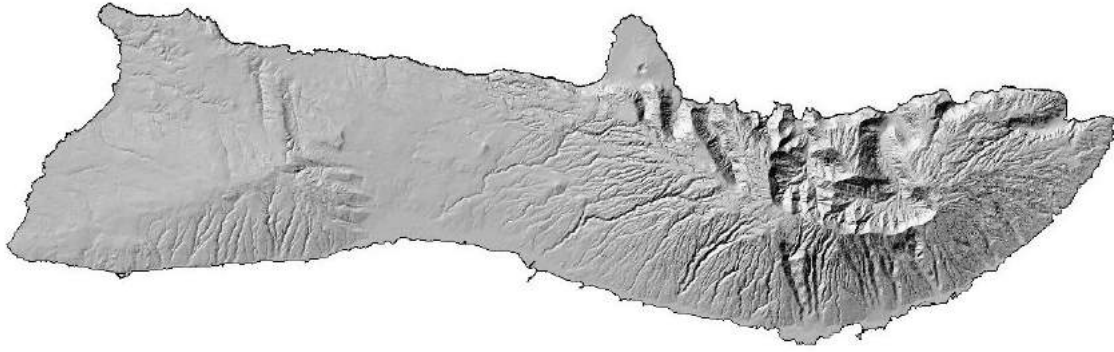




The Land Origins of Kawela: Ownership, Geology, Water

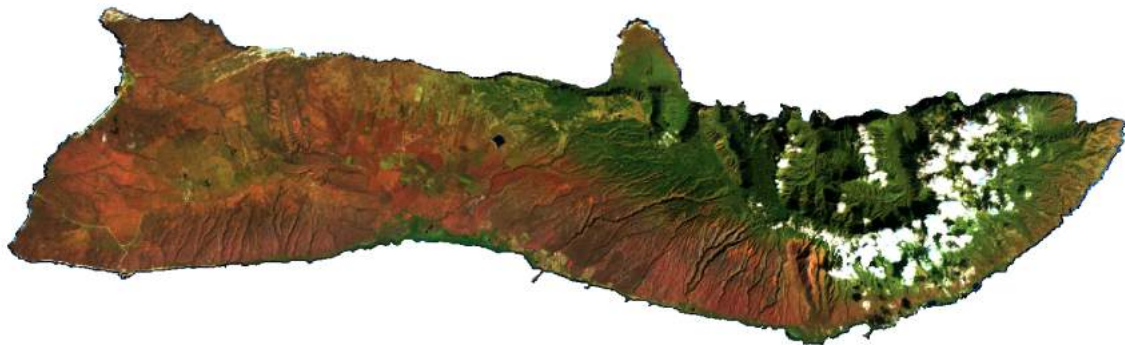
An Ancient Hawaiían Ahupua'a On Moloka'i





Molokai Brown Dry Summer

^ Kawela



Molokai Green Wet Winter

^ Kawela

Land Origins of Kawela: Ownership, Geology, Water

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203 Kupaia Place
Lot 30, Kawela Plantation

February 2016, Revised March, April, June, August 2016



Low altitude aerial view from south of Kawela Plantation stretching from fringing reef to mountain highlands during wet winter green period.

The native people of Molokai are of a mix of settlers from the Marquesas, Tahiti, and several other South Pacific islands. They were the earliest known inhabitants of the island, and occupied the Halawa Valley around 650AD . European settlers followed, beginning with British Captain George Dixon's landing on Molokai in 1786 , with significant European cultural impact beginning with the first Protestant mission of American Reverend Harvey Hitchcock in east Molokai in 1832. In the 1860's Asian immigrants , mainly Japanese and Filipino, began to arrive as contract labor.

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View of Maui looking east from south end of Lot 30 of Kawela Plantation.



View of Lanai looking south from south end of Lot 30 of Kawela Plantation

The Timeline of Kawela

c. 1600 First pre-historic permanent settlements. Molokai population 20,000-25,000 in 1778. Halawa Valley 1,000 in 1720.

c. 1820 Abandonment of Kawela permanent settlements.

Molokai population 5,000 in 1832.

1854 Lunalilo claim made to Kawela ahupau'a in Great Mahele. Civil War Molokai population owing to cotton 8,700.

1873 Boundary Commission survey by R.W. Meyer

1883 Lunalilo estate granted Royal Patent

1897 Lunalilo estate sells Kawela to American Sugar Co. .

Molokai population 2,307 in 1896. Population 1,006 in 1910.

1939 American Sugar Co. 1898 charter modified as under incorporation it becomes Molokai Ranch, Ltd. . Molokai population 5,677 in 1935, 5,341 in 1940 , 5,023 in 1960, 5,261 in 1970

1980 Molokai Ranch sells the lower 2/3 of Kawela ahupua'a, 6,000 acres, to form Kawela Plantation. Molokai population 6,049 in 1980.

1982 Molokai Ranch grants conservation easement to Nature Conservancy for upper 1/3 of leeward Kawela ahupua'a. Now called Kamakou Preserve (2,774 acres).

1986 Molokai Ranch sells most of Pelekunu ahupua'a to the Nature Conservancy, excluding part of the lower valley floor retained by 'ili private owners, including the upper stream valley that contains the stream's 461 acre headwater area originally part of Kawela ahupua'a. Now all called Pelekunu Preserve (5,759 acres). Molokai population 6,717 in 1990, 7,404 in 2000, 7,345 in 2010. The total population of the State of Hawaii was 1,431,603 in 2015. 991,788 , resided on Oahu in 2014. 70,475 resided on Kauai. 194,190 resided on the Big Island of Hawaii. 163,108 resided in Maui County which includes Maui, Lanai and Molokai. Only 3,102 resided on Lanai in Lanai City, could almost double under island owner Ellison. Over 152,000 resided on Maui.

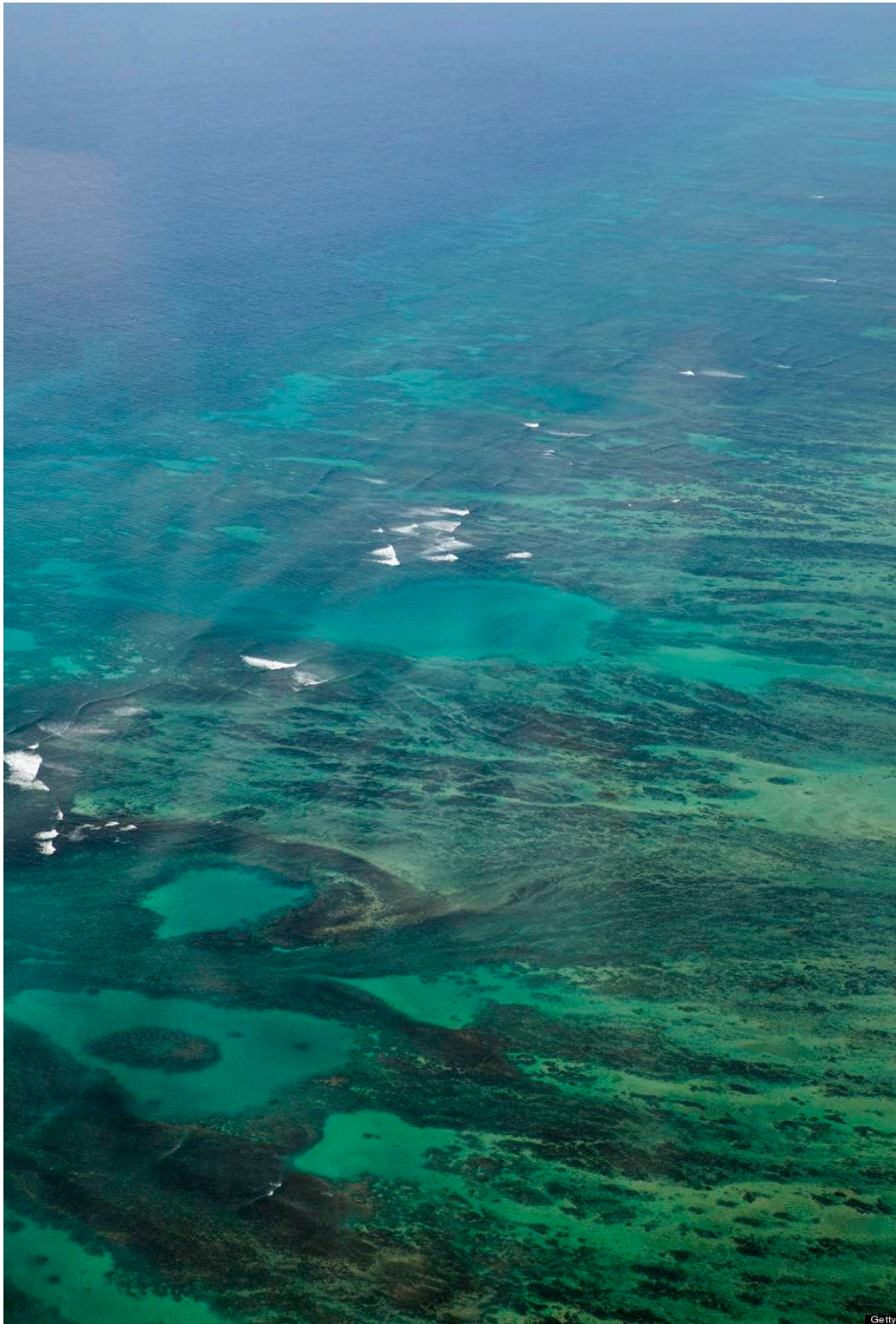
Introduction

Although it is commonly known that the present day Kawela Plantation had its origins in a pre-Hawaiian Kingdom ahupua'a, the traditional feudal division of land held by a chief that extended from sea (makai) to mountain (mauka) and had makai to mauka subdivisions ('ili) that were used by the common folk in exchange for services and products to the chief, and that this overall structure was continued under the Kingdom until its acquisition by the predecessors to Molokai Ranch and its more recent development into Kawela Plantation, the details of this history, and the relevant geology and water issues are much less known. It is the purpose of this manuscript to develop the detailed history of the Kawela ahupua'a from the period of written records in the Hawaiian Kingdom until the formation of Kawela Plantation. This time period extends from the 1830's until the 1980's. The transition from Kawela as a Crown land to fee simple ownership is traced from 1854 to 1883 through three central Hawaiian Kingdom activities: The Great Mahele Claims, The Boundary Commission Surveys, and the Royal Patent Grants. A discussion is also given of the pre-historical development of Kawela. Unlike the wet and fertile east end valley of Halawa which was settled c. 650 and had a population of 1,000 in 1720, the south kona coast was settled c.1200 and was too dry for traditional Polynesian crops without a robust irrigation which was not possible in terms of water resource and available technology. The very late settlement of Kawela was c.1600 and was most likely the result of population pressures and stability on a small remote island archipelago necessitating the utilization of marginal lands. It was abandoned c. 1820, probably a result of the population collapse and consequent evacuation of marginal land. The settlement of the south coast seems to have been driven more by the development of the valuable fish pond network than the coastal agricultural capability. All of this development occurred in the context of a feudal land system very similar to that of medieval Europe, and a social cast system like Hindu India, that was unique to Hawaii as opposed to the tribal and village based land ownership in the rest of Polynesia. This unique form of Hawaiian land ownership provided a rapid pathway to land fee simple ownership during the Hawaiian Kingdom across the economic spectrum. Water and geology pose powerful guiding forces in the utilization and development of land on Molokai, so these are examined as well in the context of Kawela's history. The local Kawela microclimate is discussed along with the resulting dominance of non-native xeric vegetation. Lot 30, 203 Kupaia Place, is used as a representative example of residential Kawela Plantation throughout.

Context is provided through an examination of all regions of the island. Below: Aerial south view of Kawela Plantation showing reef and lot 30, 203 Kupaia Place with small red circle center left. Brown coastal edge is due to upland sheet erosion which is less at Kawela Plantation than immediately east of that location. Note thin dark green coastal plain.

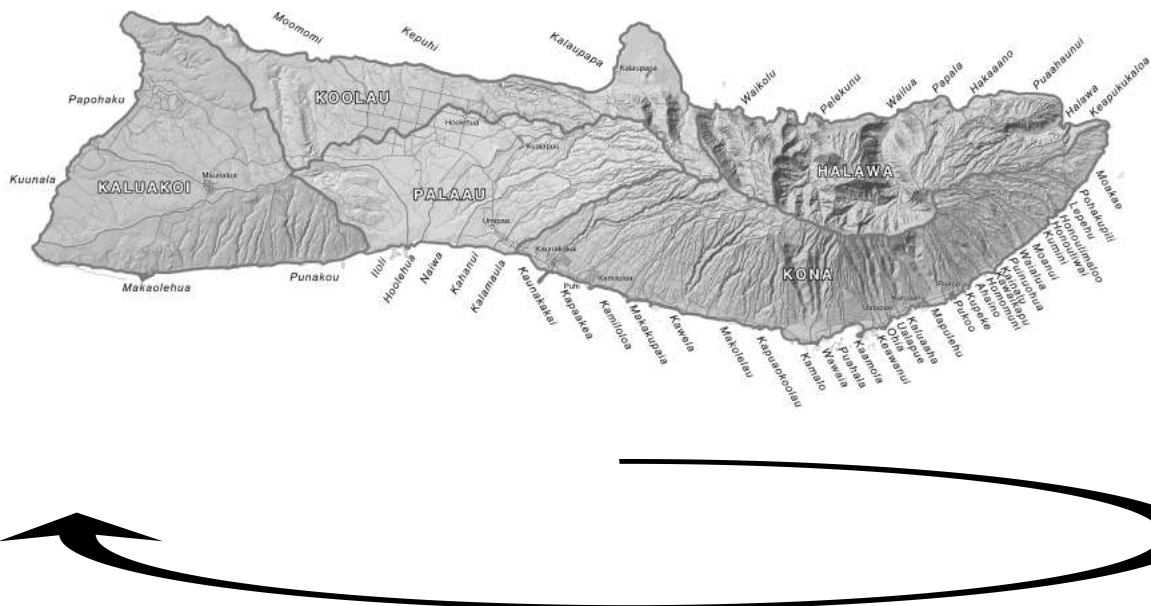


Detailed view of reef that lies off the south coast of Molokai, including along the Kawela Plantation coast as shown in the preceding image.



An Introductory Aerial and Ground Tour of Molokai

To provide context for what follows an aerial and ground tour of the entire island is provided. Starting with the first populated wet valleys of the north coast on the east side of Kalaupapa and moving eastward and traveling clockwise to the East End at Halawa Valley, home to the earliest settlements, to the old towns of Pukoo and Kamalo; then to the central southern coast to Kawela, then to Kaunakakai followed by Kalamaula; followed by the central saddle between the two island volcanoes of Wailau in the east and Maunloa in the west which is the island's agricultural heart with the former plantation towns of Kualapuu and Maunaloa; continuing clockwise onto the West End along the western south coast to its southwest Molokai terminus at La'au Point, then moving up the west coast past Papohaku beach to the northwest Molokai terminus at Ilio Point; then moving along the north coast past the Moomomi dunes area to the rising sea cliffs; and ending at the former leper colony at Kalaupapa. Each of the parts of the path has a different microclimate. This clockwise path can be visualized with the labeled topographic map of Molokai shown below.



Above: Tour starting point and direction.

The tour starts with the fertile ahupua'a valleys of the eastern north shore of Molokai, the earliest settlement sites on the island. They are typically green from valley floor to the tops of the pali or cliffs which enclose them with their streams deltas forming the faces pointed to the sea. With no sheltered bay as harbors, their accessibility is limited compared to Halawa.



Waialeia Valley waterfall east of and adjacent to Kalawao to the right.



Waialeia Valley aerial view. Note the lush vegetation from valley floor to cliff top that is typical of all north coast valleys. Development was limited by harsh winter seas and the lack of sheltered canoe landing places.



“The Wall”, Puu Kauwa (1850’), between Waialeia and Waikolu Valleys.



Looking out from Waikolu valley. The narrow valley floor and hence stream floodplain limited its capability of taro production for poi needed for development. Waikolu was an ahupua'a.



Pelekunu Valley located over the ridge line from Kawela ahupua'a. and just to the east of Waikolu. Pelekunu ahupua'a was noted for its high agricultural productivity before contact. However, it also suffered due to the lack of a sheltered harbor. North valleys get about 100" annual rainfall.



Upper Wailau Valley with Puu Ohelo (3450') in the distance. Wailau Valley displays the typical uniform green vegetative cover from low altitude valley floor to cliff top, to mid level to high levels of valley elevation as one moves from the sea on the north to the volcano ridgeline cliffs which separate the windward north from the leeward south.



View of Wailau ahupua'a valley from Kilohana saddle.



Beach gateway to the Halawa , the first inhabited valley on Molokai (c. 650). Located on the easternmost tip of Molokai. Its archaeologically documented full development in the 1600's, the result of population growth from 1350-1650, probably drove the expansion of agriculture to other less productive areas such as the Kawela gulch and stream delta of Kawela ahupua'a whose earliest permanent occupation was also in the 1600's. The Halawa taro pond fields then covered about 55 acres, the entire alluvial floodplain of the lower valley, with higher dryer areas used for dry farming. With such a high productivity, even the much smaller available useful area

in Kawela became attractive. This infrastructure was achieved at part at the expense of environmental degradation owing to the removal of forests from the uplands and consequent sheet erosion, a problem that continues to the present day on Molokai. There was also a human cost as well since many of the heiau or religious/ceremonial structures were used for human sacrifice.



Halawa ahupua'a Valley, a view from the south showing near shore valley.

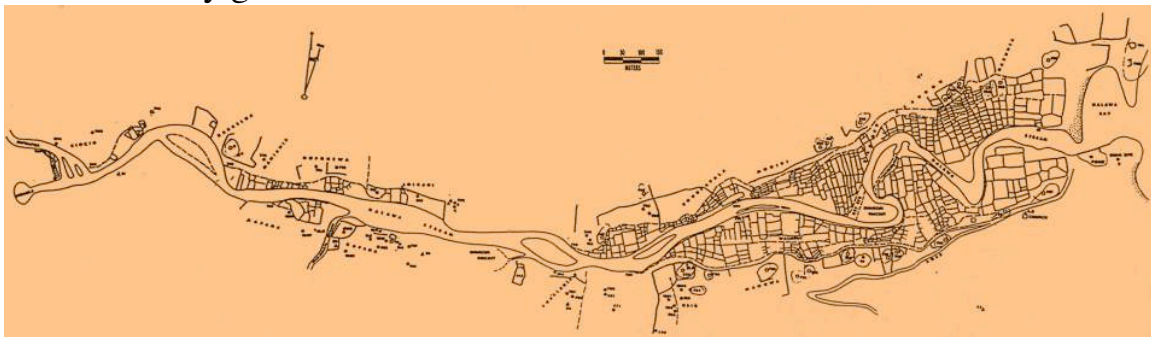


Key to the early success of Halawa was its wetness and its accessibility with its bay being a natural harbor. One of the earliest settlements in all of Hawaii and has the longest period of occupation of 1,350 years, Once the home to many; 1,000 in 1720, with a peak of perhaps several thousand, but few today, only 7 full time in 2001, as the traditional Hawaiian wave of life

there ended with the tsunamis of 1946 and 1957 causing great destruction, as with other valley communities on both Molokai and other islands. The valley, like others was abandoned with very few living there today. The east end of Kamehameha V Highway can be seen snaking toward its terminus on the valley floor.



The ownership pattern of the highly wet agriculturally productive valley floor below shown above was typical throughout Hawaii and is perhaps best preserved on relatively undeveloped Molokai. The largest owner, the Puu O Hoku Ranch is the successor to the original ahupua'a of an owner of high rank. It seems some threads of history remain intact. The smaller parcels or 'ili were those of the common people. This fee simple ownership pattern derived from an earlier feudal land holding pattern and was the result of the great property division or Mahele in the 1840's which will be developed at length later. Less fertile ahupua'a such as Kawela had far fewer 'ili. Halawa Valley gets about 45" annual rainfall; Kawela, about 15".



Extensive pre-contact or pre-historic development of Halawa Valley showing taro fields (rectangles) and irrigation channels (dashed lines).

Although Halawa is green, it is not as green as north coast valleys since it faces northeast and lacks the orographic precipitation levels of those valleys.



East End of Molokai showing terminus at Halawa Point and on the south coast Pukoo, one of Molokai's earliest towns, as the light colored multi lobed harbor. Although still fairly green, it is not nearly so as the north coast.



Mokuhooniki Island and Kanaha Rock off coast near eastern terminus of Molokai, Cape Halawa at top. Sparse vegetation since little rain captured. Note the boats that offer scale for sizing these two small islands.



View of Pailolo channel between Maui and Molokai (left) and Kolohi channel (top right) between Lanai and Molokai from East End. Terminus of fringing reef can be seen upper right (light colored sea and waves breaking offshore). Foreground waves break on the beach without the reef sheltering.



Kumimi Point near Murphy Beach at the eastern terminus of the fringing reef of Molokai's south coast. Note the clarity of the water. Both the East End and the north coast have sufficient plant cover to blunt the large scale sheet erosion that occurs in central xeric Molokai.



Moanui Gulch seen from Kahookamakea ridge near east terminus of Molokai fringing reef. Maui in distance. Farther east, the volcano is lower and does not capture moisture as efficiently as points farther west such as Pukoo which receives about 60" per year as opposed to 15" at Kawela, 25" at Kaluakoi, 65" at Moanui. 45" at Washington D.C.



Along Wailau Trail at Haleone ridge with Pukoo on left on coast and three island view left to right: Maui, Kahoolawe, Lanai. With a significant easterly direction, this segment of the south coast not only is more exposed in the direction to directly capture trade moisture, but also turns so that Maui does not exert as much blocking as it does for the south coast west of Kamalo.



East view from the original leading town on Molokai, Kaluaaha, toward one of its successors, Pukoo. Overall there is good vegetative cover in this area.



First church on Molokai built by Protestant missionaries in 1844 in Kaluaaha when it was Molokai's first and principal town. Lacking a harbor, it was eventually surpassed and supplanted by Pukoo and Kamalo, and both of them eventually by Kaunakakai as the irrigated plains of the saddle lands

between the east and west volcanoes became the agricultural and hence financial engine of Molokai.



Upland view of Ualapue , the former government center, on coast and Lanai in distance. Its government buildings were moved intact to Kaunakakai town as Kaunakakai assumed its dominant role in island commerce and shipping. As they say in real estate, "location,location,location".



View looking west from Kilohana to Kamalo. Keawanui fishpond center top. Fishponds provided a key if not dominant source of protein for pre-contact Hawaiians and were controlled by royalty for centralized distribution. It is thought that fishponds were the driving force behind the late permanent settlement of the central south coast of Molokai and in particular the Kawela ahupua'a.



St. Joseph Church in Kamalo built by Fr. Damien speaks to Kamalo's importance in the 19th century.



Keawanui fishpond at Kaamola ahupua'a just east of Kamalo. Dark blue water at left is Kalaeloa Harbor. At the seaward tip of the fishpond is a former coastal small island now linked to Molokai by a built up isthmus. It appears on early maps as Kalaeloa Island as late as the 1921 USGS map of Molokai which shows as an island with the fishpond stone walls touching it.



Kamola and old wharf. Below a view more from east showing pier length.



Upper Kamalo Gulch like that of Kawela reaches impressive depths at higher elevations. Note the cliff barrenness compared to farther east.

The extension of the point of Kamalo out into the ocean that is obvious from the pier pictures above, represents the dividing line between the wetter East (right of the pier) End and the drier Central Molokai (left of the pier).



Kamahuehue Fishpond, a marker of the north turn of the south coast to the east, giving the East End coast more easterly exposure and the ability to capture more refracted moisture from the trade winds than the much drier coast west of this fishpond. Note the greener slopes of Wailau volcano to the east and browner to the west. Peak Puu Lua at top gets 170' annual rainfall.



Full view of Maui, top left, from Kamahuehue Fishpond. Unlike farther west past the high ridgeline of Kamalo point, where part of the island view is blocked, as are more importantly the ocean swells and storms coming from its left in this image transported by the trade winds.

Below view looking east from Paalau ahupua'a to Kawela ahupua'a. Except for the greener coastal plain watered by seepage from the uplands, the dominant color of the upland central south coast is brown with sparse

vegetation in contrast to the greener and wetter East End, which is in turn out greened by the valleys of the north coast.



View of West Maui, then behind it, Haleakala, the largest volcano on Maui and presently an astronomy observatory site, and more distant but brighter due to its greater height in the setting sun, Maunakea, the home of many observatories on Hawaii.



Kakahaia Beach Park, a coastal part of Kawela ahupua'a.



Closeup of Kawela Beach. Note extremely small scale of waves.



Kawela stream delta showing the rich plant cover possible near floodplains.



Kaunakakai town viewed from the top end of Ala Malama Avenue, the main street. Longest pier in Hawaii in the ocean at top.



Kaunakakai town in the 1930's during the build up caused by the establishment of the pineapple plantations. The pace of life has not changed and the gas station remains at the same location.



And tradition continues, with the iconic Kanemitsu late night hot bread offerings. Kaunakakai's natural canoe landing friendly beach allowed its founding. However, its expansion and success depended on its central location and on the post contact technologies that allowed water to be pumped out of the cliff lined north shore valleys of the east to the dry but very fertile central plains between the east and west volcanoes. The resulting explosive agricultural expansion depopulated the wet north valleys and moist eastern south coast, causing an irreversible decline in the commerce through the harbors at Kamalo and Pukoo. The original wharf at Kamalo

still exists, whereas the wharf at Pukoo was destroyed when an unsuccessful developer dredged it to the present multi lobed form. However, the longtime results for both Kamalo and Pukoo have been to provide low density living areas that have helped to preserve the native Hawaiian lifestyle.



Kauakakai pier with surrounding reef and to right of pier, the reef cut harbor



Upper Kaunakakai gulch above town with Kaunakakai pier extending into ocean center top. Very low vegetation levels outside of the stream fed gulch bottom lands. This is typical of the central south coast, including Kawela.



Kakalahale, a hill (1180') above the North Fork of Kaunakakai gulch where the aqueduct that carries water from wet high elevation east to low elevation dry west has a gaging and pump station. Higher elevation makes it greener than lower upland south coast areas. Looking south toward Lanai with Kakalahale in front.



View above Kaunakakai gulch looking toward Maunoloa across intervening coast with Kaunakakai town on coast on left.



Old Douglas Fir plantation above Kaunakakai gulch and town.



Closeup view of Douglas Fir plantation showing characteristic uniform spacing of a tree farm. Tree farming represents another failed exotic farming technique tried on Molokai. Others have included honey production and sugar cane growing. All ran into barrier of the limits of Molokai's many microclimates.



Moonrise over western flank of Wailau volcano showing typical steep slope in silhouette that is typical of the eastern and central south coast. Except for central plains in the saddle between the east and west volcanoes, the flat south coastal plains, and the valley and gulch bottomlands, all of Molokai is composed of such steep slopes. This steepness when combined with infrequent heavy rains lends itself to a xeric environment that even under the best conditions has significant sheet erosion in the West End and upland south coast. When combined with the effects of overgrazing by alien feral species, a number introduced pre-contact by the original settlers, such as boars, goats, deer, and cattle, there exists the recipe for the large scale sheet erosion that plagues the island today. Combining this with the subsistence lifestyle of many and the consequent desire for herd maintenance, as opposed to eradication, then the present Molokai dilemma for soil conservation is exposed.



View from Puu Nana, at about 1400', the highest point of Maunloa, the western volcano, across the entire saddle plain, Hoolehua, of Molokai toward the eastern volcano, Wailau



Another view to the north from Maunloa looking across central Molokai .



Road to the east volcano, Wailau, highlands from Molokai's central plains



Hauakea (“wide cooling breeze”) Pali are cliffs running directly north from Puu Nana toward the hot and dry western north coast. Located west of the central plain, these cliffs show the typical desert like or xeric vegetation with significant barren areas. Also at the cliff base, a green area can be seen, which is maintained by seepage from the cliff face of water collected from the upland areas above the cliffs. In small scale this is the same process which keeps the south coastal plain green compared to the brown uplands. This yields the appearance of Kawela ahupua’a going from very green coastal and gulch bottom areas to very brown uplands over short distances.



Coffees of Hawaii, center, Molokai’s coffee grower and producer. Coffee tree fields lined with Cook Pines lie in front of reservoir. Adjacent is Kualapuu, one of the two original plantation towns of Molokai.



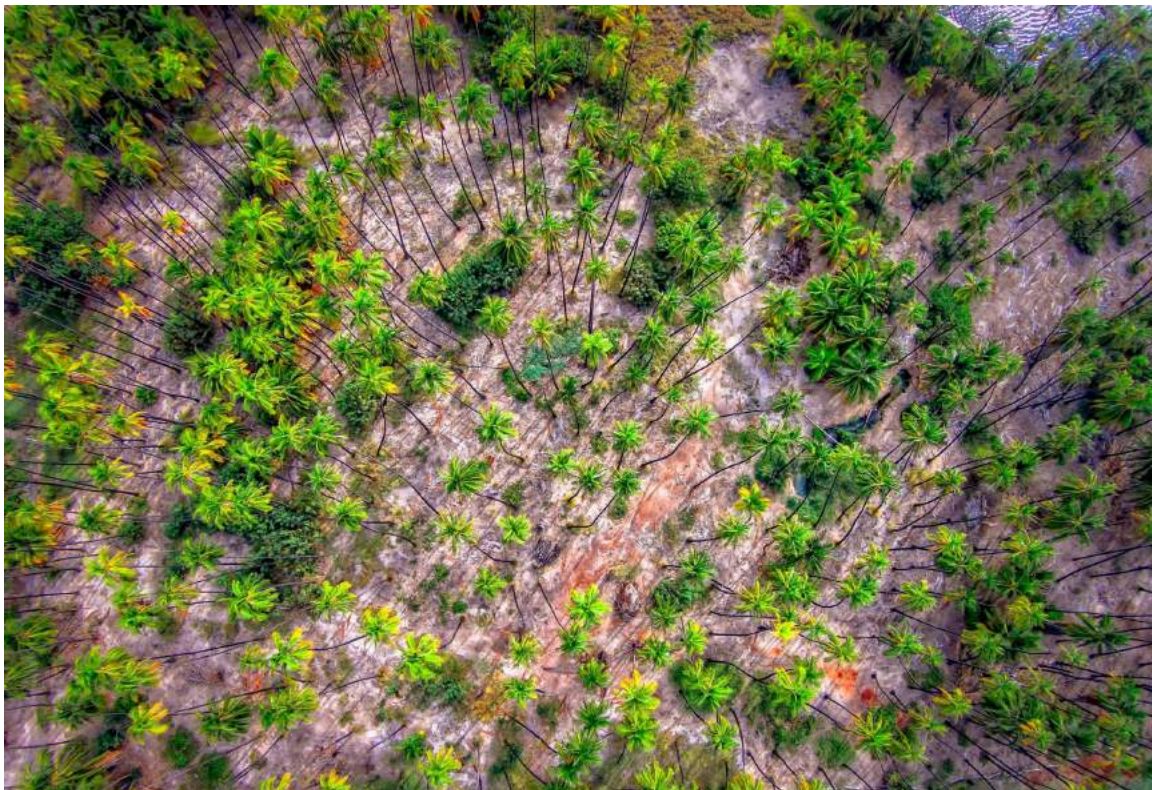
Maunaloa town, together with Kualapuu, the two principal plantation towns of Molokai. At high enough elevation (1000') that it has its own reservoir on top of Puu Nana. Still shows the regimented layout of a company town.



View of the other half of Maunaloa with the usual almost nonexistent traffic. Both Maunaloa and Kualapuu get about 35" rain per year.



Royal Coconut Grove planted by the Meyer Family under the direction of Kamehameha V. Just west of Kaunakakai town on the south coast.



Looking down on Kapuaiwa coconut grove. Ocean is visible in upper right corner. Possible to grow on the wet coastal plain without irrigation, but requiring plentiful irrigation if attempted upland like in Kawela Plantation.



The Molokai industrial park. Looking east , Wailau in distance. Its size speaks to the limited development on Molokai. Located just west of Kaunakakai town. Note the Utah or northern Arizona levels of plant growth.



The coast of Kalamaula ahupua'a , originally a crown land after the 1848 Mahele, later government land, west of Kaunakakai town. Maunaloa in distance. The site of a major Hawaiian Home Lands community.



Kaluaapuhi fishponds of Kalamaula with intervening salt flats. East view toward Wailau volcano in distance. Many fishponds have silted in over time.



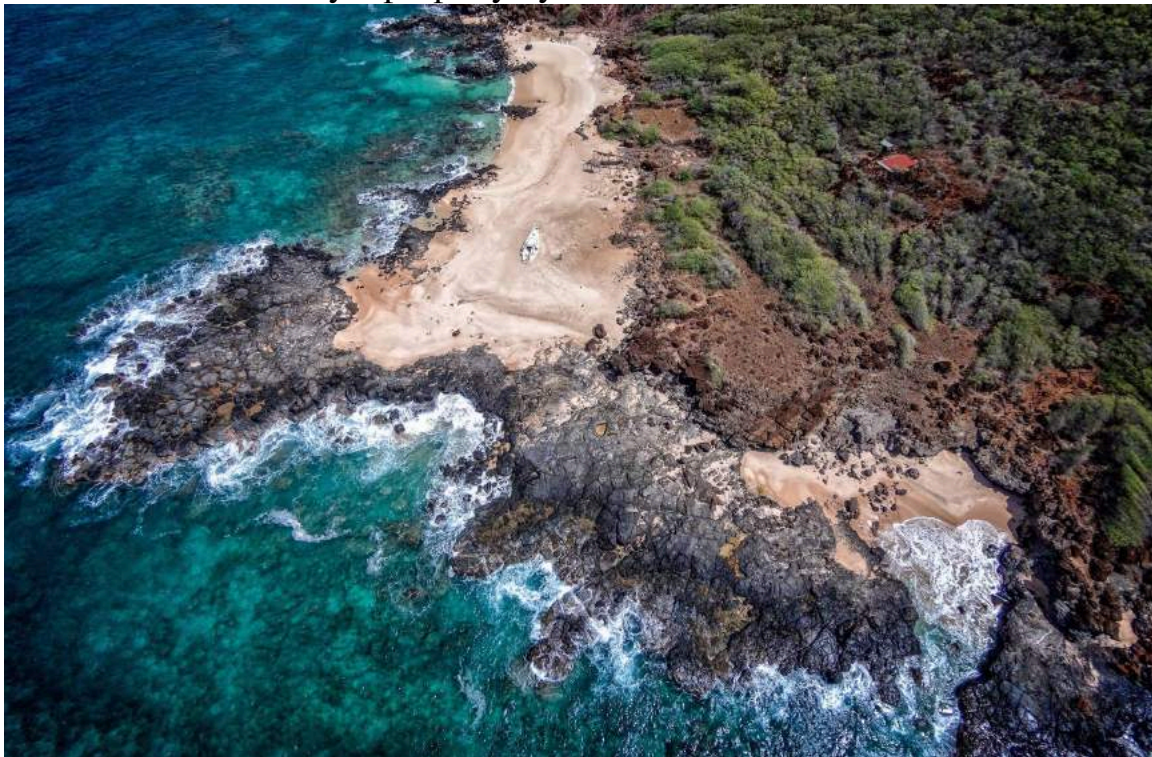
Despite usual brown sediment mudding the near shore reef water, coastal springs provide upwelling fresh water and hence the turquoise water channels in the brown muddy water. Located at the start of the Palauu mudflats, a large mud source. This coast fresh water upwelling is similar to that on Greek Aegean islands, where overgrazing, mostly by goats, has also denuded the landscape and resulted in former freshwater streams being absorbed into the water table and exiting at the islands' margins.



Palaau ahupua'a mud flats on southern coast looking toward Wailau eastern volcano and Maui. The mud flats area testament to the degree of sheet erosion on the slopes of Maunaloa. Palaau ahupua'a was originally a crown land and later a government land. Today it is also part of the Hawaiian Home Lands where ownership requirements are being at least 50 percent native Hawaiian, although heirs may be less. Located just east of Kaluakoi ahupua'a of Kamehameha V which later became Molokai Ranch.



Kanalukaha on western south shore past the west end of southern fringing reef. Waves are now breaking on the beach as opposed to the reef edge to the east. Located in the Kaluakoi ahupua'a which comprised the entire west end of Molokai. A rocky dry, xeric area, unpopulated in pre-contact Molokai, it became royal property by default.



Laau Point, the western most place on Molokai's southern shore. With no fringing reef, Laau is fully exposed to winter swells. 15" rain per year.



Ground level view of Laau Point. The sailing boat is an old wreck.



View from Laau Point looking east to Lahaina , Maui with Lanai in front. A very hot and dry place.



Dixi Maru (Kapukahehu) Beach which has the best swimming on west coast just south of Papohaku Beach, the longest beach in all of Hawaii.



View toward south of Papohaku Beach, beautiful sand but dangerous water.



On the beach at Papohaku.. Real time sand transport . 17" rain per year.



Dunes, protected by conservation easements, at Papohaku Beach are very high, over two stories and provide inland shelter. Unfortunately they also block views for expensive homes built on expensive multi acre lots that are limited by Molokai building codes to two stories. In the few places where dune breaks occur, the good news is there are spectacular views, the bad news is that the property is subject to the extremely violent winter surf. Wide sandy beaches require strong sand transport processes which in turn

means the possibility of very unstable shorelines. In contrast, the south coast is not only protected by the land mass of Molokai from the winter swells but also by a fringing reef, forcing incoming waves to break a half mile off shore. The downside for the south coast is this protection results in comparatively narrow beaches. But they are stable and there are no view blocking dunes. Some Papohaku beach front owners have used borrowed view across an adjacent vacant property having a break in the dunes. Unfortunately, it has happened that a subsequent large house built on the previously vacant lot obliterates the beautiful borrowed view.



There are times of calm water at Papohaku Beach. Safety lies in timing. However the ocean can change very rapidly and at times even the on shore breezes are high enough to sandblast people off of the beach.



Pohakumaululi, just north of Papohaku Beach, on the right with Ilio Point at top left on west coast. The western edge of Kalaukoi ahupua'a.



Kawakiu Bay just north of Pohakumaululi on the northern west coast. Just below Ilio Point. A good swimming beach, but as always at sea, humans are not at the top of the food chain, so care needs to be taken.



Ilio Point with Oahu in distance. Diamond Head at left. 23" rain per year.



Kapalauoa on the western north shore east of Ilio point. Although having a desert like palette of colors, vegetation along the western north coast is sparse and contrasts with deep green lushness of the eastern north coast. Differences are due to microclimates driven by orographic precipitation.



Kalani Beach near Moomomi Nature Conservancy Dunes Area



Kawaaloa Bay with red stream runoff from Mahana well away at the base of Puu Nana . Kaiehu point center right with Ilio point in distance.



North shore at Moomomi looking east toward eastern volcano, Wailau. The seacliffs continually rise from west to east.



Ancient sand dunes of Moomomi protected by the Nature Conservancy. This arid terrain all along the western north coast compared to the very wet east north coast stems from the fact that eastern volcano that rises to almost 5,000' is a rainmaker, while the much more eroded western volcano rises to less than 1,400' greatly reducing its ability to capture moisture from the trade winds. 23" rainfall per year.



Kalaupapa Peninsula, seen from Naiwa at cliff top, site of the leper colony. The peninsula was formed after the north flank of the eastern volcano catastrophically collapsed leaving the worlds highest sea cliffs as a result. The small volcano which made it can be seen as the rise near the cliff base.



View from Palauu State Park of Kalaupapa. The infrastructure of the present colony can be seen on the leeward or left side.



Sheltered Awahua Bay on leeward western Kalaupapa. The only sheltered beach on the eastern north coast of Molokai. Kalaupapa gets about 45" annual rainfall at the colony site itself. Annual precipitation ranges from 40" at the northern tip to 60" at the cliff face, to 70" in Waihanau Valley, to 80" in Waialeia Valley. Together with Waikolu Valley and Kalaupapa peninsula these form Kalawao County. Rest of Molokai part of Maui county.



Cliffs at Kalaupapa. Access to Kalaupapa is limited by permit and is gained by either a boat, sea landing, or by airplane at the landing strip on the peninsula's northern tip, or finally by the scenic mule trail which descends 1700' vertically down the cliffs for those without vertigo issues. Only about 10 percent of the peninsula is accessible to outsiders even with a permit.



Cliff view from the leeward bay beach at Kalaupapa. The reduction in wave heights compared to the windward side is very large. The three adjacent valleys and the peninsula form a separate County, Kalawao. The rest of Molokai is part of Maui County including Maui, Lanai, and Kahoolawe.



View from Makalii in windward Kalawao on Kalaupapa peninsula. Cliffs are seen with Walaleai Valley in foreground followed by Puu Kaiwa, “The Wall”, and then Waikolu Valley. These are early settlement locations.



View of cliffs from north tip of Kalaupapa. View from north coast of what was originally Makanalua ahupua’a.



Kauhako crater of small volcano on Kalaupapa, but very deep , it is the fourth deepest body of water in U.S. . Still periodically emits large amounts of dangerous sulfur gas. Cliffs in distance at right.



View of Kauhako crater from north, cliffs behind to south. Note the large amounts of vegetation in stark contrast to the desert like conditions of the western north coast which lack a high volcano to ring out the moisture.



Winter waves at the windward side of Kalaupapa are very large and powerful driven by the trade swells. Overall rated as one of the best surfing wave locations in the world. Surfing is not allowed due to the leper colony which still has few remaining voluntary residents out of respect for their privacy. Very large waves during the winter swell dominate both the western and northern shores of Molokai, only the fringing reef sheltered south shore of Molokai escapes this seasonal wave onslaught.

The Kalaupapa peninsula was the home of three ahupua'a which speaks to its agricultural productivity. There was Kalawao on the eastern leeward coast including Waialeia Valley, Makanalua running the length of the center spine of the peninsula to its north shore, and Kalauapapa on the sheltered leeward coast including the relatively calm Awahua Bay.



In contrast, the waves inside the fringing reef on the south coast of Molokai on the same winter day. This is a testament to the sheltering effects of the Molokai land mass from the north and eastern swells for the south coast.



Leeward Kalaupapa, site of the present day well maintained leper colony buildings restored under an effort led by Bernie Weisgerber. Patients were free to leave after 1969.



Kanaana Hou Church of Kalaupapa with only one congregant still living.

This completes the circumnavigation of Molokai. The leper colony was not always located on the protected leeward side of the peninsula. It was originally on the more hostile windward side as shown in the historical picture below, one of the earliest taken.



Very early photo of the leper colony then located on the windward side of the Kalaupapa peninsula. The location had obvious weather issues during the winter swells and was later disassembled and moved to the present sheltered leeward side. Although incredibly scenic, must have seemed like the edge of the earth to those permanently banished here.

A Low Altitude Aerial Tour of Kawela Plantation



Approaching western Kawela Plantation from Kaunakakai town, in the foreground Kaoaini Beach Park owned by the Plantation lies between Kamehameha V Highway and the sea, or makai of the road. On mountain side, or mauka, of the road is Onini Gulch, the west boundary of the Plantation. Plantation rises to almost 4000', all home sites are below 500'.



Looking westward from the west edge of Kawela Plantation, in the foreground is One Ali'i Park with Ali'i Fishpond adjacent, bordered by Hawaiian Home Land homes. The abrupt transition from the wetter, greener coast to the drier, brown upland is apparent. All Kawela home sites are upland. Rising in the distance is west volcanop. Traffic levels are always low.



Homes of west Kawela Plantation on the upland ridges between gulches. Maui rises off the coast. Wailau, the eastern volcano rises inland



Moving east, next comes Kawela Gulch, located near the center of Kawela Plantation, with its west and east forks and stream delta shown in the foreground. Smaller gulches run parallel on both sides. Red dot is Lot 30.



Next stop is Kawela eastern edge bounded by an unnamed gulch just beyond the upland curving white paved road with white water tank at top of road.



Above is a view of Lanai from Kakaia Beach park that appears in the foreground of the preceding figure makai of Kamehameha V Highway. The wave activity at the beach is very low owing to the waves breaking at the fringing reef edge almost a half mile out. The drop off to the reef edge is slow. It is possible to walk out to the edge at some locations.

Overall, Kawela Plantation can be characterized as alternating ridges and gulches on heavily eroded volcano slopes. The fertile stream delta area and gulch bottom lands were the center of Kawela agricultural activity from pre-history to early post contact. Again, throughout Kawela Plantation and most of the southern coast of Molokai, west of Kamalo where the south coast starts to turn eastward and captures more trade wind moisture, the green coastal plain to brown upland transition is stark and universal and strongest in the dry summer season. Along the road infrastructure of Kawela Plantation, lots with green areas can be observed which contrast to the surrounding brown lands. This greening is maintained with extensive irrigation and would soon revert to brown if the artificial levels of hydration were to stop. In the background of the Plantation aials is Wailau, the eastern volcano rising to almost 5000', which blocks trade wind moisture. The roads of Kawela Plantation and the adjoining residential lots run upland on Wailau ridges forming the housing pattern seen in the prior aerial photos. The lot's size of about two acres seems to have been largely due to the attempt to assure enough vertical elevation differences between lots to make the "borrowed" views of the ocean and mountains reasonably durable in the face of development of adjacent properties.



A rainbow marking the eastern of edge of Kawela Plantation ends this overview of Kawela from the air.



Above: Lower Kawela Plantation during dry summer season showing modern homesites, road infrastructure (Kupaia Place shown with red marker) and Kawela Stream delta and enlarged coastal plain with upland extensions of the wet bottom lands of Kawela gulch. The comparative dryness of the homesite upland areas compared to the wet Kawela stream and coastal areas is apparent. The Kawela stream areas (now owned by Molokai Ranch and operated as a leasehold nursery and mango plantation) were the centers of pre-historic and early historic Hawaiian agriculture in Kawela. Almost all of Kawela Plantation, save for the highest elevations, can be characterized as a leeward island xeric scrubland with a best horticulture practice of xeriscaping for arid lands. Kawela Plantation is composed of parts of Kawela and Makakupaia ahupua'a.

Prehistoric Kawela

Virtually the entire settlement landscape dates to a very short time span, centered on the period from about 1650 to 1820, i.e. the "proto-historic" period immediately preceding European contact and influence. This time span is from a series of 15 radiocarbon age determinations from a variety of residential and agricultural features distributed throughout the survey area. Three features-a coastal stream-beach midden and two stone residential features-were in use during the sixteenth to seventeenth centuries. All other features date to the eighteenth or early nineteenth centuries (terminal ages of no younger than c. 1820 are indicated by the absence of European material culture). Kawela and Makakupaia Iki ahupua'a appear to have been abandoned shortly after European contact, perhaps in response to the major

political currents associated with Kamehameha's conquests of Moloka'i and O'ahu Islands in 1795-1802, although depopulation and aridity are not to be discounted. It is necessary to also consider the long term stability effects of population growth in closed island environments and related cultural impacts.

The leeward coast was permanently occupied only late in the sequence of Hawaiian settlement (after about 1200).The Kawela- Makakupaia Iki area, with its late prehistoric settlement landscape, typifies the more arid aspects of the leeward coast. Note that lower elevation parts of both Kawela and Makakupaia Iki form modern day Kawela Plantation.

The dominant physiographic feature of the study area is Kawela Gulch, the only watercourse with permanent streamflow in late prehistory. Beginning some 8.5 km inland, its waters head at high elevation swamps, then flow seaward carving narrow box canyons through Tertiary lava flows, exposing and depositing basalt boulders on its banks (material which, significantly, was favoured by prehistoric stone adze makers). With streamflow exceeding 0.25 cu. m/second during the wetter months , stream sediment loads have transformed a formerly narrow coastal strip into a broader alluvial plain suitable for crop production. Although Kawela Gulch is the main source of potable water, other smaller gulches such as 'Onini, flow intermittently during seasonal rains. Issuing along the coastal margin, basal springs- both on land and submerged offshore- provide an additional source of fresh water and allowed the formation of Kakahaia and Uluanui fishponds.

The placename Ka-wela (literally "the heat") appropriately describes the arid climate. The coast and lower slopes receive about 350-500 mm (15-20") of annual precipitation, mostly from November to March, but rainfall is unpredictable . For example, during one summer in the early 1980's, only one single afternoon's rain shower occurred.

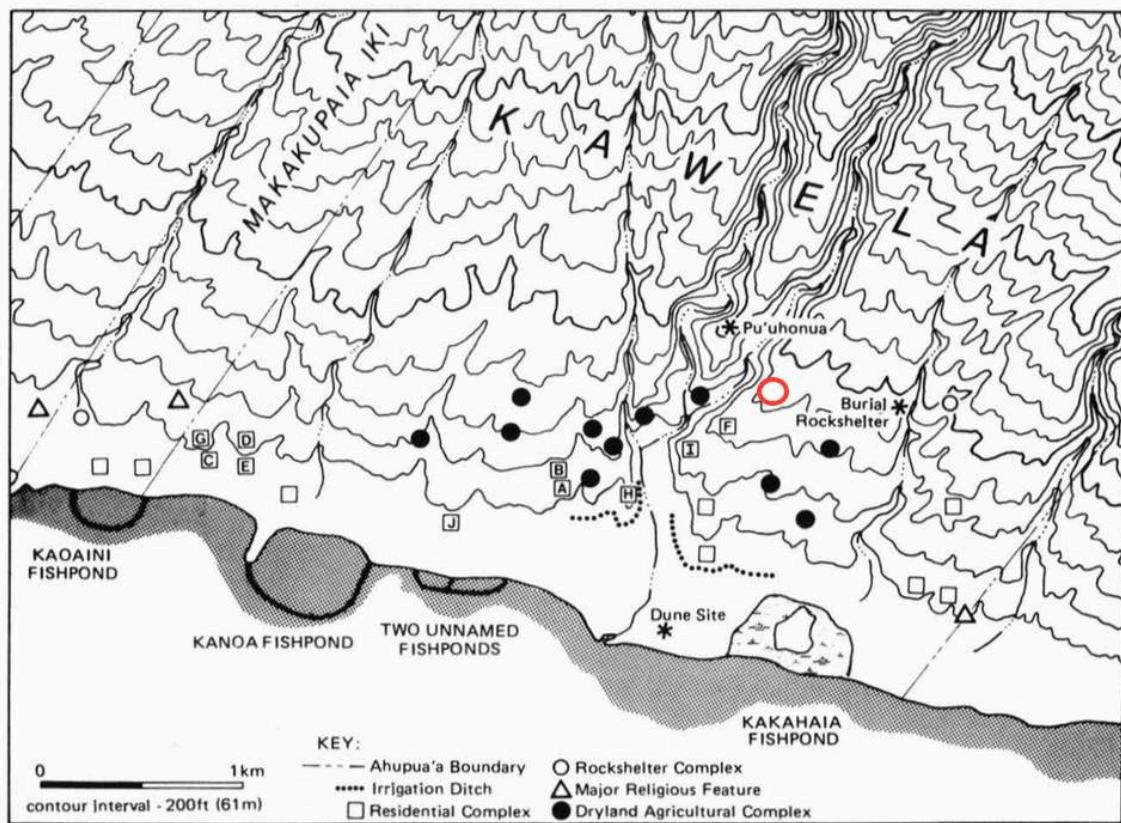
Soil types within the study area fall into two general classes: upland slope and alluvial plains. Classified as "rockland", the upland slopes have poorly developed soils with outcrops covering a substantial portion of the land surface. A thin soil horizon, low in organic matter, is irregularly developed. The present character of Kawela soils undoubtedly reflects 150 years of serious sheetwash erosion due to overgrazing by introduced herbivores. Prehistoric agricultural features on the uplands suggest the presence of formerly better soil conditions prior to this major phase of sheet erosion initiated in late prehistory- presumably by shifting cultivation and other forms of human-induced burning driven by population pressures- and accelerated during the historic period by overgrazing.

The alluvial plain seaward of Kawela Gulch has excellent agricultural soils and produces high yields under irrigation . These young, stream- deposited Kawaihapai clay loams are very friable, almost free of large stones, and are up to 6' deep. It is not surprising that the majority of indigenous land claims made during the early Hawaiian Kingdom (c.1848) were concentrated on these bottom lands, and that this area was the agricultural productive core of Kawela ahupua'a in late prehistory .

Local vegetation reflects human modification of the Kawela landscape, especially during the past 150 years, and the availability of basal groundwater. Prehistorically, the Kawela area was probably dominated by a xerophytic parkland vegetation with low stature endemic trees, shrubs, and grasses . Present floral dominants reflect the effects of feral ungulates (mainly deer and goats), erosion, and fire, all of which increased the area's aridity. The overall effect is not dissimilar to the desertification of the Aegean Greek Islands, that formerly, in classical times, supported 10's of thousands of people and presently, less than 1/10 of that.

The broad fringing reef along the southern Moloka'i coastline was of prime importance to prehistoric fishing groups, providing abundant shellfish, seaweed, octopus, and fish. Extending almost 1 km (over ½ mile) offshore, this gradually sloping coastal shelf with freshwater springs issuing along the beach, provided an ideal setting for the construction of walled fishponds, an aquacultural innovation unique to the Hawaiian Islands . Four such ponds are situated along the Kawela coastline ,while two inland ponds, Kakahaia and Uluanui, are located just east of Kawela Stream. Both coastal and inland ponds provided artificial ecosystems for the husbanding of mullet and milkfish, as well as seaweed and crustaceans.

The several hundred structural features and complexes that make up the archaeological landscape of Kawela and Makakupaia Iki ahupua'a may be broadly grouped into several functional classes, including: (1) features associated with agriculture and production; (2) residential features and complexes, both temporary and permanent; and (3) special purpose features, especially those used for ritual activities. These broad categories provide a convenient basis for discussing the range of variation and spatial patterns exhibited within the study area. The general settlement pattern of Kawela and Makakupaia Iki ahupua'a is illustrated in the contour map (100 foot contour intervals) below. 203 Kupaia Place, Kawela Lot 30 is indicated by red oval as a reference point.



Typical of the more marginal, arid, leeward portions of Moloka'i Island and of the archipelago generally, Kawela and Makakupaia Iki are not ecologically suited to the cultivation of certain indigenous Polynesian crops. Much of the land within these two ahupua'a consists of eroded upland slopes with limited soil development, and annual rainfall averages only 350-500 mm (<20"). Despite these constraints, the mouths of the larger gulches, and particularly the deltaic floodplain of Kawela Stream, offer areas of fertile alluvium, capable of producing relatively high yields under irrigation. The alluvium of the Kawela Stream delta consists of well-drained mollisols, well suited to sweet potato production. The greatest constraint to agricultural production was the limited water available for irrigation. Kawela Stream is currently intermittent, and even assuming permanent flow prior to the historic-period deforestation, it is unlikely that this watercourse ever carried sufficient water to permit the development of extensive pondfield irrigation of taro, as was the case in the island's windward valleys such as Halawa. There is both historical and archaeological evidence, however, for the intermittent irrigation of sweet potato, and a limited amount of taro, at Kawela. Valuable data on land use in

the early decades following European contact in Hawai'i are provided in the records of the Mahele or division of lands between the king, chiefs, and commoners from 1848-54 . These documents consist of land claims made by commoner (maka'ainana) cultivators to the Board of Commissioners to Quiet Land Titles, and of subsequent testimony, surveys, and awards pertaining to these claims. From these documents, one may reconstruct the pattern of mid-nineteenth century traditional land holdings, a pattern which was a continuation from the late prehistoric period. All of the land claims for Kawela ahupua'a are centered on the immediate area of the floodplain and delta, which was divided into a series of long, parallel strips, termed 'ili (subdivisions of an ahupua'a in the indigenous Hawaiian system of land tenure). As reconstructed from the land claims, each 'ili was cultivated and held by a commoner cultivator and his household group, in exchange for labour and tribute to the land manager (konohiki) and chief who held the ahupua'a unit. Each 'ili was further partitioned into subsections termed mo'o or 'ele, with a large coastal subsection on the lower floodplain, and a physically separate, smaller inland subsection on the narrow alluvial bench bordering Kawela Stream. The large coastal mo'o were cultivated for sweet potatoes, while the smaller inland sections were used for small fields of irrigated taro. There is little direct archaeological evidence of the extensive sweet potato cultivations on the lower, coastal portions of Kawela floodplain, which probably utilized simple mounding and/or furrowing techniques without construction of permanent terracing . Irrigation of the floodplain, however, required the use of permanent ditches to feed water from the stream along the inland edge of the alluvium. Two such ditches are represented in early historic maps, and the archaeological vestiges of the western ditch were discovered during 1980's fieldwork. A 40-metre-long segment of the irrigation channel, including a stone barrage to deflect floodwater back into the main stream channel, can still be traced along the base of the steep gulch wall. Excavations across the channel revealed the ditch configuration and cross-section, permitting an estimation of the maximum possible discharge. This discharge was calculated as 550 cu.m of water per 24-hour day, but it is unlikely that this maximum discharge was carried on a continuous basis, given the erratic streamflow within Kawela Gulch. Rather, it is believed that irrigation of the delta was carried out intermittently, a practice which would have produced reasonable yields of sweet potato, but which would have been insufficient for taro cultivation. Further archaeological evidence for irrigation is restricted to two small

complexes of stone-faced pondfields and associated ditch segments in the interior of Kawela Gulch, just below the major fork . Individual pondfields are rather small, ranging from 3 by 5 m up to 10 by 15 m in size. These small irrigation systems probably correspond with the taro lands ('aina kalo) described in the 1848 land claims.

Our survey revealed archaeological evidence of limited attempts to cultivate the slopes to the west and east of Kawela Gulch . Limited rainfall in the region would certainly have made any non-irrigated agriculture a risky proposition, and the agricultural complexes on the slopes may represent no more than attempts to coax out an additional crop during years of higher than average winter rainfall. Areal excavations in shelters revealed several scoop hearths and limited amounts of shellfish which are interpreted as evidence of short- term, repeated occupation. Excavations through and around several of the stone mounds revealed that crops were planted in small soil pockets immediately adjacent to the mounds, and that the stone heaps themselves served as moisture retention devices. If *Lagenaria* gourds were one of the crops grown at this site, the stone mounds would also have provided vine supports.

Of equal if not greater significance to the total scheme of production within Kawela and Makakupaia Iki ahupua'a were several large fishponds used for the husbandry of mullet , milkfish , and other species. The development of these large ponds, and of the set of aquacultural techniques associated with them, was one of the remarkable achievements of late Hawaiian prehistory. The southern Moloka'i Island coastline is particularly noted for its extensive fishponds, constructed and operated under the aegis of the chiefly class. Five ponds lie within the Kawela area, the largest of which is Kanoa Pond .Four of these ponds consist of arc-shaped walls built of basalt and coral boulders and cobbles out on to the shallow reef flat (a type known locally as 'oko kuapa. Kakahaia Pond is separated from the sea by a sand ridge or beach accretion barrier (the pu'uone type). Geomorphological and stratigraphic studies suggest that Kakahaia Pond was originally a 'oko kuapa, with a stone wall connecting two protruding points along the shoreline. The stone wall is presumably now buried under the sandy accretion barrier. Estimates are that Hawaiian fishponds produced annual yields of between 300-500 pounds of fish per acre (335-560 kg/ ha.). With the total fishpond area within Kawela and Makakupaia Iki totaling about 96 acres (38.8 ha.), the total annual production of fish ranged from 28,000 to 48,000 pounds (12,704-21,778 kg) per year. Significantly, such aquacultural production

was controlled by the chiefly class, and is an example of the intensification of production deployed in the service of the larger political economy of the Hawaiian chieftainship, again indicating increasing population pressures .

The distribution of residential complexes at Kawela and Makakupaia Iki is essentially linear and parallels the coast, with a significant inland "bulge" in the area of Kawela Gulch . Residential complexes are almost invariably situated atop ridges overlooking the coastal plain or gulch bottom, and exposed to the cooling tradewinds, not unlike modern Kawela Plantation homes. Structure foundations are often built atop or incorporate stable bedrock outcrops while reserving soil areas for agricultural activity. South-central Moloka'i is typical of the more arid, leeward regions throughout the archipelago, and therefore poses several significant constraints which in turn have influenced the development of settlement patterns. Among these are low and seasonally uncertain rainfall (at the lower limit for Polynesian crop plants), variable and low streamflow even in the larger gulches, and poorly developed soils. On the other hand, the very broad reef flat which extends along the southern Moloka'i coast offered an environmental opportunity for the development of large fishponds. It is possible that the permanent settlement of the Kawela area-a late phenomenon in Hawaiian prehistory-was stimulated by the expansion of fishpond technology along the island's southern coast. Indeed, not only fishpond construction, but the larger settlement pattern as a whole, may have been politically motivated, under the aegis of ruling chiefs in response to population pressures. At one scale, the distribution of settlement components in Kawela and Makakupaia Iki ahupua'a reflects the environmental constraints and opportunities mentioned above. Residential complexes are arrayed in a generally linear pattern, paralleling the coast with its productive ponds and reef-fishing resources, but with a significantly higher density of residential sites around the periphery of Kawela Gulch, the one area in which streamflow and soils were adequate for permanent agricultural production.

To understand the structure of settlement space at Kawela and Makakupaia Iki, however, requires a consideration of economic and political, as well as social, factors. Protohistoric Hawaiian society had achieved a level of development virtually unique within Polynesia, in which overt political considerations strongly influenced social grouping, economic production, and territorial organisation . For example, the ancestral and widespread Polynesian pattern of corporate descent groups which held land in common

(often termed *kainanga*) had ceased to exist in Hawai'i at the time of European contact. Instead, land was held by the chiefly class (organised on the *ahupua'a* system), and was worked by the commoner or *maka'ainana* class. (The term *maka'ainana* is, in fact, the Hawaiian reflex for an older Proto-Polynesian term, **kainanga*, which was a land-holding corporate descent group.) At contact, with descent no longer a significant factor for validating rights to ancestral lands, population mobility had increased, and households were usually organised around senior males who had access to land vis-a-vis their relationship to a land-holding chief. For the commoners, extensive lateral kin networks came to be far more important than genealogical, lineal relationships.

The settlement pattern of Kawela and Makakupaia Iki *ahupua'a*, dating to the final one to two centuries prior to European contact, reflects these transformations of Hawaiian society and political organization. Rather than agglomerations of households grouped on ancestral lands, and sharing a common religious facility which ritually validated land claims (as, for instance, with the Society Islands *marae*), we see a pattern of dispersed, independent households, each with its own ancestral ('*aumakua*) shrine. The overtly political organisation of territory is reflected in several ways. One of these is the siting of the household clusters of the higher ranking elites (residential complexes H and I) in the geographical core of Kawela *ahupua'a*, where they could easily dominate the local production system. The territorial organization is also represented in the major *ahupua'a* temples which define the eastern borders of each land section, and which also reflect the annual tributary relationship of the *ahupua'a* chief to the ruling paramount of the chiefdom. The fortified *pu'uhonua* site also is indicative of the integration of Kawela into the larger, chiefdom-wide political system.

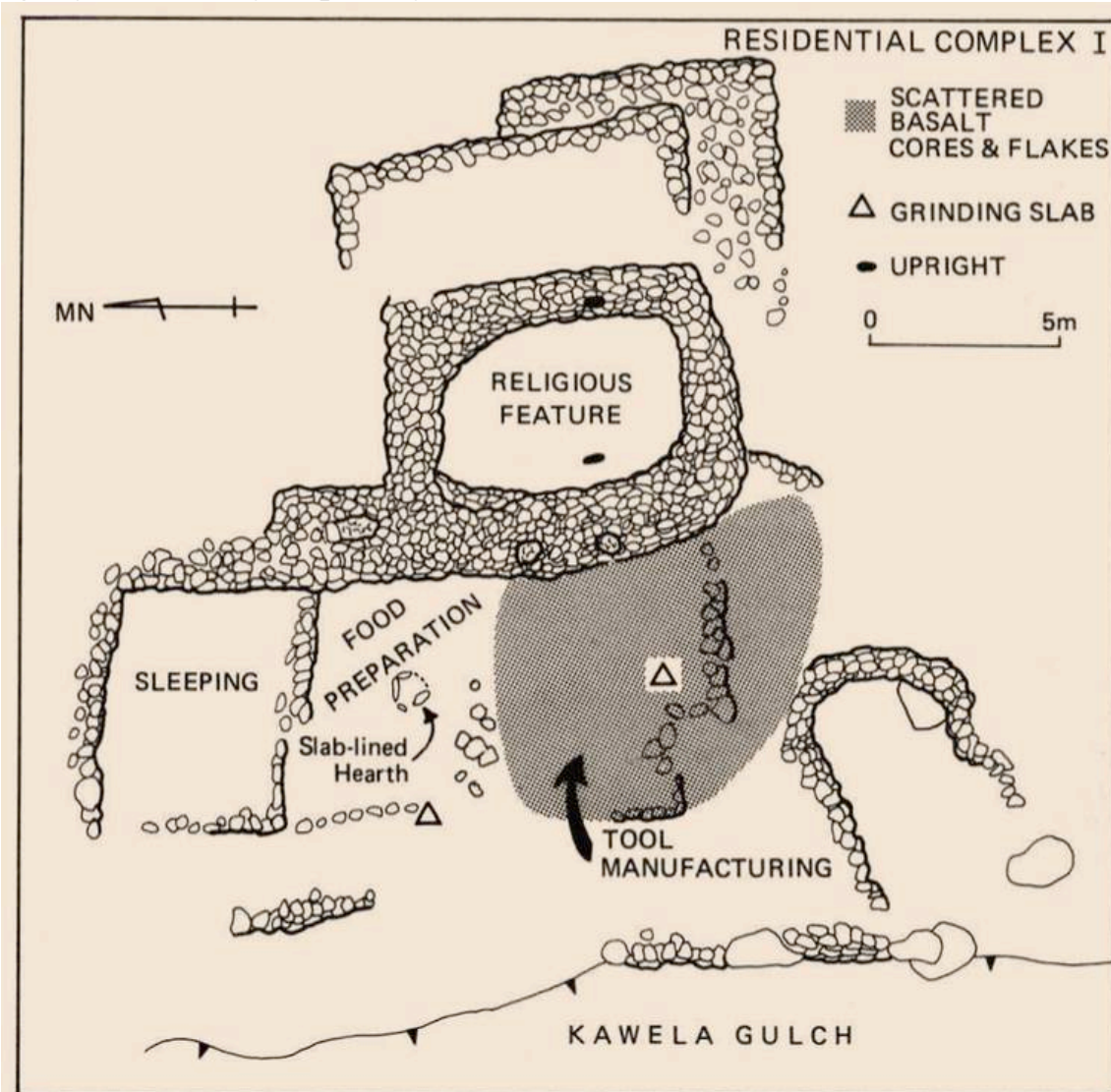
Other aspects of the political control of production are reflected in the organization of space, particularly in the close association of craft specialization sites with the household clusters of the ranking elites.

From a 1778 pre-contact population of several hundred thousand, the result of migrations first from the Marquesas Islands and much later from Tahiti, only about 5,000 pure native Hawaiians are alive today. All are elderly.

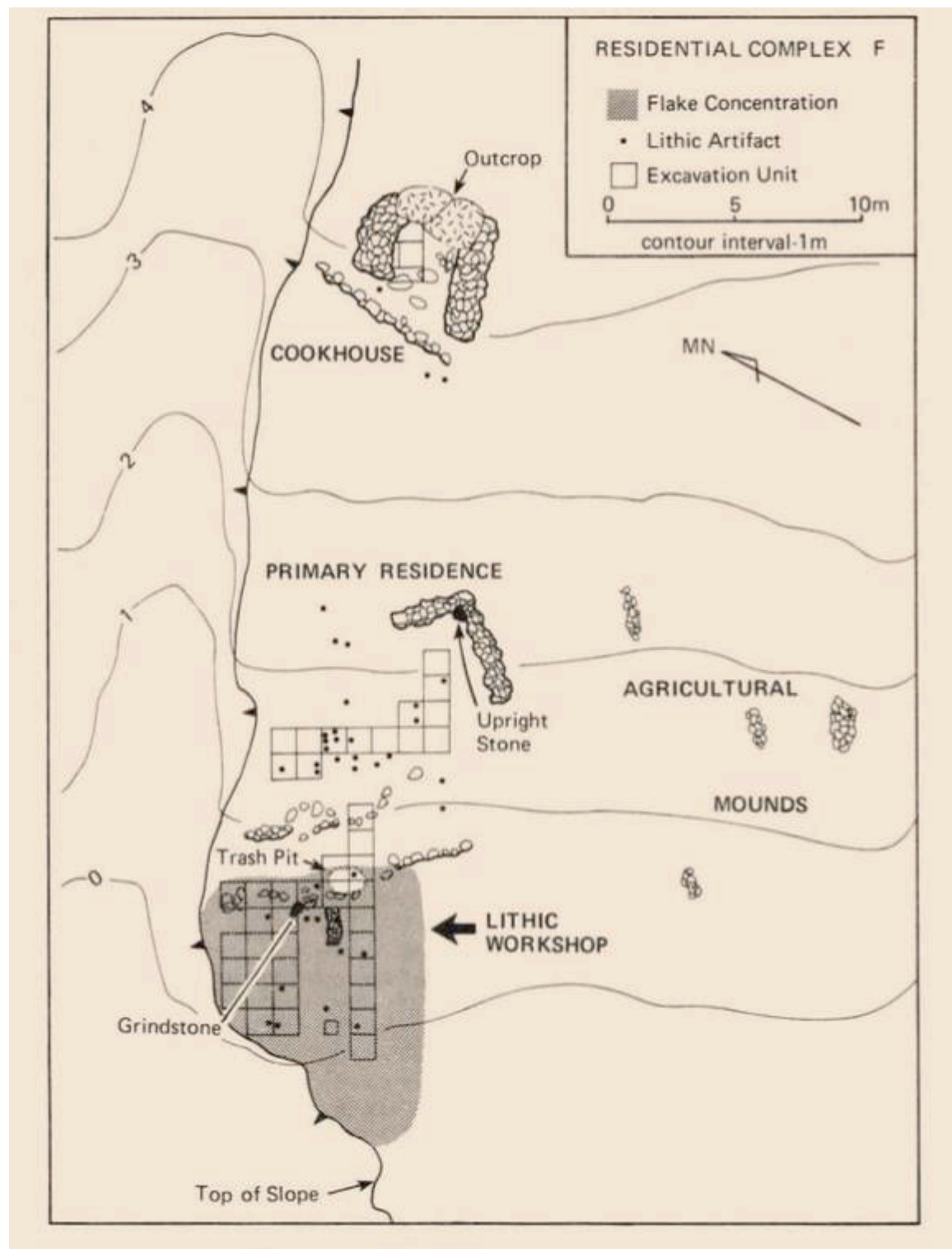
Even the population of half-blooded Hawaiians is rapidly aging and is projected to no longer exist after 2044. The future native Hawaiian population will have progressively lower blood quantum as intermarriage continues in a state famous for its diversity. But in so doing it will thread even more broadly through the mosaic fabric that is the people of Hawaii.

How the rich lived. An architecturally impressive complex, this residence

was probably occupied by a high status household. The activity areas are tightly clustered, yet spatially discrete. A men's house is located 23 m south.



West summer view from ocean of present day Kawela Plantation . The arid agriculture limiting nature of the lower elevation landscape is apparent. East Molokai Volcano, Wailau is in background and greener at higher elevations.



How the average person lived. A relatively small residential complex presumably occupied by a lithic craftsman. Note the discrete activity areas centered around the primary residence.

Both of these complexes are located on the Kawela Gulch side of Kupaia Place in Kawela Plantation. The location of Complex I is shown below.



East end of Molokai showing Kawela Gulch on left side. Dry summer view with narrow green coastal plain. Greener at higher elevations and to the east. The flat coastal plain, despite having lower annual rainfall than the upland area, is wetter than the steep sloped uplands, since the much larger upland areas collect and transport surface and shallow groundwater to the narrow coastal plain resulting in a high coastal fresh water table, overtop a shallow salt water one, expressed as springs and other features that effectively irrigate the narrow coastal plain and support plants and trees and fishponds.

The lower part of Kawela Gulch shown below formed the heart of agriculture in prehistoric and early historic period of Kawela ahupua'a. Note the green delta area of Kawela stream and the surrounding area of green coastal plain. The green continues upland in the Kawela Gulch bottom areas. In stark contrast, upland and outside of the gulch, the land is very arid and xeric and hence comparatively barren. The main coastal road, Kamehameha V Highway is shown running parallel to the coast. Onioni is seen coming upland from it with Kupaia branching off along the gulch cliff face. Lot 30, 203 Kupaia Place is indicated by red square.

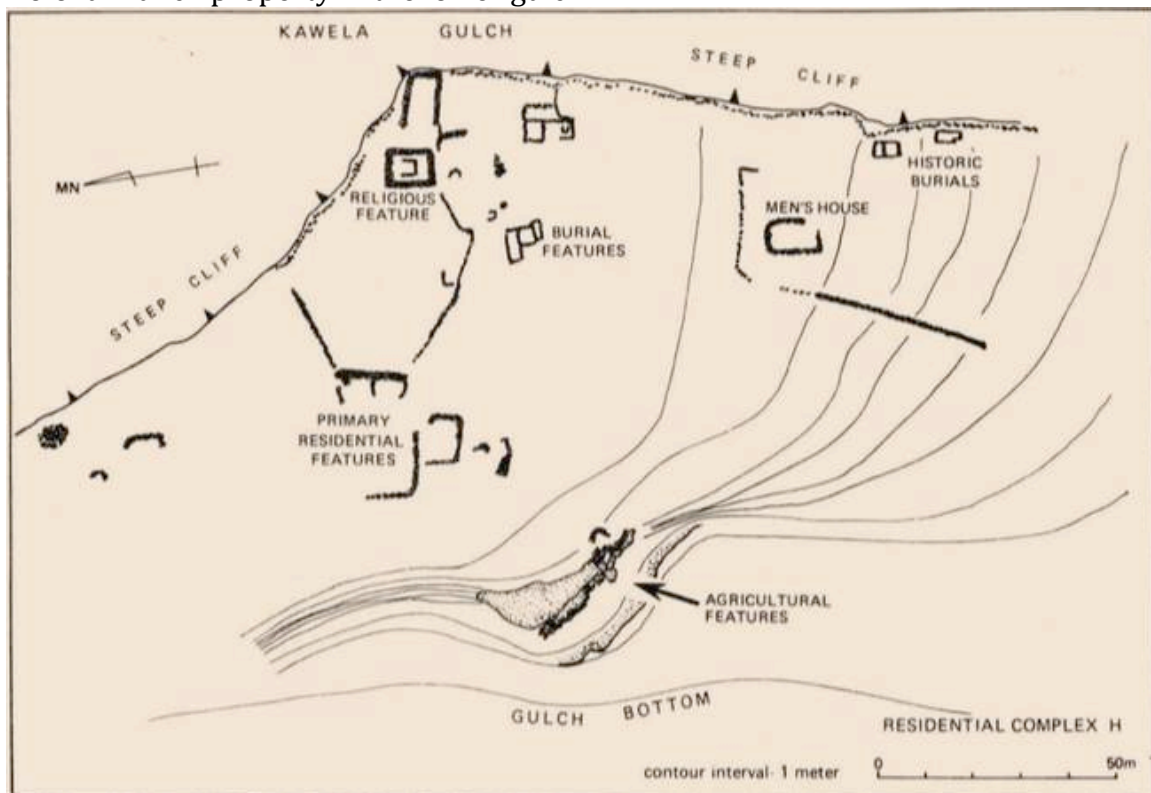


The prehistoric and early historic agricultural center of Kawela Gulch is shown below. Prehistoric complexes are located within red squares. The large complex H discussed in the text is shown in the lower left red square. The upper caste complex I, which is also discussed in the text is shown on the upper right in a red square. This area of Kawela Gulch and the bottom lands immediately above it formed the agricultural area of Kawela ahupua'a. The Kawela stream bed can be seen adjacent to complex H. Note in that area, the concentration of vegetation on the near sides of the stream bed. This is not unlike stream bed banks in arid southern Utah and northern Arizona on the mainland. The canopied area south of the complexes is the site of a present day mango plantation and also a nursery. Note also the concentration of vegetation at the cliff base of Complex I which is located above the gulch to catch the cooling trade winds and for oversight. The concentration is probably owing to water seepage at the cliff base. Again, the main coastal road, Kamehameha V Highway can be seen along the bottom. Onion branches off of that and in turn, Kupaia Place branches off following the gulch cliff face.





Above: Enlargement showing large Complex H at Kawela Gulch Bottom high status household. Below: Complex H diagram showing features. The complex lies in Molokai Ranch property in the lower gulch.



A contrastive analysis of residential complexes within the study area also reveals significant distinctions which, we believe, reflect hierarchical differentiation in the rank or status of the households which occupied them. Two complexes, in particular (H and I), are interpreted as residences of prominent social groups, presumably households which centered around a lesser chief, or konohiki, the land manager of a chief. These complexes are more extensive and architecturally complex than other residential sites in the study area. More importantly, only these two residential complexes incorporate rectangular, fully-enclosed and high-walled temples (heiau). It is also relevant to note that these two sites command prominent topographic settings, with views of the south Moloka'i coast and its fishponds, the agricultural lands of Kawela Gulch, and beyond to the islands of Lana'i, Maui, and Kaho'olawe. Determining the relative status of households formerly occupying residential complexes is a problem that must be addressed using a diverse array of archaeological data. In our view, simple measures such as floor area which is directly reflective of status (times have not changed that much) are in themselves insufficient criteria for the social interpretation of residential complexes. The Kawela and Makakupaia Iki data, however, indicate that status differences are reflected by sets of attributes such as: (1) the number of structural features in a residential complex; (2) the nature of the ritual feature, whether a formal structure separate from the primary residence, or a simple upright stone within the residence; (3) the presence of burial platforms; (4) high frequencies of pig and dog bone, both status foods according to the ethnohistoric record; (5) high density and range of formal artefacts (e.g. adzes, gaming stones, stone lamps, gourd stoppers, bone picks, tattoo needles); (6) presence of non-local lithic materials; (7) density of shellfish and other faunal remains; and (8) topographic setting. A contrastive analysis of the Kawela residential complexes using these criteria indicates that Complexes H and I were occupied by households of relatively higher status. Complex F exemplifies a household cluster of a relatively lower status group.

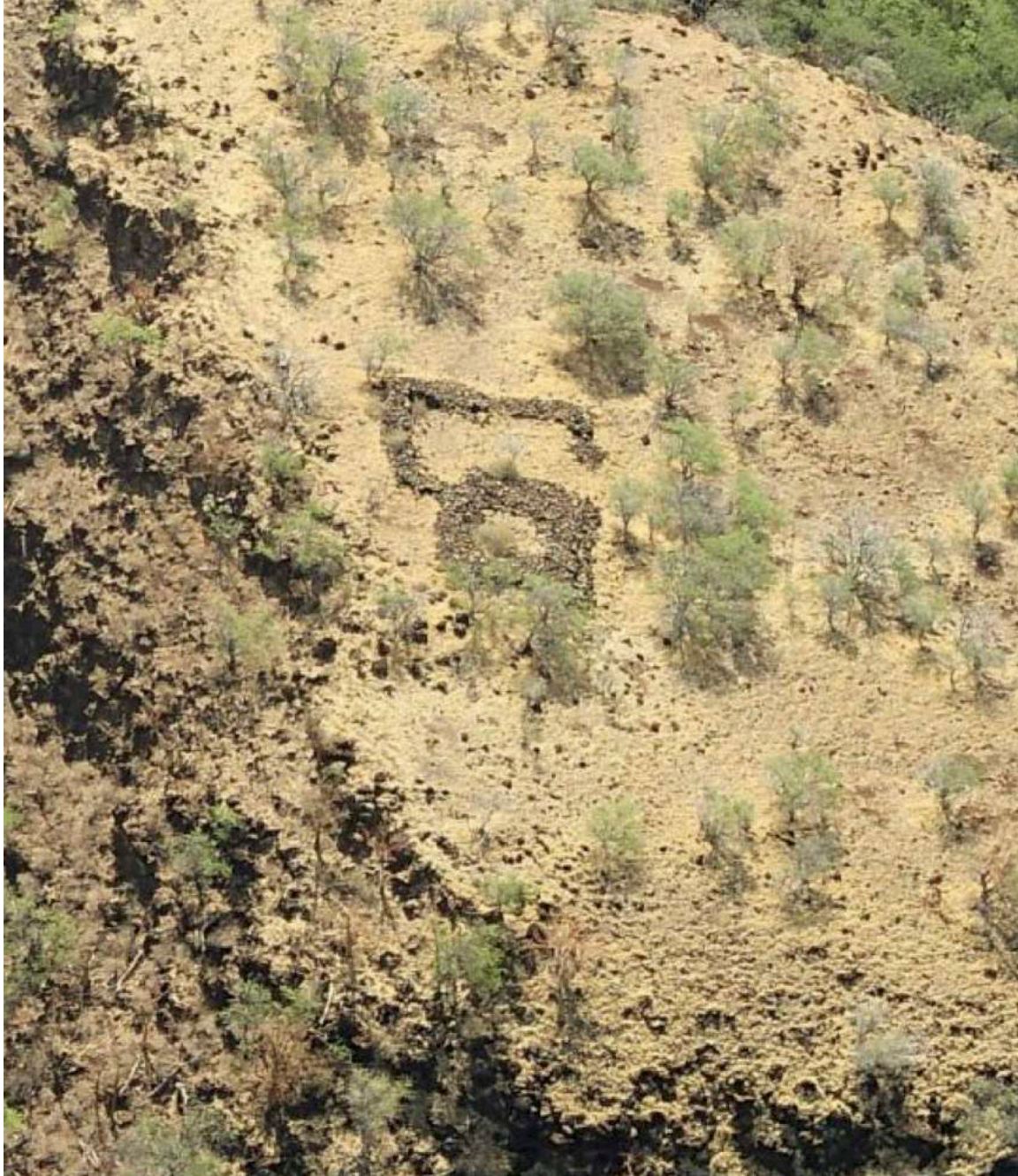
The survey and excavation data from Kawela and Makakupaia Iki allow us to define a late prehistoric residential complex minimally as incorporating: (1) a primary residence, usually the largest structure of the complex, and often including such architectural components as upright stones, a slab-lined hearth, and storage cupboards; (2) several smaller, ancillary shelters or short wall segments, one of which was used for cooking, others for craft activities or storage; and (3) minor horticultural features appearing as stone-faced earthen terraces and stone clearance mounds, or simply as soil areas cleared of stone.

Pu'uhonua , a place of refuge, was the site of final part of a battle between the invading forces of Chief Kapiiuhokalani from Oahu and an alliance between a chief from Hawaii and the Molokai chiefs in 1737 nearly a century before unification of all of the Hawaiian Islands under Kamehameha I. The invaders were defeated after being routed and taking refuge at the fortified Pu'uhonua. Slingshot stones still litter the area. In 1795, Kamehameha I during the Hawaiian unification wars would drive Molokai defenders past Pu'uhonua and up Kawela Gulch onto Pelekunu ahupua'a over the Molokai east volcano ridge line.

Pu'uhonua is located on the top of the central ridge at the junction of the east and west forks of Kawela Gulch. It is located in the typical dry land upland area as compared to the wet gulch bottom land and the wet low elevation coastal area.

Below is shown a view from the west of the present day Pu'uhonua ruins (red rectangle) overlooking lot 30 of Kawela Plantation, 203 Kupaia Place marked with red dots at the lot corners. The east and west forks of Kawela Gulch are plainly visible as is southern terminus of the narrow ridge atop of which Pu'uhonua was located. Pu'uhonua at an elevation of 510 feet looks down upon lot 30 located at 420 foot elevation.





An enlargement of Pu'uhonua showing the details of the rock wall ruins at the site, this was the most massive pre-historic structure in all of Kawela. The overall dryness of the area is notable possessing only scattered kiawe trees and patchy grass lands. The site is surrounded by steep cliffs on the west, south, and east that effectively isolate the site from access in those directions. Immediately above the site, the ridge becomes very narrow making it easy to defend from the only non cliff protected access route.

Early Land Subdivisions in Hawaii

What follows is the description given by W.D. Alexander, Superintendent of the Government (Kingdom of Hawaii) in 1891.

The ancient system of land titles in the Hawaiian Islands was entirely different from that of tribal ownership prevailing in New Zealand, and from the village or communal system of Samoa, but bore a remarkable resemblance to the feudal system that prevailed in Europe during the Middle Ages. Although this system of land tenure was radically changed by the peaceful and beneficent revolution to fee simple ownership which took place during the reign of Kamehameha III (reigned 1825-1854), the ancient subdivisions of land remain unchanged to the present day.

ANCIENT SUBDIVISIONS OF LAND

In the first place, each island was divided into several moku or districts, of which there are six in the island of Hawaii, and the same number in Oahu. There is a district called kona on the lee side, and one called ko'olau on the windward side of almost every island. Those are the only two on Molokai. On Maui there are some sub-districts called okana(s), of which there are five in the hana district, while Lahaina is termed a kalana.

The next subdivision of land below the moku is the ahupua'a, which has been termed the unit of land in the Hawaiian system. Its name is derived from the ahu or altar, which was erected at the point where the boundary of the land was intersected by the main road alaloa, which encircled each of the islands. Upon this altar, at the annual progress of the akua makahiki (i.e. year god), Ionomakua, was deposited the tax paid by the land whose boundary it marked, and also an image of a hog, pua'a, carved out of kukui wood and stained with red ochre. The typical ahupua'a is a long narrow strip extending from the sea to the mountain, so that its chief may have his share of all the various products of the uka or mountain region, the cultivated land, and the kai or sea. On east Maui the principal lands all radiate from a large rock on the northeast brink of the crater of Haleakala, called Palaha. Eight ahupua'a(s), one in each district of East Maui, meet at this rock. The ahupua'a(s) are extremely unequal. In several districts a few larger ahupua'a(s), widening as they extend inland, cut off all the smaller lands and take the whole mountain to themselves. The same lands generally monopolized the deep sea fisheries, leaving to the smaller ahupua'a(s) only

the fishery along their shores, where the water was not more than five feet deep. On Maui the lands of Waikapu and Wailuku appropriated almost the whole of the isthmus so as to cut off half of the lands in the district of Kula from access to the sea. These two ahupua'a(s), together Wai'ehu and Waihe'e, which were independent, belonging to no moku, were called na poku, and have been formed into a district in modern times. While some districts are regularly divided up into ahupua'a(s) averaging only a quarter of a mile in width and several miles in length; in others we find ahupua'a(s) like Honouliuli, in O'ahu, which contains over forty thousand acres, or the four great mountain lands of Hawai'i, viz: Kahuku, Keauhou, Humu'ula and Ka'ohe, of which the first mentioned contains 184,000 acres, mostly on the mountains. The divisions of the lands were to a great extent made on rational lines, following a ridge, the bottom of a ravine or depression, but they were often without these and sometimes in disregard of them. Sometimes a stone or rock known to the aboriginals and notable from some tradition, or sacred uses, kind of tree, herb or grass, the habitat of a certain kind of bird, sometimes made a division. Certain persons were specially taught and made the repositories of this knowledge, which was carefully delivered from father to son.

SUBDIVISIONS OF THE AHUPUA'A

The ahupua'a(s) were generally but not always subdivided into 'ili(s), each with its own name and carefully defined boundary. As was recognized by the decision of the Supreme Court in the Kane'ohe case, in 1877, there were two kinds of 'ili(s) of which the first was a mere subdivision of the ahupua'a for the convenience of the chief holding the same, who received its revenues from his konohiki or agent. The other class comprised the "'ili kupono" or "ku," which were independent of the ahupua'a, and generally did not pay tribute to its chief. Thus the transfer of the ahupua'a to a new chief did not affect the ownership of the ku contained within its limits. In some cases these 'ili(s) absorb the greater part of the ahupua'a in which they are situated. A well-known case is the ahupua'a of Waimea, Hawai'i, of which the independent 'ili(s) of Pu'ukapu and Waikoloa form about nine-tenths. The same is true of the ahupua'a of Waikele in 'Ewa. In fact, there are some 'ili(s) that do not seem to be included in any ahupua'a, as for instance, the 'ili(s) of Honolulu, which is the same of the locality, but not of an ahupua'a. Another peculiarity of the 'ili, on O'ahu at least, is that it often consists of several distinct sections of land in different parts of the ahupua'a, which are called lele(s), i.e. "jumps." Thus many lands in Waikiki have their

corresponding patches of taro land and forest in Waikiki and Manoa valleys. The taro lands of Wailupe are found in Palolo valley. In Kalihi, and also in the district of 'Ewa, are 'ili(s) which consist of eight or ten scattered lele(s) apiece, included under one title. Each of these pieces may be spoken of either by its own individual name or by that of the whole 'ili, which practice is a fruitful source of confusion. The 'ili(s) were again minutely subdivided, and many of the larger patches had individual names. The patches cultivated exclusively for the chief were called koele or hakuone. In more recent times they were styled Poalima (i.e. Fridays), from the fact that the tenants of the land were formerly obliged by law to labor for their chief on Fridays. The narrow strips of cultivated dry land, separated by ridges of stones, are called mo'o. These ridges or iwi frequently serve as boundaries between ahupua'a(s) and 'ili(s). This minute subdivision of the land and the great multiplicity of local names bear witness to the dense population that must have existed in ancient times and related population pressures on productive lands.

ANCIENT SYSTEM OF LAND TENURE

The nature of the ancient system of the land tenure during this Kingdom is clearly stated in the "Principles adopted by the Board of Commissioners to quiet land titles," which were approved by the Legislative Council, Oct. 26th, 1846. It is therein declared that "When the islands were conquered by Kamehameha I., he followed the example of his predecessors, and divided out the lands among his principal warrior chiefs, retaining, however, a portion in his own hands to be cultivated or managed by his own immediate servants or attendants. Each principal chief divided his lands anew and gave them out to an inferior order of chiefs by whom they were subdivided again and again, often passing through the hands of four, five or six persons from the King down to the lowest class of tenants. All these persons were considered to have rights in the lands or the productions of them, the proportions of which rights were not clearly defined, although universally acknowledged. All persons possessing landed property, whether superior landlords, tenants or sub-tenants, owed and paid to the King not only a land tax, which he assessed at pleasure, but also service which was called for at discretion, on all the grades from the highest down. They also owed and paid some portion of the production of the land in the addition to the yearly taxes. A failure to render any of these was always considered a just cause for which to forfeit the lands. The same rights which the King possessed over the superior landlords and all under them, the various grades of landlords possessed over their inferiors, so that there was a joint ownership of the land,

the King really owning the allodium, and the persons in whose hands he placed the land, holding it in trust." The tenures might be considered feudal, except that military service was not the principal condition on which they were held. The land taxes mentioned above were really rent, and by ancient usage went to the King as his private income or revenue. The ideas of a Nation and of a Government as distinguished from the person of the King first began to be recognized in the Constitution of 1840. All lands forfeited for non-payment of taxes reverted to him. His consent was necessary for any transfers of real estate in the Kingdom, and for real mortgages also or for seizure of land for debt. When the labor tax first began to be regulated by law, every tenant was required to work one day in every week (Tuesday) for the King, and one day (Friday) for the landlord. This tax was reduced in 1840 to 36 days in the year for the King, and an equal number for the landlords. But those landlords who did not belong to the National Council, had to pay to the King one-tenth part of all the avails of their labor days. The above arrangement illustrates the nature of the joint ownership explained above.

Ancient history affords many illustrations of these views. Judge Fornander states that "It had been the custom since the days of Keawenui-a-Umi on the death of the Mo'i (King) and the accession of a new one, to redivide and distribute the land of the island between the chiefs and favorites of the new monarch." This custom was repeatedly the occasion of a civil war. But during the long reign of Kamehameha the leading families of chiefs enjoyed a greater degree of permanence and security in the possession of their lands than had been previously known, and on the accession of his son Liholiho no general redistribution of lands took place. The common people were mere tenants at will, liable to be dispossessed at any time, and even to be stripped of their personal property at the will of their chiefs. In some respects their condition was not improved by the advent of civilization and the cessation of civil wars. Formerly chiefs lived on their lands, personally attended to their cultivation, and took a strong interest in the prosperity of their vassals, on whom they had to depend in time of war. But when the centralizing policy of the Conqueror and the attractions of the capital had drawn them away from their lands, they were succeeded by rapacious agents or *konohiki*(s), and the old feudal ties gradually lost their power. Besides commerce introduced new luxuries and new wants which led the chiefs into debts which they had no means of paying except by increased exactions on their people, until as David Malo expressed it, "Debt was far more oppressive than war."

Laws were passed in 1839 and 1840 to prevent evictions without cause, and the wanton seizure of the property of tenants, but proved to be totally

inadequate. Convinced that the ancient system was incompatible with their further progress in civilization, the King and chiefs resolved to separate and define the undivided shares which individual held in the lands of the Kingdom. After long and patient investigation it was finally settled that there were but three classes of persons having vested rights in the lands; 1st the King, 2nd the chiefs, and 3rd the tenants. The Land Commission decided that if the King should allow to the landlords one-third, to the tenants one-third, and retain one-third himself, "he would injure no one unless himself."



The Monarchs of Hawaii , from Kamehameha I (top right) ,II, III, IV,V, Lunalilo (the first fee simple owner of Kawela ahupua'a) , Kalakaua , to Liliuokalani (bottom left), who oversaw the transformation of landholdings in Hawaii. Kamehameha III in 1845 under the Great Mahele started the transition from the feudal land system to fee simple ownership and allowed foreigners to buy land. By 1893 at the overthrow of the Kingdom, foreign ownership was at 90%. The Kingdom extended from 1795 to 1895. During that period the transformation from a feudal land holding system to a fee simple form of ownership was completed and the abandonment of the onerous caste and kapu (taboo law) systems became fact.

The Present Day Kawela

The original Kawela ahupua'a is presently divided into three parts: the 6,000 Acre Kawela Plantation (established in 1980), the 2,774 Acre Molokai Properties Limited Property under a Nature Conservancy easement (Kamakou Preserve established in 1982), and 461 Acre Molokai Preserves owned by the Nature Conservancy(part of Pelekunu Preserve established in 1986). Outside of the 500 acres of homesites and roads of Kawela Plantation, over 8,500 acres of the original ahupua'a have been preserved. Kawela Plantation extends from sealevel to 3,951' altitude.

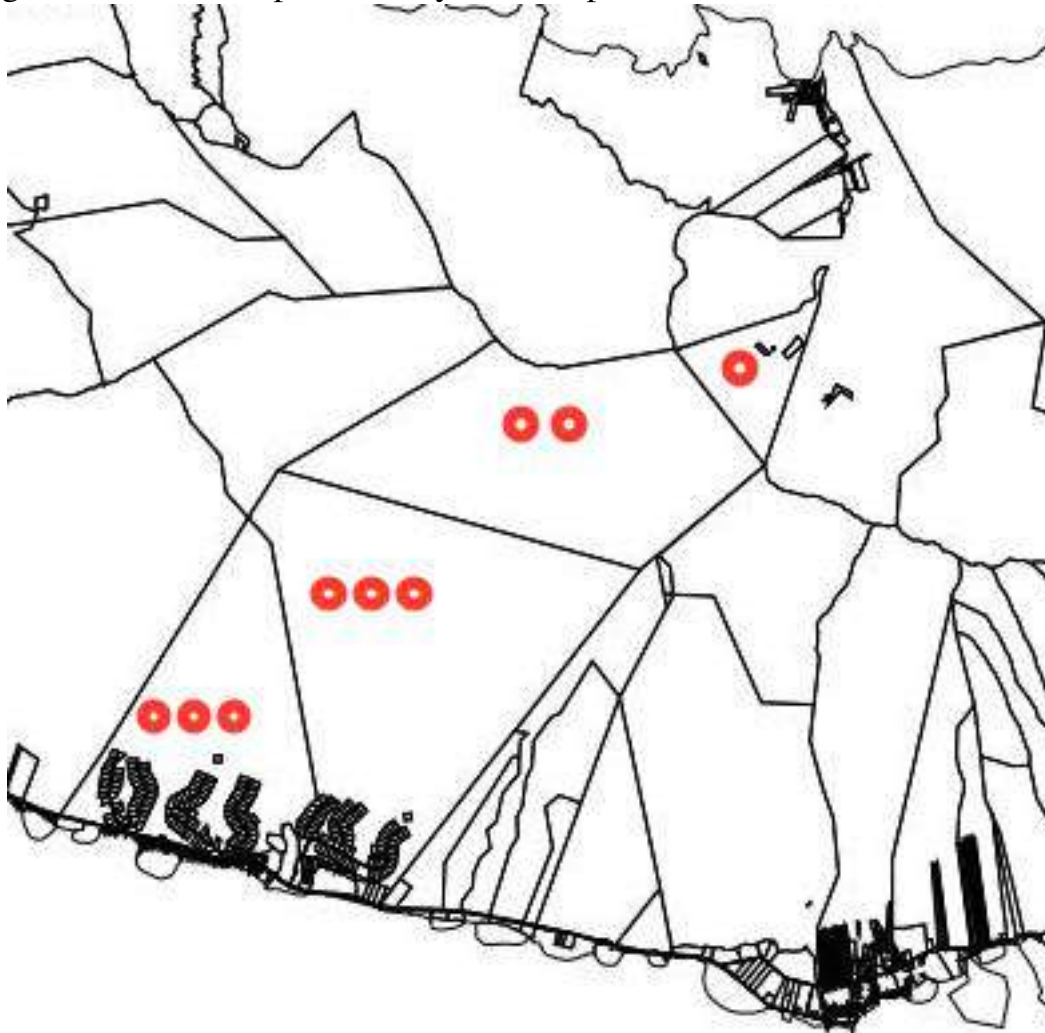


Kawela Beach Park, showing fringing reef and Pacific Ocean beyond, the part of the original beach and coastal plain of the Makakupaia ahupua'a retained by Kawela Plantation. The near shore sections of the fringing reef that are brown in colour are so due to the continued sheet erosion of the Kawela uplands and the consequent transport of that sediment to the reef. The greatest cause for the erosion is vegetation removal by a large alien deer and goat population. Hunting by Kawela residents in conjunction with aerial hunting by the Nature Conservancy attempt to control the deer population that is without natural predators. The struggle to balance between hunting and other recreational uses of Kawela open space is an on going process.



Above: Cliff side of Kawela Gulch, Lot 30 Kawela Plantation, 203 Kupaia

Place in image center, lot corners indicated with red circles. Note wet green gulch bottom compared to dry brown uplands. View from south.



Modern Map of Kawela ahupua'a showing Molokai Preserves (part of the **Pelekunu Preserve** ●), with the Molokai Properties Limited (**Kamakou Preserve** ●●) land adjacent and to the southwest, and with the **Kawela Plantation** ●●● composed of two large open space parcels and 210 a acre homesites and road complex adjacent and southwest of that. Note that Makakupaiaiki ahupua'a is part of the Plantation and Kamakou, thus it was part of Molokai Ranch when Kawela was sold to form the Plantation.

The Beginning of Historical Kawela During the Kingdom

The first cattle and sheep arrived on Moloka'i in 1833. But it was not until 1873, when King Kamehameha V consolidated his vast land holdings, centered on the largest of the Molokai ahupua'a, Kaluahohi, named for the

adze pits which produced ultra hard basalt that were located on Maunaloa's upper slopes , which was the entire western third of the island, that ranching became a successful enterprise and the long and proud paniolo tradition began. Although "His Majesty's Ranch on Moloka'i" was actually used as a retreat and vacation site until his death in 1873, it marks the beginning of the cattle business on Moloka'i. Upon the King's death the land went to Princess Ruth Keliikalani and subsequently to Princess Bernice Pauahi Bishop in 1883 who later sold the land to her husband, Charles Reed Bishop who sold it after her death to support charitable causes in her name.

Various managers oversaw the large ranch . Rudolph Wilhelm Meyers served some 40 years in that position. After his death in 1897, the 70,000 acre Kamehameha V Ranch was sold to American Sugar Company (ASCO) made up of a group of Honolulu businessmen. This sale included the separate purchase of Kawela ahupua'a from the Lunalilo estate.

Valuable data on land use in the early decades following European contact in Hawai'i are provided in the records of the Mahele or division of lands between the king, chiefs, and commoners from 1848-54 . These documents consist of land claims made by commoner (maka'ainana) cultivators to the Board of Commissioners to Quiet Land Titles, and of subsequent testimony, surveys, and awards pertaining to these claims. From these documents, one may reconstruct the pattern of mid-nineteenth century traditional land holdings, a pattern which was a continuation from the late prehistoric period. All of the land claims for Kawela ahupua'a are centered on the immediate area of the floodplain and delta (this area is retained today by Molokai Ranch and operates as a nursery and mango plantation leasehold), which was divided into a series of long, parallel strips, termed 'ili (subdivisions of an ahupua'a in the indigenous Hawaiian system of land tenure). As reconstructed from the land claims, each 'ili was cultivated and held by a commoner cultivator and his household group, in exchange for labour and tribute to the land manager (konohiki) and chief who held the ahupua'a unit. Each 'ili was further partitioned into subsections termed mo'o or lele, with a large coastal subsection on the lower floodplain, and a physically separate, smaller inland subsection on the narrow alluvial bench bordering Kawela Stream. The large coastal mo'o were cultivated for sweet potatoes, while the smaller inland sections were used for small fields of irrigated taro. It appears that the 'ili operated in a sense like modern leaseholds on the ahupua'a that was fee simply owned by a Chief of royal descent subject to government approval.

The Mahele listing of claims (successful and unsuccessful) for the Kawela

ahupua'a (Lunalilo) and the related 'ili follows:

LCA	Claimant	Island	District	Ahupuaa	Ili	Awarded
085598*Mo	Lunalilo, William C.	Molokai	Kona	Kaluaaha, Waialua, Kawela		1
08927	Kailaa	Molokai	Kona	Kawela	Kuamoo	0
10107	Maunaloa	Molokai	Kona	Kawela	Kanui	1
09988	Lio	Molokai	Kona	Kawela	Ohuapuaa, Ihuapuaa, Nukuapuaa	1
10870	Paulu	Molokai	Kona	Kawela	Kaalaea	0
11160	Pa	Molokai	Kona	Kawela	Kunui	0
00160B	Kapuahali	Molokai	Kona	Kawela	Kawaimake, Koemaki	1
02188	Ehu	Molokai	Kona	Kawela	Mahoe	0
02357	Kupau	Molokai	Kona	Kawela	Naauwaielua	0
02361	Kapuahaliu	Molokai	Kona	Kawela	Kawaimake	0
03677	Meeau	Molokai	Kona	Kawela	Moku	1
03910	Nalaalaa	Molokai	Kona	Kawela	Kaluanui, Kapapamuku	1
04176	Kanemanaole	Molokai	Kona	Kawela	Puonuu, Puanui	1
04946	Kupau	Molokai	Kona	Kawela	Naauwaielua, Wailau	1
06364	Kiau	Molokai	Koolau	Kawela, Pelekunu	Papakea	1
06375	Kahapuu	Molokai	Koolau, Kona	Pelekunu, Kawela	Papakea	1
06761	Ehu	Molokai	Kona	Kawela, Honomuni	Mahoe	1

In contrast, the Mahele claims for the Pelekunu ahupua'a, about the same size as Kawela but extending from mauka to makai towards the northern as opposed to southern shore with the resulting windward mountain side rains and much higher agricultural potential, numbered 50, 3 times that of Kawela ahupua'a.

This activity was part of the Great Mahele. The Great Māhele ("to divide or portion") or just the Māhele, was the Hawaiian land redistribution proposed by King Kamehameha III in the 1830s and enacted in 1848. The Great Māhele was one of the most important episodes of Hawaiian history, second only to the overthrow of the Hawaiian Kingdom. While intended to provide

secure title to Hawaiians, it would eventually end up separating many of them from their land. The 1839 Hawaiian Bill of Rights, also known as the 1839 Constitution of Hawaii, was an attempt by Kamehameha III and his chiefs to guarantee that the Hawaiian people would not lose their tenured land, and provided the groundwork for a free enterprise system. The document, which had an attached code of laws, was drafted by Lahainaluna missionary school alumni Boaz Mahune, revised by the Council of Chiefs and signed by Kamehameha III in June 1839.

The 1840 Constitution of the Kingdom of Hawaii established a constitutional monarchy. It stated that the land belonged to its people and was to be managed by the king. It established executive, legislative and judicial branches of government. The document established individual property rights and provided for removal of any chief who violated the constitution.

Hoping to keep the land in Hawaiian hands in the event of a political coup d'état, Kamehameha III and 245 chiefs met to divide the lands among each other. The Mahele abolished the previous semi-feudal system under which rule over an ahupua'a was given by the king to a chief, who received taxes and tribute from the people who worked the land collectively. Private land ownership did not exist, as a commoner could be expelled from his land by the chief, or the chief removed by the king.

The Great Māhele resulted in the allocation of one-third of the land to the crown as Hawaiian crown lands. Another third was allocated among the chiefs. The remaining one-third was to go to the population, but in the end, they received less than 1%. The law required land claims to be filed within two years under the Kuleana Act of 1850 and many Hawaiians made no claim. Eventually most of this land was sold or leased to foreigners. The large amount of land that went to the government resulted in Hawai'i having a very high proportion of state-owned land: about 32% is owned by the state, while another 4.8% is Hawaiian Homelands.

While opponents Kamehameha IV, Kamehameha V and missionary physician Gerrit Judd were traveling, on July 10, 1850 the legislature passed the Alien Land Ownership Act. It allowed foreigners to hold title to land. The Act was written by Chief Justice William Little Lee. The justification was the promise of prosperity resulting from an influx of much-needed capital and labor. Another notable part of the Great Mahele was the Kuleana Act of 1850. Under this provision, commoners were allowed to petition for title to land that they cultivated and lived on, similar to the homesteading laws used to manage land tenure in mainland US territories in the nineteenth century. It also abolished the right of cultivation and pasturage on the larger,

common lands of the ahupua‘a, title of which went to the chief, the crown or the government.

Ownership of land was a previously unknown concept for ordinary Hawaiians. Many did not understand the need to make a claim for land where they already lived and/or worked. Communication depended upon word-of-mouth or the ability to read the written word. Making a claim required money to pay for a pre-claim land survey. The system required two witnesses to confirm that the claimant had worked the land. About 18,000 plots of 3 acres each were successfully claimed. The Kingdom's population at the time was some 82,000. Members of higher classes and ali‘i (the hereditary line of rulers) obtained title to most Hawaiian land. Due to the ongoing effect of western diseases and property taxes, many lost their property. This was not a dissimilar result of loss to that for the homesteaders in mainland U.S. territories.

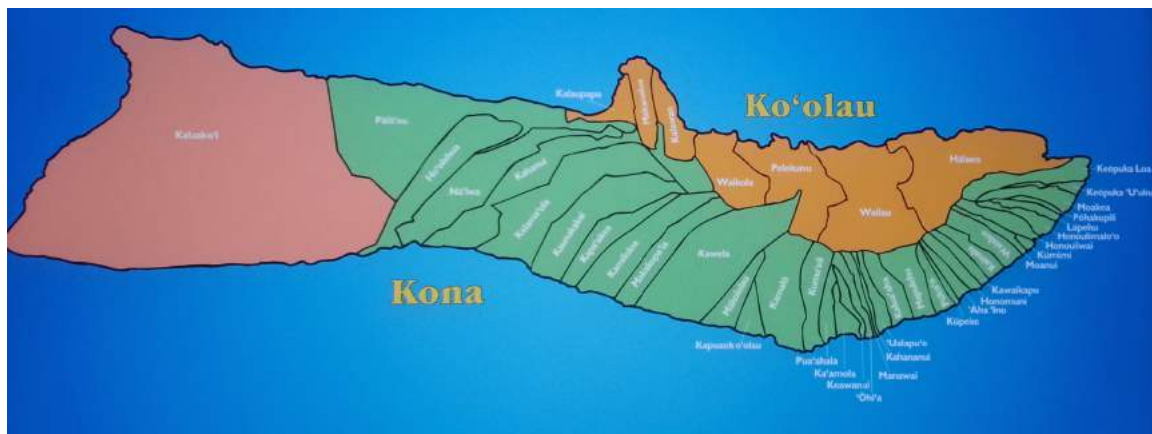
While the term Māhele most properly refers to the Great Māhele in 1848 where King Kamehameha III along with 252 of his chiefs, or konohiki, divided up the lands of the islands, it has generally come to apply to the whole process in which fee simple title was granted to the people. About 10,000 maka‘āinana, or common farmers, ultimately received land which amounted to a total of only about one percent of all the lands of the kingdom. The lands received by the common people were house lots and land actually being cultivated even though in the past these same people had always maintained gathering rights mauka–makai, that is from the mountain to the sea, within their traditional land unit (ahupua‘a).

1897 Land Map of Molokai below. Government lands are shown in green. Crown lands are shown in yellow. All other lands are fee simply held. The green and yellow areas are referred to as ceded lands.





Modern Molokai Topo map above with ahupua'a (community watershed areas) names as well as the larger 5 regions known as moku or bioregions dependent on microclimate and local geology which were traditional local districts containing a number of ahupua'a. The Kawela ahupua'a is located in the kona moku. Notice a strict definition has been applied in this modern analysis of the Hawaiian land divisions in that the Kawela ahupua'a is limited to the kona side of the mountain ridge line. In reality, the Kawela ahupua'a of the Hawaiian Kingdom extended by 461 acres across the ridge line into Pelekunu ahupua'a.



Hawaiian Kingdom land divisions above . The moku or districts are Kōna (green) and Kō'olau (orange). Both are mentioned in the Lunalilo Kawela ahupua'a descriptions since is stretched over the mountain ridge into Kō'olau. The ahupua'a subdivisions are shown. In pink, encompassing the entire west end of Molokai is the very large Kaluako'i ahupua'a which was not part of a moku. Ahupua'a that were not a part of a moku were exceptional but did occur throughout the Hawaii Kingdom. In this case,

since the Kalauko'i ahupua'a was the Kamehameha V ranch, subordination into a moku would have been inappropriate. The Kaluako'i ahupua'a formed the bulk of the Molokai Ranch that came out of the American Sugar Co. purchase of the Kamehameha ranch in 1897 sold by the Charles Reed Bishop, husband of late Hawaiian noble Bernice Bishop, after the death of Ranch supervisor R.W. Meyer. R.W. Meyer was also the surveyor of Kawela ahupua'a during the the Boundary Commission surveys. He married into Hawaiian royalty. Meyer was also in the forefront of the unsuccessful effort to produce sugar on Molokai and a small sugar mill remains today as a testament to that effort.

Central and East Molokai Ahupua'a Map. This shows the actual ahupua'a divisions of the Hawaiian Kingdom. Note the extension of Kawela ahupua'a across the mountain ridge line into Pelekunu ahupua'a. An enlargement of the east end of Molokai from the previous figure. Also adjacent of Kawela ahupua'a on the west is Makakupaia ahupua'a, its eastern half became part of western edge of Kawela Plantation and contains some homesites. During the Great Mahele, Makakupaia was divided into Makakupaianui which was given to the government and Makakupaiaiki which was retained by the owner. A typical division for the Mahele process during which conversion to fee simple ownership for the owner occurred.

Notes on the Land Commission and the Mahele

From W.D. Alexander 1891.

THE LAND COMMISSION

The "Act to organize the Executive Departments," which was passed in 1846, provided among other things for the appointment of a "Board of Commissioners to quiet Land Titles," which was to consist of five members, one of whom should be the Attorney-General of the Kingdom, and which was to exist for two years. The Commissioners took the oath of office and organized Feb. 11, 1846. Their powers, however, were repeatedly extended, and the Board was not finally dissolved until the 31st of March, 1855. Full powers were conferred upon this Board as a court of record, to investigate and finally confirm or reject all claims to land arising previously to December 10, 1845. Its decisions were only subject to appeal to the Supreme Court, which had to be made within ninety days after the date of the Award by the Land Commission. All persons were required to file their claims to land with this Board, or be forever barred of all rights to recover the same in the court of justice. And the titles of all lands which should not have been presented to this Board for confirmation on or before the 14th day of February, 1848, were declared to belong to the Hawaiian Government. Aliens were not allowed to acquire any fee simple or allodial title to land, but this disability has since been removed by the Act passed July 10th, 1850, p. 146.

The Commissioners held their first meeting for regular business on the 4th of March, 1846. They worked with great zeal and energy, visiting every part of the Islands to meet the people, and give them an opportunity to present their claims. The rule had been laid down in advance that every piece of land should be surveyed at the claimant's expense before any award would be granted for it. The filing of claims, the taking of testimony, the surveying of boundaries, and the final awards, were the successive steps which had to be gone through with in every case. When we consider that the number of claims confirmed amounted to 11,309, we can appreciate the herculean task imposed upon the commissioners, and it is not surprising that evidences of haste, that inconsistencies and imperfections can occasionally be found in their work. The character of the surveys made for the Commission will be described further on. The awards were all recorded in ten huge folios, which were deposited in the Land Office. The charges to be paid by the claimants

were slight, amounting to from \$6.00 to \$12.00 for each of the claims of native tenants, commonly known as "kuleana(s)."

NATURE OF LAND COMMISSION AWARDS

The Commissioners were not authorized to grant patents for land or to receive commutation. Their duty was to ascertain the nature and extent of each claimant's rights in land, and to issue an Award for the same which is prima facie evidence of title "and shall furnish as good and sufficient a ground upon which to maintain an action for trespass, ejectment or other real action against any other person or persons whatsoever, as if the claimant, his heirs or assigns had received a Royal Patent for the same," by Act approved July 20th, 1854. The holder of a Land Commission Award was entitled to receive a Royal Patent in fee-simple from the Minister of the Interior, on payment of the commutation to be agreed upon by His Majesty in Privy Council. In regard to this last, the Commissioners themselves state that "The share of Government or the body politic, to commuted for by any confirmed claimant wishing to obtain a fee-simple title, this Board understands from the evidence before it, to be one-third part of the value of the land without improvement which third part of unimproved value, being paid by the confirmed claimant, should extinguish the private rights of the King in the land, and leave such claimant an allodium." By a ruling of the Supreme Court in the case of the Ahupua'a of Papa'ikou, the value of land for purposes of commutation should be appraised as of the date of the Act. On June 8th, 1847, it was resolved by the Privy Council, "That in all cases in which a Freehold Estate less than Allodial, in any house or building lot, has been or shall be hereafter awarded to any Hawaiian subject by the Board of Commissioners to quiet Land Titles, we approve of the principle of reducing the rate of commutation for the same from one-third to one-fourth of the present unimproved value, to be ascertained by a commission appointed for that purpose by said Board, and on payment of said commutation, of giving a patent in Fee Simple to the confirmed claimant." It was furthermore resolved, "That in cases in which a Freehold Estate less than Allodial in any building lot, has been or shall be awarded to any person, whether domiciled alien or to any naturalized or native subject, it shall be optional with such person to pay for a certificate of that title in a manner aforesaid, or to receive instead thereof a grant for the period of thirty years, subject to all the conditions of Leasehold Estates." "That the foregoing resolution are not to be understood in a compulsory sense, nor are they, nor the rules adopted by the Land Commissioners to be understood as altering in any way, nor even

modifying the pre-existing titles, — on the contrary that Commission declares what the pre-existing titles are, which being done, we approve of offering to the confirmed claimant the more liberal terms and the choice of conditions, as explained above." This option is inserted in some of the printed forms of Awards issued (though it is not expressed in the original Awards on record), as follows: "He kuleana kona malalo o ke ano alodio, a e hiki no iaia ke ho'ohuli no ke kuleana alodio mamuli o ke Kanawai, aia i kona mana'o, a i 'ole ia e loa'a iaia ke kuleana no na makahiki he 30, aia i kona mana'o." This last clause has given rise to the common but entirely erroneous belief that the L.C. Awards are only valid for a period of 30 years.

THE "MAHELE" OR GREAT DIVISION

During the first year or two the Land Commission was chiefly occupied with the claims of foreigners for land and with house lots in and near Honolulu, on account of the great difficulties to be overcome in making the division between the King, chiefs and the Government. After years spent in ineffectual endeavors, the whole subject was brought up for final decision before the King and chiefs in Privy Council on the 11th of December, 1847, and a memorable discussion followed which was continued for several days. The general principles laid down by the Land Commission were admitted by all, and the chiefs were willing to surrender to the King the greater part of the lands held by them in fief for the sake of obtaining an allodial title for the remainder, but they asked whether the Government would have a third interest in the lands left to them. In other words, it was a question the Government commutation should be included in the first division between the landlords and the King, or whether the King and the Government should be regarded as distinct as far as property was concerned. The conclusion finally arrived at was embodied in the following rules framed by Judge Lee and unanimously voted at the Privy Council held December 18th, 1847.

"Whereas, it has become necessary to the prosperity of our Kingdom and the proper physical, mental and moral improvement of our people that the undivided rights at present existing in the lands our Kingdom, shall be separated, and distinctly defined;

Therefore, We Kamehameha III., King of the Hawaiian Islands and His Chiefs, in Privy Council Assembled, do solemnly resolve, that we will be guided in such division by the following rules:

1. —His Majesty, our Most Gracious Lord and King, shall in accordance with the Constitution and Laws of the Land, retain all his private

- lands, as his own individual property, subject only to the rights of the Tenants, to have and to hold to Him, His heirs and successors forever.
2. —One-third of the remaining lands of the Kingdom shall be set aside, as the property of the Hawaiian Government subject to the direction and control of His Majesty, as pointed out by the Constitution and Laws, one-third to the chiefs and Konohiki(s) in proportion to their possessions, to have and to hold, to them, their heirs and successors forever, and the remaining third to the Tenants, the actual possessors and cultivators of the soil, to have and to hold, to them, their heirs and successors forever.
 3. —The division between the Chiefs or Konohiki(s) and their Tenants, prescribed by Rule 2nd shall take place, whenever any Chief, Konohiki or Tenant shall desire such division, subject only to confirmation by the King in Privy Council.
 4. —The Tenants of His Majesty's private lands, shall be entitled to a fee-simple title to one-third of the lands possessed and cultivated by them; which shall be set off to the said Tenants in fee-simple, whenever His Majesty or any of said Tenants shall desire such division.
 5. —The division prescribed in the foregoing rules, shall in no wise interfere with any lands that may have been granted by His Majesty or His Predecessors in fee-simple, to any Hawaiian subject or foreigner, nor in any way operate to the injury of the holders of unexpired leases.
 6. —It shall be optional with any Chief or Konohiki, holding lands in which the Government has a share, in the place of setting aside one-third of the said lands as Government property, to pay into the Treasury one-third of the unimproved value of said lands, which payment shall operate as a total extinguishment of the Government right in said lands.
 7. —All the lands of His Majesty shall be recorded in a Book entitled "Register of the lands belonging to Kamehameha III., King of the Hawaiian Islands," and deposited with the Registry of Land Titles in the Office of the Minister of the Interior, and all lands set aside, as the lands of the Hawaiian Government, shall be recorded in a Book entitled "Register of the lands belonging to the Hawaiian Government," and fee-simple titles shall be granted to all other allottees upon the Award of the Board of Commissioners to quiet Land Titles."

At the same time a committee was appointed to effect the division between the King as feudal suzerain and the chiefs his feudatories, before whom "all

questions between the King and the chiefs were to be discussed, and settled by mutual consent of the King and each chief or landlord, after which the King and each Chief were to sign and seal the settlement that should be made, never thereafter to be disturbed." The work was commenced on the 27th of January, 1848, and conducted with such dispatch that it was completed March 7th of the same year. The book in which this division is recorded, is called the "Mahele Book" or Book of Division, and contains releases or quitclaim deed signed and sealed by the several chiefs to the King of the lands they respectively surrendered, and also releases signed by the King to the several chiefs of his feudal rights in the lands remaining to them as their shares. But this "Mahele" did not of itself give the chiefs and landlords an allodial title, nor was the Government claim for commutation extinguished by it.

As is evident from the 6th and 7th rules above, it was further necessary for each of them to bring evidence of his "Mahele" before the Board of Commissioners to quiet Land Titles, to obtain its formal Award, which could afterwards be converted into an allodial title by payment to the Government of a commutation to be fixed by the King in Privy Council. It is also evident, to quote from the decision of the Supreme Court, "In the matter of the Estate of His Majesty Kamehameha IV.," in 1864, that the lands held by the King at the close of the Mahele "were not regarded as his private property strictly speaking. Even before his division with the landlords, a second division between himself and the Government was clearly contemplated, and he appears to have admitted that the lands he then might have been subjected to a commutation in favor of the Government in like manner with the lands of the chiefs." The records of the discussion in Council show plainly His Majesty's anxious desire to free his lands from the burden of being considered public domain, and as such subjected to the danger of confiscation in the event of his islands being seized by any foreign power, and also his wish to enjoy complete control over his own property." Besides he clearly perceived how desirable it was that there should be a public domain, the proceeds of which should go to the national treasury, and from which his subjects could purchase the lands which they needed. Accordingly on the very day after the Mahele with his chiefs had closed, viz., the 8th of March, he proceeded "to set apart for the use of the Government the larger part of his royal domain, reserving to himself what he deemed a reasonable amount of land as his own estate." To effect this he signed and sealed two instruments, both contained in the Mahele Book, by one of which he set apart for the use and benefit of the Government certain lands specified by name, and "reserved for himself his heirs and successors

forever," the remainder of the lands surrendered to him in the Mahele, as his own private estate. On the 7th of the following June, 1848, the Legislative Council passed the "Act relating to the lands of His Majesty the King and of the Government," which merely confirms and ratifies what had already been done by the King, and designates the several Crown Lands and Government Lands by name. By this great Act of Kamehameha III., he showed his deep sympathy with the wants of his people, and set an illustrious example of liberality and public spirit. It remained for his chiefs to follow his example. The second Division of lands took place during the summer of 1850, when most of the chiefs ceded a third of their lands to the Government, in order to obtain an allodial title for the remainder. The whole transaction was a severe test of their patriotism, and reflects great credit on that Hawaiian aristocracy which thus peacefully gave up a portion of its hereditary rights and privileges for the good of the nation. The Privy Council accepted the proposed division August 26th, 1850, as full commutation of the Government right in the remainder of their lands.

AWARDS TO TENANTS

In all Awards of whole Ahupua'a(s) and Ili(s) the rights of Tenants are expressly reserved, "Koe na Kuleana o Kanaka." Besides, the Act of August 6th, 1850, confirmed and amended July 11th, 1851, protects the common people in the enjoyment of the right to take wood, thatch, ki leaf, etc., from the lands on which they live, for their own private use, but not to sell for profit. They are also guaranteed the right to water and the right of way, but not the right of pasturage on the land of the Konohiki. These rights are embodied in Section 1477 of the Civil Code. Furthermore, every bona fide resident on a land has the right to fish in the sea appurtenant to the land, and to sell the fish caught by him. The same Act of August 6th, 1850, confirms the resolutions passed by the Privy Council on the 21st of December, 1849, granting fee-simple titles, free of all commutation to all native tenants, for their cultivated lands and house lots, except in the towns of Honolulu, Lahaina and Hilo. For, as is stated by the Land Commission, "between the ownership of lands for cultivation, and mere building lots, there are often broad lines of distinction. Mere building lots were never bestowed by the King for the purpose of being given out to tenants, as was uniformly the case with lands suitable for cultivation. It follows therefore that (with some exceptions) there is no third class of persons, having the rights of lords over tenants." Hence the Awards for town lots were subject to commutation, "there being no Superior Lord or Chief over them, whose Ahupua'a or Ili

they were included in, and whose commutation covered theirs." As was stated above, the commutation fee for town lots is one-fourth of the unimproved value of the land.

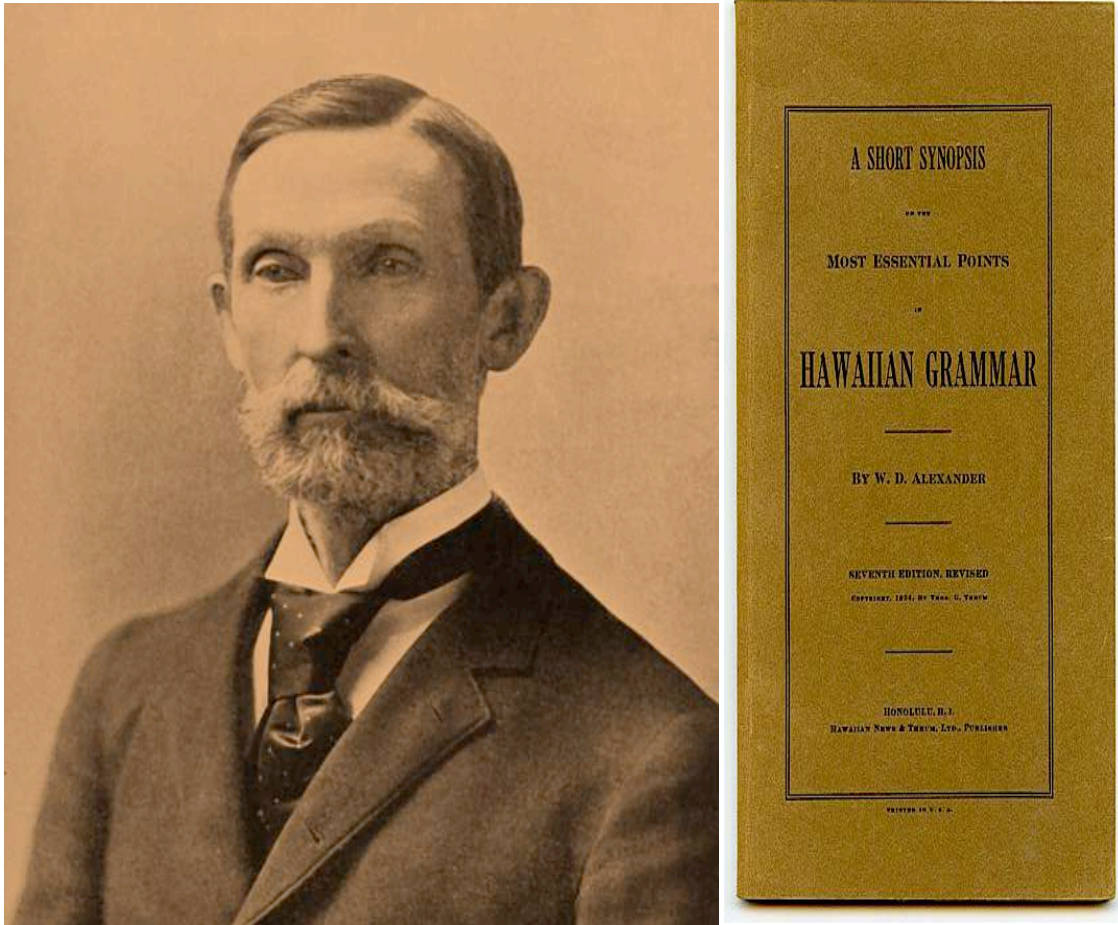
It may be observed here that Kuleana(s) in default of heirs "revert to the owner of the Ahupua'a or Ili of which the escheated Kuleana formed a part," by a law passed July 6th, 1866. But town lots escheat to the Government. As the rights of the Government extend to high water mark, the Land Commission generally declined to grant Awards below that line, or to award fisheries by metes and bounds, though fish ponds were awarded by survey. The only exceptions to this principle are found in and around the harbor of Honolulu, the title to which is still in dispute between the Government and private parties.

KONOHIKI AWARDS

To lighten the arduous labors of the Land Commissioners and to hasten the settlement of titles, they were empowered by the Act passed June 19th, 1852, to grant titles to Konohiki(s) for whole "Ahupua'a(s) or Ili(s) received by them in the Mahele of 1848, by their proper names without survey." In fact the greater part of this class of lands were awarded in this way. As many of these Konohiki(s) had failed to present their claims before the Land Commission previous to the 14th day of February, 1848, and had consequently forfeited their lands, a law was passed for their relief August 10th, 1854, giving them an opportunity to present their claims between that date and the 1st of November following. As before stated, the Board of Commissioners to quiet Land Titles was finally dissolved on the 31st of March, 1855.

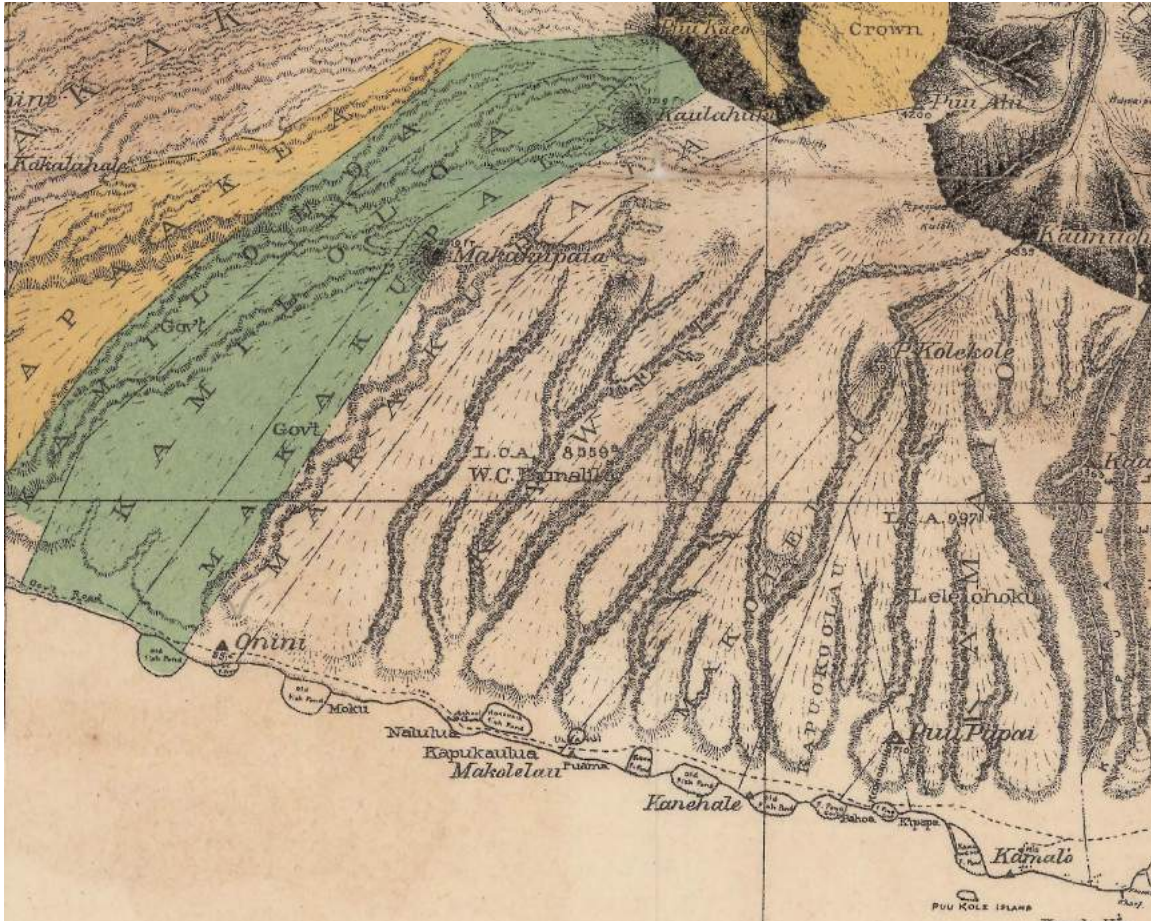
Even then a second Act had to be passed August 24th, 1860, "For the relief of certain Konohiki(s)," whose names appear in the Mahele Book of 1848, but who had failed to present their claims before the Land Commission. As the Commission had long ceased to exist, the Minister of the Interior was empowered to grant Awards to claimants of this class, provided they presented their claims before the last day of June, 1862; and those who failed to do so were declared to be "forever barred, and their rights under the Mahele Book to have reverted to the Government." About 70 Awards were issued under the provisions of this Act, which are styled "Mahele Awards," and form a distinct series. The Index of Land Commission Awards, classified and arranged according to locality by J.H. Smith, formerly one of the Commissioners, is an invaluable work, and must have cost its author immense labor. A new edition of it was published in 1881, which contains

the numbers of the Royal Patents issued in confirmation of L.C. awards previous to that date.



W.D. Alexander, Royal Surveyor-General, historian, educator, author, linguist and cartographer of Hawaii. Yale educated, he served in the Kingdom of Hawaii government and chronicled the transition from the feudal land holding system to the fee simple one of the present.

The land(s) (Kawela) are described in and covered by Royal Patent Number 7656, Land Commission Award Number 8559-B, Apana 28 to William C. Lunalilo. The award was for 14,787 acres and included all of Kawela (present day Plantation excluding Makakupaiaiki ahupua'a, plus Molokai Ranch holdings of Kawela on the coast and above the Plantation plus an extension over the ridgeline into the highlands of Pelekunu ahupua'a) plus Kaluaaha on the south coast west of Pukoo, plus Waialua on the south coast east of Pukoo.



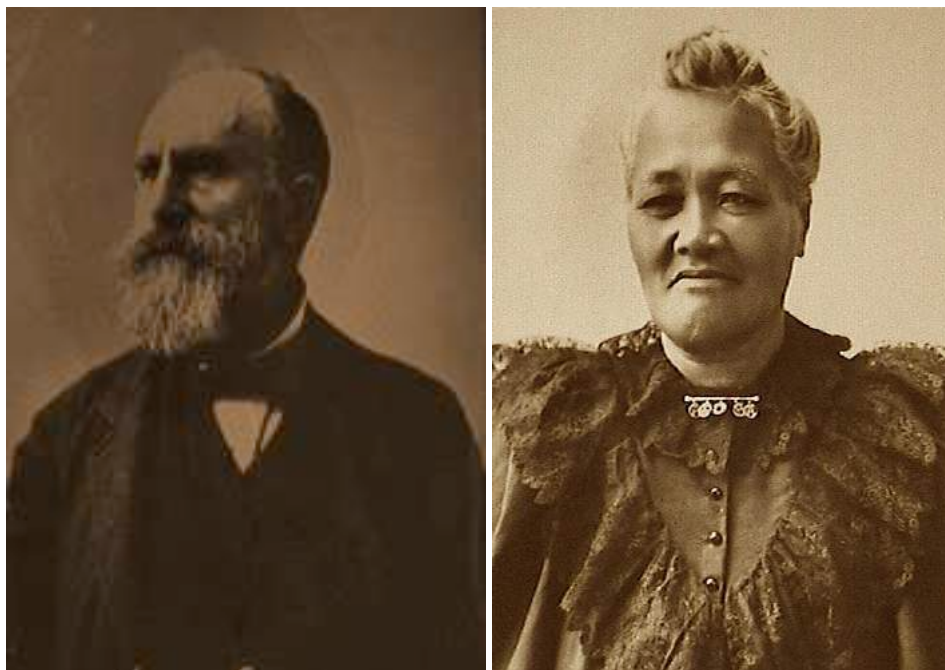
1897 Map of Kawela ahupua'a. 'ili shown on the coast are Moku (Meeau/Moku)*, Nalulua (Nalaalaau/Kalanui?)*, Kapukaulua (Kapuahalio/Kawaimake?)*

*names in () correspond to Mahele claimant names or corresponding 'ili names. All are located on the coast near the Kawela stream delta. There were only three total with only one with a clear trace to the Mahele awarded claims. This seems to indicate loss or consolidation of claims by the publication date of the 1897 map. Of the original 16 Mahele 'ili claims, 10 were accepted as shown in the earlier table. However, as of the map date only one of the original claims is shown together with two either new or variant spelling ones. Two of the claims were for Kawela Pelekunu that continues above Kawela from the mountain crest to the north shore and at present is a preserve. Another of the claims is the Honomuni watershed, east of Pukoo. Excluding these three, there were 13 original 'ili claims of which 7 were granted for Kawela itself. Only three existed as of the map date. This

is not inconsistent with the earlier abandonment of Kawela ahupua'a c.1820 : given the low agricultural potential, it is possible many claims were forfeited due to unpaid taxes and lack of productive cash revenue since traditionally subsistence crops were grown in Kawela ahupua'a. These negatives probably with time overcame the initial enthusiasm for inexpensive fee simple land. Again this was not unlike the situation with landgrants in the mainland Midwest. Note the division of Makakupaia into government (green) nui and private parts iki. Makakupaiaiki was later sold to Molokai Ranch and subsequently most of it was incorporated into Kawela Plantation.



1895 Monsarrat Map of Upper Kawela extension (lower center of map) into Pelekunu (hence Kawela having 'ili in Pelekunu and the description of Kawela as having kona and koolau parts)



R.W. Meyer, and his High Chiefess wife, the surveyor of Molokai, author of Boundary Commission 017 of Kawela in 1873, established Kawela ahupua'a boundaries. Later was the Kamehameha V Ranch manager.

CHARACTER OF EARLY SURVEYS

First in order are the old surveys made under the direction of the Land Commission, and commonly known as "kuleana"(rights) surveys. These had the same defects as the first surveys in most new countries. These defects were in great part owing to the want of any proper supervision. There was no Bureau of Surveying, and the President of the Land Commission was so overwhelmed with work that he had no time to spare for the superintendence of the surveying. As has been truly said, there was little money to pay out, and little time to wait for the work. Political reasons also added to the haste with which the work was pushed through, and barely completed before the death of Kamehameha III on December 15, 1854.

No uniform rules or instructions were given to the surveyors employed, who were practically irresponsible. Few of them could be regarded as thoroughly competent surveyors, while some were not only incompetent but careless and unscrupulous. The result was that almost every possible method of measurement was adopted. Some used 50 feet chains, and other the four pole chain divided into links; some attempted to survey by the true meridian, other by the average magnetic meridian, while most made no allowance for local variations of the needle. These are some surveys recorded, which were

made with a ship's compass or even a pocket compass. Few of them took much pains to mark corners or to note the topographical features of the country. Rarely was one section or district assigned to one man. It is said that over a dozen were employed in surveying Waikiki, for instance, not one of whom knew what the other surveyors had done, or tried to make his surveys agree with theirs, where they adjoined one another. As might be expected, overlaps and gaps are the rule rather than the exception, so that it is generally impossible to put these old surveys together correctly on paper, without ascertaining their true relative positions by actual measurements on the ground.

The Board of Commissioners to quiet Land Titles were empowered by the law of August 6th, 1850, not only "to define and separate the portions of land belonging to different individuals," but "to provide for an equitable exchange of such different portions where it can be done, so that each man's land may be by itself." This, however, was rarely done, and the kuleana(s) very often consist of several sections or "apana(s)" apiece, scattered here and there in the most irregular manner imaginable. No general rules were laid down in regard to the size of kuleana(s), though mere house lots were limited to one quarter of an acre by the Act just cited, Section 5. The consequence was that the responsibility was mainly thrown upon the surveyors, and there was the greatest variety of practice among them in different districts. The Act above mentioned provided that fee-simple titles should "be granted to native tenants for the lands they occupy and improve." This was differently interpreted by different surveyors, so that in fact the "kuleana(s)" vary from one to forty acres in extent. General maps of whole districts or even ahupua'a(s), exhibiting the exact location of all the different claims contained within them, were scarcely thought of, and hardly could have been made with the inferior instruments and defective methods used by most of the kuleana surveyors of that time.

SURVEYS OF GRANTS

Were of similar character to those of kuleana(s). Formerly it was not the policy of the Government to have Government lands surveyed as wholes, or to have their boundaries settled. Portions of Government land sold to private persons were surveyed at the expense of the purchaser. It was seldom the case that an entire "ahupua'a" was sold at once. The pieces sold were of all sizes and shapes, sometimes cutting across half a dozen ahupua'a(s), and were generally surveyed without reference to the surveys of adjoining land sales or awards. Hence most Government lands at the present time consist of mere remnants left here and there, and of the worthless and unsalable portions remaining after the rest had been sold. It follows that even

supposing all the outside boundaries of a Government land to have been surveyed and duly settled by the Commissioner of Boundaries, it would still be necessary to locate on the ground all the Grants and Awards contained within the land in question, in order to ascertain how much of it is left. Nothing short of a general survey of the country would bring to light all these facts, would exhibit the Government lands in their true position in relation to other lands, and enable the Minister of the Interior as well as applicants for land to judge of their actual value. It was considerations like these which induced the then Minister of the Interior, Dr. Hutchinson, to institute the Government Survey in 1871. An account of that survey, its objects, methods and results, was published in pamphlet form in 1889.

The state of the survey art was such that the nearly 15,000 acre area determined for Kawela Ahupua'a might well have been closer to the nearly 9,000 acre area known for today.

In 1854, the Board of Commissioners to Quiet Land Titles, by L.C. Aw. 8559-B, *1348 Apana 28, awarded the ahupua'a of Kawela by name only to William C. Lunalilo. This was recorded in Mahele Record 08559B :

The Great Mahele Claim **Mahele Record: 08559B*Mo**

Claim Number: 08559B*Mo

Claimant: Lunalilo, William C.

Other claimant: Kanaina, Charles for King

Other name:

Island: Molokai

District: Kona

Ahupuaa: Kaluaaha, Waialua, Kawela

Ili:

Apana:	3	Awarded:	1
Loi:	0	FR:	
Plus:		NR:	
Mala Taro:	0	FT:	551v3, 82v16
Kula:	0	NT:	185v10
House lot:	1	RP:	7655, 7656
Kihapai/Pakanu:	0	Number of Royal Patents:	2
Salt lands:	0	Koele/Poalima:	No

Wauke:	0	Loko:	No
Olona:	0	Lokoia:	No
Noni:	0	Fishing Rights:	No
Hala:	0	Sea/Shore/Dunes:	No
Sweet Potatoes:	0	Auwai/Ditch:	No
Irish Potatoes:	0	Other Edifice:	No
Bananas:	0	Spring/Well:	No
Breadfruit:	0	Pigpen:	No
Coconut:	0	Road/Path:	No
Coffee:	0	Burial/Graveyard:	No
Oranges:	0	Wall/Fence:	No
Bitter Melon/Gourd:	0	Stream/Muliwai/River:	No
Sugar Cane:	0	Pali:	No
Tobacco:	0	Disease:	No
Koa/Kou Trees:	0	Claimant Died:	No
Other Plants:	0	Other Trees:	0
Other Mammals:	No	Miscellaneous:	

No. 8559B*Mo, (W.C. Lunalilo) C. Kanaina
F.T. 551-552v3

W.H. Uana, sworn, says he knows the house lot of Lunalilo, in Kaluaaha, Molokai. It is bounded:

Mauka by the public road
 On the Halawa side by a fish pond of the government called "Neaupala"
 Makai by the sea beach
 On Kaluaakoi side by a government fish pond called "Kaluaaha."

This lot formerly was ordered to be enclosed by Hoapili wahine and Kekauluohe when Eseta Kipa was Governess of Molokai. The people of Kekauluohi's lands erected a stone house on this lot in the year 1835. It is now in possession of Lunalilo as heir of Kekauluohi.

E. Kipa, sworn says, she knows the lot. I was Governess of Molokai under Hoapili wahine & Kekauluohi in former times, and by their orders enclosed this lot and built a stone house on it with the labor of the people of their own lands. When the government sold the land of "Kaluaaha" to the Missionaries, I heard Kalolou come and ask permission from Kanaina to live in the stone house, which permission she got.

(A. Paki sets up a claim for this lot as heir of Kalaulou.)

L. Haalelea, sworn says, he knows the house lot claimed by Lunalilo in Kailua, Hawaii. It is bounded:

On Kiholo side by the church lots
 Makai by the public road
 On Keauhou side by a road leading mauka
 Mauka by some house lots.

It is enclosed by a wall. This lot I have heard belonged formerly to Keaho, the father of Mahuka. I have heard that when Keaho died he left this lot to Kekauluohi, and I have recently seen a letter from Mahuka to W.C. Lunalilo requesting him to allow Mahuka to retain charge of this lot under Lunalilo. In 1843 I was at Kailua & Kekauluohi was there. I then saw the later Governor Adams give her some money which he said

was rent received for this same lot. Part of this lot is claimed by the heir of W.P. Leleiohoku. There is a fence remaining though and dividing the lot into two parts.

F.T. 82-84v16 and N.T. 82-84v16

No. 8559B, William C. Lunalilo

Polea, sworn says, he knows the lots claimed by William C. Lunalilo, at Lahaina, Maui.

The first called Luaehu, is bounded as follows:

Mauka by Kaiheekai and Hiram's land
Olowalu by King's land
Makai by Sea beach
Kaanapali by Polea and M.J. Nouliau [Nowlien].

The second in Pakala is bounded as follows:

Mauka by Public street
Olowalu by Kaiheekai's land
Makai by H.S. Swinton's and others' land
Kaanapali by Public road.

The third lot called Hawaikaekae is also bounded as follows:

Mauka by Kalaleikio's land
Olowalu by Public road
Makai by Alaloa Kahiko street
Kaanapali by Daniela Ii's land.

This lot is disputed by Manuahina the wife of George Shaw, whose claim in right of her father. She has already got an award for a part of this lot.

The fourth lot in Paunau is bounded as follows:

Mauka by Keaweiheuhu's and Kahula's land
Olowalu by Keaweluaole's land
Makai by Old road
Kaanapali by Street leading to Lahainaluna.

The fifth lot called Loinui is bounded as follows:

Mauka by Keaweluaole; Kauhi and Kalolou's land
Olowalu by Mr. Baldwins
Makai by Old road
Kaanapali by Kamakinui's land.

The sixth lot in Aki is bounded as follows:

Mauka by Kaweka's land
Olowalu by Wahie's land
Makai by Main road
Kaanapali by M.I. Nowlein's land.

The seventh lot in Puunoa is bounded as follows:

Mauka by Main road
Olowalu by Iosua Kaeo
Makai by Iosua Kaeo
Kaanapali by King's land.

The eighth lot in Kelawea is bounded as follows:

Mauka by Lahainaluna

Olowalu by Road from the beach
Makai by Keleikini and Kahookano's lands
Kaanapali by A stream.

All these lots have descended to William C. Lunalilo from his mother, Kekauluohi, and are now in the hands of his lunas. The lot in "Pakala" is disputed by Paki and others.

N.T. 185-187v10

No. 8559B, William Charles Kanaina, [for Lunalilo], Honolulu, 24 April 1850

COPY

Greetings to you Highness, John Young, the Minister of Interior.

My desire is to have the government claim separated from my lands; therefore I hereby give some of my land for the government to have forever and the same shall apply to mine. Here are the names of my lands:

Kawela ahupuaa, Hamakua, Hawaii.
Waikaekoe ahupuaa, Hamakua, Hawaii.
Makapala ahupuaa, Kohala, Hawaii.
Kehena ahupuaa, Kohala, Hawaii.
Puhau ili of Iole, Kohala, Hawaii.
Puakoa ili of Waimea, Kohala, Hawaii.
Honuainonui ahupuaa, Kona, Hawaii.
Puapuanui ahupuaa, Kona, Hawaii.
Lehuulanui ahupuaa, Kona, Hawaii.
Kawanui ahupuaa, Kona, Hawaii.
Lanihaunui ahupuaa, Kona, Hawaii.
Pakiniili ahupuaa, Kau, Hawaii.
Hanuapo ahupuaa, Kau, Hawaii.
Kahanalea ahupuaa, Puna, Hawaii.
Keahialaka ahupuaa, Puna, Hawaii.
Keaau ahupuaa, Puna, Hawaii.
Makahanalua ahupuaa, Hilo, Hawaii.
Pepekeo ahupuaa, Hilo, Hawaii.

Kaapuhu ahupuaa, Kipahulu, Maui.
2 Waiehu, Puali, West Maui.
Ahipuli ili for Waiehu, West Maui.
Pepee ili for Wailuku, West Maui.
Honolua ahupuaa, Kaanapali, Maui.
Kalimaohe ahupuaa, Lahaina, Maui.
Polanui ahupuaa, Lahaina, Maui.
Kuholilea ahupuaa, Lahaina, Maui.

Waialua ahupuaa, Kona, Molokai.
Kawela ahupuaa, Kona, Molokai.

Pau ili for Waikiki in Manoa, Kona, Oahu.
Kamoku ili for Waikiki in Manoa, Kona, Oahu.
Kaluaokau ili for Waikiki in Manoa, Kona, Oahu.
Kpahulu ili for Waikiki in Manoa, Kona, Oahu.
Kaalea ahupuaa, Koolaupoko, Oahu.
Kapaka ahupuaa, Koolauloa, Oahu.
Laiewai ahupuaa, Koolauloa, Oahu.
Laiemaloo ahupuaa, koolauloa, Oahu.
Pahipahialua, Koolauloa, Oahu.

Kahili, Koolauloa [sic], Koolau, Kauai.
Kalihiwai, Koolauloa [sic], Koolau, Kauai.
Pilauwai, Koolauloa [sic], Koolau, Kauai.
Manuahi ili, Kona, Kauai.
Waipouli ahupuaa, Puna, Kauai.

These lands listed above shall be for me fee simple forever, it would not be right for the government to claim my land.

The following lands, I shall give to the government fee simple forever.

Kapulena ahupuaa, Hamakua, Hawaii.
Kukuihaele ahupuaa, Hamakua, Hawaii.
Auau ahupuaa, Kohala, Hawaii.
Keopuikahi ahupuaa, Kona, Hawaii.
Papaakoko ili of Honokohau, Kona, Hawaii.
Ninole ahupuaa, Kau Hawaii.
Laepao ahupuaa, Puna, Hawaii.
Koae 1 ahupuaa, Puna, Hawaii.
Koae 2 ahupuaa, Puna, Hawaii.
Laeapuki ahupuaa, Puna, Hawaii.
Kaiuiki ahupuaa, Hilo, Hawaii.
Kahuku ahupuaa, Hilo, Hawaii.

Waiakoa ahupuaa, Kula, Maui.
Kou ili of Waiehu Puali, Komohana Maui.
Kapoino ili of Waiehu Puali, Komohana, Maui.
Halelena ili of Waiehu Puali, Komohana, Maui.
Keokamu ili of Waiehu Puali, Komohana, Maui.
Wainee ahupuaa, Lahaina, Maui.

Mahana ahupuaa, Lanai.

Kamalomalo ahupuaa, Puna, Kauai.
Kumukumu ahupuaa, Koolau, Kauai.

I've given the lands listed above to the government forever, all of them are for the government.
Please consider my request with compassion for me.
With appreciation, I am,
William Charles Lunalilo, Charles Kanaina (child guardian)
Department of Interior, 6 April 1852.

This is a try copy of Lunalilo's division with the government,
A.G. Thruston, Secretary

N.T. 450v10

No. 8559B, William C. Lunalilo, Protested by Kaai

Mahuna, sworn, it is true my own place was written in the bill of sale to C. Kanaina, the place is just mauka of the land in Kailua of Kona, Hawaii, over which there is a dispute by Kaai. That is the lot I have transmitted to him, Kanaina, but I have not seen the property Kaai has at this present time; however, I had seen my parents living on this land at the time [of] Kaahumanu I. I had gone on a tour. Houses had been built, but I have not lived there since that time to the present, nor have I seen this lot over which there is a dispute with Kaai.

C. Kanaina, relates - the witnesses for this land on which Kaai and I are working are dead; although, I had thought they (two) would be my witnesses, but today they have denied by claim to this place. It is true this place had been for their father, Keoho, where he lived until he had died and they (two) are his own children, but I am demanding according to the old bequest of Keaho to M. Kekauluohi as well as by many other statements.

Naea, sworn, I have seen Kaai's place in Keopu of Kona, Hawaii, which is a house lot.

Mauka by Mahuka's lot
South Kona by a road
Makai by Government road
Kohala by vacant lot.

Land from Keoho (his father) upon his (Keoho) death in 1833. Keoho had obtained it long ago as idle land.

Kaai has always lived there peacefully to the present time.

Now C. Kanaina has offered a protest, I do not know the reason for it.

Kioloa, sworn, all of the statements above are true. I have known in the same way. I have not known the place was for C. Kanaina. It had been for Keoho, Kaai's father and now Kaai is the true claimant of this place.

[Award 8559B; (Molokai) R.P. 7655; Waialua Kona (apana 27); 1168 Acres; R.P. 7656 Kawela (apana 28); 14787 Acres; (Maui) R.P. 8395; Polanui Lahaina; 1 ap.; 440 Acs (apana 25); R.P. 8129; Honolua Kaanapali; 1 ap.; 3860 Acs (ahupua`a, apana 23); R.P. 7664; Pepee Wailuku; R.P. 8396; 1 ap.; 255.7 Acs; Kalimaohi Lahaina; 2 ap.; 4.93 Acs; (apana 24); R.P. 8397; Kuholilea Lahaina; 2 ap.; 184. 5 Acs; (apana 26); R.P. 5637; Paunau Lahaina; 1 ap.; 2 roods 24 perkas (apana 4); R.P. 5639; Aki Lahaina; 1 ap.; 16 perkas (apana 6); no R.P.; Paeohi Lahaina; 1 ap.; 1 Ac. 52 rods; R.P. 5699; Loiniu (Luaehu Waianae) Lahaina; 2 ap.; 2.75 Acs 37 rods; R.P. S8550/S8546 & S8537. Kaapahu Kipahulu; 1 ap.; (ahupuaa, apana 19); Waiehu 2 Wailuku; no R.P. Ahikuli Waiehu; (Hawaii) R.P. 478; Pakiniiki Kau; 1 ap.; 2357 Acs; Makanaloa Hilo; 2 ap.; 7600 Acs; R.P. 7049; Honuapo Kau; 1 ap.; ahupuaa 2200 Acs; Honuaino nui; 1 ap.; 262 Acs; R.P. 7454; Kawanui iki Kona; 1 ap.; 380 Acs; R.P. 7455; Lehuula nui; 1 ap.; 290 Acs; Lehuula nui; 1 ap.; 2840 Acs; Puapuaanui Kona; 1 ap.; 370 Acs; R.P. 7680; Kahena 2 N. Kohala; 1 ap.; (ap.4); ahupuaa; Puako S. Kohala; 1 ap.; Iliaina (Ap.6); Kahaualea Puna; 1 ap.; 26,000; Keahialaka Puna; 1 ap.; 5562 Acs; Pepeekeo Hilo; Keaau Puna; 1 ap.; 64.275 Acs; Kawela Hamakua; R.P. 7434; Honuainonui N. Kona; R.P. 7456; Lanihau Nui Kona; R.P. 8452; Waikoekoe Hamakua; no R.P.; Makapala Kohala; R.P. 7192 Makanaloa Hilo; 2 ap.; 7600 Acs; (Oahu); R.P.; 7635; Kamoku Waikiki; R.P. 8193, 8311 & 8416; Pau Waikiki; R.P. 8124 & 8165 (see Kapahulu award); R.P. 8124; Kapahulu Kona; 1 ap.; 31.50 Acs; R.P. 8165; Kapahulu Kona; 2 ap.; 2,184.44 Acs; R.P. 7652; Kalauakou Waikiki; R.P. 7531; Kaalaea Koolaupoko; R.P. 7494; Laie-wai Koolauloa; Laie-maloo Koolauloa; R.P. 5688; Pahipahialua Koolauloa; no R.P.; Kapaka Koolauloa; (Kauai) R.P. 8173; Kalihiwai Halelea; no R.P. Manuahi Hanapepe; R.P. 8323; Kahili Koolau; R.P. 7060; Pilaa Koolau; R.P. 7373; Waipouli Puna; See 8559 to C. Kanaina who is awarded a property at Ukumehame under 8559B; see also Award 277]

The award did not mention Kanoa fishpond. In 1873, the boundaries of the ahupua'a of Kawela were determined and Boundary Certificate 17 was issued by the Boundary Commissioner for the Second Judicial Circuit. In 1883 Royal Patent 7656 was issued to William C. Lunalilo. The makai boundary of the ahupua'a of Kawela described in Boundary Certificate 17 :

The Boundary Commission Report

Boundary Commission: 017

Certification:	017	Plants/Trees:	No
Lele:		Wall/Fence:	No
Ili/Area:		Fishing Rights:	No
Ahupua`a	Kawela	Road Trail:	No
District:	Kona	Cultivating Grounds/Taro	No
Island	Molokai	Structure(s):	No
Ownership:	Myers, R.W.	Kama`aina Testimony:	No
Bird Catcher/Canoe Maker	No	Misc:	
Burial Grave:	No	Year:	1873
Cave:	No		

Kawela Ahupuaa, District of Kona, Island of Molokai, Boundary Commission, Maui, Volume No. 1, pps 60-61

Keena Kiaaina o Maui, Lahaina Novemaba 12th, 1873

No ke Ahupuaa o Kawela ma Kona, Mokupuni o Molokai, ko Hawaii Pae Aina

No ka mea ma ka la 14, o Julai M.H. 1873, ua waiho mai o C.R. Bishop ma ke ano Luna Hooponopono Waiwai o ka Moi imua o ke Komisina Palena Aina o Maui, he Palapala Noi no ka hooponopono ana ina Palena o ke Ahupuaa o Kawela e waiho nei ma Kona ma ka Mokupuni o Molokai o ko Hawaii Pae Aina.

Nolaila, ua kauohaia na mea aina, a kuleana paha e pili mai ana ia Kawela ma ka la 12 o Novemaba 1873, ma ka Hale Hookolokolo ma Lahaina, hora 11, kakahiaka.

Nolaila ua noho ka Aha Komisina Palena Aina ma ka la i hoolahaia ame ka hora, a no kekahi kumu ua hoopanee ke Komisina i ka hana a hiki i ka hora 4, o ke ahiahi.

Noho hou ka Aha i ka la 12 ame ka hora i hoopaneeia ai.

Ua noho mai o R.W. Myers, Hope no ka Luna Hooponopono Waiwai o ka Moi no ka hooponopono ana ina palena o keia Ahupuaa o Kawela. Ma keia noho ana a ka Aha Komisina ina mea nona na aina e pili mai ana ia Waialua ame Kawela, ame kekahi mea ona aina e pili mai ana i hele mai ia manawa a ka Aha i noho ai.

Palena Aina a ke Komisina

No. 17, Maui

Palapala keia o na Palena o ke Ahupuaa o Kawela, ma Kona, Molokai

Ma keia noi ana mai a C.R. Bishop ma ke ano Luna Hooponopono Waiwai o ka Moi. a ma ka mana hoi i haawiia mai ia`u ma ke Kanawai i Luna Komisina no na Palena Aina o ka Mokupuni o Maui. A ma keia ke hooholo nei au ina palena o ke Ahupuaa o Kawela ma ka Mokupuni o Molokai o ko Hawaii Pae Aina

Ke hoakakaia aku nei malalo penei. Ua haawiia malalo o ku`u lima i keia la 12 o Novemaba M.H. 1873, ma Lahaina, Maui, ko Hawaii Pae Aina.

P. Nahaolelua, Komisina Palena Aina o Maui, Molokai & Lanai

[page 61]

Notes of a Survey of Kawela, An Ahupuaa in Kona and Koolau, Molokai

Commencing at the Sea at the South easterly corner of the land, a short distance west of a clump of Hala trees, running thence North 29° East 324 chains to the top of the mountain peak called Puukolikoli; thence North 40° East passing over peak called Nahuena to the top of pali at peak Kaunaohua (the boundary of above distance understood to be an old mountain road separating the Ahupuaa called Makoli from Kawela) from the top of Kaunuohua, passing down the side of the pali North 62° East along said road to top of ridge called Puuhoi, from thence North 0° East 24 chains along said ridge to point of confluence of rivers Pilipilau and Kawainui; thence following up Pilipilau over top of hill called Punalei to top of ridge called Pepeapai, bounded by the Ahupuaa called Pelekunu; thence passing over the ridge to the valley on southerly side called Wailaalau in range of hills called Wapaa being bounded by the Ahupuaa called Makakapai; thence South 19° West 300 chains to the sea at South West corner of pond called Kaoaini at pile of stones and thence following the shore to point of commencement.

Comprising an area of 14,787 Acres

(Signed) W.H. Pease

September 12th 1853

[No. 17, Kawela Ahupuaa, District of Kona, Island of Molokai, Boundary Commission, Maui, 14787 acres, 1873; Hawaiian transcription by J. Quintero]

The Commission of Boundaries was established by the aforesaid Act passed August 23, 1862. As was stated above, a large number of ahupua'a(s) and ili(s) had been awarded by their names only without survey. As the Land Commission had ceased to exist, it became necessary to provide the means of legally settling the boundaries of these lands, and the means of legally settling the boundaries of these lands, and of a few which had been patented by name, and that, too, "before the testimony of witnesses should be lost by reason of death." This Commission consisted at first of two persons in each Gubernatorial District. In case they could not agree "the Police or District Justice of the District in which the disputed boundary is situated" was to be umpire between them. This arrangement, as might have been expected, did not work well, and by an Act passed July 27, 1866, the late G.M. Robertson, First Associate Justice of the Supreme Court, was appointed sole Commissioner of Boundaries for the Kingdom. Two years later, by an Act passed June 22, 1868, the number of Commissioners was increased to four, one for each Judicial Circuit.

"All owners of Ahupua'a(s) or Ili(s) of land within this Kingdom whose lands have not been awarded by the Land Commission, patented, or conveyed by deed from the King, boundaries described in such award, patent or deed," were required within four years from the passage of the Act, to file with the Commissioners of their district "an application to have the boundaries of said land decided and certified to by the Commissioners."

"The application shall state the name of the land, the names of the adjoining lands, and the names of the owners of the same, where known, and it shall also contain a general description, by survey or otherwise, of the boundaries as claimed." It is "the duty of the Commissioner, on receipt of such application, to notify the owner or owners of the land, and also those of the

adjoining lands, of the time when he will be prepared to hear the case."
"Upon giving a decision the Commissioner shall therein describe the boundaries decided on by survey, by natural topographical features or by permanent boundary marks, or partly by each," *** "but he shall, in no case, alter any boundary described by survey in Royal Patent, in deed from the King, or in Land Commission Award."

"Any party deeming himself aggrieved by the decision of any Commissioner of Boundaries, may appeal therefrom to the Circuit Court of the Island on which such hearing is had, or to the Supreme Court; *** provided, however, that any party desirous of so appealing shall give notice of the same to the Commissioner within sixty days after the rendition of his decision." This term was shortened to thirty days by the Act of June 22, 1868. The term of the continuance of the Commission of Boundaries has been repeatedly extended, and was extended to August 23, 1892.

By the Act of July 13, 1874, the Commissioners of Boundaries are empowered "to decide and certify the Boundaries of portions of Ahupua'a(s), and portions of Ili(s) and other denominations of lands." A Commissioner of Boundaries has not jurisdiction to apportion water rights or other appurtenant rights of lands; he may only determine Boundary lines. By an Act passed September 25, 1876, it is made the duty of the several Commissioners of Boundaries "to deposit in the office of the Minister of the Interior a certified copy of all certificates of Boundaries issued by them within thirty days after the issuing thereof." The work has progressed slowly from various causes, among which may be reckoned the indifference of many owners of land, and the difficulty and expense attending surveys.

A ROYAL PATENT FOR KAWELA

In confirmation of Land Commission Award, by Section 43 of the Civil Code, "shall issue under the Great Seal of the Kingdom to any holder of an award from the Board of Commissioners to quiet Land Titles, for any land in which he may have commuted the Government rights." The fees, aside from commutation, are moderate, amounting to about \$6 for each Patent. It was decided by the Supreme Court in 1877 (in the case of J.H. Bruns vs. the Minister of the Interior) that the Minister of the Interior may lawfully issue a Royal Patent for a portion of a L.C. Award, "in the name of the person to whom the original Award was made." But "it must appear by the literal agreement of the metes, bounds and descriptions of the survey in the petition with that in the award, so far forth as the lot in question is bounded by the exterior lines of the Award, that it conforms thereunto." By the tenth Section

of an Act relating to the Commission of Boundaries, passed August 23, 1862, "the Minister of the Interior is forbidden to issue any patent in confirmation of an Award by name made by the Commissioners to quiet Land Titles, without the boundaries being defined in such patent, according to the decision of some Commissioner of Boundaries or of the Supreme Court on appeal." In a case where a Royal Patent had been issued by name only without survey, it was held by the Court that the issuance of a second patent for the same land, granting it by metes and bounds, was legal and proper. The total number of Royal Patents in confirmation of L.C. Awards issued previous to April 1, 1890, was 7,923.

The Royal Patent Grant

The Kawela Royal Patent 7656:

Royal Patents: 7656

Royal Patent Number(RP) 7656 LCA Number: 08559B*Mo

Patentee: Lunalilo, W.C. Book: 29

Island: **Molokai** Page 21

District: Kona TMK

Ahupua'a Kawela Miscellaneous

Ili

No. 7656, Lunalilo, William C., Kawela, Kona and Koolau, Molokai, Land Commission Award 8559B, pps. 21-23 [RP Reel 15, 429-431.tif]

Indexed

No. 7656

Royal Patent Upon the Confirmation of the Land Commission.

Whereas, the Land Commission to quiet Land Titles have by their decision awarded unto William C. Lunalilo, Kuleana Helu 8559B, an estate of Freehold less than Allodial, in and to the land hereafter described, and whereas proper application having been made by S.B. Dole, to the Minister of Interior for a Royal Patent on the within described land a certificate defining the boundaries of the same having been duly filed and the Government Commutation thereon relinquished by Order of the Privy Council,

Therefore, Kalakaua, by the Grace of God, King of the Hawaiian Islands, by this Royal Patent makes known to all men, that he has, for himself and his successors in office, this day granted and given absolutely, in Fee Simple, unto William C. Lunalilo, all that certain piece of land situate at Kawela, in the island of Molokai, and described as follows:

Part 28

Notes of a Survey of Kawela, An Ahupuaa in Kona and Koolau, Molokai.

Commencing at the sea at the Southeasterly corner of the land, a short distance West of a clump of Hala trees, running thence

North 29° East 324 chains to the top of the mountain peak called Puukolikoli, thence

North 40° East passing over peak called Nahinena to the top of pali at peak Kaunuohua, the boundary of above distance understood to be an old mountain road separating the ahupuaa Makole from Kawela from the top of Kaunuohua, passing down the side of the pali;

North 12° East along said road to top of ridge called Puuhoi, from thence

North 1° East 24 chains along said ridge to point of confluence of river Pilipilau and Kawainui, thence following up Pilipilau over top of hill called Punalei to top of ridge called Pepeapai [?], bounded by the Ahupuaa called Pelekunu, thence passing over the ridge to the valley on southerly side called Wailaalaau in the range of hills called Wapaa, being bounded by the Ahupuaa called Makakupaia [page 22] thence

North 19° West 300 chains to the sea at Southwest corner of land called Kaonini [?] at pile of stones and thence following the shore to point of commencement.

Comprising an Area of 14,787 Acres

[page 23]

Containing 14,787 Acres more or less; excepting and reserving to the Hawaiian Government, all mineral and metallic mines of every description, To Have and To Hold, the above granted land in Fee Simple, unto the said William C. Lunalilo [his] Heirs and Assigns forever, subject to the taxes to be from time to time imposed by the Legislative Council equally upon all landed Property held in Fee Simple.

In Witness Whereof, I have hereunto set my hand, and caused the Great Seal of the Hawaiian Islands to be affixed this 27th day of March, 1883.

/signed/ Kalakaua Rex

By the King:

The Minister of Interior

/signed/ Jno. E. Bush

[Royal Land Patent No. 7656, Lunalilo, William C., Kawela, Kona & Koolau, Molokai, 14787 Acres, 1883]

It is notable that the above Royal Patent is one of 12 for Kawela (the other 11 are for 'ili). Again, in contrast , for the much more wet windward side similar sized Pelekunu ahupua's, there were 35, all for 'ili , over 3 times as many as for more dry leeward Kawela ahupua'a.

The Boundary Commission Survey reads: "... 300 ch to the sea at S.W. corner of Pond called Kaonini at pile of stones and thence following the shore to point of commencement." Again, there is no mention of Kanoa fishpond.

In 1920, the trustees of the estate of William C. Lunalilo sold by quit-claim deed to Amos F. Cooke the portion of the ahupua'a of Kawela lying makai of the government road. The area sold was stated to be three or four acres more or less plus Kanoa fishpond, the boundaries of which were indicated by "the line of the old seawall which formerly enclosed it."

In 1936, the administrator of the Cooke estate conveyed to William Kamakana, Cooke's interest in Kawela land. The deed indicated that 46.5 acres of the land conveyed were fishpond and that the premises and accretions were the same as that conveyed to A.F. Cooke by the Lunalilo estate in 1920.

A month later, William Kamakana conveyed by deed the same property to applicant-appellee, Cecilia Koehokalani Kamakana.

Appellee filed an application in the Land Court of the State of Hawaii to register and confirm her title to the land conveyed to her by William Kamakana situated at Kawela, Molokai. Answers were filed by the State of Hawaii, Interlalia Corporation, the estate of William Kamakana, deceased, Esther Kamakana Kahalelehua and Abraham K. McAulton. The Land Court decree held that appellee is the owner in fee simple of all the land described in her application including Kanoa fishpond and that title thereto should be registered in appellee's name.

The result of this legal action was to set the stage for the extensive development of coastal Kawela fronting the Kanoa pond where a number of seaside homes on small lots of about ¼ acre each line the pond edge. In contrast coastal Kawela areas which remain preserved with open beach access include One Ali'i Park and the Kawela Plantation Beach Park, both bordering Kaoaini fishpond, in western coastal Kawela and Kakahai'i Beach Park and fishpond in eastern coastal Kawela.

Government, Crown, Public, Homestead Lands, Development

Again from W.D. Alexander of the Kingdom of Hawaii in 1891.

GOVERNMENT LANDS

In 1842 Government property began to set apart by itself, and a Treasury Board was appointed, but the Government still continued to have an undivided and undefined claim in all land in the Kingdom till the "Mahele." The great mass of the Government lands consists of those lands surrendered and made over to the Government by the King, Kamehameha III, and which are enumerated by name in the Act of June 7, 1848. To these must be added the lands ceded by the several chiefs in lieu of commutation, those lands purchased by the Government at different times, and also all lands forfeited to the Government by the neglect of their claimants to present their claims

within the period fixed by law. The Land Office was created by the "Act to organize the Executive Departments" in 1846, and the Minister of the Interior was thereby authorized to sell or lease the Government lands on vote of the Privy Council, approved by the King. In the 42nd Section of the Civil Code, the words "Cabinet Council" are substituted for "Privy Council." The Royal Patents issued to purchasers of Government lands are styled "Grants," and are recorded to purchasers of Government lands are styled "Grants," and are recorded by themselves in a distinct series of volumes from the Royal Patents in Confirmation of Land Commission Awards. Mistakes are often made by confounding the two series of patents. By an Act approved July 13th, 1874, it is enacted that "No sale of one land or lot exceeding five thousand dollars in value, shall be made without the consent of the King and a majority of the Privy Council." By an Act approved September 25th, 1876, "All sales or leases of Government lands and portions of land exceeding three hundred dollars in value, shall be made at public auction after not less than thirty days notice by advertisement in two or more newspapers, in both the Hawaiian and English languages. All such sales shall be made at the door of the Government House, at Honolulu. In the Act of June 7th, 1848, referred to above, 52 'Ili(s) in Honolulu, Kalihi and Waikiki, were set apart by name, in accordance with ancient custom, for the support of the garrison of the Fort at Honolulu, as "Fort Lands." As early as 1847 a number of sales took place of lots in Honolulu, Kulaokahua plain, Manoa and Makawao. On the 11th of July, 1851, an Act was passed confirming certain resolutions of the Privy Council of the previous year, which ordered "that a certain portion of Government lands on each island should be placed in the hands of special agents to be disposed of in lots of from one to fifty acres in fee-simple, to residents only, at a minimum price of fifty cents per acre." Accordingly land agents were appointed in the different districts to receive and forward applications; to collect payment for the land and pay it in at the Interior Office, and to attend to the surveying of the Grants. At the same time it was ordered that the so-called "Fort lands" should be surveyed and sold in lots at auction, after fifty acres had been reserved for the "Royal Agricultural Society," and after the kuleana(s) contained in the said lands should have been surveyed out, "whether the same had been entered at the Land Commission or not." A distinct series of L.C. Awards was issued for these kuleana(s) marked F.L. (Fort Land) to distinguish them from other Awards, and Royal Patents were granted for such kuleana(s) free of charge to the awardees. The water sources of Kunawai and certain other places were also reserved by an Act approved November 2nd, 1863.

Between the years 1850 and 1860, nearly all the desirable Government land was sold, generally to natives. The portions sold were surveyed at the expense of the purchaser. An Index of Grants issued before March 31, 1886, arranged by locality, was published in 1887. The total number of Grants issued before April 1st, 1890, was 3,175. It may be added here that "All fishing grounds appertaining to any Government land, or otherwise belonging to the Government, excepting only ponds," were "granted to the people of the free and equal use of all persons," May 15th, 1851. The same privilege is confirmed by Section 384 of the Civil Code.

HOMESTEAD LOTS

By an Act approved Aug. 29th, 1884, to facilitate the acquiring and settlement of Homesteads, the Minister of the Interior was authorized and instructed to cause portions of the public lands, which are suitable for the purpose, and not held by any person under lease from the Government, to be surveyed and laid out in lots not over twenty and not less than two acres in extent in dry or kula land, and not over two acres in extent in wet or taro land, with convenient roads in connection therewith.

These lots are then to be appraised by three appraisers, one of whom shall be the surveyor who laid out the land, and the other two residents of the district, who shall make a written statement of their appraisal to the Minister of the Interior, signed by at least two of their number.

The Minister shall thereupon publish a notice, inviting applications for the said lots, which shall be filed with the date of their receipt. No one is allowed to acquire more than one lot, with the exception that one individual may be allowed to acquire two lots where one of them is kula land only and the other wet or kalo land only.

The lots are severally awarded to the first applicants for them, upon the payment by each applicant of a fee of ten dollars for the papers, the quarterly rent or interest in advance, and the execution by the applicant together with the Minister of a written agreement in duplicate.

By this agreement, the applicant is allowed to occupy the lot for five years free from taxes for the same, on condition that he build a dwelling house upon it within one year, and fence it within two years, and pay quarterly in advance, the quarterly interest of the purchase price at ten per cent., and at the end of the five years pay the purchase price or the unpaid balance of it in full, or deliver a mortgage to secure his note for the unpaid balance with interest.

Furthermore, this agreement cannot be assigned to any third party. At the end of the said term of five years, on the fulfillment of the above agreement, the occupant of the lot shall receive a Royal Patent for the same.

On the 6th of September, 1888, the foregoing Act was so amended that in the rocky districts of Kahikinui and Kipahulu, Maui, and Kona and Puna, Hawai'i, the limit of the size of the Kula lots was raised to one hundred acres.

SCHOOL LANDS

By an Act passed July 9th, 1850, it was enacted that about "One-twentieth part of all the lands then belonging to the Government should be set apart for the general purposes of Education." On the 23rd of the following December, certain lands and school sites were designated and set apart by the Privy Council for these purposes. By the third section of the above mentioned Act, the Minister of Public Instruction was authorized "to dispose by sale, lease or otherwise, of any of the lands which have been or hereafter may be set apart for the general purposes of Education."

The same authority is given to the Board of Education by section 749 of the Civil Code, which was re-enacted in Section 32nd of the Act approved January 10th, 1865, "To regulate the Bureau of Public Instruction." Under this authority most of the School lands have been sold in the same manner as other Government lands, and Royal Patents or "Grants," signed by the King and countersigned by the Minister of the Interior, have been issued to the grantees, as is expressly provided in the Act approved August 13th, 1880. The sales of Government lands have always been made by metes and bounds, and the original surveys and plans placed on file, except in the case of certain ahupua'a(s) sold by the Board of Education, for which Grants by name have been issued.

CROWN LANDS

The term "Crown Lands" is here applied to those lands reserved by Kamehameha III., March 8, 1848, "for himself, his successors forever," as his private property. To these may be added a few lots in Honolulu, and Lahaina, awarded to him by the Land Commission in Award 10806. It is admitted by all that both Kamehameha III and his successors dealt with these lands as their private property, selling, leasing or mortgaging the same at pleasure. These royal deeds of sale constitute titles equally valid with Royal Patents.

At the death of Kamehameha IV., it was decided by the Supreme Court that under the above mentioned instrument executed by Kamehameha III, reserving the Crown Lands, and under the confirmatory Act of June 7th, 1848, "the inheritance is limited to the successors to the throne," "the wearers of the crown which the conqueror had won," and that at the same time "each successive possessor may regulate and dispose of the same according to his will and pleasure as private property, in like manner as was

done by Kamehameha III." Afterwards an Act was passed January 3, 1865, "relieve the Royal Domain from encumbrances and to render the same inalienable." This Act provided for the redemption of the mortgages on the estate, and enacted that the remaining lands are to be "henceforth inalienable and shall descend to the heirs and successors of the Hawaiian Crown forever," and that "it shall not be lawful hereafter to lease said lands for any terms of years to exceed thirty." The Board of Commissioners of Crown Lands shall consist of three persons to be appointed by His Majesty the King, two of whom shall be appointed from among the members of His Cabinet Council, and serve without remuneration, and the other shall act as Land Agent, and shall be paid out of the revenues of the said lands, such sum as may be agreed to by His Majesty the King."

UNASSIGNED LANDS

There are certain lands, mostly on the Island of Hawai'i, which were overlooked in the "Mahele" of 1848, and for which no title exists. As all private claims not brought before the Land Commission were declared to be forever barred, and as even claims under the Mahele Book which were not presented before June 30th, 1862, have reverted to the Government by law, no private claim to such lands can be entertained. The question remains whether they belonged to the class of Government lands or to that of Crown Lands or to the lineal heirs of Kamehameha III.

It is admitted by all that under the ancient feudal system the allodium of all land belonged to the King, not, however, as an individual, but "as the head of the nation, or in his corporate right," in the language of the Land Commission. The Constitution of 1840 declares that the land of the Kingdom was not the private property of Kamehameha I. "It belonged to the chiefs and people in common, of whom Kamehameha I was the head, and had the management of the landed property." This principle was fully recognized by Kamehameha III in the division which he made between his private lands and those of the Government. But opinions differ as to whether the remaining lands overlooked in this division belonged to him as an individual Chief or in his official capacity as head of the Government.

As we have seen above, those private claims which were forfeited by neglect to present them within the time prescribed by law, lapsed to the Government and not to the King's private estate. Furthermore it appears from the record that during the reign of Kamehameha III, the lands in question were treated as Government property, and that many sales from these lands were made by the Government, patents for which were signed by him. As the Act creating the Board of Commissioners of Crown Lands expressly defined them to be those "lands which by the statute enacted on the 7th of June 1848, were

declared to be private lands of His Majesty Kamehameha III," it certainly conferred no authority to add any other lands to that list. Since the above was written, the whole question has been settled by the Supreme Court in favor of the Government. (Thurston vs. Bishop.)



Bernice Pauahi Bishop of noble Molokai descent through the ruling monarchs, the ali'i nui, of Maui, owned 9% of all of Hawaii at the time of her death. Her refusal to accept Kamehameha V's offer of the throne upon his death allowed Lunalilo, the first owner of Kawela ahupua'a, to become the first and only elected monarch of Hawaii. This was not her first refusal of a royal plan since she was from childhood to marry her adopted Hawaiian brother as was the noble custom, but she refused and married instead an American, with a resulting year long estrangement from her father. After her death, her husband, Charles Reed Bishop, Hawaiian Kingdom Minister of Foreign Affairs, and co-founder of the First Hawaiian Bank, used the proceeds from land sales for many charitable causes in her memory. Most famously, was the Bernice P. Bishop Museum founded in 1889, the largest museum in Hawaii and having the world's largest collection of Polynesian cultural artifacts. Also the Kamehameha Schools were founded in 1887. The property sold to finance these works included the original Kamehameha V Ranch (Kaluakoi ahupua'a) part of the present day Molokai Ranch. That property was sold at the same time as Lunalilo's Kawela ahupua'a to ASCO, the American Sugar Company and resulted in the Kawela ahupua'a incorporation into Molokai Ranch.

The Royal Patent grants in Kawela ahupua'a to commoners:

RP Number	‘Ili	Patentee	Island	District	Ahupuaa	TMK	Acres	LCA Number
3721	Nukuapuaa (Mokuapuu)	Lio	Molokai	Kona	Kawela	2-5-4-01	4.39 A	09988
3722	Kaluanui, Kapapamuku	Malalau	Molokai	Kona	Kawela	2-5-4-01	2.32 A	03910
4176	Papakea	Kiau	Molokai	Koolau	Kawela	2-5-4-03	6.00 A	06364
4430	Wailau	Kupau	Molokai	Kona	Kawela		2.94 A	2357 04946
4431	Kawaimake, Koemaki	Kapuhalio	Molokai	Kona	Kawela	2-5-4-01	6.00 A	00160B
4779	Nauuwaiehua	Kupau	Molokai	Kona	Kawela		2.25 A	04946
6055	Moku	Meau	Molokai	Kona	Kawela	2-5-4-01	9.13 A	03677
6056	Kanui	Maunaloa	Molokai	Kona	Kawela		7.64 A	10107
6243	Mahoe	Ehu	Molokai	Kona	Kawela		4.10 A	06761
6244	Puanui (Puu o Nuu)	Kanemanaole	Molokai	Kona	Kawela		4.39 A	04176
6274	Papakea	Kahapuu	Molokai	Kona	Kawela	2-5-4-03	1.87 A	06375

Above is a listing of the ‘ili granted Royal Patents (RP) in Kawela ahupuaa. In the far right column, the Land Commission Award (LCA) numbers are listed. All were awarded in the 1850’s, 1860’s and 1870’s. However in the 1897 map only Moku ‘ili is recorded compared to the 11 Royal Patents above with 14 ‘ili. However, although not recorded in 1897 map, 6 Royal Patents with 8 ‘ili exist at present as properties as indicated in the Tax Map Key’s (TMK) in the above table. Note that ‘ili Papakea with two separate patentees is in the Koolau district and lies in present day Pelekunu Preserve. Most of these properties have been since subdivided. For example, Moku ‘ili just east of Kanoa fishpond in a fertile coastal area has been subdivided into beach front properties. However, some kona ‘ili seem to persist to the present around the Kakahai’a Fishpond, formerly an ocean fishpond with a typical stone seawall, now landlocked and a national wildlife sanctuary. They are Mahoe RP 6243 (o), Kaluanui RP 3722 (oo), Koemaki RP 4431 (ooo) and Puu o Nuu RP 6244 (oooo). The small lots above Kakahai’a Fishpond likely are also of ‘ili origin as are the other lots east and west of the pond.



The parcels on the west side also have early twentieth century structures on them and are suggestive of the 'ili geometry and taken as a whole, show how the Kawela Gulch and coastal plain were divided among the common folk during the Mahele and Royal Patent process. In contrast to the kona Kawela 'ili losses, both parts of the koolau Kawela 'ili, Papakea, still exist embedded in the remote Nature Conservancy Molokai Preserve which is part of the larger Pelekunu Preserve. The 6 acre parcel, RP 4176, in red, and the smaller 2 parcels that form RP 6274 are to the west of it.



Below are the 'ili from the earlier table for which detailed information is available. Note that a number of the tax map TMK numbers refer to properties that have been since subdivided. However as indicated in the

earlier figure, there are four 'ili that can be identified around the Kakahaia Fishpond, the most productive area of coastal Kawela ,as existing today.

Moku

Island: Moloka'i

Ahupuaa: Kawela

Feature: 'ili 'aina

Comments: LCAw 3677 to Meau: "[Apana 1] Aina kula me kalo ma ka ahupuaa o Kawela ili o Moku...3.8 acres. Apana 2....5.33 acres." TMK 5401:90x,91x.

Lexicology: moku. PEM: district or islet or severed.

Papakea

Island: Moloka'i

Ahupuaa: Pelekunu

Feature: lele

Comments: LCAw 6364 to Kiau: "Maloko o ka ili o Papakea, ahupuaa o Kawela..." TMK 5403:20. Also LCAw 6375:1,2, TMK 5403:21,22; LCAw 6354, TMK 5908:15. Papakea was a lele of Kawela (Summers).

Lexicology: papa-kea. PE: white flats.

Kapapamuku

Island: Moloka'i

Ahupuaa: Kawela

Feature: 'ili 'aina

Comments: LCAw 3910 to Nalalaau: "Kawela, ili Kapapamuku." 1 apana, 2.357 acres.

Kaluanui

Island: Moloka'i

Ahupuaa: Kawela

Feature: 'ili 'aina

Comments: LCAw 3910 to Nalaalaau: Apana 2. Ma ka ili o Kaluanui ma Kawela...0.04 eka."

Lexicology: ka-lua-nui. PEM: the big pit.

Kawaimake

Island: Moloka'i

Ahupuaa: Kawela

Feature: 'ili 'aina

Comments: LCAw 160-B to Kapuahalo: "Apana 1. Kawela, ili Kawaimake...1.45 acre. Apana 2...5.06 acres." TMK 5401:36x,38x.

Lexicology: ka-wai-make.

Koemaki

Island: Molokaʻi

Ahupuaa: Kawela

Feature: ʻili ʻaina

Comments: LCAw 160-B to Kapuahalio: "Apana 3. Kuleana aina kalo no Kapuahalio ma ka ili o Koemaki ma Kawela...0.19 acre."

Naauwaielua

Island: Molokaʻi

Ahupuaa: Kawela

Feature: ʻili ʻaina

Comments: LCAw 5002B & 4946 to Kupau: "...ma ka ili o Naauwaielua ma Kawela." 3 apana, 2.935 acres.

Lexicology: nā-ʻauwai-elua. PE: the two ditches.

Kanui

Island: Molokaʻi

Ahupuaa: Kawela

Feature: ʻili ʻaina

Comments: LCAw 10107 to Maunaloa: "Kawela, ili Kanui, Molokai" 2 apana, 7.563 acres. TMK 5401:39x.

Mahoe

Island: Molokaʻi

Ahupuaa: Kawela

Feature: ʻili ʻaina

Comments: LCAw 6761 to Ehu: "Kawela, ili Mahoe." 4.096 acres, 1 apana. TMk 5401:21

Lexicology: māhoe.

Puu o Nuu

Island: Molokaʻi

Ahupuaa: Kawela

Feature: ʻili ʻaina

Comments: LCAw 4176 to Kanemanaole: "...ma Puuonuu ma Kawela." 0.23 acre, 1 apana. TMK 5401:52? Misspelt "Puanui" in Award Book and Indices.

Lexicology: Perhaps Puʻu ʻōnū?

Mokuapuu

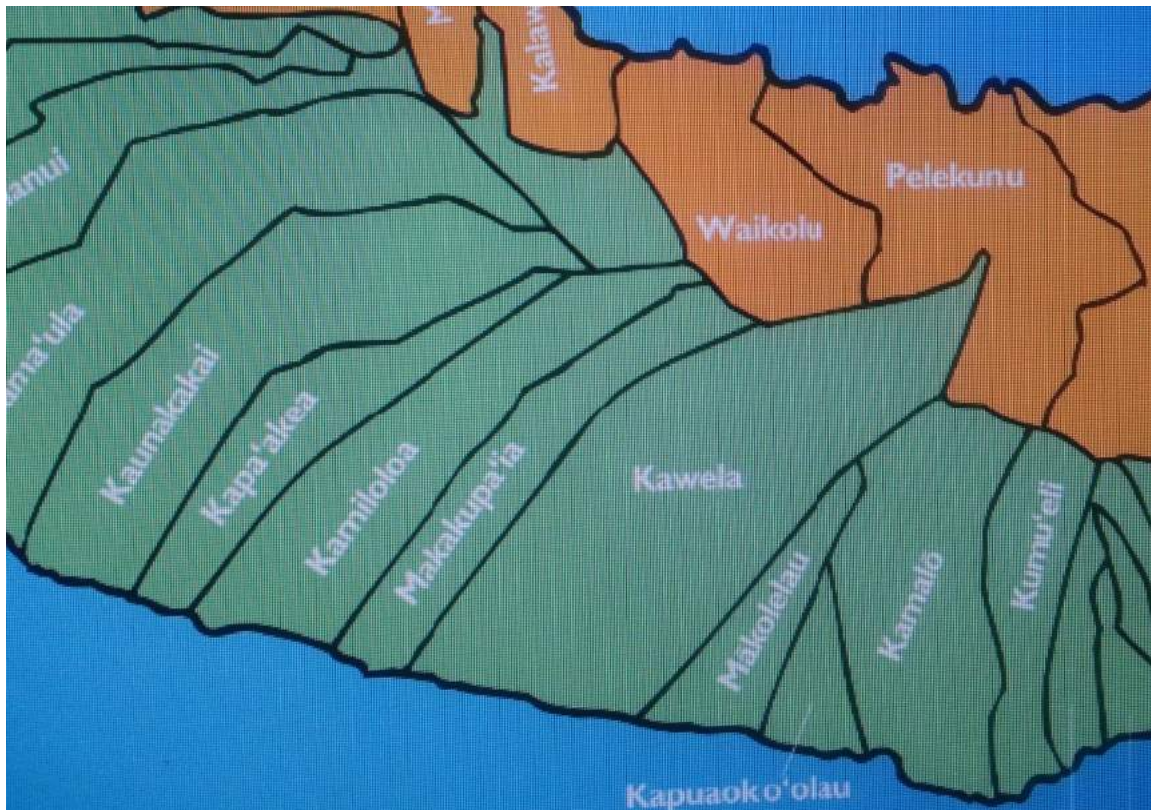
Island: Molokaʻi

Ahupuaa: Kawela

Feature: ʻili ʻaina

Comments: LCAw 9988 to Lio: "Kawela, ili Mokuapuu.." 4.394 acres, 1 apana. TMK 5401:por.29,94,41.

Lexicology: moku-ʻapuʻu. PE: clump of ferns (*Sadleria squarrosa*).



Above is map of the Molokai ahupuaʻa centered on Kawela. Information on Kawela and the bordering ahupuaʻs are summarized below.

Makolelau

Island: Molokaʻi

Ahupuaa: Makolelau

Feature: ahupuaʻa

Comments: Not named in the Mahele Book. Same as Makole (q.v.). Boundary Certificate 57, dated February 1880, defines the boundaries of Makolelau ahupuaʻa using the same courses as in BC 28 for Makole ahupuaʻa. The entire ahupuaʻa, containing 1568 acres, was sold in 1897 to F. H. Foster (RPG 4105).

Lexicology: māhole-lau. PEM: many red eyes. māhole lau. PE: leaf turning yellow or red, or drying.

Kawela

Island: Molokaʻi

Ahupuaa: Kawela

Feature: ahupuaʻa

Comments: Retained by Wm C. Lunalilo at the Mahele, LCAw 8559-B:28. A lele of Kawela, named Papakea, extends into Pelekunu valley, TMK 5403:32.

Lexicology: ka-wela. PEM: the heat.

Kamiloloa

Island: Molokaʻi

Ahupuaa: Kamiloloa 1,2

Feature: ahupuaʻa

Comments: 1/2 Kamiloloa was returned by Laniheleua at the Mahele and retained by the Government; 1/2 was retained by Laniheleua but no LCAw was issued. Laniheleua's portion therefore reverted to the Government and the two parts were later numbered 1 and 2. Both part now part of Hawaiian Home Lands 4993 acre parcel on Kawela Plantation west border.

Lexicology: ka-milo-loa. PEM: the tall milo tree.

Makakupaia

Island: Molokaʻi

Ahupuaa: Makakupaia 1,2

Feature: ahupuaʻa

Comments: Makakupaianui [1] was returned by Kaleleiki at the Mahele and retained by the Government, TMK 5-4-03:3,25. Makakupaiaiki [2] was retained by Kaleleiki, LCAw 7779B, TMK 5-4-03:28. Makakupaiaiki is part of Kawela Plantation. Makakupaianui is in Hawaiian Home Lands. Interestingly the government part is nui or big and the private part is iki or reduced

Lexicology: makakupaʻia. PEM: not translated.

Pelekunu

Island: Molokaʻi

Ahupuaa: Pelekunu

Feature: ahupuaʻa

Comments: Retained by Kapuaipoopoo at the Mahele, LCAw 5575. "There were also four lele, which belonged to ahupuaʻa on the Kona side: Papakea belonged to Kawela...; Kiloa belonged to Kaʻamola; Kaiʻamiki belonged to Kumuʻele and Wawaeolepe [and Kanipuakala] belonged to Puaʻahala." (Summers 1971: 179). Papakea is now part of Pelekuna consistent with the Kona and Koolua districts.

Lexicology: pelekunu. PEM: smelly for lack of sunshine. Good for agriculture but unpleasant living.

Waikolu

Island: Molokaʻi

Ahupuaa: Waikolu

Feature: ahupuaʻa

Comments: Not named in the Mahele Book. Like Wailau, most of the land seems to have been ili of other ahupuaa, including Kalawao, Makanalua, Kalaupapa, Naiwa and Kalamaula. "The following ahupuaa on the Kona side of the island...had lele in Waikolu: Kahanui, Palaʻau, Kaunakakai, Kamiloloa, and Makakupaia." (Summers) The ili ku of Maniania was returned by Napohaku (konohiki of Pukoo 2) and retained by the aupuni.

Lexicology: wai-kolu. PEM: three waters.

The 1998 resolution by Maui County accepting Kawela Plantation roadway lots provides insights into the status of the ʻili at that time. The text calls out specific ʻili:

lands embraced by Royal Patents 4431, 3722, 4779, 6055, 6243, 6244, 6065

The overall composition of Kawela Plantation out of the preceding Kawela and Makakupaia ahupuaʻa from the Molokai Ranch Warranty Deed was also called out:

does hereby grant, bargain, sell and convey all of that certain property situate at Kawela and Makakupaiaiki, Island of Molokai, County of Maui, State of Hawaii

As discussed earlier under Royal Patents, the sale of Kanoa Fishpond to a private party in 1920 by the Lunalillo estate was affirmed by a court decision in 1978. In 1977, the Kakahaia Fishpond was converted to a national wildlife refuge. The government made claims to a number of fishponds which lay below the high tide level which was the traditional private property boundary. However in a U.S. Supreme Court case in 1978 involving the over 500 acre Kuapa Fishpond on Oahu (largest in Hawaii) of the Bernice P. Bishop estate, the private ownership of fishponds was upheld. The Great Mahele of 1848 discussed at length earlier was central to the case. It appears, that just as Molokai Ranch retained parts of coastal Kawela after the sale to Kawela Plantation Development Associates, so earlier in 1897 did the Lunalillo estate retain parts of coastal Kawela in the sale of the bulk of Kawela ahupuaʻa to Molokai Ranch. The estate retained the Kakahaia Fishpond, which had the bordering ʻili, as well as Kanoa Fishpond. The Kaoaini Fishpond which is part of Kawela Plantation's Kawela Beach Park was part of the neighboring Makakupaia ahupuaʻa bought by Kawela Plantation. The remainder of the coast appears to have

been split between the Lunalillo estate and Molokai Ranch and was over time subdivided into coastal beach properties as it exists today. The fishponds of coastal Kawela are shown below. One Ali'i Park and Kawela Plantation Beach Park formed the narrow ocean front of Makakupaia ahupua'a on the eastern edge of Kawela Plantation.



In red, Kaoaini Fishpond which is part of Kawela Plantation Beach Park. Outlined is both fishpond and park beach. Originally part of privately held Makakupaia(iki) ahupua'a which became part of Kawela Plantation. The separate government western Makakupaia(nui) became part of the 4,993 acre Hawaiian Home Lands parcel located on Kawela Plantation's western boundary. The two parts are now referred to as Makakupaia.



In red outline, Kanoa Fishpond. Note many small beach front lots along its coastal boundary. Upland Kawela Plantation lots shown. Red dot indicates lot 30 of Kawela Plantation, 203 Kupaia Place.



In red outline, Kakahaia Fishpond. Now landlocked, the pond is the focus of a park service restoration effort. It is surrounded by the remaining surviving 'ili of the Mahele of 1848.



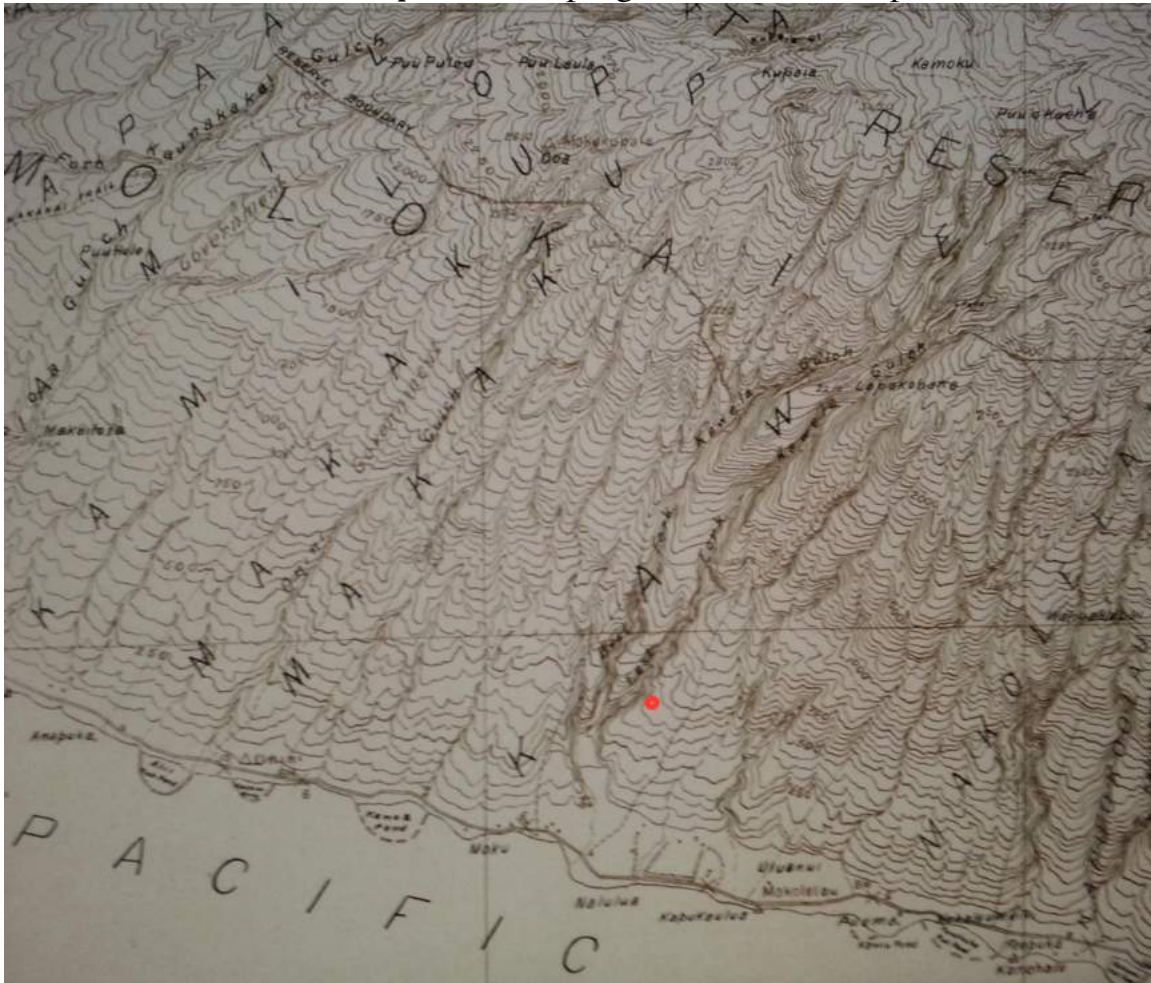
Below is an enlargement of a 1921-1922 topographic map (above) for the specific areas of Kawela and Makakupaia ahupua'a . Note the housing clustered along the central coast at Moku 'ili and also a similar cluster edging the silted-in Kakahaia Fishpond at the Kapukaulua labeled area on

This is a detailed topographic map of the Kaula Mountains region in Hawaii. The map features a complex network of ridges and valleys, with numerous peaks labeled, including Maunaloa (3429), Puu Kaeo (3580), Puu Makalili (3429), Kaulahiki, Puu Alii, Puu o Kaaha, Puu o Wahaula, Puu Kolekole, Lalanui, Kaapahua, Pohakuolu, Uluuui, Kapukaula, and Lepelepe. The map also shows several water bodies, including the Kaula River, Kaula Gulch, Kaula Valley, and Kaula Lake. The Kaula Mountains are shown in a series of ridges and valleys, with the Maunaloa and Maunaloa Forests labeled. The map includes a grid of latitude and longitude lines, and a scale bar indicating distances in miles and kilometers. The map is oriented with North at the top.

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Iki was 1425 acres in its entirety. The ahupua'a name derives from the 2610' mountain peak of Makakupaia on the border between the western and eastern parts of this ahupua'a (see 1897 map. Note on 1921-1922 map the peak is referred to as Ooa) It appropriately lends its name to Kupaia Place in present day Kawela Plantation. Below is shown the Kawela and Makakupaia ahupua'a on a 1921 USGS topographic map. Lot 30 is shown by red dot. Kupaia appears as a place name twice in upper center right. The 2610' peak is labeled Makakupaia as in the 1897 map. There were no 'ili in Makakupaia ahupua'a.

Most of Makaiki Rd and upper Makanui Rd lie in the narrow Makakupaia ahupua'a. All other Plantation roads and related residential lots lie in the Kawela ahupua'a. The progression of development of coastal



Kawela ahupua'a is shown through a series of USGS topographic maps from 1952, 1967, 1983 and 1993.

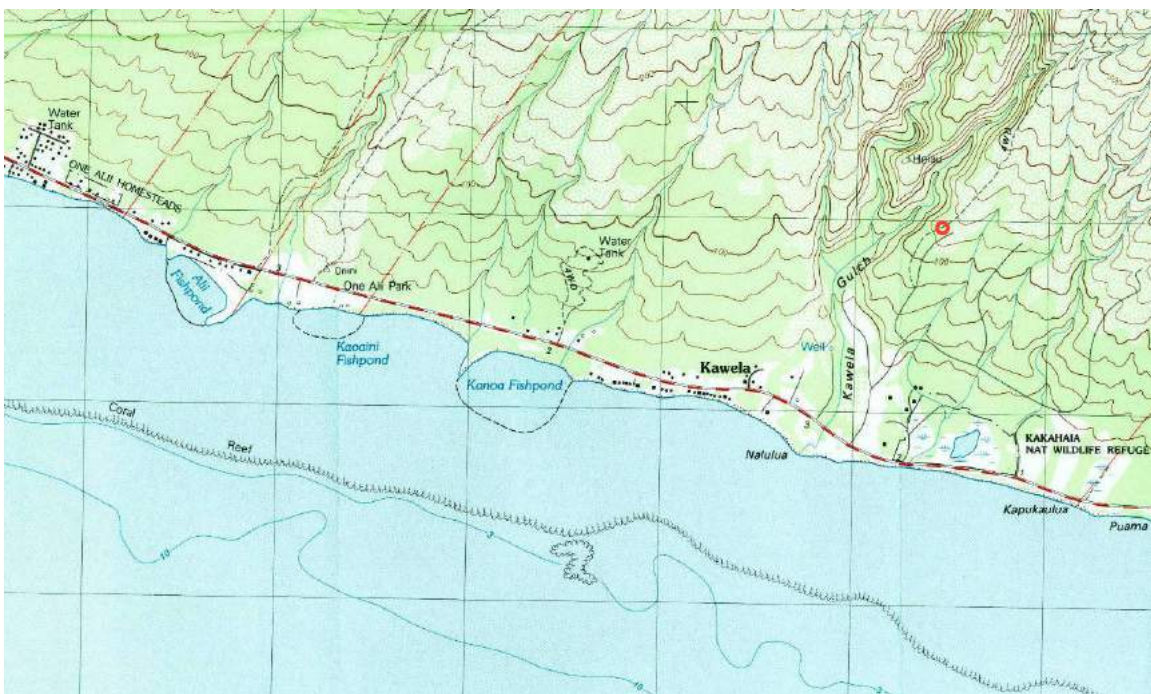
The 1952 USGS topographic map combining the Kaunakakai and Kamalo Quadrangles. Houses indicated by small black squares are scarce along the coast. The Kakahaia Fishpond is well developed compared to the lack of a signature in the 1921-1922 topographic map. A number of homes appearing in the 1921-1922 map in the 'ili locations of Moku and Kakahaia Fishpond have vanished by 1952.



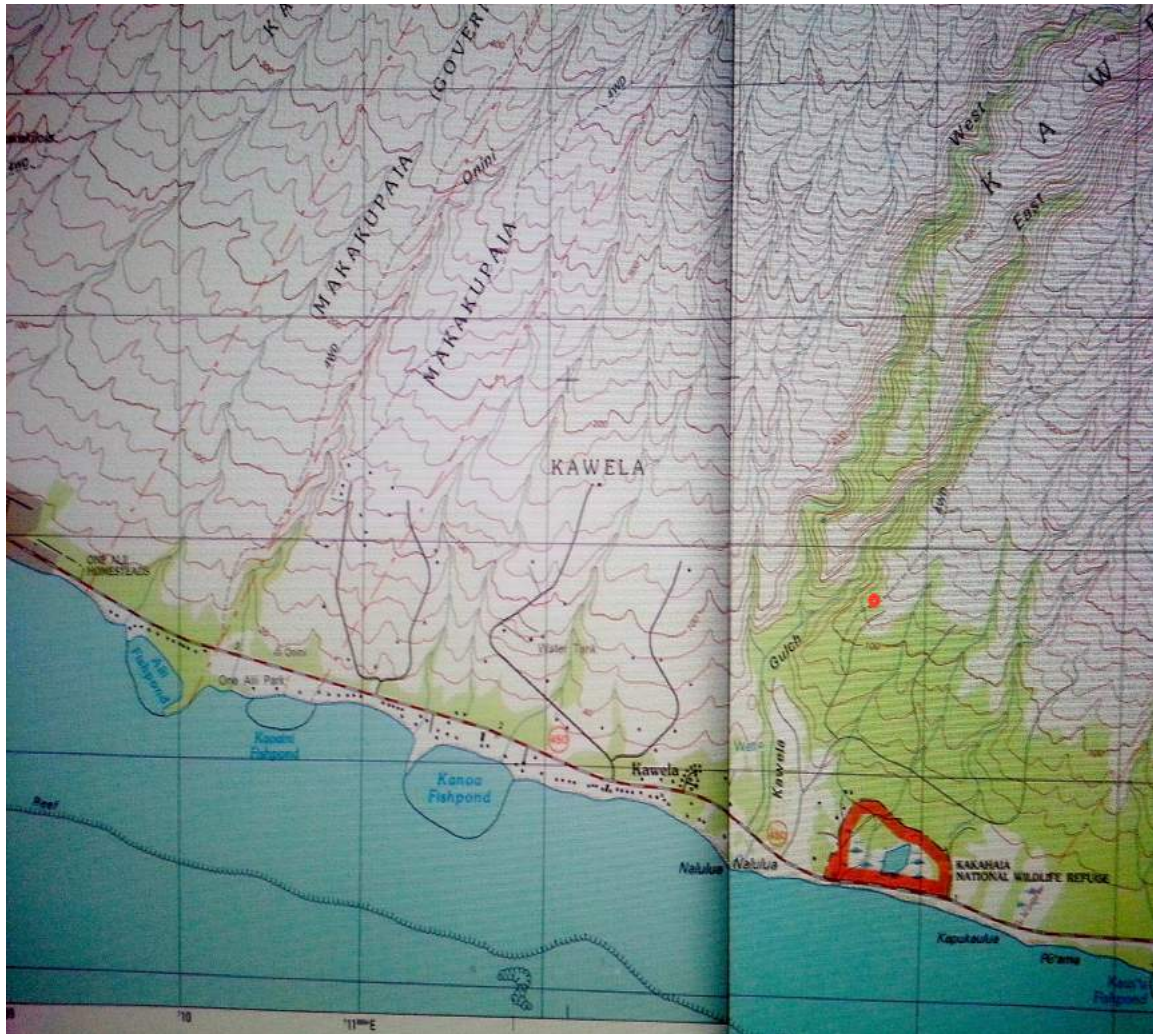
The 1967 USGS topographic map combining the Kaunakakai and Kamalo Quadrangles. More development is evident in the increased number of houses (small black squares). Also the Kakahaia Fishpond is well developed with an outlet shown to the sea. Note that the land divisions shown in all of the USGS maps from 1921-1993 show the ahupua'a after the Mahele or division of 1848 even though those properties may have been combined or subdivided by the date of the map. Thus there two ahupua'a shown for Makakupaia and Kamiloloa: one government and one private.



The 1983 USGS topographic map of East Molokai. Development is much denser by this date with extensive beach property housing as well as the Hawaiian Home Lands development of One Alii Homesteads. As opposed to 1952 and 1967, in 1983 the Kakaia Fishpond is showing extensive siltation. The roads for the first unit of Kawela Plantation are in place but no houses yet. Lot 30, 203 Kupaia Place, is indicated by the red circle.



Below is the 1993 USGS topographic map of the Kawela coast . It is composed of the Kaunakakai and Kamalo Quadrants. Notice the much more extensive beach front development compared to the earlier 1983 map and also the establishment of the wildlife refuge at Kakahaia Fishpond. Lot 30, 203 Kupaia is indicated by red dot. The houses are indicated by black squares. Curiously, Unit 1 of Kawela Plantation east of Kawela Gulch has not been updated since 1983 and still shows only road infrastructure with no houses. However, the roads for Unit 2 and 3 west of Kawela Gulch are now shown together with a number of houses that have been built. Note the two Makakupaia which provide an excellent example of the division of lands in the Mahele, where owners of a single property would give up part to the government and retain part for themselves as a condition for the transition to fee simple ownership in Hawaii.





2011 south view of Kawela Coast. Red dot marks lot 30, 203 Kupaia Place.



2011 north view of Kawela Coast. Red dot marks lot 30, 203 Kupaia Place.

Both of the 2011 views of the Kawela coast show the additional beach front development since 1993 that has almost achieved saturation. In contrast, the preserved space in Kawela above the relatively narrow coastal residential area remains as undeveloped open space. Taking this sequence as a whole from 1921- 2011, over the course of nearly a century, coastal Kawela has gone from a very rural beach area to a relatively dense beach front community. Yet despite this development, the fishponds remain as do a number of the original ‘ili of the Kawela ahupua’a from the 1848 Mahele.



Kakahai'a Beach Park is a public beach



Kaoaini Beach Park is owned by Kawela Plantation.



One Ali'i Beach Park is a public beach.

Above are the two public access beaches and one private beach that exist today along the Kawela Plantation coast area. Only Kakahai'a Beach Park lies along the

original coast of Kawela ahupua'a. Located in eastern Kawela, it is in front of the Kakahai'a Fishpond which is now a national wildlife refuge. The other two beach parks lie along the original coast of the Makakupaia ahupua'a just west of the original Kawela ahupua'a coast. Specifically, Kaoaini Beach Park occupied the coast of Makakupaiaiki ahupua'a, the part of Makakupaia ahupua'a which remained in private hands after the Mahele. Part of Makakupaiaiki was incorporated into Kawela Plantation. Kaoaini Beach Park lies immediately behind the Kaoaina fishpond. Adjacent and to the west of Kaoaini Beach Park is One Ali'i Beach Park which lies along the coast of the Government retained part of Makakupaia ahupua'a after the Mahele, called Makakupaianui ahupua'a. One Ali'i Beach Park is bordered on the west by One Ali'i Fishpond which also formed part of the coast of Makakupaianui ahupua'a which is now a part of the Hawaiian Home Lands. All of the beaches show the characteristic narrowness of Molokai beaches along the south coast area. The fringing reef that compasses almost the entire southern coast protects the coast from wave activity, as does Lanai which is immediately to the south. However, as a consequence of its wave blocking, the reef also blocks sand transport from the ocean which prevents the formation of a wider beach. The flat coastal area is mostly the result of the balance of sheet erosion from the uplands with reef limited wave removal of the sediments.



Sunrise over beach area viewed from lower Kawela Plantation. View east from southern lower residential area.

Fishponds and Farming in the Kawela ahupua'a



Above: Honouliwai Fishpond on the eastern Molokai coast.

The pre-contact large native Hawaiian population required large quantities of food, and the culture demanded this be accomplished sustainably, without waste or extensive harm to the environment, which were believed to offend the gods. The production of food included cultivating taro (kalo), which could be processed into poi, and gathering seafood from the ocean and shoreline. Some type of seafood, along with poi or taro, was part of the staple diet.

With the early settlers of the Hawaiian archipelago came the tangible necessities of long-term existence— medicinal and food plants, animals, tools—all carefully packaged on the canoes for the long voyage. Specialists, who taught and shared their knowledge through a system of generational apprenticeships, were among the settlers to ensure proper use of things, although it was not uncommon for one generation to develop practical improvements over the methods of previous generations as in all adaptive systems.

Production plots for taro were extensive, as evidenced by the remnants of terraced contours in many valleys, remains of sophisticated irrigation systems, and large rock-lined enclosures at stream deltas leading into the ocean. Consistent with the rock-enclosed, flooded farming of taro was the extension of rock enclosures at the point where streams entered the sea. In this brackish water environment, silver fish were observed to congregate, and the idea of confining them within rock walls led to systems of farming them.

Hawai‘i is the only known place in Oceania where the people practiced a pure form of fishpond aquaculture. In contrast to the rest of the Pacific, Hawaiian fishponds evolved into a unique and sophisticated aquacultural practice. Nowhere else is found either the variety of fishpond types or the quantity of fishpond remains that are found in Hawai‘i. Hawaiians attempted to utilize practically every body of water for either irrigated agriculture, mostly for their staple taro, or for fishponds. This was evidence of the ever increasing population pressures in prehistoric Hawai‘i.

The full-scale development of loko i‘a (fishponds) from mauka (the mountains) to makai (the ocean) dates back over half a millennium. Cultivation and propagation centered on many different fresh and salt-water plants and animals, with the primary species being the prized ‘ama‘ama (mullet) and ‘awa (milkfish). An inventory in the early 1900s found 360 loko i‘a in the islands and identified 99 active ponds with an estimated annual production total of about 680,000 pounds, including 486,000 pounds of ‘ama‘ama and 194,000 pounds of ‘awa. Loko i‘a were extensive operating systems that produced an average of 400–600 pounds per acre per year, a significant amount considering the minimal amount of fishpond “input” and maintenance effort apparent by that time.

Loko i‘a, Hawaiian fishponds, are impressive structures. They represent one of the ancient world’s most significant and successful aquacultural achievements. Writing about commercial fisheries in the Hawaiian Islands in 1901, J.H. Cobb estimated that about 350 fishponds had been in operation in pre-contact ancient Hawai‘i. Today, the remains of many of those fishponds are unrepairable, but some could be restored to use. Newly restored loko i‘a could be a vehicle for providing employment, economic opportunity, and fishstock enhancement. Fishponds can also provide educational opportunities and promote the sharing of cultural values for the people of Hawai‘i.

It is not known when Hawaiian fishponds began to be constructed, but some fishpond walls have been carbon- dated to the 1400s. Cobb's estimate of 340–360 Hawaiian fishponds was for the pre-contact period ended by Captain James Cook's arrival in 1778. In 1901, Cobb identified 99 ponds in commercial production on Kaua'i, O'ahu, Moloka'i, and Hawai'i. He estimated total output then at 679,692 pounds: 485,531 pounds of mullet and 194,161 pounds of milkfish. The estimates of fishpond yield ranged from 300 to 500 pounds per acre. Using the low end of this range and assuming an average fishpond area of about 18 acres, the annual yield of Hawaiian fishponds in pre-contact times could have approached 2 million pounds. In contrast, the state Division of Fish and Game (now the Division of Fish and Wildlife) reported in 1975–76 a total fishpond production of only 20,000 pounds of fish, including only 1200 pounds of mullet.

The dramatic decline in the number of ponds and the average yield of those remaining is attributed to various factors, both social and economic, including: money replacing barter as the standard of exchange ; competition from cheaper imported products ; population movement from rural to urban areas; loss of traditional fishpond management skills with the passing of people who had them; availability of alternative sources of employment. Forces of nature have also played a major role in the destruction of Hawaiian fishponds. These forces include : lava flows filling in ponds (only on the Big Island); tsunami and sea storms filling in ponds or destroying their walls; land erosion filling in ponds with silt; mangroves and other vegetation encroaching into production areas; eutrophication where level of nutrients in water results in plant growth that depletes oxygen.

The primary role of the ancient Hawaiian fishponds was not to provide food for the general populace, nor was it for commerce. Rather, the ponds were used to provide a reliable, convenient supply of fresh seafood for the ruling ali'i (chief) and the royal court.

The first three types of coastal fishponds described below—loko wai, loko pu'uone, and loko kuapa—belonged to royalty. These ponds, between 10 and 100 acres in size, were considered a symbol of high social and economic status. A fishpond also symbolized a rich ahupua'a (major land division), which reflected favorably on the ali'i as well as on the people living in the ahupua'a. Kawela ahupua'a had two large fishponds.

The fishpond remained a powerful symbol even after the Great Mahele in 1848, when the concept of land and property fee simple ownership replaced traditional land management structures while retaining the overall ahupua'a and 'ili divisions. For example, in a study of the leeward side of the island of Hawai'i, it was found that descendants of King Kamehameha I owned seven of the largest fishponds.

The smaller loko i'a, either natural or man-made, might belong to commoners, those without titles. Fishing rights to these fishponds or traps were bestowed to an 'ohana (family or extended family). These rights were managed, controlled, and kept within the 'ohana to be passed down from generation to generation.

Because the ali'i were occupied with religious and political duties, they appointed managers to oversee the daily operations of a fishpond. These individuals had distinct titles and job descriptions: konohiki, the land overseer of the ahupua'a, and kia'i loko, the resident keeper of the royal fishponds. The konohiki were like land superintendents. The kia'i loko, on the other hand, were responsible for the management, production, harvesting, and protection of the fishpond within the ahupua'a. The amount of knowledge that these individuals had has been likened to that of any doctoral degree in fishery biology and management. The keeper's knowledge and position was kept within the family and passed down through the generations. The keeper was very powerful in his capacity as fishpond manager, and his decisions were highly respected and might even be held above those of the ali'i in regard to pond management.

If the work called for many people, commoners were recruited to do maintenance upkeep of the fishponds, but usually the commoners were not allowed to take fish from the fishpond. The fishpond was a proud symbol of a rich ahupua'a to which they belonged, not unlike large community based architecture in many other cultures. Also, by having a fishpond that had great quantities of fish for the ali'i, the burden of taxes was not as heavy on the commoners' own food supplies. We can suppose that Hawaiian commoners saw a productive fishpond as a partial release from their commitment to provide food for the chief at the expense of depleting their personal resources. Also, it is believed that they were sometimes rewarded for helping to maintain the fishpond when, under special conditions and during celebrations, they were allowed to take fish.

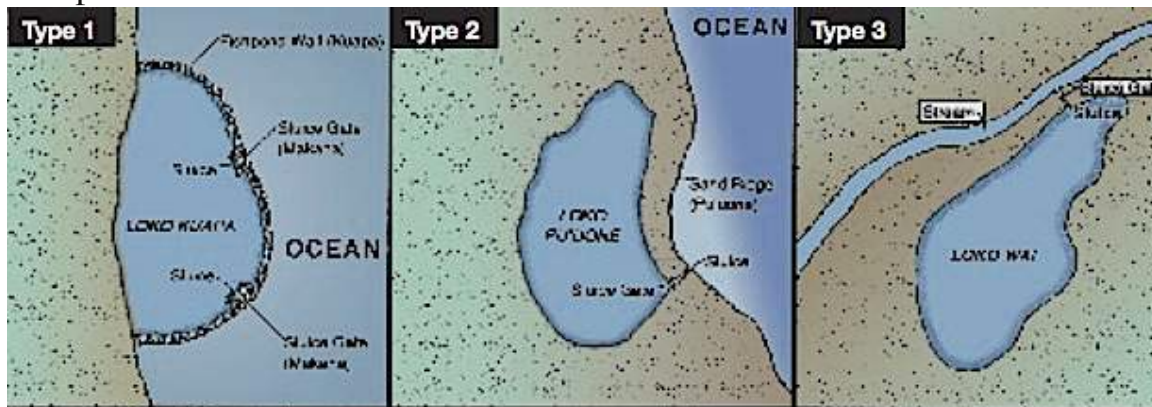
In 1973, R.A. Apple and W.K. Kikuchi published a study that began to identify those Hawaiian fishpond remnants worthy of historic preservation. Searching through historical literature, Kikuchi found, documented, and surveyed 335 ancient Hawaiian fishponds. Apple did a survey by helicopter, identified the remains of 157 sites, and evaluated their condition. At that point, 101 of those fishponds were eliminated from consideration because they were either almost completely destroyed or irreparably altered. Only 56 of the 335 ponds evaluated had any potential use as fishponds. W.D. Madden in 1997 sought out these last 56 ponds to find out their potential as productive mullet and milkfish fishponds. Madden rated six ponds as “excellent” for fishpond aquaculture, 15 as “good,” and the rest as “fair” or “poor” but still with possibilities as productive systems. The few fishponds still in commercial production today are used to cultivate ogo, rainbow trout, ornamental carp, and tilapia, as well as some of the traditional native fishpond species including ‘ama‘ama, awa, a‘hole-hole, moi, pa‘pio, ‘o‘io, awa ‘aua, and various edible seaweeds.

The primary method of getting fish into the fishpond was by stocking it with young fish, called juveniles or fingerlings. These were usually about 4 inches long and less than one year old. They were caught outside the fishpond, usually in the months of January to March, when they were abundant. The fingerlings were put into a special grow-out pond using dip-nets. This initial pond was smaller than the regular fishpond and free of predator fish species. When the fingerlings had grown to a size at which they would not be subject to predation, they were put into the main fishpond. Other ways that fish got into the fishpond was allowing them to enter through the makaha (sluice gate), but sometimes undesirable species such as jacks and barracuda would also get in this way. And, although there is no documented evidence of fish reproducing within fishponds, some kupuna believe that it occurred, considering the estuary-like nursery environment and the lack of significant pollution.

Provision of nutrients for inhabitants of a fishpond was through both natural means and human management. Nutrients carried to the ponds in drainage and runoff from streams and taro plots increased productivity at the base of the aquatic food chain, and this effect worked its way up to create natural food sources. Fish were also fed taro, sweetpotato, breadfruit, mussels, and seaweed. Religious beliefs did not allow the use of any type of animal waste as a nutrient source. The consequence of this restriction was not recognized as a loss at the time, but using animal wastes would have increased

production of algae, a valuable food source. The periodic removal of filamentous seaweed mats from the fishpond was usually done by women. Removing the seaweed mats helped maintain open water surface, which enhanced fish growth and the health of the pond. It also left the nutrients that the seaweed would extract from the pond available for use by microalgae and zooplankton, upon which mullet feed. This maintenance operation was directed by the *kia'i loko* and called upon all the women in the *ahupua'a* to go in a line to pick out the *limu* by hand. A bamboo rake called a *kope 'ohe* was also used for fishpond cleaning. This rake was dragged behind a canoe, and the outgoing currents swept the silt out the *makaha* and into the open ocean. When the fishpond became too full of fish or when undesired species became too numerous, long seine and gill nets were used to remove large quantities of fish at a time. These nets were prized possessions of the *ali'i* or *kia'i loko*. M.A. Kelley described how once it was known where the fish congregated they would be encircled again and again with nets cast from canoes. This method was used in larger fishponds where the fish could often escape harvest.

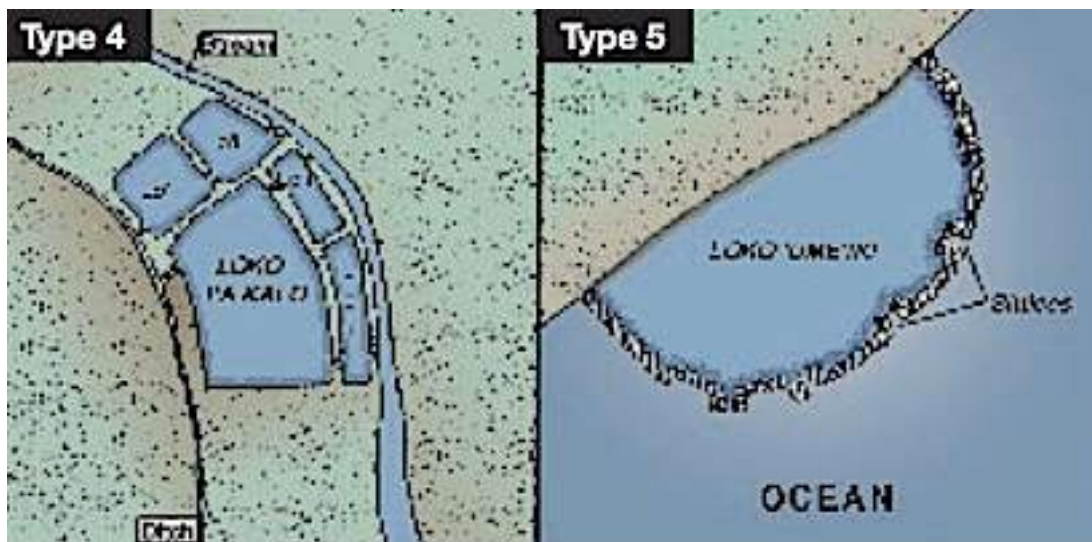
Hawaiians had five basic types of fishponds, listed below by location, from the uplands toward the sea.



Located inland and mostly of freshwater origin, a *loko wai*, Type 3, was typically made from a natural depression, lake, or pool whose water was mainly from diverted streams, natural groundwater springs, or percolation from an aquifer. Various 'o'opu were commonly found in these ponds. to raise 'o'opu, 'ama'ama, and a'holehole. Kikuchi suggested that diversion of stream runoff for the irrigation of taro eventually led to fish aquaculture. Irrigated agriculture in *lo'i* was enhanced by including fish (*loko i'a kalo*), and this led to pure fishpond aquaculture—*loko pu'uone*. to raise 'o'opu, 'ama'ama, and a'holehole.

Loko pu‘uone , Type 2, like present day Kakahaia fishpond in Kawela, contained mostly brackish water, with inputs from both freshwater and saltwater sources. Fresh water from streams, artesian springs, and percolation from adjacent aquifers was mixed with seawater that entered through channels during incoming tides. This mixing produced a highly productive estuarine environment that is known for its high biological biomass index. The most characteristic feature of this type of fishpond was a sandbar, coastal reef structure, or two close edges of landmass that could be connected to enclose a body of water. Typical of these ponds were fish that were able to handle fluctuations of salinity. These fish include ‘ama‘ama, awa, a‘holehole, pa‘pio or ulua, ‘o‘‘io, nehu, awa ‘aua, ‘o‘opu, kaku, moi, and weke. Various other fish may have been grown, but this depended on water quality, especially salinity level, and the location of the fishpond with regard to migrating species such as akule and nehu.

Loko kuapa , Type 1, like present day Kanoa and Kaoaini fishponds in Kawela, were strictly coastal fish- ponds whose characteristic feature was a kuapā (seawall) of lava or coral rubble. They were usually built over a reef flat, with the wall extending out from two points on the coast in an enclosed semicircle. These ponds usually had one or two ‘auwai (channels) that were used mainly for water flushing or inflow, depending on the rising and ebbing of the tides, but were also used during harvesting and stocking. Loko kuapa , because they were enclosed reef flats, had all the marine aquatic sea life that would be expected to be found on a reef flat including kala, palani, and manini. Less common fish sometimes found in these fishponds were the ka‘hala, kumu, moano, weke ula, uhu, various species of hi‘na‘lea, surgeonfish, crevally, goatfish, and even puhi.



Loko ‘ume iki , Type 5, were not actually fishponds but rather fish traps. Like the loko kuapā, they were constructed on a reef flat, but loko ‘ume iki had “fish lanes,” corridors used to net or trap fish going onto or off the reef. Each loko ‘ume iki had many fish lanes with fishing rights usually assigned to a family. The traps operated without the use of gates and relied on natural movements of fish. The lanes were usually tapered, with the wide end facing either inward or outward, and anywhere from 10 to 40 feet long. Type 4 is an irrigated taro plot used also as a fishpond for fish.



Above: Model fishpond , loko kuapā, showing architectural details

In traditional Hawaiian belief, fishponds were built by Menehune, a legendary race of small people who worked at night. Although there has been no documentation of traditional fishpond construction methods, the work is clearly labor-intensive, and large ponds must have taken a long time to construct. The only tools known to have been used were ropes, dragging sleds, and ‘o-‘o- (digging sticks). It is traditionally accepted that rocks for the construction were transported down from the mountains along a human (or Menehune) chain, sometimes many miles long. All materials used for the construction of the fishpond usually came from within the same ahupua‘a. This often pie-shaped land division had its point in the upland mountains and extended down through a valley or valleys and out to the edge of the coastal reef. The ahupua‘a provided its residents access to both mountains and ocean and the various provisions of these resources necessary for sustenance.

Fishpond kuapā (seawalls) were constructed from many materials including lava rock, coralline blocks, and rubble of rocks, coral, and soil. Small rocks and coral fragments filled interior cracks. Coralline algae, marine plants important in the construction of coral reefs, were sometimes relied upon to provide cementing capability. The seawall was permeable to water, allowing

aeration and water circulation while deflecting oncoming wave energy. The outer (ocean-facing) and inner seawalls differed: the outer wall had a greater angulation to allow some of the deflected current to “clean” or scour the outer rim of the fishpond. The outer kuapā was often 5 feet wide and 3–5 feet deep. The widest and most massive kuapā is Kaloko in Kona, Hawai‘i. This seawall is 35–40 feet wide at its base and over 6 feet high.

Sluice gates ,makaha, were the most distinctive and unique feature of Hawaiian fishponds. They were stationary, without any moving parts. The makaka was made of wood, typically tree branches about ½ inch in diameter lashed vertically ½ inch apart to two or three pieces of larger wood arranged horizontally in a gridlike manner. The grate structure allowed water circulation and flushing and the influx of fingerlings yet retained fish too large to pass through the grid. There was no traditional location for the makaha, but they were positioned to maximize the flow of current throughout the entire fishpond.

‘Auwai (sluices) were channels of water that connected the fishpond with the sea. In a loko kuapā they were called ‘auwai o ka makaha which means “gates of the channel,” and in a loko pu‘uone they were called ‘auwai kai, or “sea gate.” Both of these ‘auwai systems served to allow water flow, recruitment of juvenile fish from the outside, and, most importantly, harvesting.

The innovations of the makaha and ‘auwai allowed Hawaiians to progress from fish traps and enclosed ponds to artificial estuaries (fishponds), which could be better controlled and managed. A more recent innovation (introduced by Chinese immigrants in the mid-1800s) was the incorporation of a double makaha, two parallel grates set a few feet apart in a fishpond wall, which permitted the trapping of fish between the grates and allowed for easier harvesting by small hand nets.

To harvest the fish, Hawaiians relied on the natural instincts of mature fish to congregate on the fishpond side of the sluice gate when they sensed the incoming tide. Likewise, mature fish tend to congregate on the ocean side of the fishpond wall during the outgoing tide. Only mature adult fish react to this phenomenon, and during the reproductive, spawning season, this congregation is greatly intensified. Using this harvesting strategy, fish that were “caught” inside the ‘auwai o ka makaha could be scooped out with dip-nets according to desired type and size. Thus the keeper of the fishpond

could be very selective about the fish caught or released, thereby increasing the efficiency of the operation.



Above: reconstructed fishpond rockwall on Molokai

Royal fishponds were protected by a number of cultural and religious restrictions. For example, any form of pollution by sewage, rubbish, and metabolites was not tolerated. In the latter category, women during their menstrual period were not allowed in or near a fishpond, to avoid “insult” to the guardian spirit of the fishpond. Another cultural aspect of fishponds were the ceremonial structures associated with them. Ku‘ula (shrines) were built

to honor the gods Ku and Hina, his wife. All fishponds had a guardian spirit called mo‘o, which manifested itself in either a lizard or mermaid-like form. It was the duty of the kia‘i loko to make regular offerings to the gods at designated times of the lunar month to ensure the success of the fishpond. The people were also very aware of the need for conservation. To protect the environment from overuse, they instituted a kapu, or restriction system. A kapu restricted fishing during certain months of the year to let stocks rebuild; this applied to designated areas offshore as well as in the fishpond. For instance, a kapu was placed on certain fish when they were spawning. A branch of the hau tree (hibiscus family) marked an area restricted to fishing. Migrating schooling fish like the akule could also be declared kapu. To break a kapu by poaching, as well as by polluting an irrigation system, was punishable by plucking out the offender’s eyeballs, or strangulation until death which certainly limited recidivism rates. These strict kapu ensured renewable stocks and a stable population of fish resources, enabling efficient fishery management from generation to generation.

Hawaiian fishponds were one of the most important technological, social, economic, and cultural concepts developed in ancient Hawai‘i. Their open channels, sluice gates, and unique harvesting methods were unsurpassed by other Pacific cultures. The system was not developed for great amounts of yield but rather for the convenience of the Hawaiian royalty. Fishponds helped to stabilize and solidify the community’s social structure, manage natural resources, and enrich the people’s relationships with the supernatural gods of their universe. Through conservation management and a thorough understanding of their environment, Hawaiians complemented and enhanced the natural productivity that surrounded them.



Above: Kahinapohaku Fishpond (red circle) lying within the fringing reef and Honouliwai Fishpond (red dot) located near the terminus and hence less protected. Both fishponds are located near mile marker 20 in east Molokai. The overview presented above provides some insight on how to reconstruct a fishpond wall. The dimensions and strength of a fishpond wall are determined to a large extent by the length of the wall and the bottom contour of the reef fronting the fishpond wall. A fringing reef acts as a wave energy buffer and can reduce the strength of a wave by over half. If there is a shallow reef or sandbar close to the wall, the wall may need to be significantly higher and wider than if this were not the case, because the wall needs to be able to withstand most of the force of the waves. Two examples of fishponds on the southeast coast of Molokai illustrate this distinction. Honouliwai fishpond has a reef abutting it, so the rocks needed to be very large, whereas the Kahinapoʻhaku pond has a large fringing reef in front of it, allowing the pond wall rocks to be smaller and is more typical of Molokai southern shore and in particular Kawela.

Honouliwai fishpond has a narrow reef to protect it, so the fishpond wall's rocks are wide and long so it can withstand the almost unrestricted force of waves and tides. Both the width and height of the wall average 5 ½ –6 feet. Because the wave force is large, the rocks that were originally used to build it were large as well. Large rocks require special tools and handling to place them on a wall, and workers need to be extremely careful when handling the very heavy rocks. With the rocks used to build a pond like Honouliwai, it sometimes took four to eight strong people to handle a single rock.



Above: Honouliwai Fishpond



Above: Honouliwai fishpond wall rebuilt

The Kahinapohaku fishpond had a large fringing reef fronting it, which provided a good deal of protection. The base of the wall, according to the original footprint, was approximately 15 feet wide, but it was only 10 feet wide near the shoreline, being out of the direct wave impact area.

The Kahinapohaku fishpond kuapā was damaged by a major storm surge that caused it to collapse. The wall collapsed outward, toward the ocean, which may seem odd because the waves came from that direction. Actually, the waves washed over the seawall and the back-surges against the inner wall pushed it outward as the waves retreated. Repair to this breach took about two days. If fish are being cultured in the fishpond, immediate repair is critical or losses will result. Damage can also allow undesirable fish species to enter. Due to the reef fronting this fishpond, the rocks used in this pond were smaller, which a strong person could generally carry alone. This made for less dangerous working conditions. Rocks could be moved and placed on the wall with less pre-planning, because once placed on the wall they could be easily moved around to find a perfect fit. Two 4 person teams, one on the inside wall and the other on the outside wall, worked well at this fishpond.



Above: Kahinapohaku fishpond rock wall after rebuild.



Above: Collapsed Kahinapohaku fishpond wall before reconstruction showing interior rock wall construction.

Below are listed the three fish ponds associated with Kawela Plantation plus the fishpond that originally formed the oceanfront for Makakupaianui, the government held part of the Makakupaia ahupua'a, which is now part of the Hawaiian Home Lands. Kaoaini Fishpond formed the ocean front of Makakupaiaiki. Kanoa and Kakahaia lie along the ocean front of Kawela ahupua'a. A description of the largest public local ocean park is also given. The fishponds were of a type, loko kuapa, that is, a fish pond made by building a wall on a reef. They typically had one or more makaha or sluice gates to let fish in and out of the enclosure. Present day Kakahaia Fishpond is a loko pu'uone.

Ali'i Fishpond

Island: Moloka'i

Ahupuaa: Makakupaianui

Feature: fishpond

Comments: Summers "Site 135. Cobb listed a 'nameless pond in Makakupaia 1' as being 46 acres in area. Now called Alii pond, it has an area of 25.80 acres. The wall of this loko kuapa is 2710 ft long, about 4 ft wide and 4.5 ft high. There was one makaha."

One Ali'i

Island: Moloka'i

Ahupuaa: Makakupaianui

Feature: park

Comments: "Beach park and homesteads, Ka-milo-loa, southeast Moloka'i." Kamiloloa Homesteads are in Kamiloloa 1. One Alii beach park (TMK 5403:23) is located in Makakupaia 2. Coordinates approximate. See Puu Alii.

Lexicology: one-ali'i. PEM: royal sands.

Kaoaini Fishpond

Island: Moloka'i

Ahupuaa: Makakupaiaiki

Feature: fishpond

Comments: Summers "Site 136A...a loko kuapa having an area of 9.3 acres in 1901. The wall, which was approximately 1770 ft long, is now destroyed...Cobb gave the name Kaoaini for this pond; Stokes called it Kaonini." Kaonini is one of the 8 Molokai "fishing grounds which are known by the people to have shoals of fish remaining upon them [which] shall, at the proper season for fishing, be placed under the protective taboo of the tax officers for the King." (Jordan and Evermann 1902:362)

Lexicology: ka-'onini. Andrews: a very slight breeze. PEM: Pronunciation and meaning uncertain.

Lexicology: Kaoaini. PEM: see Kaonini. [Neither is translated, both are probably garble for Kaonini (q.v.).]

Kanoa Fishpond

Island: Molokaʻi

Ahupuaa: Kawela

Feature: fishpond

Comments: Summers "Site 137...was 50.9 acres in area in 1901...The wall of this loko kuapa was approximately 2860 ft long. It had two makaha on the eastern side."

Lexicology: kānoa. PEM: bowl (as for kava).

Kakahaia Fishpond

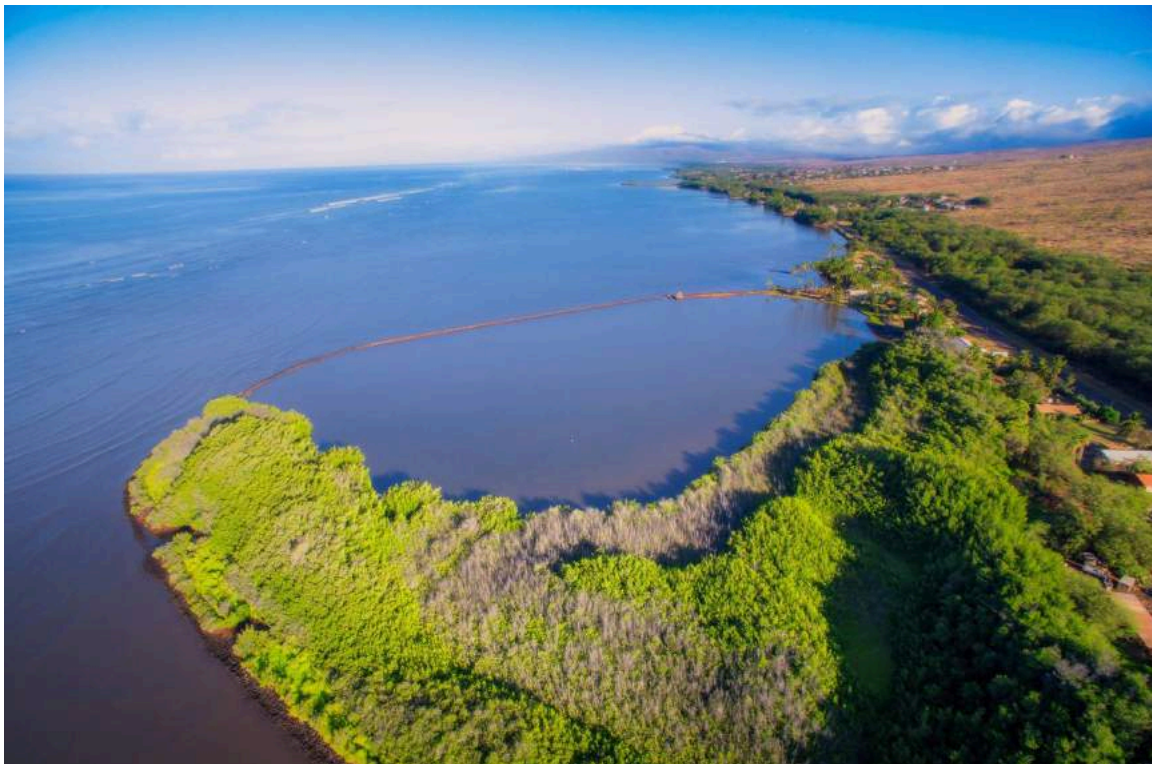
Island: Molokaʻi

Ahupuaa: Kawela

Feature: fishpond

Comments: Summers "Site 143...a puʻuone. In 1901 it had an area of 31 acres and was partly filled..."

Lexicology: kakaha-iʻa. PEM: fish slicing.



AliʻI fishpond, the best preserved fishpond of the coastal Kawela area. Note the shore line sediment collection in the pond, a problem all along the southern coast owing to the barren upland areas seen beginning on the land side (mauka) of the highway. Bordering homes are part of the Hawaiian Home Lands originally the government's Makakupaianui ahupuaʻa.

The fishponds (loko kuapa) characteristically housed aboth plants and fish. Below is a listing of the range of plants and fish in a Hawaiian fishpond.

Loko kuapā are fishponds with kuap‘ā (seawalls) built of stones and coral. Hawaiians built these fishponds on a reef flat near a freshwater stream or spring. The shoreline was the inner wall of the pond. The outer walls had openings called ‘auwai kai with mākāhā (sluice gates) that allowed sea water to flow in and out of the pond. Fish swam into the pond through the mākāhā. When the fish grew bigger, the mākāhā trapped them in the pond. Some loko kuapā had a nursery pond inside. Pua i‘i or pua i‘a (baby fish) were kept in the nursery to protect them from larger fish. Hawaiians built loko kuapā for the ali‘i (chiefs). This kind of pond exists only in Hawai‘i.

What lives in the loko kuapā?

Plants

- limu (seaweed)

Animals

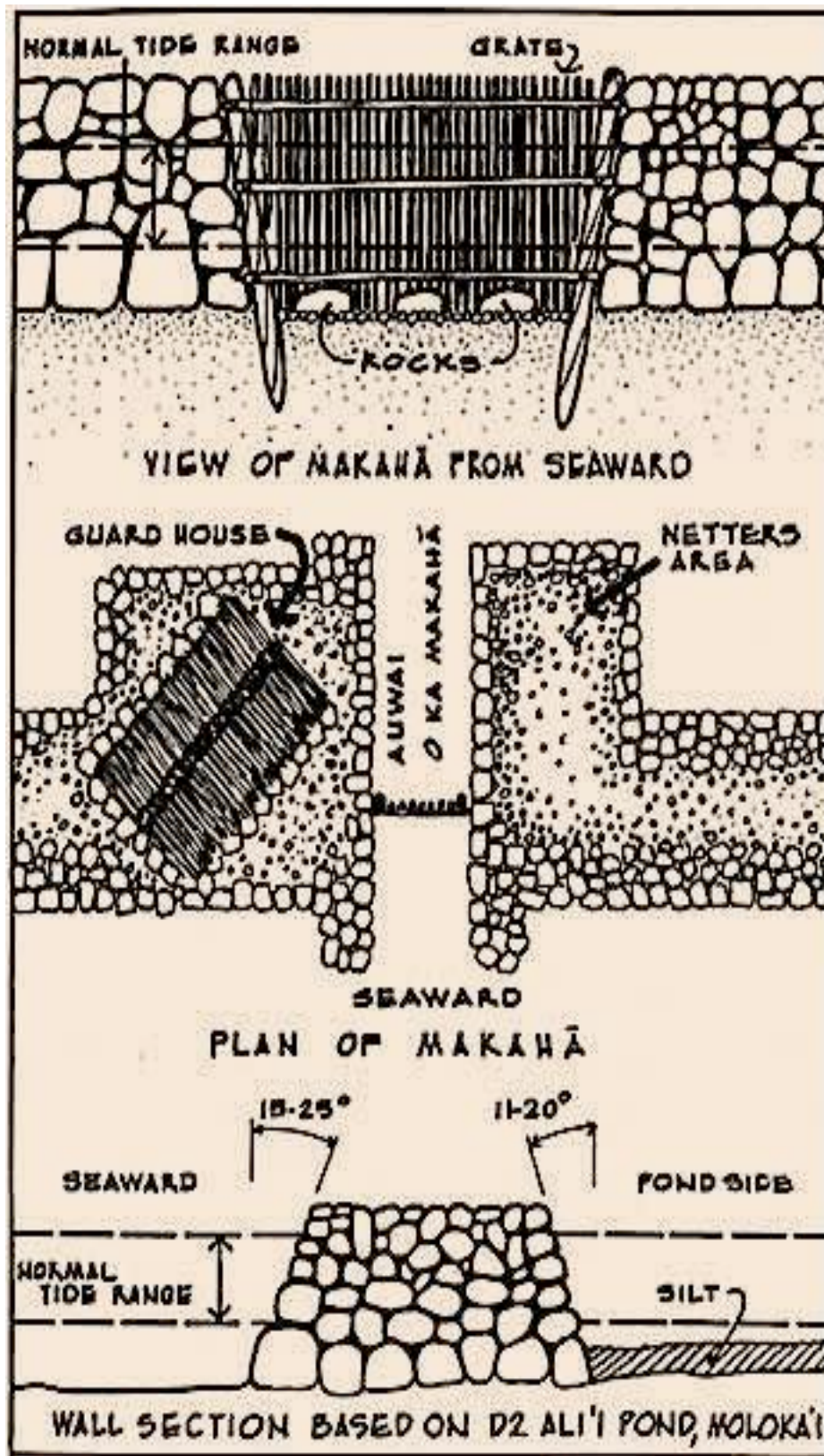
- pāpa‘i (crabs)
- ‘ōpae (shrimp)
- awa (milkfish)
- ‘ama‘ama (mullet)
- āholehole (flagtail)
- weke and kūmū (goatfish)
- awa ‘aua (ladyfish)
- ‘ō‘io (bonefish)
- manini (convict tang)
- palani (eye-striped surgeonfish)
- pualu (yellowfin surgeonfish)

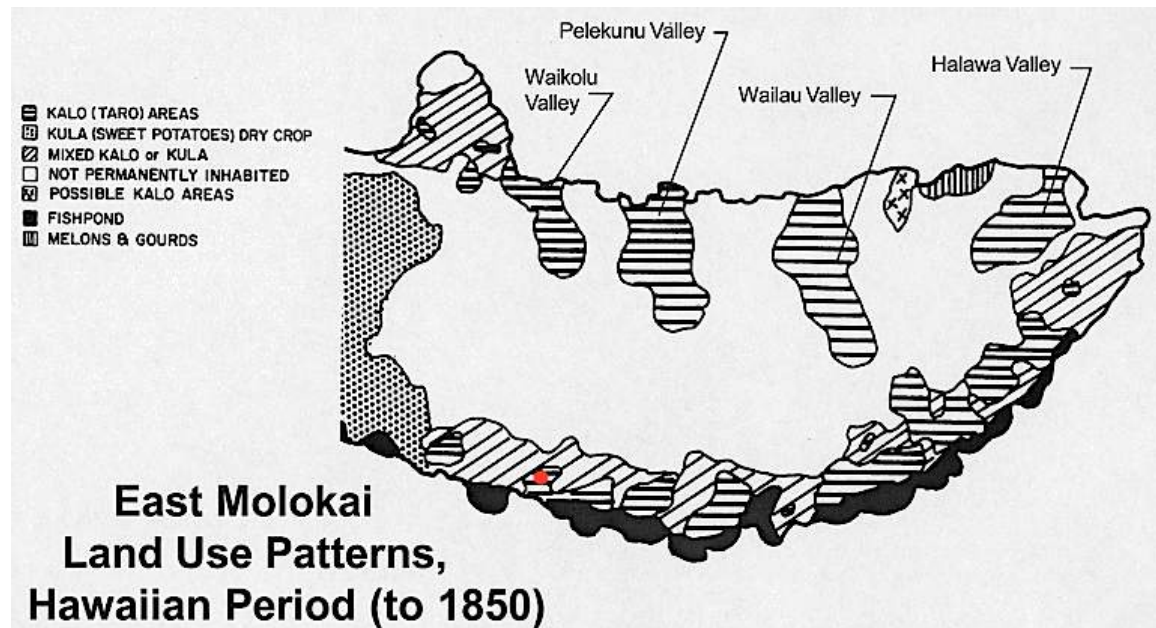



- pāpio and ulua (jacks)
- nehu (anchovy)
- akule (big-eyed scad)
- moi (threadfin)
- kākū (barracuda)
- uhu (parrotfish)
- hīnālea (wrasse)
- kāhala (amberjack)
- kala (unicorn fish)
- pūhi (eel)
- ‘o‘opu hue (puffer fish)
- nahawele (mussel)



Typical construction details for a fishpond are shown below. They are for the specific example of the Ali‘i fishpond just west of coastal Kawela Plantation. Note how the wall height is designed to always be above the high tides. The walls had at least one opening or ‘auwai kai coupled with a sluice gate or makaha.





Above is shown the interplay between pre-historic and early historic fishpond aquaculture and agriculture in Eastern Molokai. Kawela Gulch is marked with a red dot. The taro agriculture areas which require wet lands are restricted to gulch areas along the leeward south coast around Kawela due to the low rainfall as a result of orographic or mountain blocking of moisture from the windward north coast transported by the north easterly trade winds. However, moving east along the southern coast, the rainfall increases dramatically due to the increasingly south-easterly orientation of the coast which allows capture of refracted moisture from the trade winds with the East Molokai volcano blocking now helping to capture the moisture. The land becomes much wetter. As a consequence of these much wetter conditions, the taro producing lands become almost continuous. At the very east end there is no longer capture due to orographic blocking and hence the drier conditions of the southern coast obtain. However, going westward from Kawela along the southern coast the conditions become even drier owing to more complete orographic blocking and even mixed taro and sweet potatoes were not possible and only dry crops such as sweet potatoes alone were possible. The fishponds stretch from the east at the beginning of the fringing reef and continue westward along the southern coast paralleling the agriculture areas. Much more extensive wet land farming was possible along the north coast in the large valleys. Comparing Pelekunu with Kawela shows why there were many more 'ili in Pelekunu. In Kawela, the 'ili were concentrated along the case just west of Kawela Gulch around Kakahaia Fishpond. The extent of mixed/dry crop land inland is probably a maximum based on optimal rainfall. More normally uninhabited areas were larger.

Adjacent of Kawela ahupua'a to the east, is Kamalo ahupua'a, which contains that largest erosional chasm on the south coast of Molokai. It is much larger than Kawela gulch and provided the soil for an expansive wet coastal plain where traditional taro and fishpond farming continues to the present as compared to the much smaller wet areas of Kawela.



View up the Kamalo chasm showing the island scale size of the feature.



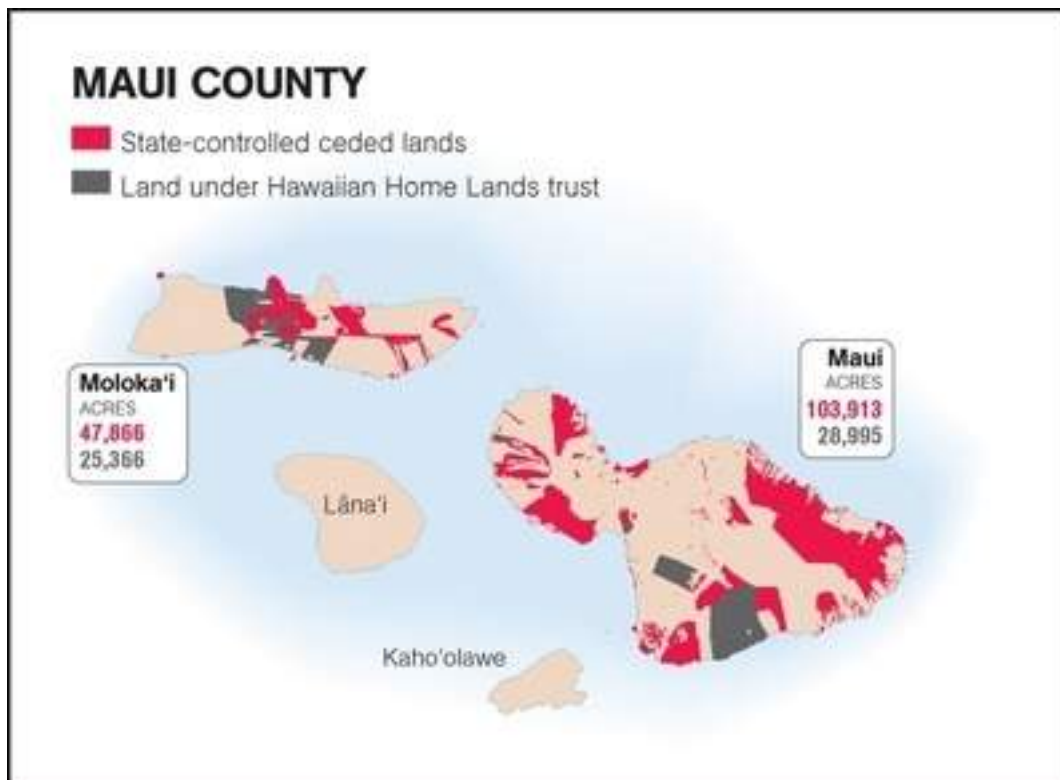
View of expansive Kamalo wetlands near Kamahuehue Fishpond.

A contemporary taro patch under active cultivation in the Kamalo wetlands is shown below.



Below is a typical dry land sweet potato patch in a location not wet enough for flooded growing of taro but still wetter than the very xeric upland areas of residential Kawela Plantation.





Present status of Crown and Government Lands shown in 1897 map earlier.

The Sale to Molokai Ranch /American Sugar Co

In 1897, a group of prominent businessmen formed what is now Molokai Ranch, Ltd. They purchased 70,000 acres of land, mostly on the western half of Molokai, leased another 30,000 acres of government land and began raising cattle and other livestock. Today Molokai Ranch encompasses about 53,000 acres which is roughly the entire western one third of the island.

Molokai Ranch is the direct descendant of the Kamehameha V Ranch formed out of the Kaluakoi ahupua'a which comprised the entire western one third of Molokai.

Kamehameha V bought large tracts of land on Molokai for a country estate. **Charles R. Bishop** inherited these lands through his wife **Bernice Pauahi Bishop**. In 1897 the Bishop Estate sold the central and western holdings of about 70,000 acres to **A. W. Carter**,

A. S. Hartwell, W. R. Castle, and J. B. Castle for \$150,000. They formed the Molokai Ranch and promoted the American Sugar Co.

The American Sugar Co. leased 30,000 additional acres of land, and began operations in 1898. A mole half a mile long was constructed at Kaunakakai, a railroad from the mole to the Hoolehua Plain was built and put in operation, 500 acres of cane were planted, 8 miles of irrigation ditches dug, wells were drilled near Kaunakakai and steam-driven pumping equipment with a capacity of 10,000,000 gallons of water daily was installed. By 1900 the thin layer of fresh water had been pumped out and the wells were yielding only salt water which soon killed the cane. The whole plantation failed dismally before the mill had been erected. The population fell from about 6,000 in 1834 to 1,006 in 1910.

About 1918 it was discovered that pineapple could be raised on Molokai and a great boom developed in this product. The population climbed to 5,677 by 1935 and shifted from the wet windward areas and eastern end to the dry western part of the island. California Packing Corporation and Libby, McNeill, & Libby soon took over most of the pineapple industry either leasing the land or paying a fixed amount per ton for pineapples raised. In 1935 these two plantations occupied 11,000 acres with a capital investment of about \$2,500,000. A wharf was built at Kolo for shipment of pineapples from the Mauna Loa section.

The Hawaiian Homes Commission, soon after they were formed in 1920, opened the Hoolehua homesteads for entry.

POPULATION AND INDUSTRIES.—Molokai had a population of 5,341 in 1940. Kaunakakai is the principal town and port. The island is reached by interisland steamers and planes. The main airport is on the Hoolehua Plain, an isthmus of land connecting East and West Molokai. The Territorial leper colony, population 447 in 1940, occupies only 4.2 square miles of the island on Kalaupapa Peninsula, a low peninsula separated from the major part of the island by a high cliff (pl. 4).

The chief industries are the production of pineapple and livestock. Formerly 200 to 300 tons of algaroba honey were produced annually by the Molokai Ranch, Ltd., but about 1935 it became uneconomical to produce honey. About 13,253 acres of land were used for the growing of pineapples in 1945, distributed as follows: Libby, McNeill, & Libby 8,453 acres and California Packing Corporation 4,800 acres. The pineapples are canned in Honolulu. About 76,200 acres are used for grazing. The two largest ranches are Molokai Ranch on the western end of the island, with 53,372 acres; and Puuohoku Ranch on the eastern end, with 13,891 acres.

About 6,150 acres of the Hoolehua Plain have been settled by Hawaiian homesteaders. Part of this land is used for truck gardening, but the chief crop is pineapples, grown under contract to Libby, McNeill, & Libby and California Packing Corporation. The Hoolehua Plain contains about 28,000 acres of land covered with deep soil. The climate is semi-arid and in many years is too dry for truck gardening. The U. S. Bureau of Reclamation has surveyed a project to irrigate 12,000 acres of this land with water conducted through a series of tunnels 18.3 miles long from the windward wet valleys of East Molokai.³

In 1908 Charles M. Cooke purchased the Ranch from Charles Hartwell of the same partnership and made his son, 27-year old George Cooke, manager. During his 35-year tenure, interrupted for the period 1918 – 1923 with his return marked by the murder of the manager E. E. Conant, he made it the 2nd largest ranch in Hawaii and did much to develop the water system by extending a pipe line and by building new structures and dedicating more land to feed production and forest lands along with sweet potatoes and honey. That first cross-island water system was constructed by Molokai Ranch in 1911 and carried water from the highlands to Kaluakoi.

George Cooke is attributed for also establishing the Mapulehu Dairy in 1920. Between 1910 – 1937, and until a devastating blight wiped out the bee population, Molokai also was the world's biggest honey producer. It should be noted that other uses were found for the vast land holdings through the years – ranging from pig and honey production to sugar and pineapple which became the island's most lucrative "cash-cow" starting in a lease of some 1,000 acres to Libby, McNeill & Libby on the West End in 1923 and later, in 1927, when another 4,000 acres were leased to Del Monte (California Packing Corp.). It is said that Maunaloa Town eventually became the 3rd largest pineapple plantation in Hawai'i with about 10,000 acres in cultivation – of which 200 acres were allotted to "villagers" for their own cultivation.

Circa 1833, cotton was introduced as part of an unsuccessful effort intended to provide uniforms to troops during the Civil War. At that time the population on island was estimated to be the highest since the post contact, population, crash, 8,700. The population soon crashed again on Molokai with the failure of the cotton industry.

As for Molokai Ranch itself, it was incorporated as Moloka'i Ranch Ltd. in 1939 – executed in the form of an amendment to the original 1898 ASCO Charter. Granted there were other ranchers as well across the island over time – all enduring droughts, floods and disease. The troubled times of WW II hit the island particularly hard with the Ranch forced to reduce the size of

its herd given that so many cattlemen enlisted by the military. This came at the same time as the curtailment of barge transit due to fuel rationing and security reasons. Food was limited for the island's population (including some 3,000 troops in training) with fishing restrictions, lack of imported staple goods and inability to export fresh produce. In 1986, for example, Bovine Tuberculosis was identified, leading to slaughter and subsequent quarantine that lasted for an extended period. Cattle were reintroduced about 1988.

In 1978 during Aka Hodgins tenure as manager, the Wildlife Park was opened as an environmental project covering 1,000 acres of land suitable for African and Asian game animals that thrived on the tall grasses and bush lands such as that on the West End. In addition to providing a safari attraction for tourists, the wildlife habitat was designed as a means of controlling the fast-growing vegetation in the area. Hodgins believed that these conditions were similar to the East Africa plains and thus ideal for the likes of giraffe, zebra, kudu, oryx, ibex, sable, sika deer, kudu, eland, Barbary sheep and Indian black buck. Ultimately he also brought in rhea birds and ostrich to round out the "wild" population. Some 400 animals ranged the lands until the park closed.

Tourism came alive on Moloka'i in 1968 when Louisiana Land & Exploration formed a joint venture with Molokai Ranch – forming the Kaluakoi Corporation. Louisiana Land, an oil and gas exploration business also known for work in land reclamation and industrial endeavors was to be responsible for funding the project while Moloka'i Ranch provided the land.

Then, in 1987, Molokai Ranch was sold to Industrial Equities Pacific (IEP) of New Zealand. Under their stewardship, until the closure of the Ranch in 2008, Brierly (the former IEP) was run by series of managers with a team of department heads who fostered a diversification plan that focused on real estate and tourism in addition to ranching. In 1987 hotel management changed when Sheraton was replaced by Colony Resorts and Louisiana Land sold to Tokyo Kosan (Kukui Molokai) who purchased 5,600 acres at a reported \$35 million on Nov. 23, 1987. Tokyo Kosan's expansion plan called for hundreds of new homes and 2 golf courses with a total of 72-holes. Naturally this met with strong opposition. Two years later, in March 1989, Sekihyo Seibaku Co., Ltd (also known as Alpha USA) purchased the remaining West End parcel of 6,349 acres owned by Louisiana Land for \$33 million. In 1991 Tokyo Kosan's Kukui Moloka'i declared bankruptcy and they along with Alpha USA were eventually sold to Molokai Ranch – by now owned by Brierly Investments Limited (BIL – formerly IEP – later

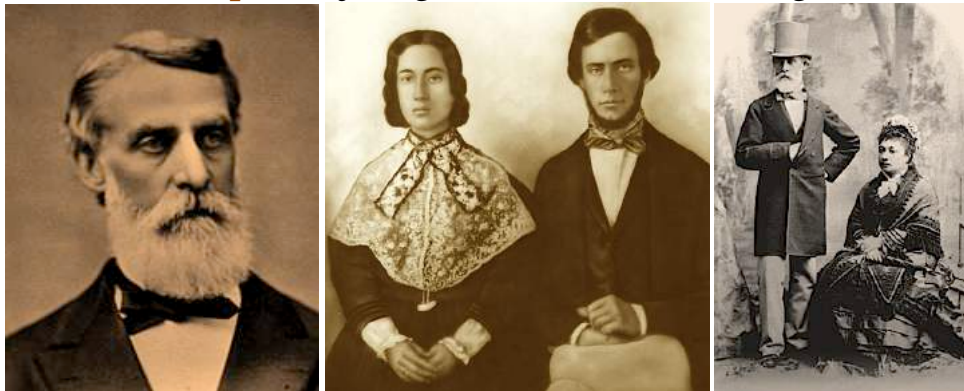
renamed Molokai Properties Ltd. MMPS) and now using the corporate name, GuocoLeisure Ltd.). The current owner of Molokai Ranch is GuocoLeisure, Ltd.

Boom days were during the 1990's with increase in cattle and rodeo activities, and with the rebuilding of the company town of Maunaloa. The latter included: a redo of existing buildings, construction of new facilities such as a new movie theatre, a retail complex (with a KFC), two parks, the Lodge, and a state of the art a new rodeo facility. Homes at several levels were constructed that offered a variety of options from self-help housing, to lease-to-own and rentals and to full ownership. Ground was broken in 1991 at Ka Hale Mua, a low income housing unit, with funding thanks to State, County and Federal sources.

During this period the Ranch also expanded its tourism activities to include 3 tenting venues, eco-tourism activities, concerts and events, rodeos and special group paniolo weekends. Kaupoa campsite was a huge success up until its final days in April 2008 as it featured cultural and nature experiences. One of the best aspects of the whole scenario was the increased employment these enterprises brought to the island.

Other parcels, such as the Industrial Park area were developed while others were leased for agricultural purposes (coffee and seed corn) and still others were donated to local organizations – including land for MCC's new campus and a parcel for a new Veteran's Center. It should also be mentioned that 2 failed wind farm projects, a coal burning plant intended to send power to Oahu, and the suggestion of building a prison – all on the West End -never materialized. Molokai residents' opposition to such projects has been key to preserving the rural Hawaiian nature of Molokai.

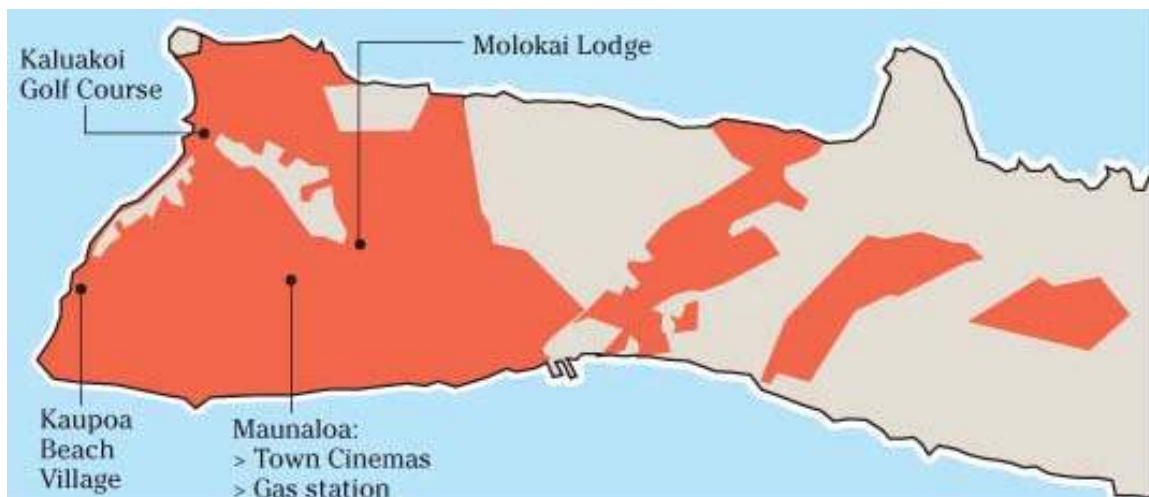
Charles Reed Bishop, a major figure in the Hawaiian Kingdom, married



into Hawaiian Royalty, and oversaw the sale of much of his wife's, Bernice Bishop's, property for charitable causes in her memory. June 4, 1850 wedding portrait of the Bishops. As an older couple.

The Sale of Kawela by Molokai Ranch

Molokai Ranch (now known as Molokai Properties, Limited) Kawela was used as grazing land for cattle until acquired by former Senator Wadsworth Yee and his limited partnership, Kawela Plantation Development Associates (KPDA). 6,000 acres of the over 9,000 acres of the Kawela ahupua'a were purchased to form Kawela Plantation. Kawela Plantation groundbreaking was on 20 December 1980. First homes built in 1982. It appears that Molokai Ranch retained the wet highest elevations of Kawela and the source waters of Kawela stream for use in providing water to the arid west end where most of Molokai Ranch is located via the early pipeline. Also retained by Molokai Ranch were the fertile lower areas of the Kawela stream delta and gulch bottom lands which is at present a leasehold nursery and mango plantation. The upland regions not sold for Kawela Plantation were in the later 1980's either put under easements as Kamakou Preserve (2,774 acres) or purchased as part of the Pelekunu Preserve (almost 6,000 acres with 461 acres from Kawela), all by the Nature Conservancy. Kawela Plantation, although affording excellent house sites and a magnificent open common area, seems to have little agricultural potential (despite some early claims by the KPDA concerning agricultural capability and attempts at greening by some homeowners), since the productive lands were retained by Molokai Ranch and the Plantation lands are rocky and arid, but allow for home sites with impressive ocean and island views. Indeed, even in prehistoric times before the large scale sheet erosion of historic times caused by historic times grazing, there is only the slightest archaeological trace of attempts at agriculture during unusually wet periods in the Kawela Plantation uplands. The Ranch now which still retains parts of the original Kawela ahupua'a:



Extreme right (east) parcel is now a Nature Conservancy Preserve (Kamakou) and was a part of the Kawela ahupua'a. The large west end parcel was originally part of the Kaluako'i ahupua'a, which took up the entire west end of Molokai, the site of the Kamehameha V Ranch, the predecessor to Molokai Ranch. Unlike all other ahupua'a on Molokai, it was not part of a larger district or moku.



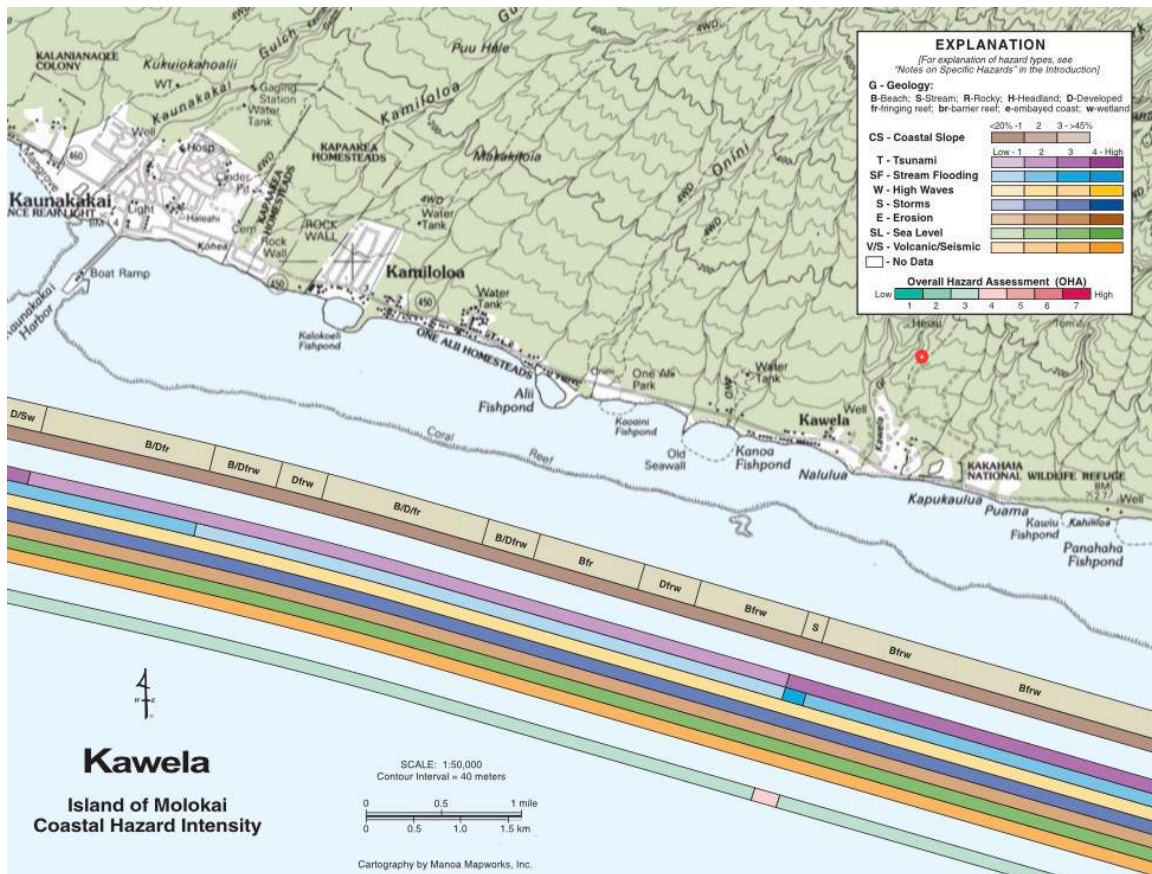
Senator Wadsworth Yee , the driving force behind the formation of Kawela Plantation which preserves the majority of the original ahupua'a. Present day Kawela Plantation aerial view of home sites and gulch.



Kawela: Geology and Water

The Kawela shoreline along Molokai's southern shore is generally low-lying with a wide fringing reef offshore. Despite an average annual rainfall of only between 10 and 20 in, a significant volume of terrigenous sediment makes its way into the nearshore waters. Where this sediment has prograded out into the shallow, low-energy reef flat environments at stream mouths, mangrove forests have developed. Commonly, immediately landward of these mangroves, wetlands have formed. Narrow carbonate beaches line most of the Kawela coast, except at stream mouths where the sand has a high terrigenous component and where fishponds harden the shoreline, although there appears to be some sedimentation along the eastern edges of some fishponds. Development increases to the west with the urbanization of Kamiloloa and Kaunakakai extending up to the shoreline. The Overall Hazard Assessment (OHA) for the Kawela coast is moderately low (3), except at the Kawela stream mouth where it is moderate (4).

This is primarily because of the high stream-flooding hazard at Nalulua, which has a history of flash flooding and sedimentation at the outflow of Kawela stream. Tsunami is moderately high east of Nalulua and moderately low to the west to Kaunakakai. Stream flooding east of Nalulua is moderately low while to the west it is low to the Kamiloloa stream mouth. Beyond the Kamiloloa Stream it is moderately low. Wave energy is generally low along Molokai's southern coast, where it is sheltered from south swell by the islands of Lanai and Kahoolawe. The storm hazard is moderately high because storms that often pass to the west generate modest winds and waves along this coast. Erosion is moderately low due to the rocky nature of the coast, while the sea-level hazard is moderately high because of the low elevation and slope of the coastal zone. The volcanic /seismic threat is moderately high in this part of Molokai which lies within the Molokai Seismic Zone. A summary of these environmental hazards is shown in the map (red circle is Kawela Lot 30 for ref.) Note the overall risk enhancement in the Kawela Gulch that is driven by flooding risk. After the hazards map below, the next map shows the wave sheltered location of Kawela (orange rectangle) from the dominant sea energy sources of swells, trades, and storms.



Molokai and Lanai

Damaging high waves* and high waves due to hurricanes

Statewide high waves that probably affected Molokai and Lanai

1959 Jan 17-18 High surf
1959 Aug 4-7 H Dot, high waves
1964 Dec 19-23 High seas
1968 Dec 5-8 High waves
1978 Jul 17-28 H Fico, high waves 8-12ft
1980 Jan 8-11 High waves
1982 Nov 23 H Iwa, high waves
1983 Sep 29 TS Narela, high waves
1985 Mar 1-11 High surf
1986 Jul 21 H Estelle, high surf
1993 Aug 16 H Fernanda, high surf

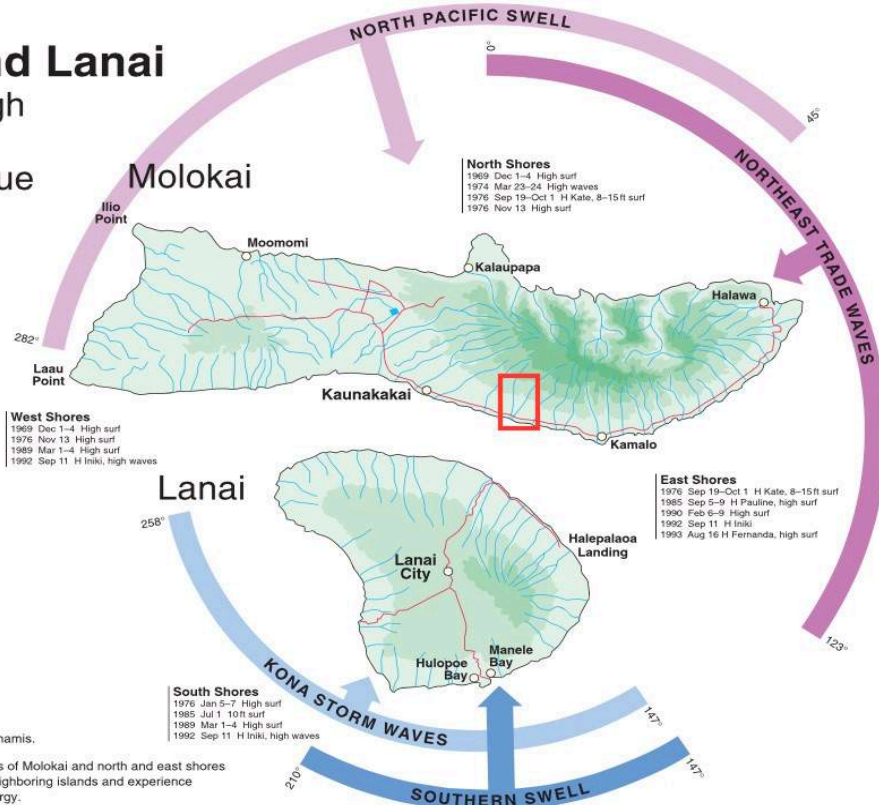
0 10mi
0 10km

Lakes and reservoirs
0-1000 feet
1000-2000 feet
2000-3000 feet
3000-4000 feet
over 4000 feet

Urban areas
Highways
Streams
Canals
H Hurricane
TS Tropical storm
10ft Height of surf (feet)

*Does not include waves due to tsunamis.

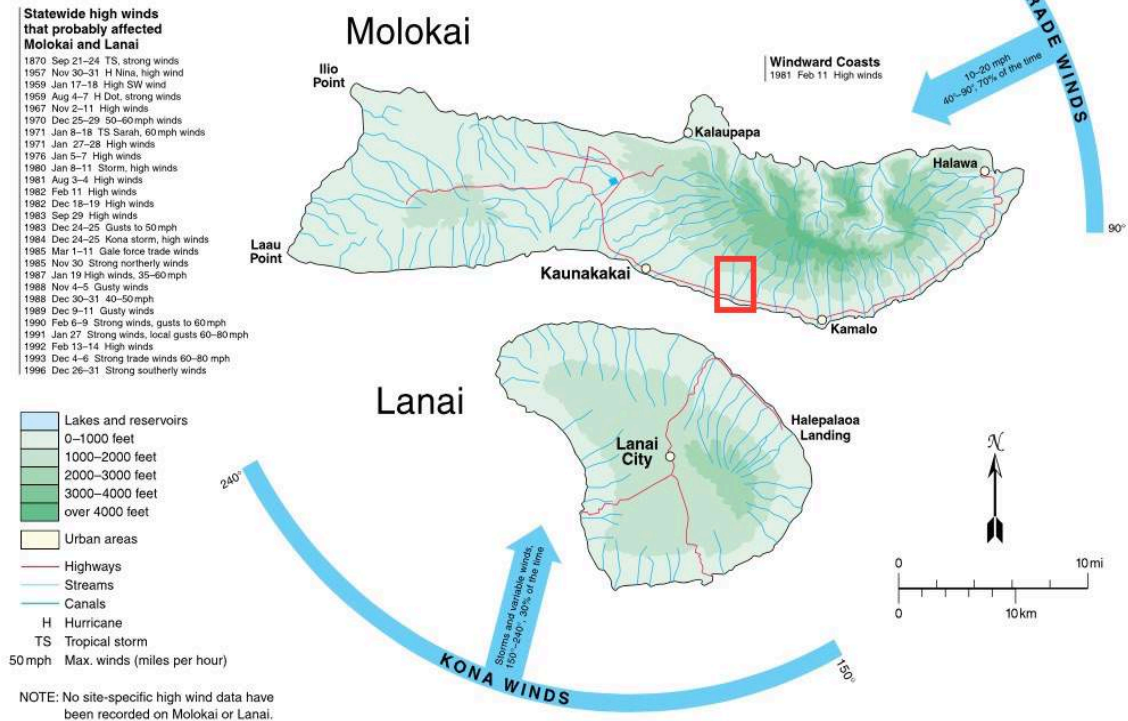
NOTE: East, west, and south shores of Molokai and north and east shores of Lanai are protected by neighboring islands and experience reduced seasonal wave energy.



In addition to waves, winds can also have an impact on coastal regions.

Molokai and Lanai

Strong winds



The prevailing strong winds affecting Kawela (orange rectangle) are shown above. Kawela is very well sheltered from these winds by the eastern volcano to the northeast and by Lanai to the southwest

Historic land use in Kawela is driven both by water accessibility and local geology. Below the figure shows historical land use patterns. In Kawela, this meant light grazing save for the small area of the Kawela stream delta, valley and coastal area. The limited agricultural potential of Kawela as a whole is underscored by the concentration of Royal Patent ‘ili on the coastal plain near Kawela Gulch around the edges of Kakahai’a Fishpond. The ‘ili sites were always chosen based on agricultural productivity stemming from generations of prior successful utilization.

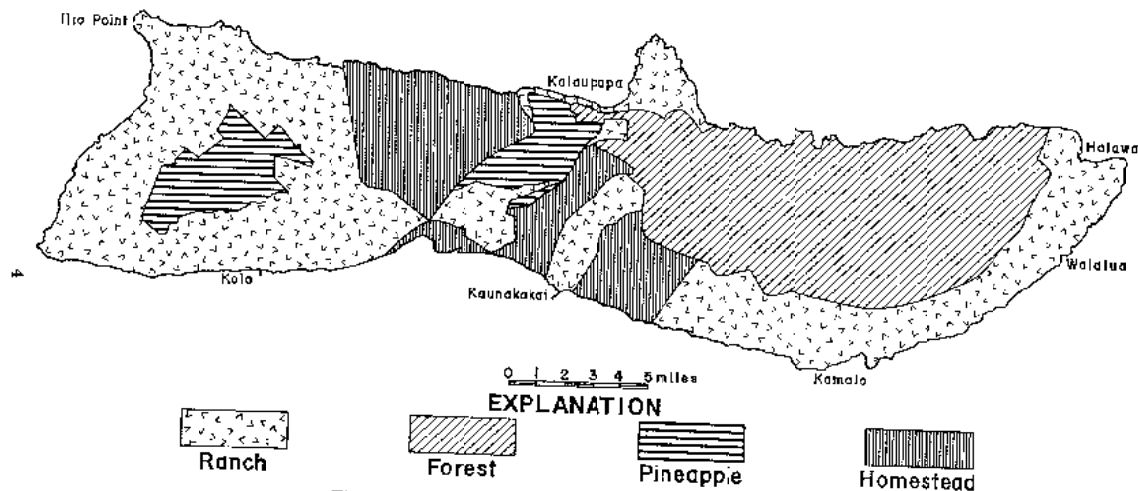


Figure 1. Map of Molokai showing land utilization in 1937.
(After pl. 36, Hawaii Terr. Plan. Bd., 1st Progress Rept., 1939.)

^ Kawela

The geology plays a major role in Kawela agricultural capability. Except for the narrow coastal plain, the land is eroded volcanic flow slopes with poor capability as shown in the figure below. This is typically a very rocky and thin soil horizon area that is at best suited for light grazing. The kona or south side has a number of narrow gulches and valleys with somewhat greater agricultural potential, but irrigation is still needed for long term success. In contrast, the area now forested on the northern coast labeled canyon country, with much higher rainfall was where most pre-historic agriculture was focused. Another area of high agricultural potential with irrigation is the central Hoolehua Plain. Other, non agricultural resources did exist on Molokai such as the large high quality adze pits at the higher elevations of the west Molokai dome at Maunaloa. Overall, Molokai is much like the volcanic Greek islands in the Aegean Sea: extensive sheet erosion driven by overgrazing has reduced streams to intermittency and severely reduced agricultural productivity in areas like Kawela. This reduction of capability at Kawela most likely drove the abandonment of occupation on a permanent basis soon after 1820 and first contact, with the resulting population decline and consequent reduction in population pressures which gave rise to the settlement of the marginal Kawela lands originally. The diminished agricultural resource probably explains the lack of persistence of most of the Royal Patent 'ili into the present.

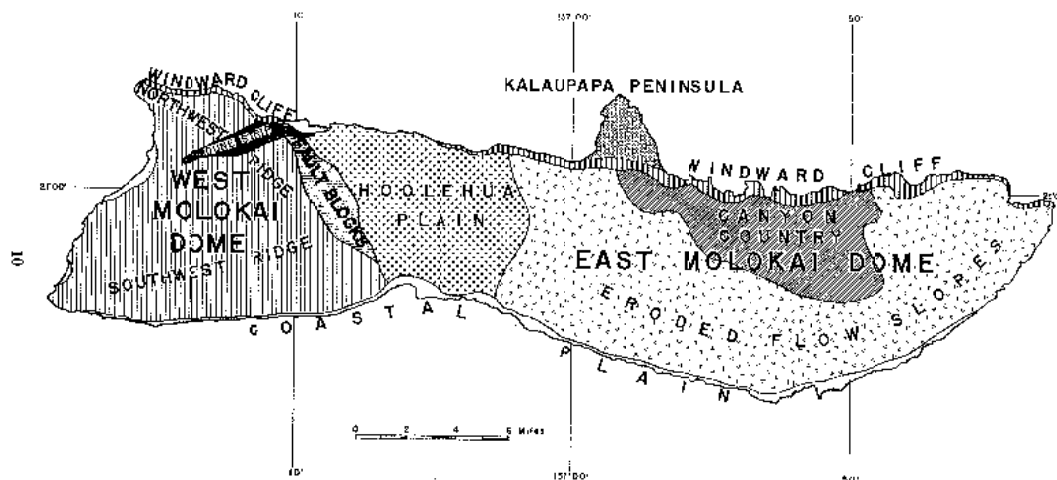
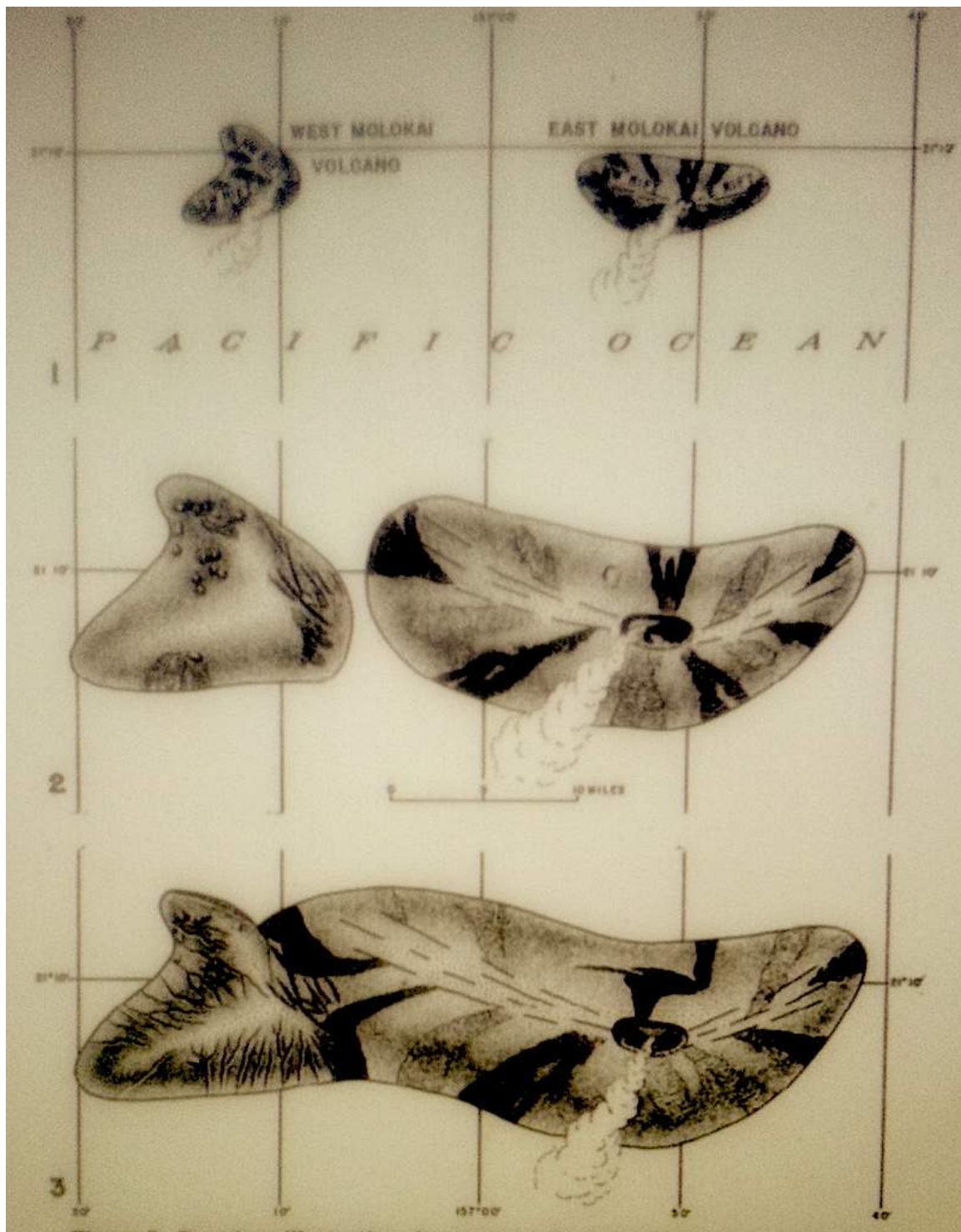


Figure 2. Map of Molokai, showing the major geomorphic areas on the island.

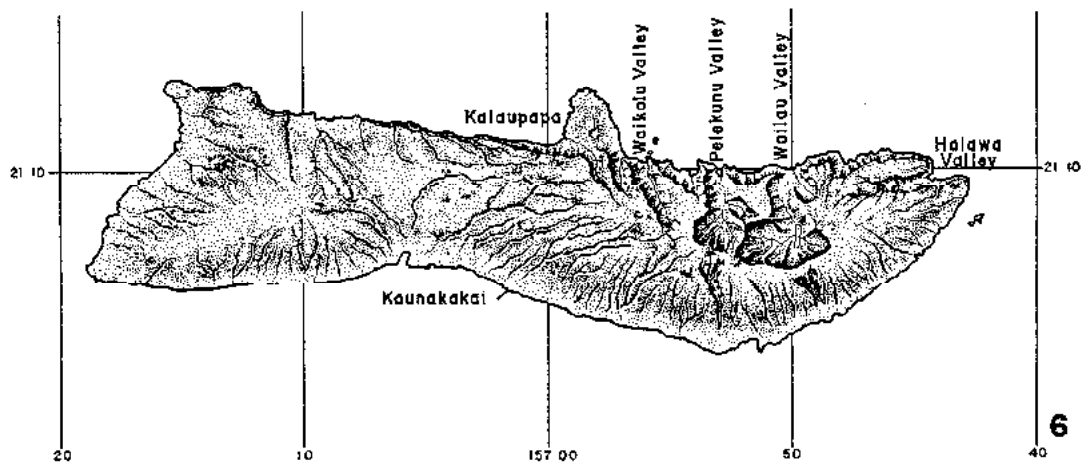
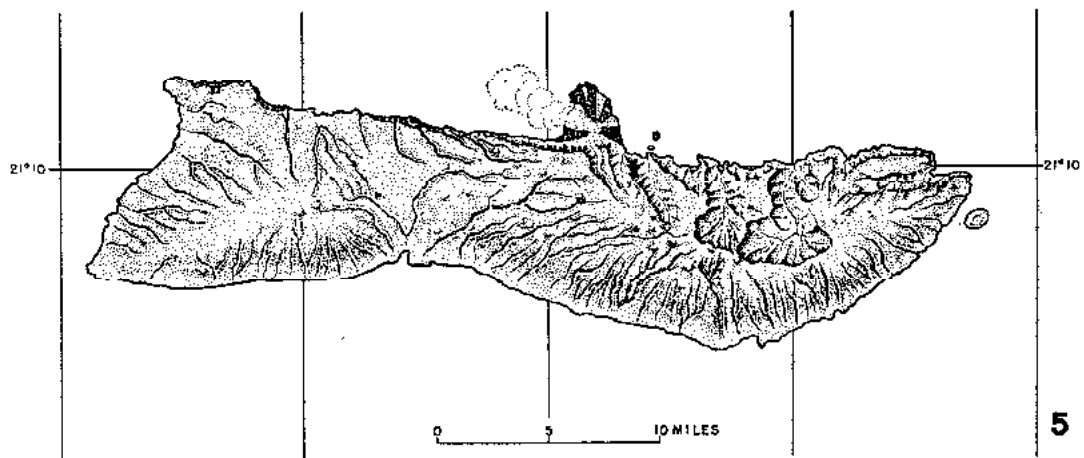
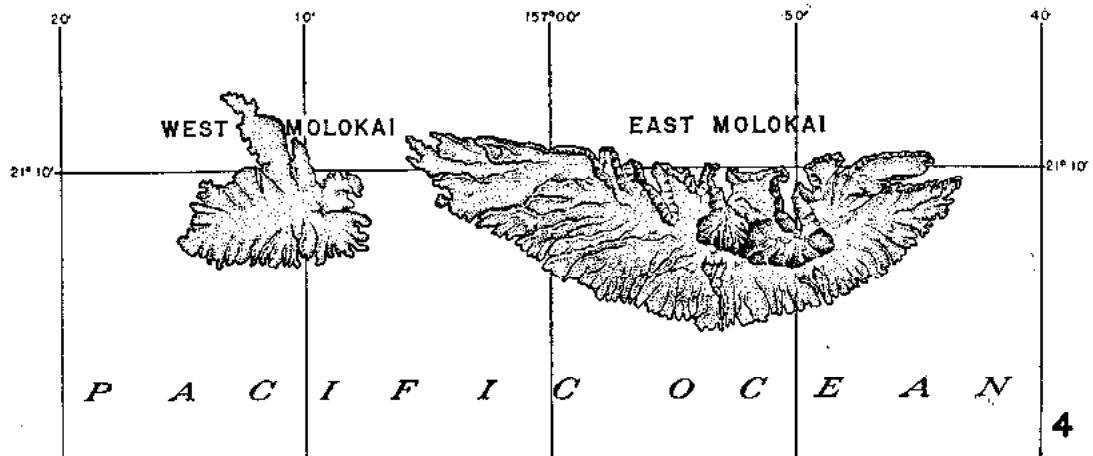
^ Kawela

Below is illustrated the geological evolution of Molokai, driven by the Hawaiian mantle plume hot spot that has long since moved on to the Big Island of Hawaii (or more precisely the movement of tectonic plates have moved Molokai away from the hot spot). The complete volcanic history from eruptions to subsequent erosion and collapse is shown. The end result is the geology shown in the preceding figure above. It shows the development of the island from the western volcano Maunaloa and the eastern volcano, Wailau. The development is shown from a Molokai centered perspective at present sea levels and those of an earlier period of global warming. The late volcanic formation of the Kalaupapa Peninsula is shown which was the site of the famous Molokai leper colony which was founded in response to the introduction of leprosy to Hawaii by Chinese immigrants in 1830. The disease, like many others from non-natives, spread rapidly among the native Hawaiian population. This resulted in Kamehameha V issuing an "Act to Prevent the Spread of Leprosy" in 1865. As a consequence, over the history of the Act which remained in force until 1969 over 8000 were banished, starting in 1866 with the arrival of 12, to the 8,725 acre peninsula, about the size of Kawela ahupua'a. Only about 10 elderly patients voluntarily remain today in what became a national historic park in 1980. The small peninsula was separated from the rest of Molokai by

sea cliffs over 3000 ft in height. It remains a separate county (Kalawao) of the state of Hawaii without any elected government.



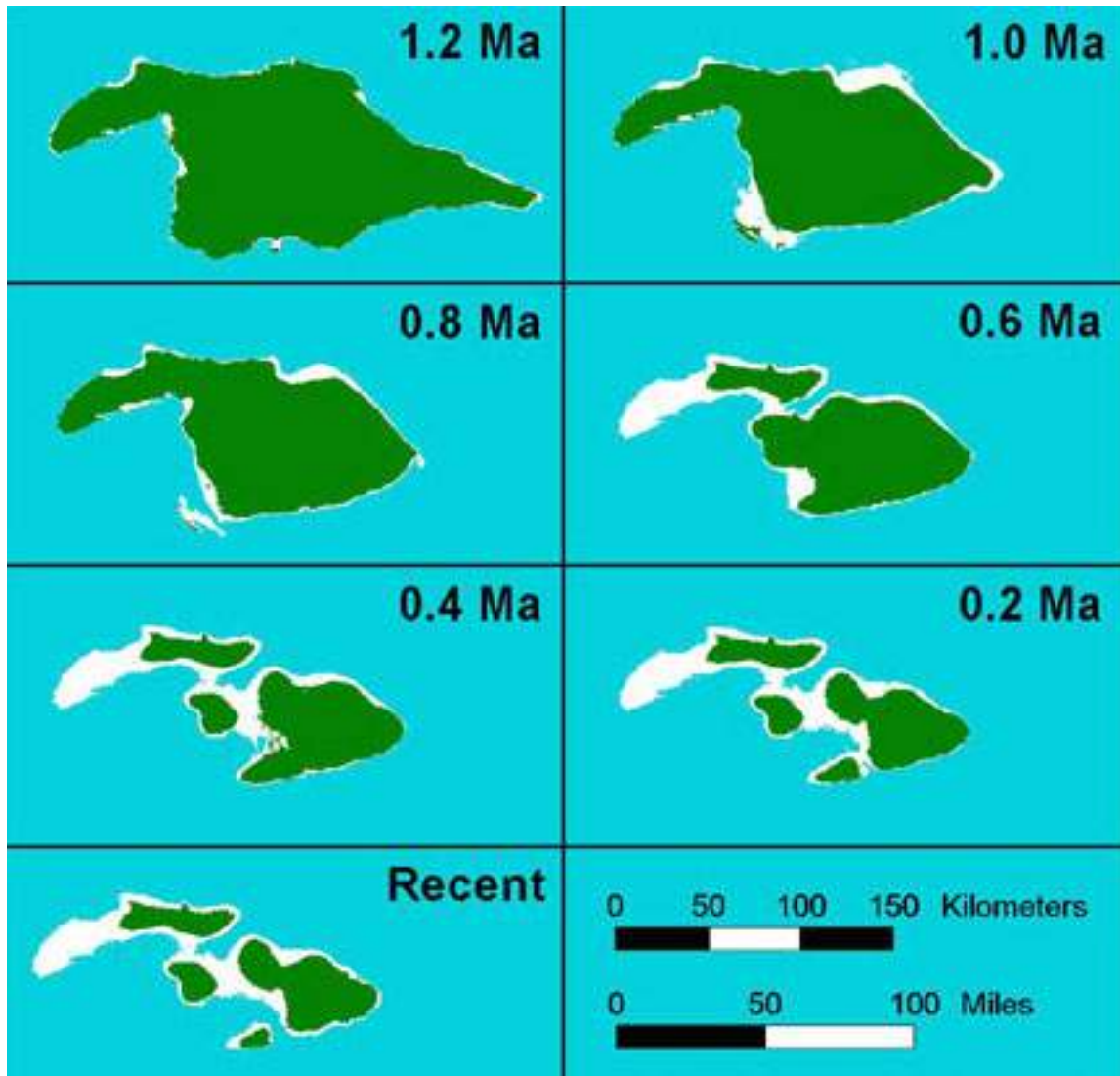
Early volcanic origins of Molokai. Note large extent of east volcano on north shore before collapse and creation of world's highest sea cliffs.



in late Pliocene or early Pleistocene time, shows a new separation into two islands by submergence. Stage 5, in late (?) Pleistocene time, shows a minor renewal of volcanism on East Molokai, and stage 6 shows the present condition of the island.

^ Kawela

Below is shown the time evolution of the entire cluster of Molokai, Maui, Kahoolawe, and Lanai from the large island of Maui to the present individual islands. Note that most of Molokai lies shallowly submerged off its present west coast. In a future ice age, it would reemerge.



Equally important to the geology is the water availability. As shown below, Kawela has the lowest rainfall on Molokai, save for the eastern and western extreme points of the island. With typically about 15" of rain per year. The reason for this is the orographic blocking of moisture from the east and north by the nearly 5000 ft high eastern volcano remanent. This mountain shadow effect lessens with increasing altitude. Hence the higher elevation

areas of Kawela , the upland common lands get much more rain. In particular at elevations of 2000- 3000 ft, the annual rainfall can be more than 40” comparable to wet Mapulehu in east Molokai.

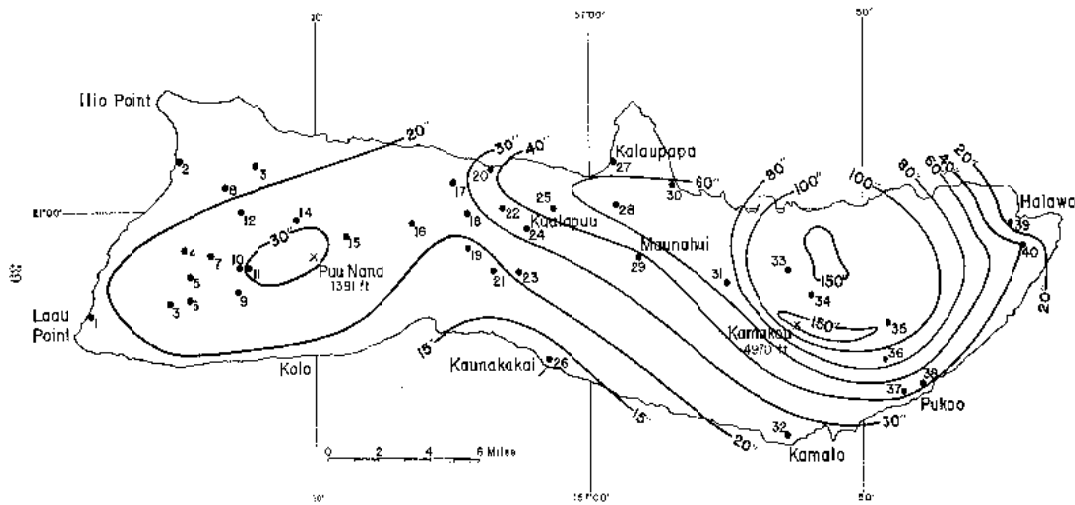
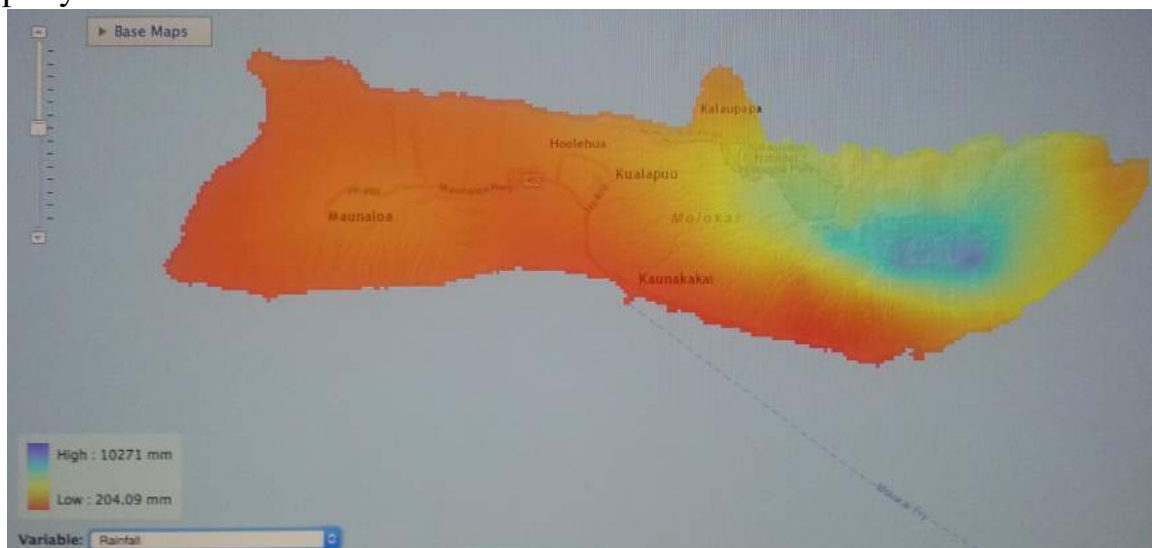


Figure 6. Map of Molokai, showing distribution of average annual rainfall and locations of rain gauges.

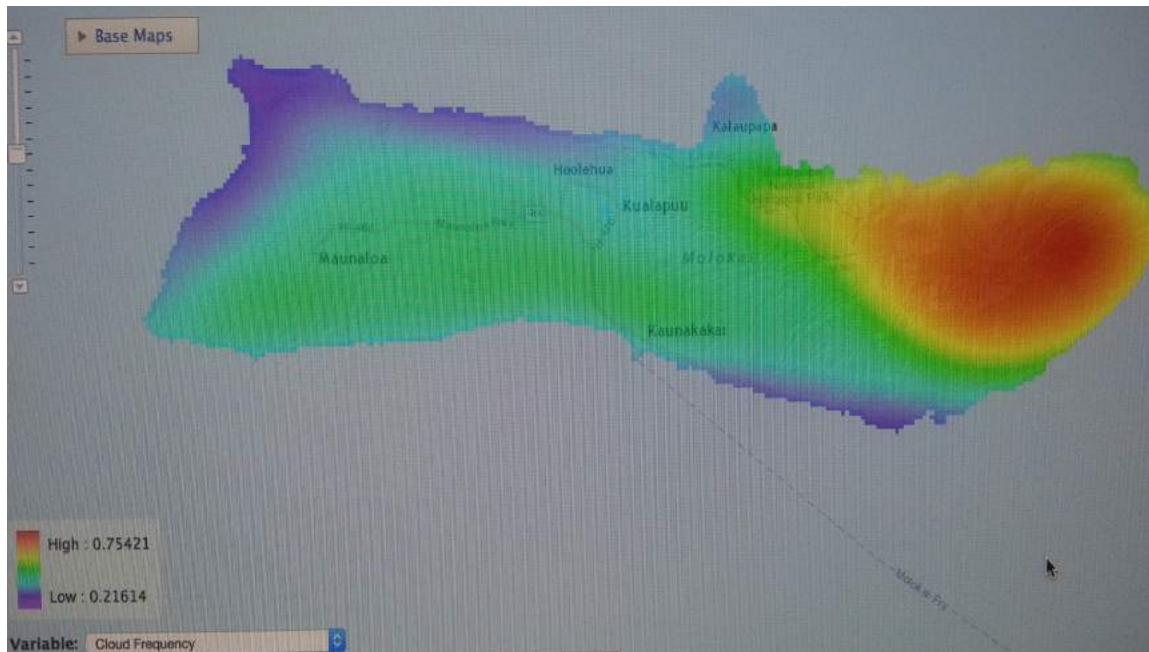
^ Kawela

A color map of the same rainfall data illustrating the comparatively low rainfall at Kawela is shown below. The low end of the scale is less than 10” per year.



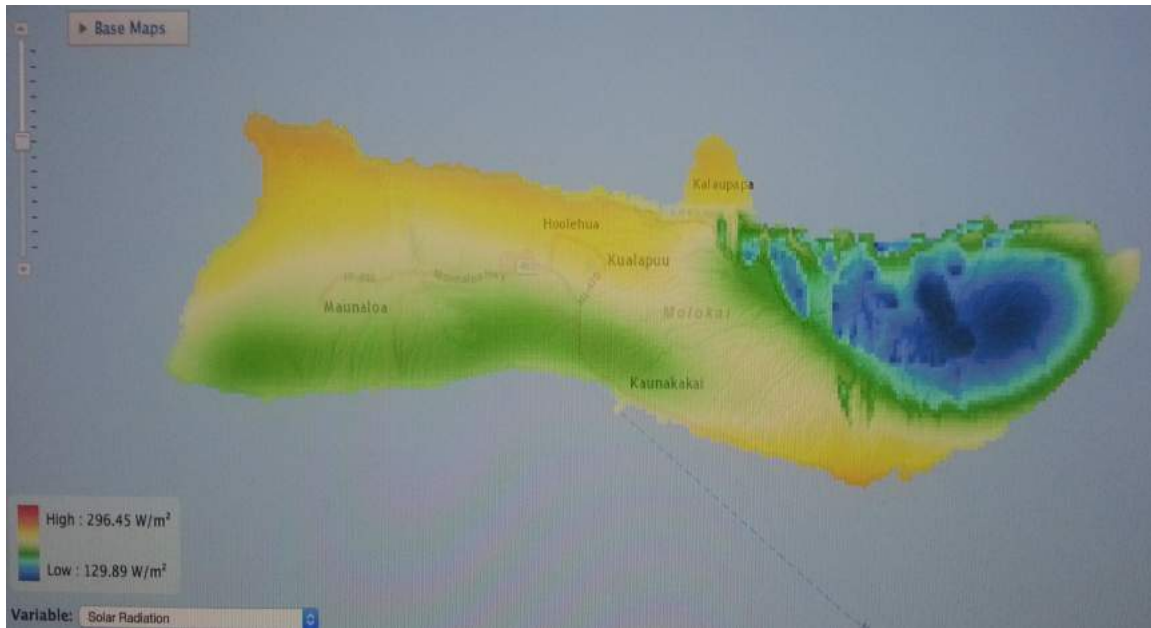
^ Kawela

Corresponding to the rainfall frequency is the cloud frequency which is low for Kawela as shown in the figure below. Kawela is one of the clearest regions on Molokai. In contrast, the east end of the southern coast is much cloudier, but has better agricultural potential. The increase of cloudiness with ascent up the volcano slopes above residential Kawela can be seen. This effect can be seen throughout Molokai.

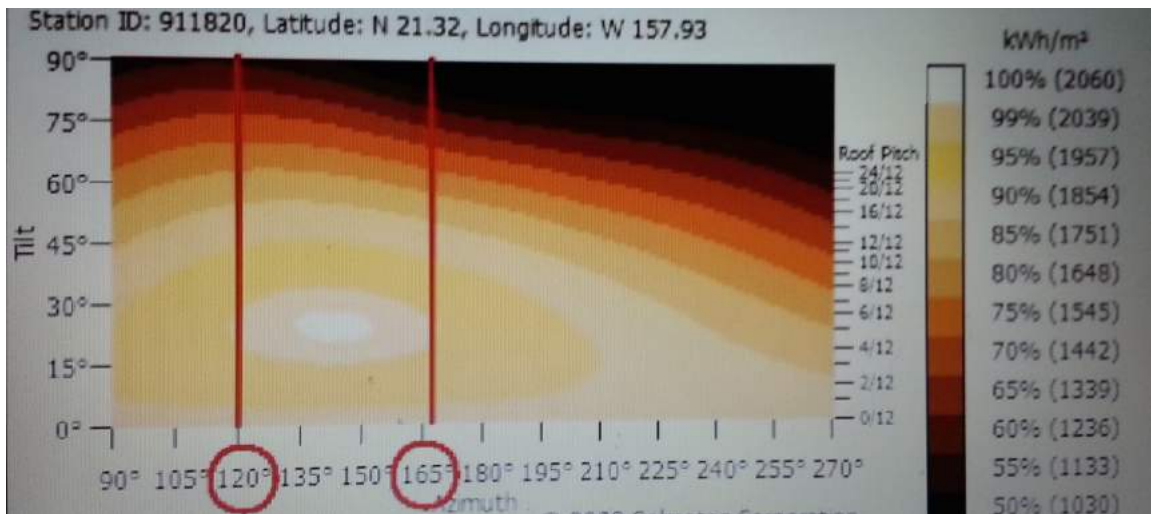


^ **Kawela**

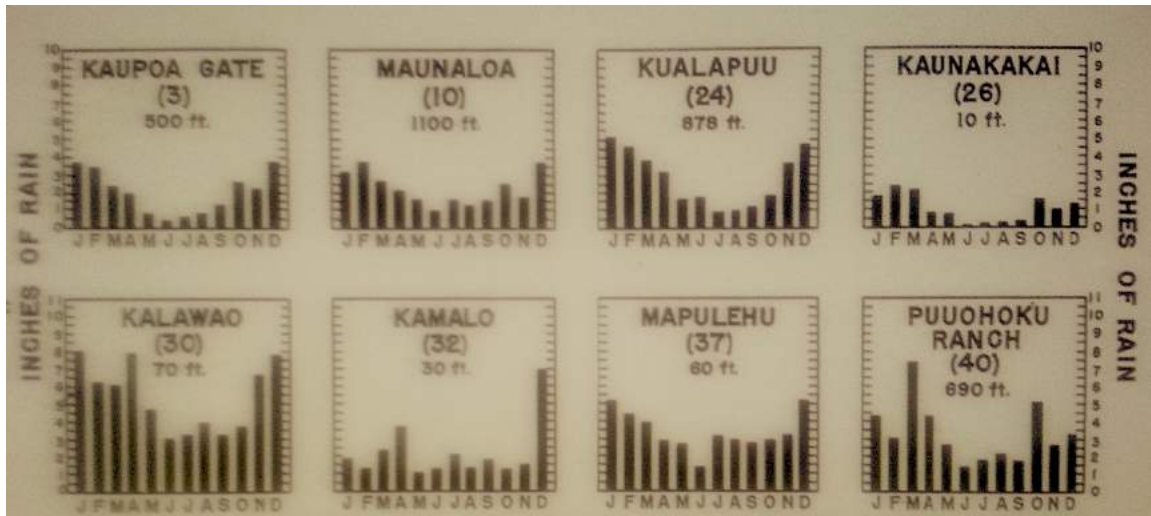
Directly related to cloudiness is the amount of sunlight reaching the ground or solar insolation as shown in the figure below. Kawela is one of the sunniest regions on Molokai. There is a persistent afternoon cloudiness that shifts the preferred orientation of solar arrays to about 30 degrees east of due south to favor the morning sun. The brightest areas of Molokai occur on the north west coast with no orographic (mountain) blocking allowing clouds to either not form or transit rapidly and on the south central coast east of Kaunakakai where there is strong orographic blocking by the Wailua volcano (4995'). In contrast , on the coast west of Kaunakakai, there is increased coastal cloudiness owing to the orographic lift from the much lower Mauna Loa (1378'). The difference between the west and east ends of Molokai is striking. The west coast is much sunnier than that on the east. As a consequence, there is much greater evaporation and aridity in the west.



^ Kawela



Solar radiation for Molokai Kawela south coast from east (90) to west (270). Peak is well off due south (180) owing to extensive afternoon cloudiness. Year average conditions are shown. For Lot 30, 203 Kupaia Place, the optimal direction is looking out across the road, parallel to the lot lines. Rainfall distribution is highly season dependent, with wet winters and dry summers. Shown below are stream gage results for Molokai exhibiting this strong variation. Hence as opposed to the mainland, Molokai winters are green, and summers are brown.

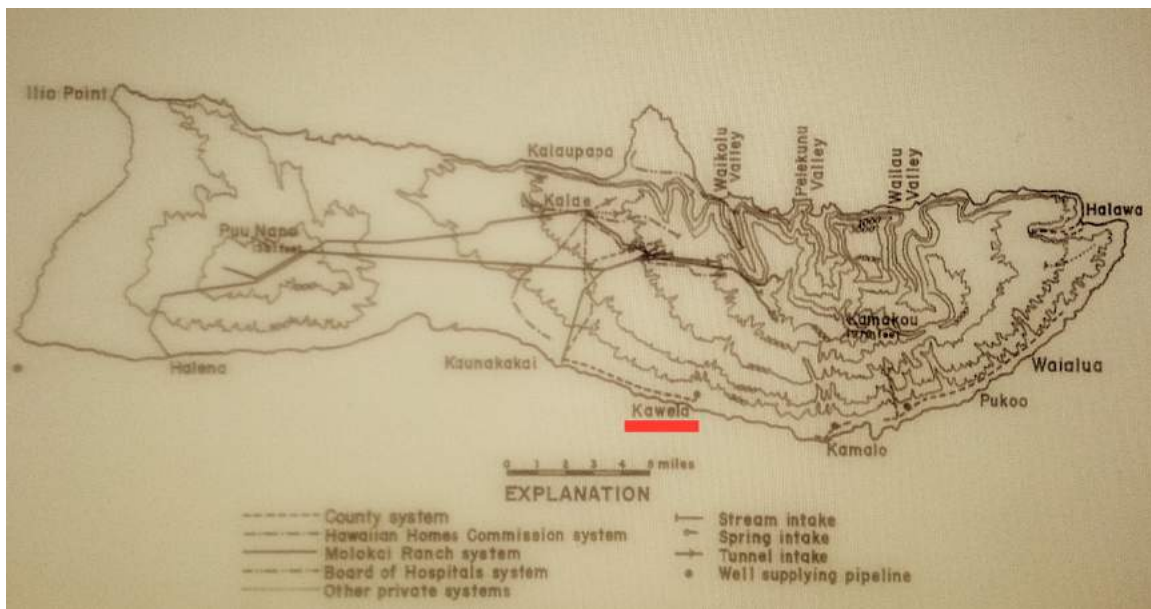


The two figures below illustrate the seasonal green (winter) and brown (summer) land characteristics of Kawela at a location at the top of Kupaia Place. 203 Kupaia Place (Lot 30) is cliffside at top, just below cul-de-sac at street end. Common lands lie above it and to the left with the gulch. Access road to common lands can be seen coming off cul-de-sac, past top house.





The large geographic differences in water distribution on Molokai have resulted at extensive uses of pipelines to redistribute the water as shown in the figure below. This redistribution is not without controversy since it has significant environmental impacts. In small scale, it is like the water redistribution issues on the mainland with proposals to take water from the wet Pacific Northwest to the dry Pacific Southwest.



All underground water in Molokai is a lens of fresh water overlaying a vast pool of salt water. So salinity (saltiness) is a major issue which limits the use of the aquifer to a greater or lesser extend in various island regions. This salinity issue is illustrated in the test borings in the figure below.

Test borings on the island of Molokai
(Data from County of Maui and U.S.G.S. files)

No. (pl.1)	Land Division	Altitude (feet)	Depth (feet)	Diameter (inches)	Salinity		Head (feet above sea-level)	Drilled by
					NaCl (gr. gal.)	Cl (p.p. m.)		
T1	Hoolehua	398	415	1.5	60.1	624 ^a	3.9-6.2	U. S. Geological Survey County of Maui ^b Do. ^c do. do. do. do. do. do.
T2	Kaunakakai	314	324	1.5	2.8	29.1	7.7-8.9	
T3	Do.	51.5	55.5	6	12.0	255	2.50	
T4	Do.	15.3	19.3	6	28.0	290	2.35	
T5	Kamiloloa	12.2	13.4	6	89.0	925	1.19	
T6	Do.	13.8	18.8	6	74.0	770	1.13	
T7	Makakupaia	17.0	17.5	6	125. ^a	1,300	1.10	
T8	Kawela	6.4	7.4	6	40.0	420	1.22	
T9	Do.	10.5	14.0	6	14.0	144	1.96	

^a Average for 1945 ; ranges from 114 on Sept. 12, 1938, to 652 on May 15, 1945.

^b In bottom of uncompleted shaft. The high head and low chloride content are probably the result of perched water running down the hole. Small amounts of perched water were encountered at depths of 157 and 174 feet.

^c Pumping at a rate of 54,000 gallons daily, drawdown was 6 inches.

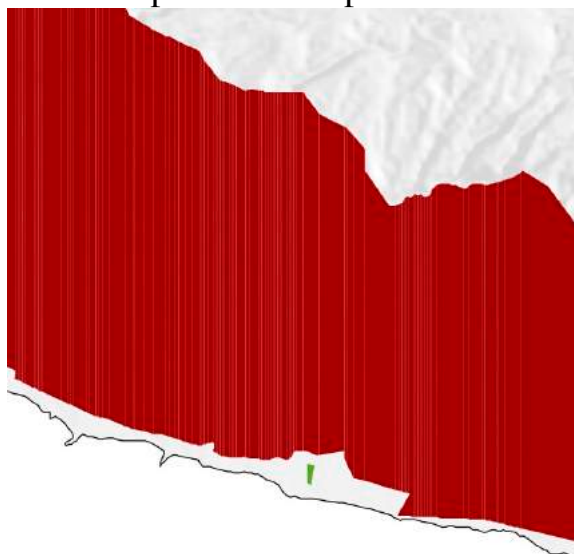
^d Pumping at a rate of 55,000 gallons daily, drawdown was unappreciable, and salinity was 113 grains per gallon.

The overall nature of the aquifer on Molokai is shown in the figure below. The entire west end of Mololaki is lacking a fresh water ground water source, as are all of the coastal zones. Fortunately, Kawela being on the eroded slopes of the eastern volcano has a good, although still limited fresh water in the aquifer lying below it. This contrasts with the entire west end of Molokai which has a brackish, unusable groundwater source. For all aquifers on Molokai and for Kawela in particular, there is a great risk of salt water intrusion if overpumping occurs over a sustained period. Notice that all southern coastal aquifer waters are brackish. Only upland wells can produce fresh water on the southern coast including coastal Kawela. The high fresh water potential of high elevations of east Molokai are apparent. This was most likely the driver for the extension of the Kawela ahupua'a across the mountain ridge and into Pelekunu valley.

Distribution of area of Molokai with respect to elevation¹

Altitude in feet	Area in square miles	Percent
0-500	97.0	37.3
500-1000	66.0	25.4
1000-2000	50.6	19.5
2000-3000	30.1	11.6
3000-4000	13.8	5.3
4000-4970	2.5	.9
	260.0	100.0

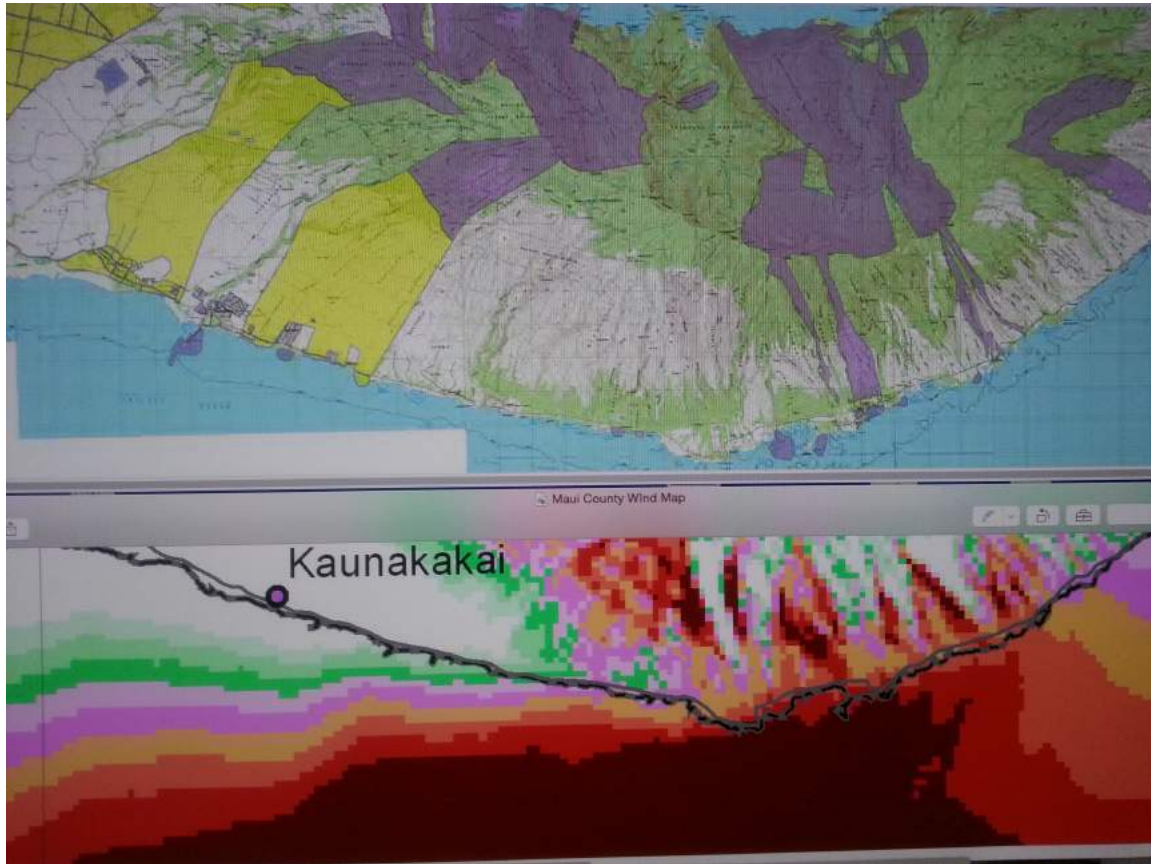
In contrast, the motivation for the acquisition of Kawela ahupua'a by ASCO, later Molokai Ranch, appears not to be for the light grazing that was supportable but rather for access to a east end water source for the bulk of their holdings in the west end. The lower elevations of Kawela only get about 15" rain per year compared to 25" in the west end of Molokai. At high elevations of Kawela ahupua'a rain is plentiful.



Above figure shows modern agricultural usage at Kawela. Owing to dry conditions, only the small green area in the Kawela stream delta operates as a nursery and mango plantation. The upland remainder in red is grazing. Above the grazing area is forest.

Hence given the annual rainfall, elevation, and geology, it is little wonder that Kawela in Hawaiian refers to a dry hot place. Mitigating this is the tradewind from the NE that has the Hawaiian name of Ihuanu (cold nose) that does make it over the mountain ridges, and the south coastal winds as

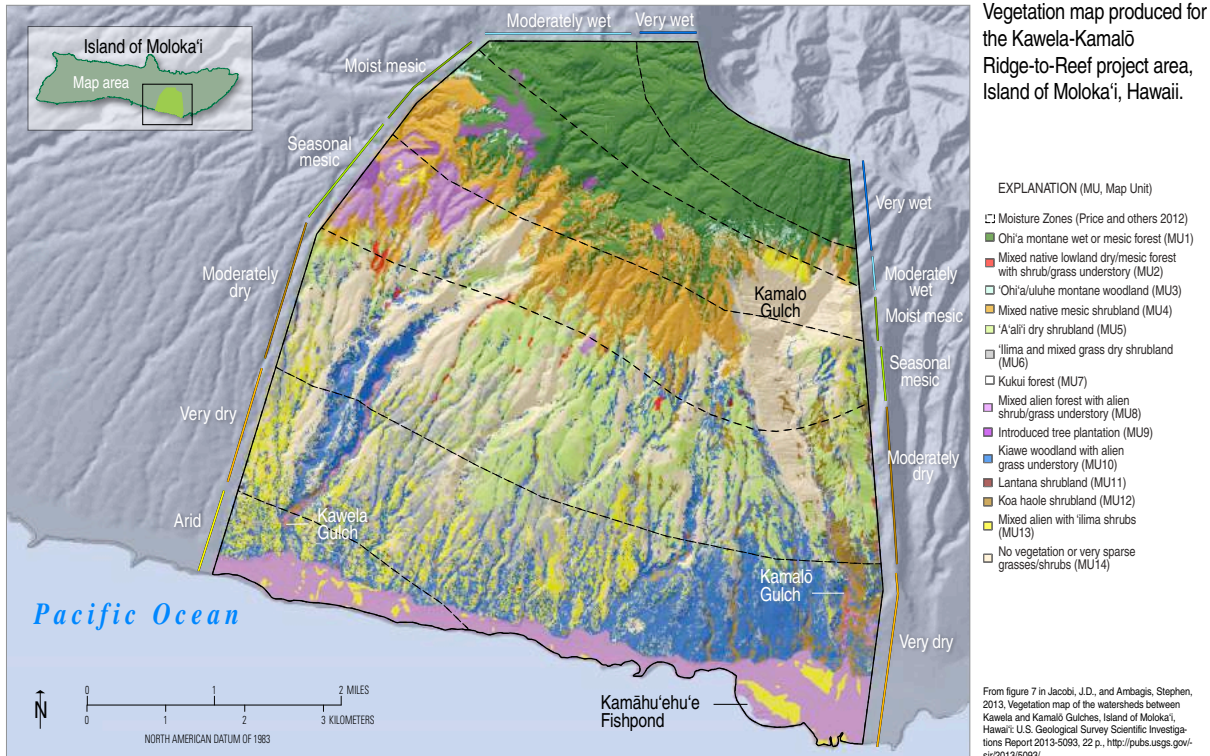
shown in the figure below. Stronger winds are shown as darker colors. Top map gives detailed geographic locations to scale.



^ Kawela

At top are shown the property boundaries and below, the corresponding wind fields. Note that Kawela has weaker wind fields compared to sharply increasing winds farther east and offshore.

Combining all of these microclimate factors together, the result is the Kawela vegetation map shown below. All Kawela lots are located in the arid to very dry zone. Much wetter areas lie upland. As a consequence, all of the forest areas shown in dark green lie above Kawela Plantation in the Kamakou Preserve, owned by Molokai Properties Limited which is the successor to Molokai Ranch, placed under a Nature Conservancy easement.

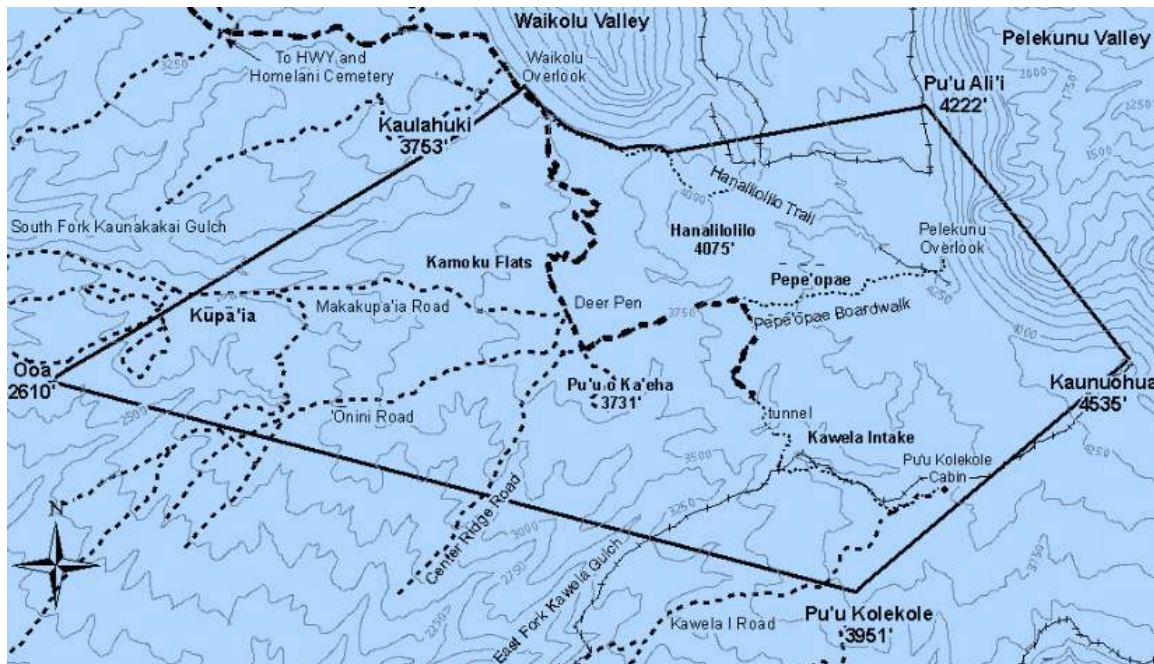


The overall vegetation is similar to that found in southern Utah and northern Arizona on the mainland that have similar volcanic soils and rainfall.

Starting with the high altitude, mountaintop Nature Conservancy Preserves of kona (leeward) Kamakou and the small part of koolau (windward) Pelekunu that were parts of Lunalilo's Kawela ahupua'a, the changes of vegetation can be traced down to the lowlands and coastal plains of Kawela Plantation, the core of the original Kawela ahupua'a.

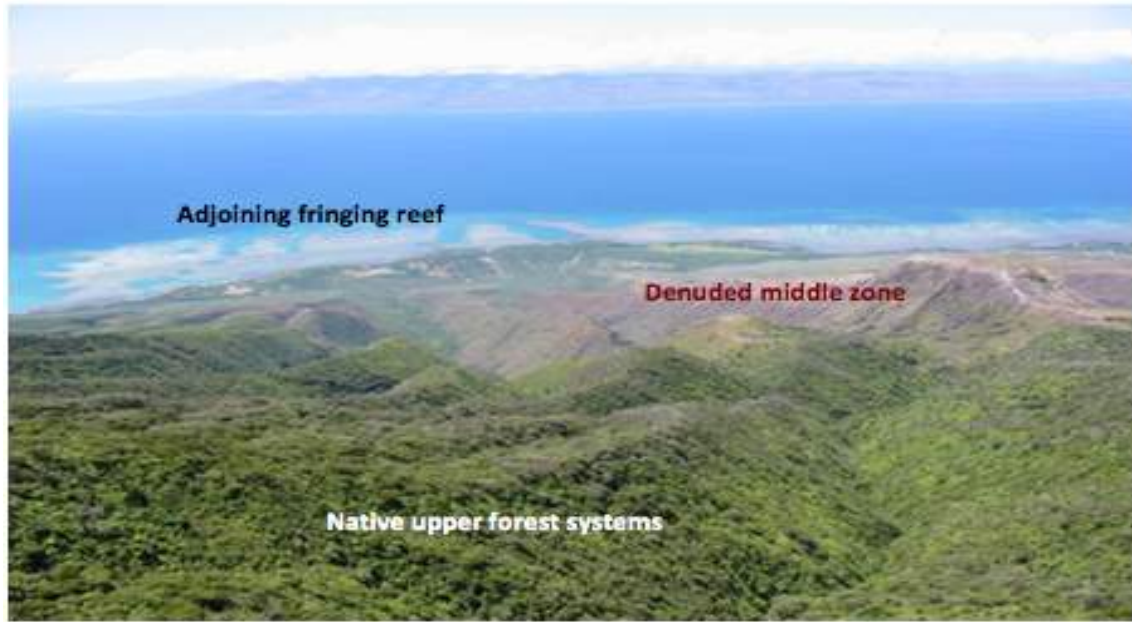
Originally part of Lunalilo's Kawela ahupua'a, Kamakou Preserve was established in September of 1982 to protect the habitat of endemic forest birds. Prior to 1982, the Kamakou Preserve area was part of the State's Moloka'i Forest Reserve under a surrender agreement with the landowner, Moloka'i Ranch, Ltd, now called Moloka'i Properties, Limited (MPL). In 1982, the Conservancy purchased a permanent conservation easement over the property from MPL. This easement supersedes the State's surrender agreement and ensures the Conservancy's rights to manage the preserve for the benefit of native species and ecosystems, and prohibits a wide range of potentially unsuitable activities by the landowner. The document also

reserves certain rights for the landowner, including the right to enter and inspect, and to harvest surface water from the established water development systems, which may be expanded within clear limits described in the easement. The Conservancy began an easement compliance monitoring program in FY2005. Conservation easement monitoring is required every three years, and was completed in 2008 and 2011 to ensure the Conservancy and MPL are in compliance with the terms outlined in the conservation easement. The 2,774-acre preserve is located in the east Molokaʻi mountains and borders is adjacent to the Olokui and Puʻu Aliʻi Natural Area Reserves (NAR), Kalaupapa National Historical Park, Kamaloʻ, Kapualei and Kawela Plantation lands, and the Conservancy’s Pelekunu Preserve. These managed areas belong to the East Molokaʻi Watershed Partnership (EMoWP) and protect more than 25,000 acres of contiguous ecosystems that range from sea level to 4,970 feet in elevation. The elevation in Kamakou Preserve ranges from 2,034 to 4,527 feet and the average precipitation ranges from 39 to 118 inches. Kamakou is one of the primary ground water recharge and surface water source areas feeding the State Department of Agriculture’s Molokaʻi Irrigation System. The preserve is open to the public for hiking and hunting, and for educational and cultural activities. Kamakou Preserve contains five vegetation zones , ranging from lowland mesic shrublands to montane wet forests.

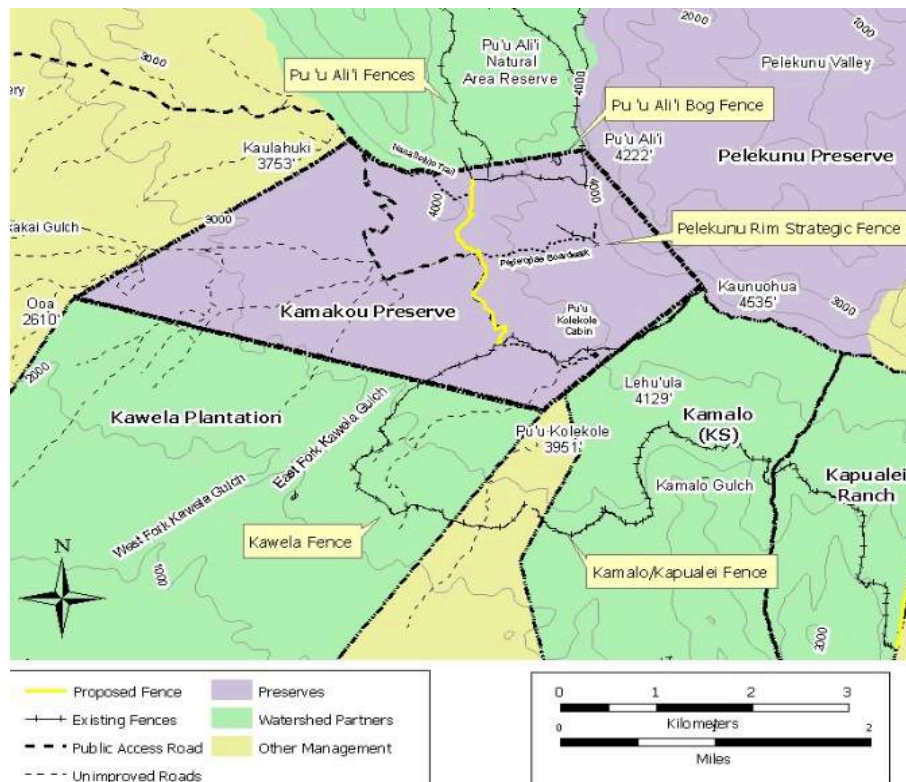


Contour map of Kamakou Preserve above Kawela Plantation, a part of the original Kawela ahupuaʻa. Kawela Plantation borders the Preserve on the

full southwest boundary. The boundary ranges in altitude from 2610' in the west to 3951' in the east. Kawela Plantation ranges from those altitudes down to sealevel. Note the extension of Kawela gulch up to the southwestern boundary and Kawela Road extending along it and above it .



View (above) looking down to Kawela Plantation from Kamakou Preserve showing the transition to the denuded middle zone characteristic of most of Kawela Plantation.



Preserve Vegetation Zones

Vegetation Zone Boundary (Ranked in order of fire hazard)

- Zone E. Lowland Dry Shrub-Grass
- Zone D. Lowland Pine-Molasses Grass
- Zone C. Lowland Moist Native Shrub
- Zone B. Montane Ohia-Uluhe Rainforest
- Zone A. Montane Ohia Shrub Rainforest

Legend:

- Fences
- Preserve Access Roads
- Preserve Boundary
- Unimproved Road
- Foot Trails

Map Details:

- Contour interval: 250 Feet
- Scale: 0 to 1 mile
- North Arrow
- Inset Map: The Hawaiian Islands, Molokai
- Map Title: TNC Molokai, 3/31/2011, KamPresVegMap.mxd

A scenic view of a lush, green mountain valley. The foreground is filled with large, vibrant green ferns and other tropical vegetation. In the background, steep, forested mountain slopes rise, with a deep valley visible between them. The sky is blue with some white clouds.

View (above) into Pelekunu Preserve from Pelekunu Overlook (4250') in Kamakou Preserve located near its northeast boundary. In the near field of view lies the koolau (windward) 461 acre part of the Kawela ahupua'a of Lunalilo. Rainfall is 134" per year around the boardwalk area.



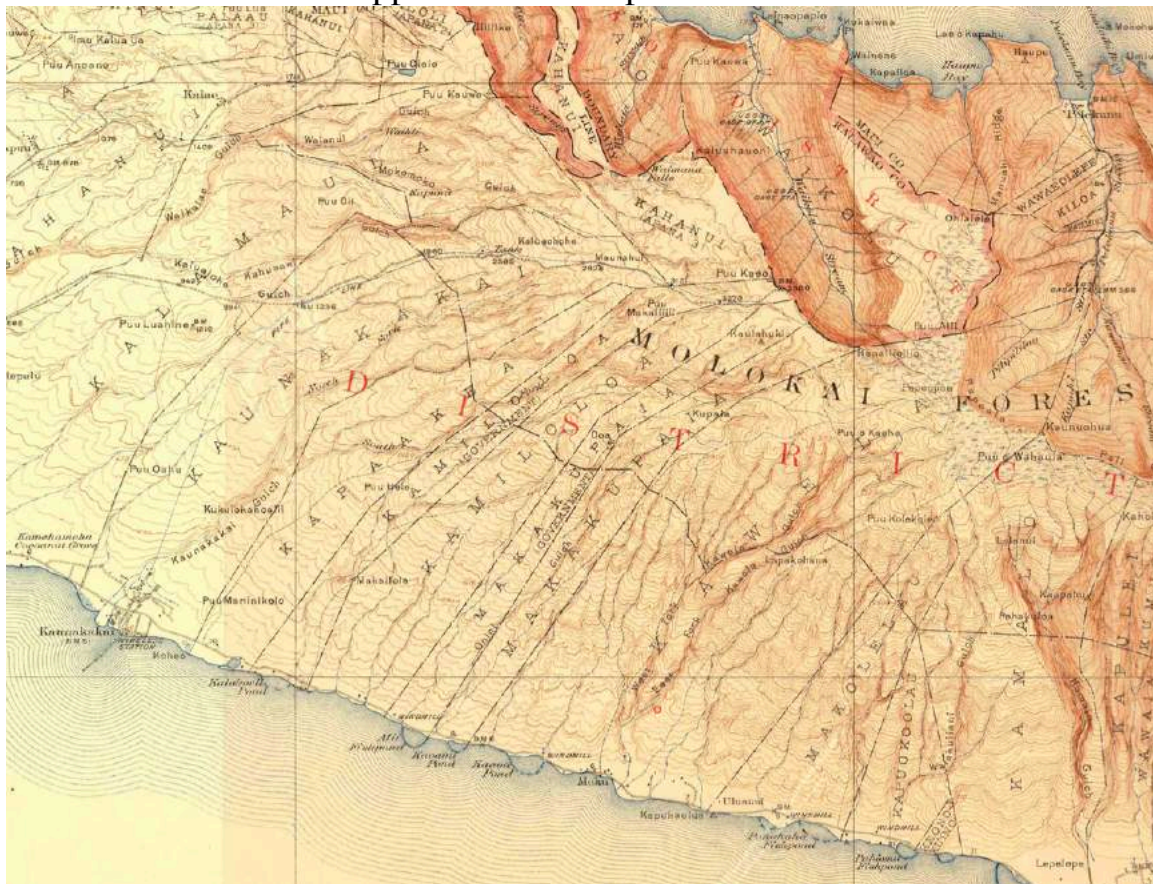
The Pepe 'opae Boardwalk leading from the Kamakou Preserve entry roadway to the Pelekunu Overlook. Note the very well developed wet forest at altitudes here above 4000'. This was part of the original Kawela ahupua'a. View below across the internal Kawela Fence at about 2000' altitude. Note the dominance of dry grassland as opposed to the wet rainforest. Lowland green is coastal plain with the blue Pacific and Lanai beyond the light blue fringing reef. Kamakou pig fence looking toward volcano rim.





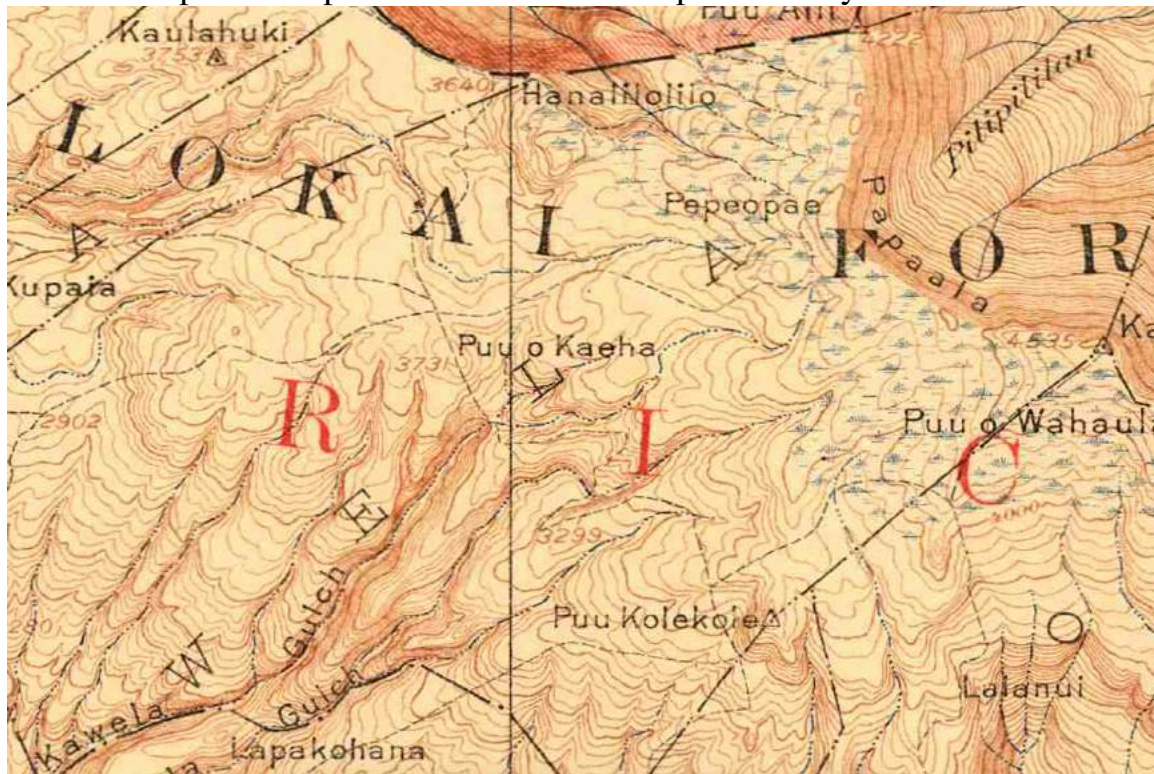
Series of views from Kamakou Preserve :Kamahuehue fishpond on left and Kawela on right on Molokai south coast with view to Lanai across water.

A detailed overview of upper Kawela ahupua'a follows.

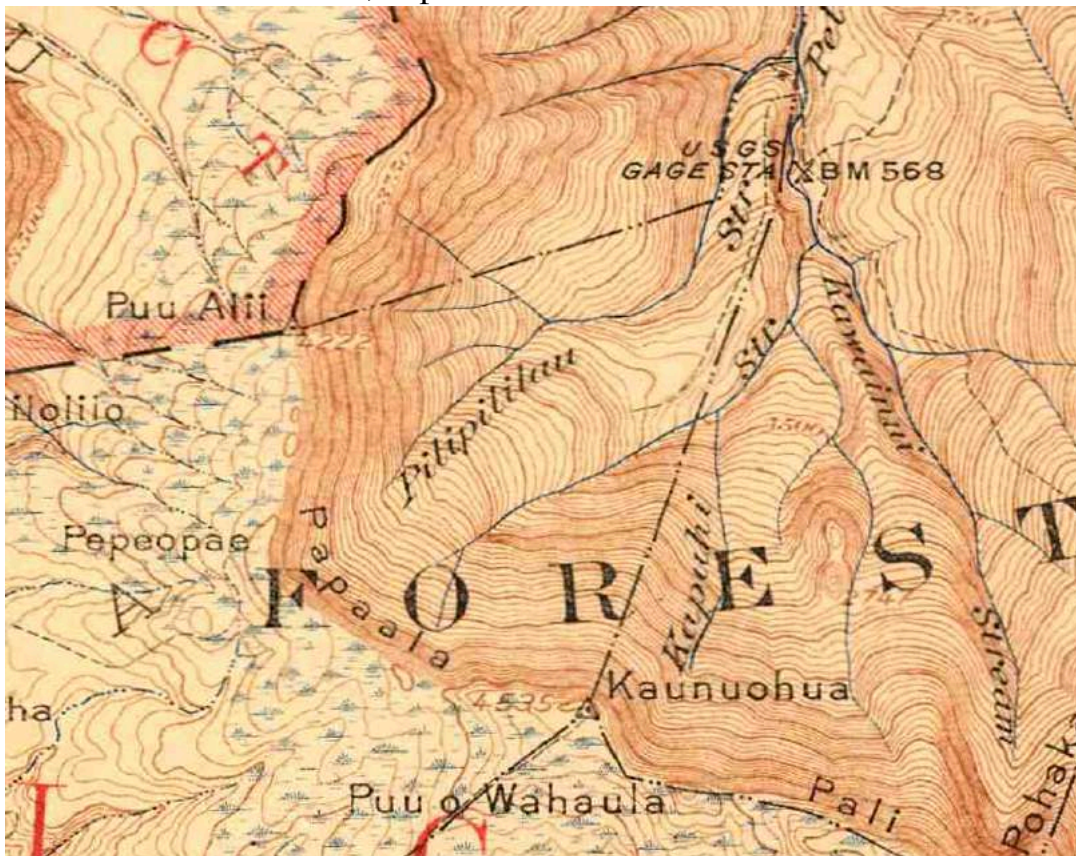


Above is a detailed 1921 topographic map from the USGS showing the entirety of what was originally the Lunaillo Kawela ahupua'a. The small red circle near the lower center indicates the location of Lot 30, 203 Kupaia Place. The lower elevations of Kawela ahupua'a and the non-government Makikupaia ahupua'a were joined to form present day Kawela Plantation. All of the other lower elevations of ahupua'a between Kawela Plantation and Kaunakakai Ahupua'a became Hawaiian Home Lands as a consequence of the Mahele. The higher level forested lands became state parkland or preserves. Like Kawela ahupua'a, Kaunakakai ahupua'a became part of Molokai Ranch and unlike Kawela, largely remains so to the present. Below is shown in an enlargement of the 1921 topographic map, the area of the Kawela Ahupua'a which became the Kamakou Preserve that extends from the top of Kawela Gulch to the Papaala Pali or cliffs of the Wailau volcano caldera rim. The transition to very wet conditions in Kamakou from the dry Plantation is apparent in the bog lands existing just above the gulch high altitude terminus. The highest point in Kawela Plantation, Puu Kolekole is also shown and is the focus of some of the pictures to follow. The map below that shows the stream capturing the 461 acre extension of

Kawela ahupua'a deep into the Pelekunu ahupua'a valley.



Below are shown the cliffs, Papaala Pali of Pelekunu and Molokai Preserve.





Ohia trees in bloom , a native tree of the myrtle family, in Kamakou Preserve. Great contrast to xeric Kawela Plantation with its sparse alien mesquite Kiawe trees..



Bog area in Kamakou Preserve flatlands above Kawela Plantation. The very high rainfall and impervious flat elevations retain large amounts of moisture.



Flowering plants in Kamakou Preserve. Note that even the boulders are covered with plant life. Although high in water content, the bog stunts plants to less than 1 foot. Geologically identical to the lower elevations of Kawela, the differences are much higher rainfall and much lower slopes.



Flowering Ohia Trees in Kamakou Preserve with a full rain forest canopy.



View from east volcano rim in Kamakou Preserve of windward Pelekunu Valley and Preserve with the Pacific ocean and sea cliffs in the distance. Green at all elevations in contrast to upland Kawela Plantation which is green only in gulch bottoms.



Snail Meadows , Puu Kolekole , in Kamakou Preserve just above Kawela Plantation. Flatter West Molokai is visible in the distance with upper Kawela gulch nearby.



Pepe'opae Bog, Kamakou Preserve showing typical dense vegetation.



South view of Kawela Plantation from its highest point at Puu Kolekole elevation 3951' at southern edge of Kamakou Preserve. Kawela Gulch branches in foreground. Ali'i, Kanoa, and landlocked Kakahaia fishponds along coast west to east (left).



West view from Puu Kolekole. Kaunakakai pier visible on coast $\frac{1}{2}$ " from left.



A view of the towering Papaala Pali (cliffs) ridgeline that separate windward from leeward Molokai. It is the present day boundary between Kamakou preserve and Pelekunu Preserve. The original Kawela ahupua'a of Lunalillo extended past the ridgeline and down into the Pelekunu valley for 461 acres, with stream headwaters, which are now listed as Molokai Preserve and owned by the Nature Conservancy. The clearing on the right hand side is the Pelekunu Overlook at 4250' at the end of the Pepe'opae Boardwalk through the bog of the same name. A dramatic change from flat bog land to towering cliffs which rise 4000' from the Pelekunu valley floor.

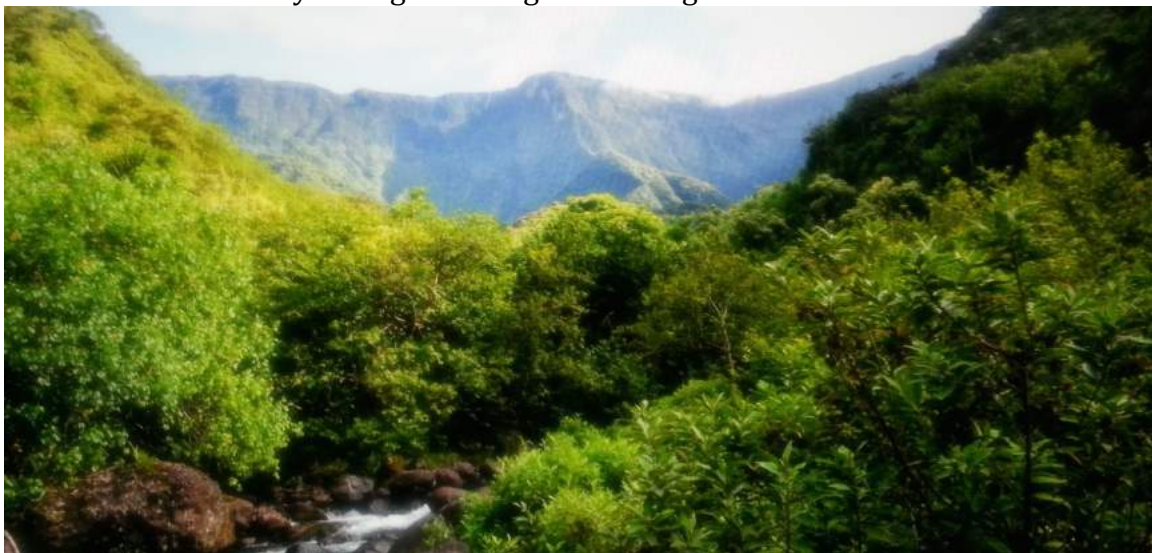


Another view of Papaala Pali ridgeline at high resolution. These cliffs formed the southern edge of the caldera of the Wailau or East Molokai shield volcano. The cloudy, overcast conditions are typical of the area with its high capture rate of trade wind moisture.

The oceanfront of Pelekunu Valley below. The emerald green of this windward valley is in stark contrast to the brown earth tones that dominate for leeward Kawela. However, although the cool damp climate is good for plants, the moist, odiferous valley is not pleasant for human habitation and as a consequence has had very low levels of habitation for the past 100 years. The delta of Pelekunu Stream can be seen cutting across the breach.



Below view of the cliffs, Papaala Pali with Kawela beyond from Pelekunu Stream bed . The cliffs rise 4000' above the stream level and form the southern intact rim of the Wailau or East Molokai Volcano caldera. The northern rim collapsed into the Pacific over 1 million years ago forming world's highest seacliffs.





Pelekunu Stream above shows a much greater flow than Kawela Stream although they both have similar watershed sizes. The much greater windward rainfall in Pelekunu compared to that of leeward Kawela also produces much more verdant Pelekunu stream valley walls in contrast to the xeric walls of Kawela. The sheer cliffs, pali, throughout the northern coast make steep valleys like Pelekunu inaccessible for large parts of the year from the sea. This obvious water resource compared to dry leeward Kawela motivated the extension of Kawela under Lunalillo's ahupua'a windward to capture the Pelekunu stream headwaters.

View (below) during summer across Kawela Plantation Lot 30 at 203 Kupaia Place , at an altitude of 420' ,showing Kawela Gulch and the typical xeric shrubland of the residential lowlands of Kawela Plantation below 2000' altitude. Note steep slope at horizon that is typical of residential Kawela Plantation. View is to north.



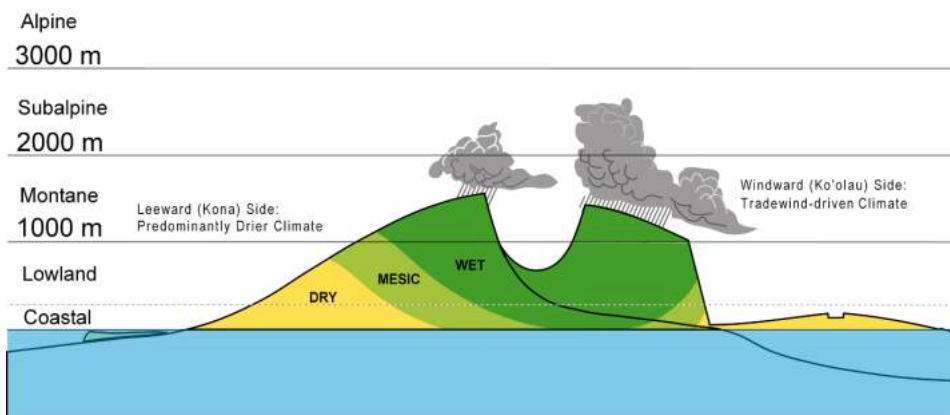
View during summer of Kawela Plantation lowlands and higher elevations from the coastal plain at an altitude of 46'. Note the rapid transition to the arid xeric shrubland of the residential lowlands of Kawela with increases in altitude from the comparatively lush vegetation of the near sealevel coastal plain. At the highest altitudes, the dark green signature of the transition to

rainforest can be seen for Kamakou Preserve in the distance at altitudes over 4000'. Eastern Kawela Plantation is visible left of photo center.

All vegetation in Kawela is non-native or alien as shown in the Molokai map below. Kawela is located directly above the **Alien/anthropogenic area** icon.



The local microclimates of eastern Molokai are shown in cross section in the figure below with Kawela on the dry kona or leeward coastal/lowland side of the eastern volcano and the seacliffs above the former leper colony with a small volcano on the koolau or windward side.



The present day MIS (Molokai Irrigation System), which represents the primary source of agricultural water on Molokai, distributes water to over 230 users in central Molokai, ranging from large to small-scale farms, homesteaders and non-homesteaders and for-profit as well as back-yard agricultural operations. It is an active, state-operated system that is managed and operated by the DOA.

The process begins at Waikolu Valley – a lush and remote north-facing valley where rain falls at an average of 120 inches per year, according to the University of Hawaii. At an elevation of 990 feet, the water is pumped from the valley's primary stream. Here the system includes three gravity flow

intakes which divert water from the stream, four wells that are actively pumped, and an additional three wells located at lower elevations.

All of the water collected in Waikolu Valley is fed to a five mile long tunnel which gravity-feeds water to the southern-facing slopes of Molokai above Kaunakakai. Water then exits the tunnel through a filtering grate and flows through a short length of underground pipe to a transition box, where water can be diverted when the transmission pipeline needs servicing. The water then flows through a 1600-foot covered concrete flume to another transition box that serves as an overflow in case there is blockage further down in the system. From here, the water travels west through 3.8 miles of pipeline where it collects at the Kualapu`u reservoir for storage.

The reservoir, which was completed in 1969, has a total capacity of approximately 1.4 billion gallons, a depth of about 50 feet of water. Its current level is at approximately 14.5 feet. It is equipped with a bypass valve and spillway in case of emergencies. The outlet of the reservoir connects to an underground pipe that distributes water throughout central Molokai. The MIS distribution system ends west of Ho`olehua in the Mahana area.

Molokai Ranch uses the MIS to transport approximately 413,000 gallons per day of drinking water to west end users via a private system. The Ranch's usage is recorded daily by MIS staff.

Kalawao obtained its water supply from a spring in the Waikolu Valley, carried by pipe across the adjacent Waialeia Valley, one mile from the settlement. The spring was also the source of the water supply for Kalaupapa, on the dry side of the peninsula, where the leper colony moved in the early 20th century. In the late 1930s, the colony had expanded to the point that the limited water from Waikolu was no longer sufficient for the growing needs of the settlement. A water development project was undertaken to provide a sufficient supply of fresh water from Waikolu stream.

An intake system was installed at the 520 foot elevation, 1.4 miles up the valley, with a catchment system in the upper Waikolu Valley. The water was piped in galvanized 8" and 6" pipe down to the shoreline where it ran on concrete posts along the base of the high cliffs separating Waikolu from Kalawao. The pipeline had sufficient head to push the water up to Kalawao peninsula where the settlement was located. The concrete monuments along the shoreline are the remnants of this early water delivery system.

This system was difficult to maintain especially in the winter months when the shoreline is pounded with winter swells and storms often would damage or clog the intake. Maintenance crews would hike up to a point near the intake and camp in a maintenance shack to do repairs to the system. This

system was replaced in 1982 with a well which gets its water from an underground aquifer.

The modern water development from Waikolu Valley started with a federally funded project to divert water from Waikolu Stream to supply water to the dry western part of Molokai to help create jobs in construction and agriculture.

In the late 1960s, a contract was awarded to construct the Waikolu diversion and development tunnel which diverts water from Waikolu Stream into a 5-mile tunnel that delivers water above Kaunakakai town. This water flows into the reservoir in Kualapuu and supplies domestic and agricultural water to Molokai farmers and residents. Two-thirds of the water is for the Hawaiian Homes lands of Molokai and one-third of the water is for other agricultural users and domestic users on Molokai.

The project took 5 years to complete. You can see 4 miles through the tunnel. It has an elevation change to move the water through the tunnel. Cars can travel through the tunnel for maintenance work.

There are six springs that enter the tunnel from the side walls in the tunnel. When the well in the tunnel is turned on, it reduces the inflow from the springs and therefore it is rarely used.

Intake One was constructed to divert water from the main Waikolu Stream, and Intake Two from a side tributary both gravity feeding into the tunnel. A third intake is located about a mile below the tunnel and an intake and pumping system adds lower elevation water captured behind a dam and pumps the water up to the tunnel. The pumping is on demand. When there is sufficient water in the catchment area the pump automatically turns on until the level is at a designated level and then turns off. These pumps are run by electricity that is brought in through the tunnel. A series of 22 transformers are needed to get sufficient power to the pumps.

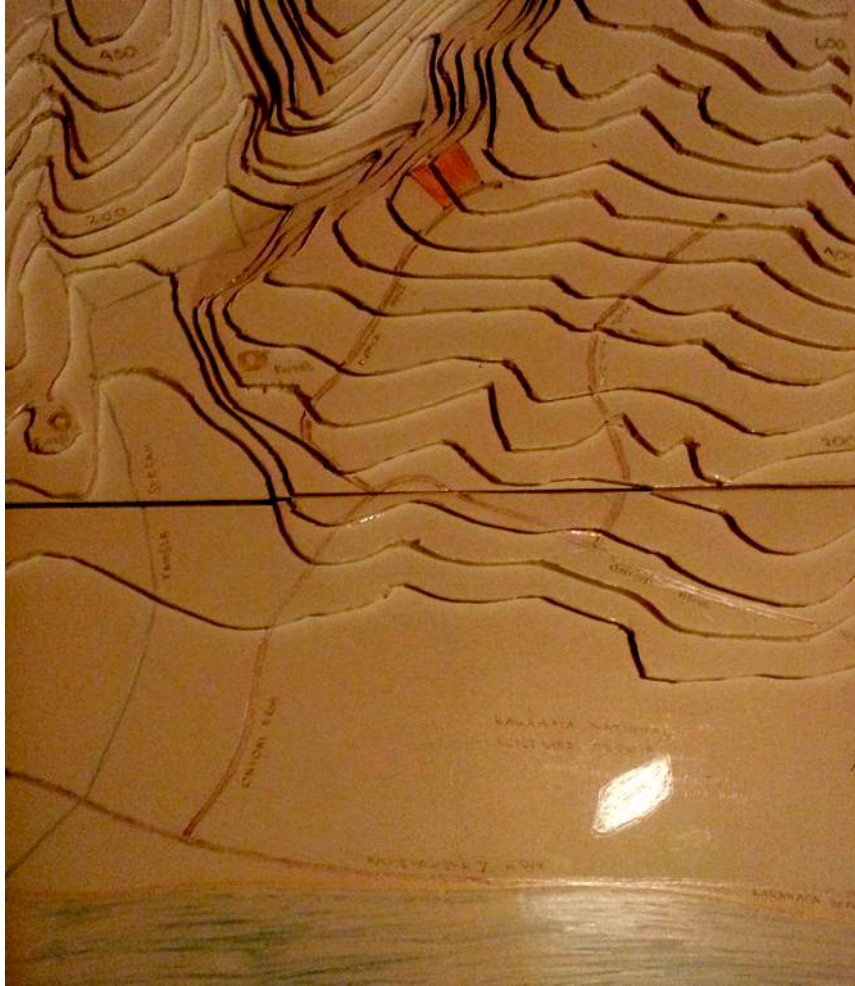
There are several environmental improvements including a fish ladder in the Intake One and a water replacement pipe that allows some of the water from the lower elevation intake to flow back into the stream.

The tunnel is approximately 12' round with a concrete floor that slopes. The tunnel has a drop of 4" over 5 miles. This water system generates approximately 2 to 5 million gallons of water per day.

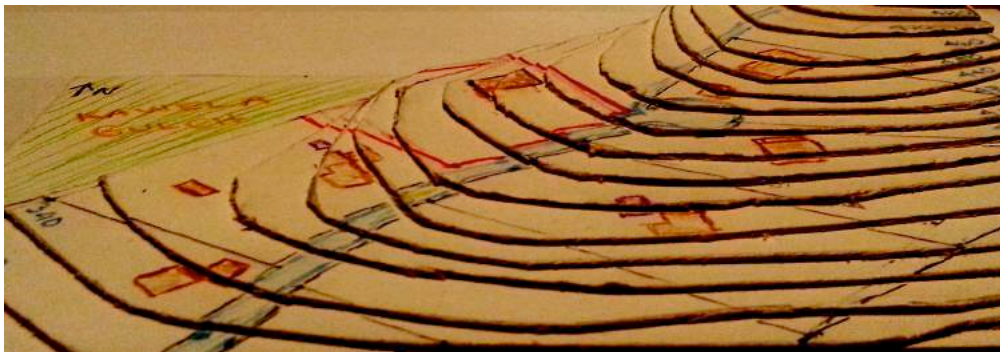
Just as water distribution faced challenges of the large scale steep slopes of Molokai, so does development of the steep slopes of Kawela Plantation.

Three 3-D contour models of southeastern Kawela Plantation with progressively higher resolution in contouring are shown below. Note the

steep slopes are representative of those that exist throughout residential Kawela Plantation and hence are prone to sheet erosion with deleterious impacts on the fringing reef located at the bottom of the figure below.



3-D relief map of south eastern Kawela Plantation with 40' contours showing entrance to Kawela Gulch and coastal plain. 203 Kupaia Place, Lot 30, in red.



3-D relief map with 10' contours of upper Kupaia Place of Kawela Plantation. 203 Kupaia Place, Lot 30, shown in red outline.



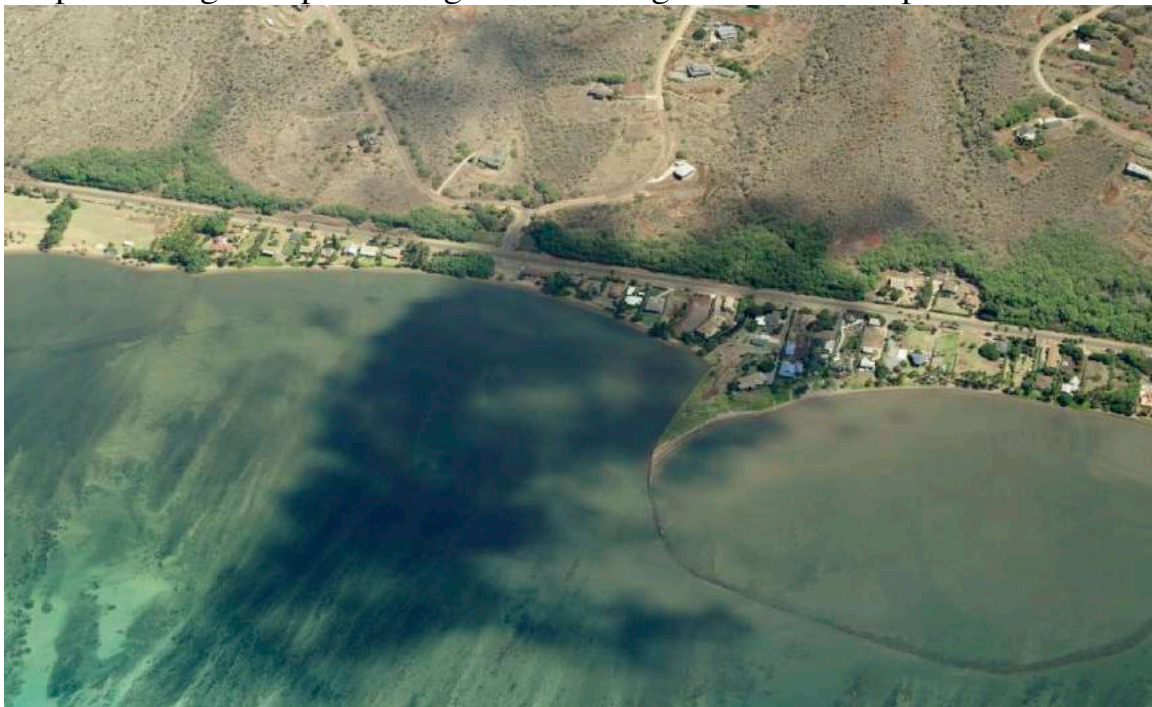
3-D relief map with 2' contours of 203 Kupaia Place, Lot 30 Kawela Plantation. Note steep cliff face on top (north) and gully traces of sheet erosion throughout. Non-cliff altitude variation is typical of all lots. Below Lot 30 north view, lot corners: red circles.



The steep topography described above coupled with the low annual rain fall of about 15' per year yielding sparse xeric vegetation and the sheltered location from ocean swells lends itself to a buildup of sedimentation in the near coast part of the fringing reef in the area of Kawela and westward to Kaunakakai. Below is shown the sedimentation built up for the beach area in east Kawela near the Kawela Stream delta (on the left).



Below is shown similar near coast sediment built up in west Kawela. Kaoaina Beach Park is visible on the western edge adjoining Kaoaina fishpond. Large fishpond at right eastern edge is Kanoa Fishpond.



In contrast, near Pukoo, with about 60" of annual rainfall, the upland slopes are better vegetated and sheet erosion is reduced. Also the local coast is less sheltered from swells leading to a more rapid removal of sedimentation. This is shown in the two figures below. Brown coastal sediment is lacking.



Pukoo coastal aerial photo showing picture perfect reef colors.



Same Pukoo view as above but more to the west as can be seen from the fish pond location between two photos.



Beach at Kawela with typical small surf. Waves break at reef edge a mile out



Reef off shore at Kawela showing typical growth for that area.



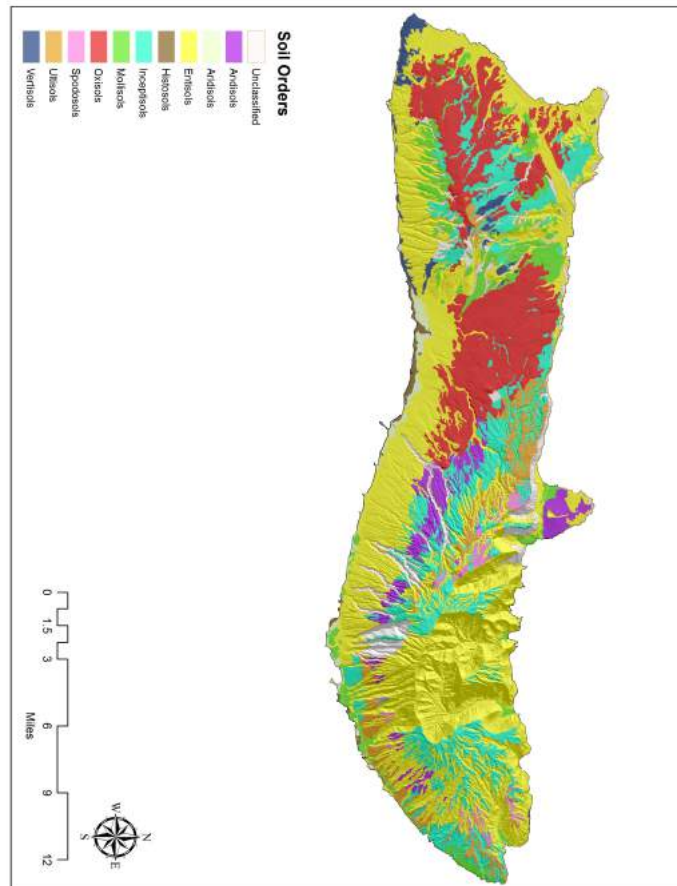
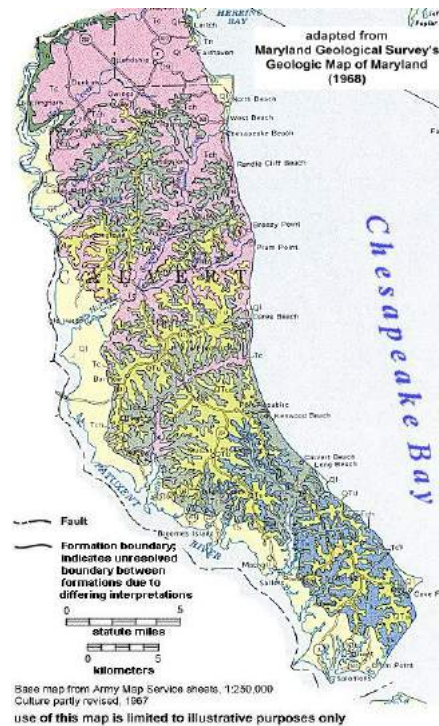
Fringing reef off Kawela coast showing more coral detail.



Fish swimming through fringing reef structure off Kawela Coast



Another image of reef off of Kawela. Water is more clear and reef growth more robust toward the east end of Molokai which is more vegetated and hence has less damaging soil run off to the reef. Higher average rainfall results in better ground cover that in turn better resists sheet erosion during heavy storms. The rainfall varies from Kawela's Arizona like year average levels to Pukoo's exceeding Washington, both D.C. and the state coast, for a typical year. The vegetation changes accordingly from xeric at Kawela to moist at Pukoo. The point at Kamalo provides the dividing line between these two leeward micro climate regimes as the coast to the east turns northward providing greater exposure to northeast trades driven moisture.



Calvert County MD

9 miles

30 miles

213 square miles

168 feet

100 feet

88,000

Soils for Calvert are all sands and clays with fossil shell beds unlike the volcanic soils of Molokai.

Above, a mainland east coast perspective of Molokai through a comparison with Calvert County, Maryland. Calvert County is a long peninsula on the western shore of the Chesapeake Bay. It is completely surrounded by water on all sides by the Bay and the wide tidal Patuxent River save for a narrow neck on the north end. As can be seen by the two side by side figures shown at the same scale, the sizes and shapes are of Calvert County and Molokai are quite similar. Although Calvert County is regarded as a rural county in Maryland, its population dwarfs that of Molokai by better than a factor 10. However the vertical

Molokai, HI

7 miles

40 miles

260 square miles

4970 feet

3000 feet

7,000

width

length

land area

highest point

cliffs

population

relief on Molokai more than dwarfs that of Calvert County with Molokai's high point and cliffs being a factor of 30 higher than those features in Calvert County. Calvert County's cliffs face the Chesapeake Bay and are fossil rich clay and sand features of an ancient sea's bed as opposed to the volcanic rock of Molokai. The Calvert County features have a much older geological age (10-20 million years) than those of Molokai (1-2 million years old) which were born from the Hawaiian mantle plume hot spot that is now under the Big Island of Hawaii.

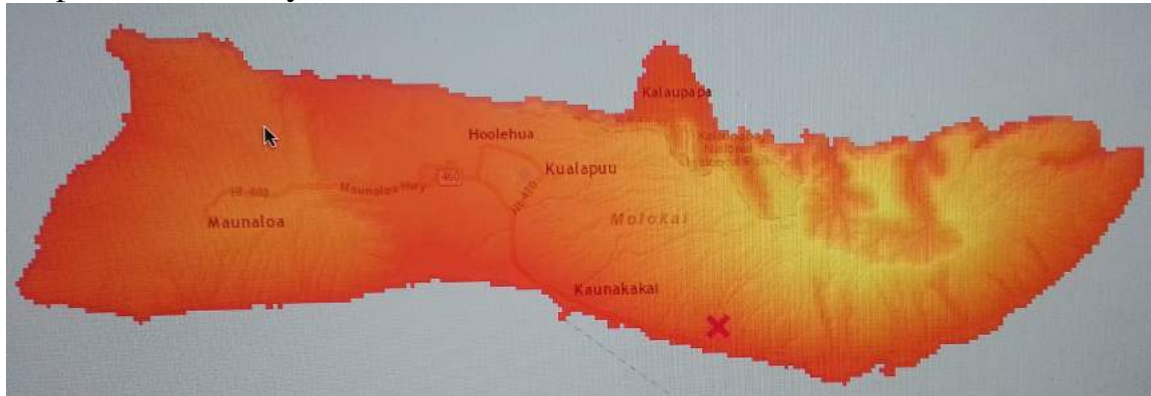


Calvert Cliffs in Calvert County, Maryland are about 100' high.



Molokai Cliffs on northern coast are about 3000' high. Note the full grown trees clearly visible for Calvert are almost specks for Molokai. The White Cliffs of Dover on the southern coast of England are about 300' high for a famous comparison, near the 200' gulch cliff height at Lot 30, 203 Kupaia Place in Kawela Plantation. Maryland temperature ranges are also quite different than those on Molokai as is discussed next.

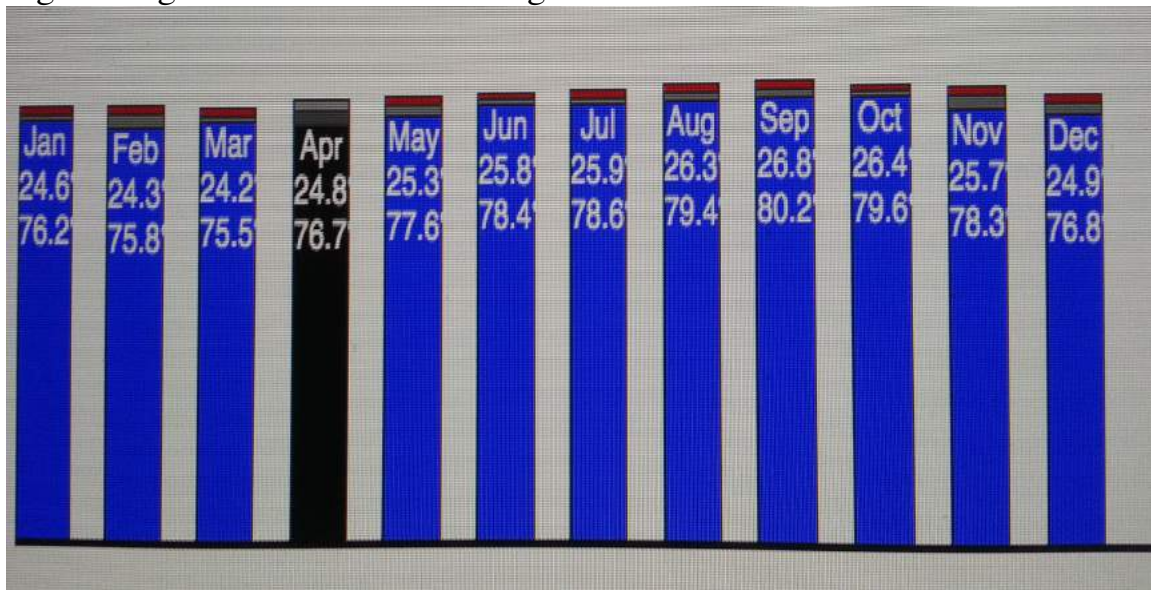
Molokai temperature map averaged over all seasons and hours of day shown below. Darkest red is 75 degrees along coast, lightest yellow is 57 degrees in the peaks formed by the east Molokai volcano rim. “X” marks Lot 30.



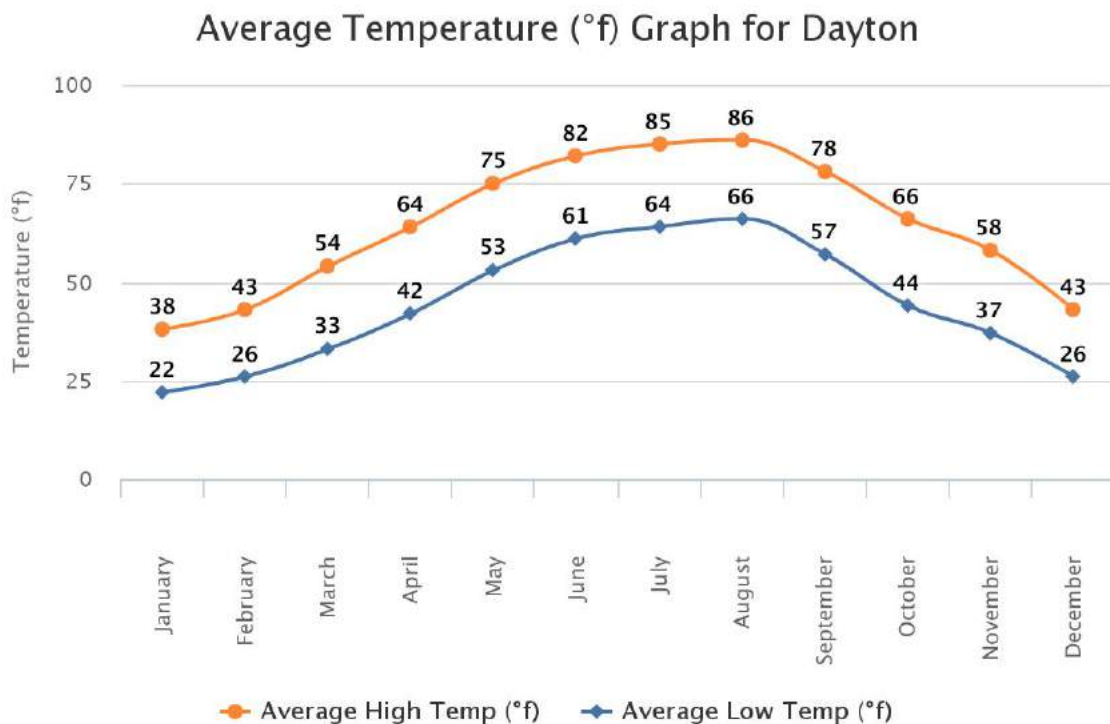
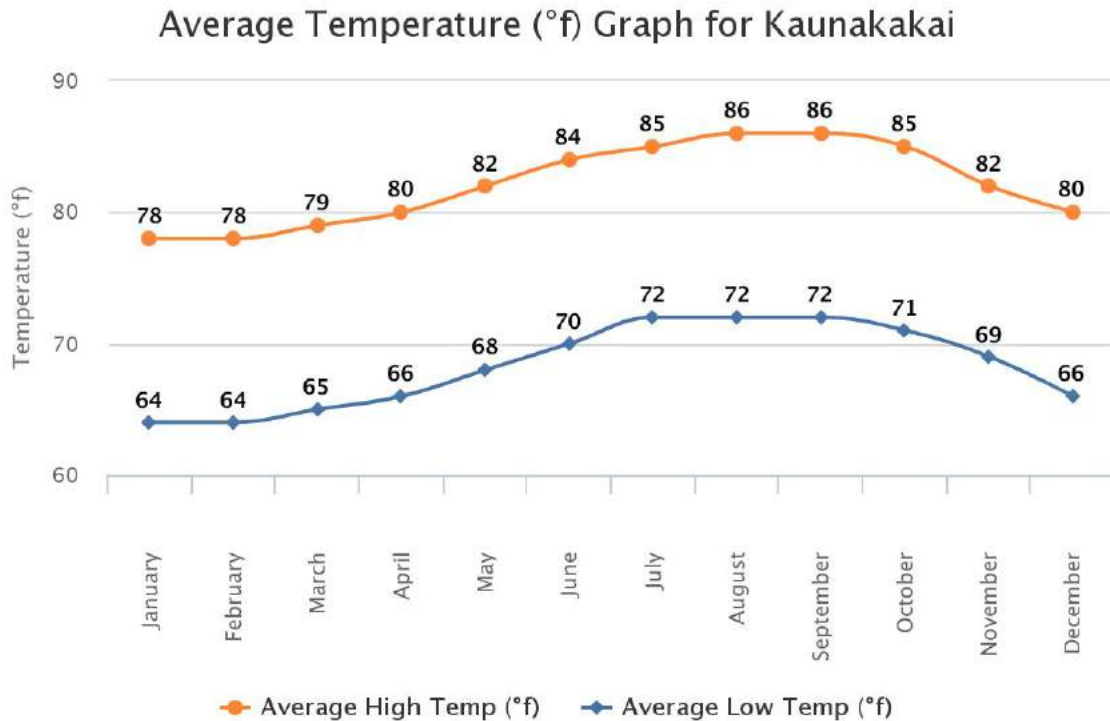
Lot 30, 203 Kupaia Place, Kawela Plantation (21.074 degrees North, 156.943 degrees West) Temperature (Degrees Fahrenheit) by Hour for Winter and Summer.

<u>Hour</u>	<u>January</u>	<u>July</u>
01:00	66.89	72.85
02:00	66.78	72.72
03:00	66.70	72.63
04:00	66.65	72.58
05:00	66.62	72.54
06:00	66.59	72.01
07:00	66.58	73.83
08:00	68.55	75.60
09:00	70.47	77.27
10:00	72.22	78.78
11:00	73.71	80.08
12:00 Noon	74.89	81.12
13:00	75.69	81.88
14:00	76.08	82.33
15:00	76.05	82.45
16:00	75.59	82.24
17:00	74.74	81.70
18:00	73.51	80.86
19:00	69.87	79.73
20:00	68.83	75.63
21:00	68.11	74.54
22:00	67.62	73.83
23:00	67.28	73.36
24:00 Midnight	67.05	73.05

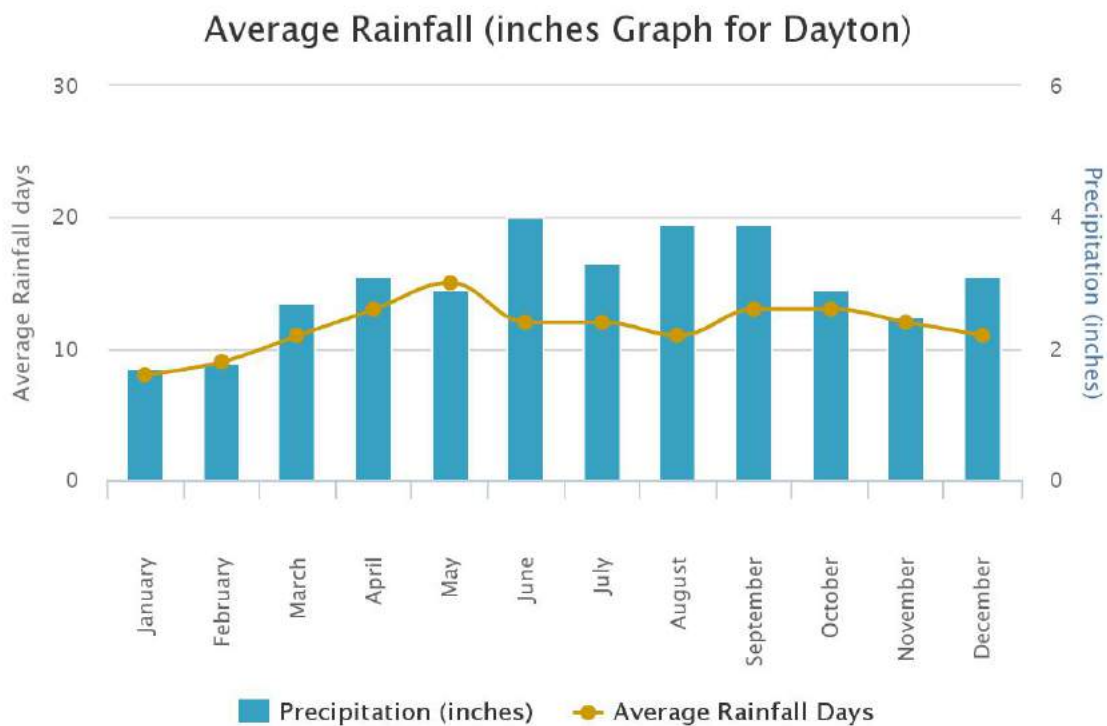
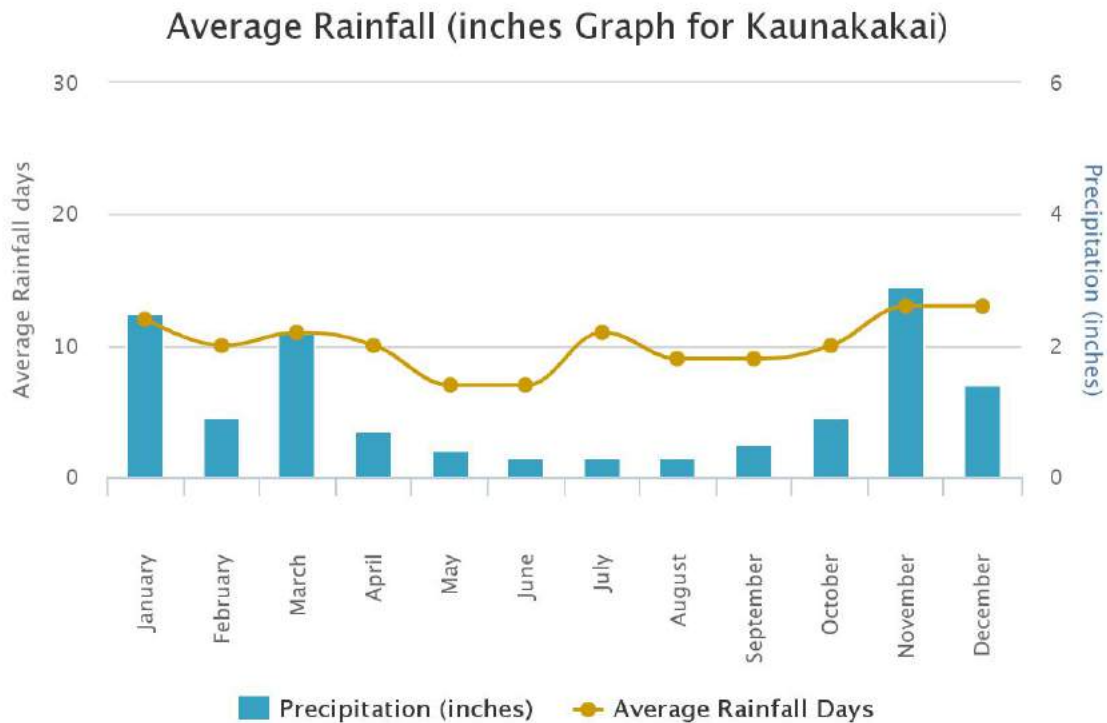
All of Molokai is characterized by only a 15 degree average temperature difference from warmest southern shore to coldest mountain peak. For the specific detailed case of Lot 30, there is less than 10 degree difference from daily highs and lows both in summer (July) and winter (January). Also there is less than a 10 degree difference between summer and winter highs, and also between summer and winter lows. Overall the temperature variations are the smallest on Earth, owing to the isolation of the Hawaiian Islands by a vast ocean with a similar small variation in temperature which either warms or cools the islands to produce this remarkably narrow temperature variation. The Lot 30 temperatures are very close to that of all of Kawela Plantation home sites and indeed the entire southern shore of Molokai. The ocean temperature in Molokai waters only varies 10 degrees throughout the year. At 80 degrees, the water is warmest in September and the ocean is coldest in March at 70 degrees. Below are the monthly average sea water temperatures at Kaunakakai over a year. The temperatures are given in Celsius (top) and Fahrenheit (bottom). Kaunakakai is a port along the south coast of Molokai about 5 miles west of Kawela Plantation. The temperatures are quite uniform along this part of the south coast, so they are very close to those of Kawela Plantation and Lot 30 in particular. Note the very narrow range of sea temperatures over a year. The temperature variations are limited to a 5 degree range between 75 and 80 degrees.



A comparison between average monthly temperatures in Dayton, MD 21036 and Kaunakakai, Molokai HI 96748 is shown below. The Kaunakakai data are very similar to those of residential Kawela Plantation. Not only is the spread of average temperatures much less, but the spread in record high and low temperatures is also: Kaunakai, 50 degrees vs Dayton, 121 degrees.



The much flatter seasonal variation of seasonal temperature variations and the smaller day to night contrasts for Kawela (Kaunakakai) compared to Dayton are obvious. Dayton is typical of the east coast mainland. Record high/low in degrees , for Kaunakakai, 96/48 for Dayton, 103/-18.



Kawela is much drier than Dayton, and the seasonal rainfall peaks occur in opposite seasons. Dayton, typical of the east coast mainland gets peak moisture from tropical storms of African origin; Kawela from trade winds.

We conclude the discussion of geology and water at Kawela with a detailed photographic description of the impacts of geology and water at 203 Kupaia Place, lot 30 of Kawela Plantation, a lot which is in many ways typical of topography which bears the signature of geological and water mediated processes of all lots in the elevated lowlands of Kawela Plantation where all of the 210 residential lots are located. All photographs were taken during Spring 2015 at the transition from wet winter to dry summer, so the landscape is about as verdant, if not as green, as it ever is.

Kiawe trees are a long thorned invasive species from South America that can adapt, within limits, to arid residential Kawela. Below is shown a large kiawe tree on the south edge of lot 30 that has grown up in a drainage gulley capturing more water than its surroundings. It has grown very rapidly over the last decade. If surface water patterns changed, it would rapidly decline.



Hence, if the water concentration were to diminish it would die back like the trees below on the western border of lot 30, which have experienced reduced flow, most likely due to shifting runoff. This is shown below.



Obviously trees which are maintained at shrub size have much longer survivability than those dependent of a fortuitous channeling of water due to the ongoing sheet erosion which is endemic in Kawela. Below are shown a

cluster of small trees located at the entrance of the drainage easement at the southern boundary of lot 30. As opposed to the surrounding xeric grass, they obviously benefit from the water collection at the concrete apron of the drainage easement.



Overall, the conclusion is that the best remedy to sheet erosion on the lots is a perimeter swale system with gravity collection of runoff at the lowest elevation in a pond, as opposed to vegetation that can only be artificially maintained by unsustainable irrigation. The swales and ponds will concentrate vegetation within in them as discussed for the trees above and hence stabilize the overall sheet erosion using only the low annual rainfall of 10-20" (for comparison the mainland mid Atlantic east coast gets about 45" per year).



As opposed to most of Kawela Plantation, the gulch bottoms are much wetter and fertile and hence more densely vegetated. As discussed in the early sections about Kawela ahupua'a prehistory and early history, this was the center for agriculture in Kawela and today continues nearer to the coast as a leasehold nursery and mango plantation. Shown above is the cliff edge view from lot 30's north boundary into Kawela Gulch. Note the high density of large trees at the gulch bottom. The elevation of the cliff edge is about 400', the gulch bottom is at about 200'. The resulting 200 foot cliff face is the highest in residential Kawela and affords a spectacular view into the gulch and down toward the gulch entrance at the Pacific Ocean. Below is another cliff edge view near the northwest corner of lot 30 (the actual corner is over the cliff edge and down in the gulch) A nearby kiawe tree is strategically self-positioned in a drainage gully.



Lot 30, 203 Kupaia Place is bordered on the west by lot 29, on the south by Kupaia Place, and on the north and east by the 5,500 acres of open space that make Kawela Plantation a unique place in all of Hawaii, preserving much of the feel of the original Kawela ahupua'a. In the figure below is the double gated entrance road to the common lands which stretch up to elevations of almost 4000 ft.. The marker for lot 30's southeast corner can be seen in the foreground. The road stretches up to the Nature Conservancy's Kamakou Preserve with its lush rainforests and its view into the Penekunu Preserve with the high cliffs of the north coast at its ocean terminus. Penekunu Preserve contains a 461 acre part of the original Kawela ahupua'a on its high elevation southern edge just over the mountain ridge from Kamakou.



Another view below along the west boundary of lot 30 looking north across Kawela gulch and toward the mountains beyond rising upward toward the east. The dominance of xeric grassland with only the occasional struggling kiawe tree is apparent.



Kawela Plantation is on the southwestern flank of the East Molokai Volcano, Wailau. The peaks of the eroded volcano can be seen looking east from Lot 30, across the east property line as shown below. Unlike mainland east coast mountains where vegetation density decreases with altitude, in eastern Molokai vegetation increases with altitude like mountains in the western mainland owing to moisture trapping by the peaks.



The volcanic origins of Molokai and the lands of Kawela Plantation are evidenced by the large basaltic boulders on the south edge of lot 30. Note the truck size for comparison. These boulders are scattered over the landscape.



Although at an elevation of over 400' , lot 30 is only about $\frac{3}{4}$ of a mile from the Pacific Ocean. Below is shown the southern view from Lot 30 where the more vegetated coastal plain and light blue fringing reef can be seen in the distance with the Pacific Ocean beyond.



Below is a southeast view from Lot 30 of the ocean with the neighboring island of Lanai, almost entirely owned by Larry Ellison, in the distance.



A southwest view below from Lot 30 again looking towards Lanai.



The steep volcano flanks suffer sheet erosion, but also provide impressive views that are not impeded by naturally occurring dense vegetation such as tree groves like those found on the wetter coastal plain just below Kawela Plantation.



View from Lot 28 across Kawela Gulch. Note East/West Fork point in mid center. East Fork in right foreground. On left, Forks have merged toward the Pacific Ocean, following Kawela Stream.



Cliff face stone just below rim. View down Kawela Gulch toward sea. Lower view of gulch canopy with sharp edged boulder from recent cliff fall.



Gulch canopy view looking up East Fork toward Lot 30., for better or worse a kiawe forest. Note xeric leaf loss uphill. Face of cliff at streambed level.



View from streambed to cliff rim. Note typical banded levels of eruption history as in aerial photos. Cliff topography varies from walkable to sheer.



Left: Kawela stream bed, mostly dry in summer when images taken. However large smooth boulders speak to peak stream flow at flood stages during winter. Right: Stream center with small summer flow, but still having appreciable pools and small falls. The pools are like natural hot tubs. Although the images were taken behind Lot 28, overall topography is quite similar to Lot 30 with the major difference that Lot 28 lies above the merger point of the East and West Forks of Kawela Gulch, In contrast, Lot 30 lies in front of the East Fork of Kawela Gulch alone. Even over this short distance, the gulch depth increases, it is much deeper in the upper common lands at higher elevations.

The road extends above Kupaia Place to the highest elevations of Kawela Plantation. It is limited access by reservation only to Kawela Plantation lot owners. It provides access also to Kamakou Preserve rainforests.



View from above Kupaia Place. Red Circle makes Lot 30 location. Lanai is framed in center across channel. Fringing reef is seen in lighter colour along the coastline.



Road loop in common land above Kupaia Place. Road is perhaps a charitable designation for this bulldozed ribbon through a mostly barren landscape in the upper common land grounds of Kawela. The road does provide a connection to the rainforest at high elevations above Kawela. It is possible to hike from southern reef fringed shore, with waves measured in centimeters

to the northern 3000 foot cliff lined coast with its deep fjord like valleys with waves measured in meters.



Upper East Fork of Kawela Gulch with much greater depth than in residential area. Note mature trees on rim for scale.



Looking west past edge of Lanai to the open Pacific Ocean at the upper end of the Kawela common lands above Kupaia Place. Note the comparative greenness as the Nature Conservancy lands, with higher rainfall and more level terrain reducing storm runoff, above Kawela Plantation are approached

Moving upland from Lot 30, 203 Kupaia Place, to a middle elevation along Kawela Gulch, a view southward is shown below. The red circle marks the location of Lot 30. As can be seen, the terrain is even more xeric and barren at these altitudes. In the distance can be seen the green coastal plain, the light blue fringing reef, and beyond that, the ocean and Lanai. The green bottom lands of the gulch can be seen. Much of the denuded landscape is due to overgrazing by goats and deer that gives rise to large scale sheet erosion on these steep slopes.



An enlargement showing the details of the East Fork gulch bottom which is much wetter than the cliff face and ridges above it. Again Lot 30 is marked with a red circle. Cliffs are 200' at Lot 30, much higher farther upland.



Below, feral goats adroitly walk on vertical Kawela Gulch cliff face.



Do not try this at home. Such highly adaptive goat behaviour has allowed feral goat populations to expand beyond the carrying capacity of the Kawela ecosystem. As a consequence of this overpopulation, overgrazing has greatly increased sheet erosion and threatens the sustainability of Molokai's southern fringing reef as well as driving a number of Molokai's remaining high altitude native plant species toward extinction. At lower altitudes in Kawela all native species have been already replaced by non-native invasive ones owing to overgrazing and the introduction of other alien pests.



Above is an Hawaiian Department of Land and Natural Resources map of trails in central Molokai. The red circle marks Lot 30, 203 Kupaia Place. Trails can be seen coming up from the coast, both along the East Fork of Kawela Gulch alongside Lot 30 (Kawela I Road) starting at the top terminus of Kupaia Place, and also on the western edge of Kawela Plantation, east of Onini Gulch, originating at the top terminus of Makaiki and Makanui Roads (Onini Road). Both trails lead to Plantation common area lands and to the Kamakou Preserve of the Nature Conservancy and the Molokai Forest Reserve. These trails provide a totally internal means of accessing these rare and beautiful lands, which lie directly above residential Kawela Plantation.

Moving farther upland, a much deeper Kawela Gulch is revealed below in the view looking toward the west. Again vegetation is very sparse.



Approaching the highest Kawela Plantation elevations the gulch reaches very impressive depths with Kamakou Preserve on the horizon.





Upper Kawela Gulch showing rugged terraced terrain. Dark green band at top of gulch wall in distance is Kamakou Preserve with full sized dark green trees gives scale to the gulch at the higher elevations of Kawela Plantation



Waterfall formed by Kawela Stream at bottom of Kawela Gulch. Note the increased green plant growth from moisture at the gulch bottom compared to xeric uplands.



A smaller waterfall in upper Kawela Gulch flowing into a downstream pond. The boulder lined channel is much wider than the flow indicating the size of storm flooding surges.



View of Lanai from upper Kawela Plantation above the eastern residential area. To control overgrazing professional aerial hunting is employed.



View across upper Kawela Gulch at western Kawela Plantation and farther west Kaunakakai, and still farther west the slopes of Maunaloa.



Alien animals of Kawela: above, axis deer, below, feral goat





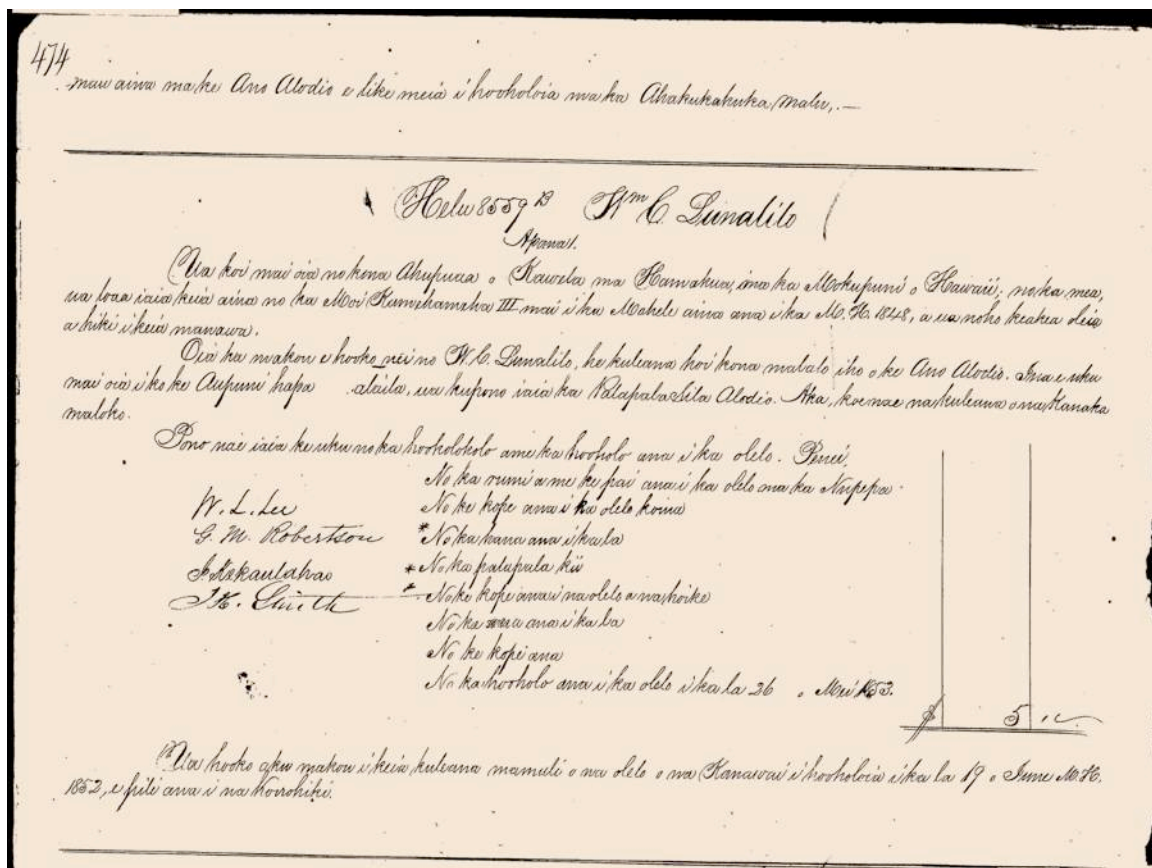
Alien wild boar above. Boar, deer , and goats are hunted for meat by subsistence hunters on Molokai, mostly native Hawaiians. However, the feral populations pose an existential threat to the stability of plant life and erosion control due to overpopulation and overgrazing.



Three island view: Kahoolawe center, Maui left, Lanai right from borderlands between Kawela Plantation and Kamakou Preserve under overgrazing threat.

Lunalilo and Kawela Ahupua'a

The motivation for the acquisition of Kawela by Lunalillo appears to have been to protect traditional agricultural areas, namely the Kawela stream valley and the Kawela stream delta, for future generations. By the time of his death and the cultural shifts, the motivation changed to providing for the needy. His actions and those directed by his will are the reason that the Kawela ahupua'a remained intact and did not dissolve into many fee simple 'ili as did many other ahupua'a. In this sense, he formed the basis for present day Kawela Plantation.

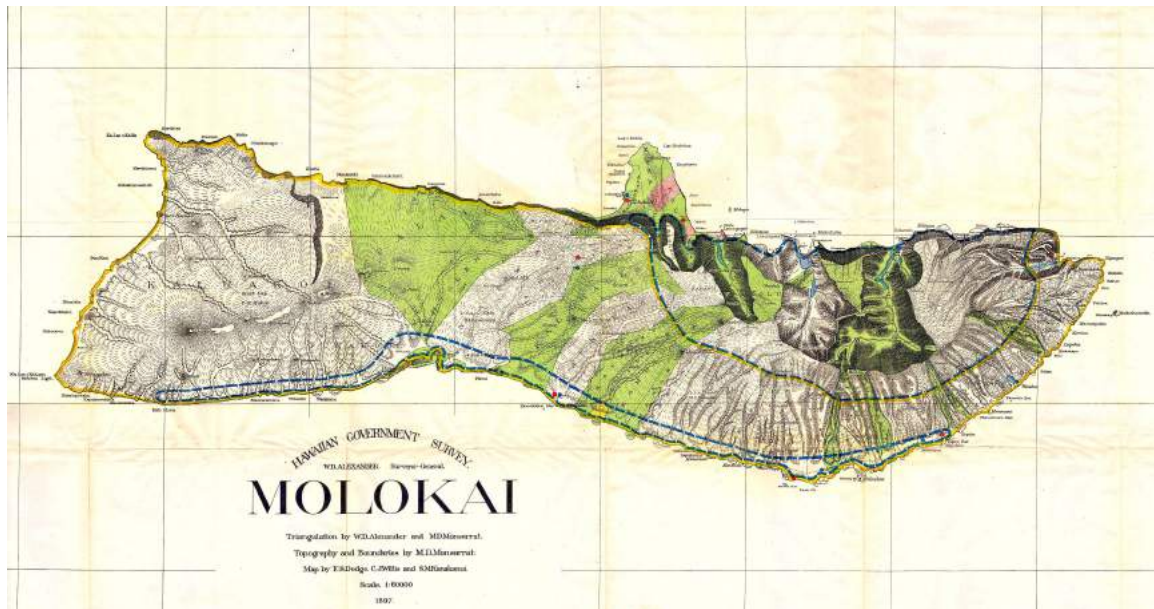


Original Land Commission Award (LCA) of Kawela ahupua'a to Lunalilo.

Proceeds from sale of lands after his death went to establish Lunalilo Home (Honolulu) for the aged as indicated in his will below. Lunalilo Home was established by the will of High Chief William Charles Lunalilo,

who died in 1874 while he was king of the Hawaiian Islands. His estate included large landholdings on the five major islands, consisting of 33 ahupua'a, nine 'ili, and more than a dozen home lots. His will established a perpetual trust under the administration of three trustees to be appointed by the justices of the Hawaiian Supreme Court. King Lunalilo was the first of the large landholding ali'i to create a charitable trust for the benefit of his people.

Enhanced map of Molokai from 1897 showing Lunalilo holdings on Molokai. Note Crown Lands have been merged into Government Lands , affected by events that had occurred in this printing of the map during the transition from the Republic of Hawaii formation in 1894 to annexation in 1898 and the formation of the Territory of Hawaii in 1900 .



Below: **W.C. Lunalilo**. King of Hawaii , January 8, 1873 until February 3, 1874 , the sixth reigning monarch of Hawai'i . Prince William Charles Lunalilo was born on January 31, 1835 to High Chiefess Miriam 'Auhea Kekāuluohi (Kuhina Nui, or Premier of the Hawaiian Kingdom and niece of Kamehameha I) and High Chief Charles Kana'ina. Lunalilo's grandparents were Kala'imamahū (half brother of Kamehameha I) and Kalākua (sister to Ka'ahumanu). His great grandfather was Keōuakupupāikalaninui (father of Kamehameha I). He was known for his sense of justice, his compassion and his kindness toward others.

He was the most liberal king in Hawaiian history



The purpose of the trust was to build a home to accommodate the poor, destitute, and infirmed people of Hawaiian (aboriginal) blood or extraction, with preference given to older people. The will charged the Trustees with selling all of the estate's land to build and maintain the home.

This was the reason for the Kawela sale which occurred at the same time as the sale of the other west end properties owned by Charles Reed Bishop husband of Princess Bernice Pauahi Bishop. All sales were to Molokai Ranch (American Sugar Company – ASCO).

In 1879, the land for the first Lunalilo Home was granted to the estate by the Hawaiian government and consisted of 21 acres in Kewalo/Makiki, makai of the present Roosevelt High School. The construction of the first Lunalilo Home at that site was paid for by the

sale of estate lands. The Home was completed in 1883 to provide care for 53 residents. An adjoining 39 acres for pasture and dairy was conveyed by legislative action to the Estate in 1888.



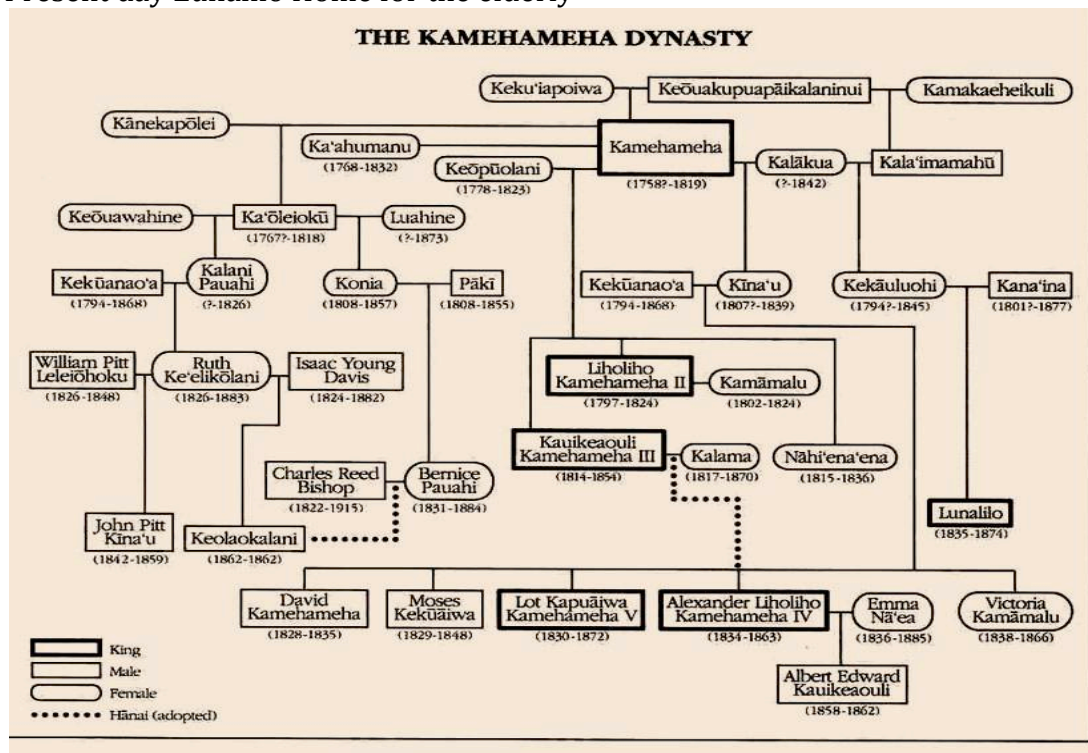
After 44 years, the Home in Kewalo had deteriorated and became difficult and costly to maintain. The trustees located a new 20-acre site in Maunalua on the slopes of Koko Head, owned by the estate of Bernice Pauahi Bishop and consisting of farmland and buildings facilities leased to the Radio Corporation of America (RCA). The Maunalua site was purchased by the Brown family (John Ii Estate, Ltd.) and given as a gift to Lunalilo Home in memory of their mother Irene Ii Holloway, daughter of John Ii, who was a close friend of King Lunalilo's father. With Court approval in 1927, the Kewalo/Makiki property was subdivided and sold, and the proceeds were used to purchase and renovate the RCA buildings in Maunalua to accommodate 56 residents.

In 1959, with the advent of Henry Kaiser's development of the Bishop Estate land of Maunalua surrounding Lunalilo Home, agricultural land was altered for residential and commercial purposes and the area became known as Hawai'i Kai. In 1969, Lunalilo Home developed 15 acres of its property into a residential tract of 80 leasehold lots, leaving the remaining five acres devoted to the Home.

Pursuant to Hawai'i state law pertaining to leasehold-to-fee conversion, in 1983, under terms approved by the Circuit Court, the Trustees sold all of the residential lots. Lunalilo Home temporarily ceased operations from 1997 through 2001 to undertake major renovations to its structure. Upon reopening, it was licensed by the Hawai'i State Department of Health as an Adult Residential Care Home (ARCH) to accommodate 42 residents.



Present day Lunalilo Home for the elderly



The impact of post-contact disease was like that of the plague in 14th century Europe: Both led to a reformation in religion and in land ownership, and the abandonment of ancient kapus. In Hawaii, a counterreformation continues until the present in an attempt to restore the past, but in a society that has vastly changed in every way measurable, much as that of Europe today.

Lunalilo Will Excerpt:

without issue lawfully begotten, I give and devise all of the real estate of which I may die seized and possessed, to three persons to be nominated and appointed by a majority of the Justices of the Supreme Court or the Court of the highest jurisdiction in these Hawaiian Islands, to be held by them in Trust, for the following purpose, to wit; to sell and dispose of the said real estate to the best advantage at public or private sale, and to invest the proceeds in some secure manner until the aggregate sum shall amount to Twentyfive Thousand Dollars, or until the sum realized by the said Trustees shall, with donations or contributions from other sources, amount to the said sum of Twentyfive Thousand Dollars, then I order the Trustees (to be appointed as aforesaid) to expend the whole amount in the purchase of land and in the erection of a building or buildings on the Island of Oahu, of iron, stone, brick or other fire-proof material, for the use and accomodation of poor, destitute and infirm people of Hawaiian (aboriginal) blood or extraction, giving preference to old people; upon such terms, rents or charges, as to the said majority of the Justices of the Supreme Court, or Court of highest jurisdiction in these Hawaiian Islands, shall seem proper; And I hereby authorize any two of the said Trustees (to be appointed as aforesaid), to act in all matters connected with this Trust, and I also authorize a majority of the said Justices as aforesaid, to require accounts from the said Trustees, to remove them from the said Trust, and their places to fill, at pleasure: But, in case, sufficient buildings shall have been provided for



Lunalillo was still fondly remembered after his death as evidenced by the issuance of posthumous stamps during the Hawaiian Kingdom from 1883-1886 (left) and after its overthrow from 1891-1900 (right).



Stamp issued by Kamehameha IV in 1864 with crude "HI" cancel used until early 1870's. In 1864, the Hawaiian Supreme Court separated royal and government lands, clarifying the extent of royal fee simple ownership like Lunalillo's later.

A Note on Kaunakakai and Its Neighbor Kawela

Kaunakakai is by far Molokai's largest town and port. Below shows Kaunakakai with its longest in Hawaii pier on upper left. Kawela Plantation is at lower right with red circle indicating Lot 30 at Kawela Gulch cliff face .



Below is an enlargement showing all of Kaunakakai town. The town center, the main street, is shown with a red dot. Kaunakakai Gulch, a source of flooding, is at top and is seen also in top left of preceding figure.



Below is the harbor and pier enlarged. Kawela Plantation lies at the extreme right about 5 miles east. Historically both Kawela and Kaunakakai had very productive salt ponds with the salt product being a highly valued commodity. The harbor is an enlarged natural reef break in use pre-contact.



Kaunakakai Gulch can be seen extending back up behind the town moving at first in a northern direction, but then moving sharply to the northeast so that at its head waters, it is near the headwaters of Kawela Gulch. The harbor penetrates the fringing reef providing access to the wharf and beach. Below is a drone aerial view of the sea end of the wharf with a number of ship mooring locations. The arrival point for all sea shipments to Molokai.

The pier is also a popular fishing place.



For comparison, below is the old wharf at Kamalo which served at the entry point for large items onto Molokai before the construction of the modern Kaunakakai wharf. The large Kamalo Gulch can be seen to wharf's left.



Below is a vertical view of the end of the Kaunakakai wharf, the entry point of most goods and services for Molokai,



Below a 1930's aerial view of Kaunakakai town and wharf at the advent of the pineapple boom. Undeveloped compared to the present shown earlier.



Kaunakakai can perhaps be best understood in the context of other towns.



A testament to Kaunakakai's age, manuscript cancelled Hawaiian Kingdom stamp of Kamehameha V with writing: " Kaunakakai (partially written on envelop from which stamp has since been removed), Molokai, March 19, 1864 (year on envelop)". Other early towns are Puko'o (1882) in east Molokai which was the first county seat, and the former plantation towns of Kualapu'u (1900) in the saddle between west and east volcanoes, and Maunaloa (1927) in West End. Most of the core of Kaunakakai was built during the pineapple boom of the 1930's. The harbor is at a natural reef break, allowing easy canoe landing. The adjoining beach was the site in 1859 of Kamehameha IV's residential compound. First wharf was built in 1889. The name derives from Kaunakahakai meaning resting place on the beach.



Stamps with Kaunakakai Town Cancel from 1881-1890 during the reign of Kalakaua, the last king of Hawaii. Note by this time, the development at Kaunakakai had progressed to the point that stamps were no longer written hand cancelled as above, but a formal well made “Kaunakakai” date stamp in 1880. As with the manuscript cancellation, almost always the town name only appeared in part on the stamp, the rest being on the envelope. In the two examples above, the one on the left (November 23) shows the front of the town name, “KAUNAKA” In contrast, the one on the right (July 12) shows the end of the town name, “NAKAKAI”. Taken together, the entire town name can be visualized. Below is the complete later cancel, with more elaborate letters from a later die, from an envelope in 1896. A complete cancel shows the year and also “MOLOKAI”.



Kaunakakai post office was opened in 1858 with the ever versatile R.W. Meyer as post master. It was the main post office after 1880. Pukoo(1882) and Kamalo(1884) opened to replace Kaluaaha (1856) which closed 1882. After June 13, 1900 Hawaiian stamps were replaced by U.S. mainland stamps. Modern engraved perforated stamps were produced by the National Bank Company of New York, later acquired by the American Bank Note

[illegible]

The image displays four historical Hawaiian envelopes, each featuring a postmark and a postage stamp. The top-left envelope is addressed to Mr. Otto Kalaie in Honolulu, with a circular postmark from Pukoo, Molokai, dated September 1866, and a two-cent stamp. The top-right envelope is addressed to Hon. W. O. Smith, Minister of Interior in Honolulu, with a circular postmark from Pukoo, Molokai, dated September 1866, and a two-cent stamp. The bottom-left envelope is addressed to O. S. Meyer in Honolulu, with a circular postmark from Honolulu, dated October 4, 1868, at 2 PM, and a two-cent stamp. The bottom-right envelope is addressed to Mrs. O. S. Meyer in Honolulu, with a circular postmark from Honolulu, dated 1899, and a two-cent stamp.

Post office cancels from Pukoo, Kaunakakai, and Kamalo in the 1890's.



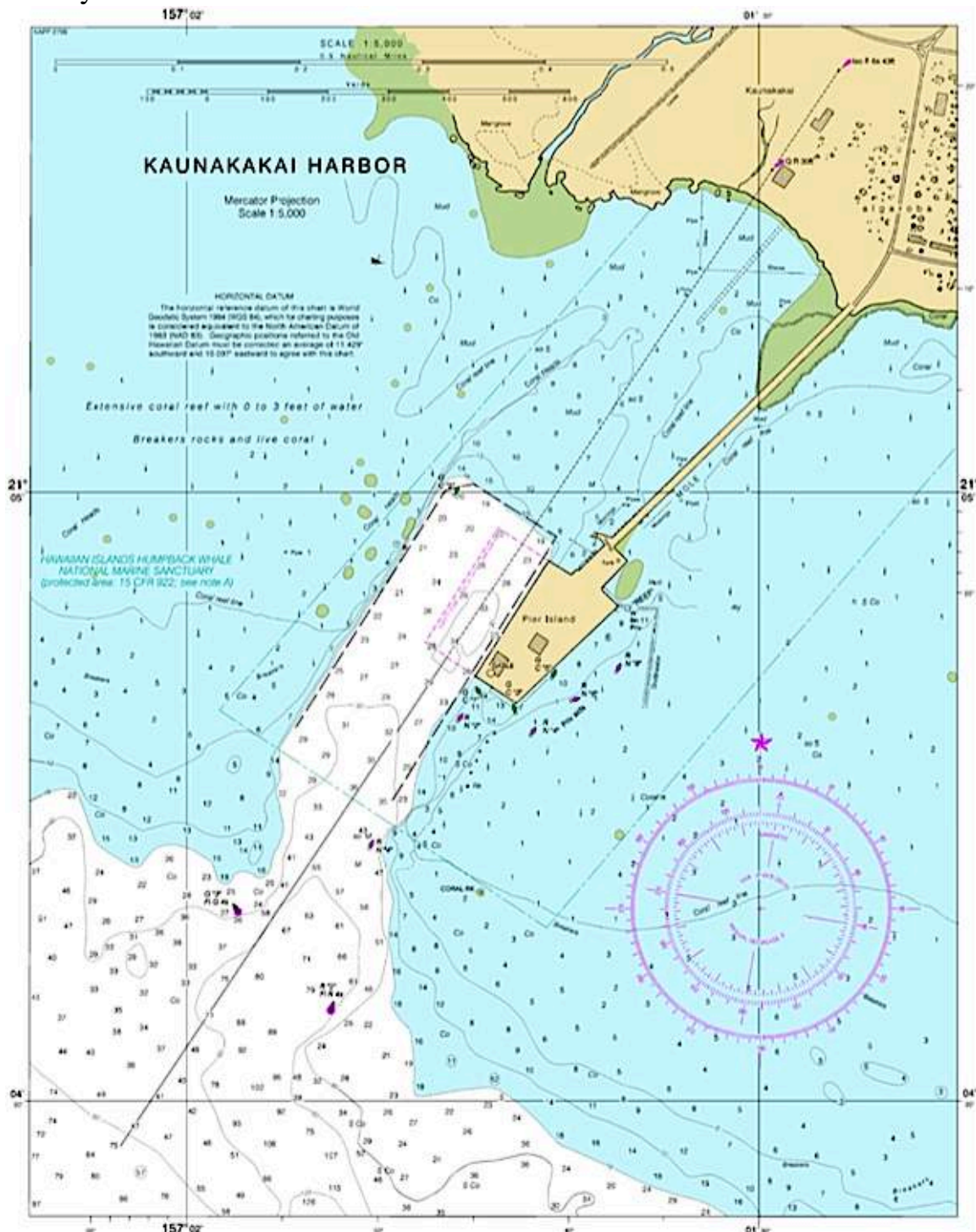
Very rare Kaluaaha cancels from 1875 and 1882. The first town on Molokai, founded by missionaries. Since Kaluaaha was inland and lacked a port, it was displaced by Kamalo and Pukoo which both had ports, and as a consequence, lost its post office soon after these cancels.



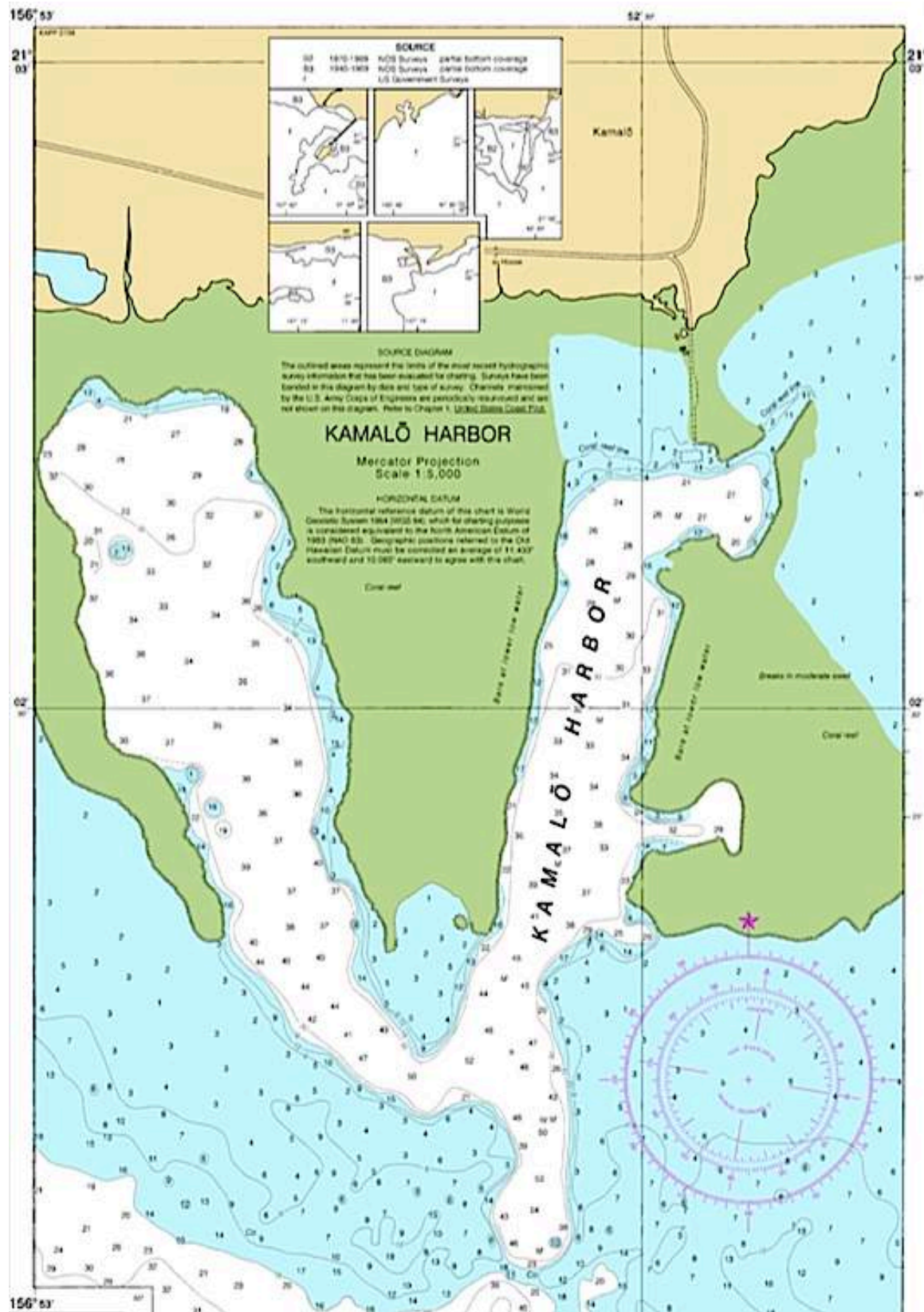
Pukoo stamp cancel late 1890's. Only a partial as is typical, but with the definitive "KOO" of Pukoo showing. Very rare complete "PUKOO"

Off island production was stimulated by criticism of the earlier cruder, Boston produced engraved and lithographed stamps. The earliest stamps starting in 1851 were produced by missionaries on a local letterpress at the Hawaiian Government Printing Office.

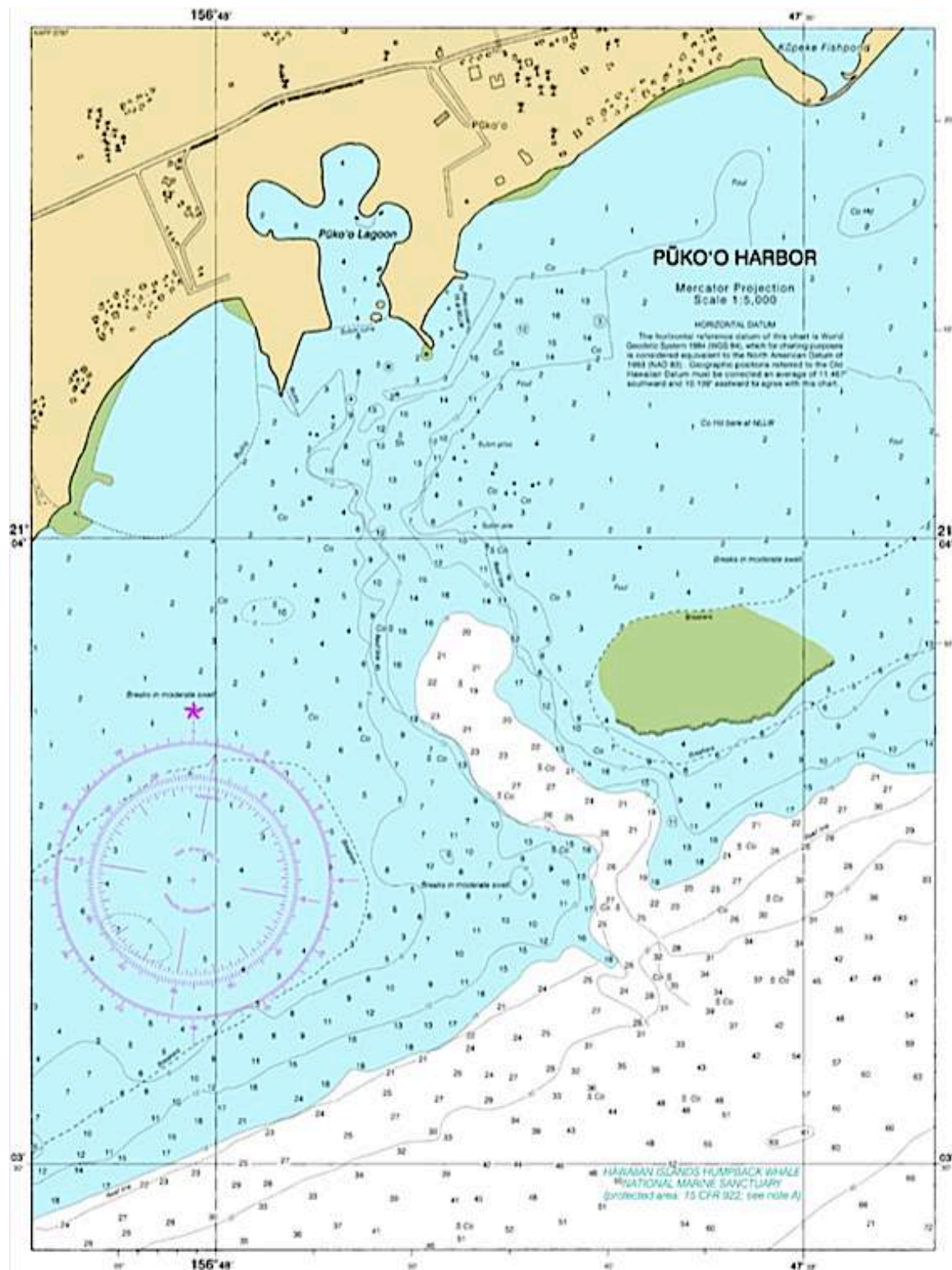
Having a harbor drove town development in the last decades of the 19th century.



Kaunakakai Harbor with longest pier in Hawaii. The successor to the earlier harbors at Pukoo and Kamalo. The depopulation of the east coupled with the irrigation of the west drove this outcome.



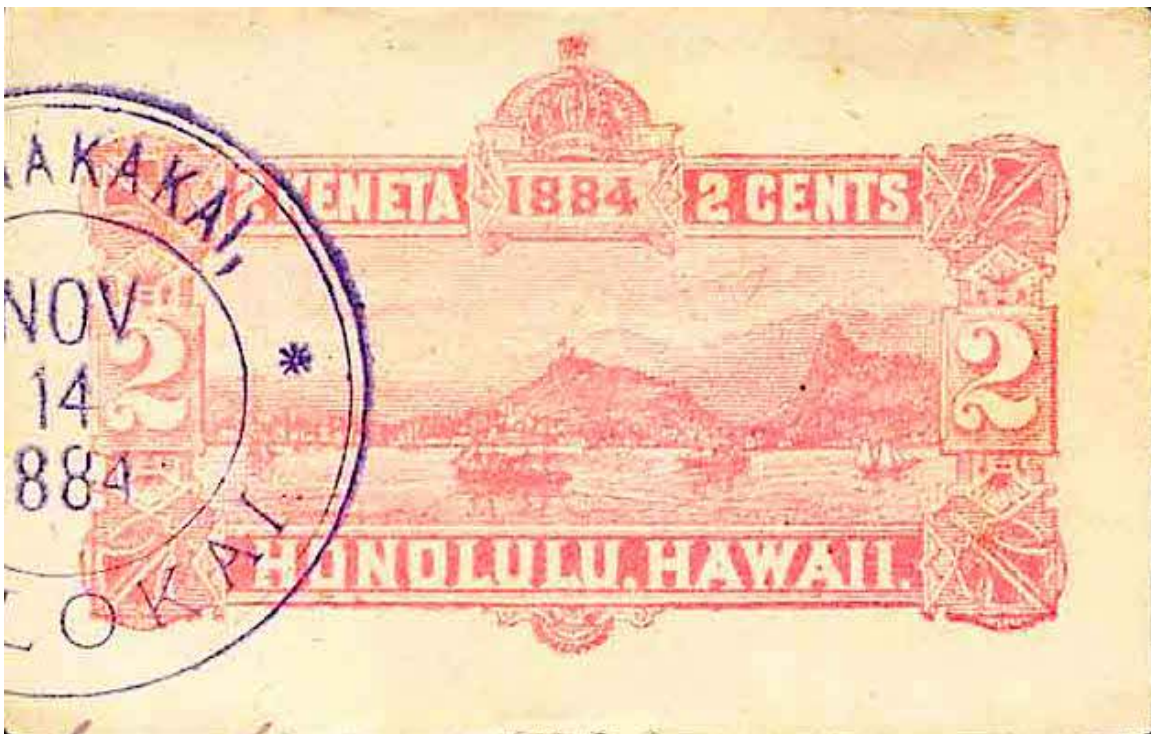
Kamalo Harbor with old pier. The main port of Molokai before Kaunakakai.



Pukoo Harbor with Lagoon dredged by modern failed developer which removed most of the traces of the historic wharf of this early Molokai port.

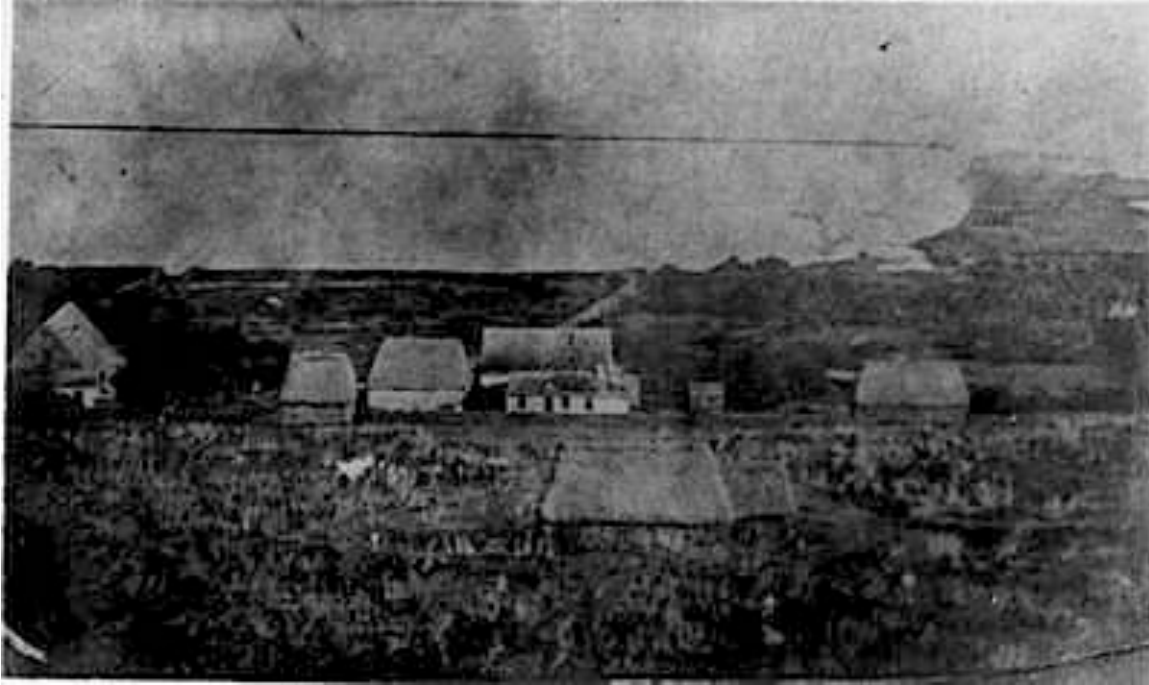


Left: Another of the very rare Kalauaha stamp cancels from the year that post office closed;
 Right: The cancel of the direct successor to the Kaluaaha post office at the harbor town of Kamalo.

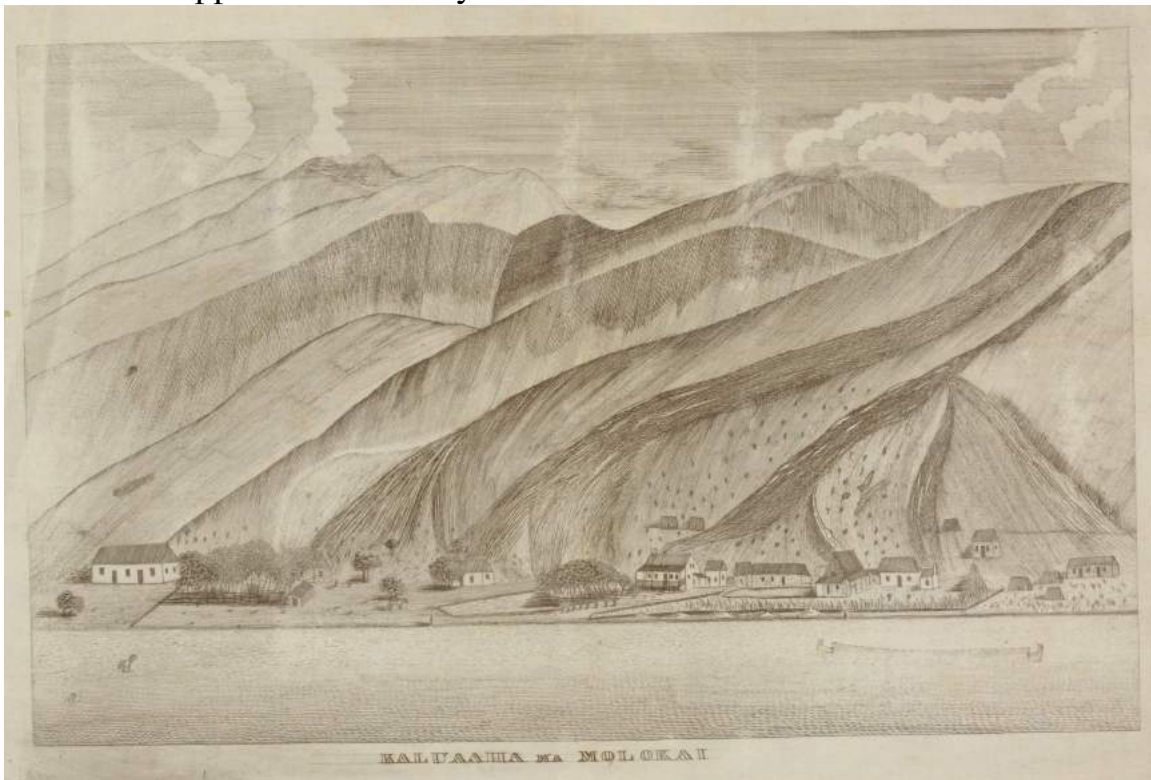


An 1884 cancel from the expanding harbor town at Kaunakakai. It would eventually supplant both Kamalo and Pukoo over the next couple of decades.

Kaulaaha , located in the ahupua'a of the same name, was the first town founded on Molokai in 1832 as part of the Congregational Church missionary efforts. As such it has early historical images.



1890 photograph of Kaluaaha centered on Rev. H.R. Hitchcock residence. Hitchcock supported R.W. Meyer when he arrived on Molokai.



19th Century sketch of Kaluaaha. 1833-1843. First Molokai town.



Congregational church in Kaluaaha. The first church on Molokai. Fishponds and ocean in distance. The walls were 18' high and 30" thick made of field stone. Naupala fishpond and Pacific Ocean in distance. Established 1832. Planned in 1843. Built in 1844. It was preceded by a thatch meeting house of 1833 and a large coral stone church in 1835. Thatched roof was replaced by shingles in 1853. The roof was replaced again in 1899 and the walls were replastered.



Side view of Congregational church showing reinforcing buttresses added prior to 1912 and in 1917, a 6" reinforced concrete facing was placed on both sides of the very thick walls and a corrugated iron roof installed. The termite ridden steeple, built on the iron roof, collapsed in 1967 during a May storm. Final wall thickness was about 40". Although the steeple appears recent, its brass bell dates to 1844.



Modern ruins viewed from Kamehameha V Highway.



Front of church.



Rev. H.R. Hitchcock



Aerial image of Kaluaaha today. Green roof inside church ruins above Kamehameha V Hwy label is the restored roof of the church, helping to bring the church back to active status after many decades of decay and a series of failed efforts starting in 1964.



Full side view of Kaluaaha church ruins with eastern volcano in background.



Details of old field stone walls revealed in present day ruins. The fieldstones are small boulders of volcanic origin.



Back to Kaunakakai. A 1962 photo of Kaunakakai. Gas station (one of two) can be seen at bend to right of street with east volcano in background.



Above is a 1940's view of main street, which is, with the exception of the 1960's addition of curbs, effectively the same place. The town has little changed over the intervening more than half century, as shown below in a recent photo. Again the east volcano can be seen in the distance, with the

brown upper level common lands of Kawela Plantation at right on the volcano shield slopes. Most buildings are 1 -2 stories with the requirement that no structure be above 3 stories or the height of a coconut tree. Both views are along the main street, Ala Malama Avenue. Red dot marks upper Kawela Gulch. Rim of the eastern volcano, Wailau, can be seen at top of image. The transition of the barren, xeric terrain of lower levels of Kawela to the green at higher altitudes is plainly visible in the photograph.



Well known shops on main street, shown above, from left hand side mid-block of preceding figure, Kanemitsu's (hot baked breads) and Imamura's (fabrics, clothing) are shown above displaying the typical one story architectural style of the main street, Ala Malama Avenue.



Iconic architecture of Kaunakakai, a circa 1900's store in rural small town style. Kaunakakai the town was formed out of a small coastal portion of Kaunakakai ahupua'a. The remainder of Kaunakakai ahupua'a is now owned by Molokai Ranch. Between Kawela Plantation and Kaunakakai, the other ahupua'a have been combined to form Hawaiian Homelands excepting some coastal development. Below is seaside Kaunakakai east of the wharf.



Below is a drone aerial view of the commercial heart of Kaunakakai. In the distance at the top left can be seen the western volcano, Maunaloa and on the top right, Puu Kualapuu with the Kualapuu reservoir behind it.



Below, the Molokai natural foods store, just around corner from gas pumps.



The main street of Kaunakakai is shown below with two groceries. It is framed by the iconic green store in upper right, gas station at upper left.



Gas like many other imported commodities is not cheap as seen below. The comparable price was \$3.33 at the time of this picture on the eastern mainland. Fortunately distances are short on Molokai.



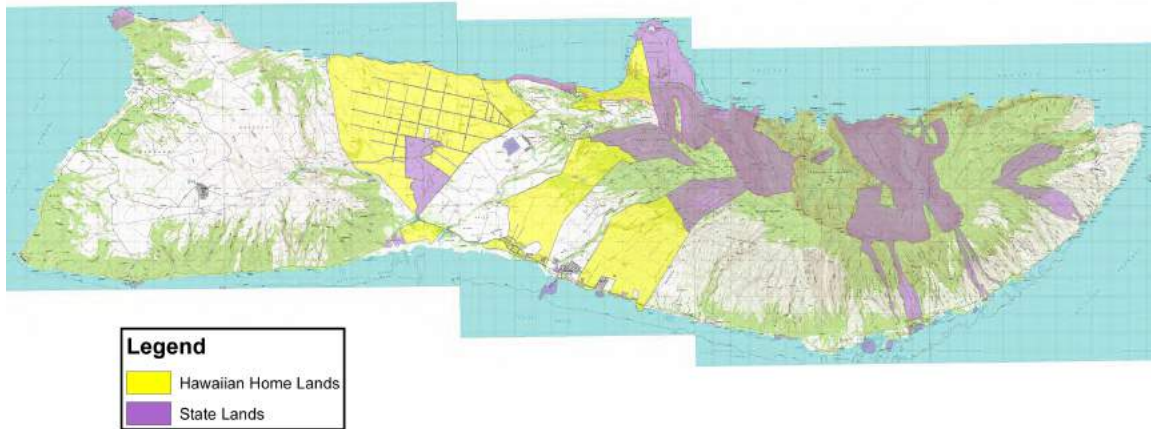
The population of the 3.1 square mile Kaunakakai town was 3,425 in 2010 almost half of the total Molokai population of 7,345. This is very different

from the pre-contact population distribution of Molokai where the south coast where Kaunakakai is located was sparsely populated, the island's west end unpopulated, and the isolated valleys on the north and eastern shore heavily populated.

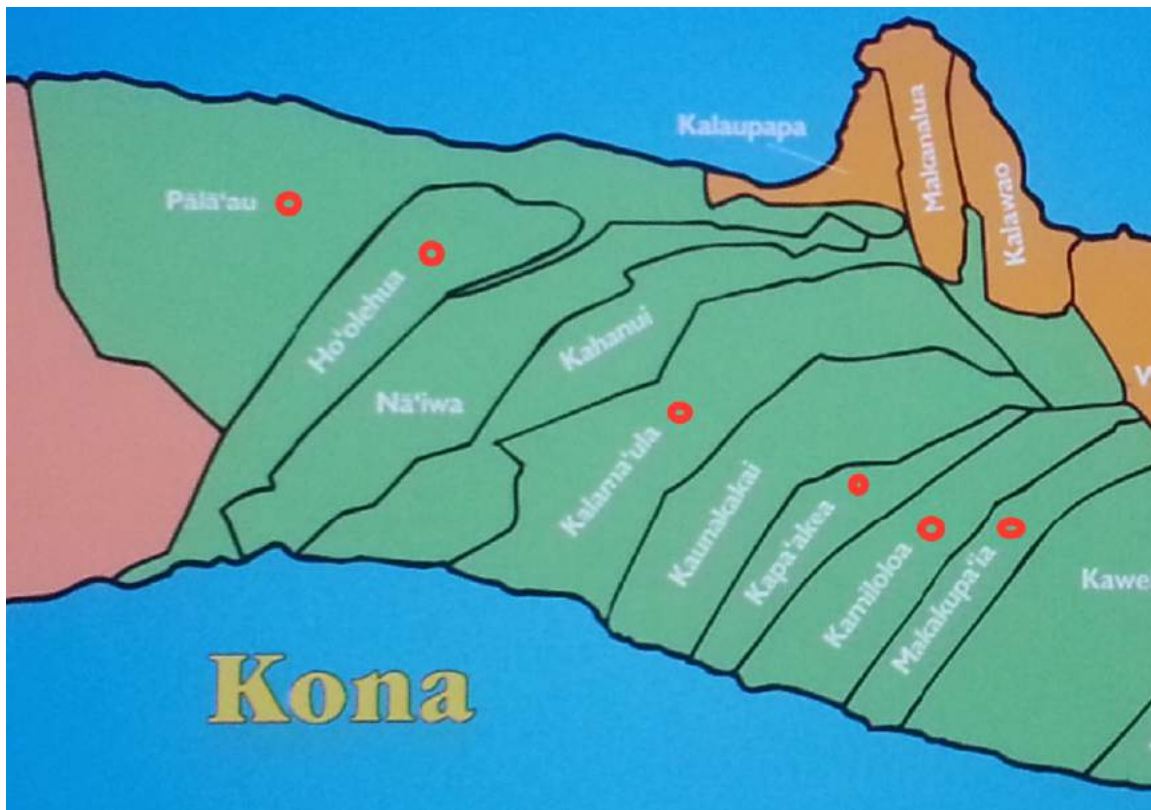
Unlike the much more densely populated islands with natural harbors, the population decrease on Molokai was much more owing to migration than to post contact disease. The pre-contact population for Molokai has been taken here to be the 20,000 – 25,000 number of recent research. However, contemporary first contact British naval estimates made in the late eighteenth century placed the population at 10,500. No matter where in this range of estimates the pre-contact Molokai population lay, it substantially decreased post-contact. There were no Europeans on Molokai prior to the arrival of missionaries in 1832, which greatly reduced disease introduction opportunity to the native inhabitants of Molokai.

Migration occurred in two waves, first there was the abandonment of the isolated, but agriculturally productive, wet windward valleys on the north and east shore in favor the much more accessible arid leeward southern shore. The second wave was off island migration to employment centers such as Honolulu on Oahu, where the opportunities arose both from post - contact commerce as well as the large population decreases owing to disease on the formerly densely populated and much more accessible islands. Save for the civil war cotton boom, the Molokai population was to monotonically decline, reaching a minimum of a little over 1,000 in 1910 compared to almost 800 in the leper colony who were counted separately. This downward population spiral strongly reversed in the 1920's.

Three events contributed to a dramatic increase in Molokai's population in the 1920s. By 1930, there were 4,427 people dwelling on the island, an increase of 3,421 in ten years. The first major change occurred when the Government passed the Hawaiian Homes Act in 1921. Seventy-nine Hawaiian homesteading families moved to south coastal Kalamaula ahupua'a just west of Kaunakakai in 1922 and in 1924 to the agriculturally productive Hoolehua and Palaau ahupua'a, which occupy the fertile plain between the west and east volcano slopes and were opened for homesteading on lands previously under lease from the government to the American Sugar Company Limited. The homestead population rose from an estimated 278 in 1924 to 1,400 by 1935 . Present Hawaiian Home Lands are shown on Molokai below together with state lands.



Below are shown the Hawaiian Kingdom ahupua'a, marked by red circles , parts of which are included in the Hawaiian Home Lands which take up most of central Molokai. Kawela ahupua'a is to the east at the lower right. Modern Kawela Plantation is composed of part of Makakupaia ahupua'a and part of Kawela ahupua'a.



Below, the agricultural heart of Hawaiian Home Lands at Hoolehua and Palaau ahupua'a. Airport is at center south of the patchwork of fields. Reservoir is on right. North coast and Pacific Ocean lie above.



Below is an enlargement of the farm fields to the left (northwest of the reservoir) . The Kualapuu reservoir, located next to Puu Kualapuu an isolated 1017 foot local peak, and once the world’s largest rubber lined water body (it leaked) , can be seen on the top right of center. Molokai High School, “ Home of the Farmers”, can be seen as the cluster of buildings bottom left above other fields, with school sports fields to the right.



A closer view of the fields alongside the reservoir is shown below. Lanai can be seen in the distance in the south. The west volcano, Wailau, can be seen to the left or east. Since the introduction of irrigation from the higher elevations and north coast valleys of Wailau, the full agricultural potential of the Hoolehua plain between Wailau and Maunaloa volcanoes has begun to be realized. This is evidenced by the fertile and productive farm fields shown here that are largely in the hands of native Hawaiians under the Hawaiian Home Lands program. Lanai in the distance. Wailau on the left.



Still closer, below, a view of Kualapuu reservoir and puu. with the productive fields in the foreground. The reservoir is elevated by dikes above the surrounding plain with the puu constituting part of that dike system wall. The height of the dikes are apparent and provide the elevation needed for the water supply system's gravity driven pressure.



Northeast of the reservoir is Kualapuu town and elementary school, both with very strong agricultural roots, shown below. A very strong lush contrast to the xeric lands of Kawela, a difference owing mostly to better soils and extensive irrigation around Kualapuu, a former plantation town.



Below is another field area just south of the reservoir and west of the intersections of Routes 460 running north to south and 470 going east. Lanai can be seen on the left across the water and Tropical Island Properties , LLC to the left or east side of the road.





View from Puu Kualapuu ,next to the reservoir, closer to the north coast, of Kaunakakai harbor on the south coast with Lanai looming in the distance.



Above are the extensive south coastal Hawaiian Home Lands settlements at Kalamaula ahupua'a west of Kaunakakai.

Below is a view looking west from Kaunakakai ahupua'a toward Kalamaula ahupua'a of the Hawaiian Home Lands. Maunaloa, Molokai's western volcano, can be seen to the west, at the top center of the image, across the water. Puu Kualapuu can be seen rising top right. Kalamaula is regarded as one of Molokai's more beautiful ahupua'a. Kalamaula was originally a crown land reserved for Kamehameha III under the Mahele of 1848. Later the land became a part of government lands after the end of the Hawaiian Kingdom. Still later, it became part of the Hawaiian Home Lands.



The establishment of the Libby, McNeill and Libby pineapple plantation on land leased from the Molokai Ranch at Maunaloa in 1923 was the second event to influence population on Molokai. This lease allowed Libby to use any of the lands of Kaluakoi ahupua'a above the 500 foot level, on a per acre basis. The village of Maunaloa was founded here to house workers for the plantation. Due to foreign competition the pineapple plantations began closing in 1970 and were completely shut down by 1989, but their population increasing effects were enduring and set the stage for the later controversial Monsanto GMO corn crop activities.

Lack of water always had been a major deterrent to the development of diversified agriculture on Molokai. Private water systems, barely adequate for their own needs, were operated by the Molokai Ranch and the pineapple plantations. The main water supply of these systems came from Molokai Ranch water sources. To meet these needs and those of the Hawaiian Homesteaders, the Kualapuu Reservoir, or the Molokai Water System, was built by the State of Hawaii under joint funding from the Federal Government. The State has always administered the program. This was the third event underlying the population increase. The major elements of this system, as discussed earlier, are three stream diversion works and three wells in Waikolu Valley, a 5.1 mile long water development and transmission tunnel, a transmission pipeline from the tunnel to the Kualapuu reservoir and the distribution pipeline network from the reservoir through Central Molokai to its terminus west of the Molokai Airport. The system became operational in 1969.

During the late 1920s and early 1930s Kaunakakai gradually became the main hub of activity, partially due to its central location and increased population. It was here that a larger, improved wharf had been developed for the pineapple plantations and for the shipment of cattle. In 1935, all County buildings were permanently moved intact from Ualapue to Kaunakakai where they are situated today. With the concentration at Kaunakakai, the roles of Kamalo harbor and Pukoo harbor (dredged to its present clover shape by a unsuccessful 1960's developer) diminished, just as inland Kaluaaha located between them had earlier. Commercial shipping to Kamalo and Pukoo ceased long ago.

The main architectural character of Kaunakakai's commercial buildings was one of consolidation along one continuous row of one and two story, wood frame structures with false fronts and canopies. Curbs and sidewalks were installed as late as the 1960s. Almost all of the buildings along the two blocks of Ala Malama Street from east to west are over fifty years old, some are quite a bit older. Kaunakakai is currently the commercial, governmental and social center of the island of Molokai. Although the harbor has played a large part in the town's importance as a business center to the island, the town itself is located a half mile from the wharf, a location which reduced flooding chances from the stream in Kaunakakai Gulch. An extensive dike works has been built along the banks of the floodplain of Kaunakakai stream as it passes through Kaunakakai town to further lessen the historic flooding risk. At Kawela Plantation Lot 30, high cliffs play the role of dikes.

The Origins of the Name for Kupaia Place

The place names in Hawaii are often used multiple times, not only on different islands, but also on the same island. This is the case for Kupaia Place, a street in Kawela Plantation. Originally on Molokai, Kupaia was used as a place name for a puu and also for a gulch in the higher elevations of Makakupaiaiki, now a part of the Nature Conservancy Kamakou Preserve located directly above and north of Kawela Plantation. This is described in the tables below.

Kupaia Gulch

Island: Moloka'i

Ahupuaa: Makakupaia

Feature: stream

Comments: Rises at 3550 ft. elevation, joins South Fork Kaunakakai Gulch at about 2675 ft.

Lexicology: kūpā'ia. PEM: hewed out.

Kupaia

Island: Moloka'i

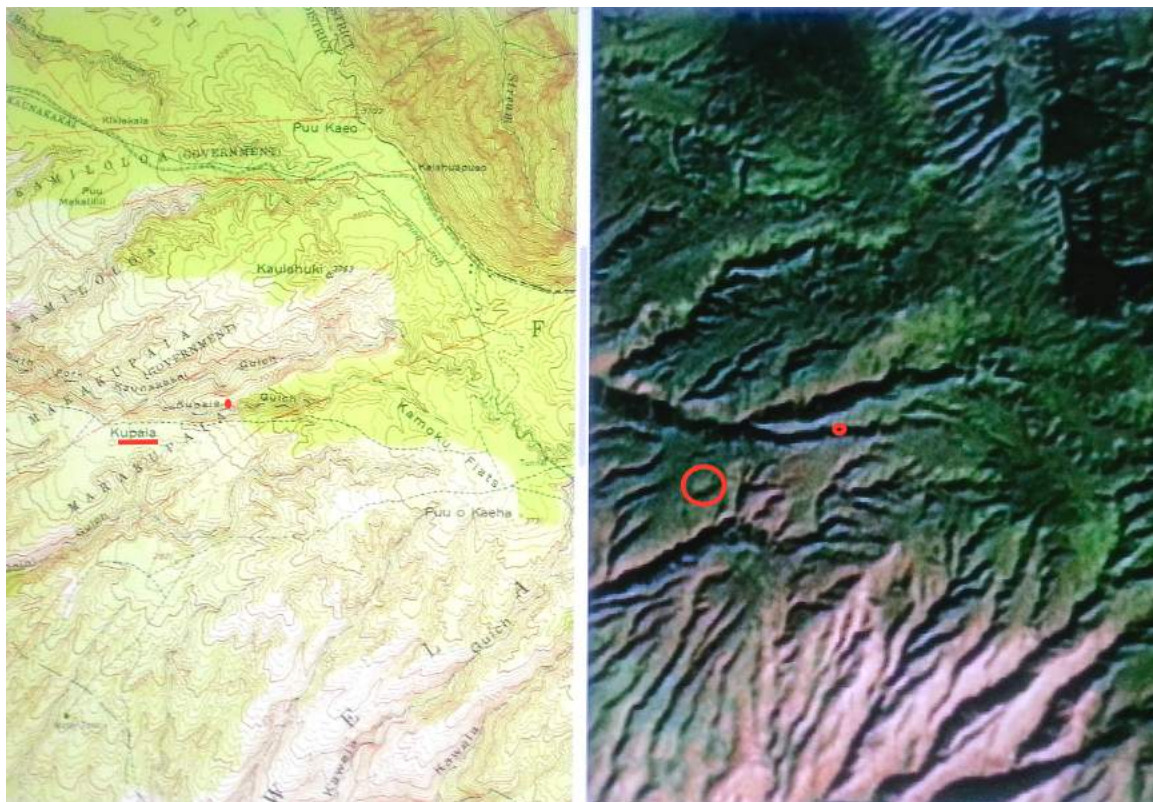
Ahupuaa: Makakupaia 2

Feature: pu'u (hill, peak, cone, mound, hump, bulge, heap, pile)

Comments: Elev. 2950+ ft.

Lexicology: kūpā'ia. PEM: hewed out.

Below is shown the current (1993) USGS topographic map for the area including the puu (red circle) and the gulch (red dot). Note that the gulch label "Kupa'la" is not only a misspelling of Kupaia, but is used to incorrectly label the larger South Fork of Kaunakakai Gulch from which the much smaller Kupaia Gulch opens just north and west of the puu. The Kamakou Preserve western and southern boundaries are shown with Kawela Plantation below the south boundary. Below that is shown the 1952 USGS map for the region alongside the Landsat photo for the same region at the same scale. In the USGS map the label for Kupaia has a red underline. The puu appears as a near circular contour to the left of the line. Kupaia Gulch is marked with a red dot. The Kona-Koolau district boundary can be seen along the ridgeline in the upper right separating windward from leeward Molokai. On the adjoining Landsat photo, the puu is indicated by a red circle and the gulch by a red dot.





Above is an aerial photo taken in 2015 of the immediate area of the puu (red rectangle) and the gulch (red circle). Both the puu and the gulch must have had a highly valued meaning, perhaps ceremonial for the pre-contact residents to have singled them out from the many other features in this rugged terrain for naming. It is also notable how much greener the Kawela region is at this altitude region of 2500 – 3000 feet.



Concluding Observations

The purpose of this work has been to trace the land origins of Kawela Plantation starting from prehistory to the fee simple transfer of the Kawela ahupua'a to Chief Lunalilo, during the Great Mahele over 160 years ago, to the present day. Although Kawela Plantation is only about ½ the size of the Kawela ahupua'a, it retains many of the essential characteristics of the original ahupua'a. In particular, the 210 2 acre lots connected by about 100 acres of road infrastructure and trails extending upland from the roads, capture in many ways the makai to mauka, the sea to mountain, extent of the original 'ili of the ahupua'a as it existed from ancient times until the early Hawaiian Kingdom. In addition, the 5500 acres of common lands is a direct analog to the upland portions of the ahupua'a that were accessible to all land holders of the ahupua'a until later in the Hawaiian Kingdom.

Five regions of Molokai determine its past, present, and future: the windward fertile wet inaccessible valleys of the north and east shores; the moist rocky south shore east of Kamalo; the dry rocky leeward south shore between Kaunakakai and Kamalo (Kawela location); the dry fertile saddle area between the east and west volcanoes; and the dry rocky West End.



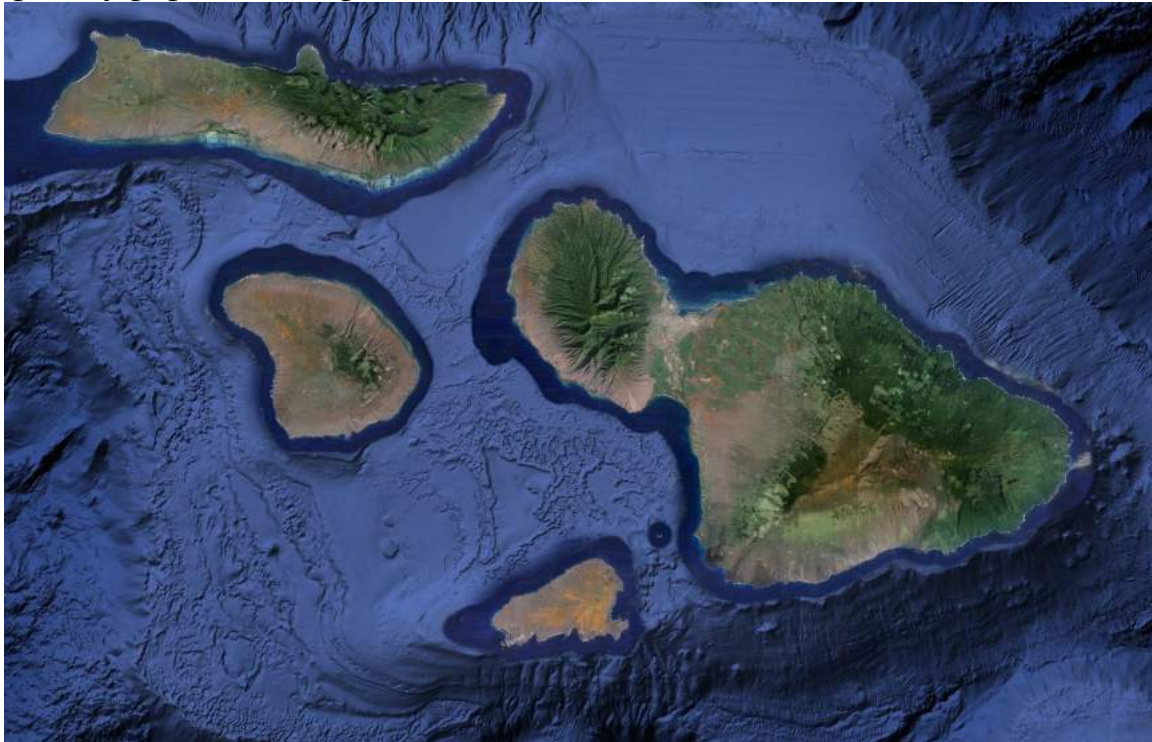
Sunrise view from Kawela of Maui, Hawaii (Mauna Kea and Mauna Loa), and Kahoolawe (left to right).



View of Kawela Gulch (foreground) with Maui offshore in background. 203 Kupaia Place, Lot 30, is cliff side at top of road along the gulch rim in center foreground.

Acknowledgements

Without the many data rich websites maintained by many diligent individuals, the assembly of the background needed in this document would have been impossible. A special thanks to Molokai native Ted Kanemitsu whose skillful and artistic use of drone aerial photography has made possible views to human eyes formerly reserved for eagles. Truly the Eagle's Eye of Molokai. Thanks also for Karter Kester's local Kawela videos. Without the wide bandwidth of the modern internet access to these websites would have been at best very difficult. An effort has been made to make this document self-contained to alleviate the need for extensive references. The text was also designed to provide many search keywords to use with the powerful search engines that exist on the internet, hence removing the need for any old pre-internet type of referencing. It has all made possible remote access to historical and research documents decades to centuries old, focusing on a sparsely populated ahupua'a on a remote island in the Pacific Ocean.



Satellite photo of Maui County showing clockwise from top: Molokai, Maui, Kahoolawe, Lanai . Kawela is located directly across from Lanai on the south coast of Molokai just west of where the coast goes from green to brown at Kamalo point.

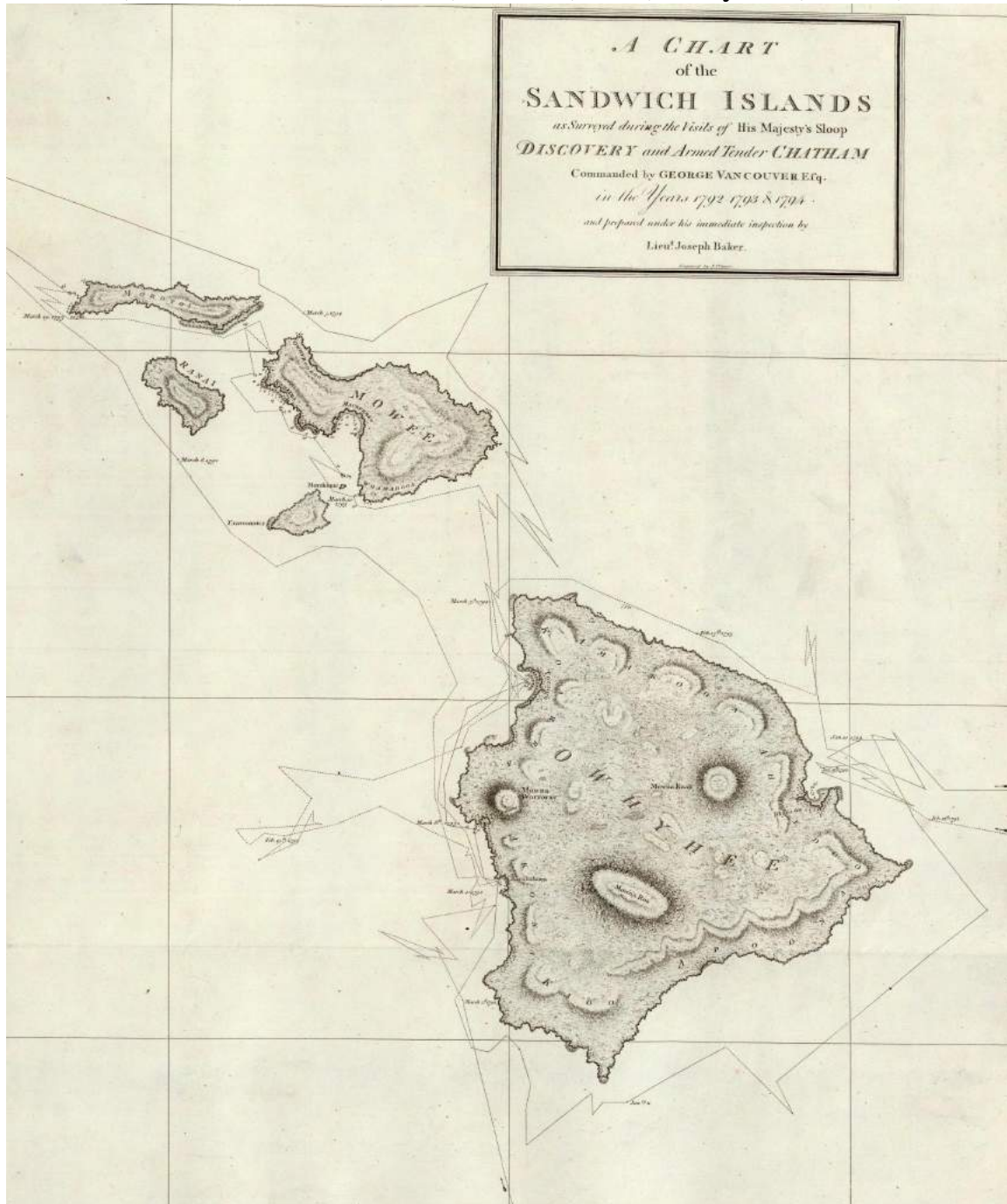
Epilogue: Kawela and Molokai in the Hawaiian Islands

Starting with first contact in 1778 and extending through the Unification of Hawaii civil war of 1782-1820 the place of Molokai and Kawela evolved. The civil war in the Hawai'ian Islands was over control of the entire island chain. At the time of European contact, the islands were divided among competing Ali'i, or high chiefs. The Island Hawai'i was divided into several districts, Molokai, Lana'i, and Kahoolawe were united under Maui, O'ahu was independent, and Kauai ruled Ni'ihau. The feudal Ali'i often fought wars to gain land and mana, however the introduction of European weapons gave some Ali'i an advantage over others, and they began aggressively taking over their neighbors. First the big island was consolidated by Kamehameha I after overthrowing his uncle for control of the Kona Hawaii. Meanwhile, the Kingdom of Maui invaded and conquered O'ahu. With Hawai'i united under his rule, Kamehameha eventually invaded Maui. Before he could successfully invade the last two remaining islands, the paramount Chief of Kauai, Kaumuali'i, negotiated a peace that submitted the islands to Hawai'ian rule.



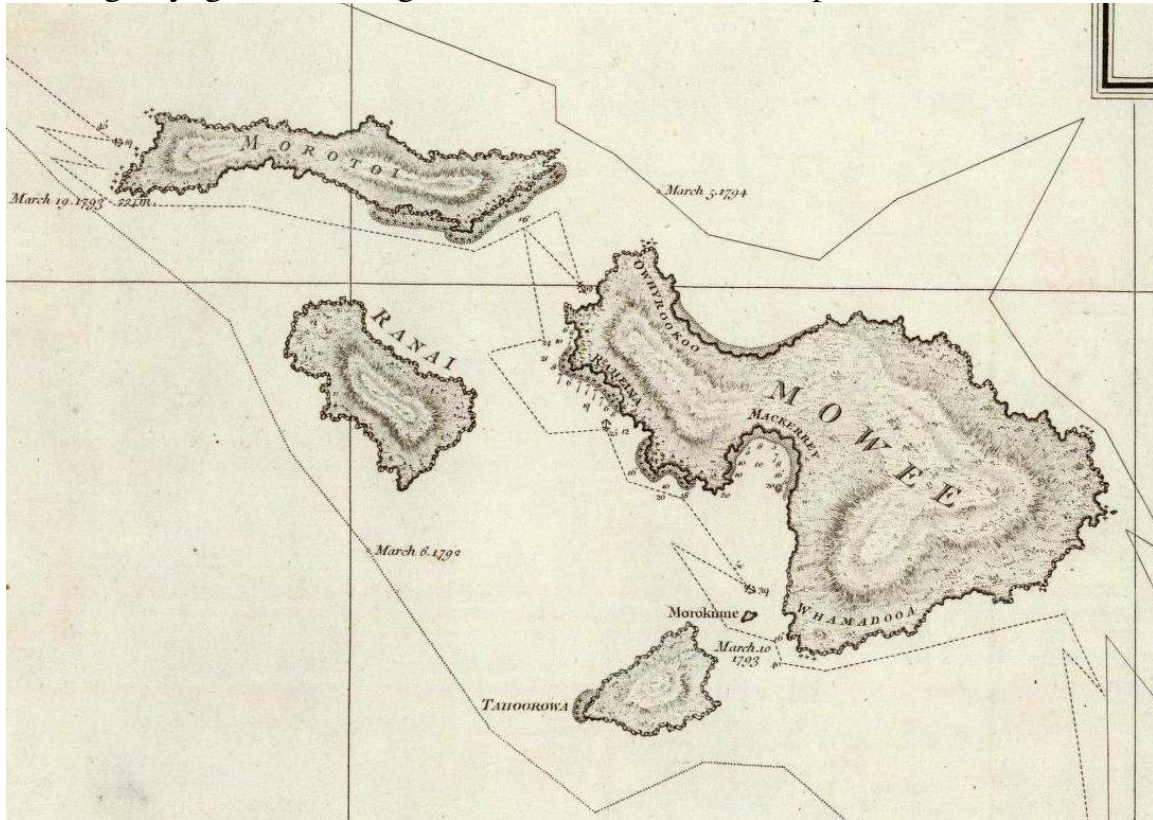
A very early map above of Molokai south to Hawaii from 1785 based on an early post contact voyage in 1778-1779. The path of the voyage with dates is shown. Like today, Molokai did not generate very much tourist traffic even then. Since there was no written Hawaiian language at the time the island spellings are phonetic :

Morotoi (Molokai), Mowee (Maui), Ranai (Lanai), Whyhee (Hawaii).



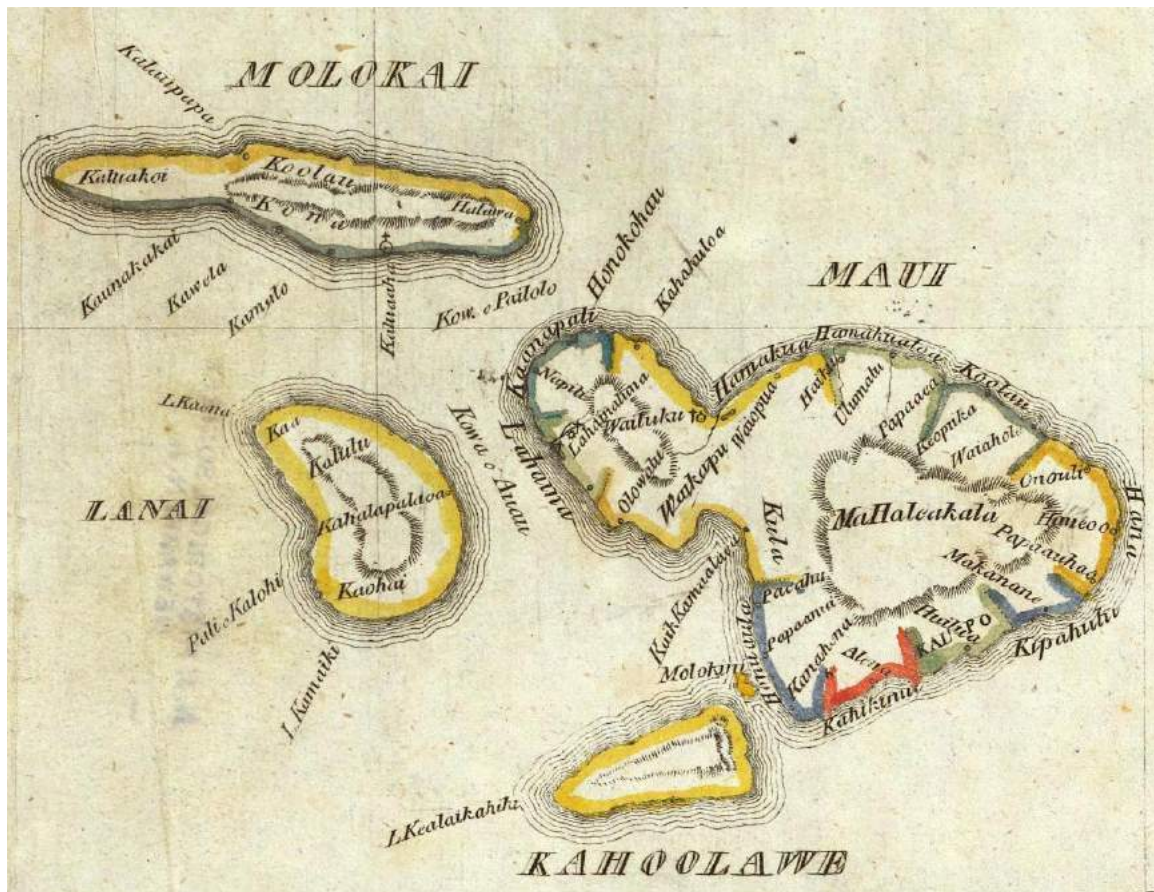
Above, a 1798 map based on a later voyage. Spelling is still phonetic, but somewhat better than the earlier map. The shape and topography of the

islands is also much more realistic. Below is an enlargement of the 1798 map showing the first record of the extensive southern reef of Molokai. Note the long voyage track along Molokai's southern coast past Kawela.



Above is an enlargement of an 1837 map made after the written Hawaiian language had been established and hence the names are spelled correctly and not phonetically as on the earlier maps. Note Kawela is called out explicitly as a major feature on the southern coast of Molokai. Also the two moku or districts of Molokai, Koolau on the north coast and Kona on the south coast are labeled, as is the very large Kaluakoi ahupua'a composing the island's west end which unlike all other ahupua'a on Molokai was not a part of a moku.

Below is the 1837 map made during the Hawaiian Kingdom from which the earlier enlargement was taken. Note the realistic island shapes that have the typical fidelity of early 19th century maps made when there existed substantive survey data. Notably, the 1798 map did a better job of capturing Molokai's shape and physical characteristics than the 1837 map. Specifically, the Kalaupapa peninsula is not captured. It seems that Molokai was not much of a destination for surveyors until the Boundary Commission work decades later, even less than during the voyages of the late 1700's.



By 1876, after the Boundary Commission surveys, the topographic maps of Molokai had become more realistic. This is shown in the 1876 map below. Note that Kawela is marked on this map.



By 1920, the maps were essentially modern in content as shown in the 1921 Rand McNally and Company map below. With the rise of towns and harbours, Kawela no longer seems to merit a map marking.





Hawaiian Island Chain as shown on a silver 1959 Hawaiian Statehood Medal No. 2302 . Molokai at center of island chain. Official Statehood Medal commemorating the Admission of Hawaii as the 50th State of the United States of America, August 21, 1959. This medal was struck in 1959. This is a very large medal with a diameter of 2 ½ inches and a weight 4.83 ounces (136.7 grams) of silver with a fineness of .916 2/3. Exactly 3,154 of the sterling silver version of the official Hawaii Statehood medal were struck. 3,000 of the sterling silver medals have a serial number on its edge, while 154 lack the serial number. The actual surviving numbers of these medals are considerable less when you consider how many went to the melting pots in the late 1970s and early 1980s during the silver bubble. Medal numbers 1 through 2500 were from the first striking. Medal numbers 2501 through 3000 were from the second striking. The citizens of Hawaii complained about the low mintage numbers and second striking was made of 500 sterling silver medals. The 154 unnumbered medals were ordered by then Lieutenant Governor James K. Kealoha to give out as gifts from his office



Hawaiian Island chain as shown on bronze 1959 Hawaiian Statehood medal. Early strike with Niihau misspelled. Molokai is in center of island chain. Same size as the silver medal but with a weight of 126.9 grams (4.47 ounces). 29,599 of the bronze version of this medal were struck. Both the error and non-error exist in the bronze version. Only 58 medals, same size but 216.3 grams (7.63 ounces), were struck in gold (900 fine) and are a true rarity with a number melted as with the silver in the metals' boom of 1980.

On August 21, 1959, Hawaii joined the United States of America as its 50th State. The Official Hawaii Statehood medals were authorized by Senate Concurrent Resolution Number 12, adopted by the First Legislature of the State of Hawaii meeting in special session October 22, 1959.

During the kingdom, there was a coinage of copper(1847) and silver (1883).

Since coinage of silver required a 2/3 approval of the Hawaiian Kingdom Privy Council and since cents were in very high demand for mid-19th century commerce as was evidenced by the issuance of private tokens in a number of countries, in particular the US and UK, to make up for the shortfall of government issues, under Kamehameha III in 1847 the first cents were issued, produced by a Massachusetts mint that produced hard times tokens in the U.S. . As might be expected, there would misspellings, in particular in the denomination. Also, the bust of the king bore scant resemblance to him. As a consequence, the cent was widely rejected with workers throwing them away when offered as payment. Despite this, lacking an alternative, they circulated until about 1900 and the post-kingdom arrival of U.S. cents. The 1883 silver coinage under Kalakaua was much more successful, being made to U.S. standards at the San Francisco mint upon dies by Charles Barber whose designs dominated U.S. coinage from the late 1800's to early 1900's.



Above: dollar, Below: ½ dollar. All coins shown in correct relative size.





Quarter, probably one from uncirculated rolls found post WW II



Dime, a high grade example. A nickel was not produced.



The large cent of 1847 showing red Hawaiian soil encrustations from burial. Likely one thrown away in disgust by a Hawaiian owing to defects.



Later reproduction of cent showing details.

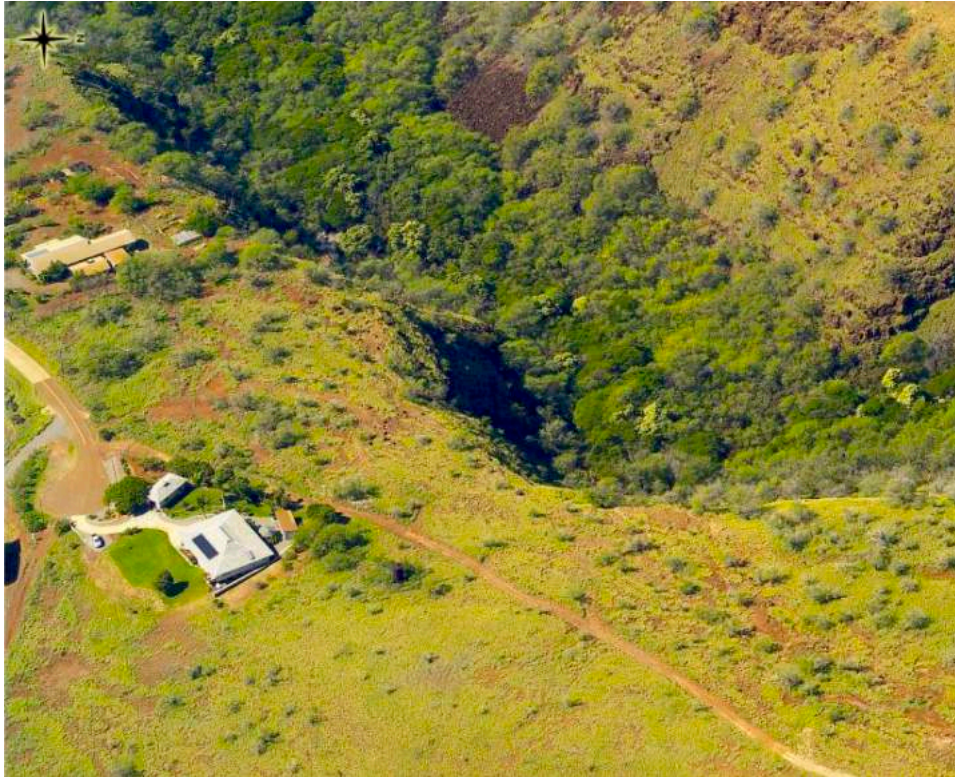
Aerial Views of Lot 30 , 203 Kupaia Place 2015



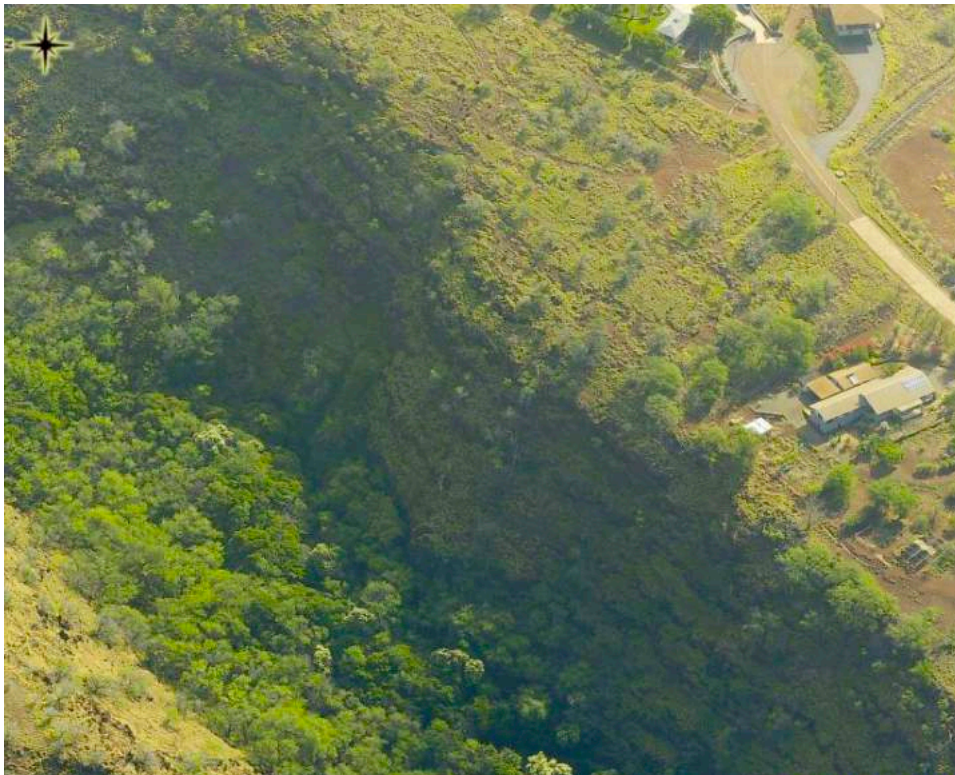
South view of Lot 30. Lot centered between homes and gulch.



North view of Lot 30 showing cliff face at lot edge.



East view of Lot 30. A view across Kawela Gulch



West view of Lot 30. Common Lands to left and at top.
These four concluding images are from winter, the green season.