



# Kōkua aku, Kōkua mai: An Indigenous Consensus-driven and Place-based Approach to Community Led Dryland Restoration and Stewardship

Katie L. Kamelamela<sup>a,\*</sup>, Hannah Kihalani Springer<sup>b</sup>, Roberta Ku'ulei Keakealani<sup>c</sup>, Moana Ulu Ching<sup>d</sup>, Tamara Ticktin<sup>e</sup>, Rebekah Dickens Ohara<sup>a</sup>, Elliott W. Parsons<sup>f</sup>, Edith D. Adkins<sup>g</sup>, Kainana S. Francisco<sup>h</sup>, Christian Giardina<sup>h</sup>

<sup>a</sup> Akaka Foundation for Tropical Forests, HI, United States

<sup>b</sup> Hui Kaiāulu, Kama'āina of Nāpu'u and Ka'ūpūlehu, HI, United States

<sup>c</sup> Hui Aloha Kīhōlo, Hui Kaiāulu, Kama'āina of Nāpu'u and Ka'ūpūlehu, HI, United States

<sup>d</sup> Conservation International, HI, United States

<sup>e</sup> University of Hawai'i at Mānoa, School of Life Sciences, United States

<sup>f</sup> Hawai'i Division of Forestry & Wildlife, United States

<sup>g</sup> University of Hawai'i, Pacific Cooperative Studies Unit, United States

<sup>h</sup> United States Department of Agriculture Forest Service, Institute of Pacific Islands Forestry, HI, United States

## ARTICLE INFO

### Keywords:

Indigenous restoration  
Forest landscape restoration  
Cultural values  
Community-based forest management  
Subsistence gathering  
Biocultural stewardship  
Sustainability  
Livelihoods  
Wellbeing  
Hawai'i  
Sovereignty  
Aloha 'Āina  
Malama 'Āina

## ABSTRACT

The well-documented and forced migration of Indigenous Peoples from ancestral lands has fragmented connections to, and understandings of place. Yet Indigenous Peoples are reconceptualizing and revitalizing these connections including by leading forest landscape restoration efforts. Indigenous and Local Knowledge (ILK) supports the design and practice of ecological restoration across rural to urban gradients – including both ancestral lands and contemporary places, with thought leaders advocating for biocultural approaches to address biodiversity loss, land occupation, and the colonial legacies of social and economic marginalization of Indigenous Peoples. To date, there are few examples in Hawai'i, where in 1893 the overthrow of the Hawaiian Kingdom disenfranchised most Indigenous People of land, freshwater, and coastal resources. Here we describe the Pu'u-wa'awa'a Community-Based Subsistence Forest Area (P-CBSFA), that was formed in 2017 to steward 34-ha of land within the Pu'uwa'awa'a State Forest Reserve, North Kona, Hawai'i Island and is led by multi-generational lineal descendants of Pu'uwa'awa'a. We focus on how this stewardship initiative has relied on holistic acknowledgement in the engagement of historical context, a Native Hawaiian conceptualization of the restoration process, and a collaborative and consensus-based restoration practice that includes non-profit organizations and state and federal agencies. This initiative, the first community-based and subsistence-focused forest restoration project on State of Hawai'i administered lands, is using a biocultural framework to transform 34-ha of non-native and fire-prone grasses into a native species dominated dryland subsistence forest. To do this, the P-CBSFA relies on a relationship ethic to: (i) build trust among partners; (ii) articulate an exportable vision of ILK-based restoration; (iii) walk in awareness of historical and contemporary injustices; (iv) enhance cultural values of the landscape; (v) establish and rely on formal, empathy focused communication; (vi) focus on community directed benefits; and most importantly (vii) cultivate joy. From this framework, the P-CBSFA emerges to provide a multi-dimensional passageway through which lineal descendants of Pu'uwa'awa'a are formalizing governance and decision-making authority over their ancestral lands.

**Acronyms:** AFTF, Akaka Foundation for Tropical Forests; CBFM, Community-Based Forest Management; CBSFA, Community-Based Subsistence Fishing Area; CI, Conservation International; DLNR-DOFAW, Department of Land and Natural Resources, Division of Forestry and Wildlife; FR, Forest Reserve; HETF, Hawai'i Experimental Tropical Forest; ILK, Indigenous and Local Knowledge; PAC, Pu'uwa'awa'a Advisory Council; PAP, Pu'uwa'awa'a Ahupua'a Plan; P-CBSFA, Pu'uwa'awa'a Community-Based Subsistence Forest Area; NGO, Non-Government Organization; RBSF, Relationship Based Stewardship Framework; T&E, Threatened and Endangered Species; UHM, University of Hawai'i at Mānoa; UH-PCSU, University of Hawai'i Pacific Cooperative Studies Unit; USFS IPIF, United States Forest Service, Institute of Pacific Islands Forestry.

\* Corresponding author.

E-mail address: [katie@akakaforests.org](mailto:katie@akakaforests.org) (K.L. Kamelamela).

<https://doi.org/10.1016/j.foreco.2021.119949>

Received 26 July 2021; Received in revised form 6 December 2021; Accepted 8 December 2021

Available online 29 December 2021

0378-1127/© 2021 The Authors.

Published by Elsevier B.V. This is an open access article under the CC BY-NC-ND license

(<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

## 1. Introduction

*‘Ike aku, ‘ike mai, kōkua aku, kōkua mai; pela iho la ka nohana ‘ohana.* Recognize others, be recognized, help others, be helped; such is a family relationship.

Pukui 1983

This *‘ōlelo no‘eau*, or Hawaiian proverb, addresses the importance of reciprocal relationships in sustaining island communities. Interpreted in a contemporary context, this proverb emphasizes personal and professional intention in the collaborative stewardship of place, effective working relationships that help Indigenous communities address legacies of historical injustice, and knowledge system integration that drives sustainable resource use. This proverb sets the tone for acknowledging the importance of familial relationships and integrating this understanding into conservation and sustainability, which is the central goal of this paper.

Here, we describe a kinship-based process for reconnecting an Indigenous People to their land where restoration is the vehicle for revitalization of Indigenous practice while addressing ecological and historical legacies of both cultural and land degradation, and disenfranchisement. This includes identifying and engaging governance and formal decision-making processes, aligning these processes with an Indigenous ethic of relationship, implementing novel expressions of ancestral practice, and cultivating resilient outcomes for an Indigenous socio-ecological system. This process builds on extensive international work on collaborative stewardship including within Indigenous communities (Berkes, 2006; Berkes et al., 2000; Borrini-Feyerabend et al., 2004) by: redefining Indigenous access to ancestral lands; integrating *aloha ‘āina* (love of the land; Beamer et al., 2021) and *mālama ‘āina* (care of the land; Winter et al., 2021) back into stewardship; and emphasizing the sustainable harvest of culturally significant, and as a result of stewardship, abundant resources (Ticktin et al., 2006a, 2006b). We achieve these goals through realization of the Pu‘uwa‘awa‘a Community-Based Subsistence Forest Area (P-CBSFA), the focus of this paper, which demonstrates the power of prioritizing “recognizing others” and “being recognized” within a Native Hawaiian restoration framework (McGregor, 1995a,b; Kamelamela, 2019; Matsuoka et al., 1994; Minerbi, 1999; Whitehead, 2015).

### 1.1. Historical injustice and cultural ecosystem services

Cultural ecosystem services are “those tangible and intangible functions that contribute to the traditions, livelihoods, and well-being of social groups, including but not limited to Indigenous and minority communities” (Lake et al., 2018a, p.85), and are centrally important to Indigenous Peoples (Pascua et al., 2017; Bremer et al., 2018; Kamelamela, 2019; Sato et al., 2021). Many terrestrial biodiversity hotspots are stewarded by Indigenous communities with governance spanning full sovereignty to mixed approaches (Berkes et al., 2000; Berkes, 2004). Community-based biocultural approaches to conservation can also address three cultural ecosystem services related justice issues: (i) redressing the historical removal of Indigenous Peoples from their ancestral lands; (ii) removing constraints on Indigenous Peoples who seek to lead the return of community stewardship and cultural services provisioning to their landscapes; and (iii) normalizing Indigenous Peoples led efforts with agency and organization partners.

Indigenous stewardship often occurs within biocultural hotspots, which in Hawai‘i are described as cultural *kīpuka*, and serve as refugia of biocultural practice against the political, social, and economic changes caused by colonization and modernization (Higuchi, 2008; McGregor, 1995a). These *kīpuka* are typically surrounded by a colonially defined matrix of lands that were taken often forcibly from Indigenous communities resulting in enormous individual and societal consequences (Farrell et al., 2021). While these disposessions were formally recognized as unlawful nearly a decade ago (United Nations, 2013),

conventional conservation has been slow to organize around ILK in ancestral landscapes and their policy implications (McElwee et al., 2020). However, justice-oriented Indigenous led conservation organizations and researchers are beginning to focus on the intensely ethical questions of: Whose land is being stewarded by conventional conservation?; What is the history of that land?; Whose priorities and processes will determine and govern on-the-ground actions?; and critically, who benefits from these actions? (Kamelamela, 2019; Kūlana Noi‘i Working Group, 2021; ICCA Consortium). Addressing these questions can reveal under-appreciated and often unspoken assumptions that support continued marginalization of Indigenous People.

These conversations have moved from the academic cutting edge into real world implementation, and have come to include “public” lands (e.g., Te Urewera National Park, Aotearoa [Coombes and Hill, 2005; Lyver et al., 2009; Harris, 2015]) and private land acquisitions (e.g., Yurok Tribe’s purchase of Ke‘pel Creek watershed, California, USA [Manning and Reed, 2019]). Rights-based approaches to conservation (Campese, 2009) have been slowly moving to the forefront of conventional conservation ideologies and engage distinctions between legally defined rights-holders (transient owners or managers/decision makers within organizations) and ancestrally bound duty-bearers (multi-generational lineal descendants who view themselves as rightful stewards even guardians [*sensu* Larsen et al., 2017] of place). Increasingly, Indigenous-led land justice advocates have been making the case that ancestral descendants of cultural landscapes are not conventional stakeholders, rather rightful leaders of restoration and conservation efforts, with rights often firmly embedded within international agreements and treaties (von der Porten et al., 2015; Lake et al., 2018a,b). Further, resource stewardship partnerships are beginning to engage justice issues by embracing Indigenous-led processes. For example, many social justice organizations seek legal remedies for the return of natural and cultural resources to ancestral Peoples, including minimally the securing of the free prior and informed consent of Indigenous Peoples before projects on their ancestral lands begin (Kahanamoku et al., 2020); too often consent is not sought or is sought after plans are being implemented. An important task then for these partnerships is understanding how interested parties perceive and go on to define governance that supports Indigenous relationships to and claims over land and associated resources. Moreover, agency-led processes that distinguish “stakeholder” from the familial, spiritual, historical, and legal claims of Indigenous Peoples to ancestral Place can be critical to effective partnerships (von der Porten et al., 2015; Lake et al., 2018a, b, c).

### 1.2. Community-Based Forest Management

Community-Based Forest Management (CBFM) is a high investment process requiring complex governance arrangements between communities and collaborating partners to achieve a diversity of desired outcomes including subsistence gathering of abundant resources, timber production, provisioning of non-timber forest products, wildlife, environmental benefits, social and religious benefits, and conservation of biodiversity (Borrini-Feyerabend et al., 2004; Mahanty et al., 2006, p.78). Contemporary CBFM applications also address social inequities such as poverty (Mahanty et al., 2006), the need for institutional support and facilitation (Gibson and Koontz, 1998), and the integration of community focused decision support (Mendoza and Prabhu, 2005). Retaining cultural values and community intent (Borrini-Feyerabend et al., 2004), and enhancing connections between the geographic focus of CBFMs and the cultural values of its community-based practitioners is central to this approach (Baker and Kusel, 2003; Ticktin, 2004; Houde, 2007; Ticktin and Shackleton, 2011; Morishige et al., 2018; Vaughan, 2018; Kamelamela, 2019). These connections fall broadly albeit uncomfortably within cultural ecosystem services.

With case studies spanning a global network of Indigenous lands, CBFMs are relying on a cultural values framework to shape objectives and indicators that lead to transparent and collaborative work

environments (Berkas, 2009). In a review of forest cultural ecosystems in Hawai'i, Gould et al. (2014) documented that Native Hawaiians "rated heritage connections as deeper and lifetime residents portrayed ecosystem-identity connections as more integral to their well-being than did people from other backgrounds." Highlighted also were concerns about postcolonial issues such as access to ecosystems and relationships among Native Hawaiian, and non-Hawaiians including lifetime residents and the newly arrived. Insights from these findings provide a bridge for integrating cultural values into community-based approaches to forest landscape restoration in Hawai'i. Specifically, holders of Indigenous and Local Knowledge (ILK) increasingly provide insight into how the design and practice of biocultural restoration can support cultural services provisioning (Kamelamela, 2019).

### 1.3. Cultivation of cultural values in Hawai'i landscapes

The Hawaiian Islands support tremendous endemic biological diversity because of geographic isolation and remarkable climatic and geomorphological diversity which has led to the adaptive radiation of numerous species (Juvik et al., 1998; Ziegler, 2002; Giambelluca et al., 2013). These volcanic landscapes contain 1,367 native and mostly endemic vascular plant taxa (Smithsonian National Museum of, 2021). To secure sources of plant material for food, fiber, medicine, ceremony, leisure, and adornment (Abbott, 1992; Buck, 2003; Handy et al., 1972; Pukui and Elbert, 1986; Gon, 2008), Polynesian voyagers brought with them "canoe" plants including root, tuber, and tree crops, many of which continue to be cultivated or have become naturalized. European contact in 1778 and the establishment of Hawai'i as a Pacific trading hub resulted in two centuries of greatly expanded plant species introductions that have doubled Hawai'i's flora. These modern introductions have supported agricultural commodity production, a vibrant landscaping industry, and extensive botanical collections, many of which have facilitated invasions of non-native species that impact native ecosystems. Hawai'i has 502 federally listed Threatened and Endangered (T&E) species, of which 424 are plants (United State Fish and Wildlife Service, 2019).

Cultivating cultural landscapes in Hawai'i involves considerations about flora and fauna, but also importantly, understanding Native Hawaiian organizational approaches to landscape stewardship (Hawai'i Conservation Alliance). The basic geographic unit is the *ahupua'a*, which is the way land was divided and organized pre-Western contact. Ahupua'a are similar but not equivalent to watersheds, and they typically run from mountain top to shoreline and into nearshore waters (Minerbi, 1999; Mueller-Dombois, 2007). The most important quality of the ahupua'a is that access to resources essential to sustaining communities, for example fresh water, are obtainable within ahupua'a boundaries as the diversity of resources vary across elevational gradients. These historically placed boundaries remain today, yet stewardship practices and resource governance have been highly dynamic over the past two centuries (Gonschor and Beamer, 2014; Gomes, 2016). Recently, there has been a push to manage larger traditional land units known as *moku*, which encompass many ahupua'a within a Hawaiian biocultural resource management context (Winter et al., 2018).

In 1850, the Kuleana Act, also known as the *Mahele* (Beamer and Tong, 2016), brought great changes to the traditional ahupua'a land-tenure system in Hawai'i. For the first time, fee simple ownership of lands was granted to the *maka'ainana*, or Hawaiian tenants of the land, while reserving *maka'ainana* right of access to undeveloped private and public lands (Lam, 1989; Kame'elehiwa, 1992). Native Hawaiian ahupua'a tenants were thus provided legal shelter to gather forest and water resources for personal subsistence including cultural and religious uses (McGregor, 2007). These traditional and customary (T&C) gathering rights are codified in the Hawai'i State Constitution, Hawai'i State Administrative Rules, and case law (Forman and Serrano, 2012). This act hybridized Indigenous systems of land tenure with Anglo-American notions of private property (Andrade, 2008), and preserved historical

place names through formal mapping (Gonschor and Beamer, 2014). The Mahele, however, ultimately dispossessed many Native Hawaiians of access to their ancestral lands as well as to natural and cultural resources (Fig. 1; Penn, 1993; Bhakta, 2019). Loss of *maka'ainana* access to land accelerated as new arrivals to Hawai'i sought expanded commercial access to land resources. A governance change to Hawaiian stewardship occurred as a result of the 1893 overthrow of the Hawaiian Kingdom (hereafter, the Overthrow), which resulted in the illegal transfer of over 700,000 ha of land to centralized territorial, then federal, and ultimately State of Hawai'i control (Senate Joint Resolution 19 – United States Apology Resolution 103rd Congress, 1993)<sup>1</sup>. As a result of the Overthrow, contemporary policy and management of ridge to reef resources operates within a colonial governance model that accommodates only modest T&C rights (Sproat, 1998; Trask, 1999; MacKenzie et al., 2015; Fig. 1).

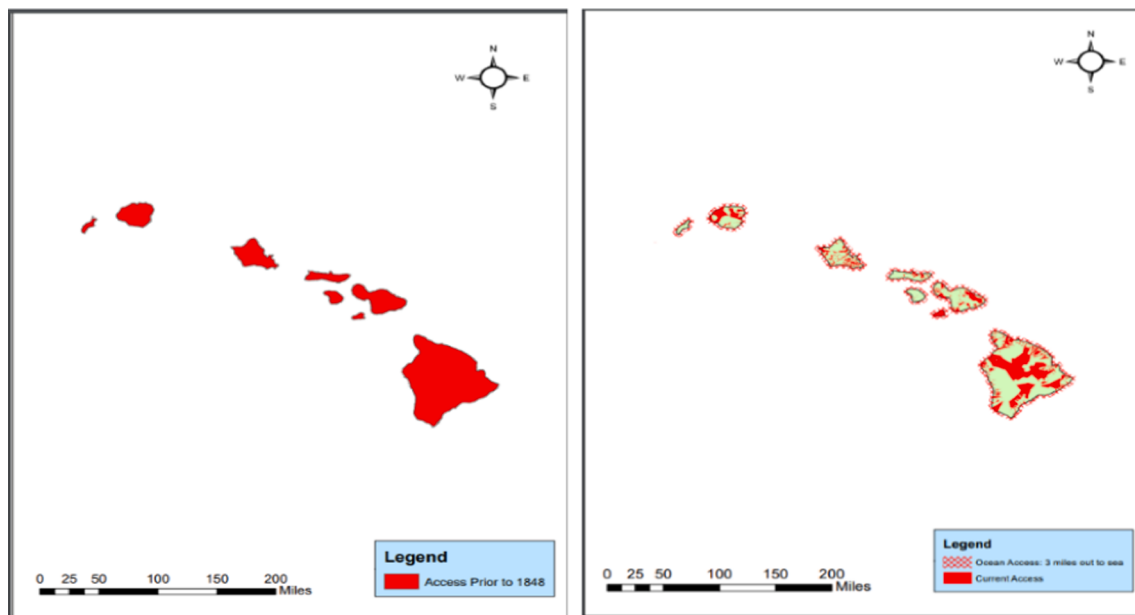
Because of deep cultural relationships defining Hawaiian landscapes (Garcia, 2002; Edith Kanaka'ole Foundation, 2009; Blair-Stahn, 2014; Enomoto, 1997; Gould et al., 2019; Kamelamela, 2019), CBFM is seen as an administrative vehicle for increasing stewardship capacity and revitalizing community access to and participation in biocultural stewardship of ancestrally important places and resources. The promise of CBFM in Hawai'i and elsewhere is that it allows participants to leverage the diverse strengths of communities, government agencies, and nonprofit organizations to realize ecological, socio-cultural, and sustainable livelihood goals. There are successful models of community-based marine management (Diver et al., 2019) and community-based subsistence fishing areas (CBSFA) in Hawai'i (Montgomery and Vaughan, 2018), but terrestrial demonstrations are lacking, even while models from the international literature exist. This paper explores how Native Hawaiian community leaders created and lead a consensus-driven and place-based approach to dryland restoration in Pu'uwa'awa'a, North Kona, Hawai'i Island, Hawai'i. We describe the underlying relationship-based stewardship framework (RBSF) and discuss foundational biocultural components that support an operational environment that leads to trust, effective communication, and kincentric (Salmón, 2000) biocultural stewardship.

## 2. Methods

### 2.1. Site description

This paper addresses lands within the ahupua'a of Pu'uwa'awa'a in the Kona District of Hawai'i Island. Pu'uwa'awa'a translates from Hawaiian language as "many furrowed hills" (Pukui and Elbert, 1986). Located on the north slope of Hualālai volcano the *Pu'u*, or cinder cone, is a defining geological feature of the Pu'uwa'awa'a ahupua'a. Historically, the lands of Pu'uwa'awa'a supported highly diverse dryland forests (Rock, 1913, p.517), but has been altered by invasive species, wildfire, drought, and ranching related land-conversions. Today, twenty-seven T&E plants call the dryland forests of Pu'uwa'awa'a home along with many T&E vertebrates, insects, snails, and a crustacean (State of Hawaii, 2003). Given deeper soils and more favorable climate than the surrounding volcanic landscape, the *Pu'u* is both an ecologically (Giffin, 2003) and culturally (Maly, 2006) important feature of leeward Hawai'i Island. The project site is located on this 124 m tall, >100,000-year-old volcanic vent, which is within the 15,200 ha Hawai'i Department of Land and Natural Resources, Division of Forestry and Wildlife (DLNR DOFAW) Forest Reserve (FR) (State of Hawaii, 2003). This FR also supports the 15,600 ha Hawai'i Experimental Tropical Forest

<sup>1</sup> United States Apology Resolution (1993), S.J.Res.19 – 103rd Congress (1993–1994): A joint resolution to acknowledge the 100th anniversary of the January 17, 1893, overthrow of the Kingdom of Hawai'i, and to offer an apology to Native Hawaiians on behalf of the United States for the overthrow of the Kingdom of Hawai'i, Public Law 103–150 Stat. 1510.



**Fig. 1.** Access to natural resources, in red, by Native Hawaiians has decreased from 1848 to 2021. (Left) Prior to 1848 resources were commonly pooled and cared for through place-based management. After the 1850 Kuleana Act privatized land, management became increasingly centralized, where today access to 25% of Hawai'i's forests (Right) are accessible for traditional and customary subsistence gathering including cultural practices only through State of Hawai'i permits. (Credit: K.L. Kamelamela). (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

(HETF) ([HETF Pu'uwa'awa'a Dry Forest](#)), which is a partnership designation with the USDA Forest Service's Institute of Pacific Islands Forestry (USFS IPIF). A cooperative agreement (approved by Hawai'i Board of Land and Natural Resources in 2007), calls for the USFS IPIF and DLNR DOFAW to collaborate on management, research, education, and demonstration ([Senate, 2679 - Hawai'i Tropical Recovery Act, 1992](#))<sup>2</sup>.

As with all DLNR DOFAW FRs, the HETF encompasses ceded lands ([Van Dyke and Mackenzie, 2006](#)) that are administered by DOFAW on behalf of Native Hawaiians and the citizens of Hawai'i. This administration is guided locally by the Pu'uwa'awa'a Ahupua'a Plan (PAP) ([State of Hawaii, 2003](#)), which delineates public access to the FR, ecotourism operations, the practice of Hawaiian culture, management of archaeological resources, environmental education, and hunting and ranching activities. Established in 2002, the volunteer-driven Pu'uwa'awa'a Advisory Council (PAC) advises the Hawai'i Island Branch of the Division of Forestry & Wildlife on implementation of the PAP and is comprised of individuals connected to Pu'uwa'awa'a as lineal descendants, non-Indigenous but in some cases multi-generational residents of the area, and professional or community experts. The PAC meets quarterly to assess progress on one or more of the 62 objectives outlined in the PAP – progress that is strongly limited by staffing and budget and which is augmented through volunteers, as well as state and federal grants.

## 2.2. The Pu'uwa'awa'a Community-Based Subsistence Forest Area

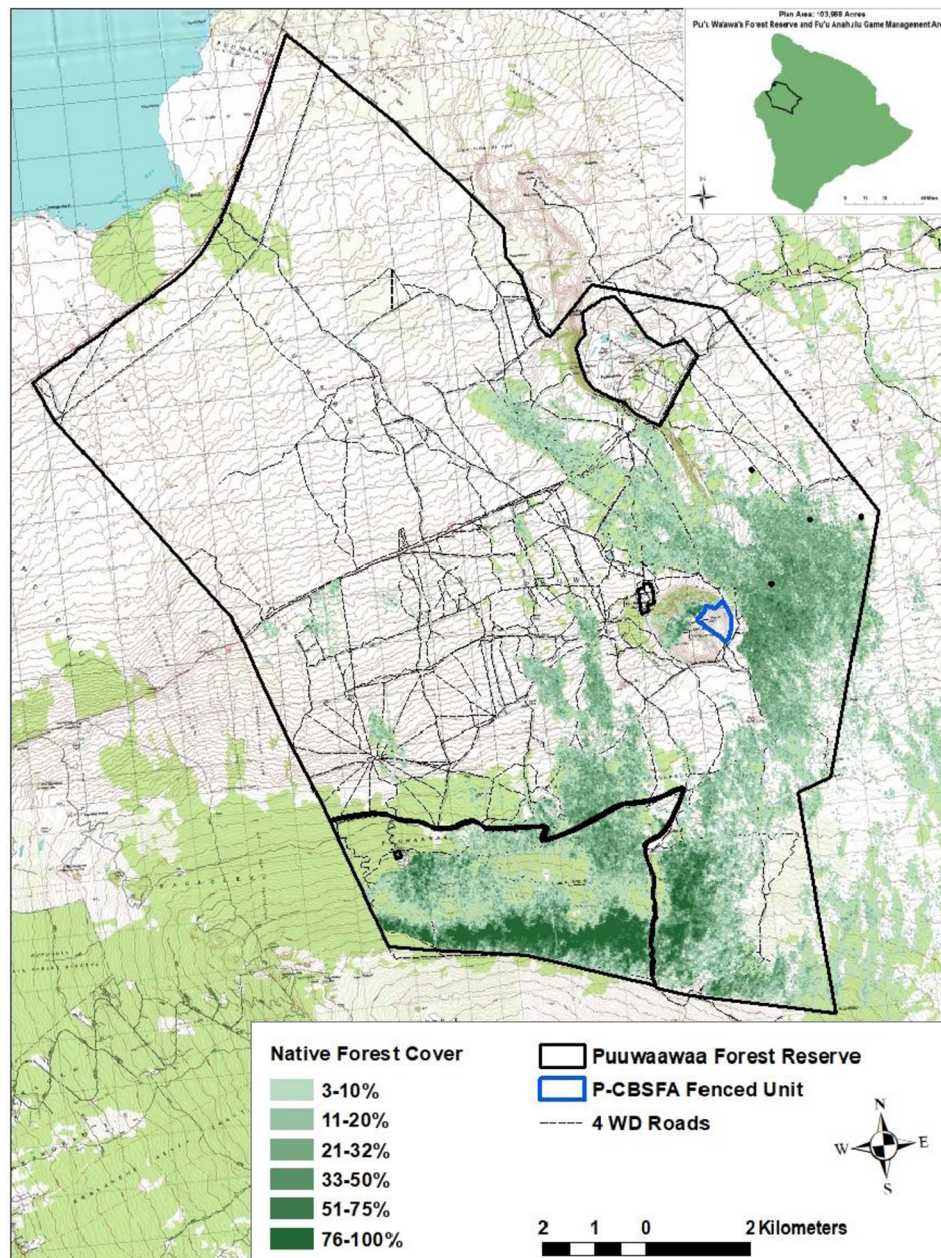
As in the case of much of Hawai'i and North America ([Farrell et al., 2021](#)), Native Hawaiian ancestors of today's lineal descendants of Pu'uwa'awa'a are removed from their birth lands. Their descendants are now advocating for reconnection ([McMillen et al., 2017](#)) and have conceived the P-CBSFA as a novel land stewardship project to explore how Native Hawaiian led, bioculturally informed, and community-

based restoration can proceed on state administered lands. Approximately 1/3 of this Pu'u supports a diverse, largely replanted conservation forest of native species, while the P-CBSFA portion of the Pu'u is mostly devoid of native and/or culturally important species ([Fig. 2](#)). The P-CBSFA seeks to restore culturally significant, mostly native dryland species to this 34-ha unit while drawing inspiration from the State of Hawai'i codified Community Based Subsistence Fishing Areas ([Higuchi, 2008; Montgomery and Vaughan, 2018; Zanre, 2014; Hawai'i Revised Statutes §188-22.6, 2019](#))<sup>3</sup>. This terrestrial case study engages the three guiding principles for the design and implementation of biocultural conservation identified by [Gavin et al. \(2015\)](#): having multiple objectives and participating partners; recognizing the importance of inter-generational planning and the dynamism of culture; honoring relationships as foundational for achieving effective conservation; and embracing approaches that are shaped by multiple knowledge systems and associated worldviews.

The P-CBSFA is a multi-generational and collaboratively governed project that integrates the strengths of its partners: community members, the Akaka Foundation for Tropical Forests (501-C-3; AFTF), USFS IPIF, Hawai'i DLNR DOFAW, the University of Hawai'i at Mānoa, University of Hawai'i at Hilo, and Conservation International (CI). The formation of the P-CBSFA was inspired by lineal descendants of Pu'uwa'awa'a who were interested in place-based community forest restoration. Steps to secure land and resources were taken by agency partners, with whom lineal descendants met to design a process for forming the P-CBSFA. In December 2017, the P-CBSFA held its first official meeting, which focused on establishing the practices and partnership needed to guide informed consent in a biocultural restoration process ([Office of Hawaiian Affairs, 2003](#)). Subsequent monthly to bi-monthly meetings of the P-CBSFA were directed at developing a

<sup>2</sup> Hawai'i Tropical Forest Recovery Act (1992), Senate 2679 – 102nd Congress (1991–1992): An act to promote the recovery of Hawai'i tropical forests, and for other purposes, Public Law 102–574.

<sup>3</sup> Designation of community-based subsistence fishing area (2019), Hawai'i Revised Statutes §188-22.6: Passed by the legislature to provide the Department of Land and Natural Resources authority to create community-based subsistence fishing areas (CBSFAs) for the purposes of native Hawaiian subsistence, culture, and religion as well as to protect and affirm customary and traditional fishing practices.



**Fig. 2.** Map of the Pu'uwa'awa'a Forest Reserve that encompasses most of the ahupua'a of Pu'uwa'awa'a with the blue outline identifying the now fenced P-CBSFA unit that currently is devoid of native plant species (credit: E. Adkins). (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

highly intentional, relationship-based stewardship framework (RBSF) that is founded on Native Hawaiian knowledge, practices, and ethics, and so reflects the Indigenous-led nature of the P-CBSFA partnership. A goal of the P-CBSFA is to illustrate how the RBSF paired with rebuilding of relationships between the community, the lands of Pu'uwa'awa'a, and consensus driven decision making can be used to reconceptualize restoration of ancestral landscapes. As the P-CBSFA is the first of its kind on State of Hawai'i administered lands, it has the potential to serve as a model for other community-based initiatives in Hawai'i and beyond.

### 2.3. Research design and the relationship-based stewardship framework

The RBSF has three components: 1) a relationship ethics agreement; 2) a three tiered, eleven-part holistic land acknowledgment process; and 3) a seven-step community and partnership building process. These components have been integrated into a place-based set of strategies

within a collaboratively developed, bioculturally grounded stewardship plan. These components do not represent sequential steps, as all three need regular engagement.

#### 2.3.1. Palapala Pilina – A commitment to an ethics of relationship

Contemporary natural resource stewardship partnerships often enter into formal agreements that delineate roles and responsibilities, and when partnerships include Indigenous communities, also describe ethics of engagement (Borrini-Feyerabend et al., 2004; Kūlana Noi'i Working Group, 2021). Early in the P-CBSFA process, partners entered into a formal relationship agreement designed by Native Hawaiian leaders of the P-CBSFA to define a code of ethics for partners being in relationship with Pu'uwa'awa'a and each other (Appendix). This *Palapala Pilina* (Relationship Document) is an agreement that has served to create an ethical foundation for sustaining long-term, place-based partnerships committed to the biocultural values, expectations, mandates, and

operational processes that define working in an Indigenous-led collaborative setting.

### 2.3.2. Holistic Land Acknowledgement for Indigenous stewardship

We determined that the success of the P-CBSFA would hinge on community members and partners establishing a shared history of place, a common set of terms for describing connections to place and Hawaiian values, and an understanding of how policy intersects with the work of the P-CBSFA. The first tier of the three-tier holistic land acknowledgement process honors the geographic focus of the P-CBSFA. For lineal descendants, Pu'uwa'awa'a is the land that feeds and sustains the community in mind, body, and spirit, with feeding defined by pluralistic, kincentric perspectives (Salmón, 2000; Keali'i'ikanaka'oleohaililani et al., 2018). Attention is paid to how partners acknowledge, support, and where needed, rehabilitate relationships between people and place. The second tier honors Indigenous ways of viewing, interacting with, and stewarding the world (Beamer et al., 2021; Winter et al., 2021). Community members pay careful attention to how to appropriately recognize, integrate, and uphold cultural values during all stages of the restoration process. The third tier engages the diversity of policy mechanisms that regulate and either limit or facilitate access to place (Mackenzie et al., 2015; Tuhiwai-Smith, 2021). As well, the community assesses how decision processes have been structured, codified, and implemented in Pu'uwa'awa'a and in other geographies to find efficient and feasible policy solutions to achieving the governance goals of the P-CBSFA.

Taken together, this three-tiered holistic land acknowledgement is designed to create a shared space where lineal descendants of Pu'uwa'awa'a can safely and productively engage place, each other, and P-CBSFA partners while restoring fragmented connections between Indigenous People and land in the 11-part process. Also critically important are healing historical trauma, rebuilding trust between community members and resource management agencies, and increasing capacity of Indigenous communities to shape and lead land stewardship efforts. These complex tasks are foundational to creating a new governance model that features historically informed pathways, enhanced biocultural diversity, and improved community well-being (*sensu* Donatuto et al., 2014).

Land acknowledgements elevate Indigenous names for the lands and waters that sustain Native communities and are viewed as "a necessary first step in the direction of moral and political reform" (Govier, 1999). These acknowledgements also name the Indigenous People who steward referenced lands (Temprano, 2015) to normalize conversations about historical injustice and discrimination. Viewed this way, land acknowledgements should serve as catalysts for redressing the dispossession of Indigenous Peoples. Yet, while these acknowledgements have become more common at talks, conferences, and events, often being directed at recognizing the adversities of displaced Indigenous peoples (Keefe, 2019), there is little evidence that they result in actual progress on Indigenous land access and governance issues. Further, the in-the-moment hyper-visibility of Indigenous Peoples during a land acknowledgement typically is followed by a rapid return to business-as-usual, with a subsequent lack of recognition of Indigenous justice issues throughout the remainder of the talk or event. As a result, the decolonizing intent of land acknowledgements have been criticized for being used simply to assuage colonizer guilt (Tuck and Yang, 2012). Robinson et al. (2019) have called for the decolonization of land acknowledgements "by considering how acknowledgement's form has a place within our lives and work that is always in relationship with the specificity and context of its use." For this reason, P-CBSFA partners are holistically defining land acknowledgement as also including the values and practices upheld by the land's Indigenous descendants, and the policy that address land access, governance, and stewardship. Successful partnership building that is inspired by an ethic of relationship has made it possible to weave this holistic acknowledgement (Meyer, 2001; Meyer, 2013; Sterling et al., 2017) into the P-CBSFA, with the RBSF designed to

support P-CBSFA efforts to redress historical justice issues and amplify biocultural approaches to conservation and restoration (Keali'i'ikanaka'oleohaililani et al., 2018).

This holistic land acknowledgement process includes eleven stewardship elements (Table 1): three Land focused elements (Community Recognition, a Decolonizing Framework, and Community Data Sovereignty), four Values focused elements (Hawaiian Knowledge Methodologies, Hawaiian Epistemology, Manifesting Cultural Values, and Collaborative Governance), and four Policy focused elements (Federal processes, Native Hawaiian Legal Rights, State Laws and Administrative Rules, State Management Approaches and Case Law). These eleven elements are grounded in Native Hawaiian kincentric epistemology, and are foundational to the RBSF.

### 2.3.3. Building trust, establishing partnership, taking action, providing benefits, creating joy

The P-CBSFA is also supported by a seven-step partnership building process to address a broad set of values focused on: (i) Rebuilding Faith and Confidence in Agency Collaborations; (ii) Defining Community and Partners; (iii) Establishing Organizational and Governance Structures to support Decision Making; (iv) Designing Community Directed Initiatives; (v) Providing Community Directed Benefits; (vi) Conducting Community Directed Evaluation; and most inspiring (vii) Creating Community Focused Joy (Fig. 3).

### 2.3.4. The Pu'uwa'awa'a Community-Based Subsistence Forest Area stewardship plan

As with many community-led restoration projects (Borrini-Feyerabend et al., 2004), the P-CBSFA's vision, approach, species selections, partner responsibilities, and governance arrangements are delineated in a Stewardship Plan that features ILK specific to Pu'uwa'awa'a. Plan development provided an opportunity for the partnership to collaborate and find common ground for conceptualizing a hybrid operational environment for implementing that vision. The Stewardship Plan describes the P-CBSFA's two main organizational bodies: the Hui Kaiāulu or community team that includes Hannah Kihalani Springer (HKS), Roberta Ku'ulei Keakealani (RKK), with participation by Katie L. Kamelamel (KLK) and Moana Ululani Ching (MUC); the Hui Pulo or agency team that includes Christian Giardina (CG), Edith Adkins (EA), Elliott Parsons (EP), Kainana Francisco (KF), Rebekah Dickens Ohara (RDO), Tamara Ticktin (TT), with participation by KLK; and the larger Hui Nui or grand team representing the coming together of the Hui Kaiāulu and the Hui Pulo. The Stewardship Plan also describes P-CBSFA workflows through these bodies, including how decisions and recommendations are formulated within the Hui Kaiāulu and how the Hui Pulo serves to support implementation of community directives including responding to requests for information, technical assistance, or support on implementation. Conversations within the Hui Nui are directed at achieving Hui Kaiāulu-identified outcomes, with all decisions being made in consensus by the Hui Nui.

In order to support planning and decision making, identify procedural next steps, and anticipate potential conflicts, the Hui Kaiāulu identified and the Hui Nui secured funding to accomplish the following efforts: 1) The P-CBSFA contracted out with Geometric Associates in Hawai'i to develop a Pu'uwa'awa'a specific geographic information systems Story Map that integrated a wide diversity of biophysical and some biocultural data layers (see Pu'uwa'awa'a Natural Resources Story Map). 2) The P-CBSFA gathered historical ethnoecology and plant abundances of Pu'uwa'awa'a to assess what plants have been used at Pu'uwa'awa'a and how these plants are currently being used. 3) Understanding that Pu'uwa'awa'a has seen a strong increase in the duration and severity of drought over the past century (Frazier et al., 2019), the P-CBSFA is hosting a UH-Hilo graduate student to examine how anticipated climate change might impact the successful restoration of the Pu'u, for example, by asking if amplified drying and warming make certain species no longer viable options for P-CBSFA goals. And finally,

**Table 1**

Three tiered holistic land acknowledgement with eleven decolonizing elements under the Pu'uwa'awa'a Community-Based Subsistence Forest Area's Relationship-Based Stewardship Framework (Credit: K.L. Kamelamela).

| Acknowledgment | Impact                        | Framework                      | Application                                                                           | Reference                                                                                                           |
|----------------|-------------------------------|--------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|
| Land           | Community Recognition         | Indigenous Local Knowledge     | Centering Place                                                                       | <a href="#">Temprano, 2015</a>                                                                                      |
| Land           | Decolonizing Framework        | Indigenous Local Knowledge     | Centering Process                                                                     | <a href="#">Tuhivai-Smith, 2021</a>                                                                                 |
| Land           | Community Data Sovereignty    | Indigenous Local Knowledge     | Centering Free Prior and Informed Consent                                             | <a href="#">Office of Hawaiian Affairs, 2003</a>                                                                    |
| Values         | Hawai'i Methodology           | Indigenous Local Knowledge     | Hawaiian Epistemology                                                                 | <a href="#">Meyer, 2001</a> ; <a href="#">Edith Kanaka'ole Foundation, 2009</a> ; <a href="#">Meyer, 2013</a>       |
| Values         | Hawai'i Methodology           | Hawaiian worldview             | Centering Community Recognition                                                       | <a href="#">Pukui, 1983</a>                                                                                         |
| Values         | Incorporating Cultural Values | Hawai'i Community Engagement   | Community Engagement                                                                  | <a href="#">Kulana Noi'i Working Group, 2021</a>                                                                    |
| Values         | Collaborative Governance      | Indigenous Local Knowledge     | Pu'uwa'awa'a Community Based Subsistence Forest Area Relationship Governance Document | <a href="#">Palapala Pilina (Appendix)</a>                                                                          |
| Policy         | Federal                       | Legislation                    | Legal Fiduciary duties                                                                | <a href="#">Senate 2679 – Hawai'i Tropical Forest Recovery Act 1992</a>                                             |
| Policy         | Native Hawaiian Legal Rights  | Legal                          | Legal Fiduciary duties                                                                | <a href="#">MacKenzie et al., 2015</a>                                                                              |
| Policy         | State                         | Administrative Rules           | Template for Community Based Subsistence Areas                                        | <a href="#">Hawai'i Revised Statutes §188-22.6 – Designation of Community Based Subsistence Fishing Areas, 1992</a> |
| Policy         | State                         | Administrative Management Plan | Natural Resource Strategy Prioritization                                              | <a href="#">Pu'uwa'awa'a Ahupua'a Plan – State of Hawai'i 2003</a>                                                  |

4) the Hui Kaiāulu conducted surveys of P-CBSFA partners in 2020 and 2021 (14 open-ended questions developed by the Hui Kaiāulu) to identify gaps in understanding each partner's vision for restoration of the Pu'u, and their values, and perspectives on policies that guide stewardship within the Pu'uwa'awa'a FR; and to document organizational responsibilities, contributions, and available resources. All information is organized into curated and securely stored in a management and team communication application which keep data, project resources and narratives for all to guide group processes and shape communications.

### 3. Results

The P-CBSFA partnership, under the structure of the Relationship-Based Stewardship Framework, has cultivated relationships and so a partnership that operates on a foundation of trust which has built over time through many virtual and in-person meetings, site visits to the Pu'u, gatherings, and knowledge exchanges. The required time investments over a ~4-year period were critical for creating what is currently an efficient and effective operating environment, including achieving the first stages of ecological restoration with bioculturally valued species. This process has relied on Native Hawaiian values, epistemology, and methods (e.g., [Edith Kanaka'ole Foundation, 2009](#); [Meyer, 2001](#)) to advance the vision and goals of the P-CBSFA. This includes the creation of a P-CBSFA Stewardship Plan that was collaboratively designed to reflect the needs of lineal descendants as well as to feature adaptive strategies for stewarding a drought-prone landscape. This process has addressed the concrete needs of securing the project area (e.g., fencing, and ungulate removal), fence maintenance and improvement, and the first stages of planting bioculturally important species. These actions are expected to provide the Hui Kaiāulu with benefits, goods, and services that accumulate from community-based stewardship of the P-CBSFA. The Stewardship Plan addresses both biophysical indicators and the monitoring of biocultural indicators (*sensu* [Sterling et al., 2017](#)), the latter being linked to life experiences of community members and their culturally derived knowledge. As a result, selected strategies are specific to meeting socio-ecological goals as laid out in the stewardship plan, including engaging historical injustice, revitalizing connections between communities and Place, and recovering the role of lineal descendants as stewards of the land.

#### 3.1. A Three-Tiered Holistic Land Acknowledgement

Our three-tiered Holistic Land Acknowledgement process, that includes eleven decolonizing elements, has provided the P-CBSFA with tools to build a solid and resilient foundation for forming a broad and effective partnership. Initial efforts to thoughtfully engage with Land, include i) learning about the history and Hawaiian socio-ecology of Pu'uwa'awa'a, ii) being witness to the expression of cultural values underpinning community processes, and iii) engage with the policies informing governance have been essential to partners cultivating cultural competence, historical awareness. Emerging from three tiers of holistic land acknowledgement are humility and a kincentric sensibility. Further, a holistic land acknowledgement has allowed the partnership to infuse the P-CBSFA with capacity for understanding and conducting biocultural restoration.

#### 3.2. Seven Steps to Partnership building

##### 3.2.1. Step 1: Rebuilding Faith and Confidence in Agency Collaborations

The lineal descendants of Pu'uwa'awa'a (HKS, RKK) are active leaders whose work engages school, university, district, Island, State, Federal, and international institutions to support Indigenous well-being at individual, family, community and nation scales. Their broad and deep experiences with cultivating wellbeing is a critical part of why the P-CBSFA is able to effectively engage place-based interests. Methods for engagement span storytelling about cultural landscapes to policy formulation and implementation. Early meetings were characterized by open-ended conversations among P-CBSFA partners and lineal descendants. The P-CBSFA Coordinator (KLK), a Native Hawaiian Scientist not from Pu'uwa'awa'a, was invited as a witness to the process by community members to help guide and document the P-CBSFA development including record keeping, organizing planning and implementation, as well as leading meetings. This position is now based at the AFTF, where the Coordinator also supports fiscal management and facilitates communications among partners.

##### 3.2.2. Step 2: Defining Community and Partners

The central focus of the P-CBSFA partnership is the land of Pu'uwa'awa'a ([Fig. 4](#)), and so defining who comprises the partners and community happens through the lens of long-term intentional engagement of this land. Partner examples include the long-term commitments



**Fig. 3.** The Pu'uwa'awa'a Community-Based Subsistence Forest Area's seven-step partnership building process for producing and providing community directed benefits and creating community focused joy (Credit: K.L. Kamelamela).

of USFS IPIF and DOFAW staff to the Pu'uwa'awa'a geography; USFS IPIF because the HETF Cooperative Agreement (CG, KF). DOFAW staff (EP), who is the Pu'uwa'awa'a Coordinator, and operates through the PAP (State of Hawaii, 2003), which provides for an ahupuaa-based, biocultural approach to management in Pu'uwa'awa'a. UHM staff have been working in partnership with lineal descendants of Pu'uwa'awa'a for over a decade (TT), or are responsible for conservation planning of T&E species and supervision of the on-site management staff for DOFAW (EA). Overall, most partners have been leading collaborative education, research, and management within this drought prone landscape for years. The AFTF is relatively new to the geography of North Kona, but KLK and RDO lead CBFM as well as professional community-focused subsistence gathering and Indigenous drought knowledge research beyond Pu'uwa'awa'a that aligns closely with P-CBSFA vision, goals, operational methods. This is demonstrated through AFTF facilitated hires of P-CBSFA staff with direction from the Hui Kaiāulu. To date, all P-CBSFA hires are Native Hawaiian, female identifying cultural practitioners, who are lineally descended from Hawai'i Island, including one

who is a lineal descendant of Pu'uwa'awa'a. Finally, HKS is active on the AFTF board and currently serves as AFTF's acting president.

The question of "Who is the community?" is an important one that the Hui Nui seeks to answer through outreach designed to engage local residents, FR recreationists, and subsistence harvesters. The P-CBSFA's Hui Kaiāulu is composed of lineal descendants of Pu'uwa'awa'a (HKS, RKK), and the partnership is focused on their goals for the 34-ha project area. The Hui Kaiāulu focuses on this area, but are also deeply committed to ridge-to-reef biocultural stewardship across their ahupua'a. They have supported these goals for decades by providing leadership to the conservation and stewardship efforts within the ahupua'a, across the Island and state, and nationally and internationally, all while representing families who have stewarded resources in the region for many generations.

### 3.2.3. Step 3: Organization, Governance and Decision Making

Early in the planning stage for the P-CBSFA, community members formed a simple organizational structure that included a decision-

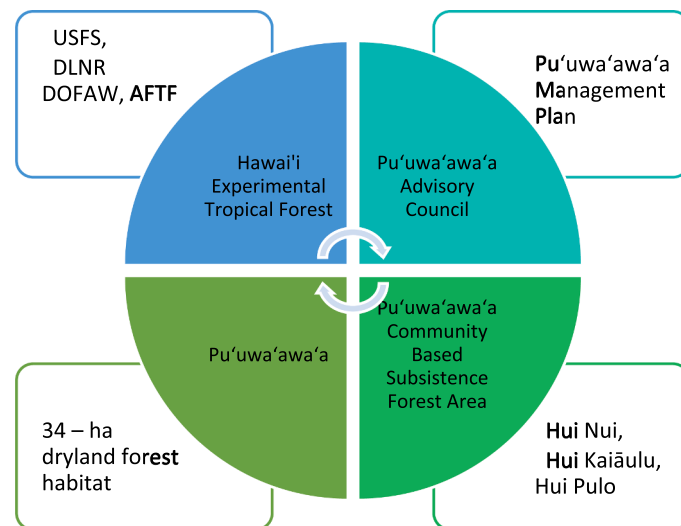


Fig. 4. Community and Partners invested in the Pu'uwa'awa'a Community-Based Subsistence Forest Area as defined by the P-CBSFA (Credit: K.L. Kamelamela).

making body (the *Hui Kaiāulu* - translated from Hawaiian as team of the community), a support body (the *Hui Pulo*, or the team of agencies), and a working group composed of the two together (*Hui Nui* – the collective or grand team). To complete projects (e.g. fencing, ungulate control, planting), committees that consist of members of both *Hui Kaiāulu* and *Hui Pulo* meet and organize to provide a proposal to the *Hui Nui* for next steps for each management project.

The AFTF has assumed the role of fiscal sponsor of the P-CBSFA, although the USFS IPIF and DOFAW provide financial, staffing, transportation, and logistical support when possible, and so have fiduciary responsibilities over management of grants and agreements. The P-CBSFA Administrator (RDO) prioritizes needs for management actions for the 34-ha area, and supports the P-CBSFA through grant administration. The Coordinator (KLK) manages ethical responsibilities and duties associated with governance elements of the *Hui Nui*, *Hui Kaiāulu*, and *Hui Pulo*. The P-CBSFA attends quarterly PAC meetings to provide updates and return PAC information to P-CBSFA partners. The state of Hawai'i does not legislatively recognize the P-CBSFA as a Marine-CBSFA-type designated area (Hawai'i Revised Statutes §188-22.6. 2019) currently, as this process does not yet exist for terrestrial projects. However, the *Hui Kaiāulu* serves in good faith as a land steward for the 34-ha P-CBSFA, operating within PAP and HETF policy guidelines.

**3.2.3.1. *Hui Kaiāulu: Community driven decision making.*** The *Hui Kaiāulu* functions as a leadership cabinet with internally vested decision-making authority for the P-CBSFA, and operationally, it meets regularly, directs the work of the *Hui Pulo*, and leads the *Hui Nui*. The *Hui Kaiāulu* was established specifically to place decision making processes within a body composed entirely of community-based individuals who have multi-generational connections to P-CBSFA lands (HKS, RKK). They are keepers of multiple generations of ILK on ridge to reef stewardship of this geograh, which is documented by the Coordinator (KLK), integrated by the Facilitator (MUC), and operationalized by the *Hui Nui* into shaping P-CBSFA goals and making decisions.

**3.2.3.2. *Hui Pulo: Government and non-government decision implementation support.*** Governance of the P-CBSFA is guided by Native Hawaiian approaches to land stewardship but is constrained by State and Federal jurisdictional overlays. The *Hui Pulo* includes: USFS IPIF, and DOFAW, which provide financial, staffing and logistical support; the University of Hawai'i Pacific Cooperative Studies Unit (UH-PCSU) and University of Hawai'i at Mānoa School of Life Sciences (UHM) that provide technical support and biocultural indicator planning; a CI affiliated facilitator which provides facilitation, technical assistance, and support for

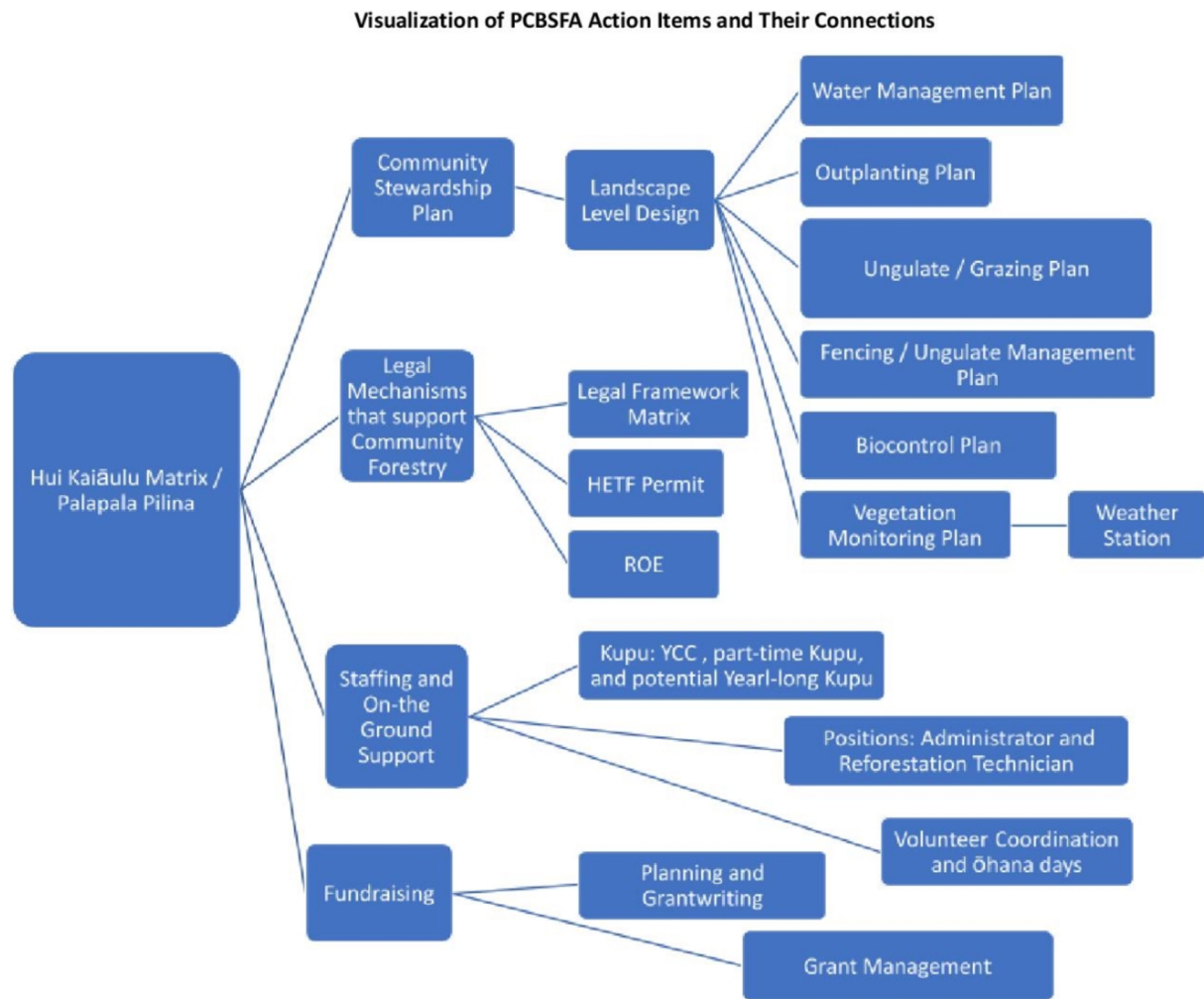
stewardship; and the AFTF, which having been founded to continue the life biocultural work of Senator Daniel K. Akaka including ILK grounded conservation, community focused sustainable livelihoods, and perpetuation of Hawaiian culture. AFTF provides facilitation, organizational, and administrative support for the *Hui Nui*. The *Hui Pulo* advocates for the P-CBSFA, employs staff (KLK, RDO, on-the-ground land stewards). All partners support and manage volunteers (e.g. Americorps and Youth Conservation Corps), university interns, as well as graduate students while supporting implementation of stewardship activities under the direction of the *Hui Kaiāulu*. This integration of community, federal, state, university, and non-government organization (NGO) capacity into a multiple knowledge systems-process has supported efficient and effective development and implementation of the P-CBSFA vision.

#### 3.2.4. Step 4: Community Directed Initiatives

Community-based gap analyses are used by the *Hui Kaiāulu* to identify needed initiatives or course corrections, to which the *Hui Nui* responds by identifying a lead, conceptualizing, planning, and implementing actions to fill the need (Fig. 5). Different pathways of support include federal, state, and private foundation giving to AFTF; in-kind staff, transportation, and equipment support; and the time of community volunteers. This RBSF-based approach to governance requires multiple confirmations throughout planning and implementation timelines. A significant role for the P-CBSFA is to advocate for lineal descendant access to and decision-making authority over the P-CBSFA project area. Authority is policy constrained because to date, the P-CBSFA operates within the PAP and the DLNR-DOFAW determines limits of the HETF Research permitting process. Current work focuses on how the *Hui Kaiāulu* will secure more formal decision-making authority over these ancestral lands.

#### 3.2.5. Step 5: Community Directed Benefits

Place-based partnerships such as the P-CBSFA conduct their work with limited funding. In this instance the USFS (IPIF and Region 5) has been able to provide some financial support to the P-CBSFA because of the HETF designation (i.e., federal overlay), and the USFS's strong partnership with DOFAW. As a result, dollars, vehicles, and staff time have been available to support the P-CBSFA. Additional funding has been provided by foundations and private giving to AFTF. Overall, the P-CBSFA provides benefits to the community through creation and filling of technical positions, making available a larger diversity of resources, partner time, and grant writing capacity, all of which increases the likelihood of funded *Hui Nui* projects, actions taken, and vision realized. As public support for these types of projects increases, new projects will



**Fig. 5.** Visualization of Pu'uwa'awa'a Community-Based Subsistence Forest Area process of community-directed initiative sequence that seeds from Hui Kaiāulu strategic goals then is clarified into next step needs and actions (Credit: R. Dickens Ohara).

require partnerships that reflect the values and culture of local communities, can generate funding to support actions, and allow CBSFA approaches, practices, and underlying philosophy integration into forest management. For example, the development of the P-CBSFA Stewardship Plan facilitated by MUC, who is a CBSFA professional, was invited by the Hui Kaiāulu to assist with integrating cultural values and bringing community-based conservation approaches to the P-CBSFA.

All hires within the P-CBSFA are thoughtfully designed position descriptions, which are approved via a matrix of standards determined by the Hui Kaiāulu. Creating local economic opportunities is important for sustaining community support, engaging local knowledge, and building conservation capacity of resource managers who embrace cultural values. Successful grant writing is central to fulfilling the P-CBSFA vision and continuing to build trust. Finally, emphasizing community-directed benefits during the process brings confidence that the fruits of P-CBSFA work are realized by Pu'uwa'awa'a and her community.

### 3.2.6. Step 6: Community Directed Evaluation

Our collective effort to bioculturally restore the project area provides important learning opportunities for all partners, including how to conceptualize and implement community-directed evaluation of restoration outcomes. In particular, the Hui Kaiāulu has developed and integrated biocultural indicators, the power of which allows the P-CBSFA to identify outcomes that are of most interest and of the greatest importance to the Hui Kaiāulu. The process of developing and implementing these indicators represents an improvement over simply

adopting conventional biophysical indicators (like forest cover), because while overlap does exist, community determined indicators are of direct relevance to the P-CBSFA (Sterling et al., 2017). An example of a biocultural indicator is a *lei* (plant-based garland on the head or around the neck or shoulders), which is often gifted and worn any time of year for a multitude of reasons including self-adornment, greeting friends and family, and specific life passage events related to the donning of the garland. The extent to which someone produces lei for oneself, or others often reflects the frequency with which they engage with natural environments. An indicator, therefore, that captures the successful gathering of plant material for lei from a natural area would provide insights into: 1) the abundances of materials available in that area which can be an indicator of forest health; 2) the skills of people who harvest plants and steward sites to make lei – skills that may be passed down inter-generationally; 3) the number of people that are going to the forest to collect foliage and flowers to make lei (thus there is knowledge of plant locations and use); 4) plant identification skills of harvesters, as not all plant material is suitable for lei (e.g., some plant dyes stain clothes, some materials are uncomfortable or are too sharp, rigid, or soft, or life span of the harvested plant material is too limited); and 5) perceived or real access to the materials on the lands where the harvesting is done.

Biocultural indicators of project success may take more time to develop but they also are more reflective of community member goals than agency goals. For example, evaluating success of perpetuating a cultural practice can indicate the favorability of the season for a group meeting or initiative (Fig. 6). The snow on Haleakala is also an indicator



**Fig. 6.** An early hō'ailona, a sign of favorable conditions, by lineal descendants was at the first Hui Kaiāulu meeting at Kiholo Bay, where looking across to Haleakalā on Maui you can see snow dusted mountain tops. (Photo: K.L. Kamelamela).

that climate change hasn't yet fully changed the alpine ecosystems on the mountain tops of Hawai'i. Sessions to develop biocultural indicators have required careful facilitation and sufficient time and focus to identify, describe, and align indicators with goals and milestones.

### 3.2.7. Step 7: Community Directed Joy

Governance arrangements impact community relationships to land and so ultimately affect cultural ecosystem services (Pascua et al., 2017). In Hawai'i, efforts to create Community-directed joy seek cultural services provisioning that includes laughter, learning, celebration, and mirth as core outcomes of the P-CBSFA process. By doing so, the P-CBSFA can achieve the important outcome of reconnecting people to land in a way that is meaningful, uplifting, and confers wellbeing (Fig. 7). In this regard, joy is an important biocultural indicator of success.

## 4. Discussion

The P-CBSFA is the result of relationships built over generations with land, decades with agencies, and years with this project. The initiation of the P-CBSFA occurred with an acknowledgement of support by agencies to assist with the rehabilitation of relationships between lineal descendants and their Places, as requested by community members. The framework and policies needed were structured to recognize, integrate, and uphold cultural values during all stages of dryland restoration. These features are exemplified by the integration of biodiversity conservation within the Palapala Pilina and Stewardship Plan, with both articulating processes for achieving place-based goals. Overall, it is this rebuilding of biophysical (e.g., as detailed in the web-based story map) but also social, cultural, emotional, psychological, and spiritual capacity

within a contemporary partnership that is driving success of the P-CBSFA.

Within this operational environment, the P-CBSFA relies on the RBSF to integrate the Palapala Pilina, holistic land acknowledgement, and partnership building to support a Stewardship Plan that is accessible to all partners. Reimagined land, values, and policy-focused acknowledgement as well as the partnership building are reinforced by the P-CBSFA partnership's collective embracing of ILK and the transformative leadership of the Hui Kaiāulu. Holistic land acknowledgement approaches directly influenced Hui Nui efforts to develop a comprehensive Stewardship Plan that allows the P-CBSFA to understand and articulate entity-specific roles, responsibilities, and intentions. As well, the RBSF guides processes for actively restoring land while inspiring commitments to increasing awareness, meeting partner obligations and responsibilities, as well as ultimately generating joy.

Our contention is that success of the P-CBSFA will hinge on the extent to which participating partners acknowledge, engage, and address historical and political context (Gavin et al., 2015). Native Hawaiian cultural values and language have permeated conventional conservation in Hawai'i (Hawai'i Conservation Alliance, 2010), but critically need demonstrations of successful Indigenous-led stewardship initiatives that integrate policy-driven governance (e.g., formal decision-making authority), agency driven biodiversity mandates (e.g., population viability for listed T&E species), and community determined biocultural goals (e.g., securing abundance of culturally important subsistence species). In this regard, the P-CBSFA is poised to build on its multi-year planning process and lay a significant foundation for biocultural restoration at Pu'uwa'awa'a, while providing an exportable framework for other established or nascent initiatives seeking to implement Indigenous-led and community-based restoration on state administered lands in



**Fig. 7.** Three generations of lineal descendants assess historical lands where cattle roamed across non-native rangelands and native forest, with peak expression during the Paniolo (cowboy) era. This image highlights the P-CBSFA established fence that was identified as a critical first step to protecting young plantings (right) (Photo: K.L. Kamelamela).

Hawai'i.

In the past decade, CBFM is increasingly being viewed as one approach for addressing historical justice issues in Hawai'i. As part of this conversation, there also has been growing advocacy for biocultural approaches to conservation and restoration, yet there are few examples demonstrating how biocultural strategies can be used to design and implement landscape scale conservation and restoration actions. Rarer still are terrestrial examples where bioculturally oriented and community-based governance is explicitly made central to an initiative. To these ends, the P-CBSFA represents an important pilot for addressing these questions, with the HETF designation serving to create a more flexible "sandbox" environment (Higgins and Male, 2019) for exploring creative approaches to community-based stewardship.

The lack of such demonstrations does not diminish the importance of conventional conservation work in Hawai'i, or the diverse efforts across the conservation community to learn and integrate Hawaiian knowledge, language, proverbs, chants, and practices into otherwise conventional approaches to natural resource management. In fact, these biocultural efforts have played a vital role in helping conservation organizations find common ground with Native Hawaiian communities, especially the development of cultural competencies in a resource stewardship context. This embracing of the many meanings of Hawaiian stewardship and investments into cultural competency have and will continue to build a broader biocultural approach to conservation that is grounded in Hawaiian knowledge, values, practices, and approaches (Keali'i-kanaka'oleohailani et al., 2018; Kamelamela, 2019). Importantly, the P-CBSFA necessarily features Native Hawaiian leadership, and ideally provides a compelling demonstration of how Indigenous-led and community-based stewardship can achieve biocultural restoration on lands administered by a complex alliance of agencies that includes: DLNR-DOFAW, USFS, a Watershed Partnership (the Three Mountain Alliance), and a legally mandated citizen advisory group (The Pu'uwa'awa'a Advisory Council). These entities drive a governance model where decision making authority lies with agency leaders who receive consultative feedback from community members on actions proposed by agency staff and members of the PAC. However, returning the P-CBSFA to governance and stewardship by Native Hawaiians in service to Native Hawaiians will be possible only through the direct leadership of Native Hawaiians. Our relationship-based approach to conservation and restoration will only succeed by engaging in a holistic land acknowledgement process, building trust and accountability, and cultivating joy!

### Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

### Acknowledgements

We mahalo (*thank*) Pu'uwa'awa'a, the place that has been the focus of our individual as well as collective attention and intentions for the past four years – a place of tremendous ecological beauty and cultural value, but also of historical conflict that we seek to address and redress. We mahalo the many generations of Hawaiians who share their memories of Pu'uwa'awa'a and who have gifted today's generation of stewards with stories and wisdom about this Place. We thank the two anonymous reviewers as well as Forest Ecology and Management special issue Editors for the positive and constructive feedback as well as encouragement to bring our story forward with clarity. We mahalo the contributions of: Melanie Leilā Dudley, who helped to draft the Palapala Pilina glossary of Hawaiian terms; Liana MacDonald-Kainoa, who supported the work of the Hui Nui in earlier stages of the P-CBSFA; the Nāpu'u Natural Resource Management Team members especially Kealaka'i Knoche and David Russell; and the Akaka Foundation for Tropical Forest's P-CBSFA Field team Ashley-Ann Kaleioneu Shaw and Ku'unahenani Keakealani

for field assistance, sharing of knowledge, ungulate control, seed collection, care of seedlings, and making work on the ground successful. We thank Americorps and Youth Conservation Corps program leadership at Kupu, the USDA Forest Service R5 and IPIF, and the National Fish and Wildlife Foundation for supporting multiple cohorts of Youth Conservation Corps and Conservation Leadership Development Program members who have put their hands on the earth at Pu'uwa'awa'a. Finally, we acknowledge the HETF and Hawai'i DLNR-DOFAW for their support of the P-CBSFA and serving as the sandbox to host this exciting initiative.

**Funding:** We thank our funders including: the USDA Forest Service IPIF (PA17-2127036029 to Akaka Foundation for Tropical Forests including salary support for KKK and RDO); the State of Hawai'i and the USDA Forest Service Region 5 (Large Scale Restoration grant # 19-DG-11052021-217 to Akaka Foundation for Tropical Forests for materials, supplies and salary support); the USDA Forest Service R5 and IPIF, and the National Fish and Wildlife Foundation for supporting multiple cohorts of Kupu Hawai'i Youth Conservation Corps and Conservation Leadership Development Program members; and Patagonia Inc., Patagonia Foundation, the Dorrance Family Foundation, the Laura Jane Musser Fund, and two additional funders who wish to remain anonymous for supporting many aspects of the work accomplished by the P-CBSFA.

## Appendix A. Palapala Pilina

### A.1. KĀ KĀKOU PALAPALA PILINA

THIS RELATIONSHIP DOCUMENT CALLS UPON US TO WORK TO ACHIEVE THE HEALTH AND WELL BEING OF PU'UWA'AWA'A AND THE KAIĀULU OF IT BY MEANS OF THE PU'UWA'AWA'A COMMUNITY-BASED SUBSISTENCE FOREST AREA HUI

### A.2. Context and Purpose

We recognize the mutual benefit to 'āina and kānaka when kānaka gather to aloha and mālama the 'āina. We recognize that achieving this outcome requires coordination, cooperation, and shared understanding. We further recognize that the strength of our work arises from our collective voice. This Relationship Document outlines the sound partnership that we seek, a partnership based on shared values and understanding of our collective and respective roles, responsibilities, and accountabilities. This Relationship Document therefore defines those roles, responsibilities and accountabilities that create and maintain an ethical and productive partnership between us and is written in the spirit of the shared values upon which our partnership is based.

### A.3. Vision

We envision vibrant and engaged kaiāulu, multi-generational, multi-ethnic, and multi-talented, applying our skills, talents, strengths, service, and aloha to maintain presence and productivity on this 'āina aloha of Pu'uwa'awa'a, in cooperation with our hoaloha from public and private agencies, as well as individuals.

### A.4. Values

#### A.4.1. Respect

We believe that maintaining respectful relationships is fundamental to the achievement of our shared vision. Respectful relationships are built upon the recognition that we all have something to contribute, individually and collectively, to the implementation of our vision. Therefore, we commit to treating each other with dignity and generosity, being responsive to one another, and acknowledging that each of us has our own respective processes and practices. We are also committed to respectful interactions with those around us.

#### A.4.2. Discipline

We have the historic opportunity to achieve restorative change in our 'āina / kānaka relationship, the health and wellness of both, and have an obligation to make the most of this opportunity. This will require discipline amongst us, including through loyalty to one another and our shared vision; upholding and supporting our roles, responsibilities, decisions, and processes; maintaining and nurturing unity and a united front; integrity and reliability in fulfilling our commitments, and accountability to one another for these commitments and contributions; and solutions-oriented and active participation.

#### A.4.3. Excellence

We are humbled and honored to have been called by each other to work on behalf of 'āina and kānaka, to improve the health and wellbeing of both, and that we have a moral and personal responsibility to strive for excellence in what we do here. Excellence means that our outcomes are sustainable, that our processes are professional and transparent and conducted with aloha, and that we commit to learn continuously, from each other and from new, different, and innovative models from across the pae 'āina and ka honua nei.

#### A.4.4. Fairness

We will work to improve the health and wellbeing of 'āina and kānaka at Pu'uwa'awa'a. Our decision-making reflects the best interests of all concerned and leads to just and equitable treatment amongst all concerned. We are committed to make room for those whom we need to make room for, and to be inclusive in our communications, knowledge-sharing, and discussions.

#### A.4.5. Relationships

We believe that effective working relationships with one another are the foundation for achieving our vision and implementing our plans and agreements to mālama 'āina at Pu'uwa'awa'a. We commit to fostering effective working relationships and camaraderie underpinned by trust; honesty; understanding; teamwork; and mutual support. We also acknowledge that humor and laughter are both good medicines, and a good way to build and sustain relationships.

#### A.4.6. Culture

We are here because of those that came before us, and to work on behalf of our lāhui to mālama 'āina. We draw upon the diverse and unique cultures, protocols, ceremonies, customs, and teachings of our lāhui for strength, wisdom, and guidance. We uphold traditional and holistic approaches to aloha and mālama 'āina and each other and strive to achieve a balance in our mental, spiritual, emotional, and physical wellness.

### A.5. Mandates

#### A.5.1. Leadership

We will embody dedication to community-based implementation of the objectives of the Pu'uwa'awa'a Community-Based Forest Hui, which are consistent with the Management Plan for the Ahupua'a of Pu'uwa'awa'a and the Makai Lands of Pu'uānāhulu (State of Hawaii, 2003). We will reflect a philosophy, culture, and practice of trust, unity, honesty, humility, and healthy living, based on traditional practices and teachings, in our decision making, planning, operations, and programs.

#### A.5.2. Advocacy

We will support and advance knowledge sharing and collaboration with our families and partners in various levels of government and other like-intended organizations, families, and individuals. We will advocate for "service improvements" at Pu'uwa'awa'a which are consistent with the objectives of the Pu'uwa'awa'a Community-Based Forest Hui and the Management Plan for the Ahupua'a of Pu'uwa'awa'a and the Makai Lands of Pu'uānāhulu.

#### A.5.3. Support

We will support kaiāulu driven and lāhui based approaches to decision making, problem solving / solution seeking, and well-being. We will support kaiāulu, and 'āina health and well-being through knowledge sharing and collaborative practice. We will support the expansion of mālama 'āina work at Pu'uwa'awa'a to include kaiāulu and 'ohana in collaboration with public and private partners.

#### A.5.4. Composition of the Pu'uwa'awa'a Community-Based Subsistence Forest Area Hui

There is the Hui Nui which is comprised of representatives of the Hui Kaiāulu (see below) and individuals working at Pu'uwa'awa'a for: the Hawai'i State Division of Forestry and Wildlife and its affiliates and the USDA Forest Service and its affiliates; the Akaka Foundation for Tropical Forests; and the University of Hawai'i. There is the Hui Kaiāulu which is comprised of 'ohana of Pu'uānāhulu, Pu'uwa'awa'a, and Ka'ūpūlehu, and others with functional, practical, and cultural knowledge of Pu'uwa'awa'a.

#### A.5.5. Cooperation

Each of us has contributions to make to the Pu'uwa'awa'a Community-Based Subsistence Forest Area Hui and we are mutually committed to ensuring cooperative, coordinated, consistent, and unified approaches to resources management and kaiāulu involvement. Further, we enjoy full and free association, and knowledge, and labor exchanges with others, including volunteers, researchers, subject-area experts, educators, and students, in the pursuit of our objectives.

#### A.5.6. Implementation

We will provide a kama'āina/kupa'āina sensibility and perspective to research and programming done to implement the objectives of the Pu'uwa'awa'a Community-Based Subsistence Forest Area Hui.

### A.6. Reciprocal accountabilities

#### A.6.1. Aloha I Kekahi I Kekahi

We will aloha the 'āina, the lāhui, and each other.

#### A.6.2. Ho'omanawanui

We will share patience, steadfastness, and fortitude on the 'āina and with each other.

#### A.6.3. Mālama I Kekahi I Kekahi

We will care for, tend, preserve, protect, maintain, and serve, the 'āina, the lāhui, and each other.

### A.7. Operations and support

#### A.7.1. Decision making

Decisions are made by consensus.

#### A.7.2. Evaluation

Evaluation will be made, selectively and cumulatively, according to measures which will report the development, progress, and completion of research, programs, and other activities which promote the success of the Pu'uwa'awa'a Community-Based Subsistence Forest Area Hui.

#### A.7.3. Compensation

Compensation will be made using professional wage schedules for contract and volunteer work, as needed. When work is not compensated, work hours will be recorded.

#### A.7.4. Grievance resolution

Grievances will be resolved by the Parties, following open discussion (s) and utilization of the values, mandates, and accountabilities described in this Relationship Agreement as a guide.

### A.7.5. Succession

Succession is the responsibility of the Parties, to assure the continuity and continuation of the work of the Pu'uwa'awa'a Community-Based Subsistence Forest Area Hui.

### A.7.6. Dissolution

Dissolution may be made by the Parties, following open discussion and unanimous agreement and consent.

### A.8. Amendments

We may make amendments to this Relationship Agreement by mutual agreement and consent.

#### A.8.1. Glossary of Hawaiian Terms

The below definitions come from a compilation of resources: Elbert & Pukui Hawaiian Dictionary, Māmaka Kaiao & Andrews Dictionary  
*‘āina*: Land, earth. That which feeds the kākāka physically, mentally, and spiritually. Also, a meal.

*‘āina aloha*: The land that is cherished and loved.

*ho‘omanawanui*: To be patient.

*aloha*: A word expressing different feelings; as, love; affection; gratitude; kindness; pity; compassion; grief; the modern common salutation at meeting and parting

*aloha ‘āina*: To have great love for the land. Love of the land or of one's country, patriotism; (aloha ‘āina is) an incredibly old concept, to judge from the many sayings (perhaps thousands) illustrating deep love of the land.

*hui*: An organization, partnership, union, alliance, team; to form a society or organization; to meet. Also, to join, unite and combine.

*kaiāulu*: A community, neighborhood and/or village.

*kama‘āina*: Kama, child, and ‘āina, land. Literally, a child of the land.

A native born in any place and continuing to live in that place.

*kānaka*: A person of Hawaiian descent.

*kekahi*: A, some, one, one of, few, other, another, a certain.

*kupa‘āina*: A native-born, someone who has a long and deep attachment to a place.

*kupa*: A native-born, a person who is well-acquainted.

*lāhui*: A people; tribe; nation. Lā, day, and hui, to unite. A time of coming together; hence, an assemblage; a company; a union of many.

*mālama*: To take care of, tend, attend, care for, preserve, protect, beware, save, maintain.

*mālama ‘āina*: To care for the land.

*nui*: Big, large, great, important, abundant; plenty, a lot.

*‘ohana*: A family. Those who dwell together and compose a family; an assemblage of parents, children and servants living together.

*pae‘āina*: A group of islands, the Hawaiian archipelago.

### References

- Abbott, I.A., 1992. *La‘au Hawai‘i: Traditional Hawaiian Uses of Plants*. Bishop Museum Press, Honolulu, Hawai‘i.
- Andrade, C., 2008. *Hā‘ena*. University of Hawai‘i Press, Honolulu, Hawai‘i.
- Baker, M., Kusel, J., 2003. Community Forestry in the United States: Learning from the Past, Crafting the Future. Island Press, <https://doi.org/10.1016/j.ecolecon.2004.07.004>.
- Beamer, K., Tong, N., 2016. The Māhele Did What? Native Interest Remains. *The Māhele Did What? Native Interest Remains*. Hulili: Multidiscip. Res. Hawaiian Well-Being 10, 125–145.
- Beamer, K., Tuma, A., Thorenz, A., Boldoczki, S., Kotubetey, K., Kukea-Shultz, K., Elkington, K., 2021. Reflections on Sustainability Concepts: Aloha ‘Āina and the Circular Economy. *Sustainability* 13, 2984. <https://doi.org/10.3390/su13052984>.
- Berkes, F., 2004. Rethinking Community-Based Conservation. *Conserv. Biol.* 18 (3), 621–630. <https://doi.org/10.1111/j.1523-1739.2004.00077.x>.
- Berkes, F., 2006. From community-based resource management to complex systems: the scale issue and marine commons. *Ecol. Soc.* 11 (1). <https://www.jstor.org/stable/26267815>.
- Berkes, F., 2009. Evolution of Co-Management: Role of knowledge generation, bridging organizations and social learning. *J. Environ. Manage.* 90 (5), 1692–1702. <https://doi.org/10.1016/j.jenvman.2008.12.001>.
- Berkes, F., Colding, J., Folke, C., 2000. Rediscovery of Traditional Ecological Knowledge as Adaptive Management. *Ecol. Appl.* 10, 251–262. [https://doi.org/10.1890/1051-0761\(2000\)010\[0251:ROTEKAJ\]2.0.CO;2](https://doi.org/10.1890/1051-0761(2000)010[0251:ROTEKAJ]2.0.CO;2).
- Bhakta, N., 2019. A Clash Between Culture and Law: A Comparative Look at the Conflict between Quiet Title Actions in Hawaii, the Kuleana Act of 1850, and the Displacement of Indigenous People. *California Western Int. Law J.* 49 (1).
- Blair-Stahn, C.G., 2014. Noho ana ke akua i ka nāhelehele: The hula practitioner as kūahu environmental steward. MA Thesis. University of Hawai‘i at Mānoa, Pacific Island Studies. Unpublished.
- Borrini-Feyerabend, G., Pimbert, M., Farvar, M.T., Kothari, A., Renard, Y., 2004. *Sharing Power: Learning by doing in co-management of natural resources throughout the world*. IIED and IUCN/ CEESP/ CMWG, Cenesta, Tehran.
- Bremer, L., Falinski, K., Ching, C., Schultz, K., Wada, C., Burnett, K., Reppun, N., Chun, G., Medoff, S., Oleson, K., Ticktin, T., 2018. Biocultural restoration of traditional agriculture: assessing the multiple outcomes of lo‘i restoration in He‘eia, O‘ahu. *Sustainability* 10 (12), 4502. <https://doi.org/10.3390/su10124502>.
- Buck, P.H., 2003. *Arts and Crafts of Hawaii*. Bishop Museum Press, Honolulu, Hawai‘i.
- Campese, J., 2009. *Rights-Based Approaches: Exploring Issues and Opportunities for Conservation*. Center for International Forestry Research.
- Coombes, B.L., Hill, S., 2005. “Na whenua, na Tuhoe. Ko D.o.C. te partner”—Prospects for Comanagement of Te Urewera National Park. *Soc. Natural Resour.* 18 (2), 135–152. <https://doi.org/10.1080/089419205090894516>.
- Diver, S., Vaughan, M., Baker-Medard, M., Lukacz, H., 2019. Recognizing “reciprocal relations” to restore community access to water and land. *Int. J. Commons* 13 (1), 400–429. <https://doi.org/10.18352/ijc.881>.
- Donatuto, J., Grossman, E., Konovsky, J., Grossman, S., Campbell, L., 2014. Indigenous Community Health and Climate Change: Integrating Biophysical and Social Science Indicators. *Coastal Manage.* 42 (4), 355–373. <https://doi.org/10.1080/08920753.2014.923140>.
- Edith Kanaka‘ole Foundation, 2009. *Kūkulu ke Ea a Kanaloa: The Culture Plan for Kanaloa Kaho‘olawe*. Prepared for the State of Hawai‘i Kaho‘olawe Island Reserve Commission. Accessed October 15, 2021: [http://kahoolawe.hawaii.gov/downloads/CULTURAL\\_PLAN.pdf](http://kahoolawe.hawaii.gov/downloads/CULTURAL_PLAN.pdf).
- Enomoto, C.K., 1997. Dance of the red dog: Kumu hula unite and realize their power in the push for sovereignty and preservation of culture. *Honolulu Star-Bulletin*, December 27. Accessed October 15, 2021: <http://archives.starbulletin.com/97/12/29/features/story1.html>.
- Farrell, J., Burrow, P.B., McConnell, K., Bayham, J., Whyte, K., Koss, G., 2021. Effects of land dispossession and forced migration on Indigenous peoples in North America. *Science* 374 (6567). <https://doi.org/10.1126/science.abe4943>.
- Forman, D., Serrano, S., 2012. *Ho‘ohana Aku, a Ho‘ola Aku: A Legal Primer for Traditional and Customary Rights in Hawai‘i*. Ka Huli Ao Center for Excellence in Native Hawaiian Law, Honolulu, Hawai‘i.
- Frazier, A.G., Deenik, J.L., Fujii, N.D., Funderburk, G.R., Giambelluca, T.W., Giardina, C. P., Helweg, D.A., Keener, V.W., Mair, Alan; Marra, J.J., McDaniel, S. Ohye, L.N., Oki, D.S., Parsons, E.W., Strauch, A.M., Trauernicht, C., 2019. Managing Effects of Drought in Hawai‘i and U.S.-Affiliated Pacific Islands. Chapter 5 in: Vose, J.M.; Peterson, D.L.; Luce, C.H.; Patel-Weynand, T., (Eds.), *Effects of drought on forests and rangelands in the United States: translating science into management responses*. Gen. Tech. Rep. WO-98. Washington, DC: U.S. Department of Agriculture, Forest Service, Washington Office, pp. 95–121.
- Garcia, S.N.K., 2002. *E Na Halau Hula, Nana Kakou Ia Laka (Look to the Source): Finding Balance Between the Practice of Hula Forest Gathering and the Ecological Realities of Hawai‘i’s Native Forests*. Doctoral dissertation, University of Hawai‘i at Mānoa. Accessed October 15, 2021: [https://scholarspace.manoa.hawaii.edu/bitstream/10125/7071/2/uhm\\_ma\\_3030\\_r.pdf](https://scholarspace.manoa.hawaii.edu/bitstream/10125/7071/2/uhm_ma_3030_r.pdf).
- Gavin, M., McCarter, J., Mead, A., Berkes, F., Stepp, J.R., Peterson, D., Tang, R., 2015. Defining biocultural approaches to conservation. *Trends Ecol. Evol.* 30 (3) <https://doi.org/10.1016/j.tree.2014.12.005>.
- Giambelluca, T., Chen, Q., Frazier, A., Price, J., Chen, Y., Chu, P., Delparte, D., 2013. Online Rainfall Atlas of Hawai‘i. *Bull. Am. Meteorol. Soc.* 94, 313–316. <https://doi.org/10.1175/BAMS-D-11-00228.1>.
- Gibson, C., Koontz, T., 1998. When ‘Community’ Is Not Enough: Institutions and Values in Community-Based Forest Management in Southern Indiana. *Human Ecol.* 26 <https://doi.org/10.1023/A:1018701525978>.
- Giffin, J., 2003. Pu‘uwa‘awa‘a Biological Assessment: Pu‘uwa‘awa‘a, North Kona. Honolulu, Hawai‘i: Prepared for the State of Hawaii Department of Land and Natural Resources Division of Forestry and Wildlife.
- Gomes, N., 2016. Some Traditional Native Hawaiian Bird Hunting Practices on Hawai‘i Island. *Hawaiian J. History* 15, 33–51. <https://evols.library.manoa.hawaii.edu/bitstream/10524/59458/1/HJH50.gomes.pdf>.
- Gon, S., 2008 Revised List of the Hawaiian Names of Plants Native and Introduced, with brief descriptions and notes as to medical or other values. *Ethnobotany Research Applications*. Accessed October 23, 2021: <https://scholarspace.manoa.hawaii.edu/bitstream/10125/12496/1/1547-3465-06-405.pdf>.
- Gonschor, L., Beamer, K., 2014. *Toward an Inventory of Ahupua‘a in the Hawaiian Kingdom: A survey of Nineteenth- and early Twentieth-Century Cartographic and Archival Records of the Island of Hawai‘i*. Hawaiian J. History 48.
- Gould, R.K., Ardoin, N.M., Woodside, U., Satterfield, T., Hannahs, N., Daily, G.C., 2014. The forest has a story: cultural ecosystem services in Kona, Hawai‘i. *Ecol. Soc.* 19 (3), 55. <https://doi.org/10.5751/ES-06893-190355>.
- Gould, R.K., Pai, M., Muraca, B., Chan, K., 2019. He ‘ike ‘āna ia i ka pono (it is recognizing of the right thing): how one indigenous worldview informs relational values and social values. *Sustain. Sci.* 14, 1213–12232.

- Govier, T., 1999. "What is acknowledgement and why is it important?". Ontario Society for the Study of Argumentation Conference Archive. URL: <https://scholar.uwindsor.ca/ossaarchive/OSSA3/keynotes/1>.
- Handy, E.S.C., Handy, E.G., Pukui, M.K., 1972. *Native Planters in Old Hawaii: Their Life, Lore, and Environment*. Bishop Museum Press, Honolulu, Hawaii.
- Harris, R.C., 2015. The changing face of co-governance in New Zealand: how are Ngai Tahu and Ngai Tahu promoting the interests of their people through power-sharing arrangements in resource management? University of Canterbury, School of Law, Dissertation. <http://dx.doi.org/10.26021/5362>.
- Hawai'i Conservation Alliance, 2010. 1. Hawai'i Conservation Alliance Hawaiian Culture and Conservation in Hawai'i. (Accessed 20 December 2021).
- Hawai'i Revised Statutes §188-22.6, 2019. Designation of community-based subsistence fishing area.
- Hawai'i Conservation Alliance, 2018. Hawai'i Conservation Alliance: Making the Case for Community-Based Adaptive Collaborative Management in Hawai'i. (Accessed 15 December 2021).
- HETF Pu'uwa'awa'a Dry Forest, 2021. United State Forest Service Pacific Southwest Research Station Hawai'i Experimental Tropical Forest Pu'uwa'awa'a Dry Forest. (Accessed 15 December 2021).
- Higgins, P., Male, T., 2019. White Paper: Sandboxing Nature; How Regulatory Sandboxes Could Help Restore Species, Enhance Water Quality and Build Better Habitats Faster. Environmental Policy Innovation Center, Washington DC.
- Higuchi, J., 2008. Propagating cultural Kipuka: the obstacles and opportunities of establishing a community-based subsistence fishing area. *Univ. Hawai'i Law Rev.* 193.
- Houde, N., 2007. The Six Faces of Traditional Ecological Knowledge: Challenges and Opportunities for Canadian Co-Management Arrangements. *Ecol. Soc.* 12 (2) <https://doi.org/10.5751/ES-02270-120234>.
- ICCA Consortium, 2021. ICCA Consortium Territories of Life: 2021 Report. (Accessed 15 December 2021).
- Juvik, S.P., Juvik, J.O., Paradise, T.R., 1998. *Atlas of Hawaii*. University of Hawai'i Press, Honolulu, Hawai'i.
- Kahanamoku, S.S., Alegado, R., Kagawa-Viviani, A., Kamelamela, K., Kamai, B., Walkowicz, L., Prescod-Weinstein, C., Reyes, M.D., Neilson, H., 2020. A Native Hawaiian-led summary of the current impact of constructing the Thirty Meter Telescope on Maunakea. arXiv: Instrumentation and Methods for Astrophysics.
- Kame'eiehiwa, L., 1992. *Pehea la e pono 'ai? Native Lands and Foreign Desires*. Bishop Museum Press, Honolulu, Hawai'i.
- Kamelamela, K., 2019. Contemporary Hawai'i Non-Timber Forest Plant Gathering Practices. Doctoral dissertation, University of Hawai'i. ProQuest Dissertations and Theses database.
- Kealiikanakaolehailani, K., Kurashima, N., Francisco, K.S., Giardina, C.P., Louis, R.P., McMillen, H., Asing, C.K., Asing, K., Block, T.A., Browning, M., Camara, K., Camara, L., Dudley, M.L., Frazier, M., Gomes, N., Gordon, A.E., Gordon, M., Heu, L., Irvine, A., Kaawa, N., Kirkpatrick, S., Leucht, E., Perry, C.H., Replogle, J., Salbosa, L., Sato, A., Schubert, L., Sterling, A., Uwolo, A.L., Uwolo, J., Walker, B., Whitehead, A.N., Yogi, D., 2018. Ritual + Sustainability Science? A Portal into the Science of Aloha. *Sustainability* 10, 3478. <https://doi.org/10.3390/su10103478>.
- Keefe, T., 2019. Land Acknowledgement: A Trend in Higher Education and Nonprofit Organizations. Unpublished, <https://doi.org/10.13140/RG.2.2.33681.07521>.
- Kūlana Noi'i Working Group, 2021. *Kūlana Noi'i v. 2*. University of Hawai'i Sea Grant College Program, Honolulu, Hawai'i. Accessed on October 15, 2021: <https://seagrant.soest.hawaii.edu/kulana-noi/>.
- Lake, F.K., Giardina, C.P., Parrotta, J.A., Davidson-Hunt, I., 2018a. Considering diverse knowledge systems in forest landscape restoration. In: Mansourian, S., Parrotta, J. (Eds.), *Forest Landscape Restoration: Integrated approaches to support effective implementation*. Routledge, New York, pp. 37–46. Chapter 3.
- Lake, F.K., Parrotta, J., Giardina, C.P., Davidson-Hunt, I., Upety, Y., 2018b. Integration of Traditional and Western knowledge in forest landscape restoration. In: Mansourian, S., Parrotta, J. (Eds.), *Forest Landscape Restoration: Integrated approaches to support effective implementation*. Routledge, New York, pp. 198–226. Chapter 12.
- Lake, F.K., Emery, M.R., Baumfleik, M.J., Friday, K.S., Kamelamela, K., Kruger, L., Grewe, N., Gilbert, J., Reo, N.J., 2018c. Chapter 4 - Cultural dimensions of nontimber products. In: Chamberlain, J.L., Emery, M.R., Patel-Weyand, T., (Eds.), 2018. Assessment of nontimber forest products in the United States under changing conditions. Gen. Tech. Rep. SRS-232. Asheville, NC: U.S. Department of Agriculture, Forest Service, Southern Research Station, pp. 84–99.
- Lam, M.C., 1989. The Kuleana Act Revisited: The Survival of Traditional Hawaiian Commoner Rights in Land. *Washington Law Rev.* 64 (2), 233.
- Larsen, S.C., Johnson, J.T., Wildcat, D.R., 2017. Reciprocal Guardianship. In: *Being Together in Place*. University of Minnesota Press. <https://doi.org/10.5749/minnesota/9781517902216.003.0005>.
- Lyver, P., Jones, C., Doherty, J., 2009. Flavor or Forethought: Tuhoe Traditional Management Strategies for the Conservation of Kereru (*Hemiphysa novaeseelandiae novaeseelandiae*) in New Zealand. *Ecol. Soc.* 14 (1). <http://www.ecologyandsociety.org/vol14/iss1/art40/>.
- MacKenzie, M.K., Serrano, S.K., Sproat, D.K. (Eds.), (2015) *Native Hawaiian Law A Treatise*. Honolulu, Hawai'i: Kamehameha Schools Publishing.
- Maly, K., 2006. He Wahi Mo'olelo no Pu'u Wa'awa'a a me Nāpu'u o na Kona: A Collection of Cultural and Historical Accounts of Pu'u Wa'awa'a and the Nāpu'u Region – District of Kona, on the Island of Hawai'i. Hilo, Hawaii: Prepared for The Institute of Pacific Islands Forestry, USDA Forest Service.
- Mahanty, S., Gronow, J., Nurse, M., Malla, M., 2006. Reducing Poverty through Community Based Forest Management in Asia. *J. Forest Livelihood* 5 (1).
- Manning, B.R.M., Reed, K., 2019-2020. Returning the Yurok Forest to the Yurok Tribe: California's First Tribal Carbon Credit Project. *Stanford Environ. Law J.* 71.
- Matsuoka, J., McGregor, D., L. M., Akutagawa, M., Hou, K.K., 1994. Governor's Molokai's Subsistence Task Force Final Report. Prepared for The Molokai Subsistence Task Force and The Department of Business, Economic Development & Tourism. Honolulu, Hawai'i: University of Hawai'i Department of Urban and Regional Planning.
- McElwee, P., Fernández-Llamazares, Á., Aumeeruddy-Thomas, Y., Babai, D., Bates, P., Galvin, K., Guèze, M., Liu, J., Molnár, Z., Ngo, H.T., Reyes-García, V., Roy Chowdhury, R., Samakov, A., Shrestha, U.B., Díaz, S., Brondizio, E.S., et al., 2020. Working with Indigenous and local knowledge (ILK) in large-scale ecological assessments: Reviewing the experience of the IPBES Global Assessment. *J. Appl. Ecol.* 57 (9), 1666–1676. <https://doi.org/10.1111/1365-2664.13705>.
- McGregor, D.P., 1995a. Waipi'o valley, a cultural kipuka in early 20th Century Hawaii. *J. Pacific History* 30 (2), 194–209. <https://doi.org/10.1080/00223349508572795>.
- McGregor, D., 1995b. *Traditional Hawaiian Cultural, Spiritual, and Subsistence Beliefs, Customs, and Practices and Wai'āhole, Waikāne, Hakipu'u, and Kahana*. Prepared for the Native Hawaiian Advisory Council, Honolulu, Hawai'i.
- McGregor, D., 2007. *Nā Kua'aina: Living Hawaiian Culture*. University of Hawaii Press, Honolulu, Hawai'i.
- McMillen, H., Ticktin, T., Springer, H.K., 2017. The future is behind us: traditional ecological knowledge and resilience over time on Hawai'i Island. *Reg Environ Change* 17, 579–592. <https://doi.org/10.1007/s10113-016-1032-1>.
- Mendoza, G.A., Prabhu, R., 2005. Combining participatory modeling and multi-criteria analysis for community-based forest management. *For. Ecol. Manage.* 207 (1), 145–156. <https://doi.org/10.1016/j.foreco.2004.10.024>.
- Meyer, M., 2001. Our Own Liberation: Reflections of Hawaiian Epistemology. In: *The Contemporary Pacific*, vol. 13. University of Hawaii Press, Honolulu, Hawai'i, pp. 123–198.
- Meyer, M., 2013. *Holographic Epistemology: Native Common Sense*. *China Media Res.* 9 (2), 94–101.
- Minerbi, L., 1999. Indigenous Management Models and the Protection of the Ahupua'a: in Ibrahim Aoude' guest ed. *Social Process in Hawaii*, pp. 208–225.
- Montgomery, M., Vaughan, M., 2018. Ma Kahana ka 'Ike: Lessons for Community-Based Fisheries Management. *Sustainability* 10, 3799. <https://doi.org/10.3390/su10103799>.
- Morishige, K., Andrade, P., Pascua, P., Steward, K., Cadiz, E., Kapono, L., Chong, U., 2018. Nā Kilo 'Aina: Visions of Biocultural Restoration through Indigenous Relationships between People and Place. *Sustainability* 10, 3368. <https://doi.org/10.3390/su10103368>.
- Mueller-Dombois, D., 2007. The Hawaiian Ahupua'a Land Use System: Its Biological Resource Zones and the Challenge for Silvicultural Restoration (Vol. 3, 23–33). Honolulu, Hawai'i: Bishop Museum Bulletin in Cultural and Environmental Studies. Retrieved June 6, 2019, from <http://hbs.bishopmuseum.org/pubs-online/strm/04-Mueller-Domboisr.pdf>.
- Office of Hawaiian Affairs, 2003. Paoakalani Declaration. Accessed April 18, 2020. <https://www.oha.org/news/statement-on-the-alo-ha-pokecontroversy/paoakalani-declaration/>.
- Pascua, P., McMillen, H., Ticktin, T., Winter, K., 2017. Beyond services: A process and framework to incorporate cultural, genealogical, place-based, and indigenous relationships in ecosystems services assessments. *Ecosyst. Services* 26, Part B, 465–475.
- Penn, D.C., 1993. Water needs for sustainable taro culture in Hawai'i. In: Ferentinos, L. (Ed.), *Proceedings of the Sustainable Taro Culture for the Pacific Conference*. Sustainable Taro Culture for the Pacific Conference; 1992 Sept 24–25; Honolulu, Hawaii. Honolulu, Hawai'i: University of Hawaii, pp. 132–134.
- Pukui, M.K., 1983. *ʻŌlelo No'ea: Hawaiian Proverbs and Poetical Sayings*. Bishop Museum Press, Honolulu, Hawai'i.
- Pukui, M.K., Elbert, S.H., 1986. *Hawaiian dictionary: Hawaiian-English, English-Hawaiian*. University of Hawai'i Press, Honolulu, Hawai'i.
- Pu'uwa'awa'a Natural Resources Story Map, 2020. 1. Pu'uwa'awa'a Natural Resources Story Map. (Accessed 17 December 2021).
- Robinson, D., Hill, K., Ruffo, A., Couture, S., Ravensbergen, L., 2019. Rethinking the Practice and Performance of Indigenous Land Acknowledgement. *Can. Theatre Rev.* 177, 20–30. <https://www.muse.jhu.edu/article/716610>.
- Rock, J., 1913. *Indigenous trees of the Hawaiian Islands*. Published under patronage, Honolulu, Territory of Hawaii.
- Salmón, E., 2000. Kincentric Ecology: Indigenous Perceptions of the Human-Nature Relationship. *Ecol. Appl.* 10, 1327–1332. [https://doi.org/10.1890/1051-0761\(2000\)010\[1327:KEIPOT\]2.0.CO;2](https://doi.org/10.1890/1051-0761(2000)010[1327:KEIPOT]2.0.CO;2).
- Sato, A.Y., Ticktin, T., Alapai, L., von Allmen, E.I., Brawner, W.P.I., Carter, Y.Y., Carter, K.A., Keakealani, R.K., Medeiros, A.C., Zahawi, R.A., 2021. Biocultural restoration of Hawaiian tropical dry forests. *Pacific Conserv. Biol.* <https://doi.org/10.1017/PC20084>.
- Senate 2679 - Hawaii Tropical Forest Recovery Act 102<sup>nd</sup> Congress (1992, September 30), Accessed October 25, 2021: <https://www.congress.gov/bill/102nd-congress/senate-bill/2679>.
- Senate Joint Resolution 19 - United States Apology Resolution 103<sup>rd</sup> Congress (1993, November 23), Accessed October 25, 2021: <https://www.congress.gov/bill/103rd-congress/senate-joint-resolution/19>.
- Smithsonian National Museum of Natural History Flora of the Hawaiian Islands: Native Taxa. (2021). Retrieved December 17, 2021, from <https://naturalhistory2.si.edu/botany/hawaiianflora/result2.cfm>.
- Sproat, K.D., 1998. The Backlash Against PASH: Legislative Attempts to Restrict Native Hawaiian Rights. *University of Hawai'i Law Review*, 20, 321. Accessed October 22,

- 2021: [https://scholarspace.manoa.hawaii.edu/bitstream/10125/35315/1/Sprout\\_20UHawLRev3\\_21.pdf](https://scholarspace.manoa.hawaii.edu/bitstream/10125/35315/1/Sprout_20UHawLRev3_21.pdf).
- State of Hawaii, 2003. Management Plan for the Ahupua'a of Pu'u Wa'awa'a and the Makai Lands of Pu'u Anahulu. Honolulu, Hawaii: Division of Forestry and Wildlife. Accessed on October 15, 2021: <https://www.fs.fed.us/psw/ef/hawaii/documents/MgmtPlanPuuwaawaa2003.pdf>.
- Sterling, E., Ticktin, T., Morgan, T.K.K., Cullman, G., Alvira, D., Andrade, P., Bargamini, N., Betley, E., Burrows, K., Caillon, S., Claudet, J., Dacks, R., Eyzaguirre, P., Filardi, C., Gazit, N., Giardina, C., Jupiter, S., Kinney, K., McCarter, J., Mejia, M., Morishige, K., Newell, J., Noori, L., Parks, J., Pasuca, P., Ravikumar, A., Tanguay, J., Sigouin, A., Stege, T., Stege, M., Wali, A., 2017. Culturally grounded indicators of resilience in social-ecological systems. *Environ. Soc.* 8 (1), 63–95. <https://doi.org/10.3167/ares.2017.080104>.
- Temprano, V., 2015. Native Land. Accessed on October 15, 2021: <https://native-land.ca>.
- Ticktin, T., 2004. The ecological consequences of harvesting non-timber forest products. *J. Appl. Ecol.* 41 (4), 11–21.
- Ticktin, T., Fraiola, H., Whitehead, A.N., 2006a. Non-timber forest product harvesting in alien-dominated forests: Effects of frond-harvest and rainfall on the demography of two native Hawaiian ferns. *Plant Conservat. Biodiversity* 59–77. [https://doi.org/10.1007/978-1-4020-6444-9\\_5](https://doi.org/10.1007/978-1-4020-6444-9_5).
- Ticktin, T., Whitehead, A.N., Fraiola, H., 2006b. Traditional gathering of native hula plants in alien-invaded Hawaiian forests: Adaptive practices, impacts on alien invasive species and conservation implications. *Environ. Conserv.* 33 (3), 185–194. <https://doi.org/10.1017/s0376892906003158>.
- Ticktin, T., Shackleton, C., 2011. Harvesting Non-timber Forest Products Sustainably: Opportunities and Challenges. *Tropical Forestry Non-Timber Forest Prod. Global Context* 149–169. [https://doi.org/10.1007/978-3-642-17983-9\\_7](https://doi.org/10.1007/978-3-642-17983-9_7).
- Trask, H.K., 1999. From a Native Daughter: Colonialism and Sovereignty in Hawai'i, 2nd ed. University of Hawai'i Press, Honolulu, Hawai'i.
- Tuck, Eve, Yang, K. Wayne, 2012. Decolonization is not a metaphor. *Decolonizat.: Indigeneity, Educ. Soc.* 1 (1), 1–40.
- Tuhiwai-Smith, L., 2021. Decolonizing methodologies: research and indigenous peoples. Zed Books, Bloomsbury Publishing, London, England.
- United Nations, 2013. United Nations Declaration on the Rights of Indigenous Peoples: Adopted by the United Nations General Assembly on 13 September 2007. Sydney, New South Wales: Australian Human Rights Commission.
- United State Fish and Wildlife Service, 2019. Environmental Conservation Online System Threatened and Endangered Plants.
- von der Porten, S., de Loë, R., Plummer, R., 2015. Collaborative Environmental Governance and Indigenous Peoples: Recommendations for Practice. *Environ. Practice* 17, 134–144. <https://doi.org/10.1017/S146604661500006X>.
- Van Dyke, J., Mackenzie, K., 2006. An Introduction to the Rights of the Native Hawaiian People. Hawaii Bar J.
- Vaughan, M.B., 2018. Kaiāulu: Gathering Tides. Oregon State University Press.
- Whitehead, N., 2015. Ku ka maila: Ethnobotany, harvest effects and recruitment limitation in maila, *Alyxia stellata* (Apocynaceae). Doctoral dissertation, University of Hawai'i at Mānoa.
- Winter, K.B., Beamer, K., Vaughan, M.B., Friedlander, A.M., Kido, M.H., Whitehead, A. N., Akutagawa, M.K.H., Kurashima, N., Lucas, M.P., Nyberg, B., 2018. The Moku System: Managing Biocultural Resources for Abundance within Social-Ecological Regions in Hawai'i. *Sustainability* 10, 3554. <https://doi.org/10.3390/su10103554>.
- Winter, K.B., Vaughan, M.B., Kurashima, N., Giardina, C., Quiocho, K., Chang, K., Akutagawa, M., Beamer, K., Berkes, F., 2021. Empowering Indigenous agency through community-driven collaborative management to achieve effective conservation: Hawai'i as an example. *Pacific Conservat. Biol.* <https://doi.org/10.1071/PC20009>.
- Zanre, E., 2014. Community-Based Subsistence Fishing Area Designation Procedures Guide. Prepared for the Hawai'i. Department of Land and Natural Resources Division of Aquatic Resources.
- Ziegler, A.C., 2002. Hawaiian natural history, ecology, and evolution. University of Hawai'i Press, Honolulu, Hawai'i.