



PC: PF Bentley, hanahou.com/22.3/stone-by-stone

CLAM GARDENS & LOKO I'A

LESSONS ON RESTORATION

SKYLER CHONG, AUGUST 2020

DORIS DUKE CONSERVATION SCHOLARSHIP PROGRAM

PC: Iain Robert Reid/Parks Canada,
<https://www.cbc.ca/news/canada/british-columbia/clam-gardens-gulf-islands-1.3949384>



INTRODUCTION

At the broadest level, the purpose of this project is to aid in the restoration of two Indigenous aquaculture practices: the clam gardens built and maintained by the Indigenous peoples of the Pacific Northwest and the loko i'a (fishponds) of Native Hawai'ians. Both of these practices have been reduced through the effects of Western Colonization and are in varying stages of revitalization today. In this project, I have interviewed people working on both clam garden and loko i'a restorations, in order to learn more about the restoration work that has been done so far and identify key lessons/ideas that can be carried forward.

I am an undergraduate student, born and raised in Hilo, Hawai'i, going into my junior year of college and studying environmental science at Brown University. This project was supported through the Doris Duke Conservation Scholars Program at University of Washington, under the mentorship of Dr. Marco Hatch at Western Washington University.

As someone who is both relatively young and newly introduced to this work, I want to acknowledge that the information in this report comes largely from an outside perspective. I do not expect everything stated in this report to be truly representative of all the hard work that has been done in the name of clam garden and loko i'a restoration. However, I am extremely grateful to have been allowed insight into these communities and I hope that the ideas presented here are relevant and allow for the same level of reflection and learning that I have been granted throughout this project.

CLAM GARDENS

HISTORY AND MANAGEMENT

In the Pacific Northwest, clams have held an important role for Native American and First Nations peoples for thousands of years, acting as a part of cultural traditions and even appearing in creation stories [5, 16]. Clam gardens are a complex management technique used to increase the productivity of beaches all along the coast, providing a rich source of protein to the communities who oversaw them [5, 8, 16].

Due to the large geographic range that clam gardens are found in which spans many different nations and cultures, the management practices surrounding clam gardens likely varied greatly from community to community. However, from what is known today, the upkeep of these beaches includes practices of returning clam shells back to the beaches, removing large rocks from the beaches, and turning over the sediment [2]. There is some debate over the role these gardens had within social systems of the time (i.e. if they were managed by individual families or whole communities), however this probably varied by community as well [5].

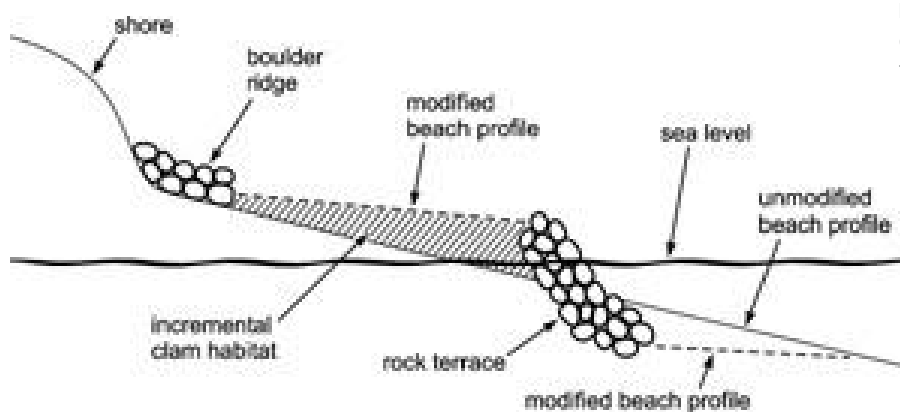


Figure 1: Clam garden diagram, from Augustine, S., & Dearden, P. (2014).

In general, clam gardens are built by creating a rock wall at the extreme low tide mark which allows for sediment to fill in the beach and change the slope of the beach (Figure 1) [3]. This decreases the slope of the beach and increases the area of the beach that falls within the optimal tidal range of clams. In addition to increasing the area for growing clams, clam gardens also increase the density, biomass, and growth rate of clams [3, 8].

CLAM GARDENS

RESTORATION

While the harvesting of clams is still practiced and the knowledge of clam gardens' existence was retained in First Nations and Native American communities, the management of clam gardens largely dropped off due to colonization by Western settlers [5, 8, 16]. One of the earliest written accounts of something resembling a clam garden was a short passage in the book *The Lummi Indians of Northwest Washington* published in 1934, which described people rolling large rocks out to the low tide mark [16]. Western acknowledgement of clam gardens in academia began in 1995, when the geomorphologist John Harper noticed man-made, walled structures at beaches in British Columbia, which he termed "clam terraces" [12]. While his observations were largely disregarded by his colleagues at first, his theories were confirmed after speaking to Kwakwaka'wakw Clan Chief, Kwaxistalla Adam Dick, who told him that these structures were clam gardens and that the practice has been around since before humans existed [2, 5].

1934

1995

2009
to
2011

2014

2015

2017

In the late 2000's and early 2010's academic and community interest in clam gardens increased [2]. One notable project supported by Parks Canada, began to compile knowledge on clam gardens and think about how these spaces could be restored [2]. During this time, the Clam Garden Network was formed in order to bring together those connected to the work being done around clam gardens along the Northwest coast [2].

In 2014 Parks Canada began a six-year project focused on bringing people back to clam gardens in the form of Science and Culture Camps, and in 2015 the first effort was made to actually restore a clam garden [2]. Today, two clam gardens have been restored in British Columbia [2].

While a restored clam garden does not yet exist in Washington, a project run by the Swinomish Indian Tribal Community in Washington state began in 2017 with the intention of constructing a new clam garden [7]. This project is currently nearing the end of the site selection process for their clam garden [7].

LOKO I'A

HISTORY AND MANAGEMENT

In terms of historical differences, it can be said that the loko i'a of Hawai'i were both less widespread and younger than clam gardens. This aquaculture system is unique to Hawai'i and one of the most sophisticated Indigenous fish cultivation methods in the world [4]. Carbon dating of loko i'a walls has put some of them at 600-800 years old, however the practice could be even older since humans first arrived in Hawai'i around 1,600 years ago [10].

There are more than four different kinds of loko i'a including loko i'a kalo, loko wai, loko pu'uone, and loko kuapā, each with unique characteristics depending on the morphology and resources of the surrounding area [4,11]. However the type that most people imagine when they think of loko i'a is the loko kuapā, fishponds located along the shoreline with a seawall (kuapā) that extends out into the ocean and encloses a portion of the coast (Figure 2) [10, 11]. Within the kuapā there are multiple makaha, sluice gates with vertically lashed poles. The poles of the makaha are spaced out to create a gap large enough for young fish to enter the pond, but prevent adult fish from leaving [10, 11].

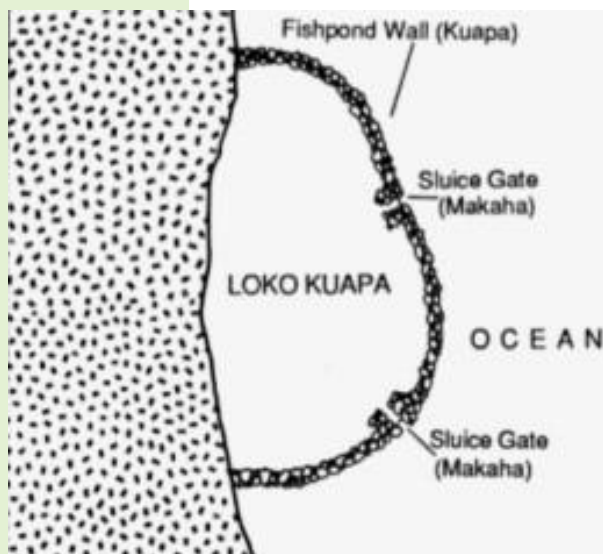


Figure 2: Loko kuapā, from DHM inc., Hawaii., Hawaii., & Bernice Pauahi Bishop Museum. (1989). Hawaiian fishpond study: Islands of Oahu, Molokai, and Hawaii. Honolulu: DHM Planners.

The loko i'a were managed by individual families who lived nearby and were responsible for maintaining the ponds [10, 11]. Whole papers have been written on the practices that were used by the overseers of the ponds, such as the use of cement-secreting algae to fortify the walls or the raking of the pond bottom to move sediment, however the end result was a highly productive, estuarine pond that acted as a source of food as well as a nursery for the surrounding reef [4, 10, 11]. The food produced from loko i'a, including limu (algae), shellfish, did not make up the entire diet of the Hawaiian people, but rather served as a supplement to meals and source of protein [10, 11].

LOKO I'A

RESTORATION

Similarly to the Indigenous communities of the Northwest, Native Hawaiian people and culture were heavily impacted by the arrival of Western colonists. The colonization of Hawai'i occurred later than that of the Northwest and the progression of events was not exactly the same. Loko i'a maintenance did not cease to the same extent as clam gardens, with around 10 fish ponds remaining active throughout the whole ordeal [10].

- ~1960 — During the late 1960's and into the 1970's, a surge of activism around Hawaiian rights and cultural revitalization, which included the protests on Kaho'olawe over the use of the island as a test site for military explosives, contributed to what some now refer to as a Hawaiian Renaissance [17]. This resurgence of Hawaiian culture increased support for the revival of traditional practices such as loko i'a [17].
- 1971 — In 1971, two researchers began the process of locating and surveying loko i'a sites across Hawai'i to assess their potential for restoration [10]. Of the 335 fishponds identified, 56 were deemed to have any potential for use [10]. In the following years, the restoration of various loko i'a began independently at different sites around Hawai'i and by the late 1980's, organizations with the sole purpose of loko i'a restoration began to pop up, such as Hui o Kuapā, founded in 1989 to restore fishponds on the island of Moloka'i, and Paepae o He'eia, which began restoration at their site in Kaneohe around the same time [6, 9, 14].
- 1989 —
- 2004 — In 2004, a network of loko i'a practitioners from across Hawai'i was established with the name Hui Malama Loko I'a [1, 9]. The hui was originally run through Paepae, however the network was taken over by the backbone organization Kua'aina Ulu 'Auamo (KUA) in 2014, taking the burden off of the fishpond practitioners themselves [1, 9]. The hui now includes over 40 different loko i'a operations across Hawai'i, with more joining every year [1]. Many of these fishponds act as a space of healing and learning for their communities, with extensive educational and community outreach programs.
- 2014 —

METHODS

From the overviews given here, it can be seen that loko i'a are further along in the restoration process, with a longer history of revitalization and a larger network of active restoration projects. For this reason, the interviews conducted were done so with the intention of asking clam garden practitioners what they might hope to learn from people in loko i'a and, vice versa, asking loko i'a practitioners what lessons they might have to share with others.

In total, six interviews were completed over seven weeks, four with people working on loko i'a restoration, and two working on clam garden restoration. Their names can be found below along with their job title to provide context for the experiences they bring to this project:

- **Brenda Asuncion** - Hui Malama Loko I'a Coordinator (KUA)
- **Courtney Greiner** - Swinomish Fisheries Marine Ecologist (Swinomish Climate Change Initiative)
- **Hi'ilei Kawelo** - Founding member and Executive Director of Paepae o He'eia, Board President of KUA
- **Luka Mossman** - Edith Kanaka'ole Foundation, Hale o Lono fishpond
- **Skye Augustine** - Clam Garden Project Coordinator at Parks Canada
- **Walter Ritte** - Founder/Executive Director of Hui o Kuapā and Manager of Keawanui Fishpond

Two of the interviews were able to be in person, while the rest were conducted virtually. All interviews were recorded with the permission of the participants beforehand. The general format for each interview included an introductory description of myself and the project, followed by a series of questions that I had pre-prepared. The interviews were very organic with no set script for the questions asked. As evidence of this, the questions I prepared were almost never asked in the predicted order, which ultimately allowed for a more free-flowing discussion.



PC: Bryan Harry,
http://www.botany.hawaii.edu/basch/uhnpscesu/htmls/kahofish/fish_pops/muglid/muglid06.htm

The set of questions for each interview followed the same general pattern, starting with a timeline of their work, going into the challenges and sources of support they have found, and ending with a question on what information they would hope to gain from and/or share with their counterparts across the Pacific. However, due to the variation in the backgrounds of each interviewee and the fact that I was learning more I progressed with the interviews, the questions changed slightly over time and were tweaked to better suit each interviewee's experience. An example of a question set used in an interview with a loko i'a practitioner is shown here:

- Can you give a short timeline of your involvement with fish ponds? When were you first introduced to clam garden restoration and what projects have you worked on since then?
- Can you provide a rough timeline for your organization specifically? How did it start out and what work has been done to get it where it is today?
- In this work, what are some of the greatest challenges you have faced and/or continue to face today?
 - How, if at all, were you able to overcome those challenges?
- Throughout your organization's history what have been your greatest sources of support?
 - Have those sources of support shifted or changed over time?
- What role does community engagement play in your work?
 - What methods of engaging the community have been most effective for you?

[I describe the current state of clam garden restoration and their needs]

- Of the lessons you have learned in this work, which ones do you think would be relevant to those in the clam garden community? What mana'o would you share with them?
- Are there any ways that the clam garden community could support you and your work?
- Based on what we've discussed so far, are there any resources you can recommend to me? This could be relevant literature or people that might also be interested in sharing their experiences and knowledge.
- Lastly, do you have any suggestions for me going forward in terms of the style of the interview and the questions asked?

After the interviews were completed, I went through the transcripts and pulled out the common threads from the stories I had heard. For this final report, I compiled a list of these key takeaways and grouped them into three overarching sections. I have also included direct quotes (having asked permission to them) to accompany and strengthen the descriptions given.

KEY TAKEAWAYS

WE HAVE THE TOOLS, BUT THE INSTRUCTIONS ARE GONE

Lost stories

One of the greatest challenges for those just starting out in the process of both fishpond and clam garden restoration, is the reawakening of knowledge surrounding traditional management practices. This is not to say that nothing is known about fishponds or clam gardens, but rather that while Indigenous communities were persevering through the oppression of colonialism, some of the finer details of aquaculture management were lost along the way.

“The Hawaiians have a saying: in doing comes the learning. So there’s no kupuna out there to guide your every step you just got to keep doing it and live with your mistakes.” - Walter Ritte

error. This may seem like an overly simplified answer, but there is a lot of truth in it. Those that I talked to were very clear on the fact that the work, as well as the land itself, are the greatest teachers, which also helps build a stronger relationship between people and place.

Guiding Principles

That said, forging a new path does not mean swinging blindly. We may not know every single step that went into fishpond management 800 years ago, but the guiding principles are still there. The best we can do is to actively place these traditional values, such as kuleana (loosely translated as responsibility, but with deeper connotations), at the foundation of this work, and allow them to guide us forward.

“When you’re dealing with something that’s a traditional system, right, the ‘how to’ is not written. Nobody documents that. And then the ‘how to’ is changing because the climate is changing. So it’s almost like you’re starting from scratch anyway, cause we’re dealing with a different environment than our kupuna (elders) had to deal with.”

- Hi’ilei Kawelo

Forging paths

So how do you work in the absence of a complete guide based on traditional knowledge? You do the work anyway; you forge a new path. As Uncle Walter tells us here, the best way to learn is by trial and

“I think the tools are there, the way to do things and the way to think about things is there, but our kupuna always allow for us to do the hard work.” -

Hi’ilei Kawelo

TRADITIONAL WORK IN A WESTERN WORLD

A key realization of mine during this project (which is probably common knowledge among anyone doing restoration) is the idea that the very world you are working in is no longer the same as it was when these practices were born; the tides are higher, the Earth is warmer, invasive species are common, the social structures have completely changed, etc. This global shift creates a lot of problems for those working with fishponds and clam gardens including the misinterpretation of the practice itself.

Measuring value

In our capitalist society of today, people see the words “fishpond” or “clam garden” and they immediately focus on how many fish, clams, and money can be extracted from these spaces. To some extent, it is true that these spaces can be used as a method of food sovereignty for local and Indigenous communities. However, from the conversations I had, it was clear that the full value of this work cannot be measured in any currency. These practices hold an intrinsic value to the communities around them; they are a method of learning and relearning, of building place-based connections, and of strengthening cultural identity.

“That’s my biggest irritant, is like don’t try and squeeze this fish pond into a circle, it’s a square. It’s not gonna fit! It is what it is and it provides what it can provide. One day, maybe we can feed more than our staff, but for now we’re still learning.” - Hi’ilei Kawelo

“Earlier, a lot of people looked at fishponds as a farm: a fish farm... and only till recently we started to curve that mentality. You know, because it’s not about feeding people food anymore. It’s about feeding people knowledge of the systems, of these places, and why they’re so important.” - Luka Mossman

As Luka Mossman describes here, recognizing these deeper impacts means that the mission/goal of this work is no longer the production of food, but rather the production of knowledge. It also means that these practices cannot be taken lightly and should not be appropriated by those who do not understand the true wealth that loko i’a and clam gardens generate.

Working with today's government

Another problem that stems from this gap between traditional work and Western systems, are the many, many barriers created by laws and regulations. This is one of the most common and pervasive issues faced in this work and it can delay projects for years or even decades. In the quote shown here, Walter Ritte demonstrates how the systems in place fail to simply identify loko i'a and how politics often seek to change the narrative.

"The Army Corps is responsible for all the wetlands stuff. So they started calling our fish pond areas wetlands, so now they're the bosses. DLNR called them historic sites, and now they're the bosses. So they're saying, 'These are wetlands', no, it's a fish pond. They say, 'These are wetlands', no, that's a taro patch. 'These are navigable waters', no, it's a fish pond!" - Walter Ritte

"Just gotta be hard head. Just got to know what you want to do and what is right and what is wrong. You just stand your ground. That's the hardest thing. You know, it's like you're going to get pushed back and forth and all over the place in what you're trying to do, but be really committed. If you're going to do something, be committed to the point where you know you're just going to do what you gotta do." - Walter Ritte

Pushing through the flood of permits and restrictions, including the Army Corps of Engineers permit and the state water quality restrictions on construction among others, was one of the greatest challenges for those who first began restoring fishponds in Hawai'i. However through great resilience and hard work, they not only succeeded in continuing their own work, but also they paved the way for those who came after them by going to court and fighting to change the very regulations that had given them so much trouble.

Today, those wishing to restore a fish pond only need fill out one or two forms describing the scope and process of the intended project. Hopefully, something similar can be achieved for those working on clam gardens, too.

THE STRENGTH OF COMMUNITY

Intersectionality of restoration

In addition to recognizing the full value of fishponds, it is also important to understand that fishponds do not operate independently from what is going on around them. Walter Ritte describes here how fishpond restoration connects to the restoration of the whole ahupua'a (watershed) and I believe this concept can be taken a step further to say that fishpond restoration is also connected to the community it serves. In many ways, fishponds and their surrounding communities seem to have a symbiotic relationship, where a community provides the labor needed to restore and maintain the fishpond, and in turn the fishpond provides a space for learning and healing to the community.

"Now, we're not just building fish ponds, but we're trying to bring life back to the whole ahupua'a. If you're going to feed people down at the end of the ahupua'a, you might as well figure out how you're gonna feed everybody with the whole ahupua'a. That's that kind of growth. You start under a magnifying glass and then you start to get broader and broader." - Walter Ritte

"It's really important that we include community in this process because, you know, if the organization ends up going away at least you will have built up that appreciation within the community such that they can be the protectors of this place if we ever leave. There's that investment." - Hi'ilei Kawelo

Community engagement

Because of this reciprocal relationship between fishponds and their communities, community engagement is a huge part of most fishponds' success and survival, as evidenced by this quote from Hi'ilei Kawelo. While there are many different tactics for community engagement, I learned that bringing people out to work at a fishpond is the often most effective way of teaching them about its

importance. Educational programs that bring young students are especially powerful because they are often eager to learn and any knowledge they take away is then also transferred to their family members when they go home.

It was also pointed out to me that if the name of a place is forgotten, it is more easily disregarded and disrespected by the community around it. Therefore, simply giving a title to a fish pond or clam garden can increase community awareness and involvement.

Doing things slowly

Something else to keep in mind when engaging members of the community, is that slow work can be beneficial. Like with most things in life, working slowly allows one to reevaluate and adapt more easily. However, it also allows for a fishpond to not only involve the community in the physical labor of restoration, but to involve them in the decision-making process and direction of the program as well, which further increases their investment in its success.

“Folks will come to me if they have questions that they know other people might have answers to, you know?... It’s not that people are coming to me for answers, but there is a place or like someone watching for those common things that they just might not know that other people are having the same issue.” - Brenda Asuncion

network, it’s important for the members to first meet one another and form relationships. Once a certain level of familiarity is found, conversations and targeted discussions can then be held more easily and knowledge can be shared more freely.

“Doing things slowly allows you to problem solve and evaluate and reevaluate and change the way you do things. Right?... I feel like doing things slowly and involving community just kind of provides that foundation for communicating with one another for like: ‘Hey, you know, let’s see if this works or if it doesn’t work, then we can change it.’” - Hi’ilei Kawelo

Benefits of a network

Breaking away from the topic of community engagement, there is also strength to be found by creating a network where individual fishponds or clam gardens can come together and collaborate. Having a network makes sharing knowledge much easier and can be especially helpful for new/younger programs that have questions that could be answered by others who are more experienced. In order to have a strong



PC: Dan Anthon (Royal Roads), <https://cvcollective.ca/full-life-clam-gardens-salish-sea/>

CONCLUSION

While doing this project and talking with the many wonderful people I was able to interview, I was able to witness the many unique and powerful relationships formed through the restoration of both clam gardens and fish ponds. The scale of these relationships ranged greatly: from an individual person's relationship with their own identity, to the relationships formed between colleagues, to the relationships connecting different groups of people, and finally to the relationships that reach across the Pacific, connecting those who are united in the restoration of Indigenous aquaculture. The goal of this project was to contribute to the sharing of knowledge across that broadest level of relationships, the one that ties together loko i'a and clam gardens.

There are countless strategies, lessons, and techniques to be employed in this work and I hope that I was able to accurately capture and present a fraction of those in this report. That said, one of the most important lessons came to me from Walter Ritte, when he reminded me that at the end of the day, adversity is one of the greatest tools for success.

“Adversity helps you to just keep plowing forward and you're going to have to do that no matter where you start off. You're going to do clam gardens? People gonna laugh at you. So just smile back and keep going. And then send them a big bag of clams one day.”

- Walter Ritte

POINTS FOR FURTHER DISCUSSION

Legal precedent set by fishponds - As described before, loko i'a practitioners were able to greatly reduce the paperwork required to restore future ponds by going to court and fighting for their changes to laws and regulations. While the specifics of how this was done are beyond the scope of my project, it was mentioned to me that some of the cases and decisions won for fishponds might be applicable to clam gardens, if not by direct precedent then at least by providing a model for similar work.

Clams in fishponds - From the interviews, I learned that clams used to be grown in loko i'a as one component of the aquaculture management system, however this practice has been lost due to the introduction of species which are harmful to the clams in Hawai'i. Of course, growing clams in Hawai'i is much different than it is in the Northwest, but this struck me as interesting given the scope of this project and I wonder if there is potential for collaboration between clam gardens and loko i'a to try and reintroduce clams to loko i'a systems.

Supporting a network - In talking about the functions and benefits of Hui Malama Loko I'a, I was told that the network was more effective when run by KUA. This was because they were able to devote their full attention to the management of the hui, as opposed to the responsibilities falling upon loko i'a staff who had other obligations. A similar change could be beneficial to networks such as the Clam Garden Network. This might not happen on the same scale as KUA which acts as a backbone organization, but even to have a staff member whose sole responsibility is the coordination of the network could be useful.

Specifics of community engagement - Both of the clam garden practitioners that I spoke with mentioned curiosity around the specific methods of community engagement used in loko i'a. While there surely is a wide variety of these strategies, I felt that this was an area that could be better discussed directly between the two groups the next time they convene.

Comparison of wall building techniques - The methods used to build the walls of clam gardens are very different from those of loko i'a, which makes sense given the vast difference in wave exposure and tides between Hawai'i and the Northwest. I cannot say much more on this topic, but I thought that this might also be an interesting point of conversation, especially since the walls on both sides of the Pacific are having to adapt with the incoming challenges of climate change and rising sea levels.

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