Chapter 4

ASSESSMENT

Scope of Assessment

In the following chapter the report shifts from reviewing to synthesizing and assessing previous research. In essence, the first section asks the question: What have we learned through these projects about the past? The next section evaluates the types and quality of archaeological data collected as evidence of the past. A number of different kinds of archaeological evidence are summarized by topic and site type. This evidence is used to synthesis in greater detail the culture history of Kalaupapa. Finally, the current state of spatial, temporal, and formal data on the archaeological record in the park is summarized.

General Summary of Prehistoric Kalaupapa

Our best evidence suggests the earliest settlers in the park probably lived in the Waikolu Valley early in the Expansion Period (A.D. 1100-1650) at least 800 years ago (Kirch 2002). At this time, people had been living in the windward Hālawa Valley to the east of the park for hundreds of years. The people of the Waikolu Valley may have chosen to live in this area since the natural landscape lends itself to the wetland cultivation. Visiting the valley today one can see the pondfields (*loi*) built by the first inhabitants and later historic-era farmers to grow taro and other crops (Yent 1986). Naturally, evidence of prehistoric settlement and land use is likely to be masked by later use and modifications of the landscape.

The Kalaupapa Peninsula, however, was probably not occupied until slightly later in the Expansion Period, perhaps around 1300-1400 A.D. (Kirch 2002; Ladefoged 1990). The prehistoric inhabitants of the park probably lived in a dispersed pattern with single households spread out from one another. Much of the land was used for agriculture. On the peninsula where it is dry and there are no permanent streams, people built field walls to protect crops like sweet potato (*'uala*) from the northeast tradewinds. The remnant field walls can be seen from the air as one arrives at Kalaupapa Airport. In wetter areas near the base of the cliffs, people built garden terraces. True pondfield agriculture may have only been practiced in the Waikolu Valley or at the mouth of the Waihanau Valley (Handy and Handy 1972). The first peoples of Kalaupapa also collected marine resources along the shore, the reef, and offshore except when strong winter storms prevented it. People visited other parts of the island both by canoe and by trail over the cliffs (Curtis in press).

By late in prehistory, the landscape was divided into four community territories (*ahupua'a*): Waikolu, Kalawao, Makanalua, and Kalaupapa. These small chiefdoms formed the west end of the political district (*moku*) of Ko'olau. Oral traditions recorded in the historic era suggests Kalaupapa was the site of a battle between the chiefs of Ko'olau district and allied forces from the leeward side of Moloka'i Island and 'Oahu Island (Summers 1971).

Makapulapai, a hill in the center of the peninsula with sixty burial cairns built on it, may be a memorial to those who died in the battle sometime in the 18th century.

General Summary of Early Historic Kalaupapa

In the years just after contact with Europeans in 1778, the population of the Hawaiian Islands was decimated by disease and overwhelmed by war. As a result, the fields and homes of people living in Kalaupapa were rapidly abandoned. Moloka'i Island was captured and occupied by Kamehameha I in 1790, later taken by forces from Maui Island, and retaken in 1795 (Summers 1971). By 1810, the Kingdom of Hawai'i was established and Kamehameha I was crowned king.

As the population of Kalaupapa decreased, the settlement pattern changed and several small villages were established. By 1848, a major reworking of the land tenure system called the Great Mahele was underway. Over the course of a few years, the ownership of land was set down in maps and written deeds. Also at this time there was a jump in the amount of potatoes exported from Hawai'i. These barrels of potatoes were valuable in the Gold Rush markets of California in 1849 where population growth was outstripping the ability for local farmers to meet demand. Newspapers tell us Kalaupapa was famous as a dependable source of potatoes. Archaeological evidence supports this notion and suggests that fields that had been abandoned on the peninsula were once again farmed specifically due to the demand for potatoes (Ladefoged 1993; McCoy 2003).

Finally, from 1866 to 1895, the Board of Health resettled the original inhabitants of the area (*kama'āina*) in an effort to close the peninsula and isolate people with Hansen's disease. Historical documents indicate people were relocated to another part of Moloka'i Island outside the park. The relationship between the first patients and the last of the descendents of the original inhabitants to live in the park is a topic that has yet to be addressed through archaeological and historical research.

Settlement and Community Patterns

Since the advent of modern archaeology in Kalaupapa, American archaeology has been dominated by "settlement pattern archaeology" (Chang 1968; Flannery 1976; Green 1980; Longacre 1970; Willey 1968). Through various techniques, archaeologists have attempted to link the spatial distribution of sites with that of natural resources as well as examine the relationship between sites. These spatial analyses take place on three analytical scales of increasing size: the household, community, and region. An evaluation of the settlement pattern minimally requires three axis of information: time, space, and form (Spaulding 1960). Thus, for archaeologist the challenge is to describe the distribution of sites and resources, the variation in the form of sites, and establish a chronology.

To date, settlement pattern archaeology has been dominated by environmental archaeology. For example, few archaeologists explicitly focus on what early settlement pattern archaeologists called the "community pattern," a pattern

distinct in that it "could be attributed to efficient causes in the sphere of sociological and social psychology" (Chang 1962:28). For example, "the placement of houses in a community, the social ties among the inhabitants, their relationship in terms of political control, social behavior, and mental attitude, can be made the subject of the study of community patterns" (ibid). Overall, given the rich ethnohistoric record and excellent state of site preservation in the region, Kalaupapa is an ideal location for a more balanced approach to settlement patterns.

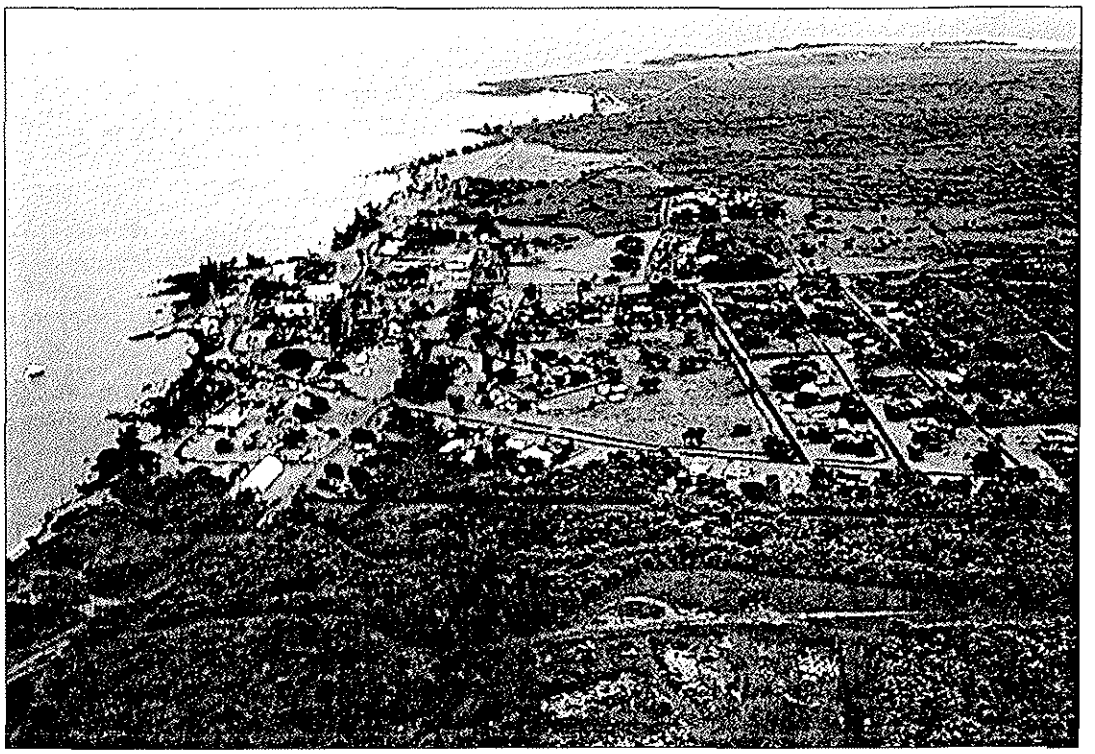

Figure 4-1 - Kalaupapa Settlement and Coastal Plain (photograph by M.D. McCoy)

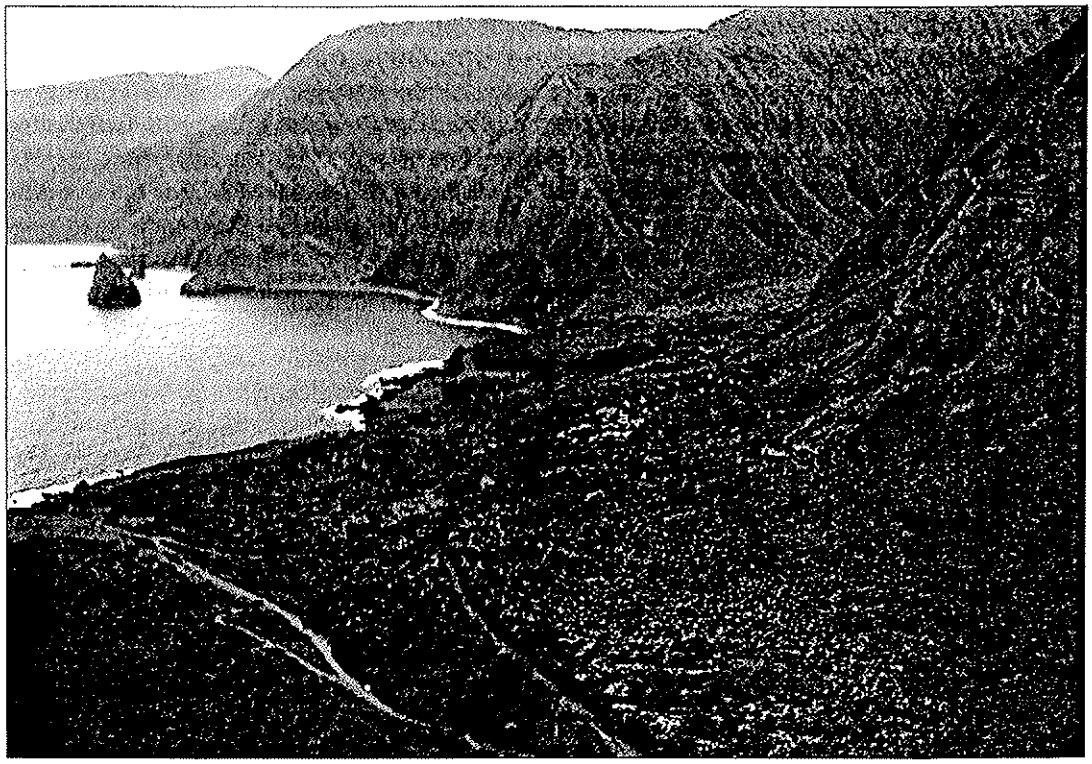

Figure 4-2 - Kalawao and Colluvial Slope Zone (photograph by M.D. McCoy)

The following discussion concentrates mainly on prehistoric settlement and community patterns. Past research on the Kalaupapa Peninsula suggests that although archaeological features are continuously distributed over the landscape, it may be useful to consider these challenges in terms of two geographic zones defined by vegetation, soil type, slope, and elevation: Coastal Plain and Colluvial Slope (Figure 4-1 and 4-2). By the historic era, the settlement pattern was dominated by villages including the coastal villages of Kalaupapa and Kalawao, but probably also one on the east coast called Iliopii, and lesser known villages in the valleys of Waialeia and Waikolu (Goodwin 1994a).

The Coastal Plain and Colluvial Slope Zones

The Coastal Plain is made up of broad, flat-to-low-sloping land formed from recent Kauhakō Crater lava flows (Figure 4-3). Many stone architectural features in this zone seem to date to the prehistoric to early historic era. A few long-term habitations are found in the area. Caves and freestanding stone shelters built to temporarily shield people from the wind are common. There is a continuous distribution of agricultural plots that make up the dryland Kalaupapa Field System. Sacred sites, such as fishing shrines (*ko'a*) found along the coast, tend to be small in size and variable in form.

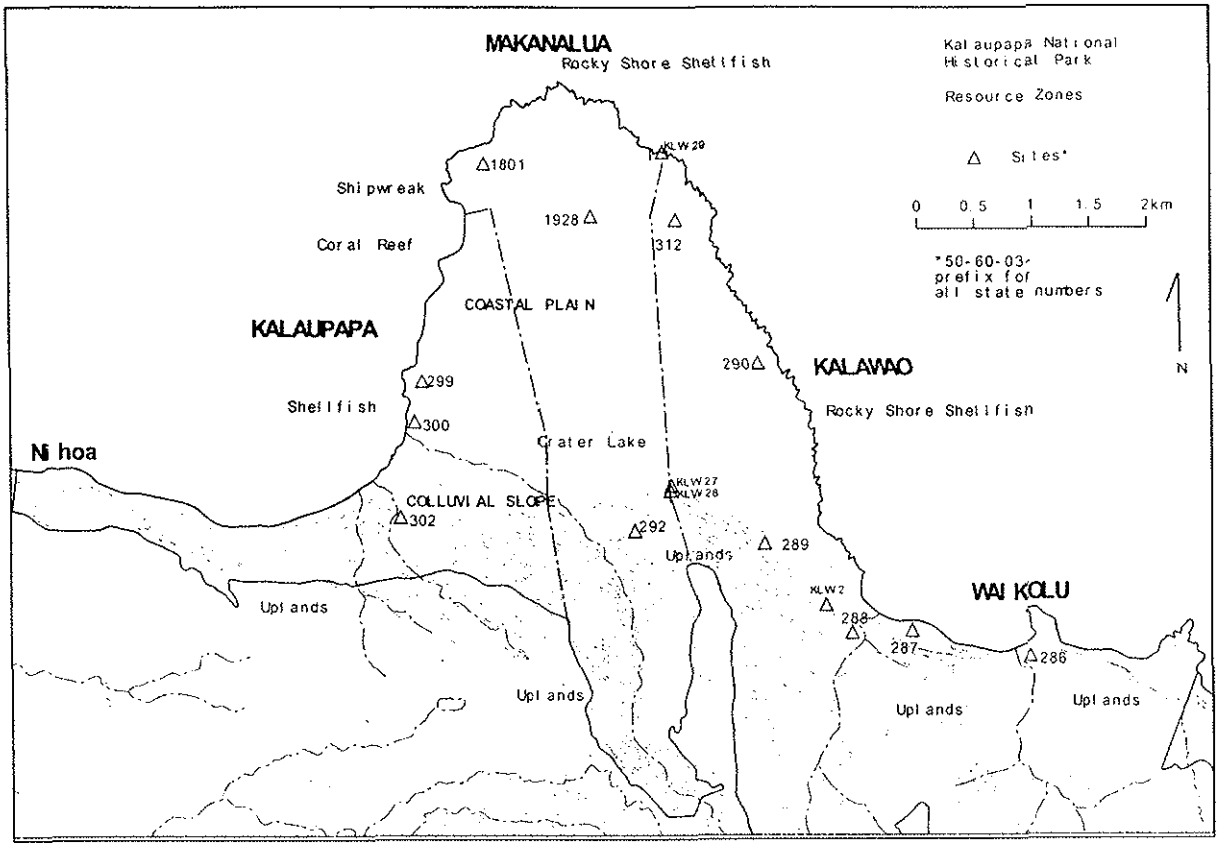

Figure 4-3 - Map of Archaeological Sites and Resource Zones

The area called the Colluvial Slope is steep land found in a west-to-east band along the base of the cliffs and valleys. The proximate origin of the Colluvial Slope is the accumulation of deposits from the constant erosion of the cliff face of the north shore. Few shelters are found in this zone. Agricultural features, mainly irregular small clearings, are continuously distributed across the landscape. Some plots may have been fed by intermittent floodwater, whereas others, especially in the valley bottoms, were probably true wetland pondfields (*lo'i*) (Handy and Handy 1972). There are a number of large *heiau* in this zone as well as a *holua* slide. Intermittent streams originating in the valleys are found exclusively in the Colluvial Slope zone. However, these zones are not homogeneous, nor are their boundaries distinct. For example, within Kauhakō Crater the landform and archaeological landscape seem to have much in common with both areas. The three community territories (*ahupua'a*) on Kalaupapa Peninsula cross-cut these zones, encompassing near equal portions of each. To the east of the Kalaupapa Peninsula is the large Waikolu Valley that was itself at one time its own community territory (*ahupua'a*). Currently, our best estimates of the settlement and community pattern in the valley are based on analogy to what was found in an extensive survey of the Hālawa Valley on the northeast coast of the island (Kirch 1975; Kirch and Kelly 1975).

Nihoa Landshelf, Points, and Offshore Islands

Within park boundaries are a number of small offshore islets, remote points, and one major landshelf that do not fit well into either major zone. Rough surf makes access to these spots difficult, especially during the winter months. However, Nihoa Landshelf on the western end of the park is known to have an archaeological landscape with a range of habitation and agricultural sites, suggesting it was used relatively regularly in the past (Kirch 2002; McHenry 1938, 1954). Off the northeastern point of the peninsula there is group of three small islets called Namoku that are probably natural low tide stands within the inshore coral reef. On the remote east end of the park, the Waikolu Bay at the mouth of the Wailoku Stream is framed to the east by Leinaopapio Point. Okala Island is just offshore from the point. Further from the coast is the larger islet of Mokapu Island. Both islands can be seen featured in many photographs of the north shore taken from the east side of the peninsula. Together, Leinaopapio Point and Kukaiwaa Point form the outline of another bay. Near the steep coast of this bay is an island called Huelo. These two bays and offshore islands would have been within the community territory of Waikolu *ahupua'a*. The archaeological landscape of this area is undescribed.[20]

The islets near Waikolu Valley, also known together as the "Rocks of Kana," are probably too small, or too steep, to expect very much stone architecture on them (Summers 1971).[21] However, recent archaeological surveys on remote landshelves on the coast of Hawai'i Island have demonstrated that in these environments archaeological sites are sometimes preserved by a layer of deposits laid down by small landslides in colluvial zones (Dawson 2001). If similar sites are found on the points along the north coast of the island, they may give us a better idea of the connection between Kalaupapa and the rest of the Ko'olau district (*moku*).

Economy and Resources

Agriculture

In terms of reconstructing agricultural development in the region, the dryland plots of the extensive Kalaupapa Field System have received the most attention from archaeologists (Kirch 2002; Ladefoged 1990, 1993; McCoy 2002a; Somers 1985). The fields probably expanded rapidly sometime in the fifteenth century, continued to expand into less desirable areas probably along with some kind of intensification of production, then were abandoned during the demographic crash following European contact, and finally re-worked during the early historic era to supply ships bound for the Gold Rush markets of California (Ladefoged 1993). Historic documents suggest that during the occupation of the Kalawao Settlement (A.D. 1866-1900) the fields were once again abandoned. Prehistorically, sweet potato (*uala*) was probably the main crop planted, but accompanying food crop plants would have included plants like yams (*uhi*) (*Dioscorea alata*) and sugar cane (*ko*) (*Saccharum officinarum*), as well as plants like bottle gourds (*ipu*) (*Lagenaria siceraria*). During the early historic era, newly introduced plants like the

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[20] Summers (1971:185-8) was only able to collect information on four sites in Waikolu, but see Kirch (2002).

[21] Elsewhere in Polynesia, offshore islands have featured prominently in religious and ritual cycles, like the famous Birdman Cult of Rapa Nui (Easter Island).

Irish potato, beans, and onions joined traditional crops. The elite, through a local land manager, probably profited from production into the historic era. Currently, the Kalaupapa Peninsula Archaeological Project (KPAP) is looking at the form, distribution, and chronology of the development of the fields. Initial investigations have demonstrated the fields to be more or less continuously spread over every undisturbed part of the peninsula (McCoy 2002a).

There are other important related issues for which we have very little information including: wetland agriculture, floodwater irrigation, soil productivity, and domestic animals. This gap in knowledge, especially regarding wetland agriculture, can be mostly attributed to the paucity of surveys within the Colluvial Slope zone and a lack of excavation in general. Two surveys in the Colluvial Slope zone this past summer revealed wetland terraces as densely distributed as the dryland fields (McCoy 2002a). In general, we cannot understand the context of dryland agricultural development without some notion of the development of wetland agriculture as well.[23]

Domestic and Wild Animals

The relative importance of domestic and wild animals in the lives of people during the prehistoric and early historic eras in Kalaupapa is virtually unknown due to the lack of archaeological excavations. However, thanks to historic records, and the relative isolation of the peninsula, the presence of certain animals can help refine the date of occupation of a site. Recent re-evaluation of deposits inside Kaupikiawa Cave (50-60-03-312) identified the remains of vertebrates including "the native Hawaiian bat (*Lasiurus cinereus*), identifiable fragments of pig (*Sus scrofa*), and the Pacific rat (*Rattus exulans*). . . [and from upper historic period levels] horse (*Equus caballus*) and the European house mouse (*Mus domesticus*)" (Kirch 2002:90-92). Excavations at an early historic era farmstead (50-60-03-1801) by Goodwin (1994a, 1994b) unearthed the remains of a number of these animals including "toad, large galliform [probably turkey], two doves, large rats, mouse, mongoose, horse, medium artiodactyl, and large land mammal" (Goodwin 1994a:181). The majority of domestic animal remains recovered were pigs, although dog (*Canis familiaris*), chicken (*Gallus gallus*), horse and probably turkey, were also discovered. Although a few examples were found, seabirds were surprisingly rare in the deposits. No other equivalent sample from a household has been excavated in Kalaupapa, making comparison over time or space difficult.

Coastal and Marine Resources

With such a large dryland field system, the role of coastal and marine resources is often overlooked at Kalaupapa. In the coastal zone there are shellfish, inshore fish and coral reef sea life in sheltered natural harbors, and deep-sea fishing grounds not far off shore (Figure 4-3).[24] The park includes a small brackish lake with no fish, but noted to be home to shellfish in the past (Phelps 1937). There are several freshwater streams in

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[23] See Kirch's (2002) discussion of dryland and wetland prehistoric agriculture in Kalaupapa.

[24] The fauna excavated by Pearson *et al.* (1971) remain unanalyzed or unreported.

[25] Summers (1971:194), citing Thurn (1907:240), writes that, "Somewhere at Kalaupapa, 'Ai'ai is said to have left a fish stone. That is the reason fish constantly gather there even to this day"

the park as well. The fishpond(s) located on the northeast point on the peninsula would have been a predictable source of fish whenever3 required (Wyban 1993). The sea was also a source of material such as coral and shell used to make tools and personal adornment.

We know very little about the relative importance of these resources due to the lack of excavation of the midden left behind after ritual, festive, or daily food preparation and consumption. Only two such deposits have been excavated thus far: Kaupikiawa Cave (50-60-03-312) and a historic era farmstead (50-60-03-1801). Pearson *et al.* (1974) in their laboratory analysis of shell from Kaupikiawa Cave identified five genera: *pipipi*, or sea snail (called *Nerita* but also known as *Neritidae*), *'opihi* or limpet (called *Heliconiscus* but also known as Patellidae *Cellana exarata*), *pupu kolea* or periwinkle (*Littorina*), *pupu awa* or drupe (*Drupa*), and *leho* or cowrie (*Cypraea*), of which the first two were selected to test changes in the average size of individuals. They found the smallest examples came from lower levels which "might be inferred to reflect a lessening of the pressure on the shell[fish] supply during the time period of the upper levels" (Pearson *et al.* 1974:48). However, it remains undetermined if the trend was "the result of human activity relating to the shellfish or to an internal dynamic within the shell[fish] population" (Pearson *et al.* 1974:49). Without a better understanding of the context in which the remains were deposited, and how they compare to other similar contemporary, previous, and later deposits, this initial midden analysis of the site tells us little. Within the samples from the site taken by Kirch's (2002) team, "some 26 different species were identified, dominated by gastropods, but also including 5 bivalve taxa, 2 sea urchin species, and a small amount of Crustacea." The taxa are consistent with what would have been available on the rocky shoreline nearby the site. In addition, 26 types of fish were found described as "generally small-to-medium sized individuals, from taxa typically inhabiting near-shore and reef environments; most frequent were Labridae (*Bodianus* sp. and *Halichoeres* sp.) and Scaridae (*Scarus* sp. and *Calotomus* sp.)" (Kirch 2002:90-92) (See Appendix I for a detailed discussion of the site).

The historic era farmstead (50-60-03-1801) fully excavated by Goodwin (1994a, 1994b) yielded a range of material evidence of coastal and marine resource exploitation such as fishing gear, shellfish remains, and fish bones. Fishing gear at this coastal site included 5 fishhooks, some made of bone and some of iron, 2 net weights, "bread loaf" and "grooved" sinkers, and 3 cowrie shell lures. The majority of the shells found at the site were worn and naturally deposited there by wave action. The remains of shellfish clearly collected and eaten at the site were found on the leeward side of the house near cooking areas. Most taxa-- *pipipi* (*Neritidae*) and *'opihi* (*Patellidae*)-- could be found in the immediate area. Some taxa not naturally available in the area were also found including "*Strombidae*, which inhabit sandy areas, and a few *Theodoxus vespertinus*, which inhabit the mouths of freshwater streams" (Goodwin 1994a:177). Goodwin (1994a:181) summarizes the analysis of over 14,000 fish bones or fragments:

> Sixteen taxa are represented. . . Most of them are small lagoon or inshore reef fish that would be taken in nets or traps while a few of the large

carnivorous varieties (labrids, cirrihitids, mullids, and carangids) could be caught on hooks. There were few offshore, deep ocean fish in the collection indicating that residents here seldom employed deep water trolling or bottom fishing as major fishing techniques.

Given the short duration of occupation of the site, the analysis concentrated on the spatial distribution of materials. It is difficult, but not impossible, to compare this sample to the one excavated from Kaupikiawa Cave (50-60-03-312), but one must take into consideration differences in sampling strategies, recovery methods, and names used to identify shellfish. One method to utilize these data on coastal and marine resources is though analysis that takes into consideration fishing techniques that bias the types of species likely to be caught.[25] For example, a possible explanation for the paucity of deep-water fish species in the collection is that rough winter seas tended to discouraged offshore fishing during a large portion of the year.

Lithic Resources

The study of flaked and ground stone is a unique branch of science developed by archaeologists to learn about the past through the only material that has beenpreserved from all stages of human history. Currently, lithic technology studies center on topics like establishing the source of the stone used, reconstructing the stages of reduction of the material from quarrying to tool making to reworking, use wear and residue analysis to try to determine the sorts of actions in which stone tools were employed, and classification of tools by type. The potential for these sorts of lithic technology studies in Kalaupapa is outstanding. An initial study by Weisler suggested the flaked basalt found by test excavation during the Airport Improvement Project could have come from a single local source (Ladefoged 1990).[26] Flakes of volcanic glass have been found in association with historic deposits by both Goodwin (1994a) and Barrera (1978), suggesting continued stone tool use well after European contact. The distribution of sources of stone in the area is currently unknown. The uplands and the *pali* are likely to have large natural deposits of basalt that could have been quarried. The past volcanic activity of Kauhakō Crater no doubt produced volcanic glass, which could be found in any number of places and forms.

Upland Resources

There is currently virtually no data on the role of upland resources in Kalaupapa (Figure 4-3). Accessible parts of the immense cliffs (*pali*) and the upper elevation of valleys held trees probably used for canoe building, birds whose feathers could have been used to make prestige items like chiefly feather cloaks, as well as countless other plants uses for crafts and medicine (Hiroa 1957; Kirch 1985). During part of the early historic period the uplands were economically important as the elite's hunger for foreign goods drew the islands into a period of heavy sandalwood (*'iliahi*) (*Santalum*

[25] See Weisler (2002) for a discussion of fishing techniques on Moloka'i Island.

[26] Ladefoged (1990:171) reports that Weisler found most of the basalt to be medium to course grained. Samples were tested with non-destructive X-ray fluorescence (XRF) methods against all eight major and three minor sources associated with Maunaloa quarry site on Moloka'i Island and Kapohaku quarry site on Lana'i Island for oxides of titanium, magnesium, iron, and trace elements (Rb, Sr, Y, Zr, and Nb).

spp.) harvesting for export to China (Kirch and Sahlins 1992).[3] Production of tapa (*kapa*) cloth and dyes also rely on plants found in the uplands. A chiefly tapa called *'ahapi'i* which was painted with fine lines made from *kukui* bark dye, and a type of tapa called *kumanomano*, are associated specifically with the Kalaupapa Peninsula (Summers 1971:188).[4] The uplands and *pali* are certainly areas in need of future archaeological research in terms of paleoethnobotany, but also as a zone where basalt for stone tool production may have been quarried.

Evidence of Lines of Transportation and Communication

Resources and information in the past have traveled to and from communities living in Kalaupapa over trails and by sea via canoe, sail, and steamer ships. Evidence of these essential parts of social life is also left behind in material remains occasionally. Archaeologists can choose to study material evidence of patterns of interaction, trade, and communication by trying to determine the location of the source of materials found (e.g., stone, shell), by looking at the few remnants of sea traffic, like shipwrecks and canoe sheds, and if we are lucky, by surveying the surviving portions of trails people used. A shipwreck visible from the northeastern shore of the peninsula is a good example why these sorts of unique sites should be investigated in their own specific historical context. The wreck is the *Kalaa,* a 1,519-ton ship that wrecked on the reef on January 3rd, 1932. According to Greene (1985), the resulting oil spill was the first major spill in which the local newspapers reported on the large amount of marine life killed.[5] It is not out of the range of possibilities this story is the first of its kind worldwide. The *Kalaa* thus may hold a place in the history of maritime disasters few would guess from the small portion visible above the waterline (Figure 4-3). The Chinese junk *Foo-po II* also sank off Kalaupapa in October 1935 but its current location is unknown. Either on land or sea, the physical evidence of interaction, transportation, and communication has yet to be addressed by archaeological research.

Household Archaeology

When carefully studied, the distributions and forms of habitation sites can be linked to known ethnohistorical social patterns like the *kapu* system that prescribed men and women's activities and underlay status differentiation between commoners (*maka'āinana*) and elites (*ali'i*). With the aid of ethnohistorical data, we currently have some idea of the form of a traditional household (*kauhale*), types of built agricultural infrastructure, various sites of religious practice, burial sites, and fortifications in Hawai'i. In addition, change in the form of houses over time has been interpreted as tracking the end of the *kapu* system in the nineteenth century (Ladefoged *et al.* 1987).

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[3] This review found no evidence of this sort of harvesting in Kalaupapa. However, this should not be taken as evidence it never occurred.

[4] Figure 1-3 is a photograph of several people wearing tapa (*kapa*) cloth garments in Kalaupapa around A.D. 1886.

[5] The *Kalaa* is listed with the "Abandoned Vessel Project" inventory of the National Oceanic and Atmospheric Administration (NOAA) (http://response.restoration.noaa.gov/dac/vessels/inventory/hi.html). The NOAA describes the wreck as "fishing boat, sunk 1996; visible wreckage reported." The author has made NOAA aware of the erroneous date for the sinking of the ship. It is also unclear how the vessel was designated as a fishing boat.

In Kalaupapa, household-level archaeology remains underdeveloped with the exception of Goodwin's (1994a, 1994b) excellent case study of an early historic farmstead.[30] For example, Manning and Neller (in prep.) present the results of extensive archival research on Kanakaokai, a man of some status who received lands in Kalawao as part of the Great Mahele. Some of the habitation sites found on the survey of Kanakaokai's land are interpreted as traditional Hawaiian households (*kauhale*) occupied at the same time he was the landowner. Other houses are interpreted simply as post-contact era houses.

Goodwin's (1994a) report on the large-scale excavation of a historic homestead (50-60-03-1801) includes many iterations of the site map showing the location and frequency of different classes of material that are used in an analysis of the functional use of space. From these we find that many of the daily activities took place on the western, lee side of the house. More importantly, these methods supply information on diet, cooking, and eating habits of the residents of the household as well as patterns of disposal of waste. The farmhouse, the largest known on the peninsula, may in fact have belonged to the land manager (*konohiki*) of the community territory (*ahupua'a*) (Goodwin 1994a:37-8). The excavation is a wonderful example of household level archaeology on remains from early historic Hawai'i and a valuable part of recent archaeological work in the islands on the often overlooked period where history and anthropology overlap (Kirch and Sahlins 1992; Mills 2002).

Communal Places and Sacred Sites

There is no systematic synthesis of the distribution and sequence of construction, dedication, or re-dedication of known sites sacred to ancient Hawaiians in Kalaupapa. The following summarizes what we currently know about sites like temples (*heiau*), shrines, burials, legendary places, and places where people would have gathered for feasting, ritual, dancing, and games. Much of what we know comes to us from elderly *kama'āina* interviewed by Stokes (1909), as well as other oral traditions, archaeology, and historic records. The relation of these sites to past socio-political changes will be discussed.

Location and Types of Temples (heiau)

In Kalaupapa, 26 *heiau*, or possible *heiau*, have been reported by archaeologists with an additional 4 *heiau* named by oral tradition but as yet unidentified (Kirch 2002; Ladefoged 1990; Manning and Neller in prep.; McCoy 2002a; Rechtman and Henry 2001; Somers 1985; Stokes 1909; Summers 1971; see Table 7). The size of *heiau* range from an example of the smallest kind in Hawai'i, the *pohaku a Kāne* type, to two examples of the largest class, the *luikini* type, with most falling into the medium-sized class. From Stokes' (1909) visit we can identify certain *heiau* as dedicated to Ku, Hina, Kamohaialii; Hoomea [Haumea] (sister of Pele) and for specific purposes such as *ho'oului'a*, offering first crops, and *hana aloha*, to aid in the union of lovers (Summers 1971). Based on their location, size, form, and cardinal orientation, archaeologists have suggested certain other *heiau* were probably dedicated to Ku, Lono, and/or Kāne (Kirch 2002). Archaeologists have also

[30] Goodwin (1994a:46-51) has reviewed the various lines of historical evidence of residential structures in Kalaupapa.

suggested some *heiau* may have been associated with the annual Makahiki festival (see below). Two nicely preserved examples of what are probably *heiau ho'o'ulu'ai* associated with fertility and agriculture were recently found incorporated in surrounding garden plots (McCoy 2002a). Still other small *heiau* were probably dedicated to family gods (*'aumakua*).

Our knowledge of these sites is uneven, however, a general spatial pattern is emerging. In the valleys and Colluvial Slope zone we find most of the medium and large sized *heiau*. The Coastal Plain has few *heiau*. some of which are associated with distinctive landforms like the Kauhakō Crater and the hilltop burial complex at Makapulapai. The *heiau* that are found tend to be small, probably family *heiau* or associated with agriculture. However, the pattern observed does not mean certain types of *heiau* are found exclusively within certain zones. There could be a few large, and certainly many more smaller and medium-sized *heiau* to be discovered in the park. It is also important for those given the task of interpreting these structures to keep in mind that *heiau* may have complex histories, sometimes with multiple stages of construction and episodes of re-dedication (Kolb 1991).

Table 7 - List of Known Sacred and Unique Sites[31]

Type	Site name	Site number	Source
heiau	Ahina Heiau	Site 286; 50-60-04-286	Summers (1971)
heiau name	Moa'ula Heiau	---	Summers (1971)
heiau name	Ka'aiea Heiau	---	Summers (1971)
heiau	Kalaehala Heiau	Site 287; 50-60-04-287	Summers (1971)
heiau	Kawaha'alihi Heiau; "Lang-Lang Heiau"	Site 289; 50-60-03-289	Summers (1971)
heiau name	---	---	Summers (1971)
heiau	Kealaakeakua Heiau	---	Summers (1971)
heiau	Kapua Heiau	Site 292; 50-60-03-292	Summers (1971)
heiau	---	Site 294; 50-60-03-294	Summers (1971)
heiau	---	Site 295; 50-60-03-295	Somers (1985)
heiau	Kuahu Heiau	Site 299; 50-60-03-299	Summers (1971)
heiau	Ka'ahemo Heiau	Site 300; 50-60-03-300	Summers (1971)
heiau	---	Site 301	Somers (1985)
heiau	Kamanuolalo Heiau	Site 302; 50-60-03-302	Summers (1971)
heiau name	Pu'ukahi Heiau	---	Summers (1971)
heiau	---	---	Kirch (2002)
heiau	---	KLW-2	McCoy (2002a)
heiau	---	KLW-24	McCoy (2002a)
heiau	---	KLW-27	Somers (1985)

[31] This list includes all sites listed in published sources and some but not all sites identified in reports that are in production.

unknown, associated with heiau	"The Pueblo"	KLW-28	Somers (1985)
heiau	---	MKL-28	McCoy (2002)
possible heiau	---	50-60-03-2416	Rechtman and Henry (2002)
possible heiau	---	---	Manning and Neller (in prep.)r
possible heiau	---	---	Manning and Neller (in prep.)
Table 7(cont.) possible heiau	---	---	Manning and Neller (in prep.)
possible heiau	---	---	Manning and Neller (in prep.)
possible heiau	---	---	Manning and Neller (in prep.)
possible heiau	---	---	Manning and Neller (in prep.)
possible heiau	---	---	Manning and Neller (in prep.)
possible heiau	---	---	Manning and Neller (in prep.)
pohaku a Kāne	---	---	Manning and Neller (in prep.)
ko'a complex	Kuka'iwaia Point	Site 307; 50-60-03-307	Summers (1971)
ko'a	Ko'a at Waialeia	Site 288; 50-60-03-288	Summers (1971)
ko'a	Ko'a at Kaupikiawa	Site 291; 50-60-03-291	Summers (1971)
ko'a	Ko'a	Site 297; 50-60-03-291	Summers (1971)
ko'a	Ko'a at Ka Laea or Koa at Kahili	Site 298; 50-60-03-298; 50-60-03-1803	Ko'a at Ka Laea (Summers 1971), Koa at Kahili (Connelly 1974a); Site 8a (McHenry 1954); Feature 10, 5a, 5b, 8 (Ladefoged 1990)
possible ko'a	---	---	Manning and Neller (in prep.)
possible ko'a	---	---	Manning and Neller (in prep.)
possible ko'a	---	---	Manning and Neller (in prep.)
possible ko'a	---	---	Manning and Neller (in prep.)
possible ko'a	---	---	Manning and Neller (in prep.)
possible ko'a	---	---	Manning and Neller (in prep.)
possible ko'a	---	---	Manning and Neller (in prep.)
possible ko'a	---	---	Manning and Neller (in prep.)
possible ko'a	---	---	Manning and Neller (in prep.)
possible ko'a	---	---	Manning and Neller (in prep.)

ko'a	---	KLW-29	McCoy (2002)
shrine	---	---	Manning and Neller (in prep.)
shrine	---	---	Manning and Neller (in prep.)
burial complex	Makapulapai Burial Complex	50-60-03-1928	Manning and Neller (in prep.)
rockshelter site	Ananaluawahina Cave	Site 290; 50-60-03-290	Summers (1971)
birthing stone	---	---	Manning and Neller (in prep.)
sacred area	Pikoone	Site 303; 50-60-03-303	Summers (1971)
holua slide	---	Site 293; 50-60-03-293	Summers (1971); McCoy (2002a)
Table 7(cont.) konane board at house site	---	KT-27	Kirch (2002)
petroglyph	"Rock Doctor"	---	Manning and Neller (in prep.)
petroglyph	"Stone Nurse"	---	Kirch (2002)
petroglyphs in rockshelter	---	MKL-29	McCoy (2002a)
stone wall	The Great Wall	---	Manning and Neller (in prep.); McCoy (2002a); Somers (1985)
shipwreck	*Kaala*	---	Greene (1985:474)
shipwreck	*Foo-Po II*	---	Greene (1985:474)

Other Sacred Sites: Fishing Shrines (ko'a), Petroglyphs, and Legendary Places

We are indeed fortunate Stokes (1909) not only recorded information about the largest and most impressive sacred sites but also smaller sites. In Kalaupapa, there are a total of 16 *ko'a* (fishing shrines), or possible *ko'a*, known from oral tradition and archaeological survey (Table 7). Sites found thus far tend to follow the expected form found in the Hawaiian Islands. Kirch (1985:261) describes *ko'a* as places:

> . . .where fishermen made offerings to assure bountiful yields of fish and other marine creatures. *Ko'a* are found in a wide range of configurations, but usually are characterized by a small court, either a pavement or a walled enclosure (often constructed against a large natural boulder or outcrop). Frequently there is an upright waterworn stone before which offerings were placed. . . *Ko'a* are distributed along coastlines, often in promontories with good ocean views.

Nearly all of these sites in Kalaupapa are within a short distance of the shore, with the exception of one high on the slopes of Waialeia Valley (Site 288, "Ko'a at Waialeia," see Summers 1971 and Kirch 2002). *Ko'a* are generally found evenly dispersed from one another along the coast. As with *heiau*, our knowledge of these sites is uneven and there are likely more examples in the park yet to be discovered. To date, only one site interpreted as a possible shrine (50-60-03-1812) has been test excavated. Ladefoged's (1990) 50cm-by-50cm test pit excavation suggests further excavations will tell us more about the dates of use, construction, types of

offerings, and activities at these sites.[35] In addition, it is likely these sites correspond to different fishing grounds and may mark particularly abundant, preferred, or contested marine resources.

Petroglyphs, carved or pecked figures or symbols on stones, have been found in three locations on the peninsula (Table 7). In all cases the petroglyphs are of human figures and appear to have been made during the prehistoric era. One of the best-known figures is located on the hilltop Makapulapai Burial Complex. Local people have named this figure the "Rock Doctor". This figure seems to be a single human holding an implement in one hand. Below, I argue the figure might be an image of Kuali'i, an eighteenth century chief from O'ahu Island, doing battle with the aid of his *ko'i pohaku* (stone adze) named Haulanuiakea. The 60 burial platforms on and around the hill may be those of the warriors who in the story of the battle were slain by the stone adze as they twice attacked the canoes of Kuali'i "at the sandbar at Kalaupapa" (Fornander 1916-17:416-20 cited in Summers 1971:16-17). Another often visited petroglyph, is also a single human figure located on a stone near a large *heiau* (50-60-03-289). Local people have named this figure the "Stone Nurse". Unlike most petroglyphs, both of these figures have been pecked into boulders and placed within stone architecture where they are found. The most recently discovered rock art is found within a rockshelter just south of Makapulapai and includes three human figures, one twice as large as the other two (Figure 4-4). These three figures could also be interpreted as representing Kuali'i and possibly the warriors on either side of his canoe slain by his stone adze. A human tooth found on the rockshelter floor suggests there may be burials present. More petroglyphs are likely to be found in the park.

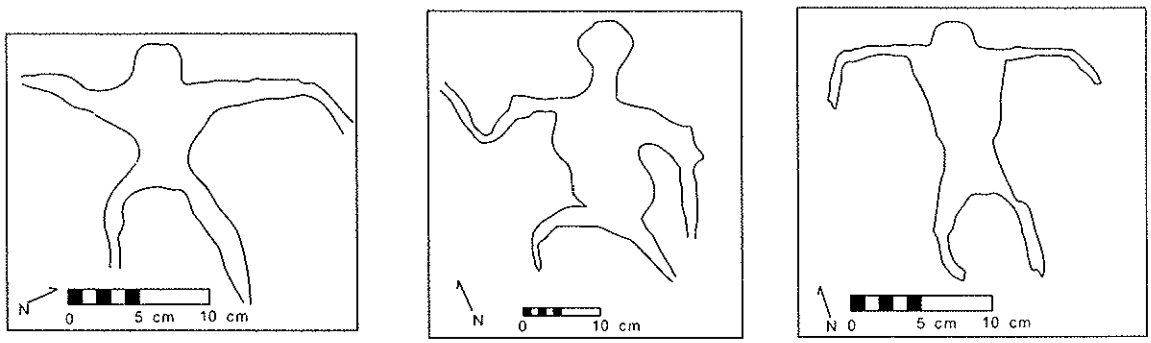

Figure 4-4 – Drawings of Petroglyphs Found at Rockshelter Site (MKL-29)

Oral traditions and archaeological survey have identified two places associated with birth in Kalaupapa. Hawaiian legends tell of a fight that occurred between husband and wife Lono and Kaikilani while playing a game of *konane* at a place called Pikoone, a sand beach on the southwest coast of the peninsula (Table 7) (Summers 1971). The place earned its name because it was

[35] Ladefoged's (1990) Feature 10 (50-60-03-1803) was probably what McHenry reported as a fishing shrine (*ko'a*). The upper layers of a test pit at the site suggest it was used as historic house. Lower layers "might represent an earlier occupation, and the possible alignment [found in excavation might be] a part of an earlier building phase" (ibid:98). Feature 13 (50-60-03-1812) was interpreted as a "possible shrine," but more investigation is needed to clarify how a large amount of immature pig bone (*Sus scrofa*), associated with historic-era animal bone, was deposited under a stone terrace. Further excavations are warranted at both sites.

a favorite place to deposit the umbilical cords (*piko*) (ibid). Elsewhere, a stone "in a shape favored as birthstones" was found during survey of the coastal plain (Manning and Neller in prep.). At the top of the *pali* trail is the site *Ka Ule o Nanahoa, (the penis of Nanahoa), the largest example of a* phallic stone in the Hawaiian Islands. The site, although not within the boundaries of the park, is unambiguously associated with fertility and should be considered when interpreting the past ideological landscape.

Ancient Feasting and Sport

We are lucky to have both archaeological evidence and oral traditions relating to ancient Hawaiian feasting and sport in Kalaupapa. The famous Makahiki festival has been described through some of the earliest historic records relating to Hawai'i Island (Handy and Handy 1972; Malo 1951; Sahlins 1995). A high-ranking elite person would have impersonated the god Lono as he and his entourage would travel from community to community around an island, collecting tribute goods in the form of food stuffs and finished goods. Based on the distribution of sites observed in Kawela on the lee side of Moloka'i Island, archaeologists have interpreted *heiau* on the boundary between communities as the likely locations at which tribute would be offered during the Makahiki season (Wiesler and Kirch 1985). Somers (1985:116) has suggested a large *heiau* and nearby multi-enclosure structure in the park "may have been associated with the god Lono and the Makahiki festival" due to their location just to the east of the boundary between Makanalua and Kalawao *ahupua'a* (Somers 1985a:116; see also McCoy 2002a). Somers (1985:53-55) notes some other similarities between these sites and ones found by Weisler and Kirch (1985) in Kawela:

> . . .the heiau may be a former hale o Loro or temple dedicated to the primary deity of agriculture. Like the structures in Kawela, the heiau is a large stone-filled terrace bordered on the east by a substantial wall. The Kawela structure was also bordered on the north by a substantial wall. This structure is bordered on the north by a retaining wall and terrace. The Kawela structure had an artificial pit to the east of the main structure. A large depression or pit is in the southeast corner of this structure. There were large quantities of branch coral adjacent to the pit at the Kawela structure. There was no branch coral associated with the pit in this heiau...
>
> . . .[there are] previously recorded heiau inside the western boundaries of Makanalua and Kalaupapa ahupua'a. . .Site 295 was recorded as just inside the west boundary of Makanalua ahupua'a and Sites 299 and 300 were recorded just inside the western boundary of Kalaupapa ahupua'a. We will never know whether or not these were hale o Lono, but their locations suggest that possibility.

Unfortunately, these *heiau* briefly described by Stokes (1909)--Sites 295, 299, and 300-- have all been destroyed (see Summers 1971; Somers 1985). The heiau described by Somers (1985) is surrounded by a landscape "literally covered with rock alignments and small clearings," again linking the site to the practice of agriculture. However, other archaeological evidence pertaining to the use of the area during the Makahiki festival has not yet been located.

As in all cultures, children and adults alike in the past enjoyed participating in sports as players and spectators. Ethnohistoric

reconstructions of games and their associated equipment by Hiroa (1957:365) gives us some idea of the variety of sports in prehistoric Hawai'i:

> The Hawaiians had a large number of ancient games (*pa'ani kahiko*); but in the years following foreign contact, they were gradually abandoned, with the exception of hula dancing and surfing. . . Many of these--such as foot racing (*kukini*), boxing (*mokomoko*), wrestling (*hakoko*), trials of strength, swimming, and diving--required no apparatus. . .Some major sports for children requiring apparatus included swinging (*lelekoali*) with a morning-glory vine for a rope; walking on stilts (*kukuluae'o*), for which the construction is not recorded; and flying kites (*ho'olele lupe*) made of *hau* covered with tapa or pandanus leaf; spinning tops and *teetotums*; and playing jack stones. . .Adult recreations included the making of string figures. . .

Hiroa (1957:365-386) goes on to describe the adult games and equipment for *no'a*, *puhenehene*, *'ume*, *kilu*, *konane*, *'ulumaika*, pitching disks, *pahe'e*, ring-and-ball game, peg-and-ball game, bow and arrow, dart game, whip stick and dart game, sledding, and surfing. In Kalaupapa a *holua* slide can be found on the southern slopes of Kauhakō Crater (Table 7).[33] Oral traditions describe the nearby Waihanau Valley as famous for the bowling game (*'ulumaika*) (Curtis forthcoming). Summers (1971:194) also describes the ethnohistoric record of surfing in Kalaupapa *ahupua'a*:

> The surf at Kalaupapa, which was called Pu'ao (Finney, 1959:347), was liked the best by the Molokai chiefs (Kamakau, 1961:54). 'The waves are fearful but the boys of Kalaupapa that were skilled surf riders enjoyed riding on them. They are not mere things to be trifled with either' (Kanepuu, 1867c).

In addition to the reference to the *konani* game in the legend of Pikoone, a physical stone slab board used in the game has been found at a house site in the coastal plains of Kalawao *ahupua'a* (Kirch 2002).

Burial Sites

Evidence of human burials from the prehistoric or early historic era have been reported in four types of places: Makapulapai Burial Complex (50-60-03-1928), the sand dunes on the northeastern tip of Kalaupapa peninsula, caves like Ananaluawahine Cave (50-60-03-290) on the coastal plain and isolated stone burial cairns found on surveys (Collins 2000; Manning and Neller in prep.; McCoy 2002a; Pietrusewsky 1991; Radewagen and Neller ms; Somers 1986, 1996). In cases where actual human remains have been found since the park was established, they were all unintentionally discovered in caves and dunes. Although sand dunes and caves are precisely the sorts of context where we expect to find traditional-styled Hawaiian burials, the remains found to date cannot be considered a representative sample. As such, it is difficult to confidently assess the areas outside of these contexts in terms of the likelihood of finding more remains. The existing data set of skeletal inventories and descriptions of bones, due to the issue of sampling, cannot be used to meaningfully assess things like status, social organization, kinship, community structure, group health, demography, or diet. However, both the large burial complex called Makapulapai and a unique burial pattern found outside of the complex deserve further elaboration (see below).

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[33] Reconnaissance survey in Kalawao *ahupua'a* suggests the possible existence of another *holua* slide in the park (L. Carter Schuster personal communication). Further archaeological survey is recommended to confirm this initial interpretation.

Phelps (1937:35) tells of other possible burial sites:

> This is on the talus slope of the mountains which form the landward end of the Peninsula. The loose rocks have been arranged in the shape of circular pits, most of them 4 to 6 feet in diameter and probably at least 7 feet deep. I have no way of verifying this interpretation (the pit may have been used for storing food) but there are similar pits at Site 41 in the Mapulehu Valley. There, the pits are made in a pile of stones rectangular in shape, about 300 feet long, 80 wide, and 10 in height. According to an old resident of the district many bodies are buried there but I had not the means of investigating. . . It may be this was a Hale Poki, or burial heiau. . . sometimes built for a deceased alii (noble) by his successors.

The landscape described by Phelps (1937) does not fit well with any site in the park described by any other source. The area seems to have some resemblance to the densely packed features uncovered in Makanalua *ahupua'a* by Somers (1985). If they are one-in-the-same, then the pits described are more likely to have been storage pits as Phelps suggests. However, the talus slope is a highly dynamic landform covered in dense vegetation. Therefore, it is equally likely the site has not been re-visited and/or it may have been buried by natural erosion of the cliffs.

Makapulapai and the Story of Kuali'i

Makapulapai (50-60-03-1928) is the name given to a prominent volcanic hill (tumulus) near the center of the northern half of the peninsula in Makanalua *ahupua'a* (Figures 4-3 and 4-5) (Manning and Neller in prep.). The area on and around the hill has been surveyed and 117 features were recorded including 60 burial platforms and terraces, 2 *heiau*, and a number of enclosed agricultural field plots (50-60-03-1928 to 50-60-03-1932). Such large burial complexes are rare in the Hawaiian Islands. Oral history suggests these burials correspond to a large, significant battle in which many were killed.

Manning and Neller (in prep.) convincingly link Makapulapai to a specific battle attested to in Hawaiian oral history between the chiefs of Ko'olau district and the chiefs of Kekaha ("the dry land that stretched from Kawela to Mo'omomi") that took place sometime during the first quarter of the eighteenth century (Summers 1971:16). Half the year, the sea was too rough for fishing off the north shore. The Ko'olau chiefs therefore waged a campaign in an attempt to take the south shore of the island to secure fishing rights there. Fornander (1916-1974:416), cited in Summers (1971:16), writes: "But the chiefs of Kekaha, knowing the value of these fishing grounds, were determined to hold on to them; so this determination on their

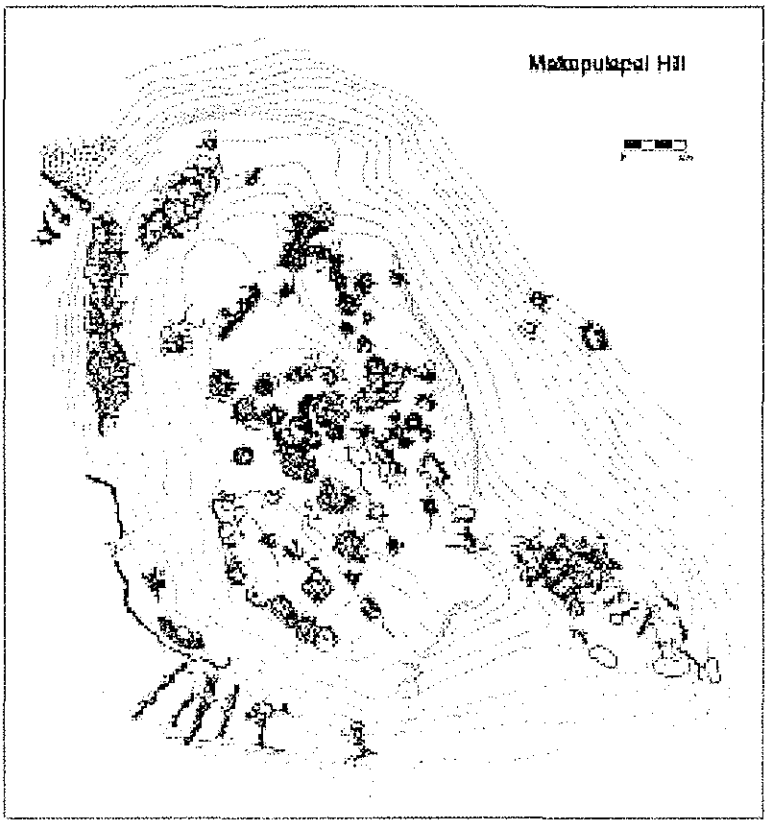

Figure 4-5 - Map of Makapulapai Burial Complex (50-60-03-1928)

part caused a general internal conflict at this time." With aid from Kuali'i, a chief from the Island of O'ahu, the Kekaha chiefs won a major victory at "the sand bar at Kalaupapa." In a final battle at Pelekunu, the Island of Moloka'i became under the control of Kekaha and the O'ahu chief. The full story retold by Fornander (1916-1917:416-420) is quoted below since it speaks to some of the motivations of the chiefs and gives a detailed account of the battle:

> When Kualii heard [from Paepae, a chief from Kekaha, that several disputes had taken place because the Ko'olau chiefs desired Kekaha]... he immediately gave his consent and the canoes were again put to sea and they set sail for Kaunakakai where they arrived in due time. A council was then held by the chiefs, at the close of which they set out. The men were embarked on the canoes, while the Molokai chiefs and Kualii went by land until they reached Maamomi [Mo'omomi], where Kualii and the chiefs took the canoes and set sail for Kalaupapa.
>
> When the chiefs of Ko'olau heard that the war was to be carried into Kalaupapa, the war canoes were put out from Halawa and from all the Koolau side to go to battle. But Kualii and his chief warriors, Maheleana and Malanaihaehae, with other warriors had already encountered the chiefs residing at Kalaupapa and had defeated these chiefs. But other chiefs of Koolau and Kona with their men arrived soon after this who were prepared to continue the battle against the chiefs of Kekaha. In this battle Paepae was very conspicuous both in strength and bravery, so much so that he and his force surpassed the chief warriors of Kaulii. When Kualii and his followers were victorious over all the chiefs of Molokai all the lands on the Koolau side came into Paepae's possession. This victory was not, however, gained

> through the use of the war clubs, but through the use of Kualii's stone axe [*ko'i pohaku*] named Haulanuiakea. Following is the story of the destruction of the enemy by Kualii with the blade of the axe.
>
> While Kualii and his followers were floating in their canoes over the sand bar at Kalaupapa, the soldiers from Koolau swam out to the canoes of Kualii with the intention of capturing them; there were some forties [sic] in number. When they got to the canoes they took hold of them and lfted [sic] them onto their shoulders. While this was being done Kualii rose with his axe in hand and swung it along one side of the canoes killing those on that side, which caused the canoes to lean toward that side as the canoes were then on the shoulders of the men. When Malanaihaehae saw that the people on one side of the canoes were slain, he rose and reached for the axe which was being held in Kualii's hand and swung it along the other side of the canoes, which slew all the people on that side; and the canoes again fell on even keel in the sea and floated as before.
>
> Not very long after this some more of the enemy came along, equal in number to those that had been slain, and again lifted up the canoes of Kualii just as the other had done, without any signs of fear, although the others were floating around dead. Again the axe was used with deadly effect and again Kualii and his followers were victorious by the use of the blade of Haulanuiakea. This was kept up until the whole army was slain.

Kuali'i had actually already left the fighting when the campaign was won in a final battle in Pelekunu to the east of the park. Paepae of Kekaha after the battle announced to the chiefs of Ko'olau in his victory speech that their warriors had been slain by Kuali'i. Before returning home, Kuali'i made a "new division of the lands" and "left Paepae and Manau his wife in charge of the island" (Fornander 1916-1917:416-420).

The petroglyph of a human figure on the summit of Makapulapai, locally known as the "Rock Doctor," might be an image of Kuali'i doing battle with the aid of his *ko'i pohaku* (stone adze) named Haulanuiakea, or alternatively Malanaihaehae, the warrior in the story who also took up the adze in the skirmish. The 60 burial platforms on the hill may be those of the warriors who in the story of the battle were slain by the stone adze as they twice attacked the canoes of Kuali'i. Of course, the single image could also have been specifically placed to distinguish the burial of a one person. The petroglyph is somewhat unusual in that it was pecked into a free basalt boulder and placed there.

Rock art that has recently been found within a rockshelter just south of Makapulapai includes three human figures, one twice as large as the other two (Figure 4-4). These three figures could also be interpreted as representing Kuali'i or Malanaihaehae and the warriors on either side of their canoe slain by the stone adze. Therefore, it may be that the burial complex may include the hill and some of the nearby collapsed lave tube valley. Overall, Makapulapai Burial Complex is clearly significant to Hawaiian prehistory although it is sometimes overlooked in overviews on Hawaiian warfare (Kolb and Dixon 2002).

Moa 'Aumakua *Burial Pattern*

NPS archaeologist Gary Somers (1986, 1996) has brought to light a unique style of interment represented in three burials discovered in Kalaupapa in

this report called the *Moa 'Aumakua* Burial Pattern.[31] First, the nearly complete remains of the two individuals were found exposed by erosion in sand dunes near Kahiu Point and later reburied. Both individuals were found in a flexed position each buried with the complete skeletal remains of an immature chicken (*Gallus gullus*). Called in the Hawaiian language *moa*, the chicken was introduced to the islands by early Polynesian settlers. Somers (1986, 1996) reviewed Hawaiian traditions regarding the *moa* and notes similar burials on the Island of O'ahu at Mōkapu (Bowen 1974).

In an attempt to explain this burial pattern Somers (1986, 1996) eliminates several possibilities. First, it is assumed the birds were not interned as food for the deceased in the afterlife since the individuals are both adult females who may have been restricted from eating chicken in life. The possibility that the birds were pets or fighting cocks was eliminated as explanations since the birds were both young. "[N]o satisfactory explanation of [the burial pattern's] occurrence" was found by Somers (1986:9), but he relates an attention-grabbing quote from Kamakau (1964:33):

> When a man died, the kahuna 'aumakua of the dead person came and performed his ritual of offering a pig (pua'a uko), or if not a pig, a chicken (moa 'aumakua), to make acceptable (ho'omaika'i) the soul of the dead person to live together with his 'aumakua, his ancestral gods.

To Somers (1986:9) the ethnohistoric documentary evidence "does not contain enough detail to explain the particular occurrence of immature chickens being buried with adult female humans." Five years later, a newborn or infant of unknown sex was discovered nearby and again with what appeared to be the bone of a chicken (*Gallus gallus*) (Pietrusewsky 1991 in Goodwin 1994b). Certainly if in the future more examples of the *Moa 'Aumakua* Burial Pattern in the park were found exposed by erosion or accident, they might yield additional information regarding this pattern.

Clearly, this review favors the interpretation that the pattern is indicative of individuals who have the *moa* as their family god (*moa 'aumakua*). Current evidence is naturally open to other interpretations. For example, the remains of the two individuals found near Kahiu Point were determined through well-developed osteological methods to be physically female. Anthropologists however commonly distinguish between the physical *sex* and the *gender* of individuals. Physical sex is determined at birth as male or female whereas gender is something that is socially constructed in life. Since gender can vary independently of physical sex, it is incorrect to assume a direct relationship between the sex of remains and the gender of that person in life, even if there are many examples of direct correlation between the two. What makes the distinction of *sex* and *gender* even more critical is the fact that the types of gender recognized in societies tends to be culturally specific. This relatively nuanced discussion is relevant to this burial pattern since it is important to keep in mind that the gender of the individuals found is in fact unknown.

[31] None of the burial discussed below were found in association with Makapulapai Burial Complex.

Landscapes in time: The Kalaupapa Chronology

Archaeological Evidence of Early Occupation

For many years the oldest accepted date from an archaeological site in Kalaupapa NHP came from Kaupikiawa Cave (50-60-03-312). In 1984, Marshall Weisler, formerly of the Anthropology Department of the B.P. Bishop Museum, collaborated with NPS archaeologist Gary F. Somers to date material collected by Richard Pearson during 1966-7 excavations at the site. The three resulting radiocarbon dates (Beta-9276, -9962, and -9275) yielded results calibrated to dates of 1031-1255 A.D., 1280-1635 A.D., and 1689-1926 A.D., respectively. In his review of 48 radiocarbon dates for Moloka'i Island, Weisler (1989:137) notes that the earliest of these dates "suggests use of Kalaupapa Peninsula during the Developmental (A.D. 600-1100) to early Expansion period (A.D. 1100-1650) for exploitation of coastal marine resources."

The results of a recent re-evaluation of Kaupikiawa Cave by Kirch (2002) in combination with new radiocarbon dates from other sites in the park suggest the culture history of the earliest stage of the occupation of Kalaupapa needs to be re-written (see Table 8). Three new dates from Kaupikiawa Cave (Beta -155366, -155365, and -155364) yielded calibrated ages of 1280-1400 A.D., <1650 A.D., and <1660 A.D., respectively. An additional new date from pondfield deposits in Waikolu Valley (Beta-153426) was found to have a calibrated true age of 1240-1280 A.D. (1 sigma), or 1200-1290 A.D. at 95% probability. Based on this data, Kirch (2002:93-95) has recently presented a new interpretation of the early occupation of Kalaupapa:

> In sum, while the Kaupikiawa Rockshelter does encapsulate a depositional sequence spanning ~500-600 years (i.e., beginning around the 14th centuries A.D.), it should no longer be claimed as proving evidence for a millennium of human occupation at Kalaupapa Peninsula. Rather than providing evidence for a possible Developmental Period settlement, as suggested by Weisler (1989), human activity in the vicinity of the rockshelter seems to have commenced during the Expansion Period, while actual occupation and deposition of shell midden dates to the Proto-Historic Period. In our view, this reinterpretation is more consistent with the environmental setting of the shelter, at the northernly, marginal extreme of the peninsula. Of course our re-dating of this site in no way negates the possibility of a longer occupation sequence for the Kalaupapa Region. Indeed, our AMS date of 1200-1290 cal A.D. on the loulu palm charcoal from Waikolu Site 1 can be taken as an indication of human presence in this large valley by at least the 13th century, or the early part of the Expansion Period. In our view, the most likely localities for early human settlement and land use in the region would have been either in the large valleys such as Waikolu, and/or along the colluvial slopes with their richer agricultural soils.

Accepting Kirch's (2002) new evidence means a shorter chronology for the prehistory of Kalaupapa. On the Kalaupapa peninsula it appears the earliest dates of occupation correspond to the Early Expansion Period during the late 13th or early 14th century. Both Kirch's (2002) earliest date from Kaupikiawa Cave, 1280-1400 A.D., and the earliest date recovered in association with a buried field wall by Ladefoged (1990), 1281-1520 A.D. (97% probability), overlap in this period. In the Waikolu Valley, new evidence points to a history of development stretching back in time to at least the Early Expansion Period and perhaps slightly longer. The date from Waikolu Valley

with a calibrated true age of 1200-1290 A.D. is now the earliest date from an archaeological site in the park, if this new analysis of Kaupikiawa Cave is accepted (Kirch 2002). Only more radiocarbon dates from early sites in the park will aid in determining the precise early settlement history of the area.

The Late Prehistoric Through Early Historic Era

After the early use of the peninsula attested to in the Kaupikiawa Cave (50-60-03-312) site, there is a gap of several hundred years until we have the next absolute date from an archaeological deposit (Table 8). Of the seven radiocarbon dates from identified wood charcoal recovered from coastal sites during excavations by Ladefoged (1990), most range from modern to the late prehistoric era, with the exception of one from under a buried field wall that dated to 1281-1520 A.D. (97% probability). From these results Ladefoged (1990:183) proposed the first chronology of the settlement of Kalaupapa:

> The results of the intensive study indicate that the study area has been used for residential and agricultural purposes over the last seven centuries. It is likely that occupation of the area has an even greater antiquity. However, the vast majority of the features in the study area appear to date to the historic era. The tendency of the features to contain a single cultural deposit suggests that they were built and used within a relatively short time frame. This does not, however, mean that all features were occupied at the same time. The chronometric and relative dating techniques suggest that the features were occupied during several different time periods within the historic era.

By combining excavation and survey evidence, Ladefoged (1990:182) comments on the form of agricultural fields:

> There are two main types of agricultural complexes in the west end of the study area. These include alignments with enclosures around them, and alignments without enclosures. . .The density of alignments is much higher within the enclosures than the areas outside. . .It is possible the agricultural enclosures are a later intensification of an earlier field system.

Several critical pieces of historical evidence helped Ladefoged (1990) to develop this general chronology for the area. First, independent sources suggest that during the Kalawao/Kalaupapa settlement periods much of the food was imported from elsewhere rather than grown locally on the peninsula. The local population (*kama'āina*) was evicted with the establishment of the leprosy settlement except for "about forty persons [who] chose to remain and formed a community that lasted about twenty-nine years" (Fortunato de Loach 1975:84, cited in Ladefoged 1990:7). Thus, the establishment of the settlement probably corresponds with the abandonment of agricultural fields built by those who were later "disposed of their birthright" (Stoddard 1893:21). Documentary evidence also shows that Kalaupapa was a prime spot for traders to buy potatoes to supply the boomtown markets of California during the Gold Rush of 1849 (see Handy and Handy 1972:518). Ladefoged (1993) later used these lines of evidence to sketch out the development of the Kalaupapa dry land field system from their first use during the prehistoric era to their abandonment shortly after European contact, their

re-intensification during the Gold Rush Era demand for potatoes, and their final abandonment after the establishment of the leprosy settlement.[55]

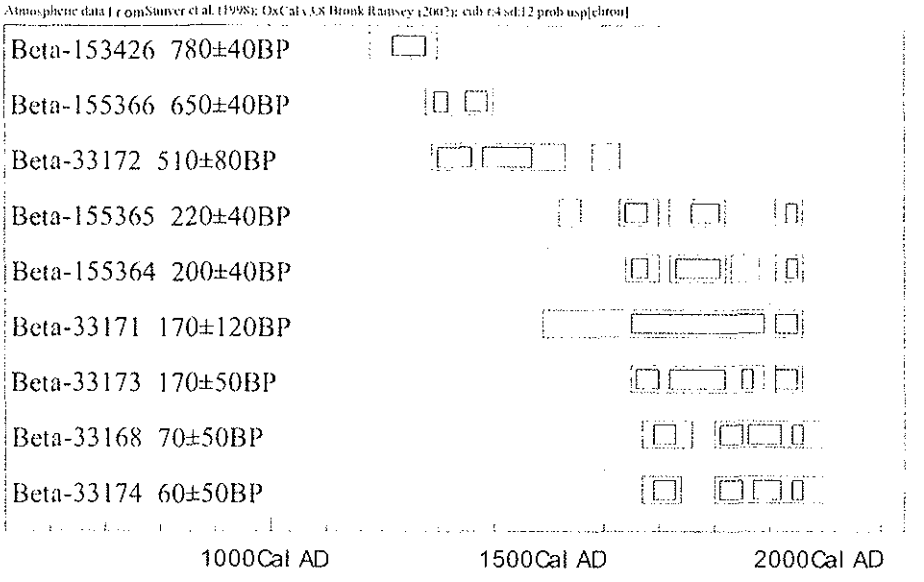

Table 8 - Calibrated Range of Radiocarbon Dates from Identified Charcoal

Major Socio-political Events in Hawaiian History

There are three major events in late prehistory and in the early historic era that we know likely had serious impacts on the political hierarchy at Kalaupapa: (a) the defeat in the eighteenth century of the Ko'olau district (*moku*) chiefs by combined forces of Kuali'i, a chief from the Island of O'ahu, and the Kekaha chiefs from leeward Moloka'i, (b) the capture and occupation of Moloka'i Island by the forces of Kamehameha I in 1790 and (c) and Kamehameha's reconquest of the island in 1795 (Summers 1971). Fornander (1916-1917:416-420) (cited in Summers 1971) notes Kuali'i before returning home made a "new division of the lands" and "left Paepae and Manau his wife in charge of the island." Makapulapai Burial Complex (50-60-03-1928) may be archaeological evidence of this battle for control of the Ko'olau district (*moku*), of which Kalaupapa is a part. A recent summary of evidence for warfare in Hawai'i suggests warfare had an increasing impact on the daily lives of commoners in the early historic era (Kolb and Dixon 2002). Indeed, the occupation of the army of Kamehameha I on other islands is noted to have impacted the settlement pattern and agricultural development of even the most remote places (see Kirch and Sahlins 1992). Currently, there is no known archaeological evidence in Kalaupapa of occupations by the forces of Kamehameha I.

As a result of this review of archaeological research and oral traditions a pattern has emerged that may allow us to link these political shifts to sites other than Makapulapai. The sites that Stokes' (1909) local informant seems to have omitted include several large sites clearly dating from the prehistoric era. These sites notably include what appears to be the largest

[55] Also as a result of Ladefoged's (1990) research we know that a massive tsunami in 1946 witnessed by the former lighthouse keeper caused the destruction of several buildings at the northern point of the peninsula.

heiau on the peninsula (KLW-2, McCoy 2002a), Makapulapai Burial Complex (50-60-03-1928), the large sized *heiau* and nearby multi-enclosure structure that "may have been associated with the god Lono and the Makahiki festival"(Somers 1985a:116),[24] as well as medium-sized sites like agricultural temple (*heiau ho'o'ulu'ai*). The tempting conclusion is that their use and the importance of the gods to which they were dedicated had been overshadowed in oral traditions by those glorifying the later reign of the Kamehameha line, who had their own favored members of the pantheon of Hawaiian gods. Alternatively, the informant interviewed may not have wanted to talk about the sites because it would revel their location. The information could also have simply been lost over time by local people or Stokes. Further archaeological investigation is required to determine if these structures were indeed built and used earlier than the ones reported by Stokes.

A Proposed History of "The Great Wall of Kalaupapa"

What is called here "The Great Wall of Kalaupapa" has recently been mapped and a possible history of its construction can now be proposed, in part thanks to this overview (Figure 4-6). Although dense vegetation now covers much of the peninsula, the wall stands out in aerial photographs and is easily accessible in many places. In the field, Trimble ProX and GeoExplorer3 Global Positioning units provided by the NPS were used by teams to record the wall as a line in relatively clear areas and as points in places where only a portion of the wall is visible (McCoy 2002a). Even so, the extreme southern end of the wall remains unrecorded due to extraordinarily thick brush.

The Great Wall is oriented north more-or-less continuously from the base of the cliffs, just to the west of a large sized *heiau* (KLW-27) and multi-

[24] Sommers (1985) interpreted these sites as associated with the Makahiki due to their location just to the east of the boundary between Makanalua and Kalawao *ahupua'a*

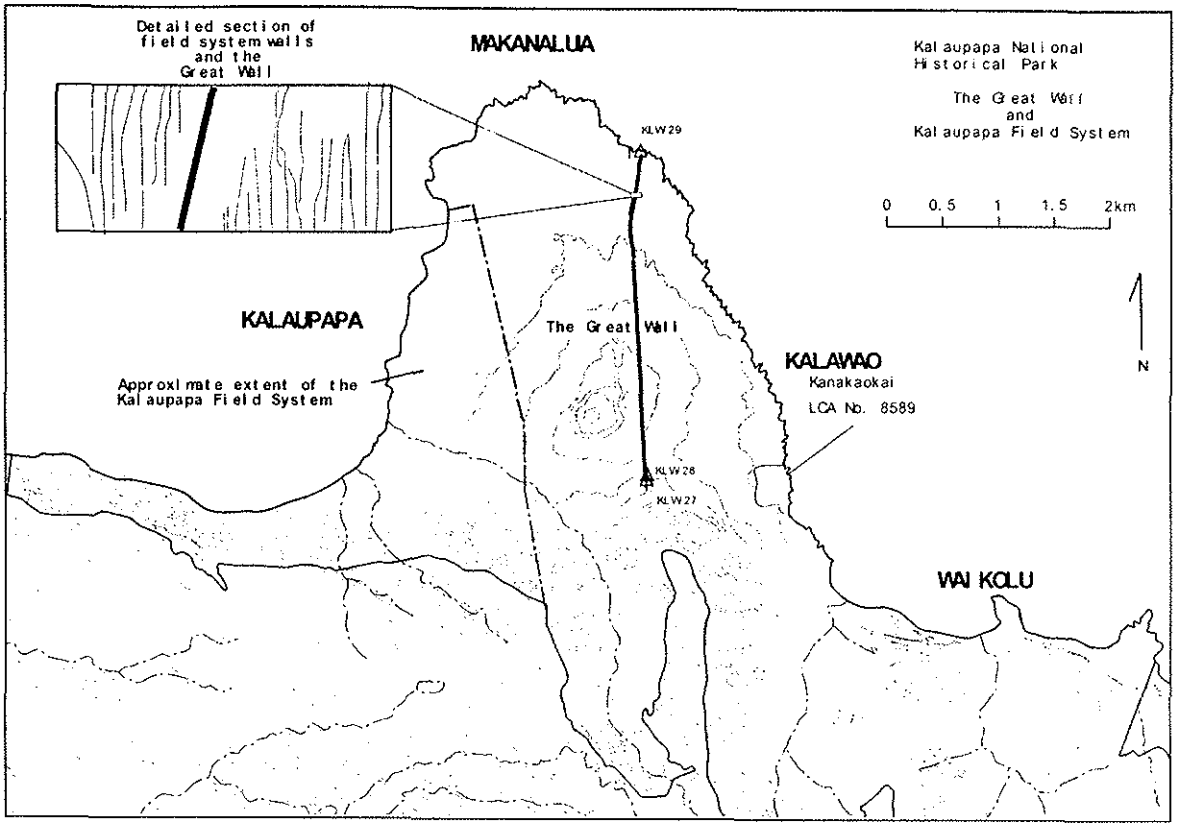

Figure 4-6 - Map of the Great Wall of Kalaupapa (adapted from Somers 1985; Manning and Neller in prep.; and McCoy 2002a)

enclosure structure (KLW-28) (Figure 4-7). From there the wall runs along the east side of Kauhakō Crater and intersects a second alignment at about two-thirds down the length of the peninsula. The second alignment extends the wall northwest along the coastal plain. This part of the wall then turns north to end at a fishing shrine (*ko'a*) (KLW-29) on the rocky north coast of the peninsula (Figure 4-8). These two sections together make up the whole of the Great Wall. On average the wall is over a meter high and 85 cm wide. The style of construction is generally core-filled with different facing patterns, perhaps due to the different types of basalt immediately available. No effort was made to record detailed architectural style.

This evidence implies the boundary between Makanalua and Kalawao *ahupua'a* may have a long and probably complex history. The temple and fishing shrine found in association with the boundary suggest it likely dates to the prehistoric era. It may have initially formed during the Late Expansion

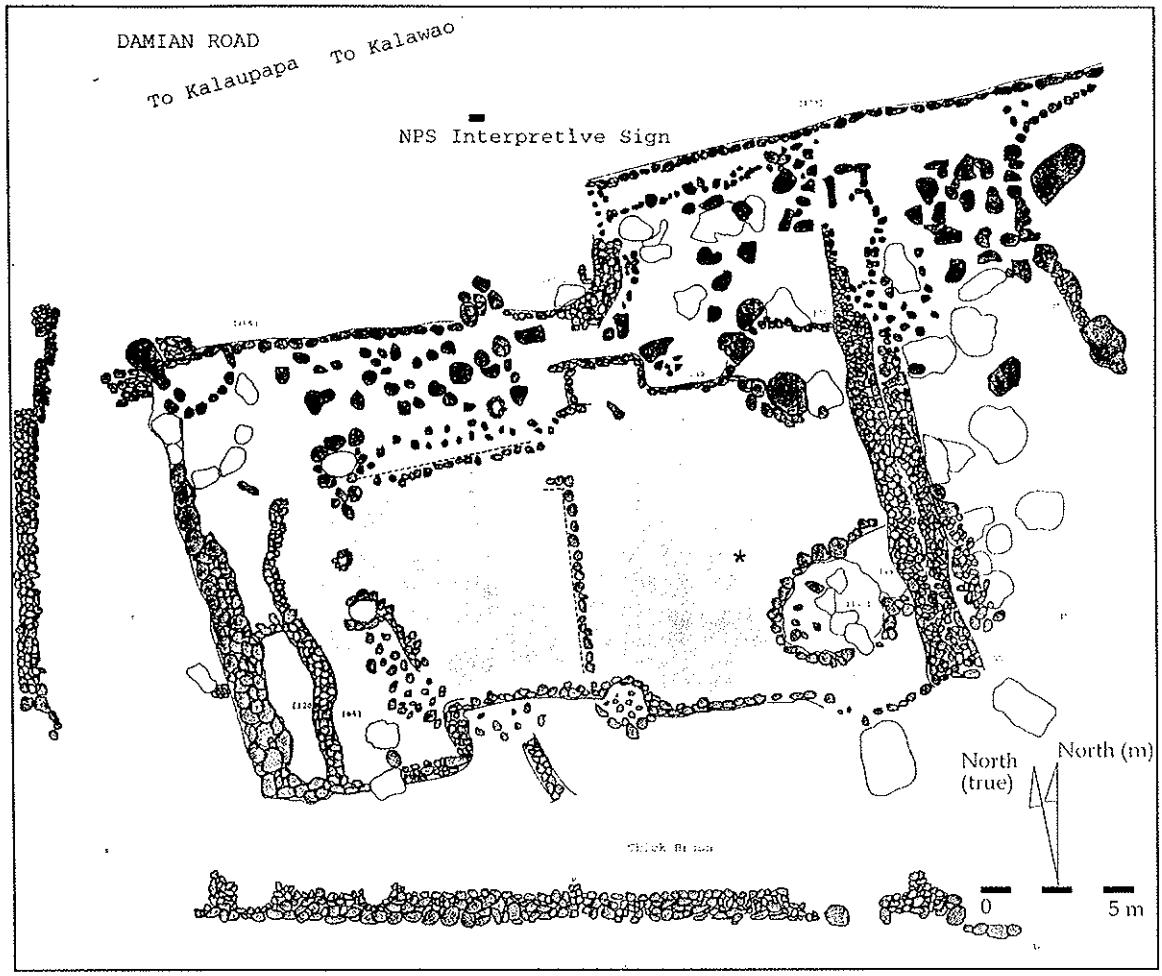

Figure 4-7 - *Heiau* (KLW-27) Near the Boundary Between Makanalua and Kalawao *Ahupua'a* (source: McCoy 2002a)

Period (A.D. 1400 - 1650) when archaeologists have argued the territorial land tenure system first arose. Under the territorial system commoners had access to land and resources in exchange for corvée labor and taxes paid by tribute to elite landholders (Kirch 1985). Chiefs used this labor force to build agricultural infrastructure, temples (*heiau*), trails, boundary markers, and to tend their gardens and fishponds. However, as demonstrated by the story of the Kuali'i, the landscape was open to re-division. It is also probable that war was not the only context in which boundaries might be redrawn or land units re-allotted.

Although the boundary between Makanalua and Kalawao *ahupua'a* is probably of great antiquity, the wall marking the boundary may have been constructed in the Early Historic Era (A.D. 1795-1866). Two pieces of evidence help to generally bracket the period when the wall was constructed. Our first historic record of the Great Wall comes a notebook kept by Monsarrat (1894) during his 1894 survey of the peninsula. In the notebook, the boundary wall was labeled as an "Old Wall." To the east within Kalawao *ahupua'a*, another wall is also described in the same way (Manning and Neller in prep.). This

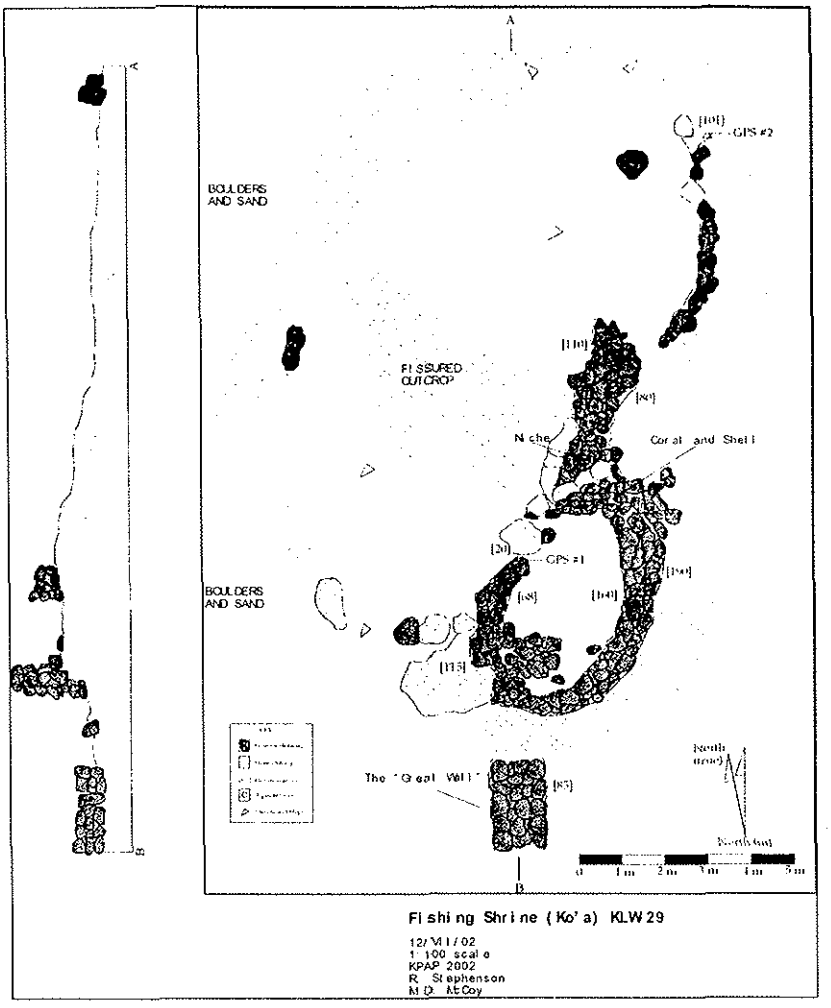

Figure 4-8 – *Ko'a* (KLW-29) on the Boundary Between Makanalua and Kalawao *Ahupua'a* (source: McCoy 2002a)

wall marks the outline of lands claimed and awarded to Kanakaokai (LCA No. 8589), a Lahinaluna-educated Protestant missionary teacher who came to live in Kalaupapa around A.D. 1839 (Manning and Neller in prep.).

Our second line of evidence comes from several archaeological surveys (Kirch 2002; Manning and Neller in prep.; McCoy 2002a) that depict sections of the two walls described in Monsarrat's (1894) notebook. Along the sides of each of these walls there is an area free of stone. Presumably, this area was cleared as stone from field walls was robbed during wall construction. On a historic household site on the northern tip of the peninsula, again stone from older field walls has clearly been robbed to create new enclosing walls (Ladefoged 1990). As described above, Ladefoged (1990) has suggested the fields were largely abandoned during the depopulation of the islands after European contact and then re-intensified as evident by enclosed gardens. If we attach a rough estimate of 1795 A.D. to the abandonment of the fields, it can be used as the a terminus post quem to bracket the construction of the

Great Wall to sometime during the Early Historic Era between 1795 and 1894 A.D. when it appeared in Monsarrat's (1894) notebook.

It is possible to further bracket the construction of the wall within the Early Historic Era. The Board of Health purchased both Kalawao and Makanalua *ahupua'a* in quick succession to build the leprosy settlement. Therefore, by 1866 A.D. the boundary marked by the wall was meaningless. Since the height of the wall would have made it a barrier to animals, it seems probable it was built after 1830 A.D. when the first cattle arrived on the peninsula. Indeed, large portions of the Island of Moloka'i were rapidly being incorporated into a single cattle ranch at this time. Over one hundred years after their introduction, McHenry (1938) does note the use of field walls at Kalaupapa by inhabitants ". . .who keep them to a certain extent in repair as drift fences for cattle." However, a closer look at the period between 1830 and 1866 reveals two important historical processes that may have come together to motivate the construction of the Great Wall: The 1849 Gold Rush and the Great Mahele Land division.

When gold was discovered in California in 1849 towns like San Francisco were swamped with new arrivals. The demand for food in the markets of these towns caused a boom in the Hawaiian Islands in potatoes for export. Historic newspapers tell us Kalaupapa was known as one of the places traders were sure to find barrels of potatoes (see Handy and Handy 1972). The booming market meant the value of the dry *kula* land laying in disuse rapidly jumped in value. Also during this period there was a remarkable slow down in the depopulation of Kalaupapa (Figure 4-9). The benefits of the new cash economy may have compelled common folks to stay and work the lands. There was also legislation that made it unlawful to leave rural areas at this time in Hawaiian history that may help explain this trend (Ladefoged 1993).

A few years prior to the Gold Rush, under the advice of Western businessmen, the Kingdom of Hawai'i began the process called The Great Mahele that would codify the land tenure system. As noted above, Kirch (2002) has found in the records of Mahele claims from Kalaupapa a direct correlation between the rank of elite and the likelihood that commoner claims were unsuccessful. Clearly, the peninsula at this time was a contested area. It may be that that elite land owners, motivated by a booming economy, sought to clearly mark uncultivated *kula* lands upon which the wall was built as their property.

In sum, all current evidence points to an early historic era date of construction of the Great Wall of Kalaupapa. The wall was probably built in

at least two stages sometime between 1795 and 1866 A.D. If we accept the Gold Rush potato boom and Great Mahele Land Division as co-occurring motivators for wall construction, this estimate can be narrowed to between 1848 and 1866 A.D.

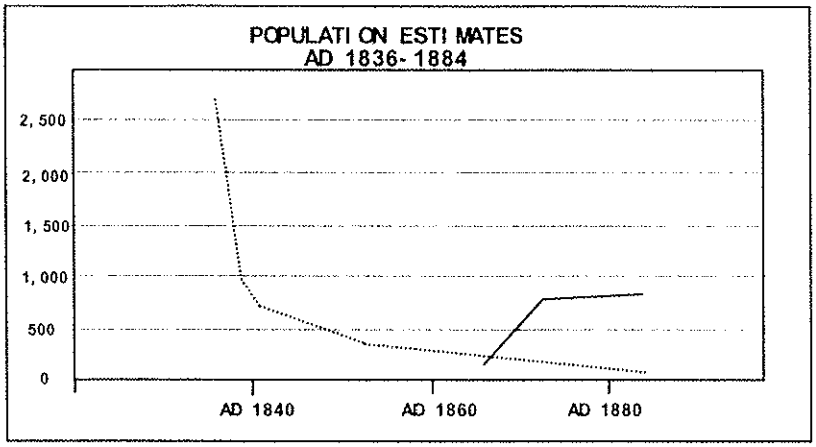

Figure 4-9 - Population Estimates of Historic Kalaupapa and Neighboring Region (sources: Creighton 1886; Fortunato de Loach 1975; Greene 1985; Hawaiian Board of Health 1886)

Social Organization and Daily Life

There are several in-depth case studies that may help understanding of developments in Kalaupapa by analogy. For example, the Waikolu Valley, of which we know so little, may have a developmental history similar to that of Hälawa Valley on the east end of the north shore (Kirch and Kelly 1975). The dryland fields, although much smaller in scale, seem to have much in common with the North Kohala and Kona field systems in West Hawai'i Island (Kirch 1985). However, these areas are certainly not the only places we should look to for comparing and contrasting what is found at Kalaupapa.

Despite the natural isolation of Kalaupapa, it is clear the former occupants of the area at any one time were interconnected through kin ties and political relationships to other communities in the islands. Unfortunately, gaps in understanding the chronology of the settlement and community patterns makes it difficult to put Kalaupapa in the context of overall changes in social organization. In addition, a dearth of fine-grained information on domestic and ritual behavior allows only a broad understanding of daily life in the past. Rather than entertain speculations at this time, social organization and daily life in prehistoric and early historic Kalaupapa are recommended as topics for future research.

Archaeological Data

Spatial Data

Global Positioning System (GPS) units and Geographic Information Systems (GIS) technology allow cultural resource managers to inventory accurately the location of large numbers of sites. The potential use of this technology goes far beyond the immediate advantages of being able to record the location

of sites in the field with a high degree of accuracy and precision. Spatial data sets in a GIS format can be used to store information about quantitative and qualitative attributes recorded on sites, features, and artifacts; used to analyze their distribution; as well as identify cultural resources likely to be impacted by future park improvement projects. GIS can also be used to bring together disparate sources of data recorded in different ways. However, to make use of GPS and GIS tools in archaeology, fine-grained, accurate data is required.

An overall, comprehensive GIS database of the archaeological landscape of Kalaupapa is currently in development. A thorough search for maps of any kind has identified the following types of site and/or location maps: (i) field maps of sites done by tape and compass; (ii) field maps of sites done by plane table and alidade; (iii) site location maps made by use of aerial photography; (iv) maps of field walls made with optical transit; (v) maps of field walls made by use of false color IR aerial photography; (vi) maps of field walls made by plane table and alidade; (vii) scale AutoCAD drawings of some of these types of maps; (vi) GPS point coordinates given for sites or features (differentially corrected and uncorrected); and (vii) GPS lines representing field walls (differentially corrected). The projects that produced these maps each decided what was the appropriate method(s) to record sites, given their research goals, equipment, and personnel.[37] Copies of these maps can be found both in the park and the PISO.

Data on Formal Variation of Sites, Features, and Artifacts

Variation in the form of standing dry-laid stone architecture and artifacts in assemblages excavated from such sites are the most widely used kinds of archaeological data recorded by archaeologists in Hawai'i. Large-scale archaeological settlement pattern studies and ethnohistoric information on traditional Hawaiian life and architecture together form a framework that allows us to interpret the uses of sites we encounter on surveys. Cachola-Abad (1996) rightly points out that our archaeological-based interpretation of sites, especially temples (*heiau*), needs to take into consideration the great deal of variation that exists in the architectural form of different classes of sites. Materials such as stone, bone, and shell preserved in trash deposits and recovered though excavation are sometimes our best clues to reconstructing the past. Variation in the frequency and form of different classes of artifacts can give us an idea of changes in the lives of people over time. Also, certain kinds of artifacts that could only have been deposited after European contact-i.e., introduced plants and animals, metal, glass, etc.-help us date by association the time period a site was occupied or used.

Temporal Data

The dating of sites is not an uncomplicated process. Archaeological science is continually re-evaluating new methods and previous findings. Table 8 above summarizes the reliable radiocarbon dates from the park and shows the calibrated range of dates that have come from secure archaeological context on wood charcoal identified by plant species. Table 9 is a list of most of the radiocarbon dates from archaeological sites and geological samples on the

[37] See Project Summaries (Appendix I) for reviews of the methodology used in specific projects.

island. Samples from within the park can be seen in italics. Reliably is rated on an ordinal scale of 1 to 3 based on the context of the find and methods of dating. The score of 3 is given to dates that have low reliability and generally not very useful. Table 10 shows a few dates obtained by volcanic glass hydration of material from an archaeological site in the park. The same reliability rating system is applied. Generally speaking, this

Table 9 - Table of Radiocarbon Dates Ranking Reliability*
(*dates from Kalaupapa NHP are in italics)

Conventional 14C Age BP (C.R.A.)	BP (calibrated, 1 sigma)	Series/ Location	Reliability 1- best 2- ave. 3- poor	Source	Lab-ID	Comment
780 +/- 40	*750-660 (2 sigma)*	*Waikolu Valley*	*1*	*Kirch (2002)*	*Beta-153426*	*WK-1*
200 +/- 40	*290-270;200-150;20-0*	*Kalaupapa Peninsula*	*1*	*Kirch (2002)*	*Beta-155364*	*Kaupikiawa Cave (50-60-03-312)*
220 +/- 40	*300-280;180-150;10-0*	*"*	*1*	*Kirch (2002)*	*Beta-155365*	*Kaupikiawa Cave (50-60-03-312)*
650 +/- 40	*670-550*	*"*	*1*	*Kirch (2002)*	*Beta-155366*	*Kaupikiawa Cave (50-60-03-312)*
880 +/- 70	*900 +/- 70*	*"*	*2*	*Weisler (1989)*	*Beta-9270*	*Kaupikiawa Cave (50-60-03-312)*
490 +/- 180	*460 +/-180*	*"*	*2*	*Weisler (1989)*	*Beta-9962*	*Kaupikiawa Cave (50-60-03-312)*
< 120	*< 120*	*"*	*2*	*Weisler (1989)*	*Beta-9275*	*Kaupikiawa Cave (50-60-03-312)*
510 +/- 80	*see table, chapter 4*	*Northwest Kalaupapa Peninsula*	*1*	*Ladefoged (1990)*	*Beta-33172*	*Feature 8*
170 +/- 120	*see table, chapter 4*	*"*	*1*	*Ladefoged (1990)*	*Beta-33171*	*Feature 12*
170 +/- 50	*see table, chapter 4*	*"*	*1*	*Ladefoged (1990)*	*Beta-33173*	*Feature 13*
100.4+/-0.6 modern	*N/A*	*"*	*1*	*Ladefoged (1990)*	*Beta-33170*	*Feature 18*
100.4+/-0.9 modern	*N/A*	*"*	*1*	*Ladefoged (1990)*	*Beta-33169*	*Feature 23*
70 +/- 50	*see table, chapter 4*	*"*	*1*	*Ladefoged (1990)*	*Beta-33168*	*Feature 28*
60 +/- 50	*see table, chapter 4*	*"*	*1*	*Ladefoged (1990)*	*Beta-33174*	*Feature 31*
300 +/- 90	*A.D. 1470-1670; 1780-1800*	*"*	*3*	*this volume, Neller (n.d.)*	*Beta-87077*	*Site 1801, Cat 167, Feature 102 (hearth), II/1*
110 +/- 90	*A.D. 1670-1740; 1800-1950*	*"*	*3*	*this volume, Neller (n.d.)*	*Beta-87078*	*Site 1801, Cat 236, Feature 105 (hearth), I/1*
90 +/- 40	*A.D. 1690-1730; 1810-1920*	*"*	*3*	*this volume, Neller (n.d.)*	*Beta-87079*	*Site 1801, Cat 239, Feature 102 (hearth), II/1*
260 +/- 40	*A.D. 1520-1570; 1630-1670;*	*"*	*3*	*this volume, Neller (n.d.)*	*Beta-87080*	*Site 1801, Cat 243, Feature 105 (hearth), II/1*

	1780-1800					
110 +/- 60	A.D. 1680-1740; 1800-1930	"	3	this volume, Neller (n.d.)	Beta-87081	Site 1801, Cat 246, Feature 105 (hearth), II/1B
100.7+/- 0.5 modern	N/A	"	3	this volume, Neller (n.d.)	Beta-87082	Site 1801, Cat 265, Feature 107 (hearth), I/1
Table 9 (cont.) 40 +/- 60	A.D. 1690-1730; 1810-1850; 1870-1920; 1940-1950	"	3	this volume, Neller (n.d.)	Beta-87083	Site 1801, Cat 292, Feature 105 (hearth), I/1
80 +/- 50	A.D. 1690-1730; 1810-1920;	"	3	this volume, Neller (n.d.)	Beta-87084	Site 1801, Cat 295, Feature 110, II/1
160 +/- 50	A.D. 1660-1710; 1720-1820; 1830-1890; 1910-1950	"	3	this volume, Neller (n.d.)	Beta-87085	Site 1801, Cat 298, Feature 107 (hearth), I/1
170 +/- 90	A.D. 1650-1710; 1720-1820; 1830-1890; 1910-1950	"	3	this volume, Neller (n.d.)	Beta-87086	Site 1801, Cat 301, Feature 108 (hearth), II/1
160 +/- 80	A.D. 1660-1710; 1720-1820; 1830-1890; 1910-1950	"	3	this volume, Neller (n.d.)	Beta-87087	Site 1801, Cat 324, Feature 102 (hearth), II
270 +/- 90	A.D. 1480-1680; 1760-1810; 1930-1950	"	3	this volume, Neller (n.d.)	Beta-87088	Site 1801, Cat 361, Feature 113 (hearth), I/2
150 +/- 70	A.D. 1660-1710; 1720-1890; 1910-1950	"	3	this volume, Neller (n.d.)	Beta-87089	Site 1801, Cat 365, Feature 101 (hearth), II/1
120 +/- 60	A.D. 1680-1740; 1800-1950	"	3	this volume, Neller (n.d.)	Beta-87090	Site 1801, Cat 370, Feature 113 (hearth), II/1
70 +/- 60	A.D. 1690-1730; 1810-1920; 1940-1950	"	3	this volume, Neller (n.d.)	Beta-87091	Site 1801, Cat 395, Feature 102 (hearth), III/1
250 +/- 50	A.D. 1520-1570; 1620-1680; 1770-1810; 1930-1950	"	3	this volume, Neller (n.d.)	Beta-87092	Site 1801, Cat 458, Feature 117, I/1
1380 +/- 90	1368 - 1491	Halawa Series	2	Weisler (1989)	Gak-2743	
820 +/- 80	818 - 673	"	2	Weisler (1989)	Gak-2741	
230 +/- 120	456 - 0	"	2	Weisler (1989)	Gak-2742	
750 +/- 90	739 - 666	"	2	Weisler (1989)	Gak-2744	
350 +/- 80	509 - 305	"	2	Weisler	Gak-2739	

				(1989)		
440 +/- 80	536 - 459	"	2	Weisler (1989)	Gak-2740	
290 +/- 60	456 - 294	Kawela Mound Series	2	Weisler (1989)	Beta-2278	
< 160	277 - 1	"	2	Weisler (1989)	Beta-2273	
300 +/- 80	474 - 291	Upland Kawela Series	2	Weisler (1989)	Beta-3364	
290 +/- 60	456 - 294	"	2	Weisler (1989)	Beta-3365	
Table 9 (cont.) < 120	261 - 24	"	2	Weisler (1989)	Beta-2274	
< 140	270 - 13	"	2	Weisler (1989)	Beta-2275	
< 140	270 - 13	"	2	Weisler (1989)	Beta-2276	
< 120	261 - 24	"	2	Weisler (1989)	Beta-3363	
150 +/- 50	285 - 0	"	2	Weisler (1989)	Beta-3366	
< 120	261 - 24	"	2	Weisler (1989)	Beta-3367	
< 180	283 - 2	"	2	Weisler (1989)	Beta-3368	
< 170	280 - 5	"	2	Weisler (1989)	Beta-3369	
< 180	283 - 2	"	2	Weisler (1989)	Beta-2277	
< 140	270 - 13	"	2	Weisler (1989)	Beta-2279	
< 120	261 - 24	"	2	Weisler (1989)	Beta-3362	
110 +/- 50	273 - 0	Coastal Kawela Series	2	Weisler (1989)	Beta-3802	
290 +/- 60	456 - 294	"	2	Weisler (1989)	Beta-7563	
710 +/- 50	688 - 665	"	2	Weisler (1989)	Beta-7564	
320 +/- 70	370 +/- 70	Upland Kaunakakai Series	2	Weisler (1989)	Beta-27390	
560 +/- 110	600 +/- 110	"	2	Weisler (1989)	Beta-27391	
160 +/- 60	30 +/- 60	"	2	Weisler (1989)	Beta-27392	
350 +/- 80	380 +/- 80	"	2	Weisler (1989)	Beta-27393	
1450 +/- 60	1000 +/- 60	Kalama'ula Series	2	Weisler (1989)	Beta-11172	
400 +/- 60	170 +/- 70	"	2	Weisler (1989)	Beta-11171	
300 +/- 60	200 +/- 60	"	2	Weisler (1989)	Beta-11168	
70 +/- 50	< 120	"	2	Weisler (1989)	Beta-11169	
< 190	< 190	"	2	Weisler	Beta-	

				(1989)	11170	
500 +/- 70	540 +/- 70	Kipu Series	2	Weisler (1989)	Beta-27115	
610 +/- 60	640 +/- 60	"	2	Weisler (1989)	Beta-27116	
1290 +/- 60	1100 +/- 60	Kaluako'i Series	2	Weisler (1989)	Beta-20906	
360 +/- 50	505 - 315	"	2	Weisler (1989)	Beta-13743	
260 +/- 50	170 +/- 50	"	2	Weisler (1989)	Beta-13744	
< 160	277 - 7	"	2	Weisler (1989)	Beta-5700	
170 +/- 60	160 +/- 60	"	2	Weisler (1989)	Beta-20881	
Table 9 (cont.) 550 +/- 300	721 - 0	"	2	Weisler (1989)	M-767	
425 +/- 150	620 - 310	"	2	Weisler (1989)	M-1183	
GEOLOGICAL SAMPLES						
3370 +/- 70	N/A	Kawela	N/A	Weisler (1989)	Beta-5122	
410 +/- 60	N/A	Puko'o	N/A	Weisler (1989)	Beta-12903	
27,000	N/A	Kalani	N/A	Weisler (1989)	GX-2672	
4870 +/- 100	*N/A*	*Northwest Kalaupapa Peninsula*	*N/A*	*Fletcher (1992)*	*Beta-55476*	
4640 +/- 70	*N/A*	"	*N/A*	*Fletcher (1992)*	*Beta-55474*	
4730 +/- 80	*N/A*	"	*N/A*	*Fletcher (1992)*	*Beta-55475*	
4060 +/- 70	*N/A*	"	*N/A*	*Fletcher (1992)*	*Beta-55473*	

method has fallen out of favor with Hawaiian archaeologists.[35] Currently, few radiocarbon samples have been securely dated to the prehistoric era. Overall, a larger sample of dates from a wider range of sites would give us a better idea of the chronology of Kalaupapa.

Age (A.D.)	**Series/Location**	**Reliability** 1- best 2- ave. 3- poor	**Source**	**Lab-ID**
1850 +/- 19	*Kalaupapa Peninsula*	*3*	*Barrera (1978)*	*4091*
1772 +/- 15	"	*3*	*Barrera (1978)*	*4093*
1755 +/- 26	"	*3*	*Barrera (1978)*	*4094*
1753 +/- 27	"	*3*	*Barrera*	*4095*

[35] See Hommon (1993) for a review of the use of volcanic glass dating by Hawaiian archaeologists. See also Barrera's (1978) Hospital Project, Project Summaries, Appendix I, this volume.

			(1978)	
1773 +/- 34	"	*3*	*Barrera (1978)*	*4096*

Table 10 - Table of Volcanic Glass Dates Ranking Reliability*
(*dates from Kalaupapa NHP are in italics)

Absolute dates are not the only method archaeologists use to date sites. Historic records and the relationship between archaeological features and deposits can give a relative date of construction, use, or abandonment (Harris 1979). For example, since agricultural field walls seem have been robbed of stone to build the Great Wall, we know the construction of this feature must have taken place later in time than the use of the field walls, relatively speaking. Historical records give us another line of evidence to relatively date the Great Wall. A sketch map of the wall made during the historic era tells us it must have been built prior to A.D. 1894 (Monsarrat 1894) (see above).

The excellent condition of the archaeological landscape in Kalaupapa and the results of past excavations hold promise for future work. To refine and improve the current temporal data set research should concentrate on: (i) the date of occupation of early sites; (ii) agricultural development, specifically the expansion and intensification of the large-scale dryland field systems during the traditional Hawaiian and early historic periods; and (iii) the historical development of settlement and community patterns. Based on current methods, the greatest improvements to the body of chronological data for Kalaupapa will come from a program of excavation of a range of types of archaeological sites. Wood charcoal identification and radiocarbon dating augmented with relative methods of dating would be ideal.

Environment and Paleoenvironmental Reconstruction
In general, data sets generated by research on natural resources can be very useful for understanding the past if the spatial and temporal scale of information is relatively fine-grained. For example, efforts to reconstruct the past environment of the Kalaupapa Peninsula and its adjacent valleys has in the past brought together people interested in better understanding natural and cultural resources in the park. So far, projects have exclusively concentrated on exploring natural deposits within the Kauhakō Crater Lake. The lake by all estimations should be an ideal location to find undisturbed layers of sediment that could be sampled by coring; however, as of now none have been discovered (see Footnote 5). Currently there is only one published paleoenviromental core from Moloka'i Island (Denham *et al.* 1999:54). The analysis of the core revealed the landscape had undergone detectable changes in plant communities due to human agents. Kalaupapa NHP is in a good location for future paleoenvironment research due to its diversity of plant communities and history of occupation and land use.

Ethnohistory and Archaeology
History, by definition, is written only by the hand of literate people in the past and reflects the biases of the author in content, precision, and accuracy. As such, the field of "ethnohistory" has developed to bring to light topics and stories relating to the historically under-represented.

Recent works by anthropologist Pennie Moblo (1996, 1998, 1999), primarily using archival sources, are excellent examples of thoughtful historical research on the leprosy settlement at Kalaupapa. Moblo (1996, 1998, 1999) has specifically addressed the history of Kalaupapa in terms of race and leadership, as well addressing the history of leprosy policy. Recently joining Moblo in revisiting the history of Kalaupapa through a critical lens is historical geographer Douglas Herman (2001). As Kirch and Sahlins (1992) have demonstrated, archaeology can provide a useful line of evidence in such ethnohistoric studies.

The worldwide attention Kalaupapa settlement has had virtually since its foundation tends to overshadow the story of the original occupants of the area (*kama'āina*). The NPS web site describing the Kalaupapa National Historical Park (www.nps.gov/kala) on the other hand is an example of presenting a balanced history including both groups:

> Two tragedies occurred on the Kalaupapa Peninsula on the north shore of the island of Moloka`i; the first was the removal of indigenous people in 1865 and 1895, the second was the forced isolation of sick people to this remote place from 1866 until 1969. The removal of Hawaiians from where they had lived for 900 years cut the cultural ties and associations of generations of people with the `aina (land). The establishment of an isolation settlement, first at Kalawao and then at Kalaupapa, tore apart Hawaiian society as the kingdom, and subsequently, the territory of Hawai'i tried to control a feared disease. The impact of broken connections with the `aina and of family members "lost" to Kalaupapa are still felt in Hawai'i today.

Through research, planning, stewardship, cultural resource managers have managed to tell the story of the lives of indigenous people of Kalaupapa while at the same time paying respect to the direct connection of the patient community and the people of Hawai'i to the historic settlement.