exhibits, and outreach materials showcasing the natural and cultural history of this remote site.[5] To see how the NWHI's fishing history is portrayed, we examined online materials made available through the official PMNM website. [6]

Oral histories of fishing in the NWHI were available from two main sources. The first of these was an oral history project with kūpuna[7] and kamaʻāina,[8] that documented fishing practices throughout the Hawaiian Islands (Maly and Maly 2003b). That project captured family histories of fishing practices in Nihoa in the 1800s, as well as firsthand recollections of fishing in the NWHI shortly after World War II. Some of those oral histories were conducted with individuals, while others captured group conversations. Many of the discussions regarding fishing in the NWHI focus on proposed changes to fisheries management in the area and relevant Native Hawaiian cultural perspectives. The second main source was a bottomfishing oral history project

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[4] Materials were coded both independently of and in reference to the cultural fishing framework. This enabled the identification of themes relevant to the Kleiber and Leong (2018) cultural fishing framework, but also ensured that themes unique to the NWHI sources used were preserved.

[5] One of the guiding principles in the creation of the PMNM was the intent to: "Bring the place to the people, rather than the people to the place" (https://www.papahanaumokuakea.gov/maritime/exhibits.html, 9 August 2019).

[6] http://papahanaumokuakea.gov.

[7] Grandparent, ancestor, relative or close friend of the grandparent's generation, grandaunt, granduncle; Starting point, source; growing.

[8] Native-born, one born in a place, host; native plant; acquainted, familiar, *Lit.*, land child.

conducted by NOAA's Pacific Islands Fisheries Science Center (PIFSC). For that project, contemporary commercial bottomfish fishers were interviewed about their fishing experiences in both the main Hawaiian Islands[9] and the Northwestern Hawaiian Islands prior to the commercial fishing closure in the Monument. Throughout this report, quotes from the bottomfishing oral history project will be attributed to "bottomfishers," or "bottomfish oral histories." For full project information, see Calhoun et al. 2020, and PIFSC 2021.[10]

To complement qualitative data from the bottomfish oral history project, we also examined participation and catch numbers from the NWHI commercial bottomfish fishery. We traced these values from the year immediately preceding the 2006 PMNM designation through present day, refining our scope to only those bottomfishers who were active in the NWHI from 2005 onward. Annual summaries were created for each calendar year, and the MHI and NWHI regions followed those mapped by the Hawaiʻi State Division of Aquatic Resources. Additionally, the following definition was adopted from the WPRFMC's bottomfish fishery query (WPRFMC 2007): Bottomfish trips were defined as those which use bottomfish handline gear and report at least 90% of catch as bottomfish management unit species.

[9] Throughout this paper we will use MHI to refer to the islands of Hawaiʻi, Maui, Molokaʻi, Lānaʻi, Kahoʻolawe, Oʻahu, Kauaʻi, Niʻihau, and their adjacent islets.
[10] Additional project details and spotlight videos are available at: https://www.fisheries.noaa.gov/feature-story/hawaii-bottomfish-heritage-project, https://voices.nmfs.noaa.gov/collection/hawaii-bottomfish-heritage-project,

Results

The PMNM website defines the Monument as a place "where nature and culture are one," focusing on the area's biological diversity, archaeological features, and Hawaiian cultural and cosmological significance.[11] Fishing is one type of direct link between the marine ecosystem and both historical and contemporary cultures in the Hawaiian Islands. We highlight the role of fishing in the NWHI, and elicit additional meanings of fishing in the NWHI in five results sections:

I. Cultural Context
II. What kinds of fishing have occurred in the NWHI?
III. The meaning of fishing in the NWHI
IV. Perceptions about NWHI fishing regulations
V. Where are they now? Following NWHI commercial bottomfishers

Section I introduces some of the similarities and differences between different fishing groups' cultures, particularly with respect to fishing practice and conservation ethics. Section II highlights historical NWHI fishery participation and the characteristics of fishing equipment and strategies adapted to the NWHI. Section III describes the intangible meanings that fishers derive from fishing in the NWHI, organized into two umbrella themes: fisher motivation and fisher identity. Section IV captures some of the perceptions and sentiments of fishers around the regulation of NWHI fisheries, including rationale for Monument designation, and perceptions about and from NWHI fishers. Finally, Section V expands on the fisher responses described in Section IV, compiling NWHI quantitative bottomfish fishery data and qualitative interview data relevant to commercial bottomfishers' response to Monument designation. By examining fisher perspectives together with fishery catch and participation patterns following Monument designation, we further explore non-commercial motives embedded in these fisheries.

The quotes provided throughout this report are taken from the two sets of oral histories identified in the Methods section, unless otherwise specified, and were selected to illustrate common themes. Quotes are taken directly from their transcripts, edited only where transcripts compromise readability or anonymity. Exchanges between individuals are notated with letters (e.g., A, B, etc.) which serve only to differentiate between speakers within a given exchange.

I. Cultural Context

Cultures are rooted in time and place. They define how people relate to their physical environment which includes every aspect of nature. In the Executive Summary of Maly and Maly (2003a), nature and culture are described as indivisible in the Native Hawaiian tradition. In Hawaiian culture, people share a kinship bond with nature that stems from time immemorial. According to Hawaiian cosmology, people are born from a common origin as other life forms and the gods who manifest within natural phenomena. Recognized as a single genealogy, Native Hawaiians are the descendants of their environment which is the context by which they respect and care for nature while it continues to feed them in every aspect that ensures holistic health and

[11] www.papahanaumokuakea.gov/about/, 24 September 2020

well-being. This is a reciprocal relationship and in terms of fishing responsibly, these values and ethics ensure sustainability. It is important to take only what is needed, being mindful of what the environment can provide as a limited resource. By definition, lawaiʻa or (Hawaiian) fishers utilize all that is taken and give back to the environment as determined by their particular practice as resource managers. Sometimes these values can take symbolic form. For example, in Maly and Maly (2003b), one oral history described the practice of releasing two fish from your first fishing set, which symbolized the return of a male and female fish to the breeding stock. Another described the fisher's grandfather offering parts of their ʻahi back to the ocean (Maly and Maly 2003b, p. 418):

> "So he said— 'The nose is for him to go where he wants to go. And the pekeu[12], you cut, that ʻahi is going to go around and around, and he will come back to the house. And that tail will steer him, no matter where he goes, he will come back.'"

The texts we examined highlighted both synergies and tensions between traditional Hawaiian and contemporary cultural fishing values in Hawaiʻi. In contrast to the environmental ethics interwoven with Hawaiian culture, conservation ethics described in the bottomfish interviews were variable and not necessarily related to spiritual or cultural heritage. Still, they often involved forms of self-governance. These included rotating fishing grounds, ending fishing if the fish became too small, and throwing back smaller fish. As described in one bottomfish oral history: "He used to like work the inner banks for a couple of years, or something. Then work the outer banks for a couple of years. So, you know, you're not fishing them all, right, every time." Other similarities that emerged between the Maly and Maly (2003b) and bottomfish oral histories included a respect for elders and the importance of sharing.

Tensions between traditional and contemporary cultural values were also expressed. A Maly and Maly (2003b) oral history described negative reactions to contemporary fishers utilizing only parts of their catch and wasting others. These included examples of fishing for home consumption and commercial purposes:

> "But one thing that I was kind of disappointed of, when we went over there and we saw some of our fishermen, they took the honu[13]. But they didn't sell the honu, they took it for themselves to eat. The thing is, they left all that back and everything all on top like that." (Maly and Maly 2003b, p. 1225)

> "It's sad they take all the lobster [gestures breaking a lobster tail from the body], they break ʻum throw away all the head parts and just save the tail. To see that, for use, when we see things like that [shaking his head]. We survived on the ʻāina[14] itself. And you see that thing thrown away. They say, 'Oh, we cannot keep those things because it takes

[12] Pectoral fin.

[13] General name for turtle and tortoise, as *Chelonia mydas.*

[14] Land, earth.

> space. All we need is this [holding the tail]. To see things like, it hurts, ‘eha[15]!’” (Maly and Maly 2003b, p. 1258)

Some Maly and Maly (2003b) oral histories also referenced foreign fishing effort specifically, perceiving a lack of culture, local knowledge, and attachment to place to degrade the Hawaiian environment and culture:

> “And there is an attitude, because there was no culture here to speak of the people who were here had no culture, no past experience, ‘It’s my right to fish and I take,’ and there was no limit. ‘I take all I can take.’” (Maly and Maly 2003b, p. 1193)

Although the fishing values and practices introduced above may not all be unique to fishing in the NWHI, they provide important context for discussions around the union of nature and culture in the Monument area.

II. What kinds of fishing have occurred in the NWHI?

The WPRFMC created an overview of the history of the fisheries in the NWHI, dating back to the earliest settlement of the islands.[16] Many of these activities were described in detail in the interviews reviewed for this report. The NWHI were initially thought to be settled by Polynesians around 500 A.D. (NOAA, USFWS, and Hawai‘i DLNR 2008). The two southernmost islands in the NWHI, Mokumanamana and Nihoa, both have abundant archaeological evidence of human habitation including agricultural areas, housing remains, and burial sites (Cleghorn 1988). While fishing is not well documented for these periods of habitation and voyaging, scarce island vegetation suggests that local marine resources played a critical role in sustaining human populations. Perhaps the earliest documented fishing activity in the NWHI is a description of Native Hawaiian fishing at Kure Atoll, which comes from Captain Cook (Maly and Maly 2003b, p. 1211):

> “There is an account in Captain Cook’s log book that he was at Kure Island, I think his second trip, 1779. When he encountered a Hawaiian canoe way up there at Kure, and asking the natives… There were ten natives on the double-hulled canoe. What they were doing there? And they said they had come to ‘collect turtles and bird eggs.’”

Documentation of Native Hawaiian bottomfishing may date back to at least the 18th or 19th centuries based on artifacts described by Iversen et al. (1990). These include a 300-ft long fishing line composed of olonā[17] fibers, and a large rotating fishhook which “would have been used with a kaka[18] rig while fishing the deep water kialoa[19] for bottomfish.”

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[15] Hurt, in pain, painful, aching, sore, pained; pain, injury, ailment, suffering, soreness, aching.
[16] History of the Fisheries in the Northwestern Hawaiian Islands available at: http://www.wpcouncil.org/wp-content/uploads/2016/06/3.7-history-of-NWHI-.pdf.
[17] A native shrub (*Touchardia latifolia*).
[18] In which a number of hooks are attached to a single line (Maly and Maly 2003a).
[19] Fishing grounds.

Summer fishing trips taken from Niʻihau into the NWHI are described in detail in the Maly and Maly oral histories (2003b). The timing of summer trips was determined by April's shifting winds, which transported fishers' canoes to Nihoa and then back to Niʻihau, allowing for a week of ulua[20] fishing on Nihoa. The same April winds that took Niʻihau fishers to Nihoa also transported people further north to Mokumanamana, where they lived for 6-month periods. They would catch fish along the way and do a lot of fishing while they lived there. Oral histories emphasized the amount of preparation required for these trips. Coconuts were harvested and processed for oil to waterproof canoes and protect them from invertebrate colonization during voyage. Salt was transported in ipu[21] to cure ulua, one of their target species. For longer trips, fishers brought potatoes with them to supplement coconut and fish diets on the island.

Most instances of fishing that we encountered in our literature review were of 20th century commercial fishing ventures, including nearshore, longline, bottomfish, Kona crab, and lobster fisheries. These were often described with a sense of adventure and expedition. Documentation began as early as the 1920s for commercial bottomfishing (Iversen et al. 1990). Then, "in the 1930s, and following World War II… vessels also fished for lobsters, reef fish and inshore species and turtles, many of which were caught inside the 3 mile limit*"* (ibid p. 9).

One oral history described different species present in the NWHI for subsistence fishing (Maly and Maly 2003b, p. 1214):

> "There was plenty of fish. All kinds, and in the shallows, they would just follow you. Māʻiʻi[22], manini[23], uhu[24], and lots of weke[25], and of course, lots of lobsters… and lots of ʻopihi[26]…. They were old animals, and they get big. And there's hāʻukeʻuke[27] and the rocks and wana."[28]

The same fisherman was heavily involved in the NWHI nearshore fishery for a decade (1946–1956). Upon his final return to the MHI in the 1950s, this fisherman described the unsustainability of NWHI commercial fisheries. He described netting for nearshore species like āholehole[29], ʻōpelu[30], and moi[31] in the French Frigate Shoals and Kure Atolls, and having to venture further offshore for larger species like tuna after he "fished out the reef fish. So I fished

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[20] Certain species of crevalle, jack, or pompano.
[21] The bottle gourd (*Lagenaria siceraria*, also *L. vulgaris*).
[22] A surgeonfish (*Acanthurus nigrofuscus*).
[23] convict tang (*Acanthurus triostegus*).
[24] The parrot fishes.
[25] Certain species of the Mullidae, surmullets or goatfish.
[26] Limpets.
[27] An edible variety of sea urchin (*Colobocentrotus atratus*).
[28] A sea urchin, as *Diadema paucispinum* and *Echinothrix diadema.*
[29] Young stage of the āhole, Hawaiian flagtail.
[30] Mackerel scad (*Decapterus pinnulatus* and *D. maruadsi*).
[31] Threadfish (*Polydactylus sexfilis*).

myself out of a job in a sense." For a year during the same period, he described aircraft-assisted akule[32] fishing in the French Frigate Shoals (Iversen et al. 1990; Maly and Maly 2003b, p. 1256):

> "Today, we have airplanes, and I am guilty of that, I fly. The boat travels about 5 or 6 knots. The airplane traveling at 120 miles an hour can cover 10 or 15 times as much distance, searching for fish. Fishermen after all, are hunters. They go out hunting for fish. So the fish don't have a chance. And it is not going to get better as technology improves. Technology is great for medicine, for health care and so forth, but it has a down side, that it doesn't allow the wild species a fair chance to stay alive."

A larger lobster fishery was born in the 1970s. Fishing effort remained relatively low until the 1980s when new traps were introduced that allowed vessels to carry and fish many more traps per night. The new traps were also more effective at catching lobsters. This initially resulted in increased catch and increased catch per unit effort (CPUE); however, by the late 1980s, severe declines in CPUE were observed (Schultz et al. 2011). As described in one oral history (Maly and Maly 2003b, p. 1242):

> "I think it was back in the mid-1980s. The first year they went out and laid out 100, 200 traps, there were 40, 50, 60 lobster in one trap, in one night. He said that within a year of fishing like that, it dropped down to lucky if they would get 4 or 5 lobsters in the trap."

Management measures were introduced in the early 1990s, including a closure in 1993 and limited effort in 1994 and 1995 (Schultz et al. 2011). In 2000, NMFS closed the NWHI lobster fishery indefinitely due to concerns about the potential of overfishing, increasing uncertainties in stock assessment models, and a lack of rebuilding of lobster populations, despite significant reduction in fishing effort (National Marine Fisheries Service 2000). Although the exact reasons are unknown, years of unrestricted fishing coupled with a NWHI ecosystem shift that negatively impacted lobster recruitment are the likely reasons for the fishery collapse (Polovina and Haight 1998). Despite ongoing protection, the last fishery independent research indicated that stocks had failed to recover (Schultz et al. 2011).

A short-lived commercial shark fishing operation at French Frigate Shoals and nearby banks took place in 2000. During one 21-day fishing trip, this vessel caught 990 sharks in the Northwestern Hawaiian Islands consisting mainly of sandbar sharks, Galápagos, and tiger sharks (Vatter 2003). There were three brief mentions of marine specimen collection from Nihoa for scientific research, including arthropods, molluscs, and echinoids (Clapp et al. 1977). And, one oral history described a sportfishing operation led by Phoenix Corporation at Midway Atoll (Maly and Maly 2003b, p. 1263).

The NWHI commercial bottomfish fisheries were separated into two limited-entry management zones: the southern Mau Zone and northern Hoʻomalu Zone. In 2006, 4 vessels operated under each zone's limited entry program, for a total of 8 NWHI bottomfishing vessels (NMFS and WPRFMC 2006, p. 7). This represented a marked, but expected decline in Mau Zone

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[32] Big-eyed or goggle-eyed scad fish (*Trachurops crumenophthalmus*).

participation from its 14 vessels in 1990, given the limited entry program (p. 5). NMFS and WPRFMC anticipated "*further attrition due to current use-or-lose permit policy*" (p. 5).

Presidential Proclamation 8031 (Executive Office of the President 2006), which established the original Monument, effectively closed the lobster fishery, implementing a zero harvest limit within its boundaries. At the time the Monument was established, the 15 permits held for the limited entry lobster fishery were eligible for compensation by NMFS (National Marine Fisheries Service 2009). Under the same regulation, 8 bottomfish permit holders were eligible for compensation by NMFS. The Proclamation did, however, permit the continued commercial harvest of bottomfish and pelagic species for 5 years after the proclamation's publication. All eligible permit holders surrendered their permits and accepted compensation by 2010, effectively closing these commercial fisheries (National Marine Fisheries Service 2010). Subsistence and sustenance fishing continue to occur at low levels as permitted activities in the NWHI. Sustenance fishing has taken place aboard vessels conducting research, Native Hawaiian practices, conservation and management, and education activities in the monument by permit.

Characteristics of fishing in the NWHI and fisher adaptation

In this section, we provide a brief description of some of the characteristics of fishing specific to the NWHI, including trip length, vessels, and crew size. Then, we describe some of the ways fishers responded to challenges and conditions of NWHI fishing.

Trip length
Nineteenth and 20th century native Hawaiian fishing trips from Niʻihau to Nihoa and Mokumanamana were described to last 1 week to 6 months (Maly and Maly 2003b, p. 1209). These involved subsisting on island resources and shore fishing. Twentieth century commercial fishing trips to the NWHI were described to last anywhere from 5 days to a month, varying by fisher, vessel, destination, and fishing strategy. A fruitful trip to the NWHI's southern regions (Mau Zone), for example, might consist of 2 days of transit and 2–3 days of trolling for uku.[33] One bottomfish oral history described the increasing distance and duration of fishing trips as the fisherman became more experienced: "When I started, we used to be like 14 days we averaged a trip. But afterwards, it was like 25 days maybe," which might include 7 days of transit out to his northernmost fishing ground (Hoʻomalu Zone), and fishing for the remainder of the trip on the way back to the MHI.

Vessel
Large, double-hull canoes were used for traditional Hawaiian fishing in the NWHI. On traveling to and fishing in Nihoa, Iversen et al. (1990) reported that: "Ocean going canoes large enough to make it to Nihoa are unlikely to have been hauled ashore, and would have been anchored offshore." Notably, one person interviewed by Maly and Maly (2003b) spoke about the importance of using traditional materials as a means of preserving culture. His example was that younger generations voyaging to the NWHI today with intentions to reconnect to its cultural heritage could not do so in a yacht, but would instead need to follow the steps of their kūpuna in constructing a canoe and preparing for voyage (p. 1244).

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[33] A deep-sea snapper or jobfish (*Aprion virescens*).

The bottomfish fishery was a small boat fishery, with a maximum vessel length of 70 ft (NMFS and WPRFMC 2006, p. 1). Bottomfish oral histories highlighted the importance of vessel storage capacity and insulation for their long distance trips.

Crew size

Fishers seemed never to make the journey to the NWHI alone. All of the bottomfishers represented in the oral histories took at least one or two crewmembers with them to the NWHI to manage navigation, safety, and fishing activities. One described a small crew as preferable in consideration of limited space on the vessel and the divvying up of trip revenue. Another described the two-man routine he established with one particular crew member: “Just two of us, all the way down, all of the way down. It worked very well.”

Human well-being

Issues of human well-being in fishing in the NWHI derived from the demands and duration of the activity. One point of emphasis was the importance of good crew dynamics. These included a committed crew in good mental and physical health, and a distribution of roles. The latter referred more than once to food and cooking while fishing: “Food was really important. You know, we’d get really good meals consistently, or take turns cooking” (bottomfish oral history). Another bottomfish oral history emphasized the critical role of the captain in maintaining equity and responding to variable conditions in the NWHI: “Just constant making decisions, putting the crew to sleep, traveling at night, going to another island to fish and then you try to rest the crew, everybody fresh on the new day. So the captain’s mind is always going.”

One bottomfish oral history described the intensity of the schedule maintained with one particular fishing partner:

> “I fished with him for, like – I did a couple hundred trips with him, you know. And we took like 2-week trips, but we’d turnaround in like 3 days at the longest. We’ve turnaround the same day that we unloaded, and we loaded up the boat and left the same day…. Oh, at that time, we were doing close to 20 trips a year, like. I mean, I spent like over 300 days a year out on the ocean on the water, you know.”

Several bottomfish oral histories described the challenges of balancing these kinds of schedules with stable family life, and the sacrifices made on behalf of one for the other. One fisher, in particular, described desires to return to the NWHI to fish now that his children are grown up:

> “And back at that time, I did not fish as much because I have three kids and I kind of wanted to be fishing around home closer so I could be with the family, you know. And now they’re all grown up, I wish it was open because I’d still be fishing up there.”

Fisher adaptation

Previous subsections touched on the careful preparation that trips to the NWHI required. Fishing in the NWHI posed unique challenges because of its distance from the MHI where fishers lived and (for those who fished commercially) sold their catch. As noted by Iversen et al. (1990), “Factors limiting trip length include the shelf life of the catch, since catches are marketed in a fresh condition, and how far the vessels must go to find sufficient quantities of the target species.” Many bottomfish interviews described adaptations they developed to ensure fish

arrived back in the MHI in good condition, or to maximize market value. Instead of freezing catch, bottomfishers spoke of brining bottomfish to preserve the fish and maintain its saleable condition. One bottomfish interview described targeting species in a strategic order for the same reason. Hāpuʻupuʻu[34] and butaguchi,[35] he said, were heartiest, and so were caught first and used to build the bottom layer in catch storage. More valuable and fragile species, like ʻōpakapaka[36] and gindai,[37] were caught later. He also described caring for his fish, and being taught to do so by his mentors, for non-commercial reasons:

> "We tried so hard – in the old days, guys would get ornery if you didn't carry the fish with two hands. We used to grab them like this and shake them all out and throw them in the stuff. Oh, brah, that is not happening. You respect that fish because you caught it and killed it, somebody is going to eat it and you need to respect that fish and carry it like this and put it in there carefully. You know, it's not like nowadays where they just slam them around. But that's how I learned."

Similarly, the salting of ulua caught on Nihoa was a non-commercial processing method cited in Maly and Maly oral histories (2003b).

The second consideration outlined in the excerpt from Iversen et al. (1990) relates to challenges in finding and landing fish in the NWHI. One bottomfish oral history alluded to the need to sell catch in good condition to compensate for the heightened personal risk and financial investment of fishing in the NWHI: "The thing was, if you traveled far, the farther you went, the faster you had to catch the fish, right, unless it's not worth it." The use of navigational and fish-finding technology, which was deemed necessary by bottomfishers, proved a useful tool for the NWHI. In one bottomfish oral history, the fisher clearly stated: "And I would never go up to the northwest without a GPS." Such systems were described to serve their obvious practical purposes, as well as provide a sense of security to fishers, or allow them to identify and track discovered fishing grounds throughout the years. In contrast, a nearshore fisher described his early pre-technology fishing career, which resulted in his targeting more visible, shallow-water fish (Maly and Maly 2003b, p. 1222):

> "Like when we were working out in those islands, we didn't have technology like depth recorders, fish finders and things like that…. We would have to sound…. We'd slow down the engine, throw down a hand line with a lead weight, about three or four pounds. Let it run down, when it hit the bottom, we'd bring it back up and span it [gestures measuring the length of the rope, let down]. How many fathoms? So that we would know the depth of what we were over…. And we had to do that all the way wherever we went. No more fathometer. Well, some boats had fathometers, but how we were running, no more. So we would fish for something else, easier, like netting. Go in shore of the islands and look for something."

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[34] Hawaiian grouper (*Epinephelus guernus*).

[35] Thick or pig ulua (*Pseudocaranx dentex).*

[36] Blue snapper (*Pristipomoides filamentosus*).

[37] Banded snapper, known as ʻūkikiki in Hawaiian (*Pristipomoides zonatus*).

The size and abundance of fish in the NWHI also necessitated certain fisher adaptations. Whereas bottomfish oral histories indicated that preference for fishing gear in the MHI might vary, the preference for hydraulic reels in the NWHI was unanimous because it minimized the physical burden of large catch volume and size. One bottomfish oral history described other types of heavier gear or and fewer hooks: “We fished only three hooks in the Northwestern Hawaiian Islands because fish was big. So I’d get like 30, 40-pound hāpuʻupuʻu, got 3 of them, man, that was really heavy to pull them up like that.”

Another way that species size and abundance affected fishing strategy was in the presence of large predators. One fisher described his first encounters with high predator abundance while netting in the NWHI. His solution was to surround not only schools of target fish but also predators, for which there was also a market (Maly and Maly 2003b, p. 1212–1213):

> “They go into a feeding frenzy when you surround. In those places, anyway. In town here, you don’t have the top predators that circle the schools. But out there you have. And Shark Bay is like that, a huge school of sharks. We would have to stay inside the net, they thought that that was a fish and they bite. Your fin touches the net, they bite. You cannot touch the net. So we learned the hard way and got the nets all torn up, and we ended up with all those big ulua...
>
> So it was this big mass, as big as this table [about 26 feet in length] of boiling fish. So those days, we could eat shark, we used to make [kamaboko[38]]. I sold all the sharks, we would head them and gut them, and just throw them on top of the ice…. But we’d bring ‘um in here, they’d chop ‘um all up, cook ‘um and make [kamaboko]. And we loved it.”

III. The meaning of fishing in the NWHI

To capture the meaning of fishing in the NWHI, we focused on the unique experiences and significance that people derive from fishing in the area. In soliciting the meaning of fishing in the NWHI, an inevitable question is: Why did people decide to fish in the Northwestern Hawaiian Islands as opposed to the main Hawaiian Islands? Since the end of human habitation in the 1700s, the shortest trip to the southernmost fishing grounds in Nihoa would entail travelling a minimum of 120 mi. Kure Atoll, at the northernmost end of the Monument, requires a journey over ten times that distance (Iversen et al. 1990). We report our results for this topic through two themes. The first, Motivation, describes what drew fishers to the NWHI. The second, Identity, describes the relationship between the NWHI and the development of fisher identity.

Motivation

“Fish is money. Fish is food. Fish is culture” (bottomfish oral history).

In the oral history transcripts, we identified three categories of reasons given for fishing in the Northwestern Hawaiian Islands: (1) Non-commercial, (2) Commercial, and (3) Better fishing. Importantly, the three categories are motivation-specific, as opposed to being indicative of fishing activity or identity. For example, non-commercial motivations were not associated

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[38] Fishcake.

exclusively with non-commercial fishing, and commercial motivations represent only a subset of what motivates a commercial fisher. We elaborate on these three areas below.

Non-commercial
Both the Maly and Maly (2003b) and bottomfish oral histories discuss fishing for non-commercial purposes. We identified several different material and non-material reasons people had for non-commercial fishing, including food, sharing catch, knowledge, fulfillment, and pleasure. These reasons also include instances of secondary fishing (where fishing was not the main point of the voyage, but something done along the way, or done for a different purpose such as research).

Food
Perhaps one of the most obvious non-commercial reasons for fishing was for food. Some of the food related themes that emerged had to do with food security, diet diversification, and nutrition. Food security concerns were largely related to the opinion that the NWHI could not provide food for a large population of people. In one oral history, a fisherman explained: "We can't feed the world. That's the whole thing that people have to know. We cannot even feed all the people in Hawai'i fresh fish" (Maly and Maly 2003b, p. 1257).

One elder also mentioned how the fish from Nihoa was helpful for diversifying the diet of residents of Ni'ihau (Maly and Maly 2003b, p. 1151):

> "So they load up about the same amount, 10 baskets of kalo.[39] Take 'um back to Ni'ihau, divide equally with all the families. They get tired of eating 9 months out of the year or 11 months out of the year, all they eat is potato, 'uala.[40] So change the pace, they going to have taro. So taro and dry ulua fish. Yes, plenty of fish."

Fishing for food could also be broken down into catch that was consumed in the NWHI, and catch brought home to be eaten in the MHI. Eating catch while in the NWHI was described in both historical Hawaiian fishing and contemporary fishing practices. One fisher described his uncles fishing in Nihoa. They would be on the island for many days and he explained: "Their food, the ulua head, coconut, and they drink the water. That's how they lived over there for the whole week." (Maly and Maly 2003b, p. 1210). Contemporary fishers also ate some of their catch. In one bottomfish oral history, the fisherman explained:

> "We anchored out over there and we caught fish. So we were able to fish, and stuff. But our main area was all the way up. We were up there 46 days, ran out of food. Of course, we got plenty fish, so."

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[39] Taro (*Colocasia esculenta*).
[40] Sweet potato (*Ipomoea batatas*).

Sharing catch
"Go get, use it, take that fish, bring it home. We can use it. To me, that's where we make that connection, pili.[41] If we leave it alone and we don't do anything, for our kūpuna, it's just like we don't care about it anymore" (Maly and Maly 2003b, p. 1225).

Bringing fish home to the MHI for friends and family could also overlap with the "sharing" motivation. One Maly and Maly (2003b) oral history described opportunistically catching moi and āholehole in the NWHI for home consumption. Those fishing both non-commercially and commercially spoke about sharing their catch with elderly kūpuna, family, and friends. In one bottomfish oral history, the fisherman described the pride he derives from being able to fish for others:

> "I feel really proud to be a fisherman like this, that I can catch this fish, I can provide fish for people to eat, people who can't go fishing, who can't catch fish. You know, they're too old. You know, all of our kūpunas. All of our grandmas and grandpas, and everybody, they can't go out and catch fish."

Another fisher emphasized the importance of sharing your best fish (Maly and Maly 2003b, p. 1254):

> "Even when we go catch fish, hoʻopuni,[42] everything, the very first fish, and the best fish, our tūtū would tell, 'Lawe ʻoe i kēia iʻa no tūtū ma laila, ma laila, ma laila.'[43] We would take them the best fish that we get in the net, and give it to them first, before we took our own."

Some commercial fishers talked about sharing selectively, keeping higher-value species like snapper and hāpuʻupuʻu for sale. In other cases, fishing trips were planned specifically for special occasions such as holidays, graduations, and funerals.

Knowledge
"Hoʻohana aku, hoʻōla aku![44] Use it, keep it alive!" (Maly and Maly 2003b, p. 1225).

Examples of both ecological and cultural knowledge emerged from the oral histories. These included knowledge relevant to fishing practice, such as patterns in fish species, abundance, spawning seasons, and koʻa.[45] In many Maly and Maly (2003b) narratives, however, fishing in the NWHI was described as secondary to Hawaiian cultural knowledge and the value of the place as a navigational training ground. Many of these descriptions were responses to the

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[41] To cling, stick, adhere, touch, join, adjoin, cleave to, associate with, be with, be close or adjacent; clinging, sticking; close relationship, relative; thing belonging to.
[42] Surrounded, controlled; overcome, as in battle or by emotion; to pervade, gain control of; to enclose. Here, referring to the surrounding and catching of fish, as with a net.
[43] Take this fish for tūtū there, there, there.
[44] Use it, keep it alive!
[45] Fishing grounds, usually identified by lining up with marks on shore.

question, "Why the NWHI and not the MHI?" as inquirers focused on the abundance of fish at home (Maly and Maly 2003b, p. 1219):

> A: And why are we hearing this story, they say they are going over there to get fish, when fish is so plentiful in our place?
>
> B: ʻAe. So it wasn't necessary to just go fishing up there, it was something else?
>
> A: Part of your traveling, part of your life…. That's part of your training to become a warrior, protect your ʻāina, protect your aliʻi like that. Kēlā ka ʻano[46]. That's what they said. ʻAʻole naʻu ke nīnau, "No ke aha kākou e hele aku i kēlā ʻāina ma laila, kiʻi aku ka iʻa?"

The final sentence from this excerpt translates to, "I don't ask, why do we go to that land over there to catch fish?" Such a question was irrelevant given that fishing in the NWHI held practical and cultural significance beyond the act of fishing itself.

Whether ecological or cultural, knowledge was shared and passed down. Contemporary fishers described going to the NWHI as crew to acquire direct knowledge from captains. Of the ecological knowledge shared by kūpuna, one fisher said, "They had experience, they learned it by observation, and it was yours for the taking" (Maly and Maly 2003b, p. 1216). Knowledge was described in other oral histories as perpetuated through practice and an intimate connection with nature:

> "The fish is plentiful, but yet, they had to go. They had to touch these islands. Because, o ka ʻaha kēlā.[47] These are the cords that connect. These manamana lima,[48] they are all connected. And if we don't do anything about them, just leave them alone. Then nothing" (Maly and Maly 2003b, p. 1244).
>
> "The thing that is interesting about cultural landscapes is they are not just some physical act that is there, it is the actual action on the land. It is a traditional use that actually adds to the significance…. So as you've said, fishing is not just one action that's going to be used terms of some way to make more money or whatever, but it is a way to continue the life of that place. Not just the life-way of a people, but the life of the place, and all those things that we don't even know about how it works yet" (Maly and Maly 2003b, p. 1252).

Fulfillment and pleasure
"Go west, young man. And I go west" (bottomfish oral history).

Oral histories documented different kinds of emotional fulfillment and pleasure associated with trips to the NWHI. A prominent theme was the thrill of adventure and danger. In one bottomfish oral history, the fisher compared the NWHI to the "wild west," describing its isolation and the

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[46] Protect your land, protect your chief like that. That's the way.
[47] That is the cord./This is the convening purpose or source.
[48] Fingers.

careful preparation that its trips required. Several bottomfish oral histories included descriptions of the inherent risk of fishing in the NWHI, including stories of traumatic near-death experiences and tragedy:

> "I have a lot of friends, through just personal guys or through my National Marine Fisheries experience that I know that have not come home. They're all still out there. You don't even recover the bodies, or anything. They're just gone, you know. It could have been good weather, you don't know. But it is a very hard profession, and it's very risky, and a lot of people don't recognize that."

These were complemented by fishers' confidence in sticky situations. In one bottomfish oral history, a fisher recounted rough seas he and his crew experienced in a hurricane:

> "And I went out in the deep water and it was blowing almost 100, I think. I just rode straight into it. It was blowing so strong that there were big swells, but the foam was just blowing into the trough, that foam. There were no waves. There were just streamers of foam going down, and the waves were 20 feet tall, or something like that… The rigging and the poles were all screaming. And I was up in the wheelhouse and it was beautiful. The noise was incredible. Just everything was screaming, going through, the riggings were all flopping and everything, but it was fine. I was not in trouble, and I knew that."

Despite its challenges, bottomfish oral histories also included descriptions of the tranquility and natural beauty experienced in the NWHI:

> "And you see a sand spit in front of you after traveling 100 miles, which would be what, all night and perhaps three-quarters of a day, and there's a sandbar right in front of you with waves peeling off of it. That's a pretty tremendous sight to see. And then behind that, able to get behind the shoals. So that area there is really beautiful, really, really beautiful area. Some of the other things, Nihoa, real beautiful island. Adam's Bay, a lot of seals. A lot of wildlife. A lot of Hawaiiana. A lot of terraced home sites. It's a really beautiful island over there, yeah.
>
> I went through a seasick period, and then get sick for like three days. Then after my body got used to, but I loved it out there, though. It's peaceful, you know. It's peaceful."

These were all related in some way to a sense of achievement or fulfillment after having traveled great distances.

Commercial

Commercial motivations derived exclusively from fisheries operating in contemporary contexts. The commercial motivations for fishing in the NWHI were essentially the same as the commercial motivations for fishing elsewhere: to make money. As a reminder, we use "commercial" here to classify the motivation, specifically, rather than its parent fishing activity or person.

Interestingly, the themes that emerged around fishing in the NWHI as opposed to the MHI favored fishing in the MHI. Its distance from the MHI made travel to the NWHI more costly in terms of vessel size, fuel, and supplies. Additionally, from the 1980s through the early 2000s,

annual price and revenue for bottomfish caught in the NWHI was nearly always inferior to that of MHI bottomfish (WPRFMC 2007). These could be attributed to the greater value of MHI bottomfish due to its relative freshness and smaller size (Iversen et al. 1990). One NWHI fisher emphasized that catch condition declined dramatically over the course of the trip home (Maly and Maly 2003b, p. 1256):

> "By the time you get home, 3 or 4 days, the quality of the fish goes down considerably. I've sold fish on the market for ten cents a pound because it was in such poor condition. Nobody wanted it, you would have to give it away or call up some institution and say "you can have it for free."… We found that out years ago, when we came back from there with our ice holds of fish sloshing in the ice. When we opened the ice box, the fins were off, the scales were off, and nobody wanted it."

Given the superior monetary value of fish caught in the MHI, what motivated commercial fishing in the NWHI? In addition to personal fulfillment and pleasure, a key benefit to fishing in the NWHI as opposed to the MHI was the better fishing opportunity. The catch per unit effort for bottomfishing trips in the NWHI exceeded that of trips in the MHI by 1–2 orders of magnitude from the late 1940s through the early 2000s (WPRFMC 2007). As it bleeds into both commercial and non-commercial fishing motivations, better fishing will be discussed separately in the next section.

Better fishing

The oral histories document superior fishing opportunity in the NWHI, which included descriptions of less competition, more fishing grounds, and greater fish abundance, size, and diversity. These could be true of non-commercial or commercial fishing. Fishing competition in the MHI was seen in increasing vessel numbers, fishing pressure, and territorial conflict. Bottomfish oral histories described these things driving fishermen away from the MHI, and creating appeal in the NWHI. One described fishery crowding off the island of Hawaiʻi:

> "And then a lot of the Hilo boats launch West Hawaiʻi started fishing Cross Seamount. Weather buoys got real crowded, started getting like 60 boats. Not at one time, but 60 boats working the outside fishery, and then that's what drove me to the Northwest Hawaiian Islands. There was peace of mind, and hardly any boats. It was really nice."

The NWHI provided reprieve from such competition in its wealth of fishing grounds and diversity, "size and plenitude of fish." Another bottomfish oral history contrasted fishing opportunities in the MHI and NWHI:

> "Now bottom fishing in the main Hawaiian Islands, you have to be able to accept smaller catches, perhaps not as many different species because you can't — there's not as much available. There are still good grounds, but it's still not as good as it might have been having all those different islands in the northwest to be able to choose from. If one area wasn't biting, well, let's go tonight and we'll get to another area in the morning."

Identity

Fisher identity emerged as an important theme in the meaning of fishing in the NWHI. As was alluded to in the section above entitled, "Sharing catch," the ability to give back to kūpuna, or

fortify communities in the MHI was described as an important part of cultural and fisher identity. In fact, many oral histories described fishing in the NWHI as closely tied to cultural and Native Hawaiian identities. Many included contrasts between different kinds of fishers based on these ties. For example, in one of the bottomfish oral histories, the fisher self-identified as, "a long distance fisherman, not a local island fisherman." Another distinction was made between foreigners and either Native Hawaiian or local identities, where fishers in the latter categories believed they felt a greater commitment to this place and its stewardship. Speaking of annual fishing trips taken from Niʻihau to Nihoa and the consistency of its membership, one oral history described: "They always have the same eight people, eight men to go fishing to Nihoa" (Maly and Maly 2003b, p. 1150). Conversely, other participants in the oral histories conducted by Maly and Maly (2003b) described the brief, extractive ventures of a foreign couple (p. 1223, 1241):

> A: There was a [foreign] couple who was fishing for lobsters on the Northwestern Hawaiian Islands. And they fished all the large lobsters, now they came over at that conference and asked to take the three-quarter pounds…. And they went ahead and awarded that guy the permit. I said, "You know, when this couple is finished fishing in the Northwestern Hawaiian Islands, they will take off." And that actually happened. I was very disappointed….
>
> B: Yes. And like what [A] said earlier about the people who were fishing lobster, when it was no longer fun, or no longer profitable…
>
> A: They took off.
>
> B: Yes, they disappear. And what do they leave you with, the dregs?

IV. Perceptions about NWHI fishing regulation

In the early 2000s, fishing regulations in the NWHI and the establishment of a Marine National Monument were contentious issues. The perceptions around decision-making processes, regulations, and fishers that emerged from the oral histories we examined are discussed below.

Rationale for Monument designation

Two primary reasons for establishing the PMNM were identified in the oral histories and subsequently adopted in the 2006 proclamation: cultural preservation and environmental preservation. For some, these goals were indistinguishable. This is best demonstrated in the Hawaiian world view described in Maly and Maly (2003b), which identifies nature, culture, and people as one, each sustaining the other.

Where these goals were distinct, the alliance between Hawaiian cultural practitioners and environmental groups gave strength to their shared cause (Maly and Maly 2003b, p. 1197):

> A: And then the conservationist jumped in and supported it from their perspective of conservation, not necessarily our cultural aspect, but they do support it.
>
> B: Yes. But there's a partnership there has to be.
>
> A: Yes.

Cultural preservation

Much of the discussion around establishing a Monument was related to the perpetuation of Native Hawaiian culture and sovereignty following the illegal overthrow of the Kingdom of Hawaiʻi by the United States in 1893 and subsequent U.S. occupation of Hawaiʻi since then. Oral histories described U.S. seizure of Hawaiian lands and peoples as "[cutting] off" Hawaiian knowledge, which resulted in the loss of much of its intimate connection with nature (Maly and Maly 2003b). The theme of who should wield control over the resource was a recurring one. As a means of protecting NWHI resources for posterity, one oral history noted (Maly and Maly 2003b, p. 313):

> "Maybe the only way we can insure that is get our sovereign recognition back. That's probably the main way we can…probably that's the only way we can protect the future of this place. The United States has only focused on the bottom line, that's really all they're all about. They don't care about whose place it is. The entire United States is built up on stolen lands from other indigenous people."

Another fisher recalled a WPRFMC permitting discussion where he believed his opinion was dismissed because he was Native Hawaiian (Maly and Maly 2003b, p. 1223):

> "Talking about the Northwestern Hawaiian Islands, I've had experience with the Northwestern Region. I had a disagreement several years ago with the Western Pacific Region people. I was the only Hawaiian sitting in the conference room. And I opposed …there was a… couple who was fishing for lobsters on the Northwestern Hawaiian Islands. And they fished all the large lobsters, now they came over at that conference and asked to take the three-quarter pounds. I stood up and I opposed, not for them to get that permit. And you know what they told me? 'You are the only Hawaiian here, where are the rest of the Hawaiians? You're not the majority.' And they went ahead and awarded that guy the permit."

Repeatedly, government institutions and fisher groups were described as part of the "economic engine," prioritizing catch levels and money-making over the health of the environment. One Maly and Maly (2003b) oral history discussed the different regulatory approaches of monuments and sanctuaries. The proclamation that established PMNM prohibited all activities (with the exception of vessel passage without interruption, law enforcement activities, emergency response, and activities of the U.S. armed forces and U.S. Coast Guard) unless specifically permitted (Executive Office of the President 2006). Permitting specifics are detailed in regulations (50 C.F.R. Sect. 404). In contrast, National Marine Sanctuaries allow all activities that are not specifically prohibited or regulated in 15 C.F.R. Sect. 922.42 (2000). This person believed that the more restrictive monument status would enable responsible management in the NWHI, calling for consideration to, "[adopt] the area, in our view, as a kuleana,[49] our responsibility, that is our recommendation" (Maly and Maly 2003b, p. 1259). The alternative he feared was the more inclusive process of sanctuary management:

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[49] Large used to mean "responsibility" but the meaning in Hawaiian is inclusive of the associated rights, privileges, and concerns.

> "What makes a person like me fearful is the Dry Tortugas [in the Florida Keys], they talk about this sanctuary, there were so many stakeholders in that thing, that you ended up with almost nothing. Everybody took a slice of it, and continued the participation and extraction in the Dry Tortugas Sanctuary… which didn't mean it was conservation. That is an example of having permitted so many participants, that you no longer can make a wise decision because it is all cut up in pieces" (p. 1263).

Environmental preservation
"If they want to benefit the public that's what they got to think about. The only way the public is going to benefit from anything up there is to leave it alone" (Maly and Maly 2003b, p. 1042).

Restricting human activities was identified as a means to return to environmental care, both from a contemporary and traditional Hawaiian cultural perspective. One of the most prevalent perceptions supporting Monument designation was the idea that protected NWHI ecosystems could replenish biomass in the MHI. In some cases such a protected area was described as the best way for the people of the MHI to sustainably benefit from the NWHI's biomass. One oral history described it as a sort of insurance for the MHI's food security, to "provide food for you later on, if something should happen" (Maly and Maly 2003b, p. 1214).

Many of the oral histories collected by Maly and Maly (2003b) emphasized the fragility of the NWHI's ecosystem balance. One fisher guessed that opposition to establishing a NWHI refuge came "from people who haven't been there, or haven't tried to harvest and seen what damage that harvest is doing to a fragile ecosystem" (Maly and Maly 2003b, p. 1208). Maly and Maly (2003b) described the learning experience of the same fisher:

> "While the NWHI were a rich fishing grounds, they could not sustain commercial fishing. Unlike the Main Hawaiian Islands, where harvested stock would replenish themselves, the fish stock of the NWHI, never returned. Uncle and his crews found that one take from a given area, depleted the population, and you needed to move on to another location. Within 10 years, the fisheries of the NWHI were depleted, and [Uncle] left, realizing that a great mistake had been made" (p. 1179).

In contrast, several bottomfish oral histories described how the NWHI could be sustained as an abundant ecosystem with certain understandings. For example:

> "I think that there has always been a consistent level of fish up there. I don't think there's near the amount of fishing pressure as people seem to feel… you've got to realize you have to move around in order for those places to be successful in the future."

They expressed frustration about losing access to the area because of political movements and public misperception. One attributed this to the government and scientists' assumption that fishers don't have "any knowledge about it. So that's clouded everything… There's a lot of misinterpretation in the community, which is very distressing." Another reported tagging more than 3,000 NWHI uku in 2008, of which none were detected or retrieved in the MHI:

> "The idea that it could be a nursery, that all the fish could grow up there and then make their way to the main Hawaiian Islands, I think is a pipe dream. So it's not going to do any good to let the bottomfish or all of the fish in the northwest grow because they're

> never going to be any use to anybody… Yeah. This isn't 10,000 fish. This isn't a million fish, you know, no. But it's I think an indicator that in almost nine years not a single one of those fish have ever come this way -- or at least come this way and been caught. So why wall it off? Why shut the gate? You know, why keep people out?"

Perceptions about fishers

Important to the discussion of fishing regulation in the NWHI are the perceptions about and from fishers that emerged in the oral histories. Many bottomfishers felt others' perceptions of them were negative. Maly and Maly oral histories also described the reputation that fishers had as prioritizing extraction over environmental health (2003b, p. 1196):

> A: And in fact you know when you were a child, fishermen weren't looked on very highly… In that society of the time. Moloā[50], you know.
>
> B: Yes. "You go fishing, ahh 'ōpala[51]." You got to put on a nice suit, nice car. How do you get that? You go out there and rape the environment [chuckling].

Several bottomfishers felt negative perceptions were shaped by environmental NGOs and politics. One bottomfish oral history described what they felt was a false depiction of fishers in the NWHI "raking everything and every chunk of coral on the bottom is going with us." This, he said, was in contrast to the reporting and monitoring responsibilities that fishers undertake. He asserted that, "No one seems to realize that bottom fishing Hawai'i is one hook, one fish." This was echoed by another fisher who used to fish the NWHI, but has since turned to promoting it as a protected area (Maly and Maly 2003b, p. 1259):

> "I don't think the bottom fish has ever been a problem with this. It's almost self-regulating, one man, one fish, one hook. So you have to really work for it. I think what we are talking of is the potential fishing. That's the trouble we'll have up there, it's not so much bottom fishing."

Another bottomfish oral history spoke to the distinction between preservationists and conservationists, where fishers were placed in the latter category:

> "And sure enough, you know, a couple years later [President] Bush came along after some tremendous battles being waged between the preservationists and the conservationists. They called us fishermen the conservationists. Whereas the people who want to preserve the fish for no other use except to preserve them, well, they're the enviro maniacs."

Repeatedly this person described the processes involved to develop NWHI fishing regulations as a "battle" or "big fight" between the Bush administration and "environmental groups [that] were

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[50] Lazy, indolent.
[51] Trash, rubbish, refuse, litter, waste matter, junk, garbage.

dead-set on banning all fishing," and "the conservationists, who said, hey, we can have our cake and eat it too if we manage it properly."

Commercial fisher response

In some bottomfish oral histories, the PMNM designation was described as a decision driven by political rather than preservation-focused motives. One described it as "more of a political decision to remove eight or ten fishermen from that area because of environmental needs and wants." Fishers expressed concern for their livelihoods, and, as fishing pressure may simply relocate and increase elsewhere, for the lesser quantity and quality of fishing opportunity in the MHI.

Concerns relating to fishery closures in PMNM included impacts to food and economic security, and to seafood sustainability. One bottomfish oral history described PMNM designation as, "a travesty to close off the Northwestern Hawaiian Islands as a resource to the people that live here in the main Hawaiian Islands." Another predicted that, "we're going to have to buy more fish from overseas. That doesn't help us here economically here on the island. It doesn't help younger fishermen now. It doesn't help anyone what's really gone on right now." He also expressed concern about excessive regulation crippling the local seafood market and increasing dependence on potentially unsustainably caught imports:

> "We're policing ourselves into a position [where] we can't afford to purchase US product, and we have to purchase overseas product. But no one is looking at where that overseas product comes from, how it's harvested, who harvested it."

Another bottomfish oral history described a growing fisher-led movement across the western Pacific against monuments and closures:

> "Our brothers in CNMI, our brothers in Guam and American Samoa are tired of being kept out of fishing grounds that are very productive because the government tells us those are specific monument areas."

There were also more emotional descriptions of the impact of Monument designation on fishers. Some spoke about feeling disheartened and unmotivated following the designation. In one bottomfish oral history, it was described as "the beginning of the end" as the fisher was unable to see a future for his efforts:

> "So I was going to insulate the holds and refrigerate them so that I would keep the ice far [colder], I could catch more fish, more in the hold and I said, well, (indicating), forget that. We've just been booted out. Why am I going to put several thousands of dollars' worth of work into the boat to fish local island, 1 or 2 days local island…. So that was rather disheartening and disgruntled for me. I was really annoyed because I still thought I had another 5 or 10 or 15 years of fishing in me, and I didn't want to quit. But boy, this is a heck of a fishery."

V. Where are they now? Following NWHI commercial bottomfishers

With the establishment of PMNM, commercial fishing activity was limited to fishing for bottomfish and associated pelagic species for not longer than 5 years. This allowance applied only to those who were already permitted in the NWHI; new limited access permits had not been issued since the early 2000s. Bottomfishing in the NWHI continued until January 2010, when the seven remaining bottomfishers were compensated for “lost income resulting from the establishment of the Monument” (National Marine Fisheries Service 2010). This buy-out included the suspension of their NWHI fishing licenses and marked the end of all commercial fishing in the Monument area.

In this last results section, we examine participation and catch data from the NWHI bottomfish fishery to obtain insights into the impact of Monument designation on fishers. By assessing data specific to bottomfishers who were active in the NWHI from 2005 onward, we hoped to illuminate general patterns in response to Monument designation. The following summaries run from 2005, the year preceding PMNM designation, to 2017.

Thirteen licensed fishers were actively bottomfishing in the NWHI between 2005 and 2010 (Figure 2). Prior to license compensation in 2010, the NWHI saw declines in participation both in numbers of active bottomfishers (Figure 2) and retained bottomfish (Figure 3). The lack of motivation and enthusiasm following Monument designation, which was described in the previous section, might have lent to the decline in NWHI bottomfishing before license compensation formally ended fishing in 2010. Six of the 13 fishers discontinued their participation in the Hawai‘i bottomfish fishery entirely.

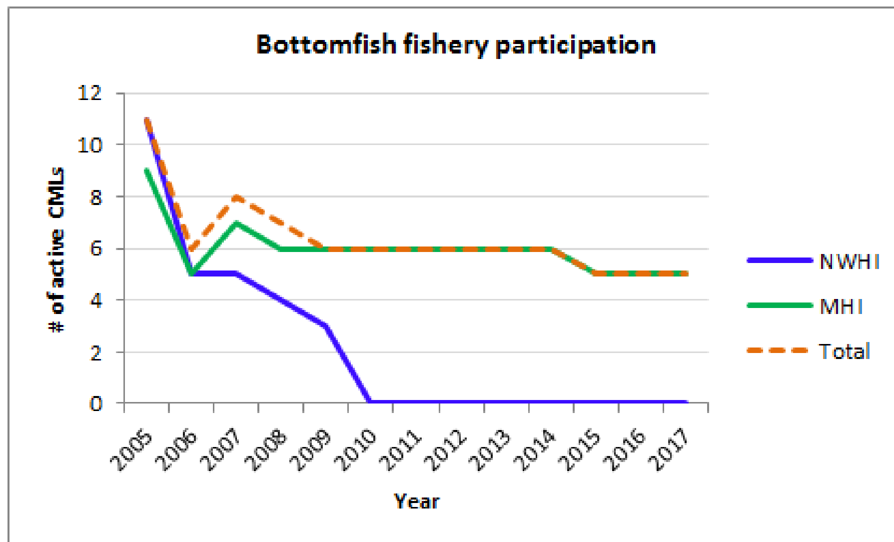

Figure 2. Breakdown of bottomfishing activity for 13 unique commercial marine licenses (CMLs) that fished in the NWHI from 2005 to 2010. Active NWHI CML numbers for 2010 were omitted for confidentiality reasons as <3 CMLs were active.

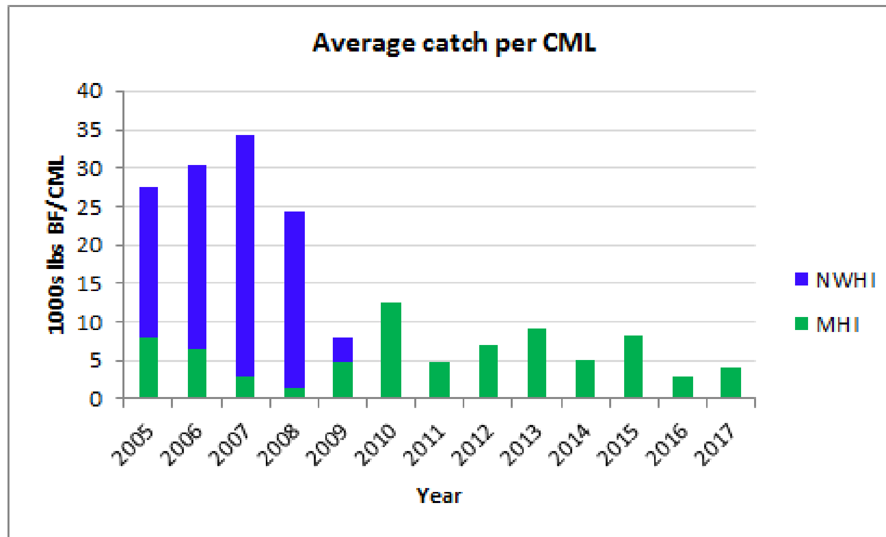

Figure 3. Annual retained bottomfish (BF) weights were totaled and divided by # of active CMLs to adjust for declining fishery participation. NWHI bottomfish weight from 2010 was omitted for confidentiality reasons as <3 CMLs were active.

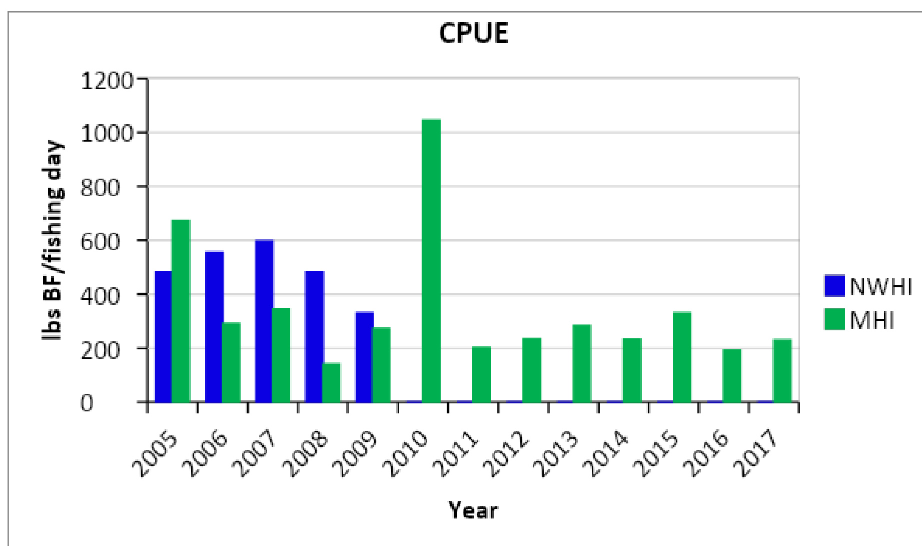

Figure 4. Total annual catch was divided by total number of fishing days per year to calculate catch per unit effort (CPUE). NWHI bottomfish catch from 2010 was omitted for confidentiality reasons as <3 CMLs were active.

The remaining seven fishers have continued to bottomfish in the MHI, with a decrease in bottomfish catch (Figure 3). Averaging annual totals for the years 2005–2009 and 2010–2017, respectively, we find that the average annual bottomfish catch per CML for these fishers following 2010 compensation is 27% that of their pre-2010 average. Applying this same calculation to the average number of fishing days per CML, we find that effort following 2010 compensation is 42% that of their pre-2010 average. Their average CPUE also decreased (Figure 4), with their 2010–2017 average representing 75% that of their pre-2010 average. Interestingly, CPUE in the MHI spiked in 2010 to exceed any other CPUE in the 2005–2017 period. Still, our

quantitative data indicates a decline in fishing participation, effort, catch, and CPUE following the end of bottomfishing in the NWHI.

One bottomfish oral history described the NWHI commercial fishing ban in relation to the fisher's identity and age: "It was pretty hard for me, an older person, the end of my career, to be forced out of that work." He reflected on his continued bottomfishing in the MHI:

> "Now I'm fishing in the main Hawaiian Islands, which of course, has a lot of pressure because there are a lot of boats. There's still pretty good production, but it's not near as good as it would be in the Northwestern Hawaiian Islands, after many, many scientists told us that that's the nursery ground and the breeding ground for all the fish in Hawaiʻi come from the Northwestern Hawaiian Islands, and they come down into the main Hawaiian Islands, that's why we're so gifted to have all these fish here in the main Hawaiian Islands."

Discussion

Among varied fisher groups, cultures, and practices, the uniqueness of the NWHI and the rich experiences it provides to its fishers was unanimous across our examined texts and oral histories. The region's abundance, whether natural or cultural, perceived as a current reality or future potential, fuels motivations for both resource exploitation and resource preservation. The question is not whether or not fishing experiences in the NWHI are valued, but how those values inform regulatory frameworks. The following summarizes how fisher values and insights derived from the PMNM analysis might serve to inform the future development of regulations for non-commercial fishing, both in the MEA and other protected areas.

Reflections on non-commercial fishing regulation in the PMNM

Allowing permitted non-commercial fishing in the original Monument under current regulations satisfies the Monument's intent to preserve nature and Hawaiian culture. This approach emphasizes the union of nature and culture as they either sustain one another or deteriorate together. From this perspective, use and cultural practice is integral to maintaining cultural knowledge. This may include traditional and customary harvesting and consumption of marine resources. Current regulations enable various Hawaiian cultural dimensions such as knowledge and practices to be kept alive together in this way. Current and future management of the Monument may benefit from reflections on additional opportunities to preserve non-commercial fishing motives and sociocultural benefits.

Within the PMNM, non-commercial fishing includes subsistence fishing "for direct personal or family consumption and not for commercial purposes" within state waters and sustenance fishing in federal waters "in which all catch is consumed within the Monument, and that is incidental to an activity permitted." This is consistent with many descriptions of Native Hawaiian fishing in the NWHI, where fishing is incidental to cultural practice or voyaging rather than a primary motive for travel to the NWHI. One oral history communicated this point well (Maly and Maly 2003b, p. 1219):

> "[Fishing is] part of your traveling, part of your life…. That's part of your training to become a warrior, protect your ʻāina, protect your aliʻi like that. Kēlā ka ʻano[52]. That's what they said. ʻAʻole naʻu ke nīnau, ʻNo ke aha kākou e hele aku i kēlā ʻāina ma laila, kiʻi aku ka iʻa?'"

His last sentence (translated), "I don't ask, why do we go to that land over there to catch fish?" emphasizes that fishing in the NWHI was not necessarily done just for the sake of fishing. From this perspective, fishing may be less incidental, but instead an assumed activity that is an integral part of continuing the life of a place, even if it is not the main impetus for a voyage.

Similarly, non-commercial considerations would not be the core purpose of a commercial trip to the NWHI, but could be additional motivating factors. For example, the fulfillment and thrill of

[52] That's the way.

adventure from a trip to the NWHI could not be replaced by a fishing trip in the MHI that does not require the same level of skill, preparation, and self-reliance.

What about the practice of sharing NWHI catch? Sharing is a common practice associated with non-commercial and commercial fishing in the NWHI, and has sociocultural implications whether or not it serves as the primary motivator for the trip. PMNM regulatory definitions of non-commercial fishing exclude the possibility of fishing for home consumption or sharing with family and friends in the MHI. However, these practices were described as important by many fishers, regardless of their ethnic and commercial or non-commercial identities. A key objective of Niʻihau fishers' trips to Nihoa, for example, was to harvest ulua and bring it back to their community. More generally, sharing practices were described as an important part of cultural and fisher identity. The cross-cutting value of sharing catch is well-documented throughout Hawaiʻi and the Pacific (Glazier 2007; Severance 2010).

Another formal policy measure defining sharing catch is customary exchange. As defined in regulations for fisheries in the western Pacific it means: "…the non-market exchange of marine resources between fishermen and community residents, including family and friends of community residents, for goods, and/or services for cultural, social or religious reasons" (50 C.F.R. Sect. 665.12). Customary exchange is included as a permitted non-commercial fishing activity in regulations for the Rose Atoll and Marianas Trench Marine National Monuments, but not in the regulations for the Pacific Remote Islands or Papahānaumokuākea Marine National Monuments.

In October 2016, the WPRFMC's Science and Statistical Committee recommended that the WPRFMC consider customary exchange for the MEA (WPRFMC 2016, p. 67). In subsequent WPRFMC meetings, attendees raised concerns about the regulatory feasibility of customary exchange (WPRFMC 2017b, p. 91), equitable access across the spectrum of financial situations (WPRFMC 2017c, p. 17), and its applicability in Hawaiʻi compared to other parts of the Pacific (p. 85). These kinds of discussions are critical explorations of the applicability and feasibility of such management measures. Given this context, it is important to consider the reasons that customary exchange may or may not be determined to be appropriate based on the unique attributes of Hawaiʻi and its northwestern islands. It will also be important to highlight the existing regulations that facilitate resource sharing.

Providing seafood and food security to MHI communities, accessing better quality fishing opportunities, finding fulfillment and pleasure, and reinforcing cultural and fisher identities also emerged from the examined texts as widely shared non-commercial motives. These kinds of values and experiences offered by the NWHI may be important to consider for non-commercial fishing regulations.

How were commercial fishers affected by PMNM designation, and how did they respond?

In the commercial bottomfish fishery, the NWHI's abundance motivated fishing despite a lower price per pound of bottomfish, long physically and mentally demanding trips, greater financial investment, and sacrifices to stable family life.

Looking at the NWHI bottomfishers who were active between the time of the 2006 Monument designation and the 2010 fisher compensation, we see declines in active CMLs, fishing effort, bottomfish catch, and CPUE associated with the Monument designation process. Post-closure averages for catch, effort, and CPUE per active CML were 27%, 42%, and 75% of their pre-2010 values, respectively. This suggests that in terms of CPUE, fishing opportunity in the MHI may be inferior to those in the NWHI. But, the margin is not drastic. The 2010 spike in MHI CPUE, for example, warrants further investigation.

NMFS' reduction of NWHI limited access permits in the early 2000s inhibited sustained NWHI fishery participation until 2010. This process and NWHI bottomfish vessel buy-out in 2010 contributed both to declines in the number of NWHI-active fishers prior to 2010 and the lack of effort transfer from the NWHI to the MHI after 2010.

Individualized decision-making processes and fishing techniques also could provide valuable insight into other variables that affected participation declines or variations in CPUE. Qualitative data from existing bottomfish oral histories suggest these responses may be due to regulatory fatigue, lost hope in a sustained fishing career, and age. They may also be related to non-commercial meanings of fishing specific to the NWHI that were lost in monument designation, including experiences of fulfillment and pleasure, better fishing opportunity, and the formation of fisher identity. Consideration of economic factors and supplementary interviews with the 13 bottomfishers active in the NWHI during its last years may elicit additional insight into what contributed to decreased participation.

Moving forward

Our examination showed that fishers cherish their experiences in the NWHI, regardless of their ethnic or (non-) commercial identities. We discovered that all types of NWHI fisher experiences were associated with non-commercial fishing values and sociocultural benefits. These included sharing NWHI fish in the MHI to fortify community and fisher identity, and deriving knowledge, fulfillment, and pleasure from fishing in the NWHI. It may be important to explore the value of these non-commercial fishing dimensions as the PMNM MEA management plan is developed.

This examination of documented NWHI fishing experiences has also demonstrated that fishing individuals may identify with multiple environmental values and fishing practices that vary through time. We therefore recognize diversity within fishing groups and recognize that certain fishing practices, values, and elements of culture and identity may be lost if demographic groups are assumed to be homogenous. This has implications for our broader understanding of fishing cultures and marine policy, and may or may not offer a useful lens through which to consider current and future management of the Monument.

Future studies may follow several research pathways. The two oral history sources examined in this report provided conversations around fishing in the NWHI, but these conversations and the data they provided were embedded within much broader study scopes. It would be ideal to conduct additional stakeholder interviews with specific focus on experiences and perspectives related to non-commercial aspects of fishing and fishing regulation in the NWHI and the PMNM MEA. Future studies might also examine public comments from PMNM meetings and hearings. These might allow us to do the following:

- understand MEA-specific fishing experiences and perspectives;
- identify potential beneficiaries to customary exchange in the PMNM;
- illuminate additional non-commercial motives and meanings of fishing in the NWHI that might be enhanced in regulations;
- document additional examples of fishing practice that illustrate links between nature and culture in the NWHI;
- draw perspectives from other fisheries affected by Monument designation;
- and understand how PMNM-excluded fisheries responded to Monument designation.

Interviewees might include those bottomfishers who were active in the NWHI during the time of the original 2006 designation proclamation (Proclamation No. 8031), Native Hawaiian fishers recently active or permitted for cultural activities in the PMNM, and longline operators recently excluded from the NWHI following the 2016 expansion proclamation (Executive Office of the President 2016). This report represents a beginning, rather than an end, to understanding the meaning, practice, and regulation of fishing in the PMNM.

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