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Restoring Reciprocity: Indigenous Knowledges and Environmental Education

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I would first like to thank Barbara Drake for sharing her wisdom with me and so many others. I would also like to thank the Tongva people for their knowledges and for hosting me on their lands. Thank you to my readers, Angela Mooney-D'Arcy and Char Miller, for their time and guidance. And thank you to my parents and loved ones for their support.

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A long time ago the Creator came to Turtle island and said to the Red People: “You will be the keepers of Mother Earth. Among you I will give the wisdom about Nature, about the interconnectedness of all things, about balance and about living in harmony. You Red People will see the secrets of Nature… The day will come when you will need to share the secrets with other people of the earth because they will stray from their spiritual ways. The time to start sharing is today.

-Mohican Prophecy
(as cited in Echo-Hawk, 2013)

Introduction

Indigenous Knowledges

Indigenous peoples have maintained an intimate relationship with the environment since time immemorial. Reliant upon their natural environment for survival, Indigenous peoples fully acknowledge[d] and embrace[d] their interdependence on the natural world. This relationship is one of human-nature reciprocity, in which Indigenous peoples continuously thank the environment for all it provides.

To help conceptualize the Indigenous value of reciprocity, I cite George Blondin, a Sahtu Dene Elder. The following is a story of his brother Edward hunting:

> Edward was hunting near a small river when he heard a raven croaking, far off to his left. Ravens can't kill animals themselves, so they depend on hunters and wolves to kill food for them. Flying high in the sky, they spot animals too far away for hunters or wolves to see. They then fly to the hunter and attract his attention by croaking loudly, then fly back to where the animals are.
>
> Edward stopped and watched the raven carefully. It made two trips back and forth in the same direction. Edward made a sharp turn and walked to where the raven was flying. There were no moose tracks, but he kept following the raven. When he got to the riverbank and looked down, Edward saw two big moose feeding on the bank. He shot them, skinned them, and covered the meat with their hides.
>
> Before he left, Edward put some fat meat out on the snow for the raven. He knew that without the bird, he wouldn't have killed any meat that day. (As cited in Coulthard, 2010, p. 80)

Glen Coulthard, Yellowknives Dene, explains: "Blondin's narrative not only emphasizes the consciousness and individual agency of the raven, but also depicts the relationship between the hunter and the bird as a mutually interdependent one" (2010, p. 80). Indigenous peoples like Edward continue to engage in reciprocal relationships with the environment. This understanding that humans are interdependent on their natural environment is a key characteristic of many Indigenous belief systems around the world. Western societies, on the contrary, have developed a relationship of domination over the land:

> Two centuries ago the Tongva relied on their deep connection to the land—an intimate knowledge of its seasons and moods, a constant awareness of its hazards as well as its potential—for their very survival as a hunting and gathering people. But when the Spanish arrived in the eighteenth century they brought a different view. Where the Indians saw seed-bearing grasslands as a vital source of food, the Spanish envisioned enormous pastures for their vast herds of horses and cattle. (Jurmain & McCawley, 2009, p. 101).

Walter Echo-Hawk (2010), Pawnee, elaborates on the difference between Indigenous and Western worldviews:

> Some ten thousand years ago, an opposing cosmology began to emerge among those humans who began domesticating animals and plants in agrarian societies. Agriculturalists had to combat the natural world, control the plants, and dominate domesticated and wild animals to survive. They evolved a new cosmology that sanctifies domination of the land and the conquest of nature. (p. 367)

While Indigenous peoples "revere" plants and animals, Western societies dominate them in the name of production. This fundamental difference in worldviews is vital to understanding how

Indigenous knowledge systems might enrich current, Western-based models of environmentalism.

Optimistically, Waziyatawin Angela Wilson—Dakota professor, author, and activist—reminds us: "The same human beings who created the conditions of this world also have the capacity to change them" (2004, p. 361). It is with this intention that I will explore how Indigenous knowledges might enrich environmentalism, particularly environmental education. Environmental education in the U.S. has been slow to incorporate Indigenous knowledges, with most pre-university curriculum centering around Western science. I believe incorporating Indigenous knowledges into environmental education can promote reciprocal, critical, and active human-nature relationships. While Indigenous knowledges should infiltrate all levels of environmental education, I argue that alternative forms of education which operate outside the formal school system might present the fewest immediate obstacles.

Locating Myself

Although I took many environmental classes in high school and college, I never learned about Indigenous peoples' worldviews regarding nature until I studied abroad in Ecuador in 2017. There I learned about an Andean worldview called *Sumak Kawsay:* an Indigenous paradigm-turned-development model that emphasizes harmony between oneself, their environment, and their community. *Sumak Kawsay* entirely dissolves the human-nature hierarchy; humans are not above nature, but are its equal. I was captured by the worldview and became curious about its potential to engage environmentalists. I asked myself: why *aren't* we learning from the people who have maintained an intimate and respectful relationship with the

earth for centuries? I realized that something had been missing from my environmental education.

I left the Andes with a new understanding of my relationship to the environment and am incredibly grateful for the communities there that shared their wisdom with me. I returned to my home in Los Angeles with not only a completely new way of viewing the environment, but also an acute awareness of my positionality in a settler-colonial state. I was no longer a visitor in a foreign country that had a prominent Indigenous population, but rather a non-Indigenous person in a country with a systemically marginalized Indigenous population. I may technically be a 'resident' of the United States, but I am hosted on Indigenous lands. I grew up in the San Fernando Valley and currently go to school in the Inland Empire, meaning I live and study on native Tongva land. I am *Kuuyam*: the Tongva word for guest (Sepulveda, 2018, p. 41). The Tongva territory spans 1,500 square miles of what is now Los Angeles and Orange County (Jurmain & McCawley, 2009, p. 7). "Until the Spanish came here in the late eighteenth century, the Tongva were a sovereign people, a people of the land and sea, their identity molded by the environment and their relationship to it" (Jurmain & McCawley, 2009, p. xxii). I want to thank the Tongva people for hosting me while I live and study on their lands.

My intention in writing my thesis about Indigenous knowledges stems from nothing but personal interest. As a non-Indigenous person, I need to be hyper-aware of academia's extensive history of simultaneously romanticizing Indigenous peoples and excluding them from academia. As Nancy Rich, professor of environmental studies, points out, "Despite some 20,000 years of actively shaping this land, the contributions of Indigenous peoples have largely been absent in those academic areas directly and primarily concerned with the environment…" (2012, p. 311).

As a non-Indigenous person writing about Indigenous knowledges, I am in many ways continuing to uphold this structure. Leanne Simpson—a renowned Michi Saagiig Nishnaabeg scholar, writer, and artist whose work I will call upon frequently—offers: "Researchers need to examine their internal environment. They need to critically examine and challenge their own biases and assumptions, and most of all, they need to listen to the numerous Aboriginal voices already present in the literature" (1999, p. 96). Following this advice, the process of writing this thesis has been one of self-reflection. I include examples from my own educational experience to reflect on how I was exposed to only one worldview: the Western one. In an attempt to spotlight the voices of Indigenous authors, sources from Indigenous scholars are identified with an asterisk notation in the references.

Terminology

When writing about marginalized groups, terminology is political. Terminology for Indigenous peoples is particularly so. Indigenous peoples existed for thousands of years without the need to call themselves anything; it was only when colonizers arrived to what is now known as the United States that they were labeled. Michael Bird—Sahnish (Arikara) and Hidatsa professor and scholar—argues that: "The idea of dividing people according to a single racial identity was the invention of Europeans, who socially constructed race to exclude and subordinate peoples who were not white and to privilege those who are" (1999, p. 3). The colonial process of naming served to draw boundaries between the colonizers and the colonized, thereby establishing power dynamics that live on to this day. Linda Tuhiwai Smith—an iwi scholar and professor—explains that Indigenous peoples not only have prior names for themselves, but "there are also terms by which indigenous communities have come to be known,

initially perhaps as a term of insult applied by colonizers, but then politicized as a powerful signifier of oppositional identity..." (2012, p. 6).

As a non-Indigenous academic, it is my responsibility to address the historical relationship between terminology and colonization. Thus, my choice in terminology is deliberate and was done in consultation with Indigenous scholars' work.

"Indigenous peoples" and "Indigenous"

Throughout the paper, I have chosen to use the term "Indigenous peoples" to signify the first inhabitants of the United States. I also use "Indigenous" as an adjective. I have done so for reasons eloquently outlined by Tuhiwai Smith (2012):

> 'Indigenous peoples' is a relatively recent term which emerged in the 1970s… It is a term that internationalizes the experiences, the issues and the struggles of some of the world's colonized peoples. The final 's' in 'peoples' has been argued for quite vigorously by indigenous activists because of the right of peoples to self-determination. It is also used as a way of recognizing that there are real differences between different indigenous peoples. (p. 7)

I have also deliberately chosen to capitalize the 'I' in 'Indigenous,' for reasons outlined by Shawn Wilson, Opaskwayak Cree researcher:

> The term Indigenous itself is in the process of being reclaimed by Indigenous people. In this respect, Indigenous differs from 'small I' indigenous, which is sometimes used to indicate things that have developed 'home grown' in specific places... Indigenous is inclusive of all first peoples—unique in our own cultures—but common in our experiences of colonialism and our understanding of the world. (2008, p. 16)

Both Smith and draw attention to the commonalities and differences amongst Indigenous communities. The usage of "Indigenous" is not universal among all Indigenous peoples and scholars. In Canada, it is standard to refer to Indigenous peoples as "Aboriginal" (Simpson, 2002). Some Indigenous peoples in the United States use the term "Indian.[1]" While 'Indian' is less and less common in the academic sphere, some authors such as Cajete (1994) have referred to Indigenous peoples as "Indian." Cajete (2000) also uses the term "Native," and others use "Native American." As Bird (1999) explains:

> While the label "Native American" may not have the baggage of stereotypes associated with the term "Indian," it still reflects a monolithic identity of indigenous Peoples and gives the impression that these lands were referred to as "America" by Indigenous Peoples, which, of course, they were not. (p. 4)

In summary, there is no formal consensus amongst Indigenous peoples on what to call them. This is reflective of the diversity amongst Indigenous peoples: each tribe has its own distinct history and way of identifying themselves. Most Indigenous people prefer to identify first by their Native Nation or tribal affiliation, and then more broadly as Indigenous or Native American. Many scholars agree that it is best, whenever possible, to address Indigenous peoples by their specific tribal identity (Bird, 1999, p. 13). I will embody this practice in my paper. Other terms will only be used in direct quotes.

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[1] A 1995 survey by the Bureau of Labor Statistics entitled "Preference for Racial or Ethnic Terminology: by Group" found that 49.8 percent of respondents preferred the term "American Indian" and 37.5 percent preferred "Native American" (as cited in Bird, 1999, p. 3). As Bird (1999) proceeds to explain, this preference is "hardly surprising considering for more than five hundred years European and European American colonizers have uncritically imposed this label upon Indigenous Peoples in the United States through federal policies, treaties, and numerous other venues." (p. 3)

"Knowledges"

When referring to Indigenous thought or worldviews, I will pluralize 'knowledges.' I adapted this from Margaret Kovach, Plains Cree and Saulteaux scholar and professor, who pluralizes 'knowledges' to avoid essentializing the wide variety of indigenous knowledges that exist amongst tribes: "The term *Indigenous knowledges*… acknowledges both the shared commonalities and the diversity of many tribal ways of knowing" (2010, p. 20, emphasis in original).

"Western"

Throughout the paper, I often use the term 'Western' as a way to describe something that is antithetical to Indigenous worldviews. I will once again follow in Kovach's (2010) footsteps here:

> Throughout this text, the term Western is used as a descriptive term for a particular ontological, epistemological, sociological, and ideological way of thinking and being as differentiated from Eastern thought, an Indigenous worldview, and so forth…the purpose us not to propagate unhelpful binaries, but to point out that Indigenous approaches to seeking knowledge are not of a Western worldview, a matter that colonialism (and its supporters) has long worked to confuse.

In this way, I use 'Western' to mean something that is of a colonial or European legacy.

Education for a sustainable world

"All education is environmental education"

-David Orr, *Earth in Mind*

In the introduction to his book *Schooled to Order: A Social History of Public Schooling in the United States*, Nasaw (1979) explains that since the earliest foundation of common schools in the 1800s, the American school system has been expected to mold the moral character of students, create a productive workforce, and maintain social order (p. 4). Stevenson (1987), similarly defines the traditional purpose of schools: "to conserve the existing social order by reproducing the norms and values that currently dominate environmental decision-making" (as cited in Palmer, 2002, p. 96).

The school system was first created, in part, to assimilate the large amount of immigrant children arriving to the United States: "With its emphasis on assimilation, conformity, and traditional values, [the school system] was able to handle the masses of European immigrants and the growing American population" (Pulliam, 1987, p. 241). The purpose of the school system has historically been to homogenize the United States' diverse population into a Euro-centric vision of social order. Today, minority students continue to experience marginalization in the school system. As David Orr—author of *Earth in Mind: On Education, Environment, and the Human Prospect* (2004)—posits:

> And for what destination and for what destiny do we educate our children? For all of the fashionable talk about multiculturalism, the fact is that modern education has contributed greatly to the destruction of local cultures virtually everywhere. Locality has no standing in the modern curriculum. Abstractions, generalized knowledge, and technology do.

> Education has become a great homogenizing force undermining local knowledge, indigenous languages, and the self-confidence of placed people… (p. 129)

Incorporating Indigenous knowledges into current education models is part of a larger decolonial project that re-centers the local, thereby working against the "great homogenizing force" that David Orr suggests education has become.

Our current education system is failing to produce the types of citizens we need to fix the environment. Perhaps then, the initial purpose of education—to create an assimilated and homogenized labor force—no longer serves us. Perhaps we need a dramatic reconception of education's purpose. As the epigraph to this chapter by Orr (2004) reads, "all education is environmental education"— that is, all education should, in some way, center the environment as its primary focus. In the book *Looking to the Mountain: An Ecology of Environmental Education*—one of the keystone texts in this area that I will call upon many times— Gregory Cajete, Tewa author and professor, explains the responsibility of education in this respect:

> It is especially with regard to educational institutions and the entire process of modern education that the creation of eco-philosophy faces its greatest challenge… Education is what molds and conditions people to "fit" into a society. Essentially, modern education conditions a person to be oriented to consumerism, competition, rationalism, detachment, individualism, and narcissism. (2000, p. 62).

Developing an "eco-philosophy" or ecological consciousness directly contradicts of the traditional purpose of schools, which was to "increase material productivity" (Nasaw, 1979, p. 4). Today's changing environment require that education develops a new set of priorities. Education should focus not on increasing productivity, but on promoting meaningful human-nature relationships.

A Brief History of Environmental Education

In reality, all education is *not* environmental education. Environmental education (EE) has developed as its own, distinct entity within the larger field of education. Although the actual origins of environmental education are contested, the EE movement began to gain momentum in the 1970s with the help of the federal government. In an address to Congress in 1970, President Nixon stated:

> It is also vital that our entire society develop a new understanding and a new awareness of man's relation to his environment—what might be called 'environmental literacy.' This will require the development and teaching of environmental concepts at every point in the education process (as cited in Carter & Simmons, 2010, p. 7).

Nixon's address was the first explicit, national call for a widespread environmental education in the United States. Shortly after the address, in October 1970, Congress passed the Environmental Education Act. The law established an Office of Environmental Education within the US Office of Education. It also provided limited funding for states to implement EE within their K-12 systems (as cited in Carter & Simmons, 2010, p. 7). Although the act only set up minimal funding for five years, it marked a milestone in environmental education as it was the first time EE was incorporated into federal law.

Under the Reagan Administration of the 1980s, the Omnibus Budget Reconciliation Act of 1981 eliminated almost all of the progress brought on by Nixon's Environmental Education Act. Nearly a decade later in 1990, a new National Environmental Education Act was signed by President Bush (as cited in Carter & Simmons, 2010, p. 9). This tug-of-war over environmental education policy demonstrates how difficult it can be to secure governmental funding for EE development. It is also difficult for EE to secure funding within the field of environmentalism. In

2003, The Campaign for Environmental Literacy estimated that, "optimistically," about 1.5 percent of federal spending on environmental research and development is dedicated to environmental education ("National Overview: Involvement of Federal Agencies in Environmental Education," n.d.).

On an international scale, the first United Nations Conference on the Human Environment in Stockholm, Sweden, took place in 1972 and produced the Stockholm Declaration: twenty-six principles concerning the environment and development. Principle 19 specifically calls for "education in environmental matters, for the younger generation as well as adults… giving due consideration for the underprivileged is essential" (Declaration of the United Nations Conference on the Human Environment, 1972). A few years later the international Tbilisi Conference of 1977 set out the three 'goals' of environmental education:

> (a) to foster clear awareness of, and concern about, economic, social, political and ecological interdependence in urban and rural areas;
>
> (b) to provide every person with opportunities to acquire the knowledge, values, attitudes, commitment and skills needed to protect and improve the environment;
>
> (c) to create new patterns of behaviour of individuals, groups and society as a whole towards the environment (as cited in Palmer, 1998, p. 136).

The Tbilsi Conference is still referenced by environmental education scholars today when attempting to define the goals of environmental education. Despite this common understanding of the *goals* of EE, there persists a general uneasiness regarding the success of EE in terms of both its *implementation* and *efficacy*.

Efficacy of Environmental Education

As Hutchinson—author of *Growing Up Green: Education for Ecological Renewal* (1998)—explains: "Few studies have been conducted to determine the long-term effects of environmental education programs on the knowledge retention or the values/ attitudinal/ lifestyle changes evoked in students" (p. 25). Perhaps the lack of consensus regarding the efficacy of EE is reflective of the fact that there is no singular way to *measure* its efficacy. Do we measure the efficacy of EE against the state of our environment today? By the number of graduates entering the environmental field today? By increased environmental literacy?

The primary focus of environmental education, I believe, has been the latter: to increase environmental literacy. However, increased environmental literacy does not necessarily lead to environmentally-conscious actions. In 2008, researchers conducted the first nationwide environmental literacy test on 2,000 sixth and eighth grade students. The National Environmental Literacy Assessment assessed environmental sensitivity, ecological knowledge, environmental attitudes, action skills, willingness to act, and behavior. The study found that while eighth graders scored higher on knowledge and skills, sixth graders scored higher in affective and behavior measures. "This suggests that students gain ecological knowledge as they mature, but increasing sensitivity or action does not necessarily accompany this growing knowledge" (as cited in National Environmental Education Foundation, 2015, p. 57)

In *Environmental Education in the 21st Century: Theory, Practice, Progress and Promise*, Joy Palmer argues that "the influence of environmental education is certainly not as dominant or successful as it ought to be," and offers two reasons why: "the first has already been addressed—there are various conflicts, inconsistencies and practical limitations leading to a substantial gap between the rhetoric and the reality of the implementation of environmental

education policy and practice" (2002, p. 135). In other words, there are logistical barriers to successful environmental education; there is no agreed upon method for how to implement environmental education. Palmer continues:

> The second reason is well illustrated by empirical research as discussed—even where well-designed and successful programmes of environmental education do exist, their impact on long-term thinking and action is not as great as that of other significant experiences and formative influences in people's lives. (p. 135)

Like Palmer, I am curious as to how environmental education might be enhanced in order to ensure tangible, long-term results. Specifically, I am interested in how the incorporation of Indigenous knowledges might improve environmental education's ability to have "formative influences" on future generations. Incorporating Indigenous knowledges can move environmental education beyond environmental literacy and focus on restoring a reciprocal human-nature relationship. The following section hopes to highlight a few characteristics of Indigenous knowledges that promote reciprocal, critical, and active human-nature relationships.

Traditional Ecological Knowledge

To best explain the relationship between Indigenous peoples and their environment, I will call upon Indigenous scholars. Gregory Cajete (1994) elucidates the relationship between Indigenous peoples and the environment:

> American Indians lived in every place the Europeans called the New World, and in every place they established a direct and enduring relationship with their natural environment. They transmitted this understanding of' relationship through the learning and teaching processes that they evolved in many unique ways. Their understanding of ecological relationship was reflected in every aspect of their lives, their language. art, music, dance, social organization. (1994, p. 85)

"Traditional Ecological Knowledge" is a term used by many scholars to define the subset of Indigenous knowledges that deals exclusively with the environment. For Indigenous peoples, the concept of Traditional Ecological Knowledge did not exist until quite recently. Similar to how Indigenous peoples did not label themselves prior to their encounter with Europeans, Indigenous peoples embodied this way of life without the need to define it. This has led to fundamental differences in how Indigenous and non-Indigenous people define TEK. For Indigenous peoples, TEK is inseparable from all other forms of Indigenous knowledges. Simpson (1999) explains how the construction of TEK is implicitly dissonant for Indigenous peoples:

> In separating environmental knowledge from other kinds of knowledge as occurs in creating a body of knowledge derived from Indigenous people, the TEK movement violates the fundamental belief system and understanding inherent in Indigenous

> Knowledge systems. In Indigenous societies, the environment was and is fully integrated into every aspect of society. (p. 64)

Ecological knowledge has been extracted from the larger realm of Indigenous knowledges (IK). Put differently, "TEK is not an accurate description of the knowledge that Aboriginal People have about the 'environment,' rather it is an accurate indication of what the dominant society sees as valuable, reliable and useful" (Simpson, 1999, p. 49). Simpson's words are useful for understanding that TEK is not a product of Indigenous communities, but rather of outsiders attempting to make Indigenous knowledges digestible for Western minds.

TEK is so difficult to define, in part, because it attempts to condense intricate knowledge systems that vary across Indigenous communities into a singular definition. There are over 500 tribes of Indigenous peoples in the U.S. alone, each with its own unique set of knowledges. Defining TEK depends on identifying similarities amongst these ways of thinking, which can lead to essentialization. Charles Menzies—Gitxaala anthropologist and professor—emphasizes that "there are many traditional knowledges, each one attached to a different Aboriginal culture. A community's TEK is embedded in the matrix of its unique local culture, history, and traditions" (2006, p. 9). Because of this, "school curricula that involve TEK must be flexible enough to incorporate local views and empower TEK holders, despite emanating from a central government" (McCarter & Gavin, 2011, p. 11). Here lies a great challenge: ensuring that the locality of TEK is maintained while attempting to standardize and disseminate that knowledge into large-scale environmental education.

Jacqueline Luckey (1995), a Metit scholar, conducted a unique study on native and non-native understandings of TEK. She found that many non-Indigenous researchers endeavor to

define TEK and how it should be used, but warns that this is not acceptable "because of the great potential for misunderstanding and misuse of knowledge" (as cited in Simpson, 1999, p. 19). With this in mind, I hope to have presented a few different ways that Indigenous scholars have articulated TEK, without defining it myself. While exploring different articulations of TEK serves to establish an understanding of Indigenous knowledges as they relate to the environment, in my paper I choose to refer to this subset of knowledge more broadly as Indigenous knowledges (IK).

Land-based Worldview

A fundamental aspect of Indigenous communities is that they greatly value and are deeply tied to land. Joy Harjo, a renowned Muscogee poet, eloquently summarizes the relationship between indigenous communities and land:

> What especially makes Indigenous cultures unique is the relationship to the land. Land is a being, an entity, a repository of meaning. There is an ongoing relationship with the land. It is the keeper of our bones, stories, and songs. In this manner of thinking/being there is no hierarchy to differentiates value between all living things. (Harjo & Winder, 2011)

This was true of the Tongva people: "Land is sacred to most Tongva; it is a physical and spiritual link to their past as well as their future. Land is timeless and so their connection to it is without beginning or end" (Jurmain & McCawley, 2009, p. 125). The Yellowknives Dene people hold a similar view:

> In the Yellowknives Dene (or Weledeh) dialect of Dogrib, "land" (or dè) is translated in relational terms as that which encompasses not only the land (understood here as

> material), but also people and animals, rocks and trees, lakes and rivers, and so on. Seen in this light, we are as much a part of the land as any other element. (Coulthard, 2010, p. 80)

As Lakota philosopher Vine Deloria Jr. elaborates, Indigenous peoples believe land to have the highest possible meaning, "and all their statements are made with this reference point in mind" (as cited in Coulthard, 2010, p.79). Both Coutlhard and Deloria highlight that for Indigenous peoples, land is not just a material space but a way of orientation.

Robin Wall Kimmerer—Potawatomi author of *Braiding Sweetgrass: Indigenous Wisdom, Scientific Knowledge and the Teachings of Plants*—uses a metaphor to visualize the difference between Western and Indigenous relationships with the land:

> In Potawatomi, we speak of the land as *emingoyak*: that which has been given to us. In English, we speak of the land as "natural resources" or "ecosystem services," as if the lives of other beings were our property. As if the earth were not a bowl of berries, but an open pit mine, and the spoon a gouging shovel. (2013)

These descriptions of land by Potawatomi, Dene, and Tongva peoples demonstrate the common Indigenous understanding that land possesses immeasurable value and, as part of the land, humans are obligated to care for it.

Describing the relationship Indigenous peoples had with their homeland, Cajete (1994) explains: "From this perspective, it is easy to understand why Indigenous people around the world lamented the loss of their land. For in truth, from their perspective and reality, it was a loss of part of themselves" (p. 168). Imagine if everybody felt that the loss of their land was a loss of themselves. In emphasizing human's interconnectedness to land, Indigenous knowledges can attempt to restore this sentiment. As Cajete (1994) urges: "The importance American Indians

traditionally place on connecting with their place is not a romantic notion out of step with the times. It is rather the quintessential ecological mandate of our time!" (p. 81-82).

Reciprocity

The National Environmental Education Advisory Council explains: "The key to resolving current challenges and preventing future ones lies in supporting an educated population that understands the interconnectedness of human and natural systems…EE provides a path to this vision for the future" (2015, p. 1). The key to understanding our "interconnectedness" to natural systems might lie in Indigenous knowledges.

Kat Anderson—author of *Tending the Wild: Native American Knowledge and the Management of California's Natural Resources* (2005) explains that "for California Indians, nature was not an abstract concept relegated to the remote fringes of human communities but was intimately intertwined with daily living." Acknowledging that their survival depends on the survival of the environment, Indigenous peoples engage in a relationship of reciprocity with the environment. In practice, this means that "when something was taken from the natural world or animals were killed, ceremonies and symbolic ritual acts were performed to ensure the perpetuation of this right balance and attitude towards relationships" (Cajete, 1994, p. 88).

Many environmental movements today focus on restoration, on restoring the natural environment to its original health. But this is more or less where restoration ends. Our ultimate goal should be eliminating the need for restoration by preventing environmental destruction before it happens. Reciprocity resembles a circle in which two parties indefinitely care for one another, without an end point in mind. Thus, long-term restoration is dependent on establishing a relationship of human-nature reciprocity. Kimmerer (2013) emphasizes that it is "one of our

responsibilities as human people is to find ways to enter into reciprocity with the more-than-human world. We can do it through gratitude, through ceremony, through land stewardship, science, art, and in everyday acts of practical reverence." Once this relationship of reciprocity is normalized, reflective policy and environmental decision making are likely to follow.

Two Eyed Seeing

Two-Eyed Seeing, or *Etuaptmumk* in the Mi'kmaq language, is a concept coined by Mi'kmaq Elder Albert Marshall. Two-Eyed Seeing is

> learning to see from one eye with the strengths of Indigenous knowledges and ways of knowing, and from the other eye with the strengths of Western knowledges and ways of knowing, and to using both these eyes together, for the benefit of all. (as cited in Bartlett, et al., 2012)

Two-Eyed Seeing, then, is a way to recognize the strengths of both Western and Indigenous ways of knowing. Elder Marshall elaborates that in order to avoid romanticizing or trivializing it, Two-Eyed Seeing requires an ongoing process of co-learning for both parties (as cited in Bartlett, et al., 2012).

One of the key characteristics of Two-Eyed Seeing is that it:

> intentionally and respectfully brings together our different knowledges and ways of knowing, to motivate people, Aboriginal and non-Aboriginal alike, to use all our gifts so we leave the world a better place and not comprise the opportunities for our youth (in the sense of Seven Generations) through our own inaction. (as cited in Bartlett, et al., 2012)

Two-Eyed Seeing provides the space for Indigenous and Western knowledge systems to function side by side. Cajete (1994) "*advocates* developing a contemporary, culturally based, educational

process founded upon traditional Tribal values, orientations, and principles, while *simultaneously* using the most appropriate concepts, technologies, and content of modern education" (p. 17, emphasis in original). While Cajete does not use the exact words, he seems to endorse Two-Eyed Seeing in that he acknowledges the value of incorporating principles of Indigenous and Western knowledge systems into one education model.

Formal Environmental Education

The National Environmental Education Advisory Council (NEEAC) —in the National Environmental Education Advisory Council 2015 Report to the U.S. EPA Administrator—defines environmental education as:

> the use of a diverse range of activities to teach individuals of all ages and backgrounds, as well as communities of varying scales, to explore their environments, engage in critical thinking and problem solving, and make informed decisions about how to use and conserve resources and environments. (p. 2)

Here, the NEEAC highlights that EE is "diverse" and occurs across "varying scales," thereby acknowledging that there is no singular form of EE.

Despite efforts to federally regulate EE since the 1970s, there is no consensus on how to best implement EE in the United States. The NEEAC elaborates: "Practitioners [of EE] include individual educators; educator communities; county, state, regional, and federal agencies; nongovernmental organizations (NGOs); and Tribal nations" (2015, p. 6). Here the NEEAC acknowledges that EE manifests in a wide variety of ways, both formally—as in schools—and informally—such as through NGO's.

Interestingly, the report includes no statistics as to how many schools have some sort of environmental education curriculum. Nor is there data on how many NGOs in the country have environmental education programs. The reason for this lack of data on EE—particularly its presence in the formalized school system—might lie in governmental regulation, or lack thereof. As of now, EE is regulated primarily on a state and local level, meaning there is no federal responsibility for the implementation of EE.

In 2015, the California State Department of Education published a 48-page Blueprint for Environmental Literacy. The plan provided examples of how every subject in every grade level might incorporate environmental education (State Superintendent of Public Instruction Tom Torlakson's Environmental Literacy Task Force, 2015). However, the blueprint includes no timeline or mandatory measures, and the suggestions place most of the responsibility for its implementation on individual schoolteachers who are already overburdened with responsibilities. In 2018, California's Legislature allocated $4 million to the California Regional Environmental Education Community Network, which intended to promote the guidelines outlined in the Blueprint by providing grants for supplies, field trips, curriculum development, teacher training, and classroom project ideas (Jones, 2018). Again, the teachers are tasked with applying to the individual grants, and the grants are focused specifically on science education.

This alludes to one of formal environmental education's primary challenges: teachers are given no support to effectively teach environmental concepts. The 1991 report "Caring for the Earth: A Strategy for Sustainable Living" points out that

> environmental education deals with values. Many school systems regard this as dangerous ground, and many teachers (particularly in the natural sciences) are not trained to teach values… Yet no lifestyle or educational system is value-free. It is vital that schools teach the right skills for sustainable living. (as cited in Palmer, 2002, p. 78)

Palmer (2002) adds that even teachers committed to take on this challenge "would cite lack of time and resources, and pressure to prioritise other things as valid reasons for declining to do so" (p. 98). Placing the sole responsibility of implementing EE on school teachers who are not trained to do so greatly compromises the efficacy of EE. While progressive states such as California have adjusted their budgets to provide resources for teachers, resource guides can only

go so far. Without any mandatory environmental literacy training for teachers, teachers will neither recognize the urgency of teaching about the environment nor have the effective skills to do so.

Challenges to Institutionalizing TEK

If educators are given almost no support to teach environmental concepts, even more challenges are to arise when disseminating Indigenous knowledges into EE. For one, Indigenous cultures are oral cultures; that is, they pass on knowledge to and from generations primarily through spoken word, and not through written word as in Western cultures. "The Tongva did not have their own written language—their laws, histories, genealogies, stories, and fables were all memorized and passed down by word of mouth from generation to generation" (Jurmain & McCawley, 2009, p. xxiii). Cajete (1994) underscores the importance of storytelling for all people, Indigenous or not:

> Humans are storytelling animals. Story is a primary structure through which humans think, relate, and communicate… Myths, legends, and folk tales have been cornerstones of teaching in every culture. These forms of story teach us about the nature of human life in all its dimensions and manifestations (p. 116)

As "cornerstones of teaching," stories are inherently educational. Kimmerer (2013) believes that "stories are among our most potent tools for restoring the land as well as our relationship to land." In Ecuador, I experienced firsthand how stories can teach lessons about the environment. When an Indigenous scholar visited my class to speak about the Andean paradigm *Sumak Kawsay,* he shared an Andean myth that deeply resonated with me. I will relay my interpretation of the story. The story narrates a hummingbird trying to put out a fire in the jungle. Little by

little, the hummingbird collects water in his beak and squirts it on the fire. A jaguar sees the hummingbird and asks what he is doing, adding that the hummingbird is silly for thinking that he can put the fire out like that. The hummingbird replies: I do my part. This story is a perfect example of how Indigenous knowledges can support environmental education. The stories are entertaining, as they often personify animals and create characters. In turning abstract and complicated concepts into concise stories, the stories and myths of Indigenous communities make environmental lessons accessible and engaging.

Stories with environmental messages are commonplace in Indigenous communities; "most tribes had legends that vividly told of the consequences that would befall humans if they took nature for granted or violated natural laws" (Anderson, 2005). While storytelling as a practice is standard amongst Indigenous peoples, the individual content of each tribe's stories varies widely. In regards to the question of whether or not non-Indigenous teachers should tell Indigenous stories, Archibald (as cited in Iseke-Barnes, 2009) notes that without basic cultural sensitivity among teachers, "appropriation and disrespectful use of stories are more likely to occur" (p. 36).

South Africa presents an example of what teacher training regarding Indigenous knowledges might look like. In 2005, South Africa adopted "Curriculum 2005" which required that teachers incorporate Indigenous knowledges into science curriculum. The new curriculum was accompanied by a "Practical Argumentation Course" intended to increase teachers' understanding of Indigenous knowledge and their ability to implement it into their classrooms. Ogunniyi (2007) found that the course achieved both of these goals, and also challenged teachers' beliefs of science as the ultimate truth. Ogunniyi emphasizes that the curriculum's success depends on long-term, continuous support for teachers.

Given that both environmental education and Indigenous knowledges are not at the top of the list of educational priorities in the United States, a question of feasibility arises when considering the implementation of a similar system domestically. Rich (2012) interviewed educators about linking Indigenous knowledges and environmental studies. She found that the steep learning curve and lack of academic training associated with Indigenous knowledges caused professors to turn to members of Indigenous communities as their mentors and inspiration (p. 314). Here Rich alludes to an alternative in which teachers seek out Indigenous peoples as mentors. This is a viable alternative, but it still places the burden almost entirely on the teacher and Indigenous mentor. We might propose state or even federally-funded training for teachers to be the ultimate goal. Said training would need to be led by Indigenous peoples.

Beyond the logistical challenges of training teachers, there are also epistemological barriers to implementing Indigenous knowledges in the classroom. Western society—and its school systems—rely heavily on written, rather than oral, modes of knowledge transmission. "The process of converting the Oral Tradition to written documents freezes Indigenous Knowledge in an inappropriate context and increases the changes of mistranslation across language, world views and conceptual barriers" (Simpson, 1999, p. 91). Moreover, TEK is often transmitted within Indigenous cultures vertically, as in parent to child. However, incorporating TEK into the formal school system "may shift the mode of knowledge transmission from vertical to horizontal (within peer groups) or oblique (one instructor from the parental generation to many younger learners). This may result in a fundamental change in the structure and content of TEK" (McCarter & Gavin, 2011, p. 11).

History of Forced Attempted Assimilation

Indigenous peoples have been simultaneously denied adequate resources for their own education systems, and forced to endure the trauma of assimilation through traditional American schooling. The history of education as forced attempted assimilation has deep roots that continue to impact Indigenous students to this day. As Thomas Thompson chronicles in his book *The Schooling of Native America* (1978), "from the arrival of the white man up until the last two decades, Indian education has rested in the hands of church and state… In 1611, the predominantly French Society of Jesus became the first group to bring European education disciplines to Native Americans." Education's systemic denial of Indigenous peoples' identity continued for centuries, and in 1870, Congress authorized an annual sum of $100,000 for the schooling of Indigenous youth. Indigenous children aged six through sixteen were forced to attend Mission schools, where their native religion and languages were prohibited and replaced by Christianity and English (Noriega, 1992, p. 380).

Although these day schools forced Indigenous youth to abandon their culture, languages, and spirituality, the government was still not satisfied. As shown in this disturbing quote from the 1886 U.S. Commissioner of Indian Affairs' Annual Report:

> The greatest difficulty is experienced in freeing the children attending day schools from the language and habits of their untutored and often savage parents. When they return to their homes at night, and on Saturdays and Sundays, and are among their own surroundings, they relapse more or less into their former moral and mental stupor (as cited in Noriega, 1992, p. 380).

To ensure total assimilation, the government funneled even more money into boarding schools. The Carlisle Indian School opened in 1879 in Carlisle, Pennsylvania. Here, Indigenous students

underwent academic and religious assimilation, and were also forced to perform manual labor to offset the costs of their 'education' (Noriega, 1992, p. 381). More so, the psychological and emotional impact of being physically removed from their lands and families cannot be overlooked. In some cases, Indigenous children were uprooted from their homes and families at age six and returned at age seventeen, "largely devoid of conceptions of both their own cultures and their intended roles within them" (Noriega, 1992, p. 381). Forced extraction from their lands caused Indigenous youth to become disoriented which, in turn, had "the predictable effect of demolishing the internal cohesion of native societies, thereby destroying the ability of these societies to resist conquest and colonization" (Noriega, 1992, p. 373). Education was used to subdue Indigenous peoples and quell any potential for resistance.

Financial constraints would prove to be the major impediment to the government's goal of mass assimilation through education. Congress had clear intentions, but were unwilling to devote the money necessary to realize them. As a result, in the early 1900s the majority of Indians were still being educated in Indigenous rather than colonial institutions. In 1901, an estimated 300 out of 5,000 of Navajo school-aged children were enrolled in assimilating institutions. Of Anishinaabe, 600 of 2,280. Of White Mountain (Chiricahua) Apache, 80 of 488 (as cited in Noriega, 1992, p. 383).

> Despite the best efforts of BIA officials, missionaries, and teachers to stamp them out, indigenous languages, spiritual practices, and sociopolitical forms were not only continued by tribal elders, but transmitted from generation to generation, more or less in accordance with the time-honored educational customs of native peoples. (Noriega, 1992, p. 383)

While the impact these institutions had on Indigenous students is immeasurable, it is important to acknowledge that Indigenous communities did maintain autonomy during this time in spite of governmental influence.

By 1906, Indian Commissioner Frances E. Leupp began to shift the government's strategy towards a wide-scale infusion of Indigenous students into the public school system, where he thought "being subsumed within an overwhelming number of non-Indian 'peers' might serve to propel such unfortunates away from their own traditions and even more rapidly into the realm of Euroamerican tastes, values, and sensibilities," while also minimizing the costs associated with running boarding schools (Noriega, 1992, p. 384). In 1928, the Interior Department's Miriam Report described boarding schools as "grossly inadequate," but the widespread closing of boarding schools did not begin until the 1970s. Some boarding schools remain operational today (as cited in Noriega, 1992, p. 386).

The federal government's legacy of assimilation lives on. Indigenous students, on and off of reservations, are systemically underserved in the education system. While the national graduation rate for public high schools in 2015-2016 was 84 percent, the American Indian/Alaska Native graduation rate was 72 percent (National Center for Education Statistics, 2018, p. 130). A 2018 report by the United States Government Accountability Office found that Native American students received higher than average rates of school discipline[2] (p. 14). The same report also found that "American Indian and Alaska Native students had the highest rates of chronic absenteeism in school year 2013-14" (p. 23). This is not a reflection of any deficiency in intelligence or behavior, but rather a direct result of centuries of maltreatment in the school system. Without teachers and curriculum that acknowledge the history, knowledges, and lived

[2] Albeit at lower rates than Black students {United States Government Accountability Office, 2018).

experiences of Indigenous students, they will continue to be disenfranchised by an educational system predicated on cultural erasure. According to Rich (2012) this "can be seen not only in the marked alienation of Indigenous students from conventional education, but also in the fact that many students are largely unaware that other knowledges even exist" (Rich, 2012, p. 311-312). Although Rich calls for the inclusion of Indigenous knowledges into conventional education, many Indigenous peoples are apprehensive.

> While most Indigenous Peoples would likely concede that some formalized education the colonizer's system is necessary for us to survive in the modern world while developing strategies of resistance, there still exists tremendous distrust for the educational systems that have treated our children so brutally. (Wilson, 2004, p. 365-366)

Potential for Preservation

However, if our goal is to create a relationship of reciprocity between these knowledge systems—in which both Western *and* Indigenous communities benefit—perhaps Indigenous peoples can gain something from the inclusion of Indigenous knowledges in environmental education.

By incorporating Indigenous knowledges into EE, Indigenous knowledges are not an 'other,' but a part of mainstream education. "[The] view of the relationship between mainstream curriculum and programming on the one hand and Aboriginal culture and language on the other, sees the two in direct competition" (Paquette & Fallon, 2010, p. 234). Incorporating Indigenous knowledges into mainstream education would serve to bring Western and Indigenous knowledge systems on the same level, thereby validating IK and showing that is has a place in the modern education system.

Secondly, its implementation could help engage Indigenous students studying in the Western school system. Barnhardt and Kawagley (2008), attribute Indigenous students' "aversion" to conventional schooling as a product of "an alien school culture," in which the curriculum, teaching methodologies, and even teacher training "are based on a worldview that does not always recognize or appreciate Indigenous notions of an interdependent universe and the importance of place in their societies" (p. 226–227). School curriculum based on Western ideologies paints a reality completely different to the that of Indigenous communities. As Simpson (2002) explains, educating Indigenous students about their own culture is imperative because it helps diminish the anxiety of being an Indigenous person in a colonial education system.

Lastly, it might help preserve Indigenous knowledge systems. Wilson (2004) claims: "As Indigenous knowledge is revalued and revived, our people become stronger and we fuel our capacity for meaningful resistance to colonization" (p. 370). Similarly, Cajete (2000) calls attention to the lack of recognition of Indigenous knowledge systems as predating and forming the basis of Western science. Optimistically, he claims that the "resurgence of interest" is causing Indigenous knowledges to be preserved and honored in some communities (p. 270).

Highlighting Indigenous ways of knowing may lead to more Indigenous peoples becoming involved in environmental decision-making down the line. Deborah McGregor (2004)—Anishinaabe professor— points out that Indigenous peoples express interest in having their knowledges influence decision-making. As such, "the study of TEK is therefore not just an esoteric or academic exercise; it can be and has been utilized as a powerful tool in the establishment of Aboriginal influence in environmental and resource management regimes" (p.

396). In this way, incorporating IK into current western education models, when done with care, can be a symbiotic relationship in which Indigenous ways of knowing are validated.

Avoiding Appropriation

There is no debate about whether Indigenous students should learn about their own culture; that is certain. But given that Indigenous knowledges are very vulnerable to appropriation, scholars question whether it should be disseminated to non-Indigenous people. In my opinion, it is imperative to spread this knowledge to those who are not Indigenous. All inhabitants of the United States, except Indigenous peoples, are hosted on land that is not ours. In order to avoid burying the legacy of colonialism, we should all be well-versed in the history of this land and how it was perceived in pre-colonial times. Taking this into account, it is also essential to disseminate this knowledge with care, in a way that does not appropriate the knowledge. Here Simpson (2004) outlines a few fundamental ways to avoid appropriation:

> From the perspective of Indigenous Peoples, how you learn is as important or perhaps more important than what you learn, and Indigenous educational programs must use culturally coherent ways of teaching and learning IK. They must be land-based, and they must provide opportunities for youth to interact with Elders and Traditional Knowledge holders on Indigenous terms. (p. 380)

Sheridan (2013) also emphasizes the importance of including Elders, or knowledge-holders, into the process, and stresses that they must be included at all stages, not just at the beginning phases (p. 18). In this way, Indigenous knowledges should inform not only the content of environmental education, but the process and structure of the curriculum completely. With Elders prioritized and fully involved, educational institutions can avoid the appropriation of Indigenous

knowledges. Elders should not be forced to carry the brunt of the labor, or should at least be compensated for doing so.

Additionally, we might consider disseminating an Indigenous *framework,* rather than specific Indigenous knowledges such as stories. Kimmerer (2013) offers:

> Teaching the specifics of TEK does not necessarily belong in the classroom, not only because it may fuel cultural appropriation and the losses and misunderstandings attendant to it, but also because it perpetuates the myth that a new environmental ethic can be borrowed or taken from someone else, when in fact it must be authentically generated between people and land. My goal is not to provide students with Indigenous knowledge per se but to be an agent in the opening of their awareness to different cultural assumptions.

While relaying specific Indigenous stories might be better off left to Indigenous peoples, schoolteachers can still deconstruct the Western worldview as the only worldview. They can still introduce different cultural assumptions, work to critically decolonize what is taught in social science classes, and enforce principles of reciprocity in their classroom.

Alternative Environmental Education

Cajete (2000) argues that "education supports the 'consciousness' that has led to the ecological crisis and dilemma we face today. Solving the ecological crisis through contemporary educational structures would be next to impossible" (p. 62). Fortunately, alternative forms of education—such as education programs led by third-party organizations like non-profit organizations—already exist. These alternative, more informal environmental education programs present an immediate point of entry for TEK: one that is less reliant on funding and bureaucratic approval. Alternative forms of education also provide the space to re-center Indigenous peoples as the knowledge-holders, and circumvent any of the problems with documentation required by the formalized school system.

For the purpose of this paper, I refer to alternative education as any education that happens outside of the classroom, apart from schools. According to the Environmental Protection Agency, "nonformal" environmental education programs are incredibly diverse in their settings and audiences, and can operate through parks, national parks, museums, scouting organizations, and community-based groups ("Nonformal Environmental Education Programs Guidelines For Excellence," 2004). As Indigenous peoples remind us, the environment is interconnected with everyone and everything; thus it is only natural that there is such a wide away of vehicles through which environmental topics can be propagated.

Naturally, we crave large-scale solutions to environmental issues. "But "part of our difficulty in confronting the future is that we think of utopia on too grand a scale' (Orr, 2004, p. 146). Rebuilding our environment is likely to be a slow, gradual process that requires not only law and policy, but the commitment of each individual. We need systematic, governmental change *and* grassroots efforts. While the former is a lengthy and elaborate process, the latter is an

immediate solution. If we were to apply the principle of Two-Eyed Seeing—that Indigenous and Western knowledge systems are more powerful together—the same can be said of formal and alternative forms of education. Formal school-based education has its strengths, as do alternative forms of education.

Focusing on environmental education at a smaller scale accommodates IK because it leaves room for locality. Indigenous peoples have deep, generational connections to their lands. Each community of Indigenous peoples in the United States has nuanced stories and ways of viewing the environment that, when possible, should not be flattened into a homogenous body of knowledge. Thus, narrowing the scale of environmental education can maintain the individuality and richness of Indigenous knowledges.

No longer dependent on schoolteachers to disseminate IK, alternative environmental education grants agency to Indigenous Elders as the knowledge-holders. Scholars (Simpson, 2004; Sheridan, 2013) stress the importance of incorporating Elders at every step of the educational process. Even if formal educators were to have the time and resources to become culturally versed in Indigenous knowledges, Indigenous peoples disseminating the knowledge themselves is still preferable as it eliminates the possibility of appropriation and grants agency to Elders.

One limitation of alternative forms of IK-based environmental education is that they will not reach the number of students that a standardized, formalized curriculum in schools would. Further, forms of education that exist outside the formalized school system tend to be self-selecting. That is, they attract students who are already somewhat interested in the environment, and in this case Indigenous knowledges. This is a problem that devoted environmental classes, such as AP Environmental Science, face. Students learning about Indigenous Knowledges in

their normal science or history class, on the other hand, would have no choice. While there is not an obvious way to avoid self-selection, one potential solution is having schools take field-trips to organizations that are doing this work. This could potentially engage students that might have otherwise not been interested.

We could also consider self-selection as a strength of Indigenous-based alternative environmental education. Describing the Nishnaabeg knowledge and education systems, Simpson (2014) explains:

> In my experiences with the state-run education system, my informed consent was never required…This is unthinkable within Nishnaabeg intelligence. In fact, if there isn't a considerable amount of demonstrated interest and commitment on the part of the learner, learning doesn't occur at all. Raising Indigenous children in a context where their consent, physically and intellectually, is not just required but valued, goes a long way to undoing the replication of colonial gender violence. (p. 15)

In this way, we can view the consensual nature of alternative forms of EE as a way to decolonize the contemporary educational paradigm. While Simpson refers to this need specifically within Indigenous communities, prioritizing consent from all students can help resist the threads of colonialism that persist in the U.S. education system.

Tongva Living History Garden

Living, breathing examples of alternative forms of education demonstrate success in promoting reciprocal, critical, and active human-nature relationships. One such program is Tongva Living History Garden (TLHG), a history-focused gardening program led by Tongva

Elder Barbara Drake. The following information is compiled from my experience at four of TLHG's workshops, two conservations with Barbara, and written material she provided me.

Background

Tongva Living History Garden is located beside a church at Chaffey Community Cultural Center in Upland, California. The project started approximately ten years ago when Chaffey expressed interest in a community garden, which were gaining popularity around this time. When I asked about Barbara's incentive for creating TLHG, she explained that she wanted to do something different and create a garden that teaches the history of where students live *(*Drake, personal communication, November 16, 2018*)*. She wanted students in the surrounding area to know about the land their houses are sitting on: what the land was like, what the people were like, and what the animals were like[3].

The following figure shows one of the first plans for TLHG, which has been realized almost exactly.

[3] . The idea was adapted from a nearby elementary school that created gardens in their courtyards representing different periods of history; the school had asked Barbara to advise the making of the pre-colonial garden. This original garden still exists at the school, and was the inspiration for Tongva Living History Garden as it operates today (Drake, personal communication, November 16, 2018).

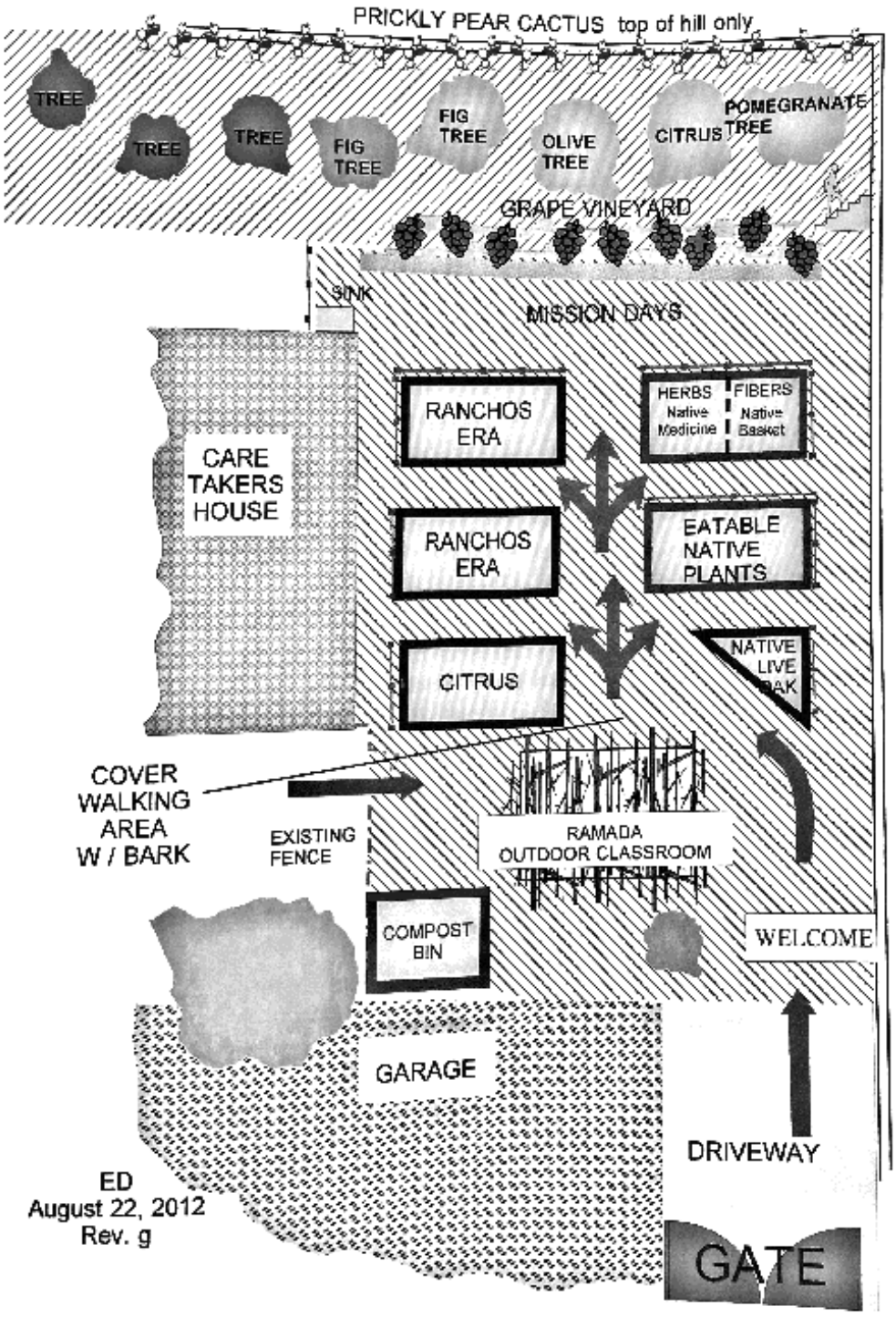

Figure 1: Preliminary plan for Tongva Living History Garden

(Credit: Barbara Drake)

Each workshop usually begins with gardening: cleaning up the garden beds, pulling weeds, watering, planting, harvesting, or whatever maintenance of the garden is needed that week. Then, Barbara will lead a hands-on activity. In previous workshops I have made medicinal teas using native plants (see Appendix B), prepared salsa with tomatillos we harvested from the garden, woven a basket using adapted Tongva techniques, and made cordage with the garden's own dogbane.

Each workshop can accommodate about twenty students, most of whom are students from the Claremont Colleges. But all are welcome, and in the past everybody from students' parents, students' partners, professors, and professors' children have attended. In fact, Barbara originally intended the garden to be catered towards elementary school students, as there are two elementary schools located within walking distance from the property (Drake, personal communication, November 16, 2018).

While various Indigenous students from the Claremont Colleges attend each week, the majority of the workshop's participants are non-Indigenous. Disseminating Indigenous knowledges to non-Indigenous peoples was one of the incentives for creating the garden. Barbara recognized that most students in the area are not indigenous to the land, and wanted to teach them the history of where they live (Drake, personal communication, November 16, 2018). Barbara elaborated that all cultures suffer from disconnect to land, as almost all peoples were once forcefully removed from their land (Drake, personal communication, November 30, 2018)..

Hutchinson (1998) identifies the "environmental impasse" as a crisis of three things: ecology, economics, and consciousness (p. 9). The last crisis, the crisis of consciousness, or the "cultural dimensions of the ecological crisis" (p. 17), is where reconnecting to the land can help. The crisis of consciousness is caused by the "implicit belief structures which are mythic in

origin, but aim to provide the human with a functional context for relating to the natural and physical worlds around us" (p. 16). TLHG aids the crisis of consciousness by providing the local context needed to re-connect us to the land. By focusing specifically on the land inhabited by the Tongva peoples, TLHG provides students with context that is not "mythic in origin" but rather very palpable.

In conversation, Barbara mentioned that she is careful to emphasize that these workshops are not just arts-and-crafts making—they are culture (Drake, personal communication, November 16, 2018). The atmosphere established is one of respect towards Indigenous peoples. During one workshop, we all gathered in the ceremonial circle and sang a traditional Tongva song using clapping sticks. Non-Indigenous people were encouraged to participate in the traditional practices of the Tongva, but under specific instructions from Barbara. She instructed us on how to correctly enter the circle, for instance. Here, Barbara's experience as an Elder and the wisdom she has acquired from her ancestors is vital; if someone without this level of knowledge were to lead the workshop, the possibilities for appropriation would increase. When I asked Barbara for permission to cite her name and the Tongva people in this paper, she replied that it would make her people proud. Barbara is interested in spreading Indigenous knowledges to as many people as possible, in a way that promotes respect towards Indigenous peoples. This is exemplified in her claim that non-Indigenous people are 'scared of' Indigenous peoples because they fear Indigenous peoples taking back the land that was stolen from them. She elaborated that the role of Indigenous peoples is to educate. Through processes of cultural exchange, Barbara explained, this fear can begin to dissolve (Drake, personal communication, November 30, 2018). In this way, appropriation is not a major concern of Barbara's. She articulated that although there are some ceremonies they do by themselves, Tongva people don't

want to exclude others. The Tongva peoples are the hosts (Drake, personal communication, November 30, 2018), and our job is to learn.

Reciprocal Human-Nature Relationships

As Kimmerer (2013) reminds us:

> What we are in control of is our relationship to the earth. Nature herself is a moving target, especially in an era of rapid climate change. Species composition may change, but relationship endures. It is the most authentic facet of the restoration. Here is where our most challenging and most rewarding work lies, in restoring a relationship of respect, responsibility, and reciprocity. And love.

At TLHG, Barbara instills "a relationship of respect, responsibility, and reciprocity" in her workshops. Before we work in the garden, for instance, Barbara has each student take a pinch of tobacco, walk to a section of the garden, and spread the tobacco on the plants while thinking or saying aloud our intentions and thanks. This is a traditional practice of the Tongva people. By giving thanks to the garden, workshop participants are actively participating in a ceremony of reciprocity. On a more practical level, we also engage in reciprocity by tending to the garden each week, doing so before the more 'fun' activity portion of the workshop.

In many ways, the garden itself survives off of reciprocity. Barbara explained that the garden is not formally funded in any way; it operates solely on volunteerism and contributions and donations. Different groups—ranging from Pomona College, Pitzer's Native Youth to College Program, Western University, the Eagle Scouts—have contributed to the making and maintenance of the garden. All the gardening tools and gloves were donated and the program has never had a formal grant (Drake, personal communication, November 30, 2018). In this way, the

program is upheld by reciprocity—by individuals providing resources so that the organization can continue to educate them and others.

Critical Human-Nature Relationships: Moving Beyond Science

> "Scholars who trouble themselves to think about disappearing species and shattered environments appear to believe that cold rationality, fearless objectivity, and a bit of technology will get the job done. If that were the whole of it, however, the job would have been done decades ago"
>
> –*Earth in Mind,* David Orr (p. 43).

Tongva Living History Garden is unique in that it takes on a historical, rather than scientific, environmental lens. I took an AP Environmental Science class in high school, which was the extent of my environmental education before college, where I am now an Environmental Analysis major. The AP Environmental Science course was based on a Western science perspective, and never took up worldviews of nature or human relationships with nature. My experience with environmental education is not unique. As Smith and Williams explain in their book, *Ecological Education in Action: On Weaving Education, Culture, and the Environment:*

> Marginalized when offered, classes in environmental education focus on scientific analysis and social policy—not cultural change. They approach issues related to the degradation of the environment as problems capable of being solved through the collection of better data, the framing of regulatory legislation, or the development of institutional procedures aimed at reducing waste (1999, p. 3)

Environmental education's focus on science is a legacy of the Western worldview, which views science as the ultimate conduit for truth. Cajete (1994) provides a brief explanation of how these differing worldviews originated:

> During the Age of Enlightenment, Western culture broke with the ancient human "participation mystique" as the basis for its relationship with Nature. It substituted a relationship based on objective scientific/rationalist thought that viewed the universe from a purely materialistic standpoint. Nature became a mass of exploitation and material gain. Animals became dumb, and Indigenous people became savage primitives. (p. 82)

This perspective born in the Age of Enlightenment has largely informed environmental movements in the U.S. Environmentalists have become dependent on science to lend credibility to their concerns (Tulloch, 2013, p. 103). The Stockholm conference of the 1970s—in addition to highlighting the importance of EE—set forth that "science and technology, as part of their contribution to economic and social development, must be applied to the identification, avoidance and control of environmental risks and the solution of environmental problems and for the common good of mankind" (Declaration of the United Nations Conference on the Human Environment, 1972).

Environmentalism's reliance on science and technology has had profound consequences. For one, "ecological science is based on the assumption that humans are (in a sense) apart from nature, that they can discover its workings and wrap them up in commodified, value-free packages of 'facts' that can be apprehended through human rationality" (Tulloch, 2013, p. 105). When this principle is diffused in EE, the result is an education that produces students who can quantitatively analyze an environmental problem, but who have reflected on their relationship to the environment. Without providing opportunities for students to think critically about their relationship as human beings to nature, environmental education cannot create holistic environmentalists. Smith and Williams (1999) suggest: "rather than seeking purely technological

or legal solutions to the environmental disruptions…we need to revisit cultural traditions that have proven their sustainability and examine our own behaviors and beliefs in their light" (p. 6).

Indigenous peoples have rich wisdom that can move our ecological consciousness away from a purely Western scientific lens, towards one that re-centers the human-nature relationship. In Cajete's aptly titled *Native Science* (2000), he refers to Traditional Ecological Knowledge as "Native Science," which is "a metaphor for a wide range of tribal processes of perceiving, thinking, acting and 'coming to know' that have evolved through human experience with the natural world" (p. 2). While our modern conception of science has become associated with numbers and data collection, we can come to understand 'science' as more broadly encompassing a way of knowing. In this way, Indigenous knowledges are too a science. Indeed, Cajete (2000) believes that "the survival of planet Earth may be dependent on Western science's ability to acknowledge and utilize the principles of Indigenous science" (p. 269).

In alignment with the principles of Two Eyed Seeing, IK-infused environmental education would not reject or even replace Western science. In the paper "Beyond Dualism: Toward a Transdisciplinary Indigenous Environmental Studies Model of Environmental Education Curricula," Dan Longboat—Mohawk and Rotinonshón:ni—and his colleagues use the example of frog dissections to highlight how Indigenous knowledges can benefit Western science. Frog dissections are a quintessential educational experience for American students; students diagram, label, and dissect frogs in a laboratory. An IK framework would move the student beyond a completely objective perspective. It would require listening to the frog, hearing stories about frogs, feeling the frog, and observing the frog in its natural habitat. "By building on the information contained within texts and moving into the natural world, science and Indigenous Knowledge can inform experiential learning-based institutional pedagogies" (Longboat et al.,

2013, p. 15). The processes of experiential learning outlined by Longboat and colleagues are parallel to Cajete's (2000) claim that "in its core experience, Native science is based on the perception gained from using the entire body of our senses in direct participation with the natural world" (p. 2). Cajete (1994) elaborates, "[Educational] conditioning, to exist as a marginal participant and perpetual observer, is a foundational crisis of American education and the alienation of' modern man from his own being and the natural world" (p. 26). An Indigenous framework helps students transcend the role of an observer, to instead occupy the role of an active participant engaged with all their senses. This is one way in which an Indigenous science framework can enter and enrich the classroom.

As Hutchinson (1998) explains, "scientific investigations play a special role within such an orientation and aim to 'unlock nature's secrets' for the purpose of 'harnessing nature' and 'exploiting nature's untapped resources'" (p. 19). Both Hutchinson and Cajete allude to the alienation that occurs in Western science classrooms when the natural environment is seen as an object to be studied. The Wishitoyo Foundation is an example of an alternative form of education that teaches Indigenous science. In 2012, the Wishitoyo Foundation launched their Chumash Tribal Marine Protected Areas (CTMPA) educational program, which currently serves about 6,000 students annually. In the program, "Chumash maritime culture, environmental sustainability and marine science content inspire an understanding of Chumash cultural values, marine stewardship, and conservation ethic" ("Chumash Tribal Marine Protected Areas Education Program," n.d.). The Wishtoyo Foundation runs several education programs, another being the First Nations Youth Summer Field Studies: an overnight program specifically for tribal youth. In the foundation's 20th Anniversary Annual Report, the Wishitoyo Foundation provides

an example[4] of their "unique emphasis on integrating Indigenous Traditional Knowledge with Western science, blending cultural perspective with environmental education…" (20th Anniversary Edition Annual Report, 2017). By adopting a Two-Eyed Seeing approach that teaches aspects of Indigenous and Western science, the Wishitoyo Foundation critically challenges the dominant scientific paradigm.

Critical Human-Nature Relationships: Decolonizing U.S. History

There is also an opportunity to diffuse Indigenous knowledges into other subjects besides science. This would provide the maximum exposure of EE to the widest variety of students. Hutchinson (1998) refers to this implementation of EE—into already existing subjects such as mathematics and geography—as the "infusionist approach." He elaborates that this approach brings environmental issues to the forefront of all subjects and helps students understand the relationship between subjects (p. 24). Orr (2004) argues that solving the environmental crisis depends on our ability to make connections between disciplines:

> The great ecological issues of our time have to do in one way or another with our failure to see things in their entirety. That failure occurs when minds are taught to think in boxes

[4] The following is an example of how Wishitoyo blends Western and Indigenous knowledges:
1. Wishitoyo's Traditional Educators introduce a lesson plan on ocean acidification and climate change. An experiment with cabbage acid-base indicators shows how water reacts with carbon dioxide. How will this affect culturally and ecologically significant species like abalone? What will happen to their shells?
2. Traditional Chumash foods are based on what is available from the local landscape—like abalone! Our students learn how to shuck, cook, and eat fresh abalone harvested from a local farm with Elder and expert, Ray Ward.
3. While the abalone cooks, we learn how to process yucca, a native plant with many different uses. Yucca flowers are a fragrant addition to a recipe, its spines can be used for sewing needles, ear piercing, and tattooing, and the fibers from yucca leaves make strong cordage.
4. Students then use their shucked and cleaned abalone shell and yucca fiber cordage to make a necklace to take home… Adding a little oil to the shell highlights that layers of red, green, and blue indicate what the abalone ate over its lifetime. The necklace is a reminder of their time at Wishitoyo, and our relationship with our ocean relatives. (20th Anniversary Edition Annual Report, 2017).

> or not taught to transcend those boxes or to question overtly much how they fit with other boxes. (p. 95)

Cajete (1994) seems to agree with Orr when he offers: "American education must move from a focus on specialization to holistic knowledge; from a focus on structures to understanding processes, from objective science, to systemic science, and from building to networking" (p. 27). For Indigenous peoples the environment was not a separate entity but rather integrated into all aspects of human life. The diffusion of TEK into EE requires following a similar structure: a diffusion into *all* aspects of education. One point of entry is through history.

U.S. History curriculum has long failed to acknowledge the destructive impact that colonialism has had on Indigenous peoples. The typical student can graduate high school, and even college, without being aware of the genocides committed against Indigenous communities in the United States. While I cannot recall learning about the death of hundreds of thousands of Indigenous peoples in California[5], I *can* recall learning about the California mission system: the very institution that was responsible for the death and displacement of Indigenous peoples of California.

In fourth grade, I constructed a Spanish-style mission out of twigs I collected from my backyard. I had to research the California mission I was reconstructing in detail and then present on it. While this project is not an official component of fourth grade social science curriculum, it is a common experience amongst California elementary school students. The project glorifies the California mission system while failing to address the violence it caused to Indigenous peoples.

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[5] Brendan Lindsay, non-Indigenous author of Murder State: California's Native American Genocide, 1846-1873 (2015), summarizes this history of California Indigenous genocide as such:

> Murder, the kidnapping of children, rape, the drop in birthrates due to malnutrition and diseases introduced or exacerbated by Euro-Americans, and the mental and physical stress and anguish of having their homes destroyed and finding themselves hunted or forcibly relocated onto reservations all contributed to the near eradication of Native Americans in California between 1846 and 1873.

In her memoir *Bad Indians: A Tribal Memoir* (2012), Deborah Miranda—member of the Ohlone Costanoan Esselen nation—effectively demonstrates the inappropriateness of the mission project by comparing it to what a project on Holocaust concentration camps would look like (p. 190). Building replicas of a concentration camp would be grossly insensitive to the genocide that occurred there. Considering the mission system is largely responsible for the near extinction of the Indigenous peoples of California, this too is entirely inappropriate. The fourth grade standards[6] for social science education in California do include curriculum about Indigenous peoples. While these standards address the interaction between the Indigenous peoples of California and Spanish missionaries, they do not take on a critical stance. The responsibility then falls to each individual teacher to make these lessons critical, if they choose.

In highlighting the injustices towards Indigenous peoples in the past, history education can bring the conversation into the present, where Indigenous peoples still face systemic oppression. "Recognition of the political realities of colonization for Aboriginal people today enables us to see how the power imbalances of North American society are still reflected in classrooms…" (Ward & Bouvier, 2001, p. 45). We need to be aware of these inequalities in order to fix them, but education is failing to do so.

As Rich (2012) posits: "The history, in which land and land loss are so central, makes environment-related disciplines a logical site for study and discussion of Indigenous

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[6] The 4th grade social science standards for California require that classes: "Discuss the major nations of California Indians, including their geographic distribution, economic activities, legends, and religious beliefs; and describe how they depended on, adapted to, and modified the physical environment by cultivation of land and use of sea resources." The standards also call for educating about the Spaniard missionaries: "Describe the Spanish exploration and colonization of California, including the relationships among soldiers, missionaries, and Indians (e.g., Juan Crespi, Junipero Serra, Gaspar de Portola)" ("History–Social Science Content Standards for California Public Schools," 2000).

perspectives" (p. 311). Colonialism's embeddedness within the structures of our nation is conveniently left out of most curriculum, history or environmental:

> …most readings in environmental ethics courses are by Anglo-European authors… Rarely is social theory included that would help students deconstruct the larger social structures (such as racial and economic factors) that can restrict individual options for ethical decisionmaking on environmental matters. (Rich, 2012, p. 313)

In exposing the relationship between colonialism and these "larger social structures," history-based environmental education exposes the colonial legacy of environmental and cultural destruction. A similar concern about TEK is that it extracts and separates the ecological aspects from Indigenous knowledges. Simpson (2001) writes that "Mainstream TEK literature has done an exceptional job of removing Aboriginal People and the past impacts of colonization from the discussions around TEK and therefore ignoring current political realities" (p.135).

Tongva Living History Garden does not bury the history of colonization; it accepts it as part of the history of this land. This is embodied in the physical structure of the garden, in which different plots representing different periods of the land co-exist side by side. The first garden is the "Tongva Indian Garden," which houses native plants used for medicine and basketry. The "Spanish Mission Garden" grows grapes, figs, olives, and pomegranates that Spain brought with them when the established the San Gabriel Mission in 1771. The "Spanish Rancho Garden" represents the time period of 1834-1882, where parcels of land were given to Spanish and Mexican soldiers. After the secularization of the missions, many Indigenous peoples worked on these ranches, which grew peppers, tomatoes, beans, squash, and corn. The final "Pioneer Citrus Garden" represents the time period after 1882, where citrus groves grew abundant after Franciscan missionaries introduced oranges to the area (see Appendix A for a more detailed

description of each garden plot) (Visit A Living History Garden, n.d.). Similarly, TLHG symbolically operates on the land of a community church. Despite the institution of the church being largely responsible for the death and assimilation of Indigenous peoples, TLHG shows that Western and Indigenous histories can coexist.

More importantly, in educating about both the history of colonization and the presence of Indigenous peoples in the land today, the garden shows how the Tongva peoples have maintained autonomy. "The Tongva adapted by assimilating with the newcomers and their cultures… Their identity changed tremendously throughout this time, but it did not disappear and it did not lose its connection to the past" (Jurmain & McCawley, 2009, p. xxiii). In one of the workshops, Barbara explained that there is nothing we can do to change the history of colonization, but we can ensure that future generations keep these cultures alive. Barbara's intention is to keep the Tongva people in the minds of others, so that we know they are 'not dead' (Drake, personal communication, November 30, 2018). In doing so, Barbara highlights how adaptive and resilient her people are.

Active Human-Nature Relationships

One criticism of environmental education, as mentioned earlier, is that an increase in eco-literacy does not necessarily guarantee an increase in environmentally-conscious actions (National Environmental Education Foundation, 2015). Indigenous knowledges go beyond environmental literacy and urge students to establish an *active* relationship with the earth. Most Indigenous scholars emphasize that TEK must be a matter of "thinking/being" (Harjo, 2011), "acting" (Cajete, 2000), or "a relationship that requires *doing*" (McGregor, 2004, emphasis in original). Anderson (2005) adds:

> Native Americans had, and continue to have, a highly participatory relationship with nature, one that restorationists can experience as well…Native elders repeatedly remind non-Indians that we will not learn to live compatibly with nature simply by locking up lands in large tracts of restored wilderness.

Tongva Living History Garden is a great example of environmental education that prioritizes doing. The workshops themselves require that students get hands-on experience with the plants through gardening. Participants also engage deeply with the materials for the specific workshop that day, whether it be peeling dogbane for cordage or cutting tomatillos to make salsa. This "direct contact and harvest for the satisfaction of human needs" works to actively challenge modern society's separation from nature (Anderson 2005). This active, reciprocal relationship with nature transcends the garden. Barbara was explicit in that her ultimate goal is to have people really *see* things. She wants us to see things we might have previously walked over and not thought about (Drake, personal communication, November 30, 2018). With these habits established in the garden, students are capable of critically examining their surroundings long after they leave TLHG.

Moving Forward

The potential for Indigenous knowledges to be incorporated into environmental education is clear, as are the challenges to doing so. In both the formal education system and alternative models of environmental education, one step toward addressing and ultimately alleviating these challenges is more equitable and just resource allocation. More consistent and prioritized funding to support programs uplifting Indigenous peoples and knowledges will allow these programs to reach more communities. Elders can be compensated for their work, non-indigenous school

teachers can be trained in environmental literacy and cultural sensitivity, and schools can fund field trips to off-site organizations.

Tongva Living History Garden is a prime example of how Indigenous knowledges can promote reciprocal, critical, and active human-nature relationships. While the garden is able to survive from the generosity of community participants, more funding could help with the upkeep. Some of the infrastructure is ageing[7]. Barbara only began receiving a stipend from Pomona College for her work with the garden five years ago, and she has to pay for the plants and materials upfront before she is reimbursed by Chaffey Community Center or Pomona College (Drake, personal communication, November 30, 2018). TLHG and other forms of alternative EE require our continued support. There is only one Barbara, and Indigenous peoples cannot be everywhere at once. While Barbara expresses that it is Indigenous peoples' job to educate, it is our job as non-Indigenous peoples to listen, and that starts with our expressed desire to do so.

By supporting programs like Tongva Living History Garden, we can obtain a more robust environmental education that transcends the scope of the Western ways of knowing. If we are to create a more holistic environmental education, we need to dedicate ourselves to integrating Indigenous knowledges into an army of both alternative and formal forms of education.

[7] Barbara has arranged for someone to fix the wobbly picnic table, and a new drip system is being installed to help keep weeds at bay (Drake, personal communication, November 30, 2018).

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(* = Indigenous-identifying author- see pg. 9)

Appendix A

Brochure: Visit A Living History Garden

The Pioneer Citrus Garden

(1882- Present)

The first citrus arrived with the Franciscan padres from the Baja California missions. These orange trees were called the Mediterranean sweet orange.

Local citrus groves became abundant in the late 1800's when the transcontinental railroad was completed, making the Washington navel orange "king."

Contributors

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- Chaffey Communities Cultural Center, 501(c)(3)
- The Cooper Regional History Museum and the museum docents
- Maloof Foundation
- Eaton Canyon Nature Center
- The Claremont Colleges
- Boy Scouts of America
- Burrtec Waste
- Hofer Ranch
- Holiday Rock

909-920-3742 - 909-982-8010

www.coopermuseum.org

Visit A Living History Garden

A walk through 500 years of living history—a visual tour of four eras of time, that tell the story of people and their plants in our local communities.

Chaffey Communities Cultural Center

525 W. 18th Street Upland, California

Behind the Church Building

Figure A1: Side A (*Visit A Living History Garden* [Brochure]. (n.d.). Upland, CA: Chaffey Communities Cultural Center.)

Figure A2: Side B (*Visit A Living History Garden* [Brochure]. (n.d.). Upland, CA: Chaffey Communities Cultural Center.)

Appendix B

Brochure: Native Cooking and Medicine with Barbara Drake

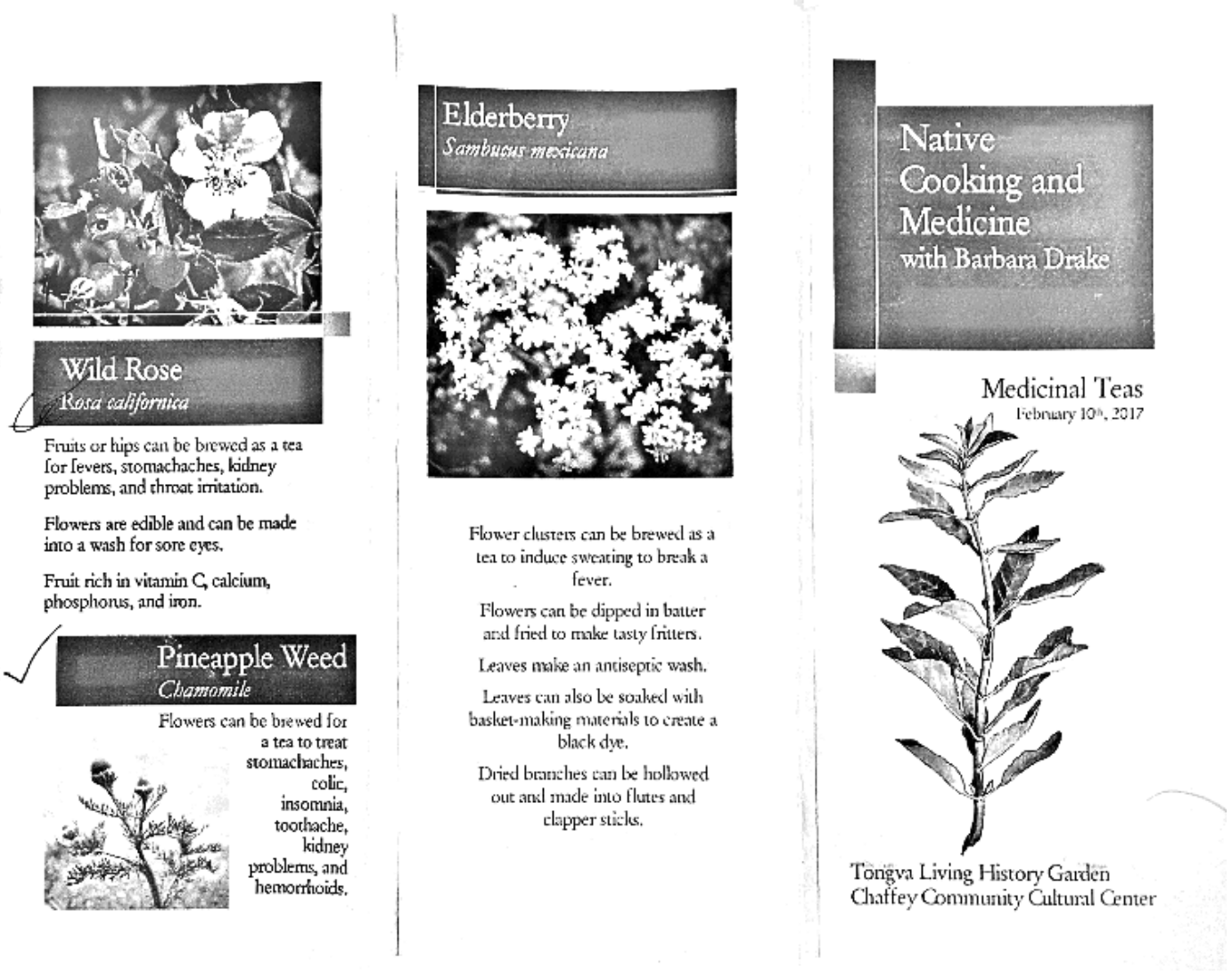
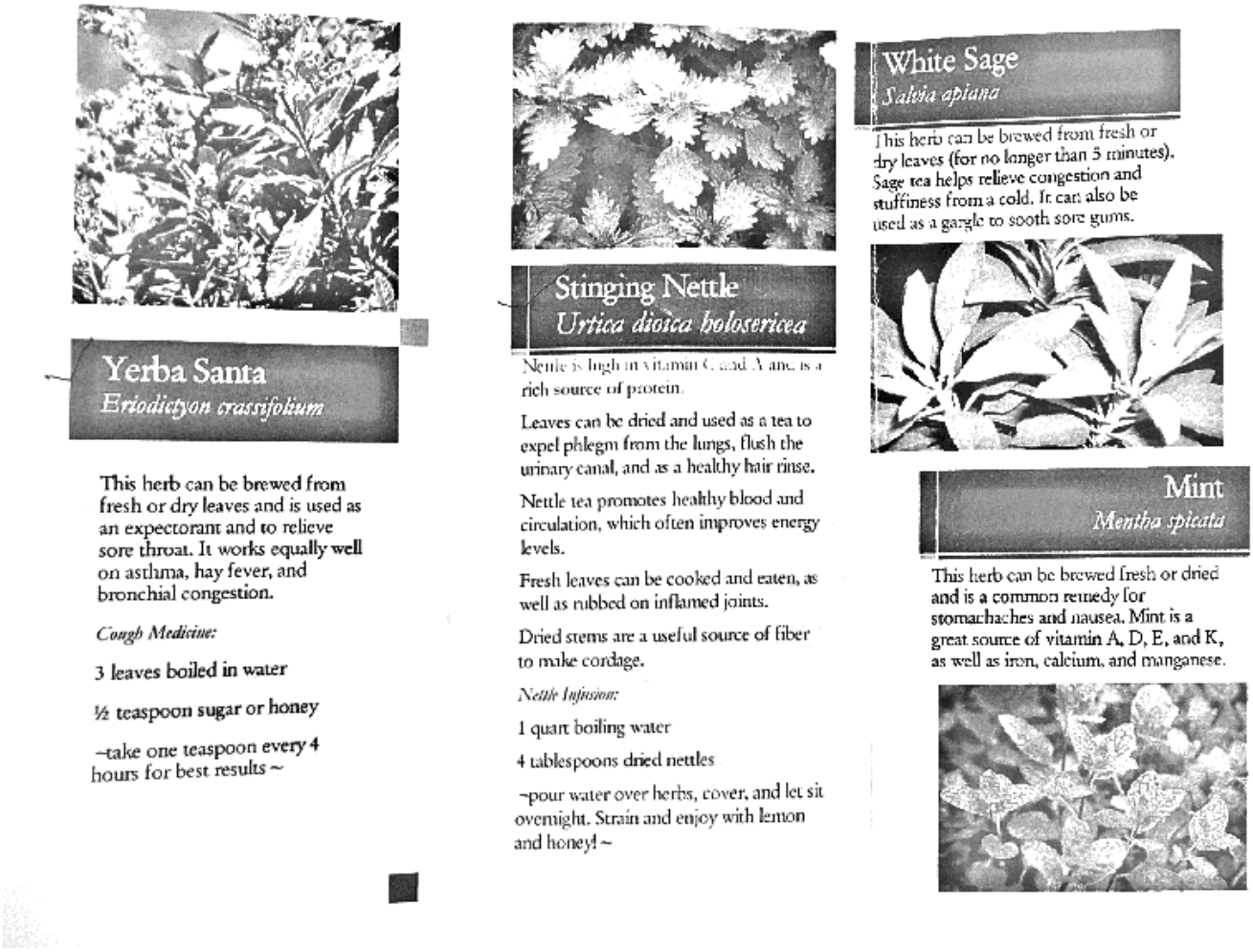


Figure B1: Side A (*Native Cooking and Medicine with Barbara Drake* [Brochure]. (2017). Upland, CA: Tongva Living History Garden & Chaffey Community Cultural Center)



Yerba Santa
Eriodictyon crassifolium

This herb can be brewed from fresh or dry leaves and is used as an expectorant and to relieve sore throat. It works equally well on asthma, hay fever, and bronchial congestion.

Cough Medicine:

3 leaves boiled in water

½ teaspoon sugar or honey

~take one teaspoon every 4 hours for best results ~

Stinging Nettle
Urtica dioica holosericea

Nettle is high in vitamin C and A and is a rich source of protein.

Leaves can be dried and used as a tea to expel phlegm from the lungs, flush the urinary canal, and as a healthy hair rinse.

Nettle tea promotes healthy blood and circulation, which often improves energy levels.

Fresh leaves can be cooked and eaten, as well as rubbed on inflamed joints.

Dried stems are a useful source of fiber to make cordage.

Nettle Infusion:

1 quart boiling water

4 tablespoons dried nettles

~pour water over herbs, cover, and let sit overnight. Strain and enjoy with lemon and honey! ~

White Sage
Salvia apiana

This herb can be brewed from fresh or dry leaves (for no longer than 5 minutes). Sage tea helps relieve congestion and stuffiness from a cold. It can also be used as a gargle to sooth sore gums.

Mint
Mentha spicata

This herb can be brewed fresh or dried and is a common remedy for stomachaches and nausea. Mint is a great source of vitamin A, D, E, and K, as well as iron, calcium, and manganese.

Figure B2: Side B (*Native Cooking and Medicine with Barbara Drake* [Brochure]. (2017). Upland, CA: Tongva Living History Garden & Chaffey Community Cultural Center)