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Mai Ka Pō Mai: applying Indigenous cosmology and worldview to empower and transform a management plan for Papahānaumokuākea Marine National Monument

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ABSTRACT. Environmental conservation management planning has an important role in creating conditions for social learning, adaptive governance, and improvements for co-management arrangements with Indigenous peoples. Incorporating Indigenous cosmologies, worldviews, and epistemologies within management planning processes can enable factors that support appropriate management practices for protected areas considered to be sacred natural sites by Indigenous peoples. Here, we review processes and outcomes of management planning led by Native Hawaiians with various positionalities that resulted in the Mai Ka Pō Mai Native Hawaiian Guidance Document for the Management of the Papahānaumokuākea Marine National Monument. As we look back to look forward, we highlight the factors that supported knowledge co-production and expanded opportunities to develop management planning and evaluation processes informed by Hawaiian place-based knowledge and human-nature relations of care and reciprocity. These include collaborative approaches, long-term commitment to community and institution capacity-building; an enabling policy environment; and diverse and consistent involvement of Native Hawaiians.

Key Words: *biocultural conservation and restoration; collaborative management; Hawaiian values; Hawai'i; Indigenous co-management; knowledge co-production; large-scale MPA*

INTRODUCTION

Co-management, or collaborative management, is recognized as a best practice for protected area management (Pearson and Dare 2019) and can create conditions for social learning and adaptation in a rapidly changing environment (Berkes 2009, Armitage et al. 2011, Oldekop et al. 2016). Co-management is also considered a knowledge partnership in which different levels of organization (i.e., local to international) have comparative advantages in the generation and application of knowledge acquired at different scales (Berkes 2009). Furthermore, developing equitable management systems for marine protected areas (MPAs) that recognize Indigenous worldviews, knowledge, values, and practices, alongside national and international initiatives such as ecosystem-based management (EBM) are critical in countries that aim to recognize Indigenous rights and responsibilities (Jones et al. 2010, Perrett 2010, Marine Planning Partnership Initiative 2015, Maxwell et al. 2020). Although government agency decision-making processes tend to preclude integration of customary norms that can privilege certain stakeholders over others (Vaughan and Ayers 2016), it is entirely possible for these systems to be redesigned in a way that emphasizes the incorporation of local, traditional, and Indigenous knowledge systems (Hui Mālama o Mo'omomi 1995, Cullen-Unsworth et al. 2012).

An important determinant of successful protected area co-management with Indigenous peoples is the existence of mutually acceptable planning and management objectives between government agency staff and Indigenous peoples (Sneed 1997, Jones et al. 2010). Although management plans are considered

important for effective management of protected areas (Oltremari and Thelen 2003, Thomas and Middleton 2003, Lockwood 2006, Leverington et al. 2008, 2010, Stoll-Kleemann 2010), there are a few examples where the distinctive socio-cultural nature of Indigenous protected areas has been effectively reflected in management plans (Hill et al. 2011, Davies et al. 2013). There are substantial differences in the conceptual underpinnings, intent, and application of customary (e.g., Indigenous) and modern management (Cinner and Aswani 2007). Integrating Indigenous knowledge also involves challenges of inequitable federal and state policies, the need to reorganize agency structure and governance, and a lack of understanding on how to devolve decision making (Vaughan and Ayers 2016). Yet, where they occur, hybrid management regimes (e.g., MPAs) have shown potential for institutional transformation based on Indigenous cultures (Jones et al. 2010, Perrett 2010, Kikiloi et al. 2017), which is seldom found in science-driven management programs implemented by national agencies.

Co-production generally refers to a collaborative and dynamic process for knowledge-generation that facilitates understanding in a way that can support trans-disciplinary and trans-cultural approaches to acquire and synthesize knowledge. The term "knowledge co-production" is used loosely in the literature to describe an inclusive, iterative approach to creating new information. It is distinguished by its grounding in relevant social, cultural, and political contexts, and its focus on facilitating collaborative interactions between stakeholders to develop an integrated and transformational understanding (Schuttenberg and Guth 2015). Furthermore, there is an explicit intention to

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create usable knowledge that can inform and influence decision-making processes (Mitchell et al. 2006). Knowledge co-production is described as both a governance strategy (Armitage et al. 2011) and a research method. As a research paradigm, it is based on the notion that all knowledge systems implicitly reflect a system of value judgements (Walter et al. 2007). From this vantage point, knowledge co-production observes the boundaries between science and policy, or between facts and values, as porous or even artificial (Pohl 2008). Although, it is also important to be aware of the potential challenges, and opportunities, that exist within co-generated spaces, especially when various knowledge and value systems and worldviews are involved. This awareness facilitates mutual understanding and respect among stakeholders while valuing different ways of knowing, understanding, and applying knowledge.

REMEMBERING CONNECTIONS AND COMMITMENTS TO PLACE

Taking a look back to move forward

Through a renaissance of cultural awareness in Hawai'i, there has been growing recognition of the ingenuity of Hawaiian biocultural resource management systems (Poepoe et al. 2007, Vaughan and Ayers 2016, Winter et al. 2018, Chang et al. 2019). There are several expected benefits of basing contemporary management on customary systems. These include community ownership and enhanced stewardship, compliance, and engagement in enforcement (Vaughan and Ayers 2016). Projects that encourage the revitalization of reciprocal human-nature relationships offer ways to connect knowledge with action to produce significant outcomes for nature and culture (Poepoe et al. 2007, Kikiloi et al. 2017, Austin et al. 2018). Biocultural approaches to conservation have been defined by Gavin et al. (2015:140) as "conservation actions made in the service of sustaining the biophysical and sociocultural components of dynamic, interacting, and interdependent social-ecological systems." Biocultural approaches to conservation and restoration ground management in local knowledge, practices, and ontologies. These approaches recognize social-ecological systems, address complex relationships and feedback, and offer flexible frameworks that facilitate synthesis across different metrics, knowledge systems, and ontologies (Caillon et al. 2017). Biocultural approaches to conservation can achieve effective and just conservation outcomes while addressing cultural erosion and biological diversity loss (Gavin et al. 2015). Biocultural approaches typically employ participatory methods for setting goals, identifying relevant criteria and indicators of resilience, monitoring, and evaluation, and continued opportunities for adaptive management (Caillon et al. 2017).

Located in the Northwestern Hawaiian Islands (NWHI), the Papahānaumokuākea Marine National Monument (PMNM) is one of the largest marine protected areas in the world. Since its establishment in 2006, foundational principles have included the integration of science, policy, cultural knowledge, traditions, and practices to create successful management strategies appropriate for both natural and cultural resources (Kikiloi et al. 2017; Fig. 1). Native Hawaiian advocacy was the impetus for the development of the Mai Ka Pō Mai Native Hawaiian Guidance Document (also known as Mai Ka Pō Mai or the Native Hawaiian Plan) for the management of PMNM (Office of Hawaiian Affairs

et al. 2021). Mai Ka Pō Mai was developed to inform the Monument's co-managing agencies about how to operationalize management that includes Native Hawaiians and Hawaiian culture in all areas of management.

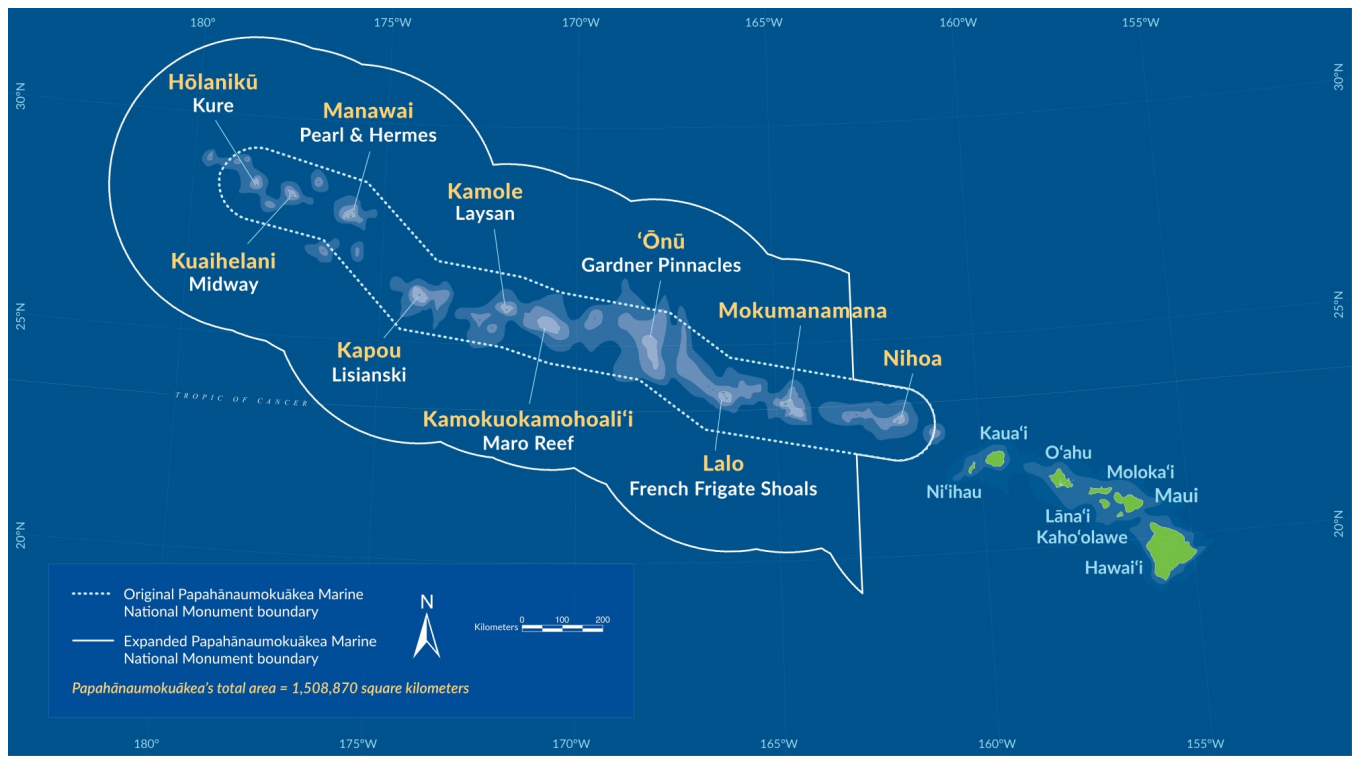
Mai Ka Pō Mai is the result of more than 10 years of commitment to a process of establishing a collaborative approach for management planning grounded in traditional Hawaiian values. Involving Native Hawaiians in the planning and development of Mai Ka Pō Mai transformed the conventional way of structuring a management plan into one that was culturally responsive to the Native Hawaiian community and placed-based as appropriate for Papahānaumokuākea. The Mai Ka Pō Mai framework is a structured visual representation of Hawaiian cosmology and worldview as it relates to the geography of Hawai'i. This framework also represents the culmination of key experiences from co-management and co-governance, and the co-generation, co-production, and co-application of knowledge. The framework supports the balanced and unified development of collaborative management systems and decision making among the co-managing agencies and the Native Hawaiian community. The Mai Ka Pō Mai framework is the foundation of the Mai Ka Pō Mai Guidance Document. It frames conceptual and theoretical formulations of relevant social-ecological relationships, interactions, and processes that identify with Native Hawaiian ideology and relates to both American and Native Hawaiian management perspectives and practices appropriate for Papahānaumokuākea. It guides Co-Trustee agencies of PMNM toward seamless integrated management systems in which Native Hawaiians and their culture are recognized as an integral part of place-based management.

The Northwestern Hawaiian Islands as a sacred natural site

The NWHI are considered a sacred place important to Hawaiian history and the cultural origins of Native Hawaiians. This region has cosmological significance tied to early creation stories of gods and humans (Kikiloi 2012). The Hawaiian creation chant, the Kumulipo (source of deep darkness), describes the Hawaiian world as being composed of two realms: pō, a place of deep darkness reserved for the gods and spirits, and ao, the realm of light where the living resides. Native Hawaiians consider the NWHI as pō, a spiritual region that provides the pathway for spirits who travel westward upon death while undergoing the process of deification in the afterlife (Fig. 2).

In Hawaiian culture, the Tropic of Cancer is referred to as Ke Alanui Polohiwa a Kāne (the dark shining path of Kāne [god of procreation, the sun]). It is considered the border between pō and ao (Beckwith 1951, Pukui et al. 1972). It marked the beginning of travels into this region of pō and supernatural islands (Kikiloi 2010). The island of Mokumanamana is situated on the Tropic of Cancer, thus it is an axis point between the worlds of the supernatural and the living. This island has at least 34 individual heiau (temples), sites that were used for ritual purposes (Kikiloi 2012, Freestone et al 2013, Guth 2013). Chiefs of ancient times would access this region as a rite of passage to commemorate the source of their birthright, authority, and mana (spiritual power derived by ancestral gods). To the south, Nihoa Island, with over 89 cultural sites that range from habitation, agricultural, and religious structures, was developed as a remote elite outpost for staging, access, and use of Mokumanamana. The occupation and

Fig. 1. The Hawaiian Archipelago including the Papahānaumokuākea Marine National Monument (PMNM) boundaries. Hawaiian names in yellow, common English names in white.



use of these islands represent one of the earliest signs of Hawaiian religious activity. For over four hundred years (~A.D. 1400–1815), Mokumanamana, along with Nihoa, became a ritual center of power, supported by an extensive voyaging interaction sphere that helped to support long-term occupation of the islands and the socio-political development of traditional Hawaiian society (Kikiloi 2012).

ACKNOWLEDGING CONNECTIONS AND COMMITMENTS TO PLACE

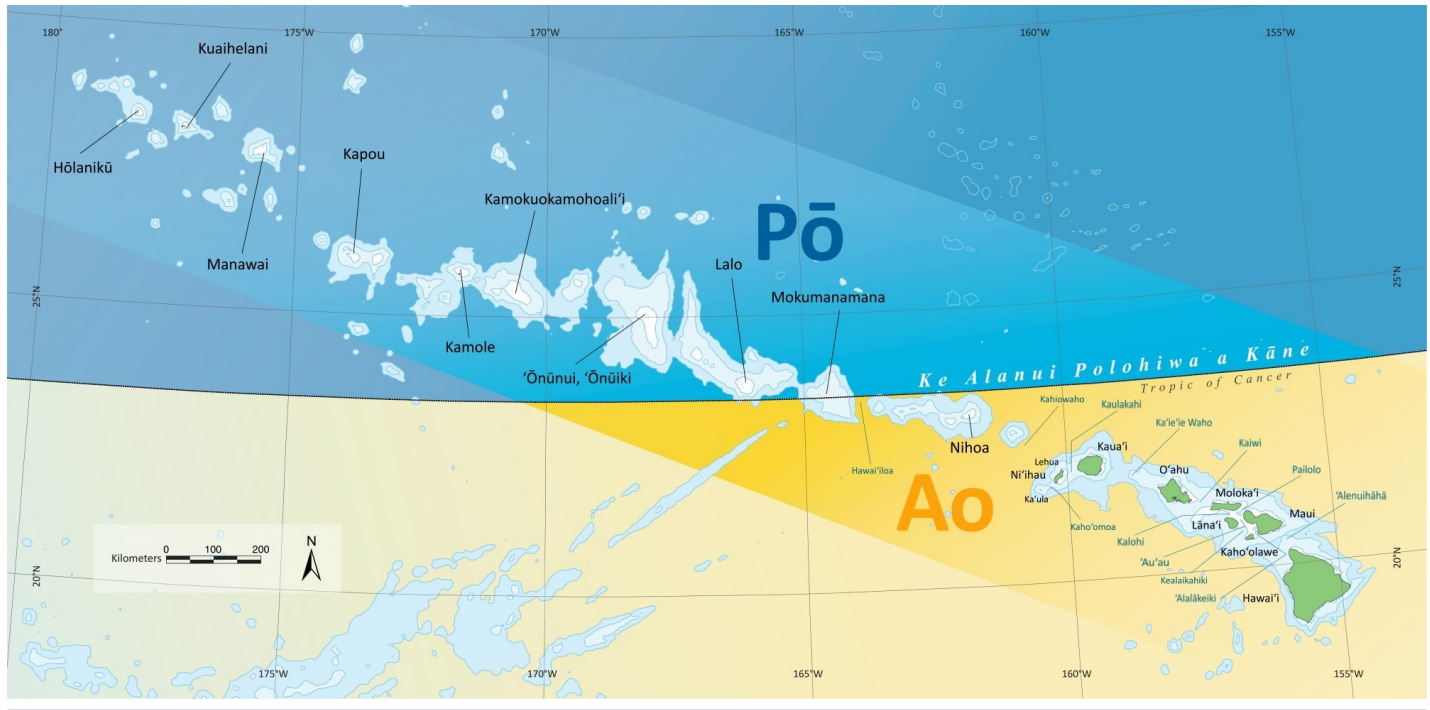
Including Native Hawaiians in U.S. protections and designations for the Northwestern Hawaiian Islands

For over 100 years, the United States (U.S.) has recognized the NWHI as an important conservation area. However, efforts to protect and manage marine and Hawaiian cultural resources with Native Hawaiians did not begin until the establishment of the NWHI Coral Reef Ecosystem Reserve (Executive Office of the President 2000, 2001) by President Clinton in 2000, in response to calls from Native Hawaiian fishers and cultural practitioners. Subsequently, the State of Hawai'i established the NWHI Marine Refuge in 2005, which included all state waters from 0–3 nautical miles. In 2006, President George W. Bush established what is now known as Papahānaumokuākea Marine National Monument (Executive Office of the President 2006, 2007). The proclamation included a Hawaiian word, *pono*, which was defined with the assistance of Native Hawaiians who served as NOAA federal employees. It states, “*Pono* means appropriate, correct, and deemed necessary by traditional standards in the Hawaiian

culture.” In 2016, President Barack Obama created the Monument Expansion Area in response to Native Hawaiian-initiated advocacy and support by a wide range of interested stakeholders that included the Office of Hawaiian Affairs (OHA). Presidential Proclamation 9478 (Executive Office of the President 2016) extended protections from the original PMNM boundary (0–50 nm) to the 200-nautical mile limit of the U.S. Exclusive Economic Zone. The proclamation describes the Monument expansion area as a “highly pristine deep sea and open ocean ecosystem with unique biodiversity ... that constitute(s) a sacred, cultural, physical, and spiritual place for the Native Hawaiian community.”

In 2010, Papahānaumokuākea received further distinction and international recognition through designation as a mixed natural and cultural UNESCO World Heritage site, the only one to carry that honor within the U.S. Papahānaumokuākea is an obvious choice for designation as a natural site because its small islands, reefs, and shoals represent the longest, clearest, and oldest example of island formation and atoll evolution in the world, spanning 28 million years. The biological diversity of the region is represented throughout every ecosystem from terrestrial landscapes to the deepest parts of the seafloor. But what really distinguishes the NWHI from the dozens of other natural World Heritage sites around the globe is the overwhelming cultural significance that the region holds for the Native Hawaiian people. It was the combination of these impressive natural and cultural features that led to the rarely awarded “mixed” designation.

Fig. 2. Ke Ala Polohiwa a Kāne was the border between pō (spirit realm) and ao (living realm; Kikiloi 2010, 2012).



Including Native Hawaiians in the monument co-management framework

Since 2006, the Co-Trustees of PMNM have included the State of Hawai'i, the U.S. Department of the Interior (DOI), and the U.S. Department of Commerce (DOC). These trustees signed a Memorandum of Agreement in 2006, which established the Monument Management Board (MMB) consisting of two members from each of the three administering agencies as well as the Office of Hawaiian Affairs. The seven MMB agencies are the Division of Aquatic Resources (DAR) and the Division for Forestry and Wildlife (DOFAW) within the State of Hawai'i Department of Land and Natural Resources (DLNR), the National Wildlife Refuge System (NWRS) and the Ecological Services (ES) within the DOI U.S. Fish and Wildlife Service (USFWS), the National Marine Fisheries Service (NMFS) and Office of National Marine Sanctuaries (ONMS) within the DOC National Oceanic and Atmospheric Administration (NOAA), and the Office of Hawaiian Affairs (OHA). In 2017, OHA became the fourth Co-Trustee of Papahānaumokuākea, something that was advocated for by Native Hawaiians and subsequently OHA (MOA 2006, 2017). As the only agency mandated to improve the well-being of Native Hawaiians, OHA was appropriately identified as a monument co-trustee because of its existing role as a co-manager since 2006; its history of support for Native Hawaiians and Hawaiian culture since 1978; and its ability to engage and connect the Native Hawaiian community with management decisions (Kikiloi et al. 2017).

The USFWS, NOAA, and DLNR are responsible for the management of the physical and biological resources within PMNM while OHA is uniquely tasked with the responsibility of representing Native Hawaiian interests on the MMB. From this perspective, OHA has assumed the “cultural jurisdiction” within PMNM. More

specifically, through the MMB, OHA is responsible for assuring “the perpetuation of Hawaiian cultural resources in the Monument, including the customary and traditional rights and practices of Native Hawaiians exercised for subsistence, cultural, and religious purpose under the Constitution of Hawai'i, Article XII, Section 7” (PMNM 2008).

Involvement of the broader Native Hawaiian community is addressed through the Native Hawaiian Cultural Working Group (CWG). The CWG was originally established in 2001 as part of the NWHI Coral Reef Ecosystem Reserve Advisory Council (RAC), which is administered by NOAA ONMS. Currently administered by OHA, the CWG is an open, volunteer group of individuals that possess expertise within Hawaiian culture, language, knowledge, and values as well as resource and environmental conservation, research, and education. The CWG provides input on management strategies, permits, and activities within and about Papahānaumokuākea through OHA. Though their recommendations are not binding on the co-managing agencies, they are given meaningful consideration in the decision-making process. For example, the CWG provided the name “Papahānaumokuākea,” which officially replaced the name, “NWHI Marine National Monument” in 2007 by Presidential Proclamation.

The need for a Native Hawaiian plan

In 2008, the MMB jointly published the Papahānaumokuākea Marine National Monument Management Plan (MMP), a 15-year plan whose mission and vision place equal emphasis on culture in the management of nature. The mission of Papahānaumokuākea is to:

Carry out seamless integrated management to ensure ecological integrity and achieve strong, long-term protection and perpetuation of NWHI ecosystems, Native Hawaiian

culture, and heritage resources for current and future generations.

The MMP lays the framework for their collaborative effort to achieve integrated management of Papahānaumokuākea by identifying 22 action plans, each for a distinct area of management. Two of the 22 action plans are the Native Hawaiian Culture and History (NHCH) Action Plan and the Native Hawaiian Community Involvement (NHCI) Action Plan (Papahānaumokuākea Marine National Monument 2008). Although the MMP does not require the co-managing agencies to complete a detailed plan for the management of Native Hawaiian cultural activities and initiatives, the MMB decided that because the mission, vision, and goals of PMNM places equal emphasis on culture, an additional plan was necessary. Therefore, the MMP's NHCH and NHCI Action Plans include various strategies and activities to drive the development of a Native Hawaiian plan.

To prepare for the development of the Native Hawaiian Plan, NOAA ONMS and OHA first sought to compile information to identify Native Hawaiian priorities alongside associated management responsibilities, challenges, and opportunities. The initial aim was to ensure that the Native Hawaiian Plan would build upon the 2008 MMP to guide future management decisions in a way that aligns with various aspects of Native Hawaiian culture. The plan would achieve this by educating readers about the significance of Papahānaumokuākea within a Native Hawaiian context; articulating how Papahānaumokuākea is important for the pursuit of Native Hawaiian knowledge and fulfillment of stewardship responsibilities (i.e., culture); prioritizing future Native Hawaiian knowledge-seeking endeavors, as identified through focus group consultation; and providing action-oriented recommendations to improve future permitting and management.

PERPETUATING CONNECTIONS AND COMMITMENTS TO PLACE

Native Hawaiians Ho'oponopono the traditional management planning process

Ho'oponopono is a Hawaiian word that is commonly associated with a process of reconciliation, but it also means "to put to rights; to put in order or shape, correct, revise, adjust, regulate, arrange, rectify, tidy up, make orderly or neat, administer, superintend, supervise, manage, edit, work carefully and neatly; to make ready as canoemen preparing to catch a wave" (Pukui and Elbert 1991). From the beginning, the intentions were focused on developing a management plan that empowered and transformed the collaborative work of caring for Papahānaumokuākea. The NOAA ONMS and OHA were advised by the CWG to involve key members of the Native Hawaiian community in meaningful consultation about how to develop the NH Plan. Native Hawaiian employees of NOAA ONMS and OHA, identified focus group participants who:

- Have existing relationships with Papahānaumokuākea;
- Previously accessed Papahānaumokuākea;
- Are practitioners of traditional Native Hawaiian disciplines;
- Are involved in the management of Hawai'i natural or cultural resources;

- Have knowledge of historical resources directly related to Papahānaumokuākea; and/or
- Are engaged in the pursuit of Native Hawaiian knowledge-seeking activities.

NOAA ONMS and OHA held initial community consultation meetings on the islands of Kaua'i (Hanalei and Waimea), O'ahu (Wai'anae and Honolulu), Maui (Kahului and Hāna), Moloka'i (Kaunakakai), and Hawai'i (Ka'ūpūlehu and Hilo). Information gathered from these consultation meetings was compiled into general themes that were used to develop a draft Native Hawaiian Plan. The draft was shared with the same communities for comment, and a second round of consultation meetings was held to gather further input. Focus group participants were asked to explain how their current beliefs were encompassed within Native Hawaiian inquiry. The key characteristics and qualities of Native Hawaiian inquiry identified by participants were organized into four general stages of the knowledge-seeking process: Inspiration (the driver, impetus, or foundational underpinnings that guide the process); Purpose (the question or topic that focuses inquiry); Application (the way in which that inquiry is carried out, the unique aspects engaged through inquiry and lens through which the inquiry is approached); and Result (the way in which the results of the inquiry are presented, with whom they are shared, and how they impact the community).

Each focus group discussed how observation is a key component of Native Hawaiian inquiry. This is a recognized aspect shared by many different types of inquiry, including non-Hawaiian methodologies, however the values that inform the approach and types of observation engaged by each methodology are distinctly different. In Native Hawaiian inquiry, observation includes watching, praying, listening, touching, consuming, and using. These forms of observation provide a holistic multi-sensory understanding of the resource that allows the researcher to deepen their relationship with the resource, thereby producing a more informed result.

As a collective, focus group participants felt that a continued Native Hawaiian presence within the NWHI was highly relevant on a number of fronts. Their feedback and input were organized within three broad themes: Knowledge-Seeking (relevance related to general Native Hawaiian inquiry and development of knowledge repositories); Traditions, Customs, Spirituality (relevance related to the practice of Native Hawaiian traditions, customs, or spiritual practices); and Resource Management (relevance related to ecology, sustainability, and management of physical and cultural resources). Native Hawaiians believe that, despite the remoteness of the NWHI, continued inquiry and practice of traditional customs within the region are fundamental to understanding Native Hawaiian culture and ways of knowing so that those foundational aspects can be perpetuated and effectively contribute to contemporary management.

The information and products from the focus group and consultation meetings were then further analyzed and refined in a multi-year process led by Native Hawaiian staff of NOAA ONMS's Native Hawaiian Program (NH Program). From 2012 to 2015, there was a strong focus on the unique characteristics, qualities, and methodologies for Native Hawaiian inquiry and maintaining dynamic knowledge systems, and therefore the plan was also referred to as the Native Hawaiian Research Plan. A plan development workshop held with practitioners on Pihemanu

(Kuaihelani, Midway Atoll) investigated various ways to convey Hawaiian concepts, and resulted in several plan versions that emphasized different aspects of Hawaiian cultural traditions, values, and symbolism.

For more than a year, the development of the plan stalled for various reasons, but primarily related to changes in staff and lack of capacity and long-term serving Native Hawaiian Program staff. Eventually in 2015, and again in 2016, Native Hawaiian Program staff were hired by NOAA ONMS. This provided dedicated staff to lead the completion of the plan. The ONMS Native Hawaiian Program Specialist worked closely with OHA to develop a collaborative work plan in coordination with the CWG and MMB. Subsequently, the Native Hawaiian Program Specialist consulted with a range of plan stakeholders and conducted an extensive content review process. Documentation of the process to date, existing plans, policy documents, and other content related to the plan were reviewed and analyzed.

As a result of the review and recommendations by the Native Hawaiian Program Specialist, and in response to input from the CWG, OHA, MMB, and former NOAA ONMS Native Hawaiian Program staff, the Native Hawaiian Plan focus was eventually broadened beyond research to include other areas of management. The Native Hawaiian Program Specialist worked with planning staff to identify concepts and language in formative documents that were comparable to a goal, objective, strategy, activity, principle or other plan component. Formative documents included the NHCH and NHCI Action Plans, focus group and workshop data and products and the various draft versions of the Native Hawaiian Plan. The other planning, research, and development documents guided the process of completing the Native Hawaiian Plan from the perspective of the Hawaiian proverb, “I ka wā ma mua i ka wā ma hope,” which conveys the value of looking to the past to inform the future (Pukui 1983).

The Native Hawaiian Program Specialist conducted a scoping review of pre- and post-1819 Hawaiian scholarship from the 19th-21st centuries, including written oral traditions, that describe the epistemological, ontological, and axiological foundations of ancestral experiences and human-nature relationships unique to Native Hawaiians. This review provided insights into how conceptual frameworks of Hawaiian cosmology and worldview could be used to integrate Hawaiian and non-Hawaiian components and considerations into a cohesive management plan. A framework was initially conceived by the Native Hawaiian Program Specialist based on organizational structures and elements found within the Kumulipo and Hawaiian concepts of time, space and place found within various oral traditions and Hawaiian scholarship, especially those referencing the NWHI. This new framework was presented to the CWG in October 2017 and, after long and careful group deliberation, was supported by Native Hawaiian elders and community members, OHA, and former and current NOAA ONMS staff.

The CWG and co-managing agencies continued to provide substantial support and guidance for the plan’s development over the following two years. CWG members provided suggestions and comments at CWG meetings, and further input at a full day workshop in Hilo, Hawai‘i. Subject matter experts provided additional assistance to ensure that the overall plan was in accord

with Native Hawaiian values, precepts, and scholarship. The Monument co-managers provided technical expertise from each agency and contributed to and helped finalize the document.

Subsequent phases of the document’s preparation entailed incorporating new information from key areas of scholarship, such as mo‘olelo (stories, narratives) and mo‘okū‘auhau (genealogies), and developing a conceptual framework consistent with Hawaiian cosmology. In the process of developing the Papahānaumokuākea Native Hawaiian Plan each new iteration provided additional depth, meaning, and space for cultural understanding. The resulting document incorporates the myriad interlocking genealogical, cosmological, and biophysical dimensions of Papahānaumokuākea, while providing action strategies for all areas of management. The Papahānaumokuākea Native Hawaiian Plan eventually was called the Mai Ka Pō Mai Guidance Document to better represent the place and the collective contributions from this collaborative planning process.

Transforming the NH Plan into Mai Ka Pō Mai through Kanaka ‘ōiwi methodologies

For more than 10 years, Native Hawaiians applied various Kanaka ‘ōiwi (Native Hawaiian) methodologies throughout the PMNM management planning process. This allowed them, as staff of management agencies (e.g., NOAA ONMS) and as public community members (e.g., CWG), to collectively determine the most appropriate methods and techniques that draw upon Hawaiian knowledge and traditions. Consequently, they were able to inquire, explore, and systematically investigate and apply their knowledge to develop the Native Hawaiian Plan for Native Hawaiians and others inclusive of their various positionalities, relationalities, and unique and shared kuleana (responsibility, authority, privilege, burden; Goodyear-Ka‘ōpua 2016, Oliveira and Wright 2016).

Similarly, Meyer (2003) describes Hawaiian knowledge as being relational and calls for the “triangulation of meaning” as an Indigenous Hawaiian way of conducting research that integrates the body (objective), mind (subjective), and spirit (cultural). Likewise, Hawaiian knowledge is shaped by the role of history, intention, and function. We understand this to mean that the utilization of Kanaka ‘ōiwi methodologies implies the presence of Kanaka ‘ōiwi axiological, ontological, and epistemological assumptions. Furthermore, these methodologies support collaborative processes that become opportunities to restore, advance, and empower individual and collective Native Hawaiian functionality. Therefore, research is not only about asking the question, it is also about drawing from ancestral knowledge and experiences to be of use (Meyer 2003).

The Mai Ka Pō Mai Framework

The Mai Ka Pō Mai framework is based on a conceptual representation of Hawaiian cosmology and worldview as it relates to the geography of Hawai‘i, which is recognizable by Native Hawaiian and non-Native Hawaiians who are familiar with the cultural and spiritual significance of Papahānaumokuākea. It is structured in a manner that geospatially aligns Native Hawaiian and American management concepts and is easily understood as facilitating place-based management. It is inspired by the cultural and spiritual significance of Papahānaumokuākea, and illuminates how Kanaka ‘ōiwi and non-Indigenous approaches

can coexist within PMNM management structures and processes. The Mai Ka Pō Mai framework is a Native Hawaiian management framework accessible to all.

Derived from the Kumulipo, Mai Ka Pō Mai incorporates the two realms of the Hawaiian creation story, Pō and Ao. Pō is the realm of deep primordial darkness, reserved for the gods and spirits, from which all life emerges and to which it returns after death. Ao is the realm of light and the living. Within Mai Ka Pō Mai, Pō and Ao are reflected as the duality of the nature-human relationship and identifies management activities that are comparable to Hawaiian traditional and customary practices that are appropriate for the geographic locations. For example, outreach, education, and community engagement activities are conducted in Ao (inhabited Hawaiian Islands region) while conservation, resource protection, and most research activities occur in Pō (NWHI region).

Ke Alanui Polohiwa a Kāne, or the Tropic of Cancer, is also an important element in the framework, as it is considered the transitional boundary between Pō and Ao. The island of Mokumanamana is located on this boundary and is the center of convergence, and the point of interaction, between the two realms (Fig. 3).

Kūkulu o Kahiki, or the pillars (kūkulu) of the ancestral homeland (Kahiki), are vertical walls that stand just beyond the edge of the horizon at the four cardinal directions and support the dome of the heavens (Malo 1951/1898). The ho'oku'i, or zenith, is the position directly overhead where the heavens join together. This conceptualization of kūkulu (pillars) represents a major component of the MKMP framework. The four foundational pillars (Ho'omana, Hō'ike, Ho'oulu, Ho'olaha) correspond to the four Kūkulu o Kahiki, while the central column (Ho'oku'i) corresponds to the concept of the ho'oku'i, the zenith that connects to the four pillars.

The Ho'oku'i and the four Kūkulu each represent a particular management domain. Each includes several components identified by Hawaiian terminology based on Hawaiian concepts that translate to conventional plan components. The kumu (source, foundation) translates to the purpose, ala ka'i (processional path, leadership) translates to mean guiding principle, and a set of pahuhopu (desired future outcomes) describe and frame each of the four Kūkulu and the Ho'oku'i (Fig. 4). Within each Kūkulu and the Ho'oku'i are four action strategies referred to as kuhikuhi. Kuhikuhi does not directly translate to strategy, rather, it means to designate or to point out. This term comes from Nihoa kuhikuhi pu'uone, which is another name for the island of Nihoa and references a type of priest known as a kahuna kuhikuhi pu'uone, an expert of temple placement and architectural engineering. Nihoa kuhikuhi pu'uone is a traditional locator for the island temple of Mokumanamana. Within this plan structure, the four Kuhikuhi point to (path)ways that erect and uphold each of the four Kūkulu, the central Ho'oku'i, and the overall framework (Fig. 5).

Projects and activities that occur in Papahānaumokuākea will likely connect to several kuhikuhi (directional strategies) because of the interconnected relationships of management activities and how the Mai Ka Pō Mai framework functions. Thus, as one "travels" along the continuum from Ho'omana toward Ho'olaha

(from west to east) in the guide, or from Pō to Ao, the focus shifts from actions to deepen and strengthen relationships with Papahānaumokuākea toward educating and guiding others along their own journey toward a deeper understanding of this special place.

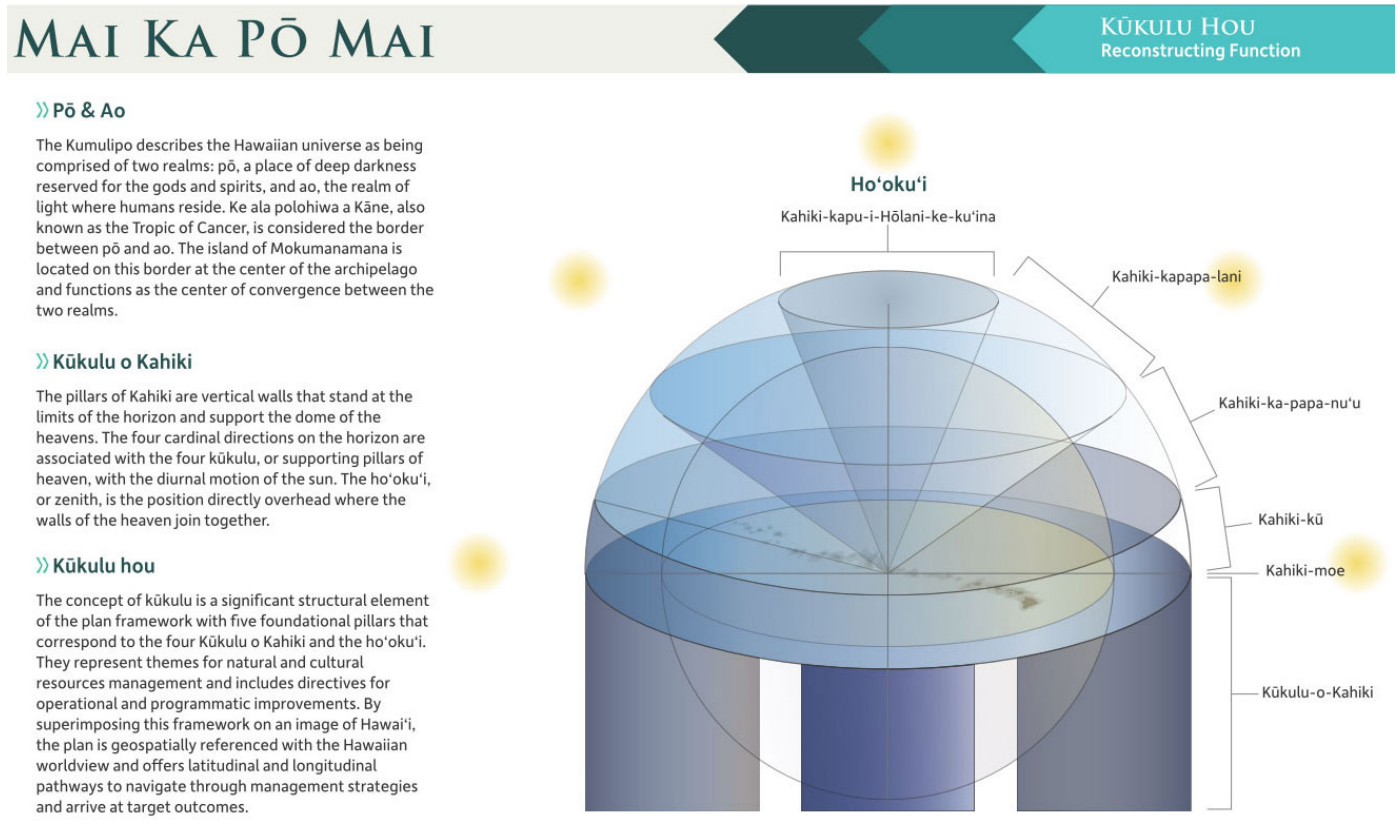
The Mai Ka Pō Mai framework is a result of the knowledge and perspectives of Native Hawaiian communities throughout Hawai'i and their unique relationships and understandings of Native Hawaiian inquiry and development of knowledge systems; the perpetuation of Native Hawaiian traditions, customs, and spiritual practices; and environmental kinship, ecology, sustainability, and management of tangible and intangible biocultural resources. Therefore, Mai Ka Pō Mai framework appropriately repurposes conventional management plan components and employs them to illuminate unique characteristics and qualities of Kanaka 'Ōiwi axiology, ontology, epistemology, and methodologies.

DISCUSSION

Successful co-management with Indigenous peoples requires building relationships and trust. The lessons from Mai Ka Pō Mai suggest that co-management, and other forms of collaborative management, are strengthened and actualized through meaningful involvement and equitable engagement of Indigenous peoples in management planning processes. This increases opportunities to identify mutually acceptable planning and management objectives that produce mutually beneficial outcomes. Here are four sets of insights and reflections expressed as lessons that were gained from Mai Ka Pō Mai. Again, we have framed these lessons with 'ōlelo no'eau (Hawaiian proverbs, old wise sayings) chosen specifically because they capture the essence of the lessons learned in planning, researching, and developing the "Native Hawaiian Plan," and the final product of Mai Ka Pō Mai. This list is not intended to limit or define the many ways that Mai Ka Pō Mai has been and will be experienced by others involved in its creation. The hope is that Mai Ka Pō Mai will be ever-evolving and iterative as more people use it in their respective roles and kuleana tending to and caring for Papahānaumokuākea for many generations to come.

1. *Ua lehulehu a manomano ka 'ikena a ka Hawai'i* (Vast is the knowledge of Hawai'i and its people; Pukui 2011). Indigenous peoples hold knowledge passed down through millennia of lived experiences and deep intimate relationships to the environment based on sustained survival within place. This living knowledge and ancestral memory continues through resilient and adaptive Indigenous communities and must be valued to protect biocultural ecosystems today. Recognizing the value of Indigenous peoples as key knowledge holders is essential in this process of co-production. Native Hawaiian expertise was the indispensable piece needed to create the "Native Hawaiian Plan" and their involvement was the only way to ensure that planning and management objectives were mutually acceptable and beneficial. Native Hawaiians, like all Indigenous peoples, have unique ways of gathering, understanding, and making use of information within their communities. It is not enough to translate Indigenous concepts and thought patterns nor to merely include Indigenous cultural content. Appropriately involving

Fig. 3. A contemporary illustration of a Hawaiian celestial sphere that includes Kūkulu o Kahiki, or the pillars (kūkulu) of the ancestral homeland (Kahiki), which are vertical walls that stand just beyond the edge of the horizon at the four cardinal directions and support the dome of the heavens (Malo 1951/1898).



Indigenous community representatives in the planning process is important to solidify Indigenous approaches (i.e., methodologies) within planning processes and overall management objectives. This cannot be achieved within the confinements of a simple consultation, or with a single or a limited number of informants. Diverse and consistent involvement of Native Hawaiians as agency staff and community members has led to a new realization and reinforcement of the relational foundations and functions of the Indigenous human-nature heritage of Hawai'i. It is key to recognize the diversity within Indigenous groups, or communities, and this diversity is best represented when a broad range of members with different expertise and roles from different sectors of the overall community are included in all stages of the planning process.

2. *'A'ohe pau ka 'ike i ka hālau ho'okahi* (Not all knowledge is from one school; Pukui 2011). Not all knowledge is found in one "house" or "school" and the considerations from both Indigenous and Western systems and perspectives was an important process of knowledge co-production negotiated through the process of creating Mai Ka Pō Mai. The knowledge co-production process can lead to cultivating respectful relationships between Indigenous peoples and people who have the decision-making power, recognizing that

each "house" has their own interests and connections to management objectives and their desired outcomes. Co-production is also an inclusive approach that encourages equitable and ethical considerations needed to bring many different types of knowledge and values to the planning process. With successful intercultural communication, there is an ability to develop and adapt communications during the process that allows trust and education of other expertise within the group of people involved. There is a shared understanding that complex management challenges require a diversity of knowledge systems and perspectives to develop effective and appropriate solutions. The outcome is greater in-depth knowledge that emerges, which then leads to a wider range of solutions for articulation problems and cross-cultural issues. Mai Ka Pō Mai not only provided a visual interpretation of Hawaiian knowledge and values, it helped to convey multiple forms of information from both knowledge systems and sources. People from both "houses" were able to work together around mutual respect for each other's worldviews, and how they can synergistically contribute to realizing shared universal benefits. Papahānaumokuākea provides a successful example of the importance of pono (appropriate/ethical) engagement of Indigenous peoples, including their knowledge, that support a diverse, equitable, and innovative approach to modern conservation of biocultural spaces.

Fig. 4. The foundational elements of the Mai Ka Pō Mai framework include Ke Kumu (purpose), Ke Ala Ka'i (guiding principles), and Nā Pāhuhopu (desired outcomes) for each of the four Kūkulu (literally pillar or foundation) and the Ho'oku'i (zenith) or central column, which account for five management domains.

MAI KA PŌ MAI		CHARTING THE COURSE Kūkulu Foundational Elements				
		KŪKULU 1 HO'OMANA	KŪKULU 2 HŌ'IKE	HO'OKU'I	KŪKULU 3 HO'OUULU	KŪKULU 4 HO'OLAHA
KE ALA — PATHWAYS	<p>» Ke Kumu — Purpose</p> <p>Papahānaumokuākea is a living spiritual foundation and a natural environment for Hawaiian existence</p>	<p>» Ke Kumu — Purpose</p> <p>Papahānaumokuākea is an abundant source of ancestral knowledge and a place where experts demonstrate excellence and advance knowledge systems</p>	<p>» Ke Kumu — Purpose</p> <p>Papahānaumokuākea represents a rich Hawaiian heritage and cultural experiences and wisdom that have cultivated healthy relationships among places and their people through time and space</p>	<p>» Ke Kumu — Purpose</p> <p>Inspire and grow thriving communities</p>	<p>» Ke Kumu — Purpose</p> <p>Papahānaumokuākea provides cultural pathways and ancestral wisdom that extends through time and space</p>	
	<p>» Ke Ala Ka'i — Guiding Principle</p> <p>Honor and perpetuate the spiritual and cultural relationships with Papahānaumokuākea by affirming respect and reciprocity through biocultural conservation and restoration</p>	<p>» Ke Ala Ka'i — Guiding Principle</p> <p>Harness, elevate, and expand place-based knowledge of Papahānaumokuākea through research, exploration, and Hawaiian perspectives</p>	<p>» Ke Ala Ka'i — Guiding Principle</p> <p>Hawaiian culture is a foundational element for the management of the Papahānaumokuākea Marine National Monument</p>	<p>» Ke Ala Ka'i — Guiding Principle</p> <p>Collaborative partnerships can create synergies for management, empower communities, and increase support for the management of Papahānaumokuākea</p>	<p>» Ke Ala Ka'i — Guiding Principle</p> <p>Education and outreach that includes Hawaiian values, knowledge, and place-based messaging are essential to connect people to Papahānaumokuākea</p>	
	<p>» Nā Pāhuhopu — Desired Outcomes</p> <p>Managers, researchers, practitioners, and others who access Papahānaumokuākea are engaged in protocols that acknowledge, safeguard, and promote the cultural and spiritual significance of this pu'uhonua</p> <p>Activities also strengthen the spiritual connections to place and serve to perpetuate Hawaiian cultural knowledge and practices</p> <p>Activities cultivate reciprocity and community for those accessing Papahānaumokuākea</p> <p>The mana of Papahānaumokuākea is enhanced</p> <p>Native Hawaiian cultural practitioners access Papahānaumokuākea and its resources to 'ike maka</p>	<p>» Nā Pāhuhopu — Desired Outcomes</p> <p>Multiple perspectives, knowledge systems, and values are incorporated into research activities</p> <p>Hawaiian sources of knowledge such as oli, mo'olelo, and ka'ao, are utilized to further research initiatives</p> <p>The value of place-based studies and knowledge is emphasized</p> <p>Research is collaborative and integrative to support Hawaiian knowledge and knowledge holders</p> <p>Research findings generate mana, honor ancestors, and help sustain people and resources</p>	<p>» Nā Pāhuhopu — Desired Outcomes</p> <p>Management decisions reflect and apply knowledge and understanding of Hawaiian culture, histories, contemporary realities, and cultural protocols</p> <p>Activities, policies, and programs honor, reflect, and implement Hawaiian values, knowledge, and management concepts</p> <p>Integrated approaches to management decisions are the norm</p> <p>Place-based knowledge in Papahānaumokuākea contributes to community initiatives in ao</p>	<p>» Nā Pāhuhopu — Desired Outcomes</p> <p>Partnerships and collaborations between managers and the community support shared educational, cultural, environmental, and stewardship goals across the pae 'āina</p> <p>The Cultural Working Group engages in, influences, and improves management decisions</p> <p>Partnerships and collaborations with other organizations support programs and initiatives at the local level and beyond</p> <p>Partnerships and collaborations support next-generation mentoring and development for leadership succession</p>	<p>» Nā Pāhuhopu — Desired Outcomes</p> <p>Everyone understand the cultural importance of Papahānaumokuākea</p> <p>Papahānaumokuākea is recognized and utilized as a source of knowledge for communities</p> <p>People feel a sense of kuleana for Papahānaumokuākea</p> <p>Cultural values, traditions, and histories are actively incorporated into all forms of Monument outreach and communication</p>	

KE ALA — PATHWAYS

3. *Ma ka hana ka 'ike* (In doing, one learns; Pukui 2011). It is important for the management and evaluation processes to allow for iterative learning opportunities shaping adaptive strategies that can pivot and evolve organically along the way. Over the course of its development, the “Native Hawaiian Plan” had several names and iterations including “Cultural Resources Program Plan,” “Native Hawaiian Research Plan,” and “Mai Ka Pō Mai” as our collective understanding of what the plan needed to be changed over time. Our ability to remain flexible, stay together, and keep the process moving was what ultimately led to its finalization. Its publication became an important achievement for Native Hawaiians and all involved, as it was a successful example of institutionalizing Hawaiian culture within the policies and rules of the management of PMNM. Mai Ka Pō Mai is an example of the transformative potential of engaging Indigenous values and perspectives in the co-generation, co-production, and co-application of knowledge. By seamlessly integrating the information validated through Native Hawaiian inquiry endeavors, co-managing agencies are given access to a wealth of local and traditional knowledge, which can often be difficult to gather through other methods. Reflexivity is key in any process of knowledge co-production

and also while relationship building to develop mutual trust and respect. It is also important to be flexible yet committed to the process and doing what you set out to accomplish together; however, not all things can be prepared and planned for ahead of time. It is also important to recognize that a co-production and co-planning process involving diverse groups takes time. It is not a quick or easy task.

4. *'O ke kahua ma mua, ma hope ke kūkulu* (First establish the foundation, and then the building; Pukui 2011). Mai Ka Pō Mai highlights the importance of an enabling policy environment, and a long-term commitment to community and institutional-capacity building for knowledge co-production. Developing capacities through appropriate programming and policies, led by Native Hawaiians involved in the management of PMNM, has allowed Native Hawaiians and agencies to successfully and iteratively navigate and advance appropriate objectives for institutionalizing and building PMNM management through partnerships and co-management relations over time. Management agencies should consider creating dedicated agency positions and/or Indigenous community-recognized positions that serve as liaisons. These kinds of positions are necessary to increase the specific capacities, proficiencies, and

Fig. 5. The Mai Ka Pō Mai framework includes 20 directional strategies altogether. There are four directional strategies within each of the five management domains including Kūkulu 1 Ho’omana, Kūkulu 2 Hō’ike, Kūkulu 3 Ho’oulu, Kūkulu 4 Ho’olaha, and the Ho’oku’i.

MAI KA PŌ MAI		NĀ KUHUKUHI STRATEGIES			
	KŪKULU 1 HO’OMANA	KŪKULU 2 HŌ’IKE	HO’OKUI	KŪKULU 3 HO’OULU	KŪKULU 4 HO’OLAHA
KE ALA — PATHWAYS	HO’OMANA 1-1 >> Manage the natural-cultural landscape through the practice of aloha ‘āina	HŌ’IKE 2-1 >> Conduct research and monitoring in a manner that incorporates multiple perspectives, knowledge systems, and values	HO’OKUI - 1 >> Conduct initiatives to increase cultural capacity and proficiency of managing agencies and permittees and to periodically assess cultural capacity	HO’OULU 3-1 >> Engage and collaborate with communities and leaders involved in mālama ‘āina work	HO’OLAHA 4-1 >> Develop educational programs and initiatives that are based on Hawaiian cultural values, concepts, and traditional resource management stewardship
	HO’OMANA 1-2 >> Perpetuate Hawaiian cultural practices, knowledge, and values	HŌ’IKE 2-2 >> Support, facilitate, and conduct Hawaiian methods of science and research	HO’OKUI - 2 >> Ensure that policies and programs incorporate relevant cultural knowledge	HO’OULU 3-2 >> Support a vibrant and sustainable Native Hawaiian Cultural Working Group	HO’OLAHA 4-2 >> Identify, share, and promote innovative research and place-based activities in PMNM that can serve as models to inform resource management in the main Hawaiian Island
	HO’OMANA 1-3 >> Enhance protections through access for Native Hawaiians	HŌ’IKE 2-3 >> Support, facilitate, and conduct research on Hawaiian cultural heritage, traditions, and history to advance resource management	HO’OKUI - 3 >> Use Hawaiian knowledge, language, values, traditions, and concepts throughout all areas of management and activities	HO’OULU 3-3 >> Develop partnerships and collaborations with other organizations to support Papahānaumokuākea programs and initiatives	HO’OLAHA 4-3 >> Conduct symposia and other forums to showcase and share knowledge and ideas
	HO’OMANA 1-4 >> Amplify the cultural and spiritual experience	HŌ’IKE 2-4 >> Promote alignment of research initiatives of the co-managing agencies and permittees to advance Hawaiian research agenda items	HO’OKUI - 4 >> Manage data to support Monument and community-based management	HO’OULU 3-4 >> Develop and support initiatives that focus on next generation capacity building for leadership succession	HO’OLAHA 4-4 >> Incorporate Hawaiian values, traditions, and histories into Monument communication strategies to better connect the public to the Monument

expertise needed to weave Indigenous knowledge and perspectives into various areas of management such as research, policy, resource protection, education, communications, and community engagement. Likewise, Indigenous representation within agencies fosters multi-disciplinary, cross-cultural collaborations addressing complex issues within all aspects of management. This helps agencies to navigate the political, cultural, social environment to implement biocultural approaches alongside Indigenous peoples. These positions and working relationships can result in institutional and social transformation over time. By transforming the framework of management planning and the plan itself, Indigenous philosophies and worldviews can exist appropriately within the context-specific form of Indigeneity they represent while remaining accessible to others. This approach has expanded understandings of reciprocal relationships and how collective responsibilities can be enacted by trusted agents and representatives within complex social-ecological systems such as Indigenous co-managed marine protected areas. At its foundation, Mai Ka Pō Mai describes the unique relationships that Native Hawaiians have to their ancestral domain and how they continue to develop and sustain desired ecological, social, and political relationships through Papahānaumokuākea.

Mai Ka Pō Mai demonstrates that co-management is not a destination for PMNM, rather a process or journey of improving equitable systems for collaborative management based on inclusion, diversity, and restorative justice. Since its publication, Mai Ka Pō Mai has received recognition throughout Hawai’i and elsewhere. It is currently being used by the co-managers in the next iteration of management planning and it was recently mentioned as a primary example of integrating Indigenous Knowledge in federal decision making in a White House Memorandum on Indigenous Traditional Ecological Knowledge and Federal Decision Making (Executive Office of the President 2021). Nevertheless, the value of Mai Ka Pō Mai is that it enables movement toward a more unified management and governance framework required to sustain and manage complex social-ecological systems in the future. If we continue to apply and build upon the lessons learned from the process of developing Mai Ka Pō Mai and the guidance within, we should also continue to experience meaningful relationships that help to improve collaborative co-management overtime and support a transformative paradigm for continual co-existence for generations to come.

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Methodology (approach of presentation), K. Q. and S.K.K.;
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Data Availability:

Data/code sharing is not applicable to this article because no data and code were analyzed in this study.

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