

We Who Listen: Land Pedagogies and Climate Change Education

Josef Donnelly

Submitted in partial fulfillment of the
requirements for the degree of
Doctor of Philosophy
under the Executive Committee
of the Graduate School of Arts and Sciences

COLUMBIA UNIVERSITY

2024

© 2024

Josef Donnelly

All Rights Reserved

Abstract

We Who Listen: Land Pedagogies and Climate Change Education

Josef Donnelly

Anthropocentric climate change is a defining issue of the twenty-first century. Considering the severity of the effects, a more appropriate term may be climate crisis. Further, the intensity of the climate crisis, whether it is more frequent natural catastrophes or record-setting heat, puts societies and ecosystems at risk. Even classrooms and students must endure rising temperatures within schools. Yet educators also play an inimitable role in preparing students for a world living in a climate crisis. This requires extensive work to promote understanding and work toward solutions.

Over the past twenty years, climate change education has evolved from a topic covered primarily in science classes to a subject covered in all content areas. In social studies, educators focus on the intersection between the climate crisis and issues such as justice, migration, and economics. Yet one of the primary methods for getting people to care about climate change is often missing from social studies curricula. The role of place is usually left unaccounted for in social studies despite place playing an important role in changing individuals' mindsets about climate change. In addition, the voices that need to be heard most, including those living in locations most susceptible to climate change, are often marginalized. This qualitative study explores how educators in a vulnerable locale account for place when teaching climate change by asking the following question: How/where do social science educators in vulnerable locales form a sense of their place, and in what ways is that sense of place used accounted for when teaching climate change? The sub-questions for this study include: What ecological and cultural experiences and learning inform conceptions of place? How do teachers' conceptualizations of

climate change engage with local and global discourses of land, people, and society? How do teaching contexts (such as place-based education or predominant native schools) create variation across these research questions? This study used various methods, including semi-structured interviews, sensory ethnography, and visual elicitation, to understand how teachers incorporated place into their teaching and how different perspectives of place can inform a more holistic approach to teaching climate change. The study took place in Hawai'i, a state and former sovereign kingdom with one of the most unique ecosystems in the world. It is a Pacific Island that faces unique challenges from climate change. Moreover, Hawai'i has a strong understanding of the importance of place that is present through its Indigenous roots and its educational systems.

The findings suggest that through a network of embedded and embodied knowledge, participants developed a relationship with land that affected not only who they were as individuals but also how they taught climate change.

Table of Contents

List of Figures	vii
List of Tables	ix
Acknowledgments.....	xi
Chapter 1: Introduction.....	1
1.1 Overview	1
1.2 Problem Statement	3
1.3 Conceptual Framework	7
1.3.1 Land/Place	7
1.3.1.1 Place/Land in Hawai‘i	11
1.3.2 Critical Pedagogy of Place	11
1.3.3 Indigenous Knowledge.....	12
1.4 Dissertation Organization.....	14
1.5 Hawaiian Words and Place Names	15
1.6 Listening to the Land-Learning through the Land: An Autobiographical Beginning.....	15
Chapter 2: Literature Review	18
2.1 Place.....	18
2.2 Sense of Place and Place Attachment	22
2.2.1 Place Attachment and Pro-environmental Actions.....	25
2.3 Place and Place Attachment in Hawai‘i	25

2.4 Social Studies and Climate Change Education	26
2.4.1 Global Citizenship Education.....	27
2.4.1.1 Glocal Citizenship	30
2.4.2 Climate Change Education and Justice	31
2.5 Climate Change and Place-Based Education	36
2.6 Indigenous Thinking and Climate Change Education.....	44
2.7 Chapter Conclusion.....	49
Chapter 3: Methodology	51
3.1 Narrative Inquiry	53
3.2 Recruitment	56
3.3 Participants and Places	57
3.3.1 Margaret and Pālolo Valley	62
3.3.2 Nathan and Wawamalu (Sandy Beach)	63
3.3.3 Megan and Hilo Bay.....	63
3.3.4 Yuki and Manoa Valley.....	63
3.3.5 Abigail and Makiki Valley	64
3.3.6 Emma and He‘eia	64
3.3.7 Daniel and Pālolo Valley	64
3.3.8 Sophie and Ala Wai Canal.....	65
3.4 School and Content Discipline Background	65

3.5 Bricolage	68
3.6 Data Collection.....	68
3.6.1 Semi-structured Interviews.....	69
3.6.2 Mental Maps	69
3.6.3 Photo-elicitation Interviews.....	70
3.6.4 Place Walking Narration	75
3.6.5 Concept Maps	77
3.7 Data Analysis	79
3.8 Researcher Positionality	84
3.9 Organization of Findings Chapter.....	87
Chapter 4: How Teachers Formed a Relationship with Land.....	89
4.1 Hawaiian Concepts.....	91
4.1.1 Viewing Land through a Prism.....	92
4.1.2 <i>Mo'okū'auhau</i>	94
4.1.3 <i>Mālama 'āina</i>	95
4.1.4 <i>Kuleana</i>	96
4.1.5 <i>Mana</i>	96
4.1.6 <i>Ahupua'a</i>	98
4.2 Embedded and Embodied Knowledge	102
4.3 Megan: Hilo Bay.....	104

4.3.1 Megan: Embodied Experiences and Building Relationship with Land	108
4.3.2 Returning to Hilo and One Ocean	111
4.3.3 <i>Malama ‘āina</i> and the Vulnerability of Loss	114
4.4 Abigail: Land and Taking Care of Self.....	115
4.4.1 Abigail and the Prism of Land	121
4.4.2 Abigail: Sense of Self through Sense of Land	123
2.5 Margaret: Embodying the Past and Navigating Cultures	124
4.5.1 Margaret and the Prism: Caring for Land and the Past	128
4.5.2 Margaret and Sustainability Embodied.....	129
4.5.3 Navigating Cultures.....	130
4.6 Nathan: Land and <i>Mo ‘okū ‘auhau</i>	131
4.6.1 Nathan: Building a Relationship with Land through Genealogy.....	136
4.7 Daniel: Hula and Embodied Knowledge	139
4.7.1 Cultural Awareness, Cultural Boundaries	141
4.7.2 Daniel and Preserving Culture	144
4.8 Sophie: Sustaining Culture and Intentionality	147
4.8.1 Sophie and Feeling <i>Mana</i>	153
4.9 Emma: (Re)connecting with Land and Bridging Cultures	156
4.9.1 Land as Reconnection	160
4.10 Chapter Conclusion.....	162

Chapter 5: How Teachers Engaged with Land When Teaching Climate Change	163
5.1 Preparing for Climate Change Education: Developing Relationship with Land	163
5.1.1 Climate Change Education and Developing Sense of Land	165
5.1.1.1 Margaret: Embedded and Embodied Experiences.....	166
5.1.1.2 Emma: Knowing the Land through Cultural Practices.....	173
5.1.2 Climate Change and <i>Mo‘okū‘auhau</i>	174
5.1.2.1 Climate Change Education through Story	176
5.2 Hawaiian Sustainability and Climate Change.....	178
5.2.1 Megan and <i>Malama ‘āina</i>	178
5.2.2 Daniel: Hawaiian Sustainability	181
5.2.3 Sophie: Hawaiian Sustainability.....	182
5.4 Tensions When Teaching Climate Change.....	184
5.5 Chapter Conclusion.....	185
Chapter 6: Discussion and Implications	186
6.1 Decoloniality and Reinhabitation.....	187
6.2 Indigenous Sustainability	188
6.3 Making the Local Global.....	190
6.4 A Network for Learning and Teaching Indigenous Practices	191
6.5 Relationship to Land and Place-Based Education.....	194
6.6 Conclusion	196

References.....	197
Appendix A: Semi-structured Interview.....	209
Appendix B: Photo-Elicitation Protocol.....	211
Appendix C: Participatory Walking Protocol.....	212
Appendix D: Mental Map Protocol.....	213

List of Figures

Figure 1: Efeng Mura.....	16
Figure 2: Hawaiian Islands Referenced by Participants. Source: Google Maps	59
Figure 3: Map of O‘ahu. Source: Google Maps.	60
Figure 4: Hawai‘i Island. Source Google Maps.....	61
Figure 5: Margaret’s Mental Map.....	70
Figure 6: Emma Begins Her Collage. Photo: Josef Donnelly	75
Figure 7: Sandy Beach. Site of Nathan’s place-based interview.	77
Figure 8: Concept Maps Completed by Participants	79
Figure 9: Land Viewed Through a Prism. Graphic created by Josef Donnelly	93
Figure 10: Traditional Land Divisions on the Island of O‘ahu. Source: National Parks Service.	100
Figure 11: Megan Embodied Malama ‘āina in Tahiti.....	106
Figure 12: Megan Emphasizes Interconnectedness	113
Figure 13: Megan’s Second Example of Interconnectedness	113
Figure 14: Megan’s Mental Map Emphasizes Malama ‘āina	114
Figure 15: A Sign Outside the Library at Abigail’s School.....	115
Figure 16: Abigail’s Mental Map	117
Figure 17: Kaimana Beach. Photograph by Abigail	118
Figure 18: Abigail’s Concept Map Emphasizes Care for Self by Caring for Land.	124
Figure 19: Margaret Gathers Native Flowers to Make Lei.....	126
Figure 20: Vegetables from Margaret’s Garden	127
Figure 21: Sandy Beach. Photo by Josef Donnelly.....	134

Figure 22: The North Shore Beach Where Nathan Learned to Respect the Ocean. Photo by Nathan.....	135
Figure 23: Nathan’s Family’s Land on the North Shore. Photo by Nathan.....	135
Figure 24: Nathan’s Concept Map.....	137
Figure 25: Diamondhead. Photo by Daniel.....	141
Figure 26: Daniel Connects Place and Hawai’i.....	143
Figure 27: Sophie’s Picture of Hawai’i Kai in the 1960s.....	148
Figure 28: Hawai’i Kai. Created with Google Maps.	149
Figure 29: Sophie’s Concept Map.	150
Figure 30: Sophie’s Close to the Ala Wai Canal.	152
Figure 31: Emma’s Students Paddling.....	156
Figure 32: Emma’s Mental Map Connects Climate Change to Capitalism and Issues of Justice	159
Figure 33: Margaret’s Concept Map. History of Place Connects Climate Change Education and Place.....	167
Figure 34: Waimanu Valley on the Island of Hawai’i. Photo by Margaret.....	169
Figure 35: Margaret’s Garden at Her School. Photo by Margaret.....	172
Figure 36: Emma’s Concept Map.....	174
Figure 37: Megan’s Concept Map Emphasizing Oneness.....	180

List of Tables

Table 1: Levels of Place Attachment	24
Table 2: Participants, Their School Setting, and Their Significant Place.....	58
Table 3: Hawaiian Concepts and Translations.....	92

Dedication

For Cavelyn

Acknowledgments

Writing a dissertation is no small feat. After six years as a doctoral student and a full-time teacher I look back fondly on the journey. Of course, I can never forget how the journey began: walking into an interview under intense pain for what would later turn out to be a kidney stone. I suppose a dissertation is manageable in comparison.

There are countless individuals who have helped me along the way. I would first like to thank my committee members for their continual support and encouraging feedback. Thank you to my advisor Dr. Sandra Schmidt. We first met in 2011. I valued your scholarship and feedback when you were my Master's advisor, and I'm grateful that that relationship has continued as a doctoral student. Your thinking, knowledge, and experience have made me a better researcher and student. Thank you, Dr. Jay Shuttleworth. My decision to take your class because I thought with a last name like that, the class had to be great turned out to be more consequential than I imagined. Talk about dumb luck. From the first class I took with you, Social Studies Methods, a peculiar friendship has blossomed that I can't really explain or express in words. All I know is that I'm thankful. Thank you, Dr. William Gaudelli, for welcoming me into the Social Studies Education program and providing thoughtful feedback and guidance. Thank you, Dr. Oren Pizmony-Levy. I sincerely appreciate your scholarship on climate change, and I am thankful for our initial coffee many years ago. And thank you, Dr. Megan Laverty. Your kindness and encouragement have sustained me through this process.

Thank you to the participants who provided invaluable knowledge and put up with my calling and questioning. On paper, I can only say thank you, but please know that I carry our meetings and connections with me daily, and I appreciate the connections we made.

Thank you to all my student teachers. You give me hope for the future of education and remind me how vital teaching is in the world.

I want to thank the Peace Corps, especially Daniel Reside, Elizabeth Neason, and Damien Richard for supporting me when I was a Peace Corps Volunteer and creating such a formative experience that continues to resonate with me today. I'd also like to thank former Peace Corps Director Jodi Olsen for encouraging me to persevere and take it one step at a time.

To my parents, Scott and Therese, my aunt, Michele, and my uncle, Chris, thank you for supporting me in college and stressing the importance of traveling globally at a young age.

Finally, I'd like to thank my friends and family in Micronesia and Hawai'i, who provided shelter, respite, and friendship during my research. It is comforting to know that our families worldwide will support each other no matter what. Thank you to His Excellency President Wesley Simina, Xavier and Cinder Billimon, Lulu, Lazarus and Grace Liemam, Nixon and Princy Phillip, and Pwo Navigator Larry Rageital. I'd also like to thank the late Susie Lokopwe, who, at the last minute, chose me to be a volunteer in Chuuk, a moment that changed my life for the better. To all the people of Oneop who taught me invaluable lessons in life, I offer a sincere and immeasurable thank you. I want to offer a few words in Chuukese:

Ipwe apasa ai kapasen kilisou ngeni Kot pwal ngeni ai family pwal ngeni kami ren ami alilis. Are esapw pwunun ami aliliseoch fanitei esapw tawe ngeni ei ai research. Kilisou chapur ngeni kami meinsin.

Lastly, I would like to thank my wife, Cavelyn Phillip. It seems surreal that we met on a small atoll in the middle of the Pacific. But you have always supported me and provided encouragement whether after a late night of class or through a writing period. In many ways this

Ph.D. is as much yours as it is mine. I don't think this process would have been possible without your support.

Chapter 1: Introduction

1.1 Overview

This research project is the product of many years of thinking, teaching, and pondering about climate change education. My interest in climate change began on a small atoll in the Pacific Island nation of Micronesia where I witnessed the effects of climate change firsthand. From my experience as a Peace Corps Volunteer in Micronesia in 2006 to teaching climate change as a high school teacher in the present, I developed many questions and concerns about the effect of climate change on the planet and how education plays a role in providing answers. Some of my questions, such as what will happen to the communities and islands I know so well, or where will family and friends go, or what it means to lose land deeply connected to one's identity, have stayed with me. I think about these questions at night as I see distant villages and relatives and hear the sound of waves rolling in and crashing on a distant reef, a sound reproduced for millions of years that lets humanity know how new and inconsequential it is in the history of the Earth. In this dissertation, my initial question is to understand how educators develop a sense of place. Yet place, as I explain below, limits the relationship participants describe. As such, I believe land is a more appropriate and inclusive word to describe the phenomenon that is taking place. In my research, I was struck by my participants' relationship with land. Through listening, sensing, and being, my participants created a symbiotic relationship with the land that sustained culture, life, and self.

A question might arise about this research project: why Hawai'i? First, Hawai'i is part of a broader, well-connected, yet vulnerable, Pacific region that I know well. Moreover, climate change threatens to have lasting impacts on individuals in this region, including Hawai'i. Next, while Pacific cultures vary, there are similarities, especially when considering one's relationship

with the land; as an individual who formerly lived in the Pacific, specifically Micronesia, I understand commonalities between Pacific Islands even as someone with European origins. For example, taro is essential for many Pacific Island communities and is a connection point. Other factors such as navigation, lineages, and the role of land remain a vibrant aspect of Pacific Island cultures that I am familiar with as a former resident, a speaker of a Pacific Island language, and someone with significant connections throughout the region.

Also, Hawai‘i has one of the most unique ecosystems on Earth. The islands, just under four degrees of latitudinal spread and less than 17,000 square kilometers of land area comprise between 28 to 37 Holdridge Lifezones, making Hawai‘i the “single most habitat-rich place on Earth” (Goh III, 2015). The incredible diversity of Hawai‘i coincides with the fragility of many ecosystems on the islands. With increasing pressure from climate change, these ecosystems are increasingly vulnerable.

Another reason why I wanted to research in Hawai‘i is that the school system recognizes the uniqueness of place by implementing a robust place-based education system underpinned, as one participant noted, by Indigenous knowledge (see HA framework, Hawai‘i Department of Education, 2017). Moreover, this place-based education system is a recent development, demonstrating how a place can make transformative transitions. This serves as a model that can be emulated globally. Also, because place-based education in Hawai‘i is deeply connected to Indigenous practices, Hawai‘i represents an important site for shaping how land is conceptualized by incorporating Indigenous worldviews.

This research study, while qualitative, was informed through Indigenous methodology (Smith, 1999) and epistemology (Battiste, 2002; Falgout, 1992; Meyer, 1998). In other words, the essence of Indigenous methodology and my experience living with an Indigenous community

guided this work. In conducting research based on experiences and stories connected to land, I attempted as best as possible to let the participants tell how they account for land in Hawai'i and what that means for teaching climate change.

I leave this overview believing I did my best to represent participants' responses and thinking within the broader context of Hawai'i and the land. Even though I lived on a Pacific Island, maintained a taro patch, and carefully considered how words and ideas are used in Hawaiian and Hawaiian culture, I know that errors occur. In this role, I was a researcher. However, at heart, many of the connections I made came from my identity as a teacher, and it was the joy of teaching and working with students that helped me connect with my participants.

1.2 Problem Statement

Anthropogenic climate change is increasingly disrupting Earth's ecology and threatening the sustainability of ecosystems, life, and society (Wallace-Wells, 2019). Rising temperatures and sea levels are pressuring communities worldwide to choose between adaptation or relocation. Whether Pacific Islands facing catastrophic sea-level rise (Barnett & Campbell, 2010) or students trying to learn in sweltering classrooms (Bidassey-Manilal et al., 2016), climate change is inescapable.

In addition to the physical effects of climate change, there are also societal effects. Climate change will exacerbate inequalities and injustice worldwide, disproportionately affecting less-developed nations (Wallace-Wells, 2019). Issues such as overconsumption and the burning of fossil fuels, which stem from countries in the Global North but also include large industrial nations such as China and India, will negatively impact smaller countries that feel the effects and bear the brunt of issues connected to climate change. The United Nations predicts more people will be displaced because of climate change-related incidents, phenomena, or disasters in the

future (United Nations Refugee Agency, 2024). Any solution to a global problem on the size and scale of climate change will undoubtedly require complex collaboration, education, and shifts in how humans see themselves in the environment.

Since the 1990s, local and international organizations have recognized the threat of climate change and the need to respond by raising awareness (Meehan et al., 2018). One way countries around the world are raising awareness is through implementing Climate Change Education (CCE). Under Article 12 of the United Nations Conference of Parties (COP), 21 nations agreed to advance climate change education (CCE) (Filho & Hemstock, 2019; Reid, 2019). Initially, most early climate change education focused on teaching the science of climate change and attempted to teach climate science as a way to correct misconceptions (Busch et al., 2019). More recently, social scientists have noted that climate change education is “more than a scientific problem, and to contend with it fully, we need other skills and habits of mind, including those cultivated in the discipline of history” (Howe, 2017, p. 4). Indeed, research for CCE has grown in areas such as environmental education (Jorgenson et al., 2019), sustainability education (Mochizuki & Bryan, 2015), and more recently, social studies (Busch et al., 2019; Meehan et al., 2018).

In social studies in the United States, climate change education has become a more prominent topic (NCSS, 2019). Some states have included climate change education in their standards. Yet, many states have not (Katz et al., 2020) despite many educational stakeholders, such as parents and students, advocating for the inclusion of climate change instruction (Kamenetz, 2019). One example of a state that includes climate change education in all content areas is New Jersey. In 2020, New Jersey became the first state to incorporate climate change into the state standards across all content areas (Katz et al., 2020). The state frames climate

change education as an opportunity to innovate (New Jersey Department of Education, 2022). Moreover, New Jersey's Department of Education describes effective climate change pedagogy as the following: personally relevant, based on problem-solving skills, helps students construct their ideas, and engages students with climate experts (New Jersey Department of Education, 2022).

New Jersey, however, is an anomaly as most educators in the United States struggle with how to teach climate change. Indeed, part of the lack of climate change education stems from the complexity of the issue and teachers' questions about where to start, what to cover, or where it fits within the curriculum (Favier et al., 2021). Some researchers, such as Favier et al. (2021), classify climate change education as a wicked problem as it is an expansive topic influenced by societal, educational, and psychological factors that influence how a teacher engages with the content.

This expansion of climate change education includes social studies and emphasizes human action in causing and addressing climate change. However, it is also important to understand a global problem by incorporating global perspectives, an area that needs additional research within the field. This research project seeks to address the role of land and its influence on how educators teach climate change. Despite the growth in climate change education, researchers acknowledge that teaching climate change continues to rely on "cognitive and passively transmissive forms of knowledge" (Bentz et al., 2022, p. 688) while paying little attention to how students and individuals experience the world (Sterling, 2001). As more teachers, school districts, and students become interested in teaching and learning about climate change, it is essential to understand how the topic is framed and taught. Social studies education is uniquely positioned to think about climate change education as a civic practice and how these

practices are informed across the globe. Vulnerable areas—like the Pacific—have different narrations of climate change that may resonate as we teach climate change in those areas or potentially even produce lessons about the dispositions we need as global citizens in climate change. This dissertation wonders specifically about the concept of place as a unifying idea. It is a spatial concept embedded in social studies but rarely exposed and a concept that seems to anchor how Pacific Islands make sense of climate change.

I turned my attention to Hawai‘i to think more about these intersecting ideas of place as they may be used in US social studies education. For this research project, Hawai‘i offers a critical starting point for understanding the role of place in teaching and learning about climate change in social studies classes. Hawai‘i is a unique site to study the role of place in teaching climate change for several reasons. First, the Hawai‘i Department of Education introduced its *HA* (“Breath” in Hawaiian) framework that explicitly emphasizes teaching place. The framework states that students will:

- Pronounce and understand Hawaiian everyday conversational words
- Use Hawaiian words appropriate to their task
- Learn the names, stories, unique characteristics and the importance of places in Hawai‘i
- Learn and apply Hawaiian traditional worldview and knowledge in contemporary settings
- Share the histories, stories, cultures, and languages of Hawai‘i
- Compare and contrast different points of view, cultures, and their contributions
- Treat Hawai‘i with pride and respect

In addition, Hawai‘i’s place-based learning and the importance of place are well-developed (Goodyear-Ka‘pua, 2013), as both charter schools and public schools have place-based education programs to help students learn about the importance of land. Additional island-

wide sustainability practices such as *aloha ʻāina* and *malama ʻāina* underscore the importance of land in Hawaiʻi. Likewise, using Hawaiian concepts within schools is an important example of the coexisting confluence of different knowledge traditions. This model provides a guide for integrating climate change education, land education, and different epistemological traditions. As Hawaiʻi is part of the United States educational system, it also represents a model that other states and teachers can emulate to teach the importance of land and how it influences climate change education.

Ultimately, this dissertation sought to understand how educators in vulnerable locales, such as Hawaiʻi, engage with land to teach climate change. Sub-questions connected to the dissertation's aim include the following:

1. What ecological and cultural experiences and learning inform conceptions of place?
2. How do teachers' conceptualizations of climate change engage with local and global discourses of land, people, and society?
3. How do teaching contexts (such as place-based education or predominant native schools) create variation across these research questions?

1.3 Conceptual Framework

The conceptual framework underpinning this study draws from several research areas including conceptualizations of land and place, critical pedagogy of place, and Indigenous knowledge. These concepts, explained below, provide insight in understanding how participants developed a relationship with land in Hawaiʻi.

1.3.1 Land/Place

Place and land are complex and nuanced concepts. Often, these concepts are discussed interchangeably. Yet, some scholars (Greenwood, 2020) wonder about the differences between

place and land and whether they are on equal terms (Tuck & McKenzie, 2014). For example, place, in the abstract, can represent many things, such as a site filled with memories or human meaning-making (Agnew, 2014). Place also represents a site of interaction between ecosystems and individuals' emotional, cognitive, and functional elements (Ardoin et al., 2012). In this sense, the human element underpins place and centers the anthropogenic. Tuck and McKenzie (2014) provide an alternative narrative by centering land instead of place. The scholars offer important insights about the difference between land and place that connect to Indigenous ontological and epistemic beliefs. For Tuck and McKenzie (2014), land instead of place is the appropriate term. The scholars contend that the term land, when used by Indigenous peoples, denotes an ontological difference from place. For example, land includes sky, water, and other cosmological entities. Indeed, in the context of this research study, the term land refers to the larger ecological community inclusive of ocean and sky.

Moreover, by centering land instead of place, a land-we ontology emphasizes that the land came first before individuals. That is to say, land exists and forms identities instead of humans dictating the meaning of place. When place is centered, instead of land, it also centers on human perspectives of land. In contrast, an Indigenous perspective is familial, well-known, and deeply connected to one's identity. It is not generalizable but flexible in that its meaning for those attached to it can change and shift. When discussing land, Martin and Mirraboopa (2003) discuss learning and knowing from the land not only from sensory experiences but from ontological understandings that inform epistemology and how the land informs what individuals know. In addition, Hawaiian scholar Meyer's (1998) scholarship on epistemology in Hawai'i focuses on the idea that environmental events and experiences are messages from the land. In other words, individuals learn from the land instead of individuals giving meaning to the

land. Viewing land through this lens informs how participants living in Hawai‘i might build a relationship with the land.

Historically, humans’ relationship with land has been theorized as a relationship portrayed as a commodity (Bigelow & Swinehart, 2014), as being part of an ecological community (Leopold, 1966), as a site that influences ontology and epistemology (Meyer, 1998), and as a source of critical pedagogy (Gruenewald, 2003). These theories come from different epistemological traditions, e.g., Indigenous and Western, and attempt to situate humans in the land, and construct a human/land relationship that goes beyond current examples that maintain the dualistic relationship between humans and the environment.

Scholars debate whether there can be coexistence between different land epistemologies. Researchers, such as Tuck and McKenzie (2015), say such epistemologies are incommensurable; they cannot and should not be reconciled. Other researchers, such as Kovach (2021), contend that “different worldviews might coexist together in a non-assimilative, respectful manner” (Kovach, 2021, p. 190). The latter point resonates as participants in this study came from different worldviews and coexisted with multiple knowledge traditions.

Greenwood’s (2019) discussion on the land/place divide provides an important insight about navigating the two concepts. Greenwood notes that land-based education commonly centers the land along with Indigenous sovereignty claims. Yet Greenwood (2019) doesn’t believe that “contemporary land apprenticeship, or taking care of the land, must always grow out of Indigenous epistemologies or the identity politics surrounding ‘Indigenous-settler’ relationships” (p. 368). Instead, he suggests that there are many ways to read the land. This is an important underpinning for how land and land-based pedagogies are being conceptualized in this dissertation. Land, especially in Hawai‘i, is rooted in Indigenous understanding. Still, this

understanding is not a binary, and individuals can come into this understanding and appreciate land with ease because there is an embedded network in place to facilitate the growth of an individual's relationship with land.

Land, when considered through the lens of Indigenous traditions and one's relationship to land, is frequently understood through stories. Martin and Mirraoopa (2003), Battiste (2002), and Kovach (2021) demonstrate how stories inform the conceptualization of land and how identities are formed through the land. Martin and Mirraoopa's (2003) framework on Indigenous research notes the importance of understanding Indigenous ways of knowing, doing, and being. For example, the framework stresses the importance of researchers understanding how Indigenous communities come to know knowledge (knowing), how this knowledge is relational to the context in which it was created (being), and how this knowledge is shown (doing). For Martin and Mirraoopa (2003), *Ways of Knowing* represents how knowledge is created. This could be through experience or cultural practices. In Martin and Mirraoopa's (2003) *Ways of Being*, knowledge is relational and considers multiple contexts. Lastly, Martin and Mirraoopa's (2003) *Ways of Doing* underscores how individuals embody knowledge and ultimately act about their knowledge and relationship with the land. This intersection and flow of learned and sensory information extends beyond contemporary time frames. Indeed, for Martin and Mirraoopa (2003), the past continues to inform the present through one's relationship with the land and understanding what came before and what will come after.

As such, an Indigenous perspective on land does not necessitate a fracture between the two perspectives. Instead, this conceptual framework proposes that the two epistemological traditions are instrumental in understanding how individuals account for place. Indeed, the different epistemological traditions are entangled within the fabric of society. The participants in

this study navigated those entanglements and illustrated the possibility of different worldviews working in tandem.

1.3.1.1 Place/Land in Hawai‘i

In Hawai‘i, land holds an essential relationship with Indigenous peoples. As mentioned above, Tuck and McKenzie (2014) use the term land instead of place as land denotes a more profound connection for Indigenous peoples than place. Furthermore, land in an Indigenous conceptualization is more inclusive and considers water, sky, and earth. For this study, participants, both Native Hawaiian and non-Hawaiian, used the term place and land interchangeably. However, for clarity and from a perspective that aligns with this research topic, I use the term land as it aligns closer to the data.

Meyer’s (1998) description of Hawaiian epistemology provides a lens for understanding land in Hawai‘i. It also guides how the land interacts with participants. When describing spirituality, Meyer discusses land as “a way of discussing the organic and cultural mediation of experience, and hence knowledge” (p. 22) and that it represents the “deeply embedded notion of the connectedness of things, gods, people and land” (p. 22). In this sense, land refers to terrestrial land and the broader environment, including the ocean and sky. Moreover, Meyer states, “How one experiences the environment plays a huge role in how the world is understood and defined, and this experience is nursed and fed via cultural practices, beliefs, and values informing how the world is experienced” (p. 23). This ontology underscores the belief that all objects, inanimate or animate, have mana and must be taken into account when making decisions.

1.3.2 Critical Pedagogy of Place

Another concept important to the study is the critical pedagogy of place. In describing critical pedagogy of place, Gruenewald (2003) builds on Freire’s (1998) example of *conscientizacao*, or the learning to perceive oppressive elements in reality. According to

Gruenewald, critical pedagogy of place provides a discourse that examines the intersection of “environment, culture, and education” (2003a, p. 10). Gruenewald states that critical theorists have overlooked the role of an ecosystem on human emotions and understanding. Furthermore, at a basic level, critical pedagogy of place is asking what it means to live well in a place, what it means to recognize oppression, and what it means to reflect on the ecological and cultural aspects of place and how to understand the daily lived experience of many individuals (Gruenewald, 2003).

Critical pedagogy of place as a concept provides opportunities to understand how individuals interact and build relationships with the land. Moreover, it allows the researcher to understand land through decolonization and reinhabitation. Gruenewald (2003) discusses climate change’s different ecological and social effects. By taking a critical approach to place, one can examine one’s identity and reflect on emotions and issues of oppression, both past and present.

By understanding place, social studies educators can teach climate change and acknowledge the layers of social issues that can afford students and teachers opportunities to do what Freire referred to as reading the world (Freire, 1998). This research is grounded in theories connected to place. It draws from and acknowledges the importance of Indigenous knowledge and epistemology. It also seeks to use critical place-based pedagogy as a lens to analyze and understand the importance of place in the teaching of climate change.

1.3.3 Indigenous Knowledge

Theories connected to Indigenous knowledge and ways of knowing underpin this research. Theories such as Indigenizing methodologies (Kovach, 2021), Indigenous research (Martin & Mirraoopa, 2003; Tuck & McKenzie, 2015), Indigenous place-based method (Wooltorton et al., 2020), and Hawaiian epistemology (Meyer, 1998) have helped inform the

meaning of land, especially in the Pacific region. Holistically, these theories guide place and suggest that learning and knowledge for Indigenous Pacific communities is a communal endeavor (Falgout, 1992) and holistic (Wooltorton et al., 2020). It must consider Ways of Being, Doing, and Knowing (Martin & Mirraoopa, 2003) and that these concepts inform how climate change is understood and also communicated in educational spaces. Although I did not work exclusively with Pacific communities, it is important to note that the spirit and knowledge of Indigenous thinking were present among the participants. Furthermore, the theories inform the perception of place in the Pacific region and how the interconnectedness and understanding of the Pacific can help shape how social studies educators teach climate change and the entanglements connected with such an expansive topic.

Furthermore, Indigenous knowledge suggests that place is imbued with local knowledge (Battiste, 2002; Davidson-Hunt & O'Flaherty, 2007). In this context, climate change is understood locally through lived experience. Two approaches that focus on conceptualizing place-based education are transformative sustainability and land education. These approaches to place-based education amplify Indigenous concepts of place and the many cultural aspects connected with land. Likewise, Wooltorton et al. (2020) note that approaches to place-based education emphasize a methodology that centers on the Indigenous resurgence of place consciousness and culture as well as responsibility to all life.

Finally, within Hawaiian epistemology, land is more than empty space. Instead, it contextualizes knowing and what is to be known. By engaging with land, an individual can reflect on their relationship with land and who they are as a researcher, teacher, or student. The senses, which are “culturally shaped” (Meyer, 2014, p. 5) represent an important way of knowing and provide the individual with a different epistemological lens of interpretation. Ultimately, in

researching in Hawai‘i, it is important to recognize Indigenous epistemologies and how the connection to the land influences teaching climate change and an individual’s thoughts and actions.

1.4 Dissertation Organization

This section discusses how this dissertation is organized. In Chapter 1, I discuss my research problem and conceptual framework. I also include a vignette describing my experience living on a Pacific Island atoll, an event that piqued my interest in studying climate change education. In Chapter 2, I review literature relevant to this study. For example, I discuss place-based education, place as a concept, and Indigenous thinking. Next, I discuss my methodology, which includes an introduction to my participants. Chapters 4 and 5 are dedicated to my findings. Chapter 4 examines how participants built a relationship with land through various vignettes. Chapter 5 discusses how participants’ relationship to land influenced their pedagogical practices. Lastly, Chapter 6 is dedicated to discussion and implications.

In writing about Indigenous land, Goeman’s (2013) observation, as quoted in Tuck and McKenzie (2014), comes to mind, “describing Native relationships to land is riddled with pitfalls and paradoxes, many of which are impossible to avoid given the nature of power and colonialism” (p. 42). Bearing this quote in mind, I have attempted to conduct this research by allowing the participants, who are the experts, to guide the research. I use Hawaiian words or phrases because these concepts or words surfaced from discussions with participants. In some ways, this highlights the power of Indigeneity in Hawai‘i and provides a generative model for teaching climate change.

1.5 Hawaiian Words and Place Names

Throughout this dissertation, I use the word Hawaiian. This term is an Anglicized version of Hawai‘i. In using the word Hawaiian, I followed the lead of my participants, who used Hawaiian to describe both the Hawaiian language and Native Hawaiians. However, it is important to acknowledge the Hawaiian term for Hawaiians is *Kānaka Maoli* as well as the Hawaiian term for Hawaiian language, *‘Ōlelo Hawai‘i*. Likewise, the correct spelling of Hawai‘i contains a ‘okina, which is a glottal stop and appears as an inverted comma. Finally, it is important to note that Hawai‘i can refer to both the state and the island commonly called the Big Island. To avoid confusion with the state of Hawai‘i, I refer to O‘ahu as such and to the island of Hawai‘i as the island of Hawai‘i. If I am discussing the state, I will say the state of Hawai‘i.

1.6 Listening to the Land-Learning through the Land: An Autobiographical Beginning

I came to this research topic in 2009 on a Pacific Island atoll called Oneop (pronounced Own-ee-up). The elevation of the atoll was about six feet above sea level. When you approach an atoll like Oneop, you are struck by the number of coconut trees on the island sticking up like the thick quills on a porcupine's back. Walking through the atoll, you hear the plunk of coconuts dropping or the thrush of palm fronds falling, both of which are dangerous, so it is best not to walk or sit under trees that are ready to dispatch with ripe coconuts or old fronds. I lived on a parcel of land called Efeng Mura (the mura is a moniker provided during Japanese colonization and occupation before World War II). The parcel extended from the road almost in the middle of the island to the ocean beyond. On the parcel towards the sea were a line of headstones, markers of previous generations, and individuals who inhabited *Efeng Mura* (Efeng translates as north in Chuukese). The names on the cement slabs were worn, but most islanders (perhaps not children) knew who was buried where. The cement slabs were not separate from the island, as a cemetery is separate from a city or society. Instead, the gravestone markers provided a space to

sit, congregate, and remind everyone of their responsibility to those who passed, those living in the present. Those yet to come who cared for the land ensured everyone's survival. Even though Oneop was picturesque and pristine, living on an atoll is one of resilience and understanding how perilous it can be if systems are not maintained.

The location of the grave markers created an interesting juxtaposition because next to them was the freshwater well. Most atolls have gone through a process that took thousands, if not millions, of years to create. It provides drinking water, water for cooking, and water for bathing. The wells, like the grave markers, must be cared for.



Figure 1: Efeng Mura

This story circled back to my story in 2009. On one particular day, the tides were exceptionally high and ultimately breached the artificial seawall. The ocean water trickled in, and although it did not reach the graves or the well, a fact popped into my head: the ocean provides and destroys. The ocean provides and sustains communities through fish, seaweed, and other creatures. It also destroys by washing graves away and ultimately upends fragile ecosystems because of events happening thousands of miles away.

Of course, this story is not about the ocean alone. Instead, it is about people and land and how we are interconnected. Fast-forward to 2020. It is New Year's Day. My father-in-law, Chief of Oneop Island, has passed in Pohnpei, an island state two hours away by plane. His burial site, however, will not be Pohnpei but Oneop. His grave marker will be next to his family members who passed before and all individuals of *Efeng Mura* who add to the continuity of the land. He is returning to a place that has sustained his life. His marker is close to where, upon my leaving Oneop, he handed me all the money he had from the little store he owned. Money was immaterial in the bigger picture as the land provides and sustains life. As the land continues and the memory of individuals remains, we, the family and the descendants, will carry and continue that continuity.

Chapter 2: Literature Review

In this chapter I review literature on place, climate change education and Indigenous knowledge. I address my first and second research question of how educators make sense of place when teaching climate by reviewing literature on place, sense of place, and place attachment. In this review, I suggest that the literature contends that a sense of place and place attachment are important components of effective climate change education. For my second question I review how the social studies and teachers have conceptualized climate change education and how this intersects with local and global discourses about climate change education. For example, how does climate change education align with Indigenous thinking in Hawai‘i? Lastly, I discuss place-based education and its use in climate change education.

For clarification, I use the term place and place-based as it is used non-Indigenous scholars. Although there are ontological and epistemological differences between land and place, I believe that in order to shift from place-based to a land-based pedagogical approach there needs to be an understanding of place. For example, stating land-based learning when an author uses place-based learning changes the meaning of the author’s claim. Ultimately moving toward land-based learning is a positive and necessary goal but it is important to acknowledge the authors for whom this work builds upon.

2.1 Place

In this section, I review the literature on place. In reviewing the literature on place, I explored various ways scholars describe place as a social construction rooted in Western epistemology (Seawright, 2014), place as a site of resistance or oppression (Butler & Sinclair, 2020), and place as any site that is imbued with meaning (Agnew, 2014; Cresswell, 2004). Additionally, I examine the distinction between space and place, with space being described by

scholars as an “abstract, general realm” (Butler & Sinclair, 2020, p. 66) and place being more concrete (Agnew, 2014).

Place is an essential and fundamental element of everyday life (Tuan, 1977). Place not only provides individuals with a sense of identity (Ebersole & Worster, 2007) but also fosters a “sense of belonging...such that individuals image themselves as a part of that place” (Li & Shein, 2022, p. 695). Moreover, place represents a crucial site where knowledge and ideas (such as equity, justice, and citizenship) are enacted and understood with nuance (Butler & Sinclair, 2020). Places are also pedagogical and center experiences that can “teach us about how the world works and how our lives fit into the spaces we occupy” (Gruenewald, 2003a, p. 621).

Agnew’s (2014) definition of place includes three characteristics: a location, a locale, and a sense of place. In other words, a place is a physical site, a material setting where people attach meaning. Creswell (2004) defines place succinctly by stating that place is space invested with meaning. Other scholars argue that place is a site of pedagogy and that a critical perspective of place addresses social justice issues as places represent sites of power and oppression (Gruenewald, 2003a; Soja, 2013). In this respect, the place is constructed or deconstructed by individuals.

Much of the research on place developed after the spatial turn in the late twentieth century when scholars turned their attention away from the linearity of time and instead focused on how time was enacted in space or place (Butler & Sinclair, 2020; Larsen & Beech, 2014). By considering space and place, new lines of learning and thinking were opened up that considered the effect of space and place on individuals.

Previous scholars introduced the concept of place as pedagogy. Scholars such as Dewey (2013) and Freire (1998) note the importance of place in education. Environmentalist and

philosopher Aldo Leopold also wrote about the role of place in pedagogy. Knapp (2005) analyzed Leopold's understanding of the role of place to identify ten different ways of knowing a place. For Leopold, place is represented by the aesthetic beauty and the interconnected biotic community that ensures the health of the land and the individual. Knapp detailed Leopold's approach to place-based learning through the following list:

- Wondering and questioning
- Knowing local history
- Observing seasonal changes
- Listening intently
- Counting and measuring
- Empathizing with and personifying nature
- Connecting elements in cycles
- Finding beauty
- Seeking solitude for reflection
- Improving land health

Leopold's (1966) understanding of place provided a foundation for place-based learning, which put humans in conversation with the ecological community.

More recent scholars have taken a more critical approach to place. For instance, Tuck and McKenzie's (2015) approach incorporates a critical inquiry perspective. The scholars underscore that place is deeply tied to Indigenous histories and land, requiring understanding oppression and putting Indigeneity first (Tuck & McKenzie, 2015). The authors contend the importance of listening to the land.

Other scholarship also illustrates what is absent from place. Seawright (2014) writes about the legacy of settler colonialism and place. Tracing the development of place-based education, Seawright notes a long-standing absence of Indigenous perspectives. He notes that the Western concept of place is not only “narrowly utilitarian” (p. 555) but also rooted in “a social epistemology that normalizes domination through systems of white supremacy, settler colonialism, heteropatriarchy, and anthropocentrism, among other modes of domination” (p. 555). To shift away from the idea of human domination underpinning ideas of place and land, Seawright argues for understanding place through an Indigenous lens not only to understand the creation of self and how past forms of Western domination have influenced how humans see their relationship with place.

This approach is essential when considering the role of place in social studies education. As Bigelow and Swinehart (2014) and Conrad (2019) have pointed out, land is less centered and detached from the human experience in schools grounded in Western epistemology. When describing land in social studies curricula, Conrad (2019) notes that Western curricula separate nature from human knowledge and identity, which suggests land is empty and available to take. The distinction made by Conrad is important and signifies a distinction between a place in isolation, which is filled with meaning, and arguably people, making it more important than land. Conrad, like Seawright, shows the effect the concept of place has on land in that the importance of land is diminished and becomes secondary to human meaning-making. Hawai‘i is an important site for understanding the role of place, as land is an integral part of many school curricula.

Gruenewald’s (2003a, 2003b) discussion of critical place-based pedagogy provides a helpful example of how place can be studied in Hawai‘i. In describing place, Gruenewald

(2003a, 2003b) synthesizes concepts of place, place-based learning, and critical pedagogy to develop critical pedagogy of place. This framework emphasizes decolonization and reinhabitation that can “link school and place-based experience to the larger landscape of cultural and ecological politics” (Gruenewald, 2003a, p. 9). These two concepts provide a valuable lens for studying places in Hawai‘i and the broader Pacific region. For Gruenewald (2003a), reinhabitation represents learning to live in a place harmed through past exploitation. Hawai‘i, through its history of colonization, represents a site of decolonization and reinhabitation as individuals learn to live with the land.

In summary, the literature on place illustrates multiple iterations and understandings of the term. It also shows how place, when used as a *de facto term*, can diminish the importance and identity of land. However, land, unlike places, will continue to exist.

2.2 Sense of Place and Place Attachment

An important element in addressing the climate crisis is to help individuals learn how to care about the land. Over the past twenty years, evidence shows that forming place attachment and developing a sense of place can positively influence pro-environmental behaviors (Briggs et al., 2014; Schweizer et al., 2019). Although sense of place and place attachment theory connote similar meanings, there are differences. For example, sense of place is a broader concept with multiple components. Scholars note three dimensions for sense of place: emotional, cognitive, and behavioral (Jorgensen & Stedman, 2001). The cognitive dimension of sense of place describes how individuals know a place. The behavioral dimension describes the interaction between individuals and a place. And the emotional dimension describes an individual's satisfaction, or, for lack of a better word, emotions toward a place. Within the emotional dimension, an individual develops an attachment to the place.

Place attachment theory, a crucial component of sense of place, offers a profound understanding of the role of place in individuals' lives. This understanding is instrumental in comprehending the connection between place and climate change. Originating in the 1950s, place attachment theory posits that individuals form emotional bonds with specific places (Low & Altman, 1992). Although it was relatively understudied until the 1970s and 1980s, it gained significant attention and focus after the spatial turn of the 1970s (Butler & Sinclair, 2020). The climate crisis has since rekindled interest in understanding how individuals address climate change and the pivotal role of place in inspiring meaningful actions.

Attachment is an important element of sense of place and key to providing context for place perception. For scholars, place, i.e., the physical location, has “ontological importance...that is...more than a mere backdrop to social phenomena” (Gruenewald, 2003a, p. 44). Moreover, environmental psychologists have demonstrated that place affects human social and emotional behavior and that place is fundamental to how humans form their identity. In a study about place attachment and climate change in Australia, Devine-Wright et al. (2015) found that most participants stated that they had global place attachment, which challenges a localist perspective that states individuals only value what is in the immediate environment. Moreover, the scholars found that it is not global attachment per se that influenced perceptions about climate change but, instead, an interplay between global and national attachments. That is to say, individuals demonstrated multiple forms of belonging. This is important when considering how to bring different conceptualizations of place, or in the case of this study, land, to scale.

Place attachment, as a component of the emotional dimension of sense of place, also has different components. These components include physical, social, cultural, and personal factors. Moreover, Hashemnezhad et al. (2013) summarized four different levels of place attachment:

- Knowledge of place
- Belonging to place
- Attachment to a place
- Sacrifice for a place

A table based on Hashemnezhad et al.'s (2013) description helps to visualize each component:

Levels of Place Attachment	Description
Knowledge of place	People can identify symbols of a place but have no attachment.
Belonging to place	People can identify and respect symbols of a place.
Attachment to place	People are integrated and place is meaningful.
Sacrifice for place	People are deeply committed to place.

Table 1: Levels of Place Attachment

The importance of place attachment theory regarding climate change education is in its analysis of the relationship between individuals and the places they inhabit. Low and Altman's (1992) review explains how place attachment can influence climate change education. In Low and Altman's review, place attachment theory is multifaceted and incorporates several different concepts such as scale, different actors, social relationships, and temporal aspects. There are several purposes of place attachment formation. One is that a place may form a social link between individuals, groups, or cultures in which the place comes to represent something more significant than the place alone. Place attachment also influences self-definition and identity and can give individuals and groups a sense of security.

2.2.1 Place Attachment and Pro-environmental Actions

Scholars describe increased interest in place-based education as it can lead to positive emotional responses and stimulate pro-environmental behaviors (Ardoin, 2006). For example, Stedman (2002) showed how property owners in Wisconsin protected their properties from an outside threat. In addition, Shibata (2022) demonstrates the close connection between identity and place attachment with the former noting a positive relationship and the latter describing an identity crisis when there is a loss of place attachment. Yet despite place attachment as an indicator for pro-environmental action, it is a concept that remains “under-theorized” (Briggs et al., 2014, p. 154).

2.3 Place and Place Attachment in Hawai‘i

Furthermore, when thinking about place in Hawai‘i, previously mentioned scholars like Leopold overlook the importance of place through an Indigenous perspective. For example, Meine (2022, p. 173) provides an overview of Leopold’s work, its challenged relationship with Indigenous ideas, and whether such ideas were appropriated. Furthermore, Whyte (2017, p. 8) argues Leopold’s focus on the land contrasts with Indigenous, mainly Anishinaabe’s, focus on the relationship between land, family, and interspecies connection.

The connection between family and land is especially significant in Hawai‘i. Kana’iaupuni and Malone (2006, p. 282), writing about Hawaiians, state that “place is intertwined with identity and self-determination of today’s Native Hawaiians in complex and intimate ways” (Kana’iaupuni & Malone, 2006, p. 282). They further elaborate by stating that “place signifies relationships, spanning spiritual and kinship bonds between people, nature, and the supernatural world. The understanding conveyed by indigenous writings spanning the Pacific is that place breathes life, people, culture, and spirit” (Kana’iaupuni & Malone, 2006, p. 284). Here, as Kana’iaupuni and Malone (2006) point out, are ontological and epistemological

underpinnings that previous, and Western, scholars of place still need to address. However, these factors are important for understanding one's identity and how one accounts for place.

When considered in the context of climate change, place plays an important role for Pacific Island nations. For example, Shibata (2022) notes that losing land in Pacific Island nations threatens cultural identity and may drive negative social behavior. In thinking about place and its effect on teaching, it is important to consider how one's knowledge and identity are entwined with the land and what this loss might mean for future generations. As Howell and Allen (2019) note, attachment to a place, and in this case, need not be the environment and can foster social justice concerns connected to climate change. Place attachment theory supports understanding the role of place in influencing individuals' actions about climate change. It can also play a role in helping educators understand how to teach climate change.

In summary, sense of place and place attachment are important concepts in understanding how an individual situates oneself in relation to place. In the case of Hawai'i, additional factors connected to the land, such as the genealogy and even the literal translation of land as *'āina*, provide an additional layer to place-based education and an important connection between individuals and the land.

2.4 Social Studies and Climate Change Education

In this section, I review literature on climate change education in social studies. Over the past decade, climate change education has increased in social studies (Meehan et al., 2018). Yet most social studies material is in the form of textbooks and focuses on personal actions individuals can take to adapt or mitigate climate change (Meehan et al., 2018, p. 515).

In addition to more curriculum discussing climate change, more teachers support teaching climate change although they also express anxiety about teaching unfamiliar topics like climate change (Nation & Feldman, 2021).

2.4.1 Global Citizenship Education

For social studies researchers, climate change education has often been conceptualized as an issue of citizenship as the questions posed by the problems and effects of climate change are matters of government, individual choices, and society at large (Chandler & Marri, 2012; Gaudelli & Heilmann, 2009; Kumler & Vosblurg-Bluem, 2014; Roemheld & Gaudelli, 2021). One method for teaching climate change education in social studies education is through a global citizenship education (GCE) framework (Gaudelli, 2016). Here, scholars suggest that GCE's ideas such as considering multiple perspectives, looking beyond borders, and understanding interconnectedness, are ideal for addressing global climate change (Gaudelli, 2016; Pashby et al., 2020; Roemhild & Gaudelli, 2021). Researchers also note GCE's emphasis on understanding multiple perspectives, being mindful of one's decisions, and the interconnectedness of the world and issues related to climate change (Roemhild & Gaudelli, 2021; Yli-Panula et al., 2022).

When considering the connection between GCE and climate change, Roemhild and Gaudelli (2021) argued for better integration between the two topics. They argue that climate change is the defining issue of our time and a human-rights issue that aligns with the goals of GCE. Furthermore, the authors argue that state educational systems must address global awareness, which is necessary if students and teachers think about and conceptualize climate change education on a global scale. Moreover, Roemhild and Gaudelli (2021) argue that global citizenship education, especially within Andreotti's (2014) framework of critical global

citizenship education and examining injustice, allows students to see and address inequity and injustice during a time dominated by climate change. An important implication of addressing injustice is understanding global perspectives about climate change and what knowledge influences those perspectives. For example, a concept such as climate refugees needs development through multiple perspectives, some of which might question the term refugee (Farbotko & McMichael, 2019). As such, GCE can be a lens that allows students and teachers to see the world's interconnectedness and address global problems like climate change.

In defining global citizenship, Schattle (2010) situates global citizenship education into four ideologies: moral cosmopolitanism, liberal multiculturalism, neoliberalism, and environmentalism. For Schattle, most school programs promoting global citizenship education use liberalism and environmentalism. Schattle also notes that the diversity of global citizenship and global citizenship education do not constitute a new ideology but instead present new ways of thinking that continue to unfold.

More recently and ostensibly due to various global conflicts, scholars such as Bosio and Schattle (2021) describe glocal citizenship. In their framework, Bosio and Schattle (2021) discuss five elements of glocal citizenship: values-creation, identity progression, collective involvement, glocal disposition, and an intergenerational mindset. The authors make the case for glocal citizenship by pointing out the world's interconnectedness and the fact that problems are often solved locally. As a result, local and global factors are essential when considering the context of citizenship. Of course, some scholars, such as Thornton (2000), raise concern about letting global politics and ideas enter local spaces as the global can overshadow local needs or desires.

Scholars contend that the lack of an agreed-upon definition for global citizenship is a strength (Gaudelli, 2016) that allows for fluidity and adaptation without abandoning guiding principles. Goren and Yemini (2016) empirically reviewed global citizenship education in academic literature to highlight this point. The researchers found the term global citizenship to vary based on geographic region and nation-state needs. In a review of 39 scholarly articles, the researchers categorized the articles using a typology from Oxley and Morris (2013) that used two categories for global citizenship: cosmopolitanism and advocacy. The advocacy approach focused on addressing injustice and inequality in the world. In contrast, the cosmopolitan approach sought to prepare individuals to live and work globally or understand other cultures or peoples. Using Gruenewald's (2003) critical place-based pedagogy to understand oppression within locales could strengthen global citizenship education's approach to addressing injustice.

Despite the strong appeal of teaching climate change through global citizenship, the connection has yet to go without criticism. Matapo (2018) views GCE as still defined by Western epistemological traditions that assume a universal ontology for all humans and a viewpoint of land as a commodity. According to Matapo (2018), GCE could improve if it focused on a region's ontology and individuals' identities while paying more attention to human-nature connectedness (Matapo, 2018). Hawaiian scholars align with Matapo's (2018) call to consider different ontologies. Writing about Hawaiian epistemology, Meyer (1998) notes that signs in the environment, such as a bird showing itself or the wind picking up, have essential value and demonstrate the need to understand how to read the land. Other Hawaiian scholars write about genealogy, and as Meyer (2015) states, "putting the past before us" (p. 2). Thus, an additional element of citizenship in this light is not only citizenship as defined by the state or through a concept such as global citizenship but also conversing with ancestors who guide the future. The

added epistemological frame has important implications for global citizenship and how scholars can conceptualize what factors contribute to citizenship. For some participants in this study, both Hawaiian and non-Hawaiian, knowledge of ancestors and people who came before provided a guiding light for how to act locally and globally.

Additionally, when educators discuss climate change education through the context of global citizenship, Western paradigms can be overemphasized. Hofmann (2018) notes that climate change can be a traveling idea based on knowledge from industrialized countries that are resituated in the Global South and carries with it Western ideas about climate change, such as how to adapt.

Furthermore, Busch et al. (2019) argue that there are significant research opportunities as climate change impacts “the family level, the classroom level, the community level, and explicitly considers the impact of culture, worldview, and political identity” with an emphasis on the collective nature of knowledge, especially around issues of mitigation and adaptation (Busch et al., 2019, p. 12). Researchers such as Busch et al. (2019) note gaps in climate change education that still need to be addressed. These gaps include how climate change affects the sociocultural aspects of a nation, place, or people.

2.4.1.1 Glocal Citizenship

There is increasing interest in global citizenship as educational institutions desire to instill and support learnings in “developing their values, knowledge, and understanding of multiple global, national, and local issues” (Bosio & Schattle, 2021, p. 288). Yet scholars also note the importance of attending to local issues. As such, scholars desiring to address the interplay of climate change at a global and local level merged the global and local binary into a singular

term: glocal. For Bosio and Schattle (2021), glocal refers to “a more globally oriented approach of caring about both the local and the global” (p. 292).

When thinking about the concept of glocal and the idea of thinking globally and locally, it is helpful to consider the flow of ideas. Anthropologist Hofmann (2018) writes that the flow of ideas, such as climate change, can be based on knowledge from industrialized countries that are resituated in the Global South and carry Western ideas about climate change, such as how to adapt. Hofmann's research is relevant to this study as she sought to understand climate change narratives in Micronesia. There, Hofmann observed that Western ideas of climate change, particularly notions of ice melting and sea-level rising, were well known in Micronesia. For Hofmann, Micronesians navigated Western narratives with local epistemologies, all while centering land. In this sense, Micronesians could think of land as more than just its physical properties; it was something that embodied one's identity and was reconstituted through culture and customs. Thus, while some Micronesians no longer live in Micronesia, they carry the land with them through their identities, which were directly connected to land names and clan membership. Furthermore, Shibata (2022) notes that climate change is a disruptive phenomenon that impacts one's social identity, especially when vital cultural practices are no longer available, which may lead to social unrest.

2.4.2 Climate Change Education and Justice

Another focus for teaching climate change in social studies is through the lens of climate justice. These issues might involve environmental justice and food justice, or they may even connect to the legacies of colonialism (see Choices Curriculum, 2020). Scholars have examined climate justice and its connection with gender equality (Terry, 2009), its emphasis on zones of sacrifice in which the need for consumption causes inequality (Klein, 2015), and its geographical

reach as a concept (Fisher, 2015). An essential lens for examining climate justice and place is the concept of critical climate justice. According to Sultana (2022), climate justice is about equity issues and how climate change affects communities differently.

Furthermore, Sultana argues that through critical climate justice, or the specific examination of intersectional issues, society can address climate inequities by using a critical feminist scholarship to understand how climate change contributes to global disparities. By using a critical feminist framework, scholars and societies can better understand the nuanced effects of climate change. Other scholars, such as Shibata (2022), note that climate change impacts one's social identity as a disruptive phenomenon, especially when vital cultural practices are no longer available, which may lead to social unrest.

One curriculum dedicated to climate justice is the Choices Curriculum's unit on climate change. The Choices Curriculum aims to "develop the skills and knowledge young people need to be informed global citizens capable of engaging in thoughtful discussions about history and decision making" (Choices Curriculum, 2020, p. 15). The climate change unit develops the extent of the climate crisis through case studies in different countries. At the curriculum's core are questions of how nations should respond to climate change and who bears responsibility for this response. Students must take on different perspectives for a mock COP (Conference of Parties) meeting to discuss practical solutions to climate change. These nations include Germany, Colombia, and Tuvalu, for instance. Key concepts still need to be included despite the curriculum's goal of centering justice in the climate change debate. For instance, while including multiple perspectives and voices, the curriculum fails to engage with individuals' or cultures' relationship with the land and how it influences their thinking.

Place-based learning is a promising bridge between global citizenship education, global climate change, and the many sources of knowledge that underpin and influence how each topic is conceptualized. In social studies, place-based learning is a valuable tool for students and teachers engaging with climate change, including local challenges that may also be attached to larger, more global issues. In this pedagogical approach, the teachers and students gain firsthand experience in bonding (Sobel, 2004) with the environment. This concept connects with and supports the field of social studies and its core mission of being an engaged and active citizen (Parker & Jarolimek, 1984).

Additionally, researchers see place-based learning as a link between climate change and individual or group experience that can also influence behavior (Schweizer et al., 2013). Some scholars also see place-based learning as a pedagogical approach that allows teachers to engage with the local community and become critical active citizens (Butler & Sinclair, 2020).

There is a long history of the field of social studies teaching about place. John Dewey, arguably the twentieth century's most influential educational philosopher, wrote about experiential learning and the need for land reform (England, 2018). In detailing Dewey's relationship with Henry George, England (2018) points out that Dewey echoed George's argument that private ownership of land caused inequality and prevented community formation, which was a bedrock of democratic society. Although Dewey did not coin place-based learning, he arguably had something similar in mind. Writing in *School and Society*, Dewey (2013) stated the following: "From the standpoint of the child, the great waste in school comes from his inability to utilize the experiences he gets outside the school in any way within the school itself; on the other hand, he is unable to apply what he is learning at school in daily life" (p. 89). In later years, Dewey expanded on his concept of education, saying, "The principle that development of

experience comes about through interaction means that education is essentially a social process” (Dewey, 2013, p. 58). As historian England (2018) shows, Dewey supported calls for land reform by supporting journalist Henry George's claim that inequality came from rising rents. Moreover, for Dewey, much of this socialization, and the act of building communities that shaped future citizens, came through access to land, which he derided as being speculated and in need of reform and even nationalization.

Despite a rich history of social studies education and citizenship being rooted in place, most place-based education and issues of place have been developed through science and environmental education. For example, scholars of science education have used place-based education to research how individuals communicate climate change education (Khadka et al., 2021), teach it in science courses (Hernandez et al., 2022), and develop a sense of place in order to address climate change issues (Semken & Freeman, 2008). Ultimately, place-based learning has been robustly developed and the social studies, in preparing for the effects of the Anthropocene, can use place and place-based learning to engage (or reengage) with or to teach about citizenship issues and global climate change.

However, according to Bigelow and Swinehart (2014), having teachers and students reexamine their relationship with the Earth is an important step in teaching climate change. To do this there needs to be an understanding about the role of place and how it shapes and influences what teachers know and by extension teach. Of course, most of teachers’ knowledge about climate change education in the United States stems from scientific studies rooted in Western epistemological traditions. Within this tradition, knowledge is static and the environment is a place to be studied; it is observable, known, and has little effect or connection with those who study it. And while there is nothing inherently wrong with such epistemological

traditions, they fail to consider different epistemologies that view an individual's place in the world differently.

According to Kissling and Bell (2021), the social studies curricula has remained relatively quiet about social studies' relationship with Earth. This has caused teachers and students to have a narrow view of Earth primarily informed through sciences. They also contend that social studies education has excluded humans' relationship with Earth, and their research seeks to re-orient climate change education by reemphasizing humans' relationship with Earth. Other researchers such as Brace and Geoghegan (2011) advocate for more research on how local landscapes influence people to expand this viewpoint. By understanding this relationship, researchers can recognize the cultural aspects of climate change and the natural elements that shape how individuals know climate change. It is in this sense that understanding the role of place can provide a link between global citizenship education and climate change education.

A primary concern for many social studies educators is how Earth is taught in relation to society. As *Rethinking Schools* author Bigelow and Swinehart (2014) note, school and his social studies classes taught him to disregard the Earth and see it as a means to some materialistic end. Other scholars such as Conrad (2019) contend that even new curriculum such as the *Big History Project* continues to separate nature from humans and normalize European, and Western, conceptions of land as a commodity. Finally, social studies researchers have noted that to teach climate change there is a need to reposition the earth and its role in social studies education (Chandler & Marri, 2012; Kissling & Bell, 2020).

As mentioned, scholars such as Kissling and Bell (2020) have provided foundational research for repositioning the Earth within social studies curriculum. In their Earthen curriculum,

Kissling and Bell argue that humans are “members of the land community alongside other beings and materials” (Kissling & Bell, 2020, p. 19). This research is connected to and grounded in Leopold’s conceptualization of citizenship outlined in “the land ethic” in which humans were part of a larger community that included everything connected with land, including soil and water.

In summary, if global citizenship is best positioned to teach global climate change, then it is important to understand the connections that citizens have with place and the lines of thinking that connect these two concepts. By understanding the role of place, social studies educators can begin to understand the role place plays in identity, understanding, and even how that identity is threatened by climate change.

As noted above, how social studies teachers engage with place when teaching climate change is an area deserving additional research. Questions about the meaning of place, especially considering the global nature of climate change and the different epistemologies and ontologies throughout the world that shape what place and climate change mean to individual locales, are issues that researchers can take up to bring into focus the intersections of place, climate change, and citizenship.

2.5 Climate Change and Place-Based Education

Literature on this pedagogical approach suggests that place-based learning can help teachers, students, and the general public rethink how they discuss and teach climate change (Resor, 2010; Wooltorton et al., 2020). In addition, when teachers and students strengthen their knowledge of a place, they are more likely to develop a more profound sense of responsibility for the place, which can significantly impact an individual’s social and emotional understanding of climate change. Nevertheless, gaps exist as most place-based education literature stems from

Western epistemological standpoints emphasizing objectivity (Kissling & Bell, 2020).

Additionally, the literature suggests that despite promising scholarship on the possibilities of place-based education, its use in social studies classes has waned as students' and teachers' relationship with the land was deemphasized or ignored, but there are renewed interests in light of the climate crisis (Bigelow & Swinehart, 2014; Kissling & Bell, 2020).

Place-based learning as a pedagogical method connects to John Dewey. Writing about the origins of place-based learning, scholar Gregory Smith (2002) states that a key component of place-based learning, which links back to Dewey, is students leveraging and observing the phenomenon in their lived worlds as a way to learn. Smith cited five characteristics of contemporary place-based learning such as cultural studies, nature investigations, real-world problems, internships, and a better connection with local community life. Sobel (2004) also wrote about the connection between place and classroom and emphasized local aspects of place not only as a method to make content areas more relevant but to also to sustain, or revitalize, local communities. For Sobel (2004), place-based learning is connected to the local community and the environment:

Emphasizing hands-on, real world learning experiences, this approach to education helps students develop stronger ties to their community, enhances students' appreciation for the natural world, and creates a heightened commitment to serving as active, contributing citizens. Community vitality and environmental quality are improved through the active engagement of local citizens, community organization, and environmental resources in the life of the school. (p. 7)

For Sobel, the connection to the local is an important component in developing a sense of place and the local environment. And although place-based education is more than developing a

sense of place, some approaches attempt to reconnect individuals to place (Kudryavtsev et al., 2012). For example, Kudryavtsev et al. (2012) describe students learning about local ecology in New York along a subway line. The authors note that “attention to the sense of place literature may enrich an already vibrant place-informed scholarship in environmental education the process of ensuring that local places carry meaning is an important element of climate adaptation and how communities respond to climate change” (Kudryavtsev et al., 2012, p. 431). For this research project, understanding how teachers develop sense of place is an important stepping stone to understanding how they teach place and climate change.

Place-based learning is an expansive area of study. In a meta-review of place-based literature, Yemini, Engel, and Ben Simon (2023) found place-based education is a broad topic that can have many different dimensions. Moreover, Kudryavtsev et al. (2013) summarize place-based learning as a pedagogical approach where students learn about local natural, built, and social environments through inquiry, environmental action, and other hands-on activities in a specific place. Furthermore, Yemini et al. (2023) found that most place-based education programs conducted by organizations outside the school focus on improving educational outcomes instead of critically engaging with the content. To this point Indigenous knowledge and methods can play an important role in supporting a more critical place-based pedagogy that is not only holistic but also takes up issues of criticality and decolonization.

In writing about place, Ardoin et al. (2012) developed a typology of place-based learning. Ardoin et al.’s (2012) typology features four different dimensions of place-based education. These dimensions are biophysical, psychological, sociocultural, and political-economic. Ardoin et al. (2012) note that place-based learning has primarily focused on the biophysical aspect of place, that is the landscape and plant and animal species that interact within an ecosystem.

Yemini et al. (2023) confirm this by noting that most studies involved STEM learning. In their conclusions, Ardoin et al. (2012) argue for more research on the sociocultural aspects of place and in particular how people interact with place.

Shifting the focus of place-based education can affect how people view climate change and ultimately change their beliefs or attitudes (Devine-Wright, 2013; Howell & Allen, 2019). Research suggests that exposure to nature helps foster change in attitudes toward climate change (Reser et al., 2014). In addition, Schweizer et al. (2013) point out that place-based learning connects individuals emotionally and socially to a place and inspires them to become more locally engaged and active. However, some research draws this conclusion into doubt. Howell and Allen's (2019) research demonstrates that the significance of place, along with education and societal factors more so than experiencing nature, can play a vital role in helping shape individuals' beliefs about climate change and cause them to act. In other words, the debate around climate change education and how students and teachers act in response is on a spectrum with people coming to learn about climate change through different mediums.

Indeed, for most students and teachers, climate change is taught through science courses. And although not a primary concern for this research project, the origins of climate change education and the connection to place-based learning in science education provide important context worth discussion. Climate change education in science has long advocated for and developed a robust place-based education curriculum (Hallar et al., 2011; Powers, 2004; Smith, 2002; Wilbanks, 2003). Smith (2002) described the development of place-based learning over the past two decades and its close relationship with environmental studies as a method for students to experience the science they are studying. For Smith (2002), a key component of place-based learning, which links back to Dewey, is students leveraging and observing the

phenomenon in their lived worlds as a way to learn. More recently, place-based learning within science curricula has expanded to include collaborations with local communities. This curricular method aligns with scientific disciplines doing fieldwork to understand climate change. And although the pedagogy of science place-based education affords students and teachers with opportunities to engage in real-world, hands-on knowledge construction, it is also not designed to engage teachers with how they make sense of place or with the cultural implications of climate change on the loss or damage to places, nor does it encourage teachers to take a critical stance toward the history and development of a place.

Science education has played a vital role in developing place-based learning. Smith (2002) described the development of place-based learning over the past two decades and its close relationship with environmental studies as a method for students to experience the science they are studying. For Semken and Freeman (2008), place-based science education is not only experiential but also an opportunity for students to reflect on the importance of place. For example, Semken and Freeman (2008) worked with students in Arizona to understand if a place-based science course increased students' sense of place. The researchers found a positive correlation and an increase in students' attachment to a specific place after the course. The researchers also noted that place-based education in science has traditionally been seen as a "dispassionate probe" (Semken & Freeman, 2008, p. 1044) and that studying place must take into account the deep cultural significance of place for some, especially Indigenous populations. This is important for studying climate change and the role of place in Hawai'i, where there is a large Indigenous Pacific Islander population, necessitating that educators consider multiple aspects about place and how to engage with place. More recently, place-based learning within

science curricula has expanded to include collaborations with local communities. This curricular method aligns with scientific disciplines doing fieldwork to understand climate change.

In summary, the ties that bind science education, climate change, and place-based learning are still being developed and not bound as tightly as expected. What is important for social studies education is the knowledge that much of how teachers teach climate change comes from science education and is grounded in knowledge produced by Western epistemology (Howell & Allen, 2016; Meadows & Wiesenmayer, 1999; Rebich & Gautier, 2005). An outcome of this approach in social studies education, which applies to the concept of place, is that humans are often separated from the Earth. Whereas Western epistemology produces knowledge through observation, Indigenous epistemology produces knowledge holistically and focuses on relational aspects between individual and land (Kincheloe & Steinberg, 2008). Here, Indigenous, and in the case of this review, Pacific epistemologies, add nuance to the production of climate change knowledge. This epistemology can help put Earth back in climate change discourse.

As climate change knowledge, research, and coverage continue to increase, education sectors will need to address the growing crisis. Indeed, a majority of the public supports teaching climate change within schools. Yet, teaching climate change is still a novel concept. For education scholars, place is central in teaching climate change. For Monroe et al. (2019), place made climate change relevant to students and was essential for their understanding. Similarly, Favier et al. (2021) see place-based learning as an effective method to develop a teacher's pedagogical content knowledge about climate change and the difficulties of solving a wicked (extremely complex) problem. Other scholars see place being deeply entwined with identity and as something that travels with participants (Shibata, 2022). Ultimately place matters as it

provides a connection to the vastness of climate change, can be embodied by individuals, and can engender climate action.

Place in climate change education is essential in developing people's sense of the crisis and actions they can take to mitigate or adapt to it. For example, in a large study on the role of place in learning about and taking action for climate change, Schweizer et al. (2013) noted that centering climate change discussion around places such as national parks helped individuals understand the issue better and also inspired them to take action. Furthermore, according to Brownlee, Powell, and Hallo (2013), direct personal experience is "more likely to influence perceptions than analytical processes alone" (Brownlee et al., 2013, p. 14). The researchers also note that place-based education for climate change needs additional research; its effectiveness in changing individuals' attitudes is a possible area of further research.

Another lens for looking at the role of place is through the impact of climate change on places and how this, in turn, affects people. Howell and Allen's (2019) research found that a direct connection to nature need not be present to influence individuals' concerns about climate change. Instead, individuals were more likely to care about climate change and take action when considering the impact on people, especially if the people were from developing countries or if they would suffer most from the effects of climate change. In other words, when climate change directly impacts people, individuals demonstrated an elevated level of concern for a place. In this sense, researching place in Hawai'i, which is experiencing the effects of the climate crisis and has a robust place-based education system, can inform how students' and teachers' awareness of place influence climate action.

In discussing place-based learning, scholars note that it is a multifaceted topic representing a diverse range of perspectives. For some place-based educators, place refers to the local with

place-based education emphasizing hands-on experiences that connect students to their community (Sobel, 2004). Other scholars (Ebersole & Worster, 2007) echo this sentiment and see the place as a local space defined by the community and the living and non-living entities within a space. Scholars of critical place-based education, such as Gruenewald (2003), describe place through different dimensions, which are perceptual, sociological, ideological, political, and ecological. Even with the lens for viewing place, many place-based educators underscore place as being a defined location and place-based education as a method for understanding the local.

For other scholars, place represents a living entity that is a dialogic transaction between a community and its environment (Coughlin & Kirch, 2010). In this sense, place influences the understanding of climate change, just as the inverse impacts the sense of place. This understanding of the place adds nuance and extends beyond the local. Seeing place as dialectical and in continuous dialogue, the authors define it as “not simply a defined location (e.g., GPS coordinates) where living and non-living things exist, interact and transact—and where we can ‘go’—but that place is where living things [the authors focus on people] shape and are shaped by this location (material world) in a process that makes any point in time unique” (Coughlin & Kirch, 2010, p. 914).

Hawai‘i affords a similar context where the land shapes individuals as much as individuals shape the land. Concepts such as *kuleana*, *mana*, and *mo‘okū‘auhau*, all of which are connected to the land, shape individuals’ relationship to the land (Crabbe, 2017). By including the land in their teaching, educators allow students to address an entity that influences individuals, whether consciously or not.

2.6 Indigenous Thinking and Climate Change Education

Researching sense of place in the Pacific when understanding climate change can serve as a helpful model for teachers who want to teach climate change. Central to this understanding is Indigenous knowledge. Many Pacific Island nations have a close relationship with the land and ocean that is a reflection of Indigenous epistemologies and ontologies. This relationship provides context for how climate change is understood and ultimately adapted to or mitigated. Over the past decade, Pacific Islands have received extensive media attention about the effects of climate change. In Western media, Pacific Island nations are portrayed as small, vulnerable, and sinking islands (Hofmann, 2018). Some climate change narratives portray the region and its citizens as the first climate refugees (Farbotko & Lazarus, 2012) or the canary in the coal mine (Nunn et al., 2017). Other researchers claim that Pacific Islands and the Arctic are “sentinel sites” for researching and writing about the effects of climate change (de Wit & Haines, 2022, p. 7). As such, the nuance of climate change experiences in the Pacific is often overshadowed by how the Pacific region is represented. However, representing the Pacific region as a monolith is, for Gegeo (2001), a legacy of colonialism that obscures a dynamic and resilient region that is well-connected and embodies many of the characteristics supported by global citizenship (Matapo, 2018). By opening climate change education up to Indigenous thinking, additional ways of thinking can be produced and correct the limitations of Western epistemology and the kinds of knowledge it can produce (Kincheloe & Steinberg, 2008). Therefore, understanding how teachers orient themselves toward climate change is vital for concepts like citizenship.

In researching climate change definitions in the Pacific, researchers have conceptualized Pacific Islands as sites of reception for a “globally communicated scientific narrative” (Rudiak-

Gould, 2011, pp. 9-10) that examine climate change as a traveling idea *emanating* from centers of power and traveling globally (de Wit & Haines, 2022; Hofmann, 2018; Rudiak-Gould, 2015).

Regarding questions about climate change, especially in the shadow of rising seas, Pacific Islanders are often reduced to a “stay or go” binary that frames them as rational for leaving or irrational for staying (Farbotko & McMichael, 2019). Lacking from many of these narratives are Pacific Islanders’ ancestral and current connections with the land that influence inhabitants (Hofmann, 2018).

When discussing Pacific Islands and Indigenous communities in relation to climate change, the concept of vulnerability is a contested topic. Scholars have debated the meaning of vulnerability, and although consensus remains elusive, there is agreement that different academic communities have different conceptualizations of vulnerability (Brooks, 2003; Cardona, 2013; Fuessel, 2005). One attempt to define vulnerability is by climatologist Fuessel (2005), who created a framework with six dimensions that include: system vulnerability, hazard vulnerability, valued attribute, temporal reference, scale, and disciplinary domain. The framework breaks down vulnerability as a broad concept and allows individuals to note the vulnerability of some dimensions, such as systems, or ecologies, while acknowledging that vulnerability in other dimensions may not be readily impacted.

Within the social sciences, scholars have used the term vulnerability with caution. Scholars like Farbotko and McMichael (2019) describe Pacific Islands as being vulnerable in the sense that the islands do face increasing pressure from rising sea levels, weather patterns, and food production. This, for Farbotko and McMichael, is not a question of debate. However, Farbotko and McMichael (2019) do caution that vulnerability when applied to populations can reduce agency (Farbotko & Lazarus, 2012). Once ideas of vulnerability are applied to

populations, it can solidify “externally formed ideas” (Ayeb-Karlsson et al., 2018, p. 557). Building on Ayeb-Karlsson et al.’s (2018) discursive study of vulnerability, the concept of vulnerability can allude to a primitive and less advanced society unable to adapt to changing times. Underpinning this assumption is a Western narrative of place as something static and to be filled, a commodity that can be left behind. Farbotko and McMichael (2019) and Ayeb-Karlsson et al. (2018) caution against applying the term vulnerable to human populations as it can deny agency and cause individuals to become more vulnerable than they were without the label. As such, I use the term vulnerability not as a deficit but as a term discussed by the participants in relation to themselves or the land.

Hawai‘i and other Pacific Island nations share similarities in their beliefs about the purpose of land and its connection to identity. Spencer et al. (2020) note that for many Pacific Islanders, identity is understood through place and the histories and stories chronicled throughout time and as told by the environment. For instance, an individual may recall a particular event or person through a tree, plant, or place that reflects historical significance. Over 90 percent of land in the Pacific is held communally, and as researcher John Campbell (2019) argues, “land is a critical component of Pacific Island societies and in most places, the people and their land are mutually constituted. One cannot be considered complete without the other” (p. 1). The importance of the land is not lost on inhabitants, whether Indigenous or not. In Hawai‘i, land was held communally and a system of land division developed to sustain the land. However, in the mid-1800s, land in Hawai‘i shifted from communally held to privatized. Referred to as the Great Mahele, scholar Kahihikolo (2013) sees this event as the start to a disconnection to land between Hawai‘i and Native Hawaiians. As such, Hawai‘i, like other Pacific Islands, is a place with intersecting epistemologies and histories that are both current and historical. And whereas every

place has both Indigenous and Western epistemologies, in the Pacific this intersection is more pronounced (Gegeo & Watson-Gegeo, 2001).

One example of place intersecting with different epistemologies connected to climate change is in a study conducted by Pam and Henry (2018). The scholars studied climate change narratives in the Pacific Island nation of Micronesia and found that global climate change narratives impacted local perceptions and diminished local agency. Writing about the island of Moch, Pam and Henry (2018) state:

At the local level, climate change discourse has the potential to stifle agency and inhibit people's ability to draw on established local knowledge and practices in response to climatic events. Not only does the discourse of climate change promote uncertainty as it attempts to predict a future for low lying islands, but also the meaning of 'risk' loses its agential possibility. Within the discourse, 'risk' becomes a future orientated 'uncertain danger' and as such, contributes to a sense of instability and helplessness that leads people astray from those modes of sociality and practices effective in an everyday engagement with a changing environment. (p. 42)

This study provides insight into local and global narratives and the effect of a global, and uncertain, risk of climate change. Yet in the context of this research project, climate change education started locally with place and built toward the global. In doing this, local epistemologies and ways of understanding the world were centered, which ultimately provided individuals with a sense of agency.

Additionally, according to anthropologist Susan Falgout (1992), in Western epistemological traditions, it is up to the new knowledge holder to decide how the knowledge is used and for what purpose. In areas of the Pacific such as Micronesia, knowledge represents the

“life force of the human body” (Falgout, 1992, p. 36). Knowledge is embodied within individuals, for example, traditional navigators, who are responsible for safeguarding the knowledge and applying it for the betterment of the community. Gegeo and Watson-Gegeo (2000) describe a similar epistemological approach in the Solomon Islands, where there is no detachment from knower and known, thus making knowledge subjective and fluid. In contrast, Western epistemology emphasizes the dissemination of knowledge based on objectivity. This knowledge can be questioned in Western countries, but in the Pacific region, knowledge is closely connected to the person or clan, so questioning knowledge also challenges a person.

That is not to say this dissertation is about epistemology. Instead, I suggest that the land, which influences epistemology and knowledge of a given place, has an effect on the inhabitants whether they are Indigenous or not. This influence and understanding provide important insights into the role of place. As such it is important to acknowledge Indigenous knowledge systems and flows of knowledge systems. In the case of this study, Hawaiian epistemology is considered and explained in the following section, not only for context within the study, but as a means to explain how knowledge is intertwined and disseminated in a place and how it affects participants’ thinking.

When Indigenous epistemology underscores climate change education, educators recognize themselves in a complex world shaped with and by the land. The ability to stretch one’s knowledge adds to Western epistemological traditions and education. MacFarlane et al. (2005) describe Maori traditions of education that position learning as

...an active process involving ongoing self-reflection, skill development, and adaptation, and engaged in by students and teachers alike, at both individual and systems levels.

Students, teachers, parents, and community need to be able to engage effectively in the life of the school so that the whole community can benefit. (p. 108)

As with other Pacific communities and cultures, the community creates knowledge, but its validity depends on how it benefits the community, not solely the individual. This supports Indigenous scholar Marie Battiste's (2002) claim that Indigenous epistemology "benchmarks the limitations of Euro-centric theory—its methodology, evidence, and conclusions—conceptualizes the resilience and self-reliance of Indigenous peoples, and underscores the importance of their philosophies, heritages, and educational processes" (p. 5). In this sense, Indigenous epistemologies, especially within areas most affected by climate change, e.g., Pacific Islands, provide an opportunity to add to a collective understanding of climate change and climate change education that allows educators to not only "gain the cognitive power of empathy" (Kinchloe & Steinberg, 2008, p. 143), but also analyze climate change education from multiple vantage points such as place.

2.7 Chapter Conclusion

After reviewing the literature on climate change education, there are several conclusions. First, place and place attachment are pivotal in helping individuals feel connected to an issue like climate change (Schweizer et al., 2012) Second, climate change education is a new subject in social studies that is still being conceptualized (Meehan et al., 2018). There are few organized curricula that focus on climate change. In addition, most climate change curricula focus on individual effects (Meehan et al., 2018) and actions that can be taken. Finally, Indigenous thinking about climate change provides a different epistemological standpoint that considers the roles of the individual and community, in relationship with the land. Taken together the literature suggests that there is a gap in what is being presenting in climate change education and how

societies in a global community view climate change. Including different perspectives in climate change education, and in the case of this dissertation, Indigenous perspectives, provides a more global sense of the climate crisis. Overall, by incorporating different knowledge, both Western and Indigenous, and by providing students and teachers with knowledge about how to know and understand place, new learning opportunities and orientations open up, which offer new insights into climate change education.

Chapter 3: Methodology

This dissertation used qualitative methods and narrative inquiry to investigate how educators account for land when teaching climate change. In this chapter, I will describe methods used for data collection. First, I explain narrative inquiry and how I used it for this study. Then, I explain how I used visual methods and their importance for understanding place. I then describe participant recruitment, how interviews unfolded, and how place-based interviews shaped the research. Next, I describe the participants and their respective places. I include several maps to help visualize the places. The participants and their significant places are described together, allowing readers to gain a better sense of the participants and places they consider important. Moreover, as land is a significant theme of this research study, the places described deserve a description, even if it is brief. Lastly, the chapter discusses data analysis and my method for analyzing both visual and textual data.

This dissertation used qualitative methods such as interviews, concept mapping and visual methodology to understand the role of place. The intention of these qualitative methods were to bring out the rich layers of the land. For example, concept mapping and visual methodology provided insight into participants' thinking about land that I put into conversation with other methods. These methods added nuance and demonstrated, for participants, a deep understanding of place. In addition, the visual methods also demonstrated that land is not static and that there is a continual negotiation with participants and the land. As one participant, Abigail, made clear, the value of land to her was more than the environment. Instead, land was embedded with names, history, and stories. Using photos, stories, and concept maps allowed participants to articulate complex concepts that took years to develop. By having participants select a place and select

photos, they were the primary determinants of the meaning of place. I had the privilege of listening.

By using qualitative research, I sought to make the world visible and accessible by providing an understanding of phenomena or individuals, and their interaction with the land. Of course, qualitative research also necessitates important considerations on the researcher's part. One area of consideration is representation.

Researching the role and importance of place in Hawai‘i requires a high degree of reflexivity on the researcher’s part. As a white male of European descent doing research on land that experienced the trauma of colonization, I am deeply aware and reflective of my positionality. Yet throughout my research, I found connection with my participants through my identity as an active teacher who speaks a Pacific Island language, who lived on a Pacific Island atoll, and who cares deeply about the preservation of land.

When considering the methodology for this research project, I considered the place where I would research and the questions I would ask. Hawai‘i, as an Indigenous place and as a formerly sovereign kingdom, required that I take special consideration into my research practices and, most importantly, how I represent participants, some of whom I anticipated being Native Hawaiian. Furthermore, using narrative inquiry allowed the participants to speak, to take the lead, and for me to follow as they told me how they accounted for the place.

Indigenous methodologies aided me in developing my sensibilities as a researcher. They also helped me forge relationships and let participants tell their stories. As a source of reciprocity, I offered to exchange teaching materials, such as curricular resources, with my participants to help them in their teaching profession.

I attempted to analyze the data holistically with different data being put into conversation (see Appendix D) and as part of a larger whole instead of understanding the data independently. I practiced being a keen observer and not discounting information that might fall out of Western epistemological assumptions of knowledge. In analyzing the data, I drew from Martin and Mirra-Boopa's (2003) discussion on doing Indigenous research and considering different Indigenous Ways of Knowing, Being, and Doing as a guiding force for seeing how participants developed a sense of place and accounted for place when teaching climate change.

3.1 Narrative Inquiry

When approaching qualitative research, different methods allow the researcher to understand the complexities of a question or phenomenon in a natural environment (Creswell & Poth, 2016). In this sense, qualitative research allows the researcher to locate “the observer in the world” (Denzin & Lincoln, 2000). This guidance, coupled with the desire for participants to tell their stories, led me to narrative inquiry. As Clandinin and Connelly (2000) contend, an important element of narrative inquiry is experience. Referencing Dewey, the scholars above note that experience comprises three criteria: interaction, continuity, and situation. Each term deserves a brief explanation. Interaction refers to how individuals interact within their world. The personal and social are always present as “people are individuals and need to be understood as such, but they cannot only be understood as individuals” (Clandinin & Connelly, 2000, p. 2). In this case, individuals are in constant relation with their lived experience. For this study, I considered participants' interaction with the land. Another element is continuity. In a Deweyan sense, knowledge of the world is built on continuity, which Clandinin and Connelly (2000) describe as experiences growing out of experiences (p. 3). Last is situation and the idea that experience is situated in place and time. In sum, for Clandinin and Connelly (2000), the use of

experience creates a three-dimensional space that aligns with narrative research. Being situated in a place changes how one thinks about place, not as an abstract entity in the distance but as an entity that envelops you and surrounds an individual in their sensory experience. In the context of Hawai‘i, this could be feeling the wind at your back or the sun on your face; it could also be deeper sensory experiences such as seeing a shadow for which a valley is named or observing an artificial water channel that diverts water and prevents flooding, but which has also dried up a historical watershed.

Ultimately, narrative research allowed the research to move into different dimensions (Clandinin & Connelly, 2000). Stories and experiences caused me to travel inwardly and be introspective and to consider how individuals were situated within the land. This necessitated traveling outward and listening to the participant’s story. For instance, this research project asked participants how they account for place when teaching climate change. To understand this question, participants not only discussed their experiences with land and place but also thought of place in a situated setting, that is, a place that was significant to them. In considering narrative inquiry as a space of three dimensions built on a foundation of experience, this research project sought to tell the story of individuals situated in place. In sum, narrative inquiry, its flexibility, and its ability to allow participants to tell stories of their experiences is a methodology that also affords opportunities to learn and listen from the land. And who is to say that the land doesn’t speak as well?

Narrative inquiry benefits this research project for several reasons. For one, the use of storytelling and narrative aligns with my research question that seeks to understand how individuals account for place. Furthermore, researchers describe narrative inquiry as a practice of telling stories (Clandinin & Rosiek, 2007). Also, narrative inquiry is a methodology that helps to

understand how individuals experience their world. Clandinin and Rosiek (2007) paraphrase Dewey (2013) by stating, “experience is the fundamental ontological category from which all inquiry-narrative or otherwise-proceeds” (p. 38). The researchers also note that narrative inquiry is “a changing stream characterized by continuous interaction of human thought with our personal, social and material environment” (Clandinin & Rosiek, 2007, p. 39).

In Hawaiian, narrative translates as *mo'olelo*. Broken down *mo'o*, or succession, and *'olelo*, or speak, or to speak in succession. As Hawaiian scholar Benham (Benham, 2007, as cited in Clandinin & Rosiek) points out, narrative inquiry “should not be seen as an end in itself but must engage scholars in an ongoing discussion to ensure there is no one-size-fits-all solution but a broader, more dynamic position of possibilities that encourages diverse representation and voice” (p. 519). Furthermore, narrative inquiry conducted in a space connected to the Hawaiian epistemological and ontological worldviews must consider the worldviews. In this sense, doing narrative inquiry required an awareness that narrative, and storytelling in general in the Pacific, are connected with genealogy and the land. Indeed, in Hawaiian genealogy, or *mo'okū'auhau*, the stem *mo'o* refers to the concept of succession. When using narrative inquiry in this context, one accounts for the past, present, and future.

Narrative inquiry, however, is more than stories alone. It is a methodology that requires understanding oneself and one's epistemologies and ontologies. Indigenous and Native Hawaiian scholar Benham's (Clandinin & Rosiek, 2007) writing on narrative inquiry asks researchers conducting narrative research to consider the following questions about doing narrative research: “What is the Indigenous perspective; is this work mythmaking or advocacy or inquiry; how does one explore, interrogate, and retain the sacred of indigenous knowledge?” (Benham, 2007, p. 518).

Benham's questions are pertinent to this research project. Although the primary concern of this project is exploring how teachers account for place, the questions above about Hawaiians' culture and connections to the land require careful consideration and reflection about my role as a researcher and the information I am gathering for this project. These questions provided guidance when thinking and writing about data.

In addition to my concerns about representation, I also needed to address what to include and leave out of my dissertation. In deciding to write vignettes, I understood that my stories would inevitably exclude some information. I also understood that, as Clandinin and Rosiek (2007) point out, "any attempt to organize...divergent views into a summary representation inevitably risks shortchanging one view in favor of the priorities of another" (p. 3). In this sense, I reflected on my biases and intellectual leanings and tried to let the participants speak for themselves through the data. In the vignettes, I let the participants share as much as possible and have their responses shape the narrative.

Finally, I considered my own story and how it influenced the use of narrative inquiry. As a Peace Corps Volunteer in Micronesia and as someone who continues to work with the Micronesian community and who speaks an Indigenous language, I developed an awareness of the importance of storytelling from Micronesian community members. In Micronesia, there is no inherent protocol for storytelling, but the storyteller will frequently connect the individuals in the story to a larger genealogical web. This web might tie individuals to a family, an island, or a clan. It is not surprising that my previous experience with storytelling drew me to a qualitative practice that emphasizes the ability to tell stories.

3.2 Recruitment

As someone who has lived, traveled, and worked in the Pacific region for over a decade, and has numerous family members in Hawai‘i I was familiar with the educational context of Hawai‘i and its emphasis on place-based learning. I was also aware that the Pacific region and many Pacific Island nations are facing an existential crisis from climate change, and even though different islands will be affected differently, there will still be immense pressure and intensification to adapt. Whereas some smaller islands may be able to sustain themselves (such is the case in Micronesia), other islands, such as Hawai‘i, may struggle to sustain such a large population should the effects of climate change (especially increased heat) put pressure on food systems.

In Hawai‘i, the concept of sustainability is well developed and served as my initial starting point, as sustainability and climate change are closely linked. Several schools have sustainability programs, and it is through contacting these schools that I was introduced to educators who teach climate change. When I connected with several educators, including the sustainability program director, I used snowball sampling to continue connecting with educators. Initially, I intended to recruit six participants as this is an appropriate number of participants when using narrative inquiry. But I also realized that not all stories are equal. The diversity of teachers I was working with presented a broad range of storytelling abilities connected to Hawai‘i, as some participants were new to the islands. I rarely turned individuals away as I continued to make outreach. For instance, I had several ELA teachers contact me and offer to participate. Considering the proximity of ELA and Social Studies, and the teachers’ unique background history as well as their knowledge of Hawai‘i and place-based learning, I believe that their insights could be of value for teachers, both in general and within social studies.

3.3 Participants and Places

The selection of Hawai‘i as a place of research is important for this study for several reasons. For one, Hawai‘i as an ecosystem is unique and also vulnerable to climate change. The Hawaiian Islands contain over twenty different ecological environments in only a few degrees of latitude (Goh III, 2012). In addition, the Hawai‘i Department of Education initiated a place-based education system connected to Indigenous thinking (see Hawai‘i Department of Education HA Initiative, 2017). Finally, Hawai‘i, a Pacific Island, is vulnerable to climate change, both externally from sea-level rise and internally from invasive species inhabiting new ecosystems.

In addition, Hawai‘i represents an intersection for how the environment has shaped individuals as much as individuals have shaped the environment. In Hawai‘i, the role of Native Hawaiian culture is integrated into place-based education.

Participant	Identity	School and teaching context	Significant place/walking site
Margaret	Chilean; Transplant	West Side Sustainability; Eighth grade ELA teacher at a charter school dedicated to sustainability.	Pālolo Valley
Nathan	Hawaiian	West Side Sustainability. Eighth grade Social Studies	Wawamalu (Sandy’s Beach)
Megan	Hawaiian	Big Island High School. High school Social Studies teacher at a large public high school on Hawai‘i.	Hilo Bay
Yuki	Local	Pacific Islands Prep. High school ELA teacher at large independent K-12 school.	Manoa Valley
Abigail	Hawaiian	Makiki Progressive Elementary. School librarian, 6 th grade media literacy teacher.	Makiki Valley
Emma	Local	East Side Elementary. 4 th grade teacher.	He‘eia
Daniel	Transplant	Manoa Prep High School. Social Studies teacher at large independent K-12 school.	Pālolo Valley
Sophie	American, Transplant	Pacific Monarchs High School. High School Social Studies Teacher at a large independent school in Oahu.	Ala Wai Canal

Table 2: Participants, Their School Setting, and Their Significant Place

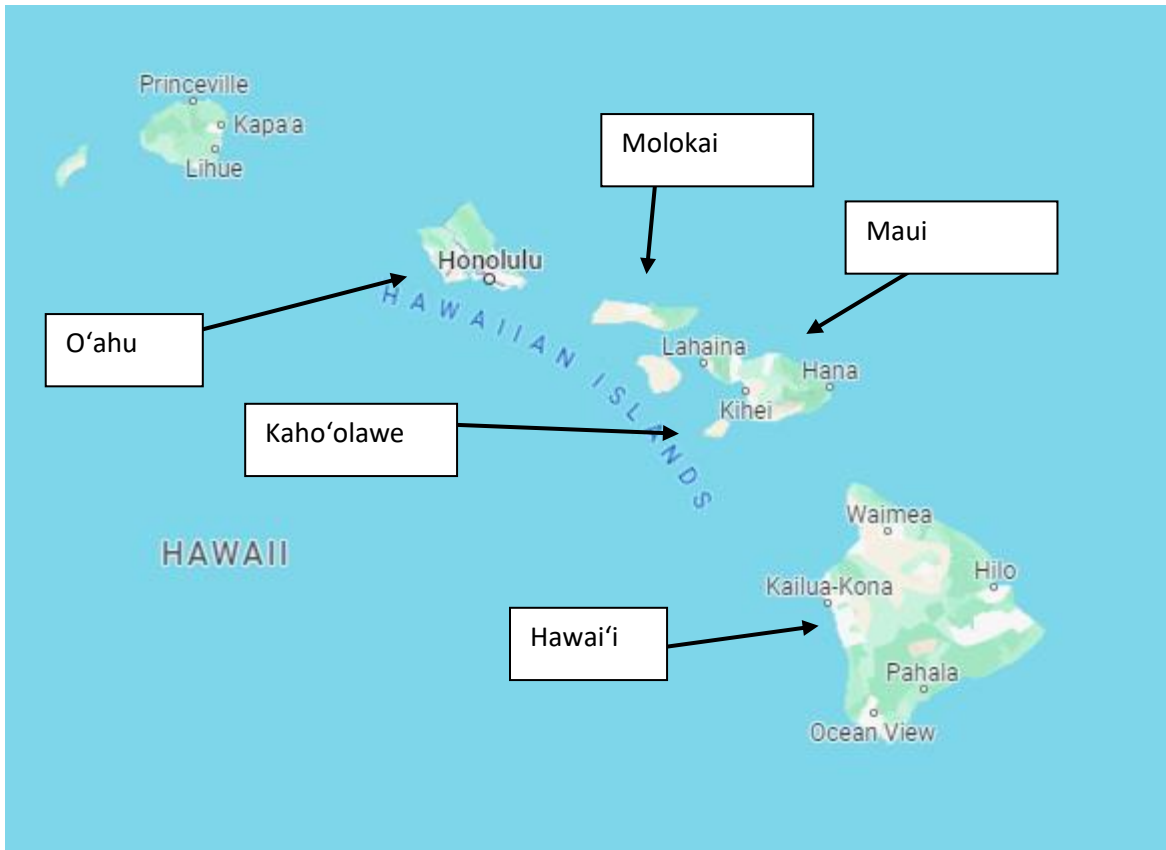


Figure 2: Hawaiian Islands referenced by participants. Source: Google Maps

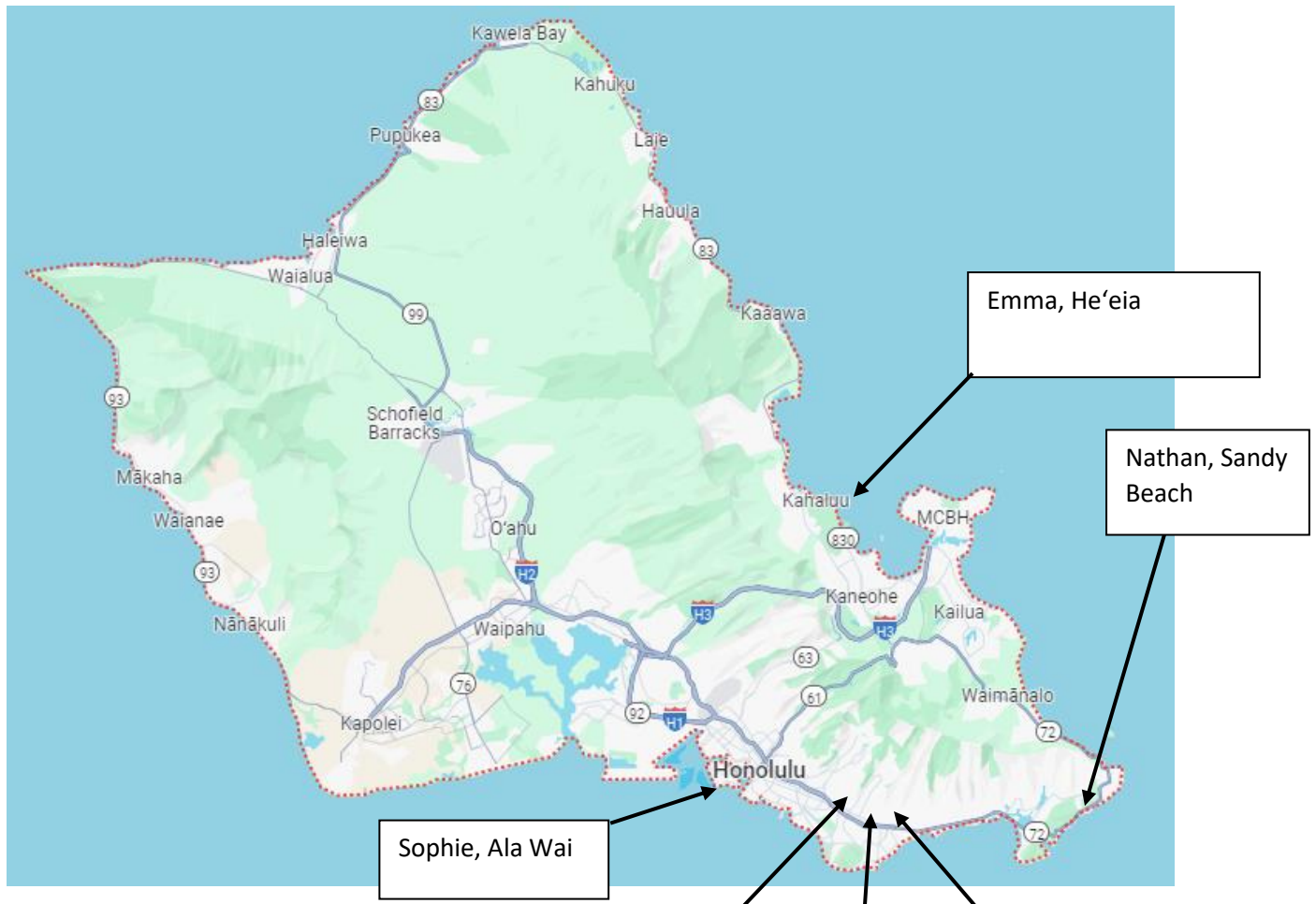


Figure 3: Map of O'ahu. Source: Google Maps.

Abigail, Makiki Valley

Yuki, Manoa Valley

Margaret, and Daniel, Palolo Valley

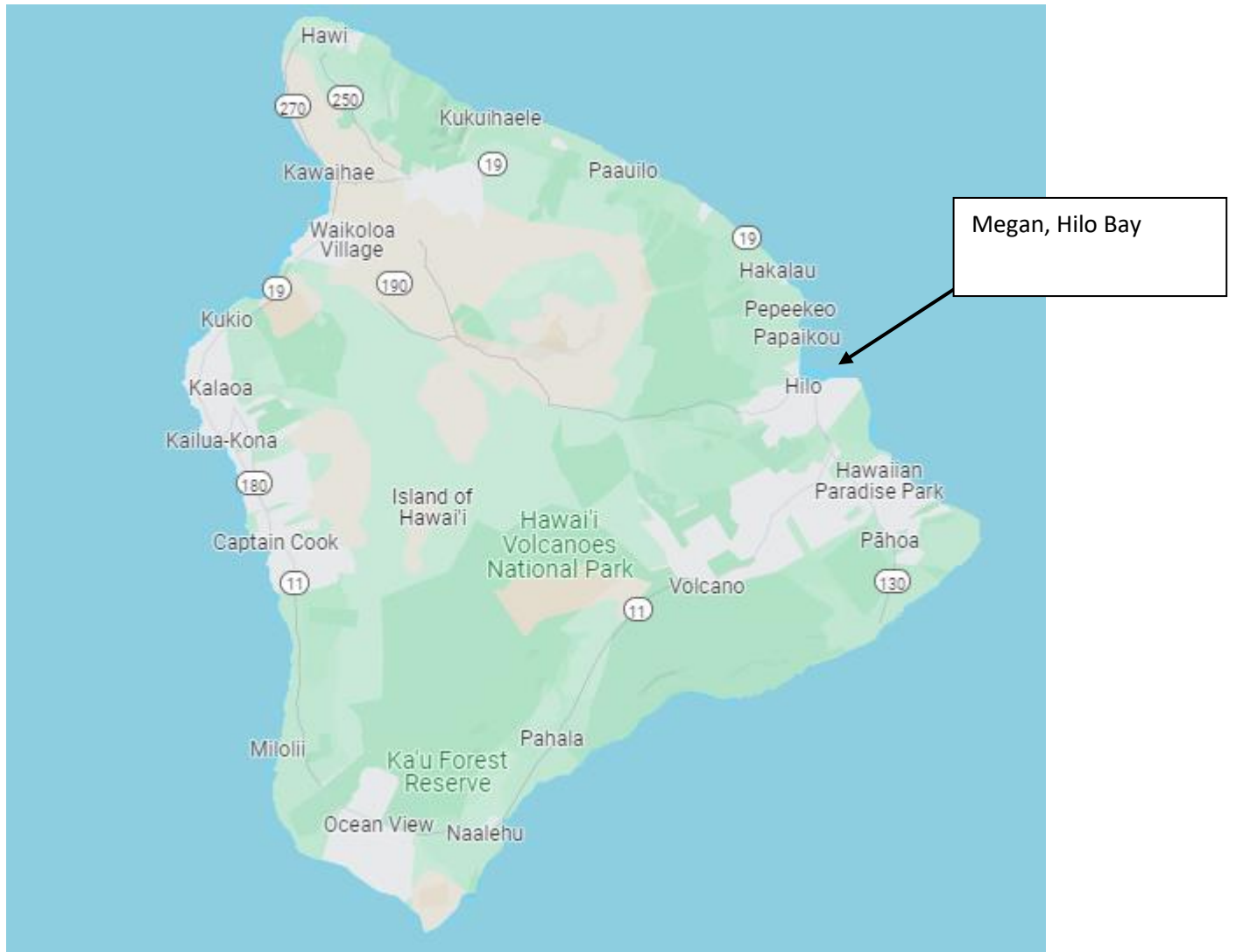


Figure 4: Hawai'i Island. Source Google Maps.

The participants in this study represented a wide range of educational experiences and knowledge. In selecting participants, I relied on purposeful and snowball sampling methods (Bogdan & Biklen, 2007). Using purposeful sampling, I contacted participants and introduced myself and my research study. I ensured that the participants discussed climate change with their students. As noted in the literature review, climate change education is relatively new and rarely afforded a permanent place in the curriculum, and if so, it might only be for a lesson.

In some cases, especially in schools dedicated to sustainability, discussions about climate change occurred at all levels of instruction, both within classes and through long-term projects. At other schools, educators taught climate change through media literacy or the context of the United Nations Sustainable Development Goals. For all participants, there was an element of teaching climate change through a social studies lens, even though their direct discipline was not social studies. Furthermore, the methods (e.g., place-based) and content (e.g., sustainable development) used to teach climate change are part of the broader concept of social studies and can be useful to social studies teachers.

When describing the participants below, I also describe the land they selected as significant. In writing about the land, I intend to provide a short summary of its identity as it played an important role in shaping the individual.

3.3.1 Margaret and Pālolo Valley

Margaret is an eighth grade ELA teacher at West Side Sustainability Middle School. Her school is dedicated to discussing issues of sustainability. Margaret has been teaching for over ten years and infuses concepts of justice, sustainability, social studies, and place-based education into her curriculum. Margaret grew up in Chile and the United States. She lives in the Pālolo Valley, which is on the east side of O‘ahu and close to Waikiki Beach and Diamondhead.

Margaret’s significant place is the Pālolo Valley. This valley is about four miles east and north of Honolulu and is located within the Waikiki *ahupua‘a*. Pālolo in Hawaiian means clay and refers to the red clay found throughout the valley. The valley extends toward Waikiki, and the extinct volcano Ka’au is situated in the back of the valley. The soil is not ideal for building and is subject, especially in the back of the valley, to mudslides, something that may increase in frequency with inconsistent weather patterns caused by climate change.

3.3.2 Nathan and Wawamalu (Sandy Beach)

Nathan teaches middle school social studies at West Side Sustainability Middle School. Nathan grew up in O‘ahu and is Native Hawaiian. Nathan is in his second year of teaching.

Nathan’s significant place is Sandy Beach. The beach is famous, and infamous, for its surfing and intense shore breaks, which has also led to many injuries. The Hawaiian place name for this area is *Wawamalu*, which translates to shady valley. The beach park is well liked by locals despite the dangerous undertow.

3.3.3 Megan and Hilo Bay

Megan is a social studies teacher at Big Island High School in Hilo, Hawai‘i. She teaches a course on Pacific Island history that discusses climate change.

Hilo Bay sits on the eastern side of the Big Island, with the town of Hilo buttressing the bay. The Hawaiian village originally in present-day Hilo was Waiakea, which means broad waters, and was the traditional name of Hilo Bay. The bay is expansive and includes a breakwater running through the center. The bay, which is one of the rainiest in the world, is an integral part of life in eastern Hawai‘i and Hilo in particular. During the day, individuals enjoy the bay, whether by swimming, canoeing, or fishing. It is an important space for the community.

3.3.4 Yuki and Manoa Valley

Yuki is a high school ELA teacher at Pacific Island Prep. Yuki is third-generation Japanese who was born in Hawai‘i and grew-up in various parts of O‘ahu. She later attended school on the west coast where she earned her Ph.D. Yuki teaches climate change at a large private high school on O‘ahu. A significant place for Yuki is the Manoa Valley.

The Manoa Valley is a storied place with a deep and rich history. The valley is known for its near daily rainfall and its cool temperatures as it faces the trade winds. There are different

rains of Manoa, each with a particular name. Within the valley is the Kūka‘ō‘ō Heiau, a sacred temple, also known as a *heiau*, that is connected to Kūali‘i, an ancient chief of O‘ahu (Manoa Heritage Center, 2023).

3.3.5 Abigail and Makiki Valley

Abigail is a librarian at a Makiki Progressive Elementary School in the Makiki Valley. She is also Native Hawaiian and from the same valley where she teaches.

The Makiki Valley lies west of Honolulu and Waikiki. Historically the valley was used for farming and agriculture. The valley extends several miles inland and is heavily forested with a towering canopy.

3.3.6 Emma and He‘eia

Emma is an elementary school teacher at East Side Elementary, a Title 1 school on the east side of O‘ahu. She currently teaches fourth grade. Many of her students are English Language Learners and immigrants from Micronesia. Emma is a lifelong resident of O‘ahu and has American and Japanese ancestry.

Emma’s place of significant is He‘eia on the east side of O‘ahu. The word he‘eia means washed away and alludes to a tsunami that washed away invaders from a neighboring island.

3.3.7 Daniel and Pālolo Valley

Daniel is a high school social studies teacher at Manoa Prep High School, a large private school located in the Manoa Valley. He teaches about climate change in the school’s introductory course about social sciences. Daniel was born and raised in New Jersey but has lived in Hawai‘i for the past forty years. He is fluent in Hawaiian and also teaches a Hawaiian hula class. At his school, Daniel teaches Hawaiian history and language as well as social studies courses including an introduction to social sciences and global history.

A place that is significant to Daniel is the Pālolo Valley. The significance of this valley is that it includes the neighborhood of Kaimuki and Diamondhead, two places of importance for Daniel.

3.3.8 Sophie and Ala Wai Canal

Sophie is a high school social studies teacher at Pacific Monarchs High School, a large private school in O‘ahu. She is originally from the east coast of the United States but has lived in Hawai‘i for over five years. She teaches climate change and sustainability in her global politics class and her Hawaiian sustainability class.

Sophie’s significant site is the Ala Wai canal. This canal is an artificial waterway in Honolulu that also serves as a northern boundary for the Waikiki tourist district. The canal’s history is complex. Historically the canal was a marshland that served as a watershed and drainage basin for the Ko‘olau Mountain Range. The area occupied roughly 2,000 acres. Early Hawaiians used the site for gardens, taro fields, and fishponds. Part of this land was owned by Queen Lili‘uokalani, Hawai‘i’s last reigning monarch. In 1927, business tycoon Walter Dillingham drained the area in order to reclaim it for what is today the tourist district of Waikiki. Today, the two-mile canal is cited for being heavily polluted and not safe for swimming.

3.4 School and Content Discipline Background

The participants in the study come from a diverse array of schools and disciplinary backgrounds. They also represent various grades, ranging from elementary to high school. The following section describes the school background and explains my choice to include teachers who are not social studies teachers.

For example, Margaret teaches middle school ELA at a school dedicated to teaching about issues of sustainability. Margaret spoke about teaching climate change through civic decision

making and helping students reflect on the history of place, its people, its fauna, and its flora. When talking about climate change, Margaret also spoke about teaching it through a lens of sustainability and understanding that civic decisions need to consider multiple viewpoints. Margaret's teaching philosophy aligns with the goals and principles of social studies education. Another example is Yuki, who discussed climate change through a different lens. For Yuki, climate change starts with stories and the importance of understanding place. When students came to understand the importance of place, they could then understand the threat of climate change as well as empathize with others on a global scale. Yuki's starting place for teaching about place was Hawaiian history, specifically origin stories that tied Hawaiians to the land. For example, in her interview Yuki discussed talking about the origin story of taro and how it is connected to the birth of Hawaiian peoples. This example is important to consider as it elevates the fact that I was researching in an Indigenous place with different epistemological and ontological underpinnings. It also causes a point of reflection when one considers that social studies is a Western construct, which could potentially undermine the spirit of the research. Lastly, Abigail was a teacher who personifies the possibility of teaching through a social studies lens in a different discipline. As a librarian, Abigail teaches a course on critical media literacy. Using material developed by SHEG (Stanford History Education Group) for example, Abigail emphasizes teaching her sixth grade students to read the media critically and to consider issues of social justice, two topics arguably within the realm of social studies education. It is also important to note that Abigail, who is Native Hawaiian, also teaches at a small independent school that is grounded in Dewey's model of progressive education and where experience, place, and what Abigail referred to as "collateral education" (that is, learning about a topic from more than one discipline, or independent of other factors) were key instructional values. As such,

Abigail is infusing social studies thinking in her class, and so I felt her expertise was valuable for this study.

Manoa Prep is a large independent school in the Manoa Valley. It serves students from grades K-12. It has an enrollment of over 3,000 students. The School for Inquiry about Sustainability is a middle school specifically dedicated to teaching about sustainability issues. At the end of each semester, students present a research project on a sustainability-related topic. Teachers at the school have stated that climate change is a continuous topic of discussion, especially since it is connected to issues of sustainability. Honolulu Prep is a large independent co-educational school close to Waikiki. East Side Elementary is a K-5 school located in the Pālolo Valley. The school's student demographic is mostly recent immigrants from other Pacific Islands, primarily Micronesia. Big Island High School is a large public high school on the east side of the Big Island. The school has a diverse student population from many Pacific Island nations, including Samoa, Micronesia, and Guam. Finally, Pacific Island Prep is a large independent school in Manoa Valley. It has a student population of over 1,000. In summary, although it is important to note the schools where each teacher works, the school itself and the school community are not the focus of this research project. Conversely, the diversity of schools represented in this study does highlight that climate change is no longer an abstraction and that teachers are thinking about how it will affect place and how they can incorporate it into their curricula.

The participants represent a variety of grade levels. Some participants teach elementary school, while others teach middle or high school. By including a variety of grades, this study provides educators with a broad representation of climate change education in schools. Thus, the elementary teacher who distills the essence of how to teach climate change provides important

insight for high school teachers who might be wondering where to begin or what information to cover.

3.5 Bricolage

The methods used in this dissertation gather data from diverse sources and seek to incorporate multiple perspectives. In order to tell a story that centers relationships with land, different research methods are needed. This study, although qualitative in its methods, sought to use different sources of information to understand how participants form a relationship to land and how this influences how they teach climate change. Below I briefly describe the concept of bricolage research and its application to this study.

Bricolage, in its simplest form, stems from the French *bricoleur*, or a handy person who uses the tools available to them. Denzin and Lincoln (1998) add complexity to bricolage by stating the approach “uses the aesthetic and material tools of his or her craft, developing whatever strategies, methods, and empirical materials are at hand” (p. 4). Other scholars, such as Kaomea (2016) use bricolage in a Hawaiian context to tell stories that go beyond the gaze of Western research and draw “upon a variety of methodological, epistemological, and cultural traditions” that “make previously repressed features of the social world visible and seek to challenge the hegemonic status quo” (p. 100).

3.6 Data Collection

For this dissertation I gathered data from six sources: (1) semi-structured interviews; (2) mental maps about climate change; (3) photo-elicitation interviews; (4) participants’ photographs; (5) place-based interviews; and (6) concept maps at the end of the data collection. Below I describe the data in the sequence that it was obtained. For each data source, I also include a visual representation to help illustrate the data.

3.6.1 Semi-structured Interviews

This research project used semi-structured interviews in the data collection process for several reasons. First, the semi-structured interview allowed my participants to discuss what they felt was important to them and to be an equal participant in the research process. This aligns with Kovach's (2021) contention that when using indigenous methodologies, the interview, or data collection, must be reciprocal. And although I did not have sufficient time to implement and use indigenous methodologies as they are intended, I did use methods that allowed the participants to lead. Part of the initial interview was getting to know the participant. I asked participants about their background, how they thought of themselves as teachers, and how they talked about climate change, both generally and with students. The openness of the interviews allowed for the participants to talk about a broad range of topics. Within the interview I asked participants to conceptualize how they teach climate change by drawing a concept map. This process allowed the participant to visualize their thinking process.

3.6.2 Mental Maps

As part of the initial interview, I asked participants to sketch a mental map of how they conceptualize climate change education. Brennan-Horley (2010) describes mental maps as a “physical manifestation of a person’s cognitive map” (p. 252). Similarly Kitchin (1994) describes cognitive maps as a process that combines spatial and environmental elements with the spatial element referring to relations of ideas and the environmental referring to awareness and beliefs about one’s environment. Participants had the opportunity to visualize their thinking and talk through what climate change meant to them. This initial sketch provided opportunities for extending a conversation and, at the end of the research process, for reflection on their thoughts about climate change and place. The sketch was just that, a sketch, and therefore participants had

roughly ten minutes, and as they created their map they were asked to talk about their thinking process.

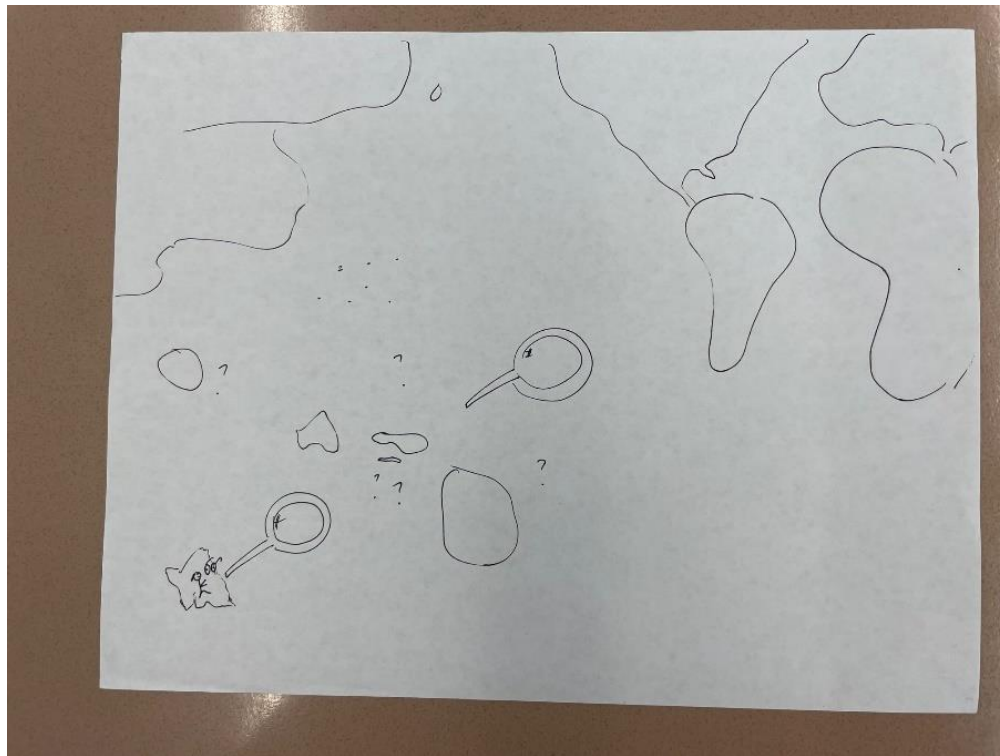


Figure 5: Margaret's Mental Map

3.6.3 Photo-elicitation Interviews

The second interview focused on the images participants selected to represent place. This interview focused on questions specific to the images. The interview process was designed to allow the participants the opportunity to explain the photos they selected and how it helped them think about place and how they might use the images, or the knowledge represented in the images, to teach about climate change. Participants were asked to select six to ten photographs that represented place to them. Most of the participants selected photos they took personally although some participants did include photographs taken from the internet.

I chose photo-elicitation as a method of data collection as it is an effective measure to explore sense of place (Briggs et al., 2014). In the case of this dissertation, photo-elicitation that allows participants to select the photos that best represent place to them has two benefits. The first is that having participants choose their photos allows time for reflection (Stedman et al., 2013). To provide sufficient time for reflection, participants had on average a week or longer to select photos that best represented place to them. The second benefit is that by allowing participants to select the images, they were able to narrate sense of place as they understand it and not through pre-selected images. Co-construction of narratives, or in this example, participants' construction of place, aligns with Indigenous methods that center Indigenous perspectives.

Moreover, photo-elicitation is a method that when paired with discussion provides a tool to explore sense of place (Briggs et al., 2014). It not only provides a glimpse into the cognitive mindset of participants but also allows participants to “feel a sense of comfort, investment, and control regarding the research, as the use of their own pictures is an engaging and empowering approach to the interview compared to a standard question-and-answer process” (Briggs et al., 2014, p. 159). As such, photo-elicitation adds to the dimensional aspects of narrative inquiry and provides participants with the opportunity to better account for their sense of place.

In using photo-elicitation, I asked participants to organize their photos from most significant to least significant representations of place. I wanted to allow participants to control the narrative. I allowed some participants to group their photos in such a way that three photos might be lined up vertically, which signified that all three photos were of equal importance. After participants finished arranging their photos, I asked participants to discuss the photos and why and how they came to choose their most significant image.

Photo-elicitation was an important element of understanding place as photos can evoke and bring forth many different layers of meaning (Rose, 2022). The participants were asked to arrange their photos in a hierarchy of most significant in explaining place to least significant. The arrangement of images created a collage, which Rose notes can “give interesting insights” (Rose, 2022, p. 339). Mannay (2015) also extols the use of visual methods, such as collage, as it can surface different insights. She writes:

Visual techniques...illustrate the ways in which enabling a visual element in qualitative research can potentially open up new understandings for both the researcher and researched; presenting a range of concrete empirical examples, which demonstrate how photographs, maps, drawings and collages can render the familiar setting more perceptible. (p. 6)

This suggests that placing images in conversation with each other, instead of in isolation, can lead to new understandings as patterns or juxtapositions open up new understandings. In the context of this study, creating a collage for participants, but also for myself as a method of data analysis, helped me visual participants’ relationship with land.

Moreover, using visual methods for this research study also afforded participants the opportunity to define land through their images and stories. This is an important consideration as “the importance of voice, whose story is being told and for whose benefit, looms large” (Walmsley & Johnson, 2003, p. 41). In using visual methods, I invited participants to co-construct knowledge of place and ultimately take the lead.

As participants arranged their photos, I asked them to discuss how they created their hierarchy. When participants finished, I asked them open-ended questions to help explain their collage and how it might relate to teaching. Questions such as “how might these images help you

teach climate change?” or “how might you use these photos in your classroom?” allowed participants additional opportunities to speak to their images.

For the purpose of understanding place, especially in Hawai‘i, with its connection to Indigeneity, photo-elicitation afforded participants an opportunity to shape the story being told. Through the use of photos, participants were able to shape the narrative of place and what it meant to them. In more than a few cases, participants choose places connected with the environment, but other participants included images of friends or family, suggesting that place is less static than presumed and that one can carry place even if the physical mountains remain. Some participants chose places that were environmentally and deeply attached to other humans, whether it be family or friends. Some of these environmental places included places where individuals learned valuable life lessons or where they had grown up as a child.

Letting participants choose their photos was used for several reasons. One reason is that place is a multifaceted term (see Tuck & McKenzie, 2014) and having a range of images selected by the participants would allow for patterns to emerge in the photos shared by the participants. By asking participants to assemble and then organize photos it allowed me to better understand their thinking. This aligns and supports a primary goal of the dissertation, which is trying to understand how teachers account for place when teaching climate change. An additional reason for allowing participants to choose their images is that it affords them the opportunity to narrate and construct a narrative about place that centers them as the storyteller. In several cases participants chose pictures that have a deep connection not only to a particular place, but also to family, or ancestral heritage.

Using photo-elicitation as part of the interview process allowed participants to provide different stories and experiences that the interview alone could not provide. Epstein et al. (2006)

content that “using photographs and playing with content (what is in the photo) and process (how photos were presented), researchers can probe participants to discuss social relationships” (p. 2). For this study, using photos provided participants with agency to decide what was a representation of place.

Another reason for using photo elicitation in the form of a collage is that the photos provided a window into how place is connected and entwined with one’s identity (Harper, 2002). This is an important consideration when thinking about climate change and its effect on individuals. Research suggests that the loss of land, territory, or place can have a negative effect on an individual's identity, especially in Pacific Island communities where land is an important source of cultural identity (Li & Shein, 2022). This idea holds true for other places as well with individuals who do not identify as indigenous. For example, Schweizer et al. (2013) note that visitors to national parks in the United States described their willingness to take action to prevent further destruction from climate change. When the role of place connected emotional and social meanings through localized impacts, participants in the study were more likely to take action to address climate change. Understanding this element of place along with the use of visual methods suggests that place plays an important role in teaching climate change at a local, and ultimately global level, and that visual and sensory elements underpin and help develop how individuals conceptualize place.

Lastly the use of visual methods and photo-elicitation allowed participants to construct a literacy of place that involved different temporal elements. For some participants, images of place represented not only a connection to place but an acknowledgement of the past. One participant included a photo of lei making and the use of native plants endemic to Hawai‘i. The participant chooses this image because lei making, mainly as a non-Native Hawaiian, provides

an opportunity to learn Hawaiian culture and practices. It is also a way to understand Hawai'i from an indigenous perspective. The participant pointed out that most leis bought by tourists feature invasive and foreign flowers. For Native Hawaiians in the study, the photos represent sites of cultural knowledge, history, and connection to the land.



Figure 6: Emma Begins Her Collage. Photo: Josef Donnelly

3.6.4 Place Walking Narration

An important aspect of the research about the role of place was understanding the experience participants had when situated within a place. This type of interview is generative in affording participants a dimensional space where sensory experience factors into producing new ideas or concepts (Clandinin & Connelly, 2000).

Participants selected a variety of sites as a place of significance. The choice of valleys was surprising, and perhaps suggestive of my own biases regarding what type of site participants viewed as impacted by climate change. Regardless of my initial, narrow viewpoint, I quickly understood the unique properties and history of each valley and why it could factor prominently into one's sense of place. For instance, Pālolo Valley and Manoa Valley are neighbor valleys with different weather patterns and history. Whereas Pālolo Valley is dry and known for its red clay, Manoa Valley is green and wet, known for its famous rain. Each valley is threatened by climate change, whether it is from increasing heat that prevents endemic plants from repopulating the island or from changing weather patterns that bring increasing rain and flooding.

Zooming in on the Pālolo valley, which is located on the east side of Honolulu and extends from Waikiki several miles inland to the slopes of the Ko'olau mountain range, reveals a diverse ecosystem. Although it is impossible to walk the entirety of the valley as it is over five miles in length, Margaret spoke about the valley's weather patterns, the effect of climate change and increasingly warmer temperatures, and how human intervention with the valley's watershed (i.e., diverting natural water channels to create a man-made channel) has allowed more development within the valley; however, that could be affected by climate change as native and even invasive species struggle with drier and hotter conditions and water is more concentrated in artificially created channels. Being able to walk to a diversion channel and discuss climate change while observing what might cause additional problems presented a powerful opportunity to generate conversation and consider the impacts of climate change.

When situated in a place, participants not only talked about the aesthetic of an area but they often opened up about past experiences related to the place. This included childhood

experiences that created meaning. Nathan discussed how he learned to clean fish at Sandy Beach while Megan discussed watching canoe races in Hilo Bay.



Figure 7: Sandy Beach. Site of Nathan’s Place-Based Interview.

3.6.5 Concept Maps

The final activity of the research study involved having participants reflect on the previous discussions and make connections with different concepts related to climate change education and place. The mental mapping task allowed participants and myself to examine the complex relationships between the aforementioned tasks, i.e., what is the connection between

physical place, climate change, and teaching. I prompted participants to draw a mental map based on previous tasks and to articulate any connections they visualize about place, climate change, and teaching. I also asked them to recreate any sensory experiences and how this factors into the development of their sense of place and how they approach teaching climate change.

The process of drawing a mental map and making connections to climate change created a thought-provoking dynamic. On one hand, the interview process activated knowledge about climate change. Yet on the other hand, participants were being put on the spot to produce, which can lead to something akin to stage fright. One participant asked to complete it in private so they could think through the process while other participants had no issue talking through their thinking. Some participants spoke about the connections without writing the details. In all situations, I tried to accommodate participants and asked open ended questions to facilitate discussion instead of reminding them to speak as they were thinking. I asked questions such as “how did you make that connection?” or “what ideas come up when you think about this topic?” If participants were unclear of the process, I presented them with an example of a mental model and how different nodes could have multiple words or ideas branching off from them and that these ideas could be connected to other ideas on the mental map. This process is supported by Thompson (2020), who suggested provided previously drawn maps as an example. In this sense, I provided participants with sample mental maps that demonstrate the nuance and complexity necessary to respond to the prompt. Following the completion of the map, I examined the different nodes on the map and if needed asked the participant follow-up questions as they relate to the map.



Figure 8: Concept Maps Completed by Participants

3.7 Data Analysis

The process of data analysis for this dissertation was a humbling and iterative process. Throughout the data collection period, I kept a researcher journal to record reflections and notes on my interactions with participants. I also reviewed my transcripts and adjusted and rehearsed questions as needed. More than once, I returned to sites participants selected to develop a sense of the land. Having a journal helped me stay focused on my research question as it allowed me to see my evolution as a researcher but also more importantly as an individual who listens and becomes adept at listening to people.

During the interview process and data collection period, I reflected on and amended my questions to ensure that participants were able to provide answers that would help address the research questions. Following the interview process I would transcribe the interview and listen to the audio recording. Listening, in this regard, was an important part of the data collection process as listening to participants provided a tone about different topics that cannot be heard on paper.

After reading my data and making annotations, I began an initial round of coding. I created fifty different codes based on an open coding system (Auerbach & Silverstein, 2003; Gioia et al., 2013). I settled on fifty as I began to notice overlap between the codes and, at that point, I wanted to review the codes and create second order codes. In creating my second order codes, I reminded myself of Gioia et al.'s (2013) guidance of connecting second order codes to theory. In this case, I created second order codes based primarily on my research questions. In grouping the first order codes to create second order codes, I did maintain some degree of flexibility in allowing first order codes to be applied to more than one second order codes. For example, the first order code "place based history" is applicable to the second order codes "place based education" and "history of place." In doing this, I hoped to maintain a holistic perspective of codes. I then put the codes from the second round into conversation with the land and my experience with participants as well as my experience in Hawai'i.

In addition, I felt it important to incorporate Indigenous ways of thinking as some of my participants were Hawaiian and because through my memos I was coming to see the influence of Hawai'i and Hawaiian thinking on the participants. In other words, although not Indigenous and not always expressing Indigenous perspectives, there was a significant amount of alignment between Hawaiian and non-Hawaiian participants about land and place. As such, I returned to my data and used Martin and Mirra-Boopa's (2003) three categories of Indigenous research as a

way to bridge the codes with thinking about the whole, that is, thinking about coding in an Indigenous space. Placing codes and analysis into three categories afforded me an additional opportunity to understand and frame how participants accounted for place. By using categories such as Knowing, Being, and Doing, I learned how participants accounted for land, established relationships with land, and enacted both their knowing and being as a form of doing, often through the act of teaching.

Whereas the transcripts provided readily available ideas on paper, or through audio, the images presented different challenges. For example, in attempting to understand how participants account for land, my interest was not only in the images they selected but also in how they discussed images in situ. Whereas the transcripts provided codes, in the images I needed to understand what was being represented not only through the images but also through how the participants described the images. I started by looking at each photo, or by placing a participant's photos in order, and taking notes about what I noticed. Following this I put all the images into a collage in order to zoom out and get a better sense of what the images were suggesting. To do this I created a large collage of all the images, which allowed me to see the images in conversation with each other. Arranging the photos together created what Rose (2022) might consider a visual essay in which "different horizons of meaning and experience are opened" (p. 333).

From this process, I developed six conceptual codes: place, culture, people, action, things, and research questions. Then I coded each image by adding subcodes based on the larger conceptual code. For example, land was a larger conceptual code and mountains were a subcode of land. In creating my codes and subcodes, I started by viewing the whole, that is all the images, instead of taking individual images and creating a larger whole. In other words, with textual

coding, one sees the trees and reconstructs the forest; in a visual collage, one sees the forest and must account for individual trees. After coding the photos, I accounted for frequency of items within the photos. For instance, the most frequent image to represent place featured either mountains or oceans. I was mindful not to assume frequency meant significance as many of the participants' most significant photos connected land to family, friends, or ancestors. However, understanding frequency did afford me an opportunity to understand participants' thinking about how place is conceptualized. Finally, I put the participants' photos into conversation with their descriptions of the place.

When thinking about and preparing for the data analysis process, I faced a dilemma of methodology. On one hand, the driving purpose of my research was to examine the role of place holistically—to see multiple connections and entry points that may not be visualized or understood at the singular level. On the other hand, a thorough analysis of the data lends itself to a line-by-line analysis that then pulls the data apart, treats it singularly, and then tries to extrapolate from said information. Also weighing on my mind was the fact that coming from a background that includes living in an Indigenous place, working with an Indigenous community, and using Indigenous research methods in previous studies, I was aware of the importance of relationships and looking at the whole, not just a part.

To navigate this dilemma, I researched Hawaiian research methods that could serve as a guide when operating between multiple world views and research methodologies. For this research, Nu'uhiwa's (2018) examination of Hawaiian history and how learning and understanding came into being provided useful insights. Historically, and before contact, Hawaiian learning was divided into three houses of learning: natural earth phenomenon, atmospheric phenomena, and all living beings and their relationships. To study these areas

Hawaiian scholars relied on, according to Nu’uhiwa, a five-step process: (1) choose a subject; (2) find a chant, story, or ceremony on the topic; (3) deconstruct the chant or information from each of the learning house’s perspectives; (4) have discussions about discoveries; and (5) reconstruct the information.

To start any process requiring deep thinking and concentration, I would find a quiet space. This might mean waking-up at 4:30 AM or 5:00 AM or I would wait until 10:30 PM or 11:00 PM, sitting in an empty office or classroom after everyone departed. This might sound excessive and extreme but there is, as they say, a method to the madness. For example, Peshkin and Ellenbogen (2019) discuss how expert poets are able to “surrender consciousness” and let their ideas run free. In this sense my experience with the land and ocean on a small Pacific Island and for spending countless hours fishing on and in an expansive and seemingly infinite ocean provided me with the tools to surrender consciousness—to clear my mind and unfocus my vision. The process is like looking into the ocean deep: nothing and something at once, interacting and taking shape. As my mind cleared, I listened to my thoughts. As a teacher who has taught lessons both great and mediocre, I know that our first thoughts may not be our best, or the most accurate. Having space to question oneself in an uninterrupted manner to analyze words and meanings requires time and space. And as Peshkin and Ellenbogen (2019) point out, clearing one’s mind is the first step, but revision is key.

Zooming out to account for all participants, I followed a similar process of putting data into conversation. After examining all the images that participants selected and recording my what I noticed, I wanted to view the images together in order to discover and explore what made a place significant. To do this, I arranged all the photos into a giant collage, with the images arranged as the participants arranged them. In examining all the photos, I wasn’t looking for a

specific item or concept, but instead I waited until the images spoke to me. I took notes, often in the form of a map, to visualize my thinking.

When analyzing my data, I was mindful of my positionality as a researcher. I am neither Hawaiian nor have I spent a significant amount of time in Hawai‘i. Instead I used this framework as a connection to the past and to demonstrate how Hawaiian research and history has a precedent of examining information at a singular level and then fitting that information back into the larger cosmology of Hawaiian being. One important historical aspect about this methodology is that it examines information from the Kumulipo, or the Hawaiian creation story, while considering multiple sources of knowledge, whether the knowledge comes from chants, dances, or the land itself. For instance, Daniel cited the importance of hula as a way to help him understand Hawai‘i as a place and as a culture. By learning and practicing hula, Daniel also learned Hawaiian as a language and the power of storytelling. For many participants, there was an emphasis on “talk story” which is similar to an unstructured conversation and requires both the speaker and listener to understand cues and context embedded within the story.

To implement a holistic approach, I placed images, maps, and text together to create a collage. Creating a collage afforded me the opportunity to see multiple sources of data in conversation.

3.8 Researcher Positionality

My positionality affected this dissertation. First, I am a European-American, white male who comes from a middle-class socioeconomic background. There is a long history of settler colonialism in the United States and it is worth noting that this history weighed heavily on my conscious while researching in Hawai‘i, a place that was colonized by the United States and is still experiencing the effects of colonization.

A reason why I decided to persist in choosing Hawai‘i as a site of research is due to my connections to the Pacific region. One connection I have to the Pacific region is through my service as a Peace Corps Volunteer. As a volunteer I served for three years Oneop Atoll in Chuuk State. In addition my spouse is from Oneop Atoll and in many ways this helped deepen my connection Pacific Island culture: I am familiar with taro farming; I have a taro patch; I speak an indigenous Pacific island language. I am also aware that Hawai‘i and Micronesia are experiencing similar challenges related to climate change. In many ways, Pacific Islands are uniquely vulnerable to the effects of climate change. For example, Hawai‘i has one of the most unique ecosystems on Earth. This diversity makes Hawai‘i arguably the “single most habitat-rich place on Earth” (Goh III, 2014). The incredible diversity of Hawai‘i coincides with a natural fragility as many of Hawai‘i’s ecosystems cannot quickly adapt to drastic changes related to climate change. This vulnerability is amplified by vulnerability within a global world.

Another connection I have that was influential in my decision to study in Hawai‘i is my adopted family. Hawaiians have a concept of *hānai*, which loosely translates to adoption in the United States. This practice is also frequently used in Micronesia. Even though I am a white male of European descent, I was adopted by a Micronesian family. This adoption is based on full acceptance of the relationship. In being part of this relationship, I learned important values such as genealogy, talk story, and the importance of listening. As a member of one of the atoll’s clans, we would have meetings in which clan members would speak, including me. More recently the extended family has come together through Zoom meetings to either strengthen our bonds as a clan or for important events such as a death in the family. For me, this experience helped me understand how to approach an indigenous place, especially as a non-indigenous individual and

as a researcher who might be perceived as extracting information. Yet, many participants thanked me and commented on how easy and calming it was to talk with me.

I think the ease of conversation with participants is also connected to my experience as a teacher who has taught for over fifteen years. The language of teaching was relatable and, as I am still in the classroom, I was able to talk openly about the struggles of students as well as teaching in general. Often the conversation drifted toward school issues unrelated to climate change, but nonetheless important for building relationship, some of which continue today.

Nevertheless, I do feel that my position as a mainland researcher coming to do research, especially at the start of the school year might have been perceived as off-putting by some individuals I attempted to contact, and rightfully so. There were several schools and individuals who I never heard back from after making initial contact, and I can understand the busyness they must be experiencing at the start of the school year.

Ultimately, I experienced many feelings, or as Peshkin (1988) refers to them, subjectivities, during the research process. Some of these subjectivities came less frequently than others. For example, issues of indigeneity and insider and outsider perspectives came up less frequently than I imagined. Other subjectivities, such as my role as a teacher, created a sense of joy that allowed the interviews and walking tours to happen with ease. All of these subjectivities required reflection and, as I was in an indigenous space, I needed to be mindful of Indigenous perspectives.

In writing about Hawaiian history, epistemology and cultural values, it is important for me to acknowledge my positionality as a researcher. I am not attempting to add new knowledge to an extensive body of scholarship on Hawaiian history or culture that has been written by Native Hawaiians. Instead, I am acknowledging the importance of how culture and history

influence how individuals develop a sense of place. It is also important to recognize that important Hawaiian concepts such as genealogy, and *mana* are important to Hawaii, and I am not suggesting that these concepts can be replicated or even should be replicated. What I propose is that Indigeneity can be approached and understood if embedded and embodied ideals are established and a network is created to provide access to the individual. Furthermore, I am proposing that one can develop a sense of place by understanding different embedded and embodied concepts. For example, I think of the importance of hip-hop music in the Bronx and how any place-based learning about the Bronx should consider hip-hop music and by extension this means listening to hip-hop music. This research is also focused on how teachers develop a sense of place. As such, when I interviewed my participants, I identified myself as a ninth and tenth grade global history teacher. Indeed, much of the conversations I had with participants centered on our identity as a teacher and the ups and downs of the profession.

In writing this dissertation, I use Hawaiian to maintain the uniqueness of the word but also to provide nuance to a concept that a translation does not. I am not, however, proposing that these words be used outside of a Hawaiian, or in some cases a Pacific Island, context. The concepts used herein are Hawaiian words that can expand knowledge and interrogate our understanding of the world. I am not suggesting that I can fully understand these terms as I am not Hawaiian. Instead, I use the terms as they were significant for the participants. I believe we can approach an understanding of the words but perhaps that is as far as we can go. Nevertheless, this understanding can be of vital importance when educators approach teaching climate change from a position of land; they can recognize the power and history of place as a starting point, which in turn acknowledges all the voices and inhabitants of a land past present and future.

3.9 Organization of Findings Chapter

By looking at the concept of land in Hawai‘i through the lens of a prism, I analyzed my data around different Hawaiian concepts surfaced by participants. These concepts include *mo‘okū‘auhau*, *malama ‘āina*, *kuleana*, and *mana*. The *ahupua‘a* land division system also surfaced and is a concrete example of a sustainable system from the past.

I organized my findings into two chapters to understand how viewing land through a prism informed how participants developed a relationship with land and taught climate change. In Chapter 4, I analyze how participants formed a relationship with land through embedded and embodied Hawaiian land concepts. Chapter 4 also analyzes how participants’ relationship with land informed their ideas about sustainability. In Chapter 5, I discuss how the Hawaiian concepts as described through the prism influenced participants’ teaching of climate change.

Chapter 4: How Teachers Formed a Relationship with Land

In this chapter, I present two findings connected to my research question. The first finding is that participants formed a relationship with the land by engaging with an embedded and embodied network of Hawaiian knowledge. Through Hawaiian concepts connected to land, participants conceptualized place not as a static idea, but as an agentive entity. The concepts reflect a symbiotic relationship where participants formed a deep sense of place attachment and responsibility for sustaining the land. In return, the land influences who the participants are as individuals as well as how they conceptualize climate change education. With some variation, participants engaged in Hawaiian knowledge, whether through embodied practice or embedded ideas that influenced their relationship with the land. This engagement sometimes created fluency amongst participants, which helped them navigate cultural binaries such as Indigenous and Western. The second finding is that participants' relationship with land helped them (re)envision sustainability through an Indigenous perspective, including the embodiment of Indigenous sustainable practices.

Land in Hawai'i is a complex entity based upon Indigenous epistemologies and ontologies. A prism provides a useful analogy for discussing land in Hawai'i. For example, Western perceptions of land represent light before going through a prism. It is white and singular. However, when light passes through the prism that is Hawai'i, it refracts and opens up to the nuances and layers of land. Moreover, the colors of visible light, like concepts connected to land in Hawai'i, are distinct yet they also blend together. At times, there were moments of clarity when a concept presented itself distinctly. At other times, multiple concepts connected to land might be present. The concepts create a holistic view of the land.

During their interviews, participants demonstrated an awareness of these concepts, whether through their daily lived experience or mindset. Participants arrived at an understanding of these concepts through different means but ultimately grounded themselves in a land-centered orientation that sought to either sustain the land, revitalize the land, or sustain an element of their identity that connected to the land. These concepts and notions of sustainability helped me understand how educators in Hawai‘i develop a sense of place. Although the sense of place was the language used in my original research question, it is important to note that many participants’ places were interchangeable with the land.

The participants did not always engage with all land concepts simultaneously or equally. Instead, participants might have demonstrated awareness or embodiment of one concept more than others. Or the participants’ actions aligned with the principles underpinning the concepts, even if the participants did not explicitly name the concepts. Furthermore, these land-centered concepts, such as genealogy, caring and protecting the Earth, and responsibility, expanded participants’ perspectives on sustainability and reflected an Indigenous perspective.

Underpinning participants’ sense of sustainability was a relationship with land that did more than uphold tradition sustainability models of maintaining the economy, environment, and society. For example, Megan sustained her sense of self and connection to her ancestors through her relationship with Hilo Bay. In the context of Megan, sustainability and the question of what to sustain were much more about sustaining culture, land, and life than about the environment, economy, or equity. Indeed, for the participants, sustaining culture, life, and land often facilitated the ability to sustain economy, environment, and equity.

I start Chapter 4 by reviewing Hawaiian concepts connected to the land. Following this, I discuss how these land concepts, while always existing in Hawai‘i, are made explicit in Hawai‘i

through a network of Indigenous knowledge. This understanding is essential when considering the act of reclaiming Indigenous knowledge and, more broadly, decolonization. I also discuss the traditional Hawaiian land division system known as the *ahupua'a* system, which participants discussed when speaking about the land. Finally, I discuss embedded and embodied knowledge and what those concepts mean for this study. Chapter 4's second section is composed of vignettes about the participants that illustrate Hawaiian concepts associated with the land. In these vignettes, I show how participants' engagement with land reflects different Hawaiian principles. I did not write a vignette for each participant. In selecting participants to have a vignette, I considered the participant's connection with and description of the land. As a result, one participant, Yuki, lacks a vignette, as our interview focused less on developing a sense of land and more on instruction. Following each vignette, I provide analysis and discuss how the vignette shows a relationship between the participant and land.

4.1 Hawaiian Concepts

In Hawai'i, the land plays a vital part in society. Land is part of Hawaiians' identity (Meyer, 1998). Land also played an important role for the participants. In the following section, I describe the concepts participants most frequently discussed. As mentioned above, land in Hawai'i is viewed as a prism with multiple layers of knowledge. These layers are embedded and embodied in Hawai'i, and when considered holistically, helped participants form a relationship with the land. Moreover, the land Hawaiian concepts described below are similar to Indigenous concepts associated with land. In retaining the term Hawaiian concepts, I maintain the uniqueness of Hawaiians' relationship with land.

I also discuss *mana*, a complex and multi-faceted concept that can connect to all other concepts. For example, *mālama 'āina*, or taking care of the land, is an action that directly

enhances the land's *mana*. Similarly, a person's genealogy, *mo 'okū 'auhau*, can increase or decrease their *mana*. Because the concept is closely intertwined with other concepts expressed by the participants, I included a brief description below.

Hawaiian concept	Translation
<i>mo 'okū 'auhau</i>	Genealogy
<i>mālama 'āina</i>	Take care of/Protect the land
<i>kuleana</i>	Responsibility
<i>mana</i>	Although there is no transferrable translation scholars note that mana is similar to spiritual or life force (Crabbe, 2017).
'āina	Land. Literally that which feeds.
<i>ahupua'a</i>	A traditional land division used by Hawaiians.

Table 3: Hawaiian Concepts and Translations

4.1.1 Viewing Land through a Prism

A prism is a tool that allows individuals to see light from a different perspective. For this dissertation, I use the prism metaphor to understand how land is conceptualized in Hawai'i and as a tool for analyzing data.

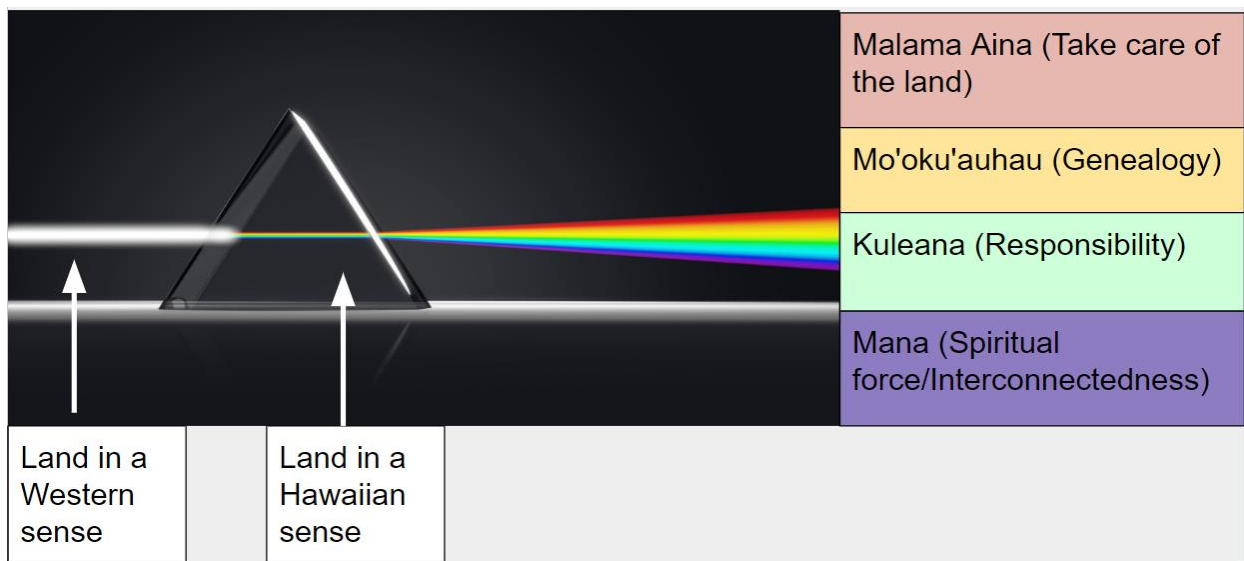


Figure 9: Land Viewed through a Prism. Graphic created by Josef Donnelly

A prism is a piece of glass used to analyze and separate white light. The separation of white light leads to the visibility of different colors, also called a spectrum. A prism (see Figure 9) provides a helpful metaphor for this research project. For example, light can be thought of as land. In Western society, for example, in the United States, land is singular. Moreover, as Conrad has noted in social studies, land is often treated as a commodity that is bought, sold, or manipulated (Conrad, 2018). Land is considered outside the realm of the human. However, if the prism in this metaphor represents Hawai‘i, then the meaning of land opens up to new definitions and understandings. Land in Hawai‘i is not just land but an entity that came before humans and is to be respected and understood. Indeed, in Hawaiian tradition, the land is the first-born brother to humans. Thus, the relationship is similar to that of siblings. From this understanding, many concepts connected to the land are revealed. Concepts such as *mālama ‘āina*, *aloha aina*, *mo‘okū‘auhau*, and *kuleana* are all in some way connected to the land (Crabbe, 2017). Yet, like a color spectrum, the colors blend at the edges; there is no sharp distinction between where red stops and orange begins. Likewise, Hawaiian concepts can blend, and work in collaboration

instead of isolation. Using the prism as a metaphor allowed me to see land from a singular Western perspective land containing multiple elements.

Ultimately, land, especially in the Pacific region, is not a static concept but a living, moving entity with which individuals embody and build a relationship. Land gives Pacific Islanders meaning and life, whether in Hawai‘i or other islands.

4.1.2 *Mo‘okū‘auhau*

A Hawaiian concept discussed by participants that is central to participants’ relationship to land is *mo‘okū‘auhau* (Hawaiian for genealogy). The concept of *mo‘okū‘auhau*, or genealogy, is important for many Pacific Island nations. Kana‘iapuni (2006) elaborates on the importance of genealogy and how

...place names underscore the inseparability of physical and spiritual interconnections between place and people in the Hawaiian worldview. Another example of this inseparability is found in genealogical traditions. Across the Pacific, identity is borne of establishing one’s genealogical ties to ancestral beginnings. Ancestral ties include not only people but also the spiritual and natural worlds, since all things were birthed by the same beginnings. (Kana‘iapuni & Malone, 2006, p. 290)

In other words, Kana‘iapuni and Malone suggest that an individual’s identity is connected to the spiritual world as well as the natural as ancestors remain an integral part of a person’s ontology. Kana‘iapuni and Malone’s (2006) assertion reveals the interconnected nature of genealogy in the Pacific region that individuals have with ancestors and the natural world. Indeed, in their example, there is no separation of human and non-human as Kana‘iapuni and Malone recognize that everyone has the same origin. As such, *mo‘okū‘auhau* is a layer of place that allows individuals to understand land through its history, place names, and the people that lived there.

4.1.3 *Mālama ‘āina*

Mālama ‘āina is a concept deeply embedded in Hawaiian history and culture. A common translation of *mālama ‘āina* is taking care of the land. Crabbe (2017) describes *mālama ‘āina* as a “cultural mandate for all natives which served to guide actions” (p. 39). Other scholars describe *mālama ‘āina* as a contemporary call to reclaim and revitalize land for future generations (Kahihikolo, 2013). In addition, when *mālama ‘āina* is translated literally, a more nuanced understanding opens up a deeper understanding of Hawaiians’ connection with the land. For example, *mālama ‘āina* can mean take care of and protect while *‘āina*, which is the translated word for land, translates to that which nourishes.

Kealiikanakaoleohaililan and Giardina (2016) describe the principles of *mālama ‘āina* as such:

Aloha ‘āina and Malama ‘āina, translated, respectively, as to love the land and to care for the land. Aloha is an in-the-moment relationship and reciprocal exchange (Alo) of breath (Ha) resulting from a relationship or bond between entities that is characterized by mutual benefit, commitment, and physical exchange. To give aloha for another entity involves a commitment that assures the wellbeing of that entity, and more important for this discussion, that allows the giver to see one’s self in each and every entity. Malama is the result of aloha-based relationships because the act of loving an entity must translate into caring for that entity, with care including protecting, tending, stewarding, and where needed restoring health and wellbeing. (p. 63)

In Kealiikanakaoleohaililan and Giardina’s (2016) description, *mālama ‘āina* is rooted in an active relationship with the land that not only necessitates acting caring for but also protecting and sustaining the land for future generations. In this sense the concept of *mālama ‘āina*

transcends time as it asks individuals to consider how the past cared for the land as well as how the land should be cared for for the future.

4.1.4 *Kuleana*

In Hawaiian, the concept of reciprocal relationship is *kuleana* (Crabbe, 2017). Like previous concepts *kuleana* can have multiple meanings. *Kuleana* can refer to a responsibility one has to one's family, or to one's community. *Kuleana* can also refer to one's relationship to the land and a responsibility to take care of it. Fulfilling *kuleana* to the land was one way to enhance the *mana* of the land.

4.1.5 *Mana*

A central concept underpinning participants' relationship with the land is *mana*. The concept of *mana* is complex, has many definitions, and is often connected to other Hawaiian ideas about land. As Crabbe (2017) points out, "no English translation is sufficient for *mana*. Native Hawaiians believed that the gods were both their ancestors and a primary source of *mana* which was embodied in land, objects, and people" (p. 23). In the previous sections, participants discussed specific concepts that contributed to the *mana* of Hawai'i. Concepts such as *kuleana*, *mo'okū'auhau*, and *mālama 'āina* are concepts embedded in Hawaiian culture and that form different layers of place. Yet the layers do not operate in a vacuum. Instead, the concepts mentioned above are highly interconnected. In this sense, *mana* is a force that connects the concepts.

Other Hawaiian writers describe the complexity of *mana*. Beamer (2015) describes *mana* as "a Hawaiian concept that incorporates material, metaphysical, and genealogical characteristics...that informed nearly every aspect of 'Oiwī (Hawaiian) society" (p. 19). Hawaiian scholar Noenoe Silva argues that *mana* is an energy that connects and inspires newer

generations in the Hawaiian struggle for greater political autonomy (Tomlinson & Kawika Tegan, 2016).

The Hawaiian cultural site, Manoa Heritage Center, defines *mana* that is appropriate for this research and in trying to convey an understanding of *mana*. The center states:

Mana has been defined by Western and Hawaiian scholars as supernatural power, divine power, miraculous power, spiritual power, but for our purposes, we will think of it as spiritual energy and the universal life force as mentioned by Pi‘ianai‘a, knowing that it may include the other definitions as well. The respect of mana, the enhancement of mana, and the protection of great mana from pollution gave rise to many rules and protocols in Hawaiian society. Anything with great mana was special, set aside, holy, sanctified, sacred, and kapu. This word, kapu, can be defined as sacred but is also used as a word that indicates law. While mana may have been thought of as permeating all living things, some persons, places, and things were thought to have more mana than others. Persons, places, or things that possessed a great deal of mana were kept sacred or kapu.

(Mānoa Heritage Center, 2023)

In addition to all things having *mana*, it can also manifest in material objects. For example, a *heiau* is a Hawaiian spiritual temple that is an important source of *mana*. Some sites, for example the spiritual temple *Pu‘ukohola*, which King Kamehameha I built, have immense *mana*.

Pu‘ukohola is a National Historic in the United States site but does not grant access to non-Hawaiians.

Another example of an object possessing *mana* is the Hawaiian double-hulled sailing canoe *Hōkūle‘a*. This canoe marked the revival of traditional Hawaiian navigation as Master

Navigator Nainoa Thompson sailed from Hawai‘i to Tahiti. In describing the *mana* of the canoe Thompson said,

Hōkūle‘a has latent, quiet, sleeping mana when she is tied up at the pier in Honolulu. But when the canoe is sailed by people with deep values and serious intent the mana comes alive - she takes us to our destination. The *mana* is inside all of us. It’s tied to our ancestry and our heritage. Sometimes, in the press of daily life, we neglect it. But when we come aboard this canoe and commit our spirits and souls and lives to a voyage like this one, I think we all feel it. (Hōkūle‘a, 2024)

For Thompson, *mana* is not a static concept rooted in the past but a dynamic force that connects Hawaiians. It should be understood holistically and underscored by lived experience. Moreover, while *mana* varies with individual sites or people, it also flows into a whole that connects the people and places of the Hawaiian islands. Therefore, Hawai‘i as a whole has *mana* into which participants’ thoughts and actions flow. And while participants did not always reference *mana*, many of their actions, as well as their thinking and intentionality, contributed to the *mana* of Hawai‘i.

4.1.6 Ahupua‘a

One way participants demonstrated *mālama ‘āina* was through their awareness of the *ahupua‘a* land division system. These divisions were not so much boundaries as they were zones of sustainability. Since participants understood the *ahupua‘a* system, it is important to briefly describe how the land division system worked. Furthermore, when discussing the *ahupua‘a* division, participants focused less on the physical land division, and more on what the division meant for Hawai‘i. That is to say, the division represented a period when Hawai‘i was self-

sustaining, a period connected to ancestors, and a period when the ‘āina provided what was needed if there was *kuleana* and *mālama ‘āina*.

Indeed, according to Beamer (2015), the *ahupua‘a* system was a central part of Hawaiian society. Within the land divisions, Hawaiians could sustain themselves. Individuals from the uplands could trade or exchange goods with individuals from the lowlands or coastal areas. Each *ahupua‘a* contained the resources needed to sustain a population and donate food during the harvest celebration of Makahiki, which was also a period when land lay fallow. This land division system is often compared to European feudalism, but this comparison misses the mark. Instead, whereas the feudal system was based on class and the succession of a lord to demand tribute, the *ahupua‘a* system was based on sustainability, and chiefs could be replaced if they did not maintain the health and goodwill of the people they governed.

The word *ahupua‘a* can be broken down into two parts: *ahu* which translates to alter (which might be shaped like a cairn) and *pua‘a* or pig. The *ahupua‘a* was an alter where a pig might be sacrificed as a tax or gift to the land’s chief. Thus, an alter was placed at the end of one *ahupua‘a* and the start of another.

In considering the *ahupua‘a* system today, the state of Hawai‘i made the *ahupua‘a* land division system publically visible in 2011 by installing *ahupua‘a* signs along streets and highways that marked traditional land boundaries. Furthermore, the state acted partly because a local organization, the Ko‘olaupoko Hawaiian Civic Club, organized the project to increase cultural awareness. The significance of the *ahupua‘a* signs is that they create a network of Indigeneity across the Hawaiian islands. For instance, thinking about the *ahupua‘a* land division can lead to an awareness of the sustainability of the past and to the concept of *mālama ‘āina*. The network of knowledge composed of different actors not only revives Indigenous knowledge but

colonialism influences and impacts the concepts above. Scholar Kahihikolo (2013) discusses the great disconnection between Hawaiians and the land due to colonialism. More specifically, the influence of colonial and capitalist thinking led to a paradigm shift in Hawai‘i. For Kahihikolo (2013), the Great Māhele of 1848 was the “legal mechanism by which the traditional Hawaiian system of sharing control and use of the land was replaced by private ownership of the land using a capitalist model.” (p. 161). The importance of this event is that the concept of land shifted from being held communally to being held privately and by individuals. In addition, the arrival of missionaries and the overthrow of the Hawaiian kingdom resulted in a “lack of *mālama ‘āina* whereby the people no longer provided stewardship over the *‘āina*” (p. 161). Although the Hawaiian concepts connected to land were always present, by the mid-1900s, they were not as pronounced.

However, in the 1970s, a powerful movement was initiated by Native Hawaiians to reclaim and restore the land. This movement, which initially aimed to end the United States’ use of Kaho‘olawe as a test site for bombing, quickly evolved into a broader mission to revitalize and reclaim Hawaiian culture, language, and songs. For Kahihikolo, the successful effort to stop the bombing and return Kaho‘olawe to Hawaiians in 1990 symbolizes something much larger; it is a return to principles centered in the land, such as *mālama ‘āina*. This collective action is a testament to people’s power and ability to effect change. One example of this collective power is in 2008 when the governor of Hawai‘i signed the Hawai‘i Environmental Justice Report, which defined environmental justice in the context of Hawai‘i. The definition of environmental justice reads as follows: “With an emphasis on the responsibility of every person in Hawai‘i to uphold traditional and customary Native Hawaiian practices that preserve, protect, and restore the *‘āina* for present and future generations” (Hawai‘i Environmental Council, 2008, pp. 4-6).

When considered in the context of the disconnection of Hawaiians from the land, the declaration symbolizes a return to knowing, understanding, and being in the land. Such an orientation toward the land is not guaranteed, even if the land remains the same. When participants discussed Hawai‘i and place, they discussed how important place and place-based learning is in Hawai‘i. Thus, in describing concepts embedded or embodied, the participants create a relationship with land that informs their sense of sustainability. There is a connection and method for listening to the land and for centering it. In doing so, participants connected with a more extensive network in Hawai‘i that desired to reconnect with the land. Indeed, the flow of connection from the past to disconnection and reconnection shows that the concept of place and the importance of land carry their vulnerabilities if they are not taken care of. It requires individuals to listen to and read the land and its myriad layers. In knowing the land, the participants tapped into a literacy based on reclamation and revival. Through this, knowing the participants’ orientation toward land influenced their orientation toward climate change. It is an orientation that not only centers land but is built on a foundation of Indigeneity.

4.2 Embedded and Embodied Knowledge

The land concepts mentioned above are embedded and embodied into the fabric of Hawaiian society. In a broader context, embedded and embodied knowledge represent knowledge classified as tacit knowledge. Although scholars debate the nature of tacit knowledge, there is general agreement that tacit knowledge is the unspoken know-how or knowledge learned or gained through experiences, objects, or working with others (Horvath, 2000).

This study uses the idea of tacit knowledge to explain the flow of knowledge occurring in Hawai‘i that participants experienced. Participants understood the concepts mentioned above even though there were no explicit rules or guidance on enacting these concepts. In Hawai‘i, the

participants demonstrated an awareness of concepts embedded into society or embodied them in their daily lives. For example, Margaret understood the importance of *mo'okū'auhau*, or genealogy, which is a concept deeply tied to Hawaiian culture. Margaret also acted upon this knowledge by asking her students to visualize the past and by using the land for sustenance, a practice embodied by Hawaiians. Other participants, such as Daniel, understood the value of land in Hawaiian by embodying these values through hula, a traditional form of dance in Hawai'i that is embedded with concepts about one's relationship to the land. Furthermore, many activists and scholars revitalized land-based concepts, allowing individuals to reconnect with the land in what Kahihikolo (2013) refers to as getting back to *malama 'āina*. By using the term "getting back," Kahihikolo addresses the decades of colonialism that resulted in a loss of connection to the traditions and ways of being in the past. For example, Hawai'i was a self-sustaining group of islands with an estimated population of upwards of a million people. After colonization, the people controlling Hawai'i, primarily white settlers, imported most of Hawai'i's food, and people lost their connection to the land. The reconnection, however, is due in part to a long process of decolonization and embedding Hawaiian knowledge into society writ large and through the state of Hawai'i creating the infrastructure to embed Hawaiian knowledge.

One example of embedding and making knowledge explicit is disseminating knowledge about the *ahupua'a* land division system. As mentioned, this traditional land division was based on sustainability, with the idea that each *ahupua'a* was self-sustaining. Daniel, Margaret, Abigail, Sophie, and Megan demonstrated awareness of this self-sustaining system and discussed it in their classrooms.

In summary, embedded and embodied knowledge represents a flow of knowledge within a specific place. In Hawai'i, many Indigenous ideas and concepts connected to the land are part

of the culture and spirit of Hawai‘i. For this study, participants’ engagement with both types of knowledge helped them form a relationship with the land.

In the following pages, there are eight vignettes from participants that explore how my participants’ engagement with this embedded and embodied knowledge shaped their conceptualizations of sustainability as an entangling land, knowledge, and culture.

4.3 Megan: Hilo Bay

Megan looked across Hilo Bay. The last rays of a setting sun clear the island’s towering volcanoes, casting a pink glow off scattered clouds. Below, the Pacific Ocean expands endlessly. The air is tranquil. I asked her about a place that was significant to her. Without hesitation, she said, “Hilo Bay. I think of all the generations of families that came before me. I feel like I’m really kind of rooted here. This is my place. People get me, and I get them” (Interview, August 25, 2023). Megan knows Hilo well. She grew up in Hilo, knows the families, and teaches at the local high school, Big Island High. Reflecting on the bay, she continued, “It was always a lively kind of time when I was growing up. We went to observe (canoe races). It was a place for teens. Well, it still is; people come here to socialize. The canoe races are still very big.”

When she thinks of what she senses at the bay now she says,

Just quiet. Being at the ocean and being able to contemplate and regroup. It’s not uncommon to drive around the bay and Reeds Bay where the hotels are, to see people out there on the wall socializing and just kind of a way to end their day. A lot of walkers down there in the morning and in the evening. It’s kind of a good place for me to get re-centered when I’m feeling like I’m getting kind of pulled in too many directions. So, it’s a place of calm. And then on a clear day, Mauna Kea is right there. You can see the mountain. It’s really pretty dramatic.” (Interview, August 25, 2023).

For Megan, Hilo Bay is land worth caring for and sustaining. She says,

There are a lot of memories down there because of the old tidal waves we've had. So, there's this kind of reverence for that area. There actually used to be a whole village in that grassy area near the bay, and it got wiped out during the 1960 tidal wave. (Interview, August 25, 2023)

And, "our bay sometimes serves as a nursery for whales that come from Alaska. I mean, you wouldn't know it to look out there in the bay in the wintertime. And when there are calves, there are actually two male whales that sit outside at the opening of the bay, kind of guarding" (Interview, August 25, 2023).

It is easy to see the communal element of Hilo Bay. Canoes dot the horizon. Families gather to fish and play in the tide pools. The shops and restaurants of Hilo are a short walk away. The bay is a gathering place and a memorial. It is imbued with history and connection to the past. For Megan, life itself entwines closely with the bay.

Hilo Bay formed an essential part of Megan's youth. As a teenager, she visited Hilo Bay and saw *Hōkūle'a*, the double-hulled navigational canoe symbolizing the 1970s movement to reclaim Hawaiian sovereignty and knowledge. Megan saw the launch of *Hōkūle'a* as it sailed from Hilo to Tahiti, beginning a storied revival in traditional navigation. Reflecting on *Hōkūle'a* and the Hawaiian revival movement, Megan said, "I really kind of wanted to somehow jump in that movement" (Interview, August 25, 2023).

Megan's sense of land connects to her ancestry and how it influences her thinking. Reflecting on her identity, she says, "I'm part Hawaiian, and I'm adopted, but my adopted family, my grandfather was born here, but his parents were immigrants from Japan" (Interview, August 25, 2023). She continues,

In Hawaiian culture, we have this idea of *malama 'āina*, taking care of the land. We're tied to the earth and sea in Hawaiian culture, and it's all tied to the earth and sea, and it's all kind of part of us. It's embedded in Hawaiian culture. And I think at some point it kind of bleeds out (to other parts of life and culture). (Interview, August 25, 2023)

Before discussing Hilo Bay, Megan shared images underscoring her connection to the land. One formative experience came in the 1980s when Megan left Hawai'i to live in Tahiti. Although distant, Tahiti shares many similarities with Hawai'i. Both regions are considered part of Polynesia, and language and concepts of land are similar. For Megan, Tahiti represents an influential experience in understanding and enacting *malama 'āina*.

In Tahiti, Megan lived sustainably off the land. Speaking of living off the land in Tahiti, Megan said, "We'd get on that canoe every day, take the baby and everything, and then we'd bring all the fish in...and then there were about five families. So, we all come together, go out, bring all the fish, and then get together and clean, and everybody takes their fish home. It was really great" (Interview, August 25, 2023).



Figure 11: Megan Embodied *Malama 'āina* in Tahiti

I asked Megan if Tahiti was a formative experience. “Yeah, absolutely,” she replied, “And I mean, we did that every day. You want to eat, you got to go out on the boat. You also learn how unimportant some of the things that you, especially from the mainland, how unimportant some of the things that you value really are. That’s what I felt when I came home. I told my husband, we’re on Oahu and I said, we’re walking through Ala Moana Mall. And I said this all feels like bullshit now. And we just kind of laughed. I’m like, wow, what was I thinking? So, I have a really deep appreciation for that Pacific background. It taught me a lot. (Interview, August 25, 2023)”

Megan’s lifelong experience with the ocean grounded her in what it means to be connected with the land. Her life living on an island, of working the land and sustaining it shifted her mindset about life:

You realize how much you don’t need. That’s what I realized in Tahiti. Oh, we don’t need paper towels? We have regular towels that we washed. Yeah, that really taught me a lesson. I was in my twenties when we did that. Yeah, really great experience. Yeah. We bought a bunch of fish nets, we bought some Tahitian spear guns and we went, my dad envied us. My dad was, he’s native Hawaiian Chinese guy. And then we were able to actually take them with us in 1986. (Interview, August 25, 2023)

Reflecting on the land Megan returned to the concept of *malama ‘āina* and Hōkūle‘a with her students and challenges them to envision caring for the land. She says:

As a club advisor, we’ve done ocean cleanups down there with Lion’s Club...that’s kind of something that I think the kids get it, they talk about it. But I said, in reality, how do we do that? Looking at how Hawaiians were able to sustain themselves for hundreds of years. I tell the students that without Matson or those other cargo companies that come in,

Hawaiians were doing it themselves for hundreds of years so it can be done.

Captain Cook was pretty stunned when he got here. Like, oh, there are already people here. And then everyone was thriving. So that's kind of where I'm at now, giving back to my community because more than half of our population here in Big Island High are native Hawaiian kids. So that's kind of meaningful for me. (Interview, August 25, 2023)

We end on a positive note as twilight sets in. The waves in the bay roll in, calm and steady. Peace.

4.3.1 Megan: Embodied Experiences and Building Relationship with Land

In this vignette, Hilo Bay plays a central role in Megan's life. Her relationship with the bay is symbiotic: it is an important component of Megan's identity, which compels her to take care of the bay. The relationship is mutually beneficial. Megan's vignette provides a window to viewing land not as a static place but as a dynamic entity whose knowledge, both embedded and embodied, is shared, communicated, and ultimately enacted by individuals.

In her vignette, Megan demonstrated multiple Hawaiian concepts that underpinned her connection to land. Concepts such as *malama 'āina*, *mo'oku'auhau*, and *kuleana* guided Megan's knowledge toward many facets of her life, including school and community. In the following sections, I explore how these concepts were embedded and embodied in Megan's lived experience and how this expands notions of sustainability. Indeed, Megan's experiences raise important questions about what it means to sustain, what should be sustained, and how a relationship to the land is an essential element in shaping sustainability.

In Megan's vignette, she demonstrates *malama 'āina* in her actions and thinking. For example, Megan's relationship with Hilo Bay is multifaceted. For example, it is a place of refuge

and reconnection. Megan discussed how coming to the bay in the calm of the evening helps her center herself. The bay is also communal, with families and individuals coming together to enjoy what the land offers. On clear days, Megan stated the ability to see Mauna Kea, a sacred volcano for Hawaiians that is also the highest point in Hawai'i at over 13,000 feet. The setting of Hilo Bay, Mauna Kea, and the community coming together is a powerful image that Megan acknowledges in our discussions.

Yet for Megan, the ability to center oneself requires caring for that which sustains who she is as a person. Megan's act of sitting at the ocean, enjoying its calm, and bringing an awareness of ancestors of the past is a sustaining practice. Megan's sense of *malama 'āina*, whether in her thoughts and actions, is a layer of a prism that allows her to connect with the land and to continue embedding Hawaiian practices with future generations. She teaches *malama 'āina* to her students and leads them on ocean clean-up projects to ensure the bay's continued presence.

In listening to Megan speak about Hilo Bay and *malama 'āina*, I noticed the unspoken. For Megan, Hilo Bay connected not only to an aesthetic sense of beauty but also to other factors. Indeed, the bay is without white pristine beaches, and there is rain for most of the year. There are no sunsets as the bay faces east, and there is always the threat of tsunamis, which have occurred in the past. Therefore, Megan's connection to Hilo Bay and her actions to sustain it extends beyond the beauty of a natural place. The bay is imbued with history, community, and culture. These factors are not only embedded in the language used to discuss the bay but the factors underscore the global possibilities of Megan's sense of sustainability. Megan is sustaining more than the environment, equity, and economy. She is sustaining a way of life, a culture, and the land, which she embodies in her person.

Megan's awareness of *mālama 'āina* also stems from growing up during the Hawaiian Renaissance movement of the 1970s. During this period, Hawaiians began working and advocating for sovereignty and a revitalization of Hawaiian practices (Kahihikolo, 2013). Before this time elements of Hawaiian culture were at a critical point of being lost.

Living in Hilo during this period, Megan was exposed to a rejuvenation of Hawaiian culture and witnessed the launching of *Hōkūle'a* in 1976. *Hōkūle'a* is a traditional double-hulled canoe that Hawaiians used to sail from Hawai'i to Tahiti. This voyage retraced the voyage of the first Hawaiians. For Megan, *Hōkūle'a* represents *mālama 'āina*. When discussing *mālama 'āina* and *Hōkūle'a*, Megan references *Hōkūle'a's* Master Navigator, Nainoa Thompson, "I think Nainoa Thompson, the lead Navigator, says it right. The canoe is a metaphor for us, for Earth. If we can't figure it out on the canoe, we're not going anywhere" (Interview, August 25, 2023). The quote from Nainoa Thompson that Megan references in full is, "Our ancestors learned that if they took care of their canoe and each other, and if they marshaled their resources of food and water, they would arrive safely at their destination." (Hawai'i College of Education, 2023). In other words, taking care of the land is a way of taking care of oneself.

Megan's experience in Tahiti helps clarify how she developed a relationship with the land. Leaving Tahiti in her twenties with her husband, Megan lived off of and cared for the land. This alone is no small feat. And Megan's experience proved formative in helping her form a relationship with the land that provided a lens for viewing the world when she returned to Hawai'i and became a teacher. For instance, Megan's experiences fishing is an embodiment of *malama 'āina*. In catching the fish she needs and not the fish she wants, Megan allowed fish populations to continue to live in balance. When she returned to land, the fish were shared communally with the village where she lived. The community members then repeated the

process. The experience of living with the land shifted Megan's perspective when she returned to Hawai'i. Her new perspective allowed her to say that a mall packed with consumerism is bullshit.

4.3.2 Returning to Hilo and One Ocean

In addition to *malama 'āina*, Megan demonstrates other elements connected to the land. Megan's understanding of Hawaiian concepts and her relationship with the land expanded the concept of sustainability. For example, Megan's description of ancient Hawaiians and their self-sustaining life when encountering Captain Cook underscores Megan's awareness of how taking care of the land and embodying such a relationship sustained a population and a culture. The connection to the past as something to sustain supported Megan's emphasis on being tied to the Earth and sea. Moreover, the role of connection appeared repeatedly in Megan's concept map.

In describing the concepts of place, both global and local, Megan draws upon her relationship with the land to highlight interconnectedness. Figures 12 and 13 are two concepts (Global and Local and Place) highlighting interconnectedness. I have circled the link between the concept and Megan's idea about connectedness in black. In writing "everyone tied together" Megan draws on her experience living on a small island in Tahiti and how her ability to sustain herself on the island connected to the sustainability of others. Moreover, Megan wrote "idea of one ocean" as an analogy to explain the interconnectedness of life. For Megan, local and global can be the same; the ocean at Hilo Bay is the same ocean in New York. In other words, Megan's idea that there are different oceans is false. Instead, the ocean represents oneness, albeit with some variation.

This concept is also applicable to Megan's teaching and her school. Not only does Megan teach a class on Pacific cultures and histories, but her student population is also a diverse mix of

Pacific Islanders. Megan uses the concept of *malama ʻāina* in her classes to help students build their relationship with the land: “The kids get it, and they talk about it. But how do we do that? So, it’s about getting land and natural resource jobs, working on the mountain, doing astronomy, or working with a new farming industry and getting water rights back to the lands where they originally were from before the plantation days” (Interview, August 25, 2023). In essence, Megan’s knowledge of how to take care of the land is an idea she has come to embody and share with her students.

In addition to caring for the ocean as a way to care for oneself, Megan sustained her relationship with the ocean and its connection with ancestors. Megan described Hilo Bay as a place of reverence, and memory runs deep in the bay. For example, not far from where Megan and I spoke is Coconut Island, a small island with a marker noting the height of several tsunamis that washed over the bay in the 1940s and 1960s. At one point a tsunami destroyed a village.

Hilo Bay also represents a storied past. Megan experienced this when seeing *Hōkūleʻa* for its initial voyage and later in 2016 for its worldwide voyage to promote caring for the Earth. The Hawaiian concepts embedded in the sailing canoe and the practice of traditional navigation sparked an interest in Hawaiian knowledge Megan and a sense of pride. In Megan’s example of land, the ocean is a link that sustains one’s life and connects one to past ancestors. These ancestors, like Megan, saw the ocean not as a barrier that separates but as a highway that interconnects the Pacific region both spatially and temporally. That is to say, the land is embedded with its history embodied through many of the cultural practices Megan witnessed as a youth and those she teaches in her class. *Hōkūleʻa*’s maiden voyage, and later her voyage around the world carrying the message of *malama honua* (care for the Earth) underscore Megan’s sense of stewardship, care, and love toward Hilo Bay.

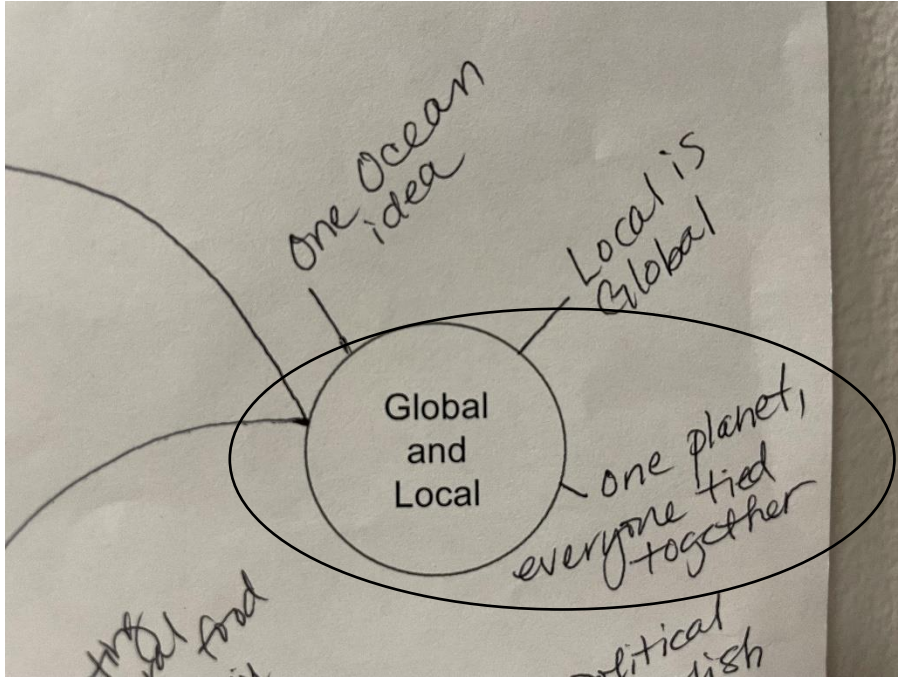


Figure 12: Megan Emphasizes Interconnectedness

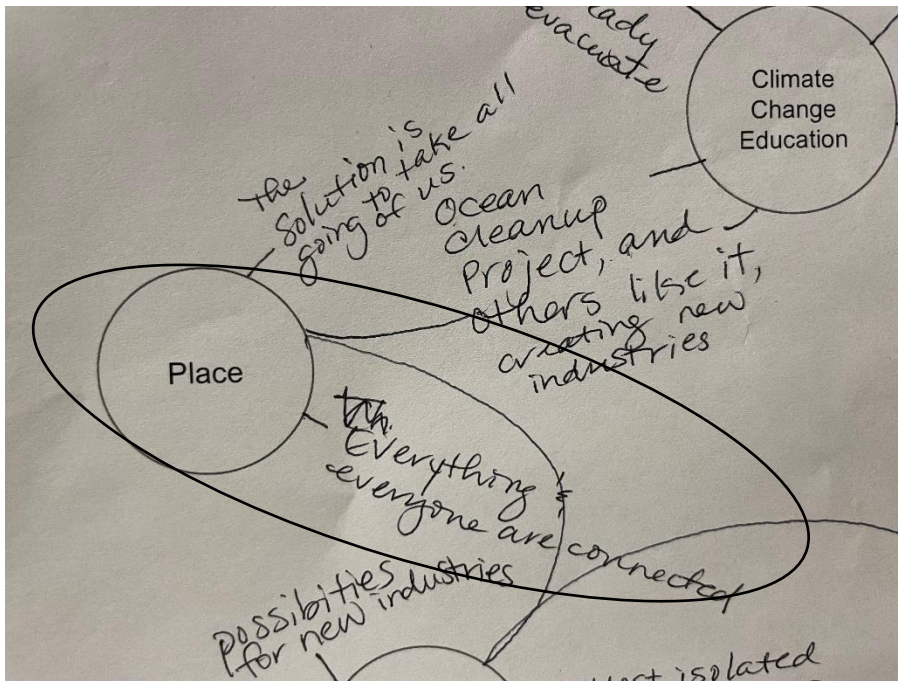


Figure 13: Megan's Second Example of Interconnectedness

4.3.3 *Malama 'āina* and the Vulnerability of Loss

As Megan discusses *mālama 'āina*, she reveals a layer of her relationship to the land. Megan, who has Chinese ancestry and was adopted into a Japanese family, demonstrates a cultural awareness about place. In using *mālama 'āina*, Megan understands why it is vital to take care of the land, “especially in a place that’s isolated as Hawaii or Micronesia, you have to be very mindful of your resources. You might not be able to go to somewhere else” (Interview, August 25, 2023). Megan shows an awareness of Hawai‘i and other Pacific nations’ vulnerability, creating a sense of urgency to take care of the land. In her initial mental map (Figure 13) of climate change, Megan focused on the idea of *mālama 'āina* as not only an embedded Hawaiian concept but also as a mindset to address climate change. For Megan, *mālama 'āina* is not only an embedded idea, but it is also a call for everyone to care for the Earth; “we are all responsible” (Mental Map, August 25, 2023) is a sentiment Megan connects to *mālama 'āina*.

atolls

③ Hawaii's idea of "Malama Aina" is embedded in the culture here, taking care of the land; *Hokulea's journey (worldwide voyage) "Malama Honua" to care for Earth illustrates the role of place expressing how we are all responsible for gaining awareness to our climate change issues and take action.

Figure 14: Megan’s Mental Map Emphasizes *Malama 'āina*

Ultimately, Megan’s stories reveal a deep connection she has with the land that informs who she is as a person. Within her stories is a reverence for Hilo Bay as a place worth sustaining and caring for and a place that sustains her.

4.4 Abigail: Land and Taking Care of Self

When I met Abigail, I found her Hawaiian identity to be strong. We meet at her school in the Makiki Valley, a place she knows well. She is reading about the names of different rains in Hawai‘i. She speaks Hawaiian with the school’s groundskeeper as he passes by. Outside the library is a sign:

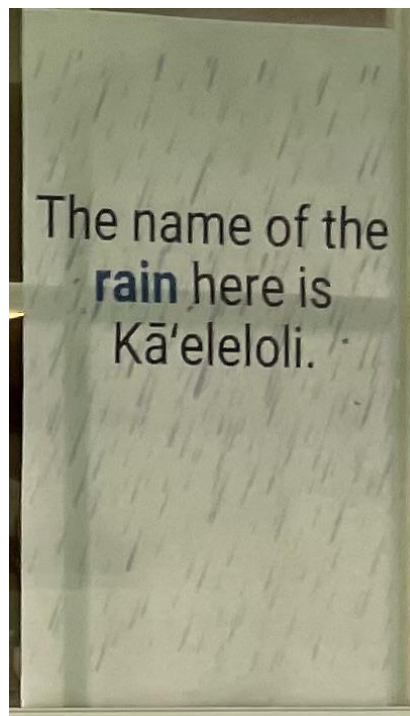


Figure 15: A Sign Outside the Library at Abigail’s School.

She introduces herself by her *ahupua‘a*: “My name is Abigail. I am from the *ahupua‘a* of Makiki, a traditional Hawaii land division in Honolulu and on the island of O‘ahu. I’m native Hawaiian, so my family has been here since the first voyagers” (Interview, August 31, 2023).

The Makiki Progressive Elementary sits on a busy intersection close to downtown Honolulu yet far enough away to avoid the noise and bustle of the city. Banners celebrating joy, community, and aloha are at the school's entrance. The school was created and modeled after John Dewey's lab school and the progressive education movement. Dewey even visited the school when he came to Hawai'i at the turn of the 20th century. As we walk on the ground floor toward the library, a large courtyard is on the right. Stepping stones, designed by students, line the courtyard. Students gather here every morning to share announcements and start the day. The library is at the corner of the courtyard. Posters with Hawaiian words line the library window.

She adds, "For Hawaiians, the *ahupua'a* system was incredibly managed and it provided sustenance for a huge community of people and was incredibly sustainable and supported life throughout the islands" (Interview, August 31, 2023). I asked her where she learned Hawaiian cultural values,

So, I guess this idea that land and ocean and water being important to me, I learned it culturally because I am a Hawaiian person. My father is a fisherman, so I grew up eating food that he would catch, which was a tradition from his own family. I also went to a school that made an effort to teach us about the water cycle and appreciating freshwater and ocean water and learning about indigenous land management and Hawaiian cultural studies. So, I always approaching the land from empathy. We take care of our land, we take care of our environment. (Interview, August 31, 2023)

We sit at a table in her library. The library is lined with culturally relevant texts, reflecting the diversity of Hawai'i. Our conversations drifts toward Hawaiian sovereignty and our favorite books about Hawaiian history. Abigail is pensive when discussing Makiki and climate change. Her voice denotes concern and loss, "as a cultural practitioner who teaches our

community the names of the rains and the winds, and unpacks the layers of knowledge sustaining Hawaiian knowledge and culture is the greatest threat posed by climate change” (Interview, August 31, 2023). For Abigail, the knowledge embedded in the culture and the land serves, as she mentioned, like a library: “I feel my native culture is much more present in part of everyday life, and the language is used more colloquially. It’s baked into the culture of place” (Interview, August 31, 2023). I asked her to draw a map illustrating climate change education. She pauses to collect her thoughts. Although we connect as teachers and speak a Pacific Island language (me Chuukese, her Hawaiian), I understand the pressure and awkwardness of drawing a map of your thinking. Abigail centers on Indigeneity.

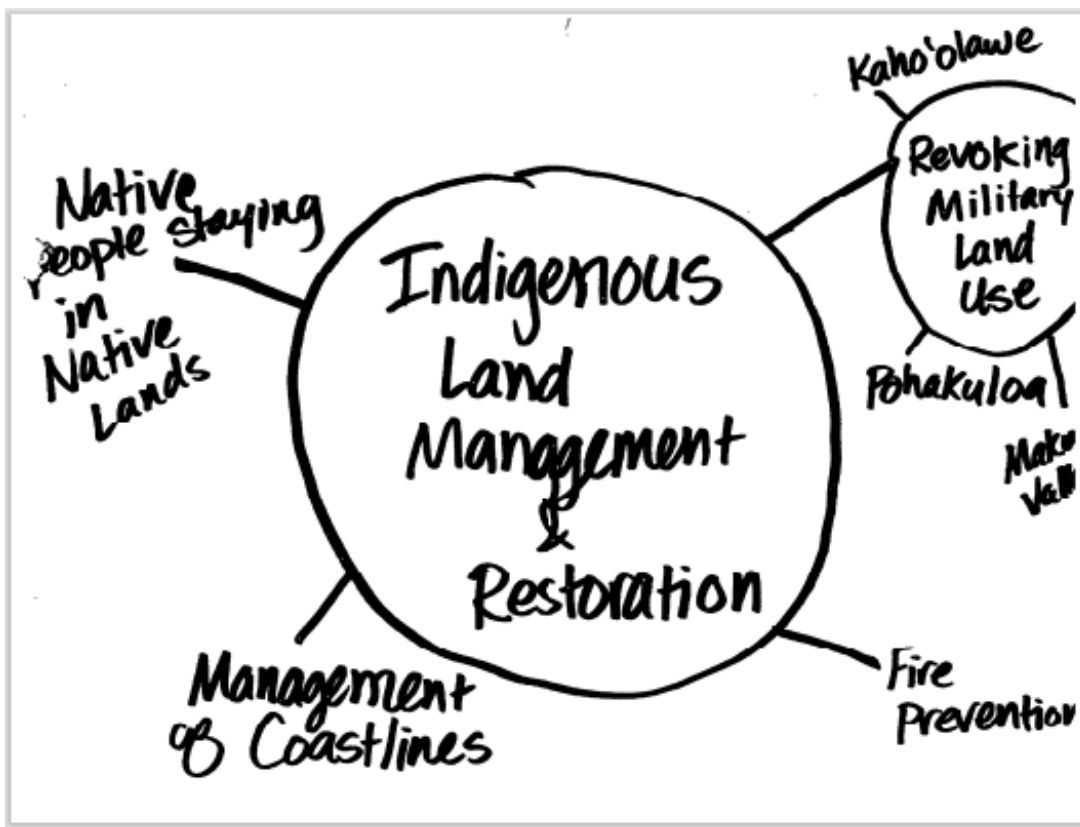


Figure 16: Abigail’s Mental Map.

As she draws, she speaks about Indigeneity and climate change,

We need land restoration if we're really going to make an impact on students' environment and make sure our kids have fresh water and breathable air. And that island Kaho'olawe is really important to me because I feel that that is the place where I learned how to be, what it means to be a Hawaiian person. And so, it is meaningful to me as a Hawaiian person. And then as someone who cares about the environment, it's pretty atrocious. (Interview, August 31, 2023)

Adding to this she stated:

I really think agency over our lands is very important. And that to me, in Hawaii in particular, that means revoking military land use and restoring it to Hawaiian hands because the impact that has had on entire islands, like Kaho'olawe, which was actually the first place I thought of when it was affected by climate change, an entire island was made uninhabitable by military impacts. (Interview, August 31, 2023)



Figure 17: Kaimana Beach. Photograph by Abigail.

When she is ready, she focuses on the image displayed in Figure 17:

And in the traditional land division, the shoreline is the *ahupua'a*. So, this would be the mountain part, and this would be going to the sea. So actually our streams should meet up with the ocean very close to here, but instead it was diverted by the canal and Waikiki. So, I think again, another very beautiful coastline. This is a beach I would go to a lot with my family. It's called Kaimana Beach, but now it's in a place called Waikiki, which was always very valued by Hawaiian people because it was so beautiful and used to be a wetland until the canal diverted all of the streams there. And when I'm down there, I often wonder what it had been like when all the streams were meeting oceans in its place. I think it must've been very beautiful. I would hate to see this coastline go away because of rising sea level change. (Interview, August 31, 2023)

I note a pause when I listen to the recording of Abigail's interview. Her pause underscores her thoughts about the beauty of Kaimana Beach, and one is left to assume if she is envisioning the beach as it is or the beach as it was, a wetland undisturbed by development, and ultimately thriving.

After our introductory interview and our exploration of images we take a sensory tour around the school grounds, which is situated in the Makiki Valley. Abigail has selected the Makiki Valley as a place that is significant to her. When I ask her what she feels walking in the valley:

When I think about place, I think purely through the lens of my cultural identity, where we understand place as a repository of knowledge in itself. I live in the place that I grew up in. I live in this valley where I teach as well. And the valley is named after the type of stone Hawaiians used to make octopus lures. My brother showed me the quarry

used for the lures. And there's many historically significant sites in this valley. There is a lot of history of farmers working in this valley with wetlands, *kalo* (taro). There is an aquifer too and you can go and feel where the cold water is coming from. It's pretty amazing. The valley traditionally had forests of sandalwood and *ohia*, which are native trees. And those trees don't exist because of many reasons. I think climate change has made it more difficult to reforest the forest of this valley with native plants. And that environment doesn't really exist here anymore. (Interview, August 31, 2023)

Abigail looks toward the mountains as we stand next to her school. After living in the valley her whole life, there is concern for the future:

I do think that having spent 33 years in this place, I think that I worry that the stream will dry up. I worry that the valley won't be as green as it is, and I think we do certainly get less rain than I did growing up. I worry that our canopies of trees that keep us cooler in the valley won't be there anymore. I mean, same hurricane that fueled the wildfires in Lahaina also uprooted a tree up the hill. (Interview, August 31, 2023)

We pause at the mention of the hurricane that brought damaging winds to Hawai'i and ultimately the wildfires on Lahaina. The silence speaks of loss and a changing world. We return to her library as a student pops in.

"Ms. Abigail, may I use the fire pole?"

"Yes, of course."

A student scampers up to the second floor and without hesitation slides down the fire pole before going to their next class. Abigail bids me good-bye as she preps for her class.

In October, I meet Abigail again over Zoom to discuss her concept map. She just finished a professional development session on progressive education and we make small talk about how

our school year is going. Abigail makes a striking point that feels like an appropriate if not somber end to this vignette:

I just find climate change to be threatening many, many things in Hawai‘i, not just our climate, but also culture, because climate change has such a ripple effect on so many things. It’s making it less possible for Hawaiian people to live in Hawai‘i. And so Hawaiian people are leaving and it’s creating this sort of vacuum of native people not living in our own homeland. So, it is sort of leading to a displacement of indigenous people. (Interview, October 19, 2023)

4.4.1 Abigail and the Prism of Land

Abigail’s stories describe how the land provides layers of knowledge that sustain who she is as a person and Native Hawaiian. These descriptions of land are simultaneously full of joy and lament. On one hand, there is joy in connecting the community to the land and continuing to sustain Hawaiian knowledge. However, Abigail’s concern that climate change will disrupt the continuation of cultural practices and knowledge is validated by her noticing that many Native Hawaiians are leaving Hawai‘i as it is no longer a sustainable option. Abigail’s conceptualization of sustainability and what she is seeking to sustain raises questions about whether land and culture, when sustained, will sustain other facets of life and society. The converse of this question is how not sustaining land and culture leads to disruption and loss.

Abigail’s knowledge illuminates various facets of the land prism. She is acutely aware of her *mo‘okū‘auhau*. She not only introduces herself by her land division but also intertwines her life in the Makiki Valley with her ancestors, particularly the first Hawaiians. When asked about significant places, Abigail’s attention turns to Kaho‘olawe. Abigail initially chose Kaho‘olawe as a significant place for her, as it is considered by many Hawaiians to be the first island where

ancient navigators from Tahiti settled. The island also holds a crucial role in land reclamation. For many years, the United States military used the island for bomb testing. However, in the 1960s, Hawaiians organized and eventually compelled the United States government to return Kaho‘olawe to Native Hawaiians. Abigail’s desire to include Kaho‘olawe as a significant place central to her identity reinforces the idea that land is an inherent part of who she is as a person and her perspective on life.

In addition, for Abigail, the land is embedded with significance and tells its own story through its mo‘okū‘auhau. For instance, Abigail’s knowledge of the history of Lahaina as a wet marshland comes from her understanding of Hawaiian place names. Embedded in the Hawaiian name for Lahaina is knowledge about the land that informs how Abigail believes land should be sustained.

Another land concept that underscores Abigail's vignette is *kuleana*. When viewing Abigail’s vignette through the prism of land, her desire and responsibility to care for the land is evident through her choice to educate future generations about Indigenous place names and history. This sense of responsibility and caring are closely connected and also factor into what she hopes to sustain.

Abigail’s sense of responsibility is to share her knowledge of the land with her community. Furthermore, by sharing her knowledge Abigail engages in the preservation of communal knowledge for the future. By maintaining and cultivating her understanding of land, Abigail is sustaining her identity, and through her identity comes an orientation for how to make sense of place guided by her actions. In this way, she is embodying knowledge that is embedded in land. The embeddedness of Hawaiian concepts, that is, the inherent knowledge of land is part of the “fabric of society” (Interview, August 25, 2023). And using language to sustain, Abigail

passes on her knowledge, not only to her community and fellow cultural practitioners but to her students whom she teaches Hawaiian concepts.

Lastly, Abigail's care for the land and her willingness to protect it, both physically and intellectually, show a deep connection to *mālama 'āina*. The sense of land Abigail developed throughout her life, coupled with experiences such as visiting Kaho'olawe, empowered her to share her belief that there needs to be greater Indigenous involvement and management of land in Hawai'i. Part of this care means protecting the land. For example, Abigail strongly advocates revoking military land use and restoring the land to its original state before military occupation. For Abigail, the military use of land, whether for training exercises or as was the case of Kaho'olawe bombing the land, is the antithesis of *mālama 'āina*. Abigail's advocacy and arrival at this position did not occur overnight. Instead, it is generational and connected to a more significant movement to reconnect, reclaim, and center Hawaiian knowledge.

And through her sense of *mālama 'āina*, Abigail embodies the concept through how she interacts with the land. For example, in describing the Makiki Valley, Abigail knows the genealogy of the valley and the invasive species that are harmful to it. Abigail is realistic in acknowledging that invasive species may never entirely be erased from Hawai'i but the knowledge of native plants reclaiming the land is an idea that informs her sense of sustainability.

4.4.2 Abigail: Sense of Self through Sense of Land

Abigail's relationship with land highlights both the importance of land and the complexity of climate change. On one hand Abigail's life and identity are closely connected to the land. Her father's work as a fisherman directly involves the land. Abigail herself connects with her Hawaiian identity through the land, whether it be on Kaho'olawe, or through understanding different place names. On her concept map, she wrote "caring for land and self."

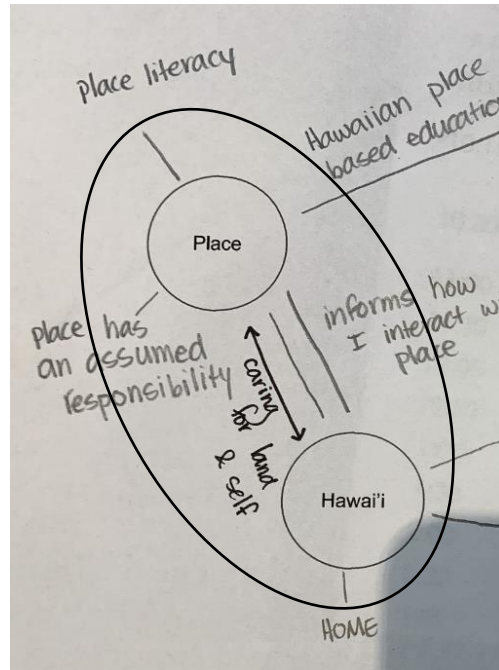


Figure 18: Abigail’s Concept Map Emphasizes Care for Self by Caring for Land.

This suggests that caring for land and self are not mutually exclusive. Indeed, without care for the land, there is no care for self. This is why she comments that cultural knowledge, more so than the physical island, is at risk. Climate change’s ability to disrupt lives, to influence where people live, when combined with other elements such as capitalism, is causing Native Hawaiians to leave Hawai‘i. Abigail refers to this as a vacuum with dire consequences. Thus teaching her community and her students about different place names is a form of climate resiliency by attempting to resist the environmental and social impacts of climate change. It is challenging work to preserve a culture.

2.5 Margaret: Embodying the Past and Navigating Cultures

The din of the coffee shop produced an uneven rhythm. Plates and cups bang against each other as individuals stare at computer screens, clicking on their keyboards. A low-hum of chatter, distinguishable only by its tone of joy, pulses throughout the café. Outside the white walls reflect a bright hot sun as an ocean breeze whips hair into frenzies. Margaret and I stand outside the

coffee shop in Pālolo. Mercifully, we are in the shade. “Shall we walk?” she says. We walk north and see the Pālolo Valley stretched out before us. Gentle slopes accelerate upward at the end of the valley into dramatic ridges. Looking south, Diamondhead, the renowned extinct volcano and symbol of Waikiki, stands tall in the distance. The valley is expansive, over five miles long. The mountain ridge towers over houses and marks the end of the valley. It is a point of tension between the habitable and uninhabitable; it is a meeting point of what the land offers and what it maintains for itself. Margaret adds, “Pālolo means slow-moving red clay” (Interview, August 8, 2023). Looking around, red clay is abundant. “I know the Hawaiian names for the ridge and the wind too.” She describes the history of the valley: “After World War II, there are a lot of Japanese families who fought in the war who settled here. So, most of the houses were built about 1950” (Interview, August 8, 2023). She knows the valley well. It sustains her and she sustains it.

Margaret is from Chile. Her father was an astronomer. She grew-up outside and curious, “I grew up outside a lot. My dad is a huge nut about native plants and obviously likes the moon and everything. I think I grew up very much asking questions” (Interview, August 8, 2023). Eventually, Margaret moved to Colorado and began her career as a teacher. Margaret always wanted to teach: “I was the kid who would line up the dolls and teach them a little lesson before I went to school. I was the kid that always wanted to be a teacher” (Interview, August 8, 2023).

We walk north. The bright sun bears no quarter. Margaret notes different blossoming flowers: “I make a lot of lei and so things that I often smell are different plants and flowers because I always like to know what’s blooming, but also where can I collect them” (Interview, August 8, 2023). Later, I met Margaret at her house where she showed me a picture of the plants she used to make her lei (Figure 19). Collecting, creating, and gifting lei is an intentional act for

Margaret. On collecting she says, “I have knocked on people’s door before and just like, hey, your blue bougainvillea is going off right now. May I have some?” (Interview, August 8, 2023).



Figure 19: Margaret Gathers Native Flowers to Make *Lei*

For our interview session to examine photos of place, Margaret invited me to her home in the valley. Upon arriving at her house, a few miles into the Pālolo Valley, I walk up a driveway with a significant incline buttressed by several breadfruit trees with ripe bread fruits hanging from the branches. Behind the house I see stalks of corn sticking up next to tomato plants. Margaret has a robust garden that she is proud of and that demonstrates a high level of care.

Her favorite memories of the Pālolo Valley connect to land. She notes, “The biggest memories I have are just understanding the land that I till and that I work with” (Interview, August 15, 2023). Her understanding of the land is deeply intertwined and supported by Hawaiian knowledge: “I think understanding the role that land and plays, plays in feeding us is really important. Like in Hawaii, the word for land is that which feeds right? And so you're

constantly in a place of like feeding you whether that's the food you grow or that's your, you know, your spirit" (Interview, August 8, 2023).

Margaret uses the resources of the Pālolo Valley. The valley sustains her. At her house, breadfruit trees shade her driveway; their tall, outstretched branches hold large dangling oval globes. Margaret's cultivation of the land no longer necessitates buying some groceries, especially produce foreign to Hawai'i. The breadfruit in her yard means that she does not "buy potatoes anymore" (Interview, August 15, 2023). An image of Margaret's garden in Figure 20 shows not only her ability to garden, but also her way of sustaining herself and the land.



Figure 20: Vegetables from Margaret's Garden

Margaret's favorite place is her garden. There are cornstalks, tomatoes, and flowers. There are mango trees, too. The valley she says is "known for having a mango tree on every corner. I have mango trees at my house," and adding a little tongue-and-cheek about the numerous mangoes, "I'm over it. I don't want it. You're just in processing mode. And so I have done that for years and my freezer has a ton of mango. I still have mango chutney from three years ago" (Interview, August 15, 2023). As I leave Margaret's house, she gives me a breadfruit

to take home. Looking up into the tree there are many more breadfruit. The tree, like the land, offers sustenance if one is willing to take it.

4.5.1 Margaret and the Prism: Caring for Land and the Past

In Margaret's vignette, the past is prologue. Margaret's awareness of embedded Hawaiian concepts and her embodiment of *malama 'āina* allow her and her family to come close to being self-sufficient. In developing and using the land for sustenance, Margaret's self-sustaining garden underscores Hawai'i's long history of being a self-sustaining island. In using the land, Margaret is part of a mutually beneficial relationship. For example, Margaret's garden, including breadfruit and mango trees, provides sustenance throughout the year. The land benefits from Margaret's cultivation and care and her avoidance of using plastics and single-use packaging.

For Margaret, the land is a sustaining force. The land provides sustenance through nourishment that fosters empathy, builds relationships, and cares for Margaret's spirit. Margaret's creation of lei using native Hawaiian plants sustains a relationship with the land and its inhabitants. In creating lei using native plants, Margaret sustains cultural practices. Moreover, in making the lei, Margaret gives it to someone, perhaps a loved one or a neighbor, and uses the land to sustain relationships.

Analyzing Margaret through the prism of land, concepts such as *malama 'āina* and *mo'okū'auhau* become visible. One example of Margaret embodying *malama 'āina* is through her work cultivating her land. Margaret's ability to develop and save food is a model for caring for the land. For Margaret, there is no waste, and what waste there might be from food is returned to the Earth as compost. Part of Margaret's desire to cultivate the land is tied to her own history growing up in Chile and Colorado and having a father who was a nature enthusiast.

However, the other part of Margaret's desire to sustain the land stems from her knowledge of Hawaiian practices and self-sustaining land systems such as the *ahupua'a* system. In her desire to continue practices of sustainability that connect to the past, Margaret displays an awareness to the *mo'okū'auhau* of the land. Her knowledge to continue the work of past generations underscores her continual emphasis on understanding the history of the land. In this sense, Margaret also demonstrates a *kuleana* to preserve the land, preserving an important part of her identity that rests upon a relationship built with the land.

In many Pacific Islands, breadfruit is a wonder fruit. The trees are among the highest-yielding food plants and require very little care. Culturally, breadfruit trees not only provide food but are also used to make canoes. Margaret has two breadfruit trees on her property. Moreover, Margaret is very intentional in using the fruits the trees produce. For example, Margaret discussed using breadfruit to make chips and flour or to roasting it. And if her trees produce more than she can eat, she freezes it. In many ways, Margaret's self-sustaining gardening embodies a distant Hawai'i when what the land offered is what was used.

4.5.2 Margaret and Sustainability Embodied

For Margaret, sustainability is an everyday embodied practice, and a crucial element to sustaining a relationship with the land is understanding the language and culture of the land. Margaret, who was born in Chile and lived in the United States, did not grow up learning Hawaiian concepts. However, she displays a curiosity and willingness to engage with the land, and to learn from those who teach. The act of learning and doing is a method for not only sustaining the land, but for continually embedding ideas and knowledge within the land and embodying one's relationship with the land through language and action.

Margaret learns about Hawaiian culture and history through embodied actions connected to Hawaiian cultural practices. By engaging with the land and forming a relationship, Margaret also reveals how she approaches sustainability. That is, sustainability can only happen if there is action. In caring for and working with the land, Margaret uses the land not as a recreational plaything such as a yard, but as the Hawaiian word for land, *'āina*, which means that which feeds. Another way of conceptualizing the term is that land feeds as long as it is cared for. The relationship to land for Margaret is building connection and feeding Margaret spiritually. In caring for and restoring the land to its original Hawaiian purpose, Margaret is engaging in a relationship that also sustains life.

Another example of Margaret embodying her relationship with the land is through making lei. In the process of making lei, Margaret is restoring a cultural practice by using native plants. Moreover, she is sharing her knowledge through the intentionality embedded in lei making. Leis are intricate floral arrangements made for many different occasions, or in some cases, no occasion at all. Furthermore, the importance of lei making is in its intentionality. Lei are created with an individual in mind who receives the lei. The intentionality in who the lei is made for as well as the acknowledgement of the land used in making the lei is significant.

4.5.3 Navigating Cultures

In Hawai'i, Margaret navigates multiple cultures and knowledge systems. For one, Margaret comes from a Western background, as her father was a scientist. Yet she is also learning Hawaiian, knows how to make lei (including endemic Hawaiian plants), and eats and cultivates food important for Hawaiian culture. Margaret's actions toward understanding Hawaiian cultural practices raises questions about how Margaret became someone who embodies Hawaiian culture.

One explanation for how Margaret navigated multiple cultures is that she demonstrated awareness and intentionality in her learning. Margaret's awareness of place led her to seek opportunities to learn about Hawaiian culture. Her knowledge is evident in her ability move between Hawaiian and Western cultures. When describing how she developed cultural awareness, she said,

I was thinking about really foundational experiences and I think visiting with cultural practitioners and going to historical sites was number one for me. I also think we're still living in the Hawaiian Renaissance. There's a lot of things (culture) that were lost and people really fought to bring back. Like Hōkūle'a, you know, there's things that are reemerging. (Interview, August 15, 2023)

The second explanation is that the land acts as a bridge between cultures and that cultivating and caring for the land is a universal language. Margaret understood and embodied this explanation through her actions. She realized the land's potential for acting as a repository for culture, and by engaging with the land, Margaret enabled preservation.

4.6 Nathan: Land and *Mo'okū'auhau*

Nathan and I sit on an open terrace on the second floor of his school. He teaches seventh and eighth-grade social studies at West Side Sustainability, a school dedicated to teaching about issues of sustainability. The wind is blowing fiercely due to a hurricane far south of Hawai'i. Nathan grew up immersed in Hawaiian culture. His family is Hawaiian and he attended secondary school at a high school dedicated to teaching Native Hawaiians. Nathan reflects on his time as a student:

Once I think we hit fourth grade, that's when we first started learning about Hawaiian history. And so every year after that it's been repeated a little bit. So, we're either tired of it by the end or we really understood it. So, it was all in the classroom, which kind of

made it boring. But towards the end of my high school career, like junior, senior year, that's when we started taking field trips and stuff. And then we started to really understand events. And that was really the connection we [the students] needed because that's how our ancestors taught and learned as well. (Interview, August 8, 2023)

Nathan's description demonstrates the power of connecting history to place. He not only connected to the place but also connects to his ancestors as he is learning how they learned.

Nathan continued by discussing the importance of land during his childhood at Waimanalo Bay: "One time my papa and my grandpa took me and my brother down to the ocean. We used to throw nets to catch fish. But then there was one day that he actually taught us how to scale and clean a fish" (Interview, August 8, 2023).

As the wind blows, the conversation transitions. I asked Nathan where he learned to value the land, and he responded, "At home. My parents, my grandparents, my aunties, and my uncles did a really good job with us in the cultural aspects, and learning about the land, the ocean, and what our connections were and I had a lot of fun because it was mainly family time" (Interview, August 8, 2023).

Family and land for Nathan are a singular relationship: "If I go to a place and it's really only me, yes, I'll enjoy it. I'll have fun and just come to appreciate it. But if I get to experience it with my family and stuff, then it just builds a stronger connection there" (Interview, August 8, 2023). Our conversation pivoted to talking about climate change, and I ask Nathan, "Do you think the main issue is climate change or over-development?" He responded,

It's both of them. They work together, they have an effect on each other. Less development. Or just smarter development. Some places need to be left undeveloped and

just need to be left for preservation or cultural usage or for the community. (Interview, August 8, 2023)

Following our introductory interview, Nathan and I met at *Wawamalu*, or as it's also called, Sandy Beach (Figure 21). We sat at a table. The beach, the ocean, and the people radiate energy.

Wawamalu means a shaded valley or in the shadow of the valley. So, basically, when Hawaiians first arrived here, coming in from the ocean, they saw the valley and stuff and it was kind of like that morning time. So, the sun was rising up behind it. So, this beach was in that shadow area, so it was named the shaded valley. (Interview, August 16, 2023)

It is midday and there is little shade. The beach is on the windward side, which brings in a nice breeze. The ocean swells come fast and strong. Surfers test their mettle while swimmers ride the waves. Nathan looks out and comments, "Tis a good place to come if you like body boarding, body surfing. Surfing as well. But then if you just like to enjoy the beach, it's pretty, there's good access and it's pretty spacious both in the beach area and the park area as well" (Interview, August 16, 2023).

Sandy Beach is a popular spot for locals. One reason for its popularity is the lack of commercialization: "They haven't really done too much development out here" (Interview, August 16, 2023). Nathan's appreciation for the lack of development is a recurrent theme. At Sandy Beach, Nathan tells the story of why the beach is important to him:

There are tide pools and stuff. So, when we were little kids, my grandma and my grandpa would take us down here. We were able to play in the tide pools and stuff. So, we got to find a lot of shells, a lot of small fishes, crabs and stuff. So, it's just a nice playground type of an area. Our parents, our grandparents would talk to us about what we found in

the fishpond or they would encourage us to look it up when we got home. Like, oh, what shells did you find? What fish did you see? So that helped me learn about the culture. We weren't just here just to play even though that was the big part of it. (Interview, August 16, 2023)

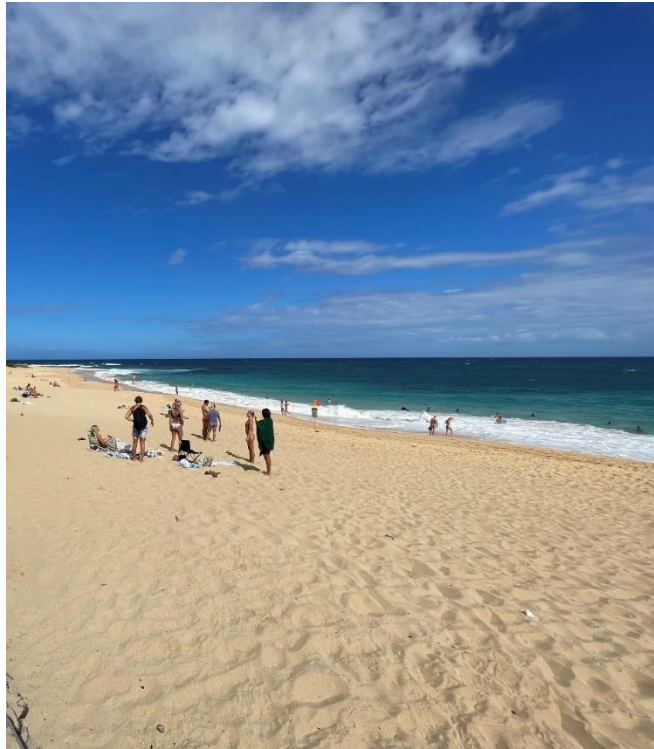


Figure 21: Sandy Beach. Photo by Josef Donnelly.

Nathan organizes his images at a park table. He lines up his images. His most significant images connect the land to his family. One image is of his grandparents' land on the North Shore of Hawai'i. The other image is of Wyman beach, a site where his family taught him cultural values.



Figure 22: The North Shore Beach Where Nathan Learned to Respect the Ocean. Photo by Nathan.



Figure 23: Nathan's Family's Land on the North Shore. Photo by Nathan.

Nathan looks at his images especially ones connected to his grandparents. Speaking about the beach on the North Shore (Figure 22), he connects spending time with his family to learning about respect for the land: “My family took us there to learn how to surf, learn how to survive in

the water. Asking us what happens if this happens. So it's really where we learned how to swim and where we're introduced to the water" (Interview, August 16, 2023).

Placing an image of a house (Figure 23) as his most significant image to represent place, he explains, "A lot of memories built here. And then just the history of my family built into this space too, because in my dad's side, this is where my papa with them grew up. We want to keep it in the family as much as possible for as long as possible. So a lot of fond memories over there" (Interview, August 16, 2023).

Following Nathan's arrangement of his images, he begins the final task, drawing a concept map. He starts at the concept, Hawai'i. As he writes, he emphasizes the idea of respect. He moves in a circular manner, adding arrows and discussing place. He discusses his thought process as he writes, "When you have respect, you can have connections, connections to people, other places, and other ways of thinking. Hawai'i, "it's about sense of responsibility to take care of the place and our *kuleana* (respect) for the place" (interview, August 16, 2023).

After we said goodbye I walk along the beach. Since Nathan choose to meet at a beach I wanted to swim. I think about respect. What it is and what it looks like in practice. As I enter the water I wait for a wave. The water picks me up and throws me back on the shore. I realize I am powerless against such a force. Respecting the land is clearer now.

4.6.1 Nathan: Building a Relationship with Land through Genealogy

Analyzing Nathan's vignette through the prism of land surfaces the importance of *mo'okū'auhau*. Not only does family underpin Nathan's sense of place, it also influences how he learned and his actions toward and with the land. More specifically, Nathan's relationship to the land includes generational learning that helped him develop a sense of *kuleana* for the land.

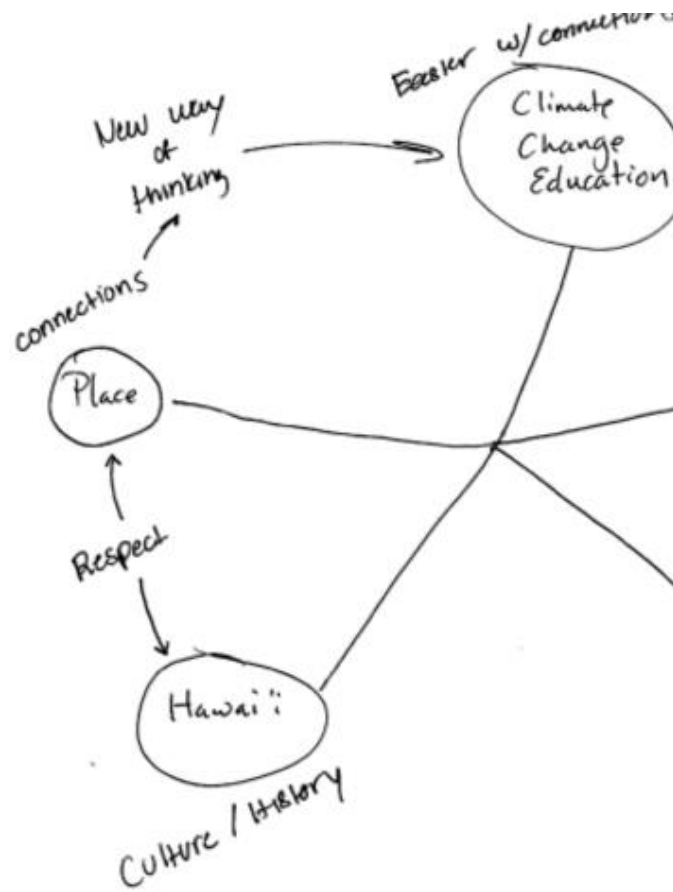


Figure 24: Nathan's Concept Map

In Nathan's vignette, family is central in building a relationship with the land. Nathan and his family maintain deep connections to their land. For example, as a child, Nathan's sense of the importance of Hawaiian history was embedded in him not through school but through visiting sites with his family. Many practices, such as fishing and cleaning fish, hold embedded knowledge and required experience and training to master. Indeed, the experiential is an essential facet of how Nathan learns about his Hawaiian heritage and culture. He spoke about experiences with his grandparents and parents interacting with the land. This type of learning is a continuation of how his ancestors learned. Furthermore, the experience shapes his position toward how land should be used, which includes not using it at all and leaving it at rest.

Examining Nathan's vignette through the prism of land, one sees the importance of *mo'okū'auhau*. Yet Nathan's vignette goes beyond discussing ancestors. Instead, Nathan's vignette reveals an expansion of what it means to learn. Most of his learning was experiential and came from his family. Activities such as fishing, learning how to clean fish, or surviving in the ocean were formative experiences during his childhood. These are hands-on practices that require a feel and an awareness of the situation. For example, reading about the waves at Sandy Beach can't convey their power nor how to interact with them. Through hands-on learning, Nathan believed an individual can learn how to practice respect (*kuleana*) toward the land.

For Nathan, *kuleana* is a relationship with the land primarily understood through the lens of his family. As a child, he learned to respect the land when he visited Sandy Beach with his parents and grandparents. The beach is known for strong currents, and his parents and grandparents taught him how to respect the ocean. In selecting an image of his family's land, Nathan underscores his sense of responsibility to maintain and keep the land in the family. In analyzing Nathan's image of his family (Figure 22), he focuses less on the mountains in the background and instead on the family getting together and enjoying each other's company. For Nathan, relationship with land comes not from oneself but from community. Moreover, this community holds embedded knowledge and embodied practices to care for and respect the land.

Nathan's concept map also emphasizes respect (*kuleana*). Nathan drew a connecting line between Place and Hawai'i with the word respect in the middle. In describing why he wrote the word respect, Nathan said, "Having respect for the place means that you care for it. And then also just having respect for Hawaii in general, just for me and stuff through learning about the place" (Interview, August 8, 2023).

Nathan's respect for the land connects to how he sees Hawai'i's future. In describing development in Hawai'i, Nathan believed some land should be left undeveloped. But also, Nathan believes that not having hands-on experience with land or not having an awareness of the embeddedness of the history and culture in the land will lead to poor decisions about land development in the future. He discusses development by stating that "the government is not good at developing places in a sustainable, smart way" (Interview, August 8, 2023). In this sense, Nathan's relationship with the land entails a responsibility to land and considering the land's perspective when discussing development in Hawai'i.

Ultimately, Nathan's relationship with the land is built on *kuleana*, or respect. For Nathan, cultivating respect occurs best through feeling and sensing the land. This sentiment has important underpinnings for how Nathan approaches climate change education. That is, if a student is going to learn about climate change, they must first respect their place. By respecting place, Nathan suggests that individuals develop a relationship with it by understanding a place's history as well as why this place is important. For Nathan, this often occurred through experiential learning. This implies that climate change education should entail experiential and embodied learning to help students build relationships with the land.

4.7 Daniel: Hula and Embodied Knowledge

Daniel's school is expansive. A large grassy knoll sits in the middle and is surrounded by historic buildings. Students walk to and from class. The distance covered in my mind is several city blocks. I am lost so I wait by the office until Daniel walks down to pick-me up. We walk across the knoll making small talk and come to rest at a lily pond fed by a natural spring.

Daniel is originally from New Jersey but has lived in Hawai'i for over forty years:

I moved here in 1981. In 1985, I joined my first *halau*, which is a hula school. And became fascinated with the culture, but also with hula, if you don't know the language, it makes it a lot harder to understand what you're dancing to. So, in 1988, I enrolled in the Hawaiian Language Program at the University of Hawaii at Manoa. (Interview, August 9, 2023)

I ask, "It's my understanding that land and ocean are very important in Hawai'i, is that correct?" "Oh yes," he replied. I ask a follow-up question, "Where did you learn these values?" He responded,

In hula, you end up learning a lot about a place. For instance, the first *halau* (school) I was in, we were doing a chant about the island of Molokai, and we took a trip there with a Kumu hula (lead/master hula instructor) whose family was from there. He knew a lot about the island, and it was so eye opening to hear it from him, his perspective, and I'm saying I think we all felt the same way. We felt very connected to that island after having spent some time there, hearing the stories, and seeing the places. (Interview, August 9, 2023)

Practicing hula on Molokai, Daniel experienced and appreciated the land through its serenity, describing Molokai as "pristine and very pretty, and the people are so nice" (Interview, August 9, 2023).

Daniel's hula experience begot another experience as he later enrolled in Hawaiian language courses. As such, the embodied sensory experience of hula generated a passion within Daniel to learn Hawaiian and Hawaiian cultural practices. In this case, Daniel's experience with embodied practices led to awareness of embedded Hawaiian knowledge. When discussing teaching, he shares how he talks about land in his class on Hawaiian culture: "We look at the

ahupua'a system, what Hawaii was traditionally, how they used land. It's very sustainable. Right? And one of the things they learn, hopefully they learn it, is that the whole idea of being in *ahupua'a* means you are self-sustaining" (Interview, August 9, 2023).

4.7.1 Cultural Awareness, Cultural Boundaries

Several weeks later, we met at a café in the Pālolo Valley to continue our sessions. He describes the Pālolo Valley as one of his favorite sites as it is where he lived in Hawai'i when he was young. The valley is part of the Pālolo *ahupua'a*, which includes one of Daniel's favorite spots, Diamondhead (Figure 25).



Figure 25: Diamondhead. Photo by Daniel.

Daniel, who always looks reflective, says, "Diamondhead is such a symbol of Hawai'i. I just love this picture. And it shows how, despite all the development, how clean it still looks. The air is clean, the water looks blue and beautiful" (Interview, August 30, 2023).

I asked him if he had any specific memories of this area. My question may have been too broad. After living in Hawai‘i for forty-plus years, Daniel has many memories. He brings up his dad: “My dad came here for a visit, and when we were driving down the street, he said, this looks like New Jersey” (Interview, August 30, 2023). Daniel’s decision to add this memory highlights the power of place attachment. In this case, place attachment manifests by connecting similarities of one place, e.g., New Jersey, to another place, e.g., Hawai‘i. Moreover, when considering land as a prism, there is overlap in how Daniel feels a particular *mana* in the land that connects his father to Hawai‘i.

Our conversation meanders from discussions about New Jersey to the beach to fishing at night. Daniel holds a wealth of information about Hawai‘i but also a self-reflective distance from considering himself Hawaiian. This point is salient when we discuss Hawaiian ‘*aumakua*:

‘*Aumakua* is like family. They are spirits that protect you. Traditionally, people would have an ‘*aumakua*, maybe more than one, and it would be not necessarily an animal, but sometimes it’s a plant. The belief is that if your ‘*aumakua* is a shark, then number one, you never eat a shark, but number two, the shark will protect you, so you wouldn’t be afraid of them. (Interview, August 30, 2023)

Daniel pauses before making a distinction:

Because of decades of ignoring culture and language, most Hawaiians don’t know their ‘*aumakua*. And nowadays people do select their own ‘*aumakua*. And I have mixed feelings about that. I particularly don’t like it when non-Hawaiians do it. It’s not part of their culture, and I would never do it personally. (Interview, August 30, 2023)

When we conclude our sessions, Daniel conducts the final activity of adding ideas to a concept map with five different concepts. Daniel drinks a tea. He is a reflective individual with

years of teaching experience. As he fills in his concept map, he talks through his thinking process. As he is writing ideas for two concepts (Place and Hawai'i, see Figure 26), he pauses and in a thoughtful moment where memories from previous years appear to come together in a moment of clarity he shares his thinking about teaching Hawaiian.

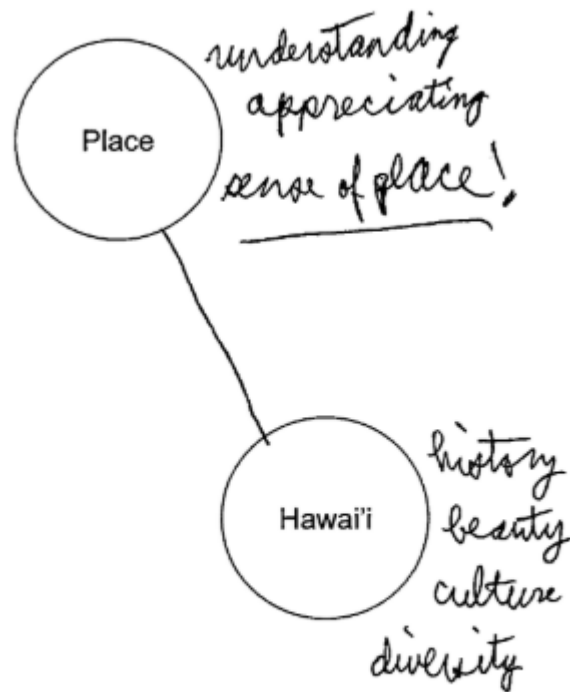


Figure 26: Daniel Connects Place and Hawai'i

I've included his statement in full as it reveals the love Daniel has for Hawai'i and how his actions embody that love:

Can I share something? The reason why is because this is just very pertinent to me. I came to this school in 2008. In 2010, I created a new course, which eventually died out because of lack of numbers. And that is due to the number of required courses that kids have to take in social studies. And the new course was based on the Hawaiian culture class. And it was a more advanced version of it, and it involved a lot more history,

and it was basically asked for by students. So that's why I created it. It went through all the channels, and it went and it ran for several years. But throughout this whole period, 12 years I pushed for a mandatory Hawaiian history class, which we don't have, and sadly are probably the only high school in Hawaii that does not have it, which is an embarrassment. And it took 12 years and it is finally going to happen next year when I'm no longer here. But the groundwork has been laid and there are four or five people in our department who are chomping at the bit, can't wait to teach it. And a big part of it is that you've got to know where you're from before you study European, Asian, et cetera, which is required, right? So, sense of place is super important. (Interview, August 30, 2023)

Daniel's connection to the land illustrates how a land-body connection developed his relationship to the land. Daniel deepened his desire to embrace Hawaiian culture through his hula movements, leading him to advocate for a return of a Hawaiian culture class. Furthermore, through the embodied experience of hula, Daniel understood embedded Hawaiian knowledge connected with place. Hula involves dancing, complex chants, and intricate movements that represent Hawaiian knowledge. For Daniel to be good at hula required him to know the language of hula and the movements.

4.7.2 Daniel and Preserving Culture

Daniel's relationship with the land through hula allowed him to see land through many different layers. In this sense, Daniel's practice of hula signifies a relationship with land and Hawai'i through embodied learning. Indeed, some hulas are generational. In Daniel's example, hula provided a connection to the land that helped him know the land through movement and language. By learning hula and later Hawaiian, Daniel came to a deeper and more nuanced

understanding of Hawaiian culture. In embodying Hawaiian culture through hula, Daniel came to understand embedded Hawaiian concepts. This allowed him to advocate for and teach about land and Hawaiian culture at his school.

When using the prism of land to analyze Daniel's vignette, many layers inform how Daniel makes sense of the land. One example is that Daniel learned *aloha 'āina* through his hula practice. Daniel's love of Hawai'i is reflected both in his acknowledgment that Molokai is one of his favorite places and in his belief that students need to learn and know about Hawai'i before they learn about European history. Because he learned Hawaiian to better practice hula, he learned different land-based concepts embedded in the culture and language. For instance, Daniel taught a class on Hawaiian cultural practices and spoke to his students about the *ahupua'a* system of sustainability.

By practicing hula, Daniel sustains a vital cultural practice. He also ensures the generational sustainability of hula as he teaches cultural practices and shares cultural knowledge with his students. Hula allowed Daniel to engage in other knowledge connected to the land. For instance, Daniel shared that to do hula well, it is necessary to learn Hawaiian. He described enrolling in Hawaiian studies at the University of Hawaii at Manoa in his interviews. In learning Hawaiian, Daniel came to understand the importance of land, which led him to advocate for the requirement that students at his school take a Hawaiian cultural studies class.

Likewise, in Daniel's description of his advocacy for a permanent course on Hawaiian culture, several elements are connected to land. For example, Daniel teaches his students about the *ahupua'a* land division system and how Hawai'i was once self-sustaining. In addition, Daniel integrates the importance of *mo'okū'auhau*. Indeed, one of his projects in his Hawaiian culture class is to have students research their *mo'okū'auhau*. For Daniel, much of his knowledge of

Hawai‘i came through hula, which embodies history through its dances and chants and sustains generational knowledge just as the library retains knowledge of books of the past.

Daniel’s advocacy, a testament to his commitment to sustaining generational knowledge and developing a sense of place, is a significant and intentional act. The fact that Daniel has dedicated over a decade to teaching at his school and has tirelessly advocated for a mandatory class on Hawaiian culture, which has only recently come to fruition, underscores the vulnerability of knowledge. Moreover, it highlights the need to shift the focus from Western educational paradigms, such as students learning European history before Hawaiian history, to a more balanced and inclusive approach.

Yet, in taking responsibility to share and preserve Hawaiian knowledge, Daniel is also cautious and acknowledges boundaries. He never claims to be Hawaiian and contends that some knowledge, for instance, the *‘aumakua*, is inappropriate for him to use. This shows a sensitivity between both Indigenous and Western knowledge and the limits of what is appropriate. Daniel can teach about and advocate for Hawaiian knowledge, but he is also aware that he cannot claim ancestry.

In this sense, Daniel engages in principles underscored in models of Indigenous sustainability. These principles include cultural sustainability, reciprocity, and respect (Corntassel, 2012). By acknowledging his limits, Daniel respects the land while helping sustain Hawaiian culture through his knowledge and advocacy.

Furthermore, Daniel describes the vulnerability of knowledge and the necessity of embedding knowledge to ensure its continued existence. Although it is assumed that place-based learning has always been prevalent in Hawai‘i, Daniel’s example brings that assumption into question, as students at his school were not required to learn about place or culture but were

instead required to learn about Europe and European history. Ultimately, Daniel is sustaining much more than just the environment. Through his advocacy, he is sustaining generational knowledge.

By practicing hula, Daniel forms an orientation that is entwined not only with the land but with other land-based Hawaiian concepts. For example, Daniel learned about the island of Molokai and its significance through hula, which generates and perpetuates *mana* by restoring knowledge of the land (Crabbe, 2017). In practicing and teaching hula, Daniel is engaging in a *mo'okū'auhau* by preserving place history, which can be passed on “to the next generation, whose connection to the past allows them to be liberated” (Crabbe, 2017, p. 256).

In summary, Daniel's relationship to the land through hula influenced who he was as a person and educator. His active embodiment of Hawaiian cultural practices shapes his perspectives on Hawai'i and forms within him a sense of responsibility to preserve and sustain the culture and the land. He also realizes his limitations and negotiates a space between Indigenous and Western worldviews that activates a type of knowledge in which the body and mind include both Indigenous and Western ideas. In doing this, Daniel is better prepared to advocate for sustainability by engaging various knowledge systems connected to the land.

4.8 Sophie: Sustaining Culture and Intentionality

It is October and the rhythm of school and life keeps a steady beat. The crisp wind and fall's encroachment on the vestiges of soft summer evenings signals a change. Sophie and I last spoke about sustainability, land, and Hawai'i in August. We spoke as experienced teachers and as individuals who thought deeply about issues of sustainability. Now we sit in front of our screens, waiting to connect to Zoom, and there is a brief moment of exhilaration when our

connection is made and faces appear on the screen. Sophie appears on the screen, and we greet each other and simultaneously agree that we feel like we are getting behind in school.

Sophie is a teachers' teacher. She is experienced, advocates for her students, and teaches relevant and timely content. She is continually learning and undertaking new projects. Her classes are well-received and her recognition as a former teacher of the year underscores her passion for teaching. She is passionate about sustainability, and her experience provides her with the ability to maintain a pulse on sustainability issues in Hawai'i. She is "by education, a historian. So I found myself diving back into old historical photos" (Interview, October 10, 2023).



Figure 27: Sophie's picture of Hawai'i Kai in the 1960s.

This vignette starts at the end. It starts with a photo Sophie shares of Hawai'i Kai (Figure 27)

The picture was not taken by Sophie but was selected for its historical and cultural significance:

I have this thing where when I'm walking around or hiking or whatever, I try to imagine what places were like before they were developed. And it blows my mind, especially in Hawai'i because so many places have been transformed. I was just listening on the drive home from work about Hawai'i Kai, where I live, and that I didn't realize that where my condo sits was basically dredged up from a lake and this whole area. (Interview, October 10, 2023)

The photo for Sophie represents,

The vulnerability of beautiful places and the insanity of a lot of these development projects. So that's what it makes me think of with regards to place, is that humans have some pretty insane ideas about how they can transform place. And yet, if you ever are in Hawai'i Kai, Koko Head (a tall and ominous extinct volcano) just sits there looking down at everything. As an effect it just sort of looms there as if to say do what you want, but I'm not going anywhere. (Interview, October 10, 2023)

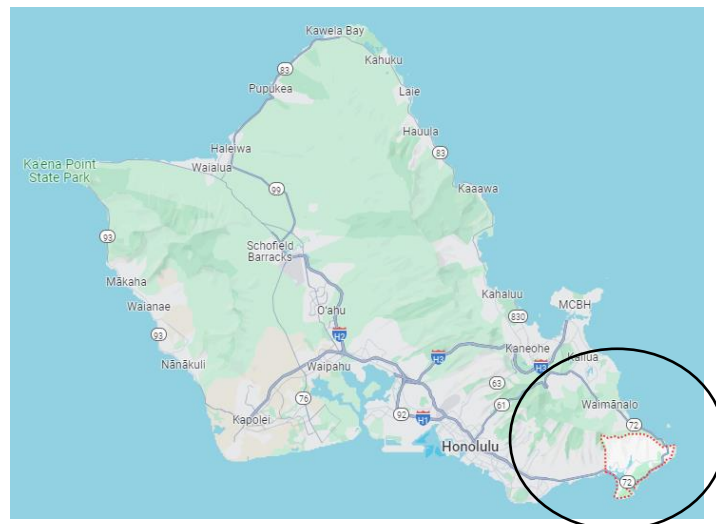


Figure 28: Hawai'i Kai. Created with Google Maps.

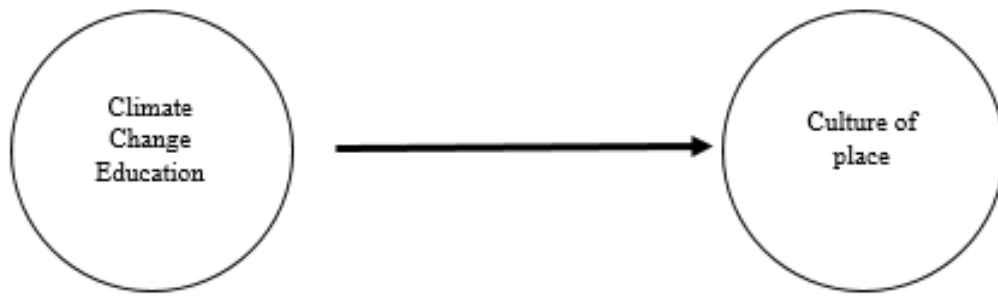


Figure 29: Sophie’s Concept Map.

Later, Sophie described her concept map and connected climate change education with culture of place. Her face lights up when she shares that her class talked with Tony Pippa of the Brookings Institute and one of the architects of the United Nations Sustainable Development Goals: “One of the things that Tony said was if they could go back and do the SDGs again, they would have one for culture, the United Nations did not include culture as a sustainable goal” (Interview, October 10, 2023). For Sophie, climate change will not only impact the land but also disrupt cultures. As such sustaining culture underscores Sophie’s teaching philosophy and is part of the reason why she teaches Hawaiian sustainability.

It is August, and I wait at the exit of the parking garage at Pacific Islands Prep. The parking garage has six levels, which gives a sense of the size of the school. Sophie meets me and leads me to her classroom. She holds a book titled *Thinking Like an Island: Navigating a Sustainable Future in Hawai‘i*. In the book, multi-colored tabs denote extensive use. She is passionate and knowledgeable about sustainability, and she shared her journey to teaching about sustainability:

I first started my path to local sustainability because I’ve been doing Model UN, but then someone reached out to me saying that people that were looking for someone to teach a Hawaii Sustainable Development course to public school students. And I

applied for the job and they just handed the whole course to me and said, go.

(Interview, August 30, 2023)

Sophie's course on local sustainability proved formative for her teaching and understanding about climate change. She connected with local community leaders and developed a sense of place, which is tied to sustaining the land,

We had 11 speakers and they were all local people connected to various parts of sustainable development. And so I was learning with the kids through all of this, and it just made me realize that everything from how housing is completely unaffordable for local people here, how tourism overshadows every other industry and essentially controls the decisions that the government makes, that we have a crisis of energy and transportation. We're so dependent on fossil fuels. And the fact that decisions about sustainability are framed in general Western thinking, which can be devastating in this island culture, this far away from other civilizations, because 90% of all of our resources are coming from outside. (Interview, August 30, 2023)

While explaining her course, Sophie shifts and discusses her own personal experiences that helped form a sense of place and what it means to sustain. Sophie shared that moving to Hawai'i meant teaching her children to be comfortable in the ocean: "I was going to have to protect them from drowning. So, I tried to get them out in the ocean and swimming and comfortable with all the kinds of conditions of the ocean as early as possible" and "Last summer we didn't do anything except go surfing every day for three hours and faced a lot of very scary things together" (Interview, August 30, 2023).

Sophie's connection to the land provides a window to access different cultural practices. One practice Sophie venerates is rowing: "It's amazing. There's something very spiritual about it.

Hawaiian culture is everything here. It's all cultural here. And the surfing mentality here is very connected to, I would say spirituality and a certain kind of attitude about nature as well as canoeing is a deep part of Hawaiian culture” (Interview, August 30, 2023).

Towards the late afternoon, we walk outside with the Ala Wai (see Figure 30) canal below. For Sophie the Ala Wai canal underscores many of the issues connected to climate change: “It [the canal] circles this school. It comes over here too. And the Ala Wai is a canal from the runoff from the mountains over here. And it is certainly going to flood this community in the next 70 years” (Interview, August 30, 2023).

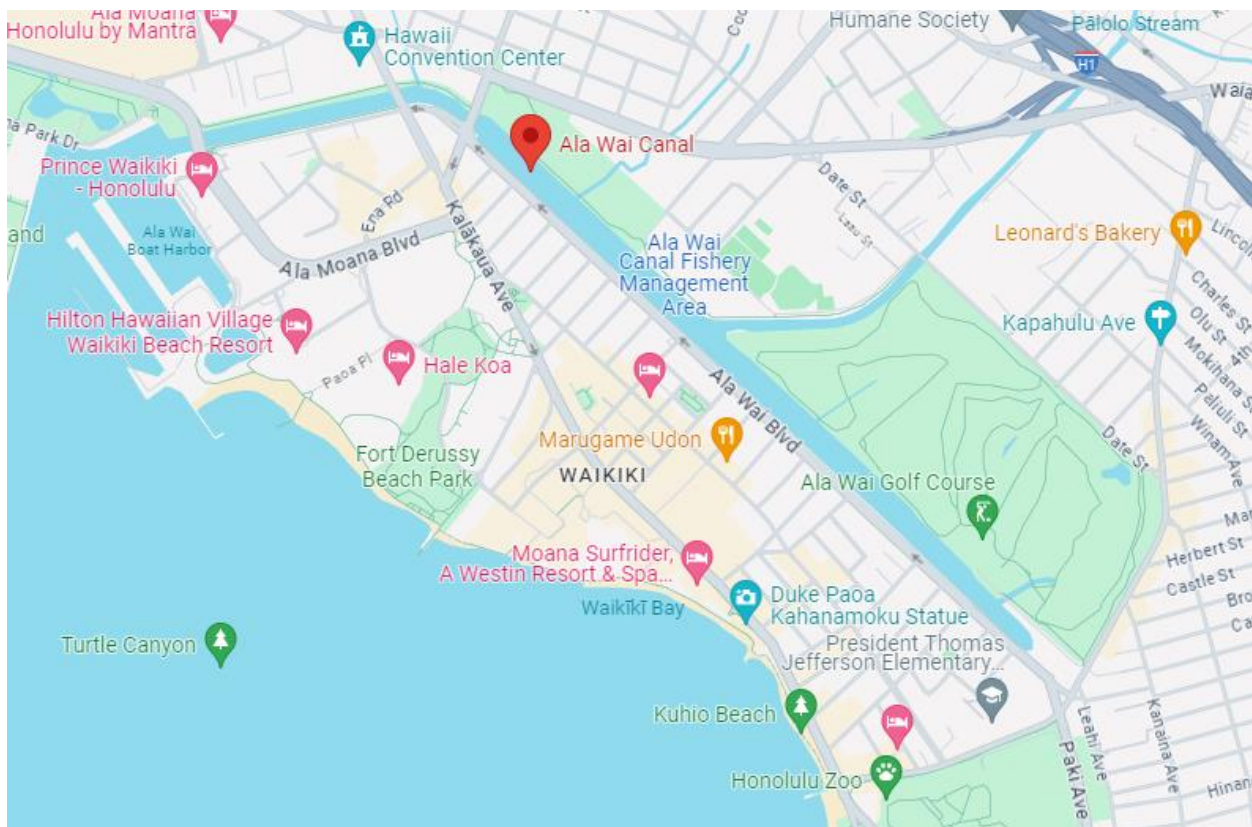


Figure 30: Sophie’s School Is Close to the Ala Wai Canal.

When discussing climate change with her students, Sophie notes,

All projections show that even just a modest rise in the sea level is going to affect this community considerably. I think that’s one of the issues that as a community we are not

really facing. But then every time we have somebody in who studies climate change here on the islands, comes, they show us a map where we're underwater. And the students are always like, okay, what are we going to do about that? And I'm like, yeah, and we are actually building new buildings. We're building another building over here. We just built a dorm. We're going to knock down the apartment complex over here and build something else. And yet, it's the same thing. (Interview, August 30, 2023)

Reflecting on her connection to the land through the Ala Wai and canoeing, Sophie pauses and, with intentionality, notes,

In Hawai'i, everything flows and place is as much a part of your daily experience as everything else, and you can't help but have place be part of your experience because you're driving home from work and looking out at this most beautiful expanse and it's informing your day. We talk about *mana* in class and that sort of spiritual element of life. I just feel like for everybody, every part of your life here is life and it's not stuff that you are doing. And I like that a lot. I feel like I no longer distinguish between anything. It's just life. (Interview, August 30, 2023)

4.8.1 Sophie and Feeling *Mana*

As Sophie shared her stories about Hawai'i and her knowledge of sustainability, there was a recognition and shift from what sustainability meant to her in the United States and what it meant to her since living in Hawai'i. Sustaining a relationship with the land is central to Sophie's conceptualization of sustainability. She not only senses the land in her experiences in the ocean, but she feels its presence in what she refers to as *mana*. Sophie shifts her thinking about sustainability as she gains awareness of embodying aloha, a phenomenon embedded in the culture of Hawai'i, and that adds more intentionality to Sophie's life. Yet sustaining a

relationship with the land is more than just awareness of the land. Instead of maintaining a relationship with the land, Sophie reflects on her own sensory experiences and develops a sense of place through cultural knowledge embedded in the land.

When we examine Sophie's narrative through the prism of the land, we see rich layers of knowledge that inform her sense of place. For instance, her choice of a photograph of the area known as Hawai'i Kai is a testament to her deep thinking about the land. Her interest in the *mo'okū'auhau* of the land, a term referring to the genealogy or history of the land, underscores the significance of history in Sophie's understanding of sustainability. In this case, the land's history serves as a lens through which Sophie can comprehend sustainability and the unsustainability of the development area where she resides.

Sophie, who trained as a historian and lives in Hawai'i Kai, reflects on the area's development into numerous single-family homes. The use of land to develop a suburban setting where most of the land is uninhabitable is, for Sophie, the precise definition of something unsustainable. The photograph is ultimately more about the land and less about the development of a suburban area. For Sophie, the history of Hawai'i Kai was dormant, unknown to her until she heard about it on a morning radio program. In learning about the development, Sophie realizes that beautiful places are vulnerable and that the land will remain long after development ceases. For example, Sophie's photo shows a lovely wetland area developers did not spare. Sophie was more precise and extracting in calling the development insane and questioning if the development was beneficial.

Sophie's life in Hawai'i underscores the importance of *aloha 'āina*, or loving the land, and *mālama 'āina*, or respecting/caring for the land. Although Sophie does not care for the land in the sense that a farmer cares for the land, she recognizes the power of the land and the need to

instill a sense of respect and relationship between her children and the ocean. By teaching her children how to swim and later by spending every day with them in the sea, Sophie drew upon embedded knowledge in Hawai‘i that the land deserves respect and that tragedy can befall individuals who lack this awareness. Sophie tried to “make the ocean part of your safe space and home because people die in the ocean every day here” (Interview, August 30, 2023).

In addition to Sophie’s daily ocean experience helping her to develop a sensory and embodied relationship, her introduction to Hawaiian sustainability through her course provided vital knowledge embedded within the community. By talking with community leaders and gaining local insight, Sophie began to advocate for addressing climate change locally. Through this course, she also learned about and taught the *ahupua‘a* system of sustainability. Ultimately, Sophie and her class decided it would be “tough to return to being sustainable” (Interview, August 30, 2023) such as ancient Hawaiians. Nevertheless, Sophie’s knowledge of the past and the fact that Hawai‘i was once self-sustaining provides a new perspective for Sophie to consider.

Moreover, Sophie’s pre-existing ideas of sustainability shifted after living in Hawai‘i and teaching sustainability through a Hawaiian lens. Indeed, in Sophie’s expanded view of sustainability, culture plays an invaluable role and should be sustained as it provides purpose and intentionality for life.

This vignette also underscores the complex nature of *mana*. In Sophie’s vignette, *mana* maintains different meanings. For instance, *mana* is a spiritual feeling or connection one has with one’s place. When Sophie describes her canoe experience, she speaks about a spiritual connection to the land and the culture. However, *mana* for Sophie also represents an interconnected network of entities, for which the land is a collaborator, which seeks to sustain Hawaiian culture by maintaining the islands themselves. This sense of *mana* aligns with Noenoe-

Silva's (2017) use of *mana* to signify connection among indigenous groups in a post-colonial world.

4.9 Emma: (Re)connecting with Land and Bridging Cultures



Figure 31: Emma's Students Paddling

My place is with my kids. I teach climate change because my students are the ones who are going to be dealing with the majority of the consequences. They're the ones who need this knowledge and they're the ones whose home is currently starting to go underwater. Even if they're not a hundred percent aware of what's happening or why they should be, to some extent they should understand it. (Interview, August 23, 2013).

This vignette begins with a photo of Emma's students. The photo symbolizes two important elements for Emma. The first element is her dedication to her students, many who are immigrants from Micronesia. The second element represents Emma's effort and desire to have her students connect with the land and experience cultural practices common to both Micronesia and Hawai'i. The photo is a microcosm of how Emma integrates land into her curriculum.

We started with the introductory interview, and I ask Emma about the importance of land and ocean in Hawai‘i. She replied:

Knowing this is our island, this is where we are, we get all of our things that we need from the ocean or we grow it ourselves. And it’s a lot of dependency on the land, so you take care of it, otherwise you get nothing. And that’s culturally across a lot of different aspects of it. And because we’re raised with it, and this is where you grow up, you’re kind of just ingrained, take care of it. Generations have taken care of the land.

(Interview, August 23, 2023)

After this interview, Emma organized her photos representing place in the shade of a monkeypod tree. There are several images of her students, including those at the beginning of this vignette. Looking at the photos of students, Emma displayed undeniable joy. But speaking about her students caused her to pause and reflect on the students and climate change: “A lot of places in Micronesia and Guam are already starting to go underwater. It’s not just erosion, it’s rising sea levels. The kids talk about having to move” (Interview, August 23, 2023).

Emma continued describing her students: “A lot of our kids are from Chuuk, and they’ll move here, but they don’t really understand why they have to move or what’s going on” (Interview, August 23, 2023). Upon hearing where her students are from, I energized and saddened, and the interview takes a personal turn. I told Emma I lived in Chuuk for three years and married a Chuukese citizen. It is not out of the realm of possibility that I know some of the students and their families that attend Emma’s school. I’m energized by Emma’s passion for working with Chuukese students, many of whom are English language learners and speak a language with few translation resources. I am also sad because Emma discussed a world of have

and have-nots: “All of our kids come from the low-income housing” (Interview, August 23, 2023). Emma contrasts this with the Hawai‘i Kai development:

The division of land plays a significant role in its development. The areas labeled as “ghetto” and the lower income housing are often in close proximity, typically consisting of apartments or townhouses with limited public spaces. In stark contrast, the more affluent neighborhoods, like Hawaii Kai, are built on filled wetlands, offering private properties. (Interview, August 23, 2023)

Emma describes this as gentrification and notes that the impact of development affects how people view the land. In many cases for Emma, the development of single-family homes styled after a suburban landscape diminishes the significance of the land. For example, during our interview, she describes people living in Hawai‘i Kai as crunchy people who “are all about zero waste but don’t do anything to help the public” (Interview, August 23, 2023). I asked Emma to elaborate on this point. Emma’s point in describing crunchy people and their ability to eat organic food or hop in their car and travel to the store “it’s a privilege” (Interview, August 23, 2023) that her students can’t afford. In this sense, Emma alludes to a division between the more affluent Hawai‘i Kai neighborhood and her students’ working-class and low-income living situations. The segregation of communities is also the antithesis of Hawaiian values such as *aloha* and *kuleana*.

Emma’s knowledge of her students’ struggles underpins her suspicion of development in Hawai‘i and who is being left out. Her dedication is prevalent in how she describes her students: “I try to make sure I connect to my kids. I’m not Micronesian, but I care a hell of a lot about my kids and I know that that’s their home” (Interview, August 23, 2023).

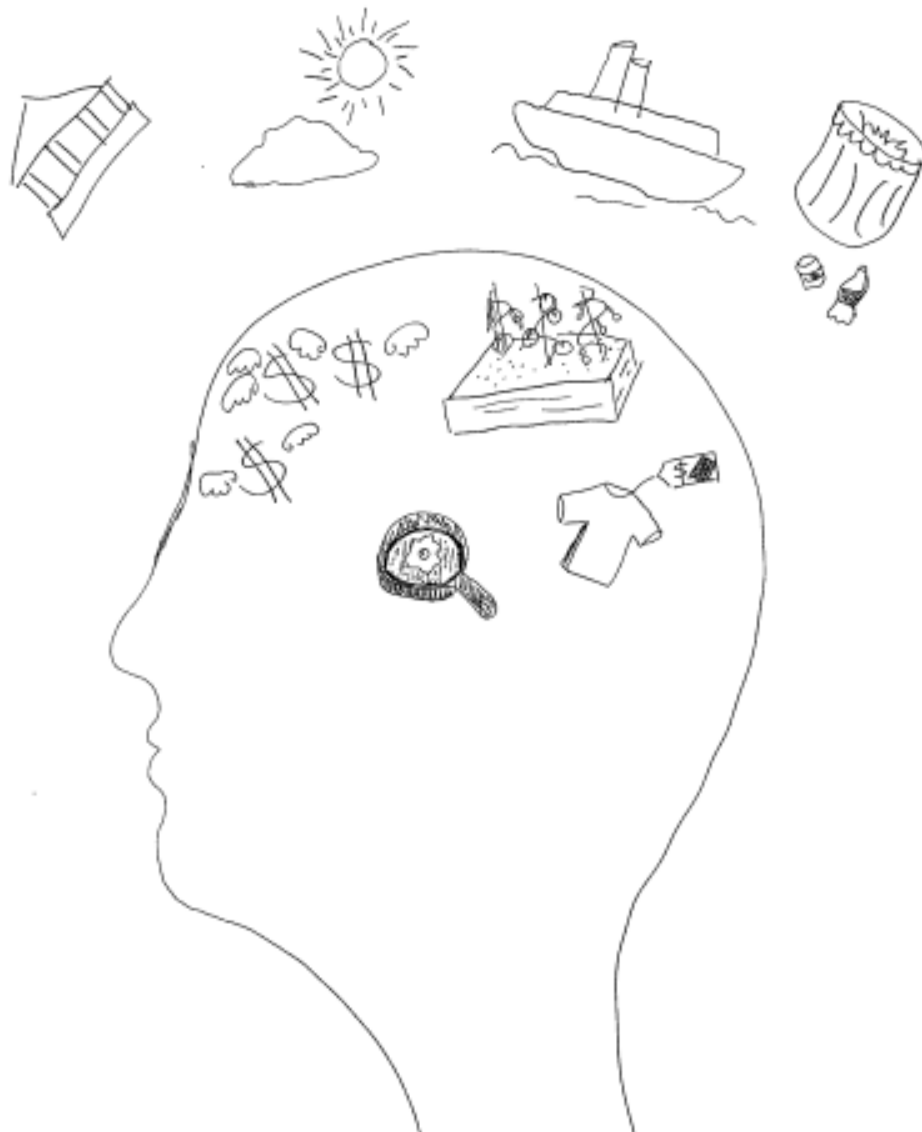


Figure 32: Emma’s Mental Map Connects Climate Change to Capitalism and Issues of Justice

Emma is deeply connected to Hawai‘i. I ask Emma how long her family has lived in Hawai‘i to which she replied, “Since the plantations. My dad’s family is white and my mom’s family is from Okinawa. My grandparents were in the first plantations” (Interview, August 23, 2023). In continuing her discussion about land, she noted, “So, our *mo‘lelo* (story) in Hawai‘i is that people came from land and we have a direct connection to land and sky and plants. And as

long as that part of our culture still persists, we'll still be very caring and very engaged with our environment" (Interview, August 23, 2023).

4.9.1 Land as Reconnection

Emma, in describing her relationship with the land, draws from Hawaiian knowledge. Although she is not Native Hawaiian, she uses a possessive when discussing Hawaiian knowledge. Her statement of "our *mo'olelo* (story)" provides a significant insight into how she views her identity in Hawai'i. When she describing the story that people come from the land, including herself, Emma underscores her belief that she has a symbiotic relationship with the land. An important aspect of this relationship is preserving the land. After all, the land provides people with sustenance, whether from the ocean or the earth, and it is the responsibility of individuals to care for the land.

Examining Emma's relationship with the land through the previously mentioned prism affords opportunities to view the many layers inherent in land in Hawai'i. Her desire to take care of the land is evidence of *malama 'aina*. For example, she helps students create a garden to provide food for families. She also emphasizes the collective nature of a community garden and its ability to sustain families. Emma contrasts this with individuals whom she calls "crunchy" and who have little connection with the broader public. When referencing "crunchy" people, Emma described a particular performativity where individuals might say they are helping with sustainable causes while also maintaining an individualistic outlook that overlooks community and civic engagement.

Moreover, for Emma, Hawaiian knowledge and an individual's relationship with the land are diminished in parts of Hawai'i. Her description of Hawai'i Kai and the destruction of a former wetland to make way for individuals who are "crunchy" contrasts with Emma's values,

which she learned from her father and as a product of growing up in Hawai‘i. Emma’s values toward her students and the land, shines through when she discusses her students. She sees her students as facing numerous threats from climate change to lack of adequate housing. In comparing these two groups, Emma understood that the Hawai‘i of organic food, pristine beaches, boating, and hiking was not for everyone and often connected to privilege. This is the antithesis of caring for the land as the land is no longer sustaining but is no more than a commodity. And if students can’t love and know a place than, according to Emma, why would they care for it?

Here Emma bridged not only cultures but also islands. Her knowledge of living on an island allows her to empathize with her students. In stating that she cares a “hell of a lot about my kids” and about their home in Micronesia, Emma works to help her students connect to place. This is critical for Emma because she understands that her Micronesian students’ identity is tied to two intertwined concepts: land and family. Emma’s use of the organization, *Malama Opia*, and having Micronesian students experience cultural practices is just as important to Hawai‘i as it is to Micronesia as it produces a bridge between two cultures and places.

Through the land, Emma is engaging in a process of connection that a traditional classroom cannot provide. Emma’s use of the land provides a model for cultural integration. She also underscores the importance and ability of schools to bring together diverse groups of individuals and cultivate understanding and empathy. Emma’s work with Micronesian students demonstrates her intentionality to support her students, not only through classroom instruction, but also through connection to land.

By having students engage in cultural practices, Emma helped her Micronesian students maintain an important part of their identity. For example, Emma understands that her students

live in low-income housing and that this housing often lacks access to public space. This is a sharp contrast to her students, who in Micronesia, lived close to the ocean and open land spaces. By scheduling trips and outdoor excursions, Emma allows her students to reconnect with the land as they might have done while living in Micronesia.

Through Emma's teaching and her embodiment of Hawaiian concepts, she provides an opportunity for her students to connect with the land. In Chuukese culture, land and ocean are deeply connected to one's identity. For example, the word for culture in Chuukese, *eereni*, is the same word for environment. As her students are Micronesian and mostly from the Pacific Island nation of Chuuk, Emma provides an opportunity for her students to connect with the ocean and sustain a critical part of their identity that is tied to the ocean.

4.10 Chapter Conclusion

The vignettes in this chapter explored how participants built, or strengthened, their relationship with land. Furthermore, the vignettes demonstrate that land, when viewed through a multi-layered prism, is dynamic and influenced participants' daily lived experience. In some cases, participants had a strong relationship with land based on their Hawaiian identity. In other cases, participants developed a relationship with land over time. Regardless of how a participant developed a relationship with the land, all participants espoused a position toward the land, either through their words or actions, based on respecting, caring for, and sustaining the land. By acting to preserve Hawaiian culture, either through their teacher or their embodied practices, participants also engaged in a process of embedding Hawaiian culture for future generations, thus creating a spatial-temporal network of Indigeneity that ensured the continuation of Hawai'i and Hawaiian culture.

Chapter 5: How Teachers Engaged with Land When Teaching Climate Change

In the previous chapter, I discussed how participants formed a relationship with land by engaging in embedded and embodied practices connected to Hawaiian knowledge. An additional finding of this dissertation relates to how participants' relationship with land helped them develop fluency with Indigenous concepts. The development of this relationship impacted their teaching and allowed them to approach climate change education through a land-first perspective that included incorporating Hawaiian concepts. The participants' engagement with land challenged traditional pedagogical models of climate change education that separate mind and body and afforded students opportunities to embody Hawaiian practices when learning about climate change (Bentz et al., 2022).

This chapter is organized into three sections that analyze how participants' relationship to land informed how they taught climate change. In the first section, I discuss how participants approached and taught climate change education. I use Hawaiian concepts connected to land to show how participants conceptualized and built students' relationship with land. Next, I discuss how climate change was presented through a lens of Hawaiian sustainability. Finally, I highlight a tension several teachers grappled with when teaching climate change and sustainability.

5.1 Preparing for Climate Change Education: Developing Relationship with Land

Participants stressed the importance of prefacing climate change education by first building students' relationship to land. In order to build a relationship with land, participants used different pedagogical approaches such as engaging in outdoor education, interacting with cultural practitioners, and learning Hawaiian history. These approaches entailed both embedded

and embodied experiences. In other words, participants discussed the importance of land with students and then provided activities for them to engage with the land. For example, Megan and Abigail discussed Hawaiian knowledge, such as Hawaiian place names or the concept of *malama ʻāina*, with students. Megan and Abigail then had students engage in experiential learning activities that helped students embody and understand these concepts. Also, Margaret and Emma had students engage in embodied experiences connected to being with the land such as gardening and participating in cultural practices. The process of engaging with the land while also learning about it provided students with an opportunity for connection and understanding, elements vital for developing attachment to place.

The table below provides examples of how participants helped students build relationships with land. In this table, participants sought to build students' relationships with land before discussing how climate change affects the land. Participants expressed several reasons for the importance of building a relationship with land first. Participants' first reason underscored a belief that if students did not care about their land, why would they care about land elsewhere? In this sense, participants helped students build empathy for land at a global level. The second reason participants built students' relationships with land stemmed from a realization that students may have yet to form a relationship with the land despite living in Hawai'i. This fact resonated strongly with Margaret and Emma, both of whom teach students from diverse cultural and socio-economic backgrounds.

Moreover, the table above reflects the participants' ability to engage students in embedded and embodied practices and stems from the participants' ease and fluency with Indigenous Hawaiian concepts. This fluency helped them teach climate change by having students engage in transformative actions outside the classroom. For example, Megan engaged in

embodied practices by taking her students on ocean clean-ups. On the other hand, Abigail engaged in embedded practices by discussing the history of place through Hawaiian names as a method to understand the effects of climate change.

In addition, when integrating Hawaiian concepts, the participants discussed climate change through a critical pedagogy of place (Greenwood, 2019) that asked students less about the science of climate change and more about what was possible in a world facing a climate crisis. This includes who should be held responsible but also what it means to respond to issues of justice. For example, Abigail discussed the history of land through Hawaiian place names. In knowing Hawai'i's past and connecting it to the present, Abigail is preserving knowledge connected to the land for future generations, a key principle of *malama 'āina*.

Participants' sensory experiences with embodied and embedded knowledge ultimately exposed students to different epistemological understandings. The ideas and concepts that participants used included both Indigenous and Western ideas that worked in collaboration, yet participants always centered land. In this sense, Indigenous knowledge served as a guide for thinking about and teaching climate change.

5.1.1 Climate Change Education and Developing Sense of Land

Participants in the study stressed the importance of students developing a sense of responsibility, or *kuleana*, for the land. In describing why it was important to develop a sense of responsibility, Nathan used the following metaphor “if students don't care about their room, they're not going to care about somewhere else” (Interview, August 15, 2023). Nathan's sentiment is apropos to thinking about how participants conceptualized climate change education, which is to say, in order to understand the damage and trauma of climate change on the land, one must first have a relationship with the land. It was not a topic to immediately jump

into, but instead involved a process that made space for discussing and connecting with land. In the sections below are examples of how participants prepared students to learn about climate change.

5.1.1.1 Margaret: Embedded and Embodied Experiences

Margaret’s focus on the land and knowing the history of the land frames how she uses embedded and embodied knowledge to teach climate change. Margaret built students’ sense of land by embedding Hawaiian concepts, followed by embodying them. For example, Margaret started by giving students “a map of O‘ahu, and asking, where are the different *ahupua‘a*?” (Interview, August 8, 2023). She also taught concepts based on Hawai‘i’s Department of Education’s *HA* framework. This framework emphasizes “values of aloha” (Interview, August 8, 2023) and is imbued with Indigenous knowledge. Finally, Margaret shared that it is common to teach “a couple of Hawaiian words” or “the names of invasive species” (Interview, August 8, 2023). In Figure 33, Margaret draws an arrow from Hawai‘i to Global and Local, indicating her belief that it is important to “closely observe our place. I think it’s also important to be connected to the minutia” (Interview, August 8, 2023).

Margaret’s ability to integrate Hawaiian concepts reveals a network of knowledge that is available for her to use in her classroom. It also reveals how Margaret’s own curiosity and the desire to understand all the nuances of a place, transfers to her students and helping them see the many layers of the land.

Moreover, when visiting cultural sites, Margaret asked students to understand place by learning different place names:

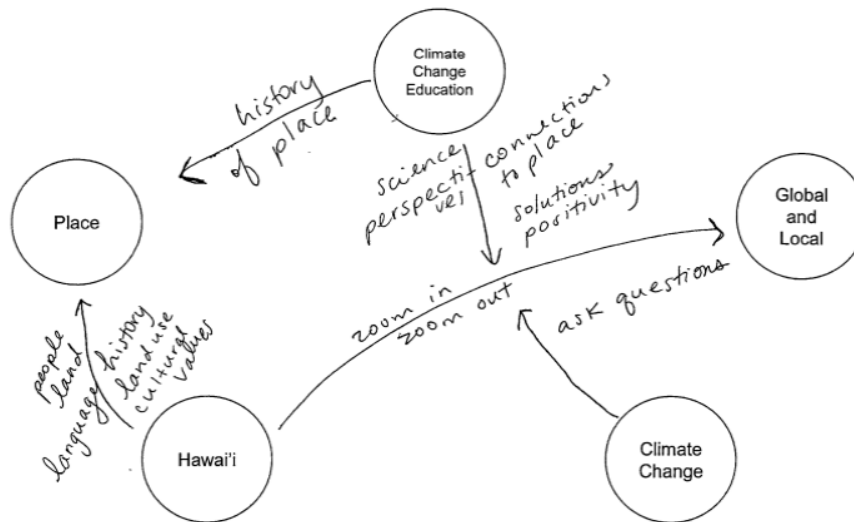


Figure 33: Margaret’s Concept Map. History of place connects climate change education and place.

I think also just the mentality that, like, I know when I go to a place to ask what it’s called, I know to ask what the Hawaiian name was. I know to ask like, how has this changed over time. And so, I think it’s also like knowing that those things exist...I think understanding the cycles and the names and everything of this place. Like, I think it just helps to empathize a lot more. (Interview, August 8, 2023)

In tandem with building students’ sense of land in the classroom, Margaret helped students develop a sense of land through embodied experiences. Margaret’s actions in her garden and her use of native food reflects the embeddedness of *malama ‘āina*. In one example, Margaret helped students know the land by taking them on a camping trip. This trip exposed students to land in ways many of them have not experienced:

We take kids every year to camp. We hike up to the top of a ridge on the windward side. One time we got to the top and I will never forget it because one of my students said, wow, I’ve never seen this side of the island before. And I was like, oh my God. Like I get

goose bumps every time I think about it because it was a really big perspective shift for me. Like, oh, I've been here three times. And so I think I really tried to shift like what I imagine kids have access to. (Interview, August 8, 2023)

Margaret and her students' experiences revealed not only how Margaret develops her students' relationship with the land but also how living in Hawai'i doesn't imply that a relationship with the land will inherently happen simply from existing on the island. Indeed, some of Margaret's students, because of a lack of accessibility, experienced difficulty in accessing outdoor spaces such as the beach or mountains.

For Margaret, the relationship she hoped students would build with the land is based on her experience with the land. In our conversation, Margaret described camping trips she has taken since living in Hawai'i. One such trip was to the Waimanu Valley on the island of Hawai'i. In Figure 34, Margaret described her hiking trip as an opportunity to "understand the cultural value of a place" (Interview, August 8, 2023). In order to get to the valley, Margaret passed through the Waipio Valley, a sacred valley full of *mana* with a deep connection to past kings and queens of Hawai'i. Margaret's relationship to the land, through the story of her hiking, demonstrates that land is more than aesthetic beauty. Instead, for Margaret, relationship to land involves a deep sense of understanding the land and how individuals used, managed, and preserved the land for future generations. It is this relationship that Margaret hopes to build with her students before she discusses climate change.



Figure 34: Waimanu Valley on the Island of Hawai'i. Photo by Margaret.

After Margaret helps students build a relationship with land, she asks them questions about climate change. For Margaret, who teaches in a school where sustainability is a driving principle, the questions about climate change are often connected to issues of sustainability. Margaret says she asks students to think about the following:

Where does the water run? What would happen if there were more storms? What would happen if there was more water? What would happen if the sea level rose right here? What effect does that have on a fishpond? Like all of those kinds of nuances.

And you [the student] can read about all you want, but when you go and an uncle tells you like, this is where you're gonna stop and this is what you're gonna do. And I think also just the mentality that I know when I go to a place to ask what it's called, I know now to ask what the Hawaiian name was. I know to ask how this has changed over time. (Interview, August 15, 2023)

By incorporating both embodied and embedded experiences, Margaret helped students develop a relationship with the land. For Margaret, students' relationship with land not only allows them to understand the nuances of climate change but to be more empathetic. Margaret expressed consternation when individuals use climate change as a blanket cover for problems with nuance:

I think that it's a disservice to climate change education when we say, oh, it was a hot day. Like that's actually just climate change? The reality is like, yes, it is hot, and we don't have plants around us and we've developed, you know, and paved over lots of things. What role does that have? These species are not native, they're not retaining the same, like what's, you know, what are the, like, interactions between these developed things? And if we think about climate change without thinking about history and context of a place, we lose the depth and the nuance. (Interview, August 15, 2023)

In describing climate change Margaret centered understanding a place both from a historical perspective as well as a current perspective. For example, Margaret discusses development and paving over lots of things, which exacerbates the effects of climate change. In contrast, Margaret suggests that Hawaiians in the past were more protective of their environment, which in the present, can mitigate the harmful effects of climate change. Margaret's understanding of both climate change education and how previous generations have interacted with land allows her to imagine what sustaining or developing an area might have looked like for ancient Hawaiians. By bringing past generations into conversation with the present, Margaret is able to support students in questioning development in Hawai'i and whether that develop aligns with Hawaiian concepts and values underpinning how to care for the land. When Margaret discusses paving over lots of things, it is in the context of what is lost. For example, large parking lots lead to a lack of shade

and cover, and only exacerbate problems associated with climate change. For Margaret, the decision to develop certain areas was done without consideration to the past. Margaret's emphasis on having students know the past is not an anomaly; understanding and being in communication with the past is a concept deeply embedded in Hawaiian culture and society (Crabbe, 2017). It also aligns with the importance Hawaiians place on *mo'okū'auhau* and knowing one's genealogy. That is not to say Margaret's students were conducting a genealogical project, but instead it is an awareness that the past is not past and must be considered when making decisions that will sustain the land.

Margaret's ability to shift from her Western background to teach and consider land through an Indigenous perspective also helped students develop a more empathetic understanding for the land. This, according to Margaret, can help them consider its future for the next generation of students.

In teaching climate change, Margaret emphasizes the importance of observation.

Working with her middle school students she guides them:

Just observe what's here. Did it rain here? Did it rain up there? And really having them understand the minutia because that's how we understand how climate is changing, right? Like this fish is doing okay today, but it's not doing okay now because of this temperature or because of this algae bloom we've never seen, you know? So I think you need to be more in tune with the smaller cycles and not just like, oh, it's hot today.

(Interview, August 8, 2023)

Margaret's framing of climate change moves away from initially presenting climate change at a global level, and instead centers climate change through the land and local experiences. The

purpose of focusing on the local is to build students' sense of empathy that can then be applied globally.

One method Margaret uses to build a relationship with the land is having students create a school garden (Figure 35). In describing the garden, Margaret discussed a deeper pedagogical philosophy: "I think understanding the role that land plays in feeding us is really important. And this image shows the big gardens that I started at school one year" (Interview, August 15, 2023). She selected this image "because I think building students' connections to place through actual interaction, which is really important to connecting place to them" (Interview, August 15, 2023). Margaret's emphasis on a relationship with land as a source of nourishment reveals her belief that there is a symbiotic relationship between humans and the land. In this case, if the land takes care of, and feeds its inhabitants, it is only fitting that the inhabitants take care of the land. Margaret's care for the land demonstrates a passion for understanding the history of the land, as well as both *malama 'āina* and *kuleana* in that she is taking care of the land but also feels that it is her responsibility to teach students how to care for the land.



Figure 35: Margaret's Garden at Her School. Photo by Margaret.

5.1.1.2 Emma: Knowing the Land through Cultural Practices

Emma, who teaches fourth grade, acknowledged that climate change for her students was conceptually harder to grasp than for high school students. Nevertheless, Emma introduced questions to help the students think about climate change. She shared, “I start with something they can understand. I ask them about the rain and if it has rained more and how this effects the stream that they go play in when it rains” (Interview, August 23, 2023).

Emma also focused on developing a relationship with land first before discussing climate change. For Emma, developing a relationship with the land for her students came through embodied practices connected to the ocean. Emma, who teaches fourth grade in the Pālolo Valley at East Side Elementary, a Title One school, talked about embodied experiences that provided her students with a sense of land, and because her students are Micronesian immigrants with a connection to home,

There’s a program called Mālama ‘āina Opio and it’s more about that direct connection to culture and tradition. So they taught the kids how to fish and then they showed them how to clean the fish. And some of our kids ate the fish hearts and it was really talking about that connection to place. (Interview, August 23, 2023)

Emma’s relationship with land influences her pedagogy as she engaged students in embodied experiences with the land. Moreover, as many of her students were Micronesian, Emma understood the direct connection to the ocean that many of her students carried with them as they migrated.

Emma teaches climate change by emphasizing the need for students to connect to the land:

Climate change education needs to be connected to place. So, there’s an arrow going

from climate change education to place. I think that it's super important to acknowledge other locations around the world, but if you're only being educated on something that you have no connection to, it has less value. (Interview, August 23, 2023)

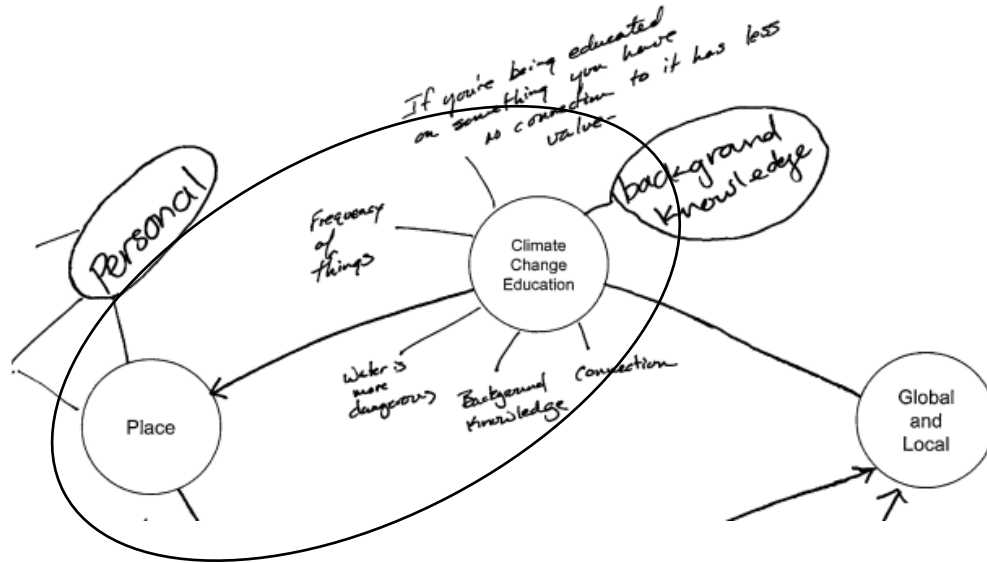


Figure 36: Emma's Concept Map

For Emma, the importance of connection to land is essential for caring about the effects of climate change in other places as well. In this sense, the one constant that students can build connection to globally is land.

5.1.2 Climate Change and *Mo'okū'auhau*

Participants discussed climate change by emphasizing the importance of knowing the history of land. This sensibility is an important concept underpinning Hawaiian epistemology, as a well-known Hawaiian saying states, *ka wā ma mua*, or the time in front. The saying is a reminder that the past is a guide and to understand one's future, it is essential to understand the past. The participants use the past as a way of understanding the totality of what climate change is changing. It is not that land alone is being altered, but the fact that natural disasters or different weather patterns are erasing the history of land.

For Abigail, the ability to understand the history of the land through different names associated with it provides a layer of knowledge that informed how climate change altered the land. It also provided context for how the land has been changed as the wetland that was once Lahaina is no more with its waters diverted to plantations. By teaching Indigenous names, Abigail views climate change through a lens that includes the past, present, and potentially the future.

As a librarian, literacy is one of Abigail's passions. She teaches what she terms place literacy to both her students and the community. Abigail describes place literacy as a method to "unpack the layers of knowledge within place names" (Interview, August 31, 2023). In explaining place literacy, Abigail describes teaching about the rains of Lahaina:

When you look at the traditional names of the rains of Lahaina, one was *pa'upili*. *Pili* is a grass and *pa'u* is to soak so it's a rain that is so hard that the grass gets soaked. And now that we don't see the *pa'upili* of Lahaina anymore gives us context for how much climate change has changed the place. (Interview, August 31, 2023)

Abigail incorporated embedded knowledge when traveling with students on learning excursions. In the story below, she recounted how the land embodied her teaching and how it led to connection with ancestors:

We took second and third graders on a geological tour of the east side of the island, and we had paused at a beach park, which was a good location for them to really see the traditional, *ahupua'a*, or land division, that went from mountains to the sea. And I talked about the name of the rain, and the name of the rain translated to white basket. And as I was discussing with the children the name of it and what it translated to, I wondered aloud, why it was called white basket. And the kids who were faced towards the

mountains observed that the clouds that had formed behind me formed a white basket. And so they were having this amazingly empathetic connection with the people who had been here many years before us who had observed the same thing and given it that name. And so maybe place-based learning can inform a lot of empathy and not make native people, we shouldn't just be relegated to the past. I think that's important to have that fellowship and union, I guess with your ancestors and not necessarily your own ancestors, just the concept of people who were here before you. (Interview, August 31, 2023)

In this example, Abigail's use of embedded and later embodied knowledge provided students an opportunity to connect with the past. The connection to the past is an important element for understanding place, and as Abigail noted, climate change.

5.1.2.1 Climate Change Education through Story

Yuki teaches high school ELA at Pacific Islands Prep. Yuki's focus on teaching climate change centers on sustainability and building students' relationship with land through Hawaiian stories that center the land. And with Yuki's background in literature, she integrated Hawaiian stories into her class to emphasize Hawai'i's connection to the land. For example, Yuki used the story of Hāloa to discuss humans' connection with the land: "The *kalo* (taro) story, the first born between these two gods is this stillborn and they put the child in the ground. And then the second born is man. And so, we are always the younger siblings to plants. And so, what are our responsibilities?" (Interview, August 15, 2023).

To further elaborate on this story, the first born, who is stillborn, is named Hāloa. When Hāloa is buried, his mother Ho'okokulani cries over the grave and her tears water the soil, which leads to the first *kalo* (taro) plant sprouting. Following this, Ho'okokulani and Wakea, the sky

father, have a second son whom they name Hāloa in honor of his brother. The second Hāloa is the first Hawaiian, and as Yuki stated, must remember his responsibility to his first born brother, the *kalo* plant (Manoa Heritage Center, 2022).

Another story Yuki used is the story of the breadfruit tree: “We do the story about the breadfruit tree and how it was a time of famine, and how a Hawaiian turned into the *ulu* [breadfruit] tree...That’s easily related to climate change and resiliency and food culture” (Interview, August 15, 2023).

When discussing the relationship between humans and the land, Yuki made it clear that the land came first. In presenting the land as an elder sibling, Yuki situates herself within Hawaiian culture and beliefs. By teaching the story of Hāloa, she is preserving and embracing Hawaiian, and to a larger extent, Indigenous knowledge. Yuki’s perspective demonstrates the ability of an individual to embody Hawaiian knowledge despite not identifying as Hawaiian.

Using Hawaiian stories to frame humans’ relationship with the land is also important for what it signifies. Yuki, like other participants, is intentional in centering the land in her class. The ability to center the land stems from Yuki’s comfort with Hawaiian knowledge, stories, and concepts. Yuki’s desire to teach about land and sustainability also is a mindset that she explains:

I think just it comes down to sustainability. On an island mindset. We have to be able to supply our own food and keep everyone in good health and have access to fresh water.

And I, what are the other things? Yeah, not import everything, I want them to see the land is valuable. (Interview, August 15, 2023)

Sustainability, with an island mindset, entails more than sustaining the economy, environment, or social equity. Instead, it is a deep commitment to understanding the interconnectedness of the island. However, what is distinct in how Yuki describes sustainability and how she teaches

sustainability is the importance of the land both in the present and the past. As such Yuki is not just seeking to sustain her current way of life, but instead, she is looking to the past as a guide for what it means to sustain.

5.2 Hawaiian Sustainability and Climate Change

Participants framed climate change through Indigeneity and Hawaiian sustainability. For example, Megan, Daniel, Margaret, and Sophie all discussed the *ahupua'a* system of Hawaiian sustainability when they discussed climate change. In the section below I discuss how Hawaiian concepts connected to the land helped frame sustainability.

5.2.1 Megan and *Malama 'āina*

When discussing the effects of climate change, Megan often returned to the idea that long before Captain Cook visited, Hawai'i the islands were self-sustaining. One way Hawai'i became self-sustaining was through the practice of *mālama 'āina*. Megan used the concept of *mālama 'āina* in her class to discuss sea-level rise and caring for the ocean. She uses *mālama 'āina* to build students' relationship to land as well as asking students about how countries have contributed to the current climate crisis.

As part of her lessons on climate change, Megan taught climate change through culturally relevant pedagogy. Many of her students are from other Pacific Island nations. To emphasize the impact of climate change, she shows students *The Last Generation*, a documentary about sea-level rise in the Marshall Islands. After showing the video, Megan uses the concept of *mālama 'āina* to both underscore the culture and history of Hawaiian, and in the case of her students, Pacific Islander stewardship toward the land and galvanize them to explore career opportunities to support the Earth. In grounding climate change education through *mālama 'āina*, she asks the students, "How do we care for the Earth? We get into the workplace, right? Land and natural

resources, fisheries, fish and wildlife service, forestry, aquatics, conservation. There's lots of things we can be doing. And then you see the light come on" (Interview, August 25, 2023). In discussing the concept of *mālama 'āina* as well as careers connected to caring for the land, Megan created a bridge between discussing a concept and putting it into practice.

For example, one method of embodying *malama 'āina* for Megan is to lead students on "ocean clean-ups at Hilo Bay" (Interview, August 25, 2023). However, Megan also connected the idea of ocean clean-ups to larger global issues. In discussing climate change, Megan focuses on plastic, particularly single-use plastic:

Part of the lessons on ocean clean-up is about getting the students to think a little more about when they purchase things, especially those single use plastics. But if we're more aware of the effects, we can just make more conscious choices when we buy things. I mean, that's how we can contribute in our small way. (Interview, August 25, 2023)

But Megan, in discussing single-use plastics, connects it to the larger issue of plastic in general and emphasizing the responsibility of corporations in creating plastics in the first place. She notes the students' response to learning about plastic: "The kids say whoever's making the plastic should be in charge of cleaning it up. I say, that's great. Fabulous idea. Why is the burden put on us as the public?" (Interview, August 25, 2023)

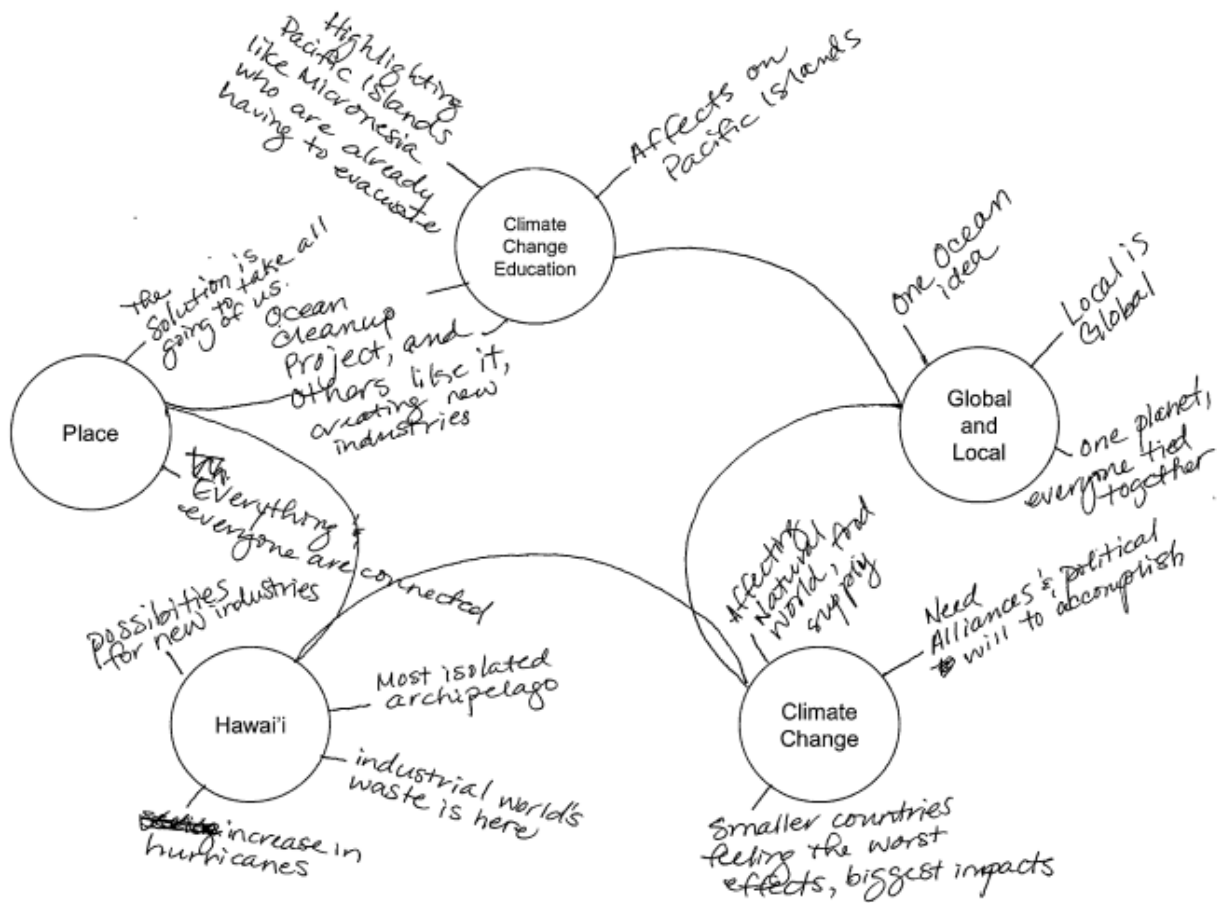


Figure 37: Megan’s Concept Map Emphasizing Oneness

Megan’s concern with climate change and how it is an interconnected problem is illustrated in her concept map (Figure 37). When describing climate change education, Megan emphasizes the effect of climate change on Pacific Island nations, where a majority of her students come from. Moreover, Megan’s emphasis on the ocean stems from her close connection to Hilo Bay and from considering the ocean as a global connector that ties everyone together. By emphasizing interconnectedness, Megan expands her use of *malama ‘āina* to a broader sense of caring, *malama honua*, or care for the Earth.

5.2.2 Daniel: Hawaiian Sustainability

In teaching climate change, Daniel integrates climate change and Hawaiian concepts into his Hawaiian culture class. He shares that he “starts with understanding local issues so the students are grounded in where they live, even if they’re not from here and they’ve moved here, this is their new home, and presumably they’re going to go through all four years here” (Interview, August 30, 2023). Daniel is consistent with other participants in developing a local understanding of both land and the effects of climate change before discussing climate change on a global scale.

One method Daniel uses to develop a local understanding of land is by teaching about Hawaiian sustainability and *ahupua‘a* system: “Sense of place is important. So students are grounded in where they live. And one of the things they learn is that the whole idea of being in *ahupua‘a* means you are self-sustaining” (Interview, August 29, 2023). Following this, he teaches climate change by focusing on first the local and then expanding to a global context. He says, “We look at online articles. How does climate change affect us here on Oahu? Just to keep it local. I show the film *There Once Was An Island*, which is more about what’s going on in the rest of the Pacific” (Interview, August 29, 2023). In showing the film, Daniel is connecting his students to the broader Pacific region. Daniel states that one scene in the movie shows how “an extra high tide came in and wiped out the library” and the students can “can appreciate the film because these are Pacific Islanders. A lot of our kids are Pacific Islanders, and even if not, they live on Pacific Island” (Interview, August 30, 2023).

After the movie and in the context of Hawaiian sustainable practices, Daniel discussed the effects of climate change with his students. He said, “We have a discussion and I ask what

would you do in that situation?” (Interview, August 30, 2023). To his surprise, “Virtually all the students say the same thing, they would move away” (Interview, August 30, 2023).

Daniel’s discussion with students highlights a tension. On one hand, his students understand the urgency of climate change and the vulnerability of Hawai‘i. Daniel stated that his students “love the beach and they will do beach clean-ups and write about protecting the reefs” (Interview, August 30, 2023). Yet despite this awareness, Daniel’s students would leave Hawai‘i in the face of sea-level rise.

Daniel’s example illustrated a tension between learning about climate change in the classroom versus learning about climate change through embodied experiences in the environment. When compared to Megan’s students, there is a different sense of land. For instance, Megan’s students are excited about “fish and wildlife jobs” (Interview, August 25, 2023) in Hawai‘i. As mentioned, Megan conducts ocean clean-ups with her students within the context of *mālama ‘āina* and her class on Pacific anthropology. Daniel, who only has his students for a semester, is limited in his abilities to take students on excursions outside of school.

5.2.3 Sophie: Hawaiian Sustainability

In teaching her class about climate change, Sophie focused on developing students’ knowledge of Hawaiian sustainability and what a sustainable Hawai‘i looks like in the face of climate change. Yet Sophie is not an expert in Hawaiian sustainability even though she does teach a course on global politics using the United Nations Sustainable Development Goals. As noted in her vignette, the Hawaiian sustainability course at her school fell into her lap. As such, in designing and teaching the course, Sophie incorporated many guest speakers who were experts in their field: “We had 11 speakers and they were all local people connected to various parts of

sustainable development” (Interview, August 30, 2023). The experts highlighted issues of sustainability connected to land use, housing, and food production.

For example, one guest lecturer was from the Department of Sustainability and Resilience at the University of Hawai‘i at Manoa. When the presenter gave her presentation on climate change and the flooding that will occur in Honolulu, and in particular at the students’ school, their response was, “We’re not here anymore. Why is nobody talking about this? What are we going to do?” (Interview, August 30, 2023).

Yet Sophie, in asking students to envision Hawai‘i’s future, also underscored the tension of students having a desire to live like their parents but also confronting a world on the precipice of climate catastrophe. For example, Sophie described how a class project to understand climate change and its effect on Hawai‘i also led to students confronting uncomfortable truths:

I had a student and she did a whole bunch of research this summer to better understand the relationship between CO2 emissions and how communities are structured and built, the kind of housing infrastructure, the kind of mixed infrastructure and communities.

And our findings were that this American dream style suburban house community is the greatest per capita CO2 emissions you can create. So talking about how our beliefs in what’s the ideal way of living are conflicting with our efforts to mitigate climate change.

(Interview, October 10, 2023)

The student’s presentation raised questions from other students in the class who said, “We don’t want to live in high density housing. We don’t want that. Why can’t we have what our parents have? Why can’t we have the American dream?” (Interview, October 10, 2023). When Sophie heard this, she said, “I just got really depressed and I was like, damnit, we’re just culturally,

psychologically, we're not there. It just drives me crazy that for whatever reason, humans need things to actually get destroyed before they want to change" (Interview, October 10, 2023).

In discussing the effects of climate change and how to be sustainable, Sophie's class is not unique. The students are confronted with evidence that the lifestyle they grew up in contributes to climate change, but in order to reduce emissions they must pursue a different lifestyle based on high density housing. For Sophie, this was a moment of reflection on how far society still needs to go to be in the right mindset to address the climate crisis.

5.4 Tensions When Teaching Climate Change

The tension Daniel and Sophie felt in their respective classes affords an opportunity to understand the importance of embodying climate change education. While both classes addressed issues of climate change and sustainability and discussed issues connected to Hawaiian land concepts such as *mana* and the *ahupua'a* land division system, the students struggled with envisioning an alternative sustainable future. Moreover, students, when confronted with the concept of high density housing, resisted and asked why it was them who need to change. As such, climate change education in the abstract, even with embedded Hawaiian principles, remains a difficult concept to grasp. In contrast, Megan and Margaret built students' relationship with land through experiences that embodied Hawaiian concepts before discussing climate change. For instance, Megan's class discussed *malama 'āina* and later embodied it through ocean clean-ups and students taking an interest in sustainable jobs. Similarly, Margaret took students camping to help them build a relationship with land. Ultimately, this comparison underscores the importance of embedded and embodied experiences as an important element in developing sense of land.

The experiences described by Megan and Margaret suggest the importance of land-based experiences outside of school when learning about climate change. For example, Megan and Margaret both described first time experiences for students in that they had not yet had experiences directly connected with the land. Daniel and Sophie echoed a similar sentiment. For instance, the experiences Megan and Margaret provided for students demonstrate the importance of prefacing building land relationships with embedded and embodied knowledge.

5.5 Chapter Conclusion

The chapter analyzed how participants taught climate change education. I divided this chapter into three sections that focused on how participants built students' relationship with land, how participants taught climate change through an Indigenous sustainable lens that drew upon Hawaiian sustainability, and how in some cases tensions might arise between students and what Hawaiian sustainability might look like in practice. I also illustrated how Hawaiian concepts connected to land were implemented and embodied in participants' teachings and how this shifted climate change education away from static material to a more active, embodied experience. Lastly, in describing the tensions that arose in Sophie and Daniel's classes I acknowledged that there was a lack of embodied experience connected to Hawaiian sustainability. In the next chapter I examine the significance of this research study and implications for the field of social studies.

Chapter 6: Discussion and Implications

In *Slaughterhouse-Five*, Kurt Vonnegut introduces readers to the Tralfamadorians, an alien species that sees past, present, and future all at once on one continuum. In Hawai‘i, land is conceptualized not only for its physical properties but as a familial relationship. The land exists on a continuum that exists in the present, honors the past, and looks ahead to the future. When an individual is in sync with the land, these three strands come together and strengthen the bond one has with land. The value of land, and how one accounts for land, is often viewed through a singular perspective. What the participants demonstrated is that land is not singular but composed of many layers that span across time. Participants also demonstrated that land is more than an individual’s perceptions and that a network of knowledge, in this case embedded and embodied Hawaiian knowledge, forms one’s relationship to the land. The participants’ awareness of the land and their ability to listen to it helped them reconsider issues connected to sustainability and ultimately what it means to teach climate change.

In social studies, there is an increased interest in teaching climate change education (see Brown University’s Choices Curriculum, 2020; the OER Project, 2022; Bigelow & Swinehart, 2014) This is not surprising as climate change is the most important crisis facing the global community (Wallace-Wells, 2019). Climate change is a generational problem that is here to stay.

Many of the methods to teach climate change seek to address misconceptions or to discuss the basics of climate change (Meehan et al., 2018). Other methods frame climate change in an abstract manner detached from embodied experiences (Bentz et al., 2022). Some studies have found that place-based education is a viable conduit for teaching about climate change, especially when a person demonstrates place attachment (Schweizer et al., 2012). This dissertation contributes to the literature by analyzing and explaining how individuals come to

form a relationship with land and practice Indigenous sustainability that not only embeds Indigenous concepts but embodies those concepts as well. In summary, this dissertation illustrates how developing a relationship with land can lead to more meaningful climate change education.

Considering the participants' perspectives and relationships with the land, this dissertation also explored the role of land in teaching climate change and how participants taught climate change by building students' connection with land. It might seem intuitive that in a place such as Hawai'i, with its emphasis on place-based education, that students would demonstrate an awareness of land. However, as participants such as Nathan, Margaret, Megan, and Emma demonstrated, many students' knowledge of land was not inherently present simply from existing in Hawai'i. Ultimately, the participants played a pivotal role in activating students' relationship to land and to the larger issue of climate change. In other words, participants' embodiment of land aided in communicating the importance of land. This provides not only a model for reinhabitation, or living well in a land, but for sustaining land through an Indigenous perspective. In the section below, I discuss several implications for the field.

6.1 Decoloniality and Reinhabitation

In the conceptual framework, I discussed critical pedagogy of place (Greenwood, 2019) and its connection to decolonization and reinhabitation. As Greenwood (2019) notes, reinhabitation is the process of living well in a place that has suffered trauma. The participants, including Native Hawaiians, in their embodiment of Hawaiian ideals and through (re)embedding Hawaiian ideals within Hawaiian society, engaged in an act of decolonization. That is to say, the participants' actions centered Indigenous practices and beliefs alongside Western knowledge. The participants did not choose between one knowledge tradition and the other. Instead, both

knowledge systems co-existed. The participants never created a binary and instead moved between two knowledge systems. The ability to navigate these knowledge systems, however, came through participants' active engagement in a relationship with the land.

Participants engaged in decolonizing practices in multiple ways. For example, Margaret, made Indigenous Hawaiian food as a staple of her diet. More importantly, she ceased to rely on most imports. She also knew how to make lei and was in the process of learning Hawaiian. Likewise, Daniel taught students about Hawaiian culture and language. Other participants such as Abigail taught students the names of native and invasive species and the stories behind place names, restoring and preserving knowledge. Megan, in learning to live off the land, returned to Hawai'i deeply questioning the commercialism of the island. In this sense, and according to Greenwood's conceptualization of reinhabitation, participants were living with the land and engaging in a relationship that was mutually beneficial. The participants were moving incrementally toward a decolonized Hawai'i and, through their embeddedness in the culture and their embodied actions, added to the larger discourse about Hawai'i, its future, and what that should look like, especially when confronted with climate change.

6.2 Indigenous Sustainability

In the Fall of 2022, I taught a class on sustainability and social studies at Teachers College, Columbia University. For one of my class I invited my close friend Larry Raigetel, who is a traditional navigator from Micronesia, to discuss sustainability and indigeneity. Both Larry and I know many individuals who have been lost at sea. Many of these incidents involve an outboard skiff's motor having mechanical problems. To this point, Larry always replies that if the islanders had used a sailing canoe, they would not be lost at sea. Larry makes a subtle comment that encapsulates much of the discussion about sustainability. Indeed, Larry's

statement not only questions traditional concepts of sustainability but also forces us to ask what it is we want to sustain and what is sustained first.

In a Western approach to sustainability, humans are centered first. For example, sustainability has been defined as “meeting the needs of the present generation without compromising the ability of future generations to meet their own needs” (Brundtland Report, 1987, p. 8). This idea often means that sustainability attempts to solve problems related to social, economic, and environmental factors for present and future generations. Yet this mindset carries its own baggage. For example, the present and future temporality of sustainability excludes one’s connection to the past as a guide to understanding what needs to be sustained. Participants in this study took great consideration to understand and incorporate voices of the past. This meant considering sustainability from previous generations, including Hawaiians who developed their own sustainable system.

For the participants in this study, sustainability started with the land. Moreover, by sustaining the land participants often sustained their lives and in some cases their identities. For example, Megan centered the land, in this case Hilo Bay, and asked what she can do to sustain Hilo Bay for herself, for the past, and for future generations. By answering these questions through her thoughts or actions, Megan came to sustain herself, realizing the Western model of sustainability lacks a relational component that asks one to consider one’s relationship to and with the land.

In Indigenous sustainability, the land is regarded as being “imbued with spirit” (McGregor et al., 2020) with a set of reciprocal duties between humans and the natural world. Other scholars note different aspects of Indigenous sustainability such as interconnectedness, reciprocity, and giving back (Mazzocchi, 2020). This is well and true, and the participants

demonstrated understandings of interconnectedness as well as taking care of and giving back to the land.

The participants also contributed an example of building a relationship with the land and engaging in Indigenous sustainable practices. This included Indigenous and non-Indigenous participants who were acting in a symbiotic relationship with the land and acting to preserve it. Often Indigenous sustainable practices are described (see Mazzocchi, 2020; McGregor et al., 2020) with descriptions of practices, yet the gap between Indigenous and Western remains. Questions remain about how to build a relationship with the land in order to engage in sustainable practices. For the participants, it involved more than learning about sustainability. It entailed learning Hawaiian, learning cultural practices, engaging with the land and the nourishment it provides, and knowing ancestors, or in cases of transplants, knowing people who lived on the land before you did. This led participants to have a deeper and richer relationship with the land that they transferred to their students.

6.3 Making the Local Global

In the social sciences, knowledge can be presented as a flow, a current that starts at one point and spreads globally or locally (Farbotko & Lazarus, 2012; Hofmann, 2018). For this dissertation, knowledge flows also influence the concept of land. When observed through a critical lens, the concept of “glocal” privileges the global where global issues are superimposed on the local. This study attempted to challenge the flow of global to local and instead situated the local as a starting point for climate change education.

Higgs (2018) argues that different knowledge systems can coexist. Using the work of philosopher Bruno Latour, Higgs argues that the world is a “plurality of local practices” that can transform the outside world (Higgs, 2018, p. 216). According to Higgs, the universal is only an

extension of local practices. An example Latour uses is mobile phones, which only became global once the outside world was readied for such technology. Higgs argues the same is true of knowledge and that there is space for Indigenous knowledge to coexist with Western knowledge and become “universal” if the conditions are right.

In teaching climate change, participants first built students’ relationship to the land. For example, Margaret took students camping and taught them place names, and Megan led students on clean-up activities of Hilo Bay.

There are several reasons why participants felt the need to develop students’ relationship to land before discussing climate change. First, even though the concept of place and land are well-known in Hawai‘i some of the participants’ students had limited knowledge about land and place. Emma’s students, for instance, were immigrants from other Pacific Islands and had different ideas about the land. Moreover, Emma’s students did not have access to many places on the island where a land-relationship might be made. Likewise, part of building a relationship with the land depended on knowledge of the history of the land. The participants demonstrated a robust knowledge of Hawaiian history that students may not yet be exposed to in their studies or at home. Additionally, participants believed that, in order to express empathy for a distant land facing the effects of climate change, it was important for students to understand the challenges of climate change in Hawai‘i. As such participants taught climate change grounded in the land instead of in the abstract.

6.4 A Network for Learning and Teaching Indigenous Practices

Participants’ knowledge and embodiment of Hawaiian practices did not occur in a vacuum. In Chapter 4, I outlined a network within Hawai‘i that helped participants engage in Indigenous practices. This network was both explicit in government and state action and implicit

in individuals' actions. These practices and knowledge, while always present, were revived in the 1960s and 1970s during the Hawaiian Renaissance. In addition, the network that nurtured Hawaiian knowledge aligns with Higgs' (2018) contention that the local can be made global if the global world is made ready. In this case, the state of Hawai'i was made ready to support Hawaiian knowledge.

For example, Margaret came to Hawai'i and entered into a network of Hawaiian knowledge. In analyzing Margaret, there is an interplay of different flows of knowledge that helped her embody Hawaiian practices. Some of this knowledge is direct and comes from government agencies. Moreover, the Hawai'i Department of Education implemented a framework for place-based learning (the HA, or Breathe, framework) that incorporates Hawaiian knowledge. However, some knowledge flows are less direct. The state government of Hawai'i's use of Hawaiian language for street names as well as markers for the *ahupua'a* traditional land divisions are visible reminders that Margaret encountered daily and that influence her connection with Indigeneity. This flow of knowledge is analogous to the concept of *mana*, a spiritual force that flows throughout the Hawaiian Islands and that is embedded in the land as well as in individuals' relationship with the land.

Furthermore, by embodying different land concepts, participants expanded the concept of sustainability to include sustaining identity, life, and culture. I am not arguing that participants entirely transformed who they were as individuals. Instead, I am suggesting that participants developed a relationship with land that transformed, at times incrementally, how they conceptualized and valued the land and what the land sustains. For example, Daniel experienced a deliberate transformation through hula, which, as a knowledge source, is embedded in

Hawaiian culture. By engaging in this practice, he came to value land, which influenced his desire to teach and preserve the knowledge he gained.

In addition to participants engaging in transformation, their actions and mindsets represent a form of climate change adaptation. By transforming, preserving, or sustaining elements of land, participants created an adaptive network that not only embodies climate change adaptation through sustaining actions but also influences how climate change education was taught in the classroom by incorporating mind and body knowledge.

The processes and actions that participants engaged in provide a model for transforming how an individual approaches both sustainability and climate change education, as participants taught climate change education by integrating different forms of knowledge based on learning through both mind and body and refusing to allow climate change education to be the passive transmission of knowledge based on facts (Bentz et al., 2020). Participants' knowledge was dynamic and based on embedded and embodied experiences. Ultimately, this influenced how they taught climate change.

Teaching climate change locally, however, still retains global implications. While the content participants taught was grounded in local issues (although increasing temperatures is a global concern), the process and experiences to teach climate change provide a model for global implementation. For the participants, the process they engaged in with students contain several consistent patterns. One pattern was that participants, when discussing climate change, started with the land. This means that the conversation about climate change was local to start. In discussing the land, participants engaged with Hawaiian concepts connected to land. These concepts might be *mo'okū'auhau*, *mālama 'āina*, *kuleana*, or *mana*. Another pattern was

participants' willingness to engage with the land in order to build a relationship. For participants, knowing the land meant experiencing the land and its many layers.

In teaching about the past, participants were also teaching for the future. By centering Indigenous practices or history, especially the fact that Hawai'i was self-sustaining for many years, participants helped their students see multiple perspectives about what it means to be sustainable and potentially how to address and adapt to climate change. The knowledge of a sustainable Hawai'i based on the *ahupua'a* system when juxtaposed to an area such as Hawai'i Kai, with its single-family suburban feel, complicates knowledge traditions. Why should Western thought be privileged when it created an unsustainable situation?

Yet history of place alone is not sufficient to affect change nor does it encompass Indigenous sustainability or education that participants came to embody. Instead, to assist students in using their knowledge, participants frequently engaged in experiential and hands-on activities. Margaret, Emma, Megan, and Sophie took students on trips or involved them in projects to aid in their learning.

6.5 Relationship to Land and Place-Based Education

In writing about place, scholars draw our attention to one's relationship with the land: how we form special bonds, how we make meaning, and how place is an important part of our identity. Many scholars draw on Leopold's (1946) land ethic to expand how one thinks about the land and their place in it. The ecological citizenship and land ethic espoused by Leopold is significant for concepts of interconnectedness. The notion that humans are all connected and have an impact on each other, whether it is a blade of grass or a mighty oak, has significant implications for thinking about the world. But this connection belongs no more in the present

than it does in the past and future. In fact, educators must consider how thinking about land influences how they think about teaching climate change.

Relationship to land is an important part of why people engage in pro-environment activities. Scholars describe two important elements needed to develop sense of place: place attachment and place meaning. The participants in this study consistently demonstrated both an attachment to place and understanding of the meaning of place in Hawai‘i. Some scholars suggest that individuals develop a place identity and then come to embody a place based on the individual seeing the place as a reflection of their selves (Kudryavtsev et al.,2012). For this study, instead of a place being shaped by what participants thought place should be, the land shaped participants. That is to say, participants stepped into a relationship with land that shifted their perspectives.

A consistent pattern for participants in listening and stepping into the land was in their embodiment of Native Hawaiian values connected to land. The flow of values embedded in both the land and the material, that is, artifacts representing connection to the land, extended to all participants who embraced and forged an identity based on and with the land. As Sophie stated early, and it is worth repeating again, “You feel like you’re a visitor or intruder on a natural space” (Interview, August 30, 2023).

Place-based education is a distinctive pedagogical approach that values connection, or reconnection, between students and place. Fundamental to this approach is having and creating experiences with places (Agnew, 2014). Within this study, participants created many experiences with land based on their relationship with the land. Yet what does this mean for the field of social studies? In one sense, the participants revealed a method for teaching climate change that incorporated different knowledge traditions and helped students make a difference. For example,

Megan not only talked about *malama 'āina* but also took students on ocean clean-up activities and established a sense of the land that was pivotal in getting students to care about the land. Part of developing this relationship came through understanding the history of land, a topic apropos for the field of social studies. Ultimately, participants demonstrated that the land is far from static but a dynamic force with a story to tell. The participants listened.

6.6 Conclusion

Since beginning my doctoral studies at Teachers College, I have witnessed an intensification of the climate crisis. Each summer is warmer, storms are more powerful, and droughts are more devastating. Of course, this is personal as well. My family's ancestral land stands to be washed away. This is a crisis of humanity's making and one we will have to live with for the foreseeable future. It is also a crisis that humanity can respond to if it considers its relationship with land. The participants in this study provide a glimpse of how to form a relationship with land and what it can mean for one's teaching. Ultimately, I hope this dissertation provides some clarity about how one interacts with the land and the significance that can have on one's teaching.

In summary I think about many moments that have connected me to the land. Some moments are simple and some are complex. At the beginning of this dissertation, I wrote a vignette about my time on Oneop, a small atoll in the Pacific. I think about the rhythm of the island and the sound of the waves and how one can't help but feel connected to the land. Then I think about my school and an annual hiking trip we take to upstate New York. In each situation the land is always there and will continue to be there. And in each situation, there is a story to tell for those who want to listen. Teachers are an invaluable resource in addressing climate change and the participants in this study illustrate the power and place the land has within schools.

References

- Agnew, J. (2014). *Place and politics: The geographical meditation of state and society*. Routledge.
- Ardoin, N. M., Schuh, J. S., & Gould, R. K. (2012). Exploring the dimensions of place: a confirmatory factor analysis of data from three ecoregional sites. *Environmental education research, 18*(5), 583-607.
- Auerbach, C., & Silverstein, L. B. (2003). *Qualitative data: An introduction to coding and analysis* (Vol. 21). NYU press.
- Ayeb-Karlsson, S., Smith, C. D., & Kniveton, D. (2018). A discursive review of the textual use of 'trapped' in environmental migration studies: The conceptual birth and troubled teenage years of trapped populations. *Ambio, 47*, 557-573. [https://doi: 10.1007/s13280-017-1007-6](https://doi.org/10.1007/s13280-017-1007-6).
- Banks, M. (2001). *Visual method in social research*. Thousand Oaks: Sage.
- Barnett, J., & Adger, W. N. (2003). Climate dangers and atoll countries. *Climatic change, 61*(3), 321-337.
- Barnett, J., & Campbell, J. (2010). *Climate change and small island states: Power, knowledge and the South Pacific*. Earthscan.
- Battiste, M. (2002). Indigenous Knowledge and Pedagogy in First Nations Education: A Literature Review with Recommendations. *Report prepared for the National Working Group on Education, Indian and Northern Affairs Canada, Ottawa, ON*.
- Bentz, J., do Carmo, L., Schafenacker, N., Schirok, J., & Corso, S. D. (2022). Creative, embodied practices, and the potentialities for sustainability transformations. *Sustainability Science, 1-13*. <https://doi.org/10.1007/s11625-021-01000-2>
- Bidassey-Manilal, S., Wright, C. Y., Engelbrecht, J. C., Albers, P. N., Garland, R. M., & Matookane, M. (2016). Students' perceived heat-health symptoms increased with warmer classroom temperatures. *International Journal of Environmental Research and Public Health, 13*(6), 566. [https://doi: 10.3390/ijerph13060566](https://doi.org/10.3390/ijerph13060566).
- Bigelow, B., & Swinehart, T. (2014). *A people's curriculum for the earth: Teaching climate change and the environmental crisis*. Rethinking Schools.
- Black, R., Adger, W. N., Arnell, N. W., Dercon, S., Geddes, A., & Thomas, D. (2011). The effect of environmental change on human migration. *Global Environmental Change, 21*, S3-S11. <https://doi.org/10.1016/j.gloenvcha.2011.10.001>

- Bosio, E., & Schattle, H. (2021). Ethical global citizenship education: From neoliberalism to a values-based pedagogy. *Prospects*, 1-11. <https://doi.org/10.1007/s11125-021-09571-9>
- Brace, C., & Geoghegan, H. (2011). Human geographies of climate change: Landscape, temporality, and lay knowledges. *Progress in Human Geography*, 35(3), 284-302.
- Brennan-Horley, C. (2010). Mental mapping the 'creative city'. *Journal of Maps*, 6(1), 250-259. <https://doi.org/10.4113/jom.2010.1082>
- Briggs, L. P., Stedman, R. C., & Krasny, M. E. (2014). Photo-elicitation methods in studies of children's sense of place. *Children, Youth and Environments*, 24(3), 153-172. <https://doi.org/10.7721/chilyoutenvi.24.3.0153>
- Brooks, N. (2003). Vulnerability, risk and adaptation: A conceptual framework. *Tyndall Centre for climate change research working paper*, 38(38), 1-16.
- Brown, M. A., Meyer. (2019). *The past before us: Mo'okū'auhau as methodology*. University of Hawaii Press.
- Brownlee, M. T., Powell, R. B., & Hallo, J. C. (2013). A review of the foundational processes that influence beliefs in climate change: Opportunities for environmental education research. *Environmental Education Research*, 19(1), 1-20. <https://doi.org/10.1080/13504622.2012.683389>
- Brundtland, G.H. (1987) Our Common Future: Report of the World Commission on Environment and Development. Geneva, UN-Dokument A/42/427.
- Busch, K. C., J. A. Henderson, & K. T. Stevenson. (2019). Broadening epistemologies and methodologies in climate change education research. *Environmental Education Research*, 25(6), 955–971. doi:10.1080/13504622.2018. 1514588
- Butler, A., & Sinclair, K. A. (2020). Place matters: A critical review of place inquiry and spatial methods in education research. *Review of Research in Education*, 44(1), 64-96.
- Campbell, J. R. (2019). Climate change, migration and land in Oceania. *Toda Peace Institute, Policy Brief*, (37).
- Cardona, O. D. (2013). The need for rethinking the concepts of vulnerability and risk from a holistic perspective: a necessary review and criticism for effective risk management. In G. Bankoff, G. Frerks, & D. Hilhorst (Eds.), *Mapping vulnerability: Disasters, development, and people* (pp. 37-51). Routledge.
- Chandler, T., & Marri, A. R. (2012). Civic engagement about climate change: A case study of three educators and their practice. *Journal of Social Studies Research*, 36(1).

- Choices Curriculum. (December 2020). *Climate Change and Questions of Justice*.
<https://www.choices.edu/curriculum-unit/climate-change-questions-justice/>
- Clandinin, D. J. (Ed.). (2006). *Handbook of narrative inquiry: Mapping a methodology*. Sage Publications.
- Clandinin, D. J., & Connelly, F. M. (2000). *Narrative inquiry: Experience and story in qualitative research*. John Wiley & Sons.
- Clandinin, D. J., & Rosiek, J. (2019). Mapping a landscape of narrative inquiry: Borderland spaces and tensions. In *Journeys in narrative inquiry* (pp. 228-264). Routledge.
- Conrad, J. (2019). The Big History Project and colonizing knowledges in world history curriculum. *Journal of Curriculum Studies*, 51(1), 1-20.
- Corntassel, J. (2012). Re-envisioning resurgence: Indigenous pathways to decolonization and sustainable self-determination. *Decolonization: Indigeneity, Education & Society*, 1(1), 86–101.
- Coughlin, C. A., & Kirch, S. A. (2010). Place-based education: A transformative activist stance. *Cultural Studies of Science Education*, 5(4), 911-921.
<https://doi.org/10.1007/s11422-010-9290-6>
- Creswell, J. W., & Poth, C. N. (2016). *Qualitative inquiry and research design: Choosing among five approaches*. Sage Publications.
- Creswell, T. (2004). *Place: A short introduction*. Blackwell Publishing
- De Andreotti, V. O. (2014). Soft versus critical global citizenship education. In *Development education in policy and practice* (pp. 21-31). London: Palgrave Macmillan UK.
- Denzin, N. K., Lincoln, Y. S., & Giardina, M. D. (2006). Disciplining qualitative research. *International Journal of Qualitative Studies in Education*, 19(6), 769-782.
- de Wit, S., & Haines, S. (2022). Climate change reception studies in anthropology. *Wiley Interdisciplinary Reviews: Climate Change*, 13(1), e742.
- Devine-Wright, P. (2013). Think global, act local? The relevance of place attachments and place identities in a climate changed world. *Global Environmental Change*, 23(1), 61-69.
<https://doi.org/10.1016/j.gloenvcha.2012.08.003>
- Devine-Wright, P., Price, J., & Leviston, Z. (2015). My country or my planet? Exploring the influence of multiple place attachments and ideological beliefs upon climate change attitudes and opinions. *Global Environmental Change*, 30, 68-79.
<https://doi.org/10.1016/j.gloenvcha.2014.10.012>

- Dewey, J. (2013). *The school and society and the child and the curriculum*. University of Chicago Press.
- Ebersole, M. M., & Worster, A. M. (2007). Sense of place in teacher preparation courses: Place-based and standards-based education. *Delta Kappa Gamma Bulletin*, 73(2).
- England, C. (2018). John Dewey and Henry George: The socialization of land as a prerequisite for a democratic public. *American Journal of Economics and Sociology*, 77(1), 169-200.
- Epstein, I., Stevens, B., McKeever, P., & Baruchel, S. (2006). Photo Elicitation Interview (PEI): Using photos to elicit children's perspectives. *International Journal of Qualitative Methods*, 5(3), 1-11. <https://doi.org/10.1177/160940690600500301>
- Falgout, S. (1992). Hierarchy vs. democracy: Two strategies for the management of knowledge in Pohnpei. *Anthropology & Education Quarterly*, 23(1), 30-43.
- Farbotko, C. & Lazrus, H. (2012). The first climate refugees? Contesting global narratives of climate change in Tuvalu. *Global Environmental Change*, 22, 382-390. <https://doi.org/10.1016/j.gloenvcha.2011.11.014>
- Farbotko, C., & McMichael, C. (2019). Voluntary immobility and existential security in a changing climate in the Pacific. *Asia Pacific Viewpoint*, 60(2), 148-162.
- Favier, T., Van Gorp, B., Cyvin, J. B., & Cyvin, J. (2021). Learning to teach climate change: Students in teacher training and their progression in pedagogical content knowledge. *Journal of Geography in Higher Education*, 45(4), 594-620. <https://doi.org/10.1080/03098265.2021.1900080>
- Fisher, S. (2015). The emerging geographies of climate justice. *The Geographical Journal*, 181(1), 73-82.
- Freire, A. M. A., & Macedo, D. (1998). *The Paulo Freire reader*. Cassell and Continuum.
- Füssel, H. (2005). Vulnerability in Climate Change Research: A Comprehensive Conceptual Framework. *UC Berkeley: University of California International and Area Studies*. <https://escholarship.org/uc/item/8993z6nm>
- Gaudelli, W. (2016). *Global citizenship education: Everyday transcendence*. Routledge.
- Gaudelli, W., & Heilman, E. (2009). Reconceptualizing geography as democratic global citizenship education. *Teachers College Record*, 111(11), 2647-2677.
- Gegeo, D. W. (2001). Cultural rupture and indigeneity: The challenge of (re) visioning "place" in the Pacific. *The Contemporary Pacific*, 13(2), 491-507.

- Gegeo, D. W., & Watson-Gegeo, K. A. (2001). "How we know": Kwara'ae rural villagers doing indigenous epistemology. *The Contemporary Pacific*, 55-88.
- Gioia, D. A., Corley, K. G., & Hamilton, A. L. (2013). Seeking qualitative rigor in inductive research: Notes on the Gioia methodology. *Organizational Research Methods*, 16(1), 15-31.
- Goh III, Sam Ohu. (2014, December 29). *Lessons from a thousand years of island sustainability* [Video]. TED. YouTube. https://www.youtube.com/watch?v=19fv_2XIJBk
- Goodyear-Ka'opua, N. (2013). *The seeds we planted: Portraits of a Native Hawaiian charter school*. University of Minnesota Press.
- Goren, H., & Yemini, M. (2017). Global citizenship education redefined—A systematic review of empirical studies on global citizenship education. *International Journal of Educational Research*, 82, 170-183. <https://doi.org/10.1016/j.ijer.2017.02.004>
- Greenwood, D. A. (2019). Place, land, and the decolonization of the settler soul. *Journal of Environmental Education*, 50(4–6), 358–377.
- Gruenewald, D. A. (2003a). The best of both worlds: A critical pedagogy of place. *Educational Researcher*, 32(4), 3-12.
- Gruenewald, D. A. (2003b). Foundations of place: A multidisciplinary framework for place-conscious education. *American Educational Research Journal*, 40(3), 619-654.
- Hallar, A. G., McCubbin, I. B., & Wright, J. M. (2011). Change: A place-based curriculum for understanding climate change at Storm Peak Laboratory, Colorado. *Bulletin of the American Meteorological Society*, 92(7), 909-918. <https://doi.org/10.1175/2011BAMS3026.1>
- Harper, D. (2002). Talking about pictures: A case for photo elicitation. *Visual Studies*, 17(1), 13-26. <https://doi-org.ezproxy.cul.columbia.edu/10.1080/14725860220137345>
- Hashem, H., Yazdanfar, S. A., Heidari, A. A., & Nazgol, B. (2013). Between sense and attachment: Comparing the concepts of place in architectural studies. *Geografia*, 9(1), 96-104.
- Hawai'i Department of State, Environmental Council. (2008). *Hawai'i environmental justice initiative report*.
- Hernandez, J., Scherr, R., German, M., & Horowitz, R. (2022). Place-based education in high school science: Situating energy and climate change in students' communities. *Sustainability and Climate Change*, 15(1), 58-67.

- Henry, R., and Pam, C. (2018). *Indigenous knowledge in the time of climate change (with reference to Chuuk, Federated States of Micronesia)*. In D. Nakashima, I. Krupnik, & J. T. Rubis (Eds.), *Indigenous knowledge for climate change assessment and adaptation* (pp. 58-74). Cambridge University Press and UNESCO.
- Higgs, P. (2018). Indigeneity and Global Citizenship Education: A Critical Epistemological Reflection. In: Davies, I., *et al.* The Palgrave Handbook of Global Citizenship and Education. Palgrave Macmillan, London. https://doi.org/10.1057/978-1-137-59733-5_14
- Hökūle‘a. (2024). *Celebrating over three decades of voyaging, since 1975*. https://archive.hokulea.com/index/voices_of_voyaging.html
- Hofmann, R. (2018). Localizing global climate change in the Pacific. Knowledge and response in Chuuk, Federated States of Micronesia (FSM). *Sociologist*, (1), 43-62.
- Howe, Joshua P. *Making Climate Change History: Documents from Global Warming’s Past*. Seattle, University of Washington Press, 2017.
- Howell, R. A., and S. Allen. (2019). Significant life experiences, motivations and values of climate change educators. *Environmental Education Research*, 25(6), 813-831. doi:10.1080/13504622.2016.1158242
- Johnson, J. T. (2012). Place-based learning and knowing: critical pedagogies grounded in Indigeneity. *GeoJournal*, 77(6), 829-836.
- Jorgenson, S., Stephens, J., & White, B. (2019). Environmental education in transition: A critical review of recent research on climate change and energy education. *The Journal of Environmental Education*, 50:3, 160-171, <https://doi.org/10.1080/00958964.2019.1604478>
- Kamenetz, A. (2019). Most teachers don’t teach climate change; 4 in 5 parents wish they did. *NPR*. www.npr.org/2019/04/22/714262267/most-teachers-dont-teach-climate-change-4-in-5-parents-wish-they-did.
- Kana’iapuni, S. M., & Malone, N. (2006). *This land is my land: The role of place in Native Hawaiian identity*. Kamehameha Publishing.
- Katz, E., Schifter, L., & La Pinta, A. (2020). *State policy landscape: K12 climate action*. *Aspen Institute*.
- Kealiikanakaoleohaililani, K., & Giardina, C. P. (2016). Embracing the sacred: An indigenous framework for tomorrow's sustainability science. *Sustainability Science*, 11(1), 57-67. <https://doi.org/10.1007/s11625-015-0343-3>

- Khadka, A., Li, C. J., Stanis, S. W., & Morgan, M. (2021). Unpacking the power of place-based education in climate change communication. *Applied Environmental Education & Communication*, 20(1), 77-91.
- Kincheloe, J., & Steinberg, S. (2008). Indigenous knowledges in education: complexities, dangers, and profound benefits. In *Handbook of Critical and Indigenous Methodologies* (pp. 135-156). SAGE Publications, Inc., <https://doi.org/10.4135/9781483385686>
- Kissling, M. T., & Bell, J. T. (2019). Teaching social studies amid ecological crisis. *Theory & Research in Social Education*, 48(1), 1–31. <https://doi.org/10.1080/00933104.2019.1673267>
- Kissling, M. T., & Calabrese Barton, A. (2013). Teaching social studies for ecological citizenship. *Social Studies Research and Practice*, 8(3), 128-142.
- Kitchin, R. M. (1994). Cognitive maps: What are they and why study them? *Journal of environmental psychology*, 14(1), 1-19. [https://doi.org/10.1016/S0272-4944\(05\)80194-X](https://doi.org/10.1016/S0272-4944(05)80194-X)
- Klein, N. (2015). *This changes everything: Capitalism vs. the climate*. Simon and Schuster.
- Knapp, C. E. (2005). The “I–thou” relationship, place-based education, and Aldo Leopold. *Journal of experiential education*, 27(3), 277-285.
- Kovach, M. (2021). *Indigenous methodologies: Characteristics, conversations, and contexts*. University of Toronto Press.
- Kumler, L., & Vosburg-Bluem, B. (2014). Climate change in the social studies classroom: A “why” and “how to” guide using the C3 Framework. *Social Education*, 78(5), 225-229.
- Larsen, M. A., & Beech, J. (2014). Spatial theorizing in comparative and international education research. *Comparative Education Review*, 58(2), 191-214. <https://doi.org/10.1086/675499>
- Leopold, A. (1966). *A Sand County almanac*. Oxford University Press.
- Li, W. T., & Shein, P. P. (2022). Developing sense of place through a place-based Indigenous education for sustainable development curriculum. *Environmental Education Research*, 1-23.
- Low, S. M., & Altman, I. (1992). *Place attachment: A conceptual inquiry*. Springer US.
- Macfarlane, A., Glynn, T., Cavanagh, T., & Bateman, S. (2005). Creating culturally safe schools: Culturally responsive approaches to supporting Māori students. In *7th World Indigenous Peoples Conference on Education, Hamilton, New Zealand*.

- Mannay, D. (2015). *Visual, narrative and creative research methods: Application, reflection and ethics*. Routledge.
- Manoa Heritage Center. What is Mana? Manoa Heritage Center. February 9th, 2024. <https://www.manoaheritagecenter.org/moolelo/kuka%CA%BBo%CA%BBo-heiau/what-is-mana/>
- Martin, K., & Mirraboopa, B. (2003). Ways of knowing, being and doing: A theoretical framework and methods for indigenous and indigenist re-search. *Journal of Australian studies*, 27(76), 203-214.
- Matapo, J. (2018). Traversing Pasifika education research in a post-truth era. *Waikato Journal of Education*, 23(1), 139-146. doi:10.15663/wje.v23i1.627
- Meehan, C. R., Levy, B. L., & Collet-Gildard, L. (2018). Global climate change in US high school curricula: Portrayals of the causes, consequences, and potential responses. *Science Education*, 102(3), 498-528.
- Meine, C. (2022). Land, ethics, justice, and Aldo Leopold. *Socio-Ecological Practice Research*, 4(3), 167-187.
- Meyer, M. A. (1998). Native Hawaiian epistemology: Sites of empowerment and resistance. *Equity & Excellence*, 31(1), 22-28.
- Meyer, M. A. (2008). Indigenous and authentic: Hawaiian epistemology and the triangulation of meaning. In N. K. Denzin, Y. S. Lincoln, & L. T. Smith (Eds.), *Handbook of critical and Indigenous methodologies* (pp. 217-232). Routledge.
- Mochizuki, Y., & Bryan, A. (2015). Climate change education in the context of education for sustainable development: Rationale and principles. *Journal of Education for Sustainable Development*, 9(1), 4-26. <https://doi.org/10.1177/0973408215569109>
- Monroe, M. C., Plate, R. R., Oxarart, A., Bowers, A., & Chaves, W. A. (2019). Identifying effective climate change education strategies: A systematic review of the research. *Environmental Education Research*, 25(6), 791-812.
- Nation, M. T., & Feldman, A. (2021). Environmental education in the secondary science classroom: How teachers' beliefs influence their instruction of climate change. *Journal of Science Teacher Education*, 32(5), 481-499.
- New Jersey Department of Education. (2022). *Climate change education*. <https://dep.nj.gov/seeds/teachers/climate-change-education/>
- NCSS House of Delegates Resolution #19-02-02. (2019). <https://www.socialstudies.org/about/hod/2019-hod-resolutions>

- Nunn, P. D., Runman, J., Falanruw, M., & Kumar, R. (2017). Culturally grounded responses to coastal change on islands in the Federated States of Micronesia, northwest Pacific Ocean. *Regional Environmental Change*, 17, 959-971.
- Nu‘uhiwa, K. (2019). A methodology and pedagogy of understanding the Hawaiian universe. In N. Wilson-Hokowhitu (Ed.), *The past before us: Mo‘okū‘auhau as methodology* (pp. 39-49). University of Hawaii Press.
- Oxley, L., & Morris, P. (2013). Global citizenship: A typology for distinguishing its multiple conceptions. *British Journal of Educational Studies*, 61(3), 301-325.
- Parker, W., & Jarolimek, J. (1984). *Citizenship and the Critical Role of the Social Studies*. NCSS Bulletin No. 72. SSEC Publications. Washington, DC.
- Paris Agreement. (2015). United Nations. *United Nations Treaty Collect*, 1-27.
- Pashby, K., da Costa, M., Stein, S., & Andreotti, V. (2020). A meta-review of typologies of global citizenship education. *Comparative Education*, 56(2), 144-164. <https://doi.org/10.1080/03050068.2020.1723352>
- Pelling, M., O’Brien, K., & Matyas, D. (2015). Adaptation and transformation. *Climatic Change*, 133(1), 113-127. <https://doi.org/10.1007/s10584-014-1303-0>
- Peshkin, A. (1988). In search of subjectivity: One’s own. *Educational Researcher*, 17(7), 17-21.
- Powers, A. L. (2004). An evaluation of four place-based education programs. *The Journal of Environmental Education*, 35(4), 17-32.
- Rebich, S., & Gautier, C. (2005/09//). Concept Mapping to Reveal Prior Knowledge and Conceptual Change in a Mock Summit Course on Global Climate Change. *Journal of Geoscience Education*, 53(4), 355-365. <http://ezproxy.cul.columbia.edu/login?url=https://www.proquest.com/scholarly-journals/concept-mapping-reveal-prior-knowledge-conceptual/docview/202779335/se-2>
- Reid, A. (2019). Climate change education and research: Possibilities and potentials versus problems and perils? *Environmental Education Research*, 25(6), 767-790. <https://doi.org/10.1080/13504622.2019.1664075>
- Reser, J. P., Bradley, G. L., & Ellul, M. C. (2014). Encountering climate change: ‘Seeing’ is more than ‘believing’. *Wiley Interdisciplinary Reviews: Climate Change*, 5(4), 521-537.
- Resor, C. W. (2010). Place-based education: What is its place in the Social Studies classroom? *The Social Studies*, 101(5), 185-188. doi:10.1080/00377990903493853.

- Roemhild, R., & Gaudelli, W. (2021). Climate change as quality education: Global citizenship education as a pathway to meaningful change. In R. Iyengar & C. T. Kwauk (Eds.), *Curriculum and learning for climate action*(pp. 104-119). Brill.
- Rose, G. (2022). *Visual methodologies: An introduction to researching with visual materials*. Sage Publications.
- Rudiak-Gould, P. (2011). Climate change and anthropology: The importance of reception studies. *Anthropology Today*, 27(2), 9-12.
- Rudiak-Gould, P. (2015). The social life of blame in the Anthropocene. *Environment and Society*, 6(1), 48-65.
- Schattle, H. (2010). Global citizenship in theory and practice. In *The handbook of practice and research in study abroad* (pp. 25-42). Routledge.
- Schweizer, S., Davis, S., & Thompson, J. L. (2013). Changing the conversation about climate change: A theoretical framework for place-based climate change engagement. *Environmental Communication: A Journal of Nature and Culture*, 7(1), 42-62.
- Semken, S., & Freeman, C. B. (2008). Sense of place in the practice and assessment of place-based science teaching. *Science Education*, 92(6), 1042-1057.
- Shibata, R. (2022). Climate change in the Pacific: Land, identity, and security. *Peace Review*, 34(1), 22-30, <https://doi.org/10.1080/10402659.2022.2023426>
- Smith, G. A. (2007). Place-based education: Breaking through the constraining regularities of public school. *Environmental Education Research*, 13(2), 189-207.
- Smith, L. T. (1999). *Decolonizing methodologies: Research and indigenous peoples*. Bloomsbury Publishing.
- Spencer, M. S., Fentress, T., Touch, A., & Hernandez, J. (2020). Environmental justice, indigenous knowledge systems, and native Hawaiians and other Pacific islanders. *Human Biology*, 92(1), 45-57.
- Sobel, D. (2004). Place-based education: Connecting classroom and community. *Nature and Listening*, 4(1), 1-7.
- Soja, E. W. (2013). *Seeking spatial justice* (Vol. 16). University of Minnesota Press.
- Sterling, S. R. (2001). *Sustainable education: Re-visioning learning and change*. Green Books for the Schumacher Society.
- Sultana, F. (2022). Critical climate justice. *The Geographical Journal*, 188(1), 118-124.

- Terry, G. (2009). No climate justice without gender justice: An overview of the issues. *Gender & Development*, 17(1), 5-18.
- Thompson, M. (2020). Mental mapping and multinational migrations: A geographical imaginations approach. *Geographical Research*, 58(4), 388-402.
- Thornton, W. H. (2000). Mapping the 'glocal' village: The political limits of 'glocalization.' *Continuum*, 14(1), 79-89. doi:10.1080/713657679
- Tomlinson, M., & P Kāwika Tengan, T. (2016). *New Mana: Transformations of a classic concept in Pacific languages and cultures*. Anu Press.
- Tuan, Y. F. (1977). *Space and place: The perspective of experience*. University of Minnesota Press.
- Tuck, E., & McKenzie, M. (2014). *Place in research: Theory, methodology, and methods*. Routledge.
- Vonnegut, K. (1994). *Slaughterhouse-Five: A novel*. Modern Library.
- United Nations Refugee Agency. (2024). *Climate change and displacement*. United Nations High Commissioner for Refugees. <https://www.unhcr.org/what-we-do/build-better-futures/climate-change-and-displacement>
- Wallace-Wells, D. (2019). *The uninhabitable earth*. Columbia University Press.
- Wheeldon, J., & Faubert, J. (2009). Framing experience: Concept maps, mind maps, and data collection in qualitative research. *International journal of qualitative methods*, 8(3), 68-83.
- Whyte, Kyle, How Similar Are Indigenous North American and Leopoldian Environmental Ethics? Available at SSRN: <https://ssrn.com/abstract=2022038> or <http://dx.doi.org/10.2139/ssrn.2022038>
- Wilbanks, T. J. (2003). Integrating climate change and sustainable development in a place-based context. *Climate Policy*, 3, S147-S154.
- Williams, M. K. (2017). John Dewey in the 21st century. *Journal of Inquiry and Action in Education*, 9(1), 7.
- Wilson-Hokowhitu, N. (Ed.). (2019). *The past before us: Mo 'okū 'auhau as methodology*. University of Hawaii Press.
- Wooltorton, S., Collard, L., Horwitz, P., Poelina, A., & Palmer, D. (2020). Sharing a place-based indigenous methodology and learnings. *Environmental education research*, 26(7), 917-934.

- Yemini, M., Engel, L., & Ben Simon, A. (2023). Place-based education – a systematic review of literature. *Educational Review*, 1–21. <https://doi.org/10.1080/00131911.2023.2177260>
- Yli-Panula, E., Jeronen, E., & Mäki, S. (2022). *Climate change education in Finland*. *Environmental Sciences Encyclopedia*. MDPI.

Appendix A: Semi-structured Interview

It is important to note that although semi-structured interview is being used it is the hope of the researcher that the interviewee will lead the discussion.

Interview #1:

1. I would like to get to know you. Can you tell me a little bit about yourself? This might include sharing where you are from, how you live in Hawai'i, and yourself as a teacher.

2. Where do you teach? What is your school like? Can you tell me about your school?

Potential follow-up questions:

How would you describe the setting of your school?

Why do you like teaching in this community?

What do you teach? Who are the youth that you teach?

3. What does the word place mean to you?

a) What are some important/valuable places in your life?

b) What is the value of place in a place like Hawai'i?

4. I understand that land and ocean are very important in Hawai'i. Am I correct in saying this? If this is correct, is that a value that you learned from your family or in school or elsewhere? Can you explain what it means to say land and ocean are important? Are these ideas related to culture?

5. Do people/teachers use the language of climate change here in Hawai'i? What does that concept mean to you and in this context?

6. Does climate change effect Hawai'i? If so, how to people here talk about climate change? If so, can you share how/if land, people, and society are each/all affected by climate change?

7. I want to think with you about how people across the globe talk about and feel any effects of climate change. I live and teach in the Bronx. Could you try to hypothesize how our understanding and relationship to climate change might be similar or different?

8. I have just asked you are three big ideas that are central to my research – place, land values, and climate change. Do you see these ideas as related at all? If so, how?

When you teach about climate change, do you integrate ideas of place and land values? If so, can you offer an example or two of what this looks like in your teaching?

*Pause

Interviewer: To get a sense of how you think about climate change I would like for you to draw or brainstorm for me a map. On the map you might consider the following ideas:

- 1) What ideas or experiences come to mind when you think about climate change?
- 2) How might you teach about climate change globally or locally?
- 3) What is the role of place when teaching climate change?

9. Can you explain your map?

10. How do you and others here learn about climate change? What knowledge is helpful to you?

11. What stories have you heard or experienced about climate change? Where do you hear these stories/knowledge?

12. How do you approach climate change as a teacher?

13. What is a place that is significant to you? Would you mind sharing a story about this place and why it is significant?

14. Is this place threatened by climate change? What does threatened mean in relation to this place?

Appendix B: Photo-Elicitation Protocol

Purpose: A photo collage is an opportunity to visually construct a narrative that reflects your knowledge. This photo collage will elicit how you think about place and climate change.

Preparation: Think of the meaning of place. What images come to mind? How might climate change affect this concept of place? In order to prepare for constructing a collage gather seven to ten photos that show how you think of place. The photos may show a specific place, or they might show how you engage with place. You may use an existing photo if it highlights how you would engage with place.

Steps:

1. Set-up: Spread the images on a table
2. Arrange- Arrange the photos in order from most significant photo for engaging with place to least significant. While all the photos are significant it is important to put them into an order. The collage will be assembled on demand as this will allow the participant to think aloud regarding the ordering of photos.
3. Think a Loud- As you create the collage talk aloud about what you're thinking. The facilitator might prompt you with questions as you assemble the collage.

When you are finished with the collage the facilitator may ask the following questions for clarification:

- Talk about your collage and how and why you have built it.
- Tell me about Photo _____?
 - How does this photo help you understand place?
 - How does this photo help you understand climate change?
 - Why did you choose Photo _____ as your most significant?
- Why did you choose Photo X as your least significant?
- How does the collage inform how you think about place?
- How might you use the photos to teach climate change?
- What is a photo you wish you could have taken to add to your collage?

Appendix C: Participatory Walking Protocol

Purpose:

A participatory walking tour is an opportunity engage your senses and thoughts about place and climate change. It is also an opportunity to consider the culture, knowledge and experiences of a place.

A participatory walk is an opportunity for you and I to walk together to a place that is important to you. I am going to ask you to narrate the walk and then our time in/at the place you have selected.

Preparation:

Think of a place that you think of when I say “climate change” and that is a place that is familiar to you.

Once we meet.

Before we start to walk, can you tell me a little about where we are and why we are here? Thank you.

Let’s walk. As we walk, please tell me more about the place and what we are experiencing. I am new to this place and want to understand what are seeing or feeling through your perspective. I invite you to talk about this place through experience, through feelings, through your different senses, whatever resonates with you.

When you feel you are “in a place”, use these prompts:

- What is significant about this site?
- How do you feel walking/standing in this place?
- What do you hear, smell, and see?
- Is this a typical day in this place?
- What memories, if any, does this place generate? What was your first experience with this place?
- How is this place entangled in local culture or ideas?
- How is this place entangled in a discussion of climate change?
- Could you imagine using this place as concept or method in your teaching of climate change? What might that look like for you?

Appendix D: Mental Map Protocol

Purpose: A mental map is an opportunity to visually represent your ideas and make connections between different ideas that reflects your knowledge.

Preparation: You will be given a blank piece of paper and a pen.

Steps:

1. Create- You may create your mental map by responding to the prompt below.
2. Nodes- On the mental map there are five nodes (circles with a concept inside). The nodes represent large ideas and serve as a starting point for your mental map. You may write and explain your thinking about each idea. These ideas are: climate change, global and local, place, Hawai'i, and climate change education.
 1. If any of these nodes are too strongly correlated for you, you can integrate them as needed.
 2. If you want to add an additional concept you may.
3. Please consider these in your map-
 1. Depict- You may want to depict your thinking during the activities as well as how your thinking has shifted.
 2. Relate- Describe or draw where your ideas come from. What knowledge are your ideas based on? This could be historical or cultural, formal (like school) or informal (like family), from experience, or other influences that shape your thinking and teaching.
 3. Connections- How do ideas connect with other ideas on your paper? How do you explain these connections?

If you want you may add arrows showing the direction of the connection. You may also offer a short explanation.