

ORIGINAL ARTICLE

Who takes care of Hawai'i? Understanding the roles and capacities of civic organizations in environmental stewardship

Rachel Dacks¹  | Heather McMillen² | Lauren Nerfa³ | Kim Kahaleua^{2,3} | Christian P. Giardina⁴ | Tamara Ticktin³

¹Department of Natural Resources and Environmental Management, University of Hawai'i at Mānoa, Honolulu, Hawai'i, USA

²Division of Forestry and Wildlife, State of Hawai'i Department of Land and Natural Resources, Honolulu, Hawai'i, USA

³School of Life Sciences, University of Hawai'i at Mānoa, Honolulu, Hawai'i, USA

⁴Institute of Pacific Islands Forestry, Pacific Southwest Research Station, USDA Forest Service, Hilo, Hawai'i, USA

Correspondence

Rachel Dacks, Department of Natural Resources and Environmental Management, University of Hawai'i at Mānoa, 1910 East West Center Road, Honolulu, HI 96822, USA.
Email: rdacks@hawaii.edu

Funding information

Region 5 of the United States Department of Agriculture Forest Service

Abstract

Extensive threats to ecosystems and a diversity of motivations for environmental care have driven a growing environmental stewardship movement. The impact of this movement has the potential to be large, but the defining features are poorly characterized. As a result, the contributions of many civic groups that care for the environment may be unrecognized. We develop an understanding of the network of environmental stewardship groups (ESGs) on O'ahu, Hawai'i, in order to identify approaches to support effective, efficient, and equitable local environmental stewardship. To do this, we conducted a survey of civic ESGs to understand how they engaged in environmental stewardship and semi-structured interviews to elaborate ESGs' visions and challenges. Survey respondents ($n = 128$) identified a network of >600 collaborating groups. While the central focus for many ESGs was caring for and educating about places, landscapes, and lifeforms, many of these groups also cultivated young leaders, community well-being, and sharing of cultural values and knowledge, highlighting the biocultural approaches to environmental stewardship taken by respondents. Stewardship networks consisted of civic ESGs (77%) with a significant number of government agencies (19%) and few private (3%) or hybrid groups (2%), highlighting the collaborative governance that occurs when groups recognize shared goals in the face of limited resources. We highlight efforts that can support the normalization of environmental stewardship into everyday life, a goal expressed by interviewees: (1) stewardship collaborations of government and nongovernmental organizations become mainstream and expand to groups beyond the environmental

This is an open access article under the terms of the [Creative Commons Attribution](https://creativecommons.org/licenses/by/4.0/) License, which permits use, distribution and reproduction in any medium, provided the original work is properly cited.

© 2026 The Author(s). *Earth Stewardship* published by Wiley Periodicals LLC on behalf of Ecological Society of America. This article has been contributed to by U.S. Government employees and their work is in the public domain in the USA.

sector, (2) ESGs expand their monitoring to include social impacts, (3) funders expand their embrace of Indigenous frameworks of well-being, especially of more diverse indicators of success, and (4) increase access to culturally guided, place-based learning for children and adults. These efforts are likely important in other postcolonial contexts with local traditions of environmental stewardship.

KEYWORDS

biocultural approaches, collaborative governance, environmental stewardship, Hawai'i, mālama 'āina, social networks, social-ecological systems, sustainability

INTRODUCTION

A diverse set of interacting threats including climate change, pollution, invasive species, overharvesting, and expanding development challenge efforts to care for natural and cultural resources. These challenges have prompted a global movement for increased local investment into environmental stewardship (Hawken, 2007). Since the start of the 21st century, the number of groups focused on environmental stewardship and academic interest in stewardship has been increasing (Fisher et al., 2012; Mathevet et al., 2018; McLeod et al., 2024).

Environmental stewardship: Concepts, motivations, and definitions

While there are many approaches to conceptualizing stewardship, few definitions for environmental stewardship exist in the Western literature (Bennett et al., 2018; Mathevet et al., 2018). Since the early 2000s, many disciplines have grappled with defining stewardship, each with different epistemological, ethical, and philosophical foundations (Thomas & Romolini, 2023). Bennett et al. (2018) proposed a conceptual framework and definition that “Local environmental stewardship is the actions taken by individuals, groups, or networks of actors, with various motivations and levels of capacity, to protect, care for or responsibly use the environment in pursuit of environmental and/or social outcomes in diverse social-ecological contexts” (p. 599). A broader definition of stewardship from Fisher et al. (2012) includes a range of activities including: “conserving, managing, monitoring, advocating for, and educating” (p. 32). Other definitions have focused on social-ecological interactions and resilience or sustainability, ethics, actions, or behaviors of stewardship (Mathevet et al., 2018; McLeod et al., 2024).

Alongside the many definitions of stewardship is a diversity of documented motivations for and satisfactions of participating in environmental stewardship. Bennett

et al. (2018) highlighted that motivations for stewardship may be related to achieving personal satisfaction or fulfillment based on one's morals and ethics (intrinsic benefits). Motivations may also be related to the achievement of more tangible objectives or the gaining of rewards (extrinsic benefits). Furthermore, relational values can underlie people's connections to the places they steward, which go beyond the framing of what places provide to people, to focus on reciprocity and cultural or traditional values informing stewardship (Chan et al., 2016). Given the diverse motivations for engaging in environmental stewardship, work is needed to understand what motivates the broad networks of groups participating in environmental stewardship, their values and objectives, and desired future directions. Achieving a more comprehensive understanding of the community of stewardship groups and what their goals and activities are could inform strategies to maximize benefits to resources and people, and also to achieve broader societal goals. By documenting these contributions in the environmental stewardship literature, lessons learned can be accessed by the global community.

Two key factors shape the nature of stewardship and who participates in that stewardship: biocultural approaches and collaborative governance. Both are useful for thinking comprehensively about stewardship and exploring how to enhance the effectiveness of stewardship, even with limited resources, and to support the larger social-ecological system.

Biocultural approaches to stewardship

Biocultural approaches emphasize the inextricable links among and coevolution of biological and cultural dimensions of systems (Gavin et al., 2015). When biocultural approaches are used in environmental stewardship, the goal is generally to care for and support not only the ecological functioning of an ecosystem but also the connections between people and place (McMillen et al., 2020).

These connections are considered to be reciprocal in that people who care for the place are also being cared for by the place (Diver et al., 2019). Biocultural stewardship has been practiced by Indigenous Peoples and Local communities (IPLCs) worldwide for centuries and in some places, millennia (Berkes, 2018). As Turner explains, stewardship practices informed by Indigenous knowledge have focused on sustaining or enhancing the “availability, abundance, productivity, diversity, and/or quality of a plant or animal population or of an entire resource area or habitat over a period of years or generations” (Turner, 2014). Further, many Indigenous resource management practices are situated within a kincentric worldview where people not only inherit a strong responsibility for the care of nature but view themselves as part of nature, with which they share genealogical connections (Salmón, 2000). As such, Indigenous peoples may not consider their practices to be acts of “resource management” as they may be within a Western worldview. Colonialism, globalization, and militarization, among other factors, have disrupted Indigenous knowledge systems by displacing and in some cases eradicating entire communities, changing land tenure and governance structures, and intentionally suppressing the passing of language, cultural practices, and belief systems, among other injustices (Farrell et al., 2021). While traditional practices have been maintained in some places despite being disrupted, recent decades have seen a revitalization of traditional practices in other places, leading to increased implementation of community-based natural resource management, guided by Indigenous Knowledge (Lam et al., 2020).

Relatedly, commons management has historically been practiced by multigenerational communities around the world, including the grazing meadows in Switzerland, communal forests in Japan, and water systems for irrigation in Japan (Ostrom, 1990). In the United States, local multigenerational environmental stewardship has been practiced by rural farming and ranching families (Bunce, 1998). By adopting a broad definition of stewardship that incorporates biocultural approaches, we can deepen our understanding of how environmental stewardship practices also advance social and cultural objectives.

Collaborative governance

State and federal agencies often share stewardship goals with IPLCs, but differences in approach and limited resources on both sides make collaborative governance a key strategy for more effective, efficient, and equitable environmental stewardship (Campbell et al., 2024; Svendsen & Campbell, 2008). Collaborative governance

brings together civic and government actors to share decision-making, coordinate efforts, and build collective capacity for stewardship (Ansell & Gash, 2008; Emerson et al., 2012). As such, it offers opportunities to bridge across levels and scales of governance, while also providing opportunities to pair diverse perspectives, worldviews, and approaches (Poteete, 2012). Collaborative governance is an especially important opportunity for IPLCs to exercise agency in managing their natural resources (Winter et al., 2021). A clearer understanding of how government agencies and civic groups collaborate will contribute to the literature on how collaborative governance fosters the weaving of diverse knowledge systems and promotes systems thinking in environmental stewardship across scales.

Study context and objectives

The Stewardship Mapping and Assessment Project (STEW-MAP) was established to investigate and inventory local stewardship initiatives in New York City, USA (Campbell et al., 2024). Since the early 2000s, STEW-MAP has been implemented in mostly urban locations across the United States and in eight international cities (Dominican Republic, Columbia, France, Mexico, and Peru), but also in mixed rural, suburban and urban areas of Hawai‘i and New England, USA (<https://stewmap.commons.gc.cuny.edu/locations/>). The STEW-MAP methodology can be used to coordinate collaborative efforts between diverse stakeholders including government agencies and groups not focused solely on environmental stewardship. In this paper, we use the STEW-MAP framework to examine environmental stewardship in Hawai‘i. We were guided by the STEW-MAP definition of environmental stewardship that includes conservation, management, monitoring, and advocacy, acknowledging that stewardship activities can be broader than “hands-on” or “boots on the ground” work, which is especially true in Hawai‘i where people care for place in many different ways (‘Āina of Ka‘ōnohi et al., 2023).

The islands of Hawai‘i have complex cultural and ecological diversity and a difficult colonial history. The overthrow of the Hawaiian Kingdom in 1893 dramatically altered land access with >7000 km² of land illegally transferred to the US federal government without consent or compensation to the Native Hawaiian People (MacKenzie et al., 2015). Land privatization during the Great Māhele in the mid 1800s introduced additional important changes to land management. With the creation of National Parks, State Forest Reserves, State and Country Parks (almost entirely reliant on appropriating ceded lands), the development of urban and agricultural

spaces, and further privatization of land, connections to place were disrupted for Native Hawaiians who had stewarded these spaces for generations. These disruptions pose ongoing cultural and well-being consequences (Trask, 1999). Since the 1970s, there has been increasing recognition of the concept of ‘āina (land, or that which feeds) and mālama (to care for) ‘āina, in environmental stewardship and biocultural approaches to restoration (Winter et al., 2021).

Given the breadth of ecological issues threatening terrestrial and marine systems in Hawai‘i as well as the variety of stewardship initiatives engaging these threats (Supporting Information), our goal in this study was to better understand the collaborative nature of environmental stewardship (inclusive of Indigenous and conventional approaches) by addressing (1) who are the civic (i.e., nongovernmental) groups that engage in environmental stewardship? (2) how does information about these

groups provide us with a better understanding of stewardship and (3) how can these groups be better supported? We expected that group motivations and goals would be diverse, with a majority of groups focusing primarily on environmental stewardship, but some percentage having other primary goals, such as cultural revitalization.

METHODS

Study site

The state of Hawai‘i has a total population of about 1.4 million people with just over two-thirds living on the island of O‘ahu (U.S. Census Bureau, 2020), the third largest island in the Hawaiian archipelago. Our research was focused on environmental stewardship on O‘ahu in the districts of Kona and Ko‘olaupoko (Figure 1), which

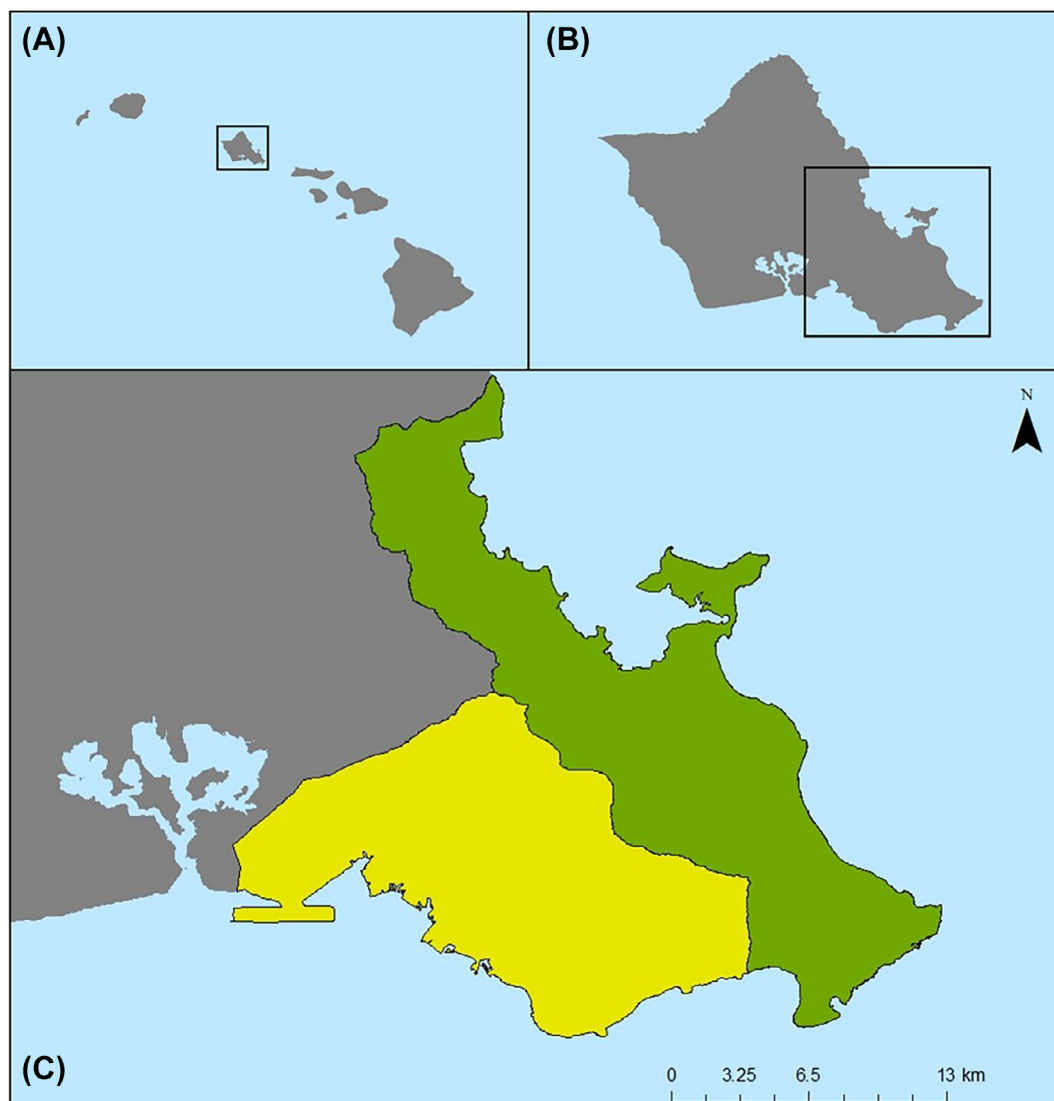


FIGURE 1 Map of (A) Main Hawaiian Islands, (B) Island of O‘ahu, (C) STEW-MAP O‘ahu’s project area, Kona district (greater Honolulu, yellow), and Ko‘olaupoko district (green).

encompass Honolulu, the state's capital city, and Waikīkī, a world-renowned tourist destination, and so are two of the most densely populated districts in the state.

Stewardship mapping and assessment project (STEW-MAP)

The USDA Forest Service developed STEW-MAP to better understand where and why stewardship occurs, with an initial focus on more urbanized landscapes. The STEW-MAP methodology includes conducting a survey to collect organizational, geospatial, and social network data. The data are then shared through different means, including a public, interactive dashboard and mapping tool. This paper will not present the geospatial data, which can be explored on the interactive map on our website (<https://research.fs.usda.gov/projects/stewmapoahu>). Rather, we focus on the organizational characteristics of the participating groups and the social networks of which they are a part.

Survey development

The first STEW-MAP effort to be conducted in Hawai'i occurred in 2017 on Hawai'i Island. As part of the Hawai'i Island effort, a STEW-MAP survey template was adapted to the Hawai'i context by a team of State, Federal, and community partners. Specifically, the Hawai'i Island STEW-MAP team tailored the survey to reflect Hawai'i-based practices and the Hawaiian language.

At the beginning of the STEW-MAP O'ahu effort, we recruited an advisory group of representatives from collaborating community-based stewardship groups ($n = 8$) and local and state agencies ($n = 2$) to advise and guide our process and further adapt the Hawai'i Island survey to an O'ahu context.

Recruitment

Potential respondents (i.e., groups that potentially engaged in some type of environmental stewardship within the project area) were identified by our advisory group, from existing directories, and through outreach. Further, the project was advertised through radio announcements, online community calendar announcements, e-newsletters, emails, and the project website. This pre-survey process resulted in 586 potential respondents. From here on, civic groups that engage in some

form of environmental stewardship are referred to as environmental stewardship groups (ESGs) regardless of whether stewardship is a central activity.

Survey outreach

The survey launched in January 2019 and remained open for 8 months. All 586 groups that were identified as potential respondents were invited to complete the survey. Respondents could participate by either completing an electronic survey on the Qualtrics software platform (<https://www.qualtrics.com/>) or a paper survey ([Supporting Information](#)). After being invited to participate in the survey, contacts were sent reminders via hard copy postcards, email, and phone calls. Paper surveys were mailed to contacts who requested them and also to nonrespondents twice during the survey period. Further, groups that were named by respondents in the social network section of the survey were invited to participate in the survey if they were located in the study area.

Data processing

For calculating response rate, groups were removed from the sampling frame if we learned that they no longer existed or were no longer participating in environmental stewardship. We also removed hula groups and canoe clubs ($n = 96$), schools ($n = 120$), and University of Hawai'i labs or projects ($n = 25$) from our survey frame, given the extremely low response rate from these groups; each of these groups was represented by a single respondent, so it was assumed that the majority of these groups did not identify as ESGs. We also removed duplicates ($n = 51$) from the sampling frame and respondents who were forced to end the survey before completion ($n = 8$) because they were not part of a group, did not engage in stewardship, or did not engage in stewardship within the two districts of the survey area. In total, the final sampling frame consisted of 333 groups, 128 of whom submitted completed surveys resulting in a response rate of 38%. Of these 333 participants, 24 groups did not fully complete the survey and were considered nonrespondents.

In the networks section of the survey, respondents were asked to identify groups (1) with whom they regularly collaborate on environmental projects or programs; (2) to whom they go for knowledge, data, or expertise related to environmental issues; and (3) from whom they receive funding, materials, or labor for environmental projects or programs. The names of groups listed within responses to these questions were standardized and

assigned unique IDs if they were not already on our contact list. Each of the responding group names were kept as they self-identified; however, if a listed group was part of a larger organization (e.g., a division that is part of a department), then that organization had a “fine-scale name” and a “broad-scale name.” Gephi (<https://gephi.org/>) was used to calculate the in-degree statistic (i.e., the number of times a group is named) and the social network maps were created in Kumu (www.kumu.io).

Follow-up interviews

Twenty semi-structured interviews ([Supporting Information](#)) were conducted in September and October 2020 with the leaders of a subset of ESGs who participated in the survey. The ESGs selected for interviews were non-randomly chosen to represent a stratified range of organizational characteristics (age, size, capacity, and stewardship focus of the group). The interviews were conducted by three interviewers. All interviews were conducted via Zoom and lasted between 45 and 90 min. The questions asked in the interview addressed several topics, but this paper focuses only on a subset of the questions: (1) *What is your hope for the future of stewardship or mālama ‘āina in Hawai‘i?* and (2) *What are the major limitations your group faces in pursuit of your mission?* All interview recordings were transcribed, and transcriptions were checked and corrected for accuracy. The interview transcripts were qualitatively analyzed using inductive coding and thematic analysis (Saldaña, 2011) in NVivo (QSR International Pty Ltd, 2018).

The survey and interview tools, along with the corresponding protocols, were approved by the University of Hawai‘i’s Institutional Review Board (IRB) (#2017-00331).

RESULTS

Survey of ESGs

Organizational characteristics

There were 128 civic ESGs that completed the STEW-MAP survey (38% response rate). We use the label “civic” for nongovernmental, nonprivate groups, inclusive of community groups. The geographic scope of these ESGs ranged from a single garden to the Earth. The majority of respondents (63%) reported they were a registered 501(c)(3) nonprofit, tax exempt organization (a legal type of entity in the United States); 17% of ESGs indicated that

they were an “other” type of group (many of these ESGs were private or University of Hawai‘i affiliated groups), 6% were school groups, 6% were non-registered groups, 3% were 501(c)(4) groups (social welfare organizations and local associations of employees that are tax exempt), 2% were public–private partnerships, and 2% were formal or informal alliances of groups. Exactly half of the ESGs who responded (64) were founded in the last 20 years, with the oldest founding date going back to 1846 ([Supporting Information](#)).

We defined stewardship broadly, to be consistent with local definitions of caring for place, and gave participants specified stewardship options to choose from when identifying the stewardship types their group conducted (Table 1). When asked to select all the stewardship types in which their group engaged, on average, ESGs listed 6.7 stewardship types; 58% of all ESGs indicated that “Educate” was a top stewardship type in which they engage (Table 1).

Respondents were presented with a long list of potential site types that they may have cared for in 2018 ([Supporting Information](#)). Site types included terrestrial and marine sites, as well as more broad “systems” site types (e.g., food systems, stormwater management). When asked to indicate all the site types in which the ESG works, more than 40% of respondents said their stewardship work focuses on food systems (45%), community gathering spaces (44%), and cultural sites (43%) (Figure 2A). Community spaces include parks, community meeting areas, and other places where people can gather. Cultural sites may refer to wahi pana (pulsing, storied, celebrated, or legendary places), burial sites, shrines, and places where cultural resources can be gathered and offerings can be made. It should be noted that in the Hawai‘i context, natural resources are viewed as cultural resources and vice versa, such that in many cases there is no distinction between the two.

Out of 123 respondents, 47% of participating ESGs were 80%–100% focused on stewardship (Figure 2B). About 40% of all ESGs indicated they focus less than 59% of their efforts on stewardship, highlighting the fact that groups with diverse goals engage in environmental stewardship. In fact, when asked about their top activities more than half of survey respondents indicated that they work on community improvement and capacity building (60%) and cultural and place-based knowledge, values, and practices (58%), highlighting the holistic approaches taken by many of the participating ESGs (Figure 2C).

Many ESGs indicated small staff sizes and a high reliance on volunteers. The number of full-time staff ranged from 0 to 2114, with an average of 29 full-time staff. Forty-five ESGs reported not having any full-time staff, with 38 of those also reporting not having any part-time staff. Out of 123 respondents, the number of regular volunteers

TABLE 1 Stewardship types and examples that were asked about in the Stewardship Mapping and Assessment survey along with the percentage of respondents who indicated that their group conducts each type of stewardship.

Stewardship types	Example foci and/or activities	Percentage of responding groups
Advocate	Planning, organizing, direct action, fundraising	30%
Care for (mālama), maintain or manage a place	- School/community garden, park, roadway, trails - Fishpond, freshwater source, stream, shoreline - Special family ('ohana) site	40%
Care for (mālama) specific living things	- Plants, animals, stones, minerals 'Aumākua (deified ancestors) or kino lau (myriad forms of deities)	17%
Conserve	- Perpetuate cultural values and practices related to stewardship - Hold a conservation easement - Protect freshwater resources	21%
Educate	'Āina-based education, research, science, training, and mentoring - Sharing mo'olelo wahi pana (histories of storied/pulsing places), mele (song), hula (dance), or oli (chant)	58%
Engage with the spirit of the land/ocean for health and well-being	- Through being present - Meditating and praying	8%
Monitor	- Air or water quality - Species monitoring - Rain or drought monitoring	11%
Participate	- Partner with groups - Support other environmental work	41%
Place-based or traditional hunting, fishing, or gathering	- For resources for consumption and exchange in reciprocal relationship with 'āina - Monitoring the quality and character of the 'āina and its resources in the process	2%
Respond	Respond to or protect against tsunamis, hurricane, flood, or fire/drought	2%
Restore	- Restore native habitats/species - Restore traditional and customary systems/structures (Agriculture, aquaculture, trails, navigation, rituals, etc.)	19%
Transform	- Changing the waste stream - Transitioning toward sustainable/clean energy - Promoting sustainable agriculture	6%

participating in an ESG's stewardship activities ranged from 0 to 1500. At least 9% of the ESGs had no budget (49% preferred not to respond to the question regarding budget). Funding was the most sought after listed resource (73%), followed by labor (volunteers, students, and interns) (50%) and data/information (48%) ([Supporting Information](#)).

Networks

Participants listed groups they were collaborating with and indicated how they were collaborating across three

types of social networks: regular collaborators, expertise, and resources. Together, over 600 unique groups were named across these three networks; these groups ranged in their locations from being within the study area to elsewhere on O'ahu, on another Hawaiian Island, to the continental United States and to overseas. Of all the groups named, 77% were civic groups, 19% were governmental agencies, 3% private organizations, and 2% hybrid groups (Figure 3). We found overlap among these three networks. When a group was listed as a "regular collaborator," 42% of the time it was also listed as a group that is referred to for expertise, while only 22% of the

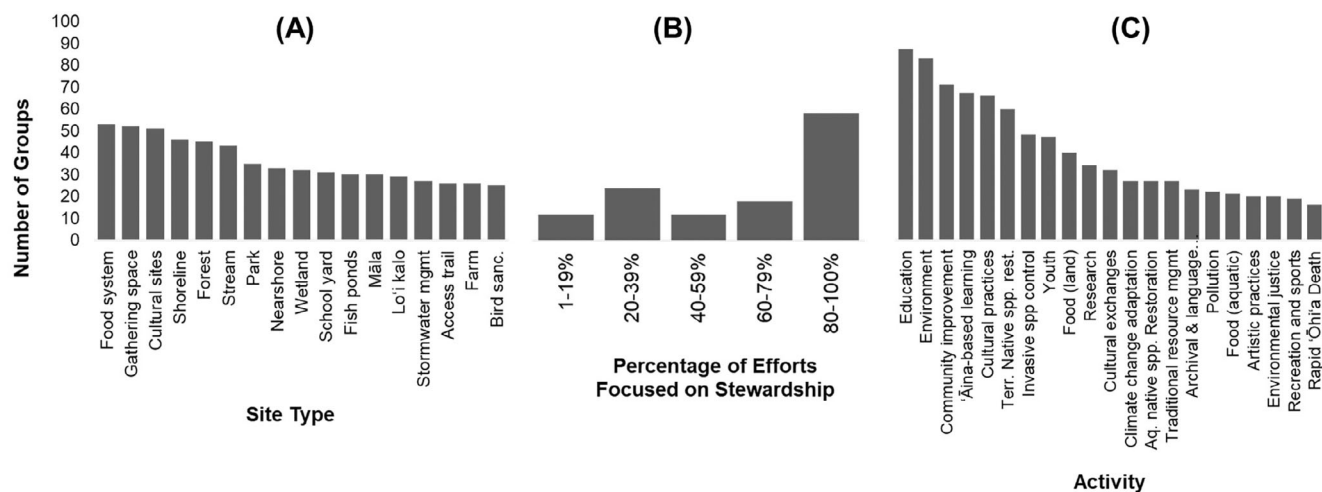


FIGURE 2 (A) Number of groups by stewardship site type, when an unlimited number of selections were available to respondents ($n = 118$). There were 40 possible site types presented as options (Supporting Information); only site types chosen by at least 20 respondents are shown in this figure. (B) Number of groups by percentage of efforts focused on stewardship ($n = 124$). (C) Number of groups by additional activities to stewardship ($n = 114$). There were 42 possible activities presented as options; only activities chosen by at least 10 respondents are shown in this figure.

time, the group was also listed as a group that is referred to for resources. Similarly, when a group was listed as a group referred to for expertise, 22% of the time the group was also listed in the resource network.

The in-degree statistic, or the number of times a group was named, was calculated for each network. In all three networks, the same groups had the highest in-degree metrics: State of Hawai'i Department of Land and Natural Resources (DLNR), the University of Hawai'i, and the City and County of Honolulu (note: these are governmental agencies and as such were not recruited to take the survey, yet they were mentioned as network partners by survey participants). These governmental agencies were either referred to as we have listed, or offices and/or programs within these agencies were listed, and we grouped them at the higher level. For example, DLNR encompasses 12 Divisions and Commissions including the Division of Forestry and Wildlife, the Division of Aquatic Resources, and the Division of State Parks, which all conduct community-engaged stewardship.

In the regular collaborator network, most ESGs are connected to the main component in the network (i.e., there are few ESGs that are not connected in some way to the rest of the ESGs in the network). On average, the number of regular collaborators named by any one ESG was 10.7. The civic ESGs mentioned the most as regular collaborators are place-based, as opposed to other ESGs that work on broader topics and geographies at larger scales.

We acknowledge that because our response rate was 38%, we are missing the perspectives of some ESGs, and

participation by these missing ESGs and their linkages in our networks could alter findings. As such, we did not conduct any further social network analyses, as doing so would have required more advanced methods that are beyond the scope of this paper.

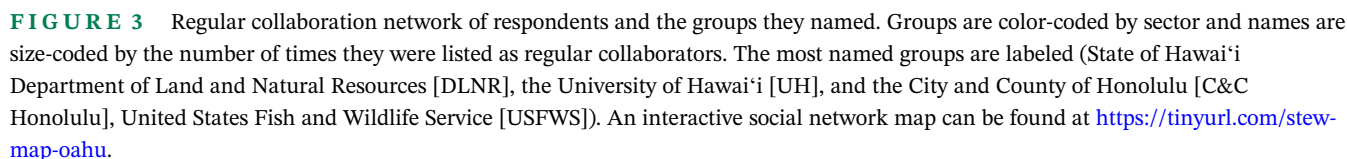
Follow-up interviews

In follow-up interviews with a subset of participating civic ESGs, the most common theme (35% of responses) in response to the question "What is your hope for the future of stewardship or mālama 'āina in Hawai'i?" had to do with normalizing environmental stewardship into everyday life (Table 2). For example, one interviewee responded:

We often talk about [how] our kūpuna never had the word [mālama 'āina]... My hope is that the word [mālama 'āina] becomes obsolete and it's just, "Hawai'i is my home and therefore, this is how we roll." And it's a norm, it becomes the norm.

The second most prevalent code (25%) was the integration of environmental stewardship into all levels of education. One respondent noted:

I would just hope that it becomes part of the curriculum for every school so that instead of these small fragmented community groups that are doing things outside of the norm that it becomes



The lack of staff and funding were the most commonly mentioned limitations ESGs face in pursuing their missions (Table 2). As one respondent noted:

Unpaid labor may be sought because funding for paid employees is limited. Thirty percent of the ESGs surveyed responded that they had no paid employees. Volunteers make extremely valuable contributions to the environmental stewardship sector. While some ESGs may intentionally rely on volunteers and want to continue to do so (e.g., in order to build community), two interviewees expressed a hope that more opportunities would be available to participate in environmental stewardship as a career. In explaining his hopes for the future of environmental stewardship in Hawai'i, one ESG leader referring to environmental stewardship as a part of Hawaiian culture, commented:

... somebody said, and this is related to Hawaiians, he said, 'if given the opportunity to be Hawaiian, they [are going to] be Hawaiian.' ... but sometimes when opportunities are not

TABLE 2 Emergent codes developed from the responses to two questions asked in follow-up interviews of 20 leaders of civic environmental stewardship groups.

<i>What is your hope for the future of stewardship or mālama ‘āina in Hawai‘i?</i>	
Code	Frequency
Environmental stewardship becomes a norm	7
Environmental stewardship is integrated into all levels of education	5
Shift economy and invest in environmental stewardship	4
More aware of need to steward	4
More opportunities to steward	2
Invasive species are reduced	1
Environmental stewardship is guided by Hawaiian knowledge	1
<i>What are the major limitations your group faces in pursuit of your mission?</i>	
Code	Frequency
Staff capacity	8
Funding	8
Accessing land	4
Government restrictions and politics	3
Relations with community	3
Recruiting local applicants	3
Technical support	2
Red tape	2
Engaging with younger generation	1
Competing with other groups	1
Access to clean freshwater	1

given, we are unable to see the gifts that people have within them that they never know themselves.

Relatedly, three interviewees explained that not being able to recruit local applicants for their positions was a limitation their ESGs were facing. Two of these interviewees expressed that staff from local communities are best suited to engage in place-based work. In a recent industry survey, employers indicated that local candidates for natural resources positions have the following strengths: Drive/Passion (82%), Native Hawaiian cultural knowledge & skills (79%), Field Work (65%), and Community Partnerships/Engagement (62%) (SMS Research, 2023).

Increased funding for environmental stewardship can yield both environmental and social benefits, as the

funding could be used to support job opportunities in the sector. However, job opportunities are only beneficial if they are well-paying; in a survey of natural resource professionals in Hawai‘i, 40% of respondents indicated that they struggle financially due to the low pay of their jobs in relation to the high cost of living in Hawai‘i (SMS Research, 2023).

DISCUSSION

We surveyed 128 ESGs that, at the time of the survey, led environmental stewardship efforts in Kona and Ko‘olaupoko districts of O‘ahu, Hawai‘i to better understand the assemblage, extent, activities, and goals of the community of stewards in this region. About half of the ESGs focused primarily on environmental stewardship, including caring for and educating about places, landscapes, and lifeforms. Many of these ESGs also aim to cultivate young leaders and community health and well-being while enhancing intergenerational family ties and the sharing of cultural values and knowledge.

Stewardship in Hawai‘i is holistic

Stewardship activities can be broader than “hands-on” or “boots on the ground” work, and the STEW-MAP methodology provides an approach that is inclusive of the many motivations that people bring to stewardship. This approach is especially important in Indigenous contexts in which people recognize themselves as part of their environments. However, ESGs that have goals beyond the environment are not unique to Indigenous contexts such as Hawai‘i. In STEW-MAP efforts elsewhere, ESGs often have both social and ecological goals. For example, in New York City and Chicago, “community improvement” is a top focus of participating ESGs (Landau et al., 2019; Westphal et al., 2014). Similarly, the word “community” is one of the most mentioned words in the mission statements of participating groups in the Puget Sound Area and the Los Angeles River Watershed STEW-MAP efforts (Thomas & Romolini, 2023; Wolf et al., 2013). In the Los Angeles River Watershed, social aims or outcomes (e.g., community, education, health, social justice) occur in 45% of the mission statements of groups that participated in STEW-MAP (Thomas & Romolini, 2023). Further, when the motivations of environmental volunteers have been studied, it is clear that volunteers have motivations beyond “bettering the environment” that include learning, socializing, and contributing to community (Measham & Barnett, 2008). In fact, when volunteer activities with ESGs were interrupted

during the COVID-19 pandemic, volunteers in Hawai‘i reported missing the social benefits of volunteering and engaging with land/place while experiencing negative psychological impacts (Dacks et al., 2021). As such, it is clear that participating in environmental stewardship can be a means for achieving broader, non-environmental objectives.

In the following sections, we highlight emergent themes from our research that provide potential paths for overcoming challenges that prevent mālama ‘āina from being more integrated into the everyday lives of those in our study area.

Stewardship benefits from an all hands on deck approach

The three stewardship networks (regular collaborators, knowledge/data/expertise, and resources) together represent an assemblage of groups that were mostly civic (77%) with a significant number of government agencies (19%) and few private organizations (3%) or hybrid groups (2%). The composition of groups and their connections highlight the interdependent nature of caring for place in Hawai‘i; the archipelago’s complex history along with the rights and responsibilities of different groups in the network underscore the need for collaborative governance.

Across all three social networks assessed, government agencies (more than civic groups or private organizations) were named most often as a collaborator. This may be the case for a few reasons: First, many ESGs steward places on state administered land, so collaborating with the state is necessary to access land. When asked about the ownership of lands on which ESGs work, 29% indicated the “state” and 27% indicated that they work “across public and private lands,” which may also include working on state and possibly federal lands. The majority of state lands are part of Hawai‘i’s ceded land estate—a large portion of the 800,000 ha of land (MacKenzie et al., 2015), that the state administers in trust for Native Hawaiians among other beneficiaries. With that in mind, the management of state (public) lands should be for the public good, which includes involving community stewards, guardians, and care takers in collaborative partnerships (Winter et al., 2021).

Second, government agencies, while charged with the management of natural resources, do not have the capacity or funds to do it alone. For example, the Hawai‘i DLNR has limited staff and approximately 1% of the state’s budget (State of Hawai‘i, Department of Budget and Finance, 2025) with which to manage 1.3 million acres of state land, 3 million acres of state ocean waters, and 2 million acres of private conservation district lands,

much of it impacted by invasive species, wildfire, and overfishing. As such, DLNR collaborates with civic groups in order to meet its mission.

Finally, relationships between government agencies and ESGs that engage multiple ways of knowing may exist in order to enhance resource management and stewardship. Watershed partnerships, large private land-owners, international nonprofit organizations, and place-based community and civic groups (including those with ancestral ties to and multigenerational relationships with places) bring a diverse body of in-depth and nuanced knowledge and practices to augment the effectiveness of the care for Hawai‘i’s lands and waters (Winter et al., 2021).

Although agencies in Hawai‘i have historically not focused directly on providing social and cultural benefits in their stewardship efforts, the past decade has seen greatly increased interest in and investment into featuring these outcomes as central elements of agency work (e.g., integration of Hawaiian cultural practices and perspectives in the establishment and operations of Papahānaumokuākea National Marine Sanctuary; Quiocho et al., 2023 and the USDA Forest Service’s and Hawaii DLNR support of Native Hawaiian led community-based forest stewardship; Kamelamela et al., 2022). This investment by agencies reflects multi-decade engagement by community groups who see these elements as integral to effective and holistic stewardship.

Collaboration with civic groups can benefit not only agencies and the lands they are charged with managing, but also participating community members themselves through opportunities to connect and engage with ‘āina in ways that are meaningful to them. Civic ESGs benefit the community and promote community resilience through, for example, supporting community health and well-being, intergenerational family ties, cultivation of young leaders, and sharing of cultural values (Figure 2C). The contributions of civic ESGs are not unique Hawai‘i but are also made by IPLCs on every continent, including those who have been recognized by the United Nations Development Program with Equator Prizes (www.equatorinitiative.org).

Broader indicators of success reflect biocultural outcomes

Across social-ecological research globally, there is a growing interest in expanding the scope of indicators that can be applied to assessing outcomes of stewardship—from indicators of ecological success to the indicators of human well-being across the scale of extended families and communities (Dacks et al., 2019). Many ESGs that

primarily focus on stewardship act holistically and therefore make important contributions in other areas (e.g., human health, youth development). However, if the comprehensive accomplishments of these ESGs are not monitored, evaluated, and communicated, the full suite of benefits of a stewardship program may not be adequately valued by people outside of the ESG, including potential funders and advocates. In the survey, ESGs that reported that they track metrics indicated that these metrics are often focused on ecological indicators (e.g., trees planted, invasive species removed, areas restored). Social indicators that were reported as being measured were often focused on number of participants, volunteer hours, and school visits. Very few ESGs indicated that they track what might be considered as biocultural indicators—measures that indicate something about both the social and ecological dimensions of the system (Dacks et al., 2019). For example, one ESG indicated that they tracked the amount of mangrove wood shared as a resource. Mangroves are an invasive species in Hawai'i but are valued for their use as firewood and material for building traditional Hawaiian structures. Similarly, another ESG tracked the amount of non-native, invasive algae that they donated to local farmers for fertilizer. These metrics can indicate the status of the removal of an invasive species as well as community connectedness.

It is unsurprising that the government agencies in the network which measured where ESGs go for resources (funding, materials, labor, etc.) are largely environment-focused (State DLNR, USDA Forest Service, National Oceanic and Atmospheric Administration). However, we know that ESGs have larger impacts beyond their environmental objectives (e.g., benefits to social, emotional, and mental well-being) (Dacks et al., 2021). As such, if ESGs are also tracking and communicating impacts to human well-being, funding from a broader collection of agencies such as the Department of Health or Department of Education may be possible.

Efforts are being made by some ESGs in the state (beyond what was reported in the STEW-MAP survey) to measure their impacts on a diverse range of well-being categories. In the Indigenous Health framework developed by local community groups Kokua Kalihi Valley and the Islander Institute, four connections are assessed: connection to place, connection to community, connection to best self, and connection to past, present, and future (Kokua Kalihi Valley Comprehensive Family Services, 2022). Storytelling and subsequent self-evaluation are one approach that is used to assess the connections of program participants in a small number of community groups (Mahi et al., 2021). Sterling et al. (2017) highlight communities beyond Hawai'i that use biocultural indicators as measures of sustainable

development and offer suggestions for comparing indicators across sites for use by governments and funders. Additional approaches for assessing biocultural indicators and integrating with international biodiversity policies and sustainable development frameworks have been developed and tested with communities throughout the world (UNU-IAS et al., 2024).

While recognized locally as indicators of health and well-being, biocultural indicators are not widely measured as metrics of success for most ESGs. Being understaffed and/or without the training or skills needed to develop and assess such indicators may be one reason that these types of metrics are not being measured. Another reason, which highlights inequities in philanthropy more broadly, could be that funders do not understand the values of and/or do not wish to shift power back to local and Indigenous communities who may have different values and ways of measuring the successes of their efforts (Ojeda & Wall, 2023).

The role of 'āina-based education

By using a broad definition of stewardship through the STEW-MAP approach, we were able to identify the significant role of ESGs who provide educational opportunities as a form of stewardship. In fact, survey participants identified “education” as the most commonly practiced stewardship type and just over half (51%) of responding ESGs indicated that they provide 'āina-based learning opportunities as a service they offer. 'Āina-based education is not just learning about 'āina, but learning through and from 'āina; in doing so, learners are exposed to experiential learning while building connection to place and to those who cared for these places in the past, as well as their role in stewarding these places for the future (Ledward, 2013).

Although this type of learning was largely discouraged and even forbidden during and after colonization, it has flourished in the years since the Hawaiian Cultural Renaissance (Oliveira, 2009). Today there are many Hawaiian language immersion schools and Hawaiian culture focused charter schools with 'āina-based learning at the core of their curricula; additionally, there is a growing demand from teachers in both private and public schools for 'āina-based learning opportunities (Maunakea, 2019), to which the Hawai'i Department of Education has responded by developing programming such as Nā Hopena A'o (<https://hawaiipublicschools.org/about/na-hopena-a%CA%BBo-ha/>). This trend is not unique to Hawai'i; there has been an increasing recognition of the value of outdoor and place-based education nationally/globally and calls for place-based,

environmental education to be included throughout the K-12 curriculum (Yemini et al., 2023). Arguments for the inclusion and/or expansion of environmental, place-based education cite that this type of education can help develop a sense of place and result in increased pro-environmental behavior (Kudryavtsev et al., 2012).

Even if ‘āina-based learning becomes integrated into curricula, schools may not have access to appropriate spaces and/or teachers may not be familiar with potential stewardship sites in their school’s community. As such, providing ‘āina-based learning opportunities is a type of stewardship that sometimes requires several types of collaboration, as ESGs may require access from landholders and need to be connected to students. Our key collaborators and other survey participants highlighted the potential value of the STEW-MAP results in helping to connect teachers with ESGs that could host service learnings and field trips.

Further, ‘āina-based learning opportunities are not just important for schoolchildren, but also for adult learners. Learning new ways of seeing, growing value for different ways of knowing, and relating to our natural world (i.e., beyond academic training or agency-based management) can promote meaningful collaborations across government agencies, community, and private groups. A model professional development program in Hawai‘i, Hālau ‘Ōhi‘a, serves the conservation community including many government agency employees by providing intensive Hawaiian Lifeways Training, and through participation, these professionals become better stewards of Hawaii’s lands, waters, wildlife, and better members of her communities. This is done through the framework of teaching Hawai‘i-based practices where stewardship is an embedded element (Kealiikanakaolehailani et al., 2018). Hālau ‘Ōhi‘a has also inspired the development of natural resource manager groups beyond Hawai‘i to explore and learn from other ways of knowing and being (McMillen et al., 2020).

SUPPORTING STEWARDSHIP IN PRACTICE: INSIGHTS FOR FUNDERS, EDUCATORS, AND POLICYMAKERS

Who takes care of Hawai‘i? From the 128 ESGs who responded to our survey, we were able to identify over 600 groups that either participate directly in and/or support stewardship efforts in Kona and Ko‘olaupoko Districts of O‘ahu. These results represent only one area and one point in time, and our response rate of 38% indicates that there are other ESGs not represented in these results. However, we expect trends to be similar

elsewhere in Hawai‘i with ESGs stewarding with wide ranges of motivations and goals, some of which are guided by biocultural approaches.

STEW-MAP was a valuable approach for identifying the diversity of ESGs that care for Kona and Ko‘olaupoko. Through their actions, the community of stewards not only care for the lands, waters, and associated flora and fauna, but the ‘āina as a whole, including the human communities of these places. The STEW-MAP approach may be especially valuable for understanding collaborative governance in other locations in which communities acknowledge the connections between human well-being and environmental stewardship, as it is an approach that is inclusive of a range of stewardship perspectives. Through the STEW-MAP process, the following insights emerged that can inform strategies for supporting efficient, effective, and equitable stewardship networks. While these insights are not intended as prescriptive recommendations, they offer transferable lessons that may be adapted to the nuances of different social-ecological contexts.

Support and expand collaborative governance

With growing impacts of environmental change, accounting for and understanding all the contributions made by ESGs can help support the more efficient allocation of resources while also more effectively building functioning stewardship partnerships. Collaborative governance is important in that it can provide mechanisms for ESGs and especially IPLC-led ESGs to achieve their biocultural goals. When IPLC-led ESGs partner with government agencies in collaborative governance, IPLCs also have the opportunity to guide broader biocultural transformation of the system. By supporting these civic efforts, we can more effectively mobilize limited resources and elevate the diverse knowledge systems that are vital for the long-term well-being of communities and their ecosystems.

Support ESGs in monitoring biocultural indicators

To increase resources for environmental stewardship, ESGs may be able to broaden their funder base by expanding the metrics of success to be inclusive of socio-cultural impacts. By working with communities to understand local and Indigenous indicators of well-being, which intersect with environmental stewardship, funders can act equitably while having the information needed to empower their grantees. However, care should be taken

to minimize the number of metrics required, so as not to burden organizations' often limited staff and funds.

Expand opportunities for place-based learning

In closing, 'āina-based learning, as raised in our interviews, is one method of building and/or strengthening connections to place, which can be seen as both the foundation for and an indicator of health and well-being (Kokua Kalihi Valley Comprehensive Family Services, 2022). Strengthening connections to place may also result in increased participation in environmental stewardship. Understanding the extent of the community of ESGs may be a helpful approach to increase collaboration between schools and ESGs, given the important role ESGs play in providing place-based learning opportunities and raising the next generation of environmental stewards. Expanding place-based learning may also help our communities to achieve what 35% of the interviewees had hoped for the future—normalizing environmental stewardship in everyday life.

These insights are likely to be relevant beyond our study site, especially in places where environmental stewardship is underfunded and places with local traditions of environmental stewardship and histories of colonization and marginalization (e.g., Pickering Sherman et al., 2010; Simms et al., 2016).

AUTHOR CONTRIBUTIONS

Rachel Dacks: Conceptualization; investigation; writing – original draft; writing – review and editing; visualization; formal analysis. **Heather McMillen:** Conceptualization; investigation; funding acquisition; writing – review and editing; project administration; methodology; supervision; writing – original draft. **Lauren Nerfa:** Writing – review and editing; writing – original draft. **Kim Kahaleua:** Methodology; writing – review and editing; investigation; conceptualization. **Christian P. Giardina:** Funding acquisition; writing – review and editing; project administration. **Tamara Ticktin:** Writing – review and editing; project administration; supervision.

ACKNOWLEDGMENTS

We acknowledge the lands whose stewardship was the focus of this study. These lands are sacred to Kānaka 'Ōiwi, the Native Hawaiian people. We would like to thank the environmental stewardship group leaders and volunteers who generously shared their time and thoughts in our interviews and surveys. We would also like to thank our key collaborators for their valuable input on our interview tools and surveys. This O'ahu

project benefited greatly from discussions with and guidance from the STEW-MAP Multi-City community, especially from our colleagues at the New York City Urban Field Station. A big thanks to Dwight Matsuwaki and Brayden Aki for providing excellent GIS support. Shannon Rivera, Rachelle Tom, Jade Rhodes, Kekai Mar, and Pia Ruisi-Besares were a great help in outreach efforts. Thanks to Sanoe Burgess for enthusiastically filling in organizational data gaps and to Pua Heimuli for her assistance in the follow-up interview process.

FUNDING INFORMATION

This project was funded by Region 5 of the United States Department of Agriculture Forest Service.

CONFLICT OF INTEREST STATEMENT

The authors declare no conflicts of interest.

DATA AVAILABILITY STATEMENT

The survey data that support the findings of this study are openly available on the US Forest Service project page at <https://research.fs.usda.gov/projects/stewmapoahu>. The interview data are not available because they contain confidential information.

ETHICS STATEMENT

The survey and interview tools, along with the corresponding protocols, were approved by the University of Hawai'i's Institutional Review Board (IRB) (#2017-00331).

ORCID

Rachel Dacks  <https://orcid.org/0000-0002-0101-3036>

REFERENCES

- Ansell, C., and A. Gash. 2008. "Collaborative Governance in Theory and Practice." *Journal of Public Administration Research and Theory* 18: 543–571.
- Bennett, N. J., T. S. Whitty, E. Finkbeiner, J. Pittman, H. Bassett, S. Gelcich, and E. H. Allison. 2018. "Environmental Stewardship: A Conceptual Review and Analytical Framework." *Environmental Management* 61: 597–614.
- Berkes, F. 2018. *Sacred Ecology*, Fourth ed. New York: Routledge.
- Bunce, M. 1998. "Thirty Years of Farmland Preservation in North America: Discourses and Ideologies of a Movement." *Journal of Rural Studies* 14: 233–247.
- Campbell, L. K., E. S. Svendsen, M. L. Johnson, N. C. Piland, D. H. Locke, N. F. Sonti, J. M. Grove, et al. 2024. "Reflecting on Local Ecological Stewardship, Care, and Action across Two Decades of Research." *Cities and the Environment* 17: 1–24.
- Chan, K. M. A., P. Balvanera, K. Benessaiah, M. Chapman, S. Díaz, E. Gómez-Baggethun, R. Gould, et al. 2016. "Why Protect Nature? Rethinking Values and the Environment." *Proceedings of the National Academy of Sciences* 113: 1462–65.

- Dacks, R., H. McMillen, P. Heimuli, K. Kahaleua, S. Burgess, C. P. Giardina, K. Francisco, and T. Ticktin. 2021. "The Important Role of Environmental Stewardship Groups in Supporting Human Health and Well-Being." *Frontiers in Sustainable Cities* 3: 1–13.
- Dacks, R., T. Ticktin, A. Mawyer, S. Caillon, J. Claudet, P. Fabre, S. D. Jupiter, et al. 2019. "Developing Biocultural Indicators for Resource Management." *Conservation Science and Practice* 1: e38.
- Diver, S., M. Vaughan, M. Baker-Médard, and H. Lukacs. 2019. "Recognizing "Reciprocal Relations" to Restore Community Access to Land and Water." *International Journal of the Commons* 13: 400–429.
- Emerson, K., T. Nabatchi, and S. Balogh. 2012. "An Integrative Framework for Collaborative Governance." *Journal of Public Administration Research and Theory* 22: 1–29.
- Farrell, J., P. B. Burow, K. McConnell, J. Bayham, K. Whyte, and G. Koss. 2021. "Effects of Land Dispossession and Forced Migration on Indigenous Peoples in North America." *Science* 374: 4943.
- Fisher, D. R., L. K. Campbell, and E. S. Svendsen. 2012. "The Organisational Structure of Urban Environmental Stewardship." *Environmental Politics* 21: 26–48.
- Gavin, M. C., J. McCarter, A. Mead, F. Berkes, J. R. Stepp, D. Peterson, and R. Tang. 2015. "Defining Biocultural Approaches to Conservation." *Trends in Ecology & Evolution* 30: 140–45.
- Hawken, P. 2007. *Blessed Unrest: How the Largest Social Movement in History Is Restoring Grace, Justice, and Beauty to the World*. East Rutherford, NJ: Penguin Publishing Group.
- ‘Āina of Ka’ōnohi, A. K. Deluze, K. Enos, K. Mossman, I. Gunasekera, D. Espiritu, C. Jay, et al. 2023. "Urban ‘Āina: An Indigenous, Biocultural Pathway to Transforming Urban Spaces." *Sustainability* 15: 9937.
- Kamelamela, K. L., H. K. Springer, R. Ku’ulei Keakealani, M. U. Ching, T. Ticktin, R. D. Ohara, E. W. Parsons, E. D. Adkins, K. S. Francisco, and C. Giardina. 2022. "Kōkua aku, Kōkua mai: An Indigenous Consensus-Driven and Place-Based Approach to Community Led Dryland Restoration and Stewardship." *Forest Ecology and Management* 506: 1–16.
- Kealiikanakaoleohaililani, K., N. Kurashima, K. S. Francisco, C. P. Giardina, R. P. Louis, H. McMillen, C. K. Asing, et al. 2018. "Ritual + Sustainability Science? A Portal into the Science of Aloha." *Sustainability* 10: 1–17.
- Kokua Kalihi Valley Comprehensive Family Services. 2022. "An ‘Aha for Health Equity: Ka Hālaulua a Kanipahu."
- Kudryavtsev, A., R. C. Stedman, and M. E. Krasny. 2012. "Sense of Place in Environmental Education." *Environmental Education Research* 18: 229–250.
- Lam, D. P. M., E. Hinz, D. J. Lang, M. Tengö, H. von Wehrden, and B. Martín-López. 2020. "Indigenous and Local Knowledge in Sustainability Transformations Research: A Literature Review." *Ecology and Society* 25: 250103.
- Landau, L., L. K. Campbell, M. Johnson, E. Svendsen, and H. Berman. 2019. *STEW-MAP in the New York City Region: Survey Results of the Stewardship Mapping and Assessment Project*. Gen. Tech. Rep. NRS-189. 1–69. Newtown Square, PA: Department of Agriculture, Forest Service, Northern Research Station.
- Ledward, B. C. 2013. "‘Āina-Based Learning Is New Old Wisdom at Work." *Hūlili: Multidisciplinary Research on Hawaiian Well-Being* 9: 35–48.
- MacKenzie, M. K., S. K. Serrano, and D. K. Sproat, eds. 2015. *Native Hawaiian Law: A Treatise*. Honolulu, HI: Kamehameha Publishing.
- Mahi, D., K. Nichols, and K. Kupihea. 2021. "SenseMaker: A Narrative Evaluation Methodology Piloted with Four ‘āina Programs across Hawai‘i." In *Hawai‘i – Pacific Evaluation Association Conference*.
- Mathevet, R., F. Bousquet, and C. M. Raymond. 2018. "The Concept of Stewardship in Sustainability Science and Conservation Biology." *Biological Conservation* 217: 363–370.
- Maunakea, S. P. 2019. "Nē Huli Ka Lima I Lalo Piha Ka ‘Ōpū": ‘Ōiwi Agency and Outcomes of ‘Āina-Based Education. Honolulu: University of Hawai‘i.
- McLeod, L. J., J. C. Kitson, Z. Dorner, N. A. Tassell-Matamua, P. Stahlmann-Brown, T. L. Milfont, and D. W. Hine. 2024. "Environmental Stewardship: A Systematic Scoping Review." *PLoS One* 19: e0284255.
- McMillen, H. L., L. K. Campbell, E. S. Svendsen, K. Kealiikanakaoleohaililani, K. S. Francisco, and C. P. Giardina. 2020. "Biocultural Stewardship, Indigenous and Local Ecological Knowledge, and the Urban Crucible." *Ecology and Society* 25: 1–14.
- Measham, T. G., and G. B. Barnett. 2008. "Environmental Volunteering: Motivations, Modes and Outcomes." *Australian Geographer* 39: 537–552.
- Ojeda, R., and M. Wall. 2023. "Power Back in the Community": Going beyond Performative Generosity in Nonprofits." *Journal of Philanthropy and Marketing* 28: 1–9.
- Oliveira, K.-A. R. K. N. 2009. "Wahi a Kahiko: Place Names as Vehicles of Ancestral Memory." *AlterNative: An International Journal of Indigenous Peoples* 5: 100–115.
- Ostrom, E. 1990. *Governing the Commons*. The Evolution of Institutions for Collective Action. New York: Cambridge University Press.
- Poteete, A. 2012. "Levels, Scales, Linkages, and Other ‘Multiples’ Affecting Natural Resources." *International Journal of the Commons* 6: 134–150.
- QSR International Pty Ltd. 2018. "NVivo 12." <https://www.qsrinternational.com/nvivo-qualitative-data-analysis-software/home>.
- Quiocho, K., K. Kikilo, K. Kuoha, A. Miller, B. K. Wong, H. Ka’aekuahiwi Pousima, P. Andrade, and W. ‘Aulani. 2023. "Mai Ka Pō Mai: Applying Indigenous Cosmology and Worldview to Empower and Transform a Management Plan for Papahānaumokuākea Marine National Monument." *Ecology and Society* 28: 280321.
- Saldaña, J. 2011. "A Survey of Qualitative Data Analytic Methods." In: Patricia L, ed. *Fundamentals of Qualitative Research: Understanding Qualitative Research* 89–139. New York: Oxford University Press.
- Salmón, E. 2000. "Kincentric Ecology: Indigenous Perceptions of the Human-Nature Relationship." *Ecological Applications* 10: 1327–32.
- Pickering Sherman, K., J. van Lanen, and R. T. Sherman. 2010. "Practical Environmentalism on the Pine Ridge Reservation:

- Confronting Structural Constraints to Indigenous Stewardship.” *Human Ecology* 38: 507–520.
- Simms, R., L. Harris, N. Joe, and K. Bakker. 2016. “Navigating the Tensions in Collaborative Watershed Governance: Water Governance and Indigenous Communities in British Columbia, Canada.” *Geoforum* 73: 6–16.
- SMS Research. 2023. “Natural Resources Careers in Hawai‘i.” <https://smshawaii.com/posts/2024/08/09/natural-resources-careers-in-hawaii>.
- State of Hawai‘i, Department of Budget and Finance. 2025. “The Operating and Capital Budget – Statewide Summaries.” <https://budget.hawaii.gov/wp-content/uploads/2024/12/06.-The-Operating-and-Capital-Budget-Statewide-Summaries-FB25-27.7Lt.pdf>.
- Sterling, E., T. Ticktin, T. Kipa Kepa Morgan, G. Cullman, D. Alvira, P. Andrade, N. Bergamini, et al. 2017. “Culturally Grounded Indicators of Resilience in Social-Ecological Systems.” *Environment and Society* 8: 63–95.
- Svendsen, E. S., and L. K. Campbell. 2008. “Urban Ecological Stewardship: Understanding the Structure, Function and Network of Community-Based Urban Land Management.” *Cities and the Environment* 1(1): 1–31.
- Thomas, A. S., and M. Romolini. 2023. “Expanding Current Definitions of Environmental Stewardship through Organizational Mission Statement Analysis.” *Ambio* 52: 1137–50.
- Trask, H. K. 1999. *From a Native Daughter: Colonialism and Sovereignty in Hawaii*, Revised ed. Honolulu: University of Hawaii Press.
- Turner, N. J. 2014. *Ancient Pathways, Ancestral Knowledge: Ethnobotany and Ecological Wisdom of Indigenous Peoples of Northwestern North America*. Montréal: McGill-Queen’s University Press.
- U.S. Census Bureau. 2020. *County Population Facts for the State of Hawaii: July 1, 2010 through July 1, 2019*.
- UNU-IAS, Alliance of Bioversity International and CIAT, UNDP GEF-SGP, IGES. 2024. *Indicators of Resilience in Socio-Ecological Production Landscapes and Seascapes (SEPLS): 2024 Edition*. Tokyo, Japan: UN University.
- Westphal, L., A. Davis, C. Copp, L. Ross, M. Bouman, C. Fisher, M. Johnston, M. Lambruschi, and E. Hasle. 2014. “Characteristics of Stewardship in the Chicago Wilderness Region.” *Cities and the Environment* 7: 1–31.
- Winter, K. B., M. B. Vaughan, N. Kurashima, C. Giardina, K. Quioco, K. Chang, M. Akutagawa, K. Beamer, and F. Berkes. 2021. “Empowering Indigenous Agency through Community-Driven Collaborative Management to Achieve Effective Conservation: Hawai‘i as an Example.” *Pacific Conservation Biology* 27: 337–344.
- Wolf, K. L., D. J. Blahna, W. Brinkley, and M. Romolini. 2013. “Environmental Stewardship Footprint Research: Linking Human Agency and Ecosystem Health in the Puget Sound Region.” *Urban Ecosystems* 16: 13–32.
- Yemini, M., L. Engel, and A. Ben Simon. 2023. “Place-Based Education – A Systematic Review of Literature.” *Educational Review* 72(2): 640–660.

SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

How to cite this article: Dacks, Rachel, Heather McMillen, Lauren Nerfa, Kim Kahaleua, Christian P. Giardina, and Tamara Ticktin. 2026. “Who Takes Care of Hawai‘i? Understanding the Roles and Capacities of Civic Organizations in Environmental Stewardship.” *Earth Stewardship* 3(1): e70039. <https://doi.org/10.1002/eas2.70039>