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The Important Role of Environmental Stewardship Groups in Supporting Human Health and Well-Being

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The human health and well-being benefits of nature are well-known. The COVID-19 pandemic has disrupted the work of environmental stewardship groups, especially those that facilitate access to and/or provide opportunities to engage with nature. To understand the impacts of this disruption on stewardship groups and their volunteers in Hawai'i, we: (i) conducted semi-structured interviews with 20 leaders of stewardship groups on O'ahu; and (ii) surveyed 85 individuals who volunteer with stewardship groups across the state. We found that some groups were negatively impacted by COVID-19-related funding losses, volunteer activity cancellations, and thus a reduced workforce. We also found that some groups were able to secure new pandemic-specific funding sources and increase their online presence. Many groups were able to strengthen their connections to community through efforts to respond to COVID-19 driven needs of the community, for example meeting nutritional needs of families through food or crop plant distributions. When asked what they missed the most about volunteering with stewardship groups, over half of surveyed respondents identified the social benefits of volunteering, including feeling a sense of community. Over a third of respondents said they missed engaging with the land/place. Nearly a third indicated that a lack of engagement with these groups during the pandemic had negatively affected them psychologically. Our results highlight the significant yet underappreciated role that stewardship groups play in community and individual well-being, and how a large-scale crisis can lead to innovative adaptations with important implications for social resilience.

Keywords: environmental stewardship, environmental stewardship groups, access to nature, benefits of nature, human well-being, COVID-19 impacts

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INTRODUCTION

For individuals, households, extended families, and communities, the health and well-being benefits of being in nature are well-documented (see reviews by Bratman et al., 2012; Hartig et al., 2014; WHO Regional Office for Europe, 2016; Wendelboe-Nelson et al., 2019). The value of these benefits are now formally recognized by the medical community, with "nature-assisted therapies" or "green care" being prescribed as effective treatments for a diverse range of ailments (Annerstedt and Währborg, 2011). Other studies have examined the mental health benefits associated more

specifically with purposeful activity in nature, such as volunteering or citizen science (Coventry et al., 2019). These findings are consistent with studies that have found that several different types of volunteering (i.e., not limited to environmental volunteering) positively impacted the mental health of those who volunteer (Jenkinson et al., 2013).

Frequent experiences and purposeful activity in nature often foster a sense of nature connectedness and higher levels of eudaimonic well-being (Pritchard et al., 2020). Similarly, knowing, perceiving, interacting with, and living within an ecosystem can lead to developing a sense of place with important well-being benefits (Russell et al., 2013; Hausmann et al., 2016).

Further, in many Indigenous communities, caring for nature is a culturally driven, moral responsibility that is foundational for well-being (Jax et al., 2018). Many Indigenous communities have kincentric worldviews where people not only assume a strong responsibility for the care of nature, but view themselves as part of nature, with which they share genealogical connections (Salmón, 2000). In such cases, caring for nature is part of a reciprocal relationship in which nature is both "care-giver and care-receiver" (Jax et al., 2018). For example, Diver et al. (2019) describe how reciprocal relations are important to Indigenous peoples' guardianship, care, and management of marine resources in Hawai'i and Madagascar, and of forests in Canada, but also how these reciprocal relationships define resource stewardship of non-Indigenous people in Appalachia, USA. However, colonial appropriation of land, eradication of entire communities, and continued marginalization have caused massive displacement of Indigenous peoples worldwide, resulting in major disruptions to people's relationship with place and driving long-lasting impacts to health and well-being (Stephens et al., 2006; Gone et al., 2019; but see McMillen et al., 2017).

Access to Nature

Nature's health and well-being benefits are not evenly distributed across communities, with observed disparities having historical, geographic, and personal roots. Access to nature may be more limited in urban than rural areas, and within urban settings, opportunities to access nature within public green spaces (Kondo et al., 2018) may not be equitable, with parks, green and blue areas typically being more numerous, larger, and of higher quality in less densely populated neighborhoods of higher socioeconomic means (Shanahan et al., 2014; Nesbitt et al., 2019; Locke et al., 2021). Access issues are not limited to urban areas. For example, in rural areas, land privatization can make access to natural areas difficult (Ho-Lastimosa et al., 2019).

In areas that are home to Indigenous communities, urban green space design and maintenance may exclude culturally important native species, and may be unwelcoming to Indigenous people, including being misaligned with or even antagonistic to Indigenous views of and relationships with nature and natural spaces (Shackleton and Gwedla, 2021). As a result, not all individuals have quality access to "natural areas," some may be uncomfortable accessing "natural areas," and others may lack knowledge, skills, abilities, confidence, or financial resources to volunteer in the environmental sector.

Hawai'i is a historically and culturally complex Indigenous geography that provides a valuable opportunity for understanding the role of environmental stewardship groups in providing meaningful access to natural areas. As with many landscapes of North America, Hawai'i's colonial history, resource management infrastructure, and on-going land conflicts all add complexity to nature access and stewardship. In the mid-1800s, U.S. interests pushed for land to become privatized, resulting in the Māhele (McGregor, 1996). With the overthrow of the Hawaiian Kingdom by U.S. interests in 1893, 1,800,000 acres of Kingdom lands were illegally transferred to the Provincial Government, then to the U.S. Federal Government, and ultimately to the State of Hawai'i (MacKenzie et al., 2015). These "ceded" lands were used to establish State Forest Reserves, State and County Parks, Hawai'i's two largest National Parks, in addition to countless urban green spaces, State and Federal Department of Transportation right of ways, and the many campuses of the University of Hawai'i System (see 1993 U.S. Apology Bill). As a result of the complex colonial, racially motivated land theft, many Native Hawaiians lost access rights to lands their families had been stewarding for generations. Past and ongoing disruptions have severely constrained, but not eliminated physical access to nature, with psychological, spiritual, and cultural consequences resulting from these socio-political disruptions. Further, colonization has impacted the capacity of Hawai'i's Indigenous communities to maintain relationships and honor stewardship responsibilities to their native lands (McGregor, 1996). Compounding ceded land issues are the high prices for land and housing in Hawai'i, which are among the highest in the nation.

Past and present land management practices can degrade or even transform native ecosystems into alternative conditions such as non-native species dominated, heavily grazed, urbanized, or intensively farmed ecosystems. Today most forests in Hawai'i are now dominated by non-native and invasive species, non-native ungulates impact all unfenced forested areas of the state, residential and commercial development is rapidly expanding, and Hawaii's agricultural footprint is growing.

There is a great deal of variation, spatial and temporal, across Hawaii's agricultural production systems. Many Indigenous food production systems covering large areas of lowland Hawai'i were, over the past century, displaced by industrial monoculture production (e.g., sugar cane, pineapple, sheep and cattle ranching). In the past 20 years, much of this agricultural land base has ceased to be used for production, with abandonment resulting in rapid invasions by some of the state's most egregious plant pests. But throughout the archipelago, biocultural approaches to land stewardship now integrate diverse knowledge systems to care for people and place (Chang et al., 2019). For example, several environmental stewardship groups are focused on the restoration of *lo'i*, wetland agro-ecosystems, that provide essential habitat to many native, endangered waterbirds and can also be used for the cultivation of taro (*Colocasia esculenta*), a Native Hawaiian food staple and spiritually important plant (Harmon et al., 2021).

Environmental Stewardship Groups (ESGs)

Community-based groups often host environmental stewardship activities that provide individuals with physical access to natural areas and meaningful opportunities to steward nature. These groups (hereafter, environmental stewardship groups or ESGs) may operate formally (e.g., registered non-profit organizations, associations, civic groups) (Svendsen and Campbell, 2008; Wolf et al., 2013; Westphal et al., 2014) or informally (e.g., individuals, households, extended families, neighborhoods) (Lukacs et al., 2016; Vaughan, 2018). While these groups engage in some form of environmental stewardship, stewardship may not necessarily be a primary goal or central activity (Svendsen and Campbell, 2008; Wolf et al., 2013; Westphal et al., 2014). Given this broad definition of ESGs, the full list of groups that participate in environmental stewardship and the extent of their engagements are difficult to quantify, especially in landscapes comprised of mixed private and public ownerships. Further, because the primary mission of most ESGs is to improve environmental conditions, the role of these groups in supporting human well-being through providing access to nature and volunteer opportunities to engage with nature is not well-studied (Svendsen, 2011).

Many ESGs operate with small staffs and so often rely on volunteers to accomplish ESG goals (Svendsen and Campbell, 2008; Dacks et al., 2021). However, in the spring of 2020, the coronavirus disease 2019 (COVID-19) pandemic caused global-scale stay at home orders, social distancing, and cautionary avoidance of social gatherings. Logically then, the pandemic may have also reduced the capacity of many ESGs, many of which were already limited by small budgets (Dacks et al., 2021). One study suggested that the impacts of the pandemic to environmental education groups could be devastating, with the sector undergoing detrimental downstream impacts to broader education systems (Collins et al., 2020).

If the pandemic has brought challenges that threaten the existence of ESGs, it is important to know specifically how they have been impacted in order to know how they can be assisted. Further, if ESGs have adapted to the challenges posed, it would be important to share details of their adaptations for the greater good of the community. In addition, the COVID-19 pandemic provides a unique, albeit unfortunate, opportunity to assess how participants have been impacted by loss of access to ESG driven stewardship opportunities. In particular, what have been and so overall what are the contributions of ESGs to human health and well-being, as revealed by loss of access to ESG activities.

We aim to better understand how ESGs have been impacted by the pandemic and the role of ESGs in supporting human well-being by asking: (1) how has the pandemic affected the budgets, volunteer base, and types of activities of ESGs? and (2) how were individuals impacted by the change in engagement with ESGs? We expected ESGs to have funding, volunteer, and staff impacts and, when possible, to have shifted some of their efforts to programs more compatible with pandemic regulations, such as providing online educational resources. We also predicted that individuals would be psychologically impacted by the reduced number of opportunities to engage in environmental stewardship.

MATERIALS AND METHODS

Study Site Information

This study took place on the island of Oʻahu, in the densely populated districts of Kona and Koʻolaupoko. Oʻahu is the third largest island in the Hawaiian archipelago and is home to Honolulu, the state's capital city, one of the largest metropolitan areas in the Pacific, and to Waikīkī, a world-renowned tourist destination. The state of Hawaiʻi has a total population of about 1.4 million people, with just over two-thirds of these people living on the island of Oʻahu, most of whom reside in the greater Honolulu area (U.S. Census Bureau., 2020).

Interviews of ESGs

Twenty semi-structured interviews (**Supplementary Information**) were conducted in September and October 2020 with leaders of ESGs in Kona and Koʻolaupoko districts of Oʻahu. These leaders were a subset of those who had previously completed a survey on behalf of their group as part of the Stewardship Mapping and Assessment Project (STEW-MAP) (http://stewmaphawaii.net/) (Dacks et al., 2021). STEW-MAP broadly defines ESGs as groups that participate in one or more of the following activities: environmental advocacy, environmental resource management, environmental conservation, environmental education, engaging with land and/or ocean for health and well-being, ecological monitoring, place-based resource harvesting, restoration, transforming local environmental systems, and supporting other environmental work. In community meetings (pre-COVID) in which STEW-MAP results were shared, we asked attendees if there were questions they would like us to ask in follow-up interviews. We incorporated these ideas when developing our interview questions, after the pandemic had started. We also referenced a follow-up survey that was conducted by the New York City STEW-MAP research team (https://www.nrs.fs.fed.us/STEW-MAP/nyc/). The interview tool was then piloted with five individuals who are employed in the environmental stewardship sector and also volunteer with ESGs. The interview questions and protocol were refined based on their feedback.

The groups selected for interviews were non-randomly chosen to represent a stratified range of organizational characteristics. To do this, we considered age, size, capacity and stewardship focus of the organization (**Table 1**). The interviews were conducted by three interviewers (RD, HM, PH) who met weekly to discuss common themes, unique replies, and any logistical challenges that arose. All interviews were conducted via Zoom and lasted between 45 and 90 min. The interviews focused on questions that fell into three topic areas: (1) Why the group focuses on a particular site(s), (2) impacts of and adaptations to the pandemic, and (3) the role of group collaborations. Here, we report on responses to the second topic area, where questions addressed "How a group was impacted by the pandemic" by probing specific impacts to budget, staff, resources and volunteer programs. To ensure that each interviewer gave each

TABLE 1 | Organizational characteristics of the groups that participated in interviews.

Group	Year founded	# Regular volunteers	# Full-time employees	# Part time employees	Landowner/administrator of stewardship area	% Group effort focused on environmental stewardship	Group type
1	2013	300	35	0	City/County government	20–39%	Public-private partnership
2	2017	0	3	5	State government	80–100%	Federal-State partnership
3	2011	120	3	9	Individual	80–100%	501(c)(3)
4	2007	10	1	3	State government	60–79%	501(c)(3)
5	1987	200	320	380	Public and private lands	40–59%	501(c)(3)
6	1999	2	7	1	Public and private lands	80–100%	Public-private partnership
7	2007	0	41	3	State government	80–100%	501(c)(3)
8	2004	20	0	0	Public and private lands	80–100%	501(c)(3)
9	2006	15	2	2	State government	80–100%	501(c)(3)
10	2005	10	0	0	State government	80–100%	Informal group
11	2007	9	0	0	Public and private lands	80–100%	501(c)(3)
12	1970	20	2	1	State government	60–79%	501(c)(3)
13	2001	0	15	1	Public and private lands	80–100%	University Research Unit
14	1993	0	10	30	Public and private lands	80–100%	501(c)(3)
15	2001	40	8	2	Private landowner	80–100%	501(c)(3)
16	1969	0	0	0	State government	40–59%	501(c)(3)
17	1995	20	1	0	City/County government	40–59%	501(c)(3)
18	1951	0	75	10	State government	80–100%	501(c)(3)
19	1912	200	1	2	Public and private lands	80–100%	501(c)(3)
20	2018	6	3	4	Private landowner	20–39%	501(c)(3)

This data was collected as part of a survey of the Stewardship Mapping and Assessment Project that was conducted in 2019 (Dacks et al., 2021).

interviewee an opportunity to touch upon the same potential impacts and adaptations, each interviewer conducted interviews with a common outline of topic areas and subsetted questions. Prior informed consent was obtained from interviewees for both their participation in the interview as well as recording of the interview. All interview recordings were transcribed and transcriptions were checked and corrected for accuracy. We then used the transcriptions to characterize the impacts (e.g., positive, negative, adaptation) for each of the probes (e.g., budget, staff) that were discussed in the interview (**Table 2**).

Survey of Volunteers

We conducted a short survey from December 2020 to January 2021 of volunteers with ESGs across the Hawaiian Islands (**Supplementary Information**). The survey was designed to receive anonymous responses to questions focused on changes and impacts associated with the COVID-19 pandemic. The survey questions were developed by the research team, with input from leaders of ESGs. The survey was piloted with five individuals who are employed in the environmental stewardship sector and who also volunteer with ESGs. The survey was administered virtually using Google Forms following the advertising of the survey on social media and through email distribution lists held by leaders of engaged ESGs. Some of these groups disseminated the survey opportunity to their volunteers. Informed consent was obtained from all respondents prior to each respondent beginning the survey. The survey consisted of five multiple choice questions (with an optional field for each question to provide additional details), three open ended questions, and a demographics section. All open ended and demographic questions were voluntary; the multiple choice questions were required in order to advance and submit the survey. Nine responses were not included because they were duplicate responses (respondent may have clicked "submit" multiple times). Survey responses were qualitatively analyzed using inductive coding and thematic analysis (Saldaña, 2011); RD and HM each independently came up with codes via an open coding scheme that identified key phrases and concepts (Lofland et al., 2005). These initial codes were compared and discussed iteratively until both researchers agreed on final codes, thereby enhancing reliability (Neuman, 2003). Each response was coded with up to three themes. RD then coded all responses with the final codes using NVivo 12 (QSR International Pty Ltd., 2018).

All interview and survey materials were approved by the University of Hawai'i Institutional Review Board. All authors on this paper are certified as having received and passed IRB training.

TABLE 2 | Impacts to ESGs as a result of the COVID-19 pandemic.

Group	Volunteers	New online engagement	Funding	Staff	Collaborations
Group 1	Canceled	Meetings and events	Not applicable	Not applicable	New partner(s)
Group 2	Not applicable	Not applicable	No change	No change	No change
Group 3	Canceled	New content	Decrease	More interns	No change
Group 4	Canceled	Events	Decrease	No change	Not applicable
Group 5	Not applicable	New platforms	Decrease	Reduced staff	New partner(s)
Group 6	Adapted	New content	No change	No change	New partner(s)
Group 7	Not applicable	Meetings and events	Pandemic relief	Increased staff	New partner(s)
Group 8	Adapted	New platforms	Adapted	Not applicable	New partner(s)
Group 9	Canceled	New content	No change	No change	Not applicable
Group 10	Less participants	Not applicable	No change	No change	Not applicable
Group 11	Canceled	Pending funding	Decrease	No change	No change
Group 12	Less students, more community	Events	Adapted	No change	New partner(s)
Group 13	Canceled	Events	Decrease	Reduced staff	No change
Group 14	Not Applicable	New content	Pandemic relief	Reduced staff	New partner(s)
Group 15	Canceled	Events	Pandemic relief	No change	No change
Group 16	More participants	Meetings	Not applicable	Not applicable	No change
Group 17	Canceled	Events	No change	No change	New partner(s)
Group 18	Canceled	Meetings	Decrease	No change	No change
Group 19	Canceled	Meetings	No change	No change	No change
Group 20	Adapted	Meetings	Decrease	No change	No change

Cells are shaded to represent positive impacts (green), negative impacts (red), and adaptations (yellow).

COVID-19 Context

As of May 2021, the state of Hawai'i had recorded a total of 31,800 cases of COVID-19, and had experienced the lowest per capita rate of infection in the country (https://health.Hawai'i.gov, https://www.npr.org). The state's first stay at home order was issued on March 23, 2020 and continued through May 5, 2020. During this time, only essential businesses were allowed to operate and a 14-day quarantine order was issued for any incoming arrivals; tourist numbers plummeted, and given the central role tourism plays in the state's economy, rates of unemployment skyrocketed. A mask mandate was issued on April 14, 2020 and remained in place to the time of this writing (October 2021), with high levels of compliance (https://health.Hawai'i.gov). After cases spiked following the 4th of July holiday in 2020, another stay at home order was issued on August 27, 2020; which lasted until September 24, 2020. It should be noted that some of our interviews took place during this second stay at home order, during which public parks, beaches, and trails were closed. Most responses to the volunteer survey were completed in December 2020, just before the first COVID-19 vaccine doses were administered.

RESULTS

The Impacts of the Pandemic on ESGs

The most widespread impact to ESGs was the cancellation of volunteer events and the resulting loss of labor, with half of all groups reporting this impact (**Table 2**). One group leader described the impact on her small group:

> *. . . it's been a huge impact because we are such a small staff that we've always really, really relied on volunteers to help us get the work done, get the invasives out, but more so that our staff rarely plants native plants. It's the volunteers that are planting native plants. And that's just kind of one of the things that I've come to love about our volunteer work days is that we pull weeds for two hours and then we spend an hour planting and 25 volunteers can plant 200 plants in an hour and a half an hour easily, but. . . it takes me half a day to plant 50. So, we fell really far behind, and on planting natives.* (Group 4)

Another group leader described the challenge of reduced capacity:

> *. . . it was challenging for us to figure out how if we no longer have our monthly community open house where volunteers come, we no longer host the women's correctional facility, and we are no longer hosting up to three school groups, sometimes up to 120 students a month on the lands – How is that work going to get done?* (Group 8)

In three of the interviews, the respondents described how the groups had adapted to the pandemic by making the in-person work environment as safe as possible for volunteers including coordinating independent volunteering, requiring reservations, relying only on small group sizes, and requiring and enforcing the wearing of masks. Since the interviews were completed, we have learned of other groups reopening volunteer events, including some of the groups that participated in our interviews, by relying on similar safety adaptations.

Many ESGs rely on student volunteers. Because in-person classes were largely replaced by virtual learning methods earlier

in the pandemic, most field trips to ESG served sites were also canceled. In order to remain engaged with these students and other volunteers, and to aid educators who were required to move their instruction online, several of the groups moved their content online, including virtually hosting events and field trips, and/or creating other educational materials. Operationally, several respondents mentioned that they moved their regular meetings online (**Table 2**).

While some respondents seemed to refer to the virtual shift with displeasure, others were more positive about the opportunities that came with virtual formats, including citing numerous benefits associated with the change. In more than a quarter of our interviews, respondents explained that they were able to reach a broader audience with their online content:

> *. . . we found that we can actually engage a broader audience. . . the [site name] stuff I put up in Google Maps– I've got 5,000 viewers! Right, so I wrote this grant to connect people to place and 300 people was like, "wow"! Now I've got more than an order of magnitude more.* (Group 14)

Another respondent explained that virtual programming allowed them to engage more participants, including reaching people beyond Hawai'i:

> *. . . there were kūpuna* [elders] *from New York who dialed into our workshop on well-being. So this has kind of opened up a new awareness of how we can do outreach and maybe we can do it better.* (Group 3)

Respondents also mentioned that going virtual had fostered new collaborations:

> *It's kind of nice because people are coming together. . . we realized that it doesn't make sense for everyone to do their own thing in their own spaces, it's like, how do we all work together? That's one benefit, the need for us to come together and address these problems.* (Group 1)

Another respondent explained that virtual connections had made existing collaborations stronger and more efficient:

> *I don't know that we have developed any new collaborations with people. But I think that it has made them stronger simply due to the fact that it's so much easier to meet with people now because everyone's been virtually so I find that I've never had more meetings before in my life until COVID. But the good thing is that I never talked to these people as much as I ever have. And so I think that it's strengthened the partnerships that we already have.* (Group 13)

However, the need for in-person, in-place gatherings was highlighted by three respondents. One respondent explained the challenges associated with not being able to follow sociocultural norms:

> *. . . you know what's challenging for Hawaiians through all of this, when we greet each other with honi* [to touch noses and exchange breath in greeting] *there's a lot of aloha. There's usually hugs and kisses when people greet each other, but to not be able to do that leads to an awkwardly sterile gathering, especially when we aren't able to engage in these ways and these practices of establishing aloha, common aloha with one another. And so when you're not able to do that, it makes it hard to engage with each other in shared aloha and trust like we used to.* (Group 2)

One respondent described that this was especially true for fishers, hunters, and farmers:

> *But I think going back to how we would have face to face meetings, face to face talking stories, that's really where a lot of the conversation is at its best. . . you know, hunters– it's a lot of tailgate talk, you know, like fisherman. A lot of people who are farmers, you know, a lot of those sunset, sunrise conversations happen on the back of one tailgate. So we can just kind of talk and kind of get at it. For myself personally within the culture and the upbringing that's just kind of how we did things. . . And we have to kind of respect that nature of it because there's things that we really never going to get unless we kind of be within each other's breath and be right there.* (Group 16)

Despite their success at engaging with students virtually, one respondent noted that this change would not be long-term:

> *. . . delivering virtual content is brand new. Because we wouldn't choose to do it otherwise. Take away the pandemic, we not going to continue to do anything virtual. We want kids back on the 'āina* [land]. (Group 15)

Interviewees responded that changes in funding had been another large impact to ESG operations (**Table 2**). Over half of the groups had reported a loss of funding, and a need to adapt their fundraising practices including applying for pandemic relief. The groups that had lost funding explained that some grants had been canceled by funders who shifted their giving to respond to emerging COVID-19 priorities. In a couple of cases, the loss of funding had resulted in the loss of staff. However, all the groups that had hosted interns before the pandemic had still been able to do so during the pandemic; in several cases, groups were able to host a larger number of interns through the Aloha 'Āina Corps (a program of Kupu, a Hawai'i based non-profit that hosts national Americorps, Youth Conservation Corp, and VISTA programs), which was supported by federal CARES Act funding.

Finally, several groups reported starting new programs or initiatives in response to community needs; some of the following programs were initiated out of a direct request from the community, while others came about as a result of perceived needs. Overall, ESGs aided parents, educators and families by: providing educational materials (7 ESGs); supporting food distribution (3 ESGs); distributing planting materials including food plants (2 ESGs); connecting people with food distributions and other aid (1 ESG); and providing grants to community partners impacted by COVID-19 (the national office of 1 ESG). Some of these efforts used existing resources or funds that were not being used as a result of changes caused by the pandemic; other efforts required groups to reach out to funders and/or collaborators for new forms of assistance.

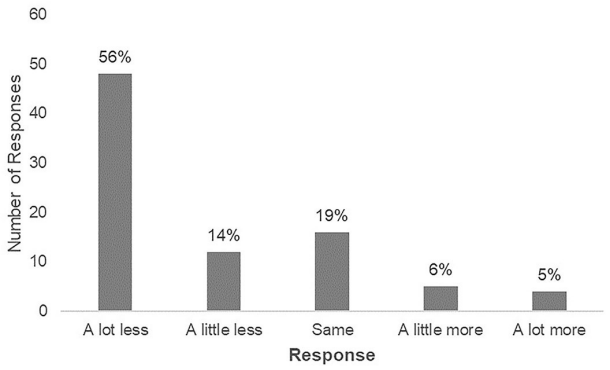

FIGURE 1 | Volunteer responses to the question "Since the beginning of the pandemic, how much time have you spent engaging with environmental stewardship groups?"

Impacts of the Pandemic on Volunteers of ESGs

A total of 85 complete responses from ESG volunteers were recorded; of these, respondents identified as female (55), male (25), and non-binary/third gender (2). Respondents ranged in age from 21 to 92 with an average age of 51.5 (SD = 19.1). Respondents were able to indicate all ethnicities with which they identify; 66% of respondents identified as Caucasian, 31% as Asian, 20% as Native Hawaiian, and 6% as Other. A quarter of respondents identified with more than one ethnicity. On average, respondents had lived in Hawai'i for 59% of their lives (calculated as their age divided by the number of years they have resided in Hawai'i). Of the 80 respondents who indicated their zip code, 84% responded that they primarily resided on the island of O'ahu (the island with the most number of COVID-19 cases).

The topics of focus of the organizations that the volunteers represent included: urban tree monitoring and planting, beach cleanups, wetland restoration, native forest restoration, traditional fishpond restoration, environmental education, and sustainable farming. Twenty-eight percent of respondents indicated that they had volunteered with at least one biocultural ESG before the pandemic (this was assessed by researchers checking the ESGs' mission statements for biocultural content). Many of these biocultural ESGs work on habitat restoration in areas that are important for both biodiversity and food production.

The survey ran from December 2020 to January 2021. On average, respondents engaged with significantly more groups before the pandemic ($M = 3.1$, SD = 3.7) than 9 months into the pandemic ($M = 1.6$, SD = 1.6). A paired sample t-test confirmed that this difference was significant [$t_{(84)} = 4.3, p < 0.05$]. Since the beginning of the pandemic, 56% of respondents spent "A lot less" time engaging with ESGs (**Figure 1**). The main reasons given for this were: volunteer events were canceled, government enacted restrictions, and their concerns for personal safety.

In the responses to the survey of volunteers, we identified several themes that describe how volunteers had been impacted by their changing levels of engagement with ESGs (**Table 3**). Several responses received multiple codes, depending on the nature of the response.

Sixty-two percent of respondents mentioned that they "miss social aspects" of the volunteer experience. These social aspects ranged from individual encounters (e.g., meeting new people) to interacting with fellow members of an established community.

> *What we have lost is a more general understanding and connection to one another, the knowledge that comes with insight & perspective, the support that comes with commraderie* [sic] *and community, and the opportunities that arise from networking therein.* (R8)

Thirty-eight percent of respondents cited missing engagement with land or place. Responses coded under this category spanned different levels of engagement, from simply being outside (e.g., "*getting out in nature*"), to making physical contact with land (e.g., "*getting dirty*"), to connecting with and/or caring for the environment:

> *… [what I missed most was] the connection/relationship with the land. No greater feeling. Land is chief, man is servant.* (R2)

Twenty-eight percent of the responses that were coded as "engaging with place" had used the word 'āina:

> *Being able to do good and much needed work with the 'āina.* (R8)

In the Hawaiian language, one interpretation of the word 'āina is simply land, although it also corresponds to a much broader concept of "that which feeds." 'Āina can refer to terrestrial and/or aquatic systems and always includes people; land without people is not 'āina.

Thirty-six percent of respondents noted that their decreased engagement with ESGs had reduced their sense of purpose:

> *The lack of engagement is isolating. I lose my sense of place and even purpose. I miss the community, the exchanges and the work.* (R48)

Twenty-three percent of responses coded as "sense of purpose" included language such as "giving back" or "mālama 'āina" (caring for land), which may refer to the reciprocal relationship a respondent can have with place.

Thirty-one percent of respondents referred to varying impacts to psychological health because of reduced engagement with ESGs. Respondents reported emotional impacts:

> *It makes me sad that I do not have regular engagement with 'āina.* (R26)

Impacts to mental health were also noted:

> *Feel less engaged, more stressed, anxious, antsy.* (R4)

One respondent noted that the lack of engagement has impacted her identity:

TABLE 3 | Coded impacts and adaptations of decreased engagement with environmental stewardship groups by volunteers.

Code	Description	Number (and %) of respondents
Impacts		
Miss social aspects	Interacting with others, companionship, meeting new people, being with like-minded people, working toward a common goal, sense of community	53 (62%)
Miss engaging with place	Engaging/connecting to place, being outside, getting dirty, caring/helping the environment, mālama ʻāina	32 (38%)
No sense of purpose	Not feeling useful, productive, fulfilled; making a difference; contributing; working; helping; doing good; giving back	31 (36%)
Mental and/or emotional health effects	Sad, depressed, stressed, feel disconnected	26 (31%)
Miss learning	Learning and sharing knowledge	6 (7%)
Adaptations		
Engaged locally	Home gardening, walking in neighborhood, interacting with neighbors	16 (19%)
Engaged virtually	Online meetings and opportunities	11 (13%)
Found other ways to help	Made financial donations, purchased goods, found other ways to volunteer	6 (7%)
More time for other things	Nature-based activities, other hobbies or activities	6 (7%)

A total of 85 volunteer responses were recorded.

> *Not being able to go to the loʻi* [Hawaiian wetland agro-ecosystem] *or māla* [garden] *every weekend feels like I'm missing part of my personality.* (R5)

Several respondents similarly reported feeling disconnected from people and/or place:

> *I do feel much more disconnected from the people around me and miss that feeling of aloha that you get when you are able to accomplish something for the ʻāina every Saturday morning.* (R12)

One respondent noted that the impacts of reduced engagement with ESGs was the "*same as you would not seeing ones ʻohana* [family]" (R38). It is unclear whether this respondent was referring to the people she engages with or the place, or both, but this response may reflect the worldview found in many Indigenous cultures, from which people are seen as a part of nature and share a genealogy with other living things (Salmón, 2000).

Finally, 7% of respondents noted that they missed the learning aspects associated with ESG activities:

> *[I miss] watching our youth wonder out-loud and listening to their laughter about the things they are learning.* (R47)

Volunteers also noted several ways that they had adapted to the pandemic by remaining engaged socially, with the environment, and/or with ESGs. When asked whether they had changed how they engage with the land around their own community, 27% of volunteers indicated no change, while 21% responded that they had taken up or focused more on gardening around their home and interacting with neighbors. Fourteen percent of volunteers also mentioned that they had remained engaged with ESGs through online meetings or other virtual events and opportunities. Eight percent of respondents noted that since they could not volunteer their time with ESGs in person, they had found other ways to help, most often financially; another 8% of respondents noted that not being able to volunteer freed up time for other activities.

When asked what they needed to feel safe and comfortable to re-engage with ESGs (e.g., volunteering, attending work day) a majority of respondents indicated: social distancing (84%), face masks worn by all participants (84%), limiting the number of participants (61%), tools to be washed between uses or required to bring own tools (61%); no potlucks, and if there is a shared meal, safety precautions taken if food is eaten with group (59%); and safety questions asked of all participants upon arrival (53%). Critically the survey took place before any vaccines were available for general use. We expect that responses would likely be different had respondents all been vaccinated.

DISCUSSION

In this study, we conducted interviews with the leaders of 20 ESGs on Oʻahu, and 85 volunteers of ESGs across the state of Hawaiʻi, to understand: (1) how the pandemic affected the budgets, volunteer base, and types of activities of ESGs; and (2) how individuals affiliated with ESGs (as volunteers) were impacted by pandemic related changes to ESG operations. We found that ESGs were most negatively impacted by the cancellation of their volunteer opportunities and loss of funding. ESGs adapted by securing pandemic-specific funding and increasing their online presence. Over half of the volunteers with ESGs reported missing the social benefits of volunteering and over a third responded that they missed engaging with the land/place. These responses are consistent with stewardship typologies and motivations described in other studies (Measham and Barnett, 2008; Bennett et al., 2018; Enqvist et al., 2019). Almost a third

indicated that a lack of engagement with ESGs during the pandemic had negatively affected them psychologically. Although respondents to the survey were specifically asked about impacts due to changing levels of engagement with ESGs, it is likely that these impacts were not solely due to reductions in time spent volunteering with ESGs, but also the result of other pandemic related disruptions including stay-at-home orders, social distancing rules, and personal safety concerns.

ESGs Work Holistically, Not Just on Environmental Issues

A decrease in volunteer participation and funding losses were the most common impacts of the pandemic to the ESGs interviewed. Interviewees described several adaptations their organizations made in response to the pandemic including changes designed to better meeting the enormous, pandemic related needs of the communities where they were operating. Their adaptive nature may be due to many groups' biocultural approach; many are not solely focused on the "environment," but more broadly on the social-ecological system. For example, when asked about their groups' activities, ESGs on Oʻahu listed the following activities most frequently: education (76% of groups), environment (73%), and community improvement (62%) (Dacks et al., 2021). As such, it is not surprising that some ESGs interviewed in this study had shifted their focus to responding to the needs of the community. Specifically, ESGs redirected their efforts to providing educational materials for teachers and parents, food distributions (including food grown on the land that they steward), and professional development (through hosting interns). Biocultural approaches are increasingly common in Hawaiʻi (Chang et al., 2019) but they are also growing globally in the conservation and restoration fields (Egan et al., 2011; Lyver et al., 2015; Velázquez-Rosas et al., 2018). As such, similar results may be found elsewhere.

While the health and well-being benefits that result from volunteering in nature have been reported elsewhere (Coventry et al., 2019), the important role of community-based groups in connecting people to place and the resulting benefits have not been well-documented. The value of ESGs to their volunteers became apparent when ESGs were no longer able to engage with volunteers and communities. Given their significant role, it would be advantageous for ESGs to be acknowledged, included, and where desired, supported by government agencies and non-government organizations who are tasked not only with environmental stewardship, but also public health (Dobson et al., 2021). In doing so, governments could potentially save money in the long-term by reducing public health expenses and resource management costs.

Currently, most ESGs track only a limited number of biophysical metrics related to volunteer impacts on the ecological system being stewarded (e.g., volunteer days, number of trees planted, invasive species removed, amount of area restored) (Dacks et al., 2021; but see Sato et al., 2021). One way that ESGs may more easily understand and publicize their public health impacts is by tracking the well-being benefits experienced by their volunteers (Seymour and Wood, 2021). While several groups track the number of participants they engage with and the number of volunteer hours, very few groups collect information on the personal impacts of engaging with ESGs (e.g., well-being benefits of volunteering).

Developing indicators that track physical, social and/or mental well-being may be beneficial for measuring and sharing ESG impacts more broadly (Sterling et al., 2017). Tracking the benefits accrued from engaging with ESGs on different landscapes could also help resource managers and policy makers better value our landscapes and seascapes in ecosystem service evaluations (Pascua et al., 2017). With thoughtful planning, indicators and metrics can be developed to assess the state of both the social and ecological dimensions of the system. Such measures may be referred to as biocultural indicators and may help ESGs track metrics that may be more closely linked to their own understandings of well-being (Dacks et al., 2019). Biocultural indicators are currently being developed and/or tested by some ESGs in Hawaiʻi. For example, in addition to measuring ecological indicators such as stream flow and non-native plant removal, one group uses an Indigenous evaluation methodology which involves compiling staff notes, ancestral stories, photographs, and participant evaluation data to assess indicators such as "the % of community participants who experience a deeper understanding of Hawaiian and ancestral practices around forest stewardship." In another example, a funder is currently supporting a pilot effort to better understand the impact of participants' connections to ʻāina and place on their well-being in four organizations across Hawaiʻi; this effort is a collaboration including the funder, four place-based programs, and involves storytelling and self-evaluation using SenseMaker (https://loncollector.sensemaker-suite.com/) to produce both qualitative and quantitative understandings of the programs' impacts on well-being.

ESGs Provide Meaningful Access

Most ESGs that participated in STEW-MAP Oʻahu reported that they do not own the lands that they steward (Dacks et al., 2021), meaning that ESGs facilitate physical access for participants to be on land that might otherwise be off limits to the public. By facilitating access, ESGs play an important role in connecting people to natural areas. For example, while much of the state's open spaces are owned or managed by just a few organizations, the largest being the state government (e.g., administrators of Natural Area Reserves), federal government (e.g., military), and a handful of private landowners (Hawaii Statewide GIS Program., 2017) (**Table 4**), access to these areas is often regulated. In some of these open spaces, stewarding nature (e.g., planting trees or removing invasive species) and even subsistence gathering may be allowed, but requires permission. However, while most public lands do allow some form of access, this fact may not be widely known and/or the process for gaining access may be difficult to understand. Thus, ESGs that

TABLE 4 | Major landowners/administrators in the study area.

Landowner/administrator	Total acres on O'ahu	Total acres in state
State Govt.	89,160	1,375,635
County of Honolulu Govt.	18,672	18,672
Federal Govt.	61,523	531,444
Kamehameha Schools	47,807	363,245
Kualoa Ranch	3,693	3,693
Ohulehule Forest Conservancy	1,471	1,471
HRT Realty LLC	1,488	1,761
Ko'olau Land Partners	1,036	1,036
State Department of Hawaiian Home Lands	61,523	198,896

Landowners/administrators listed own/administrate >500 acres in Kona and Ko'olaupoko Districts. Data from Hawaii Statewide GIS Program. (2017).

facilitate access to land they do not own are serving to expand options for the public to volunteer by taking the responsibility to acquire permission (e.g., right of entry, collecting permits, traditional protocol). For ESGs serving private lands, but also some publics lands, the ESG might be the only avenue for the public to access a site. Other ESGs that do own the land that they steward also may provide safe and well-organized opportunities for the public to access areas that might otherwise be difficult to access.

One ESG leader explained:

> *A lot of what we do is based around making restoration publicly accessible, making the native species publicly accessible so people start to see them and become acquainted with them.* (Group 4)

During COVID times when volunteers were restricted from working they continued to want to be connected to or even heightened their interest in stewardship work. S/he explained:

> *We had over 150 people respond that they wanted to foster native plants for us. It was insane!* (Group 4)

Beyond ESGs providing physical access to nature and natural areas, our results from Hawai'i emphasize that there is an additional layer to consider—the quality and character of the natural areas and the type of engagement people have with the place. As a result of COVID related restrictions, many respondents shared how much they valued and so missed having organized access to Indigenous biocultural land and seascapes. These respondents highlighted the value of accessing areas that were cultivated, in some cases over many generations, to sustain traditional agricultural, agroforestry, and aquacultural systems where native and Polynesian-introduced species thrive. In these spaces, some ESGs also provide access to experiences that enable reciprocal relationships with place (Chan et al., 2012; Pascua et al., 2017). These experiences are meaningful to Indigenous people who may no longer have access to their ancestral lands. They are also meaningful to diverse communities of residents living in Hawai'i with little to no access to land ownership (Sato et al., 2021).

One director of an ESG focused on the biocultural restoration of traditional agriculture explained:

> *There's such a huge desire and want for these kind of experiences… [during COVID people are] having a desire to be connected to those sources of where their food comes from. So definitely wanting to care more about those places…* (Group 3)

Importantly, our survey was not accessible to minors (i.e., grade school students) or residents of the Women's Community Correctional Center, two groups who were mentioned by ESGs as part of their regular volunteer base. We would anticipate however, that the themes that emerged from our survey respondents—missing social aspects of ESG stewardship, missing being in nature, feeling disconnected, and missing a sense of purpose—had also been experienced, perhaps even in a heightened way, by these two groups. Certainly, more vulnerable groups have suffered disproportionately under COVID, and so they likely stand to benefit the most from re-engaging with ESGs. Further research is needed to begin exploring this idea.

ESGs provide opportunities to engage in reciprocal relationships, which enable people to fulfill personally held ethical obligations and values, often referred to as *kuleana* (rights/responsibilities) in Hawai'i. These include obligations to care for, restore, and protect places and resources that in turn support people's lives and well-being (Diver et al., 2019). ESGs then enable people in Hawai'i to engage in activities that connect them to places/practices that help reassert local and Indigenous rights, norms, and lifeways. Diver et al. (2019) identified the mobilization of reciprocal relations between people and their places as an important contributing factor to restoring places/practices across diverse Indigenous and non-indigenous communities caring for terrestrial and marine resources. Furthermore, they describe how increased visibility of reciprocal relations as an ethical practice can shift environmental governance and enhance communities' political influence over the 'management' of their resources. Landau et al. (2019) describe how ESGs bridge civic and public sectors by serving as brokers within governance structures.

Engaging with ESGs offers opportunities for learning and knowledge transmission—about one's place, culture, but also intercultural learning. For example, the chance to practice, celebrate, and share horticultural and culinary knowledge and practices with others is found in diverse communities in Vancouver with the Maya in Exile Garden (Nesbitt et al., 2021), in New York City with Korean families in community garden networks (McMillen et al., 2016), and on O'ahu with traditional taro and aquaculture. Having a shared sense of stewardship supports more equitable natural resource planning and access to benefits of nature (McMillen et al., 2020).

If restoring (and maintaining) relationships with place is an articulated value for communities, and we know this is

dependent upon their access, the function and value of ESGs is clearly beyond restoring places. They also restore community well-being and decision-making power. Diver et al. (2019: p. 422) explain that "the ability of an individual or community to benefit from resources is contingent upon having the ability to care for those resources, and the ability to give something back to place (e.g., through weeding, cleaning, monitoring, replanting, protecting, teaching, honoring through ceremony or prayer, etc.)."

Importance of ESGs in Helping Volunteers Address Pandemic Related Stress

Pedrosa et al. (2020) has documented the potential widespread and severe emotional, behavioral, and psychological impacts and challenges resulting from the pandemic. "Nature assisted therapies," including programs and/or activities involving living things (i.e., plants or animals) or in terrestrial and/or aquatic outdoor settings are prescribed for improving a variety of health ailments, including mental health issues (Annerstedt and Währborg, 2011; Bragg and Atkins, 2016; Britton et al., 2020). As such, volunteering with ESGs could be an effective method for healing from the impacts of isolation that accompanied the pandemic. While volunteer activities were largely canceled at the beginning of the pandemic, from our volunteer survey, we learned of the conditions that participants require in order to feel safe in returning to volunteering. In the interviews that were conducted in the later part of this study, we learned of some groups that had started offering volunteer opportunities again, with adaptations for safety (e.g., masks required, social distancing, reservations with group size limits, coordinated independent volunteering). One group has even begun officially calling its community workdays, in which volunteers are tasked with removing non-native, invasive plants, "group therapy" days.

CONCLUSION

Research from around the world describes stewardship as something that strengthens resilience at the community level (Krasny and Tidball, 2009; McMillen et al., 2016; Diver et al., 2019). Our study documents the role of ESGs in facilitating meaningful stewardship opportunities that contribute to both individual and community well-being. At the individual level, ESGs host volunteer events that are important for social, mental, and emotional well-being, and building and/or maintaining a sense of place and purpose. At the community level, ESGs not only focus on environmental stewardship, but also the health of the community, as evidenced by the innovative adaptations to respond to new, immediate needs of the community that resulted from the pandemic (e.g., need for educational materials because of school closures, need for food because of drastic increase in unemployment). If we believe that the benefits of nature are related to the quality, depth and longevity of relationships between people and nature (McMillen et al., 2020), then ESGs should be recognized and supported not simply for the large benefits they foster and accumulate from tree planting and beach clean ups, but also for their contributions to community well-being.

DATA AVAILABILITY STATEMENT

The anonymous raw survey data supporting the conclusions of this article will be made available by the authors, without undue reservation.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by Institutional Review Board, Office of Research Compliance, University of Hawai'i. The participants provided their prior informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

RD, HM, PH, KK, SB, and TT planned the research. RD, HM, and PH conducted interviews. RD analyzed the data. RD and HM conceived and drafted the manuscript. HM, TT, CG, and KF provided feedback on the manuscript draft. All authors contributed to the article and approved the submitted version.

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SUPPLEMENTARY MATERIAL

The Supplementary Material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/frsc.2021.710355/full#supplementary-material

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