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GOVERNOR OF HAWAII



STATE OF HAWAII  
DEPARTMENT OF LAND AND NATURAL RESOURCES

P. O. BOX 621  
HONOLULU, HAWAII 96809

REF: SP-MY

July 18, 1991

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OFFICE OF ENVIRONMENTAL QUALITY CONTROL

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WILLIAM W. PATY, CHAIRPERSON  
BOARD OF LAND AND NATURAL RESOURCES

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WATER AND LAND DEVELOPMENT

Mr. Brian J. Choy, Director  
Office of Environmental Quality Control  
220 South King Street, 4th Floor  
Honolulu, Hawaii 96813

Dear Mr. Choy:

Enclosed are the OEQC Publication Form, Notice of Determination, and four (4) copies of an Environmental Assessment for the inclusion of Malae Heiau into Wailua River State Park, Wailua, Kauai. The project is being proposed for the management, interpretation, and maintenance of Malae Heiau as part of the Wailua Complex of Heiaus. The other three heiaus and associated sites comprising the complex are already encompassed within Wailua River State Park. The Wailua Complex of Heiaus was declared a National Historic Landmark in 1962 and is currently listed on both the Hawaii and National Registers of Historic Places.

In addition to the heiau, the project includes a buffer of approximately 6.8 acres around the heiau. In conjunction with the inclusion of the heiau into the park, the project addresses our interim plan for the management, interpretation, and public visitation of the heiau. The project area is not within a Conservation District or a Shoreline Management Area.

It is our conclusion that a negative declaration is appropriate for this project. The grading and grassing activities will be limited to the heiau exterior that has previously been altered by agricultural activities. Mitigative action will be taken during the selective vegetation removal to minimize the impact of the removal on the heiau structure. Finally, visitation of the site will be managed in an effort to avoid disturbance to the site.

If you desire additional information on this project, please contact Martha Yent, Division of State Parks, at 548-2682.

Very truly yours,

A handwritten signature in black ink, appearing to read "W. Paty".

WILLIAM W. PATY

1991-08-08- KA- FEA -

**FILE COPY**

ENVIRONMENTAL ASSESSMENT

\* INCLUSION OF MALAE HEIAU INTO WAILUA RIVER STATE PARK  
WAILUA, KAWAIHAU, KAUAI \*  
(TMK: 3-9-02: 12 and 13)



State of Hawaii  
Department of Land and Natural Resources  
Division of State Parks

**ENVIRONMENTAL ASSESSMENT**

**INCLUSION OF MALAE HEIAU INTO WAILUA RIVER STATE PARK  
WAILUA, KAWAIHAU, KAUAI  
(TMK: 3-9-02: 12 and 13)**

**Prepared by:**

**State of Hawaii  
Department of Land and Natural Resources  
Division of State Parks**

**June 1991**

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## SECTION I PROJECT DESCRIPTION

### Project Location

Wailua River State Park encompasses the lower Wailua River valley and river mouth along the southeastern shoreline of Kauai. The Wailua River originates at Mount Waialeale near the center of the island and enters the ocean at the town of Wailua, a total distance of 11.8 miles. Wailua is situated between Hanamaulu to the south and Kapaa to the north and is about 5 miles northwest of Lihue (Fig. 1). Mauka (west) of the park is the Lihue-Koloa Forest Reserve and the Wailua Game Management Area. Nonou Forest Reserve is located to the north of the park while Kalepa Forest Reserve is located to the south. Much of the land surrounding the park is State-owned and currently under lease to Lihue Plantation for the cultivation of sugarcane.

The Wailua River was designated a State Park in recognition of the scenic and wilderness character of the area that also includes historical, archaeological, and geological features.<sup>1</sup> Wailua River State Park was initially established in 1954 and included only the Fern Grotto. Shortly afterwards in 1956, the Wailua River Reserve Area was established. In 1962, the Lydgate Area, the Kaumualii Area, the Marina Area, and the Poliahu Area were added to the park. Most recently in 1977, the Wailua Beach Area was incorporated into the park. These seven areas have been retained for the management of this large park which encompasses a total of 1125 acres along the Wailua River (Fig. 2).

### Zoning and Land Use Classification

The lands around Malae Heiau are zoned agriculture and the cultivation of sugarcane on these lands is a conforming land use. Additional agricultural lands are found on the bluffs above the slopes of the Wailua River valley (Fig. 3).

The land currently in Wailua River State Park and the forest reserves is zoned conservation. There are some urban/resort lands adjacent to the park on the coast, including the Kauai Resort on the south side of the river mouth and Coco Palms Hotel on the north side. Residential lands, including the Wailua Homesteads and the Wailua House Lots, are found along the north side of the river.

### Statement of Park Goal and Objectives

The overall goal of Wailua River State Park is the preservation of the scenic, historical, archaeological, ecological, geological, and other scientific values while providing opportunities for appropriate types of recreation that will not destroy or impair the features and values to be preserved. Consequently, the development of park facilities and programs should seek to maintain the scenic and wilderness character, as well as, the historical setting of the river valley.

<sup>1</sup> Eckbo, Dean, Austin & Williams in association with Muroda, Tanaka & Itagaki, Inc. Wailua River State Park, Island of Kauai, State of Hawaii, 1970.

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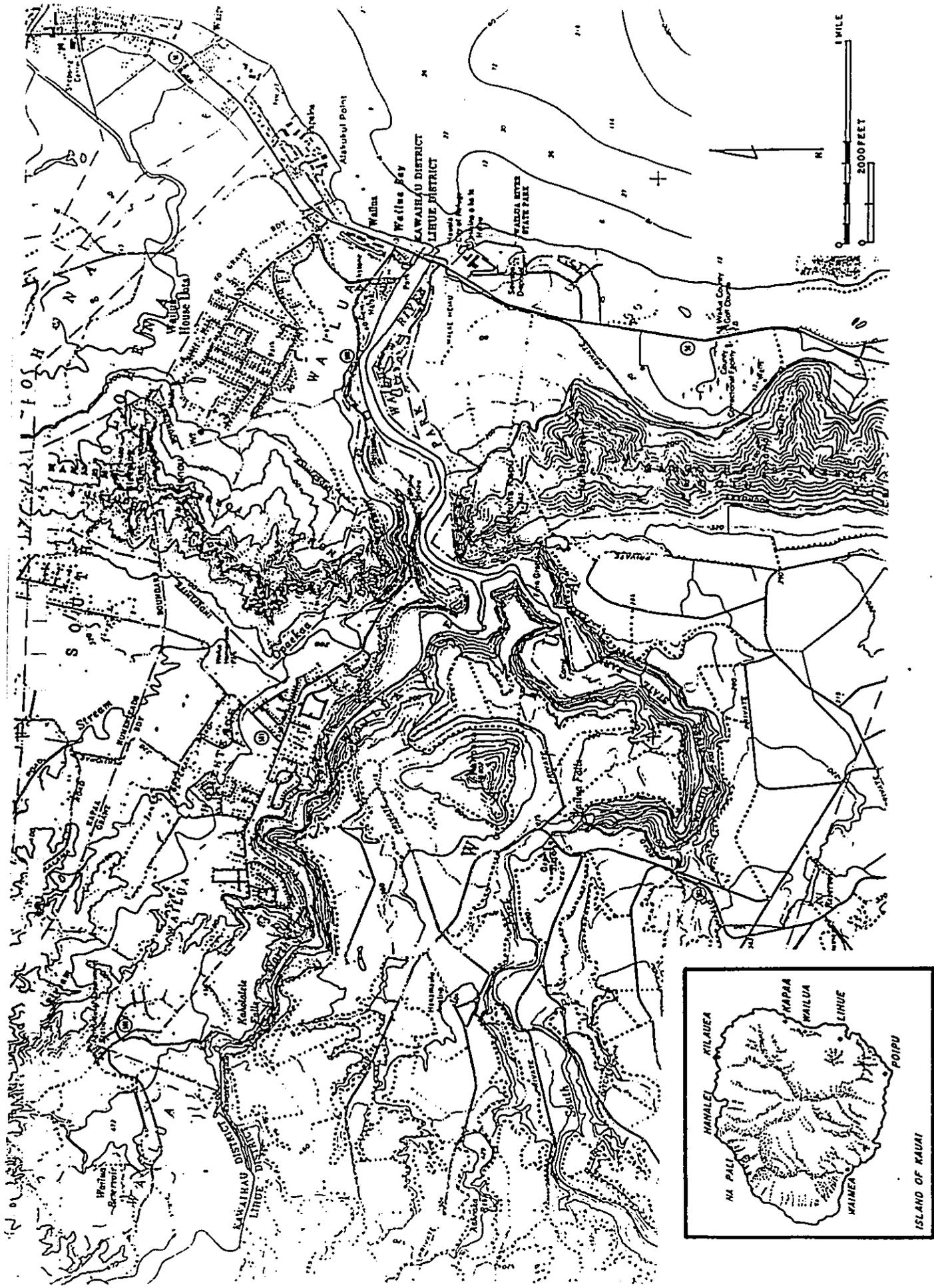


FIG. 1 - Location of Wailua River State Park and Malae Heiau.



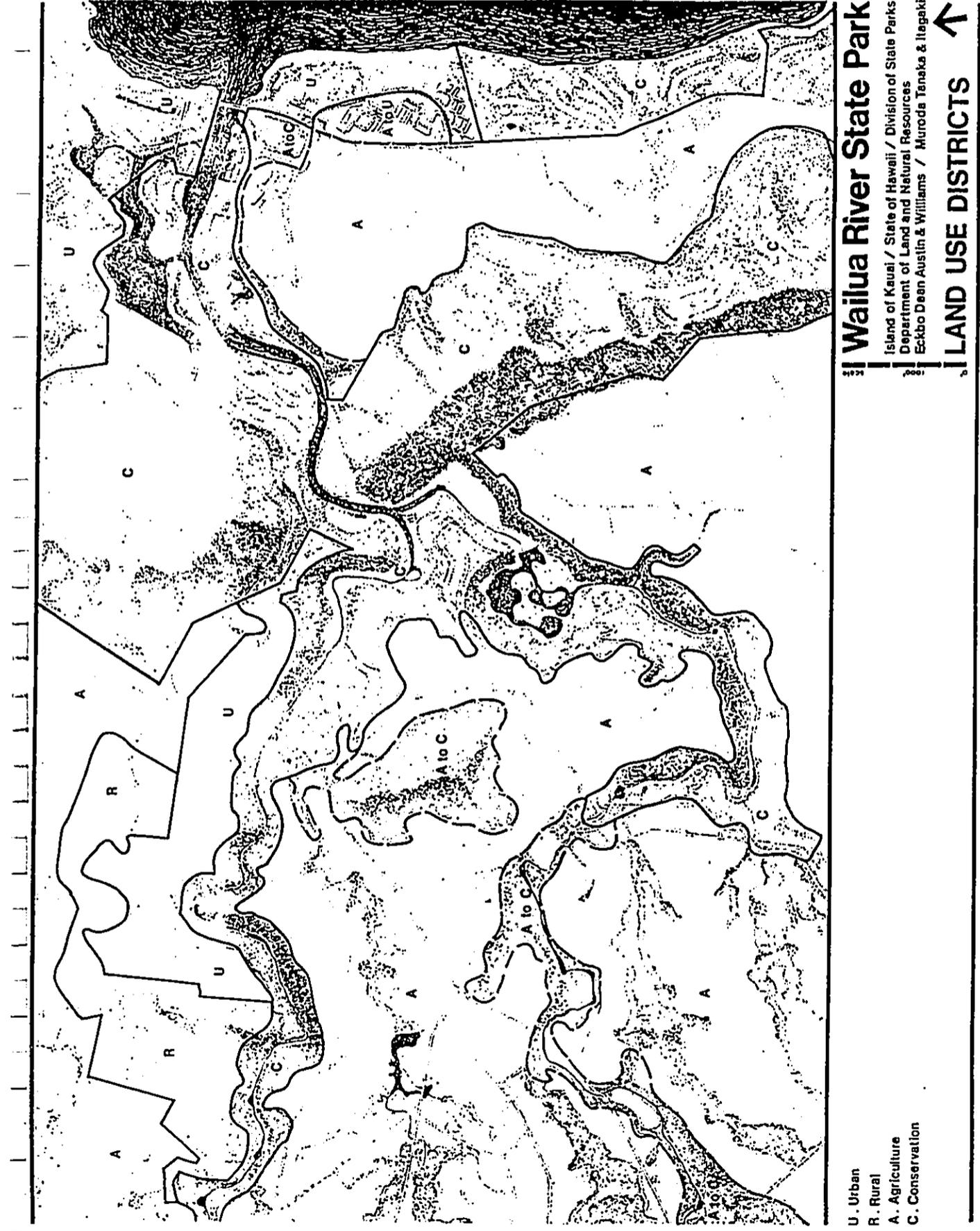


FIG. 3 - Land use districts within Wailua River State Park and the surrounding area.

The historical significance of Wailua is reflected in the complex of significant religious sites (heiaus) found in the vicinity of the Wailua River. Wailua was an economic, religious, political center on Kauai where the highest ranking chiefs resided most of the year. As a chiefly residence and religious center, the area was set aside for the exclusive use of the chief, his court, and the priests. Traditional history suggests that Wailua was a chiefly residence as early as A.D. 1200 and remained a cultural center on Kauai until after Western contact.

The historical significance of Wailua was recognized in the designation of the Wailua Complex of Heiaus as a National Historic Landmark in 1962. The complex was also listed on the Hawaii Register of Historic Places in 1981. The complex includes four heiaus, the birthstones (Pohaku Hooahanau), a place of refuge (*puuhonua*), petroglyphs, and a bellstone (Fig. 4). All of these sites in the complex are presently within Wailua River State Park with the exception of Malae Heiau. The four heiaus that comprise the Wailua Complex of Heiaus are:

- Hikinaakala Heiau - This heiau is located in the Lydgate Area on the southern bank of the river mouth. The enclosure structure once had massive walls but only the foundation stones remain today. The *puuhonua* of Hauola is adjacent to this heiau.
- Ka Lae o Ka Manu Heiau - This heiau is located in the lower Poliahu Area. Historical traditions credit Moikeha with the introduction of early religious traditions from Kahiki at this heiau. The heiau is adjacent to the birthstones.
- Poliahu Heiau - This heiau is located in the upper Poliahu Area on a bluff overlooking the Wailua River. The heiau is a large walled enclosure with interior pavings and terraces.
- Malae Heiau - This heiau is west of Hikinaakala Heiau on a low bluff along the southern riverbank and adjacent to the Marina Area. The heiau consists of a large, high walled enclosure with interior features and paved surfaces.

The heiaus of Wailua remain important to the Hawaiian community as a significant part of their cultural heritage. The preservation, protection, and interpretation of this complex of heiaus are major objectives of the park program. The inclusion of Malae Heiau into Wailua River State Park affords an opportunity to initiate programs that respect the cultural value of this complex.

#### Project Description

The inclusion of Malae Heiau into the park will unify the four heiaus of the Wailua Complex of Heiaus under the jurisdiction of the Department of Land and Natural Resources, Division of State Parks for the purposes of interpretation, management, and maintenance. Malae Heiau is adjacent to the Marina Area of the park and is on State-owned land. The lands surrounding Malae Heiau, also State-owned, are currently leased to Lihue Plantation for the cultivation of sugarcane. The heiau area, approximately 2.2 acres, was excluded from the lease. Malae Heiau is identified by Tax Map Key 3-9-02:13 while the surrounding parcel is referred to by TMK: 3-9-02:12 (Fig. 5). The land being requested for inclusion into the park includes a buffer around the heiau structure and therefore, affects both parcels 12 and 13.

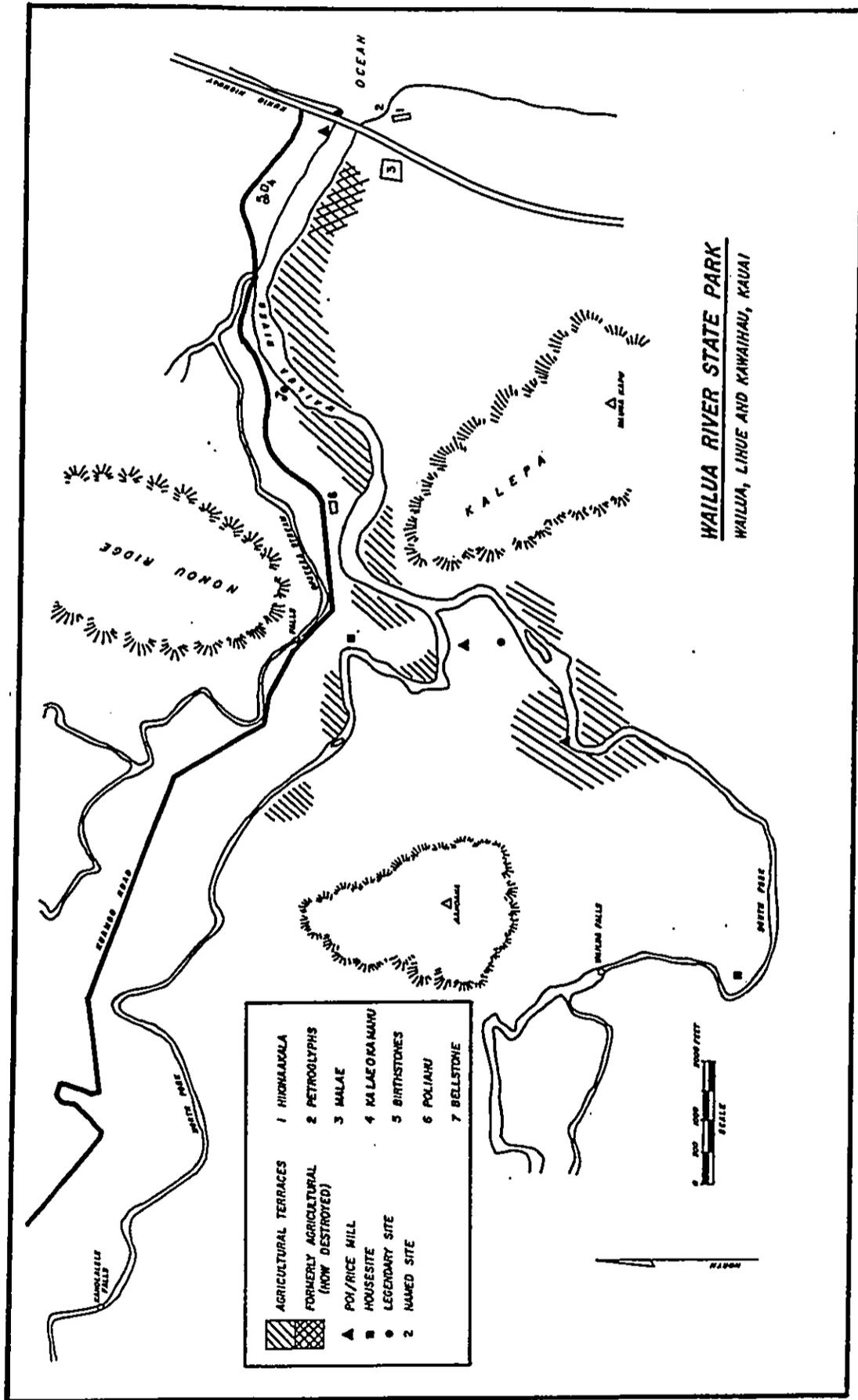


FIG. 4 - Distribution of historic sites within Wailua River State Park.



The harvesting of the sugarcane planted around the heiau is a threat to the preservation of the site because heavy machinery works in close proximity to the walls of the heiau. In addition, the stability of the walls is threatened by irrigation ditches along the base of the stacked rock wall. The creation of buffers around the site would pull these agricultural features and activities away from the heiau and mitigate the threats to the stability of the site.

Malae Heiau is located near the intersection of Kuhio Highway and the Marina Road. Therefore, inclusion into the park is facilitated by close proximity to an existing developed park area. However, to include the heiau in the park will entail the removal of State-owned land from the lease with Lihue Plantation. It is proposed that a 100 foot buffer be established on the south and west sides of the heiau to eliminate the threats to the preservation of the site from irrigation ditches and machinery. In addition, the land between the north wall of the heiau and the Marina Road and between the east wall of the heiau and Kuhio Highway would be set aside to protect the heiau and permit future visitation (Fig. 6). The approximate total of this buffer is 6.8 acres and the size of the heiau parcel is 2.2 acres. Therefore, a total of 9 acres is affected by the project. The easement for the canehaul road paralleling Kuhio Highway will continue through a separate lease agreement.

Once these lands are set aside for the park, a management and maintenance program will be initiated. This program will include:

- Archaeological testing at the site to determine the impact of vegetation clearing on structural features and any subsurface cultural deposits. An initial mapping of the site was conducted by State Parks archaeologists in January, 1991 (Fig. 7).
- Clearing of vegetation from atop the heiau wall and selective vegetation removal within the heiau.
- Clearing and grading of the sugarcane fields within the buffer around the heiau. The area will be grassed and maintained as an open area for easy viewing of the heiau from the roadways.
- Interpretive signage will be placed along the Marina Road where there is a pull-over to inform visitors about the site.

#### Vegetation Removal and Landscaping

A second aspect of this project is control of the vegetation around and within Malae Heiau. The present vegetation is comprised largely of exotic species. The site is characterized as a java plum (*Syzygium cumini*) forest with scattered Chinese banyan (*Ficus microcarpa*), Macaranga tanarius, octopus tree (*Schefflera actinophylla*), guava (*Psidium guajava*), and christmas berry (*Schinus terebinthifolius*). Some of this vegetation is growing on top of the heiau walls which threatens the long-term preservation of these walls. Therefore, removal of this vegetation will mitigate the adverse conditions of continued growth.

Based on a prior project at Keolonahihi State Historical Park in North Kona on the island of Hawaii where large Ficus trees were removed from an archeological complex, it is recommended that the large trees be injected with herbicide prior to removal.<sup>2</sup> Systemic herbicides, such as Roundup, Rodeo, or Garlon, will be used for this purpose.

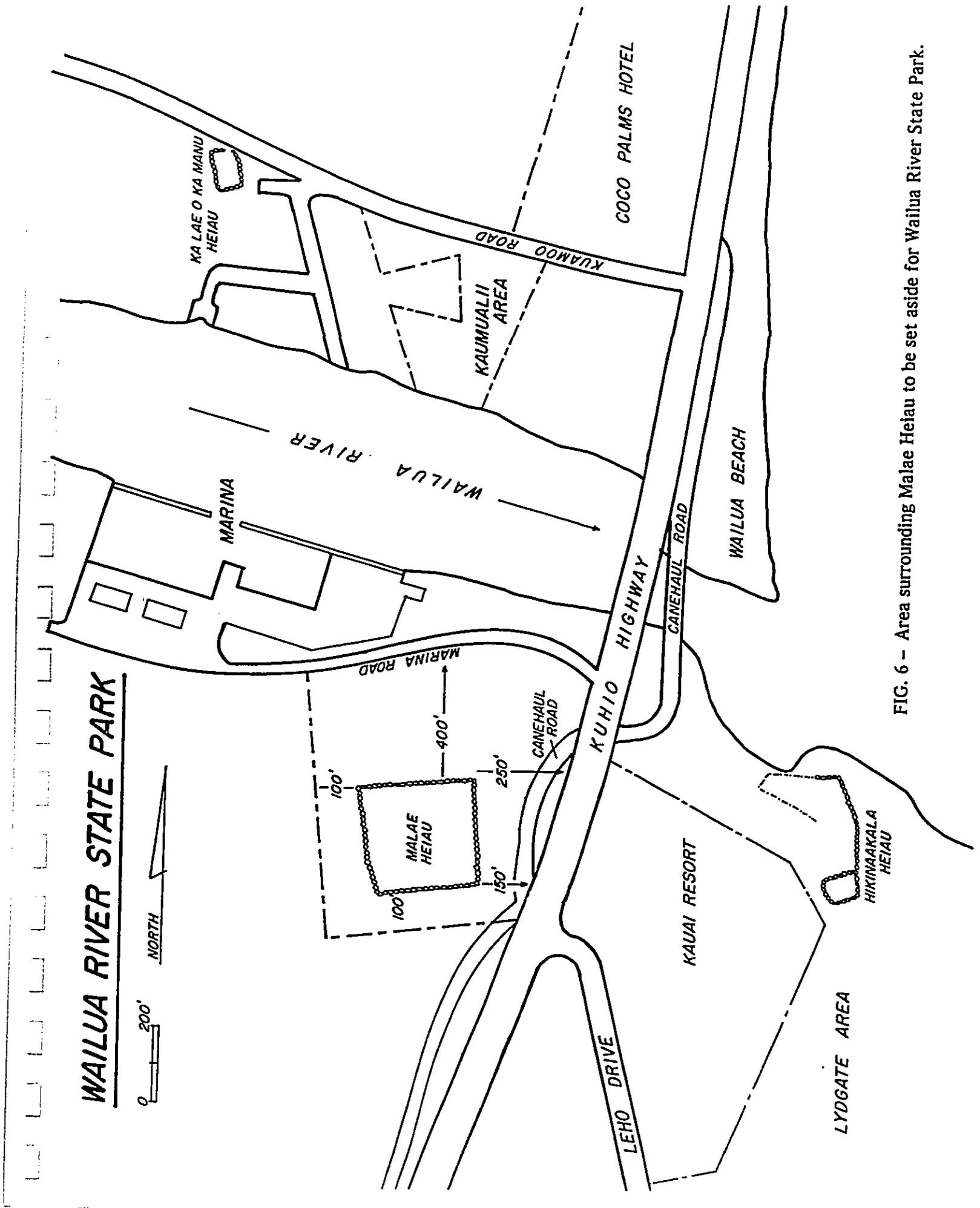


FIG. 6 - Area surrounding Malae Heiau to be set aside for Wailua River State Park.



It is recommended that the large Chinese banyan growing atop the west wall be injected with herbicide prior to cutting and removal. By injecting the tree at the base of the trunk, the herbicide will be circulated through the root system that goes into the wall. The tree will be cut to the base of the trunk and the roots will be left to decay in place. It is important that cutting be conducted 2-4 weeks after application of the herbicide because if the tree is allowed to decay, falling limbs and trees may damage the heiau structure. The other alternative is to apply the herbicide to the stump after cutting the tree down to ground level which is believed to be less effective. The herbicide will be applied by a licensed technician and there will be no broadcast spraying of herbicide.

Most of the Java plum trees within the heiau enclosure are considered medium to small in size, averaging 6 to 8 inches in trunk diameter and 20-30 feet in height. The use of herbicides to deter regrowth and promote the decay of the root system in the ground should minimize disturbance to the subsurface cultural deposits that may be present. The injection of herbicide prior to cutting is not as critical for these smaller trees.

To minimize the impact of the vegetation removal on the historic site, only hand tools will be used within the heiau enclosure and along the heiau wall. All trees will be cut with chainsaws/hand tools and branches and trunks in close proximity to structural features will be lowered with ropes rather than dropped. The small debris will be removed from the site by hand and/or wheelbarrow. One option for removing the larger sections of trunk is the use of a crane placed outside the heiau. The use of a chipper outside the heiau is recommended to reduce the bulk of materials to be removed from the project site.

The trees will be monitored after removal for regrowth. It is also hoped that removal of the larger trees will prevent the spread of these trees within the site.

The only landscaping proposed during this initial phase is the grading and planting of grass in the buffer outside the heiau. The grass cover will allow easy viewing of the site from the roadways, maintain the view corridors to the other heiau sites (Hikinaakala Heiau is makai and Poliahu Heiau is mauka), and promote a low-maintenance program for the park until additional staffing is available. Eventually, all the exotic vegetation within the heiau will be removed but this removal will be phased over several years. During this time, additional research will be conducted to evaluate if ground cover plantings should occur within the heiau and if so, which native plants would be appropriate.

#### Interim Interpretation

By consolidating Malae Heiau with the other heiaus in the park, State Parks will be able to develop an interpretive program that will coordinate the visitation and interpretation of all these sites as one cultural and historical complex. The park encompasses scenic and historic sites over several miles and there is a need to orient the visitor to the park area. Malae Heiau is an integral part of the historical complex and should be preserved and interpreted as part of the complex through park programs.

<sup>2</sup> Department of Land & Natural Resources, Division of State Parks. Environmental Assessment: Selective Vegetation Clearing and Resource Management at Kamo Point State Historical Park, North Kona, Island of Hawaii, November, 1987.

The interim interpretation at Malae Heiau will be limited to interpretive sign panels placed at a pull-over to be developed along the Marina Road which will also provide a viewing location for Malae Heiau. The sign panels will inform visitors about the site, its history and cultural significance, and the need to respect and protect the site. By making the site visible and accessible, it is inevitable that visitation of the site will occur, especially once the area around the heiau is cleared and maintained. The only way to prevent visitation is to construct a fence around the area which is not proposed at this time. Instead, it is recommended that a small, low-fenced lookout area be created adjacent to the vehicle pull-over. The interpretive information will address the significance of the site in hopes of avoiding damage and disturbance due to a lack of knowledge or respect.

#### Visitation

Although large-scale visitation will not be encouraged in the interim phase, it is proposed that a pull-over area along the Marina Road be constructed. The interpretive signs will be placed in this location and visitors will be provided with a view of the site. It is anticipated that most visitors will only spend 5-10 minutes at the site to read the signs and perhaps, photograph the site. This pull-over will limit visitation to approximately 5 cars at any one time.

By including Malae Heiau in the park, the intention is to eventually encourage visitation by providing a parking area, walkways, and additional interpretive information. However, this visitation should only be encouraged when there are measures to protect the site, such as adequate staffing and interpretive facilities. Therefore, these visitation facilities will be considered in future park planning but are outside the scope of the interim project.

SECTION II  
DESCRIPTION OF THE ENVIRONMENTAL SETTING

Project Site

There are presently no improvements or modern structures on the approximately 9 acres being requested for inclusion in the park. The use of the land immediately surrounding Malae Heiau for agricultural purposes has resulted in the construction of irrigation ditches and flumes, dirt roadways between fields, and the movement of dirt and boulders outside the heiau and along the heiau walls. Adjacent to the project area on the north is the Marina Area of the park where visitors depart for a boat ride along the Wailua River to the Fern Grotto. The facilities at the Marina include a restaurant, restrooms, small shops and ticket offices.

To the east of the project site is the Kauai Resort and the Lydgate Area of Wailua River State Park which includes Hikinaakala Heiau. Kuhio Highway, the major roadway along the windward coast of Kauai from Lihue to Haena, separates Malae Heiau from these areas. A canehaul road runs between Malae Heiau and Kuhio Highway to facilitate transport of sugarcane during the harvest periods.

Physical Environment

Geology and Soils

The Wailua River is located on the east flank of the volcano known as the Lihue depression, a broad caldera formed by the collapse of the volcano's summit. Volcanism following the collapse covered the floor of the depression with gently sloping lava aprons and streams from the rainy upland have since cut deep and relatively short gorges. The waterfalls along the Wailua River are a result of headward erosion of thick basalt layers overlying mudflow deposits of the Wailua River.

The lower reaches of the Wailua River valley fall into the Hanalei-Kolokolo-Pakala soil association which is found on the level, bottom lands of Kauai. These soils are characterized by deep, nearly level, poorly drained to well-drained soils that have dominantly moderately fine textured or medium textured subsoil. These soil areas are used for pasture and irrigated sugarcane and taro. The soils at Malae Heiau are described as silty clays with 8-20% slope. The topography in the project area consists of a gentle downward slope to the east (makai). The following stratigraphic sequence was noted in a trench excavated by the plantation to the east of Malae Heiau:

- |           |   |
|-----------|---|
| 0-70cm    | Reddish brown (5YR4/4, dry) sandy loam; crumb structure; dry and compact; slightly sticky and plastic; subangular to rounded basalt pebbles and cobbles; agricultural plow zone; wavy boundary. |
| 70-200cm  | Yellowish red (5YR5/6, dry) clayey loam; blocky structure; dry and hard; plastic and sticky; weathering basalt with iron staining noted; wavy boundary.   |
| 200-250cm | Reddish gray (5YR5/2, dry) clayey loam; blocky structure; dry and hard; few rocks in the profile.   |
| 250cm     | Base of exposure.   |

### Water Sources and Drainage

The Wailua watershed extends from Mount Waialeale to the ocean, a distance of 11 miles and an area of approximately 55 square miles. Rainfall in the upper regions of Mount Waialeale is channelled into three principal tributaries of the Wailua River, all of which are perennial: the North Fork of the Wailua River, the South Fork of the Wailua River, and Opaekaa Stream. The North and South Forks join about 2.5 miles inland of the shoreline while Opaekaa and Wailua join about 5/8 mile inland of the shoreline. Today, commercial sugarcane production includes a network of diversion dams and ditches which divert a significant proportion of the flow from both the North and South Forks of the Wailua River. However, the high annual rainfall at Mount Waialeale results in high runoff with periodic flooding along the river basin.

The run-off in the project area has been affected by the agricultural use of the land and the construction of irrigation ditches and flumes. The irrigation ditches generally move water downslope to the more makai fields. One ditch is in close proximity to the southwestern corner of the heiau. The flume that once ran through the heiau and intersected both the west and south walls has been dismantled.

### Climate

The average annual rainfall in the Wailua watershed ranges from a low of 50 inches along the coast to a high of 400 inches at Mount Waialeale. The Wailua basin has a dry season from May through September and a wet season from October through April. Temperatures average 74° with a range of 50° in January to 90° in October.

### Biological Environment

#### Botanical Resources

The historical records indicate that there has been a substantial change in the vegetation of the Wailua River valley over the last 100 years as a result of exotic introductions. As recently as 1920, it was reported that the valley walls were covered with pili grass and the river edges were marked by rice fields. Prior to rice and until around 1900, these fields would have been planted in taro.

Today, much of the Wailua River valley is characterized by a dense growth of exotic trees dominated by Java plum, guava, and mango. There is a thick growth of hau, a native plant, along the riverbank. The land around the river valley is marked by sugarcane fields. The coastal area is characterized by groves of coconut trees that were initially planted in 1896. The largest grove is located on the grounds of the Coco Palms Hotel and the Kaumualii Area of the park.

A botanical survey of Malae Heiau was conducted in March, 1991.<sup>3</sup> No threatened or endangered plants are found within the heiau or the surrounding buffer area. The vegetation within the heiau enclosure and alongside the wall is dominated by exotic plants.

The four native species found at Malae Heiau are common indigenous species that are not considered to be rare or endangered. The sweet potato, a Polynesian introduction, is also not considered rare or endangered. The presence of sweet potato may be in association with the maintenance of the flume rather than an earlier Hawaiian occupation of the site.

<sup>3</sup> Flynn, Timothy (National Tropical Botanical Garden). Botanical Survey: Malae Heiau, Wailua, Kauai, March 1991.

Exotic Trees  
(Listed in relative order of abundance)

<i>Syzygium cumini</i>	Java plum
<i>Macaranga tanarius</i>	
<i>Schefflera actinophylla</i>	Octopus tree
<i>Psidium guajava</i>	Common guava
<i>Schinus terebinthifolius</i>	christmas berry
<i>Melia azedarach</i>	pride of India
<i>Clusia rosea</i>	autograph tree
<i>Carica papaya</i>	papaya
<i>Ficus microcarpa</i>	Chinese banyan

Exotic Shrubs, Ground Covers & Herbs  
(Listed alphabetically)

<i>Archontophoenix alexandrae</i>	low palm
<i>Asystasia gangetica</i>	
<i>Canavalia cathartica</i>	maunaloa
<i>Chamaesyce hirta</i>	
<i>Chamaesyce hyssopifolia</i>	
<i>Commelina diffusa</i>	honohono grass
<i>Desmanthus virgatus</i>	
<i>Lantana camara</i>	lantana
<i>Passiflora edulis</i>	
<i>Phyllanthus debilis</i>	
<i>Thunbergia fragrans</i>	

Polynesian-Introduced Plants

<i>Ipomoea batatas</i>	sweet potato
------------------------	--------------

Native Plants

<i>Caesalpinia bonduc</i>	kakalaioa
<i>Colubrina asiatica</i>	anapanapa
<i>Hibiscus tiliaceus</i>	hau
<i>Ipomoea indica</i>	koali 'awa

The vegetation outside the heiau and within the proposed 6.8 acre buffer is limited to sugarcane except for the berms along the roadways. Vegetation includes *Cynodon dactylon* (bermuda grass), *Paspalum conjugatum* (Hilo grass), *Indigofera suffruticosa* (indigo), *Emilia fosbergii*, and *Ageratum conyzoides*.

Aquatic Resources

Marine and/or estuarine fish are found in the lower section of the river. Dominant species are the mullet and goby with lesser amounts of aholehole, awa, bluegill, small mouth bass, and carp.

Faunal Resources

Three species of endemic waterfowl are found in the Wailua River basin: the Hawaiian coot, gallinule, and duck. Many of these waterfowl are found below the convergence of the North and South Forks and are often associated with the taro fields alongside Opaekaa Stream. Other water birds associated with the river include the black-crowned night heron and the cattle egret.

Non-waterbird avifauna include the shama thrush and cardinal which are often found in the hau bordering the streams. The Western meadowlark, ring-necked pheasant, and spotted dove are associated with the canefields and open pasturelands within the river basin. Other common birds include chicken, rice bird, and mynah.

Mammals within the Wailua River basin include dogs, cats, feral pigs, cattle, horses, and rats. Mammals expected within the project area are limited to rats.

#### Cultural Resources

The Wailua Complex of Heiaus is recognized as a significant cultural and historical resource because it reflects the importance of Wailua as a chiefly residence and center of religious tradition. Wailua was one of two chiefly residences on Kauai, the other being at Waimea. The makai portion of Wailua was known as Wailua Nui Hoano and was reserved only for those of the chiefly and priestly ranks. A child born at the birthstones of Holoholoku along the Wailua River was assured chiefly status. In addition, the fertility of the alluvial flats along the Wailua River and the abundance of resources from the ocean at Wailua provided the economic subsistence base to support this chiefly settlement.

There were actually seven heiaus recorded along the Wailua River. At least three of these heiaus are presently within the park (Hikinaakala Heiau, Ka Lae o Ka Manu Heiau, and Poliahu Heiau), one is partially on State-owned lands and partially on private land (Kukui Heiau), Malae Heiau is on State-owned land and is being proposed for inclusion in the park, and the other two heiaus have not been relocated. Several of these heiau are associated with Moikeha and the early traditions introduced from Kahiki but in general, there is limited information available on these sites. Historically, several of these heiaus were modified and changed. The best example is Malae Heiau which was altered for use as a cattle pen by Deborah Kapule after her conversion to Christianity, circa 1830.

#### Archaeological Sites

Several archaeological surveys have been conducted in the area of the Wailua River. A survey of heiaus was conducted by Thrum in the early 1900s<sup>4</sup> and a survey of the archaeological sites on the island of Kauai was conducted by Wendell Bennett in the late 1920s.<sup>5</sup> Bennett inventoried six of the heiaus at Wailua and recorded dune burials along the shoreline. These sites were recorded again when the area was designated a National Historic Landmark in 1962. More recent surveys include a 1968 survey of the river valley by Francis Ching for State Parks<sup>6</sup>, a 1981 survey by Ching for the Wailua hydropower project<sup>7</sup>, and mapping of the sites by the State Parks archaeologists between 1987 and 1991.

<sup>4</sup> Thrum, Thos. "Heiaus and Heiau Sites Throughout the Hawaiian Islands" in Hawaiian Almanac and Annual for the Year 1907.

<sup>5</sup> Bennett, Wendell. Archaeology of Kauai, 1931.

<sup>6</sup> Ching, Francis. Archaeological Surface Survey: Wailua State Park, Kauai, 1968.

<sup>7</sup> Ching, Francis. A Cultural Resources Reconnaissance for the Wailua River Hydropower Study, 1981.

Briefly, the archaeological sites inventoried in the vicinity of the project area include the following (Fig. 8). State site numbers are provided where available.

- 30-80-103: Dune burials along shoreline between Wailua and Hanamaulu.
- 30-80-104: Malae Heiau is a large, roughly square walled enclosure with walls 2 meters high and 1.5 to 9.0 meters wide. The heiau is located on a low bluff on the south side of river, near the mouth river.
- 30-08-104A: Adze workshop/scatter at Malae Heiau consisting of a surface scatter of adze preforms, flakes, and cores around the exterior of the heiau.
- 30-80-105: Hikinaakala Heiau and Hauola (*puuhonua*) is a rectangular walled enclosure on the south side of the river mouth. Only upright slabs and boulders of the wall foundation remain.
- 30-08-105A: Petroglyph stones (Ka Pae Ki'i Mahu o Wailua) located along southern riverbank near river mouth and adjacent to Hikinaakala Heiau.
- 30-80-106: Ka Lae o Ka Manu Heiau is a rectangular walled enclosure located at the base of Pu'uki Hill on the north side of the Wailua River. Adjacent to the heiau are the Birthstones (*Pohaku Hooahanau*) consisting of a *Pohaku Piko*, *Pohaku Hooahanau*, and a house platform.
- 30-80-107: Poliahu Heiau is a roughly square walled enclosure located on a bluff on the north side of the Wailua River by Opaekaa Falls. Interior of the enclosure includes terraces, paved surfaces, and upright slabs.
- 30-80-108: Kukui Heiau is a rectangular walled enclosure located on the shoreline to the north of the Wailua River. Reported to be a navigational heiau where fires were kept to assist fishermen and travellers.
- 30-80-109: Heiau on north bluff of the Wailua River in the cane field a mile from the sea. This site was recorded by Bennett but has not been relocated.
- No #: Bellstone located on bluff on north side of Wailua River and makai (east) of Poliahu Heiau.
- No #: Agricultural terraces and auwai on the alluvial flats along the Wailua River. Initially in taro, the fields were converted to rice around 1900, and the flats are presently used as pasture.

#### Legendary Sites

The Wailua area is rich in myths and legends. Many of these legends relate to the landmarks along the Wailua River from the ocean to Mount Waialeale. Legendary accounts state that the first hau and coconut trees on Kauai were planted along the Wailua River.

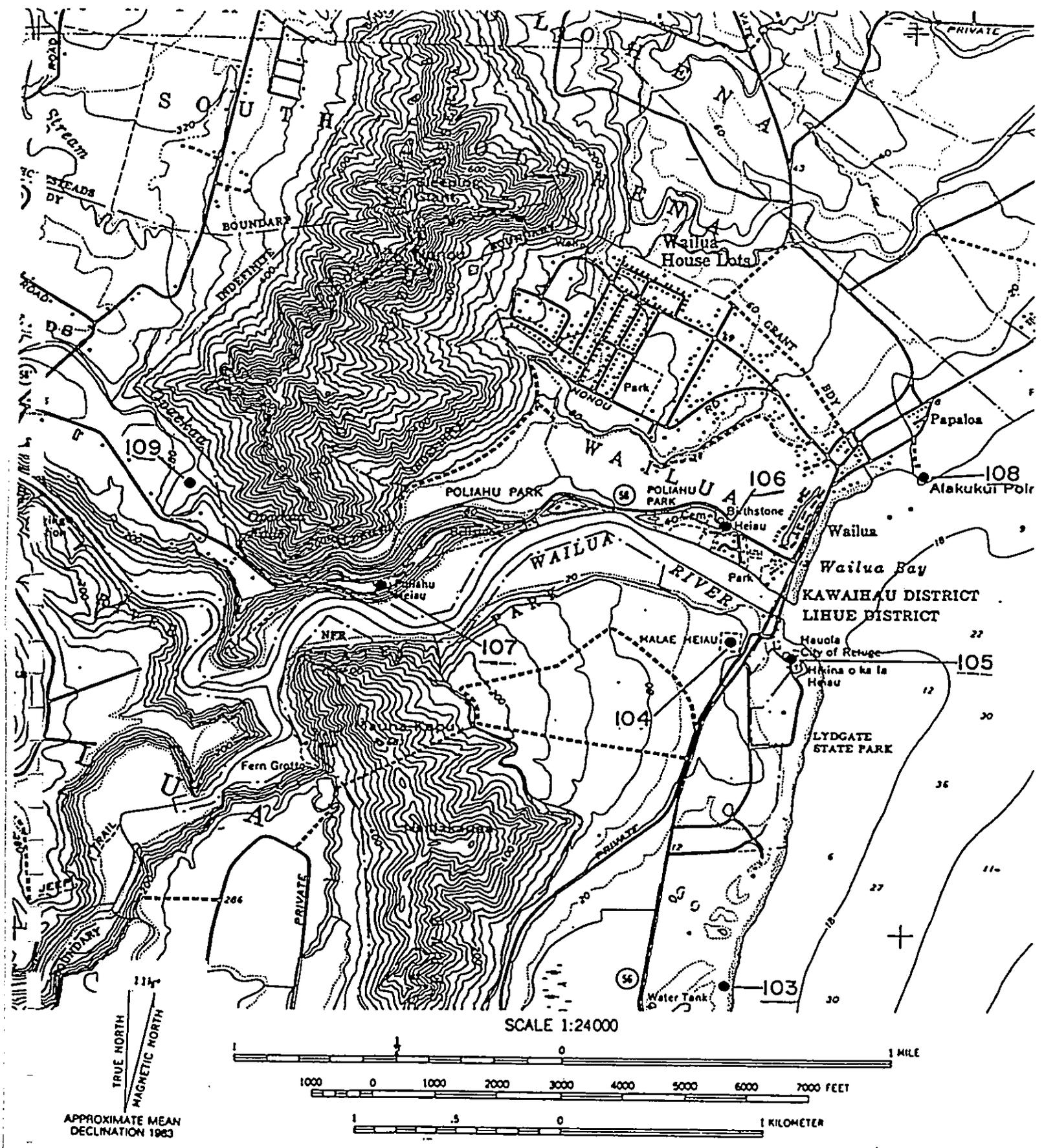


FIG. 8 - Archaeological sites recorded in the vicinity of the project area. Shown on enlarged USGS.

### Socio-Economic Environment

The Wailua-Kapaa coastline is a major resort area of Kauai and can be characterized as a low-rise resort center. This area is experiencing rapid and extensive residential and resort growth with a small, local business community expanding to accommodate this population. The area immediately around the project area includes the Kauai Resort on the south side of the river and the Coco Palms Hotel on the north side.

The lands surrounding the Wailua River valley mauka of the coastline are largely agricultural and residential. The Wailua Homesteads is the major residential area along the north side of the North Fork. Sugarcane fields dominate the south side of the Wailua River.

#### Recreation

The Wailua shoreline as been identified as a recreational center in the State Comprehensive Outdoor Recreation Plan (SCORP). This shoreline recreational use is evident today at the Lydgate Area and the Wailua Beach Area of the existing park. Recreational activities at these beach areas are oriented toward sunbathing, swimming, and picnicking. These recreational activities are participated in by both visitors and residents. Residents also use the Lydgate Area by the mouth of the river for fishing. The use of the river as a recreational area is centered around boating and skiing activities which originate at the Kaumualii Area of the park.

Many visitors to the park enjoy the scenic qualities of the Wailua area from lookouts at Wailua Falls, Opaekaa Falls, and above Kamokila Village. Many also view the river valley by taking the boat tours to the Fern Grotto. As part of these sightseeing activities, park visitors can visit the historic sites, including Hikinaakala Heiau, Ka Lae o Ka Manu Heiau and Pohaku Hooahanau, Poliahu Heiau, and the bellstone. Other attractions in the park area include Kamokila Village, a reconstructed Hawaiian settlement, and Tropical Paradise, a botanical and cultural garden. Visitation of the sites within Wailua River State Park occurs by tour bus, tour vans, rental cars, and private cars.

A number of hiking trails are located in the Wailua area and hiking is a popular recreational activity. Most of the trails are located in the forest reserves and are managed and maintained by the Division of Forestry and Wildlife. There are presently plans to develop a trail to the North Fork of the river and within the State Park.

Because of the agricultural use of the area around Malae Heiau, recreational activities in the project area are limited to the Marina. Public visitation of Malae Heiau has not been encouraged.

#### Infrastructure

##### Traffic Circulation

Kuhio Highway services traffic along the windward coast of Kauai from Lihue to Haena. This roadway accommodates visitor traffic from the resorts in Wailua and Kapaa, as well as, residential and local business traffic. This two-lane highway becomes congested, especially with morning and evening rush hour traffic going to and from Lihue.

Secondary roads provide access to the park and residential areas along the river. The entrance road to the Marina, referred to here as the Marina Road, runs along the south side of the river and provides access to the Marina Restaurant, boat docks, and Smith's Tropical Paradise. Kuamoo Road on the north side of the river runs along the North Fork of the Wailua River and provides access to the Poliahu Area of the park, the residential areas, and the Lihue-Koloa Forest Reserve. At the mauka end of Kuamoo Road are Keahua Arboretum and the Wailua Game Management Area. Both of these areas are managed by the Division of Forestry and Wildlife. Kuamoo Road is a two-lane roadway that carries a high amount of traffic from the residential areas and the visitation of the park, especially to and from Opaekaa Falls.

The canehaul road between Malae Heiau and Kuhio Highway facilitates movement of the canehaul trucks travelling between the fields in Wailua and to the mill in Lihue. There is a canehaul bridge adjacent to the Wailua Bridge and trucks cross Kuhio Highway at Malae Heiau when using this bridge. Lihue Plantation actually has two intersections with Kuhio Highway in the vicinity of Malae Highway, one off the northeast corner of the heiau and the other off the southeast corner. The Department of Transportation is proposing to use the canehaul bridge and a portion of the canehaul road on the east side of Malae Heiau as a contraflow lane during periods of peak traffic.

#### Utilities

Utilities presently exist along Kuhio Highway and the Marina Road to service the park, resorts, and residences. The utilities along the Marina Road are underground and service the park facilities and boat operations. The overhead electric and telephone lines along Kuhio Highway service the hotels, businesses, and residences.

#### Refuse Disposal

The two landfills operated by the Department of Public Works, County of Kauai are located at Halehaka (Puhi) and Kekaha. The Division of State Parks must obtain monthly permits to use these facilities. The Halehaka Landfill is presently accepting only greenwaste which includes leaves, brush and small trees to a maximum trunk size of 6 inches in diameter. The larger materials must be taken to the Kekaha Landfill.

### SECTION III ENVIRONMENTAL ASSESSMENT

#### Geology and Soils

The soil around Malae Heiau has been plowed over a number of years for agriculture, including planting, harvesting, and irrigation. The grading and grassing of the buffer around the heiau will affect the soil but not beyond the extent that the area has been previously altered by agriculture. If it is determined that irrigation for this grassed area is needed, trenching to bury the irrigation lines will be recommended but this trenching is not expected to extend below the plow zone.

The soil within and around the heiau will be subject to some surface disturbance during the cutting and removal of vegetation within the heiau enclosure and along the heiau wall. This disturbance may occur as a result of falling branches and trunks and from the foot traffic through the area to remove the cut materials. The larger trees will be injected with a systemic herbicide prior to the removal to minimize leaching into the soil. The stumps of the smaller trees may be painted with a systemic herbicide after cutting. The root system of the trees will not be removed but left to decay gradually from the herbicide treatment. Since trees will not be dug up or grubbed, there should be only surface disturbance to the ground and soil.

#### Drainage and Water

The present irrigation ditch at the southwestern corner of the heiau will eventually be re-aligned by the plantation, although an easement to maintain this ditch for the short-term is being evaluated. The grassing outside the heiau wall should minimize any runoff. The removal of trees within the heiau will be done in phases to provide time to address any runoff concerns. There are no running streams in the project area that will be impacted by the herbiciding. The irrigation ditches are not in the immediate area of herbiciding.

#### Biological Effects

##### Impact on the Flora

There are no rare or endangered plant species within the project area. The grading and grassing of the buffer outside the heiau will remove the remnant stand of sugarcane and weedy plants that have grown since the December 1990 harvest. The removal of vegetation from within the heiau and alongside the heiau walls, will address the exotic trees and shrubs and the stand of hau in the southeast corner of the heiau. Much of the vegetation alongside the heiau wall is a threat to the stability of the stacked rock wall.

The removal of selected vegetation will open the canopy which will expose the ground in these areas to more sunlight. This will encourage the spread of weedy ground covers such as the honohono, maunaloa vine, morning glory, and lantana. The spread of these ground cover plants may be controlled with herbiciding and hand clearing to prevent potential damage to the walls and surface features.

#### Impact on the Fauna

No endangered faunal species occur within the project area. The fauna in the project area is limited to rats and introduced bird species. The removal of selected large trees in the project area will reduce the habitat for these birds but the survival of the birds is not threatened as there will be trees available in the surrounding areas.

#### Impact on Aquatic Resources

There will be no impact on the aquatic resources in either Wailua River or the shoreline area. The project site is roughly 40 feet above the stream level and 500 feet from the southern bank of the river. The site is also 1000 feet from the shoreline.

#### Archaeological Effects

By including Malae Heiau in Wailua River State Park, the site will eventually be open to public viewing and controlled visitation. Visitation creates some concerns for resource management and the long-term preservation of the site. The walls of the heiau are constructed of stacked basalt cobbles and boulders which can be unstable and subject to collapse if visitors try to climb on the walls or remove the rocks.

The removal of vegetation from the heiau wall and within the heiau enclosure may threaten the condition of the site. Falling branches and small trees may potentially impact the stacked rock walls and cause some collapse of these features. The removal of the cut sections may entail dragging and climbing over walls which would pose a similar threat of collapse. In the cases where the trees are growing within or upon an archaeological structure, the impact of the removal can be reduced by several mitigative actions. Of special concern is the Chinese banyan growing atop the west wall of the heiau.

The prior plowing around the heiau has exposed a scatter of adze preforms, flakes, and cores around the exterior of the heiau wall. A surface collection was made of the materials after the 1990 harvest. Future grading may expose additional materials associated with site 104A.

#### Social and Economic Effects

##### Economics

By placing Malae Heiau and the buffer around the site into the park, approximately 6.8 acres of land will be taken out of agriculture. The irrigation ditch along the south side of the heiau feeds the sugarcane fields on the makai side of Kuhio Highway. An alternative route for this irrigation ditch was considered but found to be complicated and expensive because of the grade. Therefore, an easement for continued use of this ditch in the interim is being evaluated. Although the 6.8 acres is agriculturally productive, it is felt that this buffer is needed to facilitate the removal of vegetation and for the maintenance, management, protection, and interpretation of the historic site.

##### Recreation

By providing a view of the heiau from the Marina Road, along with a pull-over and interpretive signs, visitors to the park will be given another opportunity to learn about the history and cultural significance of the Wailua River area in old Hawaii. The Marina Area is visited by a large number of people and the opportunity to view Malae Heiau will enhance their visit of the river and the park.

In addition, the grassing of the land around the heiau will provide a view of the site from Kuhio Highway which is currently restricted by the growth of trees in the heiau and the sugarcane around the heiau. Although viewing the heiau from the adjacent roadways will be the encouraged means of visitation, it is anticipated that some visitors will walk the grounds and want to enter the heiau.

#### Impacts on the Infrastructure

##### Traffic

If Malae Heiau is included in the park and the site is made visible to the park visitor, efforts to visit the site may impact the traffic flow along the Marina Road and Kuhio Highway. Visitors along Kuhio Highway may try to pull off the road to view the site, especially along the west side going towards Lihue. The canehaul road is located along this section of the highway and some visitors may use this canehaul road as a parking area or pull off. The main intersection of the canehaul road with Kuhio Highway is located off the southeastern corner of the heiau and would be impacted if this traffic pattern occurs. This traffic pattern, in turn, would impact the operations of Lihue Plantation.

Visitation from the Marina Road would cause less traffic congestion since this road only services traffic to and from the Marina. The recommended pull-over area would be located approximately 300 feet from the intersection of the Marina Road and Kuhio Highway. It is not anticipated that the creation of this pull-over area will greatly increase traffic on the Marina Road. However, by providing only 5-10 parking spaces, it is possible that additional cars may pull off the roadway outside the designated parking area if there is a period of heavy visitation.

##### Refuse Disposal

The plowing of the field around the heiau for agricultural use has dislodged a number of large basalt boulders that have been piled alongside the heiau wall. These boulders will be relocated as part of the grading project. This may entail burying the boulders or removal from the project site.

The vegetation removed from the heiau will be disposed off-site. It is possible that some of the smaller trees can be disposed at the Halehaka Landfill. However, the larger materials may have to be transported to the Kekaha Landfill. If much of the cut materials is removed by hand, the pieces of cut debris will be relatively small in size but the quantity of material will be large. Chipping of the cut material would facilitate the removal and disposal.

##### Noise and Air Pollution

There will be noise generated by the use of machinery for grading and the use of chainsaws for tree removal. This noise cannot be avoided but will be limited to the daylight hours and the buffer around the heiau should reduce the direct impact on the surrounding Marina and Kauai Resort complex. The use of trucks for the removal of cut debris may create some additional noise.

The use of chainsaws and trucks will produce limited air emissions. Some dust may be created as the ground surface is disturbed around the heiau.

SECTION IV  
MITIGATION MEASURES TO MINIMIZE IMPACT

The inclusion of Malae Heiau into the park will involve some potential impacts to the site as a result of vegetation clearing and visitation. The effects of the proposed grading, grassing, and vegetation removal on the natural and cultural resources can be mitigated to reduce the impact of this removal.

Mitigation Measures for Natural Resources

The lack of any rare or endangered plant species and the presence of common native species in the project area indicates that vegetation can be removed from the historic site without major impacts to any significant flora. The removal of selected trees from the project site will be phased to allow the control of other vegetation that may spread or invade the site once the canopy is open. The native ground covers will be encouraged in the interim clearing in an effort to avoid the invasion of undesired exotics. Removal by chainsaw should facilitate the removal without damage to the other vegetation.

A number of bird nests were noted on the ground within the heiau during the reconnaissance surveys in February and March 1991. The Division of Forestry and Wildlife will be requested to inspect the site prior to tree removal to determine if there are any nesting birds that will be disturbed and the timing for the removal will be scheduled accordingly.

Mitigation Measures for Cultural Resources

The inclusion of Malae Heiau into the park raises concerns about resource management and site protection. The visibility of the site will encourage at least some visitation by interested or curious tourists and residents who want to see the site more closely. By including the site in the park, the intent is to make the site accessible to visitors for learning and cultural/historical awareness. However, this accessibility must be accompanied by measures to protect the site from disturbance or collapse. There will be no State Parks staff assigned to this site full-time, but the staff assigned to the Marina will be directed to monitor the site.

The cultural concerns regarding the Wailua Complex of Heiaus will be addressed through discussions and interaction with the Hawaiian community on Kauai. The means of visitation and the interpretive program should respect the cultural beliefs and traditions. The details of visitation and interpretation will be developed in accordance with these cultural sensitivities.

Construction of a viewing area with interpretive signs adjacent to a pull-over along the Marina Road is recommended to control visitation and potential visitor impacts on the site. The signs should make visitors aware of the religious significance of the site and the need for respect. This viewing area will have a 3 foot high railing to provide viewing but indicate the area to stay within for visitation of the site. It is believed that many visitors will respect the request to stay outside the site. As a secondary measure, unobtrusive ropes or a similar device will be placed across the entryways in the south and east walls to indicate that visitors are to stay outside. These ropes will not prevent viewing or photographing of the site and will allow visitation by pre-arranged, supervised educational and cultural groups.

The use of machinery for the grading and grassing will be confined to the area that has been previously plowed for agriculture with a minimum buffer of two (2) meters from the heiau wall. The use of machinery to remove boulders pushed alongside the heiau walls will only occur from outside the heiau. A qualified archaeologist will try to determine if any of these rocks are from the heiau prior to any boulder removal. In this way, an attempt will be made to avoid disturbing any areas not previously disturbed by agriculture and to prevent any further disturbance to the heiau walls.

The grading outside the heiau will impact site 104A, the scatter of adze materials. Because of previous plowing, the upper 12 inches or so has already been disturbed. The grading will be monitored by an archaeologist to collect and record exposed cultural materials and features.

The impact of the vegetation removal will be addressed by the following conditions for removal:

1. All cutting within the heiau and the immediate buffer alongside the heiau walls will be done by chainsaw and hand tools and the cuttings will involve lengths that can be hand carried or wheelbarrowed out of the heiau site. Ropes will be used to lower the cut portions if it is determined that cultural resources will be impacted by allowing the cuttings to fall to the ground.
2. Wooden platforms and ramps will be constructed over walls, pavings, platforms, and other cultural features that may be impacted during the removal of the cuttings. The first choice for removal of the material from within the heiau will be through the breaks in the walls (east and south) or already disturbed corners (northwest and northeast).
3. An archaeologist or cultural resources specialist will monitor the removal. The archaeologist will record the features that may potentially be impacted prior to vegetation removal to permit accurate stabilization/reconstruction if damage occurs.
4. Trees will be cut down to the base of the trunk and herbicided to encourage in-situ decay of the root system. It is possible that some collapse will occur but can be repaired through stabilization.

#### Mitigation Measures to Reduce the Impact of Construction

The grading, grassing and removal of vegetation will produce noise and air emissions that may impact the neighboring Marina and Kauai Resort. To reduce this impact, the activity will be limited to daylight hours. The hauling of cut debris from the site will utilize trucks parked outside the heiau site. Because of the steep grade along the Marina Road, a route from the heiau to the canehaul road will be used. This will only be done after coordination with Lihue Plantation to avoid conflicting use of the roadway. From the canehaul road, the trucks will enter Kuhio Highway and haul the debris to either the Halehaka or Kekaha landfill. To avoid traffic congestion, this hauling will not occur during peak rush hour traffic, ie. before 9:00am or after 3:00pm.

SECTION V  
ALTERNATIVES TO THE PROPOSED ACTION

Delay the Project

By delaying the project, the trees threatening the condition of the site will continue to grow and damage the structural features of the heiau and possible subsurface cultural deposits. The continued growth will also make removal in the future more difficult. The use of heavy machinery for agricultural activities will continue in close proximity to the heiau wall with a potential for damage to the site.

Poison But Do Not Remove the Trees

The trees could be injected with herbicide and allowed to gradually die and decay. However, if the trees are injected but not cut soon afterwards, the trees become hard and difficult to cut at a later time and may even topple, uprooting features and subsurface cultural layers. Also, there will be no way to monitor damage to the sites by falling branches and trees. Therefore, if the trees are not removed at this time, they should not be herbicided to avoid damage to the sites that cannot be controlled or monitored.

No Action

If no action is taken to remove the large exotic trees, they will continue to damage the archaeological sites and subsurface cultural deposits. This ongoing damage is a result of continued growth of the extensive root systems and falling branches. Eventually, the trees will fall and the uprooting will destroy both the structures and deposits. Consequently, this alternative is not acceptable if the goal is to preserve and protect the heiau structure.

**SECTION VI**  
**RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF MAN'S ENVIRONMENT**  
**AND THE LONG-TERM PRODUCTIVITY**

The short-term benefit of this project is to arrest the growth of the exotic vegetation which is impacting the stability and historical integrity of the heiau. This benefit actually extends into the long-term because the removal of the parent trees will assist in controlling new growth.

The major benefit of the project is the long-term preservation of the archaeological site. The site can be recorded prior to vegetation removal and any damage can be monitored as it occurs to permit accurate stabilization and restoration.

The overall long-term benefit of the project will be the restoration of the cultural and historical integrity of the site, rather than continued neglect and potential damage from heavy machinery in the area. By placing the heiau within the park, the site will be maintained, managed, and interpreted in a manner that promotes the cultural and historical value of the site as part of the Wailua complex. In addition, the removal of exotic vegetation from the site area will promote a sense of the historical setting for when the heiau was in use, around 200 years ago, there was probably no vegetation within the heiau. All of this will create a public awareness about the site and a sense of respect for these cultural resources.

**SECTION VII**  
**IRREVERSIBLE OR IRRETRIEVABLE COMMITMENT OF RESOURCES**

There are currently no C.I.P. State funds available to address the grading, grassing, and clearing of Malae Heiau. However, there are resources within both the State and the community that can be coordinated to carry out this project. The staff of State Parks will provide the archaeological services and assistance with the vegetation removal. Therefore, there will be State expenses for salary and equipment. Various organizations in the Wailua-Kapaa community have offered their support and assistance for this project. This assistance may include volunteer labor and donations of materials such as grass and herbicide. State funds will be requested in the future for projects such as stabilization, restoration, expanded interpretation, and a small parking area.

**SECTION VIII**  
**CONSULTED AGENCIES AND ORGANIZATIONS**

**STATE:**

Department of Land and Natural Resources  
Division of Forestry and Wildlife  
Historic Preservation Division  
Land Management Division

Office of Hawaiian Affairs

University of Hawaii  
Hawaii Agricultural Experiment Station, Wailua, Kauai

**COUNTY OF KAUAI:**

Planning Department  
Kauai Historic Preservation Review Commission

**BUSINESSES:**

Lihue Plantation

**COMMUNITY ORGANIZATIONS:**

Na Kahu Hikinaakala  
Aha o Wailua Nui a Hoano  
Kauai Historical Society