Coastal Zone Management Program

# Hawaii Coastal Zone Management Program



## Technical supplement 7

**Technical Considerations in Developing a Coastal Zone Management Program for Hawaii**

HAWAII COASTAL ZONE MANAGEMENT PROGRAM

Technical Supplement No. 7

# Coastal Zone Management and Historical Resources As Seen From An Anthropological Viewpoint

by

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# INTRODUCTION

This paper was prepared at the request of the Pacific Urban Studies and Planning Program at the University of Hawaii. Its purpose is to discuss historical resources in regard to the management of such resources in coastal zones of the Hawaiian Islands. Historical resources are defined here as past structures and items (either in use or abandoned). These resources, when used in conjunction with historical documents and oral traditions, shed light on past lifeways in an area.

Different scientific disciplines are interested in different aspects of Hawaii's historical resources. For example, architects may largely be concerned with individual buildings or historic periods of building styles. A historian may be interested in these remains as symbols of past events or time periods (e.g., the Iolani Palace as an illustration of the monarchy period). An anthropologist will look at how these remains reflect different aspects of past lifeways of an entire society (e.g., how subsistence was gained; what the social units were--commoners, low chiefs, high chiefs, king--what these social units did and how they interacted with each other). As the author was selected from the Anthropology Department (University of Hawaii) as a specialist in Hawaiian archaeology and 1778-1830 era Hawaiian ethnography (cultural anthropology), he is interested in the anthropological value of Hawaii's historical resources. Thus, this paper will be an anthropologist's view of the historical resources in Hawaii and their management in a coastal zone. For any final planning for coastal management, historians,

architects, sociologists, and other scholars should be consulted for their disciplines' viewpoints on Hawaiian historical resources.

Anthropology is a broad discipline. In the past, it was largely considered to be the study of human cultures other than modern European and American culture. Today, however, anthropologists are vitally interested in all human cultures--even Western culture (as seen in the boom of urban anthropology in the late 1960's). Thus, anthropology laps into the area of sociology. In addition, as anthropology includes archaeology (the study of past cultures) and physical anthropology (the study of human biology), it also spills over into such areas as geography, biology, ecology, etc. Anthropology then in a nutshell is the study of man.

One of anthropology's basic aims is to describe and explain the way of life of different human societies (past and present). Theoretical approaches vary (e.g., the schools of cultural particularism, functional-structuralism, cultural ecology, cultural evolution, and biological energetics), but always the crucial focus is the description of the society's lifeways. Ethnography is a technique enabling direct observation and description of a culture, usually by living in a culture and interviewing and/or observing but also by reading the reports of a culture by others. Archaeology, on the other hand, is a technique in which indirect observation of a culture occurs by viewing remains and then reconstructing lifeways.

In Hawaii, ethnography (using early historical documents and by interviewing people) has been used to reconstruct much of lifeways in Hawaii between 1778 and the present (cf Handy and Pukui 1958; Malo 1951; Kamakau 1964; Papa Ii 1959; Kelly 1956; Rohsenow 1967; Cordy 1970, 1972;

Handy 1940; Handy and Handy 1972; Howard 1974). Archaeology (analyzing actual remains on the landscape) is being used largely to reconstruct Hawaiian lifeways prior to 1778 (although some archaeological work now is being done in the post 1778 era to corroborate ethnographic patterns or to fill in gaps in the ethnographic record). Thus, as the purpose of this paper is to deal with historical remains in the landscape of Hawaii, this paper will deal with archaeology, the subdiscipline of anthropology which analyzes such remains.

A number of discussions of historical resources and possible programs for their preservation (protection) have appeared in recent years (cf Hommon ND; Newman et al. 1972). These reflect a sincere interest today among scholars to have a strong plan for management and protection of antiquities. Indeed at this time, the two state agencies having jurisdiction over historical resources (the Division of State Parks and the Foundation for History and the Humanities) are finalizing an interim proposal for long-range management of antiquities (Newman et al 1972 is the draft version of this interim proposal). A number of scholars have been involved in the formulation of this interim plan, and the plan is quite comprehensive in discussing why such resources should be preserved, what past legislation has been and why it has been inadequate, what ongoing agencies and legislation exist, and what the new proposed protection plan is intended to be. Supposedly this interim plan is soon to be printed and circulated to interested parties (scientific and public) for comments and suggestions prior to the production of a final state plan for antiquities preservation.

The aim here is not to duplicate these studies' work. Such things as why such resources should be protected and the history of past protection will be but briefly discussed here; it is suggested the reader consult

Newman et al (1972) and Hommon (ND) for more comprehensive coverage of these subjects. Instead, here the aim is to focus on the following:

(1) The nature of historical remains as seen by Hawaiian archaeologists and how to delineate a coastal zone in regard to these antiquities.

(2) The history of archaeological research in Hawaii, focusing particularly on the fact that scholars are not uniform in their views of which antiquities are important due to different theoretical orientations. This leads to a rather complex problem for any management plans. For example, if just one sector of the scientific community was selected to guide management, they may understand only the resource aspects vital to their focus and important resources of interest to other sectors of the scientific community may not be protected.

(3) The history of the public's view of historical resources and the relation of this view to that of the divergent scientific approaches.

(4) Information needed to manage coastal resources for archaeological research and public benefit.

(5) Activities threatening coastal historical remains.

(6) Present management and preservation.

## THE NATURE OF HISTORICAL REMAINS
## AS SEEN BY HAWAIIAN ARCHAEOLOGISTS

As Hommon (ND: 16-19) clearly pointed out in his discussion, archaeologists are not so much interested in single artifacts or structural remains as in patterns of these artifacts and remains. Twelve fishhooks found in a Hawaiian cave shelter mean very little to the archaeologist. But the fact that six of them were small, barbed hooks and present at the base of the cave deposits and the other six were large and unbarbed and in the upper deposits means a great deal. For example, the above pattern could be a reflection of early fishing of only small reef fish with a change in later times to deep-sea fishing for larger fish. This is but a simple example. Archaeologists also look at stone structures in valleys and by noticing differences in the structures can tell a number of things such as where the temples, chiefs' houses and agricultural fields were located. (A look at Hommon's valley example might be well worth the reader's time, for it is a clear and concise example of patterns and archaeological interpretations).

In sum, it is thus the task of the archaeologist to discover the remains and to search for patterning in them. Remains are found through surface survey and excavation. Patterning is obtained by analyzing the resulting remains under three variables--their form, their spatial location, their time of use.

Form of remains simply refers to characteristics they have. For example, fishhooks and files are different based on a number of obvious

traits. More particularly, fishhook formal traits may be means of line attachment, barbs, size, thickness, point shape, and the material they are made of. By recognizing similar characteristics in form (or patterns of formal traits), the archaeologist groups remains into categories or types. Different arachaeologists are interested in different kinds of characteristics and thus the types (categories) vary with the researcher's interests. For example, a researcher is interested in surveying features in an area based on similarities in stone construction. Thus, he may lump all stone terraces as one major type, all stone enclosures as another type, and so on (see Hommon 1970 for such a typology). Another archaeologist may be interested in the former functions of the remains. Thus, certain stone enclosures and terraces which share formal characteristics of soil behind them and small size may be grouped as agricultural features, while other terraces and enclosures with no soil and large size may be placed in a dwelling category. Other researchers may be interested in recognizing which former social units used the remains. Terraces and enclosures with walls of certain construction may be placed in a different group than those made by other construction techniques.

Patterning in remains are also discerned through location. In all surveys and excavations, each remain is carefully mapped in space. Then when remains are grouped into different categories on the basis of form, the archaeologist can analyze the spatial distribution of each category in an area of interest. He may choose to spatially plot one or more categories. Also he may choose to analyze remains at different spatial levels (e.g., a county, an island, a state).

The importance of the spatial dimension to archaeological analysis can be illustrated in an extremely general example from Hawaii Island.

Using categories of remains indicating similar function, irrigation agricultural remains (terraces, pondfields, canals) occur predominantly in stream areas from windward Kohala along the east coast to Puna, whereas dryfield agricultural remains (terraces, walled fields, pits, cleared areas) occur throughout the island. Right away this spatial distribution orders our data into a pattern that we seek to explain. (In this case, the availability of flowing water is in large part responsible for the distribution of irrigation agriculture).

Perhaps the most important variable necessary to order archaeological data, and the most difficult to obtain, is time control. Through excavations, the archaeologist in Hawaii retrieves (1) charcoal or other remains containing organic carbon for carbon-14 dating, (2) volcanic glass for hydration dating, or (3) certain artifacts for seriation dating (certain types are earlier based on previous excavations). This allows the archaeologist to determine when the remain was used. With this control variable, the archaeological data can be ordered not only by the spatial distribution of forms, but these spatial distributions can be subdivided into time units. The archaeologist then is looking at time-slices of the past and begins to see how the people lived at each time period.

Take the generalized example just given of the irrigated and dryfield agricultural remains on Hawaii Island ... Let us suppose all these remains were dated. Let us also suppose we find that only dryfield agricultural remains were present before AD 1600 and that irrigation remains appear only after AD 1600. This would be an important step in ordering and understanding the historical remains, and one that would have been missed without time control.

## HOW TO DISTINGUISH A COASTAL ZONE OF HAWAIIAN HISTORICAL RESOURCES

If the reader has followed the discussion this far, then he (she) is well on the way to understanding archaeology. This brings us to the question of a coastal resource zone and historical resources in Hawaii. Hawaiian historical remains are numerous in kind and in subtypes. They include: isolated artifacts (fishhooks, adzes, coral files), oval firepits, square firepits, stone cairns of various sizes, burials (isolated and in cemeteries), stone platforms of various sizes and types, stone enclosures (C-shaped, L-shaped, rectangular and oval of various sizes), levelled and paved surfaces, stone terraces, stone canals, stone alignments, shell piles, fishponds, stone quarries, etc.

Few of these remains are isolated in a coastal zone versus other zones. At present we archaeologists have plotted in detail spatial patterns of certain forms of these historical remains only in small local areas (e.g., ahupua'a, ili kupono, highway corridors).[1] And these forms are poorly controlled temporally. Indeed, for the era after 1778, archaeologists have rarely even shown a concern to plot spatial patterns after 1778, anthropological knowledge is restricted largely to documentary reconstruction for but a few small local areas (ahupua'a) (cf Barrera 1970; Sahlins 1971; Kelly 1971) or to island-wide studies of certain forms of remains (cf Cordy 1970 on agricultural remains between 1778-1830). Yet despite this paucity of evidence certain spatial patterns are appearing.

Prior to 1850 when land tenure was altered during the Mahele, spatial patterns seem to have altered slightly (other than a loss of

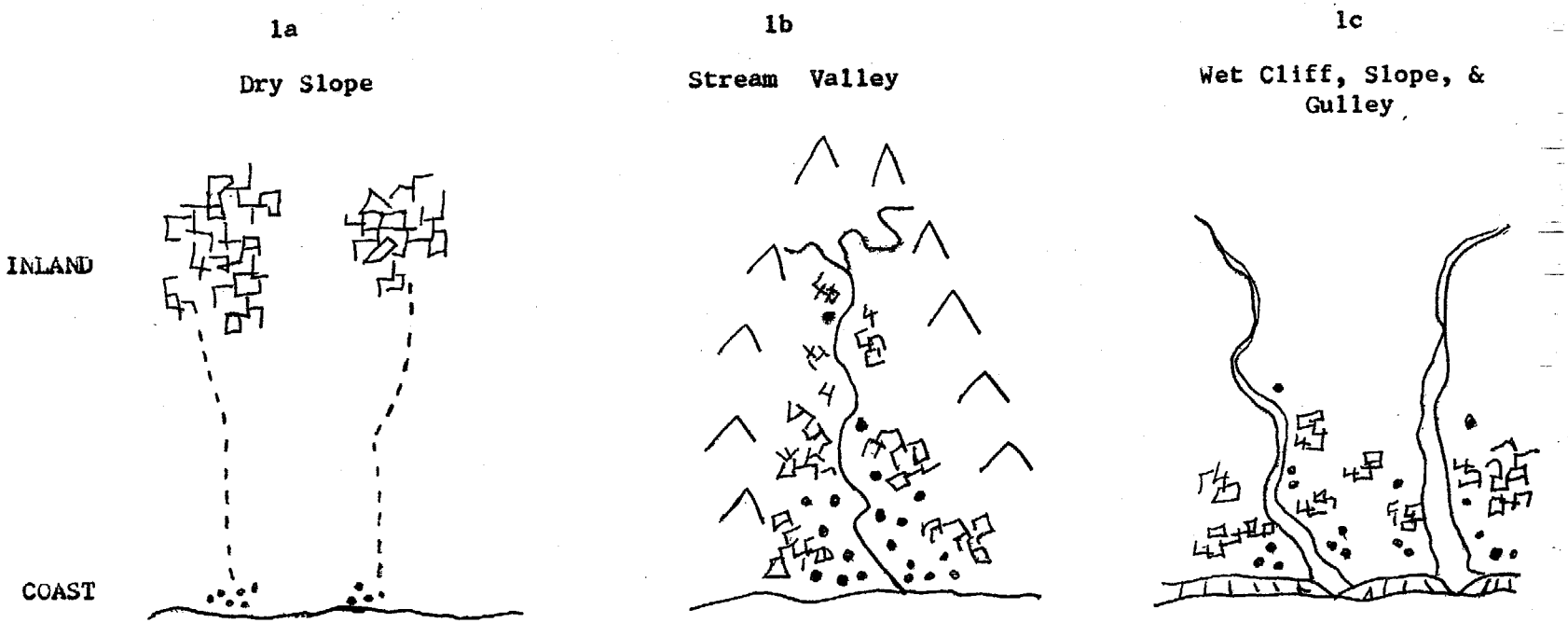
Figure 1: Spatial Distribution of Archeological Remains

Sketch Examples From Different Areas

• Sites

_ _ _ Trails

Agricultural Remains




(e.g., Lapakahi, Kaloko)

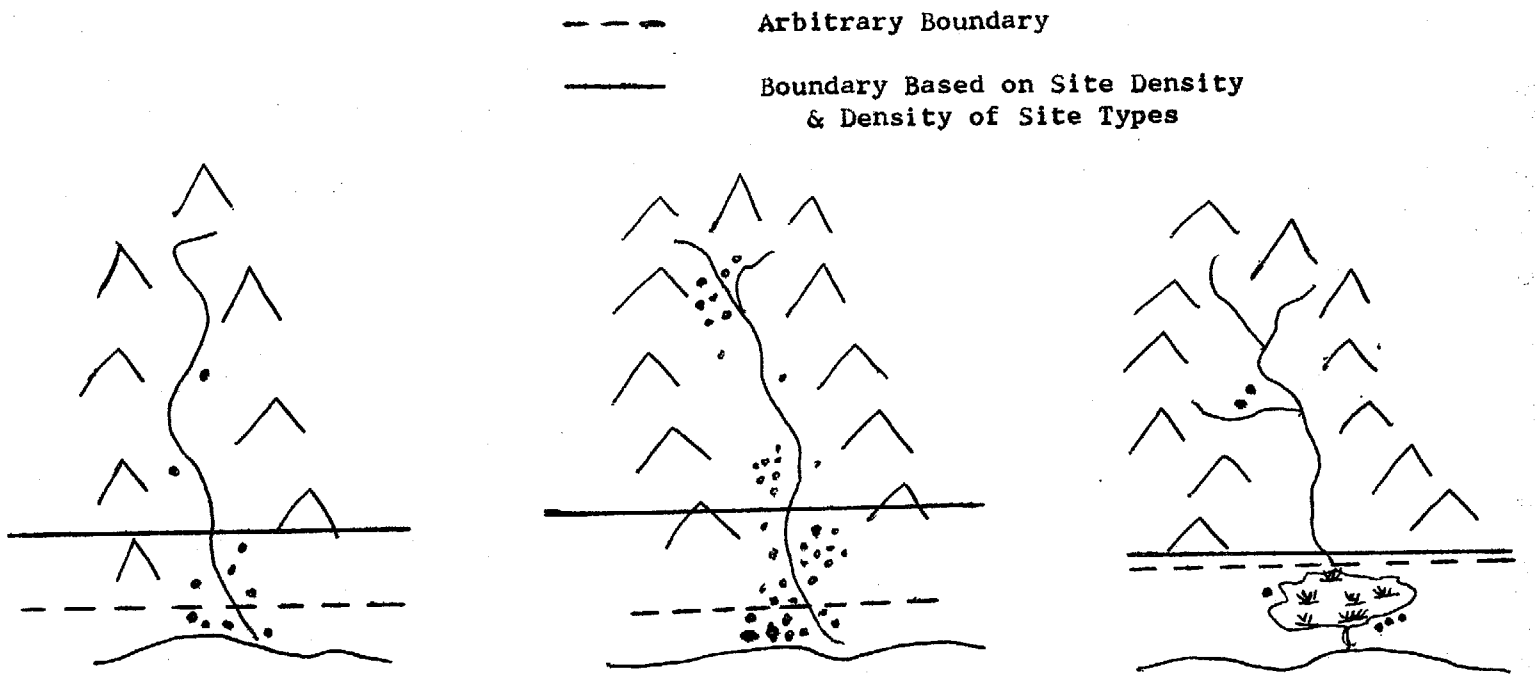
(e.g., Waipio, Halawa, Makaha, Pololu-Honokane)

(e.g., Hamakau, Kohala)

population in the ruralareas to incipient urban centers such as Lahaina and Honolulu). On Hawaii Island in dry slope areas (Kona, leeward Kohala, much of Ka'u) permanent dwellings[3], temples, shellfish middens, fishponds (in Kona), and a few agricultural remains occur on the coast rarely extending farther than one-fourth mile inland.[4] Behind this coastal zone is a barren zone with but a few shelters along inland heading trails. In some areas (North Kona from the South Kohala border to near Keahole Airport, South Kona south of Honaunau), this zone may be the only interior zone; we simply do not know. In other areas (Kohala from Upolu Point to Kawaihae; Kaloko and most likely other areas in Kona from Kailua to Honaunau)[5] this zone is replaced after one-half mile or more by a zone with dryfield agricultural remains and temporary use dwellings[6] (see Fig. 1a). This zone correlates with adequate rain and soil for agriculture. In wet valleys with streams (e.g., Honokane and Pololu in Kohala district), permanent settlement seems to have been focused mainly on the coastal valley mouths but also scattered amidst agricultural fields up the valleys for 1 to 4 miles (Fig. 1b).[7] Historic evidence[8] indicates in wet areas with gulleys and cliffs (windward Kohala, Hamakua, North Hilo) (Fig. 1c) and on flats (Hilo or Waiakea) permanent settlement also seemed to be focused on the coast (within one-fourth to one-half mile) among agricultural fields and gradually extended inland until settlements petered out (distances inland are uncertain).

On the other islands in the Hawaiian chain, our little bit of evidence suggests similar patterns.[9] However, only Maui (at Kahikinui and Palauea)[10] and west Molokai[11] seem to have a dry environment with the coastal zone isolated by an interior barren zone. In addition, historic evidence indicates on Kauai, Maui, and Oahu an additional zone of dry area streams where permanent settlement was again mainly on the coast among

Figure 2: Delineation of a Coastal Boundary in Stream Valley Areas



agricultural fields but extended inland.[12]

These variations have obvious applications to delineation of coastal zones in regard to historical resources. Clearly, such zones can be distinguished in dry slope areas of Hawaii, Maui, Molokai and probably Lanai and Kahoolawe. Here the zones seem no wider than one-half mile. But our knowledge is virtually nil in many areas (e.g., Maui, Molokai, Lanai, and Kahoolawe), and thus this must be seen as a hypothetical estimate that must be verified in each case for management purposes. In contrast to such dry slope areas, archaeological resources in the rest of the islands' environmental zones seem to run on a density gradient of numbers of remains and, more importantly, of functional types of remains (e.g., permanent houses, temporary houses, caves, temples, fishponds, etc) from most dense on the coast to least dense 3 to 7 miles inland. This will pose a serious problem for management.

Three alternatives are seen to solve this problem. One, admit a coastal zone cannot be determined. Two, establish an arbitrary boundary. Three, establish the coastal zone boundary where the density in remains (particularly functional types) greatly drops off. From this archaeologist's point of view, the second alternative is untenable. An arbitrary boundary will prevent any valid comparisons of remains between areas and will often preclude a good sample of coastal remains in some areas. This can be seen in Figure 2. The dotted lines represent the arbitrary boundary. In some areas only 50% of the remains will be in the coastal zone versus 20% and 66% in other areas. It may well be that a swamp (or some other ecological or social factor) sets back sites in one area. The first alternative is also untenable if it means no management protection. The third alternative is seen as the best approach, for it will allow more equivalent comparisons between different areas because a similar range of

functional types and the densest resource portions will be under management (see Fig. 2, solid boundary lines). In any case survey of patterns of remains in each area is necessary to determine where to establish exact coastal zone boundaries.

As for historical remains post-dating AD 1850 ... To date archaeologists have shown almost no interest in this time period,[13] and few ethnographers have been interested in spatial patterns.[14] Thus, virtually no anthropological data are available to distinguish a coastal zone for historic remains dating after AD 1850. Geographers and historians perhaps should be consulted for this era.

# A HISTORY OF ARCHAEOLOGICAL APPROACHES IN HAWAII

There is a great need to manage historical remains in Hawaii so the scientific community can make the most of the information and reconstruct past Hawaiian lifeways and so the public can see and appreciate the Hawaiian heritage to which we are all linked today. Yet as noted in the introduction, different Hawaiian archaeologists are interested in different problems due to their theoretical training. Thus, they focus on the recovery of only certain remains and on the recognition of only certain patterns in those remains. These different archaeological approaches must be clearly understood for any management plans, and this requires a review of archaeological approaches in Hawaii. Similar reviews have been briefly done by Newman (1968) and Tuggle (1972b). This departs from Newman's version markedly.

A number of theoretical orientations have been used by researchers in Hawaii. These orientations can be called "schools" (of thought) and can be basically divided into Cultural Historical and Settlement Pattern schools. (They are by no means mutually exclusive, for many individuals use aspects of both. Yet most individuals usually reflect one approach more than the other). Within these schools, there is a further subdivision of description (a search for historical sequences of patterns) versus additional attempts to explain described patterns. These cross-cutting subdivisions can be labelled historical and causal, respectively.

## The Culture Historical Approach

Theoretically, the culture historical approach's initial aims are

to describe different societies. Each society's culture is seen to be characterized by certain traits. In ethnography (cultural anthropology), the entire range of cultural traits are directly observed, listed and described (e.g., much of Buck's, Handy's, and others work in Polynesia). In archaeology the remains are listed and described (e.g., Emory's, Linton's work in Polynesia). Then once each society's culture was determined, comparisons were made. Shared traits were seen to reflect migration of people and their culture or diffusion of cultural ideas; unique traits were seen to reflect independent invention. Such comparisons were made on the basis of a few items (e.g., fishhooks and temples in archaeology; kinship and economic traits in ethnography) which were subdivided into types by formal characteristics (e.g., knobbed fishhooks versus notched). This latter step (the determination of independent invention, diffusion or migration) is often seen as the causal step in culture history analysis although much theoretical debate has taken place on whether it is a causal step or simply another part of the descriptive step.

In Polynesia, historical sequences of these items per island group have been constructed and then sequences from different island chains compared. Ethnographically, numerous traits were compared and historical connections and independent inventions noted with historical connections in the form of migrations emphasized (cf Burrows 1938; Buck 1937; Handy 1930). Archaeologically, numerous artifacts were compared and again historical connections, largely in the form of migrations, have been and are emphasized (cf Linton 1925; Emory 1928, 1933; 1968; 1970; Sinoto 1972, 1967, 1968, 1970; Kirch 1971, 1973).

In Hawaii, before 1900 archaeology was predominantly antiquarian collecting of artifacts for museums and noting large and/or impressive

remains (particularly temples, fishponds, petroglyphs). This was not true archaeology but rather a form of antiquity collection. After 1900, researchers, however, began using the culture history approach. Prior to 1950, it was widely held that there were no significantly old subsurface remains in Polynesia, so it was felt excavation would reveal little. So archaeologists concentrated their efforts to describe Hawaiian culture on discovery of stone surface structures.

Surveys were the predominant means used to discover and describe the range of Hawaiian surface remains (e.g., recording houses, terraces, caves, fishponds, petroglyphs, temples). After 1900 initial surveys began[1], became island-wide in the 1920's[2], and returned to the small region level in the late 1950's through today.[3] The quality of these surveys vary greatly. Prior to the 1960's the main artifacts used for building historical sequences and comparison with other island groups were temples. Thus, quite frequently surveys were less concerned with other structures. (There are exceptions of course).[4] After 1960, the surveys began to carefully record all features in detail.[5] Hommon (ND: 20-21) notes that these recent surveys have recovered 20 sites for every 1 listed for the same areas in 1930. This author's work at Kaloko indicates that even early 1960 reports tend to record few sites. For at Kaloko in 1961, 16 sites were recorded (Emory and Soehren 1961). Nine years later an intensive survey recorded 89 sites just in the area between the sea and the present Kona-Keahole airport highway (Renger 1970). A similar case is illustrated at Lapakahi ahupua'a (also on Hawaii Island) where a 1967 survey recorded 106 sites (from Mahukona to Kawaihae) (Soehren 1967) versus over 182 coastal sites recorded in Lapakahi between 1968-1970 (cf Connor 1969; Tuggle and Griffin 1973).

As noted, the culture history school has as an aim the comparison of

cultures' traits to discover historical ties. This is achieved by comparison of certain artifact types. Prior to 1950, temples were the main surface remain used for typing and comparison. In the rest of Polynesia, historical sequences of temple types were worked on (cf Emory 1933). In Hawaii a historical typology was not achieved although several attempts occurred (e.g., Bennett 1931; Emory 1928, 1940). This temple focus continued mainly from 1900 to 1940 in Hawaii and can be seen in the surveys of this period[6]. However, temple historical typology interests continue still today (Emory 1970; Ladd 1973).

Carbon-14 dating did not exist before 1940, so temples were arranged along an early to late time scale depending on the simplicity or complexity of their construction (cf Emory 1933). Often no time control was used at all, and types from different islands were simply compared for similarities regardless of time control. This time control of temples is still a big problem in comparison (Emory 1970).

During this time period (1900-1950), artifacts were also collected from the surface of Hawaiian sites during site surveys. Adzes (stone axes hafted like hoes) were common and an interest began in comparing different formal types of adzes between different island groups to discover historical ties (cf Buck 1927; Duff 1959). For each island group, the frequency of different adze types were reconstructed from surface and museum collections (e.g., most Hawaiian adzes were quadrangular tanged with small proportions of other types). These frequences became the island group norms. Before 1950 no time control of these adzes existed.

With the invention of carbon-14 dating in 1949, archaeologists in Hawaii and the rest of Polynesia discovered some sites were quite old. So steps were made to reconstruct traits in Hawaiian culture at different time periods.[7] Also such sites contained fishhooks and adzes

which were seen to be potentially important for building historical sequences. Thus, since 1950 culture historians have begun to excavate sites which promise to have deep and old deposits which would yield fishhooks and adzes and an inventory of other artifacts. Excavations at O1 (Kuliouou on Oahu), H8 (Waiahukini on Hawaii), and H1 (South Point sand dune on Hawaii), are early examples of such a focus, and Halawa Sand Dune and Bellows Sand Dune are recent examples.

Thus, after 1950, adzes were recovered from carbon-14 dated excavations, and historical sequences of adze types were reconstructed with some time control.[8] But with the beginning of dated excavations in Hawaii in 1950, fishhooks became the interest of culture historians. In the late 1950's a historical sequence of fishhook types was established (based on different frequences of different types through time) (Emory, Bonk and Sinoto 1959), and in 1962 the line attachment characteristic of fishhooks was also typed and placed in a historical sequence (Sinoto 1962). Today further work on fishhook typologies continues,[9] and fishhooks have become the basic item in Polynesia for comparison between island groups and reconstructing historical ties.

Other artifacts in recent years have also been placed in historical sequences in Hawaii (e.g., stone net sinkers, tooth pendants, house shapes),[10] and trait lists for Hawaiian culture at 2 different time periods are now becoming recognized (cf Cordy 1974a). Before AD 1200 the following were present: fishhooks with HT1 head types, coffee-bean type 1 octopus lure sinkers, untanged or incipiently tanged adzes with various x-sections.[11] And from AD 1200-1778 the following: fishhooks with HT4 head types, coffee-bean type 2-4 sinkers, tanged adzes of quadrangular x-section.[12] The period after AD 1778 is largely distinguished by the appearance of metal fishhooks, ceramics and metal objects. No

subdivisions within that era have been made although several have suggested how to do so (cf Newman 1970b).

Historical sequences of artifact types have been used to theorize Hawaii's historical ties to the rest of Polynesia. Once Tahiti was seen as the Hawaiian ancestral culture on the basis of temples (cf Emory 1959). Then the Marquesas became the source area with a secondary and later migration from Tahiti on the basis of simialr fishhooks from excavated sites.[13] And now the theory is beginning to suggest initial settlement from either the Marquesas or Tahiti and perhaps no later migrations--until more data are recovered.[14]

## The Settlement Pattern Approach (1966-1975)

The Settlement Pattern approach is largely restricted to archaeology (although ethnography seems to be switching to it of late). It began being used by V. G. Willey in Peru and became popular in archaeology in the late 1950's.[15] This approach reconstructs and describes complexes of spatially associated structures (and their artifacts) for specific time periods. To do this, detailed surveys of regions are undertaken, followed by excavation of numerous structures for dating control and artifacts. Thus, its descriptive-historical aspect presents patterns in a historical sequence. Comparisons are then made between areas within one society or with other societies.

These historical patterns are not always the same, for as noted above different researchers are interested in different formal characteristics. Some are interested in subsistence, so functional characteristics (e.g., agriculture traits, fishing traits, manufacturing and cooking traits) are recorded and patterns delineated. Such settlement patterns are frequently called settlement-subsistence patterns. Other researchers

are interested in social structure, so style characteristics representing say different households are focused on (e.g., viewing pottery style designs), recorded, and patterns recognized.

Once such historical patterns are obtained, causal explanations of the patterns are often attempted. These explanations are oriented towards ecological explanations. For example, sudden change to cities caused by warfare with other societies, by population growth, by environmental degradation, or trade with other societies. These kinds of explanatory theories have led to search for such ecological effects in the archaeological remains (e.g., excavation for trade items).

In Polynesia, the settlement pattern approach began only in the late 1960's--first in New Zealand (cf Green 1972; Groube 1965) and Tahiti (Green 1967), then in Hawaii (Chapman's work in Kahikinui on Maui in 1966, the Makaha project, the Lapakahi projects).[16] Settlement pattern studies in Hawaii have boomed since 1968. Various regions (of ahupua'a or ili kupono size, or smaller) have been intensively surveyed and excavated with varying amounts of dates recovered yielding settlement patterns with varying degrees of temporal control.[17]

Basically, to date the interest has focused on settlement-subsistence patterns (e.g., at Makaha, South Halawa, Moanalua and Kahana on Oahu; Halawa on Molokai; Lapakahi and Kaloko on Hawaii) with agricultural patterns of extreme interest. Agricultural patterns have been recorded now at numerous small local regions (using agricultural plant remains, stone remains, and associated dwelling structures).[18] But although spatial control of such patterns are good, time control is yet minimal (cf Cordy 1973). Besides agricultural patterns, interest has focused on social organization patterns (although rarely). At Palauea (Maui) a local group was recognized (Kirch 1971), and at Kaloko (Hawaii) local

groups, community and social ranks were reconstructed (using structure sizes and locations, burial patterns) (Tainter 1973; Cordy et al 1975). Again our patterns have poor time control as only a few dates have been recovered (1 at Palauea and 5 at Kaloko).[19] In the last 3 years, island-wide patterns have also been theorized, being syntheses of the small regions (Cordy 1974a, 1974b; Kirch 1973; Hommon 1972).

Attempted explanations of these settlement patterns have been extremely rare to date, largely because the patterns are complex and we are still trying to date them and expand them to cover wider areas in order to understand their exact nature. For the agricultural patterns, local ecological conditions, population growth and expansion into different ecological areas have been offered as possible explanations for both the small region level (Tuggle 1972) and the island-wide level (Cordy 1974a). In addition, political demand and expansion have been suggested (Tuggle 1975, University of Hawaii Department of Anthropology Colloquium.) Excavation to test such hypotheses have been undertaken in Pololu-Honokane only with attempts to control population and field areas temporally.

For the social organization patterns, population growth and warfare or internal reorganization have been theorized at the local region level (Rosendahl 1972; Tuggle and Griffin 1973) and at the island-wide level (Cordy 1974b). Excavation to test these hypotheses has not occurred although an aerial photography project is to map social ranking patterns in leeward Kohala and North Kona to pinpoint the nature of the social ranking change in Hawaii (Cordy et al 1974). As a final note, these explanatory hypotheses are not only relevant to Hawaiian prehistory but involve world-wide problems (agricultural change and social change) and thus are relevant to anthropologists elsewhere.

Summary

This, then, has been the history of Hawaiian archaeological approaches to date. As seen, two different approaches exist today (culture history and settlement pattern)--three if one subdivides settlement pattern studies into settlement-subsistence and settlement-social orgnaization approaches. Each orientation is interested in different aspects of the antiquities in the Hawaiian Islands; thus, each has a need for the protection of certain resources.

## INFORMATION NECESSARY TO MANAGE COASTAL ZONE

## HISTORICAL RESOURCES

Management of coastal historical resources for the public requires information on the range and meaning of antiquities in that zone. Obviously, we do not yet have such information. It has to be obtained by the scientific community and then public management can proceed in light of such information. Today, then, management must initially gear toward protection of the historical resources so the scientific community can provide information for future public management.

As seen, different research aims in Hawaiian archaeology focus on different historical resources. Thus, if each research school is to carry on with their studies of Hawaiian lifeways and obtain results benefitting the public and scientific communities, management is necessary to protect the historical resources that each school studies. An additional complexity is that scientific problems change, and in 10 years a completely new school of archaeology may develop and be interested in a different range of the Hawaiian historical remains.

Future orientations cannot be predicted, but to obtain the various research aims of Hawaiian archaeology today, the following information is needed:

(1) Differences in settlement patterns. (Obtained by detailed surveys in different areas on each island).

(2) Historical sequences of settlement patterns. (Obtained by excavating samples of remains within the survey areas and retrieving datable material and artifacts).

(3) Detailed data on such things as population estimates,

carrying capacity differences in agricultural field yields, social ranking differences, social organization patterns, trade patterns, etc. (Obtained by detailed mapping and excavation in certain survey areas and by detailed laboratory analysis).

The above information covers the culture history school (inventory of artifacts and structures at different time periods and historical sequences of certain artifacts and stone structures marking the time periods) and the two settlement pattern schools (subsistence and social organization). If the above information were available, management of coastal resources for the public and the scientific community could easily proceed.

Unfortunately, the above information is far from available. To date, we lack detailed knowledge of settlement patterns for many areas on every island. For Lanai, Kahoolawe and Niihau no detailed surveys have been made. Settlement patterns on Kauai are also virtually unknown with Wainiha Valley[1] being the exception. On Molokai, only Halawa Valley has been surveyed in detail.[3] On Maui, Oahu and Hawaii, the picture is somewhat better, for here archaeological salvage surveys have taken place under hire to the state and private corporations in association with hotel and highway construction.[4] Also several pure research projects (Lapakahi, Pololu-Honokane) have occurred on Hawaii Island.[5] However, even on these islands our knowledge of settlement patterns is still slight. On Hawaii Island (the best covered), we know next to nothing of the Hamakua and Hilo district settlement patterns and only very little of Ka'u, Puna, and Kona (south of Kailua-Kona) districts. On Maui, settlement patterns are only known in detail in the small and dry Kahikinui and Palauea areas of the east and southeast coasts.[6] On Oahu, settlement patterns in detail are known only for the non-coastal portions of Makaha, South Halawa and Moanalua valleys[7] and for Kahana Valley and Barbers Point.[8] Quite

obviously we know very little and lack much information on settlement patterns.

The recent statewide inventory of historical sites (the Hawaii Register Program--under the management of the Division of State Parks) just being completed may erroneously be assumed by some individuals to be a survey and listing of all the sites in the Hawaiian Islands (in sum, a massive study of settlement patterns). It is not!!! This is a vital point that should be made clear to all management planners. The inventory is a record of all known sites (Newman et al 1972). It lists sites recorded by spotty 1930 era surveys and recent intensive surveys. As seen (pp. 22), the intensive surveys have been in but a few areas. Thus, the inventory largely records only the spotty surveys. For example, only 25 known sites were recorded for the Hamakua coast, and the inventory found only 7 of them (Newman et al 1972: 79). In North Hilo, the only 2 recorded sites were not found during the inventory (Ibid: 79). Hommon (ND: 21) suggests that there are 20 sites for every 1 recorded, and this suggests that instead of the 461 recorded sites for Oahu there are at least 9,220. Obviously then, the statewide inventory is not the detailed survey of Hawaiian settlement patterns that the archaeologists need today. It would be a serious mistake if the inventory were used as a basis for future planning (other than to preserve vital sites already known).

The second step of information needed for archaeological research in Hawaii is historical sequences of settlement patterns. We know even less about this, for of the few areas where detailed surveys have been made, excavation and dating control has been minimal. Only from Halawa Valley (Molokai); Palauea (Maui); and Anaehoomalu, Lapakahi, Pololu-Honokane valleys, and Kaloko (Hawaii Island) has some dating control been achieved. And even in these cases, I think the excavators (including

myself) would admit the control is minimal and our historical sequences far from detailed. For example, we have 5 dates from Kaloko (for dwelling sites only)[9]. Only 19 structures are dated from Anaehoomalu.[10] In the crucial uplands of Lapakahi, only 5 structures are dated, and along coastal Lapakahi only 4 structures outside Koaie village.[11] This is far from adequate time control.

Under this second step of selected excavation is included the recovery of artifacts for building historical sequences (e.g., fishhooks, adzes). Additional site excavation in coastal areas has occurred for this aim. K3 (Nualolo-kai cave shelter) on Kauai; O1 (Kuliouou cave shelter) and O18 (Bellows sand dune) on Oahu; Halawa sand dune on Molokai; and H1 (South Point sand dune), H8 (Waiahukini cave shelter), and H65 (Kahakahakea cave shelter) on Hawaii are the prime examples. In a few of these sites carbon dating and/or hydration dating occurred (e.g., K3, O1, O18, H1, H8). In others (e.g., H65) a historical sequence of fishhook types was used for dating. However, again, as in settlement pattern sequences, our dated samples are few and dating control is minimal. K3 has only 1 date from the middle of a deep sequence[12], and the same is true for O1.[13] Halawa Sand Dune and Bellows Sand Dune have much better time control, having a number of carbon-14 and volcanic hydration dates.[14]

The final step of information needed in archaeological research is to obtain detailed information from certain areas to build a more detailed idea of past life and/or to test explanatory hypotheses about why certain patterns are present. This is a rare step in Hawaiian archaeology and has been taken largely in relation to agricultural problems (e.g., detailed analysis of field areas, former crops, water flow, land tenure, associated structures) and only in a few areas (Lapakahi, Makaha, Halawa, Pololu-Honokane). Only one attempt to obtain population estimates has

been made (at Kaloko).[15] Only two studies of social organization at the community level have been made (Kaloko, Palauea).[16] Only one area has seen social ranking analysis (Kaloko).[17] No carrying capacity or trade studies have yet been made.

This final step is often overlooked in plans for managing historical resources. Hommon (ND: 23-24) suggests two steps--(1) survey and (2) selected excavation. And these are the steps seen in most salvage projects in Hawaii. Yet to obtain more than a minimal knowledge of Hawaiian lifeways, problem oriented excavation following the selected excavation step is vital. Only then can the archaeologists begin to tell management officials and the public the details of Hawaiian history.

## THE PUBLIC'S VIEW OF HISTORICAL REMAINS

At this point, it should be strongly emphasized that historical resources should not be managed solely for scientific aims. These resources are equally crucial for the public (both in our state and visitors from other states) to understand and appreciate the past lifeways in our state. The public has strong opinions on what historical remains are important. Their opinions are based on a number of reasons, among them are local family traditions, cultural traditions, impressiveness of remains, supernatural connotations of remains, and awareness of remains important to scientific research. Quite frequently, the public's view of what remains are important do not match the views of the scientific community, and this bears some discussion.

For years the public has been interested in temples, fishponds, certain artifacts (e.g., fishhooks, adzes, pendants), burial caves, and petroglyphs. They have felt these remains were vital for a number of reasons. Quite obviously, one reason is that the remains have aesthetic aspects. Other reasons (as noted) are sacred connotations, oral traditions, and visual impressiveness. A less obvious reason but one that seems immensely important is the effect of past scientific popularizations.

As noted, early archaeological interests in Hawaii focused on inventories of remains and historical sequences of certain remains. In the inventories, burial caves, temples, fishponds and petroglyphs were predominant, and fishhooks and adzes were collected from the surface. The historical sequences focused on temples, adzes, and fishhooks with temples

almost exclusively emphasized for 40 years from 1900-1940. Only these remains were stressed in numerous anthropological publications right through until 1960 (e.g., Buck 1974; Emory, Bonk and Sinoto 1959; Summers 1964). Many of the public have either read these publications or read popular extractions of them (e.g., Ancient Hawaiian Civilization). In addition, museum collections (e.g., those of the Bishop Museum) emphasize these remains. It is, thus, not too surprising that the public sees such remains as important. It is perhaps more surprising how closely this matches the culture historical viewpoint long predominant in Hawaii.

Since 1970 the public's viewpoint of historical resources has altered slightly. With a more pronounced interest in preserving ethnic heritage by Hawaiians, attempts have been to preserve entire areas to show the Hawaiian way of life as it was and as a healthy, alternative approach to modern living. The Kaloko-Honokohau area on Hawaii Island is perhaps the best example of this altered public view (cf Hono-kō-hau Study Commission 1974, 1975). Yet this view still strongly reflects the scientific viewpoints held from 1900-1960. At Kaloko, crucial resources are seen to be temples, fishponds and burial areas. These features and house remains are seen to be examples of the 'ohana family living pattern. And the 'ohana view is decidedly a 1900-1960's anthropological view, having been first emphasized by E. S. C. Handy and M. K. Pukui in the Polynesian Family System in Ka'u based on 1930's research and having been accepted by many archaeologists and ethnographers until recently (cf Rosendahl 1972 and Kirch 1971 for recent examples).[1]

Unfortunately, recent archaeological research emphasis (settlement pattern studies) have not been brought directly to the public's attention other than in rather detailed scientific publications. Thus, the public is holding to old scientific standards as to what remains are vital. This

is unfortunate and perhaps a disservice to the public on our part.

## ACTIVITIES PRESENTLY THREATENING COASTAL HISTORICAL RESOURCES

Four main activities threaten to permanently alter or destroy historical resources in Hawaii today--(1) development, (2) agricultural-livestock related activities, (3) looters, and (4) natural disasters. Of these activities, the last three are minor. Looting and natural disasters are common but minor sources which have not changed much over the years.[1] Initial results from the 1971 inventory of known sites on Oahu indicate that of sites recorded in 1930 only 2% have been destroyed by looting and another 2% by natural disasters (Newman et al 1972). Agricultural-livestock related activities destroyed much of the historical resources of Hawaii in the past (12% of the sites recorded on Oahu in 1930--Newman et al 1972) through clearing activities for Hawaiian kuleanas after 1850 and for cane and pineapple cultivation. But these activities are now minor threats because kuleana and agricultural-livestock industries are largely contracting rather than expanding into yet undestroyed areas.

The prime source of activities threatening historical remains on the coast today is development. This heading includes urban sprawl, hotel construction, highway construction, boat harbor construction, and the like. Such development either permanently destroys or covers historical remains. Of the sites on Oahu recorded in 1930, by 1971 38% had been destroyed by urbanization (Newman et al 1972). Sixty percent of the sites destroyed since 1930 were lost between 1960 and 1971 (Hommon ND: 20) with the average number of sites destroyed per year jumping to 11 during that

period compared to 2 per year in the previous 30 years (Newman et al 1972).

Urban sprawl is most serious on Oahu and Maui. On Oahu, urban growth since 1960 has covered much of the Ewa and Hawaii Kai areas, and there is no sign that urbanization is letting up (witness the activities in the Campbell estate areas in Ewa; Mililani Town; downtown Honolulu; Punchbowl and Moiliili, and windward areas from Kailua to Haleiwa). The same threat is taking place today on Maui in the Kihei area.

Hotel construction is equally as serious a threat to coastal historical remains. The recent hotel boom at Kaanapali on Maui is a good example. Their remains are largely destroyed or covered along a large coastal strip. The same threat is presently likely along the Kona coast of Hawaiian Island and around Kihei on Maui.

In sum, the antiquities in these areas (Kihei on Maui, the Kona coast on Hawaii, and all of undeveloped Oahu) are currently threatened. Remains in areas already within urban or hotel areas (e.g., Honolulu, Kahului, Kaanapali) are largely lost. Antiquities in areas not presently threatened may soon be threatened if development spreads into those areas with minimal or no control.

In the light of the two ongoing approaches in Hawaiian archaeology, what does this mean? Culture historical approaches basically require only individual sites of good depth to recover artifacts. Such sites are usually cave sites or dune sites. Cave sites are frequently undestroyed, even in urban areas (e.g., 01 in Honolulu), so urbanization is not a major threat to such sites. Dune sites, however, are highly vulnerable to bulldozing and levelling. Thus, they are lost in urban areas and threatened in areas of ongoing development. So, as a crude estimate, the culture historian has one-half of the range of his vital sites threatened.

For the Hawaiian archaeologist interested in settlement patterns,

the situation is more critical. This approach, as seen, requires intensive surveys and excavations of entire regional areas (of ahupua'a size) from the coast to the mountains, so the nature of settlement can be determined. In urban areas, this cannot be done--the data are irrevocably lost (particularly on the coast). In threatened areas, the data are soon to be lost. In unthreatened areas, the data are present in varying degrees depending on the extent of past agricultural-livestock activities.

When the archaeologist is interested in island-wide settlement patterns, the picture is even worse. Island-wide patterns must be based (at the least) on representative region samples from each ecological or social area on each island. At present we have total (but insufficiently known) region samples only from Halawa Valley (Molokai), Kahana Valley (Oahu), Lapakahi (Hawaii), Anaehoomalu (Hawaii), Kaloko (Hawaii), and Pololu-Honokane valleys (Hawaii).[2] On Oahu, most of the dry leeward ecological area is under modern Honolulu and most of the windward Koolaupoko plains are under rapidly expanding Kailua, Kaneohe, and Waimanalo. On Hawaii Island, most of the windward Hamakua and North Hilo coasts have long been cleared for cane, and much of the fertile Kona coast is going under hotel development or expanding housing. Effective management control of anything that is left is, thus, vital and must occur soon if adequate island-wide archaeological patterns are ever to be obtained in the Hawaiian Islands.

## HOW ARE HISTORICAL RESOURCES MANAGED?

Newman et al (1972) in their interim report draft document in depth past legislation and agencies managing antiquities. The reader should consult that report. Here management as of 1972 as documented by Newman et al will be briefly summarized.

At the federal level, federal agencies involved in any project had to submit environmental impact statements outlining the effects of the project on historical resources (Section 106 of National Historic Preservation Act of 1966; Public Law 91-190 known as the National Environmental Policy Act of 1969). If any significant site were threatened then the project was to be halted and hearings on the threat and alternative solutions held. The public hearings at the state and national level concerning development threats to the Kaloko-Honokohau area (Hawaii Island) are an example of this. Of course, the National Park Service is in control of historical sites in park lands, but in Hawaii such lands including historical remains are minimal (Honaunau City of Refuge largely; Hawaii Volcanoes National Park has some remains).

At the state governmental level, two organizations have the most responsibility--the Division of State Parks (in the Department of Land and Natural Resources) and the quasi-official Foundation for History and the Humanities. All state projects had to have environmental impact statements (Office of Environmental Quality Control established in 1971). Also the state under various general plans noted that preservation, restoration and access to historic sites was vital and that significant sites should

be marked on zoning maps and placed as conservation zones (1967 Revised Hawaii General Plan). The administration of these tasks lay (and lies) with the Division of State Parks. This agency also regulates the use of antiquities on state lands (through providing research permits, enforcing protection laws, reviewing public works' plans which might affect sites, registering sites, and conducting archaeological survey and salvage when needed). In addition, some control over private land existed in 1972, for 3 months notice of alteration of historical resources on private land was to be given to allow review (Section 6-11 of Chapter 6 of Hawaii Revised Statutes) and lands undergoing zoning changes were to be reviewed for historic value (Section 6-11.1 of Chapter 6 of Hawaii Revised Statutes).

In the Interim Report draft, a new management program is formulated by the Division of States Parks. This consists of (1) an inventory of known sites (Hawaii Register Program), (2) an overseeing of use of antiquities on state lands (noted above) (Review Program) and (3) the interpretation of historic sites and their development into state historic parks (Interpretive Program) (Newman et al 1972, Part I: pp 71-72). The inventory has been undertaken to record known sites as the start of a long-range preservation plan. Significant sites are to be interpreted from the survey, (and gaps where no sites are known to be discovered and filled.)

The Foundation for History and the Humanities is a non-profit organization established to evaluate antiquities sites in the state and enter into the Hawaii Register of Historic Places (and to nominate important sites to the National Register), to develop museum activities for the public, and to preserve Hawaiian heritage in general. The foundation membership is open to the public of Hawaii and the Board of trustees

is elected by the members. A separate Review Board now of 10 members (2 archaeologists, architects, Hawaiianists, historians, and sociologists) reviews all sites inventoried by the Division of State Parks for placement and ranking on the Hawaii Register and National Register of Historic Places.

At the county level in 1972, other than general statements that antiquities should be protected, only Hawaii and Maui counties had additional management legislation. The Hawaii County General Plan stated public and private developers had to provide for surveys of antiquities if they were thought to be present. Maui County had two historical districts (one in Lahaina and one in Wailuku) where activities were overseen by a commission.

In the nongovernmental sector, numerous interest groups have been actively campaigning for preservation in recent years. For example, the archaeologists of Hawaii banded together and pressed for additional legislation in the late 1960's (Coordinating Committee for Hawaiian Archaeology). Today, various public groups (e.g., Life of the Land, Hawaiian Civic Clubs, etc) are active. The private sector is also becoming aware of the value of antiquities in lands under their control, and hiring archaeologists to do salvage work and some preservation. Also, of course, there are private institutions such as the Bishop Museum and public institutions such as the University of Hawaii which also play a role in preserving artifacts and information from historical resources.

## PRESERVATION TO DATE

Prior to the late 1960's governmental management of historical resources (when it occurred) largely had followed the culture history school's view of what was important. Temples had been protected by state agencies (e.g., Ulupo Heiau State Monument, Puu O Makuha State Monument--both on Oahu) and by federal agencies (the City of Refuge National Historical Park and Wahaula heiau in Hawaii Volcanoes National Park--both on Hawaii). Burial areas, fishponds and petroglyphs had been protected to a much lesser degree. Artifacts had been preserved largely by the Bishop Museum.

In the late 1960's the settlement pattern school's view influenced state agencies and federal agencies. Yet the public has not yet been made aware of these recent activites. For example, Bellows site (018) and adjacent areas on Bellows Air Force Base (Oahu) are now protected as a national historic register site. It is the oldest archaeological site yet excavated in the Hawaiian Islands, yet no displays or exhibits are anywhere available to the public. Lapakahi ahupua'a (Hawaii) and Kahana Valley (Oahu) are two future state parks emphasizing historical resources. Lapakahi has had 3 years of excavation, and presently reconstruction activities are ongoing there under the Division of State Parks. It has been one of the most productive areas for Hawaiian archaeologists to date in learning about later agricultural patterns and settlement, yet it has largely been inhibited (except in a few newspaper articles). The Kahana Park is also largely inhibited, and little excavation has taken place.

Private management of archaeological resources for the public has long lagged behind governmental endeavors. Prior to the late 1960's developers had little concern for preserving antiquities on their lands. Antiquities were sometimes removed by contracted archaeologists (particularly when burials were found) if their discovery was a hindrance to development work. In the alte 1960's, however, developers began to see the economic attraction of having historical sites reconstructed on their grounds and the public service attraction of having archaeologists come in and survey and remove remains. The Mauna Kea Beach Hotel was one of the first cases of such contract (or salvage) archaeology. Since then governmental laws and public pressure have made this contract archaeology virtually a necessity rather than an option. The contract work to date has been done by both schools of Hawaiian archaeology represented in various archeological agencies (e.g., the Bishop Museum, the University of Hawaii, Archaeological Research Center Hawaii, the Division of State Parks). The work largely consists of inventory and selected excavation. In Makaha Valley, Anaehoomalu-Waikaloa, and Kaloko settlement pattern approaches were used. Elsewhere inventories and their dating have been the focus. The remains to be preserved and reconstructed are largely the impressive ones (e.g., temples, large houses, fishponds, and petroglyphs).

In sum, at present, management of historical resources for the public has been done by governmental and private sectors. The remains protected have largely been those of interest to the culture history school of Hawaiian archaeology. A few protected areas reflect the interest of the settlement pattern school of archaeology (Bellows, Lapakahi, Kahana), but the public is largely unaware of these areas or the settlement pattern approach. Thus, it is not surprising that the public's view of historical remains is largely a culture historical view.

## THE AUTHOR'S OPINION ON THE EFFECTIVENESS OF PRESENT MANAGEMENT AND WHAT IS NEEDED FOR EFFECTIVE FUTURE MANAGEMENT

It is obvious that all sectors of our society in Hawaii are aware of the need to preserve and manage historical resources. But how effective is management today and what is needed to make management effective in the future?

At the national government level, Newman et al (1972) have clearly pointed out that in 1972 only officially designated significant sites were protected. AT the state level, they have noted that projects still proceeded without regard to antiquity preservation because their own Division of State Parks staff was not large enough or well-funded enough to oversee many projects. Indeed their discussion of progress on the Division of State Parks' 3-point future program illustrates this. The statewide inventory had to be delegated out to other archaeological agencies (the Bishop Museum, Archaeological Research Center Hawaii) to be completed as the State Parks had but two archaeologists (Newman and J. Martin.) The normal overseeing function had no staff funding and had to use the inventory staff. The development of state historic parks was "extremely limited" in 1972.

The other agency at the state level also had problems as of 1972. The Foundation for History and the Humanities was not funded until 1971 (it was established by the legislature in 1969) and then concentrated much of its early work on ethnic studies. In 1972 the Review Board had

assigned a number of sites to the Hawaii Register, but apparently the significant sites had not been placed on the tax maps due to surveying costs, and only those sites on the tax maps were officially protected.

I would add further comments to Newman et al based on my personal knowledge of ongoing archaeology in Hawaii. The Division of State Parks seems to be in even worse straights as far as staffing. Only one archaeologist (to my knowledge) is on the staff (J. Martin). And although the inventory is largely completed, staffing is inadequate for other tasks. Funding and other problems have created havoc with the State Parks' development of the historic park at Lapakahi.

I have already noted problems in using the statewide inventory as a basis for future planning of antiquities managment in Hawaii (pp. 23). It does protect individual known sites, but the inventory does little towards achieving an intensive knowledge of settlement patterns in Hawaii. The claim that only investigation in unknown geographic gaps needs to follow the inventory to provide a picture of Hawaiian antiquities (Newman et al., 1972, Part I: pp. 74-75) is fallacious, unless it is clearly stated that the gaps in our knowledge of sites are virtually island-wide. And this acknowledgment would be tantamount to admitting that the inventory's worth is little more than an easy means to review old work and rank sites already known. Quite frankly, I feel that the inventory is only that. It should not be used for planning.

Archaeological salvage projects are constantly ongoing in threatened areas today (undertaken by the state, the Bishop Museum, Archaeological Research Center Hawaii and others and contracted by the state and private sectors). As such they are stop-gap forms of management. Yet there is no coordination for such salvage; instead, it is handled by each archaeological institution in their own way. Also the salvage projects vary

greatly in quality. These two points have led to quarrels among the different Hawaiian archaeological institutions. More vitally, in my opinion, these salvage projects at best cover only intensive survey and selected excavation (sometimes only survey), and then the developer is allowed to alter the areas and their historical remains and the archaeological institutions write up their results. I have tried to clearly point out under the sections on research approaches (pp. 12-20) and information needed to manage historical resources (pp. 21-25) that detailed problem-oriented studies are a necessary final step in archaeological research. Without such a step, the details can never be recovered to explain the patterns obtained from survey and selected excavation. And without detail and explanations, much of the past is lost. The inclusion of this research step would require an additional delay in development while archaeologists analyze their survey and selected excavation data to determine whether further problem-oriented excavation is needed. While the delay might be irritating, it is crucial, for otherwise the information would be lost.

Finally, it is also necessary to return to the problem of the divergent schools and institutions of archaeological research in Hawaii. I have noted the different schools (pp. 12-20) and in the above paragraph I have indicated there is considerable bickering between institutions (e.g., the Bishop Museum, the University of Hawaii, Archaeological Research Center Hawaii, the Division of State Parks). While this is normal in any science, in this case it is not healthy for any management program of historical resources in Hawaii. All schools and institutions should be represented in managing activities (either on a 1-to-1 basis or be skewing to most adherents) or else serious omissions of needed data and knowledge may be lost. The Coordinating Committee for Hawaiian Archaeology offered

a chance to coordinate these divergent views. Unfortunately, this committee is virtually defunct and has done little in the last two years (although it is not dead and could be revived). In the existing agencies, only one archaeologist is on the State Park's staff and only two on the Review Board of the Foundation for History and the Humanities. Are these archaeologists representing all schools of thought? The same could be asked of nongovernmental archaeological institutions when they undertake salvage excavations; do they represent all schools or only some when they save historical data? This is a serious problem and should be carefully considered in any management plans.

Also the entire range of historical remains reflecting the work of both schools of Hawaiian archaeology should be preserved for and brought to the attention of the public. As noted the culture historical view is the only school widely known to the public (through published material and illustrative protected remains). It is the task of managers of historical resources to illustrate to the public the range of antiquities the settlement pattern school sees vital for understanding the past in Hawaii. This would require the promotion of the Bellows, Lapakahi, and Kahana areas. It would also require the preservation of other remains reflecting aspects of settlement approaches yet unpreserved. For example, nothing is preserved concerning social ranking (e.g., areas where several levels of social ranks--commoners, low chiefs, high chiefs--can be seen in remains) or social groups (e.g., areas where groups--households, local residence groups, communities--and their interrelations could be seen in remains). I for one think the Kaloko-Honokohau coastal area (Hawaii Island) would be an excellent example of these patterns. In addition, management policy might consider showing the range of remains on each island.

In sum, as an archaeologist and one that has been trained by and worked for several of the archaeological institutions in Hawaii (the Bishop Museum, the State, and the University of Hawaii), I feel some coordinating group consisting of the divergent archaeological views in Hawaii is necessary for aiding management plans. A comprehensive management plan is needed in Hawaii to preserve historical remains; archaeologists all realize that. The public needs its interests protected, and archaeologists are best qualified to do that in regard to historical resources. Perhaps it is time for archaeologists to put aside some of their quabbles and attempt to formulate a program acceptable to all factions for management of historical resources in regard to preservation, research, and salvage work.

## SUMMARY

This brings this paper to an end. The author hopes the ramblings have made the reader aware of the nature of archaeological research in Hawaii and archaeologists' interests in historical resources. The knowledge archaeologists gain from the resources can greatly benefit the public's understanding of the history of our state, and historical remains should be protected to allow adequate scientific research to obtain such knowledge and illustrate it in the form of preserved remains to the public. In sum, coastal management of historical resources in Hawaii hinges on two points--delineation of coastal historical resources and obtaining the knowledge of divergent research approaches in archaeology. It has been suggested both points can be achieved, but additional work is needed in both cases for successful management of historical resources.

Note: Again, this is only an anthropologist's view of historical remains. Other disciplines should be consulted for any actual planning.

## FOOTNOTES

### How to Distinguish a Coastal Zone of Hawaiian Historical Resources

1. Exceptions are the plotting of temples for the entire island of Kauai (Bennett, 1931) and the island-wide plotting of fishponds (Kikuchi, 1973) and general agricultural patterns (Cordy, 1974a).

2. Nothing yet has been published on these remains in either area.

3. Archaeologically, the argument for permanent dwellings can be argued on structures' (e.g., platforms, paved areas, enclosures) floor area being larger than 10 meters squared (based on cross-cultural studies by two anthropologists--Naroll and LeBlanc). Also the association of temples and other special purpose structures of day-to-day life can be an argument for permanence. Rosendahl (1972) has suggested each family had 2 permanent dwellings at Lapakahi for use during different seasons--one inland in the agricultural fields and one on the coast. My research with contact historical material (Cordy, 1970, 1973) and with archaeological material at Kaloko (Cordy et al., 1975) however, suggest dwellings inland among agricultural fields were small (often less than 10 meters squared) and were used sporadically when visiting the fields for vegetables every few days. This explanation seems to fit the data and the Polynesian data much better. Only perhaps around Kawaihae where agricultural fields were 7+ miles inland near Waimea, does it seem likely that dual permanent dwellings occurred.

4. Kaloko in Kona 1/4 mile inland (Cordy et al., 1975). Anaehoomalu in Kohala less than 1/4 miles (Barrera, 1971). Honokohau in Kona less than 1/2 mile (Cluff, 1969). Lapakahi in Kohala less than 1/4 mile (Newman, 1970). See Appendix 1 for maps of Kaloko, Anaehoomalu and Lapakahi showing this pattern.

5. M. Kaschko of the Dept. of Anthropology (University of Hawaii) did research in several *ahupua'a* in leeward Kohala and C. Sugiyama's rough map from aerial photos (on file Dept. of Anthropology, University of Hawaii) show this pattern in Kohala. See Cordy et al., 1975 for Kaloko and Cordy, 1970 for historical evidence on Kona.

6. Temporary use dwellings are less than 10 meters squared in floor area. See footnote 3.

7. H. David Tuggle, 1975, Dept. of Anthropology Colloquium talk (U. of Hawaii) (unpublished).

8. Cordy, 1970. There is no archaeological data for this area.

9. Halawa Valley on Molokai (a wet stream valley) has continuous dwellings to ca 1 mile inland (cf Kirch, 1971c). Kahana Valley (also a wet stream valley) on Oahu has continuous sites ca 3 miles inland (cf Hommon and Barrera, 1971). See map of Kahana in Appendix 1.

10. Chapman's Kahikihui work is unpublished. See Kirch (1971b) for Palauea. Coastal remains less than 1/2 mile inland.

11. Bonk, 1954. Coastal remains right on the shore (less than 1/4 mile inland).

12. Makaha's coastal section is destroyed; 1 mile inland where archaeological analysis began only sporadic temporary dwellings were found (Green, 1969, 1970). See Sahlins (1971) for historical plotting of Moanalua Valley (see map Appendix 1). See Cordy, 1970.

13. Tuggle's unpublished work in Pololu (Hawaii) is an exception. There remains seem localized in the lower valley less than 1/2 mile from the shore. Timothy Earle (Dept. of Anthropology, UCLA) has done recent work in Wainiha Valley on Kauai which is unpublished.

14. Barrere's (1970a, 1970b) research for Makaha and Moanalua Valleys (Oahu) shows a spatial scattering into the upper valleys in each case--distances vary from 3 to 5 miles from the sea.

A History of Archaeological Approaches in Hawaii

1. See Newman (1968) for listing.

2. E.g., McAllister on Oahu (1933a) and Kahoolawe (1933b), Bennett on Kauai (1931), Emory on Lanai (1924) and Necker and Nihoa (1928). see Newman (1968) for additional listings.

3. E.g., Makaha (Green, 1969, 1970) and Kahana (Hommon and Barrera, 1971) on Oahu; Lapakahi (Rosendahl, 1972; Tuggle and Griffin, 1973), Kaloko (Renger, 1970), Honokohau (Cluff, 1969), and Anaehoomalu (Barrera, 1971) on Hawaii. See the Bishop Museum's Dept. of Anthropology Reports and the Division of State Parks' former Hawaii State Archaeological Journal for other cases.

4. Emory's work on Kaunolu village on Lanai (1924), although the bulk of his survey is temple-oriented,

5. See Footnote 3.

6. See Footnote 2.

7. These results of such endeavors can be seen in Emory, Bonk and Sinoto (1959); Pearson et al. (1971); Kirch (1971, 1973); Cordy (1974a).

8. Emory, 1970; Pearson et al., 1971; Kirch, 1973; Cordy, 1974a.

9. Pearson et al., 1971; Kirch, 1971.

10. Emory, Bonk and Sinoto, 1959; Sinoto, 1967, 1970; Kirch, 1971.

11. Cordy, 1974a.

12. Cordy, 1974a.

13. Emory, 1963; Emory and Sinoto, 1964; Sinoto, 1967, 1968, 1970.

14. Bellwood, 1970; Kirch, 1971a, 1974; Cordy, 1974c.

15. Parsons, 1972.

16. For Makaha see Green (1969, 1970), Ladd and Yen (1972) and Ladd (1973). For Lapakahi see Newman (1970) and Tuggle and Griffin (1973).

17. See Footnote 3.

18. See Rosendahl (1972), Rosendahl and Yen (1971), Yen et al. (1972), Riley (1973), Hommon and Barrera (1971), Tuggle (1972), Cordy et al (1975).

19. In addition to these archaeological studies, recent enthnographic work with archival resources dating 1850 have led to reconstruction of social organization in several areas (Moanalua and Anahulu valleys on Oahu and Wainiha valley on Kauai). Some archaeological work (by Kirch and Earle but unpublished) to corroborate aspects of this enthnographic work has also occurred.

Information Necessary to Manage Coastal Zone Historical Resources

1. Earle unpublished.

2. Kirch, 1971c; Riley, 1973

3. For Maui, Kirch (1971). For Oahu, Kahana Valley (Hommon and Barrera 1971; Hommon and Bevacqua, 1973). For Hawaii, Anaehoomalu (Barrera 1971), Kaloko (Renger, 1970; Cordy et al., 1975)

4. Newman, 1970; Tuggle and Griffin, 1973 for Lapakahi. The Pololu-Honokane data are not published yet.

5. Chapman's Kahikinui work is unpublished. Kirch (1971) on Palauea.

6. Makaha (Green, 1969, 1970; Ladd and Yen, 1972; Ladd, 1973), South Halawa (Ayres, 1970; Denison and Forman, 1971) and Moanalua (Ayres, 1970).

7. Kahana (see footnore 4), Barbers Point (Lewis, 1970).

8. Cordy et al., 1975.

9. Barrera, 1971

10. See Rosendahl (1972) for uplands and Tuggle and Griffin (1973) for coast.

11. Emory, Bonk and Sinoto, 1959.

12. Emory and Soehren, 1961.

13. Kirch, 1971, 1974; Pearson et al., 1971.

14. Cordy et al., 1975.

15. Cordy et al., 1975; Kirch, 1971.

16. Tainter, 1973, 1974; Cordy et al., 1975.

The Public's View of Historical Remains

1. Sahlins' (1971) recent work has shown the *'ohana* was definitely a post-1850 phenomenon. Prior to 1850, local residence groups (of blood relatives, in-laws, and friends--not just blood relatives as in the *'ohana)* were present and then communities (*ahupua'a*, often with the chief a nonrelative and with internal local residence groups unrelated). In sum, there was no branching *'ohana* type structure for commoners, rather each individual had his network of alliances built through blood, marriage, and friendship.

Activities Presently Threatening Coastal Historical Resources

1. An exception may be the looting along the Napali Coast of Kauai by helicopter during recent years.

2. Makaha Valley on Oahu has its coastal portion destroyed by urbanization and is thus not a total region.

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## APPENDIX 1

## MAPS OF SPECIFIC ARCHAEOLOGICAL SITES

Map 1--Kaloko (Renger 1970)

Map 2--Anaehoomalu (Barrera 1971)

Map 3--Lapakahi (Newman 1970)

Map 4--Kahana (Hommon and Barrera 1971)--archival map.

Map 5--Kahana (Hommon and Barrera 1971)

Map 6--Moanalua (Sahlins 1971)--archival map.

Map 7--Halelea district (Earle 1973. Unpublished PhD thesis, U. of Michigan).

Note: These maps have been xeroxed, and permission from authors and publishers should be obtained if they are reproduced for publication.

MAP 1 -- KALOKO

(Renger 1970)

Map is self-explanatory. Scale is in feet with scale marked in 200 foot intervals.

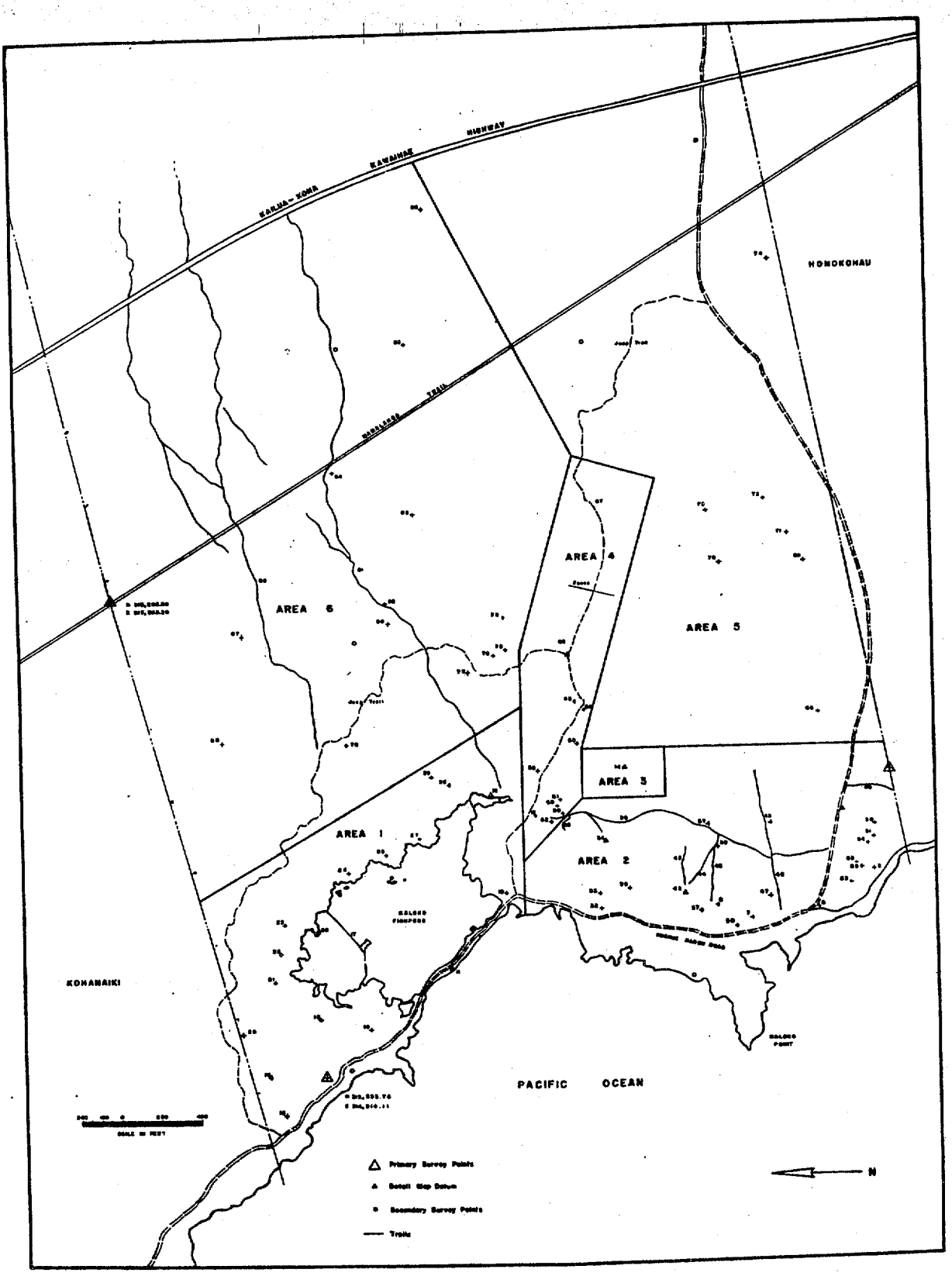



Fig. 1. ARCHAEOLOGICAL SITES IN THE COASTAL PORTION OF KALOKO.

MAP 2 -- ANAEHOOMALU

(Barrera 1971)

Map is self-explanatory. The boxed areas (e.g., Ridge Cluster, Anaehoomalu Point Cluster) refer to complexes of structures in those locations which are mapped elsewhere by Barrera.

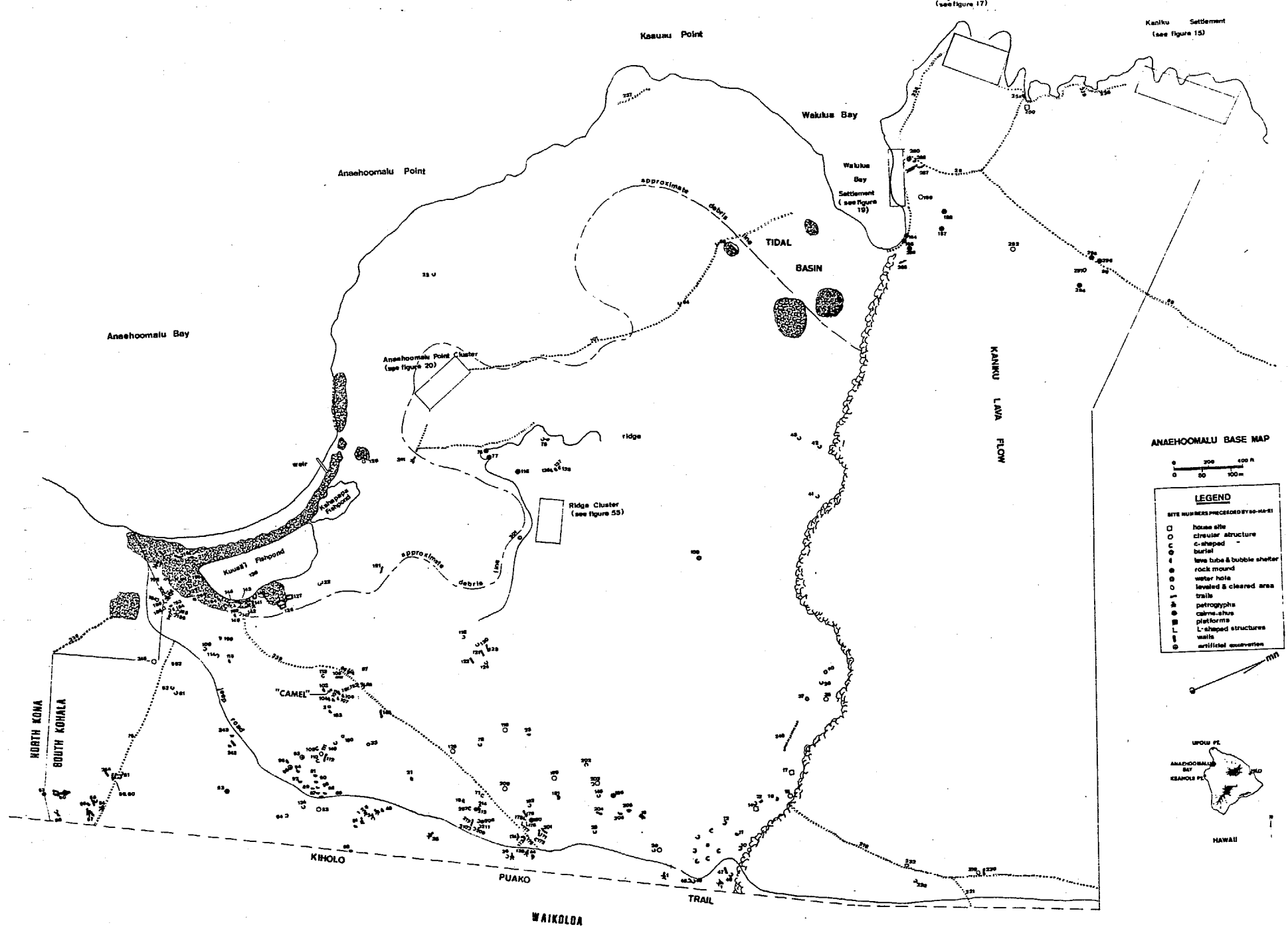



Figure 1. ANAEHOOMALU SITE MAP.

MAP 3 - LAPAKAHI

(Newman)

Map is self-explanatory. Inland fields are to the left and the coast to the right.

MAP 4 -- KAHANA

(Hommon and Barrera 1971)

Map is self-explanatory.

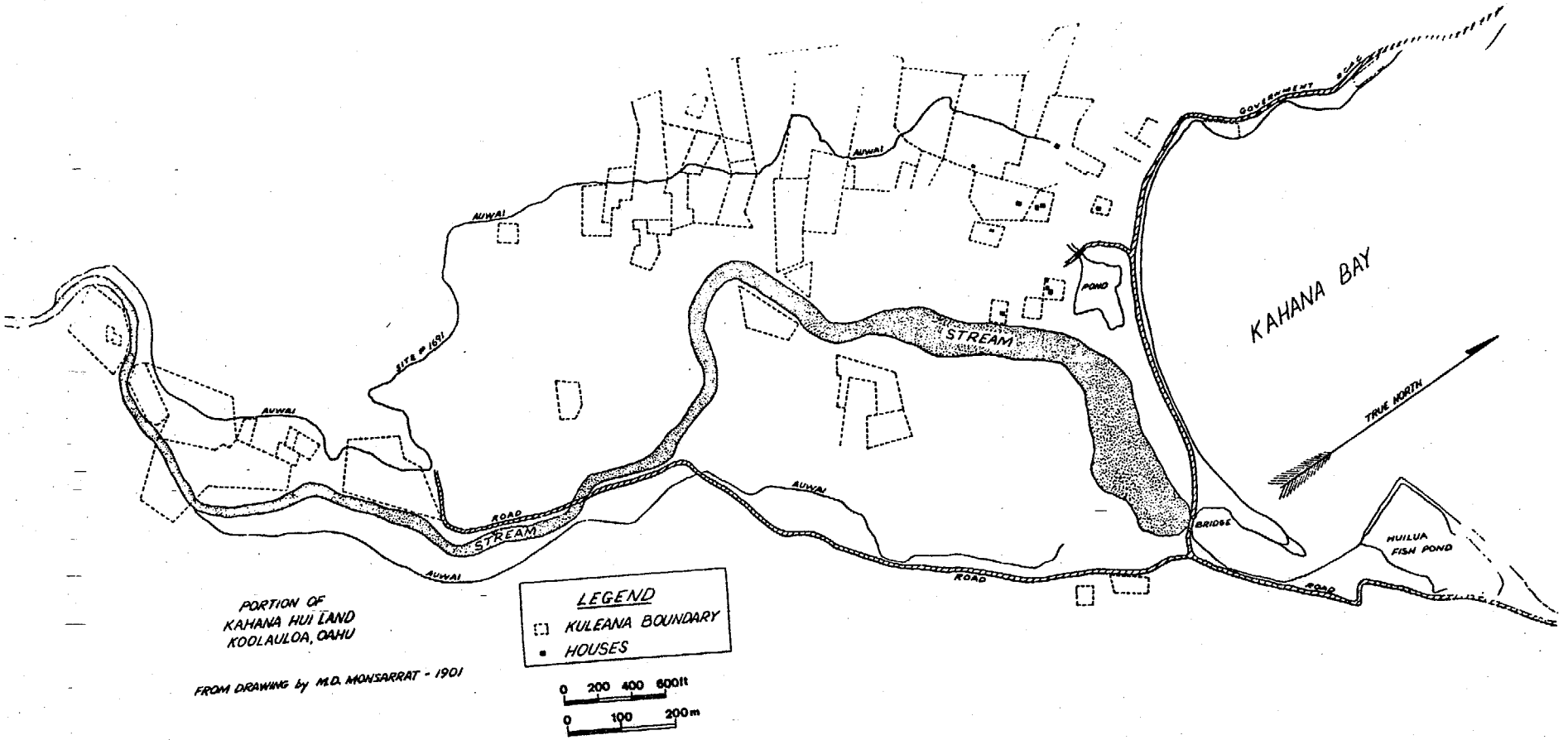



Figure 8. MAP OF LOWER KAHANA VALLEY SHOWING MAJOR IRRIGATION CANAL (WAILUA) AND KULEANA BOUNDARIES, 1901.

MAP 5 -- KAHANA

(Hommon and Barrera 1971)

Map is self-explanatory.

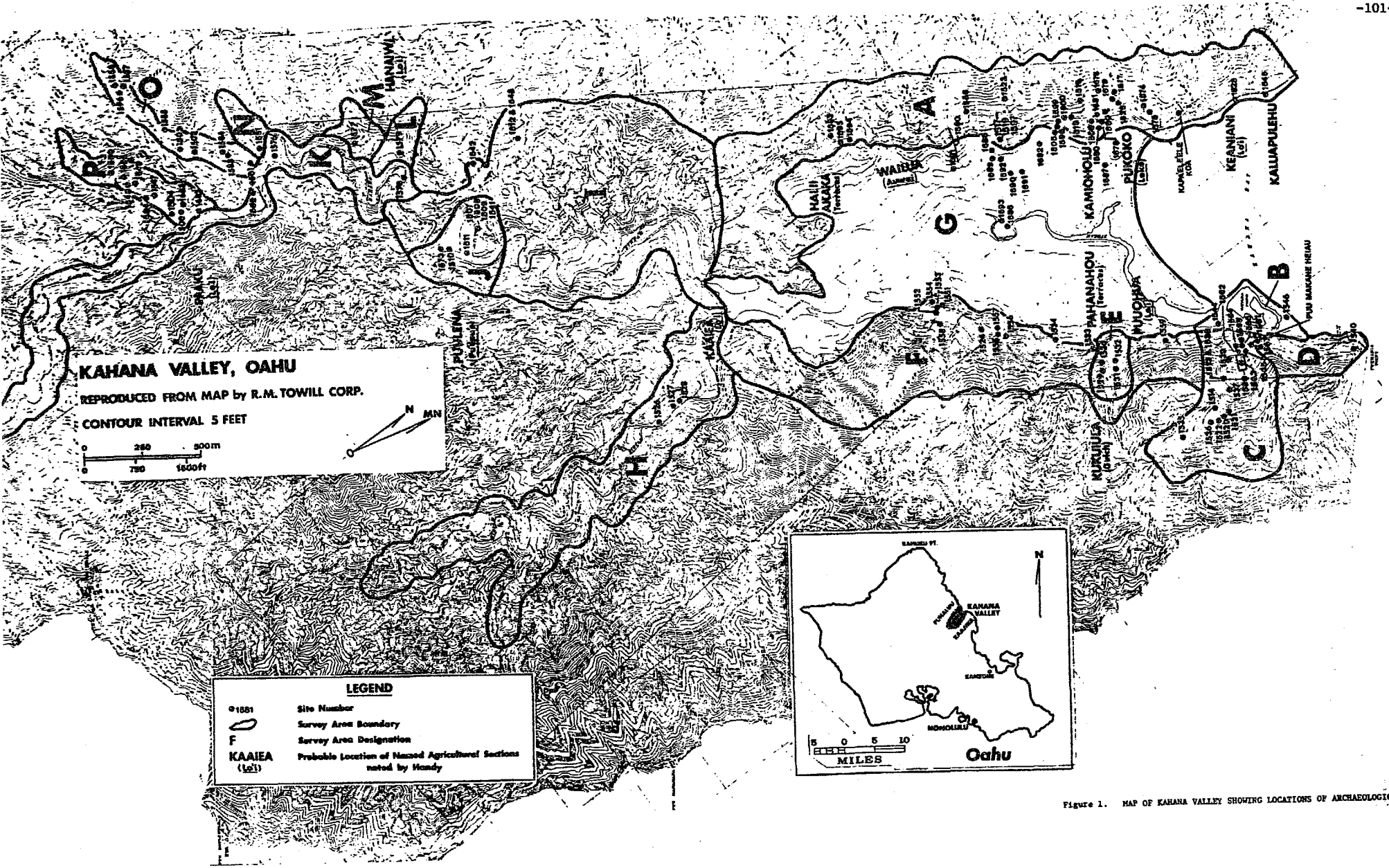



Figure 1. MAP OF KAHANA VALLEY SHOWING LOCATIONS OF ARCHAEOLOGICAL SITES

MAP 6 -- MOANALUA

(Sahlins 1971)

This map is a historical document of land plots in the lower valley of Moanalua. Although it does not show the upper valley, it illustrates the nature of settlement in historic times and the nature of recent ethnographic study in Hawaii.

# BOTTOM LANDS
in the AHUPUAA of
# MOANALUA
# OAHU

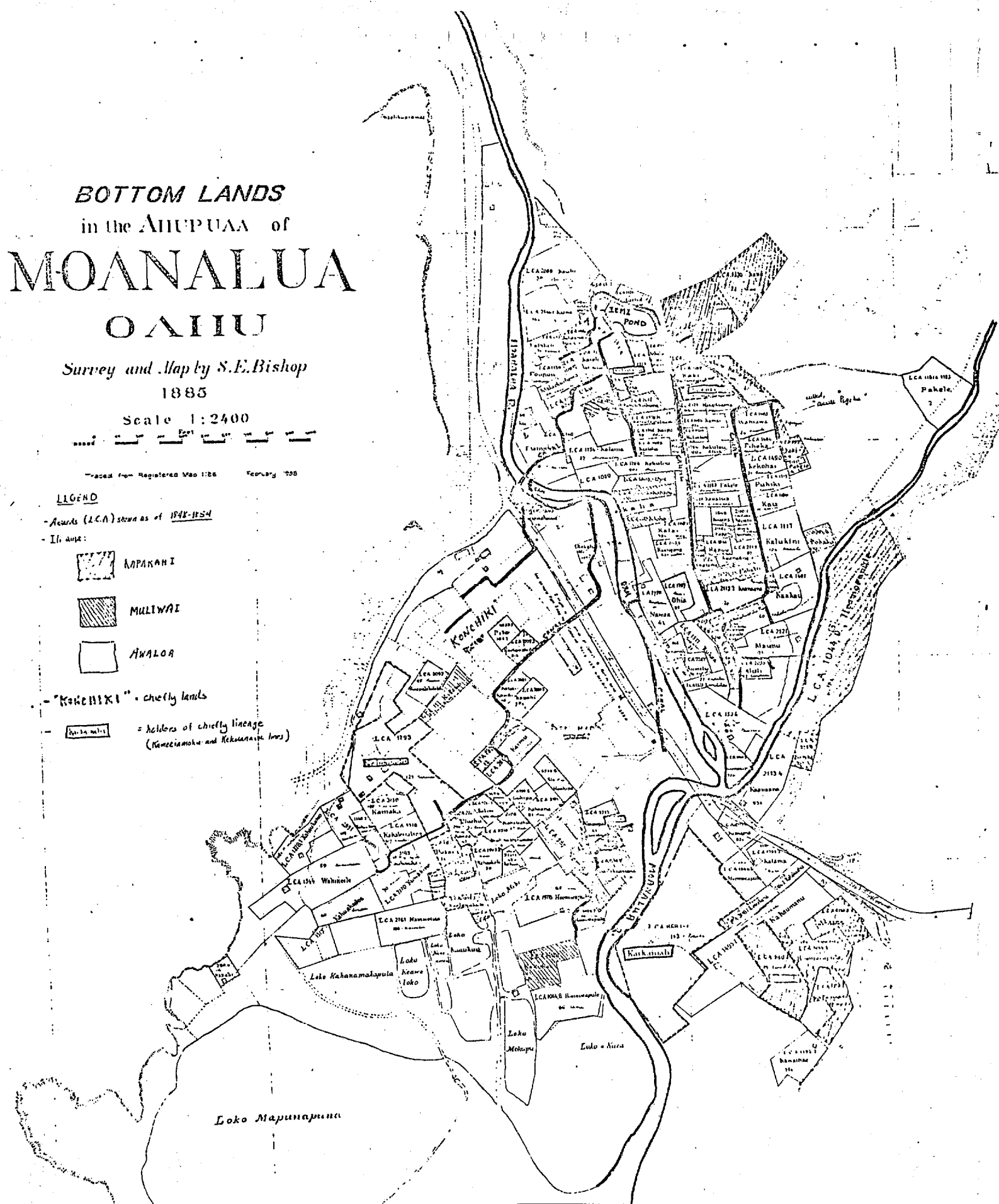
*Survey and Map by S.E. Bishop*
1885

Scale 1:2400

Traced from Registered Map 1126 February 1898

LEGEND

- Awards (L.C.A.) shown as of 1848-1854
- Ili auia:
  - KAPAKAHI
  - MULIWAI
  - AWALOA
- "KEKEHIKI" - chiefly lands
- [illegible] = holders of chiefly lineage (Kameeiamoku and Kekuanaoa lines)



MAP 7 -- HALELEA DISTRICT

(Earle 1973)

This map is a reconstruction from a study of historical documents. It shows the location of irrigation systems along the coast. The map refers to post-1850 time.

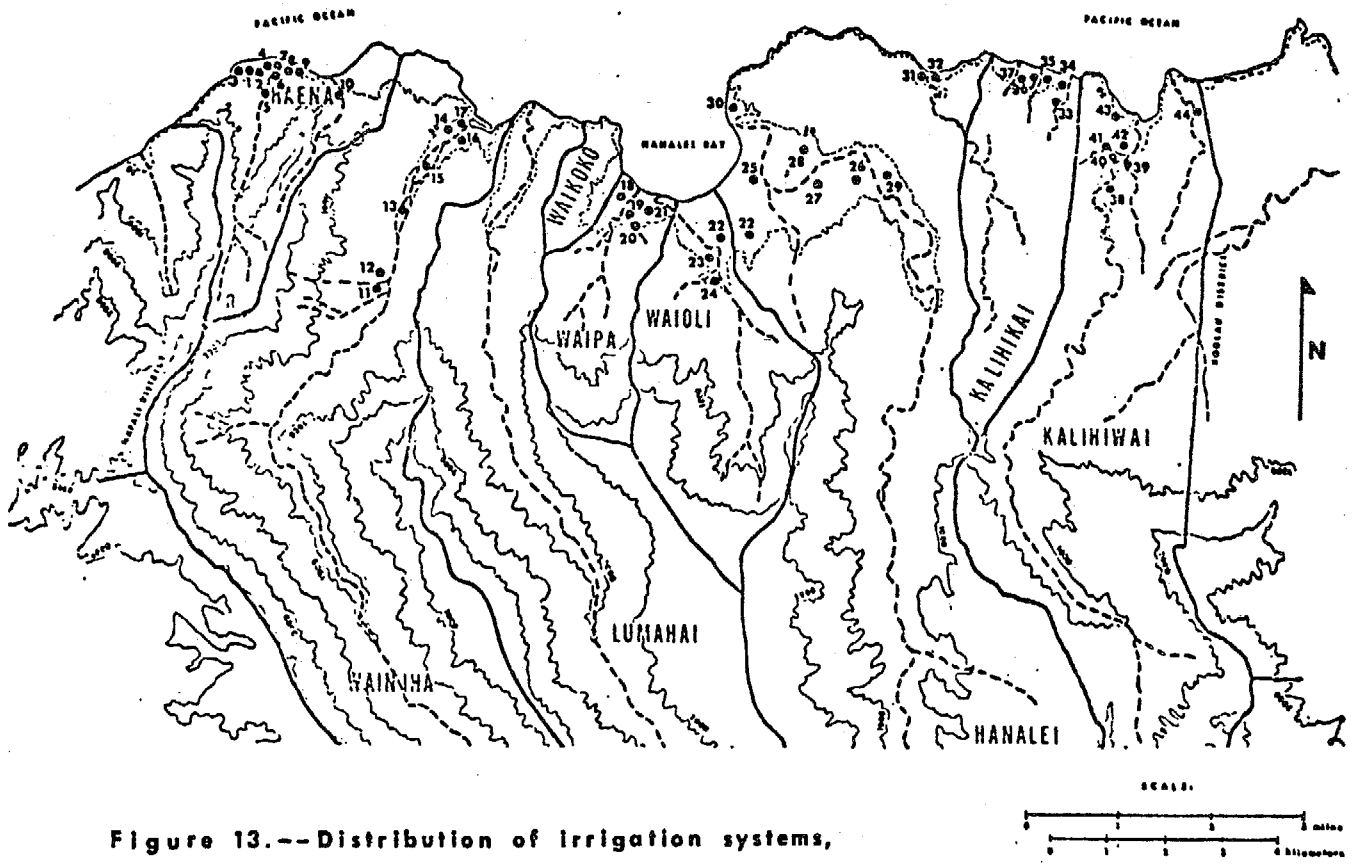



Figure 13.--Distribution of irrigation systems, Halelea district, Kauai

## APPENDIX 2

## SUMMARY OF ARCHAEOLOGICAL RESEARCH WORK TO DATE

Part of this paper is to "include summaries or abstracts of research work that has been done." A summary with cited references has been given in the text. Any attempt to summarize or abstract each research project in Hawaii to date would be an onerous and nerve-grinding task, and one this author feels is beyond the scope of this paper. Instead, here the reader will be given the sources where certain kinds of information can be obtained. Only synthetic and critical research work is abstracted.

There are two past brief published listings of research undertaken in Hawaii (Bonk 1961 and Newman 1968). Newman's publication is a good source for listings of work through 1967, and his bibliography shows where this research is located. Bonk's publication is more a summary of sites excavated as of the 1950's. If the reader is well acquainted with Hawaiian references and knows the author of a work but not the work itself, he can also use Newman et al's (1970) "Bibliography of Hawaiiana" (published in the Hawaii State Archaeological Journal, 70-3).

The early research work done in Hawaii (as noted, pp. 12-17) was survey and artifact descriptions. Newman (1968) lists these surveys and their published locations. The reports are largely descriptions of site appearance and dimensions with some oral history and history of the survey areas summarized occasionally. Examples range fron Thrum through Bennett (1931), McAllister (1933a, 1933b) and Emory (1924, 1928) to Emory and Soehren (1961) and Soehren's (1967) work in the early 1960's. The detailed surveys of recent salvage projects largely continue in the same site descriptive framework (e.g., Barrera, 1971; Cluff, 1969; Ching, 1971; Rosendahl, 1972b, 1973; Renger, 1970). Also consult the Dept. of Anthropology Reports

of the Bishop Museum and the former Hawaii State Archaeological Journal of the Division of State Parks for additional research.

Excavation research work has largely occurred since 1950 (exceptions are McAllister's excavation of a site on Kahoolawe and listing of its artifacts, McAllister, 1933b. Also excavations at Mokapu on Oahu where burials were recovered. Only manuscript data in the Bishop Museum and some data in Bowen, 1961, exist on that project). Excavation through the mid-1960's centered on single sites and is often unpublished (e.g., South Point on Hawaii, Kualolo-kai on Kauai, and M8 on Maui which exist in note form in the Bishop Museum and the University of Hawaii at Hilo). Excavations are published for the Kuliouou area (Emory and Sinoto, 1961), west Molokai (Bonk, 1954), and various Hawaii Island sites (Soehren, 1966; Emory, Bonk and Sinoto, 1959, 1971; Wallace and Wallace, 1969). These largely describe the nature of the sites, how they were excavated, food remains and artifact distributions, and artifact descriptions. Interpretation of lifeways at the sites are rare.

Excavation since the mid-1960's has also focused on individual sites and included similar information (Halawa Sand Dune and Bellows Sand Dune reported by Kirch, 1971, Pearson, et al., 1971, Kirch, 1974), but these reports have also carefully reconstructed the subsistence patterns at these sites (e.g., agriculture, shellfish collecting, and fishing). Other excavation has been in conjunction with intensive surveys and settlement pattern studies (e.g., Anaehoomalu, Lapakahi, Kaloko, Waiahukini, Kahaluu, and Pololu-Honokane on Hawaii Island; Kahikinui and Palauea on Maui; Halawa on Molokai; Kahana, Makaha, and Moanalua, and South Halawa on Oahu). Here site descriptions are largely done as before, but all sites are interpreted within an economic and/or social organization framework. (See Barrera, 1971 for Anaehoomalu, Newman, 1970, Rosendahl,

1972, Rosendahl and Yen, 1971, Tuggle and Griffin, 1973, Griffin et al., 1971 for Lapakahi; Tainter, 1973, 1974 and Cordy et al., 1975 for Kaloko; Sinoto and Kelly, 1970 for Waiahukini; Kirch, 1973, Emory et al., 1971, Crozier, 1971a, 1971b, and Barrera 1971b for Kahaluu; Tuggle's notes at the University of Hawaii for Pololu-Honokane; Chapman's notes at the Bishop Museum for Kahikinui; Kirch, 1971b for Palauea; Kirch, 1971a, 1971b, 1973 and Riley, 1973 and Griffin et al., 1971 for Halawa; Hommon and Barrera, 1971, Hommon and Bevacqua, 1973 for Kahana; Green, 1969, 1970 and Ladd and Yen, 1972 and Ladd, 1973 for Makaha; Ayres, 1970, Denison and Forman, 1971 for Moanalua and South Halawa).

Synthetic research in Hawaii has been rare. Artifact sequences have been developed and compared to other areas in Polynesia, leading to the formulation of theories on historical ties (see pp. 12-17 of text).* Emory, Bonk and Sinoto (1959) developed a historical sequence of fishhook types using hooks from H2, H8 (Waiahukini) and H1 (South Point Dune) sites in the South Point area. Notched hoods were found to be early (pre-1200) and knobbed hooks late (post-1650) with an intermediate transition period (1200-1650). Sinoto later (1962) further developed this typological sequence (focusing on line attachment traits) and incorporated hooks from the K3 site on Kauai. Work at O18 Dune on Oahu (Pearson et al., 1971) and Halawa Dune on Molokai (Kirch, 1971a) revealed a new early type of hook (simple knobbed) which dated pre-1200 in both these areas and at site M8 on Maui. Emory has discussed adze types (1967) and temple types (1970) and has found the latter to be temporarily uncontrolled to date. Emory (1967), 1970), Emory and Sinoto (1964), and Sinoto (1967, 1968, 1970) in

*Often the pre-1950 survey publications end with a section on comparisons in which items (such as temples) are compared with those of other island groups to formulate historical ties (cf Emory 1928: 106-122).

recent years have argued that these artifact sequences parallel those of the early Marquesas and later Tahiti, indicating Hawaii was occupied in 2 migrations--one early from the Marquesas and one late from Tahiti. Sinoto has emphasized fishhook, pendant, and other similarities, while Emory has emphasized adzes and temples.

Syntheses of economic patterns have only recently occurred (Kirch, 1973; Cordy, 1974a) as have those concerning social ranking patterns (cf Cordy, 1974a, 1974b; Tainter, 1974). Cordy (1974a) reviewed the archaeological record in Hawaii up to 1972 and suggested occupation occurred first in optimal agricultural areas on the wet windward sides of islands in Hawaii followed by expansion to drier areas less favorable to agriculture in leeward areas. Dates from sites seemed to support this shift with windward areas generally occupied pre-1000 AD and leeward areas after AD 1000. Kirch (1973) also corroborates this early windward pattern related to economies in this review of archaeological material from Halawa Dune, 018 Dune, 01 cave shelter, and H8 cave shelter.

Social ranking changes were also observed during Cordy's review of the pre-1972 archaeological data (Cordy, 1974a). The change was seen to be one from simple, minimally ranked societies to complex societies with several levels of chiefs. The sudden appearance of large temples, houses and graves after AD 1600 seemed to mark this change. Later data pushed this date back to AD 1500 (Cordy, 1974b), and it seems likely to go back even earlier. One other social ranking synthetic paper exists, and it is presently unpublished (Tainer, 1974). In it, Tainter expanded his analysis of social ranking seen in grades of graves from the small region level (Kaloko) to include 3 small regions (Kaloko, Anaehoomalu, and Lapakahi). He concluded similar levels of social ranks were present in Kaloko and Lapakahi (including chiefs) while at Anaehoomalu only lower social ranks (commoners) were present.

Two papers have discussed synthetic sequences for the entire time-span of prehistoric occupation in the Hawaiian Islands (Newman, 1969; Cordy, 1974a). Newman argues for an initial Marquesan settlement in leeward areas with a marine-oriented economy (Initial Settlement Period), followed by later Tahitian immigration and the development of an agricultural-oriented economy and expansion into windward areas (Early Swidden and Late Swidden periods), followed by the development of irrigation and large dryfield areas and marked differences in social rank (Permanent Agriculture period) based on minimal excavations prior to 1968. Cordy (using the large amount of excavation material recovered between 1968-1972) suggests only 1 migration occurred (the initial settlement) with a minimally ranked society dependent on agriculture and fishing occupying first the agriculturally optimal windward areas (Initial Settlement Period) and then expanding into the less optimal leeward areas (New Adaptation Period) and finally the alteration of these small societies into larger complex ranked societies (Complex Chiefdom Period).

Finally, a few initial synthetic explanatory papers have occurred attempting to explain in ecological terms (e.g., population growth, warfare, political expansion) some of the island-wide patterns. Cordy (1974) suggested population growth induced the development of complex societies via warfare or internal reorganization. Evidence was indicated from the archaeological reocrd, but it was noted that hardly any detailed, time controlled evidence is available to make any firm statements. Tuggle in an unpublished presentation (1975, Dept. of Anthropology--University of Hawaii--colloquium) has suggested politically induced expansion into unoccupied areas was a means of relieving population pressure and explained the sudden and late occupation of some marginal agricultural areas (such as Pololu-Honokane valleys on Hawaii).

Papers critically (but constructively) reviewing past archaeological research in Hawaii are even rarer than syntheses (in recent years). To this author's knowledge, there are only 4 papers which have this as their main aim. Green (1971) critically reviews problems with the carbon-14 dating and the fishhook sequences at South Point. He argues clearly that most of the archaeological layers used to compare hook types were not of comparable time span. He concludes carbon-14 dates clearly show a different sequence than the fishhook seriation of Emory, Bonk and Sinoto (1959).

Another paper (Cordy, 1973) reviews the interpretations concerning work at Lapakahi (Rosendahl, 1972; Tuggle and Griffin, 1973) and points out the lack of dating control makes some of these interpretations quite shaky. It concludes by suggesting that archaeologists should shift their focus from small regions to larger areas in order to recover remains more significant to social organization reconstruction.

The third paper (Cordy, 1974c) reviews the claim (based on archaeological sequences, linquistics, and oral traditions) that Hawaii was subject to a secondary migration from Tahiti and concludes that the claim is not supported by present data.

The final critical paper (Cordy, 1975) argues that methods used to interpret certain historical structures to be certain structure types noted at contact (e.g., temples, men's houses, fishing shrines) are not good. Structures intepreted as men's houses are discussed, and the interpretations are shown to be weak. A different method for interpretation (rigorous use of historical documents) is suggested.

This ends the summary of research in Hawaiian archaeology to date and should allow access into the material for anyone wishing to obtain additional detail.

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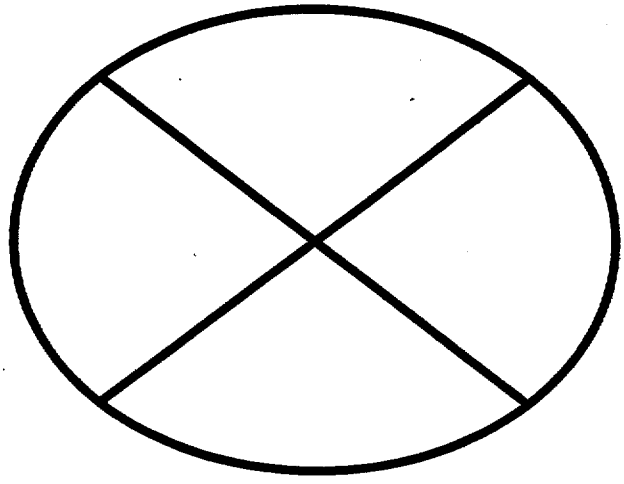

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DOC-HAWAII GROUND SURVEYS

**Page #:** Map #1