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NEW ZEALAND ARCHAEOLOGICAL ASSOCIATION NEWSLETTER



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EARLY SETTLEMENT AND MAN-LAND RELATIONSHIPS

AT KAWAINUI MARSH, OAHU ISLAND, HAWAII

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From mid-January to mid-March 1980, the Bernice P. Bishop Museum conducted a preliminary archaeological investigation at Kawainui Marsh on Oahu Island, Hawaii (see Fig.1). The results of that investigation have yielded some of the earliest dates yet known for the Hawaiian Islands and raised important questions regarding early settlement and man-land relationships in the islands. This report is a brief summary of that work which has been reported on at length elsewhere (Clark, ms.; Kelly and Clark, 1980).

The Kawainui study area comprises a large marsh and its bordering slopes. This area is located behind the city of Kailua on the windward (or north) shore of Oahu Island. With regard to the traditional Hawaiian land divisions, Kawainui is within Kailua ahupua'a, Ko'olau-poko District.

The Kawainui area lies in the Kailua plain, a region of detrital sedimentary rock bordered by igneous rock of the Ko'olau Volcano. The terrain varies from low level marsh at sea level to very steep, stony uplands up to 30 m above sea level. Generally the slopes range between 40 to 70%, and stone and boulder cover occurs over 50 to 90% of the surface.

The vegetation of the slopes is somewhat varied but is dominated by koa haole (Leucaena glauca) with numerous groves of dense hau (Hibiscus tiliaceus) along the marsh edge. The marsh itself is covered primarily with California grass (Brachiaria mutica) and bulrushes (Scirpus californicus). Two freshwater streams feed into the marsh from its furthest inland extension and eventually converge before losing form. Several natural springs along the slopes at the inland end also feed into the marsh. The water of the marsh ranges from brackish in its seaward reaches to comparatively fresh in its more inland extension.

The area of primary concern in this report is the inland, panhandle-like extension of the marsh and the slopes immediately around it. This zone lies from 2.25 to 4.0 kilometres inland of the present shoreline. Three separate reconnaissance surveys in this area (Cordy, 1977; Ewart and Tuggle, 1977; Clark, ms.) located a total of thirteen clusters of

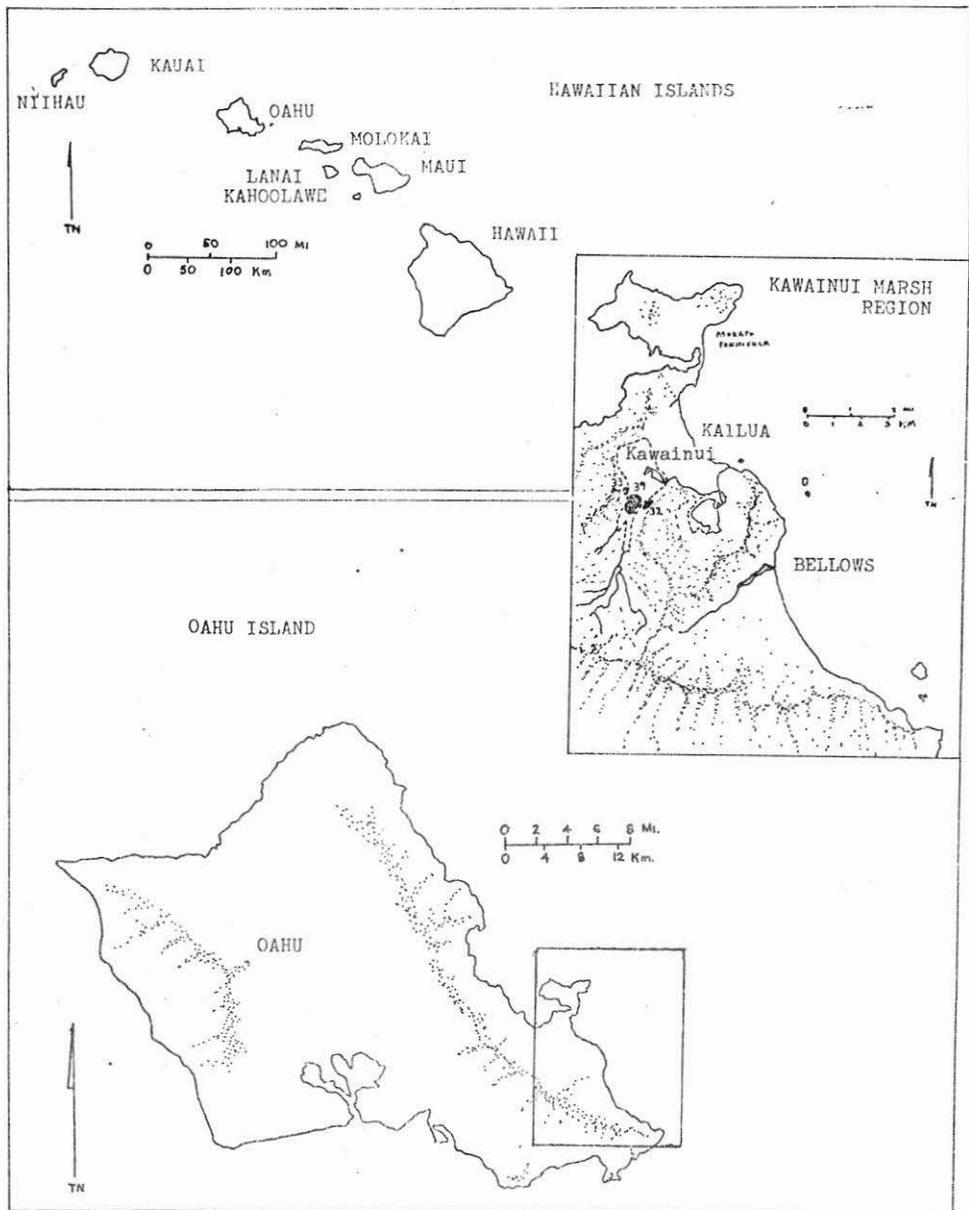


FIGURE 1. Kawainui Marsh location map.

surface features composing seven sites (see Clark, 1980:22-24). Of these, three were subjected to subsurface testing, the results of which are the focus of this summary. These sites are, in the Bishop Museum site numbering system: 50-0a-G6-39, 50-0a-G6-32, and 50-0a-G6-33.

In 1978, limited test excavations were carried out at G6-39 by Cordy (1978) and Morgenstein (ms.). This site stretches throughout the marsh portion of the study area and consists of a large agricultural complex of rectangular walled fields. The identification of a probable water channel suggested that the agricultural system probably utilized drainage technology (Cordy, 1978:5). Excavations of three test pits at this site indicated that taro was a major cultigen in at least part of this system. Volcanic-glass flakes were dated with hydration-rind measurements to the early to mid-18th century (Cordy, 1978). This work was quite limited, however, and in all likelihood did not succeed in identifying the beginning of agricultural activities in the marsh.

The Bishop Museum study focused on the slopes bounding the marsh. Site G6-32 is located on the seaward (north) extension of the eastern slope. The site extends along the slope for some 750 m and varies in width from 50 to 120 m. During the survey and mapping of the site, 175 surface features were recorded. These were predominantly terraces with stone retaining walls, stone mounds, and free-standing stone walls.

Seven test pits were excavated at G6-32 opening a total of 7.5 m². On the basis of excavation results, structural characteristics, ethno-historical data, and informant information, the surface remains appear to represent a predominantly agricultural set of activities which have, for the most part, taken place over the last 200 years. As changes in the environmental and sociocultural conditions occurred over those years, the specific range of activities changed as well.

The subsurface remains uncovered at the site, however, added a new and somewhat surprising dimension. Two constructed stone alignments were revealed some 30 to 40 cm below the surface. Feature 1 possibly represents a structure foundation while Feature 2 may be an old, minimal retaining wall. A charcoal sample (Beta-1137) was collected from a small concentration located 5 to 10 cm from the edge of Feature 1 and from the same depth as the base of the feature. A radiocarbon age determination of this sample placed it at A.D. 747 ± 215. Unfortunately, the sample was small and thus yielded a large standard deviation (see Table 1).

A second charcoal sample (Beta-1138) was collected from a test pit some distance away. The radiocarbon age of this sample was determined at A.D. 484 ± 145. The soil zone from which the sample came was marked

by a noticeable concentration of charcoal flecking several centimetres thick, followed by several centimetres of decreasing density. It is important to note that similar zones were not found in any of the other units even at greater depth. In short, this zone appears to represent a localized burning.

Lab Sample	Museum Sample	Site	Unit	Radiocarbon Yrs. B.P.	Michael & Ralph Correction, A.D.	Range A.D.
Beta-1137	HRC 332	Oa-G6-32	TP2	1210 ± 215	747 ± 215	532-962
Beta-1138	HRC 333	Oa-G6-32	TP7	1500 ± 145	484 ± 145	339-629
Beta-1139	HRC 334	Oa-G6-33	TP5	1220 ± 90	749 ± 90	659-839

TABLE 1. Radiocarbon age determinations from slopes around Kawainui Marsh. Range A.D. given as one standard deviation. Determinations made by Beta Analytic, Inc.

This burning may have been the result of human activity, i.e., land clearing. While no items of material culture were found in direct association, the sample area was quite small (less than .5 m²). Even though some burning has recently been reported for the marsh itself (Smith, 1977:39), the possibility that the zone in question merely represents a natural fire is not particularly strong. The probability of virgin vegetation along the edge of a marsh or coastline (see below) on the windward (wet) side of the island being subject to natural burnings seems low. Furthermore, if conditions did allow for such an occurrence it seems unlikely that it would be so localized in extent. An additional point of interest is the demonstrated human occupation of this portion of the island at the Bellows site at the time of, and possibly before, the burning at Kawainui (Pearson, Kirch, and Pietruszewsky, 1971; Tuggle, Cordy, and Child, 1978).

A few years ago, ethnobotanist Douglas Yen (1973:81-82) presented a model for the development of the Hawaiian agricultural complex. In part, this model proposes that the first Polynesian immigrants to Hawaii brought a nearly complete agricultural set which included both irrigation and swiddening techniques. Both sets of practices were initiated in their simpler forms in the earliest phases of occupation, expanding and becoming more complex with increases in population and social stratification. Archaeological research in Halawa, Molokai (Kirch and Kelly, 1975) and Makaha, Oahu (Yen et al., 1972) has established that such a mixed system of swidden and pondfield practices was in operation, in those areas, at least by the 13th century. The Kawainui Marsh, particularly in its better-drained area (i.e., the inland extension and/or farther up Maunawili Stream), and the slopes around it are

people, however, have clearly specified what is meant by 'inland'. That is to say, is distance from the coast sufficient for classification and, if so, what is the necessary distance, or are environmental conditions a factor as well? By a distance criteria alone, sites G6-32 (at about 2.25 to 3 km from the coast) and G6-33 (at about 2.9 km from the coast) seem to qualify as inland locations by most of the implicit standards.

Given this situation, the sites at Kawainui would seem to represent a counter example to the conventional models of late inland expansion. The structural remains from the 8th century demonstrate that inland occupation may be several centuries earlier at Kawainui than previously suspected for anywhere in the islands. The prospect of inland agriculture as early as the 4th to 7th century A.D. is even more intriguing. Up until now there have been no agricultural fields, swidden or irrigation, dated to before the 13th century.

While the Kawainui data are certainly thought provoking, caution must be exercised in their interpretation. Understanding the nature of the marsh itself is critical for understanding the nature of the human occupation of the locality.

Subsequent to the limited archaeological research along the marsh slopes, preliminary coring was conducted in the marsh itself by geologist John C. Kraft. While detailed analysis is still in progress, Kraft's (pers. comm.) work has shown that at one time the marsh area was an open marine embayment and, later, a lagoonal-type water body. Subsurface coral-rubble deposits were found at several locations just inside the marsh periphery.

The most intriguing aspect of this work has been the suggestion that the embayment or, more likely, lagoonal conditions may have been in existence at the time of initial human settlement of the area. Corings off the marsh edge at G6-32 yielded two pieces of kukui-nut shell, one at the coral-peat interface and the other in the coral-rubble matrix. It is generally believed that kukui (Aleurites moluccana) was an early Polynesian introduction, although the possibility remains that it was indigenous. If it was, indeed, an introduction, then we are faced with the real possibility that the marsh area was actually open to the ocean during at least the earliest stages of human activities on the island. The correspondence between human occupation and dramatic ecological change raises many new questions regarding man-land relationships in Hawaii at both local and regional levels. Clearly, much more evidence is needed on this issue.

Although the research conducted at Kawainui marsh has been quite limited, the results have been remarkably rewarding. Continued research,

particularly well suited for such a mixed agricultural system. If this pattern is in part represented at G6-32, it would constitute the earliest evidence of such a system.

Site G6-33 represents a slightly different situation. It is located on the far north end of the western slope. It is further up the slope, well above the marsh edge. The site consists of eleven surface features scattered over an area some 185 x 90 metres. The features are dominated by a large basalt outcrop which serves as a focal point and provides a panoramic view of the marsh and the surrounding environs. Eight of the features are terraces constructed with stone retaining walls. Only two or three of these, however, appear to be agricultural in nature. The remaining features are two stone wall segments and an enigmatic stone alignment.

A single one metre square test pit was excavated at this site. The edge of a small fire pit was revealed at 30 cm below the surface. This feature yielded a charcoal sample (Beta-1139) which was radiocarbon dated at A.D. 749 \pm 90 (see Table 1). Three volcanic-glass flakes from the same stratum were subjected to hydration-rind analysis (see Table 2).

Sample	Site	Unit	No. of Traverses	Quality of Dated Surface	Mean in Microns	Calculated Date A.D.
63-2	50-0a-G6-33	TP5	10	poor/fair	9.49	780
63-3	50-0a-G6-33	TP5	10	poor/fair	8.86	900
63-1	50-0a-G6-33	TP5	opaque	undatable	--	--

TABLE 2. Hydration-rind age determinations from slopes around Kawainui Marsh. Determinations made by the University of Hawaii, Archaeology Laboratory.

There are still numerous problems involved in attempts to convert such measurements to an absolute date and, consequently, the hydration dates reported should only be taken as close approximations. In brief, the hydration and radiocarbon dates are in substantial agreement.

The dates determined for Kawainui sites G6-32 and G6-33 place them among the earliest in the Hawaiian Islands. Indeed, if the charcoal layer from which Beta-1138 came is taken as representing human activity, site G6-32 is essentially contemporaneous with the earliest site known for the islands, i.e. Bellows Beach.

It has generally been held by archaeologists in Hawaii that inland expansion came with population increase later in the Hawaiian sequence (e.g., Hommon, 1976; Rosendahl, 1976; Cordy, 1977; Tuggle, 1979). Few

if made possible, from combined archaeological, geological, and ecological investigations should contribute significantly to our understanding of man-land relationships in the Hawaiian Islands.

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