

WAIMEA'S HERITAGE LANDSCAPE: USING GIS TO COMMUNICATE CHANGE AND
SIGNIFICANCE OF A CULTURAL LANDSCAPE IN SOUTH KOHALA, HAWAI'I

A THESIS SUBMITTED TO THE GRADUATE DIVISION OF THE
UNIVERSITY OF HAWAI'I AT HILO IN PARTIAL FULFILLMENT
OF THE REQUIREMENTS FOR THE DEGREE OF

MASTER OF ARTS

IN

HERITAGE MANAGEMENT
DEPARTMENT OF ANTHROPOLOGY

JUNE 2018

By

Samuel Plunkett Jr.

Thesis Committee:

Kathleen Kawelu, Chairperson
Jack Rossen
Momi Naughton

UMI Number:

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Dedicated in loving memory to family whom passed during this academic journey,

Gleni, Cooper, and Glory,

And

To the Future Heritage Managers of Pae ‘Āina Hawai‘i –

Preserve Heritage by Protecting Hope

ACKNOWLEDGMENTS:

THESIS COMMITTEE:

Kathleen Kawelu

Jack Rossen

Momi Eileen Naughton

PAST INSTRUCTORS:

Kalani Meineike

Emalia Keahokalole

Kekuewa Kikilo

Kelley Uyeoka

EXPERT AND COMMUNITY COLLABORATORS

Pomai Bertlemen

Roland Reeves

Keomailani Case

Rick Gmirkin

Charlie Kimura

Lisa Marrack

Gary Rapozo

Chad Wiggins

Kalani Flores

OTHER ADVISORS

Peter Mills

Joseph Genz

FOR KINDNESS AND ENCOURAGEMENT:

Kamana Beamer

ABSTRACT

Hawai‘i County’s Land Use Pattern Allocation Guideline map (LUPAG) show an increase in lands being allocated for urban development in the South Kohala District of Hawai‘i Island. Being that land allocations, and subsequent zoning is created by a combination of Hawai‘i State Land Use designations, and the Hawai‘i County General Plan, this thesis addresses preservation and restoration of a region’s natural and cultural resources, and sense of place from a planning approach. In order to incorporate both cultural and environmental resources into an integrated plan, that also accounts for community input, I combine a cultural landscape approach with geographic information systems (GIS) to produce a Heritage Landscape Resource Inventory Model.

Through this model I spatially re-present Waimea Kālana, a traditional land unit that occupied most of modern day South Kohala. In re-presenting Waimea Kālana, a geographic and cultural baseline was created which challenges current perceptions of place in order to invite planning participants (community and governmental) to consider layers of landscape significance from an earlier point in time. This project argues that this geo-cultural baseline could be used by the Waimea community to raise its collective heritage awareness and participate in land-use planning. By re-presenting cultural landscape attributes of Waimea Kālana on a GIS format, this project will spatially model interconnections between a variety of resources, articulate its cultural and natural significance, and exemplify how a community might turn statements of significance into community derived land-use guidelines. In effect this model aims help a community preserve its sense of place and sustainably manage its cultural, and natural resources for their benefit, and for the benefit of the future generations of Waimea, South Kohala, Hawai‘i.

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PREFACE

On July 19, 2015 –approximately five weeks before my studies in the University of Hawai‘i at Hilo Heritage Management Program began– I drove some fifteen miles from my home near Waimea Town westward toward the coast. The South Kohala coastline is a hot and rugged landscape where I often spend my free time exercising, exploring, and reconnecting with place. On that day I chose to walk a section of the Ala Loa trail that runs through the jagged a‘a lava fields of ‘Anaeho‘omalu and Kalāhuipu‘a. From the tourist shops of Waikōloa I headed north towards Puakō – one of a number of pre-contact coastal settlements in South Kohala. Out on the trail alone, my senses automatically reached out attempting to reconnect with the lands of my ancestors. Hiking fifteen minutes past a field of remnant rock shelters and petroglyphs left by the trail travelers of old, I paused to grab water from my back pack, slowly scanning my surroundings as I turned back from whence I came. At that moment an image appeared before me, one which had previously eluded me as I negotiated my footing on the rocky trail and shaded my eyes with the brim of my hat from the bright sun. Juxtaposed before me was a gated luxury condominium complex (Ke Kailani at Mauna Lani), and the Ala Loa Trail running through the rugged lava field. My senses immediately returned to me, and the stark contrast of old and new moved me to capture this image (Figure 1).

Initially I could not decipher the emotion this image stirred up within me, but I have since come to understand it as a commentary on our choices in heritage management and negotiated change. The image provoked feelings of melancholy, and curiosity. Curiosity about negotiated change, and the decision-making process when trying to balance development with heritage management. In that moment and emotion, elements of the past, present, and future were all



Figure 1. Ala Loa trail adjacent to Ke Kailani gated resort condominium.

there as an amalgam, like formless gases mixing while still individually distinguishable. They were all present on a nonlinear format, and yet linear time (the present) provoked within me a sense of urgency. The lava landscape and the cultural-historic trail represented the natural and ancestral elder; myself and the exclusive resort complex represented the present, while my studies in heritage management represented my personal future. And yet, the heritage that lay before me, while personal, was also a corporate resource belonging to anyone who might choose to view it as something to be stewarded. In that moment, regardless of linear time, all elements were relevant and interconnected. In that moment heritage management for me became synonymous with negotiating change.

My reflections on negotiated change, triggered by the juxtaposition of the Ala Loa Trail and the resort condominium complex, provoked questions like, “who gets to negotiate heritage and development, and on what basis of significance are potential impacts negotiated?” In this thesis I apply the juxtaposition effect to Waimea and the South Kohala district. Understanding

that majority of the space that is called South Kohala today was once called Waimea Kālana by the early historic residents of the area, provides a contrast in perception that I argue needs to be addressed when planning change through land-use regulations.

In this thesis I identify multi-temporal perspectives, and lack of a baseline of significance as two major challenges planners (community or governmental) face when negotiating change. These challenges make balancing cultural preservation, natural resource management, sustainability, and preservation of sense of place with development difficult, if not impossible. Given these challenges, the model I put forth in this thesis does not claim to be a perfect solution, rather it is a negotiation in of itself, attempting to be a nexus that addresses each of the challenges presented above. Additionally, this model does not claim to be a one size fits all solution. Every community and region have their own unique histories of change and varying levels of community capacity by which to engage in land-use planning. Therefore, while this model is applied to Waimea and South Kohala, it is hoped that other communities would be able to glean insights from the processes of this case study and molded it to their own landscapes and concerns.

CHAPTER 1. INTRODUCTIONS

Two primary heritage management questions drive this project, “who gets to negotiate how heritage and development are balanced, and on what basis of significance are land-use allocations negotiated?”. In an attempt to include cultural and community values in these negotiations, I approach these questions by combining a Cultural Landscape approach with Geographic Information Systems (GIS) to produce a Heritage Landscape Resource Inventory Model (HLRIM). Exemplified through Waimea’s Heritage Landscape, this model attempts to inform a community about how current associations to its landscape came to be, inventory the landscape’s general distribution of cultural and natural resources, and spatially model and articulate a baseline of significance to produce Heritage Land Use Guidelines (HLUG).

This model is applied to Waimea, and the district of South Kohala by first spatially documenting historic shifts in socio-economic land-use and population growth that contributed to multi-temporal perceptions of place (perception of place based on temporal experiences), and secondly by formulating a geo-cultural (geographic and cultural) baseline of significance. This spatial-historic documentation incorporates GIS as a spatial tool which allows past cultural landscape significance to be compared with current Hawai‘i County land-use allocations. Given that other communities in Hawai‘i are also experiencing changes related to land-use and development, Waimea’s Heritage Landscape puts forth a flexible inventory model that could aid theoretical community-based heritage programs in preserving their resources and sense of place. By re-presenting (to present again) Waimea as a cultural landscape this thesis argues that a HLRIM can help a community raise its collective heritage awareness and possibly enable them to engage in governmental land-use planning.

Waimea as a town, or Census Designated Place (CDP), within the District (Moku) of South Kohala (Figure 2), has undergone an 87% population increase between 1980 and 2010 (U.S. Census Bureau 2000b:5; U.S. Census Bureau 2010:10). The State of Hawai‘i’s 2012 Land Use District map (Figure 3) shows urban zoning designations to the west of Waimea Town in Waikōloa and Kawaihae (State of Hawai‘i Land Use Commission 2012). Hawai‘i County’s Land Use Pattern Allocation map further details land-use designations and shows areas of proposed low, medium, or expansion urban development. These various urban designations are found north of the South Kohala Boundary (Moku Boundary), near the coast, and within the Waimea CDP (Figure 4). Additionally, Hawai‘i County’s South Kohala Community Development Plan (SKCDP), reports that, “Of the total 29,142 acres designated by the County for urban expansion across the Big Island [Hawai‘i Island], 42% of those acres are in South Kohala” and “A smaller acreage of land is designated for urban expansion in the Waimea area” (County of Hawai‘i and Townscape Inc. 2008:23). At 12,264, the South Kohala District has the highest acreage allocated for urban expansion within the County of Hawai‘i (County of Hawai‘i and Townscape Inc. 2008:23).

The combination of the SKCDP and Hawai‘i County land-use map clearly indicates that South Kohala and Waimea are planned for unprecedented change. Furthermore, these documents indicate a dichotomy in land-use planning between the South Kohala coastline and the upland region where Waimea Town is located. While there are urban expansion designations in both locations, the coastline has resort designations, a trend that took root in the 1960s when Parker Ranch (Parker Ranch discussed in Chapter 2) began to lease and sell land holdings for resort and recreational use as a strategy to cope with economic stressors caused by drought and rising overhead costs (Pennhallow 1962:1). Through time this dichotomy helped to normalize the

perception of Waimea as a town, separate from its larger traditional (pre- and -early cattle era) cultural landscape. Therefore, the impact to the coastal region as forecasted by the urban expansion zones may seem isolated from Waimea because of this temporal perception.

However, Hawaiian Kingdom land records of the mid-nineteenth century document Waimea as being a land division that encompassed lands from the coast to the inland area where the town stands. This larger land base was called Waimea Kālana (Mi 1865:No.2).

By re-presenting Waimea Kālana through a HLRIM, the potential exists to raise the collective heritage awareness within the community, and greater insight when negotiating change. Given Waimea's historic population growth and land-use development, coupled with its current State and County land-use designations, Waimea is an ideal case study for addressing multi-temporal perceptions of place while examining a possible pathway for including cultural values and community concerns into land-use planning, sustainable resource management, and preservation of sense of place.

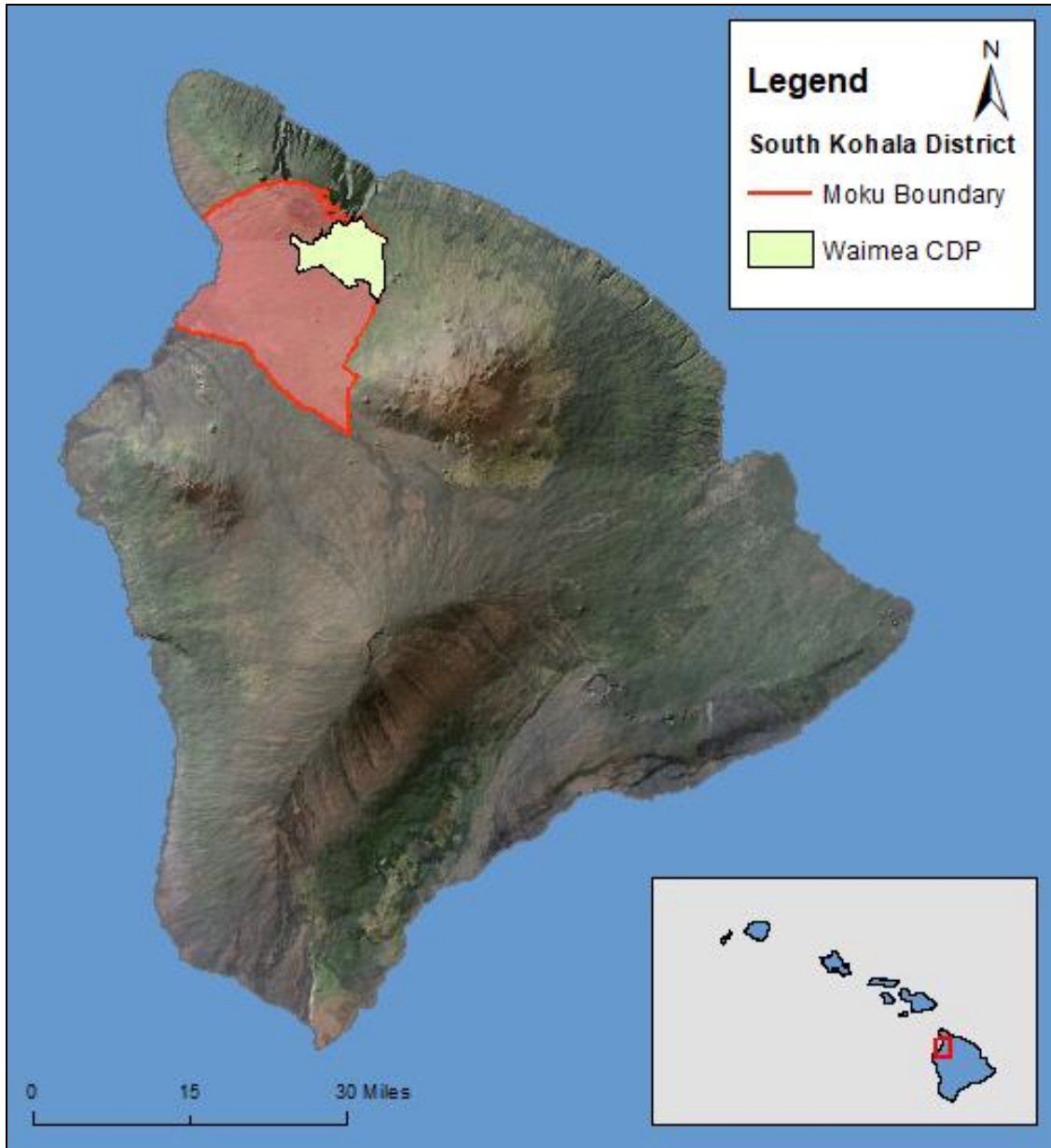


Figure 2. Hawai'i Island, South Kohala District (Moku), and Waimea CDP.

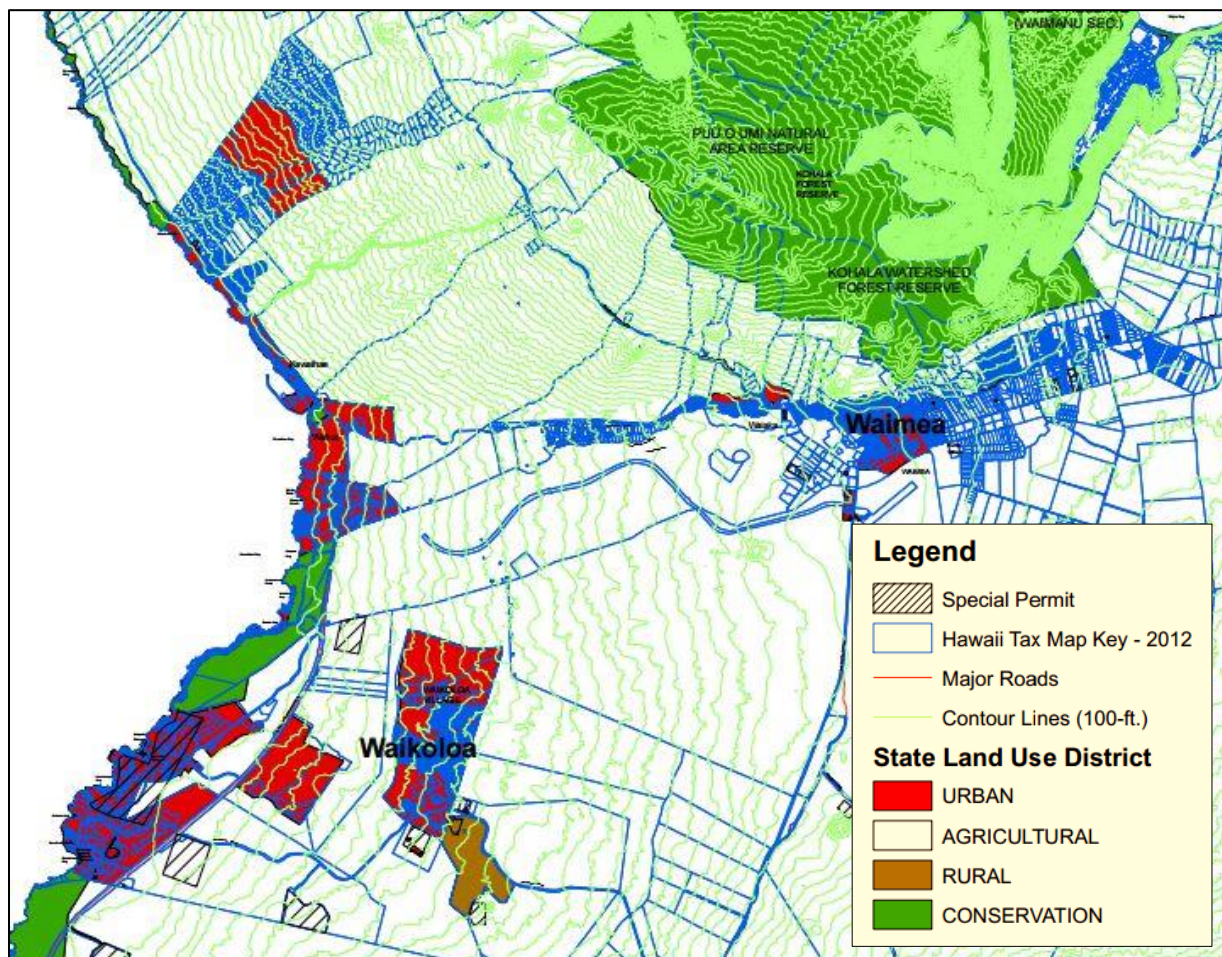


Figure 3. State of Hawai'i 2012 land-use designations in Waimea and Waikōloa.

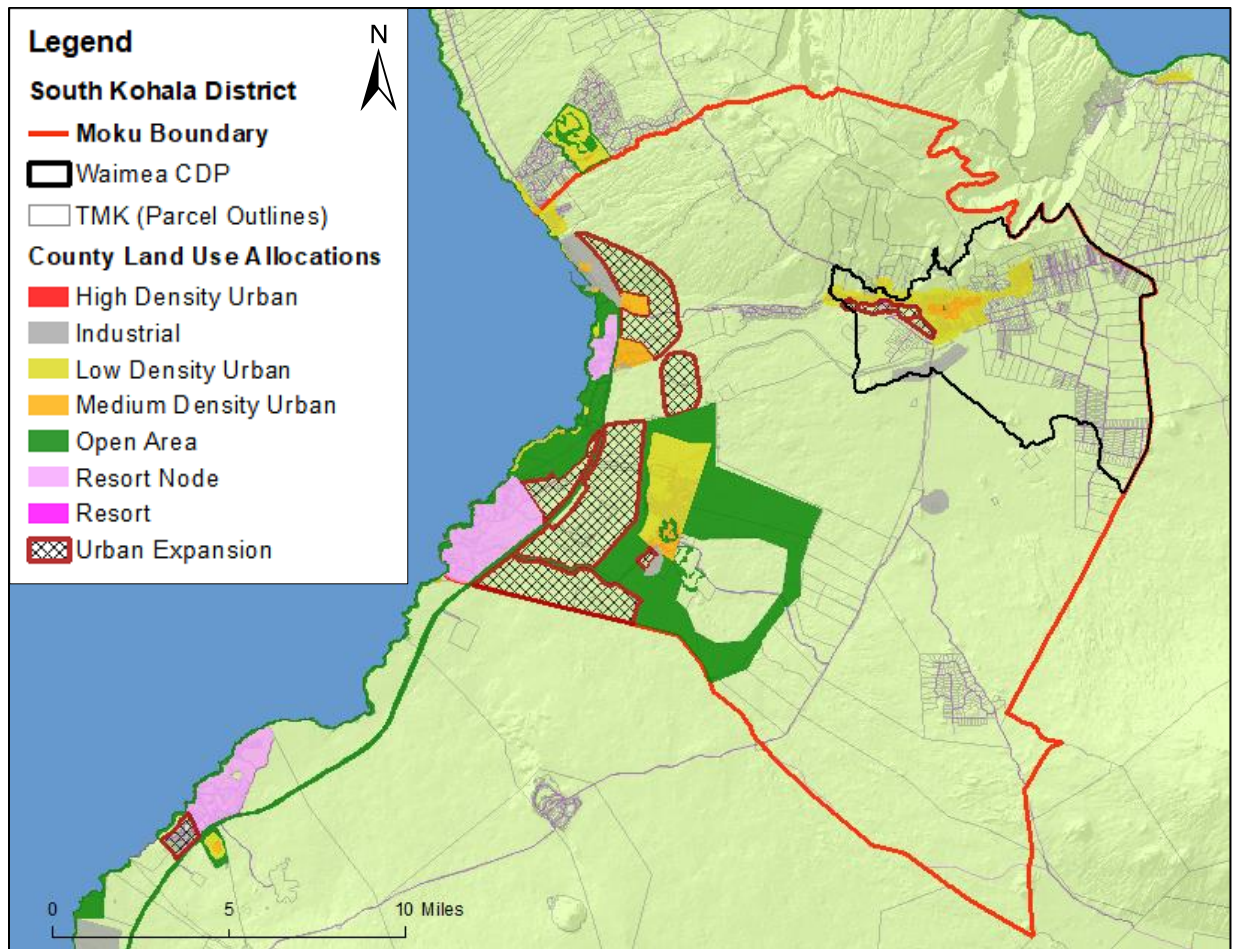


Figure 4. Hawai'i County land-use allocation map.

1.1 TEMPORAL PERCEPTION OF PLACE

A place can be important for social, scientific, historical and aesthetic reasons, or any other combination of values, depending on the features and the layers of history and associations attached to these features.

(Mitchell et al. 2009:52)

There is a historical, cultural, and geographical distinction between Waimea as a town, and Waimea Kālana, its traditional Hawaiian land designation. The difference is more than just in name, geo-spatially it is a difference of 128,261 acres; it is the contrast between a town and a cultural landscape and reflects historic shifts in perspective and land utilization that, for this

project, began with the establishment of cattle ranching. Before delving into Waimea's ranching history this section discusses the temporal nature of how places are perceived.

In this project, multi-temporal perception of place refers to perceptions that are formed by experiences of a place based on the existence or condition of features and elements present on its landscape and related land-use practices at a given time. For example, in the 1830s Waimea's uplands were affectionately called "'Ala 'Ōhi'a," after the fragrant lehua blossoms in the 'ōhi'a forest that once flourished on the plateau where Waimea Town now exists (Doyle 1953:43). Currently, 'Ala 'Ōhi'a is the name of a road that passes through a portion of the former forested region, which most residents are not associated with, and only recognize as fenced pasture land today. This particular place then, can simultaneously be perceived as a fragrant forested area, as well as a thoroughfare adjacent to fenced pasture land. While the forest is no longer visible, acknowledgment of its former existence is significant when thinking about restoration of a place's earlier sense of place.

1.1.1. A Community, its Landscape and Sense of Place

As the features and elements of a landscape change over time, a community's perception of place could change from one generation to another. According to professional heritage managers Lisa Brochu and Tim Merriman, a "community is considered to include the built, social, and natural environments that comprise a defined location where people live, work, and play together" (Brochu and Merriman 2011:1). In turn, a community's sense of place "lies within the intangible atmosphere created by the unique social and historical fabric created by its cultural and natural environment" (Merriman and Brochu 2011:5). This project acknowledges that a community's sense of place is influenced by its defined location, its natural and social environment, and its history.

Landscapes': Features, History, and A Community's Association to Place

A main consideration for this Heritage Landscape study, is that landscapes are influenced by segments of historic social structures and related practices (Mitchell et al. 2009:17).

Concerning early academic landscape research regarding community perception Sullivan et al. (2013:2-3) acknowledged that a community's history, values, and interactions with a landscape, all affect perception of place, saying that

Some scholars stress the importance of interaction with communities associated with the landscape, as well as the need for recognizing variations in the way landscapes are valued in different cultures (e.g., Buggey 1998; Cook 1998), as values based on spiritual, historic, economic, or other connections vary greatly, so do the ways in which landscapes are perceived.

Furthermore, Mitchell et al. (2009:17) say that, "The modern notion of cultural landscape expresses a wide variety of relations – physical and associative – of populations with their territory and its natural elements." Associations in this context means "the connections that exist between people and a place" (ICOMOS 2013:3). Since associations to features or elements present on a landscape contribute to influencing a community's sense of place, the combination of historic shifts in geographic bounds, land-use development, and historic population growth are individually and collectively, powerful agents in creating multi-temporal perceptions of place, both "physical and associative." To help the Waimea community navigate multi-temporal perceptions of place, this research re-presents Waimea Kalāna as a geographical baseline by which the current bounds of Waimea Town may be compared.

1.2 WHAT IS A KĀLANA

In this thesis, the land term kālana is synonymous with the term moku as is used in current Hawaiian land division discourse when referring to a district (large division of an island with internal land divisions). However, historical literature pertaining to moku, its variations and subdivisions is multifaceted. The following section gives reasoning for equating kālana with a district, and its heritage implications regarding cultural landscape research.

In 1903, Waimea born surveyor C.J. Lyons (Honolulu Star Bulletin 1914:5), commented on Hawaiian land divisions saying, “That the ahupua‘a may be regarded as the primary division of Hawaiian Land” (Lyons 1903:3). According to Lyons (1903:26), both the ahupua‘a and moku divisions were “fixed about twenty generations back in Hawaiian tradition”, which Moffat and Fitzpatrick (1995:23) estimated to be “about 600 years ago.” Although the dating of events documented orally in Hawaiian history is often debated, the names and bounds of ahupua‘a and moku according to Beamer and Duarte (2009:73) were established long enough in Hawaiian antiquity to be effectively understood and used during the Mahele,

Since the ancient divisions were already well established on the ground and in the minds of the Hawaiian people when the Kingdom of Hawai‘i began to ‘modernize’ its land system in the period of the Mahele of 1848, the Kingdom was able to award large portions of land based on traditional name and location alone.

Ahupua‘a as a Hawaiian land division term, is commonly mentioned in modern vernacular, and most Hawai‘i residents theoretically understand its meaning, even though they may not know the name of the specific ahupua‘a they reside in. Additionally, even without knowing it’s bounds, most Hawai‘i Island residents are familiar with the name of the moku (Hāmākua, Hilo, Puna, Ka‘u, Kona, Kohala) they live in. The kālana however is a land division

less recognized or utilized in modern discourse, and perhaps this is because in classic Hawaiian literature the *kālana* is ambiguously defined. To rectify such ambiguities, a brief overview of the major Hawaiian land divisions is presented below, along with a Boundary Commission testimony specific to Waimea.

Note on The Hawaiian Kingdom Mahele and Boundary Commission

Before delving into traditional Hawaiian land divisions, some quick comments on the Mahele and Boundary Commission of the Hawaiian Kingdom era will provide context for how these land records reflect a localized native sense of place. Under unfavorable circumstances, not discussed in this project, the Hawaiian Kingdom modernized its traditional land tenure system in the mid-nineteenth century (Sai 2008:66-86). According to C.J. Lyons (1903:4) “A general division took place in 1846 – 1849 under Kamehameha III,” which “set the stage for the large-scale privatization of lands in the Hawaiian Kingdom” (Beamer and Duarte 2009:68), in what is known today as the *Māhele* of 1848. After the process of settling the ownership of lands between the King, the government, and the chiefs, commoners were invited to apply for “fee simple holdings” the lands they worked prior to this division (Lyons 1903:5). *Kuleana* or “*Kuleanas*” (Lyons 1903:5) became the general term for lands awarded through the application process, which included a survey of said lands. Land Commission Awards (LCAs) are the record of *kuleana* applications, many of which include an illustrated survey of the land plot, some having notes on neighboring plots. LCAs also included testimonies of plot boundaries, landscape features (if applicable), associated place names, and land-usage. Finally, these testimonies provide (in various combinations) the name of the *‘ili*, *ahupua‘a*, *moku*, and island that the land plot was located in.

A little more than two decades later the Hawaiian Kingdom determined that another wave of surveying was necessary to keep pace with land transactions that had accelerated since the Mahele. These Boundary Commission surveys, intended to take stock of remaining government lands, began in 1871 (Lyons 1903:6). Like in the Mahele, native informants provided Boundary Commission surveyors localized knowledge of land boundaries, associated place names, and landscape descriptions.

Many of the surveys conducted and maps produced within the Kingdom of Hawai‘i during the nineteenth century were carried out by native Hawaiians, and most of these were done with native informants and were based largely on traditional palena [boundaries].

Beamer and Duarte (2009:68)

In effect, by documenting palena information from native informants, Mahele and Boundary Commission documents recorded the local temporal sense of place. While not always apparent at the surface, embedded in these defined spaces is a foundational expression of a socio-cultural world-view upon which many layers of the Hawaiian cultural landscape were built.

1.2.1 Network of Major Hawaiian Land Divisions

This overview of land divisions is based on the relation between a land division’s hierarchy, regarding lands that encompass smaller land divisions. For instance, an island (mokupuni) is divided into districts (moku). In this relationship, the island is the larger land designation encompassing its districts. The obviousness of this analysis is pertinent as conflicts between historic commentaries concerning kālana divisions are related to this hierarchy. For example, accounts from Handy and Handy (1972:46-47) and Malo (1951:16) regarding ‘okana or okana conflict. Malo (1951:16) says that large subdivisions “are termed sometimes okana and sometimes kalana”, denoting equivalency. However, Handy and Handy (1972:46-47) determined, “that kalana is not the equivalent of ‘okana in general usage but in particular

localities refer to larger subsections of ‘okana.” To better grasp landscape characteristics of Waimea Kālana, the following land terms for island chain, island, districts, and major land divisions within districts will here be reviewed.

1.2.2. Archipelago, Island, District, Ahupua‘a and ‘Ili

Despite historical variations in Hawaiian land terms and descriptions, this overview subscribes to the following land division hierarchy. An archipelago, called pae ‘āina or pae moku, is comprised of a chain or group of individual islands called moku or mokupuni (Malo 1951:16; Moffat and Fitzpatrick 1995:23). In modern vernacular both moku and mokupuni are accepted terms used for islands, however, according to (Moffat and Fitzpatrick (1995:23) mokupuni specifies “a land division surrounded by water,” or what Kamakau (1976:7) expresses as “a cut off surrounded [by the sea].” Each island was subdivided into districts termed moku or moku‘aina (Moffat and Fitzpatrick 1995:23; Kamakau 1976:7). Ahupua‘a were subdivisions within a moku – as a district of an island (Handy and Handy 1972:48; Lyons 1903:24-28). Finally, the ‘ili and their variations were a further subdivision within an ahupua‘a. This divisional hierarchy is broken down in Table 1.

1.2.3. Kālana and Moku

Relevant to this project is the fact that the term moku by itself may be used to designate an island or a district of an island. Also relevant is that (Kamakau 1976:7) equates a moku‘aina to a district. Moffat and Fitzpatrick (1995:23) comments on Kamakau’s description of moku‘aina saying, “He implies that kālana is equivalent to moku‘aina and that ‘okana is a subdistrict.” Moffat and Fitzpatrick (1995:23) continues with this train of thought saying, “Given this historical meaning, kālana may have been the correct term for what is called a moku today.”

With the combined reasoning of Kamakau and Moffat and Fitzpatrick, this project maintains that a kālana’s divisional hierarchy is similar to a moku in that it encompasses smaller sub-divisions of land such as ahupua‘a and ‘ili.

Table 1. Hierarchy of major encompassing land divisions.

Land Division	Translation	Description	Reference
Pae ‘Āina	Archipelago	Chain of Islands	(Malo 1951:16) (Pukui and Elbert 1986) (Ulukau 2003)
Pae Moku	Archipelago	Chain of Islands	(Malo 1951:16) (Ulukau 2003)
Moku Puni	Island	Island surrounded by water	(Moffat and Fitzpatrick 1995:23) (Malo 1951:16)
Moku	Island	Island	(Moffat and Fitzpatrick 1995:23) (Pukui and Elbert 1986) (Ulukau 2003)
Moku	District, County, Region	Large subdivision of an Island	(Moffat and Fitzpatrick 1995:23) (Pukui and Elbert 1986) (Ulukau 2003)
Moku ‘Āina	District	Large subdivision of an Island	(Kamakau 1976:7) (Moffat and Fitzpatrick 1995:23)
Ahupua‘a	Stone platform boundary marker, location for tax collection, taxed land unit	Large subdivisions of a moku, usually extending from off shore to upland forested region	(Handy and Handy 1972:48) (Lyons 1903:24-28)
‘Ili ‘Āina	‘Ili ‘Āina	A subdivision of an ahupua‘a	(Handy and Handy 1972:48) (Malo 1951:16)
‘Ili Kupono	‘Ili Kupono	An independent subdivision within an ahupua‘a. “The transfer of the ahupua‘a to a new chief did not carry with it the transfer of the ili kupono contained within its limits.”	(Lyons 1903:28)
‘Ili Lele	‘Ili lele	Two or more distinct land sections in separate locations and/ or resource zones. [Land units of same owner]	(Lyons 1903:27)

This line of reasoning is consistent with Mi's Boundary Commission testimony of 1865. In aiding the Boundary Commission to settle a border discrepancy in Waikōloa / Waimea between Rex (King Kamehameha V) and George Hueu Davis, Mi describes Waimea's divisional hierarchy as follows,

I live in Waikoloa – I am kamaaina [child of the land] of the lands in dispute. The name of the large land is Waimea – I am a witness for George Davis, and also for Rex. – Waimea is a Kalana. – which is the same as an island divided into districts. – there are eight Okana in Waimea. – In those Okana are those lands said to extend out (hele mawaho). These lands came into the possession of Kamehameha I.

(Mi 1865:6)

Mi's testimony clarifies that Waimea is a kālana and that there are eight "Okana" within Waimea. Moreover, Mi denotes that there are lands within these okana that "extend out" reminiscent of Lyons' (1903:24-28) description of ahupua'a. While there exist regional and historical discrepancies concerning Hawaiian divisional land terms, this review of land divisions combined with Mi's testimony shows that Waimea as a land division operated similar to the following description from Kamakau,

A kalana is like a moku'aina; it is a large division of the island. The 'oknana are divisions within the moku'aina or kalana, and ahupua'a are the many divisions within the moku'aina or kalana or 'okana.

(Kamakau 1976:7)

In conclusion, based on this study of land division terminology, this project maintains that a kālana is equivalent to a moku'aina or moku in that it may encompass both ahupua'a and 'ili land divisions (illustrated in Figure 5 below). To re-present Waimea Kālana the following section applies this hierarchy of encompassing land divisions to land testimonies provided by residents of Waimea during the mid-nineteenth century.

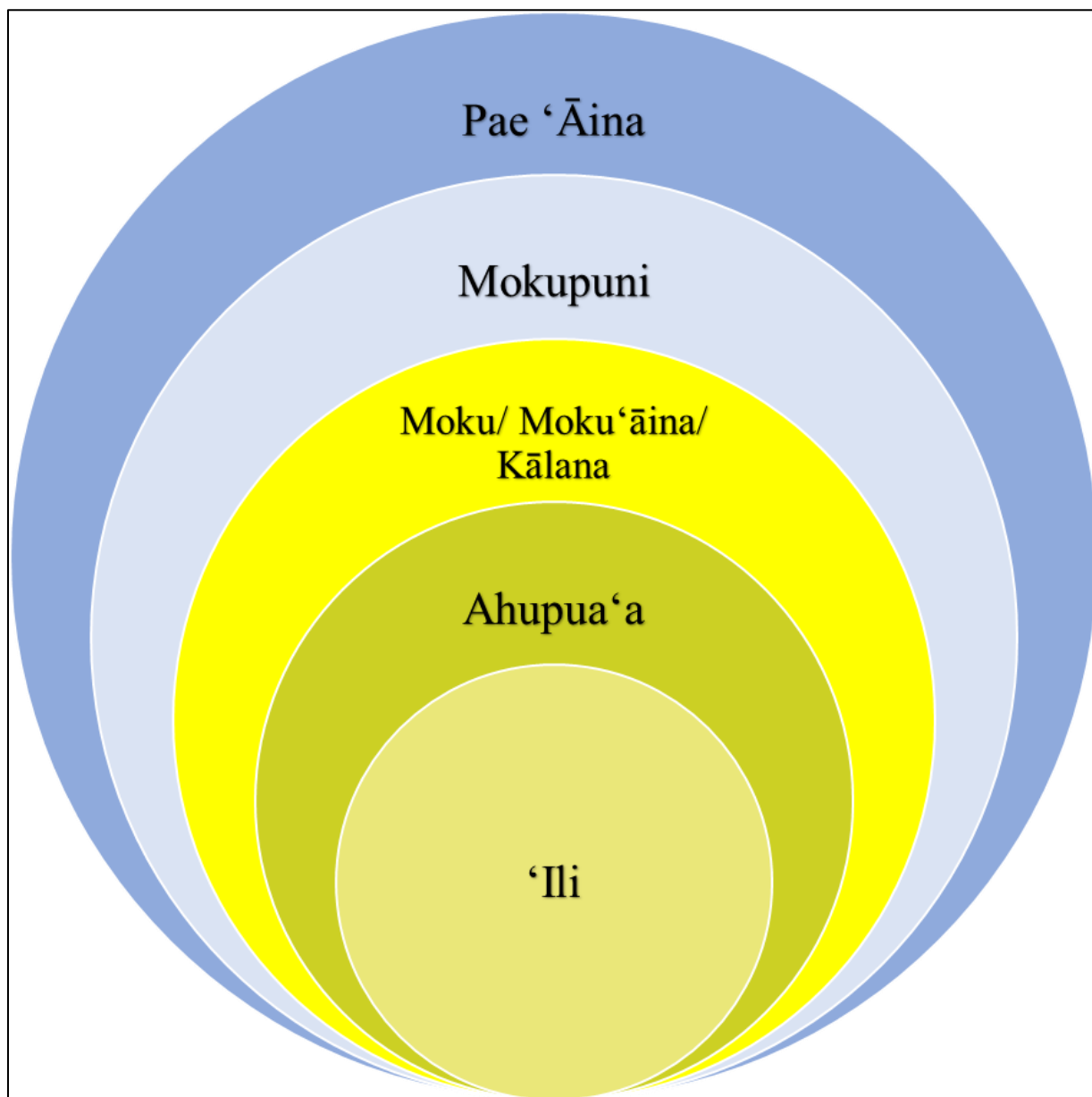


Figure 5. Illustration of encompassing lands hierarchy.

1.3 RE-PRESENTING WAIMEA KĀLANA

To re-present Waimea Kālana today, I use ethnohistoric place name and archival research of Mahele and Boundary Commission records to emphasize Waimea's geographical bounds as described by residents living in this area from 1848 to 1865. These testimonies, combined with current Hawai'i State and County GIS ahupua'a boundaries, highlight the contrast in geographic scope between Waimea Town and Waimea Kālana, clarifying Waimea's traditional and cultural associations as functioning similar to a district/ moku.

1.3.1 Method

Visually contrasting the geographic bounds of Waimea Kālana with Waimea Town is done by representing archival place name research and its geographic associations on a GIS generated map. Figure 6 displays the major land divisions of the South Kohala District as shown on the State of Hawai'i's GIS ahupua'a layer. According to the metadata (GIS reference notes) of this ahupua'a layer "the boundaries correspond to the 19th century survey maps" commissioned by the Hawaiian Kingdom Boundary Commission (Hawai'i State Office of Planning 2017). Therefore, while the names and boundaries of these land divisions are traditionally accurate, their designations as ahupua'a of South Kohala does not align with Mahele and Boundary Commission testimonies which designate these as 'ili land divisions of Waimea. To rectify past (19th century testimonies) and present (state GIS database) perceptions of Waimea Kālana I have color coded present representations of ahupua'a to reflect Mahele testimonies.

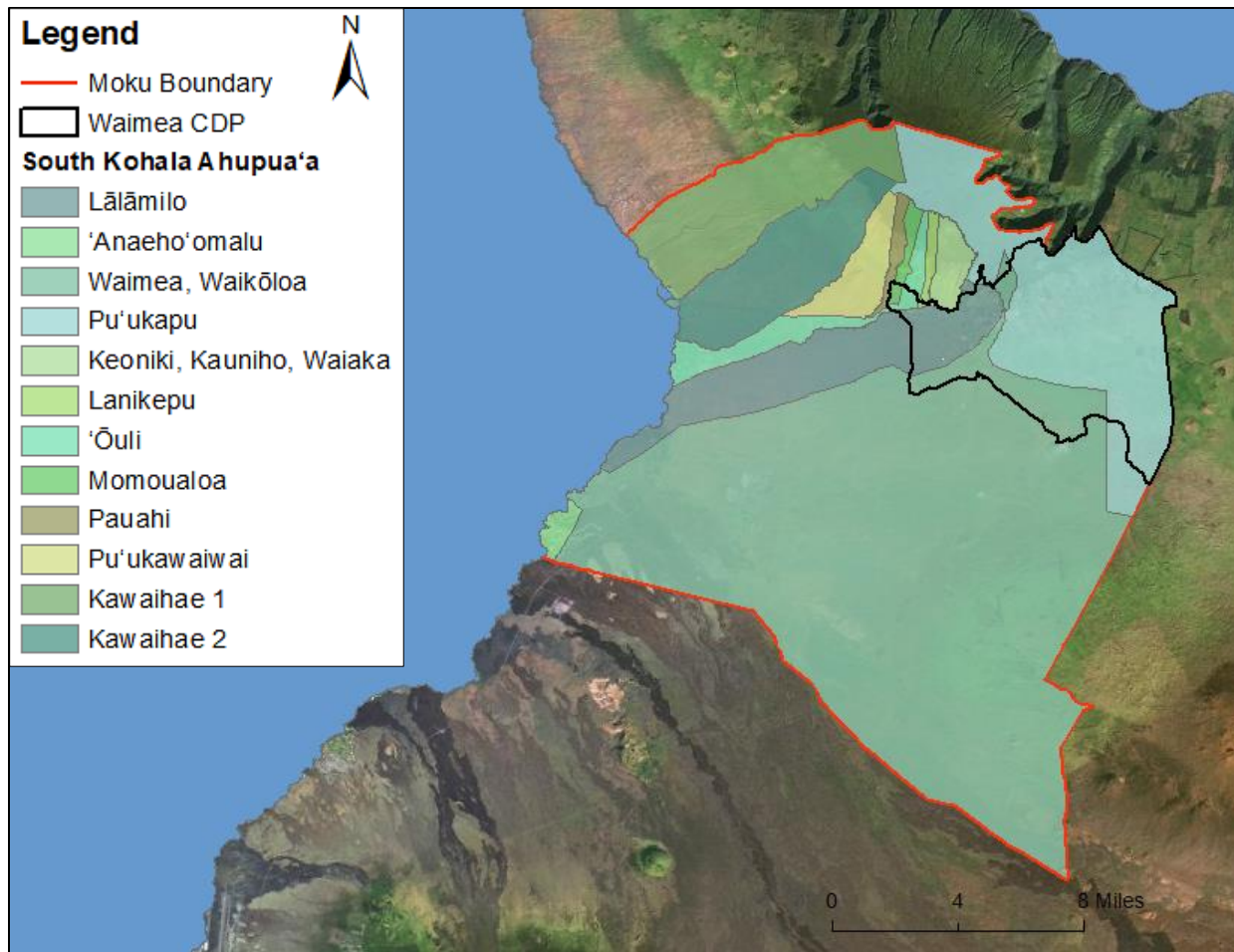


Figure 6. Land divisions of South Kohala per State and County ahupua'a GIS.

1.3.2. Using GIS to Reflect Hawaiian Kingdom Land Records

The following land claim research prove that the following 'ili were part of a larger land division named Waimea. In reviewing a sample of these archival land testimonies, this section provides an alternative perception, seeing these lands as being divisions within Waimea Kālana as opposed to being ahupua'a of South Kohala District. The goal of this section is not to disregard the current ahupua'a layer, instead this exercise reveals the existence of temporal perceptions place and uses the scope of Waimea Kālana as the impetus for viewing this landscape more traditionally.

Table 2 compiles seven LCA claims from Maly (2000:24-28) for residential land parcels located in five ‘ili – Lālāmilo, Puakō, Kalāhuipu‘a, ‘Anaeho‘omalū, and Waikōloa. On the State’s South Kohala ahupua‘a map (Figure 6) Puakō is merged with Lālāmilo, and Kalāhuipu‘a is merged with Waikōloa. Regardless of this modern-day merger, all seven claims state that their land claims are within ‘ili(s) that are encompassed by a larger land named Waimea. LCA 3758, 4099, 4452, and 4100 situate their lands within the larger land division of Waimea, however they do not specify Waimea’s land designation. LCA 8559-B, 4452, and 8521-B specifically identify Waimea as a kālana. While not all claims use the term kālana to describe Waimea, all seven claims denote that Waimea is the encompassing land in which their lands are located.

Table 2. LCA testimonies compiled by Maly (2000:24-28)

Date	Claim #	Claimant	Parcel Within ‘Ili of	Encompassing Land
1848	8559-B	Lunalili	Lālāmilo/Puakō	Waimea Kālana
1848	3758	‘Akahi	Puakō	Waimea
1848	4099	Keawekulua	Puakō	Waimea
1848	4452	Hakaleleponi Kalama	Kalāhuipu‘a	Waimea Kālana
1848	4452	Hakaleleponi Kalama	‘Anaeho‘omalū	Waimea Kālana
1848	4100	Kahenehene	‘Anaeho‘omalū	Waimea
1848	8521-B	Davis	Waikōloa	Waimea Kālana

The following are examples from Table 2 for how these land relations are worded. All of these examples are translations found in Maly (2000:24-28). In LCA 8559-B, Lunalili says their land is in the “Ili of Puako and Lalamilo, Kalana of Waimea.” Keawekulua (LCA 4009) says, “Here is our claim for a lot at Puako, Waimea, Hawaii,” and Kahenehene’s claim (LCA 4100) attests that “Anaehoomalu, it is an independent land division of Waimea.” These lands from Table 2 are re-color coded yellow and labeled on Figure 7 as Waimea Lands Table 2 (Maly 2000) – keep in mind that two of the ‘ili have been merged on the State map.

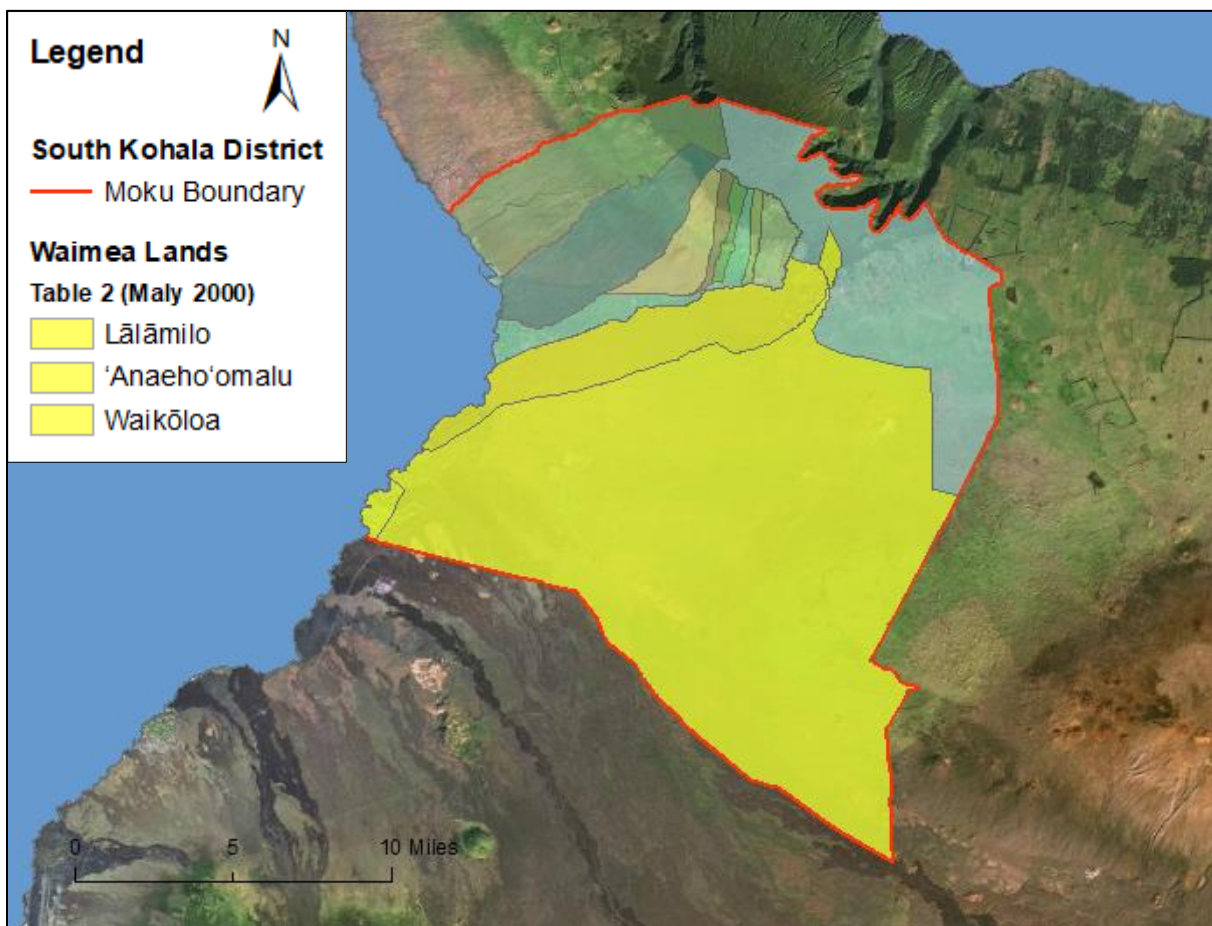


Figure 7. Color coded lands of Waimea from Table 2.

Table 3 compiles land designation research for eight land divisions of current South Kohala not covered by Table 2. Five named land divisions were researched using LCA archives accessed through the Office of Hawaiian Affairs’ online Papakilo Database (OHA 2017); these lands are, Kauniho, ‘Ōuli, Pauahi, Lanikepu, and Pu‘ukapu. The land designation for Momoualoha (shaded green in Table 3), was found through (Waihona ‘Āina 2017). The land designations for the ‘ili of Keoniki, and Pu‘ukawaiwai, (shaded blue in Table 3) were researched by “place names” using Soehren’s (2010) online Hawai‘i place name repository.

Table 3. Compilation of LCA and place name research.

Named Land Division	Claim #	Date	Claimant	Land Designations	Citation
Kauniho	3832	1848	Poolipi	aia ma Kauniho, Waimea, Hawai‘i	Mahele Award 3832
‘Ōuli	3833	1848	Pae	aia ma Ouli, Waimea, Hawai‘i	Mahele Award 3833
Pauahi	4124	1848	Kalua	ili aina i Pauahi, Waimea, Hawai‘i	Mahele Award 4124
Lanikepu	4209	1848	Kiai	ili aia ma Lanikepu ma Waimea Hawaii	Mahele Award 4209
Pu‘ukapu	3685	1851	Mahoe	ili aina i Puukapu, Waimea, Hawai‘i	Mahele Award 3685
Momoualoha	6833	1876	Naaho	ili Momoualoha, Waimea ahupua‘a, Hawaii	Waihona ‘Āina 2017
Keoniki				ili kupono of Waimea	(Soehren 2010)
Pu‘ukawaiwai				ili kupono of Waimea	(Soehren 2010)

Testimony from LCA claim numbers 3685, 3823, 4124, and 3833, state first, the ‘ili that their land or house plot is located in. This is followed by the encompassing land of Waimea, which is followed by the island name of Hawai‘i. Claim number 6833 follows a similar pattern, except that it designates Waimea as an ahupua‘a (note that this claim is 28 years after the Mahele of 1848). The remaining land divisions of Keoniki, and Pu‘ukawaiwai according to Soehren (2010) are also ‘ili of Waimea. Like the compilation of Table 2, the ‘ili lands compiled in Table 3 are all part of the larger land division of Waimea. Figure 8 represents the lands from Table 2 and 3 as lands of Waimea by re-coloring them yellow.

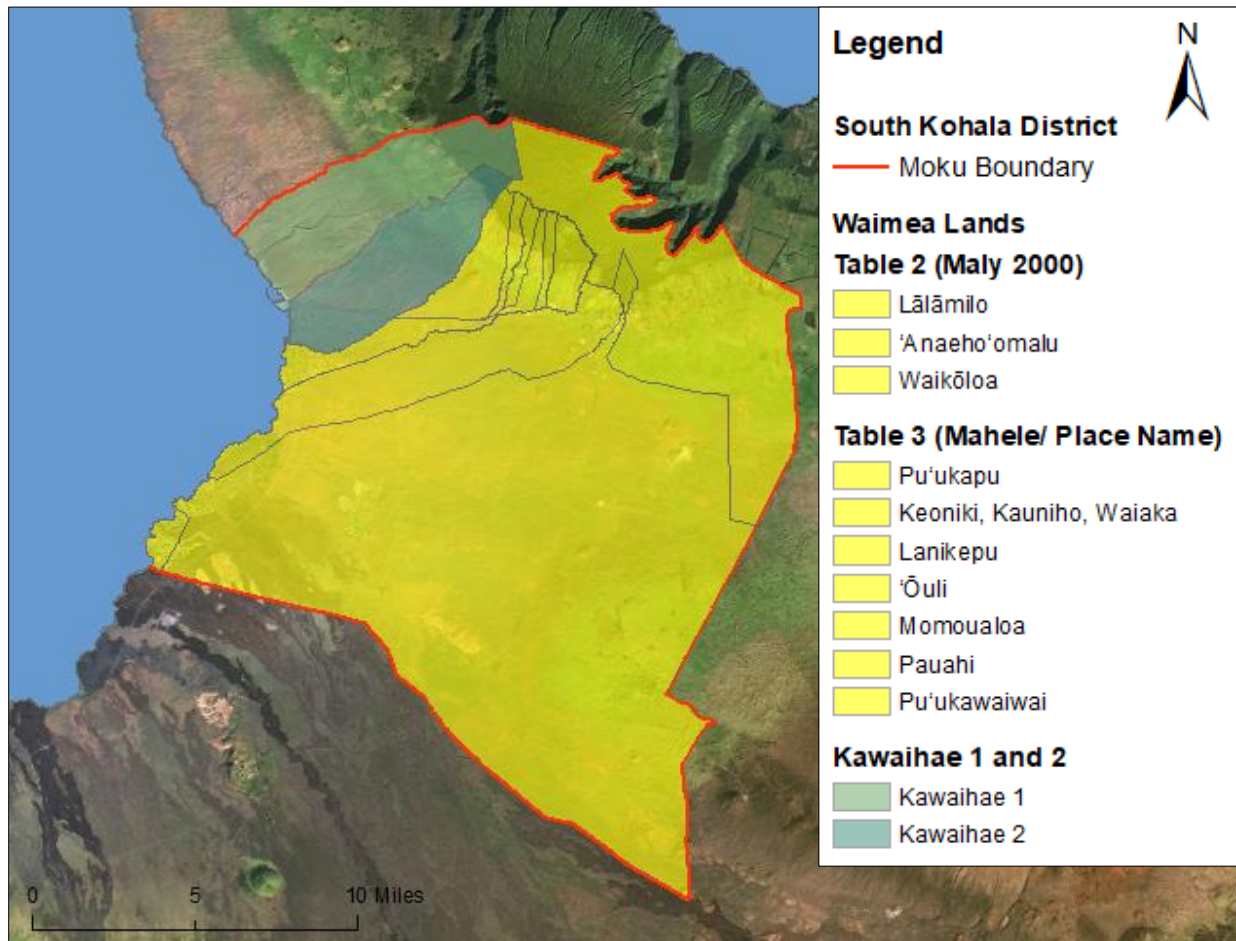


Figure 8. Color coded lands of Waimea from Table 2 and Table 3.

Waimea CDP is demarcated in Figure 6. When compared to the Lands of Waimea in Figure 8, it is clear that the government's identification of Waimea is disjointed from its traditional geographic scope which occupies most of South Kohala. LCA testimony for Kawaihae 1 and 2 situate them in Kohala, or today's North Kohala District. The non-inclusion of Kawaihae 1 and 2 might cause some to dispute Waimea's land designation as a kālana, however, Lyons (1903:29) comments that kālana may also be smaller or separate from an associated moku (district). Below Lyons specifies that Waimea was considered separate from the moku of Kohala.

On Maui are some smaller divisions than the Moku [district] called kalana, Lahaina being one of these Wailuku, Waikapu, Waiehu, and Waihee were independent, belonging to no Moku. On the map it was necessary to form a new district and call it Wailuku, Nawaieha, the four waters, being too cumbersome and ill understood. Olaa, on Hawaii, is said to have been independent of Puna, and Waimea of Kohala. Otherwise the district division was very exact and comprehensive. [underline emphasis added]

(Lyons 1903:29)

In conclusion, the collective lands of Waimea represent Waimea's designation as a kālana. Since many of the heritage landscape resources presented in Chapter 3 is distributed throughout Waimea Kālana and Kawaihae 1 and 2, South Kohala and Waimea Kālana will be used interchangeably. Figure 9 juxtaposes Waimea Kālana and Waimea CDP and reveals that not only is Waimea Town geographically smaller, but that it is comprised of five small arbitrary pieces of Pu'ukapu, Waikōloa, Lālāmilo, 'Ōuli, and Lanikepu, which fragments the larger cultural landscape. This fragmentation is an example of how perception of a traditional landscape is altered by modern definitions of place. Therefore, the collective lands of Waimea represent this study's cultural landscape and the basis of this project's geo-cultural baseline. Finally, throughout the rest of this paper moku and district boundary may be used interchangeably when describing South Kohala.

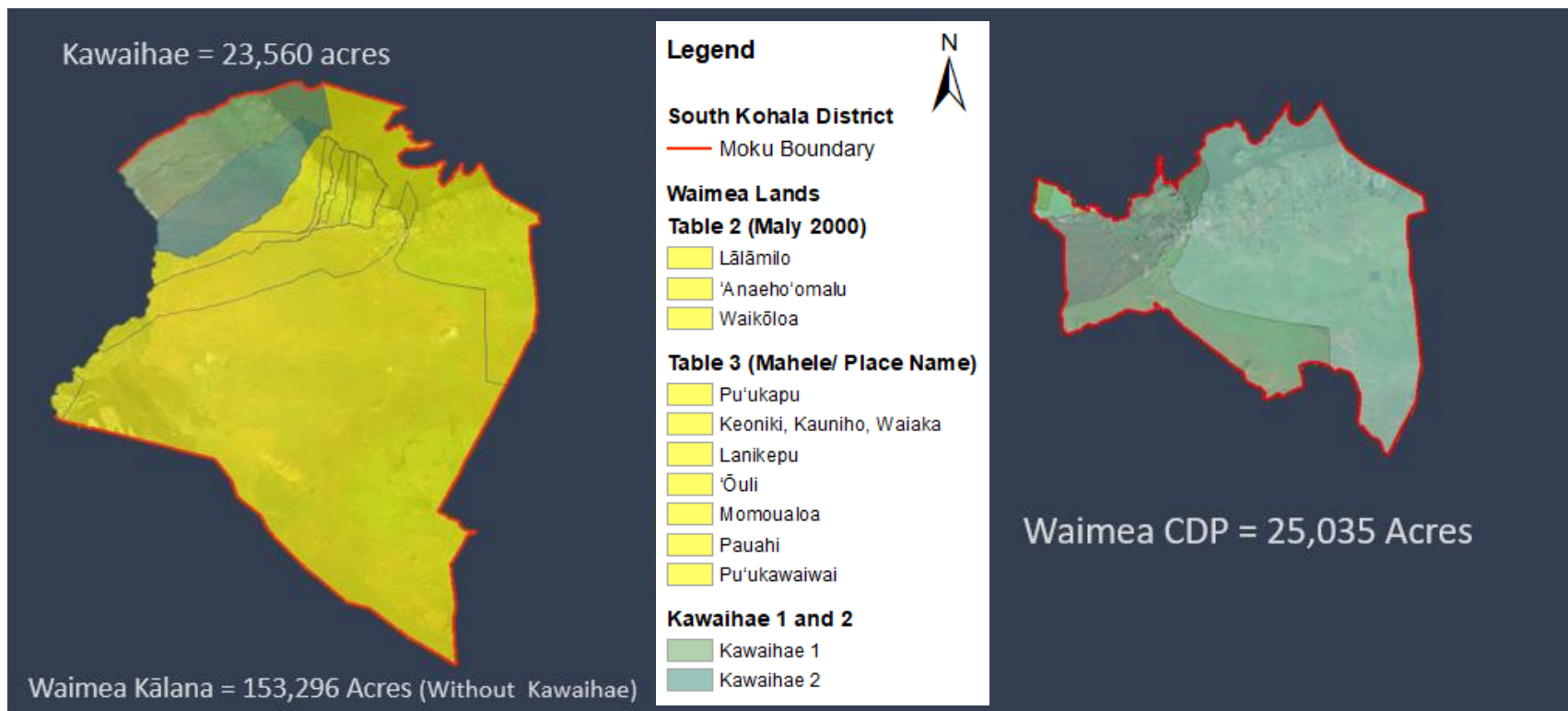


Figure 9. Waimea Kālana and Waimea CDP juxtaposed.

1.4 HERITAGE AND CULTURAL LANDSCAPES

Issues related to mixed cultural and natural heritage and the intrinsic links between communities and their natural environment have been discussed since the World Heritage Convention came into being with its adoption in 1972. In the early years the balance between natural and cultural heritage was discussed, as well as the “combined works of men and nature”. For years the Committee debated as to how this feature could be considered for inscription.

The “break-through” came only in 1992 at the World Heritage Committee level – it was a crucial year, as the first “Earth Summit” took place, the UN Conference on Environment and Development in Rio de Janeiro. This paved the way for a new thinking on human beings and their environment, linking culture and nature, with a vision of sustainable development. The awareness raised at the level of government, NGOs and civil society helped to accept “cultural landscapes” as a category of sites for nomination.

(Mitchell et al. 2009:3)

The preceding quote is an excerpt from the preface of the United Nations Educational, Scientific and Cultural Organization’s (UNESCO) 2009 Conference on World Heritage Cultural Landscapes. This excerpt of how cultural landscapes became a UNESCO Heritage designation, tells of how “in the early years” links between heritage and the “combined works of men and nature” were being processed by these World Heritage thinkers – the result of which was the formalization of cultural landscapes as both a form of heritage and as an approach to preservation, conservation, and restoration. Waimea’s Heritage Landscape and its HLRIM are built on two related streams of thought, one being heritage, and the other being cultural landscapes. If a cultural landscape can be described as “the combined works of men and nature”, then a Heritage Landscape according to this project, describes the inheritability and perpetuity of properties (including elements and features) that reflect the combined works of man and nature

on a landscape that contributes to an area's sense of place. With the capabilities of GIS, even landscape properties contained in archival and archaeological maps, and historic vegetation studies, can be incorporated into heritage landscape models when georeferenced (overlying various sources of information) onto the current landscape (Sullivan et al. 2013:5-6).

1.4.1. Heritage

At its most basic level, heritage is anything that can be inherited. When considering that Brochu and Merriman (2011:1) and Mitchell et al. (2009:3) definitions of community combines people with its geographical and environmental location, it is plausible to say that a community's landscape is a form of heritage that future residents will inherit. According to Cambridge Online Dictionary, heritage properties "are features belonging to the culture of a particular society, such as traditions, languages, or buildings, which come from the past and are still important" (Cambridge 2018). According to, UNESCO World Heritage "About" webpage, "Heritage is our legacy from the past, what we live with today, and what we pass on to future generations. Our cultural and natural heritage are both irreplaceable sources of life and inspiration" (UNESCO 2018).

According to Elia and Ostovich (2018), heritage management "is a growing field that is concerned with the identification, protection, and stewardship of cultural heritage in the public interest." Speaking on attributes of heritage properties, they continue by saying...

Heritage is a rather open-ended and fungible term that embraces a huge range of meanings and potential disagreement; it comprises the cultural expressions of humanity and may be tangible or intangible, movable or immovable, old or new, and owned privately, corporately, or not at all ...

With the above reasoning in place, a HLRIM is the application of heritage management to cultural landscapes, for the purpose of identifying properties that may be inherited and managed to perpetuate or restore a location's cultural and natural resources and sense of place. Especially pertinent to modern day landscapes is the issue of ownership. Elia and Ostovich's understanding of heritage ownership, combined with Brochu and Merimen's (2011:1) definition of community, allows for heritage landscapes to be viewed as a "corporate" or community resource. Therefore, in this project a Heritage Landscape is one in which a community's sense of place is a collective inheritance, consisting of the cultural and natural resources of an area that is purposefully managed and stewarded for the current and future residents of an area.

1.4.2. Cultural Landscapes and Heritage

The recognition of cultural landscapes as a form of heritage contributed to a shift within the historic-preservation field that broadened the definition of heritage to incorporate a wide range of tangible and intangible expressions of culture. The heritage values of landscapes often include cultural traditions, intergenerational use and continuity, socioeconomic systems, and the natural environment; consequently, landscapes are characterized by both cultural and ecological change.

(Mitchell 2008:25)

According to UNESCO, "Cultural landscapes are those where human interaction with natural systems has, over a long time, formed a distinctive landscape", moreover "these interactions arise from, and cause, cultural values to develop" (Mitchell et al. 2009:5). Thus, the potential scope of cultural landscape studies inherently broadens typological categories of heritage properties not only because it includes cultural and natural resources, but moreover because it tries to account for interactions between the two. While cultural landscape studies are still evolving in approach and method, institutions such as UNESCO, ICOMOS (International Council on Monuments and Sites) and the U.S. National Parks Service (NPS) have made efforts

to define or describe attributes of cultural landscapes and their significance. From these institutions, Tables 4 - 6 compile definitions or descriptors of cultural landscape attributes that deal with geographic scope, properties of cultural and natural significance, and values deriving from the interaction of the two. These excerpts were chosen from these organizations based on their relevance to Waimea Kālana and its history.

Table 4. UNESCO descriptions of cultural landscapes

UNESCO (Mitchell et al. 2009)		
GEOGRAPHIC SCOPE	<p>The second category is the organically evolved landscape. This results from an initial social, economic, administrative, and/or religious imperative and has developed its present form by association with and in response to its natural environment. Such landscapes reflect that process of evolution in their form and component features. They fall into two sub-categories:</p> <ul style="list-style-type: none"> • a relict (or fossil) landscape is one in which an evolutionary process came to an end at some time in the past, either abruptly or over a period. Its significant distinguishing features are, however, still visible in material form. • a continuing landscape is one which retains an active social role in contemporary society closely associated with the traditional way of life, and in which the evolutionary process is still in progress. At the same time, it exhibits significant material evidence of its evolution over time. 	Pg. 20
NATURAL SIGNIFICANCE	The global environmental movement is interested in cultural landscapes because many are important for nature conservation and may contain habitats valuable to the conservation of biodiversity	Pg. 22
CULTURAL SIGNIFICANCE	A cultural landscape may be directly associated with the living traditions of those inhabiting it or living around it in the case of some designed landscapes like gardens. These associations arise from interactions and perceptions of a landscape; such as beliefs closely linked to the landscape and the way it has been perceived over time. These cultural landscapes mirror the cultures which created them.	Pg. 22
INTERACTION	Cultural landscapes often reflect specific techniques of <i>sustainable land-use</i> , considering the characteristics and limits of the natural environment they are established in, and a specific <i>spiritual relation to nature</i> .	Pg. 22

Table 5. ICOMOS definitions and descriptions of cultural landscapes.

ICOMOS (Burra Charter 2013)		
GEOGRAPHIC SCOPE	<ul style="list-style-type: none"> • <i>Place</i> means a geographically defined area. It may include elements, objects, spaces and views. Place may have tangible and intangible dimensions. • Place can be large or small: for example, a memorial, a tree, an individual building or group of buildings, the location of an historical event, an urban area or town, a cultural landscape, a garden, an industrial plant, a shipwreck, a site with in situ remains, a stone arrangement, a road or travel route, a community meeting place, a site with spiritual or religious connections. • Setting means the immediate and extended environment of a place that is part of or contributes to its cultural significance and distinctive character. 	<p>Pg. 2</p> <p>Pg. 3</p>
NATURAL SIGNIFICANCE	<ul style="list-style-type: none"> • <i>Fabric</i> means all the physical material of the <i>place</i> including elements, fixtures, contents and objects. • Natural elements of a place may also constitute fabric. For example, the rocks that signify a Dreaming place. • Fabric may define spaces and views and these may be part of the significance of the place. 	Pg. 2
CULTURAL SIGNIFICANCE	<ul style="list-style-type: none"> • <i>Cultural significance</i> means aesthetic, historic, scientific, social or spiritual value for past, present or future generations. • Cultural significance is embodied in the <i>place</i> itself, its <i>fabric</i>, <i>setting</i>, <i>use</i>, <i>associations</i>, <i>meanings</i>, records, <i>related places</i> and <i>related objects</i>. • Places may have a range of values for different individuals or groups 	Pg. 2
INTERACTION	<ul style="list-style-type: none"> • Associations mean the connections that exist between people and a place. • Associations may include social or spiritual values and cultural responsibilities for a place. • <i>Meanings</i> denote what a <i>place</i> signifies, indicates, evokes or expresses to people. 	Pg. 3

Table 6. U.S. National Parks Services definition and descriptions of cultural landscapes.

NPS (Sullivan et al. 2013)		
GEOGRAPHIC SCOPE	<ul style="list-style-type: none"> cultural landscapes are dynamic landscapes where humans, the environment, and its non-human inhabitants interact with each other 	Pg. 2
NATURAL SIGNIFICANCE	<p>Many modern experts on cultural landscapes critique older ideas of the concept for giving too much precedent to material culture and for failing to recognize the triangular relationship between humans, non-human “nature”, and material culture created by humans (e.g., Korr 2002). There is a concern when discussing cultural landscapes that not enough attention is paid to the reciprocal relationship between humans and the landscape, and there is interest in improving our understanding of the cultural and ideological underpinnings of modes of interaction with landscapes and parse them out accordingly (e.g., Meinig 1979).</p>	Pg. 3
CULTURAL SIGNIFICANCE		
INTERACTION	<p>Recent trends in the conceptualization of cultural landscapes include a tendency to reject a dualistic sense of the relationships between culture and the environment and to focus on the interactions (if not inseparability) of culture and the environment as they are expressed in cultural landscapes. Further, there exists a shift in the literature on cultural landscapes, abandoning the temptation to view cultural landscapes as being static, historic, or inactive, in favor of a view that finds their value to lie in their dynamic nature.</p>	Pg. 3

1.4.3. Waimea’s Heritage Landscape: Hawaiian Themes and Attributes

Temporally, this project attempts to model a more traditional perception of Waimea’s Heritage Landscape spanning from 1792 (a year before cattle arrived in Hawai‘i), to the year of Mi’s Boundary Commission testimony in 1865. Geo-spatially, Waimea’s Heritage Landscape are the collective lands of Waimea discussed in Section 1.3 (Waimea Kālana). However, since some of the landscape resources modeled for Waimea Kālana continue into Kawaihae 1 and 2, I include all of South Kohala into this heritage landscape model. The purpose of this model is to first re-present Waimea in a format that spatially reflects a more Hawaiian sense of place based

on traditional land divisions and resource management. Secondly, the model provides guidance for a possible community-based heritage programs to initiate landscape studies for the purpose of better negotiating land-use and planning issues. Table 7 defines the HLRIM acronym based on definitions and attributes of cultural landscapes as described by UNESCO, ICOMOS and NPS in the previous section.

Table 7. HLRIM Acronym defined.

H	= Heritage	- any inheritable property deemed significant to sense of place; deemed important for management, preservation or restoration; for future generations to inherit
L	= Landscape	- a cultural landscape defined by traditional resource management practices; (Waimea Kālana)
R	= Resource	- a property of cultural or natural significance, or a property significant for displaying interactions between man and nature
I	= Inventory	- the documentation and spatial re-presentation of heritage properties and resources
M	= Model	- a temporal compilation of heritage resources spatially represented to act as a baseline by which current changes related to land-use planning may be negotiated (proactive resource management)

Heritage Landscape Themes and Categories

The HLRIM proposed for Waimea is not intended to be a comprehensive landscape analysis, and does not claim to contain all the cultural, spiritual, and natural significance of its landscape. Instead, this cultural landscape approach and study focuses on two cultural landscape themes, one being the interconnectedness of cultural land divisions with the fabric of the Waimea landscape, and the other being resource distribution in relation to land-use. These themes are fleshed out in four cultural landscape categories; these categories represent Waimea's geography in relation to visual resources management, historic vegetation, watershed configuration, and traditional agriculture.

Hawaiian Context of Boundaries and Resource Management

UNESCO acknowledges these four cultural landscape categories as representing the “combined works of nature and of man”, because they are “illustrative of the evolution of human society and settlement over time” (Mitchell et al. 2009:19). However, the value for the interaction between a people group and land is not just significant to UNESCO. From a Hawaiian perspective, these interactions shape the Hawaiian world view. According to Kepā Maly, a cultural historian and resource specialist, “In the Hawaiian context, these values —the ‘sense of place’— have developed over hundreds of generations of evolving ‘cultural attachment’ to the natural, physical, and spiritual environments” (Maly 2001:1). Maly emphasizes the previous statement by saying, “In a traditional Hawaiian context, nature and culture are one and the same, there is no division between the two” (Maly 2001:1).

The Burra Charter of 2013 adopted by the Australia International Council on Monuments and Sites (ICOMOS) defines “Fabric” as “all the physical material of the place including, elements, fixtures, contents and objects,” which “may define spaces and views and these may be part of the significance of the place” (ICOMOS 2013:2). According to Hawaiian language and history professor Katrina Oliveira, “Prominent natural features” served as landmarks in the construction and re-construction of “boundaries” (Oliveira 2014:61). In describing the creation of ahupua‘a boundaries, Maly (2001:4) combines physical landscape features with resource cycles, saying, “The boundaries of the ahupua‘a were generally defined by cycles and patterns of natural resources that extended from the mountainous zone, or peaks, to the ocean fisheries.” This close connection to the landscape was influential in the creation of traditional Hawaiian palena (boundaries), resource management practices and social organization. The creation of

these palena according to Beamer and Duarte served not only to define space, but simultaneously helped to facilitate social organization and land-use productivity.

The establishment of palena on these divisions brought greater productivity to the lands, and was also a means of settling disputes of future ali‘i [chiefs] who would be in control of the bounded lands. This indigenous system of land divisions and boundaries enabled a konohiki (land or resource manager) to know the limits of the resources to be managed.

(Beamer and Duarte 2009:81)

Maly (2001:3) goes on to comment saying, “Over the centuries, as the ancient Hawaiian population grew, land-use and resource management also evolved.” The development of the major land divisions on the islands of O‘ahu and Hawai‘i by the early 1600s was part of this evolving resource management process (Maly 2001:3). The time depth of the establishment of these boundaries according to Lyons (1903:29) “were fixed about twenty generations ago”. With variations of perspective, various researchers have accepted these boundaries to have been established sometime around four hundred years ago (Maly 2001:3; Moffat and Fitzpatrick 1995:23; Beamer and Duarte 2009:73).

1.4.4. Why does Waimea need a Heritage Landscape Model?

Presently, of all the districts in Hawai‘i County (Hawai‘i Island), South Kohala has the most acreage planned for urban expansion. Furthermore, these county land-use plans define Waimea as a town in the uplands of South Kohala District, delineated by its CDP outline. From Hawai‘i County’s land-use map (Figure 4) it’s evident that some urban expansion is within Waimea CDP, with the majority of urban expansion and resort development situated along the coast. In this land-use and planning scenario, Waimea Kālana is not represented as a cultural landscape nor is its traditional resource management (cultural or natural) strategy visualized. Therefore, I argue that best management practices geared towards restoring or preserving this

district's sense of place and resources should include the cultural landscape significance of Waimea Kālana in long-range land-use planning.

Before modeling the GIS layers of Waimea's geo-cultural baseline, the following chapter will provide a historical background of how shifts in land-use, politics, and demography, contributed to how Waimea is perceived today. This background is intended to historically and spatial link Waimea's perceptual evolution from traditional landscape to its modern manifestation. To bridge the past with the present, is to track the forces and actions of change that could provide any community-based heritage program insights into past decisions of change, that may aid them in negotiating land-use planning.

CHAPTER 2. LAND USE BACKGROUND

Today, as a result of the cultural diversity of our island community, island residents look at the natural and cultural resources around them in different ways and apply different values to them.

(Maly 2001:1)

This chapter provides context for how Waimea became more associated as a town rather than its traditional designation as a *kālana*. By documenting historical shifts in land-use, economics, politics and local population growth from 1960 to 2010, I build a spatial and historical explanation for how Waimea's current population may have multiple perceptions of place based on their temporal experience of Waimea. This historical background is especially concerned with socio-political and economic influences operating in Hawai'i and Waimea in the late 1950s and early 1960s. This segment of history is significant as Hawai'i transitioned from a U.S Territory into an official State during this time.

Furthermore, cattle and ranching have a long history in Waimea and has been influential in driving change in the region. Parker Ranch established in 1847, has been the region's largest land holder for more than a century. Therefore, this section also provides a brief background of how cattle came to Waimea, and the managerial decisions and movements of Parker Ranch that influenced Waimea's land-use history. As part of a theoretical community-based heritage program, story-based maps (Buckley and Sullivan 2014:38) of Waimea's historical land-use visually aids this project's HLRIM in spatially representing socio-historic changes in landscape perspective. While this background section does not account for all historical factors of change for Waimea, it does model how history, landscape studies, and GIS can be combined to provide a community with spatial-historic references related to changes that affect perception of place.

2.1 ARRIVAL OF CATTLE AND JOHN PALMER PARKER I

The remaining live flock I had on board, consisting of five cows, two ewes and a ram, were sent on shore in some of his canoes; these were all in a healthy state though in low condition, and as I flattered myself the bull would recover, I had little doubt of their succeeding to the utmost of my wishes.

I cannot avoid mentioning the pleasure I received, in the particular attention paid by Tamaahmaah [Kamehameha] to the placing of these animals in the canoes. This business was principally done by himself; after which he gave the strictest injunctions to his people who had the charge of them, to pay implicit obedience to the directions of our butcher, who was sent to attend their landing.

(Vancouver 1793:213)

2.1.1. The First Cattle: From Kealakekua to Waimea

On the morning of Friday February 22, 1793, just offshore of Kealakekua bay, Captain George Vancouver writes of an exchange of words between himself and the King of Hawai‘i Island, Kamehameha I. Proceeding from an impressive procession of ten native canoes onto Vancouver’s ship, Kamehameha “demanded” to know if Captain Vancouver and his King (George) were friends; “On receiving a satisfactory answer to this question, he declared that he was our firm good friend; and, according to the custom of the country, in testimony of the sincerity of our declarations we saluted by touching noses” (Vancouver 1793:212). Although this was not the first time Kamehameha I and Vancouver met, this was their first explicit declaration of intent towards each other and the kingdoms each represented. Following their honi or greeting by touching noses and exchange of breath (called a “salute” by Vancouver), an exchange of gifts transpired in which Kamehameha presented Vancouver “with four very handsome feathered helmets”, ninety “large hogs”, and a “profusion of vegetables” (Vancouver 1793:212-213). To complete this protocol of friendship Vancouver gave to Kamehameha the aforementioned livestock. Almost a year later (Wednesday January 28th, 1794) on Vancouver’s third trek to

Hawai‘i, another exchange between the two took place again at Kealakekua Bay. Kamehameha provided replenishment supplies consisting of hogs, vegetables, and most likely water; in return Vancouver sent “a young bull nearly full grown, two fine cows, and two very fine bull calves” to shore along with “five rams, and five ewe sheep” (Vancouver 1794:17-18). Shortly thereafter, Kamehameha along with a retinue of his chiefs accompanied Vancouver northward (by sea on canoes) as Vancouver’s next destination was the Island of Maui. Before departing Hawai‘i Island, the Discovery (Vancouver’s vessel) made anchorage at Kawaihae, the main port of current South Kohala. At this anchorage, Vancouver provided a brief description of his immediate surroundings at Kawaihae and the view-shed ascending towards Waimea – the future station for the cattle he exchanged with Kamehameha.

The only circumstances that seem to render this a desirable stopping place, are the run of water, which however does not constantly flow; and the probability of procuring refreshments, from its contiguity to the fertile, and populous western part of the district of Koaarra [Kohala], and the plains of Whymea [Waimea], lying behind the land that constitutes this part of the sea coast.

The country rises rather quickly from the sea side, and, so far as it could be seen on our approach, had no very promising aspect; it forms a kind of glaxis, or inclined plane in front of the mountains, immediately behind which the plains of Whymea are stated to commence, which are reputed to be very rich and productive, occupying a space of several miles in extent, and winding at the foot of these three lofty mountains far into the country.

In this valley is a great tract of luxuriant, natural pasture, whither all the cattle and sheep imported by me were to be driven, there to roam unrestrained, to "increase and multiply" far from the light of strangers, and consequently less likely to tempt the inhabitants to violate the sacred promise they had made; the observance of which, for the time stipulated in their interdiction, cannot fail to render the extirpation of these animals a task not easily to be accomplished.

(Vancouver 1794:106-107)

While popular belief say that ten years was the duration of the kapu (“sacred promise” stated by Vancouver above) not to kill any cattle seed stock or offspring, Bergin (2004:22,28) estimated that a kapu of twenty years is more accurate as legal cattle hunting –as regulated by the Hawaiian Government– commenced in 1815. That same year John Palmer Parker I, born in Newtown, Massachusetts on May 1, 1790, settled on Hawai‘i Island and earned his appointment as the king’s first authorized “cattle hunter” (Bergin 2004:28). The kapu had accomplished its goal to the effect that, “By the 1850s, the number of cattle (wild and tame) in the Hawaiian Islands was estimated at more than 40,000” (Cuddihy and Stone 1990:59).

2.1.2. Parker Ranch: From Kamoku to Waimea Village

The current town of Waimea is historically linked to the growth and managerial movements of Parker Ranch. Although John Parker had his initial residence in Waiāpuka, North Kohala, respected Parker Ranch historian Bergin (2004:151) considers the acquisition of two acres by John Parker I and his wife of chiefly descent (Kipikane – granddaughter of Kamehameha I) in January of 1847 as a point of delineation, marking a transition from wild cattle hunter, to Parker becoming a “bona fide rancher”. These two acres were (and still are) located in the ahupua‘a of Kamoku, which is tangent to South Kohala’s eastern border (Figure 10). This parcel was named Mānā and served the dual purpose of being the homestead of the burgeoning Parker family and original headquarters for Parker Ranch.

From this genesis, a succession of land acquisitions by John Parker I, and his descendants (and later ranch manager A.W. Carter) greatly expanded the ranch’s land holdings. Before he passed away on August 20, 1868, John Parker I acquired large tracts of land in Pa‘auhau and Waikōloa (Figure 10). This expansion extended ranch operations south towards the steepening slopes of majestic Mauna Kea, and westward towards the interspersed white sand beaches of the

South Kohala coast. Without the acreage of Waikōloa, between 1847 and 1866 Parker initiated acquisitions that resulted in landing at least 48,000 acres (Table 8 compiled from Bergin 2004:151-159). A map modified from Bergin (2004:342) includes the lands of Waikōloa and shows that by 1906 Parker Ranch had gained control over most of South Kohala (Figure 11). One of the primary endeavors for Parker Ranch's paniolo (cowboy) gang throughout this period was to domesticate the wild cattle stock roaming upon their lands. Between 1859 and 1900, in building up their domesticated cattle counts, Parker Ranch reduced its wild stock from 12,000 head to 5,000 (Bergin 2004:151).

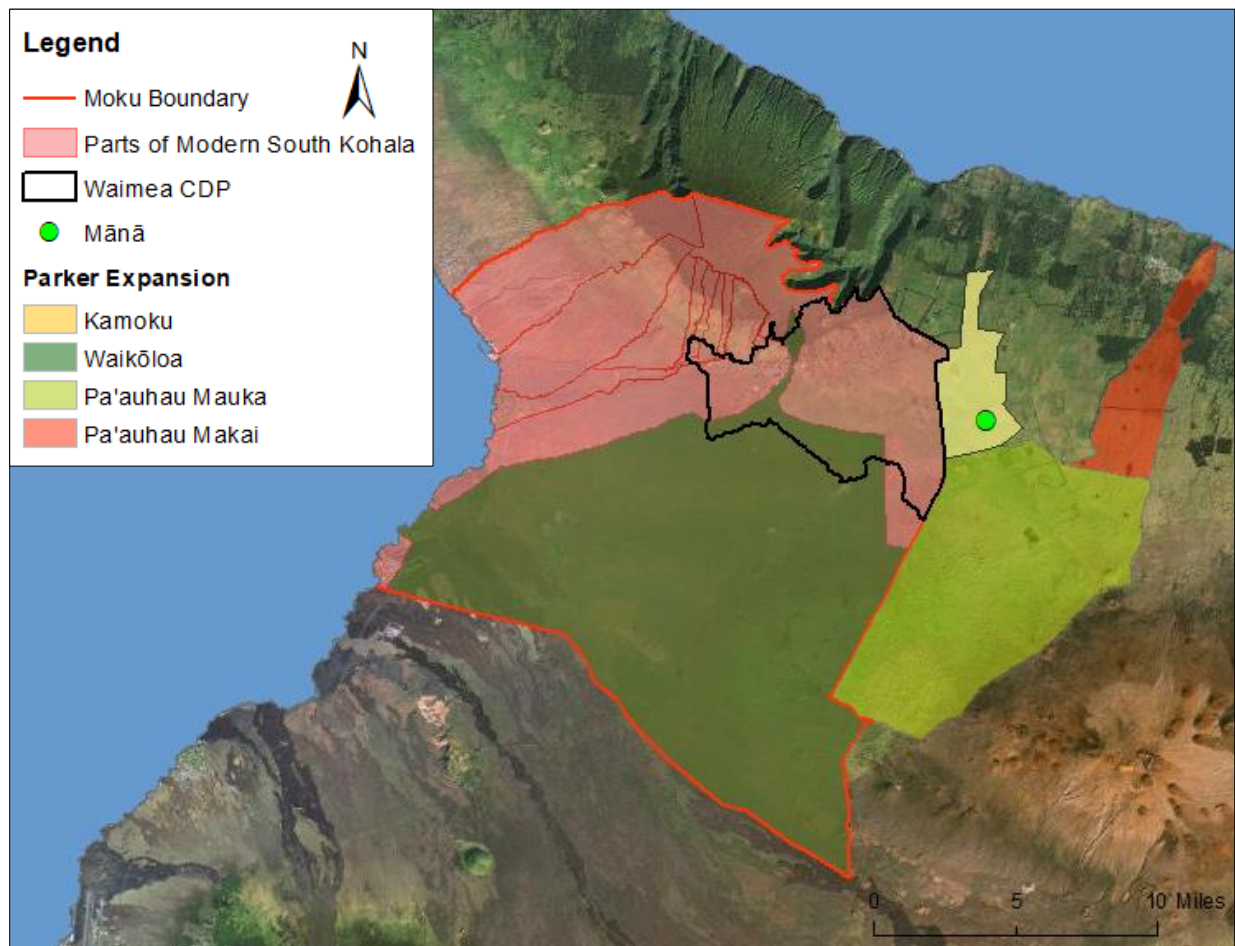


Figure 10. Initial settlement of Parker Ranch and expansion.

Table 8. Land acquisitions of John Palmer Parker I compiled from Bergin (2004:151-159).

Year	Acres Acquired	Associated Place Name	Path to Acquisition
1847	2	Mānā, in Kamoku	Hawaiian Land Commission – Land Grant
?	640	Land surrounding Mānā Hale	Purchase
1851	1000	?	Lease from Hawaiian Kingdom Department of Interior for 75 cents per acre
1852	?	Waikōloa	Originally leased by permission of Kamehameha III, then eventually purchased
1860	400	Pā‘auhau	Purchased from George Hardy
1861	150	Pā‘auhau	Purchased from Phillip Ryan
1861	37,888	Pā‘auhau Mauka	Government Grant No. 2769
1862	8,165	Pā‘auhau Makai	Controversially purchased from Charles R. Bishop
1866	100	Pā‘auhau	Purchased from Lewis Cockrill

Note, [?] Represents Data Gaps in Bergin’s accounts of John Palmer Parker I’s land acquisitions.

In 1879, approximately ten years after the death of John Parker I, his son John Palmer Parker II relocated his family from Mānā to a seven-acre parcel named Pu‘u‘ōpelu. Pu‘u‘ōpelu along with another land parcel named Lihue, were part of a strategic land acquisition made by John Parker II that placed Parker Ranch within the village of Waimea and provided the ranch access to “the well-watered foothills of the Kohala Mountains” (Bergin 2004:162). In 1895, Pu‘uhiale Corral was built near the lands of Pukalani not very far from Pu‘u‘ōpelu. This large working corral replaced the old Cowboy Gang base yard at Mānā. Of these two managerial movements Bergin (2004:194) comments, “As the Parkers moved to Pu‘u‘ōpelu and many of the working families followed, Waimea became the center of operations.”

Figure 12 plots the original Parker Ranch headquarters in relation to their new base of operations within the modern-day CDP. In addition to tracking the movement of Parker Ranch’s headquarters, Figure 12 also displays the current footprint of Waimea Town and its development distribution in proximity to Pu‘u‘ōpelu and Pu‘uhiale Corral as indicated by the concentration of Tax Map Key Parcels (TMKs) surrounding them. TMKs are property divisions used for value, and tax purpose assessments (Department of Taxation and Finance 2018) and in this case represents individual land plots. At best this figure represents a possible correlation rather than a causation of modern development springing up around Parker Ranch’s center of operations. Nonetheless, the government’s CDP outline effectively represents the town’s urban footprint that eventually sprung up around Parker Ranch. Richard Smart would be the last direct descendant of John Palmer Parker I to both own and manage Parker Ranch. Examining the social, political, and economic forces operating during his tenure will provide more context to the modernization of Waimea Town.

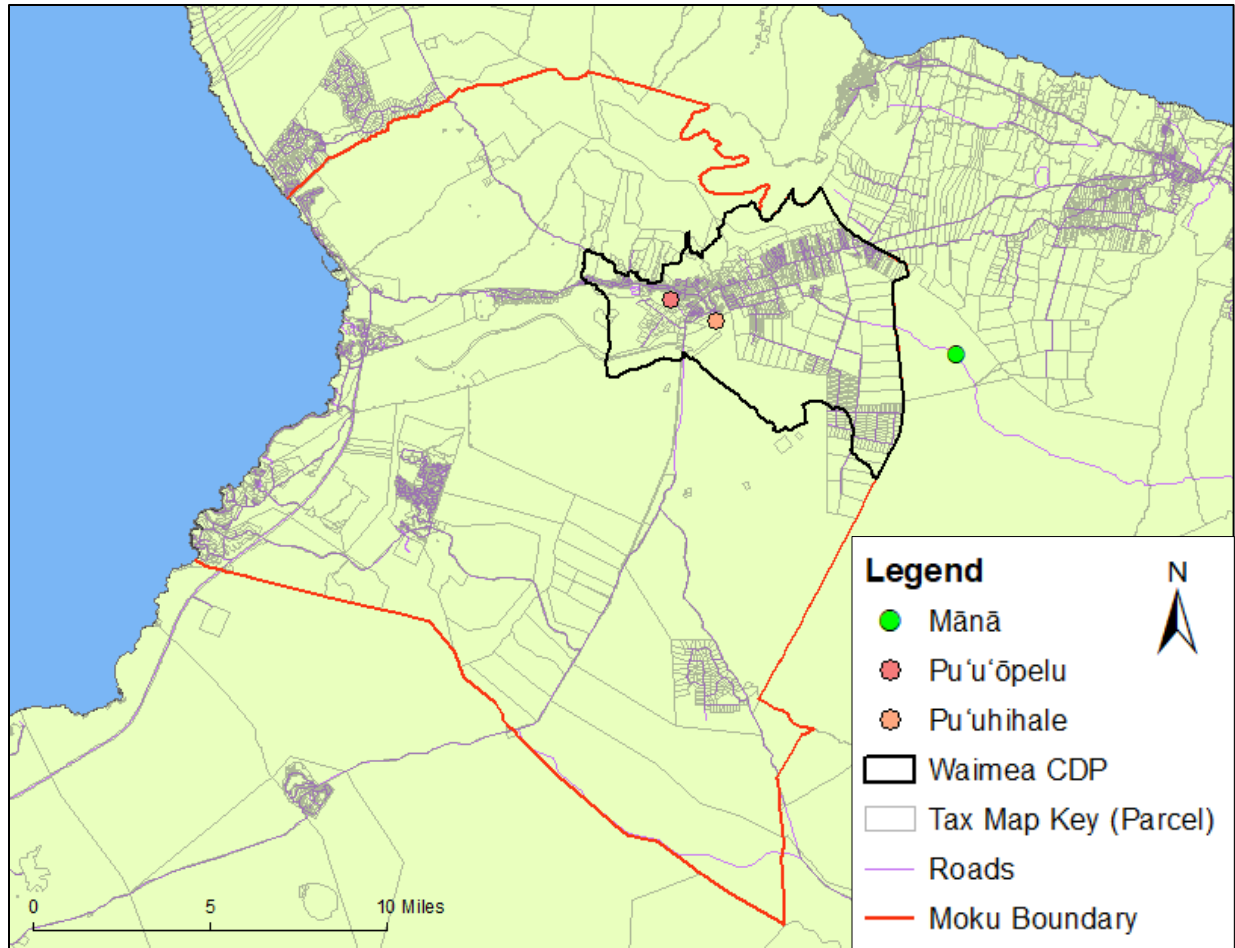


Figure 12. Parker Ranch operations consolidated in Pu'u'ōpelu and Pu'u'hiale by 1895

2.2 RICHARD SMART, MODERNIZATION, AND GROWTH:

Tracking the succession of Parker Ranch ownership and management from John Parker I to Richard Smart is complicated as the ranch had been mortgaged after Parker's death. Along with being mortgaged, management and ranch operations was subject to trusts that utilized a general manager position to oversee daily operations. This meant that after John Parker II and Samuel Parker (John Palmer Parker I's grandson), ranch ownership and management were not embodied in the same person until Richard Smart permanently moved to Pu'u'ōpelu, Waimea in 1959. *Loyal to the Land* by Dr. Billy Bergin is recommended reading for learning the finer

details of the Parker family, and Parker Ranch. The following section provides a brief review of ranch succession from John Palmer Parker I, to Richard Smart.

2.2.1. Parker Ranch Succession of Ownership and Management

Samuel Parker was John Parker I's grandson and co-owner/manager of Parker Ranch with John Parker II. Samuel Parker caused the ranch to go into mortgage due to extravagant spending and a failed sugar venture (Bergin 2004:159-162). While in mortgage with William G. Irwin and Company Ltd., trust representative Charles R. Bishop appointed existing ranch employee Paul Jarret as manager to oversee day to day operations. Bergin (2004) does not clarify if Paul Jarret continued as ranch manager, or if another person took that position when Godfrey Brown and P.C. Jones took over trusteeship. Elizabeth Dowsett, after the death of her husband John Palmer Parker III, appointed A.W. Carter as manager of their daughter's (Thelma Parker) inheritance and half-interests in Parker Ranch. Carter also served as trust manager for Thelma Parker's son, Richard Smart. After A.W. Carter retired, his son Hartwell Carter succeeded him as ranch manager. Hartwell Carter was relieved from the ranch manager position sometime after Richard Smart permanently moved to Waimea in 1959. Although Richard Smart relieved Hartwell of his duties, he continued to utilize the ranch manager position for day to day operations. Table 9 and 10 provides a timeline of events in Parker Ranch's history relating to succession of ranch ownership and management.

Parker Family Name Abbreviations for Tables 9 and 10

JP-I = John Palmer Parker I

JP-III = John Palmer Parker III

JP-II = John Palmer Parker II

ED = Elizabeth Dowsett

SP = Samuel Parker

TP = Thelma Parker

Table 9. Patriarchs of Parker Ranch prior to ranch being mortgaged.

Date	Owner	Relation to JP-I	Function	Management
1847	John Parker I		Founder	JP-I
1868	John Palmer Parker I Dies			
	John Parker II	Son of JP-I	Co-Owner with SP	Co-Manager with SP
	Samuel Parker	Grandson of JP-I	Co-Owner with JP-II	Co-Manager with JP-II
1888	Parker Ranch is Mortgaged			

Table 10. Succession of Parker Ranch ownership and management after mortgage.

Date	Co-Owner	Relation to JP-1	Mortgager	Trustee	Trust Manager
1888	JP-II	Son of JP-1	William G. Irwin and Company Ltd.	Charles R. Bishop	Paul Jarret
	SP	Grandson of JP-1			
1891	John Palmer Parker II Dies				Paul Jarret
	SP	Grandson of JP-1	?	Godfrey Brown and P.C. Jones	?
	JP-III ¹	Great Grandson of JP-1			
1894	John Palmer Parker III Dies				
	SP	Grandson of JP-1	?	Godfrey Brown and P.C. Jones	?
	TP ²	Daughter of JP-III and ED ³			
1899	A.W. Carter becomes manager of Thelma Parker's inherited half interest of Parker Ranch				A.W. Carter
1906	A.W. Carter facilitates the buying out of Sam Parker's half interest on behalf of Thelma Parker				A.W. Carter
1912	Thelma Kahilu'onāpua'api'ilani Parker Smart Trust is Created (Thelma Parker Trust)				A.W. Carter
1915	Richard Smart son of Thelma Parker inherits mothers Trust and Estate. Guardian: Grandmother Elizabeth Dowsett				A.W. Carter
1937	Richard Smart	Hartwell Carter son of A.W. Carter formally takes over management duties for Parker Ranch			Hartwell Carter
1959	Richard Smart	Richard Smart Returns home as owner and manager of Parker Ranch			Hartwell Carter

¹ John Palmer Parker III, was the son of Samuel Parker, but adopted and raised by his grand-uncle John Palmer Parker II. JP-III is the father of Thelma K Parker.

² Thelma Kahilu'onāpua'api'ilani Parker, daughter of JP-III and Elizabeth Dowsett. She with Henry Giillard Smart, birthed Richard Smart.

³ Elizabeth Dowsett was the mother of Thelma Parker and grandmother to Richard Smart. After Thelma's passing she became Richard's guardian.

2.2.2. Richard Smart

Richard Smart was born to Thelma Parker and Henry Smart on May 21, 1913. Sadly, by 1915, due to the untimely deaths of his sister and parents, Richard just two-years of age, was the sole living member of his immediate family, and heir to the Parker Ranch estate. In 1915 his grandmother and guardian Mrs. Fred Knight (formerly Elizabeth Dowsett – wife of John Parker III), took young Richard to live with her in California (Bergin 2004:267; Bergin 2011:49). Back at the ranch, A.W. Carter continued as trust manager.

While growing up in California, Richard’s grandmother helped to cultivate within him an appreciation for the arts and for entertainment, as she was a longstanding participant of the San Francisco Social Register (Bergin 2011:53). While Smart and his grandmother visited Waimea in the summers, his upbringing was predominantly on the continental United States. Located in a well-to-do town just south of San Francisco Bay, Smart attended Los Gatos High School, and later enrolled as a freshman at Stanford University in 1931 (Bergin 2011:53). In 1932, Smart leaving Stanford University, set a trajectory for his future career in performing arts when he enrolled into the Pasadena Playhouse. Beginning in 1933, Smart performed on stage (singing and acting) back and forth between the east and west coasts of the continental United States. During this time, Richard was married, had two children, and divorced before permanently settling down in Waimea in 1959.

For Waimea and Pae ‘Āina Hawai‘i (the Hawaiian Archipelago), 1959 was both a year of culmination and transition. In August, Hawai‘i entered formal statehood with the United States of America, while at the age of forty-six, Richard Smart assumed control of Parker Ranch. Between A.W. Carter and his son Hartwell, “the Carter dynasty firmly controlled the destiny of Parker Ranch” for six decades (Bergin 2011:128). The approaching decade would bring with it

an era of challenge and change for Parker Ranch and Waimea. However, this time around, a Parker (Richard Smart) would again be at the reigns of the Ranch and therefore most, if not all of Waimea Kālana.

2.3 DISCOURSE OF GROWTH AND CHANGE: PAKA PANIOLO

Paka Paniolo, December 1961 - December 1963

One of Richard Smart's innovations was *Paka Paniolo*, a monthly periodical he published with the help of his editor Lois Stewart. Of this periodical, Smart stated that the intention for its creation was to acquaint his employees "with my plans and feelings on Parker Ranch, its progress and development" (Smart 1961:1). The first edition of *Paka Paniolo* was launched in December of 1961. At this juncture in time, Parker Ranch had been based in Waimea for over sixty years and was the region's largest landowner. Therefore the "progress and development" that *Paka Paniolo* relayed to Ranch employees, is now an invaluable resource for examining change in Waimea during the early 1960s.

The following section examines change in Waimea as related to shifts in sense of place by examining two years of *Paka Paniolo*. Topics of change include: modernization, politics, population growth and land-use. As an example of modernization, in the very first edition of *Paka Paniolo*, a quote from an article reports that, "The hitching post –by the way– has become a rare item in these days of mechanization" (*Paka Paniolo* 1961:1). Although short, this statement has a lot to say about a social and practical change occurring in Waimea in 1961. The inference is that mechanization is becoming a normalized mode of transportation, while hitching posts, analogous of parking spaces for horses, is becoming a rarity. In this case, the shift in sense of place is related to vehicles phasing out horseback transportation. This sentiment is confirmed as issues of traffic, child safety near roads, and county road planning is reported in *Paka Paniolo*

on multiple occasions (Smart 1962b:1; Smart 1962d:1). Sarcastically, in 1963 *Paka Paniolo* reported what appears to be the town's first observed traffic jam, saying, "The little village is becoming much too big for its britches. There was even a traffic jam the other day, two trucks and three cars at the main intersection!" (Paka Paniolo 1963a:2).

2.3.1. Socio-Political and Economic Influences: 1957 – 1963

Historically, Parker Ranch leadership was not unfamiliar with influential governmental figures. John Parker I was an appointed cattle hunter of Kamehameha I, and his grandson Samuel Parker was a friend to King Kalakaua (Bergin 2004:162). In this era, Richard Smart is acquaintances with William F. Quinn and endorses him for governor in Hawai'i's second election (1962) since statehood (Borreca 2006; Smart 1962e:1). Prior to statehood, in 1957, Quinn was appointed by President Dwight D. Eisenhower as Hawai'i's "Territorial" governor and served on the "statehood commission" (Borreca 2006). This was Quinn's attempt for re-election as he won the 1959 election when Hawai'i became the 50th State of America. In his September 1962 endorsement, Smart did not force his employees to vote for Quinn but briefly provided four points for why he supported Quinn's re-election; Smart's support was based on Quinn's positions on agriculture, land-use, education, and tourism (Smart 1962e:1).

2.3.2. Land Use and Politics: Tourism comes to the South Kohala Coastline

As related to land-use, tourism, and politics, Smart acknowledged Quinn's role in introducing Laurence Rockefeller to the beach of Kaunaoa, where he eventually built the first resort of the South Kohala coastline.

It was Governor Quinn's invitation that brought Mr. Laurance Rockefeller to our Island and particularly to Kaunaoa Bay. Since Mr. Rockefeller's decision to develop this coastal area...

Governor Quinn has given his utmost cooperation to this project. Governor Quinn's courageous leadership in promoting welfare and growth for the people of Waimea is unquestionable. Therefore, I sincerely feel that he is a true friend of Parker Ranch and our Ranch families.

(Smart 1962e:1)

Although Quinn lost the election, Rockefeller eventually began construction of Mauna Kea Beach Resort at Kaunaoa Bay in 1963 (Paka Paniolo 1963b:2-3). Borreca (2006) provides insight into Quinn's possible motivation for introducing Rockefeller to Kaunaoa saying that, "Quinn's governorship was remarkably visionary, as he urged land-use planning, called for a planning commission, and decried the overbuilding of Waikiki." It should be noted that according to David Callies, a professor of economics at the University of Hawai'i Mānoa, the State of Hawai'i's Land Use Commission and "early land use laws were meant to serve the big 5" (Hollier 2013), a powerful "private landholding oligarchy" (Callies 2010:4) that economically rose after the overthrow of the Hawaiian Kingdom. Contrary to Quinn's intent, Waikiki was eventually overbuilt; however, with the building of the Mauna Kea Beach Resort, Governor Quinn, Richard Smart, and Laurence Rockefeller established a trend for tourism development on the South Kohala coastline. The result is that currently most of its shore is occupied or zoned for resort or golf course development, with urban expansion designated a little further inland. Figure 13 represents this trend with the County of Hawai'i's LUPAG GIS layer (Hawai'i County General Plan 2005).

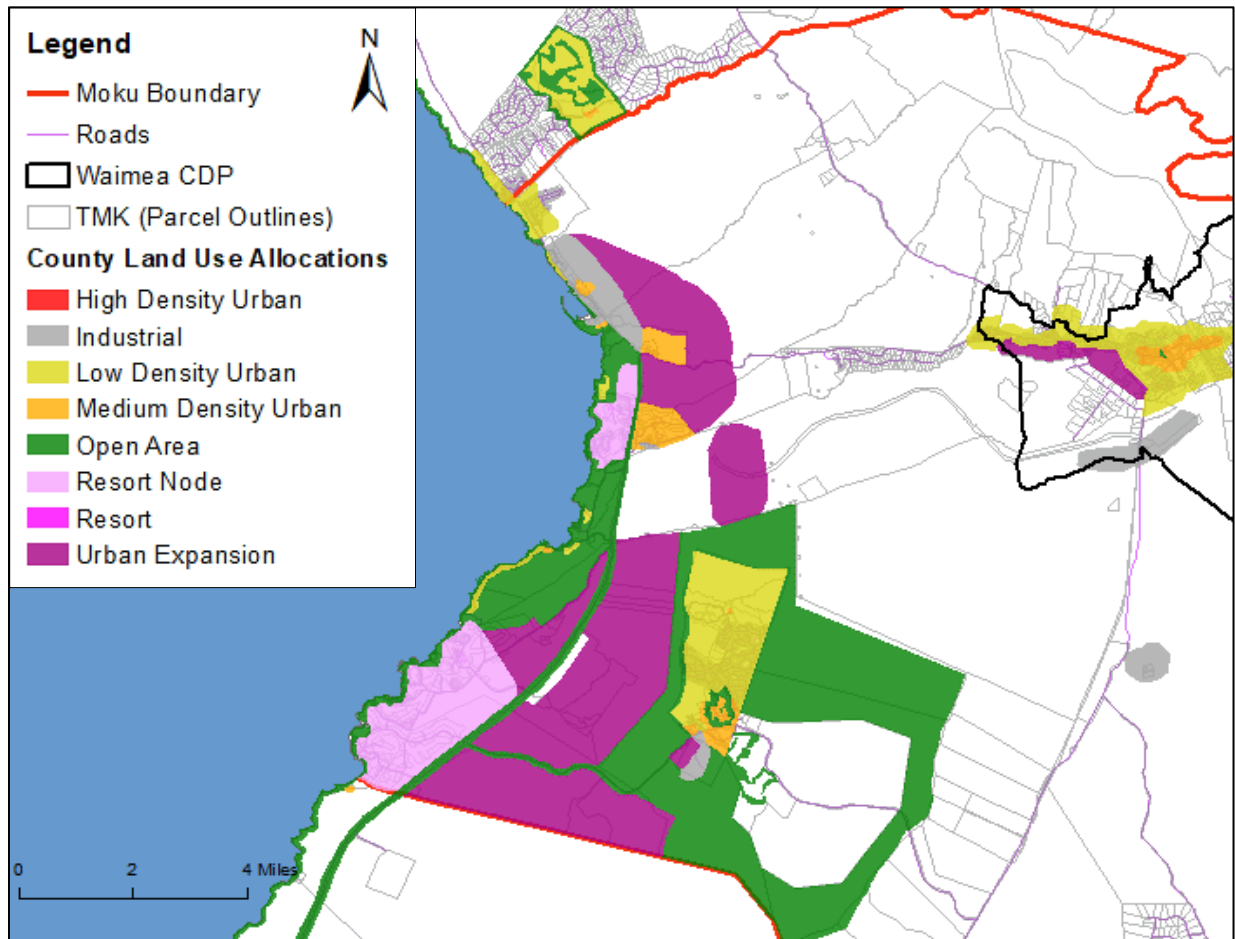


Figure 13. Land-use designations for the South Kohala coastline.

2.3.3. Local Drought and Economic Diversification

Coinciding with modernization and politics, the onset of the 1960s brought with it a severe drought that negatively affected Parker Ranch's cattle production. *Paka Paniolo* reports to ranch employees in October of 1962 that "cattle again went to market light" (Smart 1962f:1). The following month, ranch management decided to cancel their shipping of 250 head of cattle for the same reason (Paka Paniolo 1962f:1). In January of 1963 the persistence of the drought and its financial impact, influenced Smart to sell more prime coastal properties adjacent to the Mauna Kea Beach Resort development. Eighteen acres were sold to Mrs. William P. Roth of San Francisco and thirty-five more acres were sold to Laurence Rockefeller, expanding the latter's

development potential from Kaunaoa Bay, to Hapuna Bay (Smart 1963a:1). In his segment “Aloha Aina”, Smart shares his predicament with ranch employees saying, “there is no alternative at this time”, and that,

There are two important factors which have led me to this decision. First of all, the last two years have taken a heavy financial toll due to drought conditions. The second reason results from pressures stressing “the best use of land”. I am in complete accord with the policy that land should always be used to its full productivity.

(Smart 1963a:1)

Historically, Parker Ranch and ranch leadership were not unfamiliar with the hardships of drought as both John Parker I and II, along with their successive ranch managers, had to cope with precipitation scarcity. For example, John Parker II expanded land holdings in the midst of the 1877 drought (Bergin 2004:161-162). While his predecessors expanded ranch land holdings—even through times of drought—the way in which Smart coped with this challenge was markedly different in that Smart and his manager Richard Pennhallow chose to diversify Parker Ranch’s economic portfolio by allocating lands for lease or outright sale. Of this strategy Pennhallow writes to ranch employees saying,

Obviously, larger use of the property is the only solution. Before considering results let’s look for a minute at what opportunities for larger use are available. Here they are:

1. Offering Recreational, Resort and Residential land for development
2. Leasing facilities for business development
3. Developing services which a ranch can supply to 1 and 2.
4. Producing more beef
5. Increasing the efficiency of factors serving 4

(Pennhallow 1962:1)

This strategy to diversify also coincided with a number of modernizing “firsts” for the town of Waimea. The opening of Waimea’s first “beauty shop” and the first “dentist’s office”

were announced in February of 1962 (Smart 1962a:1). In 1962 Waimea got its first travel agency named Tiki Travel (Paka Paniolo 1962e:4). The opening of Waimea's "first laundromat and self-dry-cleaning plant" was announced in August of 1963 (Paka Paniolo 1962c:4). With the opening of First National Bank, Waimea residents, for the first time, had a choice between two banking institutions (Smart 1963b:1). And in December of 1963, Smart for the first-time limited invitations to Parker Ranch's annual Christmas party to ranch families only, explaining that "the community has become too large to have all the children at Puuopelu" (Smart 1963e:1).

2.3.4. Growth: Discourse and a Shift in Community Composition

These "firsts" were symptomatic of the "progress and development" that Smart spoke of in his first issue of "Aloha Aina" just two years earlier. Aside from reporting the novelty of new services coming to Waimea, the discourse of Paka Paniolo subtlety reflects a shift in the composition of the Waimea community. When considering Parker Ranch's annual Christmas party in 1963, Smart for the first time had to make a distinction between ranch families and non-ranch families. Smart in another statement notes that the portion of the town's population not employed by the ranch was out pacing the number of families employed by the ranch (Smart 1963c:1). The shift indicated by these statements is that there was a growing demographic within the Waimea community that were not connected to the landscape through ranching. These shifts in connection/ association to place, is a temporal example of how, as a whole, a community's perception of significance may change over time. Table 11 compiles excerpts from *Paka Paniolo* (most are specifically from Smart) that provide a glimpse into the discourse of growth occurring in Waimea in the early 1960s. This section concludes with an excerpt from *Paka Paniolo* telling of how residents of Oahu were becoming interested in Waimea real estate, and the mixed response of Waimea community members towards growth.

Table 11. Paka Paniolo Discourse of Growth in the early 1960s.

Reference	Growth Context	Quotes
Smart 1962a:1	Commercial	Little by little our town is growing and we will grow with it.
Smart 1962c:1	General Community Growth	<p>Little by little the village of Kamuela and the district of Waimea are expanding.</p> <p>There will be growing pains, but I think we are eager for the change and will profit by the vigor emanating from our community.</p>
Smart 1962d:1	Traffic	Increase in traffic in our village is noticeable. And it will double and triple because we are involved in a growing community.
Smart 1962e:1	Politics and Economics	Hawaii's Governor William F. Quinn has long been a true friend of Parker Ranch. His achievement in fostering the economic growth of our area is well known.
Paka Paniolo 1962e-2:4	Pace of growth	fastest growing town in Hawaii
Smart 1962g:1	Growth of town in relation to Hawai'i Island	<p>This has been a year of great change on Parker Ranch.</p> <p>And we are a part of the only growing community on the Big Island.</p>
Smart 1963c:1	General population growth in relation to employee population	<p>We all know our community is growing and will continue to grow.</p> <p>Each year as the population of Waimea increases, the Ranch population decreases in ratio to the whole.</p>
Smart 1963d:1	Increased water demands in relation to Hawai'i's overall economy growth	Water is the life blood of Parker Ranch. With Parker Ranch embarked on a production-growth program to keep pace with Hawaii's expanding economy, we are more than aware that an increase in our herds automatically means an increase in our water supply.

From our Honolulu friends we learn that it's "smart" to have a home in Waimea. From the scads of Oahuans [people from Oahu Island] looking over property in these parts, it appears that we'll soon lose the village status and emerge into the small town category.

There are many who bewail the inroads of progress. The charm of old Waimea is being threatened, they say. It's about time to organize the Kamuela Marching Society to Perpetuate the Flavor of Old Waimea. No dues, no officers, no meetings. Every man for himself!

(Paka Paniolo 1963c:8)

The above excerpt from *Paka Paniolo* notes two facets of growth occurring in Waimea at that point in time, 1) real estate opportunities in Waimea are being recognized by people from Oahu, and 2) some residents are concerned that the sense and spirit of Waimea (charm of Waimea) is being "threatened". The unnamed author of this excerpt curiously concludes by suggesting that perpetuation of place need not be organized but is instead a cause that should be approached as "Every man for himself".

Although this author's response to change is ambiguous, what is clear is that Waimea in the early 1960s started to show signs of modernization that were distinct from its previous history. Statehood, politics, and tourism hit the shores of Waimea Kālana at this time. Coinciding with mechanization and modern convenience services, expanded land-use in the form of sale or commercial lease became an accepted strategy for economic viability in this era. Most importantly is that these changes were coinciding with population growth and outsider real estate interest. In examining Smart's own writing in *Paka Paniolo*, there is no doubt that he loved the land (Aloha Aina) and the people of Waimea. With that being said, the negotiations of change applied in his era set a trajectory for Waimea's landscape that would shape future land-use, sense and perception of place for the future residents of the region.

2.4 POPULATION GROWTH AND LANDSCAPE PERCEPTION

United States Census data reports that the population of Waimea Town was 414 in 1940; the population decreased to 341 in 1950 (U.S. Census Bureau 1960). In 1960, shortly after Richard Smart assumed control of Parker Ranch, and Hawai‘i became a state; the population of Waimea Town rose to 657 (U.S. Census Bureau 1960). In 1970, a little less than a decade after Parker Ranch diversified their economic portfolio by increasing land-use for lease, resort, and residential development, Waimea’s population bumped up just a bit to 756 (U.S. Census Bureau 1990). At this point in history, Parker Ranch operations had been centralized in Waimea Town for seventy-five years. By reflecting on the discourse of change reviewed in *Paka Paniolo* we know that in the previous two decades (1950s and 60s) Waimea experienced social, political, and economic shifts that coincided with statehood. At the Federal level, Hawai‘i as a “territory” received its first and only U.S. House of Representative seat in the 1950s. In 1960, Hawai‘i gained another House of Representative seat for a total of two (Burnett 2011:2). With Hawai‘i’s induction into the U.S. Government so came with it their methods of allocating congressional representation based on demographics.

2.4.1. CDP and Apportionment

The Federal government uses a process called “apportionment” to divide the 435 U.S. House of Representatives’ seats among the fifty States. Congress bases the apportionment on the decennial census data of each State (Burnett 2011:1). The U.S. Census has two types of “place” designations that are geographically defined, “Incorporated Places”, and “Census Designated Places”. These boundaries do not serve as territorialities, instead, “CDPs are delineated to provide census data for concentrations of population, housing, and commercial structures that are

identifiable by name but are not within an incorporated place” (U.S. Census 2000a: A-17). Because CDP boundaries are based on the footprint of population, housing, and commercial activity, “CDP boundaries may change from one decennial census to the next with changes in the settlement pattern” (U.S. Census 2000a: A-17). Such a boundary shift occurred for Waimea Town between 1980 and 1990. In 1980 Waimea’s population jumped from 765 to 1,179; in 1990, population numbers made a significant leap to 5,972 (U.S. Census 1990). Per the 2008 South Kohala Development Plan, this population boom is partially reflective of Waimea’s CDP being expanded beyond the “town center” to include areas further south (near Waimea Airport), and east to west from Mud Lane to Mahua St. (County of Hawai‘i and Townscape Inc. 2008:55). Figure 14 shows the current Waimea CDP in relation to Pu‘u‘ōpelu and Pu‘uhiale where the town’s main intersection and commercial hub historically developed. In 2000 and 2010, Waimea’s population again spurted to 7,028 and 9,212.

To re-cap, by 1906 Parker Ranch was able to unite most of the lands of South Kohala under its management. Historically centered around Parker Ranch’s operations, between 1940 and 1990 Waimea village evolved into its current CDP. Coinciding with modernization and economic diversification, Waimea experienced consistent population growth for the last fifty years making it possible for residents that settled in Waimea in different decades to have varying perceptions of place. In addition to Waimea’s geo-cultural landscape being perceptively fragmented between residents, and the government having its own geo-socio-political and economic methods of defining boundaries, Historic Preservation Law and practice known as Cultural Resource Management (CRM) performed at the spatial level of TMK parcels is another layer of landscape segmentation.

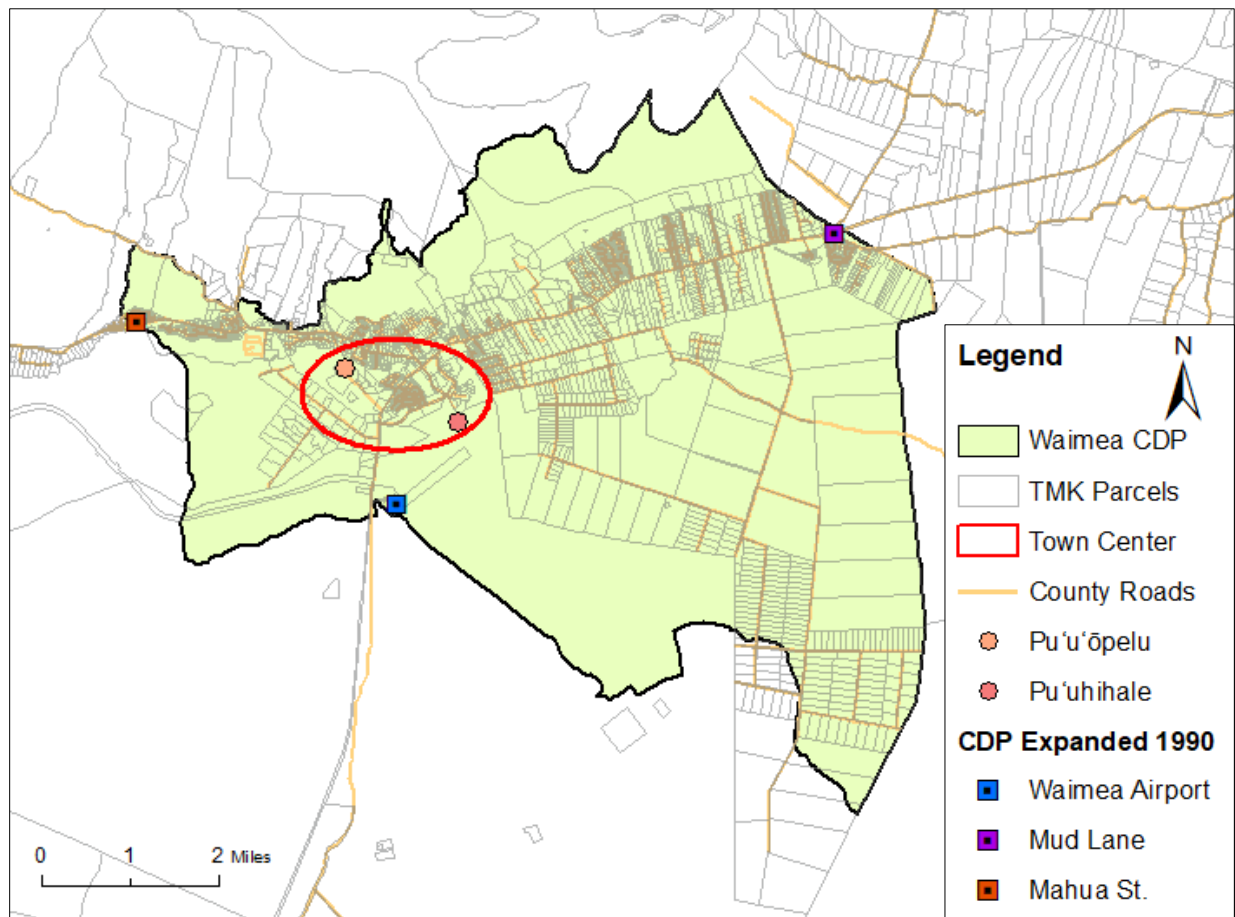


Figure 14. Current Waimea CDP in relation to Pu'u'ōpelu and Pu'uhihale.

2.4.2. TMKs and Piecemeal Historic Preservation

A tax map is a special purpose map, accurately drawn to scale showing all the real property parcels within a city, town or village. These maps are used to locate parcels and obtain other information required in assessment work. As changes take place in ownership, size, or shape of the parcels, the tax map system must be updated.

(Department of Taxation and Finance 2018)

In addition to the CDP outline, Figure 14 also includes Hawai'i County's Tax Map Key parcels (TMKs). TMKs are practical for a variety of governmental and real-estate purposes. For home and landowners, there is something reassuring about being able to know and communicate the extent of one's legal and spatial ownership. However, when considering cultural landscape

significance, TMKs may be viewed as another layer of landscape segmentation since these parcels are the geographic standard by which archaeological contractors in Hawai‘i perform their historic preservation studies. Exceptions to this norm do exist when landowners or developers pay contractors for cultural studies not limited to parcels such as ethnohistoric reports and cultural impact assessments.

At the Federal level, Section 106 of the National Historic Preservation Act (NHPA 1966) regulates historic preservation measures for Federal agencies engaged in development, as well as for developments that use Federal monies. State historic preservation laws are based on Section 106 regulations. Title 36 in the Code of Federal Regulations (36 CFR 800) inform State level scoping.

§ 800.4 Identification of historic properties. (a) *Determine scope of identification efforts.* In consultation with the SHPO/THPO, the agency official shall: (1) Determine and document the area of potential effects, as defined in §800.16(d);

§ 800.16(d) *Area of potential effects* means the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist. The area of potential effects is influenced by the scale and nature of an undertaking and may be different for different kinds of effects caused by the undertaking.

At the state level, Hawai‘i Administrative Rules (HAR) governing historic preservation studies, scope Archaeological Inventory Studies (AIS) according to a development’s “project area” represented by its TMK (HAR 13-276-2) [HAR 13-276-5(1)(b)]. However, AIS studies must also consider if a project has the potential to impact areas outside of the immediate TMK of a proposed development (HAR 13-276-2). AISs are required by law to perform background research to help predict distribution of resources and to provide context for resources inventoried [HAR 13-276-5(b)].

While State and Federal regulations provide considerations for background research that may extend beyond TMK parcels, more often than not, the motivation for performing an AIS is development compliance – initiated and paid for by developers. In addition to being initiated by development, the primary stakeholder in the process is a State agency rather than the community connected to possible resources inventoried. The historic preservation review process concerning development compliance says,

The primary participants in the process are DLNR [Department of Land and Natural Resources], represented by the SHPD [State Historic Preservation Department], and the agency with jurisdiction over the project. The agency has responsibility for complying with the historic preservation process. The agency may have others prepare the review process items.

Interested persons are those organizations and individuals that are concerned with the effect of a project on historic properties. Provisions in these rules enable interested persons to participate in the process.

[HAR 13-275-1(c)(1)(2)]

In such a process, if a community member or organization were to oppose a development, it is usually in reaction to a development already underway, and in opposition they could only participate as an interested person as opposed to a primary participant. AISs also do not address land zonation, meaning that if an AIS is being performed, it is mostly likely being performed in a location that has already been zoned, or re-zoned, for the type of development proposed. Furthermore, by piecemealing historic preservation compliance at the pace of development, it is likely that the collective impact of successive developments over time may lessen the significance of a landscapes broader geo-cultural context. Under such a process, it is possible for the sense and spirit of a landscape to be transformed one TMK at a time.

2.4.3. Perception of Place After 1960 and Summary

From Vancouver's landscape description of Waimea, up until the present-day land divisions of CDP and TMKs, this section historically and spatially reviewed shifts in demography, politics, economics, and environment (drought) that affected Parker Ranch's land-use strategy. Most pertinent to discussing temporal perception of place is how Waimea's population has consistently increased after 1960 coinciding with post statehood and Parker Ranch diversifying its economic portfolio (Table 12).

Table 12. Historic population growth of Waimea Town.

Year	Population	
1940	414	
1950	341	
1960	657	<ul style="list-style-type: none">• Statehood 1959• Apportionment (CDP)• Drought• Coastal Sale of Lands• Tourism Development
1970	756	
1980	1,179	
1990	5,972	
2000	7,028	
2010	9,212	

This scenario not only makes it possible for Waimea's current population to have multi-temporal perceptions of place; it is also conducive to Waimea's community likely being dis-associated with its deeper temporal cultural landscape significance. Given Waimea's historical spatial land-use background, the following chapter models an approach to resource management that is proactive and community inclusive.

CHAPTER 3. GEO-CULTURAL BASELINE LAYERS

Data most generally used to delineate cultural landscapes include archaeological and historical data, oral history transcriptions, and archival materials such as maps, photographs, journals, and socioeconomic data. Geographic information systems (GIS) data are put to effective use in reconstructing landscapes and viewsheds (e.g., Contreras 2009; Bongers, Arkush and Harrower 2012). Overlays of historic maps and photographs are shown to be helpful in determining population and cultural landscape drift (e.g., Darling, Ravesloot and Waters 2004), as well as indicating the location of landscapes such as Indian reservations. The need for clearly defined and confined time periods of study is emphasized repeatedly in cultural landscape literature (e.g., Etter, McAlpine and Possingham 2008), although it is recognized that to fully tell the story of the evolution of a landscape, it is possible that many time periods may need representation.

(Sullivan et al. 2013:5-6)

To bridge multi-temporal perceptions of place, this chapter models a geo-cultural baseline that spatially and temporally re-presents Waimea Kālana and its land divisions in relation to resource distribution and traditional management perspectives regarding access to resources and land-use. The implicit value in this re-presentation is how its analysis renews perceptions of the reciprocal interactions between man and nature that co-created the boundaries, and therefore the geo-cultural definers of this cultural landscape. However, this geo-cultural baseline does not claim to re-present all the cultural significance of Waimea Kālana. For example, traditional spirituality related to Waimea's sacred and storied (mo'ōlelo) landscape is not explicitly discussed. The inclusion or non-inclusion of various layers of cultural landscape significance is not based on a hierarchical negotiation of significance. Rather the non-inclusion of traditional spirituality was based on time constraints and my lack of confidence to speak on such matters. Furthermore, the layers in this baseline were chosen for their ability to bridge

perspectives of past and present resource management concerning current land-use and planning issues.

This geo-cultural baseline is composed of four GIS landscape layers that are broad across the region, and one place specific layer (traditional agricultural). These layers also represent a temporal period spanning from 1792 (McEldowney's Vegetation Reconstruction) to 1865 (latest year of Boundary Commission testimony used in this project). Counting the traditional boundaries of Waimea Kālana as the first geo-cultural layer, the other layers include, fabric and viewshed; environmental reconstruction and land-use; 'ili/ ahupua'a configuration relating to watersheds and aquifers; and a place specific case study on traditional agriculture. The inclusion of both broad and place specific forms of landscape heritage is meant to demonstrate the scalability of a GIS Heritage Landscape approach. These layers and the data they contain constitutes the "Inventory" portion of this HLRIM. The term mauka-makai is also introduced in this chapter which is used in general modern vernacular to refer to connections between inland regions and the coast or ocean. Literally, "mauka" means inland, and "makai" means ocean (Ulukau 2003).

Of this type of landscape data collection Mitchell et al. (2009:49) says, "This documentation (where culturally appropriate) creates a permanent record to use for management decisions and establishes a baseline for future reference". Thus, the importance of a geo-cultural baseline within this HLRIM is that its layers provide temporal-spatial references of significance by which current land-use allocations may be compared; these same references may also be utilized to raise a community's collective heritage landscape awareness. The significance and value of these layers will be analyzed in Chapter 4.

3.1 HERITAGE LANDSCAPE MAPPING METHODS

Increasingly, communities are conducting their own identification and assessment projects, collecting cultural information and oral history as part of programs oriented toward management of natural resources, and recording places and landscapes in ways that make cultural sense to them, rather than using the frameworks established by government agencies.

Another example has involved the mapping of a large area in southwest Victoria in a partnership among the Traditional Owners, consultants, and public land managers, which has produced landscape and story-based cultural maps that recognize multiple narratives over different times, as well as an array of tangible and intangible elements. Cultural-mapping programs in many parts of the world have been developed by Indigenous people for their own uses, taking advantage of technologies such as GPS and GIS to integrate natural and cultural values and the tangible and intangible in their own heritage work.

(Buckley and Sullivan 2014:38)

ArcMap 10.3 from Environmental Systems Research Institute (Esri) is the Geographic Information Systems (GIS) software used in this project for all map making. Various layers of data from different sources were compiled on this program to create maps specific to its category of cultural-historic and spatial significance. The primary earth imagery (similar to Google Earth satellite imagery) and geo-spatial tools used to layer historic and contemporary data are copyrighted by (Esri 2015) and their affiliates. Some GIS generated maps were converted to KMZ (Keyhole Markup Language Zipped) files for aspect (view) analysis on Google Earth.

3.1.1. GIS, GPS, and Shapefile Resources

State, County, and Census GIS data compiled in this project are sourced from two open-sourced GIS databases; these databases are the (Hawai‘i State Office of Planning 2017) and the (Hawai‘i Statewide GIS Program 2017). Additional GIS data include point shapefiles from Geographic Positioning Systems (GPS) field work, as well as original shapefiles created by tracing and drawing polygons. Table 12 and 13 lists the layers sourced from Hawai‘i State Office

of Planning and the Hawai‘i Statewide GIS Program; these tables also list the name of layers derived from the original layer. Table 14 lists original line, polygon, and point shapefiles produced from analysis of various GIS layers sourced from the two aforementioned databases, as well as shapefiles created by tracing features found on georeferenced maps.

Table 13. Hawai‘i State Office of Planning source layers and layers derived from them.

State GIS Layer Name	Link to Metadata and Citation	Derivative Layers
Ahupua‘a	http://files.hawaii.gov/dbedt/op/gis/data/ahupuaa.pdf (OHA 2009)	<ul style="list-style-type: none"> – South Kohala Ahupua‘a – South Kohala District – Moku Boundary – Kamoku – ‘Ili/ Ahupua‘a Bounds
Aquifers (DOH)	http://files.hawaii.gov/dbedt/op/gis/data/aquifers_doh.pdf (Department of Health 2011)	<ul style="list-style-type: none"> – Aquifer Sectors/ Systems
Census Designated Place	http://files.hawaii.gov/dbedt/op/gis/data/cdplc10.pdf (U.S. Census Bureau 2011)	<ul style="list-style-type: none"> – Waimea CDP
Coastline	http://files.hawaii.gov/dbedt/op/gis/data/coast_n83.txt (USGS 1983)	<ul style="list-style-type: none"> – Coastline
Hillshade	http://files.hawaii.gov/dbedt/op/gis/data/hillshades.tif.txt (Hawai‘i State Office of Planning 2003)	<ul style="list-style-type: none"> – Waimea Plain Plateau
Geo-Names	http://files.hawaii.gov/dbedt/op/gis/data/geonames.pdf (United States Board on Geographic Names 2018)	<ul style="list-style-type: none"> – Pu‘u (Hills/ Summits)
Oceans	http://files.hawaii.gov/dbedt/op/gis/data/ocean_mask.pdf (Hawai‘i State Office of Planning 2016)	<ul style="list-style-type: none"> – Ocean
Streams	http://files.hawaii.gov/dbedt/op/gis/data/darstreams.pdf (Department of Land and Natural Resources 2013)	<ul style="list-style-type: none"> – Ravines and Drainages – Surface Drainages

Table 14. Hawai‘i Statewide GIS Program sourced layers and extracted layers.

County Layer Name	Extracted Layer	Link to Metadata and Citation
COH Centerline	-Major Roads -County Roads -Roads	http://files.hawaii.gov/dbedt/op/gis/data/centerlines_haw.pdf (State of Hawai‘i Office of Elections 2012)
Land Use Pattern Allocation Guide	County Zoning/ Land Use Guidelines	http://files.hawaii.gov/dbedt/op/gis/data/hawctylupag.pdf (Hawai‘i County General Plan 2005)
Parcels	TMK Parcels	http://files.hawaii.gov/dbedt/op/gis/data/niparcels.pdf (County of Hawai‘i 2017)

Table 15. Original shape files.

Shapefile Name	Shape Type	ArcGIS Tool	Data Source
Akona ‘Auwai	Point	Editor	Field GPS (Garmin)
Commercial Residential Area	Polygon	Editor, Georeferencing	Multi-layer map analysis
Field Complexes	Polygon	Editor, Georeferencing	Multi-layer map analysis
Historic Vegetation	Polygon	Editor, Georeferencing	Multi-layer map analysis
HPA Terrace	Point	Editor	Field GPS (Garmin)
Mānā Hale	Point	Editor	Field GPS (Garmin)
Plain - Plateau	Point	Editor	Polygon Analysis
Pu‘uhihale	Point	Editor	Field GPS (Garmin)
Pu‘u‘ōpelu	Point	Editor	Field GPS (Garmin)
View Points	Multi-Point	Editor	Multi-layer map analysis
Waimea Plateau	Polygon	Editor	Hillshade (D.E.M.) Analysis

3.1.2. Georeferencing Maps – Method

In this HLRIM eight maps (Table 16) are overlaid onto the current Waimea landscape using ArcMap’s Georeferencing Tool. Four of these maps are products of an Archaeological Investigation and Survey (AIS) by Clark and Kirch (1983) done for a road corridor extending through Waimea from the coast at Kawaihae, to Mud Lane Road at the eastern edge of the South Kohala boundary. Of the four maps from Clark and Kirch, three are of archaeological resources; the other map is an estimated environmental reconstruction study produced by Holly McEldowney. The other four overlays are historical maps from the early twentieth century used for their documentation of cultural landscape features such as irrigation ditches and trails.

Using the Georeferencing Tool

After converting these maps to Tiff. files, the next task of georeferencing was to correlate four control points (done individually for each map) onto the current landscape; the current landscape is provided by Esri Earth Imagery (Esri 2015) – part of ArcMap software. For the three archaeological maps (Four Field Complexes, Kuhio Village Corridor, Rodeo/Airport) and Wall’s 1914 map, finding initial control points were relatively easy as the road alignments on these maps correspond to current Hawai‘i County “Major Road” alignments (State of Hawai‘i Office of Elections 2012). McEldowney’s historic vegetation map and the four historical maps covers a broader area, thus points along the South Kohala boundary in the east and west were used for initial control points. With these initial control points correlated, ArcMap produced an initial projection of these maps onto the current landscape by which accuracy could be assessed. From this assessment it could be determined if adding additional control points distributed more broadly across the map was needed to deal with collinear or warping issues.

Below is an example of correlating control points with an initial projection point of Wall's 1915 map. Figure 15 depicts a wall segment with an enclosure located near the western limit of Waimea's traditional irrigation system. This wall segment and enclosure are still visible on the current landscape (Esri's Earth Imagery) shown below in Figure 16. This point along with three others were correlated and then projected. By analyzing the initial projection, the top (north) corner of the enclosure proved a match (Figure 17), with other portions of the wall slightly miss aligned. This process of selecting initial control points and then selecting matching features distributed further out was repeated with each map as required to achieve overall accuracy.

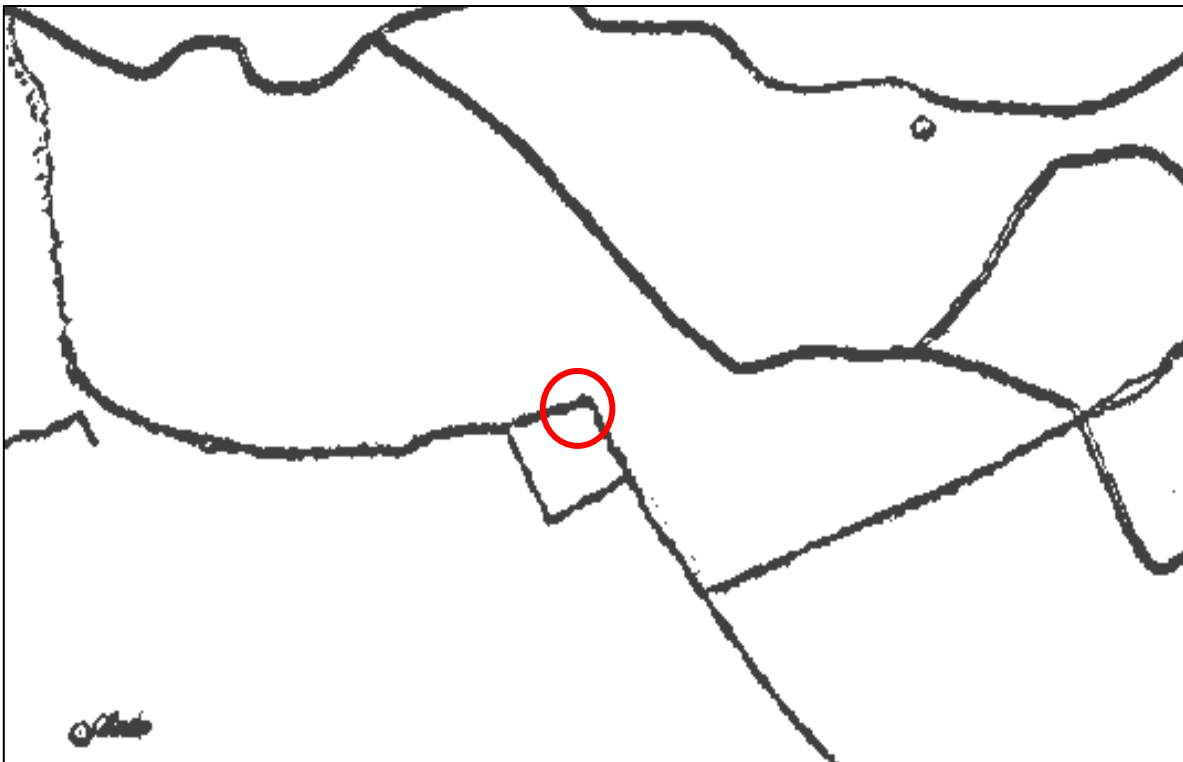


Figure 15. Segment of wall and enclosure on Wall's 1915 map.



Figure 16. Current landscape corresponding to Wall's 1915 map.



Figure 17. Projection of Wall's 1915 map onto current landscape.

Table 16. List of Georeferenced Maps.

Map Name	Type of Map	Source of Map/ Citation	Category and Spatial Landscape Significance	Method of Conversion
Four Field Complexes	Archaeological	(Clark and Kirch 1983:244)	Traditional Agriculture near Waimea Town	Scanned from report to Tiff. file converted to overlay
Rodeo-Airport	Archaeological	(Clark and Kirch 1983:247)	Traditional Agriculture in Waimea Town	Scanned from report to Tiff. file converted to overlay Field
Kuhio Village Corridor	Archaeological	(Clark and Kirch 1983:243)	Traditional Agriculture in Waimea Town	Scanned from report to Tiff. file converted to overlay
Patterns of Early Historic Vegetation 1792 - 1850	Environmental Reconstruction	(McEldowney 1983:442)	Environmental Reconstruction for South Kohala	Scanned from report to Tiff. file converted to overlay
Hawaii, Hawaiian Islands	Historic/ Archival	(Donn et al. 1901)	South Kohala Coastal Trail and Lālāmilo Mauka-Makai Trail	Convert from Tiff. file to overlay
Classification Survey of Portions of the lands of: Waikoloa Nui, Waikoloa Iki, Lalamilo and Puukapu Waimea, South Kohala Hawaii.	Historic/ Archival	(Wall 1915)	Traditional Agriculture in upper Lālāmilo and Waimea Town	Convert from Tiff. file to overlay
Hawaii, Hawaiian Islands	Historic/ Archival	(Newton 1919)	Coastal Trail of South Kohala	Convert from Tiff. file to overlay
Hawaii Soundings in Fathoms at Mean Lower Low Water	Historic/ Archival	(Patton 1936)	Coastal and Mauka-Makai trails of South Kohala	Convert from Tiff. file to overlay

3.1.3. Inventory and Connectivity of an HLRIM

The various landscape attributes included in each layer of this geo-cultural baseline were chosen for its relevance to the categorical topic of the layer. The objective of each layer and its maps are to provide a visual cultural landscape perspective, and/ or a historic-contemporary landscape comparison. The process of data collection and map production serve two important functions; first this process geo-spatially inventories lesser recognized significance of Waimea's landscape, and secondly, the maps produced from this process help the community to visualize spatial and temporal relationships (interconnections) between resources. The various combinations of GPS points, sourced GIS data, georeferenced maps, and original or traced shape files, are designed to create what Buckley and Sullivan (2014:38) calls "landscape and story-based cultural maps". In effect each layer in this geo-cultural baseline are composed of storied maps that are significant in of themselves while being analytically relevant to other layers.

3.2 FABRIC OF WAIMEA'S LANDSCAPE

Fabric means all the physical material of the place including elements, fixtures, contents and objects. Fabric includes building interiors and sub-surface remains, as well as excavated material.

- Natural elements of a place may also constitute fabric. For example the rocks that signify a Dreaming place.
- Fabric may define spaces and views and these may be part of the significance of the place.

(ICOMOS 2013:2)

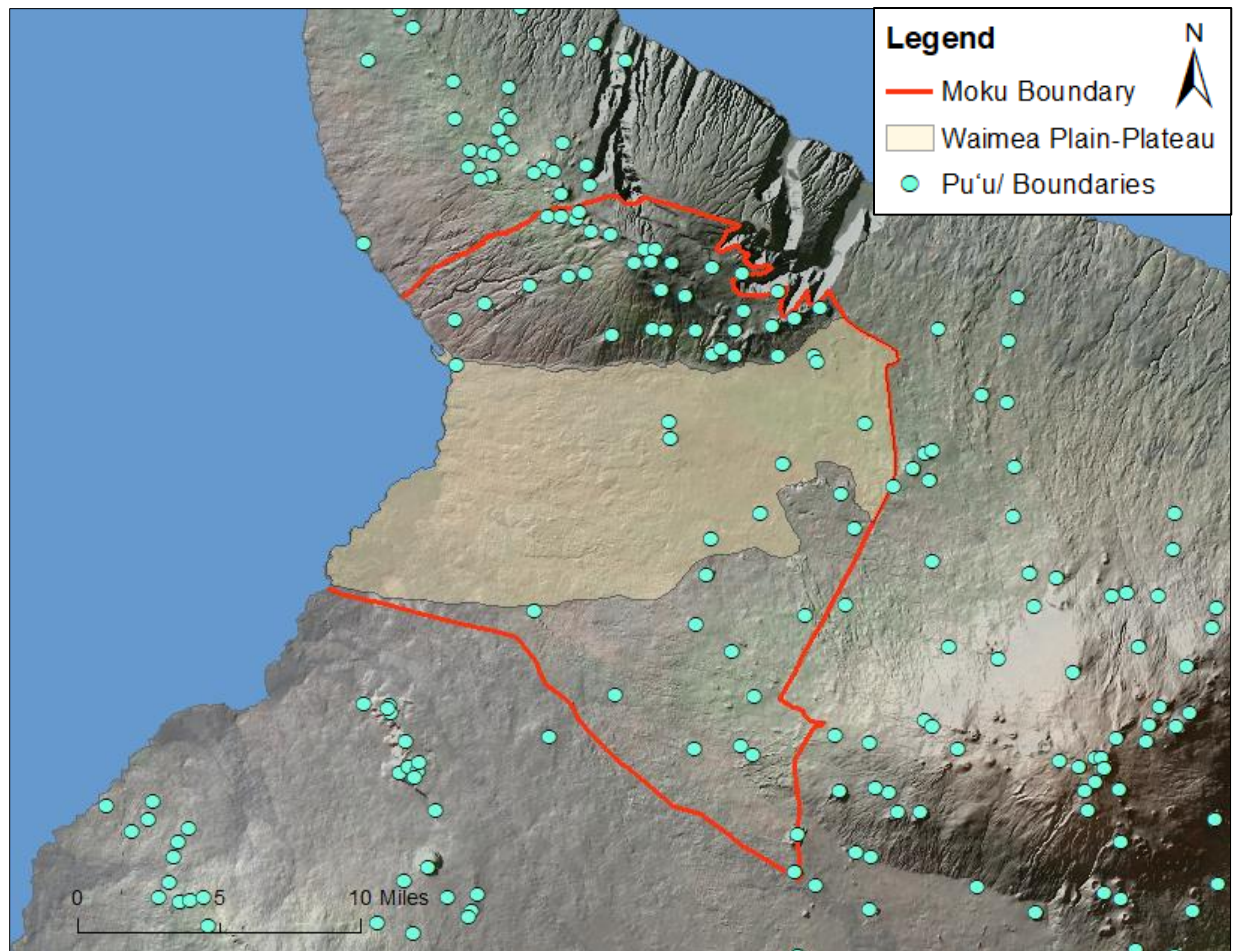


Figure 18. The Waimea Plain-Plateau viewshed.

Situated on a plateau between two shield volcanos (Kohala and Mauna Kea), Waimea Town boasts impressive views. From its nestled position against the southern base of Kohala mountain, residents, and visitors alike, may enjoy views of open pastures interspersed with rolling and jutting hills (pu‘u) found on the Waimea plain and on the ascending slopes of these mountains and their respective ridgelines. While the “openness” (Weitkamp 2011:207) quality of these views could be considered an aesthetic resource in of itself, the expanded geo-cultural viewsheds of Waimea Kālana demonstrate how the fabric of its landscape is imbued with cultural significance. The following maps were created for this section utilizing the following GIS layers: Hillshade (Hawai‘i State Office of Planning 2003), Earth Imagery (Esri 2015), State

ahupua‘a boundaries (OHA 2009), Hawai‘i County place names (United States Board on Geographic Names 2018) and Google Earth. These maps provide an initial viewshed analysis for Visual Resource Management (VRM) considerations. These maps also aid in examining how “traditional palena” or boundary making (Beamer and Durate 2009:77-78) manifested in Waimea.

3.2.1 Topography: Waimea Plain-Plateau and Visual Resource Management

Topographical and other natural features – ridges, outcropping, rocks, a stream channel sometimes a tree – would give the lines and angles of defined areas.

(Handy and Handy 1991:48)

The Waimea Plain and Plateau (WPP) polygon shown in Figure 18 (above), is a combination of the relatively leveled surface of Waimea CDP (plateau) and the westward descending plain adjacent to it. The northern border of the descending plain is tangent to the southern base of Kohala mountain where at the surface, Mauna Kea lava converges against Kohala’s south facing slope (Clark 1986:26-28). This northern border descends to the coast where at Kawaihae Harbor it turns south following the coastline towards ‘Anaeho‘omalu. The southern border of this plain turns east from ‘Anaeho‘omalu until it meets up again with the Waimea CDP. This southern border is less pronounced than its northern counter-part and was estimated by visually analyzing the Hillshade elevation layer. The combination of Hillshade and Google Earth aspect analysis (Figure 19) illustrates the WPP’s situation between the mountains of Kohala and Mauna Kea. Figure 20 shows the WPP facing south towards, the mountains of Mauna Loa and Hualalai. In addition, Figures 19 and 20 contain semi-arbitrary viewpoints (red dots) in relation to pu‘u (blue icons) and the South Kohala moku boundary. The alignment of these viewpoints was estimated using three reference points. The first point is the coastal border between Lālāmilo and Waikōloa; the second point is the WPP midpoint as determined by

ArcMap polygon analysis; the third point being the Parker family's original residence at Mānā.

Figure 21 is a photo of the WPP's ascent from the coast at Waikōloa towards Waimea Town.

Combined, these figures represent the elevational contrast between the WPP, the mountains that surround it, and the landscape fabric that are present on the slopes of these mountains. Thus, the natural topography of Waimea Kālana created a visual resource corridor that resulted in culturally significant viewsheds.

Viewsheds are defined by the U.S. Bureau of Land Management (BLM) as being, "the landscape that can be directly seen under favorable atmospheric conditions, from a viewpoint or along a transportation corridor" (BLM 1984:11). (Note, trails are transportation corridors of the ancestors.) According to the *Guide to Evaluating Visual Impact Assessments for Renewable Energy Projects*, viewsheds are described as "areas visible from a given point or points" (Sullivan and Meyer 2014:20). The Bureau goes on to say that Visual Resource Management (VRM) is, "the inventory and planning actions taken to identify visual values and to establish objectives for managing those values; and the management actions taken to achieve the visual management objectives", and that VRMs are part of Resource Management Plans (BLM 1984:11-12). Thus, dependent upon a community's topography, VRM studies should be a consideration for community-based resource management planning. The Bureau's Manual H-4810-1 (BLM 1986) provide a framework for assessing "visual contrast" and "visual impacts" that communities could use to initiate their own VRM assessments.

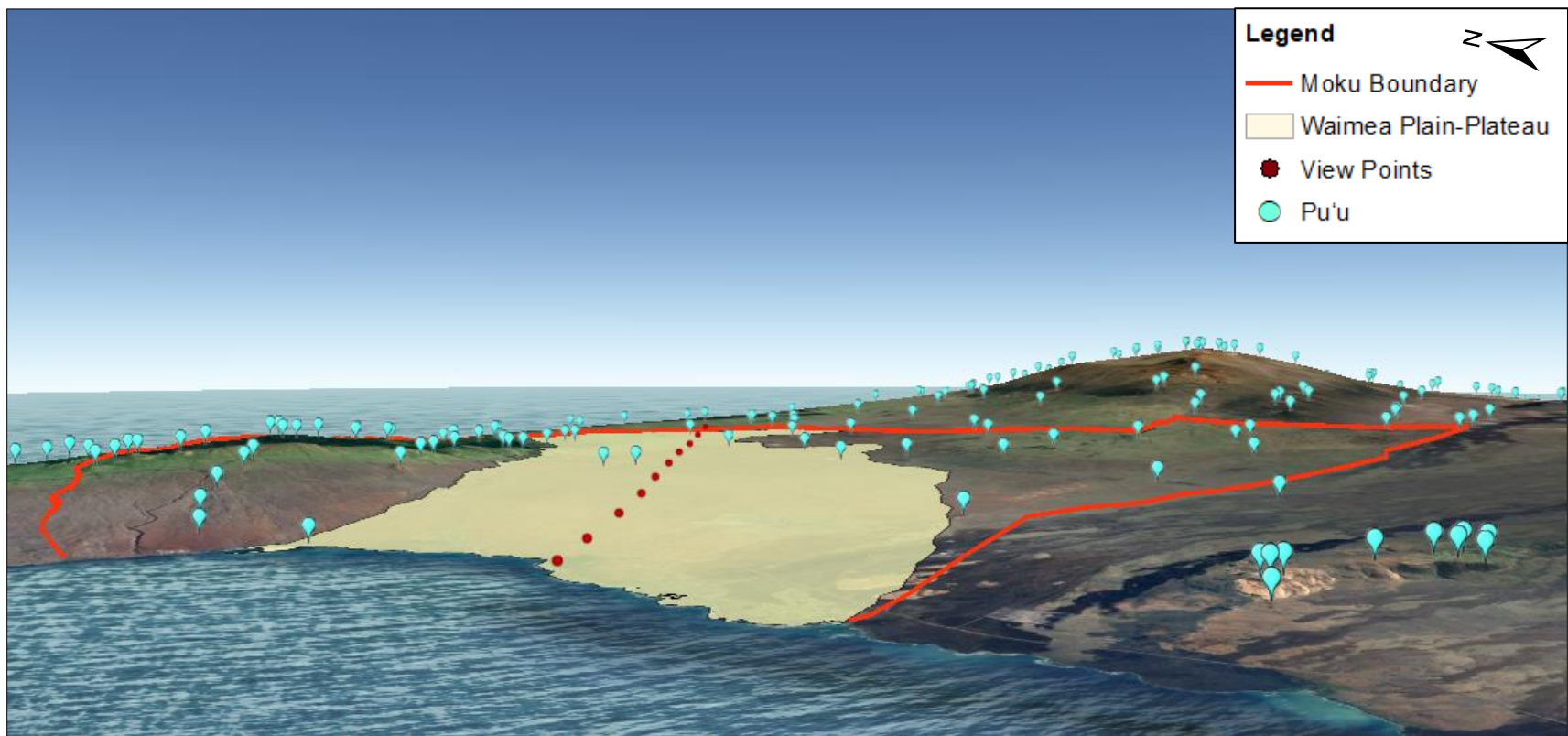


Figure 19. View of WPP from ocean facing east. Kohala Mt. (left), Mauna Kea (right).

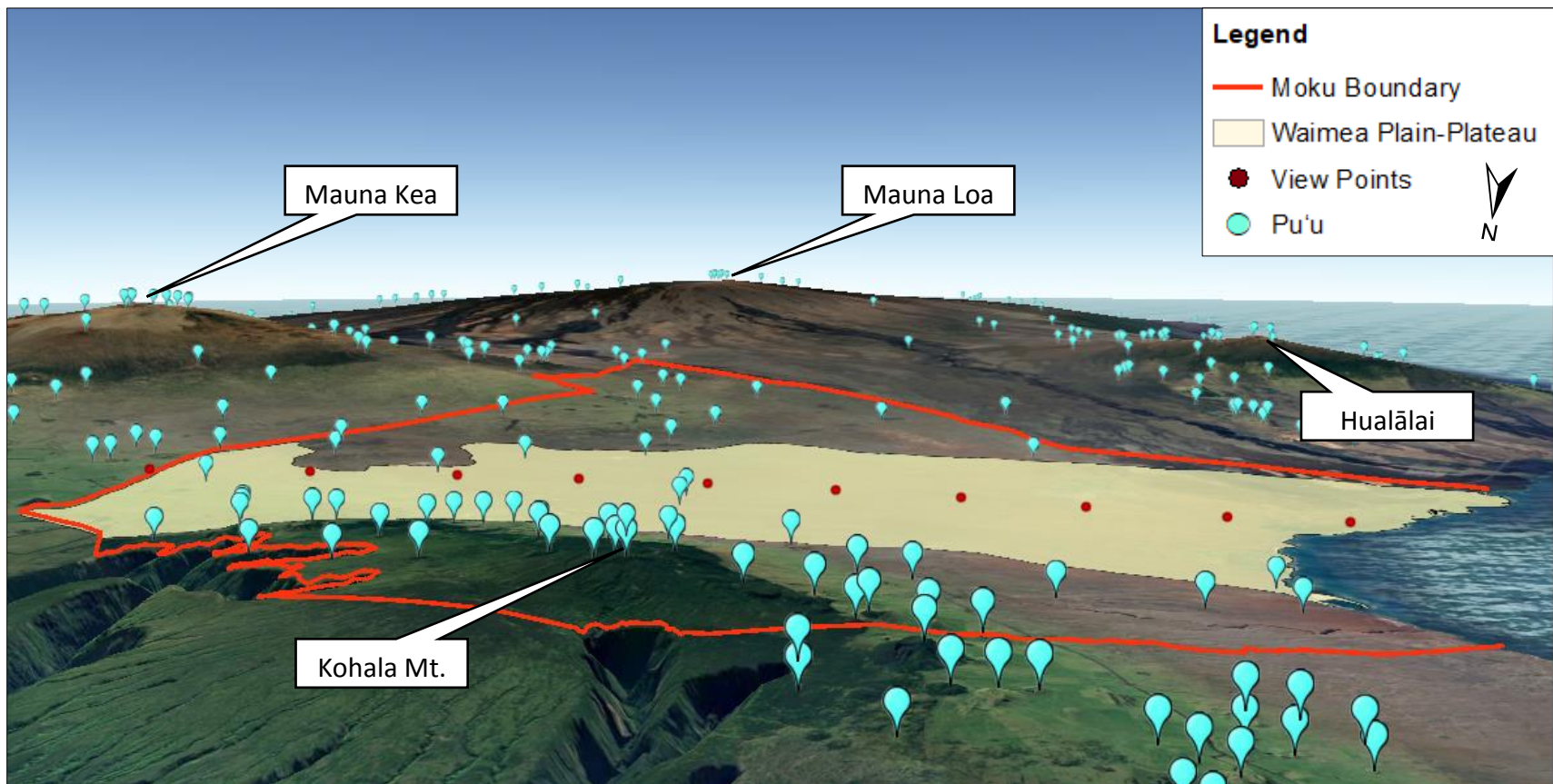


Figure 20. WPP southern view – Mauna Kea, Mauna Loa, and Hualālai.

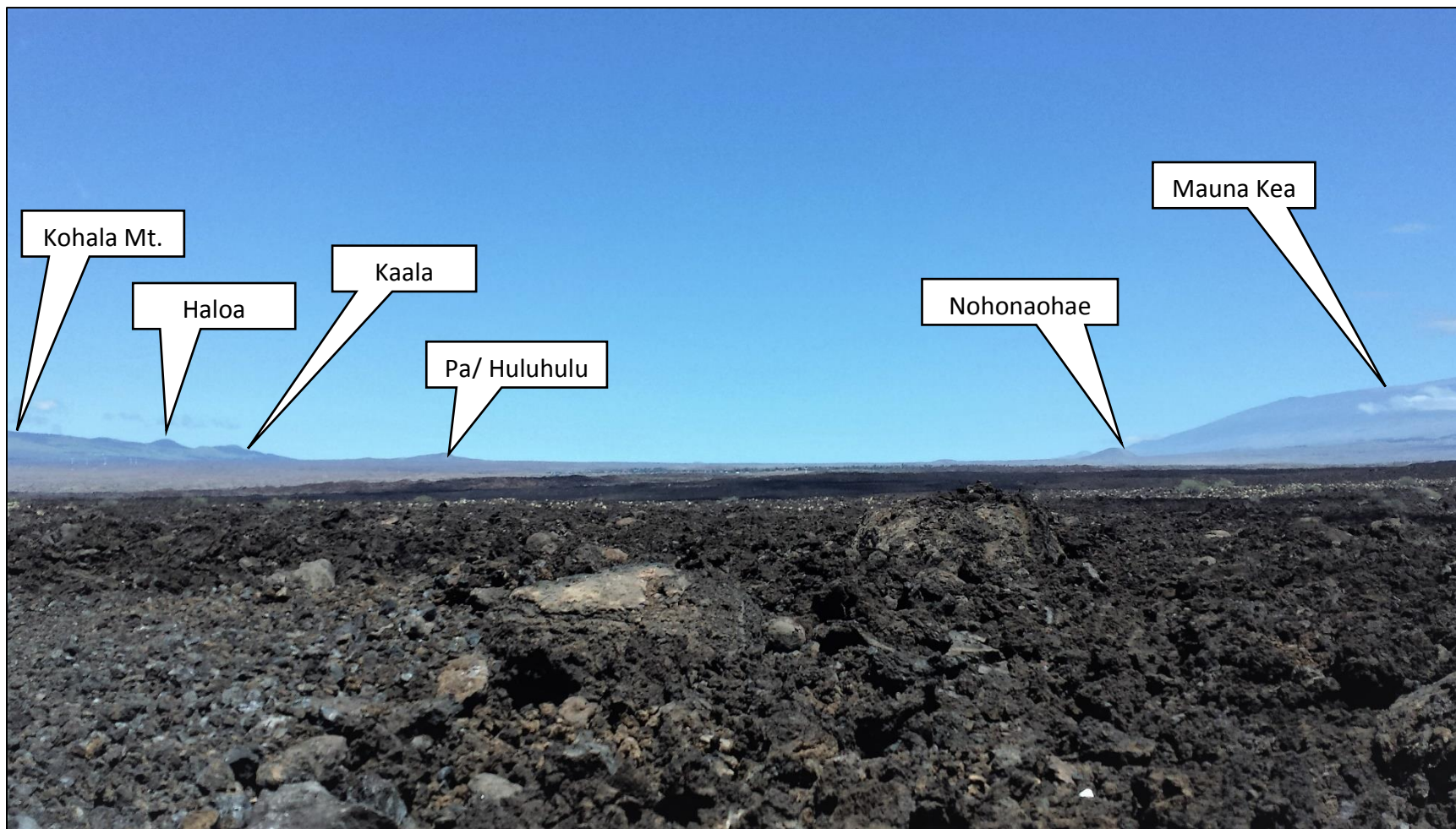


Figure 21. Photo of the WPP from Waikōloa facing east.

3.2.2. *Fabric: Pu‘u and Boundaries*

The term ‘placial’ here refers to a place-based approach, which requires the researcher to be immersed in the particularities of place, and in which an embodied knowledge of places precedes the formation of theory about spaces. As Murton writes, ‘the understanding of the great divide between spatial and placial ways of seeing and coming to know the world is critical for geographers working on the interface of Native and Western understandings of the world.

(Beamer and Durate 2009:71)

More than just aesthetically pleasing, the pu‘u of Waimea as landscape fabric, functions culturally as definers of place. “Every pu‘u has a name”, was told to me by Charlie Kimura –a Parker Ranch kupuna (elder)– on more than one occasion during a community-based internship I participated in at the North Hawai‘i Education Resource Center (NHERC). This fact was known and readably accepted by the NHERC Tuesday morning Paniolo (cowboy) group, consisting of Charlie, Momi Naughton (NHERC Coordinator), Gary Rapozo (former Parker Ranch veteran), and Jimmy Silva (long-time North Hawai‘i resident).

In the spring semester of 2017 another community-based internship was performed at Kanu O Ka ‘Āina –A New Century Charter School– located in Waimea Town. In the fifth and sixth grade classes taught by Kumu (teacher) Keomailani Case and Pomai Bertlemann, the pu‘u of Waimea were significant visual resources used to teach students place names and directional references in relation to Waimea’s cultural landscape. In Pomai’s class, students learned pu‘u names and other landscape significance through performing ‘oli (chant), and hula (traditional dance). Another example, from Keomailani’s class is how Pu‘u Holoholoku, Pu‘u Ahumoa, and the visual ridgeline of Mauna Kea were combined to teach students directional references and information about traditional flora and fauna (e.g. the māmane tree (*Sophora chrysophylla*) and the bird manu palila (*Loxioides bailleui*) that feeds on māmane seeds).

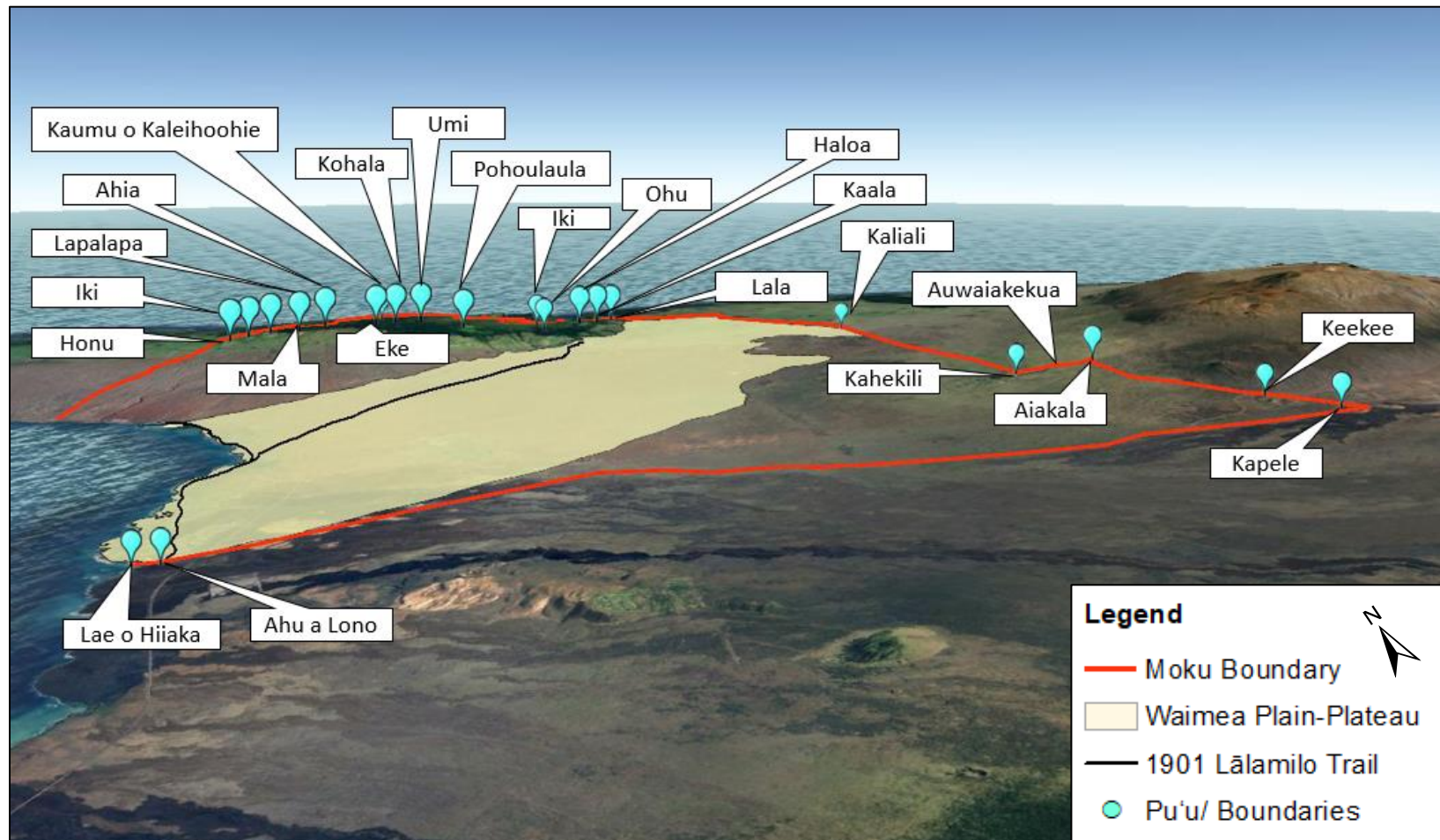


Figure 22. Pu'u in relation to boundaries of Waimea Kāhala.

In Figure 22, the Moku Boundary is shown in relation to the WPP and a mauka-makai trail overlaid and traced from a historical map compiled by John M. Donn (Donn et al. 1901) labeled as 1901 Lālāmilo Trail. This figure also shows how certain pu‘u correspond or correlate to specific perimeter points along the Moku boundary that define the place and space of Waimea Kālana especially when being viewed from the WPP visual corridor. Pu‘u Kapele, Ke‘eke‘e, Kaliali, Lala, Kaala, and Haloa correspond to specific points along the southeastern and northeastern borders of South Kohala. While Pu‘u Aiakala and Kahekili do not correspond to specific points on the border, they are visual markers of a segment of Auwaiakekua, a gulch that runs in between these two pu‘u and corresponds to a segment of the Moku Boundary located on the western slope of Mauna Kea near Waiki‘i Ranch.

In a general westerly direction from Pu‘u Haloa, the pu‘u(s) Ohu, Iki(a), Pohoulaula, Umi, Kohala, Kaumu o Kaleihoohe, Ahai, Lapalapa, Iki(b), and Honu, represent a visual ridgeline that correlates to Moku Boundary points that lay beyond visibility of the WPP. Although these pu‘u do not correspond to exact points on the boundary, it is highly probable that the ancestors of Waimea Kālana knew the names of these pu‘u and thus their spatial relation to the boundaries both perimeter and internal. For this point a reiteration from Beamer and Durate (2009:73) is pertinent,

Since the ancient divisions were already well established on the ground and in the minds of the Hawaiian people when the Kingdom of Hawai‘i began to ‘modernize’ its land system in the period of the Mahele of 1848, the Kingdom was able to award large portions of land based on traditional name and location alone.

In effect, from a traditional Hawaiian perspective, the fabric of Waimea Kālana, its topography, viewsheds, landscape features and their names are all an important part of defining Waimea Kālana’s sense of place that stands in contrast to the spatial boundaries of Waimea CDP.

3.3 ENVIRONMENTAL RECONSTRUCTION

In the old days much of Waimea plateau was covered by a forest largely of the ohia lehua. Accordingly the euphonious name Alaohia (fragrance of the ohia) had been given to a district in Waimea. My father frequently used the expression, “Alaohia nei”. It is true that the name had become unfamiliar as the ohia forest retreated toward Hamakua, but historical fitness not less than appeal to the ear and the imagination urged the acceptance of this old Hawaiian name in place of the time honored but untenable Waimea.

(Doyle 1953:43)

In Clark and Kirch 1983:407-448), Holly McEldowney provides a reconstructive vegetation study titled, *A Description of Major Vegetation Patterns in the Waimea-Kawaihae Region During the early Historic Period* that spatially plots (on a map) the vegetation communities, moisture regimes, and land-uses spanning a period from 1792 to 1850. As the first cattle came to Hawai‘i in 1793, the temporal significance of this reconstruction is that it estimates the pre-cattle flora –and some fauna– of the region. Spatially, this reconstruction has an approximate west to east orientation, continuous from the northwestern border of the South Kohala District on into Hāmākua (neighboring district) and covers most of the district – except for a swath of land in the southwestern portion of Waikōloa. This vegetative reconstruction map was georeferenced as a GIS layer and is used in this project for cultural landscape analysis related to environmental resource distribution and land-use in Waimea Kālana. From this chapter on, references based on this vegetative reconstruction will be cited as McEldowney 1983.

McEldowney's Methods

This historic vegetative layer and its analysis are based on eight vegetation zones identified on McEldowney's map; these zones include, Pili Lands 1 and 2, Kula Lands 1 and 2, 'Ōhi'a Rainforest, Ululā'au, Mixed Open Canopy Forest, and Open Māmane Forest (McEldowney 1983:442). These vegetation zones represent predominant historic native plant communities and were derived primarily from early historic documents, ground and aerial photography, and surveys of relict and present-day (at the time of the study) vegetation patterns (McEldowney 1983:407-414).

Relict vegetation communities represent plant communities that survived ungulate consumption in the ravines that dissect the south and southwestern slopes of Kohala Mountain. Relict vegetation surveys performed in these ravines were deemed valuable based on the premise that steep ravines were less impacted by cattle thus representing, "what remains of former communities, either as scattered individuals that are not reproducing regularly and will eventually disappear, or as members of isolated communities that are reproducing and maintaining themselves on a limited scale" (McEldowney 1983:12). Since the ravines dissect Kohala mountain perpendicularly to its slope (Figure 23), these plant communities could then be correlated with estimated moisture gradients corresponding to elevation. Moisture estimations were categorized into three general gradient descriptions – dry, moist, and wet. "In terms of mean annual rainfall, dry roughly corresponds to rainfall isohyets of 10 to 20 in., moist corresponding to 20 to 40 in., and wet corresponding to 40 to 150 in." (McEldowney 1983:409).

Early historic descriptions substantiating vegetative communities and their locations were sourced from testimonies of native and foreign residents of the area provided "before and after the Great Mahele in 1848", as well as from landscape descriptions provided by early foreign

visitors passing through the region (McEldowney 1983:14). The names of these vegetative zones follow terms used in Mahele testimony and early historic accounts. In areas where native testimonies lack a generalized name, zone names were chosen to “reflect dominant structural or compositional features of the vegetation” (McEldowney 1983:414).

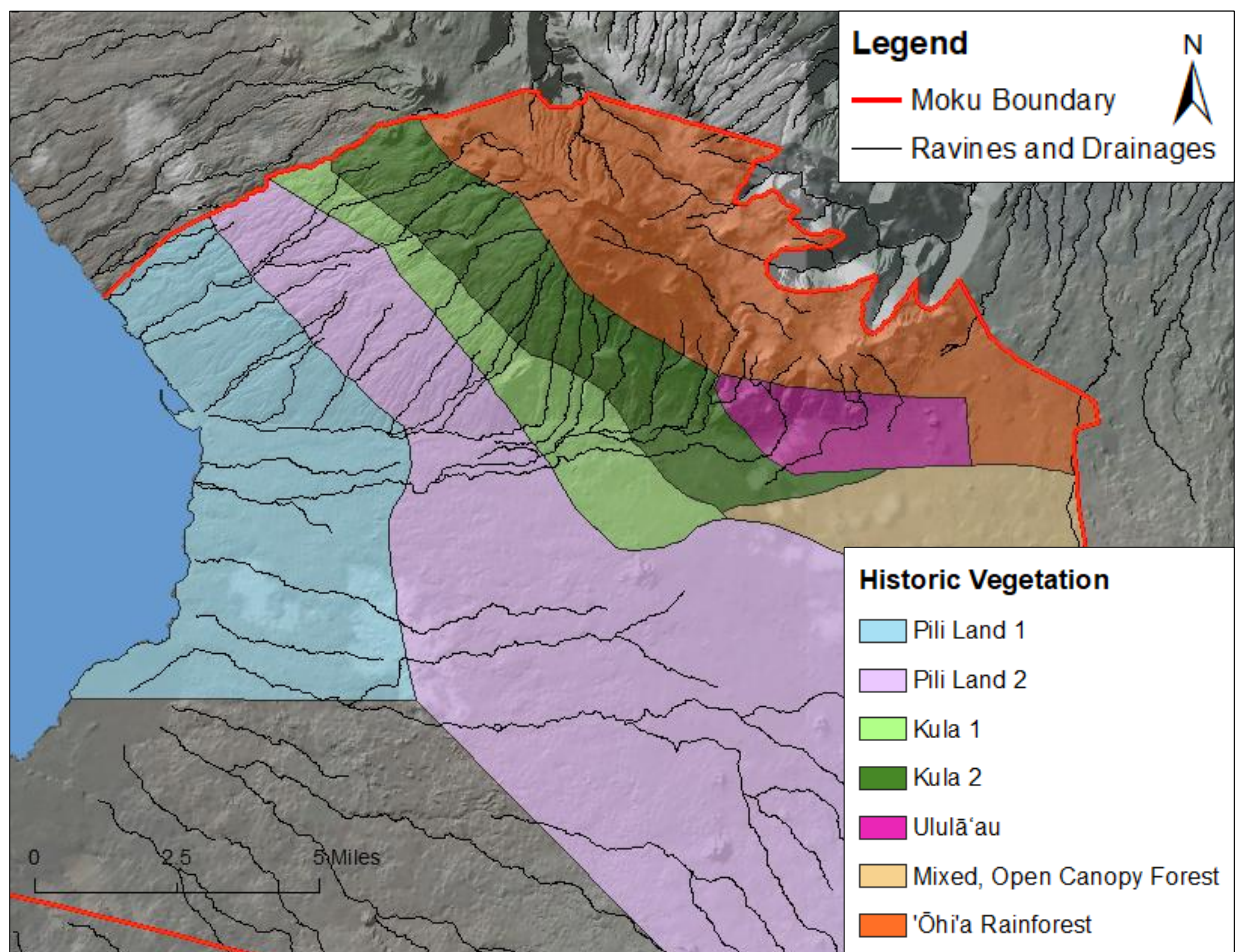


Figure 23. Ravines running perpendicular to slope.

3.3.1 Historic Vegetation Patterns and Land Use

Equally important to the spatial and temporal distribution of resources depicted in Figure 23 is McEldowney's estimations of general land-use for each zone. The following tables compile zone name with its respective, moisture regime, landscape descriptions, and land-use. Note, the moisture regime for these zones are not described simply as dry, moist and wet; instead McEldowney starts with the driest zone in Pili Land 1 at the coast and describes successive zones in relation to the previous. Landscape and vegetation descriptions are direct quotes from McEldowney's report. The significance of these zones will be discussed in relation to other layers in the following Chapters.

The Pili Lands

Zone	Moisture	Landscape and Vegetation Descriptions	Land Use
Pili Land 1 pg. 414 - 415	Dry	<p>"... barren, stoney, and dried landscape"</p> <p>"... very low shrubs, thistles, and dry looking grass"</p>	<ul style="list-style-type: none"> • Coconut, <i>Cocos nucifera</i> • Lauhala, <i>Pandanus sp.</i> • Loulu, <i>Pritchardia sp.</i> • Kou, <i>Cordia subcordata</i> • Milo, <i>Thespesia populnea</i> • Salt works/ production • Fishponds and fishing
Pili Land 2 pg. 415 - 418	Dry but seasonally influence by wetter windward weather	<p>"... expanse of grasslands behind (inland) of coastal settlements"</p> <p>"untended and uncultivated"</p>	<ul style="list-style-type: none"> • Wild birds • Pili grass • Trails • Possible mulching material

The Kula Lands

Zone	Moisture	Landscape and Vegetation Descriptions	Land Use
Kula Land 1 pg. 418 - 422	Increased moisture from “fluctuating interface between the leeward sea breezes and the tradewinds”	“... contain characteristics of both the upper <i>pili</i> and upper <i>kula</i> lands” “...open vegetation type underlain by “extremely rocky ground”	“the kula lands roughly bracket all specifically or generally located agricultural features documented in the Land Records” Agricultural Infrastructure: <ul style="list-style-type: none"> <i>kō ‘ele, ‘auwai, kuaīwi, iwi ‘āina, kīhapai, mala,</i>
Kula Land 2 pg. 418 - 422	Increased moisture from “fluctuating interface between the leeward sea breezes and the tradewinds”	“... increase in the verdant aspect of the landscape” “... the descriptions imply an increase in percentage of ground covered by grasses, as well as the presence of scattered shrubs and low stature trees”	Native Food Plants: <ul style="list-style-type: none"> taro, sugarcane, sweet potatoes, plantains, arrowroot, <i>wauke</i> Foreign Introduced Food Plants: <ul style="list-style-type: none"> Irish potatoes, onions, corn, watermelon, pole beans, corn, pumpkins

The Ululā‘au

Zone	Moisture	Landscape and Vegetation Descriptions	Land Use
Ululā‘au pg. 422 – 425	“Wetter, trade-wind-dominated climatic conditions that included greater rainfall, a prevalence of fog and mist, and longer periods of cloud cover”	“The vegetation community delineated as the ululā‘au encompassed a patchwork of scattered agricultural and residential features interspersed with numerous trees, probably forming an open, ‘ōhi‘a-dominated canopy, and a luxuriant, structurally diverse understorey.”	Grove or wild resources: <ul style="list-style-type: none"> <i>māmaki, hau, kukui</i> “extremely scattered distribution of numerous garden plots or fields” <ul style="list-style-type: none"> <i>kalo, ‘uala, kō</i> “greater prominence of plots planted in <i>mai ‘a</i>”

Mixed Open Canopy Forest

Zone	Moisture	Landscape and Vegetation Descriptions	Land Use
Mixed Open Canopy Forest (pg. 425-427)	Moist	<p>‘<i>Ōhi‘a</i> co-dominant with mixed canopy trees: <i>koa</i>‘<i>a</i> (<i>Acacia</i>), <i>naio</i> (<i>Myoporum</i>), and <i>olopua</i> (<i>Osmanthus</i>).</p> <p>“...characteristics of having an open canopy and the appearance of a wooded parkland, particularly when contrasted with the grassy plains to the west and the dense “impenetrable” rainforest to the east”</p>	<p>Speculated Uses:</p> <ul style="list-style-type: none"> • feral pig resource • bird catching • collection of famine foods • sandalwood trade

‘Ōhi‘a Rainforest

Zone	Moisture	Landscape and Vegetation Descriptions	Land Use
‘Ōhi‘a Rainforest (pg. 427-427)	Wet	<p>‘<i>Ōhi‘a</i> dominated canopy with mixed sub-canopy of ‘<i>ōlapa</i> (<i>Cheirodendron</i>) and <i>pilo</i> (<i>Coprosma</i>) along with a diversity of understory species.</p> <p>“Most frequently, this forest is portrayed as “dense” or “impassable,” interspersed with swampy lands, composed of “luxuriant” and “abundant” vegetation of all kinds, and crossed only by “treacherous” and “muddy” trails”.</p>	<p>Scattered locations of resource procurement accessed by trails:</p> <ul style="list-style-type: none"> • birds <ul style="list-style-type: none"> – ‘<i>ō</i>‘<i>ō</i> – <i>mamo</i> – ‘<i>ua</i>‘<i>u</i> – unidentified seabirds • fiber plants <ul style="list-style-type: none"> – <i>māmaki</i> – <i>olonā</i> • famine or supplemental foods <ul style="list-style-type: none"> – mai‘a – kī – ‘ama‘u, fern – hapu‘u fern – swamp taro

3.4 ‘ILI CONFIGURATION: WATERSHEDS & AQUIFERS

"Waimea, Hawaii was an ahupuaa which partook largely of the qualities of a moku or Division. (This...is the reason why some of the ilis within it are often mentioned in the Mahele and in the Land Commission Records as ‘ahupuaas’.) It was however itself assigned as an ahupuaa in the Mahele...becoming by later legislation a Crown Land like other lands in the same category." (IDLL) [Interior Dept., Land, Letters] "Waimea is a kalana, which is the same as an island divided into districts; there are eight Okana in Waimea." (BCT7) [Boundary Commission Testimony #7] For cataloging purposes, most of the named divisions of Waimea are treated here as ahupuaa rather than as ili kupono. Several small lands, such as Papuaa and Waawaa, are treated as ili aina of Lalamilo, and Waimea itself is regarded as a kalana.

(Soehren 2010)

The maps produced for this section are combined with ethno-historic descriptions of resource distributional functions of moku and ahupua‘a land divisions. While Section 1.2 explained how the State of Hawai‘i’s GIS layer mistakenly identified the ‘ili of Waimea Kālana as ahupua‘a of South Kohala; the configuration of Waimea’s ‘ili regarding access to mauka – makai resources, function as do ahupua‘a in relation to moku land divisions. In particular this section demonstrates how watershed and aquifer functions are designed into the configuration of Waimea’s ‘ili. Without mentioning watersheds and resource distribution, Soehren (2010) used a similar rationale in his categorization of Waimea’s ‘ili, saying “most of the named divisions of Waimea are treated here as ahupuaa rather than as ili kupono [‘ili]”. Therefore, in this section the method of explaining how Waimea Kālana functions as a watershed and aquifer units, is to describe how its ‘ili function as ahupua‘a do. In examining the distribution of vegetation in relation ‘ili boundaries and the region’s hydrogeological cycle, this section highlights interconnections between mauka-makai cultural and natural resources. Note, in the rest of this thesis ‘ili and ahupua‘a will be used interchangeably. Also, figures in this section do not include the vegetative zone “Pili Land 1” so as to not conflict with the color scheme of streams.

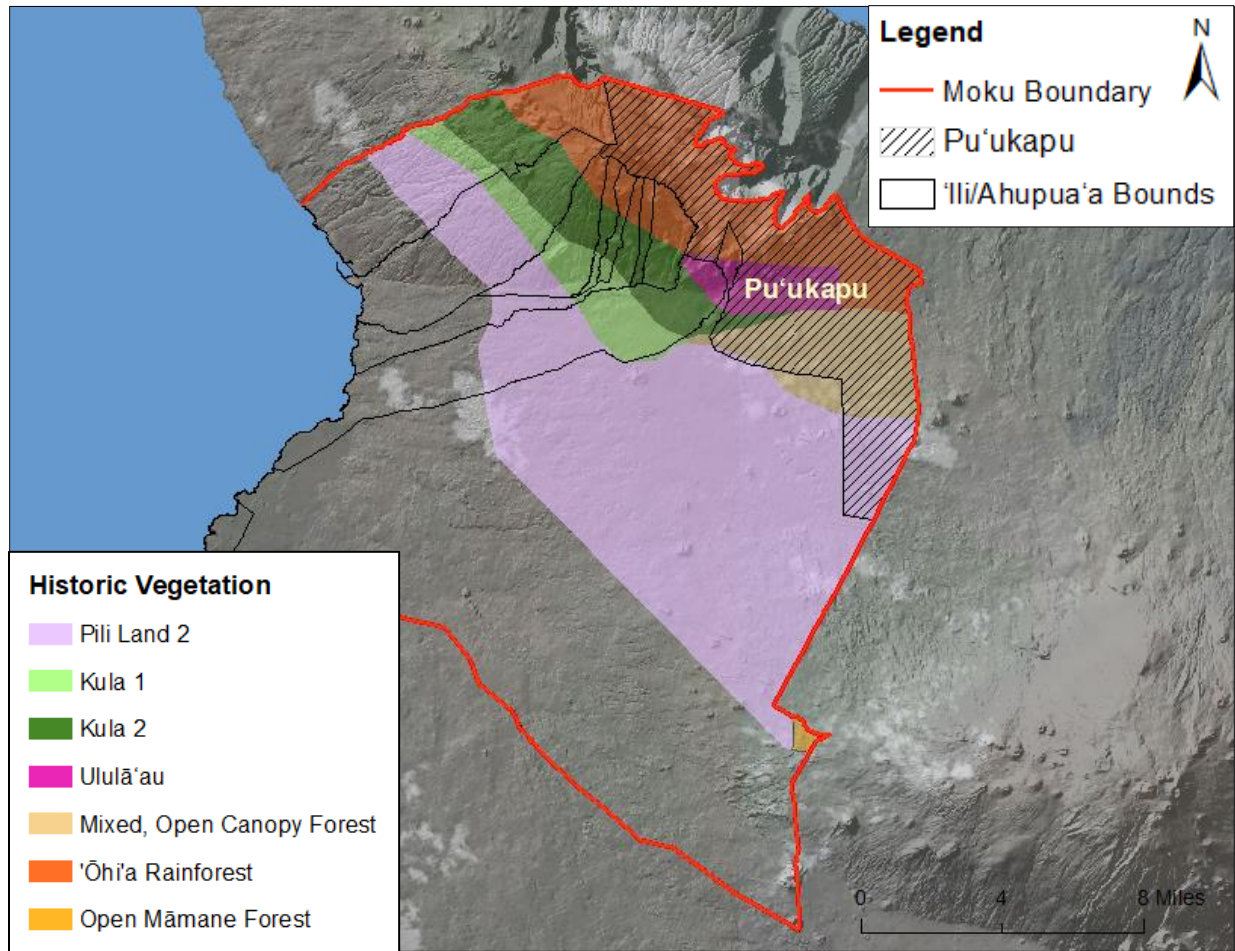


Figure 24. 'Ili of Waimea Kālana cross cutting various resource zones.

3.4.1. 'Ili of Waimea Kālana Share Resource Characteristics of Ahupua'a

Figure 24 depicts the Moku Boundary and its 'ili, in relation to the historic vegetative zones reconstructed by McEldowney (1983:442). By analyzing these layers together, it is observed that all internal land divisions of Waimea Kālana cross multiple vegetative resource zones – with the exception of 'Anaeho'omalū in the southwest corner. While there are some exceptional ahupua'a, most ahupua'a were designed such that its residents could access, manage, procure and gather a variety of resources. Of this intention Maly (2001:4) says, "The *ahupua'a* within which the native Hawaiians lived, represented land divisions that were complete

ecological and economic production systems.” Thus, most ahupua‘a extended from the mountain to the sea, (Lyons 1903:24; Moffat and Fitzpatrick 1995:29; Handy and Handy 1991:48).

The central ‘ili land divisions colored white in Figure 25 (Pu‘ukawaiwai, Pauahi, Momoualoo, Lanikepu, Haleaha, Keoniki, Kauniho, and Waiaka) are exceptions to normal ahupua‘a resource zoning; while they do cross multiple zones, they do not extend to the shoreline. However, the zones that they do cross –Kula 1, Kula 2, and ‘Ōhi‘a Rainforest– afforded them agricultural lands, forest resources, and fresh water (as their southern boundaries are bounded by, or near the Waiulaula/ Waikōloa stream network). These streams were perennial in traditional times (before modern diversion) as their tributaries –Waikōloa Stream, Haleaha Gulch, Waiaka Gulch, Lanikepu Gulch, Ouli Gulch, Mamaewa Gulch, Momoualoo Gulch, Kohakohau Gulch, and Oolamakapehu Gulch– according to Hawai‘i State GIS Stream data categorize them as such (Department of Land and Natural Resources 2013). Moreover, residents of these ‘ili would have still maintained access to coastal and marine resources through a network of ancient trails. Figure 25 depicts two of these mauka-makai trails that were overlaid and traced from two historic maps – Donn et al. (1901) and Patton (1936).

To reiterate, “The boundaries of the *ahupua‘a* were generally defined by cycles and patterns of natural resources that extended from the mountainous zone, or peaks, to the ocean fisheries” (Maly 2001:4). The combination of these layers confirms that whether called ‘ili or ahupua‘a, these land divisions functioned along a “fundamental” Hawaiian cultural landscape “mauka and makai” perspective, regarding resource distribution and access (Lyons 1903:24).

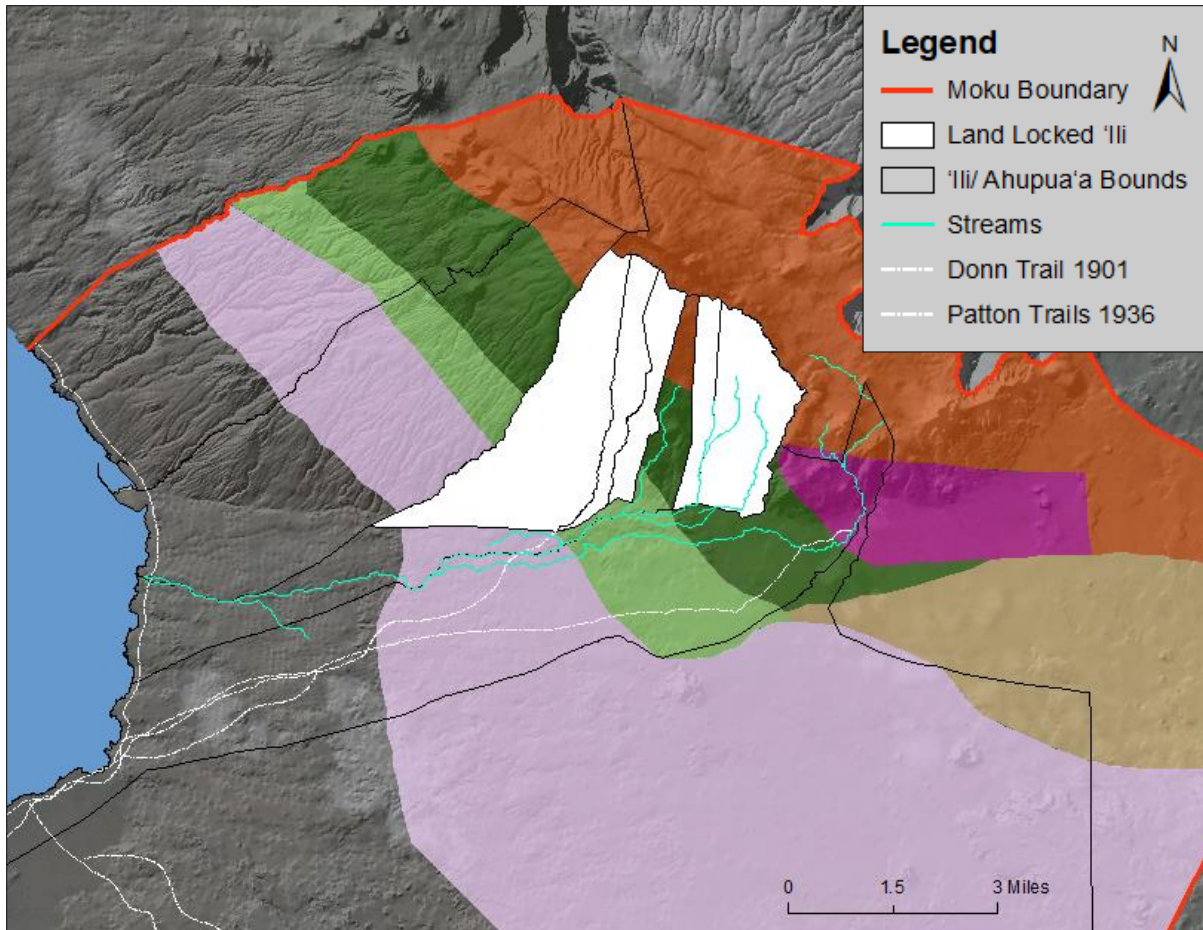


Figure 25. 'Land-locked' 'ili with trail access to coastal resources.

3.4.2. *Pu'ukapu as a Lateral, Capping, and Forested Watershed*

Another example of how ahupua'a configurations are related to moku mauka-makai resource management, is how in some moku particular ahupua'a located most inland of the district does not extend to the sea but caps other ahupua'a that do. These capping ahupua'a usually represent the innermost boundaries of a moku and therefore abut other moku near or at mountain ridges (Moffat and Fitzpatrick 1995:29). Lyons (1903:25) describes such ahupua'a saying,

Then there are the larger ahupua'a, which are wider in the open country than the others, and on entering the woods expand laterally, so as to cut off all the smaller ones and extend toward the mountain till they emerge into the open interior country...

Further analysis of ‘ili boundaries, with the reconstructed vegetative zones, it is observed that Pu‘ukapu both caps the other land divisions of Waimea Kālana and is the most densely forested ‘ili. Figure 26 shows that Pu‘ukapu (outlined in white) partakes of three forested resource zones. These are ‘Ōhi‘a Rainforest, Ululā‘au, and Mixed Open Canopy Forest (refer to Section 3.3.1. for moisture, landscape, and plant resource descriptions of each zone).

Commenting on the ahupua‘a of Hawai‘i Island, Lyons (1903:24-25) said, “Taking the above mentioned island first in order, the common ahupua‘a is found to be a strip say of 1,000 feet average width, and running from the sea shore, not by any means to the top of the mountain, but to the zone of timber land that generally exists between the 1,700 feet and 5,000 feet line of elevation.” About the function of capping ahupua‘a, Moffat and Fitzpatrick quotes and expounds on a concept of “Commons”, introduced by Lorenzo Lyons⁴.

In a letter written in 1858, Lorenzo Lyons noted that,

... the Moku in ancient times was the Commons –the people had a perfect right to anything on it– without taxation.”

The common land to which Lyon referred was situated above most of the ahupua‘a and encompassed forest and barren mountain. Although the land may have technically belonged within a given ahupua‘a, it was apparently available to all the people living within that district. In that sense, moku may have come to refer to the portion of an island that shared access to a single common area.

(Moffat and Fitzpatrick 1995:23)

⁴ Lorenzo Lyons is the father of C.J. Lyons who was a surveyor for the Hawaiian Kingdom and is cited in this thesis as (Lyons 1903). Both father and son called Waimea their home for some portion of their lives.

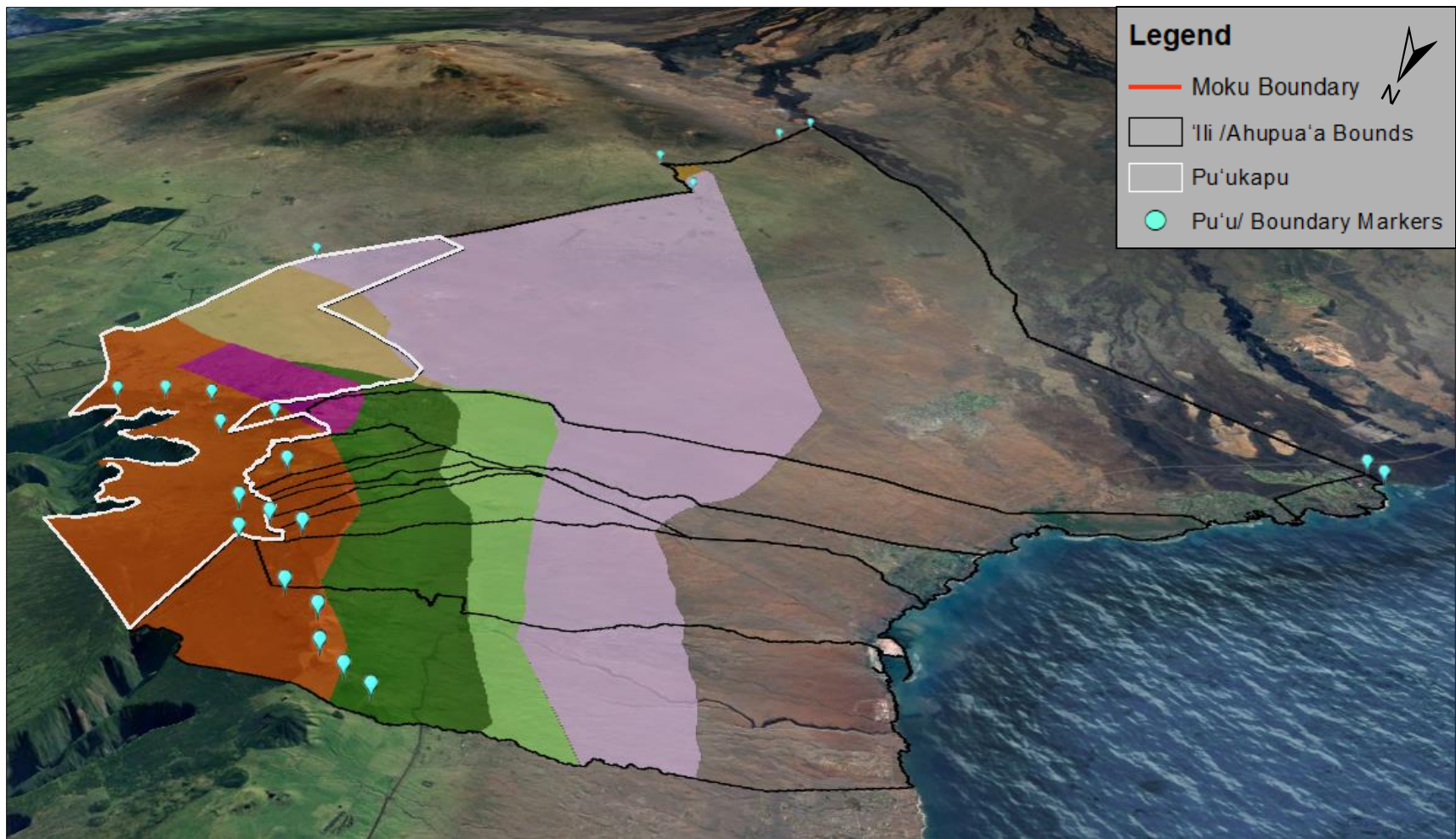


Figure 26. Pu'ukapu in relation to resource zones and other 'ili boundaries.

Looking again at Figure 26, it is observed that the land divisions of Waimea Kālana, (as well as all South Kohala when including Kawaihae 1 and 2), with its reconstructed vegetative zones exemplify the descriptions provided by Lyons (1903:25) and Moffat and Fitzpatrick (1995:23). In line with Lyons' statement, it is observed that all 'ili touch some forest before reaching the mountain summit and the capping boundary of Pu'ukapu. However, in this respect the 'ili of Waikōloa in comparison to other 'ili, has minimal forest resources. However, if Moffat and Fitzpatrick's comments on Lorenzo Lyons' 1858 statement about "commons" are applied to Pu'ukapu, ancient and early historic residents of Waikōloa would still have had access to ample forest resources. Thus, the configuration of Pu'ukapu and the other land divisions of Waimea Kālana confirm the purposeful cultural landscape relationship between boundaries, resource distribution and mauka-makai access.

3.4.3. Mauka – Makai Water Resources: Watersheds and Aquifers

Depressions in the land that extend inland are *awawa*, or kahawai, valleys. If the valley is very small it is called an *owawa* or *ho 'alu*, gulch. The place that rises up high mauka of a valley is a *waihi* or *hei* or *manowai* [watershed].

(Kamakau 1976:9)

Hawaiian historian Samuel M. Kamakau, in describing the mauka region of land that drainages such as streams and gulches extend into, used the word "*manowai*" –which in this 1976 edition was interpreted as "watershed". Monowai as a compound word literally translates as –many waters– "mano" meaning many, and "wai" meaning water (Ulukau 2003). Referring back to Section 3.3, Figure 23 depicts drainages that extend into the forested region of Kohala mountain which fits Kamakau's description of many waters. Kamakau (1976:9) also uses the word "*hei*", meaning a "net" or "snare" according to Ulukau (2003). In additions to streams (drainages), in the context of watersheds, this land section when described as *hei*, denotes a

Hawaiian perspective of how upland forests capture various forms of moisture. According to the Hawai‘i Association of Watershed Partnership (HAWP), “Forested mountains, by attracting clouds, were the source of water to feed lo‘i (fields)” (HAWP 2017).

Mauka-Makai Water Connections

“A watershed is an area of land, such as a mountain or valley, which collects rainwater into a common outlet. In Hawai‘i, the common outlet is ultimately the ocean.”

What is a Watershed? (HAWP 2017)

Regarding captured moisture, watersheds naturally facilitated mauka-makai fresh water connections by either recharging subterranean “aquifers” and “basal water” levels, or by coalescing it into surface drainages – i.e. streams and gulches (Bauer 2003:14; Fukunaga & Associates 2010:1-2 to 1-7). The following texts from Fukunaga & Associates (2010) further describes water’s possible pathways to coastal areas. The first text is Hawai‘i’s State definition and delineation of watersheds; the second describes Hawai‘i’s general hydrologic cycle.

A watershed unit is comprised of a drainage basin (or basins) which include both stream and overland flow, whose runoff either enters the ocean along an identified segment of coastline (coastal segment) or enters an internal, landlocked drainage basin.

(Fukunaga & Associates 2010:1-7)

Some of the precipitation or rainfall may be lost through evapo-transpiration; it may become surface runoff or runoff into streams and empty into the ocean; or it may infiltrate the ground to become soil moisture or collect as ground water and eventually escape to the sea.

(Fukunaga & Associates 2010:1-16)

While Pu‘ukapu served as the common forest resource center for all Waimea Kālana and possibly all of modern-day South Kohala as it caps Kawaihae 1 and 2), at the coast, the influence of its surface waters only extends as far south as the Waiulaula/ Waikōloa stream network as indicated

by their perennial tributaries (Department of Land and Natural Resources 2013). Its groundwater influence most likely terminated near this delineation as Bauer (2003:10) says that “The aquifer systems generally coincide with the surface expression of the geological contacts between the volcanoes”. South of the Waiulaula/ Waikōloa stream network there are two non-perennial drainage systems (Kamakoa gulch and Auwaiakekua gulch); water in these drainages that is not evaporated, eventually infiltrates “the highly porous and permeable surface” to become groundwater before reaching the ocean as stream flow (Young et al. 1977:14). Therefore, south of the Waiulaula/ Waikōloa stream network, fresh water emerges at the coastline as “springs”, “basal lens”, or “basal water discharge” (Marrack 2015:1171; Young et al. 1977:18).

An aquifer is generally described as a water bearing stratum of permeable rock, sand or gravel and constitutes a source of ground water.

An Aquifer Sector Area reflects an area with broad hydrogeological (subsurface) similarities while maintaining traditional hydrographic (surface), topographic and historical boundaries where possible. The Aquifer System Area is an area within an Aquifer Sector Area that is more specifically defined by hydrogeologic continuity among aquifers in the System.

(Fukunaga & Associates 2010:1-2, 1-3)

Figure 27 is composed of two GIS data layers derived from the (Hawai‘i State Office of Planning 2017) – “Aquifer Sectors/ Systems” (Department of Health 2011) and “Surface Drainages” (Department of Land and Natural Resources 2013). This figure depicts the major surface drainage systems of South Kohala in relation to the aquifers of the district. Figure 28 labels places where fresh water mixes at the coast to create named brackish water resources that exemplify mauka-makai water connections.

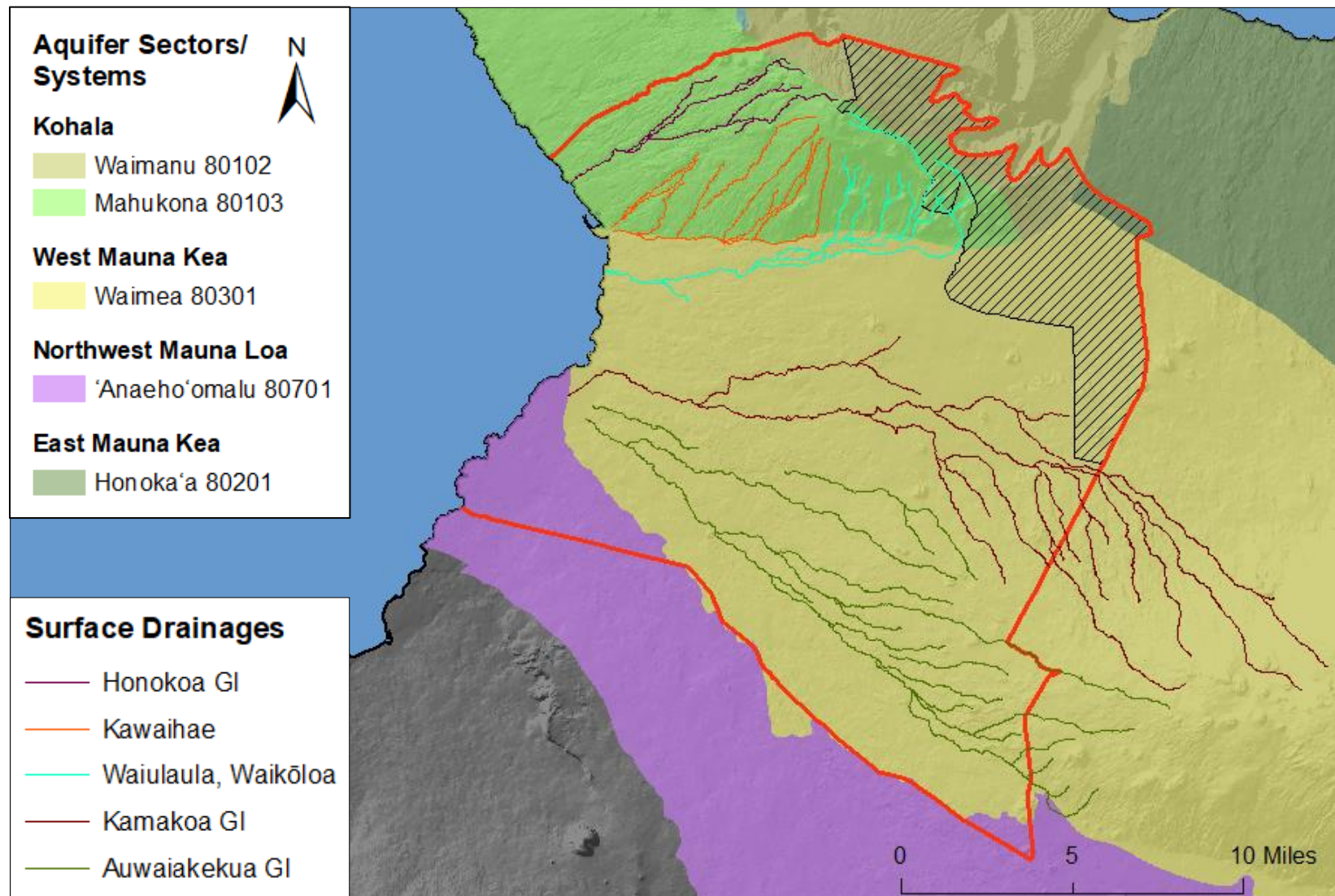


Figure 27. Surface drainages, Aquifer Sectors and Systems.

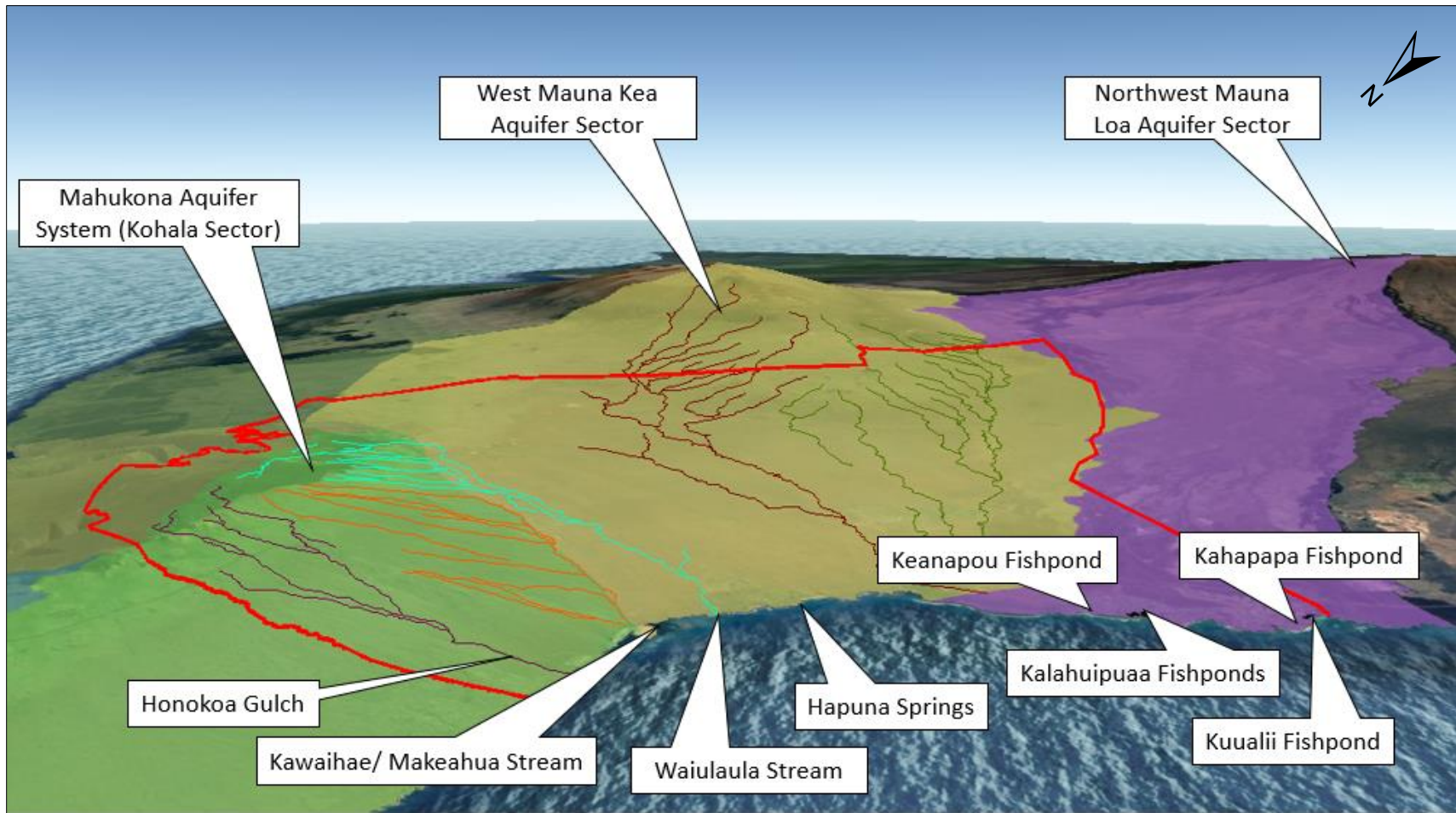


Figure 28. Sample set of coastal resources connected to inland water sources.

3.4.4. Water at the Coast: Bays, Anchialine Pools, and Fishponds

At the coast of Waimea Kālana a variety of estuary-like resources occur due to the coast's geomorphology (Kikuchi 1973:25; Young et al. 1977:17-19; Marrack 2015:1171) facilitating the mixing of ocean water with water coming from inland watersheds and aquifers.

According to the Hawaii National Estuarine Research Reserve,

Estuaries are coastal areas where salt water from the sea mixes with fresh water from rivers and streams. They are among the most productive ecosystems on Earth. Whether they're called a bay, harbor, inlet, or lagoon, estuaries are the transition area between the inland waters and the sea.

(Hawai'i Coastal Zone Management Program 2013)

Being that water from surface drainages only reached the coastline as far south as Waiulaula Stream, fresh water mixing along the rest of the coastline is sourced from the West Mauna Kea and Northwest Mauna Loa Aquifer Sectors. Fresh groundwater manifested here at the coast as “springs or seepages” (Kikuchi 1973:44) to create a suite of natural brackish water environments that include embayments and anchialine pools.

Brackish Water Bays and Anchialine Pools

Both topographic and hydrologic conditions have determined the marine biota, a biota which was exploited in prehistoric times as is indicated by the numerous remains of ancient Hawaiian settlements which fringe the coastline, and which today is vulnerable to modern types of exploitation.

(Young et al. 1977:2)

Brackish water bays south of Waiulaula Stream include Kauna'oa, Hapuna, Puakō, Makaīwa, Honoka'ope, and 'Anaeho'omalū ('Anaeho'omalū is the name of a bay as well as the land division that it is located in). Kauna'oa Bay and a northern portion of Hapuna Bay are located within the 'ili of 'Ōuli. The remaining portion of Hapuna, along with Puakō Bay are located in the 'ili of Lālāmilo. Makaīwa Bay is specifically located in a smaller coastal 'ili called

Kalāhuipu‘a which the State GIS ahupua‘a layer merges with Waikōloa. Finally, Honoka‘ope and ‘Anaeho‘omalu Bay are located within the ‘ili of ‘Anaeho‘omalu (Figure 29). Anchialine pools were an essential resource for Hawaiian settlements found along these bays as salinity levels in some of these brackish water pools were low enough to be potable. Although outside of the project area, Maly provides an oral history for the “Kekaha” region of the North Kona District that describes the various uses of brackish water resources including anchialine pools. (Note, The kekaha region of North Kona and the South Kohala coastline share similar coastal geomorphological and hydrological characteristics.) “The drinking water of this land, the water in which to bathe, and the water for doing various tasks, is the water that is partially salty” (Maly 2007:45).

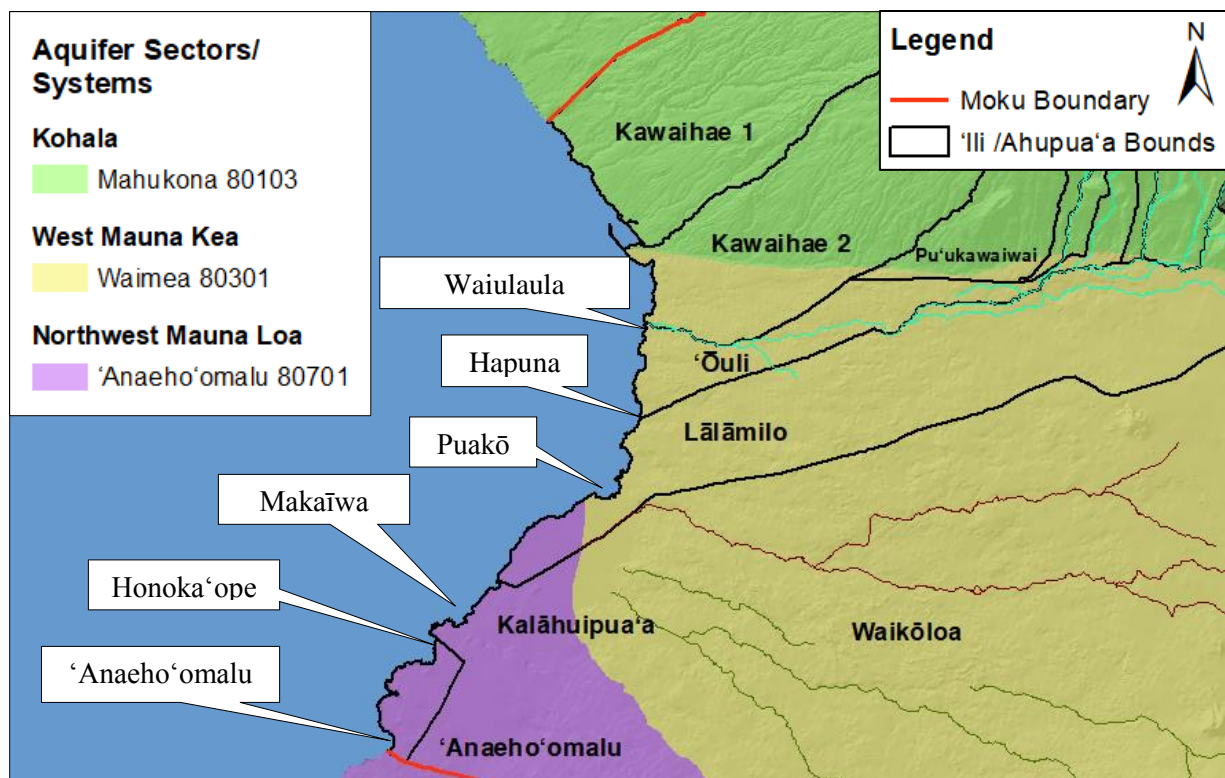


Figure 29. Bays of Waimea Kālana in relation to 'ili boundaries.

According to Marrack and Wiggins (2018) and Marrack et al. (2015), there are twenty-four anchialine pools in Lālāmilo, eleven in Waikōloa/ Kalāhuipu‘a, and fourteen pools in ‘Anaeho‘omalū. Although not perfectly discrete, according to Figure 29, the basal water lens that fed fresh water into the bays and anchialine pools of Lālāmilo, Waikōloa/ Kalāhuipu‘a, and Anaehoomaula were fed from either the West Mauna Kea, or Northwest Mauna Loa aquifer sectors.

Fishponds

When one studies fishponds and how they were connected by underground waterways, it seems likely that the larger Moku districts were subterranean water management areas.

(Kameeleihiwa 2017:7)

Ancient Hawaiian fishponds are another brackish water resource that exemplifies mauka-makai connections and epitomizes UNESCO’s cultural landscape sentiment when it says, “the combined works of nature and of man” (Mitchell et al. 2009:19). Given the region’s hydrogeological cycle, building fishpond enclosures as an aquacultural practice was part of a larger cultural landscape water engineering project. Wyban (1992:88) comments on Hawaiian fishpond ingenuity saying,

Fishponds of ancient Hawaiian design and engineering are unique, appearing nowhere else in the world. Hawaiians knew the watercourse and understood that waterflow was contiguous. What happened to waterflow in one area would affect areas downstream.

Because the necessities of life stretched from the mountain to the ocean and because waterflow was continuous, it made perfect sense for them to divide their resources into mountain-to-ocean divisions of land, ahupua‘a.

The Hawaiian irrigation system integrated agriculture and aquaculture. This was possible because the staff of life was a water-grown plant, taro. The concept of contiguous waterflow combined with the food production system was like an

interwoven lei – irrigation channels, agriculture, aquaculture, shrines of worship, wild taro rootstock, all intertwined within the same watershed.

According to Kikuchi and Belshe (1971:A10-A12) there are two fishponds in ‘Anaeho‘omalū, and seven fishponds in Kalāhuipua‘a/ Waikōloa. The total fishpond acreage in ‘Anaeho‘omalū at the time of Kikuchi’s study was 4.9 acres, and 10.4 acres in Kalāhuipua‘a/ Waikōloa (Kikuchi and Belshe 1971:A10-A12). In *Hawaiian Aquaculture System*, Kikuchi (1973:1) explains the link between fishponds’ estuary-like environment and its potential for productivity saying,

It has been determined that the shore, the estuary, and the fertilized fishpond are capable of a greater productivity of food than farm land of equivalent size...

(Kikuchi 1973:1)

As noted in the introduction, fishponds can be likened to estuaries. The reasons for the tremendous productivity of an estuary are the shallow water depth, the maximum radiation that reaches its depths, the circulation brought on by tidal flow of sea water, and the nutrients carried into the estuary by each tide. The generally shallow nature of most Hawaiian fishponds and their affect by both tidal and stream effluents reflect the model comparison to estuaries.

(Kikuchi 1973:89)

As noted by Wyban (1992:88), “Hawaiians knew the watercourse and understood that waterflow was contiguous”. In regard to watersheds and aquifers, this section has demonstrated how the traditional boundaries of Waimea Kālana reflect purposeful resource distribution for the collection of fresh water from inland, while accounting for its path and distribution at the coast. Although the hydrogeological cycle operating below the surface of this cultural landscape may be visually less obvious; the settlements, bays, anchialine pools, and fishponds at the coast exemplify a nexus of nature and man that ties the entire landscape together.

3.5 TRADITIONAL AGRICULTURE (SCALABLE CASE STUDY)

“The standard piecemeal approach to Section 106 [Federal Historic Preservation Law] compliance is essentially reactive and unpredictable.”

“The best regional approaches focus on large-scale historic or prehistoric settlement and subsistence patterns to predict resource distribution and significance and are not tied to modern political boundaries.”

(Pat Baker 2010)

This section combines previous archaeological and historical maps with GIS to re-present a group of traditional agricultural complexes located predominantly on the uplands of Lālāmilo with some portions lying on surrounding ‘ili (Figure 30). This re-presentation is spatially accomplished by georeferencing three archaeological maps from Clark and Kirch (1983:243,244,247), and a historical map by Walter E. Wall (Wall 1915) which documents a series of traditional agricultural ditches (‘auwai). Hawaiian Kingdom land records and ethnohistoric resources are used to flesh out details of traditional agricultural practice in relation to place names and labor organization. While the previous sections of this chapter focused on landscape attributes that were general and broad across the landscape, this section demonstrates how GIS can also be applied to specific areas or features. To exemplify the scalability of GIS Heritage Landscape studies, this traditional agricultural study will begin by spatially re-presenting an agricultural footprint estimated to be approximately 6,148.50 acres [Arcmap Geocalculator (Esri 2017)] and conclude by scaling down to a single ‘auwai.

By overlaying maps, drawing polygons around each agricultural complex, and calculating acreages, this section works to re-present traditional land-use in an area near to, and overlapping with portions of Waimea CDP (Figure 31). When georeferenced and layered onto the current landscape, this re-presentation of Waimea’s traditional agriculture serves as a visual aid in

helping the community spatially contrast traditional land-use in an area that has experienced landscape change from cattle ranching and urbanization. This comparison could inform the community and government planners about place specific cultural strategies of food production that may then be considered in current sustainability and food security planning.

3.5.1. Method of Georeferencing Maps and Drawing Polygons

Georeferencing Maps

In this section one historic map and three archaeological maps were georeferenced onto the current Waimea landscape. General georeferencing methods were discussed in the beginning of this chapter. For this section the primary reference points for correlation between the plan view maps and the current landscape of Waimea, were “Major Roads” alignments (State of Hawai‘i Office of Elections 2012). These initial correlation points provided accurate georeferencing as the thoroughfare of Waimea Town –although widened over the years– has retained its general course. Figure 32 depicts how the roads on the “Four Field Complexes” map (Clark and Kirch 1983:244) align relatively well with the “Major Roads”. Additionally, the topographic lines from the “Four Field Complexes” overlay, also aligns well with the gulches separating land divisions of the “‘Ili/ Ahupua‘a Bounds” layer. The remaining maps in this section were georeferenced with similar accuracy.

Drawing Polygons

After these maps were georeferenced, a polygon was drawn around each complex (Figure 33). Inter-Field Complex boundaries were more easily estimated based on delineations on the Four Field Complex map overlay. The outer perimeter boundaries of these polygons are imperfect negotiations based on map and Google Earth analysis, in combination with landscape fabric and features mentioned in archaeological and ethnohistorical descriptions. When grouping

the Four Field Complexes' polygons with the Ululā'au "agro-forestry" (Ulukau 2003) polygon, gaps or abrupt corners were gradually connected as to account for human interaction between complexes (e.g. – walking from the edge of one complex into, or along the edge of the other). The grouping of these polygons represents an approximate total acreage (6,148.50 acres) of the traditional settlement and subsistence pattern of the area that people currently associate Waimea Town and ranching practices.

3.5.2. Four Field Complexes: Polygons and Descriptions

Traditional agriculture in the uplands of Waimea Kālana took on many forms. From "lynchet-type" field ridges on the steepened south slopes of Kohala, to "supplemental irrigation" fields on the plain-plateau region of upper Lālāmilo and Waikōloa, agricultural infrastructure and technique was diverse (Clark and Kirch 1983:293-296). The Ululā'au vegetative reconstruction layer located to the east of the Four Field Complexes (with some overlap) adds yet another form of traditional agriculture consisting of groves, agricultural plots, and residential plots interspersed amongst a probable open, "ōhi'a-dominated canopy" (McEldowney 1983:422).

In describing Field Complexes 1 - 4, the archaeological descriptions will be provided verbatim from (Clark and Kirch 1983). However, Field Complex 3 will be presented in the following section as it is pertinent to a separate case study. These archaeological descriptions will be supplemented with layered GIS data in the form of maps that aid in locating points of reference given in the archaeological and ethnohistoric descriptions. Acreages of each estimated polygon were calculated using Arcmap's Geocalculator Tool (Esri 2017) and is presented in the heading of each Field Complex description.

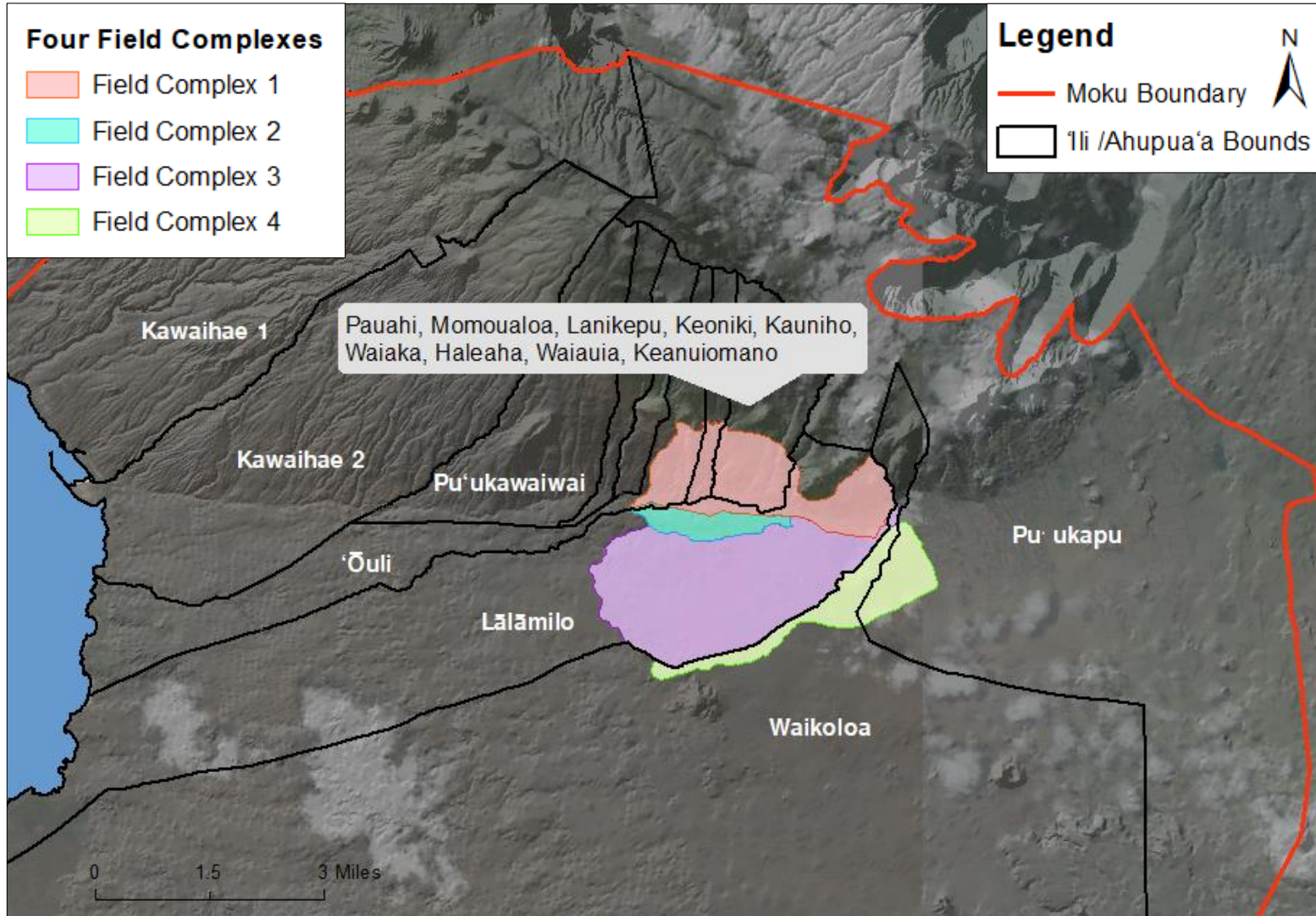


Figure 30. Four Field Complexes in relation to 'ili boundaries and related place names.

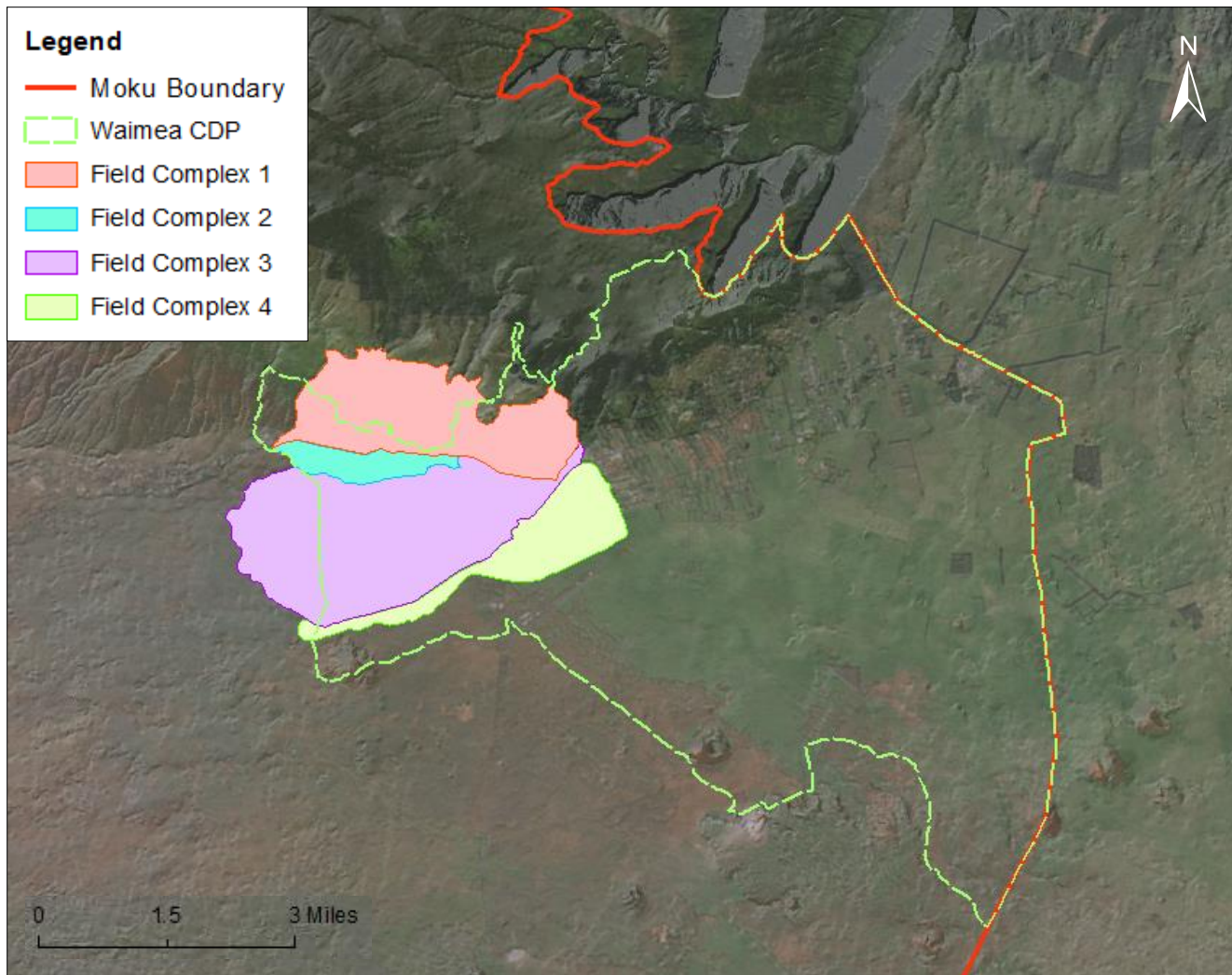


Figure 31. Four Field Complexes in relation to Waimea CDP.

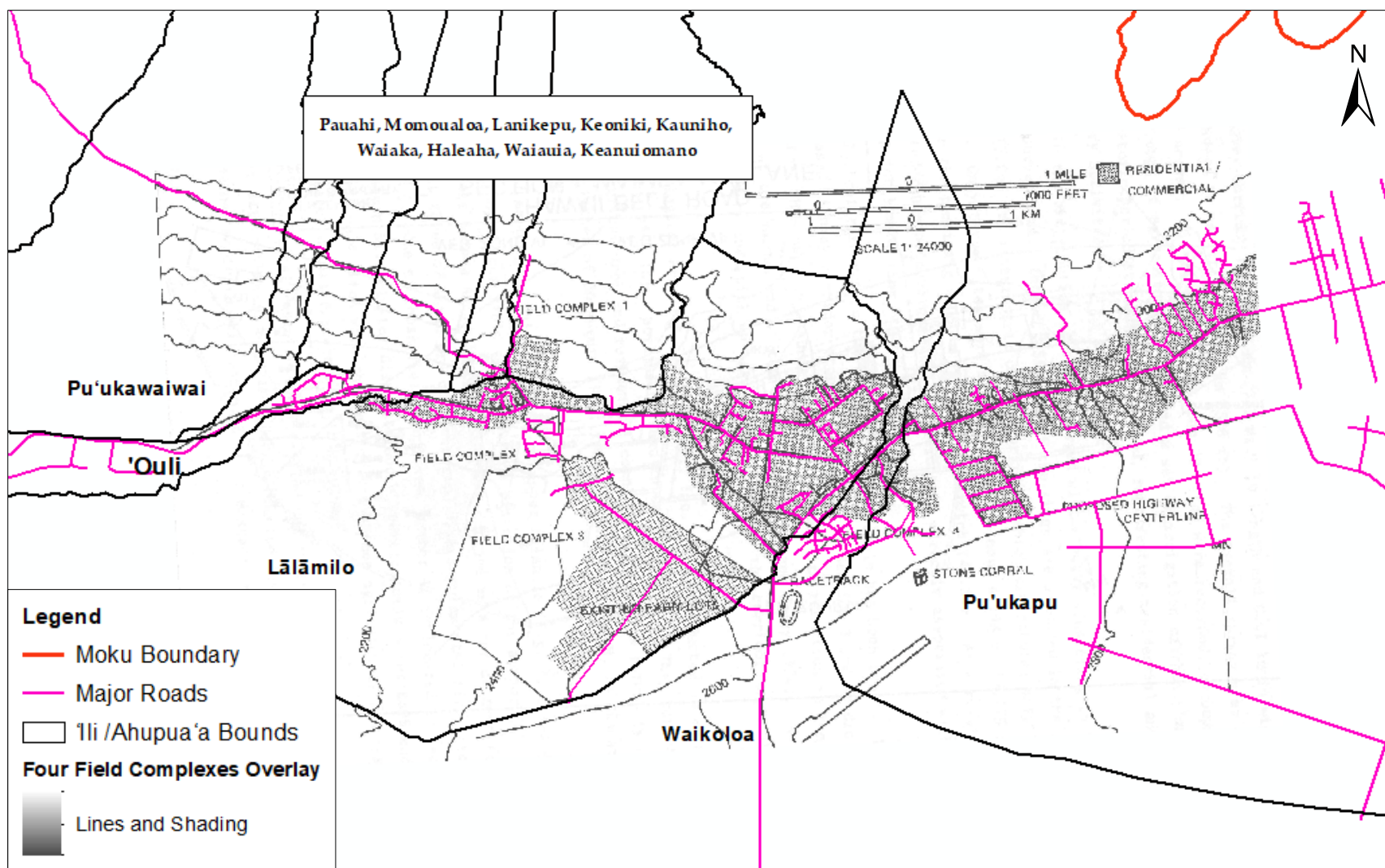


Figure 32. Four Field Complexes map georeferenced to road alignments.

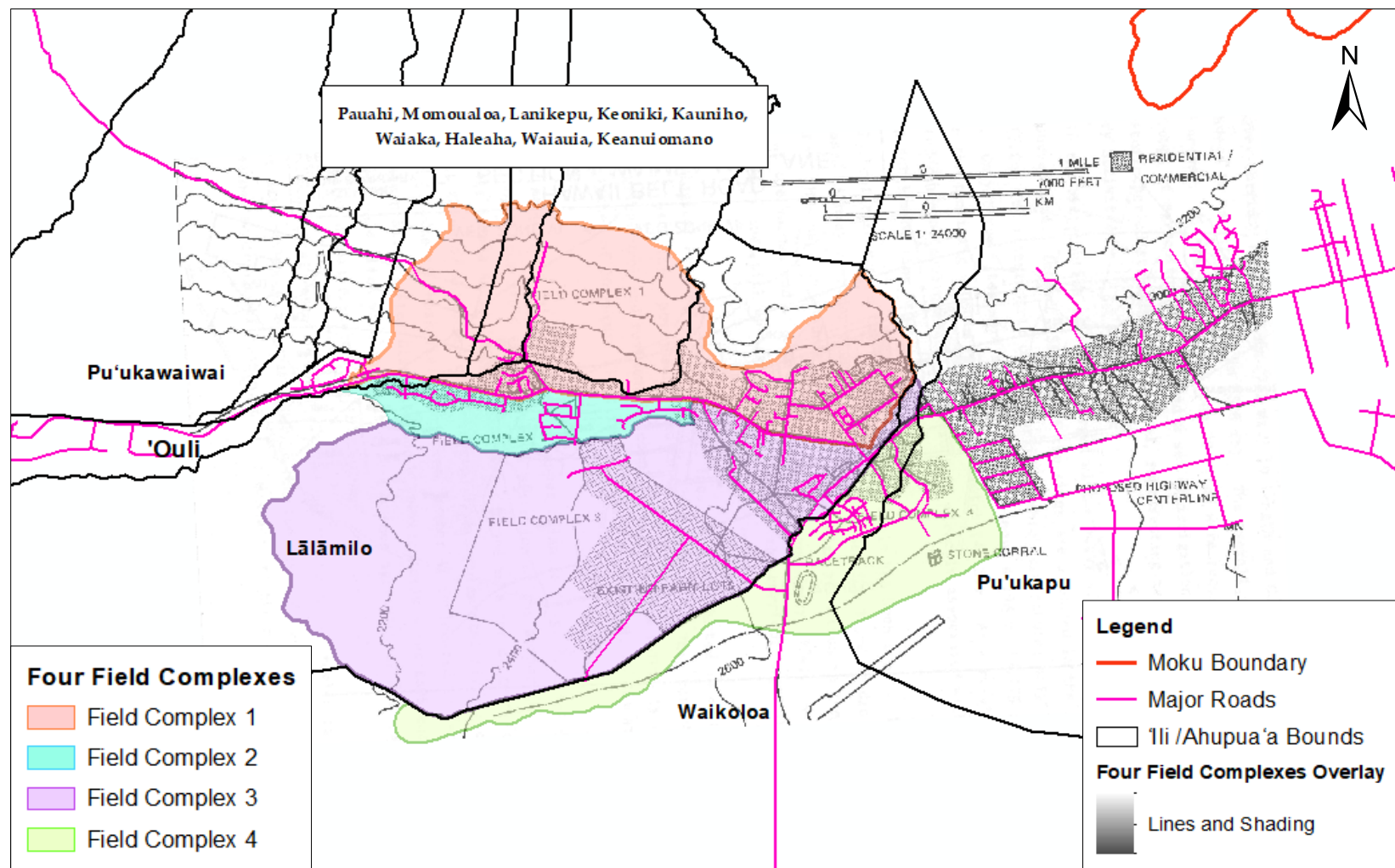


Figure 33. Drawn polygons of the Four Field Complexes.

Field Complex 1: Polygon Acreage – 1,877.50

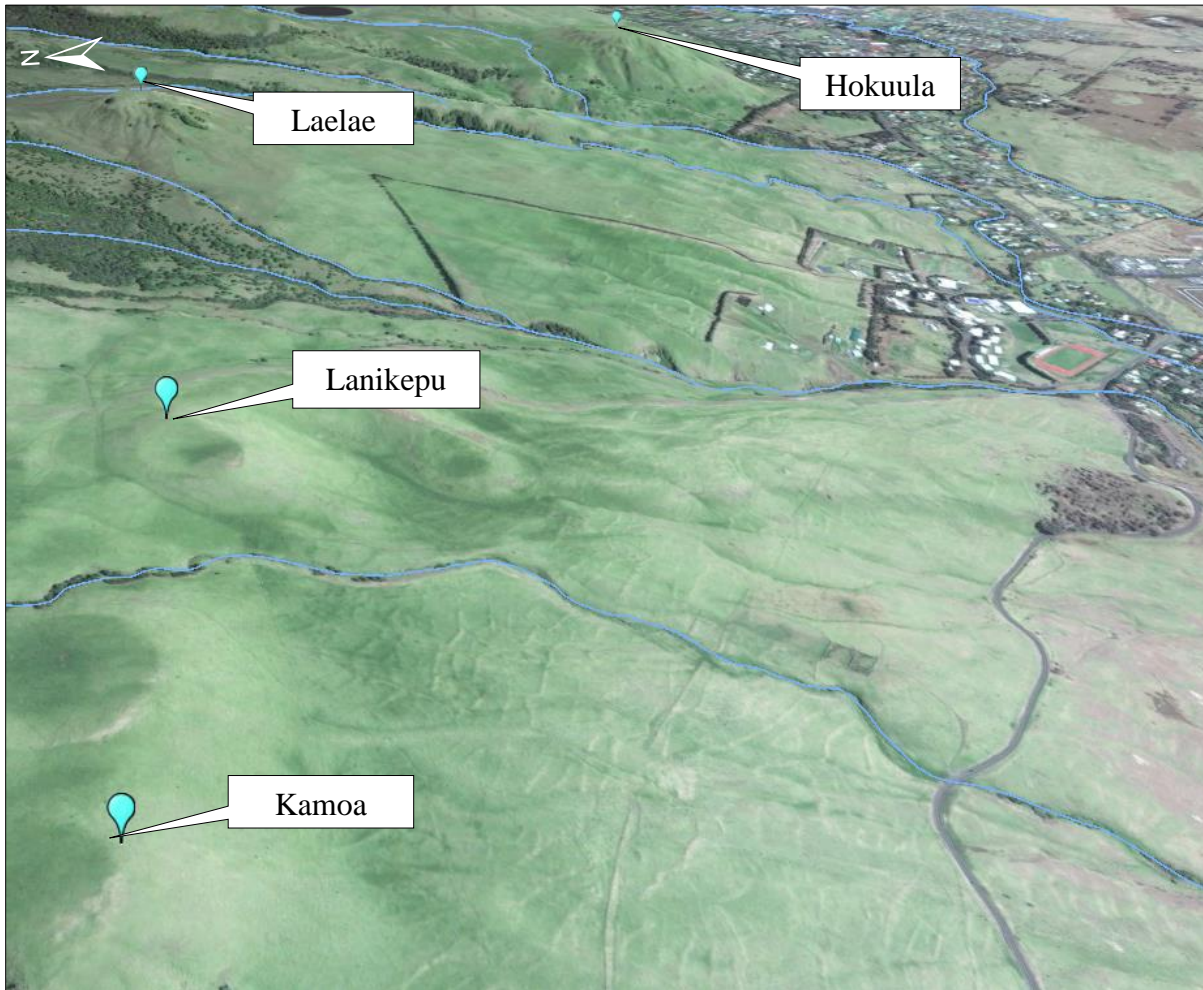


Figure 34. Field Complex 1 field ridges, view looking eastward.

Field Complex 1 is located on the Kohala slope, principally between Lanikepu and Hale‘aha Gulches, and N [North] of the Kanu‘iomanō and Kohākohau Streams where they leave the slope and turn to flow westerly. In this area of comparatively steep slope, the upper elevation portion is dominated by low mildly terraced field ridges. These seem most likely to be of the lynchet-type development rather than intentionally constructed ridges. The lower portion of the complex is marked by larger terraces with broader and flatter surfaces behind soil embankments. These are probably the result of cut-and-fill construction. Associated with the fields is a set of water-flow channels that run down the slope. Most of these appear to serve a drainage function, diverting water off of the fields rather than onto them. (The rainfall on the slope is substantially greater than on the plain below.) Also present, over at least a portion of the complex is a set of irrigation ditches (*‘auwai*) the main channel of which is diverted from the Kohakohau Stream at an elevation of 915m.

(Clark and Kirch 1983:295)

Field Complex 2: Polygon Acreage – 351.30

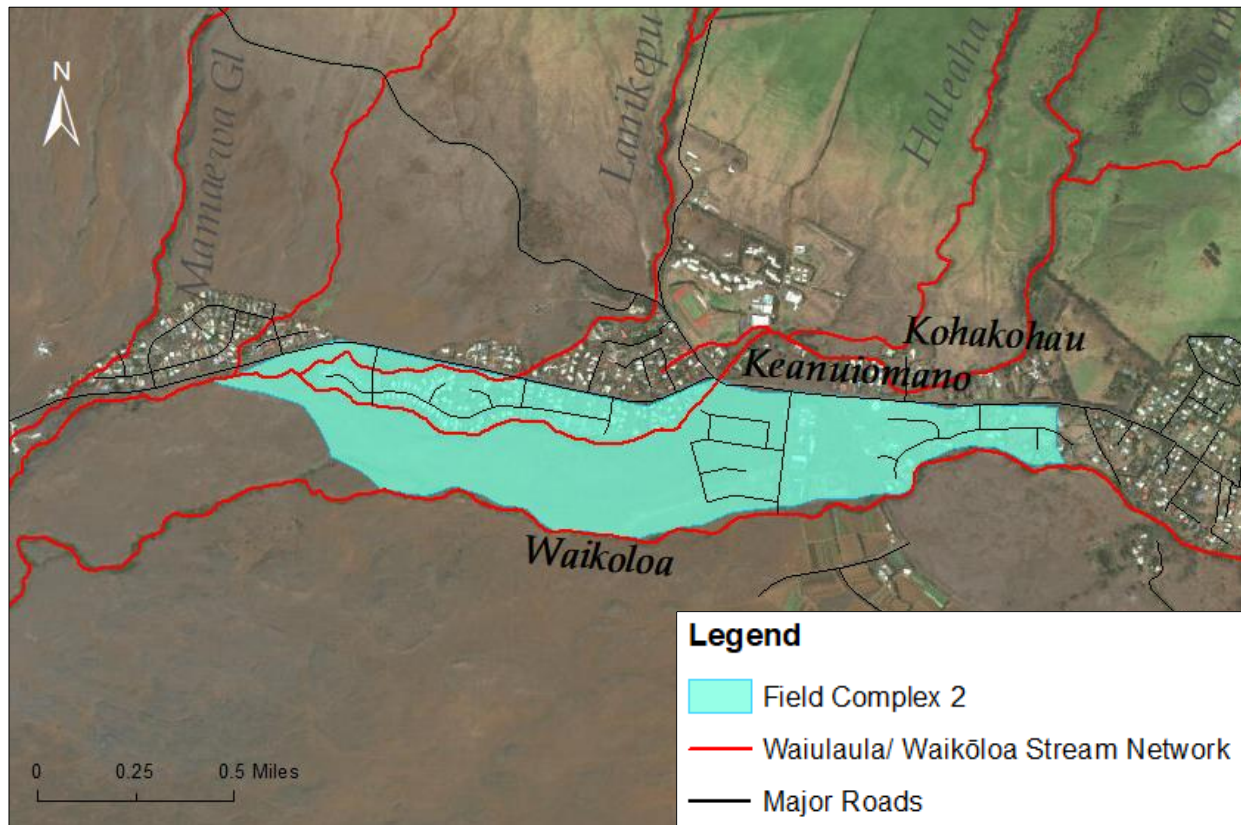


Figure 35. Field Complex 2 in relation to Keanuimano and Kohakohau Stream.

Field Complex 2 is bounded on the N by Streams, and on the S [South] by Waikoloa Stream. It is characterized by a set of agricultural fields that are demarcated by low terrace retaining faces or ridges of soil and/ or stone. The long axes of the fields are oriented NW by SE or perpendicular to the prevailing winds. Associated with the fields is a set of *‘auwai*, the main channels of which divert from the Kohākōhau Stream and angle to the SE, eventually draining into the Waikoloa Stream. Other agricultural and residential features are scattered throughout the area.

(Clark and Kirch 1983:295)

Reference Points: Google Earth, Maps, Fabric, and Ethnohistorical Resources

Figure 34 provides a view of Field Complex 1 in a relatively easterly orientation looking from Pu‘u Kamoā towards Pu‘u Hoku‘ula. This figure shows field ridges continuing westerly beyond Pu‘u Kamoā, however an arbitrary line in between Pu‘u Kamoā and Pu‘u Lanikepu was chosen as an underestimated western boundary for this polygon. The eastern boundary was

estimated using the “Four Field Complexes” map in combination with an ethnohistorical account provided by Handy and Handy (1991:531), “For 1.4 miles along the southern base of Pu‘u Hoku‘ula, terraces are visible under pasture and house sites, presumably formerly watered by a ditch from Waikoloa Stream.” After measuring and distributing the one-and-one-quarter mile along the southern base of Pu‘u Hoku‘ula, it appeared that Waikōloa Stream was the natural eastern boundary of Field Complex 1, thus the polygon was drawn accordingly. As for the southern transition from Field Complex 1, to Field Complex 2, Handy and Handy (1991:531) continues,

These [field ridges] evidently used to be more or less continuous down to and below Waiaka Stream where the road now crosses. Here in 1935 a Hawaiian planter still cultivated taro in a few terraces irrigated from Waiaka Stream where the road now crosses.

The polygon for Field Complex 2 was more easily estimated as the stream and road references provided in the ethnohistoric and archaeological descriptions were plainly identifiable from map overlays and modern road alignments. Figure 35 shows Field Complex 2 situated between Kohākōhau and Waikōloa Stream as referenced by Clark and Kirch (1983:295), in relation to the road alignment mentioned above by Handy and Handy (1991:531).

According to Clark and Kirch (1983:295) “Pu‘u Pā hill” is a reference point between Field Complex 3 and 4 (Figure 36). Note, Wall’s 1915 map (Wall 1915) names Pu‘u Huluhulu as the hill between Field Complex 3 and 4. The east and west polygon limits of Field Complex 3 and 4 matches the extent of the irrigation system documented on Wall’s map (Figure 37). Figure 38 depicts Lanimaumau Stream leading into Field Complex 4. Figure 38 also shows that Lanimaumau Stream matches up with ‘auwai depicted on the overlay of Wall’s 1915 map in Field Complex 4, with a single ‘auwai running along the southern edge of Field Complex 3.

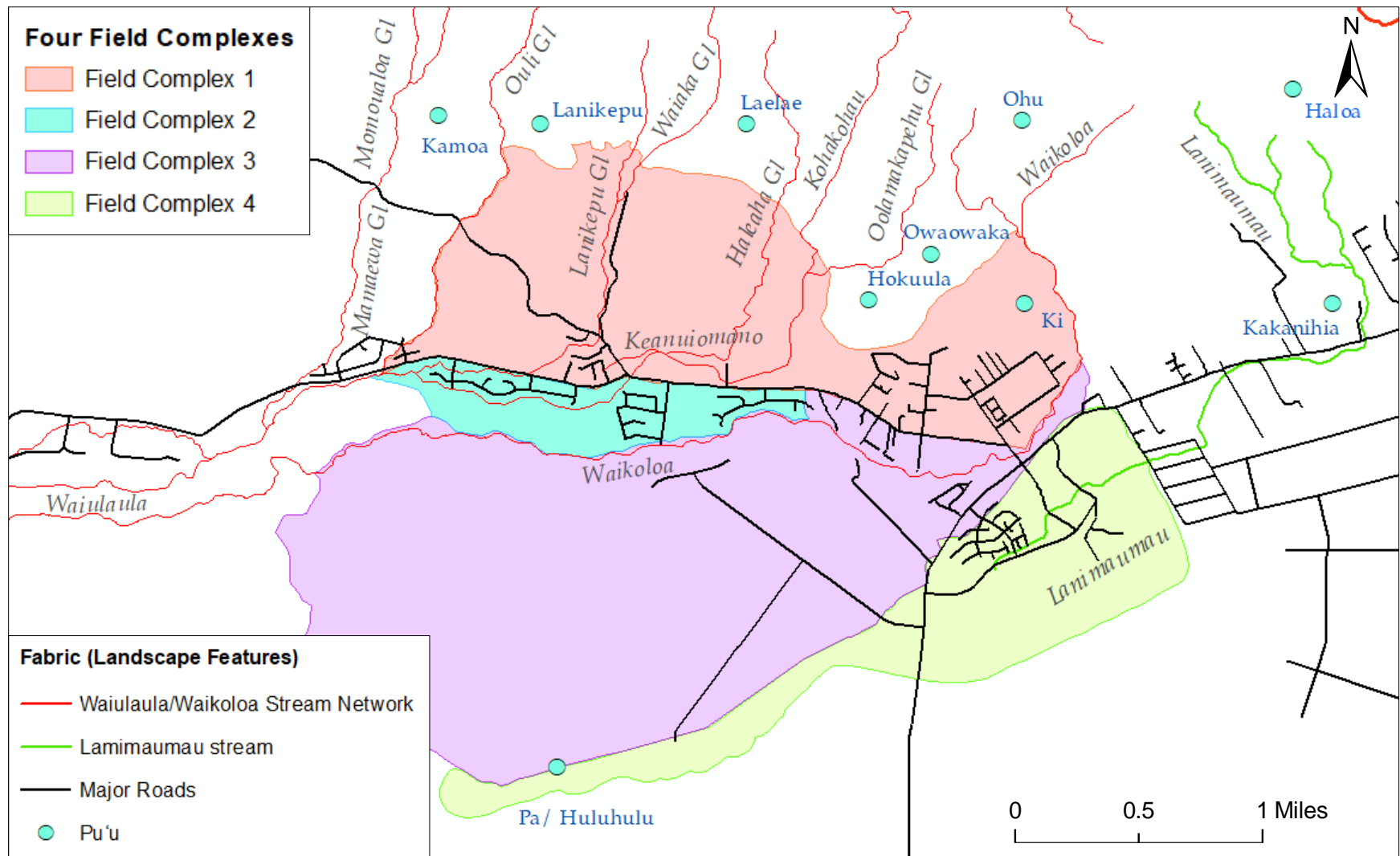


Figure 36. Surface drainages (streams) in relation to Field Complexes and Pu'u.



Figure 37. Wall's 1915 map informs boundaries of Field Complex 3 and 4.

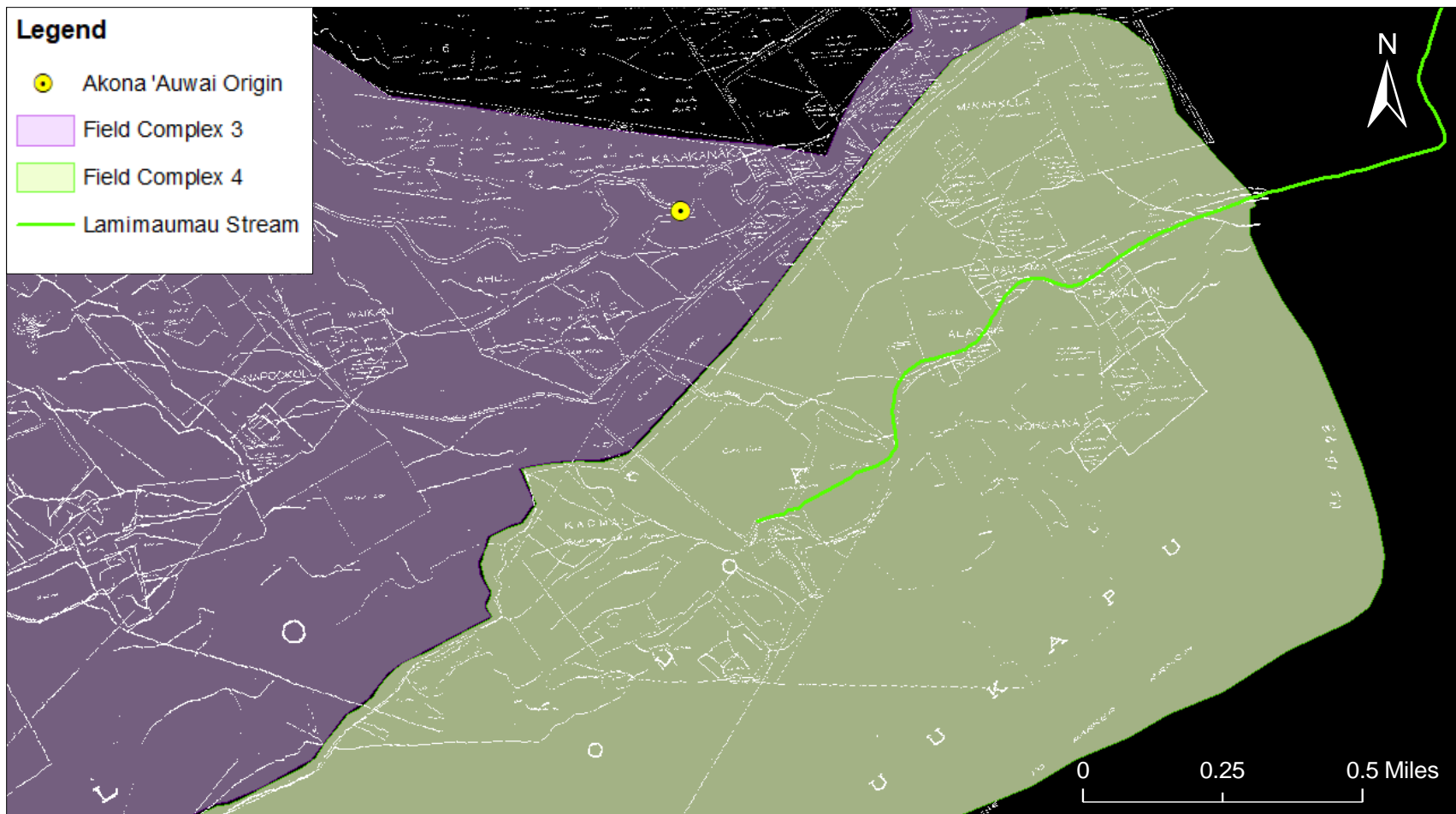


Figure 38. Field Complex 4, Lanimaumau Stream, and 'auwai between FC 3-4.

Field Complex 4: Polygon Acreage – 988.22

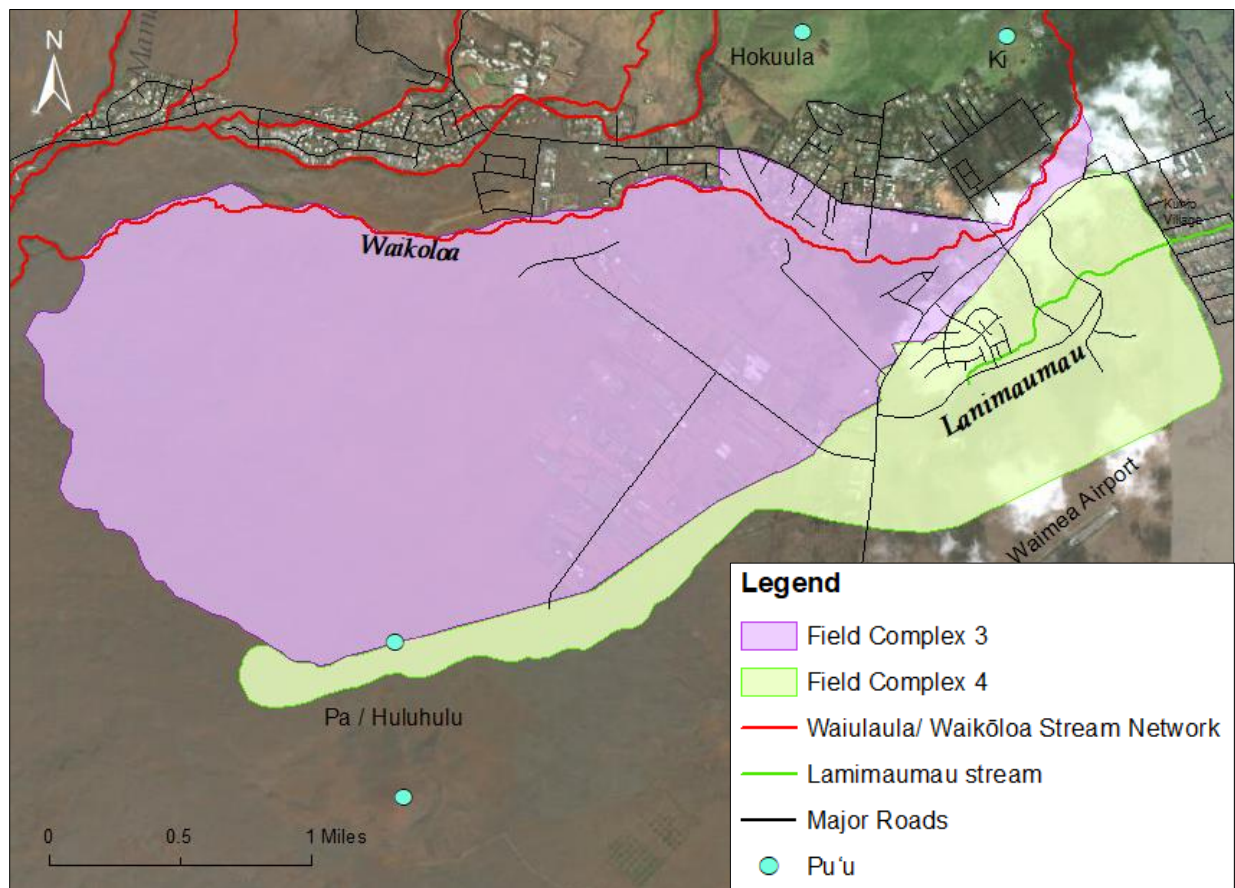


Figure 39. Field Complexes 3 and 4.

Field Complex 4 lies directly S of the village of Waimea. Its probable connection with Field Complex 3 has been obliterated by modern housing and farming. This complex consists of a series of long, narrow fields that are demarcated by low soil ridges. Also present are irrigation ditches that are diverted from the Waikoloa Stream and appear to represent the same type of supplemental irrigation system as found in Field Complex 3. Also found in this zone are numerous stone walls and residential sites situated on the sides of low knolls..... Field Complex 4 represents the easternmost expansion of the Waimea agricultural system.

(Clark and Kirch 1983:297)

3.5.3. Field Complex 3: Waimea's Unique Supplemental Irrigation System

Field Complex 3: Polygon Acreage - 2931.48

Field Complex 3, the largest of the field complexes, is situated between the Waikoloa Stream on the N and Pu'u Pā hill on the S. A portion of unknown size on the eastern end of the complex has been destroyed by modern residential and agricultural expansion. The western extent has not yet been precisely determined, but it appears likely that the system fades out at around 550m a.s.l. The topography in this area varies from steeply to gently undulating, with moderately broad to narrow soil swales separated by numerous low and occasional high rocky to outcropping knolls and ridges and stretches of rocky ground. As one moves S across the plain from the Waikoloa Stream, the area becomes drier, the swales diminish in size, as do the ridges and knolls, and the rockiness increases.

Distributed across this landscape are a large number of residential and other non-agricultural sites. The residential sites are nearly always found on the knolls and ridges over-looking the swales, and often on the leeward sides of these features. Temporary shelters (C-shapes, L-shapes, etc.) as well as permanent dwellings (habitations, terraces, platforms, etc.) are present; many of the latter structures are associated with other features, most commonly animal or agricultural enclosures, stone-edged depressions, fireplaces, and burial monuments. The dominant features of the archaeological landscape are those related to agriculture. These fall into five main categories: (1) bounded field units; (2) small planting swales; (3) pondfields; (4) 'auwai; (5) minor planting features, i.e., stone mounds, small terraces, and/or outcrop modifications on the slopes.

(Clark and Kirch 1983:295-297)

Clark and Kirch's Conclusion on Agriculture

The agricultural production system in operation in the prehistoric and historic past in the Waimea area was varied over space and time. Its full import, history of development, and operational nature can only be understood with further excavations at sites in the core of the Waimea agricultural system., and in the intermediary zone between this system and the coast. Our work in the highway right-of-way, as described here and in the other reports in this volume, provides a picture of the system on its periphery, but only a glimpse of the primary occupation and agricultural zone. Clearly, the variety of agricultural practices evidenced here, and the uniqueness of the supplemental irrigation system that was in operation, make this an extremely significant region for Hawaiian archaeology.

(Clark and Kirch 1983:313)

3.5.4. Akona ‘Auwai: Irrigation, Place Names, and Land Use Case Study

In this section, Field Complex 3 is further analyzed to exemplify how a Heritage Landscape approach may be applied an area or feature specific case study. The heritage being re-presented in this case study is related to place names and land-use connected to a named irrigation ditch (Akona ‘Auwai) documented on Wall’s 1915 map. LCA testimonies were researched for descriptions that might confirm water movement from this ditch’s point of origin, to an area named Lihue on Wall’s map. After confirming contiguous irrigation from source to Lihue, the number of secondary and tertiary or terminating irrigation branches were tabulated. The number of irrigation branches serve as a proxy for counting irrigation gates which allows for a discussion about organized labor. The combination of GPS, field photography, and spatially re-presenting place names associated with ethnohistoric land-use descriptions, aids this case study in reviving a sense of place related to traditional agricultural practices.

Locating Akona’s ‘Auwai

Field Complex 3 is predominantly situated within the ‘ili of Lālāmilo and was the largest of the four agricultural complexes and consisted of at least five types of farming infrastructure. Central to the success of these various forms of food production was the presence of ‘auwai used mostly for supplemental irrigation, which according to Clark and Kirch (1983:313) is a unique system not well documented in classic Hawaiian literature. One of the main ditches that fed Field Complex 3 was Akona ‘Auwai. Figure 40 and 41 shows a portion of Wall’s map overlaid near the main intersection of Waimea Town at Lindsey Rd. and Mamalahoa Highway. These figures also contain a GPS point taken during a field survey of a walking trail along Waikōloa Stream suspected to be the origin of Akona ‘Auwai. Figure 41 shows that this GPS point is near a branch-off from Waikōloa Stream that is labeled “Akona Auwai” on the overlay of Wall’s map,

thus representing the ditch's point of origin on the current landscape. Discrepancy between the GPS point and the branch-off on the overlay is a result of the $4\text{m} \pm$ degree of GPS accuracy in combination with historical changes in the stream's water level due to modern diversion, and possible stream bank erosion. Figure 42 is a photo depicting the bend of Waikōloa stream drawn in on Wall's map. Figure 43 shows a log that now blocks the stream from what today is used as part of a walking trail; Figure 44 shows this trail beyond the log, running between banked earthen sides looking in a relatively westward direction.



Figure 40. 1915 Wall map overlaid to current roads.



Figure 41. Close-up of Wall map overlay showing Akona 'Auwai labeled.



Figure 42. Bend in Waikōloa Stream near origin of Akona 'Auwai.



Figure 43. Log fronting trail near Akona 'Auwai point of origin.



Figure 44. Current walking trail that shares alignment with Akona 'Auwai.

Confirming Irrigation with Place Names and Land Commission Awards

From its point of origin, Akona ‘Auwai goes on for 8456.53 feet [Arcmap Geocalculator (Esri 2017)] or approximately 1.6 miles before it reaches the end point of this case study in Lihue (Figure 45). Two LCA testimonies for land plots connected to Akona ‘Auwai on Wall’s map confirm irrigation on or along their properties. These LCA land plots are found in the named lands of Ahuli and Napookolu. In Ahuli, LCA# 4885 for claimant William French states, “along wall near water run to corner of wall” (Mahele Award 4885). Although the grammar of this quote is incorrect, the accompanying land plot map (APPENDIX A) clearly depicts a waterway running along a corner of this property. Further west, along Akona ‘Auwai before entering into the lands of Lihue, is the land of Napookolu. In Napookolu, LCA# 989 for claimant John Davis states, “Commencing at pile of stones at [(East?) unsure of symbol] corner of this land by water course leading down from Waimea Village to Lihue...” (Mahele Award 989). This phrase, “water course from Waimea Village to Lihue” is written along a ditch drawn on an accompanying land plot map (APPENDIX A). These two LCAs in combination with Wall’s 1915 map confirms irrigation from Waikōloa Stream to Lihue.

A total of six LCAs associated with four named lands were researched through the Papakilo Database (OHA 2017). Along its divergence from Waikōloa stream to Lihue, Akona ‘Auwai branches more than once; these branches are associated with the lands of Ahuli, Waikani, Puopelu, and Napookolu. Table 17 compiles information from these LCAs and highlights whether these claims mention the presence of ‘auwai and/ or konohiki as a proxy for socio-cultural organization of labor. Note, a konohiki is a traditional resource manager appointed by the chief of an ahupua‘a (Handy and Handy 1991:307; Malo 1951:58). Duplicates of these LCA testimonies and accompanying plot maps may be found in APPENDIX A.

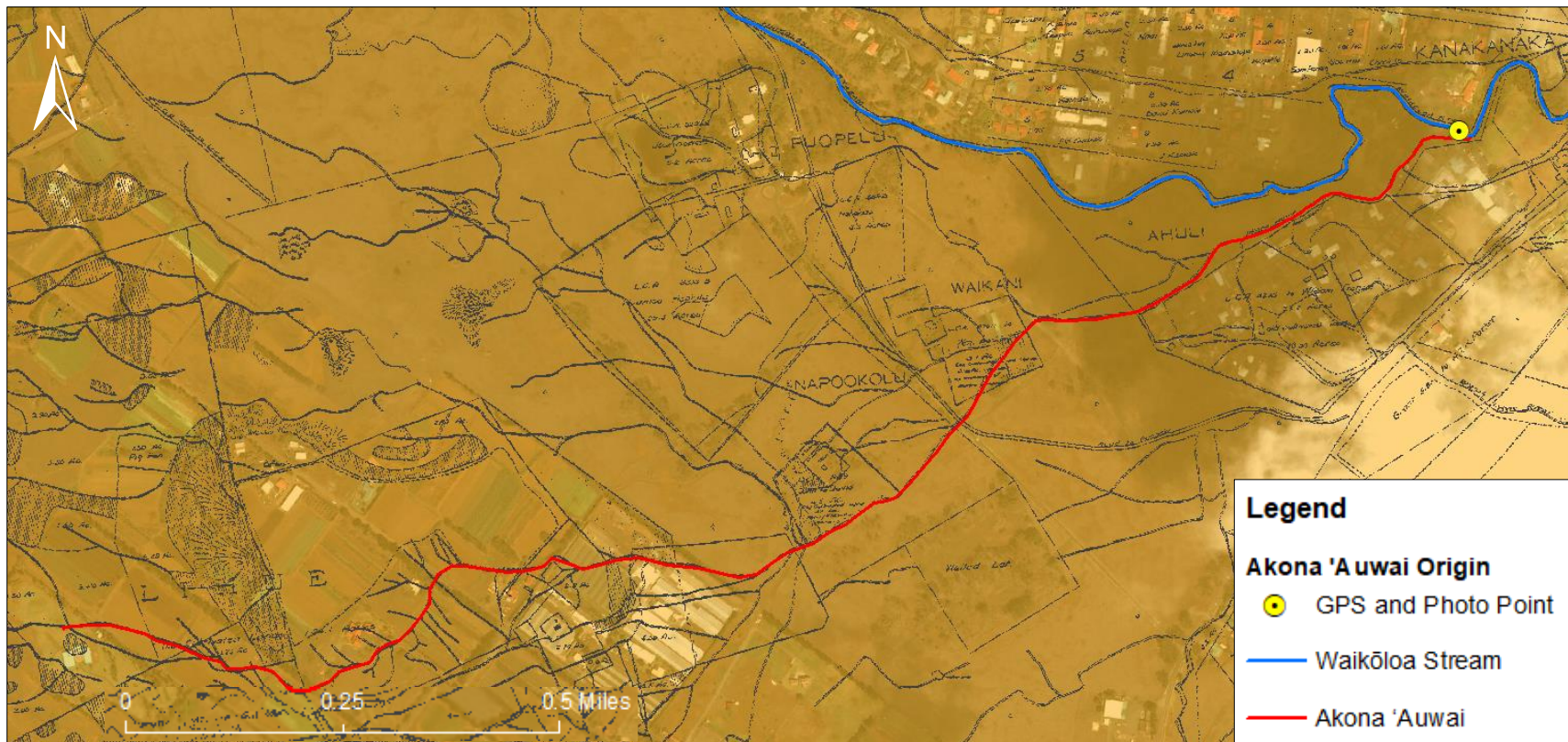


Figure 45. Akona 'Auwai from point of origin to Lihue.

Table 17. Compilation of LCAs associated with Akona 'Auwai from source to Lihue.

Place Name	LCA #	Claimant	Year	Mention of 'Auwai or Konohiki in Testimony or on Land Plot Map		Citation	Acreage (Wall map)
				'Auwai	Konohiki		
Ahuli	4885	William French	1850	✓		Mahele Award 4885	23.2
Waikani	976	William Beckly	1851	✓	✓	Mahele Award 976	5.1
Puopelu	3202B	Jose Bowers	1851		✓	Mahele Award 3202B	8.2
Puopelu	589B	Naholowaa	1851	✓	✓	Mahele Award 589B	5.3
Napookolu	8513B	Kuamoo Hoolulu	1851	✓	✓	Mahele Award 8513B	29.3
Napookolu	989	John Davis	1849	✓	✓	Mahele Award 989	5.1

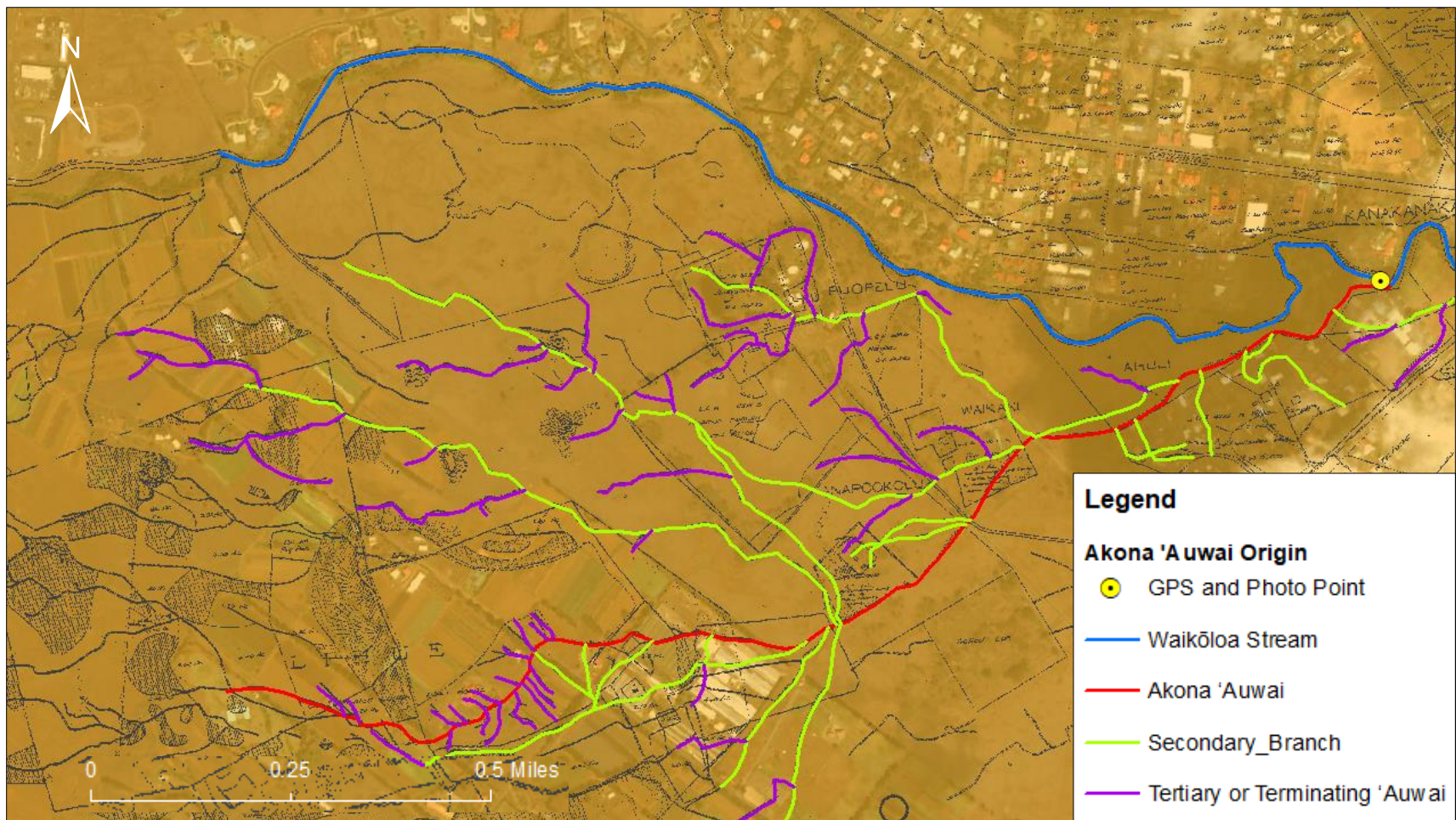


Figure 46. Akona 'Auwai with secondary and tertiary or terminating branches.

Water and Authority: ‘Auwai and Traditional Resource Management

From Table 17 this LCA analysis reveals that up into the mid-nineteenth century, a relationship still existed between ‘auwai and konohiki in the western portion of modern day Waimea CDP. The konohiki was a traditional land and resource manager that was appointed by the chief of an ahupua‘a (Beamer and Duarte 2009:81; Maly 2001:4). The socio-political station of the konohiki was situated between the chief of the land division, and the farming tenants on the chief’s lands, otherwise known as maka‘ainana (Handy and Handy 1991:41,21; Beamer and Duarte 2009:81). Thus, the konohiki by authority of the socio-political system, organized labor and land-use (natural resources) to make the chiefs’ lands sustainably productive.

In traditional Hawai‘i irrigated water use was highly regulated. The konohiki of an ahupua‘a (in this case an ‘ili) was charged with the authority and duty of allocating water to farming tenants on lands under his jurisdiction according to maximum efficiency and fairness. Fairness in this sense was allocation based on contribution of labor from farmers in the production and maintenance of the ‘auwai, and the productiveness of lands under the farmer’s cultivation. Nakuina (1894:79-80) provides an ethnohistorical account of regulated water allocation saying,

The general distribution of the quantity of water each independent land was entitled to was in proportion to the quota of hands furnished by each land, but subject to regulation as to distance from source of supply. This quantity was regulated by the time each had in the water rotation or division, when such land would take all or almost all the water of the ‘auwai for the period of time allotted to it. This time varied in the cases of mooaina, ku, ili, or ahupua‘a [types of land divisions] from a few hours, half a day, night, or both, to two or three days.

Water allocation under the authority of the konohiki, from stream to ditch, was facilitated by the construction of māno (dams). It is plausible that damming may also have been required for larger ‘auwai when allocating between major branches. Figure 46 shows Akona ‘Auwai with

its branches spreading out to the named lands and LCA parcels compiled in Table 17. Figure 46 color codes these secondary ‘auwai (major branches of Akona ‘Auwai that have branches of their own) and tertiary or terminating ‘auwai (branches off of secondary ‘auwai or those that terminate without branches of their own). In an article written in 1894 by Emma Metcalf Nakuina titled *Ancient Hawaiian Water Rights*, Nakuina (1894:79) says the māno was “a low loose wall of stones with a few colds here and there, high enough only to raise water sufficiently to flow into the ‘auwai.” Tertiary or terminating ‘auwai are presumably smaller and may have been what Nakuina (1894:81) called “runlets” in which case turning them on or off was facilitated “by means of a clod, stone, or both”.

Whether secondary or terminating, there were thirty-eight water channels coming off of this case study’s portion of Akona ‘Auwai. Nakuina goes on to briefly describe the labor process required to insure the proper watering rotation between agricultural plots.

In ancient times the holders of a water right were required whenever it became their turn in the water rotation or division to go up with the *luna wai* (superintendent) to the water head or dam to see that it was in proper condition; follow down the *auwai* from there, removing all obstructions which may have fallen in or had been carried down by the water during the night from the *kahawai* or mountain stream; shut off all branch *auwais* or runlets from the main auwai, except those conducting water to lois [*lo ‘i(s)*] entitled to water at the same time ...

(Nakuina 1894:81)

Perception of Place Through Water and Labor

Nakuina’s statement above hints at an intricate relationship that existed between authority, labor, and resources (land and water) in the maintenance of the ‘auwai system, and the execution of the water rotation. When counting ‘auwai branches for all the LCAs on Table 17, there are over sixty possible water channels that would need to be managed to ensure that water

reached its intended plot. In the broader context, the management of human (labor) and natural resources would thus have to be exercised over at least 4,271 acres as Field Complexes 2, 3, and 4, were irrigated. In his 1988 treatise on irrigation and authority –*Size and the Structure of Authority in Canal Irrigation Systems*– anthropologist Robert C. Hunt discussed whether population, total canal length, or overall extent, was the best proxy measurement to assess the influence of centralized authority over irrigation systems (Hunt 1988:344). Hunt settles his discussion by saying,

More useful than the above figures for measuring the size of an irrigation system would be a ratio of the number of canal gates to the extent of the whole system. This would be a telling figure, for it would identify the number of decision points in the system (each gate must be operated; and the more gate operations, the more decisions taken) and could very well serve as an index of administrative density. However, such data are rarely available.

(Hunt 1988:344)

Although much of Waimea’s traditional field system now lay under pastures, modern farms, and commercial or residential development; archaeological, ethnohistorical, and archival resources still preserves the knowledge of Waimea’s traditional agricultural heritage. In applying GIS to re-present these resources –in combination with place specific names and landscape fabric– it is possible to spatially re-envision traditional practices related to land-use and resource management on the current landscape. Also significant is that this geographically scaled down case study, being part of a larger Heritage Landscape format is still able to be analyzed and appreciated in the context of its broader cultural landscape. Thus, this HLRIM is able to aid a community discuss significance of GIS layers independently or simultaneously (interconnected). Finally, the broad, specific, and interconnected analysis of a Heritage Landscape approach helps to ensure that heritage land-use planning won’t be confined to modern boundaries such as TMKs.

CHAPTER 4. ANALYSIS AND DISCUSSION

Although this thesis does not put forth a formal management plan for the landscape attributes contained in this project's geo-cultural baseline, this chapter's analysis and discussion provides an example of how geo-cultural attributes may be translated into Heritage Land Use Guidelines (HLUG). In moving from inventory to management, both UNESCO (Mitchell et al. 2009:42) and The Burra Charter of 2013 (ICOMOS 2013:8) include in their frameworks the need for creating statements of significance. "Once the assessment [assessment in this project means inventory and analysis] is completed, the statement of significance of the place's heritage values will provide guidance in the next stage of determining management policies and priorities" (Mitchell et al. 2009:42). Since the significance and values of a place's heritage should be done with "transparency and involvement of community members and multidisciplinary expertise" (Mitchell et al. 2009:42); this chapter's analysis is meant only as an exercise that may or may not be retained by the Waimea community.

In preparing statements of significance for Waimea's Heritage Landscape, this chapter identifies important attributes contained in each layer of the geo-cultural baseline in Chapter 3. These attributes were chosen for their cultural and/ or natural function, and their ability to provide a previous sense of place as perceived through spatial resource distribution and management. In this chapter UNESCO's World Heritage Criteria for Cultural Landscapes, and Hawaiian resource management perspectives provides frameworks for articulating the significance of a landscape attribute. The purpose of this chapter is to exemplify how a community that has implemented a HLRIM might begin to articulate a baseline of significance for its resources and sense of place. In this way heritage values for preservation, conservation, and restoration may be proactively included into land-use planning.

4.1 ANALYZING AND ARTICULATING SIGNIFICANCE

The value of the cultural landscape is based on the interaction between people and their environment; and the focus of management is on this relationship...

(Mitchell et al. 2009:35)

The method employed for formulating statements of significance was to create a multi-faceted metric that would capture the value of landscape attributes documented in the geo-cultural baseline. An attribute's value here is not numerically quantified, instead the categories of the multi-faceted metric is the heritage or cultural landscape value attempting to be captured. Thus, the exercise of capturing an attribute's value is to state how it applies to each category within the metric; likewise, the metric categories created for this project are in alignment with the purpose of this HLRIM as defined in Section 1.4 and Table 7.

Metric categories created for this analysis were structured to capture each attributes relevance to Hawaiian resource management, UNESCO's Cultural Landscape Criteria, its traditional or natural function, and its ability to provide a past landscape perspective. Table 18 lists UNESCO's Cultural Landscape Criteria (Mitchell et al. 2009:21) that dually focuses on an attributes relevance to culture and nature, or the interaction between the two. Each attribute's relevance to the other three categories listed above were both implicitly or explicitly re-presented in its respective layer in Chapter 3 and is here compactly stated in the metric. Tables 19 – 23 displays the metric for each landscape layer. The subsequent statements of significance are derived from the values captured in its metric table. The goal of these statements is not to restate every element or criteria found in its metric. Instead these statements are a culminating exercise that models how a heritage landscape inventory, filtered through cultural and environmental values, may progress from data to an articulated baseline that is spatially referenceable.

Table 18. UNESCO's World Heritage criteria for cultural landscapes (Mitchell et al. 2009:21).

Criteria Numbers	Extract from the <i>Operational Guidelines for The Implementation of The World Heritage Convention: Criteria</i> (Paragraph 77)
i	represent a masterpiece of human creative genius; or
ii	exhibit an important interchange of human values, over a span of time or within a cultural area of the world, on developments in architecture or technology, monumental arts, town-planning or landscape design; or
iii	bear a unique or at least exceptional testimony to a cultural tradition or to a civilization which is living or which has disappeared; or
iv	be an outstanding example of a type of building or architectural or technological ensemble or landscape which illustrates (a) significant stage(s) in human history; or
v	be an outstanding example of a traditional human settlement or land-use which is representative of a culture (or cultures), especially when it has become vulnerable under the impact of irreversible change; or
vi	be directly or tangibly associated with events or living traditions, with ideas, or with beliefs, with artistic and literary works of outstanding universal significance (the Committee considers that this criterion should justify inclusion in the List only in exceptional circumstances and in conjunction with other criteria cultural or natural);
vii	contain superlative natural phenomena or areas of exceptional natural beauty and aesthetic importance; or
viii	be outstanding examples representing major stages of earth's history, including the record of life, significant on-going geological processes in the development of landforms, or significant geomorphic or physiographic features; or
ix	be outstanding examples representing significant on-going ecological and biological processes in the evolution and development of terrestrial, fresh water, coastal and marine ecosystems and communities of plants and animals; or
x	contain the most important and significant natural habitats for in-situ conservation of biological diversity, including those containing threatened species of outstanding universal value from the point of view of science or conservation;

4.1.1. Metric and Articulation of Cultural Landscape Significance

Traditional Boundaries Based on Waimea Kālana

Table 19. Metric for Analyzing the significance of Traditional Boundaries.

Landscape Attribute	Hawaiian Resource Management	UNESCO Criteria	Traditional or Natural Function	Baseline Perception and Management Guidance
Waimea Kālana Boundaries	Share functional properties of moku divisions related to resource distribution and management	i, ii, iii, iv, v, vi, vii, viii, x	Mauka to Makai Resource Management	Expands current geographic scope to reflect traditional significance associate with the name Waimea
‘Ili Boundaries	Share functional properties of ahupua‘a related to resource distribution and socio-economic access	i, ii, iii, iv, v, vi, vii	Access to multiple resource zones	Exemplifies traditional resource distribution strategies
LCA and Boundary Commission Testimonies	Testifies of less recognized land division, and nuance of socio-political organization	iv	Testimonies reconnect coastal and upland relationship	Renews traditional, local, and native perspective of place, thus re-presenting a past sense of place

Statement of Significance:

The Heritage value of the traditional boundaries of Waimea Kālana and the subsequent land divisions it encompasses, is that it more accurately re-presents a cultural landscape based on native testimonies of the mid-1800s and reflects the broad traditional Hawaiian practice of holistic natural resource distribution – its management, and strategy of socio-cultural access. Thus, the re-presentation of these boundaries provides the current community a temporal and geo-cultural sense of place. This sense of place also spatially renews cultural associations with the name Waimea Kālana and provides a more culturally relevant geographic baseline for current negotiations of resource management regarding preservation, conservation, or restoration of heritage landscape attributes – both cultural and natural. The significance of perpetuating perceptions of these traditional boundaries is that it exemplifies how the interaction between man and nature shaped this cultural landscape and provides the foundation for other layers of significance to be built upon.

Landscape Fabric and Viewshed

Table 20. Metric for Analyzing the significance of Landscape Fabric and Viewshed.

Landscape Attribute	Hawaiian Resource Management	UNESCO Criteria	Traditional or Natural Function	Baseline Perception and Management Guidance
Waimea Plain - Plateau (WPP)	Trail corridor for traveling between places and resources; facilitates maintenance of socio-economic and familial relations	ii, iv, v, vi, vii, viii, xi	Topography, fabric, and visuals define places and spaces of social, economic, and spiritual significance	Various viewpoints along corridor are connected to place names and storied places, WPP is also associated with historical events (e.g. battles)
Pu‘u	Correlated to: - Waimea Kālana boundaries - ‘Ili boundaries - Resources - Storied places	ii, iii, iv, v, vi, vii, viii	Provides landscape reference points, defined boundaries and therefore also provided a physical sense of place	Landscape reference points Named and storied places
Trails and Viewshed	Travel routes connecting people to places and resources while viewshed help to define the bounds of the landscape itself	ii, v	Facilitated socio-cultural, economic, and political connections between people, places	Viewshed provides socio-cultural, economic, and political boundaries/sense of place
Mountains – Kohala – Mauna Kea – Mauna Loa – Hualālai	Watersheds, Aquifers, and Sacred Landscape	ii, iii, iv, v, vi, vii, viii, ix, x	Water collector, shape weather patterns, and provided forest and other resources	Wao Akua (realm of the gods), Piko (connection to source)

Statement of Significance:

Situated at the base of Kohala and Mauna Kea, with visuals of Mauna Loa and Hualālai, the possible viewsheds of Waimea Kālana are an important resource that contributes to the region's sense of place. The region's visual resources being the result of the elevational contrast between plain, plateau, and mountain ridgelines, is the topographical canvas upon which centuries of interaction between nature and man eventually birthed the cultural bounds of Waimea Kālana. The Waimea Plain-Plateau as an ancient mauka-makai, socio-cultural, and natural resource corridor remains a fixture of the landscape from which culturally significant reference points may still be seen. Initial spatial and Visual Resource Management (VRM) analysis highlights the significance of particular pu'u that correspond or correlate to perimeter points of Waimea Kālana thus defining the place and space of this cultural landscape. Furthermore, all of the summits (State GIS layer groups mountain tops and pu'u as summits) of the region are named, many of them being storied places significantly related to resources, legends, battles, genealogies, and more.

The heritage value of these visual resources is that their presence is still capable of referencing the stories, places, and resources that they referenced to the ancestors of this land, thus contributing Waimea's baseline of significance and a prior temporal sense of place. Continued VRM studies on landscape view-planes could help to inform urban, commercial, and industrial land-use planning to ensure that these visual resources retain their traditional associations.

A restored mauka-makai trail within the Waimea Plain-Plateau would also serve as a heritage resource that would enable current residents (and visitors) to experience the landscape more intimately. This trail, along with interpretive signage, height, and locational development regulations, would serve to perpetuate Waimea's visual associations as a cultural landscape that was holistically managed from the forested uplands to the sun baked sea shore.

Historic Vegetation and Land Use

Table 21. Metric for Analyzing the significance Historic Vegetation and associated land-use.

Landscape Attribute	Hawaiian Resource Management	UNESCO Criteria	Traditional or Natural Function	Baseline Perception and Management Guidance
Pili Land 1	Access to coastal and marine resources, salt production and groves of native food plants and building material	ii, iii, v	Estuary-like habitat; Geomorphology conducive to anchialine pools, springs, seepages, and fishponds	Provides baseline land-use guidance for specific environmental sector
Pili Land 2	Hunting and gathering zone	ii, iii, v	Habitat for native and migrating birds, and pili grass	Provides baseline land-use guidance for environmental sector
Kula Land 1	Prime agricultural zone	ii, iii, v	Climate, moisture, and soils conducive to agriculture; Watershed catchment area	Provides baseline land-use guidance for environmental sector
Kula Land 2	Prime agricultural zone	i, ii, iii, iv, v, vi, vii, viii, ix	Climate, moisture, and soils conducive to agriculture; Watershed catchment area	Provides baseline land-use guidance for environmental sector
Ululā‘au	Agro-Forestry/ subsistence; hunting and gathering zone	ii, v, ix	Watershed and a subsistence strategy	Provides baseline land-use guidance for environmental sector
Mixed Open Canopy Forest	Access to forest resources; hunting and gathering practices	ii, v, ix	Watershed, and resource gathering zone	Provides baseline land-use guidance for environmental sector
‘Ōhi‘a Rainforest	Access to forest resources; hunting and gathering practices	ii, v, ix	Watershed, and resource gathering zone	Provides baseline land-use guidance for environmental sector

Statement of Significance:

From Pili Land 1 at the coast, to the ‘Ōhi‘a Rainforest atop Kohala Mountain, the moisture and vegetative gradient of Waimea Kālana provided ancestral residents access to coastal resources, building and cordage materials, garden mulch, avian and swine protein, farm lands, and most importantly, water. Most significant of this vegetative reconstruction is that its estimation provides the current community a spatial sense of the pre-to-early cattle environment of their landscape and its subsequent land-uses.

When combined with the perimeter and internal boundaries of Waimea Kālana, this vegetative reconstruction re-presents the embedded Hawaiian practice of resource distribution when dividing lands. Trails linking the coast to the internally land locked ‘ili of this region, exemplifies how all major ‘ili of Waimea Kālana had access to costal, agricultural, and forest resources.

The heritage value of this baseline is that its spatial data may be used to inform current efforts of conservation, preservation, and/or restoration of native habitats. Furthermore, because McEldowney coupled vegetation and moisture gradient with historic land utilization, this data could also be used to inform long-range sustainability guidelines to be included into current land-use planning allocations.

‘Ili Configuration and Mauka-Makai Connections

Table 22. Metric of significance for ‘Ili Configuration and Mauka-Makai Connections.

Landscape Attribute	Hawaiian Resource Management	UNESCO Criteria	Traditional or Natural Function	Baseline Perception and Management Guidance
‘Ili Boundaries	Share functional properties of ahupua‘a related to resource distribution	i, ii, iii, iv, v, vi, vii	Configuration of Pu‘ukapu in relation to other ‘ili reflects moku type function as watershed	Renews the perception of the intentionality and functionality of traditional land divisions related to resource management
Pu‘ukapu – Forested Watershed	Intentional land division resembling a forested watershed and resource commons	i, ii, iii, iv, v, vi, vii	Captures various forms of water and channels it to coast in drainages or recharges aquifers and basal water; Resource gathering commons	Renews the perception of the intentionality and functionality of traditional land divisions related to resource management
Aquifer Sectors – Kohala – West Mauna Kea – Northwest Mauna Loa	Makes anchialine pool and equestrian-like water resources from ground water possible at the coast	iv, v, vii, viii, ix, x	Filters, stores, and disperses fresh water	Exemplifies Mauka – Makai connections through hydrogeological cycle and coastline subsistence patterns
Surface Drainages	Streams and Gulches tapped for drinking and irrigation; (Some match land divisions)	iv, v	Drains rain water into the ocean, and recharges aquifers	Renews perception of Waiulaula - Waikōloa as a perineal waterway
Coastal Water Resources – Stream – Springs – Anchialine Pools – Fishponds – Brackish water bays	Coastal settlements, trail travel, brackish water coastal and marine habitat resource procurement; Fishpond and anchialine pool management	i, ii, iii, iv, v, vi, vii, viii, ix, x	Natural hydrogeological cycle enabled cultural coastal subsistence and settlement patterns to be established at the shore	Renews the importance of mauka – makai connection and holistic regional (district scale) land-use planning

Statement of Significance:

The analysis of traditional boundaries with reconstructed vegetation serves as a significant reminder of the intentionality and wisdom embedded in the palena of Waimea Kālana as a holistic resource management strategy. Furthermore, this layer renews perception of Pu‘ukapu as a forested and capping watershed that functioned as a resource commons for the rest of the internal land divisions.

The significance of perceiving Waimea’s landscape as an intentional watershed unit is that it connects the cultural and natural resources at the coast with fresh water resources that originate from the inland forests, and various aquifer systems. As annual rainfall along the South Kohala coastline is minimal, lateral travel and settlement patterns at the coast would have been supported or at least supplemented by fresh water occurring in streams, springs, or as the top layer of potable water found in anchialine pools. Other cultural-natural estuary-like resources made possible by the mixing of sea water with fresh water found along the coastline are the fishponds and embayments. In effect all anthropogenic activities occurring in Pili Lands 1 and 2 –the driest zones of the region– were supported by a holistic approach to water resource management in which the configuration of land divisions was foundational.

While all the attributes included in this landscape layer are significant in of themselves, their collective heritage value is that they emphasize the interconnectedness of the landscape and the resources distributed throughout. The baseline perception value of this layer is that from forest to fishpond, it re-presents to the current community how the name Waimea is synonymous with traditional Hawaiian resource management, whose geo-cultural associations are just as relevant at the coast, as it is to the town in the uplands.

Traditional Agriculture

Table 23. Metric for Analyzing the significance of Traditional Agriculture.

Landscape Attribute	Hawaiian Resource Management	UNESCO Criteria	Traditional or Natural Function	Baseline Perception and Management Guidance
Field Complex 1 and 2	Planting strategy transitioned with topography and water availability from field ridges on mountain slope, to irrigation on plain land with irrigation	i, ii, iii, iv, v, vi, vii	Food production and settlement strategy	Perception of traditional land-use and practice helps to envision a cultural sense of place that informs sustainable food production strategies that contrasts with cattle production
Field Complex 3 and 4	Intensive and expansive supplemental irrigation system, unique among known traditional Hawaiian planting strategies	i, ii, iii, iv, v, vi, vii	Food production and settlement strategy	Perception of traditional land-use and practice helps to envision a cultural sense of place that informs sustainable food production strategies that contrasts with cattle production
Waikōloa and Lanimaumau Stream	Managed stream system for irrigation and mauka – makai water flow	ii, iii, v, vii, viii,	Water for drinking, irrigation, and natural mauka – makai water cycle	Renews perception of these streams being managed as perineal water resources as opposed to intermitted drainages
Akona ‘Auwai	Example of place specific ‘auwai management	ii, iii, iv, v, vi	Food production, and socio-cultural organization	Renews perception of place-based traditional agricultural practice
LCA Testimonies and Wall 1915 Historic Map	Exemplifies traditional agricultural practices related to irrigation	ii, iii, iv, v, vi	Archival records testify to land-use and socio-political organization	Renews perception of place-based traditional agricultural practice

Statement of Significance:

The topic of sustainability and food security is now a normal part of community discourse throughout the Hawaiian archipelago. However, Hawai‘i’s communities today are multicultural and socio-economically diverse, leading diverse approaches to sustainability. The significance of Waimea’s traditional agricultural complexes is that it is able to inform current negotiations related to sustainable food production in ways that are place-based and culturally relevant. The spatial, ethnohistoric, and archaeological evidence contained in this layer provides a baseline of knowledge that may be applied in schools throughout the district for place-based curriculum related to culture, history, and sustainable resource management.

The restoration of portions of the Waimea agricultural complexes could provide a nexus for community-based organizations focused on sustainability and food security to be informed by traditional practices. While these restorative projects may not be equipped to recreated complete authenticity, the mixture of old and new techniques of food production would help to perpetuate this form of heritage and simultaneously provide the community with more locally grown produce.

The perceptive value of this layer is how it may renew an aspect of Waimea’s sense of place prior to cattle that persisted into the early cattle era. As land-use in Waimea has been associated with cattle ranching for over 150 years, pastures more than traditional agricultural fields have been the dominant landscape fabric relatable to its community. This layer renews perception of an integrated and traditional food production system consisting of slope terrace, supplemental irrigation, and agro-forestry, that highlights the ingenuity of the ancestors residing in the area.

As it is unlikely that the Waimea Field Complexes will be restored in its entirety, this digital format is a form of heritage that is scalable from over 6,000 acres down to a single irrigation ditch. With this spatial reconstruction ‘auwai deemed not feasible for irrigation today, may possibly be

adaptively reused as trails. Turning old ‘auwai into trails, accompanied with interpretive signage that incorporates place names with irrigation practices, is a possible strategy for perpetuating the traditional farming heritage of the area. Finally, as a least one of the major trails from the coast comes up into the central portion of the Field Complexes, a community-based heritage center and program located somewhere in this area of confluence is appropriate. From this location the establishment of a community-based heritage complex would highlight the interconnectedness of Waimea Kālana.

4.2 DISCUSSION: HERITAGE LAND USE GUIDELINES

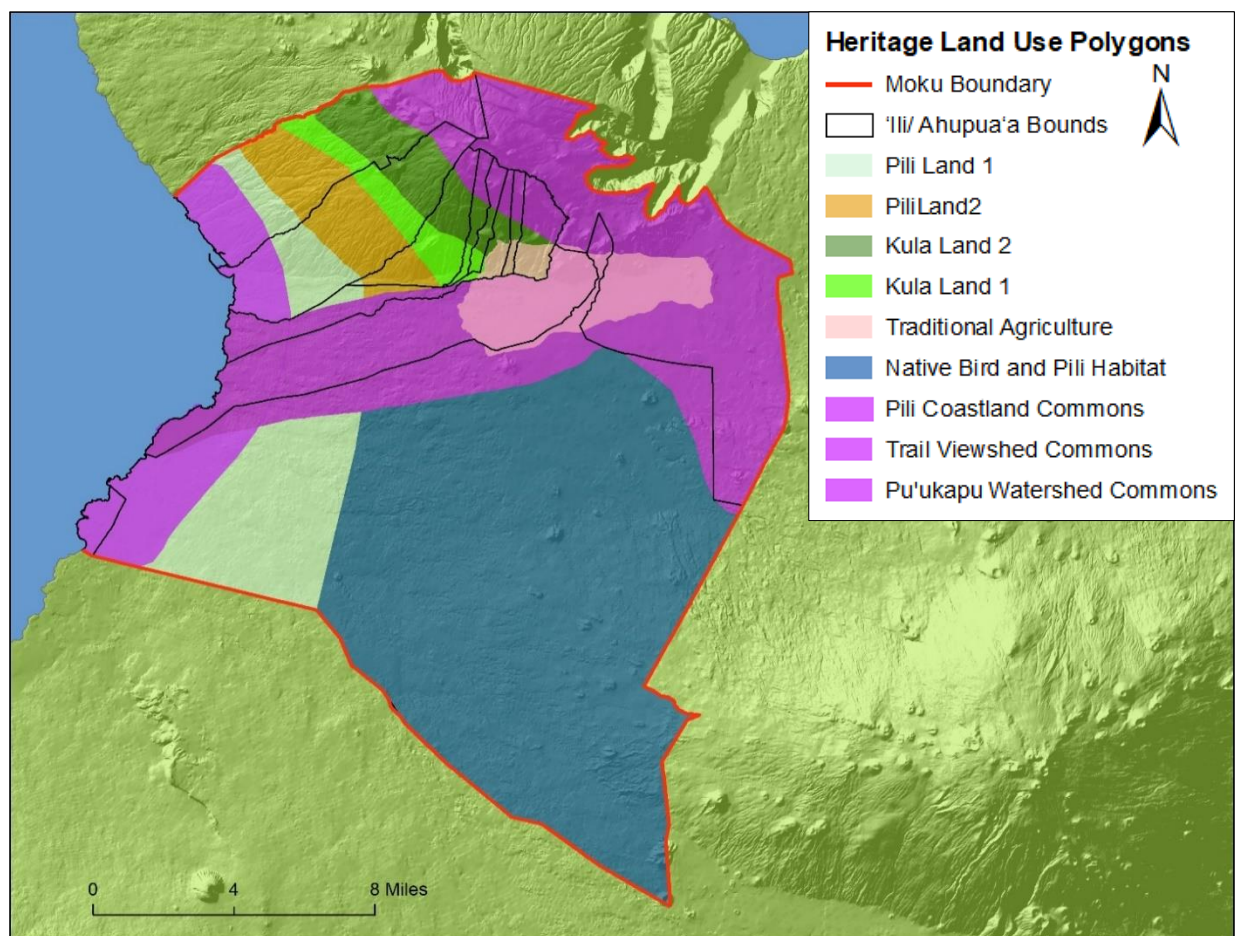


Figure 47. Heritage Landscape planning polygons used to inform land-use allocations.

The LUPAG GIS layer used in this project was adopted by “Hawai‘i County in January 2005 in Ordinance 05-25” (Hawai‘i County General Plan 2005). While regional land-use planning discussions began in the 1950s, the current LUPAG evolved from Hawai‘i County’s 1971 “General Plan” intended to “set forth the policy for the comprehensive development of the entire island” (Hawai‘i County General Plan 2005). “The land use pattern is a broad, flexible design intended to guide the direction and quality of future developments in a coordinated and rational manner. The General Plan Land Use Pattern Allocation Guide (LUPAG) map indicates the general location of various land uses in relation to each other” (Hawai‘i County General Plan 2014:14-7). Zoning ordinances are the “legal instrument that regulates the use of land”, “implements the General Plan”, and “deals with existing conditions and shorter range needs” (Hawai‘i County General Plan 2014:14-3). The relationship between the LUPAG and Zoning Ordinances is intertwined as “Rezoning must be consistent with the General Plan, including the Land Use Pattern Allocation Guide Map” (Hawai‘i County General Plan 2014:14-4). While seemingly proactive, there exists heritage and cultural value gaps in the intention of these allocation guidelines. These value gaps are evident in the methodological hierarchy used to develop these allocations.

The General Plan Land Use Pattern Allocation Guide Map shall also designate areas for urban expansion. An area is designated as urban expansion when the specific settlement pattern and types of uses have yet to be determined.

The methodology used to develop the land use pattern reflects estimates of future population based on economic and employment evaluations, existing land uses and zoned areas, determination of community facility needs, and transportation demands for the entire island. The topography and other physical features of each area were also analyzed, and other factors, particularly economic, social, and physical characteristics, were noted.

(Hawai‘i County General Plan 2014:14-9,14-10)

The above excerpt reveals two important considerations; first, there is a bias towards designating lands as urban expansion, and secondly western economy and urban infrastructure considerations outweigh natural and cultural considerations. From a Heritage Landscape approach, I would argue that the LUPAG's focus on "existing land uses", over a region's earlier sense of place consequently lessens cultural perspectives of resource management and subsequent heritage values relating to preservation or restoration of a cultural landscape. This is evident as culture is not mentioned in the above methodology, and social and natural factors are considered after development considerations.

4.2.1 Plotting Heritage Land Use Guideline Polygons with Recommendations

Value gaps existing between the County's LUPAG and a community's concerns pertaining to cultural-heritage, sense of place, and sustainable resource management may possibly be filled by creating Heritage Land Use Guidelines (HLUG) based on the spatially referenceable statements of significance produced by the HLRIM process (Figure 47). (Note, because the resources analyzed interconnects all of South Kohala, the scope of these guidelines applies to the whole district.) These polygons are estimations based on all the landscape attributes contained in the various layers of the geo-cultural baseline. Like the LUPAG, Heritage Land Use Guidelines are useful for projecting broad and flexible land-use guidelines for each respective polygon while considering each polygons relation to each other. Figure 48 combines these Heritage Land Use Guideline polygons in relation to a sample set of landscape fabric that represent visual, natural, and cultural resources that connects various parts of the landscape. Figure 49 layers HLUG polygons with LUPAG polygons as an example of how value gaps in land-use may be spatially compared.

These polygons (Figures 47 -49) were subject to my own perceptions of significance and therefore are just part of a discussion in how to progress data from significance, to spatial guidelines. The following Heritage Land Use Guidelines are not extensive nor comprehensive. As a demonstration piece, they are simplified examples of the process by which a community may plot significance in the form of land-use recommendations that would help to inform county planning, zoning, and permitting. These polygons could also inform developers of areas of potential conflict should their proposals not align with community-based heritage values associated with places and spaces. Recommendation themes include sustainability, restoration/preservation of sense of place, and an adaptive re-use of Lorenzo Lyons' idea of commons.

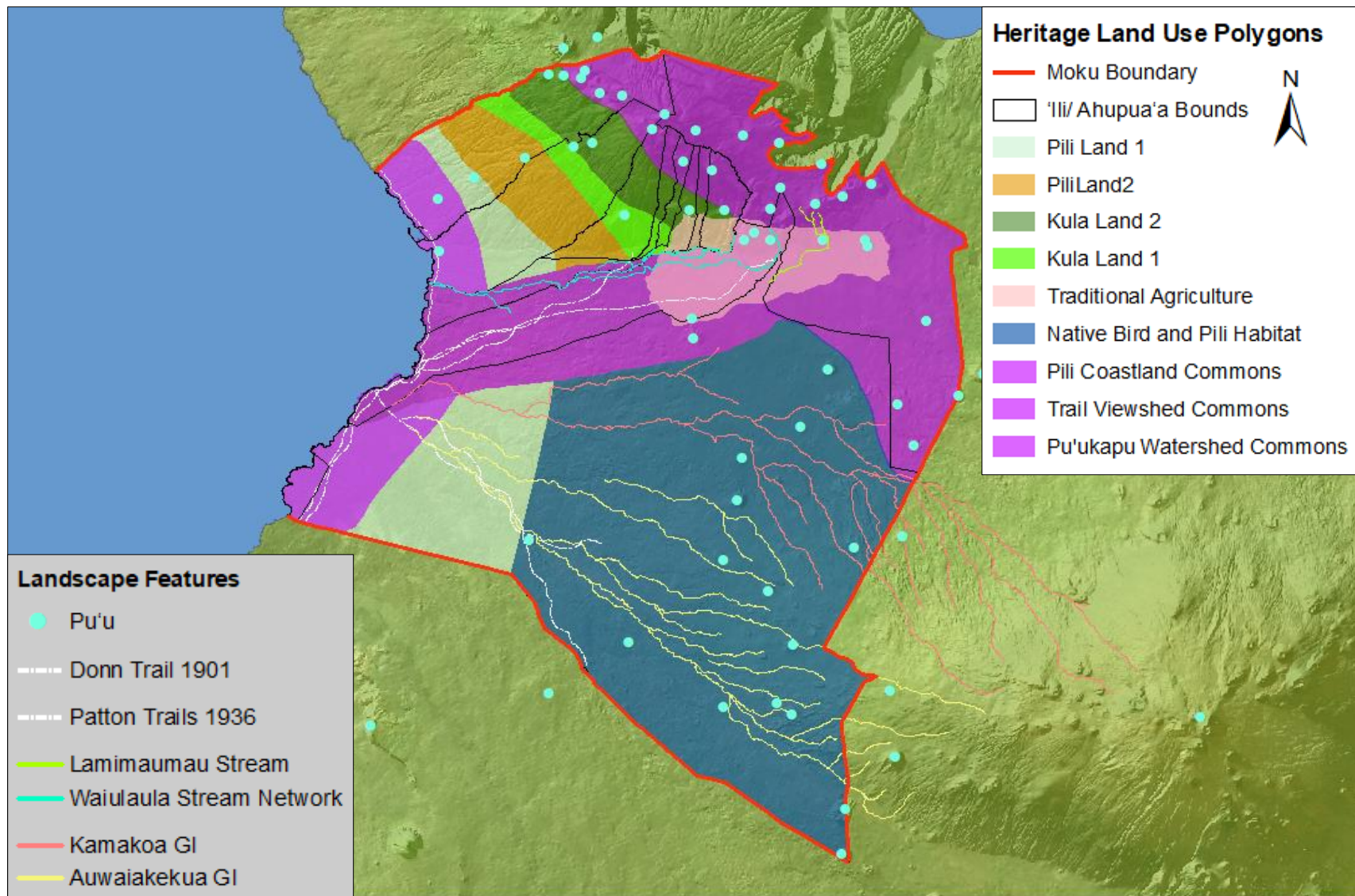


Figure 48. Heritage Land Use Polygons in relation to various cultural landscape features.

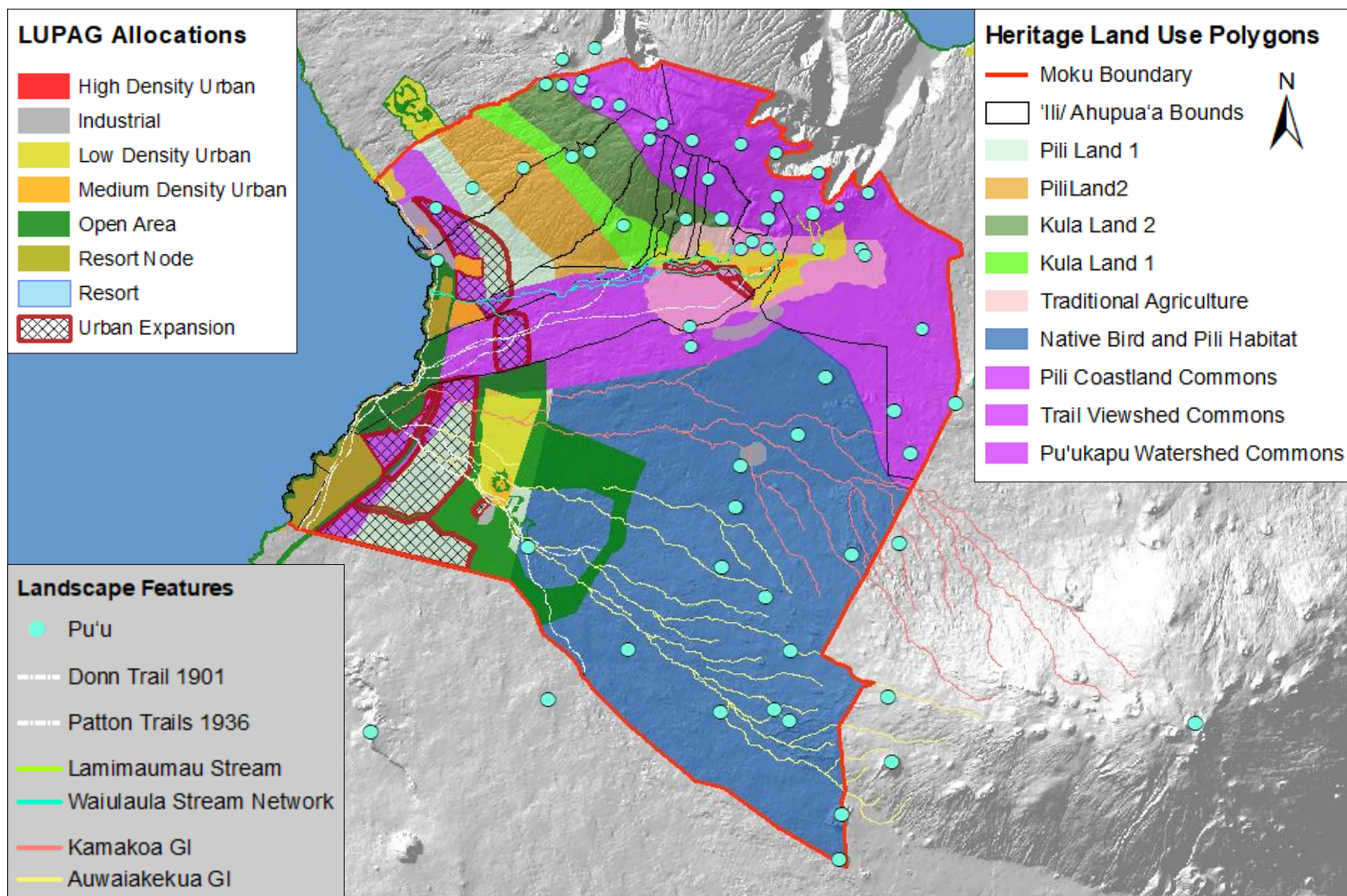


Figure 49. Heritage Land Use Polygons in relation to LUPAG allocations.

4.3 HERITAGE LAND USE GUIDLINE RECOMMENDATIONS

4.3.1 The Commons

The use of Lorenzo Lyons' idea of the "Commons" as a land section that "the people had a perfect right to" (Moffat and Fitzpatrick 1995:23), is adapted in this discussion to represent portions of land that have multiple heritage resources spread throughout, and whose function or uses have broad, but relatable heritage benefits.

The Pili Coastland Commons

Along with the common benefit of ocean access and all that it affords, the Pili Coastland Commons has four other attributes in common, 1) a network of coastal and near coastline trails, 2) viewsapes of the coastline and inland topography (pu'u, mountains, and plain), 3) a common climate that is conducive to salt-making and planting of coastal groves as described by McEldowney (1983:414-415), and 4) cultural-natural water resources such as anchialine pools, fishponds, springs, brackish water embayments and their accompanying archaeological remnant fishing settlements.

The Lālāmilo Viewshed, Trail, and Riparian (VTR) Commons

Heritage Landscape studies reveal that due to the natural topography of South Kohala; the Lālāmilo commons has natural elevational characteristics that is conducive to viewsheds, trails, riparian resource management, and traditional irrigated agriculture. This polygon represents a mauka-makai corridor that contains ancient trails and the Waiulaula - Waikōloa stream network as a continuous resource throughout. At various points along this corridor views of landscape features that reference perimeter and interior boundaries of the cultural landscape can be seen. In referencing boundaries, landscape features such as pu'u and gulches provided the

ancestors of this land a strong sense of place by serving as visual references to resources and storied places that linked them to the land, to their genealogy, and to their spirituality. Views from a restored trail in this corridor could continue to provide current residents of Waimea Kālana linkages to a previous sense of place. Finally, the Waiulaula - Waikōloa stream provides a visual and living watershed connection. Preservation and restoration of the native riparian habitat along this corridor is of high ecological, visual, and sense of place value.

The Pu‘ukapu Watershed Commons

The Pu‘ukapu Watershed polygon represents the extent of the pre-cattle forested region of Waimea Kālana. This pre-cattle forest estimation is a combination of three vegetative zones reconstructed by McEldowney (1983:422-427); these zones are the ‘Ōhi‘a Rainforest, Ululā‘au, and Mixed Open-Canopy. Of these three forest types, only the ‘Ōhi‘a Rainforest portion survives today. As an integral component to this landscapes’ natural hydrogeological cycle, existing conservation efforts and regulations remain a priority. For areas within this polygon that are currently un-forested, this polygon informs the community, potential developers, and governmental planners where reforestation, or integrated development-reforestation land-use could be planned. Integrated development-reforestation means that development in these areas must not pose any threat to the existing ‘Ōhi‘a Rainforest, while incorporating a native tree planting plan into their plans. Owners of existing residential and commercial lots that lay in this polygon are also encouraged to plant native trees on the unforested portions of this polygon.

The “Commons” Heritage Land Use Recommendations

In consideration of these “Commons” and their resources, and in the interest of the current and future generations residing in Waimea Kālana and South Kohala, with the intended benefit of sustainable resource management, and the preservation and restoration of this cultural landscape’s sense of place, the following guidelines are provided.

For the Pili Coastland Commons it is recommended that –

- 1) Height limits for structures of any type are not to obstruct any viewplanes starting from the coastal trail up to any viewshed above 200 feet in elevation when looking inland. Overall building dimensions may not interfere with lines of sight paralleling the coast from the trails to culturally significant landscape features (natural or archaeological). Height and width limits must be analyzed on a case by case basis.
- 2) Increased and more convenient points of community shoreline access for cultural ocean and coastline practices related to trails, fishing, salt-making, and native species grove planting, be provided for in collaboration with private and government landholders.
- 3) All coastal water resources related to inland watersheds and aquifers must be preserved in totality. Any future development in this area must not pose any threat to the subterranean hydrogeology or contribute to any form of pollution, including vectors for invasive species (terrestrial or aquatic) related to brackish water embayments, anchialine pools, fishponds, and springs.

For the Lālāmilo VTR Commons it is recommended that –

- 1) A mauka-makai trail be restored in this corridor with at least six points of access along its length from the coast up into Waimea town. This trail would include viewing stations equipped with interpretive signage that points out significant landscape features and the cultural and natural linkages they represent.
- 2) Building codes near this corridor, or in the vicinity of significant landscape features that may be viewed from designated scenic points, be regulated to preserve viewplanes that have high past or present sense of place value. These building regulations would require VRM analysis to be conducted
- 3) In combination with existing riparian ecological regulations, opportunities for community-based native species habitat restoration be scoped and planned. It is recommended that a conservation district be placed in this zone that encompasses both the riparian and trail restoration projects, with appropriate development buffers. The inland limit of this zone would terminate at a designated point within the Waimea Field System where a community-based heritage complex and program should be established.

For the Pu‘ukapu Watershed Commons it is recommended that –

1. The existing conservation designation for the remaining ‘Ōhi‘a Rainforest continue in perpetuity, and that the continued health of this forest be supported by all stakeholders – community, commercial, non-profit, and governmental.
2. A native tree planting initiative be started among landowners, or long-term land leaseholders of lands within the Pu‘ukapu Watershed Commons (portions outside of the existing ‘Ōhi‘a Rainforest). Tree species to be planted would be informed by the Ululā‘au and Mixed Open Canopy Forest vegetation polygons. Planting densities per lot and acreages are to be informed by further Heritage and Watershed studies.
3. Future developments in this area must not threaten the existing forest, and likewise should incorporate native watershed trees and vegetation into their landscaping as informed by the reconstructed vegetation layer. Ground water pollution prevention planning must also be incorporated into all future developments in this area, including but not limited to issues of wastewater, chemical pesticides, and fertilizers.

4.3.2 The Pili and Kula Lands

By spatially comparing the LUPAG polygons with HLOG polygons (Figure 49), it is observed that Pili Land 1 is planned for the most intensive development. By the same comparison Pili Land 2 and the Kula Lands have minimal land-use change planned as most of these lands are currently utilized for cattle grazing. Even as cattle grazing is the dominant land-use in these areas, the numerous drainages (perineal and non-perineal) found on these lands are an important part of the South Kohala Watershed cycle. Re-vegetation along the banks of these drainages with fenced easements on either side would serve as a sediment alleviation strategy for the coastal lands that could co-exist with cattle ranching. Any future change in land-use for development in these lands should incorporate the vegetative zones and land-use descriptions provided by (McEldowney 1983:414-422), with special consideration to food traditional production in the Kula Lands. Finally, any future developments in these lands should be planned as to avoid obstructing views from the Pili Coastland and Lālāmilo VTR Commons, to landscape

features such as the pu‘u and gulches that define or reference land divisions of Waimea Kālana and are associated with storied places.

Heritage Land Use Recommendations for Pili and Kula Lands

In consideration of “The Pili and Kula Lands” and their resources, and in the interest of the current and future generations residing in Waimea Kālana and South Kohala, with the intended benefit of sustainable resource management, and the preservation and restoration of this cultural landscape’s sense of place, the following guidelines are provided.

For Pili Land 1 it is recommended that –

1. The zoned footprint for urban expansion, resort nodes, and open areas intended for golf courses, be reduced to preserve more of the natural landscape as can be viewed from the Pili Coastland Commons and the Lālāmilo VTR Commons. In line with viewshed consideration, height and architectural building conceptions, should aim to blend proposed developments in with the natural landscape.
2. All developments in this area shall incorporate native plant species into their landscaping as informed by the vegetative reconstruction layer for this area.
3. All developments in this area shall preserve the integrity of, and appropriate access to, all archaeological resources including but not limited to trails, temporary habitations, petroglyphs, ahu, and boundary markers.

For Pili Land 2 and the Kula Lands it is recommended that –

1. Existing watershed projects be supported by all stakeholders, including initiatives for creating restorative vegetation corridors and fenced easements for all drainages on these lands.
2. Any future changes in land-use and development shall incorporate native species into their landscaping, with special consideration for traditional agricultural practices in the Kula Lands.
3. All developments in this area shall preserve the integrity and public access to all archaeological resources including but not limited to trails, temporary habitations, ahu, and agricultural features.
4. All developments in this area shall preserve the integrity of, and appropriate access to, all archaeological resources including but not limited to trails, temporary habitations, petroglyphs, ahu, and boundary markers.

4.3.3 Traditional Agriculture

This polygon represents the four Waimea Field Complexes described by Clark and Kirch (1983:293-314) combined with the Ululā‘au agro-forestry complex described by McEldowney (1983:422-425). The current LUPAG shows Low Urban land-use designations in the center of this polygon (Figure 49). Further east in this polygon is another expanse of Low Urban designations where traditionally Ululā‘au land-use was dominant. The LUPAG also shows an area designated for Urban expansion located in the general vicinity of where Waikōloa Stream, an ancient mauka-makai trail (Donn 1901), and Akona’s ‘Auwai all converge. The combined variety and significance of the resources linked to this area bestows upon it a high heritage value.

Traditional Agriculture Heritage Land Use Recommendations

In consideration of these lands used for traditional food production, and the various cultural and natural resources that converge in this area, and in the interest of the current and future generations residing in Waimea Kālana and South Kohala, with the intended benefit of sustainable resource management, and the preservation and restoration of this cultural landscape’s sense of place, it is recommended that:

1. All urban development planned in this area which does not contribute to restoring or preserving sustainable-traditional, or integrated (traditional with modern) food producing practices consistent with this areas significance and heritage values, be re-allocated to an area of less impact.
2. An integrated cultural and sustainable agricultural initiative be created that would make lands available for cultural and community groups to revive and perpetuate traditionally informed food production practices back onto these lands. This initiative would be a collaboration between community groups, current landowners and long-term lease holders, and government land-use officials.
3. Given the confluence of significant resources that converge in this area, it is further recommended that:
 - i. A community-based heritage center be built in this area, where heritage landscape resources and cultural practices relevant to the area, may be preserved through research, education, and practice.

- ii. A mauka-makai trail be re-established, preferably by restoring an ancient trail in totality or with modified segments that would remain in the Lālāmilo VTR and would connect the coast with the community-based heritage center proposed above.
- iii. A hydrology study be performed that would advise setting a quota for reallocating water back into the Waiulaula/ Waikōloa Stream network that would aid in facilitating the restoration of traditional food production in this area, restore a healthy stream habitat, and renew Waimea’s association as a traditional watershed unit.

4.3.4 Native Bird and Pili Habitat

Ehu’s Testimony

I am kamaaina of Puukapu only. Kainea was not there when I lived there. There was no pili grass on that land – my father was not a bird catcher, he used to mahiai. Waikoloa was the land that had the birds. [emphasis added]

(Ehu 1965: No.2)

Kualehelehe Cross examination of Wahahee’s Testimony

“All the pili belongs to Waikoloa”

(Kualehelehe 1865: No.2)

The designation of this polygon as a native bird and pili grass habitat is informed by three lines of information 1) being a southern extension of Pili Land 1 and 2 from McEldowney (1983:415-418) vegetative reconstruction, 2) two separate boundary commission testimonies (excerpts above) that describe Waikōloa as the land of pili grass and birds, and 3) an article from *Paka Paniolo* giving account of bird abundance in this region (Paka Paniolo 1962d:4). Currently these lands are predominately sparse brush and grasses. However, the Kamakoa and Auwaiakekua Gulches reflect the subterranean aquifer system of the West Mauna Kea Aquifer Sector that filters water down to the coastline in between Kawaihae and Puakō (Lālāmilo). In addition, the pu‘u along the eastern edge of this polygon are significant visual heritage resources as Pu‘u Kapele, Ke‘eke‘e, ‘Aiakala, and Kahekili are all boundary references for portions of

Waimea Kālana’s perimeter. While the LUPAG does not indicate much change in land-use for this area, any future developments in this area should consider the preservation of these resources and their natural function or cultural associations.

Heritage Land Use Recommendations

In consideration of the aquifer located under these lands and the significant visual landscape features that spatially defines the east-southeastern portion of Waikōloa, and in the interest of the current and future generations residing in Waimea Kālana and South Kohala, with the intended benefit of sustainable resource management, and the preservation and restoration of this cultural landscape’s sense of place, it is recommended that:

1. Portions of these lands be allocated for re-habilitating a pili grassland (and other climate appropriate native vegetation) environment conducive to native and migratory bird species habitat.
2. Any future developments in this area shall conduct VRM studies to prevent obstructing views of significant cultural landscape features, especially from the Pili Coastland and Lālāmilo VTR Commons.
3. Future land-uses in the area must not negatively impact this area’s aquifer by geological disruption or pollution.

4.4 BRIDGING CULTURE, COMMUNITY AND PLANNING

As part of a community-based heritage program a HLRIM may serve as both an inventory model, as well as an informative management tool. Although done as an exercise, this section exemplified how analyzing a geo-cultural baseline through a heritage values-based metric, may provide a community with spatially referenceable statements of significance. In turn these statements may be used to formulate land-use recommendations that inform developers of opportunities and constraints for preservation and restoration of the cultural landscape, while also filling value gaps that exist in government land-use allocations. In this way a HLRIM serves

as a communicative bridge between communities, resource managers, developers, and governmental land-use and planning personnel.

Figure 50 displays theoretically how a HLRIM is positioned in the process of bridging land-use issues between communities and the government. In summary this flow chart shows that a community-based heritage program would initiate and continually update its HLRIM with on-going heritage landscape research. It would then use this information in two venues. One venue being within in its community; this venue would periodically update its community of the results of on-going research, and help the community facilitate the information into statements of significance and land-use recommendations. The other venue would be in communication with the government or any other large-scale land-use entity. In effect, a HLRIM would aid a community in voicing their concerns relating to cultural and natural resource management, issues of sustainability and food security, land-use zoning, and preservation or restoration of their sense of place.

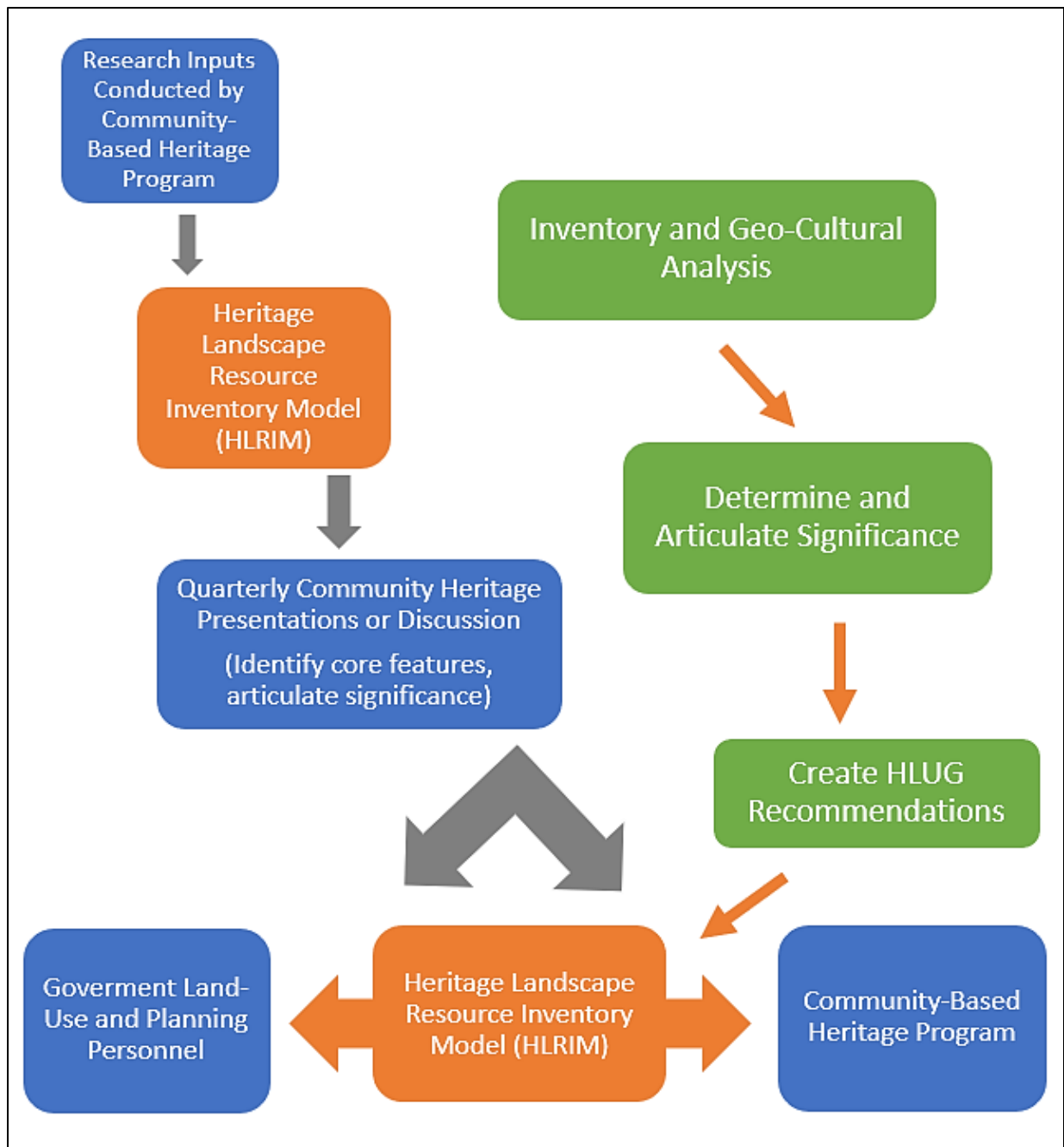


Figure 50. Flow chart showing role of HLRIM in community and planner collaborations.

CHAPTER 5. CONCLUSION

Hawaiian life vibrated from uka, mountain, whence came wood, kapa, for clothing, olona, for fish-line, ti-leaf for wrapping paper, ie for rattan lashing, wild birds for food, to the kai; sea, whence came ia, fish, and all connected therewith. Mauka and makai are therefore fundamental ideas to the native of an island. Land as we shall see in a subsequent article was divided accordingly.

(Lyons 1903:24)

This thesis argued that a HLRIM is a viable approach to community-based cultural and natural resource management and land-use planning. By using GIS to compile interdisciplinary research, this project has displayed how Heritage Landscape studies can help a community evaluate change according to a baseline of significance rather than just by what is currently on their landscape. Essential in helping a community participate in negotiating change, I also proposed that it is important to spatially and historically explain to a community how their landscape transformed from the re-presented geo-cultural baseline, to the landscape that they associate with in the present. This spatial and temporal land-use link between the past and the present is valuable for its ability to help multicultural communities –whose population has multi-temporal perceptions place– begin to perceive a common standard by which to judge how much change, and what types of change, is appropriate for them, their environment, and the generations to come.

Given Waimea’s socio-political and economic history, in combination with Hawai‘i County’s planned urban expansions for South Kohala, the historical account of Waimea’s evolution from kālana to CDP has been an appropriate case-study for formulating a Heritage Landscape study that approaches preservation and restoration from a community-based planning approach. While the basic function of this projects HLRIM has been to communicate the cultural

and environmental significance of Waimea's traditional geography; helping communities negotiate land-use change has been an equivalent motivation in this thesis. Using the representation of Waimea Kālana as the impetus to a traditional perspective, this thesis will conclude by summarizing how the creation and analysis of an HLRIM can help a community guide change by participating in land-use planning.

Change History

“On what basis of significance and perspective should current changes related to land-use and development in Waimea be negotiated” has been the consistent motivational question this thesis has attempted to address. The importance of a temporal, spatial, and cultural baseline for rural landscapes negotiating change in Hawai'i is more appreciated when set in the broad and local forces of change history. Reviewing a small sample set of changes over the last 240 years helps to illustrate this point.

Captain Cook arrived in Hawai'i in 1778, and the first cattle were brought to Hawai'i shortly thereafter in 1793 by Captain George Vancouver. Kamehameha I united Hawai'i's individual chiefdoms in 1810. Immigrants from around the world began settling in Hawai'i in the early 1800s. John Palmer Parker I received his cattle hunting appointment in 1815 and established Parker Ranch in 1847. The Mahele of 1848 began a shift in traditional land tenure practices. In the late 19th century the Hawaiian Kingdom was overthrown and supposedly annexed leading to Hawai'i becoming a territory of the United States. In 1959 Hawai'i entered into Statehood and Richard Smart who grew up in San Francisco became the last Parker to own and manage Parker Ranch. Population records report that Waimea as a town has experienced consistent population growth since 1960.

Baseline and Perception

Despite the histories of Hawai‘i and Waimea, and shifts in population, demography, values, and perception, this project began its formulation of a temporal geo-cultural baseline rooted in place-based values derived from the interaction between man and nature that had existed in the project area prior to the arrival of cattle, with some traditional practices persisting into the early cattle era. By putting natural resources and traditional boundaries at the center of this inventory and assessment model, this project’s HLRIM dealt with multi-temporal perceptions of place by heightening the significance of the Hawaiian cultural landscape. This geo-cultural baseline doesn’t disregard other perspectives, however since it is rooted at the nexus of nature and culture, its significance is evaluated interconnectedly making it an appropriate format for balancing heritage management and sustainability with healthy change. International frameworks like UNESCO’s Cultural Landscapes and the Burra Charter of 2013 assisted this project by providing articulation frameworks for an integrated approach to proactive preservation and restoration of a culturally informed sense of place.

By localizing these international frameworks within Hawaiian practices of dividing lands according to natural resource distribution, this HLRIM is interdisciplinary and multi-epistemological. In turn, by applying this format to the local moku, ahupua‘a, and ‘ili makes a HLRIM more community and place relevant. In line with making a HLRIM relatable to its current community, it was important for this project to spatially and historically link current landscape associations with past negotiations of change. For example, the history of Parker Ranch’s establishment, expansion, and 1960s economic strategies, provided an explanation of land-use evolution in South Kohala. While not a complete causative history of change, Parker Ranch as the region’s largest historical landowner was, and remains, a major change agent.

Sugar and coffee plantations, or other large ranches in other districts could provide other communities with a similar link between their traditional and modern landscape.

Participating in Planning

In order to best participate in land-use planning this thesis advocates for inclusivity and transparency in developing statements of significance and Heritage Land Use Guidelines (HLUG). The utilization of GIS to spatially map traditional landscape significance, land-use evolution, and current LUPAG designations, serves a community-based heritage program in two ways. First it serves as the program's inventory database. Secondly, because it is visual and spatial, it serves as an excellent communicative tool that raises awareness and promotes heritage planning.

For example, the maps of an HLRIM would first serve as an educational tool that would inform the community about the significance of lesser recognized landscape attributes like Akona's 'Auwai. After awareness is heightened, successive facilitated meetings could allow interested community members to participate in developing statements of significance, heritage land-use polygons and their respective HLUG. Because these heritage land-use polygons are GIS referenceable, they can then be used to compare with County or State land-use maps to identify areas of potential conflict, or heritage conservation, preservation and restoration opportunities.

Areas where historic land-use trends have already negatively impacted a cultural landscapes' sense of place, HLUGs could be used to supplement current LUPAG designations so that new or renovative developments in the area may be informed of how to incorporate heritage values into their designs. In this project the recommendations for the Pili Coastland Commons exemplifies this scenario. Conversely, in areas not heavily affected by development, a

community already possessing HLUGs, would be equipped to articulate objections or stipulations to LUPAG designations which invite developments that would negatively affect attributes that a community has already deemed important for preserving sense of place or sustainable resource management. Likewise, these same guidelines would inform the county planning and permitting office of what types of developments –in a given area– would trigger community opposition. Finally, a communities HLUGs could theoretically be incorporated in long term land-use planning when the county reviews and revises its General Plan. In these ways a community would be proactively participating in preservation and restoration at the planning level rather than reacting to developments already in process.

Konohiki: Inviting Possibilities

In conclusion Waimea’s Heritage Landscape and its HLRIM is not anti-change, it is simply about negotiated change based on a baseline of significance which evaluates opportunities and constraints. The name of the ancient Hawaiian land manager “konohiki”, is actually a compound word that literally means “invite” kono, “abilities or possibilities” hiki (Ulukau 2003). Like the LUPAG, the ancient konohiki was charged with inviting possibilities onto the land. However, the difference between today’s land-use planners and the ancient konohiki, lies in knowledge-base, values, and perception of place and space. With an intimate understanding of the spiritual, natural, and socio-political sense of place, and charged with the sustainable productivity of the chiefs’ lands, the konohiki invited possibilities based on opportunities and constraints of the multifaceted and interconnected Hawaiian landscape.

In this project the re-presentation of Waimea Kālana has been used as the impetus for challenging current or multi-temporal perceptions of place. Regardless of what perception a resident of South Kohala associates with the name Waimea, its re-presentation invites the

community to realize that there are older strategies of sustainable resource management available to them. While incomplete and theoretical, this HLRIM, its re-presentations, its geo-cultural baseline, and its Heritage Land Use Guidelines, has been presented as a possible community-based approach in negotiating a balance between development, preservation, and restoration. It is in this way, in following the tradition of konohiki, that Waimea's Heritage Landscape again presents Hawai'i's communities an invitation, with possibilities, to participate in cultural and natural resource management through proactive planning.

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APPENDIX – A: HAWAIIAN LAND COMMISSION AWARDS

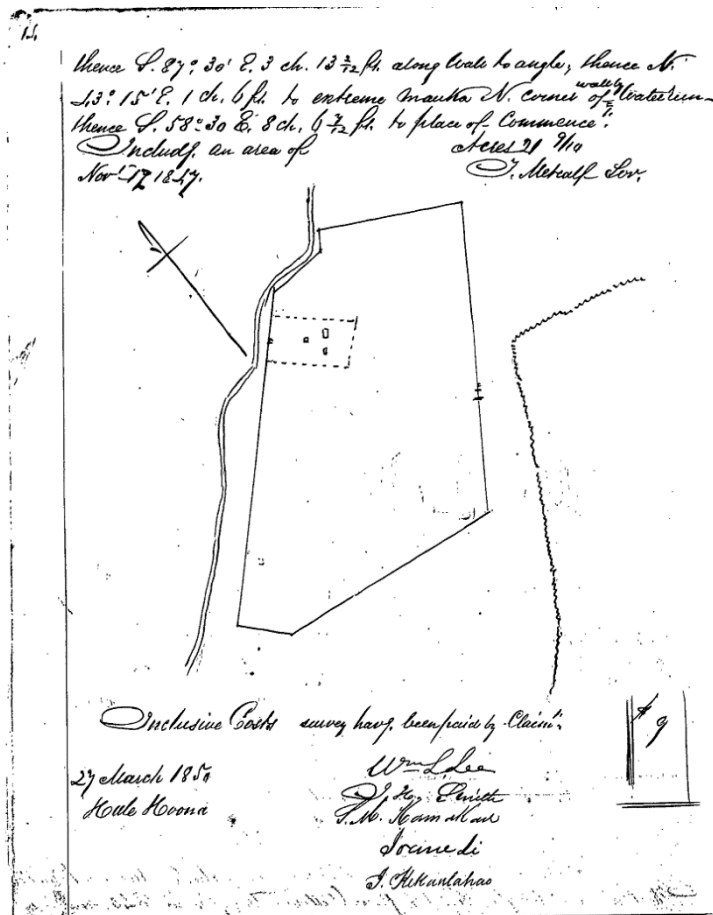
LCA 4885 – William French

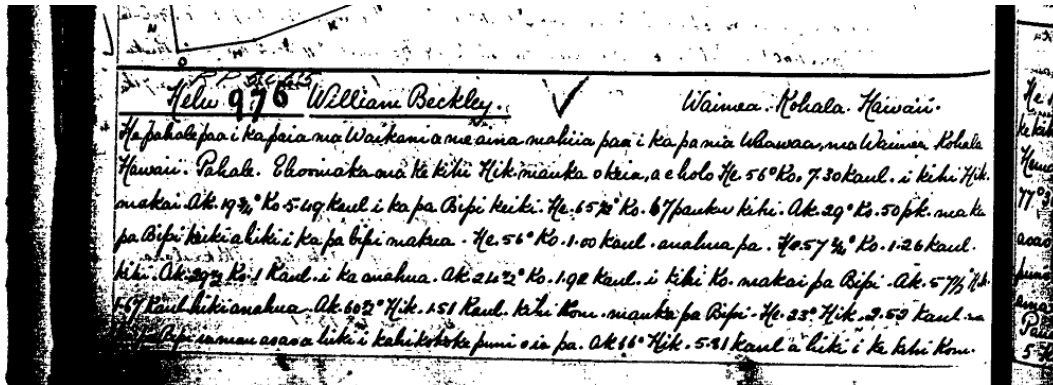
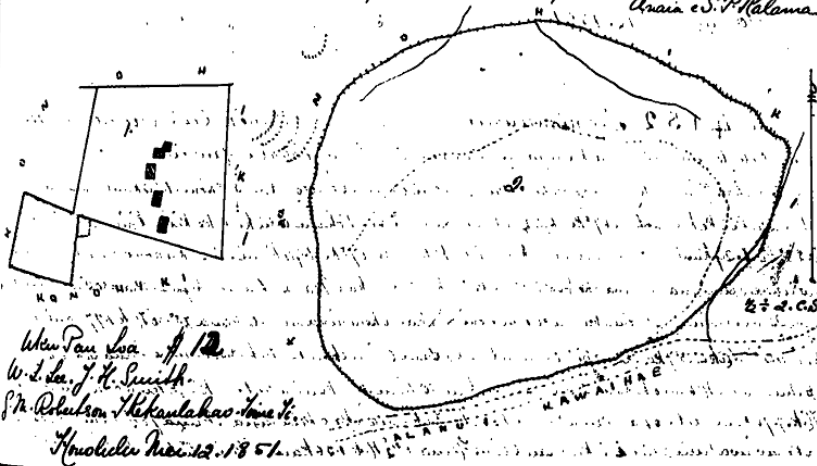
C. 1885 William French

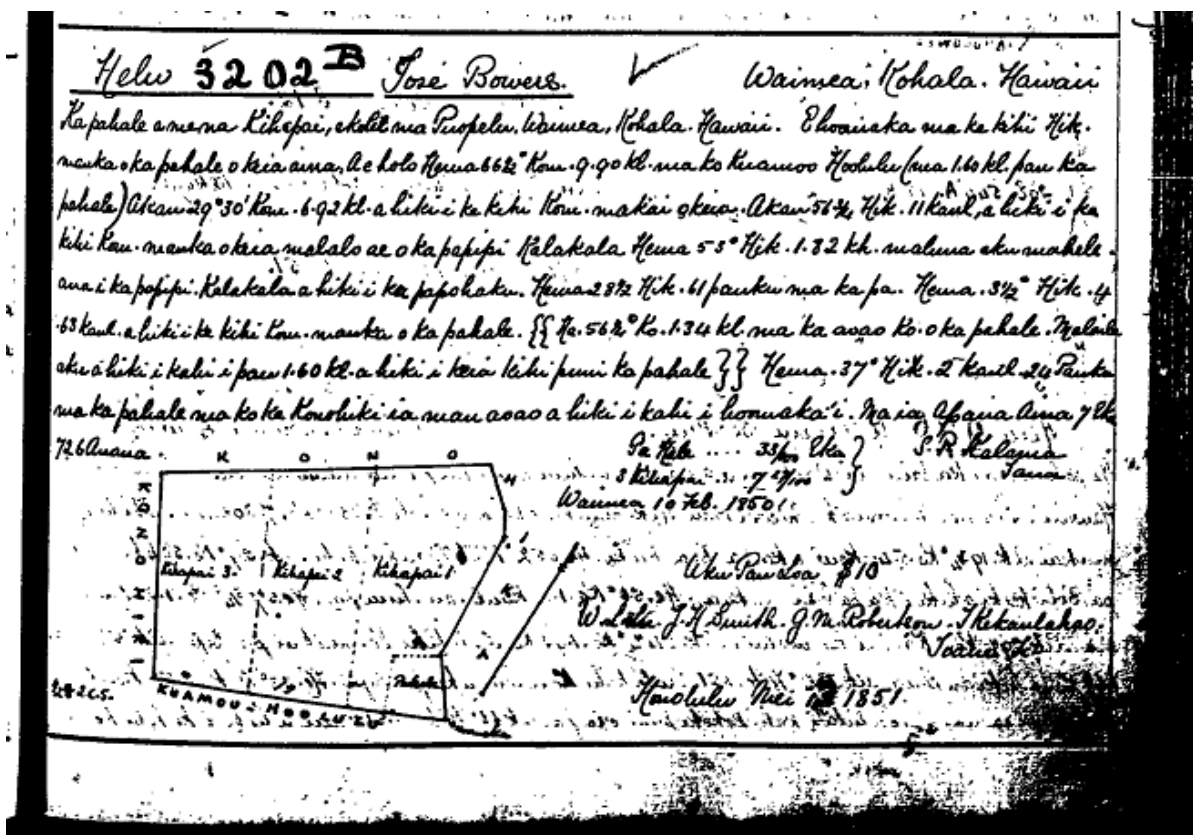
This is a claim for a lot situated in Muli, Waimea, Kauai. The claimant bought this lot from William Hughes in 1860, and has occupied the same in peace ever since. Hughes had this land from Sir Tiahuine in 1831 for service as a Bullock's cartage.

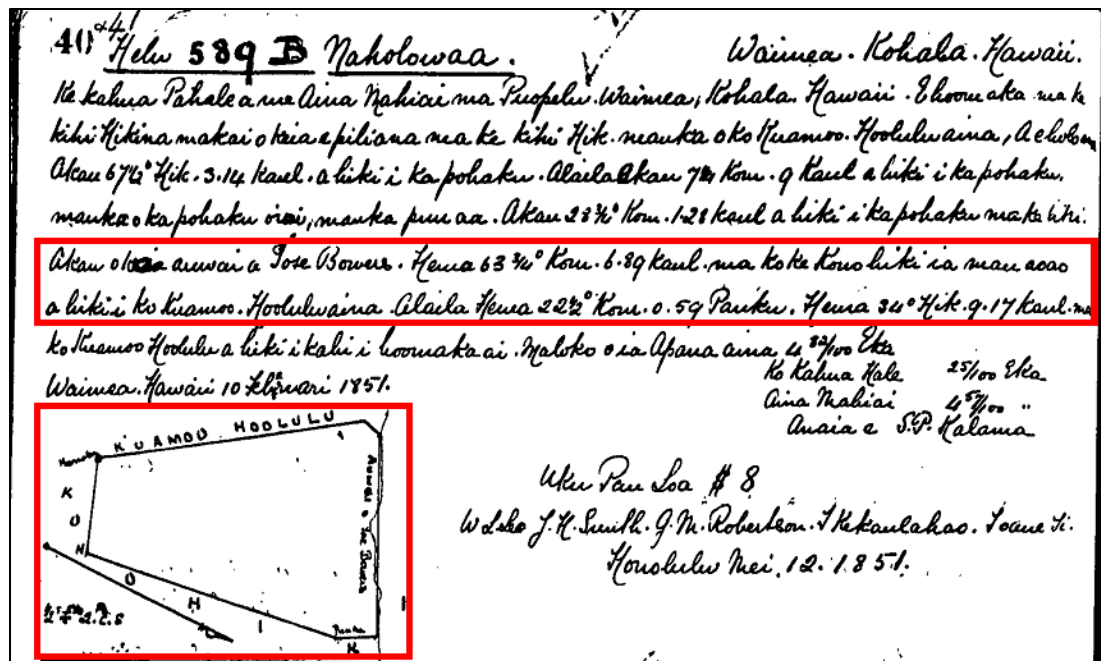
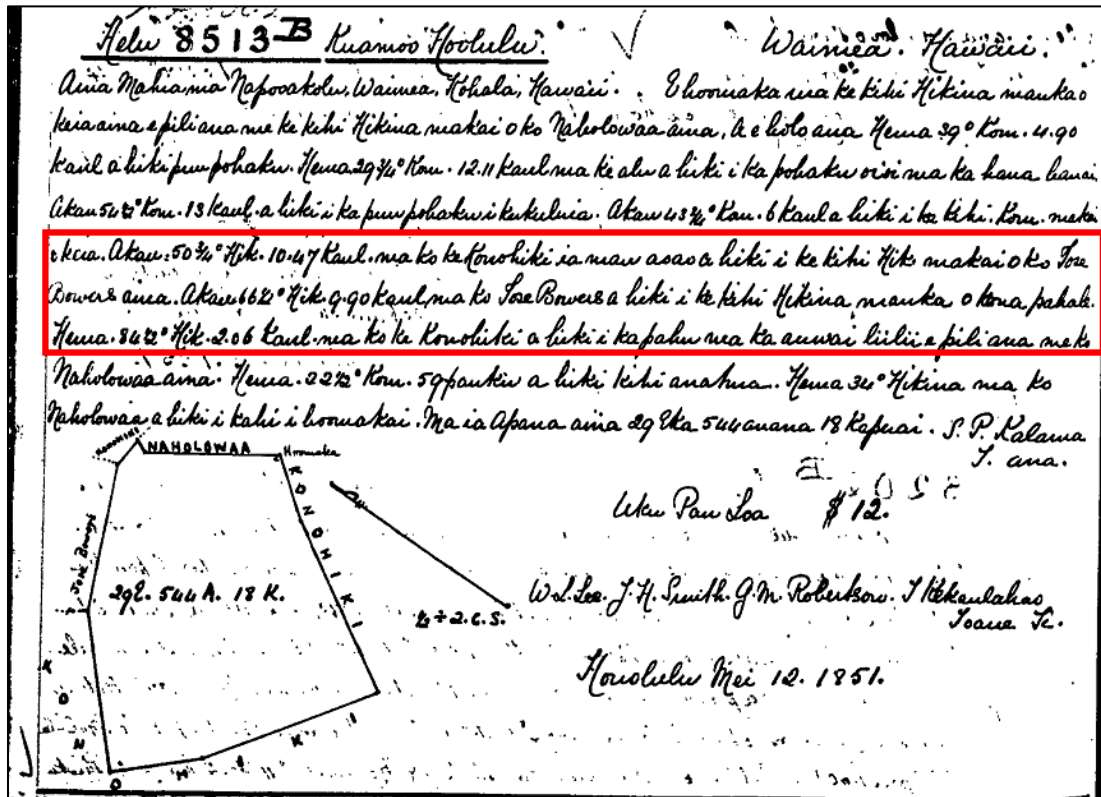
This claim is one coming under the 1st Rule of the Board, and we do hereby award the claimant a feehold title less than absolute in said land, which he may commute for a fee simple title as prescribed by law.

Commencing at E. corner of wall enclosing large lot by main road, and running S. 37° W. 15 ch. 59 1/2 ft. along road to S. corner of wall. Thence N. 78° 15' W. 13 ch. along wall to angle, thence N. 38° 45' W. 2 ch. 50 1/2 ft. along wall to W. corner, thence N. 48° 15' E. 17 ch. 26 1/2 ft. along wall near water run to corner of wall.



[illegible]





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C. No 989 John Davis

The Claimant states himself to be a Welshman by birth and that he has been a Resident of these Islands upwards of twenty years; having a wife and three children born upon them. The present claim made by him, is for a piece of land in the ili of Napoohoku in Waimea, Island of Hawaii, and measuring according to Mr Metcalf's survey 4 Acres $\frac{2}{100}$.


According to the testimony taken on 1st February 1850 before Mr. Pelham sub-commissioner to this Board, this claim is well established, and stands without opposition, the accompanying Survey having been confirmed as a correct description of its mates and bounds by Wm Beckley Honohiki on the examination of the Claim in conjunction with two other witnesses.

We therefore Award to the Claimant John Davis, a fee hold Estate in the same as described in the Survey of J. Metcalf subscribed which he may commute for a fee simple title as the law provides.

In Napoohoku, Waimea

"Commencing at pile 11, stone at S. corner of this land by water course leading down from Waimea Village to Pihue old water Course intersecting it, and running N. 34° 15' W. 5 Ch 17 $\frac{1}{2}$ ft. along an old water Course to stone Wall at the corner of this land thence N. 36° 30' E. 6 Ch. 2 $\frac{1}{2}$ ft. along wall to N. corner of this lot. thence S. 54° E. 7 Ch. 5 $\frac{1}{2}$ ft. along land called "Waiehi" to Wiliwili tree by water course at E. corner of this land then along down water course to place of Commencement. Including an area of Acres 4 $\frac{2}{100}$

April 4. 1849.



Costs.	
Incidental Expenses of Comm ^r & Assessor of Comm ^r & Assessor 50	2 50
Survey, Claim & de Pengross, test. f. & 1	2
Expenses Survey by J. Metcalf.	50
Report of Commissioners this day rendered in the above Claim	5
15 August 1850	10

W. L. Lee
J. H. Smith
J. H. Smith
J. H. Smith
J. H. Smith