Archaeological Monitoring Plan for the Proposed Eradication of Mangroves at ‘Alula Bay (TMK: 3-7-4-08:071 por.)

Kealakehe Ahupua‘a
North Kona District
Island of Hawai‘i

FINAL VERSION

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INTRODUCTION

At the request of Ann Kobsa of Malama O Puna, Rechtman Consulting, LLC has prepared this Archaeological Monitoring Plan for the eradication of the alien invasive plant red mangrove (*Rhizophora mangle*) from a roughly 0.71 acre area along the coastline of ‘Alula Bay, Kealakehe Ahupua’a, North Kona District, Island of Hawai’i (Figures 1 and 2). The eradication site is situated within a Special Management Area (SMA) located less than 100 meters south of the Honokōhau Small Boat Harbor within a 218.45 acre State-owned parcel (TMK: 3-7-4:08:071) (Figure 2). The mangroves are covering two archaeological sites (Sites 50-10-27-1898 and 1899) that are listed in the State Inventory of Historic Places (SIHP). The sites, commonly referred to as the ‘Alula Bay Complex, contain a total 13 features including the remains of Maka’opio Heiau (Site 1898 Feature A). In 1962 these sites were included within the boundaries of a large coastal area of Kealakehe, Koloko, and Honokōhau ahupua’a that was designated as a National Historic Landmark (NHL). Later, the Koloko and Honokōhau portions of the NHL became the Kaloko-Honokōhau National Historical Park, and the Kealakehe portion became the Honokōhau small boat harbor. Sites 1898 and 1899 were not disturbed during the harbor construction project however, and they currently fall within the legislative boundaries of the Kaloko-Honokōhau National Historical Park, although they are located outside the boundaries of the park itself.

A recent visit to the eradication area in January of 2010 shows that the mangroves have completely covered Site 1898 with the exception of Maka’opio Heiau, which has been kept free of the invasive species by a community group (Nā Wai Iwi Ola) that cares for the heiau, and that they have partially covered Feature A of Site 1899 (a large enclosure). The roots of the mangroves have grown through the rock features of these sites, and if left unchecked, may completely destroy them. Sites 1898 and 1899 were most recently recorded during an archaeological inventory survey conducted by Haun and Henry (2006) that has been submitted to DLNR-SHPD for review, but that has not yet been approved. As a result of that study both sites were recommended for preservation. The proposed mangrove eradication is an essential first step in preserving these sites. This monitoring plan will help ensure that the eradication efforts do not negatively impact the existing archaeological and cultural resources. The eradication will entail the cutting of mangroves by hand and the removal of all cut material from the eradication area. Malama O Puna, community volunteers, and students will participate in the eradication effort.

A portion of the funding for the eradication project will come from the United States Fish and Wildlife Service (USFWS) Coastal Program. Malama O Puna has also applied for discretionary funds from the Pacific Coast Joint Venture for a crew to supervise and work with the volunteers, and the Kaloko-Honokōhau National Historical Park's resource manager, Sallie Beavers, has indicated that she will apply for some National Park Service (NPS) funds to aid in the mangrove eradication effort. As part of the National Historic Preservation Act Section 106 process, Malama O Puna has already consulted with the State Historic Preservation Officer (SHPO) with respect to potential impacts the proposed project may have on the documented historic properties. As a precautionary measure that would serve to mitigate any potential adverse effects to the historic properties, the Hawai’i SHPO has requested that a qualified archaeological monitor be present during all cutting and removal activities, and that an archaeological monitoring plan be prepared and submitted to the SHPO for review. Rechtman Consulting, LLC has prepared this monitoring plan to fulfill that directive. The plan details the procedures that will be followed during the monitoring of the removal of the invasive mangroves at ‘Alula Bay, adherence to this plan will help minimize potential impacts to the archaeological sites that could occur during the eradication effort.
Figure 1. Project area location.
Figure 2. Aerial view showing the proposed mangrove eradication area.
Figure 3. Tax Map Key (TMK): 3-7-4-08 showing the proposed mangrove eradication area (portion of parcel 71).
Culture-Historical Context

There have been numerous archaeological, cultural, and historical studies conducted in the general vicinity of the eradication area. A synthesis of these studies provides a culture-historical background for the Kona area. Archaeologists and historians describe the inhabiting of the Hawaiian Islands in the context of settlement that resulted from voyages taken across the open ocean. For many years, researchers have proposed that early Polynesian settlement voyages between Kahiki (the ancestral homelands of the Hawaiian gods and people) and Hawai‘i were underway by A.D. 300, with long distance voyages occurring fairly regularly through at least the thirteenth century. It has been generally reported that the sources of the early Hawaiian population—the Hawaiian Kahiki—were the Marquesas and Society Islands (Cordy 2000; Emory in Tatar 1982:16-18).

For generations following initial settlement, communities were clustered along the watered, windward (ko‘olau) shores of the Hawaiian Islands. Along the ko‘olau shores, streams flowed and rainfall was abundant, and agricultural production became established. The ko‘olau region also offered sheltered bays from which deep sea fisheries could be easily accessed, and near shore fisheries, enriched by nutrients carried in the fresh water, could be maintained in fishponds and coastal waters. It was around these bays that clusters of houses where families lived could be found (McEl Downey 1979:15). In these early times, Hawai‘i’s inhabitants were primarily engaged in subsistence level agriculture and fishing (Handy et al. 1972:287).

Over a period of several centuries, areas with the richest natural resources became populated and perhaps crowded, and by about A.D. 900 to 1100, the population began expanding to the kona (leeward side) and more remote regions of the island (Cordy 2000:130). In Kona, communities were initially established along sheltered bays with access to fresh water and rich marine resources. The primary “chiefly” centers were established at several locations—the Kailua (Kaiakeakua) vicinity, Kahalu‘u-Keauhou, Ka‘awaloa-Kealakekua, and Hōnaunau. The communities shared extended familial relations, and there was an occupational focus on the collection of marine resources. By the fourteenth century, inland elevations to around the 3,000-foot level were being turned into a complex and rich system of dryland agricultural fields (today referred to as the Kona Field System). By the fifteenth century, residency in the uplands was becoming permanent, and there was an increasing separation of the chiefly class from the common people. In the sixteenth century the population stabilized and the ahupua‘a land management system was established as a socioeconomic unit (see Ellis 1963; Handy et al. 1972; Kamakau 1961; Kelly 1983; and Tomonari-Tuggle 1985).

In Kona, where there were no regularly flowing streams to the coast, access to potable water (wai), was of great importance and played a role in determining the areas of settlement. The waters of Kona were found in springs and caves (found from shore to the mountain lands), or procured from rain catchments and dewfall. Traditional and historic narratives abound with descriptions and names of water sources, and also record that the forests were more extensive and extended much further seaward than they do today. These forests not only attracted rains from the clouds and provided shelter for cultivated crops, but also in dry times drew the kēhau and kēwai (mists and dew) from the upper mountain slopes to the low lands (Rechtman and Maly 2003).

Over the generations, the ancient Hawaiians developed a sophisticated system of land and resources management. By the time ‘Umi-a-Līloa rose to rule the island of Hawai‘i in ca. 1525, the island (moku-puni) was divided into six districts or moku-o-loko (cf. Fornander 1973–Vol. II:100-102). On Hawai‘i, the district of Kona is one of six major moku-o-loko within the island. The district of Kona itself, extends from the shore across the entire volcanic mountain of Hualalai, and continues to the summit of Mauna Loa, where Kona is joined by the districts of Ka‘ū, Hilo, and Hāmākua.

Kona, like other large districts on Hawai‘i, was further divided into ‘okana or kalana (regions of land smaller than the moku-o-loko, yet comprising a number of smaller units of land). In the region now known as Kona ‘akau (North Kona), there are several ancient regions (kalana) as well. The southern portion of
North Kona was known as “Kona kai ‘ōpua” (interpretively translated as: Kona of the distant horizon clouds above the ocean), and included the area extending from Lanihau (the present-day vicinity of Kailua Town) to Pu‘uohau (now known as Red Hill). The northern-most portion of North Kona was called “Kekaha” (descriptive of an arid coastal place). Native residents of the region affectionately referred to their home as Kekaha-wai-‘ole o nā Kona (Waterless Kekaha of the Kona District), or simply as the ʻāina kaha (Rechtman and Malo 2003). It is within this region of Kekaha, that the ahupua’a of Kealakehe is found.

The ahupua’a were also divided into smaller individual parcels of land (such as the ‘īli, kōʻele, māla, and kīhāpai, etc.), generally oriented in a mauka-makai direction, and often marked by stone alignments (kuaiwi). In these smaller land parcels the native tenants tended fields and cultivated crops necessary to sustain their families, and the chiefly communities with which they were associated. As long as sufficient tribute was offered and kapu (restrictions) were observed, the common people, who lived in a given ahupua’a had access to most of the resources from mountain slopes to the ocean. These access rights were almost uniformly tied to residency on a particular land, and earned as a result of taking responsibility for stewardship of the natural environment, and supplying the needs of the ali‘i (see Kamakau 1961:372-377 and Malo 1951:63-67).

Entire ahupua’a, or portions of the land were generally under the jurisdiction of appointed konohiki or lesser chief-landlords, who answered to an ali‘i-ai-ahupua’a (chief who controlled the ahupua’a resources). The ali‘i-ai-ahupua’a in turn answered to an ali‘i ‘ai moku (chief who claimed the abundance of the entire district). Thus, ahupua’a resources supported not only the maka’āinana and ‘ōhana who lived on the land, but also contributed to the support of the royal community of regional and/or island kingdoms. This form of district subdividing was integral to Hawaiian life and was the product of strictly adhered to resources management planning. In this system, the land provided fruits and vegetables and some meat in the diet, and the ocean provided a wealth of protein resources. Also, in communities with long-term royal residents, divisions of labor (with specialists in various occupations on land and in procurement of marine resources) came to be strictly adhered to. It is in this cultural setting that we find Kealakehe Ahupua’a and the present ‘Alula Bay study area prior to the 1800s.

The ahupua’a of Kealakehe is one of some twenty ancient ahupua’a within the ‘okana of Kekaha-wai-‘ole. The ahupua’a crosses several environmental zones that are generally called wao in the Hawaiian language. These environmental zones include the near-shore fisheries and shoreline strand (kahakai) and the kula kai/kula uka (shoreward/inland plains). These regional zones were greatly desired as places of residence by the natives of the land.

While the kula region of Kealakehe and greater Kekaha is now likened to a volcanic desert, native and historic accounts describe or reference groves of native hardwood shrubs and trees such as ūlei (Osteomeles anthyllidifolia), ēlama (Diospyros ferrea), uhiuhi (Caesalpina kaviensis), and ohe (Reynoldsia sandwicensis) extending across the land and growing some distance shoreward. The few rare and endangered plants found in the region, along with small remnant communities of native dryland forest (Char 1991) give an indication that there was a significant diversity of plants growing upon the kula lands prior to the introduction of ungulates and invasive plant species.

The lower kula lands receive only about 20 inches of rainfall annually, and it is because of their dryness that the larger region of which Kealakehe is a part is known as Kekaha. While on the surface, there appears to be little or no potable water in this region, the very lava flows which cover the land contain many underground streams that are channeled through subterranean lava tube feeding the springs, fishponds, and anchialine ponds on the kula kai (coastal flats).

The ancient Hawaiians saw (as do many Hawaiians today) all things within their environment as being interrelated. That which was in the uplands shared a relationship with that which was in the lowlands, coastal region, and even in the sea. This relationship and identity with place worked in reverse as well, and the ahupua’a as a land unit was the thread that bound all things together in Hawaiian life. In an early account written by Kihe (in Ka Hōkū o Hawai‘i, 1914-1917), with contributions by John Wise and Steven
Desha Sr., the significance of the dry season in Kekaha and the custom of the people departing from the uplands for the coastal region is further described:

...‘Oia ka wā e ne‘e ana ka lā iā Kona, hele a malo‘o ka ‘āina i ka ‘ai kupakupa ‘ia e ka lā, a o nā kānaka, nā ʻī i o Kona, pūhe‘e aku la a noho i kahakai kāhi o ka wai e ʻōla ai nā kānaka – It was during the season, when the sun moved over Kona, drying and devouring the land, that the chiefs and people fled from the uplands to dwell along the shore where water could be found to give life to the people. (Ka Hōkū o Hawai‘i, April 5, 1917 translated by Kepā Maly)

Travel was made possible by the use of a network of trails (alahele and alaloa) that connected the mauka and makai residential and resource areas. Alahele (trails and byways) and alaloa (regional thoroughfares) were an integral part of the cultural landscape of Hawai‘i. The alahele provided access for local and regional travel, subsistence activities, cultural and religious purposes, and for communication between extended families and communities (Rechtman and Maly 2003). Trails were, and still remain important features of the cultural landscape.

By the fourteenth century, inland elevations of Kona (to around the 3,000 feet above level) were being turned into a complex system of dry land agricultural fields (today referred to as the Kona Field System; Rechtman and Maly 2003). By A.D. 1400 agricultural fields had spread across the slopes of Hualalai, and much of the coastline was utilized for habitation purposes (Burtchard 1995; Cordy 1995). The earliest agricultural fields may have been located in the southern portion of the system (Schilt 1984), with new fields expanding northward over time (Haun et al. 1998). Radiocarbon data indicates that the population in Kona increased dramatically around A.D. 1400-1600 (Burtchard 1995; Haun et al. 1998; Schilt 1984). It was the pressures of the growing population on the food supply that demanded the growth of the agricultural fields. With the increase in population and agriculture, residency in the uplands was also becoming permanent (Rechtman and Maly 2003).

By A.D. 1600-1800 the Hawaiian environment may have reached its maximum carrying capacity, resulting in social stress between neighboring groups (Haun et al. 1998). This volatile period was accompanied by internal rebellion and territorial annexation (Hommon 1986; Kirch 1985). During this period, Kekaha certainly felt the effects of the chiefly turmoil. By the early eighteenth century, following the death of his father Keawe, Alapa‘inui had secured all of Hawai‘i Island under his rule (Kamakau 1992). Around 1740 his forces were attacked at Kona by the forces of his brother-in-law, Kekaulike of Maui (Maly and Maly 2006). Kamakau relates that:

…This Ke-kau-like so delighted in war that he sailed to attack Hawaii. The fighting began with Alapa‘i at Kona. Both sides threw all their forces into the fight. Ke-kau-like cut down the trees throughout the land of Kona. Obliged to flee by canoe before Alapa‘i, he abused the country people of Kekaha. At Kawaihae he cut down all the coconut trees. He slaughtered the country people of Kohala, seized their possessions, and returned to Maui. (Kamakau 1992:66)

In 1754 Alapa‘inui died and his son, Keawe‘ōpala, succeeded him, but he was defeated and killed that same year by Kalaniōpu‘u, who then became the ruler of Hawai‘i Island. Kalaniōpu‘u was the reigning chief on January 18, 1778 when British explorer Captain James Cook arrived in the Hawaiian Islands, ushering in a new chapter in Hawai‘i’s history. Kalaniōpu‘u exchanged gifts with Cook the following January [1779] at Kealakekua Bay, and was present in February when Cook, having damaged a mast in a severe storm off the coast of Kohala, returned to Kealakekua Bay and was killed (Kamakau 1992).
During the first of the defined historic periods (A.D. 1778-1819), Kalaniʻōpuʻu was chief of the Island of Hawaiʻi and he often resided in the Kona District (Haun et al. 1998). Around 1780, Kalaniʻōpuʻu proclaimed that his son Kiwalaʻo would be his successor, and he gave the guardianship of the war god Kukaʻilimoku to Kamehameha. Kamehameha and a few other chiefs, however, were concerned about their land claims, which Kiwalaʻo did not seem to honor (Fornander 1996; Kamakau 1961). Following Kalaniʻōpuʻu's death in 1782 civil war broke out. Kiwalaʻo was killed and Kamehameha became the ruler of Hawaiʻi Island, and eventually of all the Hawaiian Islands. Early historical accounts emphasize that modern day Kailua Town during this period was a significant political seat and population center. The Kona Field settlement and subsistence system continued relatively unchanged through the first few decades of the historic era (Handy et al. 1972).

The second quarter of the 19th century (A.D. 1820-1847) was a time of profound social change in Hawaiʻi. Kamehameha I died in mid-1819, and a council of chiefs supported Kamehameha's son Liholiho as successor (Kelly 1983). Liholiho gained the council's support in exchange for the distribution of the profits from the sandalwood trade and the bounty of the land that moved up the hierarchy from the various ahupua'a under his control; privileges previously retained solely for the ruler. Within six months after Kamehameha's death, Liholiho, Kaʻahumanu, and Queen Keopuolani broke the kapu prohibiting men and women eating together. This act of "free eating" symbolized the end of the traditional kapu system. With the end of the kapu system, the changes in social and economic patterns began to affect the lives of the common people.

Liholiho moved his court to Oʻahu, and as a result the burden of resource procurement for the chiefly class lessened considerably on the people of Hawaiʻi Island. Some of the work of the commoners shifted from subsistence agriculture to the production of foods and goods for trade to the early Western visitors. Introduced crops, such as yams, coffee, melons, Irish potatoes, Indian corn, beans, figs, oranges, guavas, and grapes (Wilkes 1845) were grown specifically for trade with Westerners. Other commodities, especially sandalwood, were collected to purchase Western goods, often to the detriment of agricultural pursuits. The arrival of the Western missionaries in Hawaiʻi during the 1820s brought further changes to the social and religious systems of the islands.

By the mid-nineteenth century, the ever-growing population of Westerners forced socioeconomic and demographic changes that promoted the establishment of a Euro-American style of land ownership, and in 1848 the Māhele ʻĀina became the vehicle for determining ownership of native lands. This change in land tenure was promoted primarily by the missionaries and Western businessmen in the island kingdom. Generally these individuals were hesitant to enter business deals on leasehold land. The Māhele (division) defined the land interests of Kamehameha III (the King), the high-ranking chiefs, and the konohiki. During the Māhele, all lands in the Kingdom of Hawaiʻi were placed in one of three categories: (1) Crown Lands (for the occupant of the throne); (2) Government Lands; and (3) Konohiki Lands (Chinen 1958:vii and Chinen 1961:13). The chiefs and konohiki were required to present their claims to the Land Commission to receive awards for lands provided to them by Kamehameha III. They were also required to provide commutations to the government in order to receive royal patents on their awards. The lands were identified by name only, with the understanding that the ancient boundaries would prevail until the land could be surveyed. This process expedited the work of the Land Commission.

All three types of land were subject to the rights of the native tenants therein; those individuals who lived on the land and worked it for their subsistence and the welfare of the chiefs. Native tenants could claim, and acquire title to, kuleana parcels that they actively lived on or farmed at the time of the Māhele. The Kuleana Act of December 21, 1849 provided the framework by which native tenants could apply for and receive fee-simple interest in their kuleana lands from the Land Commission. The Board of Commissioners over saw the program and administered the lands as Land Commission Awards (LCAw.). Not all lands that were claimed were awarded.
As a result of the Māhele, the ahupua’a of Kealakehe was designated Government Land. Eleven kuleana land claims made within Kealakehe Ahupua’a, all were located east of the current project area at elevations ranging between 1,000 and 1,500 feet above sea level. Native testimony shows that the native residents were claiming land used for farming taro, sweet potato, banana, and there were at least ten houses, including some that were fenced in (Donham 1990).

Following the Māhele, and the Homestead Act of 1884, the upper portion of Kealakehe Ahupua’a was subdivided and sold as grants (Haun and Henry 2001). This area was referred to as the Kealakehe Homesteads. Historic land use of these parcels likely included residential, diversified agriculture, and ranching.

Traditional and historical accounts of this time (Rechtman and Maly 2003) describe at least two traditional trails that were of regional importance which passed through the land of Kealakehe. One trail was the alaloa—parts of which were modified in the 1840s and later, into what is now called the Alanui Aupuni (Government Road) or Māmalahoa Trail or King’s Highway—that crosses the makai (near shore) lands, linking royal centers, coastal communities, and resources together. The other major thoroughfare of this region was “Kealāehu” (The path of Ehu), which passes through the uplands, generally a little above the mauka Government Road or old Māmalahoa Highway, out to the ‘Akāhipu’u vicinity, and then cuts down to Kīholo in Pu’u Wā’awa’a. From Kīholo, the makai alaloa and Kealaehu join together as the Alanui Aupuni, and into Kohala, passing through Kawaih ae and beyond. The mauka route provided travelers with a zone for cooler traveling, and access to inland communities and resources. It also allowed for more direct travel between the extremities of North and South Kona (cf. Malo 1951; I’i 1959; Kamakau 1961; Ellis 1963; and Māhele and Boundary Commission Testimonies). These trails were the primary routes of travel through North Kona prior to the construction of the Kona Belt Road in 1933 and the current alignment of the Māmalahoa Highway in 1956 (Rechtman and Henry 1998).

Kekaha was regularly occupied up until World War II. The primary method of travel between 1900 and 1947, was by foot or on horse or donkey, and those who traveled the land, were generally residents of the Kealakehe, Kalaoa, ‘O’oma, and Kohanaiki Homesteads and other lands in the immediate vicinity (Rechtman and Maly 2003). Following World War II, retired military vehicles became available to the public, and after that time, the Alanui Aupuni and some of the smaller trails along the shore were modified for vehicular traffic.

A short lived agricultural pursuit, centered in Kealakehe and Keahuolū ahupua’a, began in Hawai‘i in 1893. It was in this year that the Hawaiian Commissioner of Agriculture and Forestry ordered 20,000 sisal plants from Florida (Conter 1903:11). During early 20th century a sisal mill, used to process the raw sisal into fibers, was constructed in Keahuolū Ahupua’a along Palani Road. Kelly (1983:89) relates that Kona was naturally adapted to the cultivation of sisal, and that depending on the terrain, anywhere between 500 to 1,000 plants could be grown on an acre. Thrum (1905:181) reported that the “McWayne sisal tract consisted of about 500 acres at or near Kailua”. Jensen (1990:A-5) reports that the first crop from the McWayne Estate did not reach Honolulu until 1918. Mr. Minoru Inaba, who worked at the mill from 1920-21, stated that the mill was owned by Luther S. Aungst from 1917 until its closure in 1924 (in Jensen 1990:A-5). Mr. Inaba recalled that over a thousand acres were in cultivation in Kealakehe and Keahuolū ahupua’a surrounding the mill along Palani Road. Workers would harvest the plants in the field and then bundle and transport them to mill by donkey where they were thrashed, dried, and baled before being sent to San Francisco on steamers (Jensen 1990:A-5).

In 1968 work began on the Honokōhau Small Boat Harbor at the northern end of ‘Alula Bay in Kealakehe and Honokōhau ahupua’a. Initial work on the harbor was completed in 1970, but in 1978 the facility was expanded to enlarge the harbor basins, and provide additional boat ramps, loading docks, and moorings. Construction of the harbor drastically altered the landscape in the vicinity of ‘Alula Bay, and brought many more people to the area. Today, the white sand beach at the southern end of the bay is an easily accessed, popular spot for swimming, sunbathing, and other recreational activities.
PRIOR ARCHAEOLOGICAL STUDIES AND KNOWN ARCHAEOLOGICAL SITES

Two archaeological sites are known to exist within the proposed mangrove eradication area SIHP Sites 1898 and 1899. Although a large number of previous archaeological studies have been conducted within Kealakehe Ahupua’a and the neighboring ahupua’a of Honokōhau, the following discussion is limited to work conducted at these two previously identified sites by Reinecke (n.d.), Emory and Soehren (1971), Sinoto (1975), Greene (1993), and Haun and Henry (2006). For a detailed discussion of the archaeological work conducted throughout Kealakehe Ahupua’a the reader is referred to Haun and Henry (2006).

SIHP Sites 1898 and 1899 were first noted by Reinecke (n.d.) during an archaeological survey of coastal West Hawai’i Island conducted for the B.P. Bishop Museum (B.P.B.M.) in 1930. Reinecke recorded Maka’opio Heiau as Site 35, an unnamed heiau, and the general ‘Alula Bay Complex as Sites 36 and 37. Reinecke described these sites as follows:

Site 35. A Heiau, name unknown, situated between the bay and a group of brackish pools. It is remarkable for the size of the stones used in its facing and for two great stone slabs, - kuula, fixed in the west or makai side. One slab in 7’ x 3¼’ x 12-15”, the other 8’ x 4¾’ x 12-15”. But one of the larger stones in the wall is no less than 5 x 4 x 1. The heiau is very carefully constructed the stones being joined with care, and only the S.E. corner being broken down.

The length north and south is 53’ with a slight slope to the south. It is built against the lava slope at the north. The width at the north is 25½’ & 9’, there being a drop of 2 ½’ on the east; the width at the south is 35’ -- the identity being planned at 6’, tho [sic] it is slightly less on the makai side. On the N.E. it is 4 - 2½’, the terrace being only about 16’ long and merging into the main platform.

At the north end is a house site or more probably a grave, marked by lava and coral pebbles, c. 13x10.

Stretching back of the heiau in two directions are pools of brackish water, which have been rather carefully walled into compartments. Between the two arms is a house site, or platform resembling one. A well-built pen about 50x50 cuts across the southern arm. There is an entrance, and it must have been used as stock pen close to a water supply.

Site 36. Small, old house site to overlooking the pools; row of three modern house sites. On the sand in front are traces of ruins, and on a knob by the beach, indications of some sort of platform.

Site 37. Natural depression c. 40x40x10 with dirt floor, neatly walled up; entrance and steps. Pools of brackish water on either side. About 75' makai is a modern house site, followed by an old house site. (Reinecke n.d.:11)

In 1961 the B. P. Bishop Museum (Emory and Soehren 1971) conducted an archeological study of the Kealakehe-Honokōhau-Kaloko complex including the sites previously noted by Reinecke (n.d.). During that study a map was prepared showing the locations of the coastal sites in these ahupua’a (Figure 4). The sites in the vicinity of the proposed mangrove eradication area were recorded as B.P.B.M. Site Nos. D11-6 (“three Kahua hale”), D11-7 (“Heiau Makaopio [sic] and pools”), D11-8 (“Corral”), D11-9 (“Kahua hale”), and D11-10 (“Pen”) (Emory and Soehren 1971:3). Each of these sites was described in detail, and plan views were prepared showing the locations of the features relative to one another and the brackish pools. The Emory and Soehren (1971) site descriptions and plan views are reproduced in Appendix A of this monitoring plan. The name of the Maka’opio Heiau, which was not known by Reinecke in 1930, was given to Violet Hansen of the B. P. Bishop Museum in 1957 when she interviewed Naluahine, a long time
resident of the area, shortly before his death (see Appendix A). As a result of the Emory and Soehren (1971) study it was recommended that Sites D11-6 and D11-7 be preserved, and that their locations be placed on the State Tax Maps.

In 1968 work began on the Honokōhau Small Boat Harbor. Several of the archaeological sites recorded by Reinecke (n.d.) and Emory and Soehren (1971) were destroyed during the blasting and dredging associated with its construction, but the sites along the south side of ‘Alula Bay in the vicinity of the proposed mangrove eradication area were spared. During the mid 1970s these sites were once again relocated by the B. P. Museum (Sinoto 1975) as part of a survey conducted for the proposed expansion of the harbor facility into Kealakehe Ahupua’a. No new work was conducted at the sites, but their locations relative to the Honokōhau harbor were plotted on a map of the survey area, which is reproduced below as Figure 5. Following that study, in 1973 as part of the Hawai‘i Island portion of the Statewide Inventory of Historic Places survey, the sites were assigned their current SIHP Site numbers (Sites 1898 and 1899).

Greene (1993) prepared a cultural history of three sites on the west coast of Hawai‘i Island for the National Park Service. One of the three sites discussed was Maka‘opio Heiau, which falls within the legislative boundaries of the Kaloko-Honokōhau National Historical Park. Greene included photographs of Maka‘opio Heiau that were taken by the National Park Service in 1989 (note that no mangroves are evident in these photographs; Figures 6 and 7), and provided the following description of the site:

The fisherman's heiau known as Maka'opio, a Hale-o-Lono class of heiau, is a low rectangular platform built out into a shallow, ponded area. Its outstanding features are two great upright stone slabs, measuring over six feet five inches in height, that rise above the pavement perpendicular to the seaward face. The stones, one of which bears a petroglyph of a man about twenty-four inches high, may have represented fishermen's gods. Also present is a small ko'a (fishing shrine) comprising a large, smooth stone (ku'ula) standing on a platform. Nearby are ancient house sites, petroglyphs, and bathing pools. (1993:VIII-G:2)

The most recent archaeological study that included SIHP Sites 1898 and 1899 was conducted by Haun and Henry (2006) for the proposed Kona Kai Ola project. This study included 370.5 acres of land (portions of TMKs: 3-7-4-008: 002, 003, 071, and 072) between Highway 19 and the coast in Kealakehe and Keahuolū ahupua’a. As a result of the survey Haun and Henry recorded 127 sites containing a total of 432 features. SIHP Sites 1898 and 1899 were relocated on TMK: 3-7-4-008:071 along the southern edge of ‘Alula Bay within the legislative boundaries of Kaloko-Honokōhau National Historical Park (Figure 8). Updated descriptions and plan views of the two sites and their component features were prepared as part of the study; the Haun and Henry (2006) descriptions and plan views of SIHP Sites 1898 and 1899 are reproduced in Appendix B of this report.

SIHP Site 1898 (Features A-I) was described by Haun and Henry (2006) as unaltered and in poor to fair condition, and the presence of mangroves was noted at the site. This site was interpreted as having been used for Precontact ceremonial and permanent habitation purposes. It was assessed as significant under Criterion C, D, and E, and was recommended for preservation.

SIHP Site 1899 (Features A-C) was described by Haun and Henry (2006) as unaltered and in good condition, and no mangrove encroachment was noted at the site. A test unit (TU-16) excavated at Feature B of SIHP Site 1899 revealed the presence of a substantial cultural deposit within the terrace that was indicative of Precontact habitation use, and included two bone fishhooks and a number of urchin spine and coral abraders. This site was interpreted as having been used for livestock control and temporary habitation purposes. It was assessed as significant under Criterion D, and was also recommended for preservation.
Figure 1. Detailed Map of site locations in Coastal Area of Honokohau, and Kealakehe, N. Kona, Hawaii.
Figure 5. Sinoto (1975:4) site location map.
Figure 6. Maka’opio Heiau, view to east (NPS photo, 1989; Greene 1993: Illustration 121).

Figure 7. Maka’opio Heiau, view to southwest (NPS photo, 1989; Greene 1993: Illustration 122).
Figure 8. Portion of Haun and Henry (2006:fig. 7) site location map showing the locations of SIHP Sites 1898 and 1899.
COORDINATION OF EFFORTS

Malama O Puna has already been in contact with Theresa Donham, Hawai‘i Island State Archaeologist, Nancy McMahon, Deputy SHPO/State Archaeologist and Historic Preservation Manager, Kumu Keala Ching of Nā Wai Iwi Ola, and Geraldine Bell, Superintendent (former) Kaloko-Honokōhau National Historical Park in regards to the proposed mangrove eradication efforts at ‘Alula Bay. All parties agree that the eradication of the mangroves from ‘Alula Bay will have a positive effect on the environmental, cultural, and archaeological resources of the area. In order to ensure that the known archaeological and cultural sites are not adversely impacted during the eradication process specific concerns related to the preservation of the sites will be discussed with all parties before the removal of the alien species begins.

Prior to eradication activities, a qualified archaeological monitor will meet with Malama O Puna and community volunteers to discuss the procedures for monitoring. It will be explained that the monitoring archaeologist has the authority to halt activities in the event that cultural resources are in danger of being adversely impacted. If the removal of a tree damages, or appears to have the potential to damage, a known archaeological feature, or if previously unidentified cultural resources are discovered during monitoring, and are deemed significant (and thus Historic Properties), the monitoring archaeologist will immediately notify the SHPO and coordinate consultation as appropriate with any groups or organizations. Additionally, the SHPO will be notified in writing upon the on-set and completion of the monitoring activities.

FIELD METHODS

A qualified archaeological monitor will be present during the removal activities associated with the eradication of the mangroves at ‘Alula Bay. Prior to eradication activities an effort will be made by a qualified archaeologist to identify and mark all known archaeological features that are currently buried beneath the growth of mangroves to ensure that they are not inadvertently damaged. As the eradication and removal of the mangroves progresses the exposed features will be inspected and compared to field maps and descriptions prepared by Emory and Soehren (1971) and Haun and Henry (2006) in an effort to correlate the structures with their existing site and feature designations, and to assess their current condition. This practice will be followed to help identify any previously undiscovered intact cultural deposits, features, artifacts, or human skeletal material. If any such resources are encountered the monitor will initiate the following procedures:

**Intact Cultural Deposits**

If intact cultural deposits are discovered during monitoring, an assessment will be made as to their integrity and significance. If deemed significant, and the deposit is likely to be further impacted by eradication activities, work in the affected area will be curtailed, and an appropriate mitigation strategy developed in consultation with the SHPO.

**Surface Features**

Surface features observed, if previously unrecorded, will be fully described, drawn, and photographed. Location information (including UTM data) will also be recorded and related to a previously recorded feature. The limits of the feature will be defined, but no subsurface testing will be conducted.

**Artifacts**

Artifacts observed during and after the eradication measures will have their precise locations recorded as well as any observed association with archaeological features. The artifacts will then be moved to a less conspicuous location within the same feature they were found, thereby preventing their discovery and removal.
**Human Skeletal Remains**

While not likely, it is possible that human skeletal remains could be discovered during the monitoring. If such material is encountered, activity in the immediate area of the discovery will be halted, the remains stabilized, and the appropriate authorities contacted. If the skeletal material is determined to be historic or Precontact (as opposed to recent), the monitoring archaeologist will direct the applicant to seek SHPO guidance on how to proceed with the discovery. If the remains are determined to be recent, the Hawai‘i County Police Department will be contacted.

If the SHPO determines that the removal of buried human remains is an appropriate course of action, then a treatment/reburial plan will be developed in consultation with the SHPO and other consulted parties, as appropriate. Such treatment might include reburial without further analysis, or reburial following analysis. If osteological analysis is deemed appropriate, the analysis will comply with Hawaii State law as outlined in Hawai‘i Administrative Rules 13§13-300.

**REPORTING**

Following completion of the monitoring a final monitoring report will be prepared and submitted to the SHPO for concurrence. This report will follow the specifications contained in Hawaii State law (HAR 13§13-279-5). If any human skeletal remains are recovered and analyzed as part of the monitoring project they will be addressed in the final monitoring report following procedures contained in HAR 13§13-300. The final monitoring report will be submitted to the SHPO within 180 days of completion of the monitoring fieldwork.
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APPENDIX A - Emory and Soehren (1971) site descriptions

D11-1 (cont'd)

the platform is built up nearly 4 ½ feet to level the site. The sinkhole probably served as a convenient rubbish dump. A gap in the west wall undoubtedly marks the entrance to the enclosure.

It will be noted that the dimensions of a house generally may be expressed in fathoms, or ohana, a basic unit of measure of the old Hawaiians. This kahua, or house foundation, is approximately 12 by 18 feet, or 2 by 3 fathoms.

-2 Only a few scattered stones and a patch of coral and sand mark this old kahua kai'a. The site is situated on a pahoehoe flat commanding a view of the large heiau Puuoina and the intervening pools. The platform consists of a rough pavement of lava fragments and a few water-worn stones with a patch of sand and coral at the northeast corner.

-3 In a sandy pocket surrounded on three sides by a pahoehoe ridge are three burial cists (Fig. 3, D11-3, and Pl. 1a). Others may be buried in the sand in similar pockets in the immediate vicinity. All three are rectangular in outline, about 9 feet in length and 4 feet in breadth, and are surfaced with sand and coral pebbles. The construction is typified in one of the cists which was found partially opened: upright slabs of water-worn stone around the perimeter bridged by similar slabs placed transversely across them. Two crania were visible within.

-4 Overlooking the three burial cists is a small platform, outlined with beach boulders and paved with sand and coral. Its use is uncertain, but most likely it is a small house site (Fig. 3, D11-4).

-5 Again illustrating the use made of natural features is this coral. A roughly oval sinkhole, about 55 feet by 75 feet, has been enclosed by a rough wall of lava fragments varying in height from 1 ½ feet to 6 feet as required by the terrain, resulting in an inside height of from 5 to 10 feet. On the west side is a gate, built so as to utilize a natural ledge as a ramp leading from the floor of the coral. The pen was most likely used for goats, which were quite important for some time after their introduction.

-6 This group of three house platforms, two of which are in an excellent state of preservation, illustrates the use of material from an abandoned site in the construction of a new one (Fig. 4, D11-6, and Pl. 1b). The northernmost of the platforms is of an earlier date, as indicated by its disrepair. It had at one time been enclosed by a wall, similar to D11-1. This has been mostly destroyed to provide material for the two newer platforms. This practice is especially well illustrated in Honokohau. As may be seen from the plan, the west wall terminates abruptly and only a few feet remain of the north wall.

The two recent kahua are fine examples of the type found in this area. From 1 to 1¼ feet high, each is faced with lava slabs and paved with sand and coral, save for a strip about 3 feet wide running the length of the east and west sides, which was left rough. The central
portion would thus accommodate a house 3 by 4 fathoms, a generous
dimension. Over-all, the platform is 4 fathoms square. Both houses
had entrances at the west (front) and east (back), marked by large
water-worn slabs set as steps. The house to the south has a konane
board set in the platform adjacent to the front entrance and the north
house has one at the back entrance. Each has a very small enclosed
yard in front and a small pen has been incorporated in the yard of
the south house. In front of the south house is a large beach boulder
which may have served as a seat and behind the north house is another.

A heiau platform is situated between the beach and a series of
brackish pools (Fig. 5, D11-7, and Pl. 2a-c). The structure is about
34 feet by 54 feet, oriented north and south, and from 4 to 6 feet
high, sloping slightly to the south. The north end is formed by a
natural ridge of pahoehoe which rises about 6 feet above the platform.
The base of the heiau is awash even at low tide. Portions of the west
or seaward face have collapsed, and the southwest corner has been
broken down, probably by high surf. Two remarkably large stone slabs,
each about 1 foot by 4 feet by 7 feet, are spaced equidistant in the
west face, dividing it into thirds and projecting well above the surface
of the heiau. Flanking them are large slabs which measure up to 1 foot
by 4 feet by 5 feet. At the north end of the platform is a small house
site paved with sand and coral, about 10 feet by 13 feet. At the north-
east corner, overlooking the first enclosed pool, is a small terrace,
10 feet by 16 feet, which at its north end is about 2 feet below the
main platform with which it gradually merges at its south end. Except
for the paved house site and smoothly cobbled path leading south from
it for about 10 feet, the surface of the structure is composed of
roughly set water-worn beach boulders.

The heiau, site No. 35 in Reinecke's manuscript, he gives as "name
unknown." The two largest slabs he called "Ku'wik" (fish gods). Aged
Naluahine gave as the name of the heiau, Makaopio, when interviewed
shortly before his death by Violet Hansen, February 1957. He said that
the smaller of the two large slabs represented Ka-cha and the larger
his father. He stated further that the stones were brought from Kailua
and that this was a fishing heiau. The name Hale o Lono appearing on
the present U.S. Geological Survey map has no source for this in the
Bishop Museum records. It is a general heiau name which can be applied
to heiau in which Lono was worshipped. It is one of the names of
Ahuena heiau in Kailua, for example. However, this was also the name
given to Reinecke in 1930, for the heiau Hale o Kane (Pl. 3a, D11-12).
That Hale o Kane is the correct name is certain because of the recording
of this name by surveyor Emerson in 1883.

Extending eastward from the heiau is a long pool of very brackish
water which has been divided by walls and terraces into three compart-
ments. Along the north side of the first pool a terrace 6 by 30 feet
has been constructed at the foot of the pahoehoe ridge, and another 8
feet by 20 feet, divides the first and second pools. The third pool is
bounded naturally, but also contains an artificial terrace on its north
D11-7 (cont'd)

side. All the terraces rise about one foot above high tide. Those pools may have served as bathing places. The water is cool and noticeably less salty than the sea. Some of the pools farther inland contains quantities of hiiwai (naritina), which live in fresh or brackish water.

A second tidal pool extends from the beach past the south end of the heiau to the foot of site 8. A terrace 8 feet by 30 feet cuts off the upper portion of this inlet. Near the north end of the terrace, and between the two series of pools, is what may have been a house site. A very rough pavement, 15 feet by 18 feet, is bounded by a low wall on three sides and a ledge on the south side. The north wall extends westward past the enclosure 14 feet and another wall 16 feet long parallels the west side of the enclosure 20 feet away. The two latter walls may have enclosed a pen or yard. However, the site is indistinct, and its location does not seem well suited for a dwelling because of its vulnerability to high surf.

-8 At the head of the tidal inlet is an impressive enclosure roughly 60 feet square, whose walls are 6 to 8 feet high and 4 feet thick at the top, and made of water-worn boulders. The gate is near the center of the north wall. Most likely this enclosure served as a livestock pen. Brackish water may at one time have been available within the pen, although it is now largely filled with sand and vegetation (Fig. 5, D11-8).

-9 The remains of three platforms lie under a clump of koa trees and koa haole at the west side of Alula Bay, on the south side of the tidal inlet. The inland site is only a jumbled mass of beach boulders with scattered traces of coral paving. Toward the beach a few yards on the inland slope of a low sand dune is a still definable house site with a lani on the east end and small pens at the west end. The 10 feet by 20 feet terrace at the east end is about 1 foot high with some coral and sand pavement, and has a nicely made step in the center of the east side. The house platform proper is one-half foot higher, and would accommodate a 2 by 3 fathom house. The walls are badly broken down and the stones scattered. About 50 feet south is a tumbled down wall, 50 feet long, running in an east-west direction. It may be a part of an enclosure associated with the kahua.

To the north a few yards is a platform overlooking the tidal inlet and the heiau. The platform is built up 1 foot to 2½ feet on the inlet side and is paved with sand and coral (Fig. 5, D11-9).

-10 A wall 4 feet high built across a height made by a pa'ahoe ridge forms a small pen at the head of Alula Bay. At the water's edge a heap of water-worn stones suggests that a wall or platform had been built there, but which was destroyed by the surf. In 1930, Reinecke estimated that as many as six structures may have occupied the sandy flat around the head of this bay.
APPENDIX B - Haun and Henry (2006) site descriptions

Site 1898

Site 1898 is a complex of 10 features located south of the harbor in the Land of Kealakehe at elevations that range from c. 5-10 ft. The site is located in an area of bare pahoehoe lava with a series of backish water pools. A sandy beach area is situated along the shoreline to the southwest of the site. Portions of the site were previously identified by Emory and Soehren and designated as Sites D11-7, 9 and 10. The site was assigned its current SHIP site designation during the 1973 statewide survey. The features consist of a platform (Feature A), four terraces (Features B, D, E1 and G), three walls (Features C, F and I) and two endoreseurs (Features D2, Feature H1) and are located in an area 88.5 m long (north-south) and 42.5 m wide (Figure 32).

Feature A is a large platform located in the northwestern portion of the site near the shoreline. This feature was first noted by Reinecke as Site 35 (1930). It was subsequently designated as Site D11-7 during Emory and Soehren’s (1971) study. The platform is rectangular in shape with a notch in the northeastern corner (Figure 35). It measures 16.6 to 16.8 m long (north-south) and 10.5 to 11.3 m wide, with the notch measuring 3.7 m long (north-south) and 1.9 m wide. A low terrace is located below the notch to the east. The structure is bordered by bedrock outcrops to the north, east and southwest, with backish water pools extending to the south, southeast and northeast. The outcrop to the north of the platform is c. 1.5 m in height above the surface. An area of wave deposited water worn boulders is located to the west of the northwest corner of the feature.

The sides of the platform are built of cobbles and small boulders that range in height from 0.51 to 1.21 m. There are several massive cobbles along the west side that range in height from 2.24 to 2.25 m and which extend above the surface of the platform. Smaller vertical slabs are incorporated into the structures side along the west side and in the northeast corner. The surface throughout the majority of the feature is comprised of uneven pavement of cobbles and small boulders with scattered water worn coral fragments that have likely been impacted by storm waves. An area of level cobbles pavement is located in the north-central portion of the feature measuring 7.5 m long (north-south) and from 2.5 to 3.2 m wide. Water worn coral fragments and marine shells (Ciprus sp. and Callaoa sp.) are scattered over the surface of the pavement.

Emory and Soehren provide the following description for this large platform:

The heiau, site No. 35 in Reinecke’s manuscript, he gives as “name unknown.” The two largest slabs he called “ku’ula” (fish gods). Aged Nahubine gave as the name of the heiau, Makaepio, who interviewed shortly before his death by Violet Hansen, February 1957. He said that the smaller of the two larger slabs represented Ka-eha and the larger his father. He stated further that the stones were brought from Kaluaa and that this was a fishing heiau. The name Hale o Lono appearing on the present U.S. Geological Survey map has no source for this in the Bishop Museum records (1971:9).

A water worn basalt small boulder is located within the level paved area in the northern portion, measuring 0.58 m in height. A faced pit is located adjacent to the south end of the level pavement to the east. This pit is 1.4 m long (north-south), 1.3 m wide and 0.4 to 0.8 m in depth below the platform surface. The floor of this pit contains water worn coral and basalt pebbles. This pit potentially supported an upright stone or idol.

It is probable that the two largest slabs along the west side of the structure are the stones noted by Emory and Soehren (1971) as representing Ka-eha and his father. The upright water worn may also represent an idol and the faced pit may have once supported an upright or idol.

Feature B is a narrow terrace that is located 9.5 m to the northeast of Feature A, along the north side of the tidal pool in this area (see Figure 32). The terrace is rectangular in shape and is 2.96 m long (east-northeast by west-southwest) and from 1.2 to 1.8 m wide. The north side is relatively level with the
Figure 33. Site 1898, Feature A Plan Map
edge of the surrounding pahoehoe lava and the south side ranges in height from 0.5 to 0.6 m above the surface of the water. No cultural remains are present.

The Feature C wall is located 3.5 m to the east of Feature B (see Figure 32). This wall spans a brackish water pool in this area, measuring 6.25 to 7.2 m long (north-northwest by south-southeast) and 1.7 to 2.3 m wide. The surface is comprised of level, paved cobbles with no cultural remains present. It averages 1.0 m in height above the surface of the water. The Feature D terrace is located 10.0 m east of Feature C, in a smaller isolated brackish water pool. This terrace is roughly oval in shape and measures 4.6 m long (northwest by southeast) and 2.8 m wide. The northeast side is level with surrounding pahoehoe lava with the southwest side measuring 0.7 m in height the surface of the water in the tidal pool. The surface is irregular and uneven with several fragments of Cypraea sp. shell present.

**Feature E1** is a roughly rectangular-shaped terrace located to the east of the Feature A platform. The Feature E2 enclosure adjoins Feature E1 to the west (Figure 34). Feature E1 is built across the surface of the inland end of a brackish water pool, and measures 4.3 to 7.3 m long (north-south) and 6.0 m wide. The north side is built on top of the bare pahoehoe lava and the east and west sides extend across the pool. The sides are built of stacked waterworn basalt cobbles and small boulders, ranging in width from 0.55 to 1.2 m and in height, with collapse present along the south and east sides. The surface consists of a rough cobbled pavement in the western portion, with an area of level soil with scattered cobbles in the eastern portion. A fragment of Cypraea sp. shell is present on top of the paved area.

The Feature E2 enclosure adjoins Feature E1 to the west. It encompasses an area 7.05 m long (east-west) and 6.8 m wide. It is formed by a wall that extends across a brackish water pool along the west sides and a wall located on the pahoehoe lava along the north side (see Figure 34). The west wall measures 5.1 m long (north-south), 0.9 to 1.35 m wide and 0.3 to 0.42 m in height. It is comprised of waterworn basalt cobbles and small boulders, collapsed along the eastern side. The north wall of the enclosure originates at the northwest corner of Feature E1 and extends 5.0 m to the west. It is 0.5 to 0.7 m wide and 0.4 to 0.6 m in height, built of roughly stacked and piled waterworn basalt cobbles and small boulders.

The south side of the feature is bordered by the pahoehoe lava that forms the south side of the tidal pool. The interior of the feature is comprised of a level muddy area with no cultural remains. The area to the west is comprised of a mangrove (Rhizophora sp.) thicket.

**Feature F** is a wall that extends across a tidal inlet that extends to the southeast from the Feature A platform (see Figure 32). The inlet is covered with a dense thicket of mangrove. The wall is linear in shape and measures 11.9 m long (north-northwest by south-southeast) and 2.7 to 3.5 m wide. It is constructed of stacked waterworn basalt cobbles and small boulders with a relatively level, roughly paved surface and no cultural remains. The sides of the feature range in height from 0.47 to 0.65 m above the surface of the tidal pool.

**Feature G** is a terrace located 14.5 m west of Feature F. The terrace is roughly rectangular in shape and is located at the inland edge of a beach in an area of uneven pahoehoe lava that slopes slightly to the east (Figure 35). This feature corresponds to Emory and Soehren's Site D11-9. It is 8.4 m long (north-south) and from 3.5 to 4.5 m wide. The east and north sides of the feature are bordered by retaining walls that range in height from 0.36 to 0.74 m. The central portion of the east side is stacked and faced subangular basalt cobbles and small boulders with the remaining portions of the east and north sides having collapsed. The south side is bordered by several aligned subangular small boulders and the west side abuts the side of the sloping pahoehoe lava. The surface of the feature is comprised of an uneven pavement of pahoehoe slabs, cobbles and small boulders with fragments of unidentified bivalve shell and waterworn coral. A Callianassa sp. shell is located to the north of the structure re. A pocket of thin coarse sand is located adjacent to the terrace to the west.

**Feature H** is an enclosure remnant 7.5 m to the south of Feature G on a low sand dune. The enclosure remnant is rectangular in shape with overall dimensions of 11.9 m long (west-northwest by south-southeast) and 5.1 to 6.9 m wide (Figure 36). The enclosure is open to the west and the eastern wall is comprised of scattered waterworn basalt cobbles and small boulders that range in height from 0.15 to 0.2 m. The south wall is comprised of roughly stacked cobbles and small boulders with collapse present in the
Figure 35. Site 1898, Feature G Plan Map
eastern portion and along the south side. This wall is 0.8 to 1.7 m wide and in height from 0.32 to 0.42 m. The north wall is disturbed with only the western end remaining. This section is comprised of cobble and small boulder rubble with an alignment of stones present along the southern side. It is 3.7 m long (west-northwest by east-southeast), from 1.0 to 1.5 m wide and 0.25 to 0.35 m in height. The interior of the enclosure is comprised of level sand with scattered cobbles and waterworn coral.

Feature I is a wall located 11.8 m to the south of Feature II in an area of sand (see Figure 32). This feature appears to correspond to Emory and Soehren’s Site D111-10. It is linear in shape and currently measures 10.1 m long (northwest by southeast), 0.6 to 0.8 m wide and 0.5 to 0.7 m in height. Emory and Soehren (1971) indicate that the wall measured 15.4 m long, suggesting that portions of it have been destroyed. The wall is constructed of piled waterworn basalt cobbles and small boulders with scattered *Cypraea sp.* and *Cellana sp.* shells and waterworn coral scattered to the north and south.

Site 1898 is interpreted as a ceremonial site with associated permanent habitation and transportation features. The Feature A platform is Makapio Heiau based on information presented in Emory and Soehren (1971). Feature A has attributes typical of *heiau* including substantial construction (faced walls, paved surface), large area (189.9 sq m), upright stones representing idols, a depression that may have supported an idol, and location overlooking the ocean. Emory and Soehren suggest that the Feature B and D terraces may have been used to facilitate bathing within the brackish water pools (1971: 11). The Feature C and F walls both have broad surfaces and potentially functioned as bridges permitting passage along the coast that avoided the *heiau*.

The Feature E1 and G terraces and the Feature E2 enclosure may have served as the foundation for permanent habitation structures, based on their formal types, areas (Feature E1 = 43.8 sq m, Feature E2 = 47.9 sq m, Feature G = 37.8 sq m) and the substantial construction (paved surfaces) at Features E1 and G. The Feature H enclosure is interpreted as a possible canoe shed due to its formal type and linear shape. The site is unaltered and in poor to fair condition.

Site 1899

Site 1899 is a complex of three features located in the Land of Kekalahi in an area of uneven pahoehoe lava at c. 10 ft elevation. The site is located to the east of Site 1898 and is bordered by a brackish water pool to the south (see Figure 32). The features are comprised of a large enclosure (Feature A) and two lava blisters (Features B and C). The Feature A enclosure was initially documented by Emory and Soehren (1971) as Site D11-8. This feature was assigned its current SIHP Site designation during the 1973 statewide survey.

The Feature A enclosure is located in the southern portion of the site. It is rectangular in shape with a 1.0 m wide entrance in the center of the northern wall (Figure 37). It measures 19.1 m in length (north south) and from 14.7 to 18.9 m wide. The walls are built of stacked and faced subangular basalt cobbles and small boulders ranging in width from 1.0 to 1.5 m and in height from 1.4 to 2.2 m. The interior of the feature is comprised of pahoehoe lava with grass and *kiawe* trees. There is an area of thin soil located in the northeastern interior corner with scattered cobbles. A cluster of historic green, purple and blue glass bottle fragments are located outside the structure at the northeast corner.

The Feature B lava blister is situated 12.8 m northeast of Feature A, in an area of uneven pahoehoe lava. The entrance to the feature is through a roughly oval-shaped sinkhole that is 10.8 m long (east-northeast by west-southwest), 7.7 m wide and 2.8 m in depth below the surrounding ground surface (Figure 38). The interior of the sink is filled with cobble and boulder rubble and modern trash. The interior of the blister is 15.6 m long (east-northeast by west-southwest) and from 0.65 to 3.0 m wide. The floor is comprised of bare lava with the ceiling heights ranging from 0.85 to 1.65 m, with the dripline heights ranging from 1.8 to 2.5 m.

There is a small piled cobbles mound located in the western portion of the interior, measuring 0.52 m long (northeast by southwest), 0.32 m wide and 0.26 m in height. An oval-shaped rock ring is situated below the dripline in the north portion. This ring is comprised of aligned cobbles and small boulders.
Figure 37. Site 1899, Feature A Plan Map
and is 1.06 m long (east-west), 0.73 m wide and 0.41 m in height. A linear alignment of small boulders extends 3.4 m to the south from the southern side of the ring.

A crude terrace is located below the dripline in the eastern portion of the interior, below the dripline. This feature is 4.0 m long and from 0.3 to 0.9 m wide. The western side is built of roughly stacked and aligned small boulders and cobbles ranging in height from 0.65 to 0.71 m. The east side is level with the bedrock floor. The surface of the terrace consists of a rough uneven cobble pavement. Scattered marine shells (Cyprea sp. and Cellana sp.) shells and waterworn coral fragments are present to the east and west of the terrace.

A 1.5 by 1.0 m test unit (TU-16) was excavated into the surface of the terrace, revealing a single layer over bedrock (see Figure 38). Layer 1 consisted of 0.55 to 1.0 m of tightly packed cobbles and small boulders with cobble and pebble pavement at the surface. Cultural remains from Layer 1 consisted of marine shells (Cyprea sp. [n=279, 368.8 g], Comps sp. [n=12, 34.1 g], Isogomomon sp. [n=2, 283, 335.4 g], Littoraria pintaudo [n=80, 11.7 g], Mytilidae sp. [n=1, 1.1 g], Nertia picea [n=184, 66.4 g], Thalidium sp. [n=63, 74.7 g], Trochus interter [n=4, 3.8 g] and unidentified marine shell fragments (n=75, 30.5 g), urchin body fragments (n=301, 53.7 g) and spines (n=25, 14.3 g), fish bone (n=29, 4.7 g), non-human mammal bones (n=21, 12.5 g), Crustacea fragments (n=10, 2.2 g), kahakai nut shells (n=92, 285.9 g), waterworn coral (n=83, 412.4 g), a dog tooth (n=1, 0.2 g), charcoal (n=1, 5.2 g), volcanic glass flakes (n=4, 2.7 g), two bone fishhook fragments (1/1- point and tip fragment = 11.1 mm long, 7.4 mm wide, 1.4 mm thick, 0.2 g, #2-shank fragment = 25.7 mm long, 9.6 mm wide, 3.8 mm thick, 0.6 g). three urchin abraders (#1 = 50 mm long, 7.6 mm wide, 6.7 mm thick, 1.0 g, #2 = 27.4 mm long, 9.6 mm wide, 6.6 mm thick, 1.3 g, #3 = 22.1 mm, 8.1 mm wide, 6.2 mm thick, 0.8 g) and five waterworn coral abraders (#1 = 52.6 mm long, 35.6 mm wide, 31.1 mm thick, 38.9 g, #2 = 35.1 mm long, 31.1 mm wide, 20.1 mm thick, 12.6 g, #3 = 41.5 mm long, 24.2 mm wide, 22.4 mm thick, 15.2 g, #4 = 38.9 mm long, 23.3 mm wide, 17.0 mm thick, 9.9 g, #5 = 51.1 mm long, 23.6 mm wide, 9.9 mm thick, 4.1 g).

The Feature C lava blister is located 15.0 m east-northeast of Feature B in an area of uneven pahoehoe lava. The entrance to the blister is through a roughly oval-shaped vertical entrance that is 11.5 to 13.4 m long (east-west), 9.7 m wide and 3.2 m deep below the surrounding ground surface (Figure 39). The dripline ranges in height from 1.6 to 1.8 m. A raised bedrock outcrop occupies the north-central portion of the floor below the entrance. The entrance opens onto an oval chamber that is 14.5 m long (east-west) and from 0.3 to 1.8 m wide. The floor is comprised of bare lava with scattered with scattered rock fall and the ceiling heights range from 0.5 to 0.8 m. Scattered waterworn coral fragments are present throughout the floor of the feature and several Cyprea sp. and Cellana sp. shell are present in the northeastern portion. There are two areas of standing brackish water in the central portion of the feature, the entrance. A large waterworn basalt cobble is present in the northeastern area of water.

The Feature A enclosure is interpreted as an historic coral based on its large area (360.9 sq m), method of construction, high walls, and the presence of the glass bottles. Emory and Soehren (1971) also interpreted the enclosure to be a livestock pen. The Feature B and C lava blisters likely served as prehistoric temporary habitation shelters based on their formal type and the presence of the cultural remains. The site is unaltered and in good condition.

**Site 1900**

Site 1900 is a complex of four features located in an area of pahoehoe lava adjacent to a harbor parking lot on the land of Kealahoe at c. 5 ft elevation. The site was initially documented by Emory and Soehren (1971) as Site D11-6 and was assigned its current SHIP site designation during the 1973 statewide survey. Emory and Soehren’s initial examination of the site identified three platforms, two of which had attached enclosures and a wall (Figure 40). The examination of the site during the present project indicates that the site was impacted subsequent to this earlier study, evidenced by discrepancies between the original map and its current condition (Figure 41). Emory and Soehren (1971) described the site as follows:
Figure 39. Site 1899, Feature C Plan Map