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Hālana ka manaʻo: place-based connection as a source of long-term resilience

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ABSTRACT. In April of 2018, the island of Kauaʻi broke national 24-hour rainfall records, experiencing several days of intense rain and flooding that destroyed property, threatened lives, and reshaped the land. However, out of the turmoil came stories of survival, resilience, community, and strength. We interviewed over 80 individuals and found that concepts of resilience are intimately linked to place and community. This research explains how connections to place underpin and contribute to long-term, community-level resilience. We illustrate the significance of place-based knowledge in preparing for floods and mitigating flood damage, as well as the crucial role of community in emergency response and long-term disaster recovery. We found that community organizations facilitated the transmission of supplies and support, underscoring the connections to people and environment that foster resilient outcomes. Interviews also highlighted threats to place-based community resilience, such as tourism and prioritizing infrastructure over human needs. Reframing resilience to be more inclusive of social factors that attend to place-based dynamics can give more agency to community members and strengthen the connections that support recovery and adaptation amid increasing frequency of unpredictable and hazardous weather patterns.

Key Words: *climate adaptation; community environmental care; flood; Kauaʻi; place-based resilience; tourism*

INTRODUCTION

In April 2018, the Hawaiian island of Kauaʻi broke national rainfall records during several days of intense rain and flooding that destroyed property, threatened lives, and reshaped the land. A rain gauge near Waipā on the island's North Shore recorded 49.69 inches of rain between April 14-15, the most rainfall recorded in a 24-hr period in U.S. history. At least a dozen landslides closed eight miles of the only highway, cutting off all vehicle access to the north-west coast for several weeks. According to one local natural resource manager quoted in the Los Angeles Times, "this is the most severe rain event that we know about since records started being kept in 1905." However, out of the turmoil came stories of survival, resilience, community, and strength. Embedded in these stories are narratives of resilience anchored in processes and connections to place.

Three years later, some residents remained houseless, families and businesses were still recovering, even as the frequency of climate-related disasters increased. In 2021, residents of the islands' north-western district, Haleleʻa, experienced three new flood events: 10 bridge closures due to high water, two landslides, and a massive hillside collapse. The collapse closed the lone highway that provides critical access to medical care and emergency services, as well as daily access to jobs, schools, and family outside the community. People of Kauaʻi, like many communities across the globe, are living at the cusp of the climate crisis, adapting daily to the many resulting changes in their lives.

Humans have dealt with floods and fires for millennia. However, changes in climate are causing more severe and frequent events such as hurricanes, extended periods of drought, and intensified rainfall, creating disastrous outcomes for humans and their environments (IPCC 2021). Disaster preparedness and resilience research often focuses on public communication, the presence of emergency shelters, and the timing of evacuation, all formulated

beyond the local level (Rehman et al. 2019). As climate change induced disasters become more prevalent, the critical role of community response is increasingly recognized (Beatley 2009, Kais and Islam 2016), yet there is a dearth of research on the local-level social and cultural factors that build long-term resilience (Clare et al. 2017, Sharifi et al. 2017, Summers et al. 2017). This work engages with the concept of place to broaden understanding of community resilience in the face of increasing climate-change-induced disasters. We propose that place is an inextricable part of community, and, by extension, community resilience. During the 2018 Kauaʻi floods, neighbors secured one another's safety, and the community played an integral role in collective response and recovery efforts. They relied on place-based knowledge and connections to one another and with their physical environment. These connections and reciprocal relations of care support long-term resilience strategies despite the increasing frequency of unpredictable and hazardous weather patterns. Interviewees who lived through the 2018 floods emphasized that it was a miracle and blessing that there was no loss of life, and that they had an opportunity to learn and prepare for future disasters.

This project embraces productive change with the title Hālana Ka Manaʻo. Hālana means to overflow or flood, but also to be buoyant, float, or remain calm. Manaʻo means thought, belief, to expect something, or to consider. Hālana ka manaʻo is translated as "to be hopeful," with lana ka manaʻo an expression for happiness, literally floating thoughts. The phrase Hālana ka manaʻo refers to flooding because the communities we studied were flooded, and our project team was flooded with interviews from survivors eager to share their experiences. At the same time, it captures a sense of tranquility, hopefulness, and buoyancy in their stories, stories of thankfulness and turning to a stronger, safer future. Their stories provide generative possibilities for communities across Hawaiʻi, the Pacific, and beyond that face

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increasing environmental uncertainty amid extractive tourism practices and colonial legacies. They highlight a collaborative approach to management and the power of place-based knowledge to provide stability and recovery in the short term and resilience that honors place in the long-term. Drawing on interviews with over 80 individuals, we argue that concepts of resilience are intimately linked to place and community. This research explains how connections to place underpin and contribute to community-level resilience and offers strategies for enhancing place-based connections to foster more resilient communities.

Theoretical framing
We define place as a set of connections and the processes through which these connections materialize. Relatedly, we identify community as the people who are connected to and by a place, along with the place itself. This concept of community is place-based but not spatially bound, recognizing diverse membership and avoiding prescriptive norms of social organization, all of which have been noted as limiting factors in previous definitions (Agrawal and Gibson 1999). Place-based resilience is the ability of these strong connections to remain intact, if malleable and adaptive, under disturbance, and to support cultural, social, ecological, and physical well-being. Building on relational understandings and imaginaries of place, and moving toward a layered and inclusive definition, this research evaluates survivor experiences for the 2018 Kauaʻi floods to identify sources of (community) resilience through place-based connections as well as threats that can destabilize place-based resilience.

The concept of place, central to understanding spatial relations, has been a source of theoretical production, debate, and criticism from geographers (Cresswell 2004). It evokes a physical space through bounded social ideas of neighborhood, community, and suburb, and scientific divisions such as habitats and landscapes. Places are shaped by weather, climate, geologic forces, and multispecies interactions. They hold political meanings as states and territories, which carry historical context. Place is also a framework for understanding the world, individually or collectively, "an aspect of the way we choose to think about it - what we decide to emphasize and what we decide to designate as unimportant" (Cresswell 2015:55). Humanistic geographic thought has made notable contributions to ideas of place, asserting that it is a physical location imbued with meaning, and offers a particular experience (Tuan 1989, Basso 1996, Cresswell 2004, 2013).

Although there are useful metrics for evaluating resilience within places, such as access to medical treatment or local food availability, we contend that place itself defines more meaningful and long-term indicators through connections and processes. Scholars have proposed a relational conceptualization of place that builds on social-ecological systems' (SES) framings of resilience, identifying the multiple imaginaries of place to foster "deeper understanding of the forms of social resilience that enable communities to respond to and cope with disasters" (Massey 1991, Cretney and Bond 2014:9). This draws on broader theorizations by geographers on the amorphous definitions of place. Notably, connections are essential for understanding place (Cresswell 2004). A connected, relational perspective of place rejects the need for rigid bounding of space. Place is a fluid

concept, one that evades collective agreement. However, even as the meaning and identity of place is contested, a synthesis of embodied experiences, intentional observations, and knowledge that facilitates human well-being through practices such as farming, hunting, and restoration, form a cohesive body of connections to place. These connections are not solely individual, but social and collective, re-inscribing cultural values and protocols, reaffirming identity in a changing landscape.

Resilience literature grew out of ecological research to identify systems and their ability to rebound and equilibrate after disturbance (Holling 1973). Recent expansions of resilience theory include SES that address social values and relations that are intertwined with ecological health and make space for thinking with transformation. The capacity for adaptation and adjustment emphasizes a shift toward living with change rather than controlling change, persistence rather than stasis (Gunderson and Holling 2002, Magis 2010). However, SES has been criticized for perpetuating a false dichotomy of humans and the environment and failing to account for more complex cultural and spiritual aspects of place-based well-being (Caillon et al. 2017, Dacks et al. 2019). Resilience frameworks that rely on SES theories have also fallen short of theorizing social complexities and connections (Brown 2014) by focusing on predetermined institutional variables and associated ecological outcomes (Cote and Nightingale 2012). These frameworks fail to critically engage with the concept of place, a necessary component of hazards and resilience research (Cretney and Bond 2017). Recognizing these limitations, we conceptualize resilience as place-based capacity to adapt to and persist amid change, honoring the "cultural values, historical context and ethical standpoints" that overlay ecological processes and relations (Cote and Nightingale 2012:480).

In community resilience, a subset of the broader resilience literature focused on connections between people and to the local environment, place-based frameworks can help to inform assessments and recommendations (Brown 2014). Defined as "the existence, development, and engagement of community resources by community members to thrive in an environment characterized by change, uncertainty, unpredictability, and surprise," community resilience builds capacity to mitigate impacts from change (Magis 2010:402). Despite the growing attention to the concept of community resilience, it continues to center Western variables and quantifiable data for resilience indicator metrics (Cutter et al. 2008, 2014). For example, many frameworks focus on community statistics and demographic data such as employment, income, levels of education, and poverty across the community as a whole, without attending to differences within communities or on connections and cultural reserves as sources of resilience (de Bruijn 2004, Wardekker et al. 2010, Jepson and Colburn 2013). We propose shifting perspectives of community resilience to incorporate facets of Indigenous knowledge systems, which are "poly-rhetorical, contextually based, and rooted in a specific place and time;" a move away from homogenized indicators toward connected, place-based dynamics (Louis 2007:134). This critical approach attends to the specificity of place in community resilience, recognizing the unique relationships that residents have with local resources and the knowledge that comes from intimate and shared connections with the environment and between people.

The impacts of climate change on people, ecosystems, and watersheds are complex; driven and exacerbated by multiple interdependent factors and feedback loops (Terzi et al. 2019). Traditional engineering approaches to forecasting future climate impacts focus on a small number of variables in isolation, or on idealized model representations, without meaningful assessment of the veracity of these models in relation to actual places and communities (Shaw et al. 2009). Such approaches are difficult for communities to access and comprehend, much less use to collect data themselves to guide their own decision making. These methods often ignore generations of Indigenous ecological knowledge of place (Turner and Spalding 2013, Winter et al. 2021). In many rural areas, local and Indigenous community members possess long-term knowledge of streams and waterways, which is critical to understand changes and vulnerability in watersheds (Shaw et al. 2009; Chew and Chief, in press). Local and Indigenous knowledge is often shared through community environmental care, the active management of resources to meet functional and cultural community needs (Thompson et al. 2020). The value of Indigenous ecological knowledge in adapting to climate change is well-established (Berkes and Jolly 2002, Lauer and Aswani 2010, Turner and Spalding 2013); however, there is a need for approaches that effectively integrate Indigenous and Western-science-based knowledge to prepare for climate-change-induced hazards (Hiwasaki et al. 2014, McMillen et al. 2017).

Collectively identified as biocultural approaches, researchers have emphasized the relationships, processes, and co-productions of knowledge in place that eschew dichotomous theorization as either social or natural. Biocultural approaches also focus on holistic well-being that attends to non-Western indicators of health, such as cultural subsistence and the perpetuation of traditional values (Pascua et al. 2017). Dacks et al. (2019) identified diversity and valuation of traditional/local ecological knowledge as missing from SES frameworks and support the development of place-based indicators for well-being. According to Fabinyi et al. (2014), it is evident that universalization is not the key to improving well-being, nor, we argue, the key to understanding pathways to resilience.

Similarly, 'āina, a Hawaiian word that can be defined as land, includes broader concepts and multiple meanings that bridge well-being, identity, and community. 'Āina evokes notions of reciprocity between people and place, it is that which feeds but is not recognized as a separate and distinct entity. 'Āina is alive and possesses spiritual qualities that forge genealogical ties to kulāiwi, or homelands (Pearce and Louis 2008). It is part of the people and a guiding philosophy of living in and with a place (Larsen and Johnson 2012). Hawaiian understanding of place is multidimensional. It goes beyond typical sensorial boundaries and appeals to "other more abstract 'senses' that are linked to intuition, place, time, and connection to the past, present, and future" (Pearce and Louis 2008:114, Oliveira 2014). In this way, place is an embodied concept and experience that aligns with our assertion that community cannot be defined without both people and place.

Hawaiian definitions emphasize connection between humans and their environment, processes that sustain life and cultural values. Beyond Hawai'i, Indigenous languages and knowledge systems have words that denote place, such as land and country, which

include material, biological, meteorological, spiritual, and historical components while also emphasizing connections with people (Diver et al. 2019, Barker and Pickerill 2020). Such concepts of place center collaborative environmental care and reciprocal relations, both of which are key components of climate adaptation. Engaging with the myriad uses and referents of the concept of place, in ways that reflect the multiple meanings of 'āina, we explore the concept of place as an approach for assessing and enhancing resilience.

STUDY AREA AND METHODS

Data collection took place in March and May of 2019. Researchers of a blended undergraduate and graduate social science methods course worked in small groups to meet with residents from Hā'ena, Wainiha, Lumaha'i, Waikoko, Waipā, Wai'oli, Hanalei, Kalihiwai, Anahola, Kīlauea, Kōloa, and a small area of Kapa'a called Keapana on the island of Kaua'i, all areas impacted by the floods. These communities have various types of hoa'āina (people of a place), including 'ōiwi (those with ancestral indigeneity to a place), kulāiwi (those with ancestors buried in a place), kama'āina (those raised in a place), and kupa'āina (permanent residents of a place; Winter et al. 2021). Relationship to place is a defining characteristic and represents different kuleana, or responsibilities, to a place. These communities hold Indigenous and place-based knowledge alongside increasingly globalized tourism flows, representing a confluence of knowledge systems, values, economies, and ways of being in a place. All are common features among tourism destinations with colonial histories.

We also spoke with state and county officials, most interviewed in Līhu'e. Interviews were open ended, allowing participants to "talk-story" about their experiences and share thoughts, or mana'o, about the 2018 floods (Au and Kawakami 1985). Some interviews took place while walking or driving, with maps, photos, and aerial images also used to connect events to place. This open-ended and geographically based approach draws on culturally relevant methods in qualitative research that are particular to the Pacific but also used in other settings (Vaioleti 2006, Kenney and Phibbs 2015). Interviewees were selected based on involvement in flood recovery efforts at both on the ground and policy levels or having been directly impacted by the floods. We selected interviewees from every impacted community on the island and worked with community members prior to data collection to create a list of interviewees to contact. Students spoke to more than 80 individuals including 14 community members, 20 individuals who were flooded, 22 community leaders, 16 community volunteers, 18 government employees, 4 emergency responders, and 2 transient vacation rental (TVR) owners. These categories are not exclusive and several interviewees held multiple roles. This same group of students returned in May of 2019 to share preliminary results and findings in 3 separate sharing events for participants, also conducting 10 additional interviews with groups that were not well-represented in the first round of interviews such as elected officials. All interviews were transcribed then analyzed to identify common themes and community suggestions. The students synthesized these findings to write up a list of recommendations to move forward with. A year later, a second graduate class continued interview transcription and conducted a more thorough analysis, specifically focusing on planning and policy related themes. Themes were identified in the

interviews using a grounded theory approach to coding. These themes were refined and quantified, then connected to illustrate relationships and processes that defined the response and recovery of the floods. All interviews were coded using refined themes and subthemes. To address potential bias from heavy representation of a few interviews, the number of codes for each subtheme as well as the number of individuals contributing to those codes was calculated. This phase of research resulted in the compilation of themes and subthemes that revealed patterns and generalized perceptions of interviewees regarding their flood experience and perception of recovery and the resilience landscape.

RESULTS

Although each story was unique, commonalities emerged regarding sources of and threats to resilience. The first theme, place-based knowledge and community environmental care, explains how regular observations of weather and maintaining functional landscapes helped residents prepare for the flood. Next, we highlight how the community came together after the flood and the importance of social ties in emergency response. Threats to place-based resilience were also prevalent throughout the interviews, notably the prioritizing of infrastructure over human needs during recovery and the expanding tourism industry. In the following thematic sections, interviewees are identified by the community they are from or their role in the flood response and recovery.

Place-based knowledge and community environmental care
Though the 2018 floods were precipitated by a record-breaking rainfall event, flooding has been a regular occurrence for many Kaua'i residents, especially in low-lying areas and along streams. Several interviewees shared that they had developed a system of preparedness for floods, knowing when to elevate certain items in their garage, how much time they had to evacuate before the highway closed, or knowing where to move their cars to higher ground.

> We got a little method to our mayhem when you're living down in that flood area. You gotta be able to elevate all your stuff, washers and dryers gotta be upstairs, your water heaters are elevated, all that stuff's elevated to a certain level from the high water line based on the last 20, 50 years. (Wainiha community member)

Past flood experiences coupled with regular observations of weather patterns help people study key dynamics contributing to flood conditions. However, the knowledge and routines they had built proved inadequate in such unprecedented heavy rains.

> The water rises fast now. So, it's really different. I've seen it all my life and my whole recollection and everything is just blown...I can't predict it anymore, because it's different. (Wainiha community member)

Interviewees agreed that the flooding was both more intense and faster than normal, limiting evacuation options and creating dangerous conditions for those who sheltered in place. The stark differences in this storm brought attention to broader environmental changes impacting the area.

Interviewees described connections with 'āina as a fundamental aspect of life, identity, and resilience. These are active relationships cultivated through daily activities, paying attention to environmental rhythms, and identifying indicators from previous weather events. Twenty-six people mentioned how environmental observations and knowledge of the history of their home, and of local conditions helped community members to prepare and respond to the storm. Fifteen individuals also talked about the importance of environmental stewardship, articulating ways in which community responses tended to 'āina and reciprocity between people and place.

> First, was making sure all the families and everybody's okay. Everybody's getting food, water, shelter. The people are okay, now the environment, the rivers, the reef, the ocean. How do we preserve and take care of the damage that happened to our area? (Wainiha community member)

Debris removal was an important task in the aftermath. Nearly one-fifth of interviewees identified the need for active management of streams and waterways, including regular clearing of invasive species, as a vital lesson from the floods. Hawaiian ahupua'a (self-sustaining geographic units) land management systems relied upon careful oversight of water and the maintenance of 'auwai (ditches) and stream systems to ensure water was available and shared with all. Hawaiian irrigation accounted for the variability of water flow and flooding, with manowai or dams that diverted water, built to wash out in large floods. Many of the flooded areas are former lo'i (irrigated terraces, especially for taro) that are no longer actively farmed. One interviewee noted that in Wainiha Valley some of the worst flooding was caused by old ditch systems that are no longer used and maintained, choked by invasive hau bush that collects debris and the readily broken branches of invasive albizia trees. He recalled having to clean these same 'auwai before and after school every day as a child, to provide water for his family's taro patches. In many communities, newer residents were unaware that they had built houses on old lo'i or filled in old 'auwai.

> All of the broken trees and boulders came up against this bridge, piled up, caused more flooding, therefore these houses over here had way more damage than it would have been had it been maintained. (Anahola community member)

Some restoration projects have been going on for more than 10 years. In the community managed ahupua'a of Waipā, stream restoration has included clearing hau bush, rerouting tributaries back to the stream to prevent erosion and facilitate the flow of water, and replacing invasive plants with native ones. Area homeowners experienced less flooding because of these restoration efforts. Still, Waipā staff reported that the 2018 storm washed out newly planted trees, cut deeper into river banks, and made stretches shallower with deposits of pebbles. As one of the Waipā Foundation workers stated, "We didn't lose our homes, we lost a little portion of blood, sweat, and tears."

A work crew of 10 area young people assembled in the most devastated area, Wainiha Valley, to clean the river, including years of trash and debris, not only items deposited by the floods. They surveyed debris and spent a month removing over 60 cubic tons of debris. After their work, over the summer of 2018, Hurricane Lane hit in August, bringing nearly as much rainfall to Wainiha Valley. Residents reported that due to the crew's work, the water moved through the valley much more quickly, causing less damage. Kūpuna (elders) said they had not seen the river so clean in a quarter century.

Interviewees portrayed their relationships with ʻāina as foundational to resilience to future natural disasters. This includes listening to ʻāina by paying attention to environmental rhythms and changes, as well as actively maintaining the land and waterways to ensure continued coexistence.

> *Most people here, it's all encompassing visceral and passionate connection to place that's in everything that we do... with work choices, and I think lifestyle choices as well, but it's more a love of a family member as opposed to something separate.* (Hāʻena community member)

> *How key it is to have people on the ground that understand not just by looking at a map, but understand the complex nature of the entire system and how one decision affects other places and the consequences of all that. I can't imagine managing it if we didn't have them, those guys. How key that is, the longtime knowledge of this place, in the whole system.* (Kīlauea community member)

Knowing your neighbor and assessing needs: community organization as first response

> *Everybody, no matter how much they lost, they help their neighbors.* (Hanalei community member)

Strong social ties and neighbor-to-neighbor response were critical in reaching those impacted by the floods as well as assessing their ongoing needs. Residents relied on each other to check on neighbors, family members, and area elders to make sure they were safe. After the flooding, if a loved one could not be reached by phone, the community worked to find someone to knock on their door to see how they were holding up. Neighbor-to-neighbor response was facilitated by a shared sense of community identity built on trust. It sometimes meant meeting someone new or knocking on the front door of a stranger, creating new opportunities for neighbors to connect and reinforcing the importance of place-based human relations as a source of resilience.

Another facet of life in remote communities is self-sufficiency. Some impacted families found it hard to admit that they needed help. As one taro farmer explained:

> *Families around here, they're proud. You ask how they are doing and, even if they're struggling, they'll say, 'We're OK. Go check on our neighbors, they have it much worse than us.'*

Through neighbor-to-neighbor response, community members found multiple creative ways to preserve people's dignity while making sure everyone's needs were met. A Wainiha resident shared the story of her friend who started a meal service:

> *She started asking people if you know of anybody who's really vulnerable, any neighbors and ʻohana that need help with food. We're going to make food and deliver it and that was...her generous heart and her genius and so people in the community just wrote down other people's names... nobody applied. We didn't go searching. We just said, 'Please let us know if you know of anybody.' That's why it was so beautiful because it was people referring other people, looking out for each other.*

Once immediate emergencies were addressed, community members mobilized to assess impacted families' needs and effectively direct aid. This process also relied on community networks and strong social ties. One Anahola mother devised a simple Google form with questions on family needs such as number of children and kūpuna in the house, extent of job loss, medical issues, and property damage. A group of mothers from across the island, many single parents, volunteered to go door to door in impacted areas, helping families to fill out the forms. They continued to go back every few days, week after week, for months. As one explained:

> *The first time I went, they told me they were fine, they did not need anything. But because they knew me already, and because I continued to go back and check on them, slowly they started to tell me what was going on, that their child needed medicine, or they needed help getting an elder relative to the doctor.*

People helped with whatever skills they had. A group of local retirees volunteered to enter the assessment forms of community needs into a database created by another volunteer with data management expertise. The database, which included over 500 affected families, was completed weeks before the Red Cross or FEMA reached the scene. Canoe paddlers from across the island assembled to help the two Hanalei canoe clubs clean up and salvage their canoes, some of which were washed across the bay. Babysitters provided a mini school where children could go to keep them from playing in flood waters, while their parents worked to clean up their homes.

Mobilizing volunteers based on their individual skills was a valuable component of the community response, which also relied upon existing community relationships and knowledge of one another. Four days after the flood, community members held an organizing meeting in Haleleʻa. Over 40 community and non-profit leaders showed up with less than 24 hours' notice. They signed up to volunteer to lead responsibilities in key areas such as family outreach, boats, health and medical supplies, meal provision, education, and government communication.

Families and non-profits launched community kitchens in each impacted area, providing over 140,000 pounds of food and supplies (Hawaiʻi Community Foundation 2018). Restaurateurs used their kitchens to cook food that would otherwise spoil to feed residents and volunteers. Area non-profits offered their certified kitchens and refrigeration space to store and prepare food. The group dinners provided by local kitchens created a space for camaraderie at the end of long days. In some communities residents gathered for dinners each night, while brown-bag lunches were also delivered to those who kept working.

In Kōloa, the Sheraton Kauaʻi, which was undergoing renovations, worked with a long-time community leader to offer shelter for those who were displaced. Collectively, area hotels donated refrigerators, beds, and furniture to residents whose belongings were damaged or washed away. The hotels regularly change out their furnishings and were able to support those in need while doing routine maintenance.

Although the floods brought hardships and obstacles, most interviewees focused on the positive outcomes of working together, knowing one's neighbors, and finding ways to employ those relationships and everyone's individual skills to create networks of support. Existing organizations and those that coalesced in the aftermath connected people to resources and

strengthened social networks, effectively (re)producing the relational values and practices that shape place. Individuals recognized their kuleana, or responsibility, in caring for neighbors, streams, loʻi, and animals. Working together, they were able to build capacity and subvert many bureaucratic barriers that more formal organizations and government agencies faced in providing support.

> *Know who is in your neighborhood. Know who are your community members. Know what skills they have.... and I think before you have a disaster, you should know your people. We know each other.* (Hāʻena community member)

Threats to place-based resilience

Prioritizing infrastructure over human needs
Although there were many sources of federal and state money for recovery, the vast majority was directed toward improving and repairing infrastructure, such as roads and bridges. Interviewees expressed frustration at the lack of direct funding for flood victims to recoup losses and start rebuilding their lives. Although infrastructure was viewed as an important aspect to rebuilding, some residents felt that the government prioritized reopening roads and allowing tourists to visit and alleviate the local economy, rather than making sure every family had a roof over their head. The need to support residents first before infrastructure was suggested in nearly half the interviews (32), appearing 68 times.

Community members also expressed the need for more flexibility in allocation and use of funds, especially because on-the-ground needs after a disaster change quickly. Overall, 25 people (36% of interviewees) raised issues with funding and the flow of finances after the flood. Many specifically noted a lack in funding for projects that both the community and government prioritized. Some interviewees found grants to be overly restrictive on how the money could be spent, further straining recovery efforts. The Hawaiʻi Community Foundation was highlighted as a notable exception, quickly dispersing flexible funding with streamlined application and reporting requirements to community non-profits.

The community also took it upon themselves to fundraise through various platforms and to host donation drives to address pressing needs. Donations and unsolicited aid flowed in from all across the state and even outside of Hawaiʻi. These informal mechanisms bypassed the bureaucratic dispersal of funds from state and federal agencies. Based on recommendations expressed from interviewees, the government needs to direct more monies to flexible mechanisms that address actual on-the-ground evolving needs of communities affected by natural disasters. Direct cash grants allow residents to resolve their unique precarities faster and turn their attention to collective recovery. Because communities emerged as the critical center of response and resilience, finding means to fund community efforts was vital to reaching impacted families. Official funding was not directed to where it was most needed, eroding rather than strengthening community integrity and resilience.

Tourism
The North Shore of Kauaʻi is a popular tourist destination and many properties are vacation homes that also function as transient vacation rentals (TVRs). The Kauaʻi Tourism Strategic Plan

2019-2021 found that visitation has been increasing, and the average daily visitor count reached almost 30,000 for the first half of 2018. According to the 2020 census, just 67,091 people live on the island. The plan also noted that average daily visitation over 25,000 puts a strain on infrastructure and the environment, and it negatively impacts the quality of life for residents. In times of disaster, high tourism rates create more dangerous emergency evacuations.

> *Even the Hawaii Tourism Authority, who's supposed to be promoting tourism, they have even come to the assessment that Kauaʻi has hit a tipping point. There's a maximum capacity that you can hold tourists and we're pretty much at it. Which is why you don't really see many new hotels coming out.* (Kauaʻi Planning Department Director)

The historic bridges along Kūhiō Highway, all over 100 years old, were not safe for large vehicles such as tour buses. This was a key factor in regulating tourism along the North Shore. However, after the landslides, bridges needed to be fortified to support the necessary machinery for road repairs, opening the possibility of future tour-bus traffic. Interviewees compared the anticipated influx of tourists once the road opens to the floods that came through in April, indiscriminately reshaping this sacred space as the communities continue to recover.

The pressures of tourism increases are compounded by the type of tourism as well. Rather than booking hotel rooms and traveling in small groups via tour bus, the Kauaʻi Tourism Strategic Plan identifies most visitors as

> *free independent travelers (FITs), often staying in vacation rentals within communities, traveling in cars they rent for their entire stay and searching for special, 'undiscovered' places (often found on social media), including places they should not be* (Zachary 2018:ix).

The county spent upward of $2 million dollars to evacuate tourists from the North Shore and are looking into moving TVRs out of hazard areas, especially where there are very few evacuation routes.

Although tourism plays a significant role in Kauaʻi's economy, the industry also fuels the current housing crisis. The steady flow of visitors willing to pay for high priced accommodations incentivizes turning houses into transient vacation rentals rather than long term residences. At the same time, some tourists invest in second homes they can rent as TVRs or choose to move to the island seeking a state of permanent vacation. Locals cannot compete to buy properties at going rates set by wealthy global markets.

> *The taxes are high and ridiculous, so it makes it practically impossible for us to continue to stay home here. Our kids won't be able to pay for the land that we own.* (Wainiha community leader)

Tourism degrades place-based connections by bringing an influx of new residents, owners, and transients with no knowledge of the place to rural neighborhoods, increasing crime, congestion, and noise, while raising property values. Because long-time community members are forced to move away, social dynamics change, and community cohesion erodes.

We're having these housing affordability challenges and yet we're not giving the housing that we already have to our local people. As a community, we're out of whack. We need to make some changes really fast. Otherwise, we're going to lose our middle class. We're going to be a playground for the rich and people who serve them. The floods just exacerbate our existing problems. (community leader)

In April of 2021, a shuttle system was implemented on the North Shore of Kaua'i to reduce traffic along the newly repaired highway, eliminating 30,000 vehicles from the road during the first 10 months of operation (https://www.hanaleiinitiative.org/north-shore-shuttle). Disruptions from the flood and from COVID-19 gave residents the opportunity to make beneficial adjustments to local tourism infrastructure. The Hawai'i Tourism Authority reported that, from 2019 to 2020, average daily visitors to Kaua'i declined significantly, from 32,986 to 1027. However, recent counts from 2021 are averaging 30,194, indicating no significant change. As restrictions are lifted and visitor numbers continue to rise, many residents call for thoughtful consideration of the social and environmental benefits of limited tourism and how this can lead to more responsible tourism management and enhanced resilience for the future.

DISCUSSION

Interview data suggest that connections, both to place and to one another, were instrumental in post-flood recovery efforts, and the data also support the reinforcement of these connections to build resilience. Although early definitions of resilience rooted in ecology emphasized returning to a prior state after a shock (Davoudi et al. 2012), we build upon scholarship defining resilience as the ability to learn from a disturbance and adapt, change to not only survive but thrive in a new state of normal (McElduff et al. 2016). The shift toward framing resilience through a place-based lens highlights the processual aspect of place and the reciprocal connections within it, enabling adaptive capacity that enhances "the mutual caretaking *obligations held between and among* nature and society, as intertwining entities that co-constitute each other" (Diver et al. 2019:402).

Understanding resilience requires methods that engage with place. With critical place inquiry that attends to the dynamic and relational facets of spatiality, we point to collaborations that support resilience through place-making practices such as caring for the environment and ensuring the safety of neighbors (Tuck and McKenzie 2015). Community resilience efforts rely on the strength of place-based connections and will only succeed if adaptation plans build on existing social and cultural norms (Ensor and Berger 2009). Ensuring social and cultural fit can be accomplished through participatory research to co-develop climate change adaptation and disaster recovery plans, working across institutional boundaries to center Indigenous and place-based knowledge, rights, and sovereignty (Wyborn et al. 2019).

Many of the Indigenous technologies enabling adaptation in the face of climate change across the world mirror those described by interviewees as critical to community resilience. These factors include: knowledge of one's natural environment and awareness of the ways in which it is changing (McMillen et al. 2014), ability to source food from the land and sea to survive (Ford et al. 2020), connection to fellow community members (Kenney and Phibbs

2015) and to larger networks beyond the community that can provide support (often these are extended family networks and kin; Campbell and Barnett 2012, Kenney and Phibbs 2015).

Community, the people who hold connections to and through place, can bolster connectivity through observation and collective environmental care. Knowledge is assembled through observation of and engagement with the land, ecological processes, weather patterns, and seasonal shifts. Observation supports caretaking of both place and people, building reciprocal relationships that preserve knowledge through daily practice and environmental management (Green et al. 2010, Diver et al. 2019). After the floods, Kaua'i residents removed the debris from streams and recognized the importance of maintaining clean waterways as changing climate patterns bring more intense storms. The ability to predict floods through meticulous observation has cultivated awareness that enhances reciprocal relationships by which people and place are connected through ongoing interactions and adaptation.

Reinforcing connections between people is also a key strategy for making more resilient communities. Worldwide, the collective power of volunteers and local organizations in post-disaster management have become pivotal in community outcomes. Existing organizations and networks can facilitate knowledge sharing and mobilize immediate support to clear debris, repair homes, and coordinate food and shelter options (Uddin et al. 2020). As climate change increases the frequency and intensity of natural hazards, citizen volunteers and community non-profits can build "anticipatory structures of networked governance" that provide actors autonomy in determining how to address place-specific needs (Klijn and Koppenjan 2000, Waldman et al. 2018:1). Such connectivity is a form of practicing place that revitalizes the local values and networks, recognizing the individual experience as well as the collective, collaborative, more-than-human characteristics (Tuck and McKenzie 2015). These are essential bridging functions during recovery and sources of long-term resilience once established.

Threats to community resilience came from tourism and related material and social changes. Herrschner and Honey (2017, as cited by Cheer et al. 2019:568) asserted "[c]onnectivity among tourism community members is vital in times of crisis yet very often this is compromised in tourism systems." Tourism destabilizes processes and connections that shape place through the (re) development and restructuring of communities to fit the needs of visitors and the vision of a commodified space (Hall and Page 2006). Modifications like this can force residents to move, changing demographics and creating empty communities with fewer actual residents. Breaking down community connectivity alters the reciprocal relationships that created the place now sought after by outsiders. Tourists often operate within liminal spaces, "beyond the bounds of ordinary social reality" (Crick 1989:335) where norms associated with daily life are suspended. Liminality impacts the nature of social interactions between tourists and residents and limits the possibility of meaningful connection and a shared sense of responsibility, a vital aspect of place-based community resilience (Urry 2002, Urry and Larsen 2011).

Choices to fund infrastructure repairs before addressing immediate resident needs indicate the local government views the maintenance and return of tourism as a component of the island's

resilience. Tourism thrives on difference, such as cultural and environmental distinction, and the exploitation of such difference, notably through commodification, (re)produces inequalities between residents and visitors (Büscher 2016, Büscher and Fletcher 2017). Through a political economy lens, the market is not neutral nor level, but rather built upon historical power and knowledge asymmetries (Bianchi 2018). Tourism itself becomes capital "when the value generated through the commodification process starts circulating to become a dynamic (and uneven) process whereby money or resources are invested in order to generate more money or resources" (Büscher and Fletcher 2017:655-656). Although tourism as capital is economically beneficial for the state, communities can fail to access these benefits or even be sidelined by tourism development. Our research provides examples of outside influences undercutting the community's strength in recovery.

Often residents showed resilience in spite of, not because of, state and federal help. As Winter et al. (2021:341) acknowledged,

> *With a history of operating from a 'resource as commodity' model of centralised management led by professional practitioners who have been trained to view IPLCs* [Indigenous people and local communities] *as problematic to management, government agencies and other conservation institutions have had difficulty bridging with and sharing decision making authority with IPLCs. Fundamentally different worldviews, operating environments and relationships to Place have all driven conflicts in the pursuit of effective IPLC-led collaborative conservation and resource management.*

Natural resources and community relations with the environment are fundamental to climate adaptation and Indigenous knowledge systems. Current settler colonial governance structures often challenge rather than support the connectivity and community agency upon which long-term community resilience is built (Whyte 2018). The resumption of pre-pandemic visitation rates by 2021 indicates a lack of community power to implement livelihood alternatives. It also signifies the influence of American political and economic systems on Hawai'i's ability to transform in line with community desires.

These challenges are not new and community action is building to change the course of state politics. Writing about Hawaiian social movements, Noelani Goodyear-Ka'ōpua explores ea, a concept of sovereignty "based on the experiences of people on the land, relationships forged through the process of remembering and caring for wahi pana, storied places" (Goodyear-Ka'ōpua et al. 2014:4). As a set of practices, ea "make[s] land primary over government, while not dismissing the importance of autonomous governing structures to a people's health and well-being" (Goodyear-Ka'ōpua et al. 2014:3). Co-producing actionable resilience strategies that recognize political differences and build on Indigenous concepts such as ea could reduce conflict, improve environmental care, and ultimately enhance long-term resilience in local communities (Turnhout et al. 2020, Winter et al. 2021).

CONCLUSION

The record-breaking rainfall in 2018 heralded significant changes for many communities on Kaua'i. Homes and belongings were lost, residents were displaced, and the aftermath reshaped the lives of numerous residents. Despite disastrous flooding and protracted recovery, there was no loss of life. Residents from impacted communities relied on their relationships to each other, place-based knowledge, and connections to the environment to mobilize a critical first response and facilitate recovery. Their generosity in sharing personal accounts has expanded and enhanced concepts that ground long-term resilience within particular geographic contexts.

Looking forward, the role of scale in place-based resilience provides a lens through which fundamental connections and reciprocal relations extend temporally and spatially, beyond the immediate community. Broadening analysis to county and state governments in disaster response and tourism management can engage with the political framings of community, even the coproduction of place from secondary and tertiary connections. Kin networks that exist outside of this scope of community are also productive lines for examining "how and where community - and social resilience - [is] performed" (Pauwelussen 2016:2).

Community interviews revealed the importance of reciprocal relationships with place. Knowing and caring for the land is a responsibility, but also an expression of Indigenous agency. As different worldviews interact through local government and visitor/resident encounters, relational aspects of place create conflict with commodification practices central to tourism economies. This research points to possibilities for long-term resilience in honoring place-based knowledge that is central to Indigenous agency, identity, and well-being. These findings are relevant throughout Hawai'i and the Pacific and include places that face compounded uncertainties of climate change, tourism, and colonial histories. Centering place and the people of place in climate change adaptation confronts historical systems of oppression and enables new community-led strategies for resilience that draw on reciprocal relations of care. Reframing resilience to be more inclusive of sociocultural factors that attend to place-based dynamics can enhance the self-determination of community members and strengthen the connections that support recovery and adaptation amid the increasing frequency of unpredictable and hazardous climate change impacts.

Responses to this article can be read online at:
https://www.ecologyandsociety.org/issues/responses.php/13555

Data Availability:

Data will be made available upon request.

LITERATURE CITED

Agrawal, A., and C. C. Gibson. 1999. Enchantment and disenchantment: the role of community in natural resource conservation. World Development 27(4):629-649. https://doi.org/10.1016/S0305-750X(98)00161-2

Au, K. H., and A. J. Kawakami. 1985. Research currents: talk story and learning to read. Language Arts 62(4):406-411.

Barker, A. J., and J. Pickerill. 2020. Doings with the land and sea: decolonising geographies, indigeneity, and enacting place-agency. Progress in Human Geography 44(4):640-662. https://doi.org/10.1177/0309132519839863

Basso, K. H. 1996. Wisdom sits in places: landscape and language among the Western Apache. University of New Mexico Press, Albuquerque, New Mexico, USA.

Beatley, T. 2009. Planning for coastal resilience: best practices for calamitous times. Island, Washington, D.C., USA.

Berkes, F., and D. Jolly. 2002. Adapting to climate change: social-ecological resilience in a Canadian Western Arctic community. Conservation Ecology 5(2):18. https://doi.org/10.5751/ES-00342-050218

Bianchi, R. 2018. The political economy of tourism development: a critical review. Annals of Tourism Research 70:88-102. https://doi.org/10.1016/j.annals.2017.08.005

Brown, K. 2014. Global environmental change I: a social turn for resilience? Progress in Human Geography 38(1):107-117. https://doi.org/10.1177/0309132513498837

Büscher, B. 2016. Reassessing fortress conservation? New media and the politics of distinction in Kruger National Park. Annals of the American Association of Geographers 106(1):114-129. https://doi.org/10.1080/00045608.2015.1095061

Büscher, B., and R. Fletcher. 2017. Destructive creation: capital accumulation and the structural violence of tourism. Journal of Sustainable Tourism 25(5):651-667. https://doi.org/10.1080/09669582.2016.1159214

Caillon, S., G. Cullman, B. Verschuuren, and E. J. Sterling. 2017. Moving beyond the human-nature dichotomy through biocultural approaches: including ecological well-being in resilience indicators. Ecology and Society 22(4):27. https://doi.org/10.5751/es-09746-220427

Campbell, J., and J. Barnett. 2012. Climate change and small island states: power, knowledge and the South Pacific. Routledge, New York, New York, USA.

Cheer, J. M., C. Milano, and M. Novelli. 2019. Tourism and community resilience in the Anthropocene: accentuating temporal overtourism. Journal of Sustainable Tourism 27 (4):554-572. https://doi.org/10.1080/09669582.2019.1578363

Chew, S., and K. Chief. In press. Community-engaged participatory climate research with The Pyramid Lake Paiute Tribe. Ecology and Society.

Clare, A., R. Graber, L. Jones, and D. Conway. 2017. Subjective measures of climate resilience: what is the added value for policy and programming? Global Environmental Change 46:17-22. https://doi.org/10.1016/j.gloenvcha.2017.07.001

Cote, M., and A. J. Nightingale. 2012. Resilience thinking meets social theory: situating social change in socio-ecological systems (SES) research. Progress in Human Geography 36(4):475-489. https://doi.org/10.1177/0309132511425708

Cresswell, T. 2004. Place: a short introduction. Blackwell, Malden, Massachusetts, USA.

Cresswell, T. 2013. Geographic thought: a critical introduction. Wiley-Blackwell, Chichester, West Sussex, UK.

Cresswell, T. 2015. Place: an introduction. Second edition. J. Wiley and Sons, Chichester, West Sussex, UK.

Cretney, R. M., and S. Bond. 2014. 'Bouncing back' to capitalism? Grass-roots autonomous activism in shaping discourses of resilience and transformation following disaster. Resilience 2 (1):18-31. https://doi.org/10.1080/21693293.2013.872449

Cretney, R. M., and S. Bond. 2017. Shifting relationships to place: a relational place-based perspective on SES resilience. Urban Geography 38(1):8-24. https://doi.org/10.1080/02723638.2016.1139865

Crick, M. 1989. Representations of international tourism in the social sciences: sun, sex, sights, savings, and servility. Annual Review of Anthropology 18(1):307-344. https://doi.org/10.1146/annurev.an.18.100189.001515

Cutter, S. L., K. D. Ash, and C. T. Emrich. 2014. The geographies of community disaster resilience. Global Environmental Change 29:65-77. https://doi.org/10.1016/j.gloenvcha.2014.08.005

Cutter, S. L., L. Barnes, M. Berry, C. Burton, E. Evans, E. Tate, and J. Webb. 2008. A place-based model for understanding community resilience to natural disasters. Global Environmental Change 18(4):598-606. https://doi.org/10.1016/j.gloenvcha.2008.07.013

Dacks, R., T. Ticktin, A. Mawyer, S. Caillon, J. Claudet, P. Fabre, S. D. Jupiter, J. McCarter, M. Mejia, P. Pascua, E. Sterling, and S. Wongbusarakum. 2019. Developing biocultural indicators for resource management. Conservation Science and Practice 1(6): e38. https://doi.org/10.1111/csp2.38

Davoudi, S., K. Shaw, L. J. Haider, A. E. Quinlan, G. D. Peterson, C. Wilkinson, H. Fünfgeld, D. McEvoy, L. Porter, and S. Davoudi. 2012. Resilience: a bridging concept or a dead end? "Reframing" resilience: challenges for planning theory and practice interacting traps: resilience assessment of a pasture management system in Northern Afghanistan urban resilience: what does it mean in planning practice? Resilience as a useful concept for climate change adaptation? The politics of resilience for planning: a cautionary note: edited by Simin Davoudi and Libby Porter. Planning Theory and Practice 13(2):299-333. https://doi.org/10.1080/14649357.2012.677124

de Bruijn, K. M. 2004. Resilience indicators for flood risk management systems of lowland rivers. International Journal of River Basin Management 2(3):199-210. https://doi.org/10.1080/15715124.2004.9635232

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 (1):400-429. https://doi.org/10.18352/ijc.881

Ensor, J., and R. Berger. 2009. Community-based adaptation and culture in theory and practice. Pages 227-239 in W. N. Adger, I. Lorenzoni, and K. L. O'Brien, editors. Adapting to climate change: thresholds, values, governance. Cambridge University Press, Cambridge, UK; New York, New York, USA. https://doi.org/10.1017/CBO9780511596667.015

Fabinyi, M., L. Evans, and S. J. Foale. 2014. Social-ecological systems, social diversity, and power: insights from anthropology and political ecology. Ecology and Society 19(4):28. https://doi.org/10.5751/ES-07029-190428

Ford, J. D., N. King, E. K. Galappaththi, T. Pearce, G. McDowell, and S. L. Harper. 2020. The resilience of Indigenous peoples to environmental change. One Earth 2(6):532-543. https://doi.org/10.1016/j.oneear.2020.05.014

Goodyear-Kaʻōpua, N., I. Hussey, and E. K. Wright. 2014. A nation rising: Hawaiian movements for life, land, and sovereignty. Duke University Press, Durham, North Carolina, USA. https://doi.org/10.1215/9780822376552

Green, D., J. Billy, and A. Tapim. 2010. Indigenous Australians' knowledge of weather and climate. Climatic Change 100 (2):337-354. https://doi.org/10.1007/s10584-010-9803-z

Gunderson, L. H., and C. S. Holling, editors. 2002. Panarchy: understanding transformations in human and natural systems. Island, Washington, D.C., USA.

Hall, C. M., and S. Page. 2006. The geography of tourism and recreation: environment, place, and space. Third edition. Routledge, Abingdon, Oxon, UK.

Hawaiʻi Community Foundation. 2018. Kauaʻi Relief and Recovery Fund update. Hawaiʻi Community Foundation, Honolulu, Oahu, Hawaiʻi, USA. https://issuu.com/hcfhawaii/docs/hcfkauaiimpactreport112018?e=1137810/66316445

Herrschner, I., and P. Honey. 2017. Tourism and the psychologically resilient city: Christchurch after the earthquake. Pages 218-235 in A. A. Lew and J. M. Cheer, editors. Tourism resilience and adaptation to environmental change: definitions and frameworks. Routledge, Abingdon, Oxon, UK. https://doi.org/10.4324/9781315463971-16

Hiwasaki, L., E. Luna, Syamsidik, and R. Shaw. 2014. Process for integrating local and Indigenous knowledge with science for hydro-meteorological disaster risk reduction and climate change adaptation in coastal and small island communities. International Journal of Disaster Risk Reduction 10:15-27. https://doi.org/10.1016/j.ijdrr.2014.07.007

Holling, C. S. 1973. Resilience and stability of ecological systems. Annual Review of Ecology and Systematics 4(1):1-23. https://doi.org/10.1146/annurev.es.04.110173.000245

International Panel on Climate Change (IPCC). 2021. Summary for policymakers. Pages 3-32 in V. Masson-Delmotte, P. Zhai, A. Pirani, S. L. Connors, C. Péan, S. Berger, N. Caud, Y. Chen, L. Goldfarb, M. I. Gomis, M. Huang, K. Leitzell, E. Lonnoy, J. B. R. Matthews, T. K. Maycock, T. Waterfield, O. Yelekçi, R. Yu, and B. Zhou, editors. Climate change 2021: the physical science basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change.

Cambridge University Press, Cambridge, UK. https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_SPM.pdf

Jepson, M., and L. L. Colburn. 2013. Development of social indicators of fishing community vulnerability and resilience in the U.S. Southeast and Northeast regions. NOAA Tech. memo. NMFS-F/SPO; 129. National Oceanic and Atmospheric Administration, Washington, D.C., USA. https://repository.library.noaa.gov/view/noaa/4438

Kais, S. M., and M. S. Islam. 2016. Community capitals as Ccmmunity resilience to climate change: conceptual connections. International Journal of Environmental Research and Public Health 13(12):1211. https://doi.org/10.3390/ijerph13121211

Kenney, C. M., and S. Phibbs. 2015. A Māori love story: community-led disaster management in response to the Ôtautahi (Christchurch) earthquakes as a framework for action. International Journal of Disaster Risk Reduction 14:46-55. https://doi.org/10.1016/j.ijdrr.2014.12.010

Klijn, E. H., and J. F. M. Koppenjan. 2000. Public management and policy networks: foundations of a network approach to governance. Public Management: An International Journal of Research and Theory 2(2):135-158. https://doi.org/10.1080/14719030000000007

Larsen, S. C., and J. T. Johnson. 2012. In between worlds: place, experience, and research in Indigenous geography. Journal of Cultural Geography 29(1):1-13. https://doi.org/10.1080/08873631.2012.646887

Lauer, M., and S. Aswani. 2010. Indigenous knowledge and long-term ecological change: detection, interpretation, and responses to changing ecological conditions in Paci_c Island communities. Environmental Management 45:985–997. https://doi.org/10.1007/s00267-010-9471-9

Louis, R. P. 2007. Can you hear us now? Voices from the margin: using Indigenous methodologies in geographic research. Geographical Research 45(2):130-139. https://doi.org/10.1111/j.1745-5871.2007.00443.x

Magis, K. 2010. Community resilience: an indicator of social sustainability. Society and Natural Resources 23(5):401-416. https://doi.org/10.1080/08941920903305674

Massey, D. 1991. A global sense of place. Marxism Today 24-29.

McElduff, L., D. Peel, H. Ritchie, and M. G. Lloyd. 2016. The octagon values model: community resilience and coastal regeneration. Urban, Planning and Transport Research 4(1):1-25. https://doi.org/10.1080/21650020.2015.1124735

McMillen, H. L., T. Ticktin, A. Friedlander, S. D. Jupiter, R. Thaman, J. Campbell, J. Veitayaki, T. Giambelluca, S. Nihmei, E. Rupeni, L. Apis-Overhoff, W. Aalbersberg, and D. F. Orcherton. 2014. Small islands, valuable insights: systems of customary resource use and resilience to climate change in the Pacific. Ecology and Society 19(4):44. https://doi.org/10.5751/ES-06937-190444

McMillen, H., T. Ticktin, and H. K. Springer. 2017. The future is behind us: traditional ecological knowledge and resilience over time on Hawaiʻi Island. Regional Environmental Change 17 (2):579-592. https://doi.org/10.1007/s10113-016-1032-1

Oliveira, K.-A. R. K. N. 2014. Ancestral places: understanding Kanaka geographies. Oregon State University Press, Corvalis, Oregon, USA.

Pascua, P., H. McMillen, T. Ticktin, M. Vaughan, and K. B. Winter. 2017. Beyond services: a process and framework to incorporate cultural, genealogical, place-based, and Indigenous relationships in ecosystem service assessments. Ecosystem Services 26:465-475. https://doi.org/10.1016/j.ecoser.2017.03.012

Pauwelussen, A. 2016. Community as network: exploring a relational approach to social resilience in coastal Indonesia. Maritime Studies 15(1):2. https://doi.org/10.1186/s40152-016-0041-5

Pearce, M., and R. Louis. 2008. Mapping Indigenous depth of place. American Indian Culture and Research Journal 32 (3):107-126. https://doi.org/10.17953/aicr.32.3.n7g22w816486567j

Rehman, J., O. Sohaib, M. Asif, and B. Pradhan. 2019. Applying systems thinking to flood disaster management for a sustainable development. International Journal of Disaster Risk Reduction 36:101101. https://doi.org/10.1016/j.ijdrr.2019.101101

Sharifi, A., L. Chelleri, C. Fox-Lent, S. Grafakos, M. Pathak, M. Olazabal, S. Moloney, L. Yumagulova, and Y. Yamagata. 2017. Conceptualizing dimensions and characteristics of urban resilience: insights from a co-design process. Sustainability 9 (6):1032. https://doi.org/10.3390/su9061032

Shaw, R., A. Sharma, and Y. Takeuchi. 2009. Indigenous knowledge and disaster risk reduction: from practice to policy. Nova Science, New York, New York, USA.

Summers, J. K., L. M. Smith, L. C. Harwell, and K. D. Buck. 2017. Conceptualizing holistic community resilience to climate events: foundation for a climate resilience screening index. GeoHealth 1(4):151-164. https://doi.org/10.1002/2016GH000047

Terzi, S., S. Torresan, S. Schneiderbauer, A. Critto, M. Zebisch, and A. Marcomini. 2019. Multi-risk assessment in mountain regions: a review of modelling approaches for climate change adaptation. Journal of Environmental Management 232:759-771. https://doi.org/10.1016/j.jenvman.2018.11.100

Thompson, K.-L., T. C. Lantz, and N. C. Ban. 2020. A review of Indigenous knowledge and participation in environmental monitoring. Ecology and Society 25(2):10. https://doi.org/10.5751/ES-11503-250210

Tuan, Y.-F. 1989. Space and place: the perspective of experience. University of Minnesota Press, Minneapolis, Minnesota, USA.

Tuck, E., and M. McKenzie. 2015. Relational validity and the "where" of inquiry: place and land in qualitative research. Qualitative Inquiry 21(7):633-638. https://doi.org/10.1177/1077-800414563809

Turner, N., and P. R. Spalding. 2013. "We might go back to this"; drawing on the past to meet the future in Northwestern North American Indigenous communities. Ecology and Society 18 (4):29. https://doi.org/10.5751/ES-05981-180429

Turnhout, E., T. Metze, C. Wyborn, N. Klenk, and E. Louder. 2020. The politics of co-production: participation, power, and transformation. Current Opinion in Environmental Sustainability 42:15-21. https://doi.org/10.1016/j.cosust.2019.11.009

Uddin, M. S., C. E. Haque, D. Walker, and M.-U.-I. Choudhury. 2020. Community resilience to cyclone and storm surge disasters: evidence from coastal communities of Bangladesh. Journal of Environmental Management 264:110457. https://doi.org/10.1016/j.jenvman.2020.110457

Urry, J. 2002. Consuming places. Routledge, New York, New York, USA.

Urry, J., and J. Larsen. 2011. The tourist gaze 3.0. Third edition. Sage, Thousand Oaks, California, USA.

Vaioleti, T. M. 2006. Talanoa research methodology: a developing position on Pacific research. Waikato Journal of Education 12:21-34. https://doi.org/10.15663/wje.v12i1.296

Waldman, S., L. Yumagulova, Z. Mackwani, C. Benson, and J. T. Stone. 2018. Canadian citizens volunteering in disasters: from emergence to networked governance. Journal of Contingencies and Crisis Management 26(3):394-402. https://doi.org/10.1111/1468-5973.12206

Wardekker, J. A., A. de Jong, J. M. Knoop, and J. P. van der Sluijs. 2010. Operationalising a resilience approach to adapting an urban delta to uncertain climate changes. Technological Forecasting and Social Change 77(6):987-998. https://doi.org/10.1016/j.techfore.2009.11.005

Whyte, K. 2018. Settler colonialism, ecology, and environmental injustice. Environment and Society 9(1):125-144. https://doi.org/10.3167/ares.2018.090109

Winter, K. B., M. B. Vaughan, N. Kurashima, C. Giardina, K. Quiocho, K. Chang, M. Akutagawa, K. Beamer, and F. Berkes. 2021. Empowering Indigenous agency through community-driven collaborative management to achieve effective conservation: Hawaiʻi as an example. Pacific Conservation Biology 27(4):337-344. https://doi.org/10.1071/PC20009

Wyborn, C., A. Datta, J. Montana, M. Ryan, P. Leith, B. Chaffin, C. Miller, and L. van Kerkhoff. 2019. Co-producing sustainability: reordering the governance of science, policy, and practice. Annual Review of Environment and Resources 44 (1):319-346. https://doi.org/10.1146/annurev-environ-101718-033103

Zachary, D. Executive summary: Kauaʻi tourism strategic plan 2019-2021: refocusing tourism to find balance. County of Kauaʻi, Hawaiʻi Lodging and Tourism Association-Kauaʻi, Kauaʻi Visitors Bureau, Hawaiʻi, USA. https://kauai.gov/Portals/0/OED/Kauai%20TSP-FINAL-EXEC%20SUMMARY.pdf?ver=2018-08-28-104501-213