

'Ewa 'Āina Education Initiative

Unit Plan: Hawaiian vs. Modern Food Production

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'Ewa 'Āina Site: Kuhialoko

Hawaiian Culture-Based Lens	Cross Cutting Content	Instructional Design
<ul style="list-style-type: none"> Mālama 'Āina: Land stewardship focusing on sustainability and a familiar connection Ola Pono: Values and life skills that synthesize Hawaiian and global perspectives Hō'ike: Performance requiring multi-level demonstrations of knowledge and/or skills 	<ul style="list-style-type: none"> Climate Change Human Interaction/Impacts Food production Health-Total well-being 	<ul style="list-style-type: none"> Scientific Inquiry Stewardship - Sustainability CTE-NR Problem-Solving Project

Essential Question/s

- 1) Can aquaculture and agriculture help relieve Hawai'i's food insecurities?
- 2) What makes traditional Hawaiian aquaculture and agriculture possible?
- 3) What are the impacts of modern aquaculture and agriculture on the environment; traditional Hawaiian aquaculture and agriculture techniques?

Target grade: 10-12

Target subject: CTE Natural Resources

Background Information -

'Āina site background for Kuhialoko available via the following link:

https://drive.google.com/file/d/1VCg-GCD3zYd9P1S8_NBvU0a_cEL9PcX3/view?usp=sharing

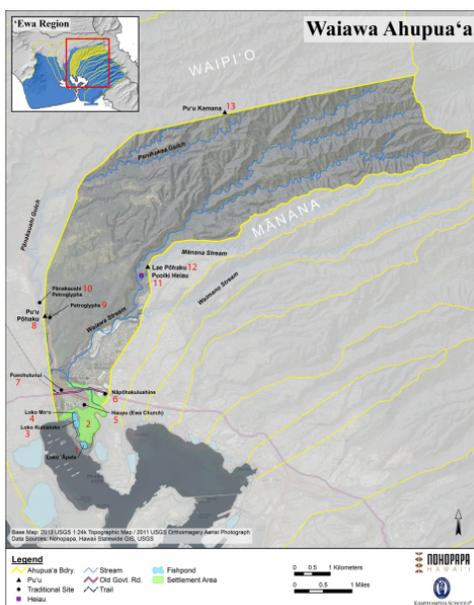


Figure 61. GIS map depiction of significant Hawaiian cultural and natural resources in Waiawa Ahupua'a

The Pearl City/ Pearl Harbor area (Waiawa Ahupua'a) was once an important area for agriculture and aquaculture.

Important historical information is summarized on the next page.

Background Information Cont.

Summarized from the Halau o Pu'uloa: Ewa `Āina Inventory.

A direct link to this resources available via the following URL:

https://www.ksbe.edu/assets/site/special_section/regions/ewa/Halau_o_Puuloa_Waiawa.pdf

`Āina Site Steward: Ali'i Miner and 'ohana

In general, prior to the introduction of western values, concepts of land use and ownership, and commercial activities in the 19th century, traditional Hawaiian life in Waiawa (literally “milkfish water”) was very much centered around the natural resource and wahi pana of Pu'uloa (Pearl Harbor), with its extensive shoreline and estuaries that were home to numerous fishponds and lo'i kalo (pondfield complexes). As shown by Māhele documents, the coastal flats around Pu'uloa (i.e., the area below, or south of, the H-1 freeway), including the lower reaches of Waiawa Stream on the Mānana (Pearl City) Peninsula, were the favored places for permanent settlement and irrigated agriculture in this area. McAllister (1933) recorded three fishponds in Waiawa Ahupua'a: Loko Apala ('Āpala), Loko Kuhialoko and Loko Mo'o. By this time (early 1930s), Loko 'Āpala was reduced from a very large (75-acre) fishpond to just a few acres. Likewise, the other fishponds had also nearly disappeared by the 1930s (see Sterling and Summers 1978:48), but they were once major sources of food and tribute in traditional times. In typical Hawaiian style, these fishponds were integrated with the lo'i kalo area, the Waiawa Stream and pūnāwai (fresh water springs) in Waiawa kai.

Mo'olelo (Oral-Historical References) The mo'olelo associated with Waiawa include references to Pu'uloa; the fisheries of Kuhia; various sharks such as Kahi'ukā (shark goddess' brother), Ka'ehuikimanōopu'uloa (shark who visited Pu'uloa), and Ka'ahupāhau (shark goddess of Pu'uloa); Kāne and Kanaloa, who named places of 'Ewa from Haupu'u (hill in Waiawa); Keaomelemele (goddess); Kanepaiki, a chief who began the construction of the 'Ewa Church on top of a heiau; Luau (a prophet); various mo'o (supernatural water spirits); 'ulu maika (Hawaiian game similar to bowling); and the 'awa plant (*Piper methysticum*). According to Hawaiian legend, Waiawa is one of the “wai” (watered lands) given to the priests of the Lono class, by Kamapua'a, the demigod (Maly and Maly 2012:43).

One of the most important figures in Waiawa is Kahi'ukā. This shark god, brother to the shark goddess Ka'ahupāhau, is famous throughout Pu'uloa for being one of the guardians of the people there. His home was said to be located in the ahupua'a of Waiawa. The following is an excerpt of Moses Manu's “He Moololo Kaa Hawaii no Laukaieie,” translated by Maly and Maly (2003):

Looking seaward, Makanikeoe saw the fin of a shark passing by, in front of a stone in the estuary of Waiawa, on the west side of Kanukuokamanu, next to Piliaumoa. Seeing the shark, Makanikeoe drew nearer and he saw that it was Kahiuka, a native of this estuary. His cave was comfortably situated on the side of the stone. Kahiuka was a good shark, and in his story, he is the guardian of Manana and Waiawa. (Maly and Maly 2003:84–91)

Another relevant mo'olelo, based on Moses Manu's “He Moololo Kaa Hawaii no Laukaieie,” is that of Kāne and Kanaloa's naming various places in Waiawa. A portion of the translation provided by Maly and Maly (2003:89) is as follows: From this place, Makanikeoe then turned and looked to the calm waters of Kuhia Loko and Kuhia Waho. He went to the ponds and saw water bubbling out, and in the pond were many fish of the sea. It was of this pond, that Kāne and Kanaloa spoke, while in Kahiki, as heard by the prophet Makuakaumana, who crossed the sea and traveled to Hawaii: The mullet are at Kuhia-loko, The seaweed is at Kuhia-waho, The salt is at Ninauele, The nehu pala are at Muliwai The lone coconut tree stands at Hape, The taro leaves are at Mokaalika, The water is at Kaaimalu, The awa is gathered at Kalahikiola. Behold the land. All of these places named by the gods can be seen, extending from the sea of Waiawa, to Halalena at Waiawa uka.

These mo'olelo describe some important aspects of the historical abundance of this area: reverence and relationship to nature including sharks in the waters (a sign of a healthy reef ecosystem), freshwater springs, thriving fishponds and limu. This abundance is apparent when visiting Kuhialoko - the `āina site connected to all the lessons in this unit.

Sequential Unit Plan Lesson Outline	
Lesson Titles and Description	Time Estimate in Hours
<p>1) Introduction to modern aquaculture and agriculture? Introduction into freshwater aquaculture. Introduction to agriculture. Purpose, equipment, technology used, and environmental impacts.</p> <p>Introduction to traditional Hawaiian aquaculture and agriculture. Construction of Hawaiian fish ponds, purpose, equipment, technology used, and environmental impacts. Why was it so important to the survival of the people? Why is there so much mo'olelo about aquaculture and this area?</p>	4-6 Hours
<p>2) Field Trip to Kuhialoko Investigate the traditional Hawaiian aquaculture and agriculture, wildlife present, sustainability, techniques, materials used, etc.</p> <p>Students compare and contrast with modern aquaculture. Discussion.</p>	5-8 Hours
<p>3) New Agriculture and Aquaculture Designs. Design a new aquaponics system and agriculture system that uses the best of both modern technologies and traditional technologies.</p>	4-6 Hours

Unit Assessment Plan
<p>Formative Assessment Methods Used On a Regular Basis Throughout Unit</p> <p>Whole class and small group discussion, Graphic organizer- compare and contrast Projects (2 groups investigate modern aquaculture/ agriculture vs traditional Hawaiian aquaculture/agriculture) Hear the mo'oleos during the first lesson and write how it made them feel, and the visuals they imagined.</p>
<p>Summative Assessment/s</p> <p>Summative assessments are:</p> <ul style="list-style-type: none"> ● Student Group Project ● Post-assessment in Google Forms ● Student Written Final Reflection <p>The summative assessment is the completed design of the aquaponics/ agriculture systems that contains both modern and traditional techniques. Students will need to be able to:</p> <ul style="list-style-type: none"> ● Describe how the system works. ● Which techniques are from which type of system. ● How is it sustainable? ● Challenges they ran into. ● How is it going to help our food dependence? <p>If time and materials are available, the students may be able to construct models of their systems and try their designs out.</p>

Students may submit in presentation form.

Post project reflection for all students for individual assessment.