Theme: The Original Inhabitants
Native Cultures of the Pacific

NPS Form 10-900
(3-82)

OMB No. 1024-0018
Expires 10-31-87

United States Department of the Interior
National Park Service

For NPS use only
received APR 28 1987
date entered

National Register of Historic Places Inventory—Nomination Form

See instructions in *How to Complete National Register Forms*
Type all entries—complete applicable sections

1. Name

historic HUILUA FISHPOND NATIONAL HISTORIC LANDMARK

and or common State Site Number: 50-80-06-301

2. Location

street & number Kamehameha Highway (State Highway 83) ___ not for publication

city, town Kahana Valley, Koolauloa ___ vicinity of 13 mi north of Kaneohe

state Hawaii code 15 county Honolulu code 003

3. Classification

Category	Ownership	Status	Present Use	
___ district	X public	___ occupied	___ agriculture	___ museum
___ building(s)	___ private	X unoccupied	___ commercial	X park
___ structure	___ both	___ work in progress	___ educational	___ private residence
X site	**Public Acquisition**	**Accessible**	___ entertainment	___ religious
___ object	___ in process	X yes: restricted*	___ government	___ scientific
	___ being considered	___ yes: unrestricted	___ industrial	___ transportation
		___ no	___ military	___ other:

4. Owner of Property

*Visitation not encouraged by the State because of residences in access vicinity of fishpond.

name Department of Lands and Natural Resources, State of Hawaii

street & number P.O. Box 621

city, town Honolulu ___ vicinity of state Hawaii

5. Location of Legal Description

courthouse, registry of deeds, etc. Bureau of Conveyances (Tax Rap: 5-2-05:21)

street & number Department of Land and Natural Resources, State of Hawaii

city, town Kalanimoku Building, Honolulu state Hawaii 96809

6. Representation in Existing Surveys

title National Survey of Historic Sites and Buildings (NPS) has this property been determined eligible? X yes ___ no

date 1962 (HASS-50-CA-F8-1) X federal X state ___ county ___ local

Also: Bishop Museum Survey
depository for survey records Kahana Valley (homman 1971)

city, town state

7. Description

NPS Field Inspection: 5/30/86

Condition		Check one	Check one
___ excellent	_X_ deteriorated	___ unaltered	___ original site
___ good	___ ruins	_X_ altered	___ moved date _____
_X_ fair	___ unexposed	(historic period repairs and modifications)	

Describe the present and original (if known) physical appearance

Local Kahana residents have said that there were once 3 fishponds in Kahana Valley (Rothwell and Madden 1980:3). These were Huilua, a loko kuapa or stone walled pond, and two inland freshwater ponds (pu'uone) both of which were located mauka (on the landward side) of the present highway. A remnant of the largest of the two ponds is located on the western side of Kahana Bay near the present boat ramp. Neither of the inland ponds was named.

The foregoing description of Huilua Archeological Site 50-80-06-301), taken principally from Rothwell and Madden (1980:3-7), has been revised to depict conditions as they were observed during the May 1986 NPS inspection visit.

Huilua Fishpond is a shallow, brackish water enclosure of approximately 4½ acres that is roughly shaped as a right triangle with the right angle of the base forming the northwest or seaward corner of the pond. The base or western wall abuts and partially deflects the effluent from the Kahana estuary as it discharges into Kahana Bay. This wall, approximately 500 feet in length, is composed of compacted calcareous sands and terriginous muds which appear to have been dredged from the pond. The outer margin of this wall has an irregular facing and parallel line of basaltic rock. Of decreasing width from the mauka or landward corner to the northwest corner, it ranges from approximately 75 feet to less than 10 feet in width. The general elevation ranges from 1 to 4 feet above high water with the highest portion to seaward. Vegetation covers the wall, providing significant stability and reducing the effects of erosion. The most prominent vegetation is false ironwood (Casuarina glauca), Koa haole (Leucania latisiligua), and Bermuda grass (Cynodon dactylon). Along the outside of the wall, an intermittent sand beach is accreted during portions of the year which nearly blocks the mouth of the estuary. This is quickly eroded during times of heavy stream discharge, allowing the waters to attack those portions of the wall unprotected by the remaining rock facing.

Presently, the wall is being eroded by wave action in several places. This action is due in part to the loss of structural integrity at the northwest corner which permits the full force of waves to wash what has now become a peninsula from several angles. Nearly 50 feet of the seaward portion of the wall has been eroded, leaving a pile of basaltic rock which is covered at high and mid-tides. Presumably, this rock comprised a part of the original walls of the pond. Several false ironwoods have also been toppled in the process and are rapidly being broken up. In addition, a 100 foot section of the western wall is heavily scalloped and the banks undercut; at high tide waves refracting around the northwest corner erode and wash over the remaining barrier which has been reduced to only several feet wide.

At the extreme south end of the western wall are located two parallel makaha or sluice gates. The makai gate is longer by approximately 10 feet than the mauka gate. Both channels have mortared stone walls (the mortar was introduced in historic times) and formed concrete gates (another historic addition). The mauka channel is completely filled with sand, debris, and vegetation, principally hau (Hibiscus filiaceaus) and mangrove (Rhizophora mangle), both of which are introduced species. The makai channel is also

8. Significance

Period	Areas of Significance—Check and justify below			
X prehistoric	X archeology-prehistoric	community planning	landscape architecture	religion
1400–1499	X archeology-historic	conservation	law	science
1500–1599	agriculture	X economics	literature	sculpture
? 1600–1699	architecture	education	military	social/ humanitarian
X 1700–1799	art	X engineering	music	theater
X 1800–1899	commerce	exploration/settlement	philosophy	transportation
X 1900–	communications	industry	politics/government	X other (specify)
		invention		

Aquaculture
Ethnic Peoples-Pacific Islanders
Maritime History

Specific dates A.D. 1667(?) - 1969 **Builder/Architect** Unknown

Statement of Significance (in one paragraph)

The invention of fishponds was a unique achievement of the ancient Hawaiians for nowhere else in Polynesia was true aquaculture developed. Huilua Fishpond is one of only six remaining fishponds out of an estimated ninety-seven such structures that once existed on coastal Oahu (McAllister 1933:29) and one of the few ancient Hawaiian fishponds that were still operational well into this century. It is also one of only ten ponds left in the Hawaiian Islands which have not been denuded of their archeological sites during the course of historic coastal development (Kikuchi 1976:297). A large majority of ponds throughout the Islands have been destroyed by natural agencies such as tsunamis (tidal waves) and sea storms.

Technical Significance

Aquacultural fishpond technology allowed the ancient Hawaiians to move beyond mere harvesting of fish and other marine products (i.e. crustaceans, shellfish, and seaweed) to intensive fish production and husbandry. Kikuchi (1973) reported a total of 449 ponds that were constructed prior to A.D. 1830, most during the prehistoric period. They were built on all the major islands but were most extensive on Kaua'i, O'ahu, Moloka'i and Hawai'i. Broad shallow reef flats or natural embayments provided an environment where ponds could be constructed easily in sweeping semicircular arcs out from the shoreline. Certain inland ponds, especially lava basins, along the shoreline were also modified with wall (kuapa, or pa), sluices ('auwai) and sluice gates (makaha) to convert them into operational fishponds. The distinctive feature of the ponds was the sluice gates. The makaha was stationary with no moveable parts. This was the technological innovation, probably an adaptation from an earlier form used in irrigation agriculture (taro), that enabled the prehistoric Hawaiians to progress from tide-dependent fishtraps to artificial fishponds which could be controlled at all times of the tide (Apple and Kikuchi 1975:6).

Ponds varied in form, construction, methods of operation, and in the species of fish raised. Ponds or loko, were divided into two major categories: shore and inland ponds. Apple and Kikuchi (1975:7) further subdivided these categories into five major types:

Type I Loko kuapa whose main characteristic is a seawall as its artificial enclosing feature and which usually contains one or more sluice gates.

Huilua Pond has been traditionally classified as this type, although the recent study by Rothwell (1980) indicates it may contain features of both the Type I and Type II ponds. Huilua was a working fishpond (with modifications) until the late 1960s. A number of other Type I ponds are still operational, especially on Moloka'i where aerial photographs show extant ponds and remnants of older loko kuapa whose flattened walls now lie beneath the sea even at low tide.

9. Major Bibliographical References

See Continuation Sheet.

10. Geographical Data

Acreage of nominated property 16 acres

Quadrangle name Kahana 7.5 Minute Quadrangle **Quadrangle scale** 1:24000

UTM References

	Zone	Easting	Northing
A	04	615750	2384750
B	04	616200	2384775
C	04	615850	2384350
D			
E			
F			
G			
H			

Verbal boundary description and justification

See Continuation Sheet

List all states and counties for properties overlapping state or county boundaries

state	code	county	code
state	code	county	code

11. Form Prepared By

name/title Helene R. Dunbar

organization National Park Service, Western Region
Interagency Archeological Services Branch **date** February 9, 1987

street & number 450 Golden Gate Avenue, P.O. Box 36063
San Francisco, California 94102 **telephone** (415) 556-5190

city or town **state**

12. State Historic Preservation Officer Certification

The evaluated significance of this property within the state is:

X **national** ___ **state** ___ **local**

As the designated State Historic Preservation Officer for the National Historic Preservation Act of 1966 (Public Law 89-665), I hereby nominate this property for inclusion in the National Register and certify that it has been evaluated according to the criteria and procedures set forth by the National Park Service.

State Historic Preservation Officer signature

title **date**

For NPS use only

I hereby certify that this property is included in the National Register

date 9/10/87

Keeper of the National Register

Attest: **date**

Chief of Registration

filled with sand and has substantial mangrove growth. Both makaha, while connecting to the pond, are landlocked on the estuary side due to sand accretion of more than 20 feet. Subsequently, false ironwood and coconut (Cocos nucifera) have colonized, preventing this accreted sand from being washed away.

The makai or northern wall of the pond consists of a sand dike or berm 1,400 feet long and ranging from one foot above mean high water to five feet above along its length. The width of the berm is variable with the eastern portion widest, being approximately 90 feet and extending to less than 20 feet at the northwestern corner. At this point, a sand bar extends at a right angle into the pond for nearly 75 feet. This bar is parallel to the western wall and is separated by a 50 foot channel which currently serves as the primary sea access to the pond. A facing of rounded basaltic rock of varying sizes remains along the eastern portion of the berm but is degraded and scattered toward the northwest corner. The northwest wall structure was recorded as being four feet high and three to four feet wide according to one of Kelly's (1979:31) oral informants and constructed as a boulder faced wall with rubble fill. As a result of the tsunamis of the 1940s, 1950s and 1960s, plus the lack of a caretaker, the wall has deteriorated to a low line of rock and coral rubble which is submerged at high and mid-tides. Where the rock facing has been dispersed or degraded, the sand berm has migrated as much as 20 feet mauka into the pond, leaving a low line of rocks where the berm originally stood as part of the north wall.

At a point in the berm approximately two-thirds of the distance toward the northwest corner is a third makaha which was built in historic times in an unsuccessful attempt to improve circulation and drainage of the pond. It is completely filled with sand and only its rocky outline is visible. A concrete apron extends outward from the sand toward the line of basaltic rock at the water's edge but this feature and details of the gate structure are also obscured by sand (see Photos 2 and 5).

The entire berm is covered with a dense stand of coastal and riparian trees, grasses and low plants which provide stability to the berm and resist wave action. However, several large trees have fallen along the western end of the berm, allowing wave action to occasionally wash over the crest of the wall. When this occurs, debris and sand are carried into the pond.

The mauka or southern shore of the pond extends approximately 850 feet in an irregular line parallel to the adjacent Kamehameha Highway (State Highway 83). A portion of this shore in the southwest corner directly in line with the break in the wall is undercut and eroded due to wave action through the break. The entire shoreline is heavily vegetated, with many trees, grasses and shrubs growing over and into the water. Along this shore, toward the eastern corner of the pond, freshwater seepage occurs which undoubtedly is the source and remnant of the springs which fed the pond in the past (McAllister 1933:164).

The interior of the pond includes several islands of accreted sands and muds located in the eastern end, the bases of which are exposed only during low tides. The islands have been densely colonized by mangrove and by a salt-tolerant grass, seashore paspalum (Paspalum vaginatum). The giant bulrush (Scirpus californicum) grows in the water around

them, forming a protective bulwark against currents which could erode the bases.

It is not clear on surface evidence if the walled pua (pond for fry), the location of which is indicated in Figure 2, has been submerged by sand or destroyed. Kelly notes that dragline excavation of the pond after the 1957 tsunami redeposited spoils in the area obliterating the pua pond (1980:15). Sinoto believes the pua walls may have been destroyed by the same dredging (1980:7), although none of his test trenches appear to have probed that location. It is also possible that the pua may have been constructed in late historic or early modern times for none of the early sketches show it. Jackson's 1884 map (Figure 7) does not depict an interior pond; and the earliest known illustration of it appears in a 1936 Army Air Corps aerial photograph (Sinoto 1980:7).

Jackson's 1884 survey map does indicate a stone-walled enclosure adjacent to the makaha, in the same location that McAllister later recorded and photographed the remains of a ko'a, or fishing shrine (in Kelly 1980:5). Nevertheless, none of Kelly's informants in the Kahana Bay oral history project remember a fish shrine near the makaha, nor could it be relocated in the 1971 surface survey by Homman and Barrera. Somewhat later, however, Rothwell noted "several unusual stones" present in the vicinity of the alleged ko'a location (in Rothwell and Madden 1980:11).

No surface evidence remains of the former net house or other temporary shelters that may have been associated with the pond and its maintenance in prehistoric or historic times (see Figure 2). The caretaker's house, no longer extant, overlooked the makaha. This structure dated from the historic period. Archeological tests in the vicinity might well establish the location of earlier caretakers' huts, net houses or other structures, and the ko'a fish shrine. Several residences (occupied under State Parks permits) are presently located on the far eastern end of the stabilized dune that forms the eastern portion of the northern seawall. This area has not been archeologically surveyed but has the potential for containing significant prehistoric and historic archeological deposits.

Archeological Investigations at Huilua Fishpond

Detailed mapping of Huilua was completed in 1972 as part of the Kahana Valley Archeological Project undertaken by staff from the Bishop Museum (Homman and Bevagua 1973; see also Figure 2, this report). Further surface survey and subsurface archeological excavations were undertaken at the pond by Sinoto in 1978 as part of an assessment to determine the feasibility of stabilization and/or restoration of the fishpond (1980:1). The surface survey confirmed continuing bank erosion as evidenced by falling ironwood trees, as well as progressive damage to the unrepaired northwest corner of the seawall that had led to increased silting and sand spit formation within the pond (Figure 6).

Archeological testing consisted of backhoe trenches opened at appropriate locations across pond banks to determine the nature and relationships of the various components of the fishpond (Figure 5). None of the trenches, however, produced in situ cultural deposition. Historic artifacts and cultural material were recovered from T-3 only, but these appeared to be of secondary deposition.

Sinoto was able to confirm the location of the prehistoric seawalls but discovered that they had undergone a number of modifications in historic times, principally due to storm and sea damage (rebuilding of the original walls; walls subsequently repaired with mortar; the addition of metal grates and cement linings to the sluices; plus the construction of a third makaha between 1946 and 1957 in an unsuccessful attempt to introduce more salt water to the pond). Sinoto concluded that despite serious deterioration and neglect, Huilua Fishpond merited preservation as one of the few surviving ponds in Hawaii. With little or no archeological information available from his investigation, or on pond management generally in prehistoric times, the pond cannot be restored to its prehistoric integrity; however, its historic integrity is fairly intact.

Unquestionably Huilua Pond has been an important element in the long-term habitation of Kahana Valley and is expressive of that habitation. Kelly's ethnohistorical research (1980), conducted as a part of the pre-stabilization study, further substantiates its importance as a part of the historic cooperative subsistence economy of the Valley from the late 19th Century until the late 1960s when the konohiki fishing rights for Kahana Bay were condemned and acquired by the State of Hawaii to allow public access to the bay. At that time, Huilua Pond became a part of Kahana Valley Cultural Park, an innovative "living park" concept developed by the Hawaii Department of Lands and Natural Resources whereby approximately 150 persons, many of whom grew up there, reside in the Park. Because much of the skills and knowledge of the old Hawaiian culture are not practiced today, the living park concept was initiated to foster these diminishing arts and to spread the knowledge of these values and lifeways. Kelly's interviews with various senior residents and relatives of earlier fishpond caretakers resulted in a substantial collection of data relating to the history and management of the pond such that the pre-stabilization study team was able to propose restoration of Huilua to a working fishpond as it existed in 1915-20, and to provide extensive stabilization and restoration recommendations (Rothwell 1980:1-13). Archival sketches and historic photographs are also available for the late historic period. One of the best illustrations for indicating the contributing properties associated with the fishpond during the historic period is the circa 1910 photograph (Photo 8).

Contributing Archeological Properties

By far the most significant contributing property, and the only known prehistoric property within the proposed 12 acre Landmark boundary, is archeological site 50-80-05-1546 located on the berm at the northeast end of the seaward wall (Figure 4). It is also the only known beach midden site along Kahana Bay. The site was identified in the 1971 Bishop Museum survey (Homman and Barrera 1971) and later tested with five 1 X 1 meter test units (Homman and Bevagua 1973; Figure 3, this report). Eight strata were recorded, of which the upper five were cultural (1973:25). The cultural deposits contained charcoal and firepits, bone (mammal, human, bird and fish), marine shells, kukui shells, and a few artifacts ('ulu maika, basalt flakes, basalt adz, and a bone pick). Although the full extent of the site is

not known, it is estimated to be at least 50 square meters, with the most intensively used portion of the site located west of the five square meters tested.

The site appears to have been a series of temporary camps used intermittently over a period of time that was long enough for sand layers to develop between the cultural layers. It is possible that it was used by people in charge of maintenance of the fishpond. Homman and Bevaqua infer three distinct periods of occupation at the site. Charcoal from firepits in each occupational period were submitted for radiocarbon analysis. Two of the samples (from the lowest two cultural layers) could not withstand the treatment for humic acid removal and thus provided unreliable dates. One sample from the uppermost cultural layer was fully treated for humic acid removal and yielded an apparently accurate date: between A.D. 1667 and A.D. 1850. Because no post-contact evidence was found at site 1546, however, the authors believe it was abandoned prior to the mid-nineteenth century (Homman and Bevaqua 1973:33).

State Parks archeologists again investigated site 1546 in 1981 following a report that the cultural deposits were eroding (Yent 1981). A vertical cut was made in the exposed areas and the stratigraphic sequence recorded. Stratum IV was marked by heavy charcoal staining; the only cultural material within the deposit was fire-cracked basalt cobbles and one artifact, a small one piece pearl shell fishhook with an incurved point and notched head (Yent 1981:9).

In the same year State Parks archeologists recovered a single human cranium from within the fishpond itself, in approximately 30 centimeters of water (Kam and Ota 1981). It was determined to be that of an adult male, about 35 years of age. No dateable materials were found in association with the skull and its original provenience remains speculative. Kam and Ota theorized the skull came from within the roots of a tree that had been uprooted and then washed out, rather than associated with site 1546. This suggests that the potential for other buried deposits or sites exists within Huilua Fishpond.

Potentially Contributing Properties:

Because several recent historic structures located on the eastern angle of the triangularly shaped fishpond are occupied under State Parks permits, no archeological survey has been conducted in that area to locate and evaluate prehistoric and historic properties. The potential for both site types is high. For example, the historic circa 1910 photograph of Huilua Fishpond (Photo 8) shows two structures of unknown use on the berm forming the eastern end of the seawall. These structures are no longer standing but historic archeological deposits may be present. The construction dates for the currently occupied residences in the same general vicinity are unknown and they also may be found to be contributing properties following further study.

Description (continued)

Illustrations

Figure 1 Map of lower Kahana Valley showing Huilua Fishpond NHL and locations of excavated sites and auger test areas.

Figure 2 Outline sketch of Huilua Fishpond showing former structures.

Figure 3 Map of Site 1546 showing excavated areas.

Figure 4 Map of Huilua Fishpond showing location of human remains and cultural material reported by Kam and Ota (1981).

Figure 5 Location of archeological pre-stabilization trenches at Huilua Fishpond.

Figure 6 Appearance of Huilua Pond on 20 June 1980.

Figure 7 Portion of Hawaiian Government Survey Map (1884) showing Huilua Fishpond at Kahana Bay.

Figure 8 Early sketches of Huilua Fishpond (1879 and 1884).

Figure 9 State of Hawaii Tax Map: Zone 5, Section 2, Plat 05.

Figure 10 U.S.G.S. 7.5 Minute Kahana Quadrangle, Honolulu County, Island of Oahu.

Photographs

Photo 1 Aerial view of scenic Kahana Bay and Huilua Fishpond (1982). Air Survey Hawaii, Inc., Honolulu.

Photo 2 View to southwest, showing breach in seawall. Rock formation at center is the remains of an historic attempt to construct a third makaha. National Park Service, Division of National Register Programs, Western Region. Photo by Holly Dunbar. May 1986.

Description (continued)

Photo 3 View to west, showing interior extent of sand fan encroachment. National Park Service, Division of National Register Programs, Western Region. Photo by Holly Dunbar. May 1986.

Photo 4 View to southeast; uprooted trees and flotsam litter pond interior. National Park Service, Division of National Register Programs, Western Region. Photo by Holly Dunbar. May 1986.

Photo 5 View to south; closeup view of Kekona's unsuccessful attempt to build a third makaha. National Park Service, Division of National Register Programs, Western Region. Photo by Holly Dunbar. May 1986.

Photo 6 View south, showing dense mangrove encroachment. National Park Service, Division of National Register Programs. Photo by Holly Dunbar. May 1986.

Photo 7 View north; NHL dedication plaque at location overlooking Kahana Stream estuary instead of Huilua Fishpond. National Park Service, Division of National Register Programs, Western Region. Photo by Holly Dunbar. May 1986.

Photo 8 View west. Historic (ca. 1910) photograph of Huilua Fishpond. Courtesy of the Bernice P. Bishop Museum, Honolulu.

Type II — Loko pu'uone (sometimes called loko haku'one), an isolated shore pond usually formed by a barrier beach building a single elongated sand ridge parallel to the coast.

Type III — Loko wai, a freshwater fishpond located inland from the shore. The former un-named ponds in Kahana Valley (referenced in Item Number 7 above) were examples of this type.

Type IV — Loko i'a kalo, another inland fishpond which utilized an irrigated taro plot (fish were grown in the waters flowing among the earth mounds planted with taro corms).

Type V — Loko 'ume 'iki is similar in shape and construction to Type I, however, it is a fishtrap characterized by numerous stone flanked lanes which led fish into netting areas with the ebb and flow of the tide. This last type is also the only pond where women were permitted to net.

The first three types were royal fishponds in the sense they were owned exclusively by the ruling chiefs and managed by a caretaker, or kia'i loko, or in some cases by a lesser chief, the konohiki, who served as a managerial overseer of both the pond and the adjacent agricultural lands. The latter two types of ponds, while technically owned by the ruling chiefs, were the domain of families with commoner access. Commoners' rights to the harvest, however, were never independent of the chief's.

The most important of the shore ponds was the loko kuapa (Type I) which consisted of an arc-shaped wall extending out from the shore onto a reef flat and back again; these ranged in area from one acre to over 500 acres. The mortarless walls were constructed of basalt cobbles and blocks, and coral fragments. These were usually several meters thick and projected about one meter above the highest tide level. Clearly only a high chief could command the labor necessary to construct such monumental structures. For example, the widest and most massive reported by Kikuchi (1975:17) had a 750 foot seawall, was 6.5 feet high, and measured 35 to 40 feet wide at its base. The structure contained an estimated 150,000 cubic feet of stacked rocks. The longest seawall recorded by Kikuchi was 6,300 feet. Some loko kuapa had secondary walls within the pond to form pua (fry ponds). Other engineering aspects of the Hawaiian seawalls were also of merit. The interstices in the mortarless masonry walls made them permeable and served to reduce stress from tidal, wave, and current energy. The construction of seaward versus interior pond wall flanks was equally sophisticated. Seaward flanks were inclined slopes which further permitted the seawall to withstand wave energy and to absorb, per square inch, more energy than a more vertical batter (Apple and Kikuchi 1975:20).

Seawalls were gapped in one or more places with makaha which permitted the flow of seawater. Grates were blocked with slatted wooded panels that allowed fry to enter from the sea, but kept the larger, mature fish from escaping. Sluices (water channels or ditches usually lined with stone) ranged in length from several feet to several miles. The placement of sluices and grates ('auwai o ka makaha) appears to have

been "according to prevailing water-related energy patterns so as to provide flow into and draining out of the pond to effectively reduce silting and inhibit stagnation. Nutrients also entered ponds through the sluice grates" (Apple and Kikuchi 1975:23). Mature fish, ready for harvest, congregate on the pond side of the sluice grate during the incoming tide, and on the sea side of the makaha during an outgoing tide. The commonest method of harvesting was the use of scoop nets on the pond side of the makaha on the incoming tide.

Associated with most Type I and Type II ponds was a guard house or hale kia'i situated close to the makaha. Rather than a residence, this structure was a shelter for the caretaker while he was on poaching patrol. Ponds with several makaha also had several guard houses. Other structures included fishing shrines and net houses.

Economic and socio-political significance

The evolution of Hawaiian fishponds from a simple technological device into a symbol of a paramount chief's status and power is politically significant in the development of complex society, the consolidation of chiefdoms, and what may have been an incipient state level of socio-political organization in Hawaii in the late prehistoric period. Overall pond size clearly indicates that the labor force involved in such construction and upkeep must have been considerable, requiring perhaps as many as 10,000 men in some cases. Only an individual of very high status could command such a labor force (Kikuchi 1976:298). Fishponds, thus, "became symbols of the chiefly right to conspicuous consumption and to ownership of the land as well as coastal marine resources. They were manifestations of the chief's power and his ability to control and tap his resources " (Kikuchi 1976:298).

The beginning date for the construction of fishponds in ancient Hawaii is unknown. The builder of the first pond is traditionally reputed to be Ku'ula-kai, "who lived in an undated period of heroes and gods" (Kikuchi 1976:295). Since fishponds were commonplace in legendary literature attributed to the 14th through the 19th centuries, it is conjectured that they were developed sometime prior to A.D. 1400. An estimated date of A.D. 1200 to A.D. 1400 seems reasonable in view of socio-political and concomitant religious changes that were taking place by that time as manifested in other large scale constructions such as the luakini heiau (temples) that appear to have functioned as "state temples" dedicated to the war god Ku.

Selected fishponds, especially the loko kuapa type and other variants of the royal or chiefly reserved ponds, played an important symbiotic role in the development of the Hawaiian chiefdoms and the royal court (Kikuchi 1976:298). The Hawaiian court consisted of a ruling chief who was surrounded by relatives, servants, specialists, priests, warriors and entertainers. The court was mobile in the sense there was no single permanent seat of government; thus, a chief's fishponds and intensively irrigated agricultural plots provided a constant supply of food for the court in residence, and for religious offerings at shrines as well, without unduly burdening commoners by reducing their own food supplies.

Administration of a paramount chief's aquacultural ponds and irrigated fields was vested in a well defined bureaucracy of lesser chiefs. The kahuna, a priest-architect, was consulted and advised the paramount chief on all construction or alteration projects relating to his ponds and taro fields. The konohiki, or land and water manager, acted as a resident superintendent of the paramount chief's ahupua'a, a pie-shaped section of land that extended from an apex inland out into the sea. He also commanded the local labor force for building and repair projects. In addition, each loko kuapa had one or more caretakers, or kia'i-loko, who lived with their familes at the pond site, cleaning and patrolling it, and when instructed, harvesting the selectively bred species of fish (i.e., mullet, milkfish, etc.) reserved only for chiefly and religious use.

Religious and legendary significance

Very few fishponds are documented as having been made by man; construction of most, including Huilua Fishpond, is attributed to the menehune, mythical supernatural, often mischievous, dwarfs who were also credited with creating (in a single night) many other large scale civil projects such as roads and temples (Apple and Kikuchi 1975:25). A number of gods and spirits were also associated with fishponds. The primary fishing shrine was the ko'a at which rituals and offerings were dedicated to attract fish to the pond and to insure procreation. McAllister (1933:164) recorded a ko'a several meters to the south of Huilua pond along the bank of Kahana Stream, however, Hommon and Bevaqua were unable to locate it during the 1972 Kahana Valley archeological investigations (1973:41). During the 1979 prestabilization study of Huilua, Rothwell (in Rothwell et al., 1980:11) located some "unusual stone" south of the makaha which he felt were probably the remains of the former ko'a. Oral history informants from Kahana Valley related that their elders and grandparents propitiated the traditional fish god Ku'ula, otherwise the fish might disappear from the pond. While the ko'a was not used within living memory, they reported that a fish stone (pokaku ku'ula) required prayers and proper care in order to keep the fish in the pond (Kelly 1980:9). The location of the sacred stone is not clear.

The ancient Hawaiians believed that walled fishponds of the loko kuapa type were inhabited by mo'o (water spirits) who were also akua (gods) and kia'i (guardians) and relied upon them to protect the ponds from ritual and physical pollution in order to assure an abundance of fish. Ritual pollution included the violation of kapu (taboos, i.e., women could not fish nor be involved in the work of the pond), neglect of ritual obligations associated with the pond, poaching, and so on. Pollution of the pond by sewage, rubbish or offal also violated the religious sanctions guarding an area. Informants on the Kahana Valley oral history project related: "Huilua Fishpond has a mo'o that lives in a deep hole at the northwest corner of the fishpond where the western wall meets the northern." When the mo'o leaves the pond and then later returns "there are always dried leaves floating on the top of the water to indicate its presence" (Kelly 1980:17). Informants also related that vestiges of ancient purification ceremonies and propitiation rituals were practiced into this century.

Integrity

Huilua is the only fishpond that has been declared a National Historic Landmark as a single structural entity, although several other Hawaiian NHLs include a fishpond as one component of a larger complex. At the time of its designation in 1962, Huilua Pond possessed exceptional scenic and considerable structural integrity; moreover, it was one of the few fishponds still in operation in the Hawaiian Islands. It still possesses a scenic integrity and charm that typifies rural Hawaii and is the most arresting feature of the Kahana Valley (Figure 1).

Fishpond structures are highly vulnerable to damage from floods, surf, and tsunamis. Eight recorded major tsunamis alone have devastated coastal Oahu in this century. Kelly's oral history research (1980) with long-time Kahana Valley residents indicates damage to the Huilua seawalls from the 1923, 1946, 1957, and 1960 tsunamis. Sinoto (1980:3-4) further confirmed these natural and other artificial events through an interpretive analysis of eight aerial photographs spanning the years 1926 to 1977. Until 1969 there was a resident caretaker at Huilua who supervised maintenance of the pond and repairs following tidal waves or storms. Damage resulting from tsunamis of the 1960s, however, were no longer repaired and the cycle of deterioration that is visible today set in. This decline in structural integrity and pond quality would have been well advanced when Apple and Kikuchi (1975) attempted to rate and rank order surviving fishponds, hence its lower rating in little more than a decade after National Historic Landmark designation. The significance of Huilua Fishpond, on the other hand, has increased with the discovery of archeological site 1546 on the periphery of the pond which makes it one of the few known archeological midden sites in direct association with a fishpond. Further, it is the only beach site located along Kahana Bay; the site is extensive and stratified; it is the only site located to date in the area that contains marine midden deposits, clearly defined fireplaces and *in situ* artifacts; and it holds the potential for dating assumptions about Huilua Fishpond.

Major Bibliographic References

Apple, Russel A. and William K. Kikuchi
1975 Ancient Hawaiian shore zone fishponds: an evaluation of survivors for historical preservation. Honolulu: U.S. Department of the Interior, National Park Service.

Cordy, Ross H.
1981 A study of prehistoric social change: the development of complex societies in the Hawaiian Islands. New York: Academic Press.

Hommon, Robert J. and William M. Barrera, Jr.
1971 Archaeological survey of Kahana Valley, Koolauloa District, Island of Oahu. Department of Anthropology Report 71-3, Bernice P. Bishop Museum.

Hommon, Robert J. and Robert F. Bevaqua
1973 Excavations in Kahana Valley, Oahu, 1972. Department of Anthropology Report 73-1, Bernice P. Bishop Museum.

Kam, Wendell and Jason Ota
1981 State Parks memorandum on the recovery of the human skull from Huilua Fishpond, Kahana Bay. Typescript on file, Department of Lands and Natural Resources, State of Hawaii.

Kelly, Marion
1980 "Background history of Huilua Fishpond." In Rothwell, Guy N., et al., Pre-stabilization survey of Huilua Fishpond, Kahana Bay, Oahu, Chapter II. Waimanalo: The Oceanic Institute.

Kikuchi, William K.
1973 Hawaiian aquacultural systems. Ph.D. dissertation, University of Arizona.

1976 "Prehistoric Hawaiian fishponds." Science 193:295-99.

Kirch, Patrick V.
1985 Feathered gods and fishhooks: an introduction to Hawaiian Archeology and prehistory. Honolulu: University of Hawaii Press.

McAllister, J. Gilbert
1933 Archaeology of Oahu. Bulletin Number 104, Bernice P. Bishop Museum.

Rothwell, Guy N.
1980 "Recommendations for stabilization and restoration." In Rothwell, Guy N., et al., Pre-stabilization survey of Huilua Fishpond, Kahana Bay, Oahu, Chapter IV. Waimanalo: The Oceanic Institute.

Major Bibliographic References (continued)

Rothwell, Guy N. and William D. Madden
1980 "Huilua Fishpond today." In Rothwell, Guy N., et al., Pre-stabilization survey of Huilua Fishpond, Kahana Bay, Oahu, Chapter 1. Waimanalo: The Oceanic Institute.

Rothwell, Guy N., William D. Madden, Marion Kelly, and Aki Sinoto
1980 Pre-stabilization survey of Huilua Fishpond, Kahana Bay, Oahu. Waimanalo: The Oceanic Institute.

Sinoto, Aki
1980 "Archeological pre-stabilization assessment of Huilua Fishpond." In Rothwell, Guy N., et al., Pre-stabilization survey of Huilua Fishpond, Kahana Bay, Oahu, Chapter III. Waimanalo: The Oceanic Institute.

U.S. Department of the Interior
1962 The national survey of historic sites and buildings, Theme XVI, indiginous peoples and cultures: Hawaii aboriginal culture A.D. 750 - A.D. 1778. Washington, D.C.: National Park Service.

Yent, Martha
1981 Field investigations of eroding cultural deposit at Huilua Fishpond, Kahana Valley State Park, Koolauloa, Oahu. Typescript memorandum on file, Department of Lands and Natural Resources, State of Hawaii.

Verbal Boundary Description and Justification:

An earlier attempt to define a boundary for Huilua Fishbond gave an estimated original size of 200 acres for the pond (U.S. Department of the Interior, Survey of Historic Sites and Buildings, 1962:80). The USGS 7.5 Minute Kahana Quadrangle accompanying a subsequent attempt at boundary revision for this NHL delineated a 20 acre area, however, this over-estimated the actual pond size and also included a portion of the adjacent Kahana Stream estuary immediately southeast of the walled fishpond. It was further speculated that portions of the former fishpond extended beneath the existing Kamehameha Highway to the east and south of the site. There is no current justification for the earlier acreage estimates nor the hypothesized former extent of the pond. Nineteenth century sketches indicate the "old government road" was located on the narrow sand beach bordering the foothills; the modern Kamehameha Highway appears to coincide with, or at least very closely parallel, the earlier road around Kahana Bay (see also Photo 8).

Archeological survey and test excavations in the vicinity of Huilua Fishpond (Homman and Bevaqua 1973) identified four additional archeological properties (see Figure 1):

50-80-5-1594	An artificial terrace that probably served as the foundation for some type of structure.
50-80-5-1687	An 'auwa or artificial channel possibly used in irrigation agriculture for rice or taro.
50-80-5-1529	A massive (10.5 square meters) stone platform that may have been the site of religious activities.
50-80-5-1555	A mortarless masonry enclosure (12 X 15 meters), with paving and terracing, whose function is unclear.

Dating and interpretation of these sites proved difficult due to problems encountered with humic acid removal and the paucity of artifactural materials. Nearby Huilua Fishpond was probably part of the same ahupua'a (the ancient Hawaiian landholding unit) but no clear connection between the sites and the fishpond has been established; therefore, the boundary has not been extended to include them.

It is difficult to support an estimated original size for Huilua Pond in excess of 12 acres in view of the fact that all available historic documents, photographs and maps depict a pond enclosure of approximately the same configuration that is illustrated in Figures 1, 2, and 6-9. For example, according to the State of Hawaii Tax Map (Figure 9), the entire parcel containing the present 4½ acre pond enclosure is located immediately west of the Kamehameha Highway and encompasses only 12+ acres. Vegetational creep and sand migration reasonably account for the observed reduction of overall pond acreage in historic times; and, original seawall locations were confirmed through testing by Sinoto (1980; see also Figure 5, this report).

Boundary Description.

Starting at Point A at the far northwest tip of the makai or northern wall proceed east along the wall for 1200 feet to its intersection with Kamehameha Highway (State Highway 83) at Point B, thence southwest for 1800 feet along the west side of the highway to Point C, thence northwest for 1000 feet to Point A.

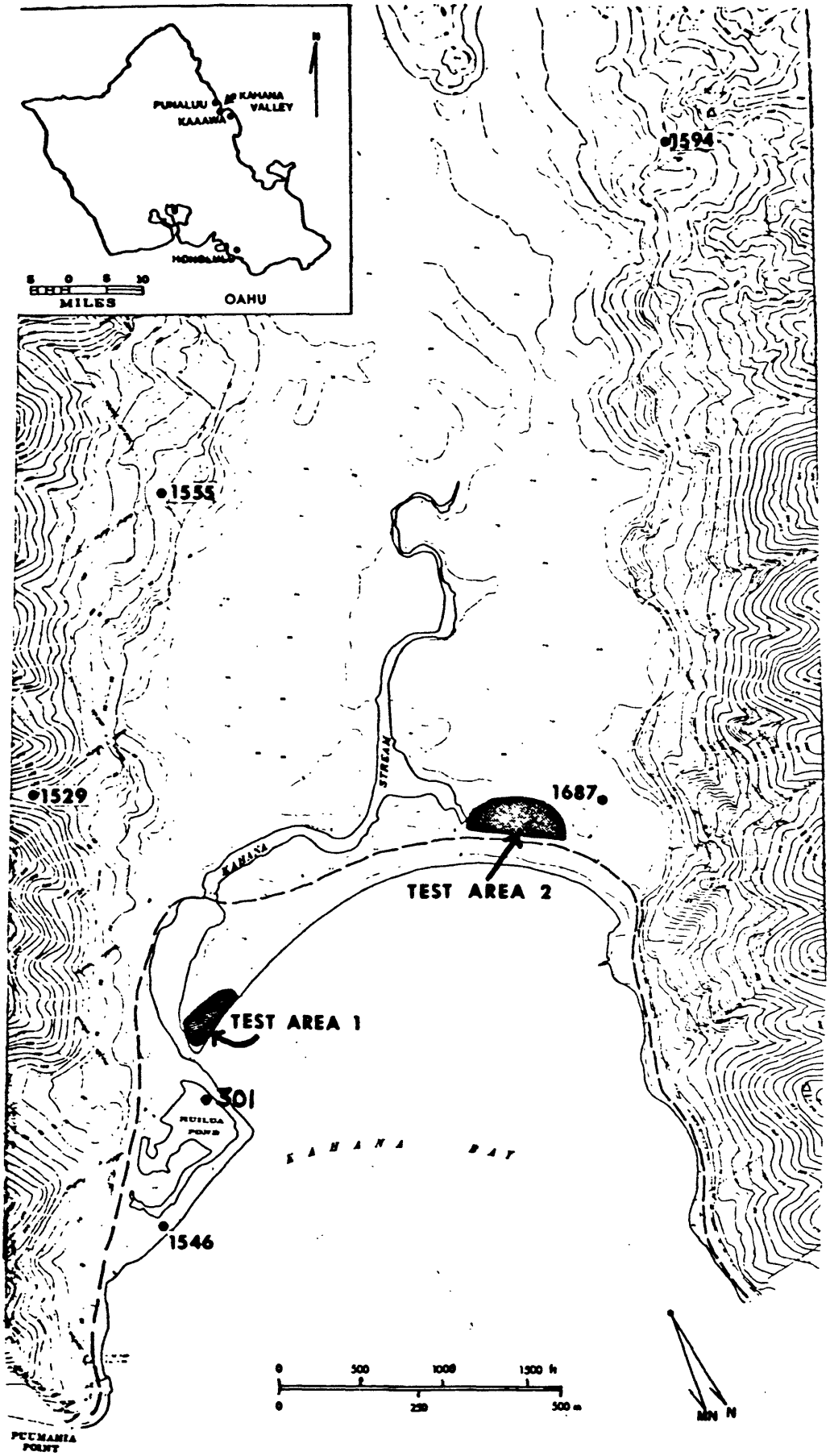


Figure 1: Map of lower Kahana Valley showing Huilua Fishpond and locations of excavated sites and auger test areas. (Source: Hommon and Bevaqua 1973:2, Fig.1)

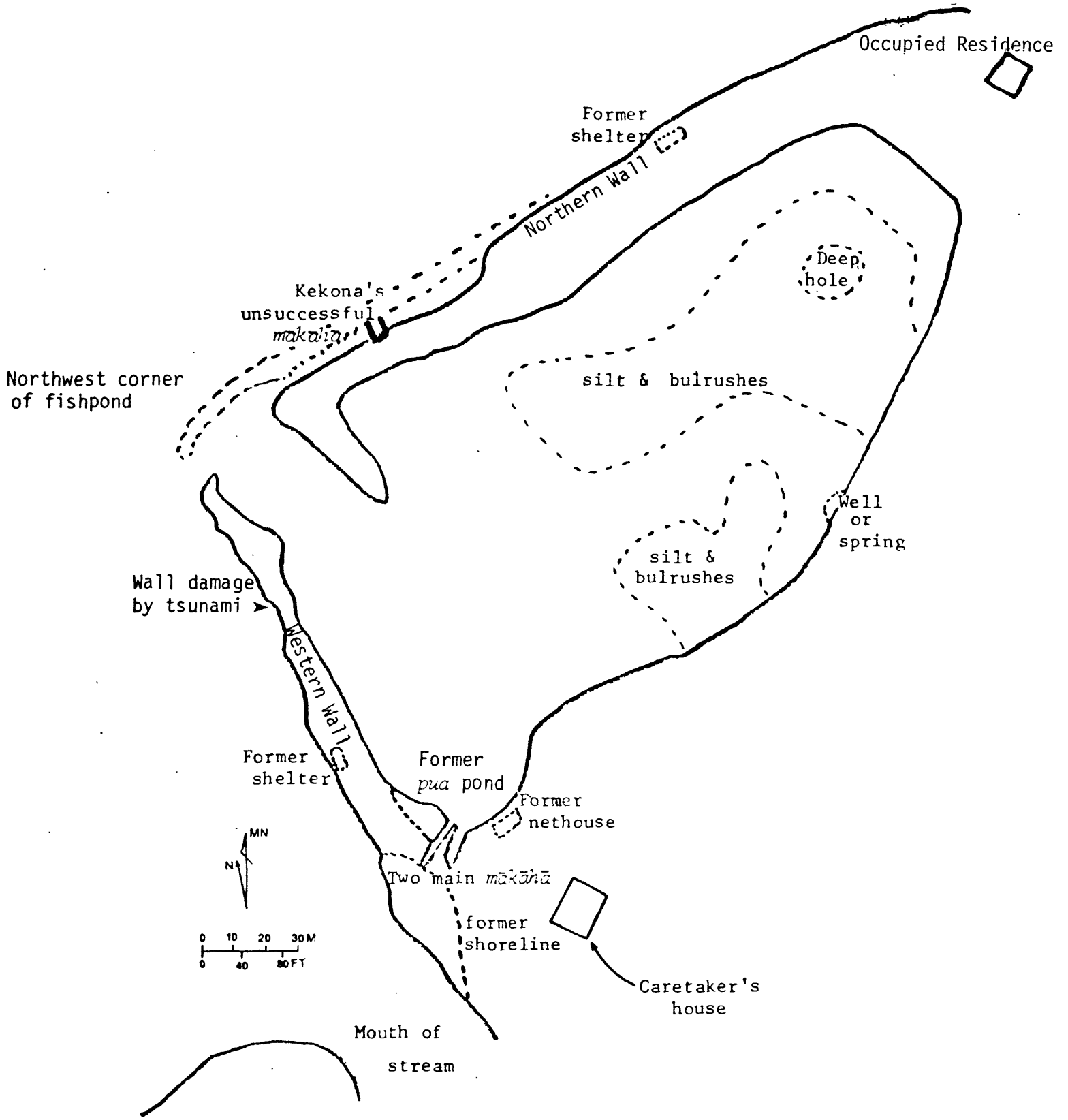


Figure 2: Outline sketch of Huilua Fishpond showing former structures, well, deep hole, and a third and unsuccessful *makaha*. All positions of sites are approximate. (After Hommon and Bevacqua 1973:39, fig. 22).

APR 28 19

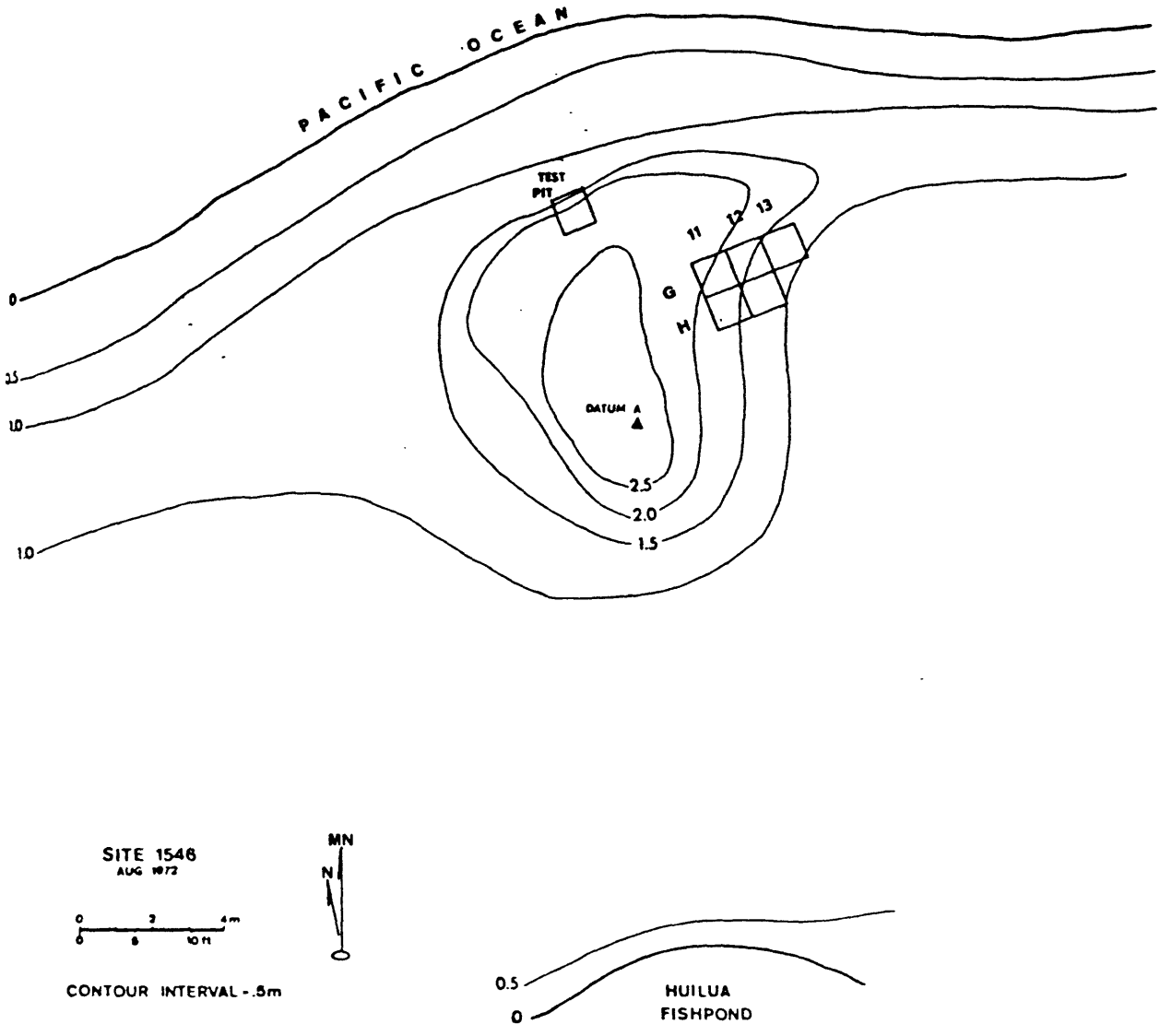


Figure 3: MAP OF SITE 1546, SHOWING EXCAVATED AREAS.
Map taken from Hommon & Bevacqua, 1973:24.

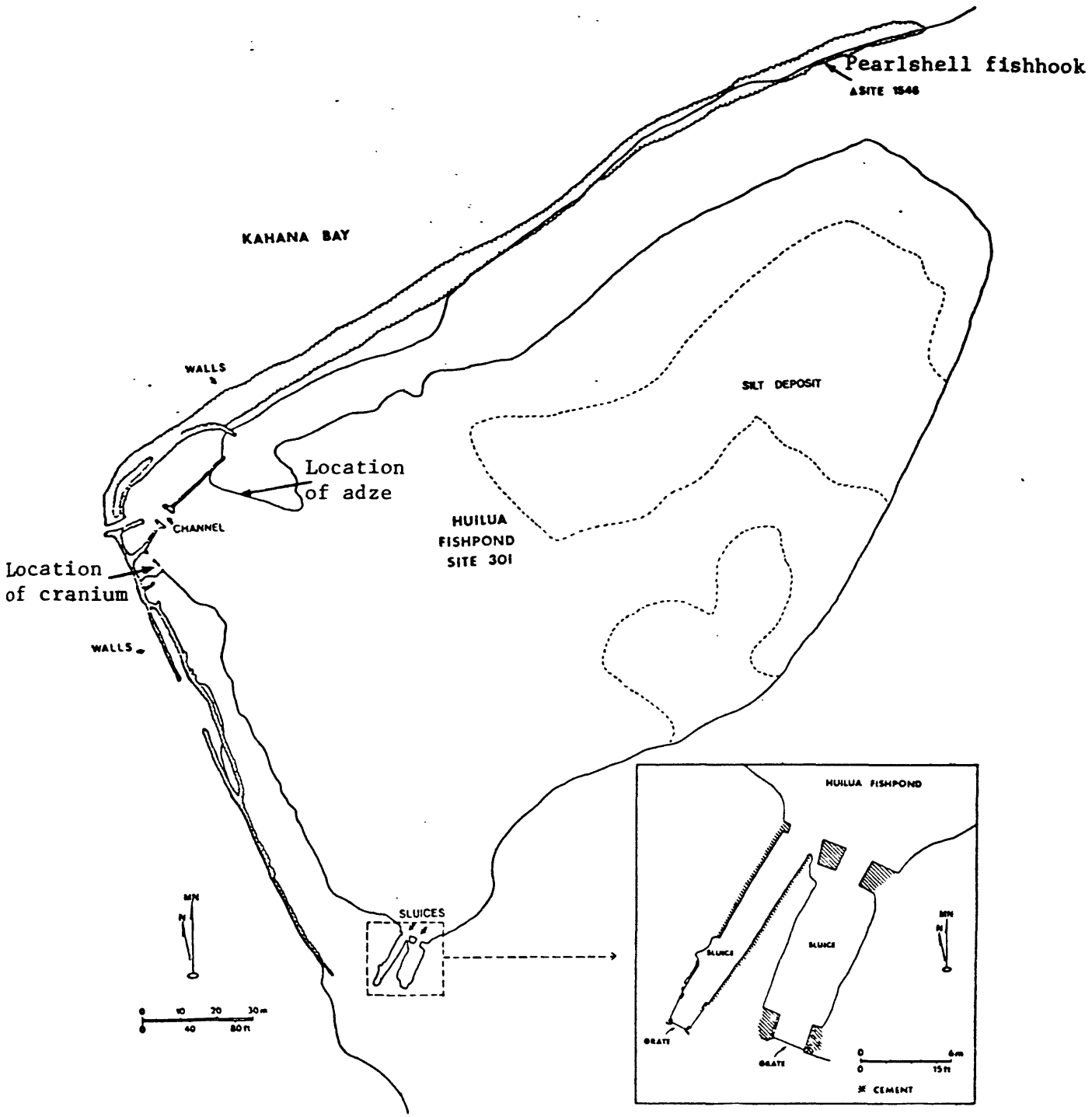


Figure 4: MAP OF HUILUA FISHPOND (SITE 301). INSET SHOWS SLUICES AT SW CORNER.

Location of human remains and recovered cultural materials - cranium location taken from Kam and Ota (1981).

(Map taken from Hommon & Bevacqua, 1973:39)

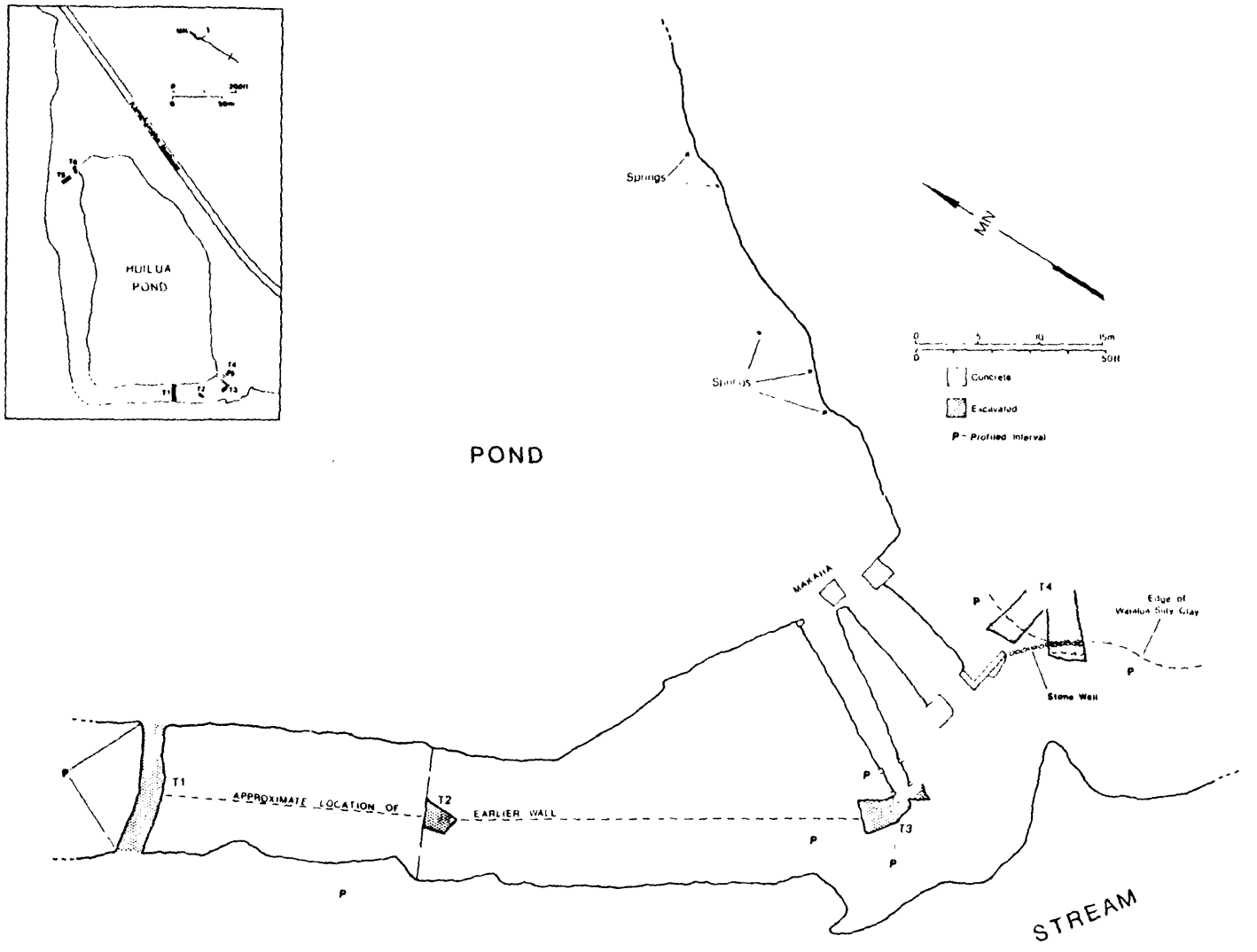


Figure 5: Location of archeological pre-stabilization trenches at Huilua Fishpond. (Source: Sinoto 1980:Fig. 1).

APR 2 8 1987

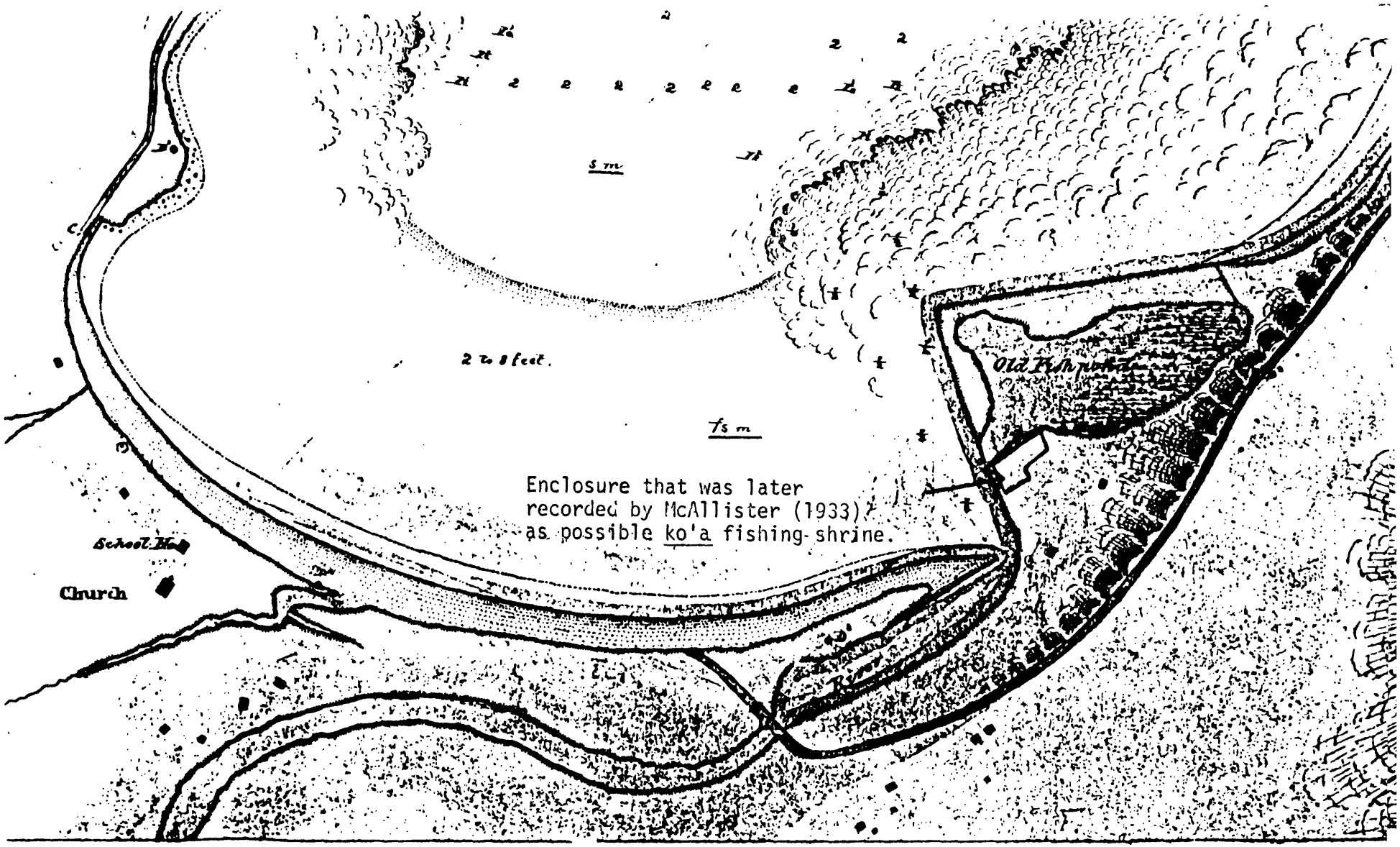
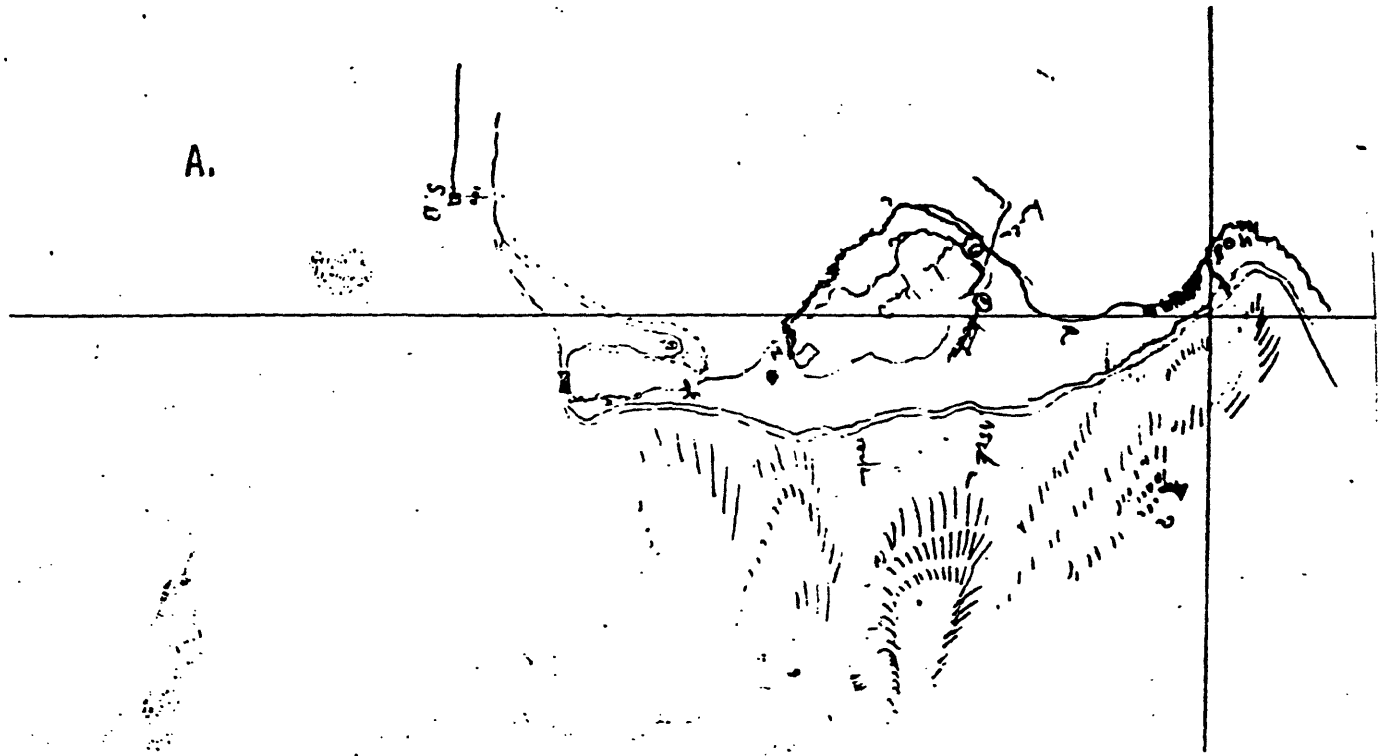


Figure 7: Portion of Hawaiian Government Survey Map (1884) showing Huilua Fishpond at Kahana Bay. Note stone-wall enclosure at southern end of fishpond. From map and survey done by George E. Gresley-Jackson, May 1884, Scale 300' = 1 inch (1/3600). Reg. Map No. 1350, State Surveyor's Office.

Reproduced from Kelly 1980:7.



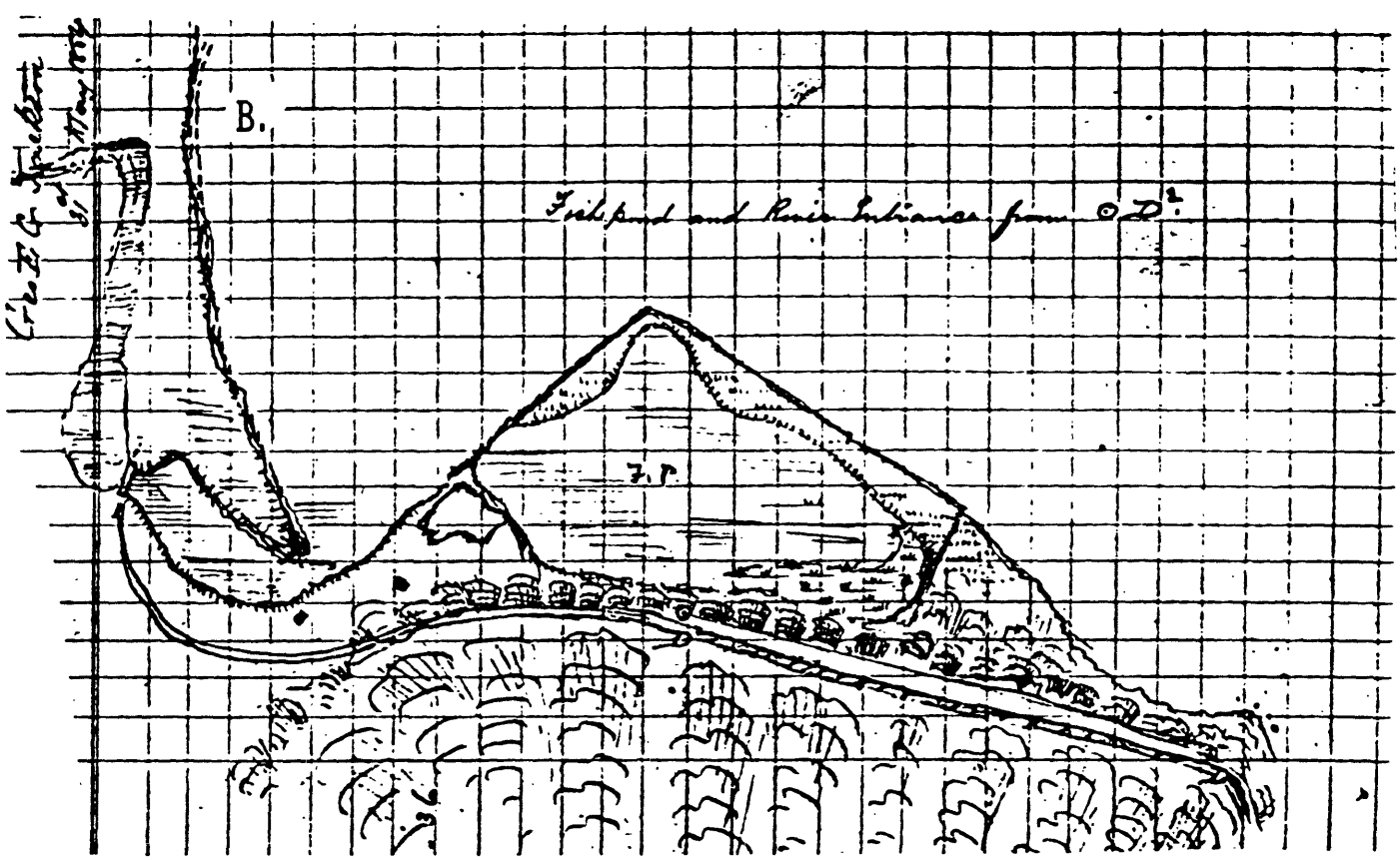


Figure 8: Early sketches of Huilua Fishpond, Kahana Bay, O'ahu from surveyors' field records:

a. By J. F. Brown, June 19, 1879 (Field Book Reg. No. 173:95);

b. By Geo. E. G. Jackson, May 31, 1884. Fishpond and River Entrance (Field Book Reg. No. 247:13). In these early years the government road around the bay was on the sand beach.

APR 28 1981

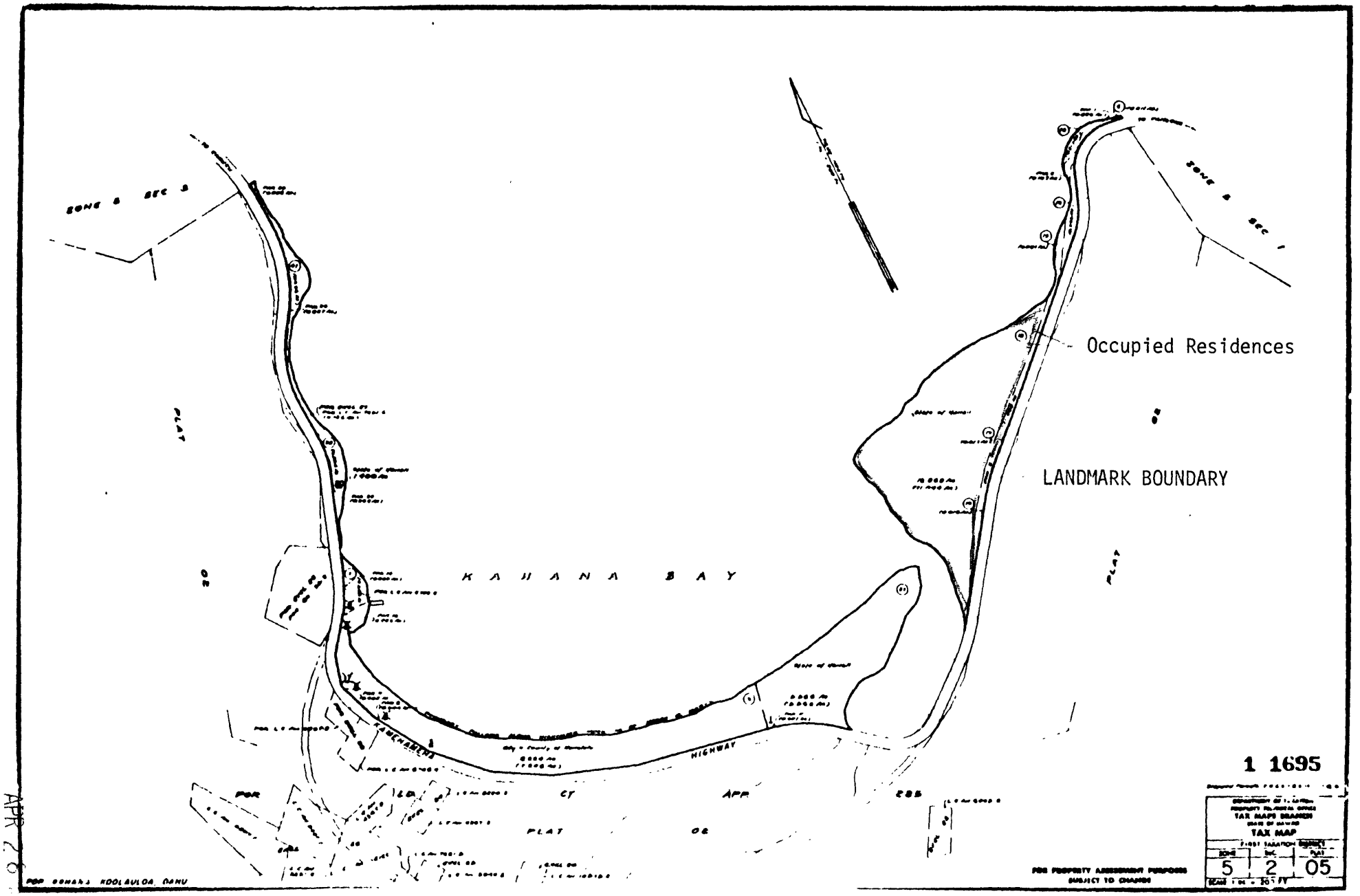


Figure 9: State of Hawaii Tax Map:
Zone 5, Section 2, Plat 05