

THE ISLAND OF HAWAII

A RESOURCE STUDY AND MASTER PLAN

PRELIMINARY
WORKING DRAFT

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THE ISLAND OF HAWAII
A RESOURCE STUDY AND MASTER PLAN

RECOMMENDED:

Glenn O. Hendrix
CHIEF, Environmental Planning & Design

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Date

SUPERINTENDENT

Date

APPROVED:

DIRECTOR, Western Region

Date

*United States Department of the Interior
National Park Service*

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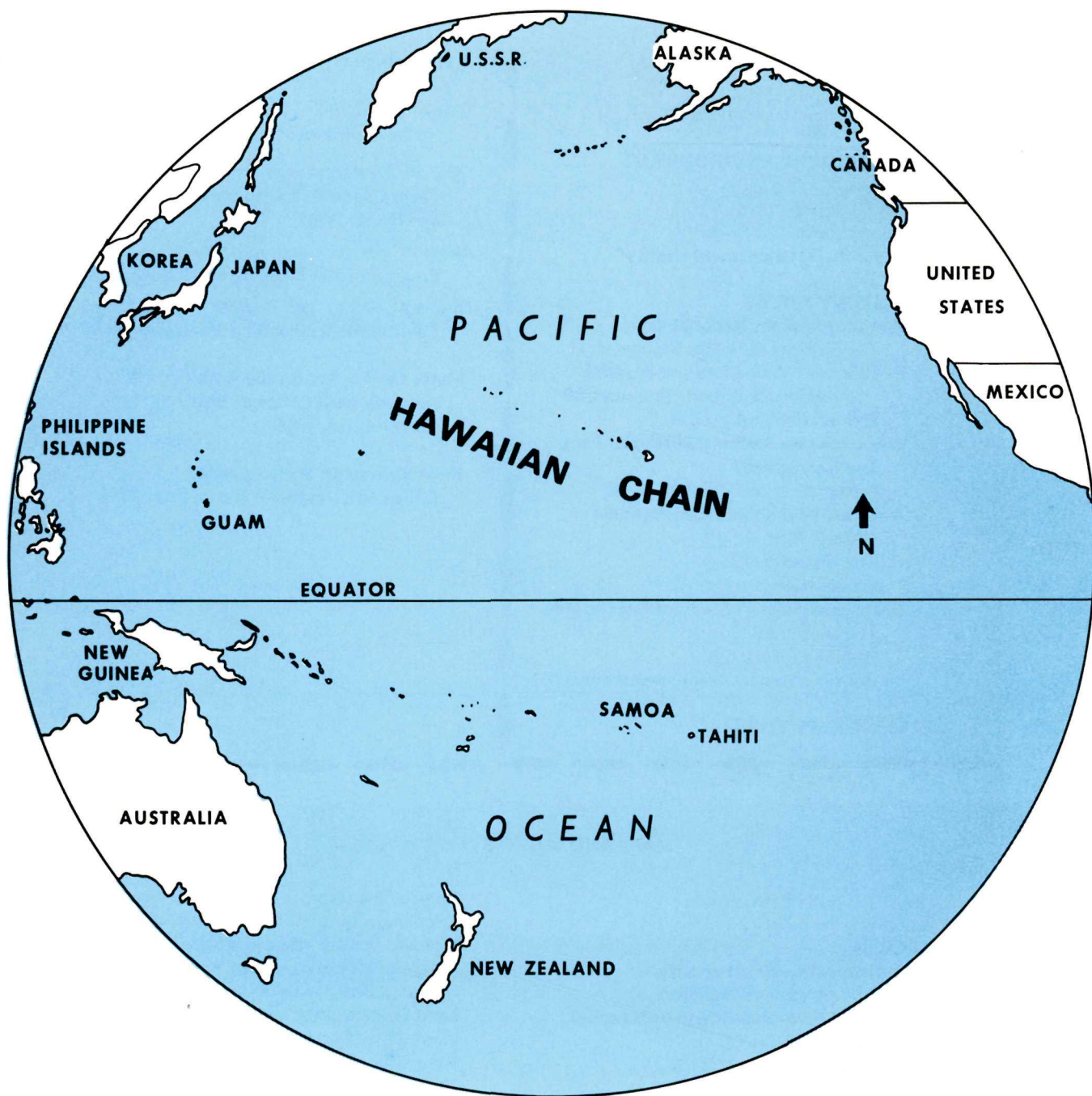
STUDY PARTICIPANTS

- Daniel J. Tobin, Jr., former Superintendent
Hawaii Volcanoes National Park
- Richard W. Barnett and Ronald N. Mortimore,
Team Captains, Environmental Planning
and Design, WSC
- John W. Henneberger, Park Planner
Environmental Planning and Design, WSC
- Bruce W. Black, Park Planner
Environmental Planning and Design, WSC
- Frank Collins, Landscape Architect
formerly with Office of Design &
Construction, WSC
- Kenneth Kasper, Staff Appraiser
Office of Land and Water Rights, WSC

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HAWAII and the PACIFIC BASIN



SUMMARY

The Island of Hawaii is a land of seasonally snowcapped mountains, active volcanoes, broad expanses of sugarcane, large cattle ranches, dense tropical rain forests, and varied coastlines. The development of these many resources for increased use by Hawaii residents and visitors requires careful planning. Through coordination and planning with other organizations in the region, a wide spectrum of outdoor recreation and cultural opportunities may be developed, with each resource being utilized for its optimum benefits.

The National Park Service is dedicated to conserving the scenic, scientific, and historic heritage of the United States for the benefit and enjoyment of the people. This report seeks to determine the role of the National Park Service in preserving the nationally significant resources on the Island of Hawaii and in providing park and recreation facilities for island residents and for the increasing number of visitors from the mainland and from other countries.

PLANNING CONCEPTS

The major scenic and recreation resources on Hawaii are generally in an arc stretching from Kalapana through Kilauea, Mauna Loa, Hualalai, Kona, and finally to the north Hamakua Coast. In this region are all elements of Hawaii's scenery—rough lava coastline, fern jungles, active volcanoes, high mountains, colorful cinder cones, sunny coral-sand beaches, and a series of deeply eroded valleys and coastal cliffs.

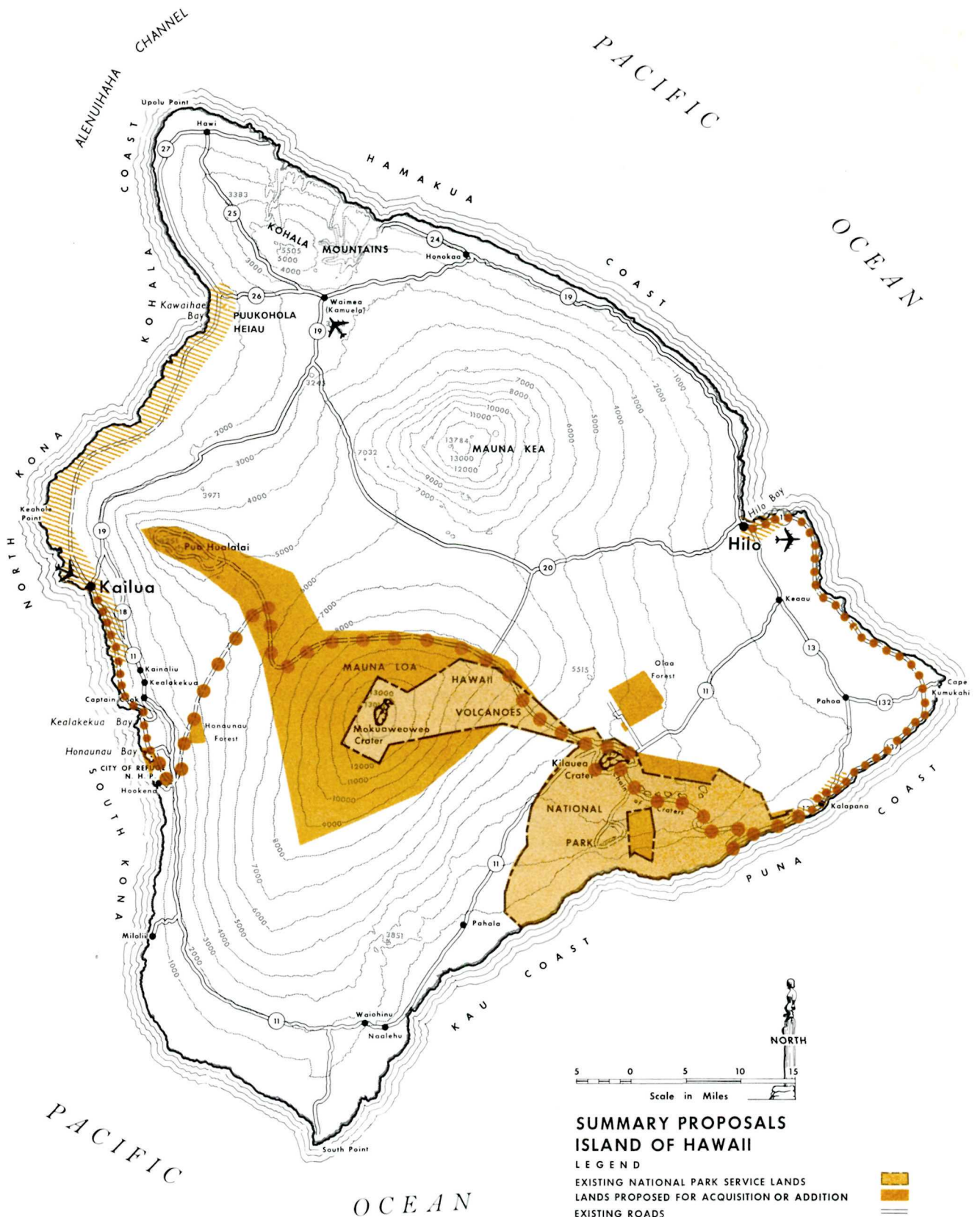
Development of overnight facilities for use of these resources has centered in three tourist destination areas—Kailua, Hilo, and Kawaihae. As population and visitation increase, the Kona-South Kohala Coast between Kawaihae and Kealahou Bay will emerge as a continuously developed recreation area. Lesser development may also be expected on the Puna Coast near the village of Kalapana.

The increase in island visitation continues to outstrip predictions, which is particularly interesting when it is considered that visitation to Hawaii is limited by the availability of hotel rooms.

Some nationally significant resources on Hawaii are now developed and managed by the National Park Service. The two primary attractions are Kilauea Volcano, a natural phenomenon, and City of Refuge—a window into prehistoric Hawaii. Numerous other features within the parks tell the stories of the island-building volcanic process and early Hawaiian civilization, and exhibit native Hawaiian flora and fauna. In accordance with the Environmental Awareness Program, all phases of park operations will be compatible with maintaining environmental quality as determined by National Park Service regulations. The goal will be an outstanding example of environmental management.

Of the many other historical, archeological, scenic, and recreation resources on the island, some are dedicated to public use by the State and county park systems, while others are being developed by the expanding tourist industry. However, there are additional important resources worthy of being conserved which as yet remain undeveloped.

Identification of these areas and recommendations for their appropriate use and management are important elements in State recreation planning. Involvement of the National Park Service as proposed in the following recommendations complements the planning done by the State, county, and private industry. Affected agencies and individuals were consulted during the master plan field studies.



MAJOR RECOMMENDATIONS

Extend Hawaii Volcanoes National Park to include the profile of Mauna Loa as the classic example of a shield volcano, the cinder cones and pit craters of Hualalai Volcano, and outstanding examples of remaining native Hawaiian flora and fauna.

Enlarge City of Refuge National Historical Park to include additional important archeological sites and to protect the integrity of Honaunau Bay and Kiilae Bay.

Coordinate the planning of City of Refuge with the major proposed State and county recreation facilities and development by private landowners in the Kealahou Bay area.

Conserve the coastal scene between Kealahou Bay and Hookana for increased public use through a combination of a national park, State and county parks, State scenic routes, and increased State zoning.

Create a parkway which will become a major interpretive opportunity, provide convenient access to the expanded national park, and augment Hawaii's State scenic highway program and statewide recreation plans.

Add Puukohola to the National Park System as a national historic site.

Emphasize day use within the national parks. Overnight facilities will be limited to those specifically needed for the use of park resources.

Preserve sections of the park as wilderness and encourage appropriate back-country use both in the coastal areas near Kalapana and in the mountainous interior.

The expanded national park resources will fall generally into two categories:

Natural areas—Mauna Loa, Kilauea and Hualalai Volcanoes, and their associated ecological values. (This encompasses almost 100 percent of the park land.)

Historic areas—City of Refuge, including Honaunau Bay and Kiilae Bays; Puukohola Heiau and its associated archeological values.

The discussion of resources and proposed development and management programs will be divided into these two categories.

THE REGIONAL ENVIRONMENT

The Island of Hawaii comprises the region of the park proposals considered in this report. Hawaii—the Big Island—lies at the southeast end of a chain of islands extending nearly 2,000 miles across the north-central Pacific. These islands are the emerged peaks of a tremendous volcanic mountain range rising from the ocean floor. Of 124 islands, islets, and atolls, there are only 8 main islands, and these, located at the southeast end of the chain, form the group commonly known as the Hawaiian Islands.

Long extolled in tourist promotional programs for their pleasant climate, romantic history, exotic peoples, unusual scenery, and recreation opportunities, the Hawaiian Islands have become nearly every "mainlander's" vacation dream. Dreams are coming true as air fares decrease and personal incomes rise. The primary tourist destination is the Island of Oahu which has Honolulu, Waikiki Beach, the bulk of accommodations, and the only international air terminal. From Oahu, Hawaii and the other neighbor islands are only a short flight.

ACCESS

The principal means of access to the State is via air. Jetliners arriving from North America, Australia, New Zealand, and the Orient make Honolulu one of the world's busiest airports. Use of Hilo on Hawaii by scheduled airlines operating from West Coast cities commenced in 1967. Boat travel to the islands is secondary and there are no immediate plans for increasing service. During 1967, only 5 percent of the visitors to Hawaii arrived by boat. The following graph, adapted from State of Hawaii Visitors Bureau reports, indicates the expected increase in tourism from outside the State, compared to that of the State of Hawaii and the Island of Hawaii.

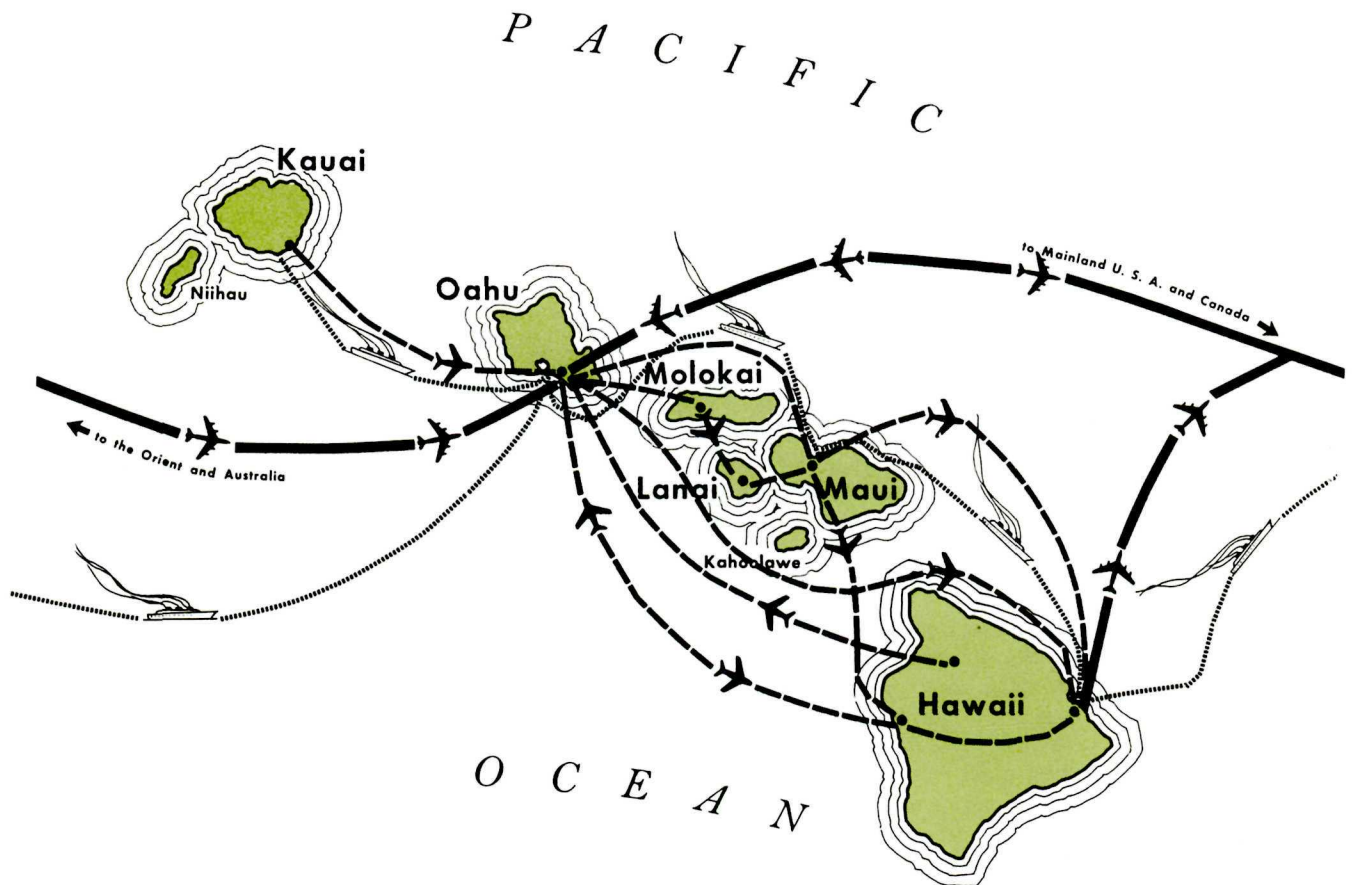
The travel industry, notably the airlines, is deeply involved in promoting tourism to the islands through advertising, lower fares, and improved service. Jet aircraft carrying up to 370 first- and economy-class passengers are now in operation; lower air fares are expected to follow. Supersonic planes may be in service by the mid-1970's, cutting flying time in half. Even now it is faster for residents of west coast metropolitan areas to reach Hawaii than to drive to mountain resorts. There are up to 32 flights per week making the 4½-hour trip between Hilo and mainland cities.

Interisland airlines make about 30 scheduled flights daily to the Big Island terminals of Hilo, Kamuela, and Kona. Visitors with limited time may arrive and leave the same day—from a different airport if they desire. The Big Island is included on one-day air tours originating in Honolulu which permit short stops and provide excellent aerial coverage with in-flight informational talks.

In contrast to the heavy air traffic, steamship travel is light. The Lurline stops at the island only about five times each year and other lines seldom call.

Air service to the west coast of Hawaii will be facilitated by a new airport north of the present Kona airport. Of even greater long-range significance to the development of the island and the entire State, is a proposal to construct an international airport for supersonic aircraft at Keahole Point, north of Kailua. No decision on this proposal has been reached.

Intraisland circulation is by ground and air transportation centered around Hilo, Kamuela, and Kona. Cars and pickup campers may be rented. Commercial tours are available by bus and tour car. Air taxis fly visitors to other airstrips.

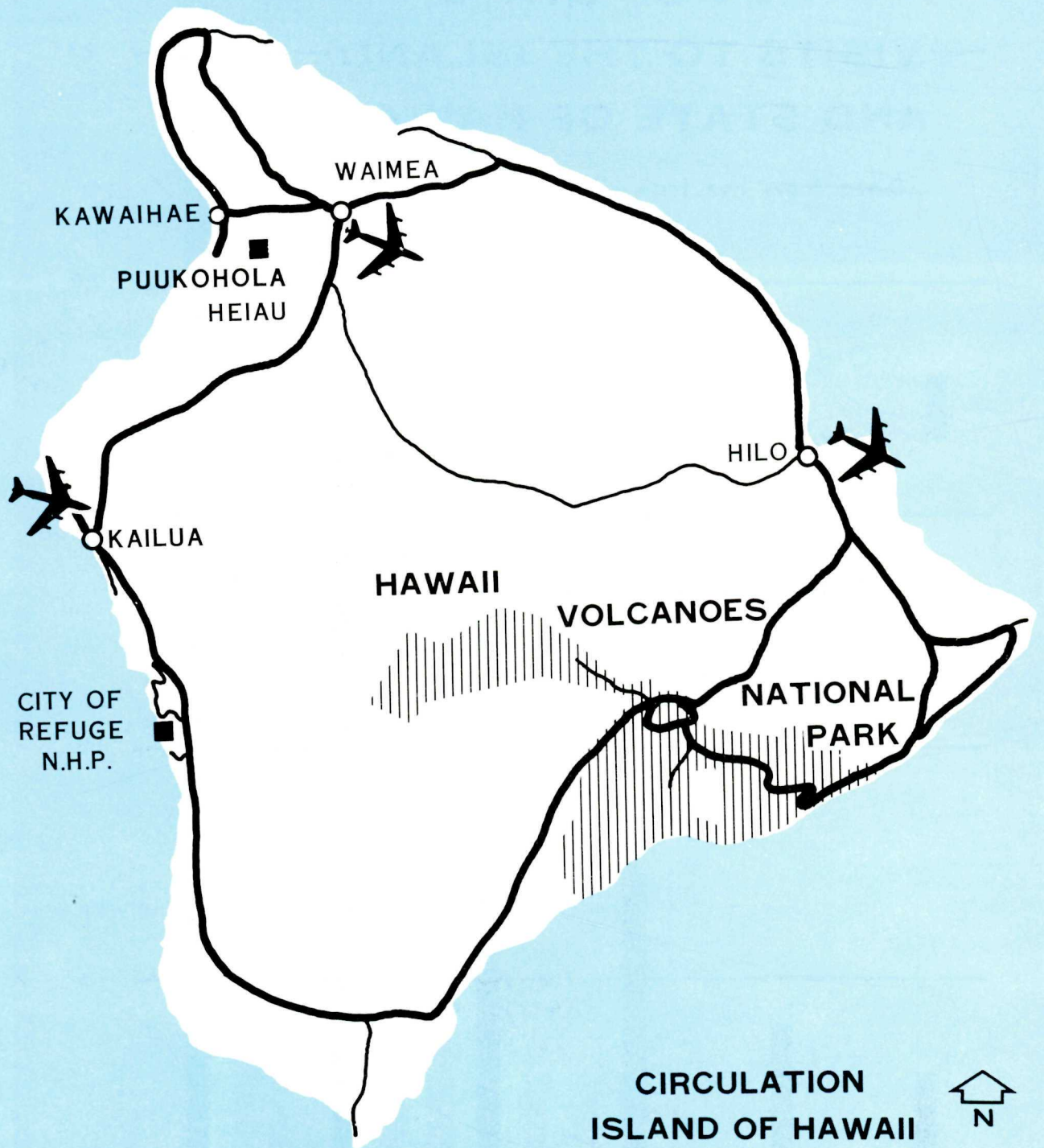


INTER-ISLAND AIRLINES
 OVERSEAS AIRLINES
 SURFACE PASSENGER SERVICE



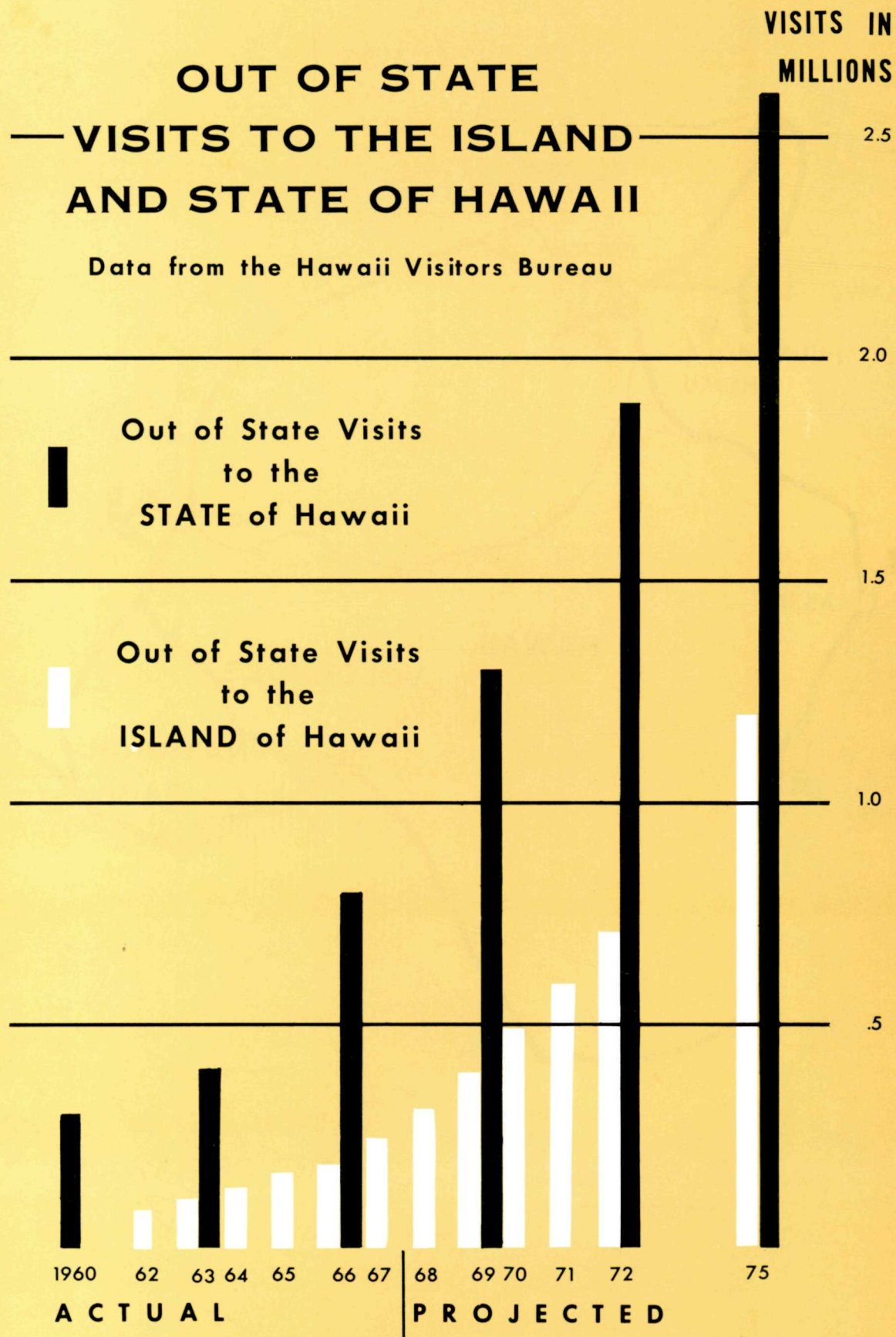
ACCESS





OUT OF STATE — VISITS TO THE ISLAND — AND STATE OF HAWAII

Data from the Hawaii Visitors Bureau



Access to existing National Park System areas is generally satisfactory, considering the condition of the island road system and the volume of traffic involved. The "Golden Triangle" is a popular loop trip from Hilo to Kalapana and Kilauea Volcano. The "Belt Road," consisting of State Highways 11 and 19, makes a general loop around the island and provides the main surface route between towns and communities for commercial and visitor use. It passes through Hawaii Volcanoes National Park near park headquarters and is connected to City of Refuge National Historical Park by an excellent secondary highway. The State plans to upgrade the entire belt road system to a high-speed standard. In addition, the State is planning a scenic road between City of Refuge National Historical Park and the Keauhou resort development under construction south of Kailua. This new coastal drive will provide convenient access to proposed State and county parks around Kealahou Bay and will make a loop drive possible between Kona resorts and City of Refuge.

The Puukohola Heiau, an ancient temple platform, proposed as a national historic site, is readily accessible from the belt system via a paved road from Waimea (Kamuela) to the Kawaihae Bay resort area. An alternate route from the Kailua-Keauhou area will open when a proposed low-level road is constructed from the Kona airport to Kawaihae Bay.

POPULATION

Although the State of Hawaii ranks 15th among the 50 states in population density (approximately 100 persons per square mile), the Island of Hawaii is still sparsely populated with only 15 persons per square mile. The State population increased 26 percent between 1950 and 1960, but the Big Island population has been shrinking for a number of years because of the mechanization of agriculture, primarily sugarcane production, and the loss of some industry. However, it is believed that this decline is over and that a growth period has started.

County	1950 Census	1960 Census	1968 Estimate	1980 Prediction
Hawaii	68,350	61,332	65,941	69,486
Honolulu	353,020	500,409	683,796	930,000
Kauai	29,905	28,176	25,049	32,242
Maui	48,519	42,855	50,015	54,798
STATE TOTAL	499,794	632,172	824,801	1,086,526

For the 10-year period ending in 1970, a 34-percent statewide population increase is forecast. Population increases on the Big Island will probably occur mostly in the resort regions on Hawaii's dry west coast. Most of the island's people live near the coast. Over 32,000 of Hawaii's 66,000 inhabitants live in Hilo, 30 miles from Hawaii Volcanoes National Park. Nearly 10,000 reside in the districts of North and South Kona, mostly within 30 miles of City of Refuge. The remainder live in small towns, villages, and farming areas.

Considerable construction is in progress or planned for the Kona Districts, bringing new building tradesmen and service workers into the area. In the initial development stage is a resort and residential community at Keauhou, a few miles south of Kailua-Kona.

The population of the Waimea (Kamuela) and Kawaihae area, surrounding the proposed Puukohola National Historic Site, will expand rapidly as the Kohala Coast Resort Region on the northwest coast of Hawaii is developed. Development of the Kohala Coast resort area began with the Mauna Kea Beach Hotel which opened in 1965. A high-quality resort and residential community is planned. Besides the visitors, residents, and service employees for the resort community, additional population increase should result from improvement of the Kawaihae deep water harbor complex which will attract light industry. A lesser hotel and residence complex is planned for Waimea. It appears likely that the population of the Waimea-Kawaihae area would increase by well over 12,000 permanent residents.

As the low-level highway is built from the Kona airport north to Kawaihae, additional lands will become more accessible for resorts and homes. Sales of residential lots on Hawaii appear to be quite successful and suggest the land booms in southern California and Florida of a generation ago.

RECREATION

Hawaii's abundant recreational opportunities are largely undeveloped. The island's 266 miles of coastline, its varied topography—much of it barren lava—extending from the sea to nearly 14,000 feet above sea level, and vast areas of wild lands comprise a raw resource adaptable for swimming, surfing, fishing, boating, hiking, horseback riding, hunting, camping, and picnicking. Coastal-oriented recreation holds the greatest appeal for visitors, but island residents are interested also in other activities. Some even seek Mauna Kea's snowy summit for skiing.

Paradoxically, Hawaii has relatively few swimming beaches along its extensive shoreline. Most are on the west coast between Kailua and Kawaihae where there are about six small sandy beaches. Sand, however, is not essential for swimming; rocky coves and bays offer excellent possibilities for snorkeling or scuba-diving to view tropical fish and coral.

The big island of Hawaii is rich in the sites and events which led to the founding of the historic kingdom of Hawaii, the political ancestor of the modern State. The important sites of Hawaii's prehistory—Wahaula, Mookini, and Honaunau—and of its history are on the Big Island.

State and county parks have been established for a variety of historic, scenic, scientific, and recreational sites, but a number of additional areas are also worthy of protection and will be needed to meet the public demand for cultural and recreational activities. Since county parks are mainly of local interest, they receive little use from visitors to the State but do play an important role in satisfying the recreational needs of Hawaii's resident population. Hawaii County has 72 parks and recreation areas including 36 beach and community parks, neighborhood playgrounds, gymnasiums, swimming pools, community halls, a golf course and civic auditorium. The major State and county parks of significance to National Park System planning on Hawaii are indicated on the following map showing Park and Recreation Areas.

Harry K. Brown County Park on the Kalapana Coast offers picnicking, camping, and water access. It is heavily used on weekends and complements the historical and sightseeing features in the coastal section of Hawaii Volcanoes National Park. The Kalapana Black Sand Beach is a well-known scenic attraction near the county park.

State and county parks will affect use at City of Refuge National Historical Park. Hookena County Park, just south of City of Refuge, has a palm-fringed sand beach, calm waters, and coral and tropical fish. It is to be expanded and improved. The county has plans to develop recreation facilities on Palemano Point, a lava tongue jutting into the sea on the south side of Kealahou Bay. Inside the bay, at Napoopoo, the State preserves a heiau. The proposed state park at Kealahou Bay will emphasize the circumstances of Captain Cook's visit to the bay and his subsequent death there. Ruins of historic Hawaiian structures which would be interpreted bear a relationship to the story at City of Refuge.

Two popular beach parks near Puukohola Heiau offer swimming, picnicking, and some camping. These parks will be improved as the Kohala Coast Resort Region is developed.

Private enterprise is making indispensable contributions toward the recreational use of Hawaii. Without accommodations, there could be little nonresident use of the recreational resources. Spectacular resort hotels have been built where they provide access to beaches or scenic views of the coast. Some more isolated resorts have complete recreation complexes including golf courses, swimming pools, tennis courts, and equestrian trails.

The provision of good-quality facilities is not keeping up with demand. This is partly because forecasts of visitation have been too conservative.

Private enterprise is particularly responsive to the implications of increasing tourism, and new hotels and other tourist facilities are under construction or planned. The Hawaii Visitors Bureau Research Report for February 1968 included the following statistical summary of hotel rooms:

HOTEL ROOMS

	Existing 1968	Existing Plus Planned Units			Future
	1968	1968	1969	1970	
Island of Hawaii	2,188*	2,609	3,661	--	6,505
State Total	18,657	23,282	28,108	32,828	40,840

**Island Breakdown:*

Kailua-Kona	1,074
Hilo	850
Other	264

Because of its ideal climate, the west coast of Hawaii will continue to be developed as the island's major resort region. Resort facilities in Hilo may increase in number but decrease in relative importance, primarily because of heavy rainfall. The more important developments will be from Keauhou Bay south of Kailua to the Kawaihae-Waimea area.

In addition to hotel resorts, private enterprise is active in other recreation ventures. At Kailua, Hulihee Palace and Mokuaikaua Church are privately owned and maintained historic structures open to the public. Kona is the center of marlin sport-fishing in the State, with charter boats and three cruise boats leaving from the Kailua wharf. A glass-bottom boat offers tours of Kailua Bay, and cruise boats carry visitors to Kealahou Bay where they transfer to glass-bottom boats to view the undersea world. Scuba and snorkel equipment and training are available in Kailua.

LAND CHARACTER AND USE

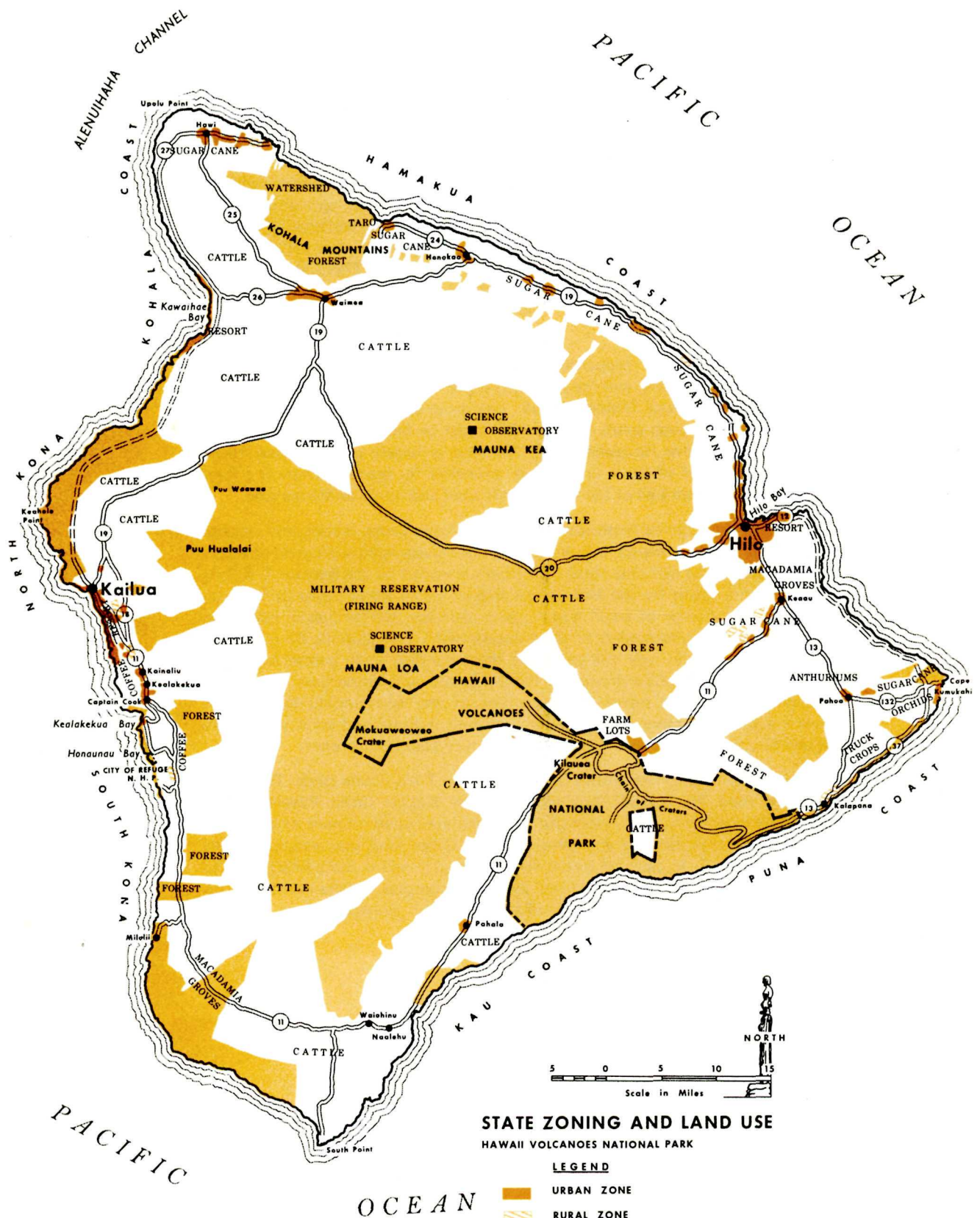
The recreational and resort potential of the Island of Hawaii is closely related to its natural environment, which varies widely in desirability. The generally smooth and gently sloping topography is related to the lava flows which have erupted from the five volcanoes which created the island. Because Hawaii is a young island with many fresh lava flows, much of the area is still barren.

Climate is largely the product of the prevailing trade winds, high mountain masses, and elevation. The annual temperature averages a balmy 75-degree F. at sea level, but freezing winter weather is to be expected on the snowy summits of Mauna Loa and Mauna Kea where elevations exceed 13,000 feet above sea level.

The eastern side of Hawaii intercepts the moisture-laden trade winds and favors lush vegetation in humid rain forests and commercial sugarcane fields. The southern Kohala Coast presents a desert appearance with cactus-dotted rangeland. The Kona area, also protected from the trade winds, is characterized by sunny mornings with cloudy and rainy afternoons. Most of the afternoon rains fall on higher slopes, leaving the shore areas pleasant.

Sugar production is the chief industry of the island. Other basic industries include tourism, cattle, diversified agriculture, and floriculture. Hawaii has the only coffee industry in the United States and the world's largest commercial orchid-growing center. The production for local use and export of papayas, macadamia nuts, and tropical flowers is rapidly expanding. Large areas of the island are still in undeveloped forests and barren lava fields. In addition, there are extensive grass and scrub areas used for grazing livestock.

Under the State's "Greenbelt" Law, all land in Hawaii is classified into four major land-use districts—urban, rural, agriculture, and conservation—as determined by the State Land-Use Commission. This law provides some assurance that land will be used for its best purpose and that development will be compatible with the uses permitted within the four categories. The counties regulate internal zoning in the urban, agricultural, and rural districts; the State Department of Land and Natural Resources regulates use in the conservation districts. Outdoor recreation and the preservation of natural resources and cultural values are considered in administering the State Land-Use Law. The law states that, "Conservation districts shall include areas necessary for protecting watershed and water resources; preserving scenic areas; providing park lands, wilderness and beach reserves; conserving endemic plants, fish, and wildlife; preventing floods and soil erosion; forestry and other related activities; and other permitted uses not detrimental to a multiple use conservation concept."



Management and planning for existing and proposed national parks is affected by the character, ownership, and use of surrounding lands. At Hawaii Volcanoes National Park, barren lava flows at high elevations, and scrub forest below, border the Mauna Loa section. Grazing in the scrub vegetation is the only use of these lands. Grass and scrub range lie west of the park's Kilauea section. Forests are contiguous with most of the eastern boundary. Adjacent lands are primarily under trust estate and State ownership. Between the Kilauea section and the Olaa Forest Tract are estate lands leased for small homesties, agriculture, and a golf course. The balance of the tract is surrounded by forest and grazing lands. A 25,000-acre tract of estate lands bordering 25 miles of the park's eastern boundary has been leased for a dude ranch operation. There is subdivision activity close to the boundary in the Kalapana section.

Land surrounding the proposed Hualalai-Mauna Loa addition to Hawaii Volcanoes National Park, and the proposed scenic road connecting the park with City of Refuge National Historical Park, vary from arid and barren lava flows at high elevations through scrub and the lush forest to the agricultural and lightly populated belt above Honaunau Bay. The land is largely under Bishop Estate ownership, some of which is under lease, primarily for grazing. There is a large military training area east of the Hualalai rift zone and north of Mauna Loa.

City of Refuge National Historical Park, on the Kona Coast, is relatively isolated from modern developments. Surrounding lands are vegetated with grass or scrub. Grazing land to the east and north of the park is owned by the Bernice P. Bishop Estate; to the south by the McCandless Estate. Lying along the existing north boundary is a cluster of small houses, with perhaps five families in residence. Other houses are unoccupied or used occasionally. The Catholic Church owns three parcels of land near the park and there are four small parcels in private ownership. Both the Church and the Bishop Estate lease house sites. The largely unspoiled scenic and recreational qualities of the surrounding lands, from Hookena to Kealahou Bay, may be preserved if State and county plans are carried out as indicated on the Honaunau Vicinity Map in this report.

The Puukohola Heiau lies within Queens Hospital Trust Estate lands. The area is presently used for grazing, but is within the Kohala Coast Resort Region mentioned previously. The resort plan contemplates establishment of the heiau and immediate vicinity as an historical park. Other land uses existing in the vicinity include S. M. Spencer Beach Park (county), Hapuna State Beach Park to the south, and the Kawaihae Harbor industrial complex to the north. A rock crusher is presently in use in the immediate vicinity of the heiau.

HAWAII VOLCANOES NATIONAL PARK

CITY OF REFUGE NATIONAL HISTORICAL PARK

A MASTER PLAN FOR THE PROPOSED PUUKOHOLA
NATIONAL HISTORIC SITE

KEALAKEKUA BAY—A STUDY OF SIGNIFICANCE

THE STUDY AREAS

HAWAII VOLCANOES NATIONAL PARK

THE EXISTING PARK—ITS RESOURCES

The dominant features of Hawaii Volcanoes National Park are the volcanoes of Mauna Loa and Kilauea. They are surrounded by a youthful area surfaced with recent lava-flow materials and unique flora including many endemic species. Geologically, ecologically, and from the point of view of the evolution of the species, the park is possibly of greater long-term value to the world for research than for its scenic and recreational assets.

With the arrival of European civilization to the Island of Hawaii two hundred years ago, the fragile native biota of the islands was disturbed. However, these disturbances have been minimal in the park insofar as their being readily apparent to the park visitor. Thus, the park looks much the same today as it did when the first man saw the magnificent displays of volcanism, the fern forests so strange and interesting to the itinerant visitor, and the superb seascapes along the coast and up the palis.

NATURAL HISTORY

Geology

Hawaii Volcanoes National Park occupies the summit and part of the southeast flank of Mauna Loa Volcano and almost a third of Kilauea Volcano. These broad, flat volcanic domes rarely explode, but erupt quietly, sending up fountains of melted rock hundreds of feet into the air. Eruptions generally occur in calderas (huge collapsed depressions in the summit) or along the rift zones on the flanks of the volcanoes.

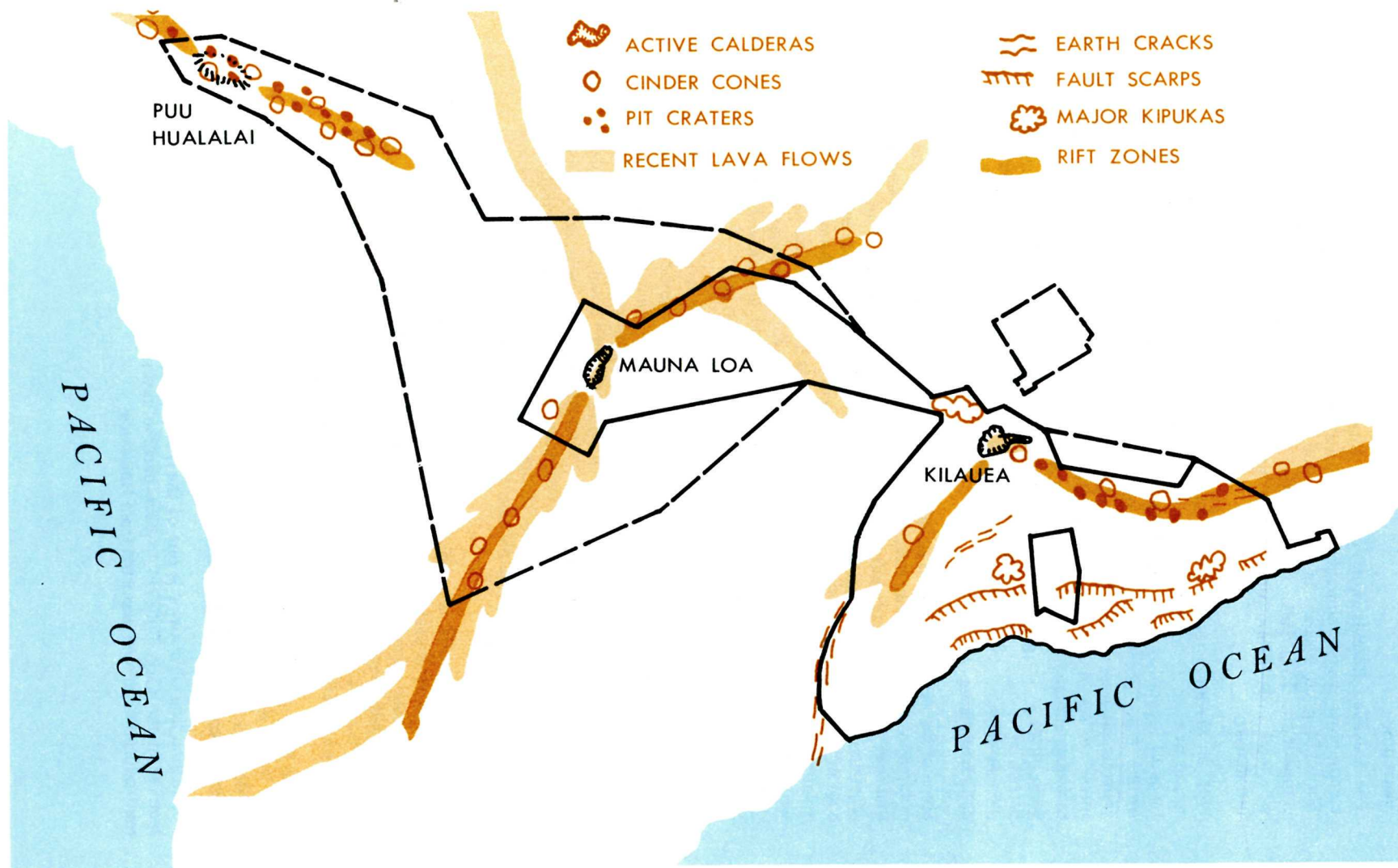
Kilauea is the most active volcano in the world. The feature that made Kilauea famous among volcanoes was the presence of an almost continuously active lake of liquid lava at Halemaumau through the 19th century and the first quarter of the 20th century. Other lava lakes existed for short periods elsewhere on the caldera floor and in the Chain of Craters, but throughout history Halemaumau has been the principal place of volcanic activity.

Kilauea's two main rift zones are defined by large pit craters, cracks, and cinder cones. The Chain of Craters along the southeast rift has been an active area in recent years. Kilauea's seaward side is bounded by great fault scarps contrasting with its other gentler slopes. Lava flows, devastated areas, and steam cracks show old and new activity. Steam issues from the ground at many places in and around the Kilauea caldera and along the Chain of Craters.

Mauna Loa is a massive, flat-domed shield volcano built by layer upon layer of lava flows and is recognized as the best example of its type in the world. Extending from about 20,000 feet below sea level to 13,680 feet above, it is one of the world's greatest mountains. Its upper slopes, along its two principal rift zones, contain extensive, recent flows of various colors and types. These flows are stark, colorful, bare, and forbidding. Since man has watched it, Mauna Loa has been intermittently active, with periods of quiet ranging from a few months to more than a decade. Many of its eruptions are confined within the caldera of Mokuaweoweo; others start there, then split open the side of the mountain and gush from cracks in the flanks far below the summit and rush many miles to the sea.

Both Kilauea and Mauna Loa are young volcanoes, for their growth keeps well ahead of erosion. Geologists calculate from its present growth that Mauna Loa could have been formed within the last million years.

Kilauea is one of the most studied and best understood volcanoes in the world as well as being the most safe and accessible for people to see. This dual role makes Kilauea of extreme value for research and sightseeing. The favorable opportunities afforded by Hawaiian volcanoes for fundamental and detailed research are not duplicated or even approached in any other part of the world. The program of study at the Hawaiian Volcano Observatory is under the direction of U. S. Geological Survey scientists.



Vegetation

The Hawaiian flora is quite young in relation to continental vegetation. Its communities possess numerous niches which were never filled by native forms. There is good reason to believe that the endemics evolved with little competition. This made the Hawaiian vegetation units more vulnerable to structural and composition change when highly competitive species were introduced.

With an elevation range of from sea level to 13,690 feet and a precipitation spread of from 15 to 100 inches of rain annually, there is within the park a wide range of vegetative types—from lush, rain forest jungle to the sparse vegetation of the Kau Desert, a few miles to the southwest. Some native species are endemic only to a single valley or mountain slope. Dense ohia and fern “rain forest” exists in areas of heavy rainfall. In drier areas, the forest opens into savannah containing mixtures of ohia and koa trees. In several portions of the park, there is only low scrub and open grasslands. The Kau Desert is nearly barren, as is much of the coast. Topographic vegetation profiles show that 23 distinct vegetation types are present and that a fourth of these have nonnative dominant plants.

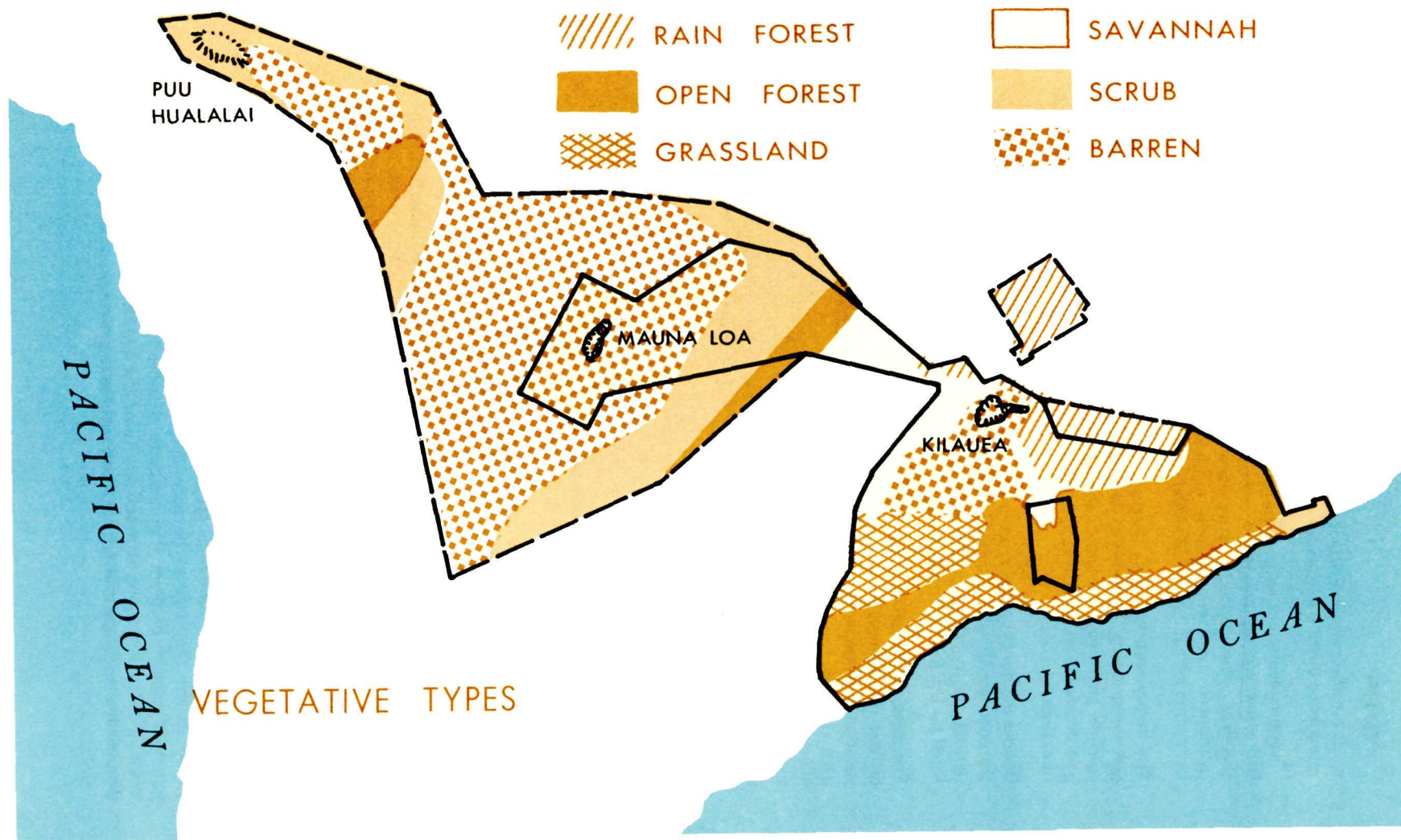
Some of the rarer plants, such as varieties of hibiscus (*Hibiscadelphus*), are found in kipukas, older areas that have been surrounded by more recent lava flows and that can be readily recognized as islands of denser vegetation in sparsely vegetated areas. Kipukas represent somewhat simplified ecosystems, analagous to bogs or lakes, that are suitable for studying integral ecological relationships. The isolation of small populations in the park’s kipukas provides opportunities for evolutionary study. The park’s two principal kipukas, Kipuka Puaulu, popularly known as “Bird Park,” and nearby Kipuka Ki, contain unique and complex compositions of plant species and are judged to be “of great age.”

During the Polynesian colonization period, several nonnative plants were released into the native vegetation. In a relatively short period, some of these became securely established. The appearance of western man, near the close of the 18th century, marks the period of mass introduction of highly competitive and aggressive species (guava, tibouchina, lantana, and kiawe), and the direct removal or alteration of the native forest for sugarcane, pineapple, and ranching activities. Sections of the Mauna Loa Strip have been most obviously affected by domestic stock. This activity was stopped and the vegetation is recovering. Exotic plants, particularly grasses, have invaded all disturbed areas and ecological niches within the park.

Significant large areas of original vegetation still remain intact in spite of foraging cattle, feral goats, and pigs. Many rare native plants still exist within the park. The most important forest type is in the Olaa Forest tract, an area of almost 10,000 acres, which is probably the largest remaining tract of virgin ohia and fern forest in the Hawaiian Islands. This tract has been recognized by the Society of American Foresters as a “natural area,” the best example of its type.

At Bird Park, many rare native plants have been replanted in an effort to keep them from extinction, including one of the world’s rarest trees, the “hua Kuahiwi,” or *Hibiscadelphus Giffardianus*. At the Naulu Forest there are other species of rare native plants clustered in a small forest.

The Mauna Loa silversword is one of the more interesting and spectacular floral features in the park. Believed to have become extinct within the park, it was reintroduced from seed imported from Haleakala.



VEGETATIVE TYPES

Animal Life

Birds are the most important aspect of the park's wildlife. There are 10 species of endemic birds, 6 migrant or sea birds, and 15 species of exotics.

Several endemic species of birds and insects have become extinct within the park and elsewhere on the Island of Hawaii because of agricultural and forestry practices which disturb native habitats and introduce competitive animals. Introduced birds are especially detrimental to the highly specialized Hawaiian honeycreeper family (*Drepaniidae*) which ornithologists believe is declining.

The honeycreepers are an endemic family of special interest to ornithologists and evolutionists. Included in this group are the apapane and iiwi (common); amakihi and creeper (scarce); and akepa, ou, and akiapolaau (rare). The latter two drepanids are classified by the U. S. Department of the Interior as in danger of extinction.

Besides the honeycreepers, other endemic birds which range throughout the park are pueo (owl), amao (thrush), and elepaio (flycatcher). Io (hawk) and nene (goose) are found within the park in limited numbers, being two other species listed by U.S.D.I. as "endangered."

The nene, or Hawaiian goose, was once close to extinction but now appears to be out of immediate danger as the result of the efforts of many interested agencies and people to re-establish it in remote sections of the Big Island. In the park the few nenes range from 5,000 to 8,000 feet on the eastern flank of Mauna Loa. They once inhabited the lower coastal section of the park during their nesting period. But man's hunting and ranching activities, and the deadly predations of mongooses, cats, and dogs, as well as the disturbances of goats and pigs, have driven this bird higher up on the barren lava slopes of Mauna Loa and into the Hualalai region.

Migrant sea birds include the dark-rumped petrel, white-tailed tropic-bird, the American golden plover, the ruddy turnstone, wandering tattler, and the white-capped noddy. The exotic species are the California quail, chukar, ring-necked pheasant, Japanese blue pheasant, spotted dove, barred dove, skylark, Chinese thrush, red-billed leiothrix, mynah, white-eye, ricebird, house sparrow, cardinal, and house finch.

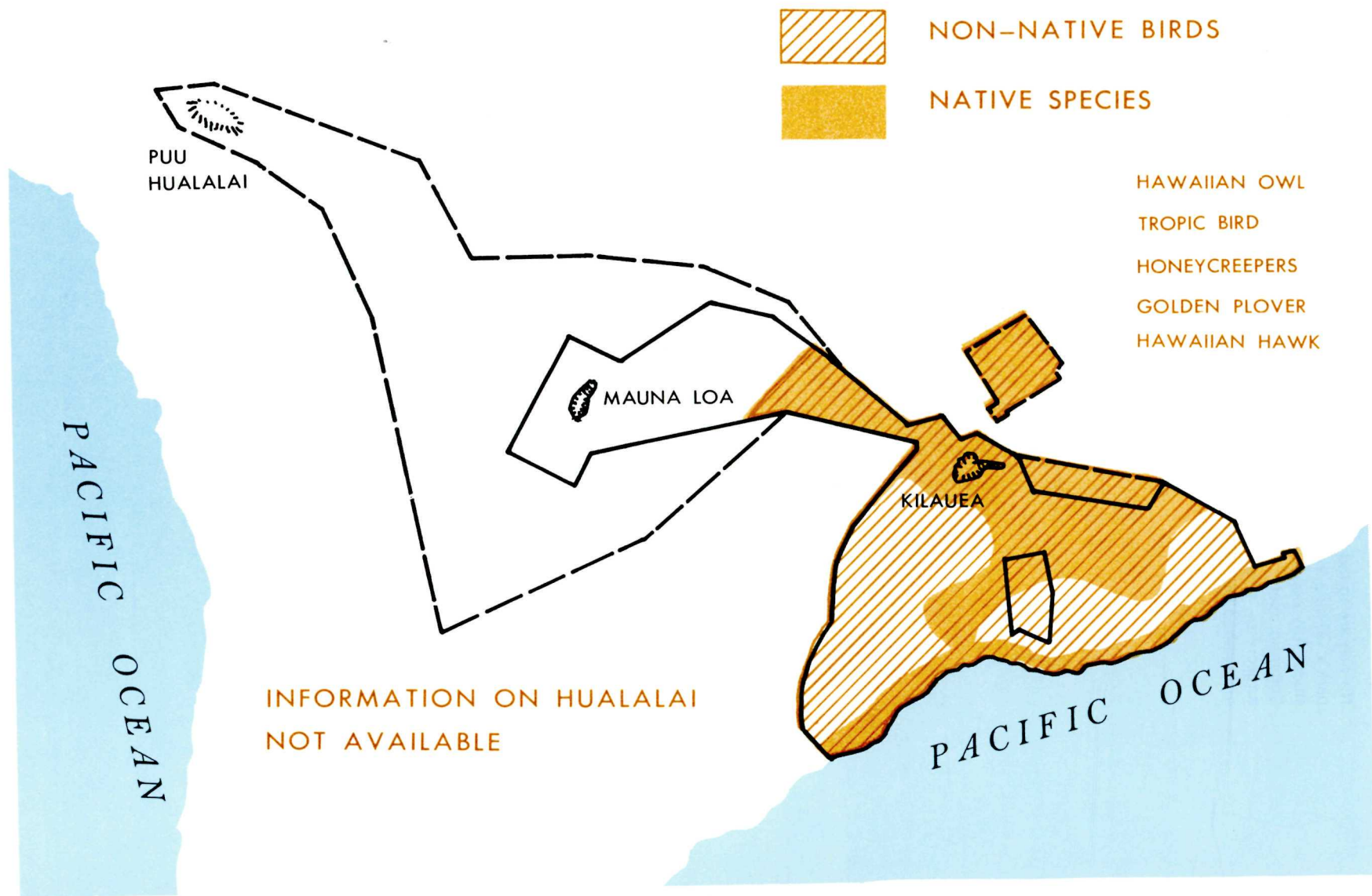
The Hawaiian bat is the only native land mammal. A few species of whales and several members of the dolphin family have been seen in waters off the park's coastal region.

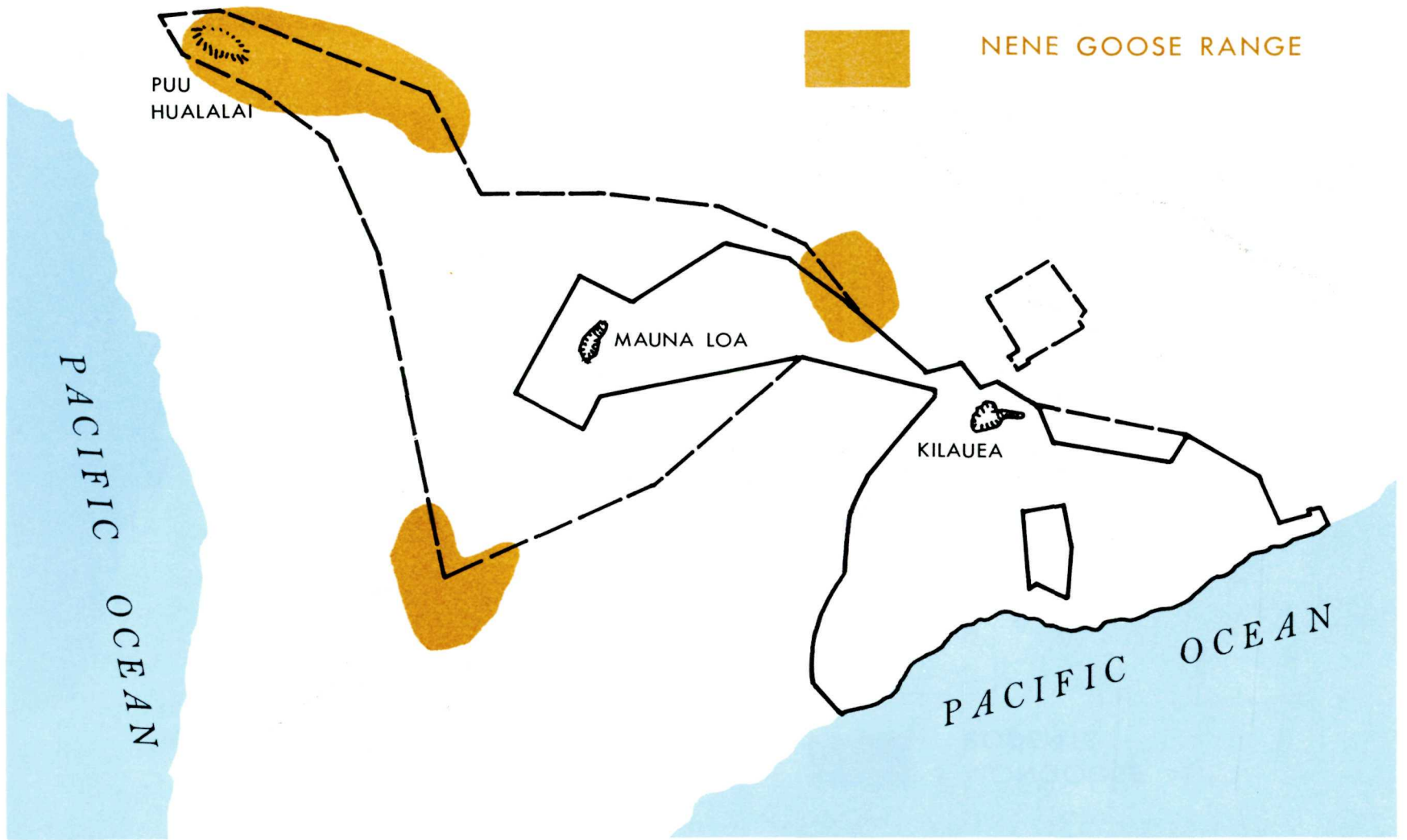
Feral goats and pigs have built up high populations in some sections of the park despite long term reduction efforts. Recent feral goat populations in the 10,000 to 20,000 range have been reduced by half through vigorous annual reduction programs which have removed some 4,000 animals each year. The feral goat inhabits the open, drier coastal and high mountain sections of the park.

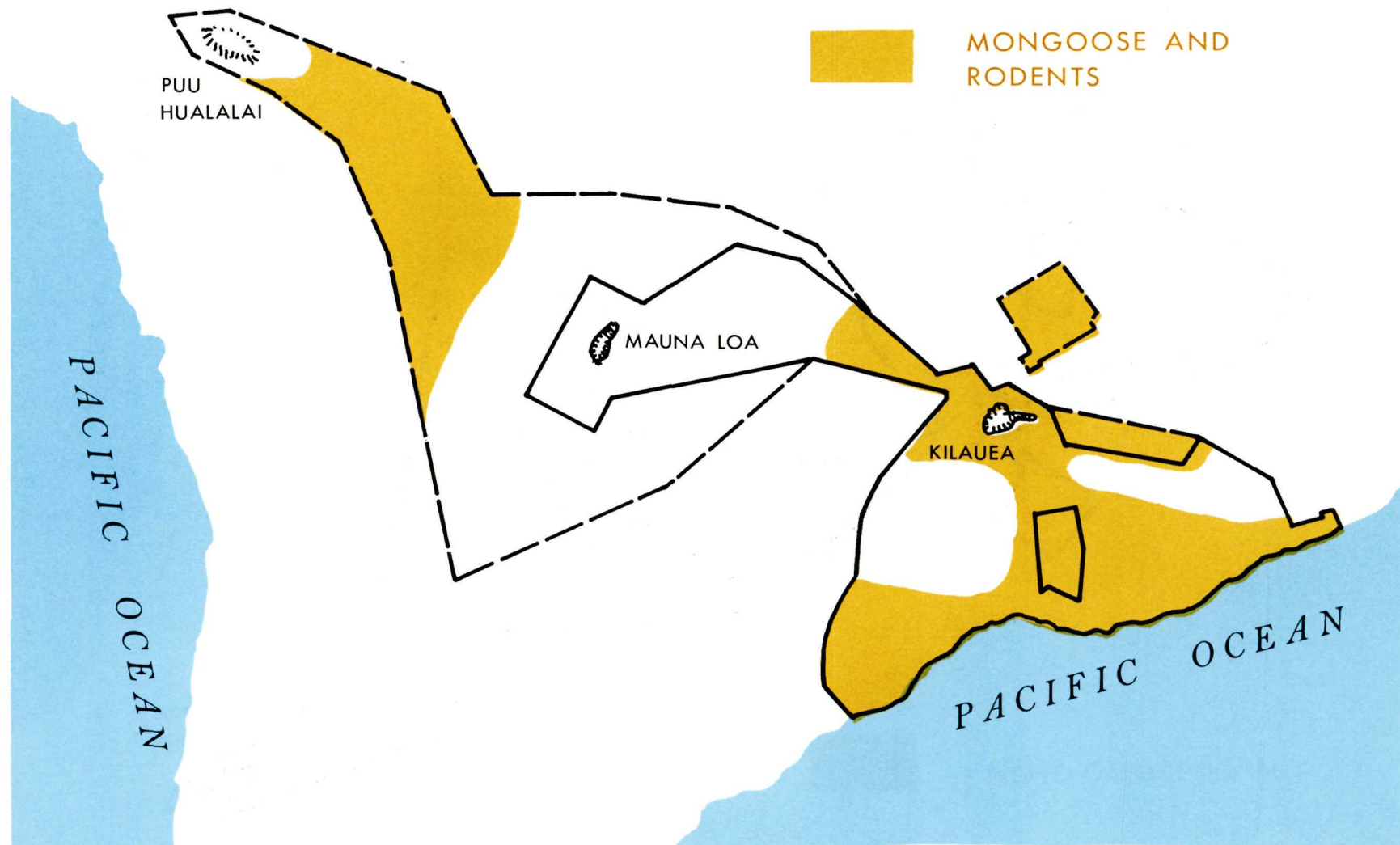
The pig was brought to the Hawaiian Islands by the Polynesians during their early migrations. The Polynesian strains mixed with later European varieties, producing the present-day pig inhabiting the dense rain forests of the park.

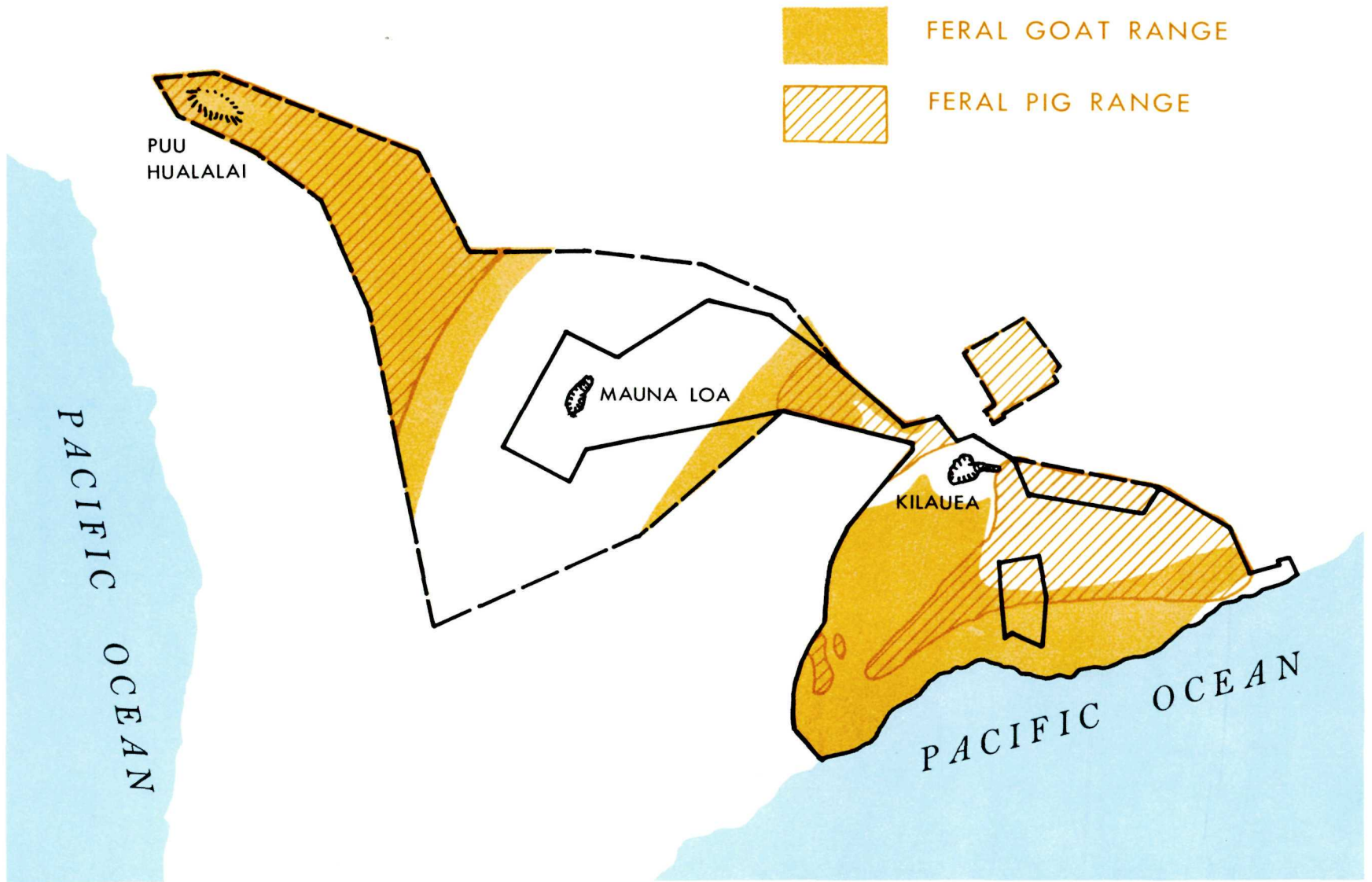
Feral goats and pigs have done great damage to the park vegetation and birdlife to an extent that cannot be accurately assessed without a continuing and extensive research program. Pigs are quite effective in engendering the spread of exotic plants by carrying seed and scarifying the ground. Heavy goat browsing denudes the landscape of shrubs and prevents the regeneration of small trees.

No fish are found within the park. However, colorful fishes are found along the park's 30-mile coastline where there are excellent opportunities to view and study fish populations. Coral reefs are limited to a small area near Halape. Common reef fishes include the squirrel fish, butterfly fish, Moorish idol, surgeonfish, trigger fish, and several kinds of eel. Opihi, a shellfish found on the surf-washed lava cliffs, is an important delicacy.









HISTORY

The historic importance of Hawaii Volcanoes relates to two of the Historic Theme Studies *Hawaii Aboriginal Culture, A. D. 750-1778 (Theme XVI, Indigenous Peoples and Cultures)* and *Hawaii History, 1778-1910 (Theme XXI, Political and Military Affairs, 1865-1910)*.

Captain James Cook, R.N., discovered Hawaii for the Western World in 1778 and died at Kealahou Bay in 1779. His ships, the *HMS Discovery* and *HMS Resolution*, in 1779 navigated offshore from what is now Hawaii Volcanoes National Park, trading with the Hawaiians of Puna and Kau, exchanging nails, beads, and cloth for pigs, fruit, and salt.

The historic events that occurred within the park area after Captain Cook first viewed the Puna-Kau coast are of value chiefly in their association with events that occurred elsewhere, and in the descriptions of the volcano and the coastal Hawaiian habitation recorded in accounts of early travelers. The destruction by a Kilauea explosive eruption of a portion of Keoua's Hawaiian army in the Kau Desert in 1790, while on its way to battle the forces of Kamehameha, was a factor in the eventual rise of Kamehameha as ruler of all Hawaii. Fossil footprints of some of the Hawaiian warriors remain today in the Kau Desert. Vancouver's naturalist, Archibald Menzies, was the first Westerner to penetrate inland to what is now the park. He ascended Mauna Loa in the winter of 1794, a climb not duplicated until Lt. Charles Wilkes U.S.N. and aides made the climb again in 1841.

Kilauea first felt Western shoes in 1823 when a band of Christian missionaries found the summit active and wrote such vivid and widely read descriptions that thereafter Kilauea was of prime scientific interest as well as a desired visitor destination. By the 1840's, before Yosemite Valley had even been discovered, Kilauea Volcano had become a regular stop for tourists to Hawaii. They stayed in native-style huts until, in 1866, a commercial hotel, the Volcano House, was established on the rim.

The records of Menzies and the Rev. William Ellis in 1823, and the officers of *HMS Blonde* in 1824 started a long list of amateur and professional observations of Hawaii's volcanoes, which formed the basis of volcanic study which was formalized in 1912 with the founding of the Hawaiian Volcano Observatory.

Hawaiians held the Kilauea summit sacred, made offerings to the Goddess of Volcanoes—Pele, and honored their dead by depositing bodies in the summit crater. It was at Halemaumau, the principal vent of Kilauea, that the image of Pele was weakened and the influence of the priests of Pele lessened by the High Chiefess Kapiolani. She was a convert to Christianity who defied Pele in 1824 by eating ohelo berries without the traditional offering. She dared Pele to kill her and her followers while proclaiming the Christian god supreme. Her action did much to shatter the last remnants of belief in the old gods and paved the way for a wider acceptance of Christianity.

The Wahaula Heiau ruin is historically significant since it continued to operate for a time after the official abolition of the ancient religion in 1819. It was perhaps the last heiau in which worship was publicly offered to the Hawaiian gods.

Christian missionaries based in Hilo built churches and schools in the mid-1800's along what is now the park's seacoast. Cattle, goat, pulu (a fern product), and

tourist enterprises changed the Hawaiian way of life as well as the structures of the villages. The now-abandoned villages represent Western influences grafted onto the traditional Hawaiian culture. Only tourist activity and scientific investigation on Kilauea's rim and a pocket of cattle ranching within the park have survived.

Two relatively recent historic sites have been identified. One is the "Old Volcano House" of 1877 which still stands. The second is the Keauhou Landing Site which for a time in the middle 1800's was a landing for tourists coming to the Kilauea volcano. The landing and village were virtually destroyed by the 1868 tsunami (tidal wave) which destroyed whole villages along the Puna Kau coast. A few coconut trees and remains of the old wharf are all that is left of what was once a fairly large village and steamship port.

A third historic site of some significance, a pulu factory ruin, is located on the trail between Makaopuhi and Napau Craters.

ARCHEOLOGY

The sections of the Puna and Kau coasts lying within the park are rich in remains of villages, temples, canoe landings, petroglyphs, and other evidences of native life. They represent various aspects of ancient and historic Polynesian culture. Sites situated in sheltered areas along the rugged Puna Coast were occupied from prehistoric times until the middle 1800's.

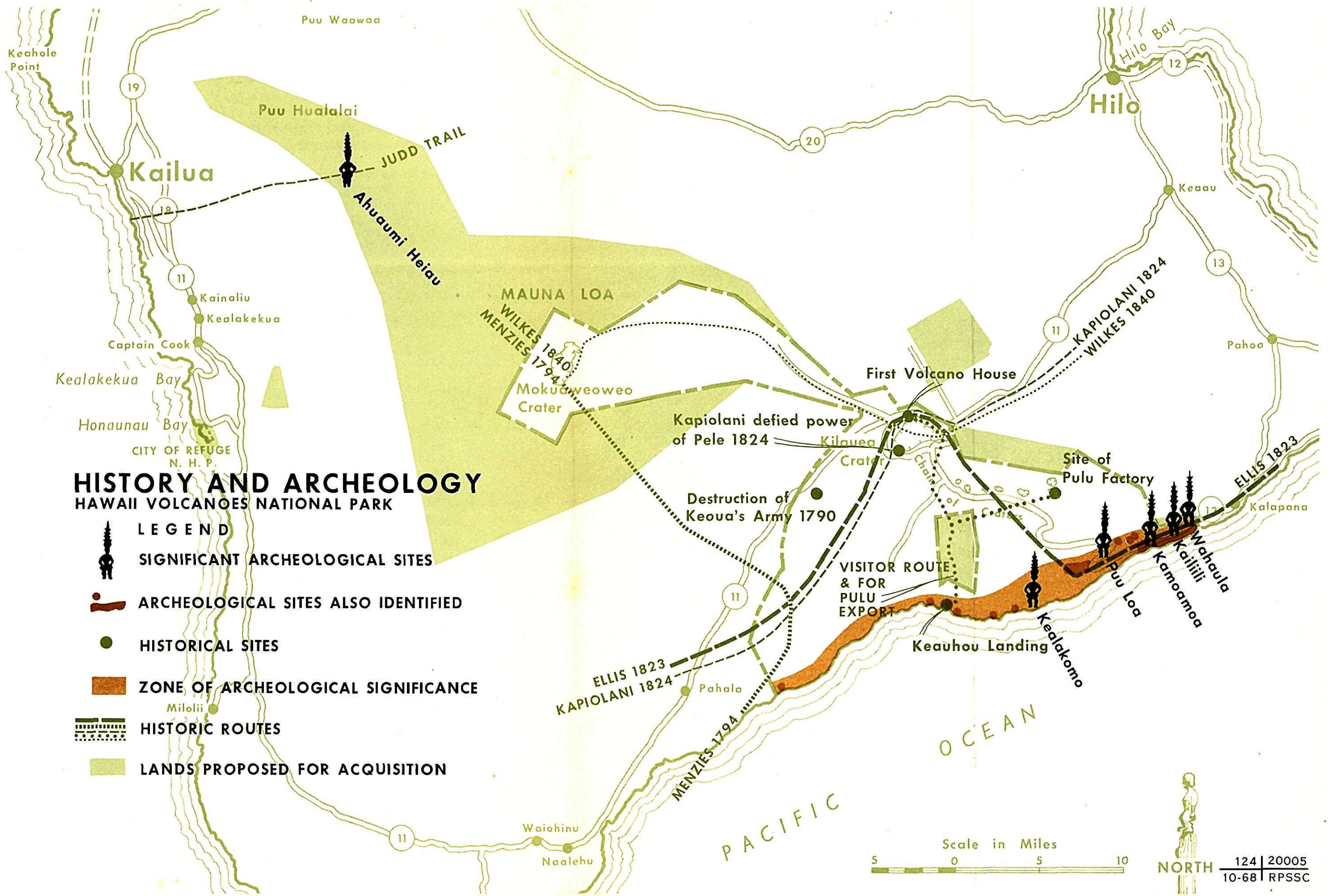
The area within the park was sparsely inhabited at widely separated sites along the coast and adjacent upland benches. Habitation required special adaptation to severe environmental conditions and reveals the versatility and ingenuity of the Hawaiians.

The people who lived here were mainly fishermen and farmers, and in the uplands some were bird hunters. With the introduction of horses and goats, the collection of fern wool (pulu) for mattresses and pillows, and the establishment of churches, great changes in the pattern of living came about. These changes are clearly reflected in the modification of ancient structures, stone-walled enclosures, cement cisterns, horse trails, and middens at house sites.

Archeological field work was not undertaken until 1959 when the Bishop Museum, under the direction of Dr. Kenneth P. Emory, made the first extensive field survey. A second survey was made between 1963 and 1965 which completed the assessment of the park's archeological resources and suggested avenues along which more detailed investigations might proceed. These surveys recorded 380 sites. Between 1962 and 1968 several small sites were salvaged as part of the Chain of Craters road project.

Recent surveys have made it possible to arrive at some understanding of the park's archeological resources. These resources are unique in several ways and it seems clear that some aspects of Hawaiian prehistory can best be investigated within the park and, in some instances, can only be investigated here.

The park has a fairly complete sample of various types of archeological remains left by the ancient Hawaiians—heiau ruins, house platforms, stone walls of canoe sheds, pens and corrals, graves, shelter caves, petroglyphs, paved trails and agricultural areas. Many are within easy reach of the Kalapana—Chain of Craters Road.



HISTORY AND ARCHEOLOGY

HAWAII VOLCANOES NATIONAL PARK

- LEGEND**
- SIGNIFICANT ARCHEOLOGICAL SITES
 - ARCHEOLOGICAL SITES ALSO IDENTIFIED
 - HISTORICAL SITES
 - ZONE OF ARCHEOLOGICAL SIGNIFICANCE
 - HISTORIC ROUTES
 - LANDS PROPOSED FOR ACQUISITION

Scale in Miles
5 0 5 10

The Wahaula Heiau—Red Mouth Temple—is one of the better known temple sites in the district of Puna. It is reported to have been established and constructed by the foreign chief Pao in A.D. 1275. The Kailili village site adjoins the Wahaula temple. This village probably supported the temple and was apparently abandoned shortly after Ellis saw it in 1823. It is probably the only uncontaminated (culturally speaking) ruin in the Puna area. It has the distinction of being the only place along the Puna coast where ilili, small water-polished stones, used for paving the temple and the house sites, are found.

Wahaula Heiau and companion Kailili village site is the most important archeological area in the park. The heiau is one of the most significant in the Hawaiian Islands, as it is important in the story of Pao and the introduction of the heiau luakini and the ritual worship of the major gods that characterized Hawaiian ceremonial worship. It is in remarkably fine condition and has an impressive appearance.

Site 911 is a small cave shelter west of Kailili village near the coast which was used by the ancient Hawaiians as a shelter and an occasional overnight campsite from about A.D. 1300 to modern times.

Kamoama Village site represents an area where two periods of time appear to be superimposed. The ancient village appears to be farther back from the shore and the later (historic) development is toward the ocean. There is a windmill tower, a modern house site (possibly the site of the school used as a meetinghouse in 1847), and high walls. There is a heiau and house platform sites in the ancient section.

The Puu Loa petroglyph field is the largest concentration of "rock carvings" in the park. It is located along the old Hawaiian Trail from the village of Laeapuki to Kealakomo. Many of the petroglyphs are ancient, as they have been almost completely obliterated by successive drawings and erosion. The forms are mainly dots with rings, human figures, sails, and circles with attached lines. The petroglyph area is about ½-acre. It is one of the three largest in the Hawaiian Islands.

Kealakomo Village site and vicinity is the first on the eastward coastal trail taken by Ellis. It was the hub of a number of other trails from Laeapuki and Kaena on the coast and from Puuloa, as well as inland trails from the Volcano-Olaa area. This was perhaps the largest Hawaiian village on the Puna coast. It has the remains of a church and what is reported to be a heiau.

The park preserves one of the largest single accumulations of stone structural remains in the Hawaiian Islands and, therefore, is a rich source of research material. However, much of the stone remains are "non-excavatable"—unsuitable for the recovery of detailed information such as can be accomplished at the City of Refuge. Deposits of habitation material in the park are rare. Only about 9 or 10 sites are regarded as potentially suitable for excavation. The extreme rarity of such sites requires that the utmost care be exercised in their investigation. The functional interpretation of much of the park's archeological evidence remains uncertain. Evidence suggests prehistoric coastal fishing settlements were complemented by inland farming settlements. There was a considerable shift in population away from the coastal settlements during the historic period due to widespread and severe Hawaiian population decline and

drift to new centers of population, such as Hilo. Temporarily, a pastoral economy sustained settlement at several points along the park's coastline but eventually those people drifted outside the park to the villages of the Kalapana and Pahala regions.

The development of the Hawaiian pastoralist, and particularly the Hawaiian goat herds, is unique in Polynesia and this story can best be told at the stone structural remains in the park which are numerous and various, scattered over some 15 miles of coastal grassland. The Kamoamoa area contains perhaps the best remains.

RECREATION

The park encompasses a variety of terrain between sea level and 13,680 feet, with a wide range of climatic conditions.

The resources, however, afford only limited active recreational opportunities. Lava flows and other volcanic features cover a major part of the park. The park's 30 miles of seacoast are extremely rough with shore cliffs up to 100 feet, sparse vegetation, and a dry, windy climate. There are only a half-dozen trail access points to the ocean along the entire park coast. In the areas of heaviest rainfall are sections of dense rain forest.

Within the park are pockets of less severe terrain—the forested kipukas in the Kilauea area, along the palis and in the Kalapana coastal section where the terrain is level and the vegetation is subtropical.

FACTORS AFFECTING RESOURCES AND THEIR USE

LEGAL FACTORS

The Act of August 1, 1916 (39 Stat. 432), authorized tracts of land on the islands of Hawaii and Maui, in the Territory of Hawaii, to "be perpetually dedicated and set apart as a public park or pleasuring ground for the benefit and enjoyment of the people of the United States, to be known as Hawaii National Park." The act gave the Secretary of the Interior authorization to permit the erection and maintenance of buildings in the park for scientific purposes. Subsequent acts extended the boundaries of the park: Act of May 1, 1922 (42 Stat. 503); Act of February 12, 1927 (44 Stat. 1087); Act of April 11, 1928 (45 Stat. 424); and the Kalapana Extension Act of June 20, 1938 (52 Stat. 781).

No Federal funds have been expended for land acquisition, nor can such funds be used to acquire the remaining lands authorized for acquisition. The park was created from federally owned lands and by donation from the Territory (later the State) of Hawaii of ceded, exchanged for ceded, condemned and purchased, and direct purchased lands. The Act of February 27, 1920 (41 Stat. 452), authorized the Governor of the Territory to acquire privately owned lands and rights-of-way within the boundaries of the park.

Section 1 of the Kalapana Extension Act placed a restriction on the use of Federal money for land acquisition of the tracts to be included in the extension. It provided:

That the United States shall not purchase, by appropriation of public moneys, any land within the aforesaid area (Kalapana Extension), but such lands shall be secured by the United States only by public and private donations.

The Territory and, later, the State of Hawaii, acquired the lands of the Kalapana Extension for the United States through donation, exchange, and condemnation with purchase.

Exclusive jurisdiction was assumed by the United States for the park by Act of Congress (46 Stat. 227), approved April 19, 1930; (amended 52 Stat. 1164), approved June 25, 1938; (62 Stat. 196), approved April 21, 1948; and (73 Stat. 4, 11), approved March 18, 1959.

Just prior to World War II, Congress authorized the withdrawal of certain portions of park lands and transferred jurisdiction and control to the Secretary of War for military purposes (54 Stat. 761), approved July 16, 1940. The terms of the Act were put into effect by Departmental Order 5-FR5219, dated December 3, 1940. The lands were used as training grounds during the war. The order was revoked after World War II by joint Secretary of the Army and Department Order of June 14, 1950, returning jurisdiction of the lands to the Secretary of the Interior.

Section 3 of the Kalapana Extension Act (52 Stat. 781), approved June 20, 1938, gives homesite rights to all Hawaiians and fishing rights to native Hawaiians of the Kalapana area. It reads:

Sec. 3. (a) That the Secretary of the Interior is authorized to lease, under such rules and regulations as he may deem proper, land

ascertained by him to be suitable for home site purposes in the Kalapana Extension as described herein, to native Hawaiians when such occupancy does not encroach on or prevent free access to any points of historic, scientific, or scenic interest or in any manner obstruct or interfere with protection and preservation of said area as a part of Hawaii National Park; Provided, however, That occupants of homesites shall reside on the land not less than six months in any one year: And provided further, That fishing shall be permitted in said area only by native Hawaiian residents of said area or of adjacent villages and by visitors under their guidance.

(b) The term "native Hawaiian," as used in this section, means any descendant of not less than one-half part of the blood of the races inhabiting the Hawaiian Islands previous to 1778. (16 U.S.C. sec. 396a.).

The Olaa Forest Tract of 9,654.67 acres was obtained by donation of ceded Territorial lands in 1951 and 1953 (Executive Order No. 1540 by Territorial Governor Long, November 28, 1952). Title to this land is vested in the Federal Government. The National Park Service has protective custody of this acreage, though the land is not a part of Hawaii Volcanoes National Park. Under the terms of the Kalapana Extension Act, which governs the inclusion of this land into the park, all lands acquired must be adjacent or contiguous to the existing park boundary. The Olaa Forest Tract is separated from the park by small parcels of private intervening lands.

In 1961, Congress changed the designation of the park on the island of Hawaii to "Hawaii Volcanoes National Park," (75 Stat. 577), approved September 22, 1961, and created a separate national park, "Haleakala National Park," of the park lands on the island of Maui.

LAND STATUS

FEDERAL (National Park Service)	201,007.12
PRIVATE	19,337.72
GROSS ACREAGE	220,344.84
Olaa Forest Tract	9,654.67

Under the provisions of the Kalapana Extension Act authorizing the Secretary of the Interior to "round out the park" by adding any adjacent or contiguous lands he deemed necessary, 10 tracts were authorized by Secretarial orders of March 26, 1951, and January 14, 1953.

Two of the 10 tracts, Tracts 11 and 25, were acquired. Two others, Tracts 23 and 24, the Olaa Forest Tract, were transferred to the National Park Service by the Territory and await addition to the park, as they are not adjacent or contiguous. Six tracts are unacquired—Tracts 19 (portion only), 20, 22, 26, 27, and Parcel F, totalling the 19,337.72 acres of private land listed above.*

*Acreage as listed in *Areas Administered by the National Park Service and Related Properties*, July 1, 1968.

CLIMATE

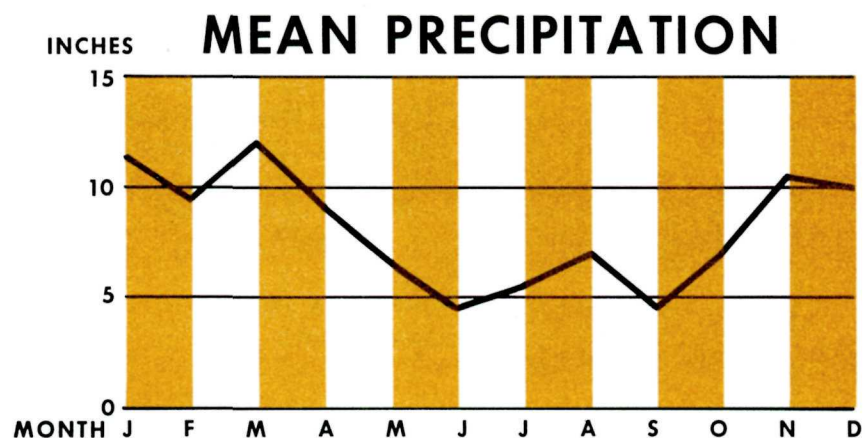
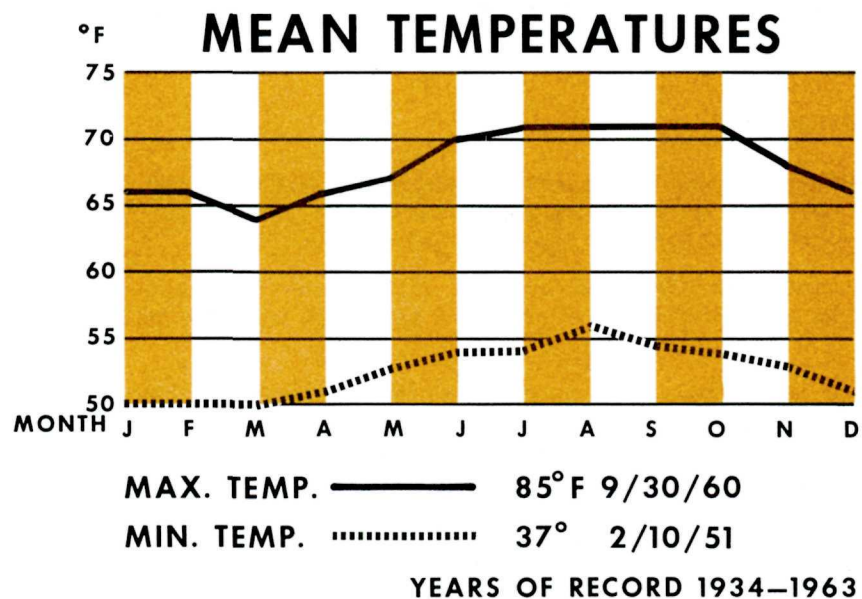
Weather at Hawaii Volcanoes is an important influence in determining the park visitor-use pattern. The park climate is not conducive to pleasurable overnight use, particularly when compared to the warm coastal areas where resorts are located. In 1951 there were only 15 days when no rain fell on the Kilauea section.

The construction season is year-round, though work is interrupted at times by heavy rains.

Humidity is generally high in the greater part of the park, often in the 70- to 80-percent range, and mildew is a problem.

CLIMATE CHARTS

PARK HEADQUARTERS — KILAUEA SECTION — 4,000 FEET



Precipitation

Rainfall varies greatly throughout the park and from year to year. Any particular year may have 2 to 3 times as much precipitation as another year. The wettest parts of the park are on the trade wind side of Kilauea and its east rift zone. At park headquarters the average annual precipitation is 99.9 inches while 2 miles from headquarters on the Kau side of Kilauea Crater, at a similar elevation, the average is 48 inches.

Along the ocean the rainfall varies from 15 to 60 inches annually. At the summit of Mauna Loa the average annual rainfall is 15 inches. Snowfall occurs at times above 9,000 feet. Depths up to a foot have been noted. The snow mantle on Mauna Loa is generally for several months in the winter.

Wind

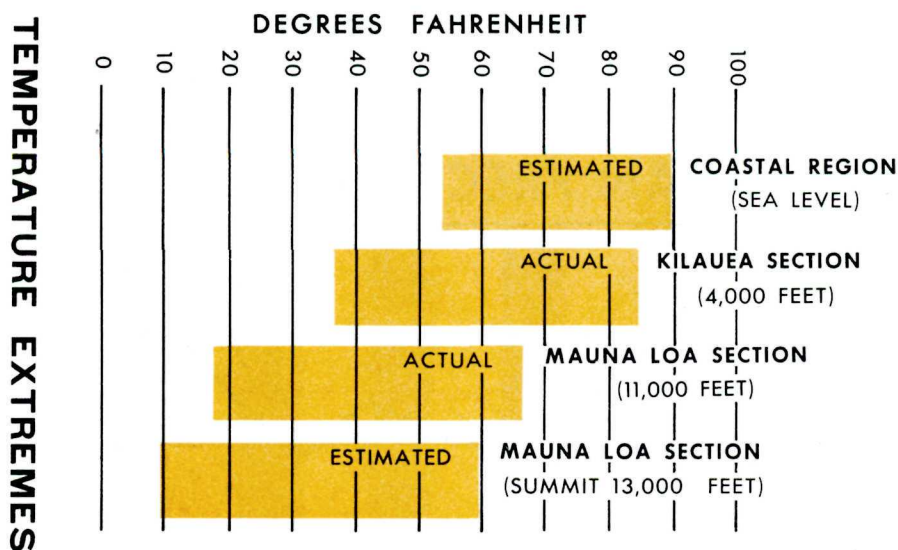
The northeasterly trades prevail from March to November. Their velocity is generally 10 to 20 miles per hour, with higher gusts in exposed areas. During winter, Kona storms bring southwesterly winds which may exceed 50 miles per hour.

Special Conditions

Heavy rainstorms over periods of several days occur with rainfall amounts of up to 15 to 20 inches. Electrical storms are infrequent and mild, but occur any month and often produce snow at higher elevations on Mauna Loa.

Strong tropical winds (Kona winds) blow once or twice a year, inflicting damage on buildings and vegetation and bringing minor flooding to the pali sections of the park.

There is a tsunami (tidal wave) danger along the low sections of the park coastline. Points above the 50-foot contour are considered safe. The National Guard warns fishermen and coastal-users from airplanes of potential tsunami danger as part of the Statewide tsunami warning network.



FIRE HISTORY

The generally wet climate over much of the park presents a low fire potential. In some drier pali and coastal sections, high grass is accumulating which may present a fire hazard.

Average number of wildland fires per year	—	1
Causes: Man — 50% Volcanic — 50%		
Average area burned per year	—	1 acre
Normal fire season:	—	All year
Average number of structural fires per year	—	1

TERRAIN

High surf dashes against the base of the cliffs, presenting a danger to shore fishermen and shellfish gatherers.

The volcanic eruptions create safety problems of crowd management at the edges of unstable craters.

Volcanic cracks throughout the Kilauea area make building-site selection difficult. Considerable damage to road surfaces along the Chain of Craters results from frequent earthquakes. Water mains must be placed above ground to prevent ruptures from quake activity.

SOILS

The most significant soil feature is its lack of depth. Permeability is excellent. The water table is extremely low, just above sea level. The frostline is at 5,000 feet.

Much of the park is covered with essentially unweathered lava. There is soil to several feet in depth at Kipuka Puauolu, Kipuka Ki, and elsewhere on the lower slopes of Mauna Loa. The soil consists of recent ash deposits over highly weathered ash.

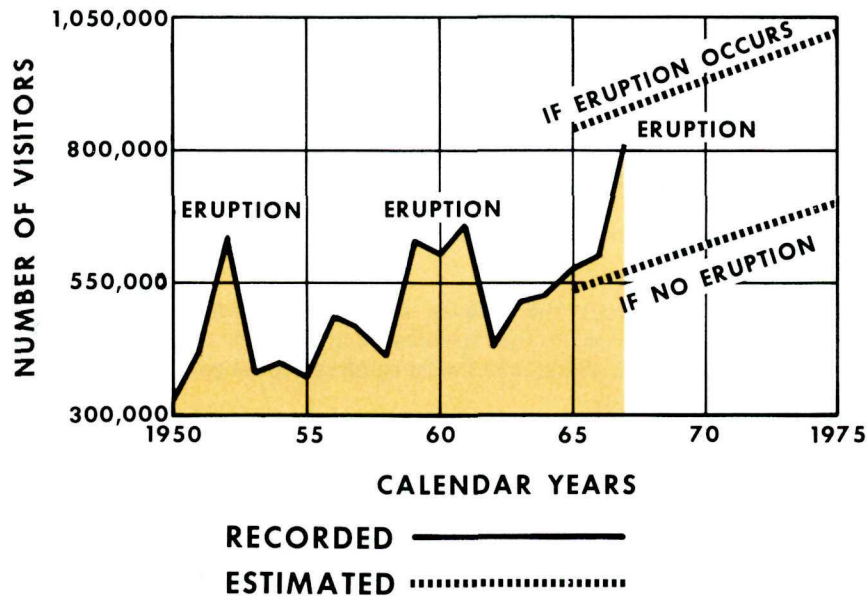
WATER SUPPLY

There are no running streams in the park and few on the Island of Hawaii, due to the extremely porous fresh lavas. Water for domestic use in the Kilauea area is collected from extensive rain sheds. Current storage capacity is about 3½-million gallons.

VISITOR USE

Visitor use of Hawaii Volcanoes National Park is year-round, 90 percent day use, and increases greatly during periods of volcanic activity. Visitation averages 40,000 to 60,000 a month in the "off-season" from September to May, and between 60,000 to 80,000 a month during the summer.

ANNUAL NUMBER OF VISITORS



Visitation is from four basic sources:

Park Visitation Statistics
1967 Estimated Use from Traffic Counter

Total Visits (from traffic counter)	786,166	
Off-Island Visitors (Tour & U-Drive)	300,000	38%
Kilauea Military Camp	80,000	10%
Local Island Residents	200,000	26%
Subtotal	580,000	
Park Administrative Use	206,166	26%

The majority of off-island visitors see the park in organized tours. Kilauea is a major stop on the Hilo-Kona (and reverse) tours. Eight companies serve the park, using 11-passenger limousines and larger conventional buses. They carried 175,000 visitors through the park in 1967. In the summer, 700 to 800 persons tour the park each day; the "off-season" average is about 400. The tours are usually in the park between mid-morning and mid-afternoon and almost all make a lunch stop at the Volcano House.

The balance of off-island visitors see the park in rental automobiles. There are presently over 650 rental cars available on the island. Of the average 280 cars rented each day, 81 percent are driven to the park.

Residents use the park somewhat less than off-island tourists, but make up a greater portion of eruption-viewers. They also come to picnic, sightsee, hike, and, to a limited extent, to camp and fish. The farthest islander resides within a 2½-hour bus drive of the park and more than half the 62,000 residents live within an hour's drive. Their use is almost entirely during the day.

Limited park recreational resources and an adverse climate greatly limit overnight use. Local residents prefer recreational activities associated with the island's warm beaches and shoreline.

The Kilauea Military Camp receives the greatest overnight use. The camp provides a complete, week-long vacation program for active and retired members of the Armed Forces and their families.

Park visitation increases greatly during periods of volcanic activity. Thousands of people flock to the park—mostly between dusk and midnight—to see the vivid eruption displays at Halemaumau and along the Chain of Craters. Crowds to 20,000 a night have witnessed the more dramatic eruptions. Overnight use increases somewhat during eruption periods and Volcano House is usually full.

VISITOR USE TRENDS

A continuing rising trend in park visitation is the result of the tremendous increase in tourist travel to the Hawaiian Islands, the recent increase in popularity of the "Outer Islands," and the direct flights between Hilo and the mainland. The completion of the Chain of Craters road in June 1965 stimulated use by opening a one-day loop trip through the park from Hilo.

Park visitors engage in a variety of activities:

OVERNIGHT VISITATION

HAWAII VOLCANOES NATIONAL PARK

1963–1967

Activity	1963	1964	1965	1966	1967	Average Annual Increase
Volcano House	10,538	13,132	12,628	14,253	14,909	+ 9.5%
Namakani Paio Cabins	—	—	112	431	1,137	+ 48.0%
Camping	723	647	1,606	2,631	1,179*	+ 19.3%
Backcountry Use	1,175	588*	1,204	1,124	1,021	— 4.3%
Subtotal	12,436	14,367	15,550	18,439	18,246	
Kilauea Military Camp	38,785	40,018	43,533	52,216	57,542	+ 10.5%
Total Over- night Visits	51,221	54,385	59,083	70,655	75,788	+ 10.2%

* Decrease due to change in method of counting camper use.

Automobile Sightseeing

Automobile and bus sightseeing is the most popular activity and enjoyed by virtually all visitors. Many points of interest are made available by 58 miles of good park roads and can be readily seen in one day.

Air Sightseeing

Two air-tour companies run daily flights which include the park; these are steadily increasing. During periods of exceptional eruption activity, the island airlines and charter services make numerous flights over the eruption site, resulting in air congestion during certain periods.

An estimated 20,000 persons viewed the park by air in 1967, averaging 100 daily in the summer and 30 to 40 in the off-season.

Attended Interpretive Talks

Interpretive talks throughout the year at the Kilauea Visitor Center are a major part of the interpretive program. Daily programs include a talk and a color film presentation of recent eruptions. The presentation of talks is geared to the tour pattern. They are suspended during periods of unusual eruptive activity when interpretive contact is shifted to the eruption site.

Attendance at interpretive talks in 1967 was 147,364 visitors, up substantially from the 100,736 of 1960.

Attended Stations

Manned information and interpretive stations are located at the Kilauea caldera rim and at Wahaula Heiau on the Kalapana road. Visitation at the Kilauea visitor center was 176,973 in 1967.

Self-guiding Interpretive Trails

Hundreds of persons daily hike three trails—Devastation, Bird Park, and Thurston Lava Tube. Halemaumau Trail across the floor of Kilauea caldera is a long, 3-mile nature trail that receives much less use. The Footprints Trail in the Kau Desert has only light use.

Backcountry Use

Only 1,021 visitor-days of backcountry use were recorded in 1967, mainly along the coast below Hilina Pali. Ocean fishing at Halape, Kakiwai, and Apua Point is good. There is a limited amount of hiking along the coast and to the summit of Mauna Loa. Rough terrain and the lack of fresh water deter back-country use. There are two overnight cabins on the Mauna Loa trail, one at Red Hill at the 10,000-foot level and another on the eastern edge of the summit caldera.

Camping

Three small campgrounds have a total of 222 camping spaces. Total camper days in 1967 were 11,179. The major reason for this light use appears to be the cool wet weather present around Kilauea. In addition, the coastal area lacks potential for traditional recreation uses such as swimming, boating, or fishing which are the usual focal points for campground development in Hawaii.

Hotel, Lodges, Cabins

Three types of visitor overnight accommodations are located on or near the Kilauea caldera rim:

The Volcano House and its successors have been used by visitors from all over the world since 1866. The present structure is a 125-guest-capacity lodge directly on the Kilauea caldera rim. Overnight use is light except during the summer and periods of eruption activity. The return of almost constant lava lake activity to Halemaumau in November 1967 brought greatly increased use. The occupancy rate during the peak month of August was 80 percent.

The renowned Volcano House receives heavy luncheon patronage from bus tours. The 181-seat dining room is overcrowded during peak periods. The lunch count averages 400 to 500, with peaks of 800 to 900 during the summer, holiday periods, and eruption activity. There were 160,684 lunches served in 1967—a 440 daily average.

Namakani Paio Cabin is a 10-unit facility operated by the Volcano House and constructed by the National Park Service in 1965 to provide low-cost overnight accommodations. Each unit sleeps four and has an outside picnic table, grill, and lights. There is a central washroom with hot showers. Visitors can bring their own bedding and cooking utensils or rent them from the concessioner.

Use of this facility was initially very light, but has been growing. Heaviest use is in the summer and during eruption periods. The occupancy rate is still quite low, not reaching 50 percent for any month of operation.

Kilauea Military Camp provides a complete, year-round recreational vacation program within its 50 acres for active and retired members of the Armed Forces and their families. The camp is on the Kilauea rim and provides overnight accommodations for 300 people. Its program includes guided tours of the park and surrounding points of interest, tennis, bowling, and other indoor sports activities, and golfing just outside the park.

The camp operates under a National Park Service special-use permit and has been in existence since 1916. It is commanded by an Army officer who has a 57-man complement of Army, Navy, Air Force, and Marine Corps personnel, and 24 civilian employees.

It operates at capacity during the summer and at 55 percent capacity during off-season. There has been increasing off-season use. The house count for the past 3 years was:

1965	—	43,533
1966	—	52,216 (up 20% over 1965)
1967	—	57,542 (up 10% over 1966)

The vacation program is usually for 5 days and is a well-rounded, well-run, low-cost program. There is a limit of stay of 7 days. The general public does not have use of these facilities. No expansion is planned.

Fishing

Fishing from the park shoreline is done by hook and line, throw net, and spear. The coast from the Puna-Kau District line west to Kapao Point (15 miles) is open to public fishing under permit from the park superintendent. Access to this area is by trail. Management of the permit system is difficult.

The remaining coastline, known as the Kalapana Extension (15 miles), is limited by law to sport and commercial fishing by native Hawaiian Kalapana residents and persons under their guidance. Enforcement of this limitation is difficult and island residents think the law unfair.

Other Water Activities

The rough ocean waters greatly limit boating, swimming, scuba diving, and skin diving.

Horseback Riding

There have been saddle horse operations in the Kilauea area in previous years, but none at present. The trail system around the Kilauea caldera is good for horseback riding.

Picnicking

The three small picnic locations in the Kilauea area, the two along the pali section, and one at Kamoamoa on the coast receive only moderate use.

Hiking

There are 159 miles of trails in the park, providing short hikes in the Kilauea area and longer ones to Mauna Loa summit and the coastal backcountry. Use of the short trails is substantial; backcountry trails receive light use—not more than 100 hikers a year hike to the Mauna Loa summit. The Kilauea Military Camp guests use the trails radiating out of the camp.

THE PROPOSED MAUNA LOA AND HUALALAI ADDITIONS AND THEIR RESOURCES

Large expanses of primitive land surround and lie between the summits of Hualalai and Mauna Loa. Access has been limited by the rough character of the land, a pattern of ownership which has restricted public access, and the marginal economic value of the lands.

NATURAL HISTORY

Geology

Hawaii Volcanoes National Park contains only a small portion of Mauna Loa. The Mauna Loa section is 1 mile wide near Kilauea and flares out to 6 miles at the summit. Major geologic features of Mauna Loa lying within the park are the Mokuaweoweo caldera complex and the upper portions of Mauna Loa's rift zones.

About two-thirds of the major geologic features of Mauna Loa are outside the park. This includes the greater part of the dramatic southwest rift and the lower portion of the major historic lava flows.

The historic flows contain many interesting features characteristic of basalt flows, such as tubes, stalactites, stalagmites, lava-river channels, tree molds, and lily-blossom forms where pahoehoe lava has welled up through holes in accretionary lava balls.

Hualalai rises 8,271 feet above sea level over the resort town of Kailua. It rests in the rain shadow of its lofty neighbor, Mauna Kea, and has suffered very little erosion.

The last eruption on Hualalai occurred in 1800–01, when two voluminous flows poured from the northwest rift at the 5,500- to 6,000-foot level. Several lava rivers flowed seaward to form the Kaupulehu flow which overwhelmed Hawaiian villages on the shore.

About 120 cinder, spatter, and lava cones lie at the source of the volcano's most recent flows. Some of the cones reach a height of 300 feet, but most are 100 to 200 feet high. Cones are far more abundant around the summit of Hualalai than on Mauna Loa and the profile is steepened by them. Numerous pit craters, mostly small and deep, pockmark the summit of Hualalai. The larger summit cones contain crater depressions up to 500 feet deep. Much of the summit area and the Kona slope of Hualalai are covered with loose cinders and pumice from adjacent cones.

An additional geologic feature of Hualalai is xenolithic nodules which occur in great abundance on some of the basaltic flows. They are coarse crystal aggregates composed of the minerals olivine, pyroxene, and feldspar that have been brought to the surface during an eruption. Because of their significance in deducing the genesis of basaltic magmas, these nodules have received worldwide attention by earth scientists. The unweathered condition of the lavas and the fact that their composition is basaltic but low in silica make the lavas of Hualalai most attractive for a study of the nature and perhaps the causes of the change in

composition that is characteristic of the "life cycle" of Hawaiian volcanoes. In most of the other volcanoes of Hawaii, the lavas that have the particular range of composition displayed on Hualalai are weathered and so are not suitable for accurate studies.

The lavas of Mauna Loa, Mauna Kea, and Hualalai dip outward in all directions from the summits. These flows have built a generally level plateau of 150 square miles between the three volcanoes at the 5,000- to 7,000-foot elevation.

An extensive field of coarse cindery pumice deposited by lava fountains along the southeastern rift of Hualalai covers the Mauna Loa-Hualalai saddle and the slopes farther north.

Vegetation

The upper slopes of Mauna Loa from its summit to 11,000 feet are classified as unvegetated stone desert. Precipitation is light and there is year-round ground frost. Mosses appear at 11,000 feet on north-facing cracks of lava and in sheltered blister-holes. At 10,000 feet down to 8,000 feet are scattered low, gnarled pukeawe and ohelo berry shrubs, bunchgrass, and small ferns. At 8,500 feet on Mauna Loa and also on Hualalai, shrubs begin suddenly to grow taller and to be more densely distributed. Other shrubs and berries, such as pilo and kukainene, a favorite berry of the nene goose, appear. The ground frost disappears, precipitation increases, and clouds frequent the ground.

Timberline is from 7,500 to 8,000 feet. Here, the ohia is a full-grown tree, and there is an occasional silversword in a small depression. An open ohia and mamani forest is established on the aa flows at 7,500 feet down to 6,600 feet. Below the ohia-mamani forest there is koa and sandalwood.

At lower elevations to 4,000 feet, where rainfall greatly increases, the forest changes to a dense mix of koa and soapberry with tree ferns. Tall and well-formed ohia and koa are present in the "rain forest" belt between 3,000 and 5,000 feet.

One particularly fine "rain forest" section is the Honaunau Forest which is located on the leeward side of Mauna Loa and is a part of the main watershed for the coastal areas of Kealahou and Honaunau on the Kona coast. Since it is a part of the only rain forest on the leeward side of the Hawaiian volcanoes, it is of major ecological significance.

The Honaunau Forest starts at 2,200 feet of elevation and rises to 4,750 feet. It has an area of about 10,500 acres in a somewhat rectangular shape of 3½ by 5½ miles. Preliminary examination of the forest indicates that the greater part is still intact and, except where roads, trails, and clearings have been made, the native species still dominate.

The unaltered (directly by man) Hawaiian rain forest is becoming rare. Only a fractional part of this important vegetation is under full protection. In the State of Hawaii, there are only 23,000 acres under full protection (all in Hawaii Volcanoes National Park). The remainder is subject to range and commercial forest development. Although the Honaunau Forest manifests various degrees of alteration, there is every reason to believe that the native components can, in most instances, recover and restore the major community characteristics under full protection and management.

Below the rain forest to the Belt road are open pasturelands, cut flower patches, and farms growing coffee, macadamia nuts, avocados, and bananas.

At one time, most of the interior plateau country was covered by fine stands of koa and sandalwood. The sandalwood stands were destroyed during the China trade period of the early 19th century. The other interior forests were further depleted by extensive cattle grazing which has existed up to the present. Some forest sections were cleared for pasture. Only the Honaunau Forest and another smaller rain forest section, the Kahaluu Forest to the north, remain. In recent years ranchers have been fencing the lower lands up to 6,000 feet, so some recovery of sandalwood, mamani, and koa has occurred in the interior plateau. But the long-term effects of heavy cattle grazing are still noticeable in the Hualalai-Mauna Loa interior lands.

The following plant species are found within the proposed additions and are considered either rare or endangered: various species of *Bidens*, *Santalum pilgeri* and/or *paniculatum*, *Cyanea carlsonii*, *Delissea undulata*, Hawaiian strawberry, and Hawaiian rubber tree.

Animal Life

Nene are increasing on Hualalai and may be seen in the volcano's eastern slopes. The State Fish and Game Division, in cooperation with the Bishop Estate, has established sanctuaries on the eastern slopes of Hualalai and Mauna Loa (Keauhou Ranch) where nene are released and given protection. Successful reproduction resulting from pen-reared and wild nene has been observed. A third sanctuary and release site was established in 1967 on the Kahuku Ranch on the southwest slope of Mauna Loa between 6,500 and 8,500 feet, through a cooperative agreement with the Damon Estate. Seventy-five nene were released there in 1967.

There are a number of other endemic Hawaiian birds on Hualalai and the interior plateau. Among these are four honeycreepers: apapane, iiwi, amakihi, and creeper. Small numbers of the Hawaiian crow have been reported in the Honaunau Forest and on Hualalai in recent years. They are among the very last in existence, and are on the United States Department of Interior list of endangered species.

In 1967, small breeding populations of another endangered species, the Hawaiian dark-rumped petrel, were discovered in the vicinity of Puu Keokeo, a 6,800-foot cinder cone on Mauna Loa's southwest rift. No other populations of this extremely rare and threatened seabird are presently known on the Island of Hawaii.

The exotic chukar, ring-necked pheasant, and dove reside on the interior plateau and slopes of Mauna Loa and Hualalai.

Feral goats and pigs exist in fairly good numbers on Hualalai's slopes and throughout the interior lands between Hualalai and Mauna Loa. They receive relatively light hunting pressure, as access to this region is limited by landowners.

Also within the area are many insects of great interest to entomologists, including *Drosophila*.

Landscape Values

The Mauna Loa-Hualalai addition encompasses types of landscapes found nowhere else in the Hawaiian Islands. Throughout this remote area are sweeping vistas unknown to most Hawaiians and visitors.

A particularly scenic and dramatic section of historic lava flows exists on the northeast flank of Mauna Loa between 8,000 and 10,000 feet in elevation. Long, black, narrow fingers of lava of the 1880, 1935, and 1942 eruptions intermingle with prehistoric gray and brownish flows. A similar colorful section of fresh lavas occurs between 7,000 and 12,500 feet on Mauna Loa's southwest slope. This intermingling of colorful lavas is not evident on Mauna Loa's lower slopes or on Kilauea because at lesser elevations there is more vegetative cover and more rapid weathering of the lavas.

Mauna Loa's bulk is so tremendous that its size and gently sloping profile can be comprehended only from a distance. The view of the mountain is best from the Kilauea area. It is especially impressive following winter storms when snow may cap the mountain down to about 9,000 feet.

At daybreak, Hawaii's lower windward slopes are frequently shrouded by clouds, while the upper slopes of Mauna Loa and Hualalai are bathed in sunlight and crisp, clean air. From many vantage points there are views of towering Mauna Kea, the Kohalas, Hawaii's expansive interior volcanic plateau, and the foam-fringed coastline and neighboring islands. These superb views are even more interesting later in the day as clouds build, slowly fill the interior, and creep up the volcanoes. The vistas change constantly. Finally, only the summits remain open above the clouds and sometimes even they disappear.

RECREATION

The upper slopes of Mauna Loa, Hualalai, and the interior plateau country are sparsely vegetated lava flows and open pumice flats. There are no lakes or streams, though there are some patches of koa and ohia on the lower plateau that are suitable for campground and picnic sites.

ARCHEOLOGY AND HISTORY

Ahuaumi Heiau—also called Ahu-a-Umi, Ahua-a-Umi, Umi's Heiau, and the Temple of Kaili— is an ancient Hawaiian rock feature on the barren interior plateau mentioned by early Westerners in 1823, but probably not visited until later. Visitors have given many stories and descriptions reflecting the changing uses man has made of this structure, from religious use prior to the European down through the goat- and cattle-ranching era, to its use as a World War II outpost, and recently as an object of artifact- hunting.

A plan of Ahuaumi Heiau was made by Lieutenant Charles Wilkes in 1841. It is the first known drawing and represents, in this surprising place, the dry-masonry remnants of the type of major Hawaiian temples usually found close to coastlines. Wilkes wrote of the heiau:

After a day's travel they (his men) reached the site of the ancient temple of Kaili. These ruins lie equally distant from three mountains, Mauna Kea, Mauna Loa, and Hualalai. This temple is said to have been built by Umi, who with his wife, Papa, is supposed to have inhabited it when he was king of the island. The northern pyramids forming the front were originally erected by Umi, to represent the districts of the land he then governed; and as he conquered other districts, he obliged each of them to build a pyramid on the side of the temple. All these are built of compact blocks of lava, laid without cement. The building is said to have formerly been covered with idols, and offerings were required to be brought from a great distance, consisting generally of provisions. There are now no traces of these idols. The situation of the temple is at an elevation of 5,000 feet above the sea.

Other stories present the feature as ancient Hawaii's first census, with each district contributing a stone for each man, woman, and child, with the largest pile indicating the most populous district. There are other variants.

The Kaili title may refer to the family war god, Kukailimoku, held by Umi and passed down to Kamehameha the Great in historic times. This title, with a plan of the structure drawn by Wilkes, lends credence to the structure being a major ancient temple. Research now underway on ancient Hawaiian temples may shed greater light on Ahuaumi Heiau.

The Judd Trail, a typical two-horse Hawaiian trail of the mid-1800's, was an abortive attempt to connect Kona with Hilo in a more-or-less-direct line. Built by taxpayers and prisoners who worked side by side under the direction of Gerritt P. Judd, M.D. (missionary turned into His Majesty's Minister of the Interior), the trail construction was aborted through two major causes: the 1859 lava flow from Mauna Loa which crossed in front of it and left new land surface too hot to handle, let alone walk over; and the logistics of supply for a work gang getting farther and farther from food and water. Remnants of the trail are well preserved and its story is an interesting sidelight on the transportation history of Hawaii.

Ahuaumi Heiau and the Judd Trail are the only two archeologic and historic sites on the interior plateau.

FACTORS AFFECTING RESOURCES AND USE

LAND STATUS AND USE

The Hualalai summit area, the upper slopes of Mauna Loa, and the interior plateau lands are in large blocks of private, State, and Federal ownership. They lie above the productive farm and ranchlands except for portions of the proposed right-of-way corridor to the City of Refuge. The only significant development within the proposed addition is the Mauna Loa Observatory.

There are three principal landowners—the B. P. Bishop Trust Estate, the Samuel M. Damon Trust Estate, and the State of Hawaii. Almost all the lands are within State Conservation Districts.

The B. P. Bishop Estate Lands

The trust estate manages the lands of the late Princess Bernice Pauahi Bishop for the support of the Kamehameha schools. They include most of the Hualalai summit, Honaunau Forest, the interior between Hualalai and Mauna Loa, and lands above the City of Refuge. The lands under consideration for park status are mainly barren or sparsely vegetated. Most of these lands are leased on an annual basis for ranching, with the understanding that the leases will be terminated on any lands added to Hawaii Volcanoes National Park. A 7,568-acre portion of one lease is subleased to the Department of the Army as a buffer to the Pohakuloa military training activities.

The Damon Trust Lands

The Samuel M. Damon Trust Estate manages the Kahuku Ranch which extends from the park boundary at 12,500 feet on the southwest rift of Mauna Loa to the ocean. Their holdings contain the greater portion of the upper southwest rift slopes. The lands above 8,000 feet are sparsely vegetated to bare, fresh lava flows.

The State of Hawaii Lands

The State lands, essentially barren, are in three forest reserve parcels above the 8,500-foot level on Mauna Loa and a small tract of Hualalai.

The Mauna Loa Observatory, at 11,150 feet, is on a 4.05-acre tract of State land transferred to the Department of Commerce by the Territory of Hawaii for research purposes. Title remains with the State. The following groups are these:

The Environmental Sciences Services Administration (Federal) is engaged in upper air and coronagraphic studies.

The National Center for Atmospheric Research is operated under the sponsorship of the National Science Foundation by a joint university corporation. They maintain a high-altitude observatory for solar and space weather research.

Sandia Laboratories has a contract from the Atomic Energy Commission to maintain monitoring devices for detection of atomic explosions and testing for deterioration of nuclear debris.

The Weather Bureau (part of the ESSA) operates the main facility. Their research is in cloud physics and the collection of air samples to follow contamination of the earth's atmosphere.

These agencies have located at this point on Mauna Loa because of cloud-free conditions, the absence of vegetation and insects, and because other favorable upper-altitude research points, such as Haleakala, have become quite crowded, creating unfavorable conditions for their very sensitive types of research.

Recreational use of these lands has been limited to a minor amount of pig- and goat- hunting up to the 8,000-foot level and some game bird shooting on the lower slopes of Hualalai and Mauna Loa. The best hunting is at the 6,000- to 7,500-foot level. Ranchers have limited hunter use by closing the ranch jeep-access roads on the Kona side. There is some hunting by local residents who obtain keys from ranchers.

Some island residents snowplay at the Mauna Loa Observatory when the snow level drops. On Mauna Kea the snow is deeper and the surface terrain is smoother, allowing for skiing, sledding, and ski-doos.

SURROUNDING LAND USE

North of Mauna Loa and east of Hualalai in the interior plateau is the Pohakuloa Training Area. The Army, Air Force, and Marine Corps conduct maneuvers and tank, artillery, and small arms firing at this 115,353-acre training facility. There is no indication that these activities will be reduced.

An artillery and tank impact area is between the Saddle road and about 8,800 feet on Mauna Loa. Most firing is from near the Saddle road, west, toward a central impact area at 5,500 to 7,000 feet. A 2- to 3-mile buffer area on the perimeter of the impact area is maintained. Present firing practices do not present danger to lands at the 9,000- to 9,500-foot level on Mauna Loa. The impact area has been within the Mauna Loa Forest and Game Management Area. Limited public hunting on the perimeter has been allowed when training activities are not in progress.

The balance of the surrounding lands are in ranching—mostly large acreages of State and Trust Estate lands leased to ranchers.

SPECIAL CONDITIONS

At the higher elevations on Mauna Loa and Hualalai there is a virtual daily occurrence of clouds blanketing the slopes with a dense fog condition. The band of greatest concentration of fog is from 6,000 to 10,000 feet. This fog condition usually starts developing in midmorning and persists until early evening when dissipation begins.

In the winter months there is a snowline on Mauna Loa down to 9,000 feet. Depths are not great, often only a few inches each storm, though depths of up to a foot have been recorded at the Mauna Loa Observatory; at around 9,000 feet the snow does not last long. Snow at higher elevations is present some years from December to May. Most of the snowfall occurs during periods of thunderstorm activity on the mountain.

Mauna Loa has a record of producing great flows of lava from the summit caldera and rift zones to the ocean. The areas of most frequent flow activity are

the southwest and northeast rifts. Flows break out on the southwest rift and head mainly westward toward the Kona coast. On the northeast rift, they have in recent times gone north and eastward toward the Saddle area between Mauna Loa and Mauna Kea and toward Hilo, cutting the main road in the Saddle area.

PRESERVATION AND USE

PURPOSE

The purpose of the Mauna Loa and Kilauea sections of Hawaii Volcanoes National Park is to conserve the geologic features and ecosystems of two exceptional volcanoes— Kilauea, the world's most active volcano, and Mauna Loa, the classic example of a shield volcano. The Hualalai section would preserve an older and less active volcano where erosional and ecological changes have had more time to advance. The purpose of the Puna coastal area (Kalapana extension) is to provide a scenic road connecting the Kilauea Volcano region with the Kalapana coastal area and to preserve extensive Hawaiian cultural remains including the abandoned village of Kamoamoa, the important heiau of Wahaula, and several smaller heiaus.

The park thus preserves for public exhibit and scientific research nationally significant features of Hawaii's natural history and cultural background, enabling visitors to understand the powerful volcanic forces, subtle biological relationships, and human activities which produced the island environment.

MANAGEMENT CATEGORY: *NATURAL*

OBJECTIVES

To achieve park purposes, the National Park Service establishes the following objectives:

RESOURCE MANAGEMENT

Research

Support the U.S. Geological Survey's research program on volcanism which contributes invaluable knowledge needed for park management and interpretation, and encourage research in other fields of natural history and anthropology by other organizations and individuals. Research stations will be supported where they are justified.

Preservation

Preserve the evolving natural scene by protecting outstanding geologic features, such as the calderas and rift zones, steam and sulphur banks, the profile of Mauna Loa, and the associated native ecosystems.

Reestablish native ecosystems, where practical—first in areas where needed to illustrate primeval conditions in accord with the park interpretive theme, and eventually throughout the park when it becomes feasible to do so.

Control and, if possible, eliminate nonnative plants and animals in order to

protect the native biota, giving particular attention to those aggressive species which are destroying habitats of native species.

Preserve the sites and structural remains of the early Hawaiian period and historical period through a program of limited stabilization and restoration.

Museum Collections

Limit park collections of natural history specimens and artifacts to those intended for display and to those essential to study for the purposes of resource management and authentic presentation of the interpretive themes.

Assist other institutions in developing the extensive collections required for intensive research.

Boundaries and Land Acquisition

Adjust park boundaries and acquire lands for effective management, expanded interpretation, and visitor use; and preserve fully the park's unique features, particularly the Mauna Loa profile.

Preserve additional outstanding features related to Hualalai Volcano and remaining examples of disappearing native ecosystems in the Olaa and Honaunau Forests.

Provide land for routes of access which will facilitate interpretation and use of the additional resources and connect the park with City of Refuge National Historical Park.

Private Developments on Exterior Lands

Stimulate the tasteful and harmonious development of exterior lands which serve as gateways to the park.

Architectural Theme

The great variety of elevation, climate, terrain, and vegetation suggests three architectural themes.

The warm coastal area and its associated archeological values should reflect Hawaii's Polynesian history in addition to the physical setting. Major elements in the landscape are black lava flows, sparse vegetation with scattered coconut palms, and the sea. Topography is gently sloping with columnar basalt cliffs on much of the shoreline. Tropical temperatures and frequent breezes suggest open structures with protection from rain and hot sun.

The rain forest dominates the scene on the northeast side of Kilauea Caldera. Bare lava and cinders with open vistas are characteristic of the southwest side and the rim of Halemaumau firepit. Wood and lava rock are appropriate construction materials in this area. Low building profiles will minimize intrusion on the scene. Protection from frequent rains and cool breezes is also important, particularly since visitors are usually dressed for the warm coastal climate.

No vegetation exists on the lava flows above 8,000 feet and only occasional low shrubs exist for some distance below. Colors range from reddish brown to black. Buildings in these areas should be very low-profile, muted in color, and offer protection from cold winds and occasional rain.

VISITOR SERVICES AND FACILITIES

Interpretation

Develop an interpretive program predicated on the three themes of particular significance in Hawaii Volcanoes National Park. The primary story is the active volcanism from which the Island of Hawaii is evolving, as illustrated by the Hualalai, Mauna Loa, and Kilauea Volcanoes. The story of the native ecosystems and the threats to their survival resulting from introduced plants and animals is second in importance to the geologic story. Another secondary theme will be prehistoric and historic events.

Access and Circulation

Provide visitor access between the Kalapana Coast and the City of Refuge National Historical Park via the Kilauea Caldera, Mauna Loa lava flows, Hualalai summit craters, and the Honaunau Forest, so that these major features can be seen and enjoyed by the majority of visitors.

Accommodations

Develop the park essentially for day use, limiting overnight facilities to those specifically needed for the enjoyment of park resources.

Encourage gateway communities and private enterprise to develop accommodations for park visitors by limiting the overnight and dining facilities within the park.

Recognize Kilauea Military Camp as an established nonconforming use that will continue and cooperate with the Armed Forces in managing the camp so that it will attain its goals, with minimum interference to the public use of the park.

Camping

Provide campgrounds as a means of facilitating visitor enjoyment of resources.

Back-country Use

Encourage visitor enjoyment of remote areas—including the summit and slopes of Mauna Loa, Kau Desert, and the Kau coast.

Safety

Develop a strong safety program which will provide for emergency measures during eruptions and tsunamis, and also provide safeguards from the ever-present hazards along the coasts, around crater rims, in the jungles, and in those caves, deep pits, and wide cracks that are common to the park's geology.

THE PLAN

A great variety of experience awaits the visitor to Hawaii Volcanoes National Park. The foremost attraction will continue to be Kilauea Caldera where the visitor will be able to view, at close range, the active volcanic firepit at Halemaumau.

The historic and natural exhibits in Kalapana, Hualalai Volcano, the great lava flows from Mauna Loa's summit, and the Honaunau rain forest are important secondary attractions. If connected by a good standard park road, all these features could be seen easily in one day, as stops on the cross-island tour between Hilo and Kona. Tours may be either by private car or by a variety of bus tours. Thus, day use will be the major emphasis for park development and management programs.

For the visitor who travels by private car and wishes to spend more time, additional attractions will invite his attention: the Olaa fern forest, vast primitive areas from Mauna Loa to the sea, remote coastal areas, and additional historical and archeological exhibits such as the Judd Trail and Ahuaumi Heiau. Activities could include fishing, nature walks, camping, hiking, picnicking, and pleasure driving over motor nature trails (low-standard, one-way roads).

Campgrounds and hotel accommodations will be provided for those few visitors who remain in the park for more than one day.

INTERPRETATION

The interpretive program must be comprehensive and flexible—comprehensive enough to include a wide variety of natural features and archeological remains, and flexible enough to meet the needs of visitors who have differing travel patterns, education, and interests. Large visitor groups from commercial tours make regular stops at key points, imposing relatively high demands on facilities and staff for brief periods each day. These visitors must be served, as must those traveling independently and arriving continuously during the day. Furthermore, during eruptions, heavy visitation occurs at night when the molten lava is seen as spectacular, glowing red fountains or streams. The interpretive program must reach nighttime visitors whenever they congregate.

The three interpretive themes dealing with volcanism, ecology, and archeology are related since volcanism has strongly influenced the evolution of ecosystems and human developments, and there has been interaction between natural ecology and human activity. The full story of one theme cannot be related without some reference to the others. Volcanology will be the dominant theme along the Chain of Craters road, in the Kilauea Caldera area, along the road traversing historic lava flows on Mauna Loa's flanks, and along the Hualalai Motor Nature Trail. Ecology will be the dominant theme in the Naulu, Olaa, and Honaunau forests, and at other appropriate locations such as the nature trails in the Kilauea area. Marine environment will be interpreted along the Kalapana Coast and related to the Hawaiian culture. Prehistoric cultural remains along the Kalapana Coast and at the Ahuaumi Heiau will be used to interpret the archeological story. History is of minor importance but will be included where appropriate. An ecological approach to interpretation should blend themes in relation to the significance of the features involved.

The means of interpretation will include literature, talks, conducted trips, wayside exhibits, self-guiding trails, and visitor center presentations. The major interpretive facilities are indicated on the general development plan. Minor devices, such as roadside markers and signs, will be described in the interpretive prospectus yet to be prepared.

Existing facilities (with the exception of the Kilauea Visitor Center) are adequately located and in harmony with this plan's interpretive concept. The visitor center, originally constructed for geological research, is outdated. It will be replaced by an interpretive facility convenient to the rim of Kilauea's caldera where it can relate visually to the park's primary features, including the interior of Halemaumau firepit, Kilauea Iki and Mauna Loa without presenting an intrusive force. The new exhibit and audiovisual presentations can be readily associated with features in view from an observation room in the visitor center.

An innovation proposed for the elevated nature trail in the Olaa Forest is to vary trail elevations in order for users to obtain closeup views of different forest levels from the ground cover to the forest canopy, thus taking visitors into frequently missed realms of forest ecology. The upper levels will provide exceptional opportunities for observing the brightly colored Hawaiian birds that inhabit the forest canopy.

Another innovation will be a cantilevered observation structure extending from the Kalapana cliffs, near Lae Apuki, over the water to allow viewing and interpretation of the colorful fishes and other marine life.

A glass-walled parkway overlook on Mauna Loa's north side will feature outstanding views of Mauna Kea, Hualalai, the Kohala Coast, and other features mentioned in the resource descriptions.

RESEARCH

National Park Service

Many of the management problems in Hawaii's national parks result from inadequate information on native plants and the effect of exotic plants and feral animals on the very fragile, native ecology. Extensive and continuing research is the most important element in the future planning and management programs for the national parks on Hawaii. Research should include the following:

- Location of ecosystem boundaries or zonal separations.

- Degree of present community stability and guidelines for manipulating environmental factors for restoration of historic communities.

- Evaluation of the use of herbicides in the plant control program.

- Further pathological study of declining plant populations on the Mauna Loa strip.

- Present impact of the goat and pig populations on plant and animal communities, and the impact when control programs drastically reduce or eliminate the feral animals.

Ecological investigation of the Mauna Loa silversword, its past and present distribution, and method of restoration.

Oceanographic investigation along the coastline, its ecology, vanishing species, and possibilities for restoration and interpretation.

A complete study of bird populations, including the effect of the numerous exotic birds on the native bird population.

Investigation of the nene and its habitat in cooperation with the State of Hawaii Fish and Game program.

Historical and archeological investigation of coastal villages as they are associated with upland agricultural and pastoral cultures.

Study of the legend of Pele and religious ceremonies connected with Kilauea.

Further investigation of the Wahaula Heiau and the adjacent Village of Kailili.

The relative historic value of the Old Volcano House, near the present Volcano House, will be studied by the Office of Archeology and Historic Preservation. The result will determine whether or not the building should be retained and interpreted.

U.S. Geological Survey Research

This important program predates establishment of Hawaii Volcanoes National Park. Their facilities for research are in strategic locations throughout the park. No major change in the program is contemplated. New electronic developments may allow removal of many of the wires which intrude on the natural scene. The major research center at Uwekahuna is to be moved to a site off the rim. The research requires considerable space and facilities which intrude on the setting of the prime exhibit and are in the vicinity of the proposed location for a new visitor center. Established policy guidelines will assure continued cooperation between the two agencies.

MANAGEMENT

Eruption Activity

Major activity, such as the 1959 Kilauea Iki eruption, attracts huge crowds, thus presenting special management and protection problems in unexpected locations. Future major lava flows could result in the necessity of relocating one or more sections of the park road system. Eruptions from Mauna Loa will probably flow across the parkway on the north flank of the mountain, prohibiting traffic movement and requiring road reconstruction.

Park Headquarters Residential Requirements

Employee housing will be provided for rotatable employees and for those employees subject to emergency call in the event of volcanic eruption. The nearest adequate housing area where suitable rental and purchase housing is

available is Hilo, 30 miles from park headquarters. Sufficient employee housing should be provided at Kilauea near the eruption activity areas, as it is essential that park personnel be at hand to cope with sudden eruptions.

There is sufficient employee housing at park headquarters for all rotatable and emergency staff, so there is no immediate need for additional new residence construction. The replacement of some residences is required. If park staffing in the rotatable and emergency categories increases, then increased housing will be provided.

Additional U.S. Geological Survey employee residences will be constructed in the event of increases in Survey rotatable staff. The Survey will continue to provide the financing, and the Park Service will undertake the construction and maintenance of the residences under the existing agreement.

Kona Administrative Site Residential Requirements

Employee housing for rotatable employees at the City of Refuge and the Mauna Loa-Hualalai district of Hawaii Volcanoes National Park will be provided. Initial housing requirements are estimated at three residences with a maximum requirement of six.

Rental and purchase housing is almost nonexistent in the Kona area. Since employees transferring from mainland parks are unable to obtain suitable housing, an employee residential section is needed in the Kona administrative site.

Feral and Exotic Animal Control

Future research may discover new methods which would eliminate or more effectively control feral animal populations. The proposed program is based on known control methods.

Goat reduction programs since the early 1960's have resulted in substantial reductions; intensive control measures should continue.

It is unlikely that the mongoose, present throughout the island, can be completely eradicated. Reduction programs will be limited to developed areas, back-country cabins and campsites, and nene goose nesting areas.

Complete elimination of the feral pig also appears impractical because of dense vegetation and the scope of the problem. Control levels and methods should be set by an action plan based on research to determine the extent of damage to park vegetation.

The State may introduce axis deer onto the Island of Hawaii in the near future. If this occurs, they may enter the park and become a problem.

Exotic Plant Control

It is particularly important to recognize the magnitude and cost of any exotic plant control program in Hawaii. Previous programs have concentrated on selected species, such as blackberry, and then only in specific areas. For the foreseeable future, control will concentrate on Naulu Forest, Kipuka Puau, the summit of Hualalai, the setting for Wahaula Heiau, areas of heavy visitor use

around Kilauea Caldera, and other areas which may be identified through research.

Improvements in control methods may allow expansion of the program to larger sections of the park.

Kalapana Extension

The special regulation included in the Congressional act adding the Kalapana extension limits fishing along the coast between the Kalapana entrance and the vicinity of Keauhou landing to Kalapana Hawaiians and their guests. This will continue to be a management problem, particularly since it is a situation peculiar to Hawaii Volcanoes National Park, gives preference to a specific group, and involves an extensive section of coastline. No change in the status of this regulation is proposed because of the sensitive nature of minority rights.

The Kalapana Extension Act permits homesites for native Hawaiians on all lands which it authorized for addition to the park. (See legal factors under basic data, this report.) No applications for homesites have been made and it is unlikely any will. It is recommended that the provision be repealed by legislation to protect potential wilderness areas and to prevent a nonconforming use.

Fencing

Complete fencing of the park boundaries below 7,000 feet is essential to the effective control of feral goats and pigs. Fencing of specific areas within the park to improve management and plant and animal control may also be necessary.

Fees

The Land and Water Conservation Act requires a fee from all federally owned park and recreation lands where feasible. It is proposed that fees be charged at Hawaii Volcanoes when the reconstruction of the circulation in the Kilauea area is completed. Entrance stations will facilitate control of all sections of the parkway and all major park features and facilities. Proposed locations are the entrances at Kalapana, Kilauea, Mauna Loa, City of Refuge, and Keokea. (See also City of Refuge fee collection.) A future State road may be built from Kiholo Bay up to the northern slope of Hualalai and join the parkway at Ahuaumi Heiau. If this road becomes a reality, an additional entrance station at Ahuaumi will control the Hualalai area.

State Highways in Hawaii Volcanoes

Highway 11 within the boundaries of the national park is maintained by the State, but remains under the legal jurisdiction of the Service. Continuation of this status is recommended.

Air Tours

Flights over Halemaumau, both charter and scheduled, are increasing. They are becoming a distraction to visitors on the ground, as well as a safety hazard. It is recommended that liaison be established with F.A.A. to determine a feasible method of controlling all flights to insure maximum safety for all visitors on the ground and on the flights.

Kilauea Military Camp

Use of this facility is exclusively for active and retired members of the Armed Forces and their families and is nonconforming. After construction of a new access from Highway 11, it will remain within the park but be separated from the formal park operation and fee structure. Screen planting between the camp and the road along the caldera rim will complete the separation.

Job Corps Camp

When the operation is ultimately discontinued, it is recommended for use as a research center and N.E.E.D. camp.

Environmental Awareness Program

Management programs will seek to foster a better understanding of the cultural and natural values of the Island of Hawaii, through the establishment of environmental study areas within Hawaii Volcanoes National Park. While further research may identify several appropriate sites, Bird Park appears to be the best opportunity to begin the program as an environmental study area.

Mauna Loa Observatory

The proposed parkway will pass approximately 2,000 feet below this important scientific installation and there are plans to improve the access road. However, since it is important that there be no disturbance to the extremely pure air which is of paramount importance to the research programs, it is proposed that public access be prohibited.

Administrative Roads

An escape road east of Kilauea is reserved for emergency use only in the event an eruption cuts the existing Crater Rim road. The terrain traversed by the escape road has no unique features not found along park roads now open for public use, which eliminates its consideration as a potential motor nature trail. It is proposed that this road remain for emergency use only. The road is gated and locked.

The existing administrative jeep road to the summit of Mauna Loa, hardly more than a track, will be phased out when helicopter service for research activities can replace vehicle transportation.

Mauna Loa Cabins

The existing cabins at Red Hill and on the summit will be retained for management and visitor use.

Water Supply

The present collection system for the Kilauea vicinity will be inadequate for future expansion of facilities. The addition of more rainsheds and increased storage capacity can solve the problem although this will entail use of additional lands. A second and preferable solution would tie in with the public water system on the island, which is now being extended from major water sources toward the park's eastern boundary.

Water for proposed developments on Hualalai and Ahuaumi may pose serious problems; rainfall is light, there is no surface water, and no known available subsurface supply. A special investigation will be necessary before development plans are drawn.

The temporary transporting of water to the Kalapana area is on an emergency basis and limits public use. The State and county should be encouraged to complete their water supply system as soon as possible, so that the Kalapana system can make connection.

Ranching Operations between Ahuaumi and Honaunau Forest

The proposed parkway will pass through existing ranching operations on the western slopes of Mauna Loa. Several access points and cattle underpasses will be required. The access points are not for public use and will require locked gates. If the cattle operations cease in the future, the use of access points will be discontinued.

DEVELOPMENT

Carrying Capacity

This is the most important element in establishing programs for development, interpretation, and use of park resources. However, programs outlined in this report are based mainly on projected visitation which in only specific cases approaches carrying capacity.

Three factors primarily govern the carrying capacity of the Hawaii Volcanoes National Park resources, which include Mauna Loa, Hualalai and parkway sections (proposed): they are the physical and indirect ecological impact of the visitor on the park resources; the quality of the park experience; and the safety of visitors during volcanic activity.

A peculiarity of visitor use at Hawaii Volcanoes is that, during periods of eruption activity, night use often exceeds day use, thereby greatly extending the carrying capacity of the resource.

In a park which ultimately will extend across the island from Kalapana to the City of Refuge, the resource can support a great number of persons. However, fragile resources such as Bird Park, Thurston Lava Tube, and Olaa Forest can carry only limited numbers, since overcrowding would drive out the bird population or trample irreplaceable native plants.

Separate groups of visitors can view and utilize the farflung park resources at the same time. Almost all, however, will seek the Kilauea rim area during their visits

and, more specifically, the Halemaumau firepit. This feature can be viewed from two overlook points.

Therefore, the carrying capacity for the park is based on the number of persons that can be at the two overlooks, Halemaumau and Uwekahuna, during a visitor day, or 10,000 (see chart). Carrying capacities for selected fragile resources, such as the Wahaula Heiau and Bird Park are listed as a guide in preservation.

Section of the Park	Controlling Factors	Duration of Stay	Number at One Time	Persons Per Hour	Daily Carrying Capacity	Hours of Use
Halemaumau Overlook	Safety	30 min.	250	500	5,000*	10
Uwekahuna Overlook	Safety	30 min.	250	500	5,000*	10
Thurston Lava Tube	Ecological impact					
	Park experience	20 min.	100	300	3,000	10
Devastation Trail	Park experience	30 min.	100	200	2,000	10
Bird Park	Ecological impact	1 hour	100	100	1,000	10
Wahaula Heiau	Park experience	30 min.	100	200	2,000	10
Naulu Forest	Ecological impact	1 hour	100	100	1,000	10
Chain of Craters Overlooks (6)	Safety	1 hour	200	200	2,000	10
Kamoamoa	Park experience	1 hour	200	200	2,000	10
Backcountry—coastal	Facilities	Day or more	200–300	N.A.	200–300	24

* During eruption periods this carrying capacity is greatly exceeded by management of traffic around the crater rim road and control of visitors at the overlooks. Crowds up to 20,000 per day have been handled during major eruptions.

Access

The proposed 110-mile parkway from Kalapana to the City of Refuge will be the means for access and interpretation of resources administered by the National Park Service and will be a connecting link to certain State and county parks along proposed and existing State scenic routes. It also will help to connect existing and proposed resorts. Except for approximately 25 miles of road from Ahuaumi Heiau to City of Refuge, the parkway will be within the expanded park boundary. Thirty miles from Kalapana to Kilauea are already completed as part of the Hawaii Volcanoes National Park road system.

Lower standard roads accessible from the parkway will lead to campgrounds, picnic areas, and trailheads, or function as interpretive routes through areas of special botanical or geological value. Horse and foot trails will follow routes of special interest for those who wish to experience the wilderness.

Kilauea Area Development

Increasing visitation, fee collection, and construction of the parkway will complicate traffic movement in the Kilauea area. The accompanying plan recommends a reorganization of the circulation system and relocation of certain facilities to accomplish the following:

Reduce the number of park entrances to simplify fee collection.

Allow easy circulation of buses and private cars during the noon hour congestion.

Relocate the U.S. Geological Survey research facility to the park headquarters area.

Relocate an expanded visitor center convenient to the rim of Kilauea Caldera, in the vicinity of Uwekahuna, and constructed in such a way that it will not be an intrusion on the scene.

Design circulation so that visitors will proceed from the entrance to the visitor center and then to the concession, remaining caldera rim, and other points of interest. An overpass at State Route 11—Bird Park Junction—will become the major Kilauea entrance.

Provide an improved interpretive viewing facility near the rim of Halemaumau with special attention given to the unstable crater rim.

Provide short-order lunch facilities in the vicinity of the Volcano House, if such facilities are not provided outside the park.

Expand and relocate the post office in a location convenient to park visitors and employees.

Close Kilauea Military Camp access to Rim Drive and provide a separate entrance from State Highway 11.

Provide convenient ingress and egress for park employees.

Continue to provide an escape route to be used during eruption periods.

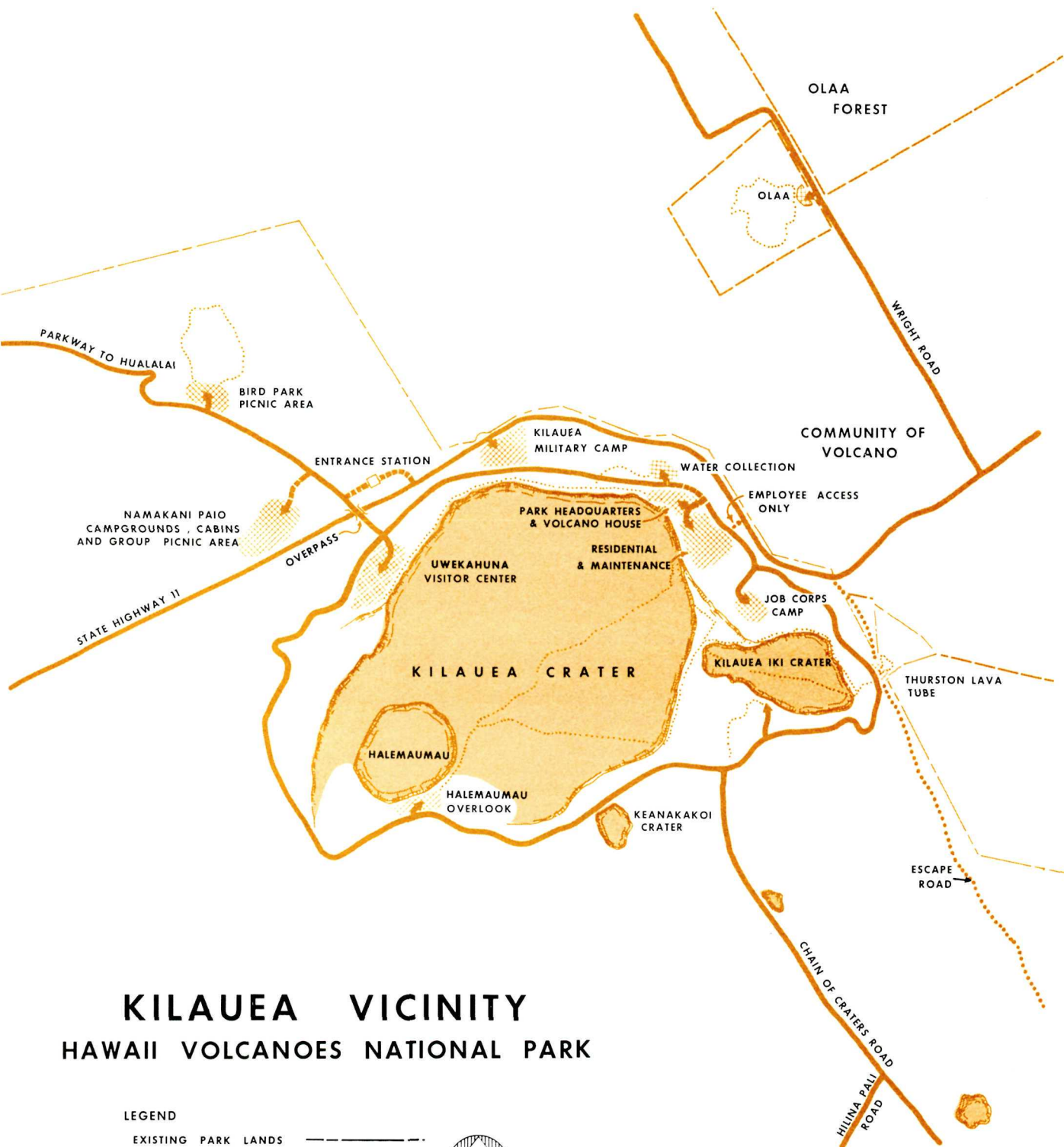
Kalapana Coast

Proposed and existing facilities along the coastal section of the Kalapana road consist of a series of scattered small developments; each is associated with a specific resource and its appropriate use. Attractions include the historic features at Wahaula, Kamoamoa, and Kailili; camping and picnic sites; and coastal overlook points.

Concentration of facilities in one location would ignore many of the excellent natural and historic features which the visitor would enjoy.

Historic Preservation

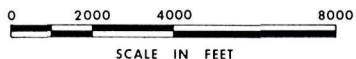
Wahaula Heiau will be restored as nearly as possible to its original form, including selected structures, based on research findings.



KILAUEA VICINITY **HAWAII VOLCANOES NATIONAL PARK**

LEGEND

- EXISTING PARK LANDS
- PROPOSED ADDITIONS
- EXISTING ROADS
- PROPOSED ROAD
- TRAILS



LEGEND

EXISTING PARK LANDS ———

PROPOSED ADDITIONS - - - - -

MAJOR ARCHEOLOGICAL SITES 

KAMOAMOA

INTERPRETIVE TRAILS
CAMPGROUNDS
PICNIC AREA

WAHAULA HEIAU

VISITOR CENTER
ENTRANCE STATION
INTERPRETIVE TRAILS
MAINTENANCE & RESIDENTIAL

COAST ORIENTED
INTERPRETIVE STRUCTURE

KALAPANA VICINITY

HAWAII VOLCANOES NATIONAL PARK



Kailili Village will be restored to a limited degree in order to exhibit the life of the early Hawaiians.

Other significant sites, such as Kamoamoa and Kealakomo, will be stabilized to preserve them in their present state.

Hilina Pali Motor Nature Trail

The existing road from the Chain of Craters to Hilina Pali is low-standard and receives little use. The road terminus is the main trailhead to the coastal backcountry. As traffic increases, it is proposed that the road be extended along the top of Hilina Pali and looped back to Kipuka Nene to become a motor nature trail. Interpretation will emphasize kipukas, views of the distant coastline, and the intervening palis, formed by faulting. The proposed road will be designed to protect the ecological integrity of the Kipuka by staying on its perimeter.

Hualalai and Ahuaumi Development

Locations for all facilities on Hualalai and the central plateau are only approximate. Considerable additional planning will be necessary to determine the best location for all facilities with regard to available water and fragile natural and historic features.

Ahuaumi Heiau will be stabilized, pending further research, and no major facilities such as campgrounds and picnic areas will be located on the immediately surrounding pumice flats.

Honaunau Forest Development

Precise road, trail, and exhibit shelter locations must await completion of research projects which will determine measures needed to protect the native forest's integrity. The parkway will pass along one side of the block of forest lands to be conserved, rather than through the center.

Administrative Site for Kona District

Residential and maintenance facilities for both City of Refuge and the Hualalai-Honaunau section of Hawaii Volcanoes will be included in a development adjacent to the proposed parkway and the existing belt road. A small area for growing Hawaiian plants (discussed further under the City of Refuge plan) will also be included.

Volcano House

This facility will be expanded in accordance with the new concession contract, effective January 1, 1968. The terms include a building program of not less than \$300,000 for expansion of the dining room, cocktail lounge, offices, kitchen facilities, and tour drivers' dining room; landscaping and reconstruction of the porte cochere; construction of employees' dormitory; and razing of existing

quarters. The expanded facility will provide for about 1,200 persons during the lunch period and 200 in overnight accommodations. This is considered to be the maximum future expansion allowed, based on estimated carrying capacity for this particular rim area. Provision of additional facilities in gateway communities will then be encouraged, since it is not desirable to extend development to other portions of the rim.

Campgrounds

All existing campgrounds will be upgraded and expanded to Class A standards and will include space for both tent campers and the camper units which are now becoming available in the islands on a rental basis. New campgrounds will be constructed to the same standards. The number of proposed sites—125 individual sites and 6 group sites for the entire park—is based on estimated future demand rather than carrying capacity, which is considerably more. If future demand increases greatly, the resource base exists to handle considerable additional campgrounds.

Back-Country Use

The Kalapana coast and mountain backcountry have received only limited use in the past. The proposed primitive campsites along the coast of Keauhou Landing, Apua Point, and Kakiwai will include simple shelters and water storage tanks, as there is no groundwater available in the backcountry. Activities will include hiking, fishing, and camping.

A proposed wilderness trail will lead from Ahuaumi to the existing trail at the summit of Mauna Loa.

Specialized Interpretive Structures

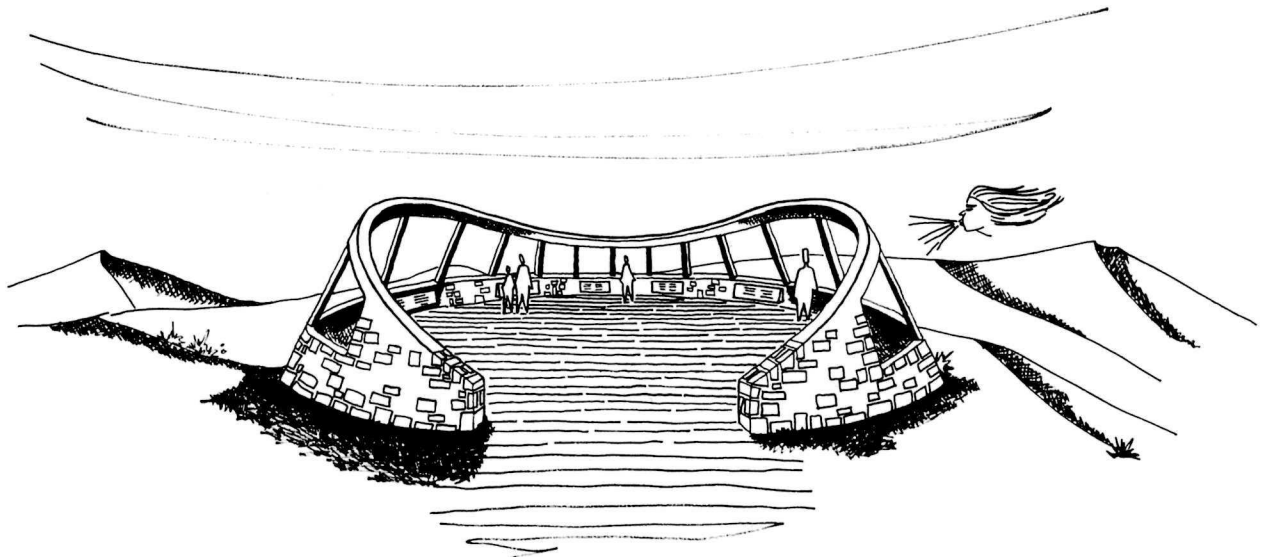
The coastal cliffs along the Kalapana road provide excellent views of marine life in the crystal-clear water directly below. An interpretive structure is proposed for construction into the cliffs to assist the visitor to see the sea life.

The Olaa Forest Tract is divided into two sections by Wright Road. The larger section is to remain a primitive area and is proposed as a research study area. The smaller section on the Kilauea side will have limited facilities for interpretation. Because of the extremely fragile nature of the fern forest ecology, the proposed nature trail, approximately ½-mile long, will be an elevated walk for minimum disturbance to the native plants and soil. The trail should be designed for 50 persons per hour. Previous suggestions for a one-way interpretive drive were discarded as being a mechanism for introduction of exotics and of a scale which would not satisfactorily interpret the forest. The tract will remain a detached area from the park.

There are expansive views of the interior basin of Hawaii, Mauna Kea, the Kohala Mountains, and the Island of Maui from the parkway along the north flank of Mauna Loa. A special enclosed structure for viewing and interpretation is proposed at approximately 9,500 feet at a point to be determined during the detailed parkway study. Shelter from the frequent cold winds will be an important feature of the structure.



OLAA FOREST TRAIL



MAUNA LOA OVERLOOK

BOUNDARIES

Kilauea caldera is the primary national park attraction on Hawaii and the center of park visitor facilities and activities. The shield volcano profile of Mauna Loa is in full view from Kilauea. Other features within the park and on adjacent lands complete the story of volcanic processes, exhibit ecological progression from volcanic materials to dense rain forest, and illustrate early Hawaiian occupation of the island. To protect these features and to provide for optimum visitor use and enjoyment, the following boundary changes are proposed:

Kilauea and Kalapana Areas

Several land parcels adjacent to the present park boundary were authorized for inclusion by Secretarial Order. However, no funds were to be expended for purchase, and they could be acquired only by donation. Proposed legislation should authorize purchase or deletion of these parcels as follows:

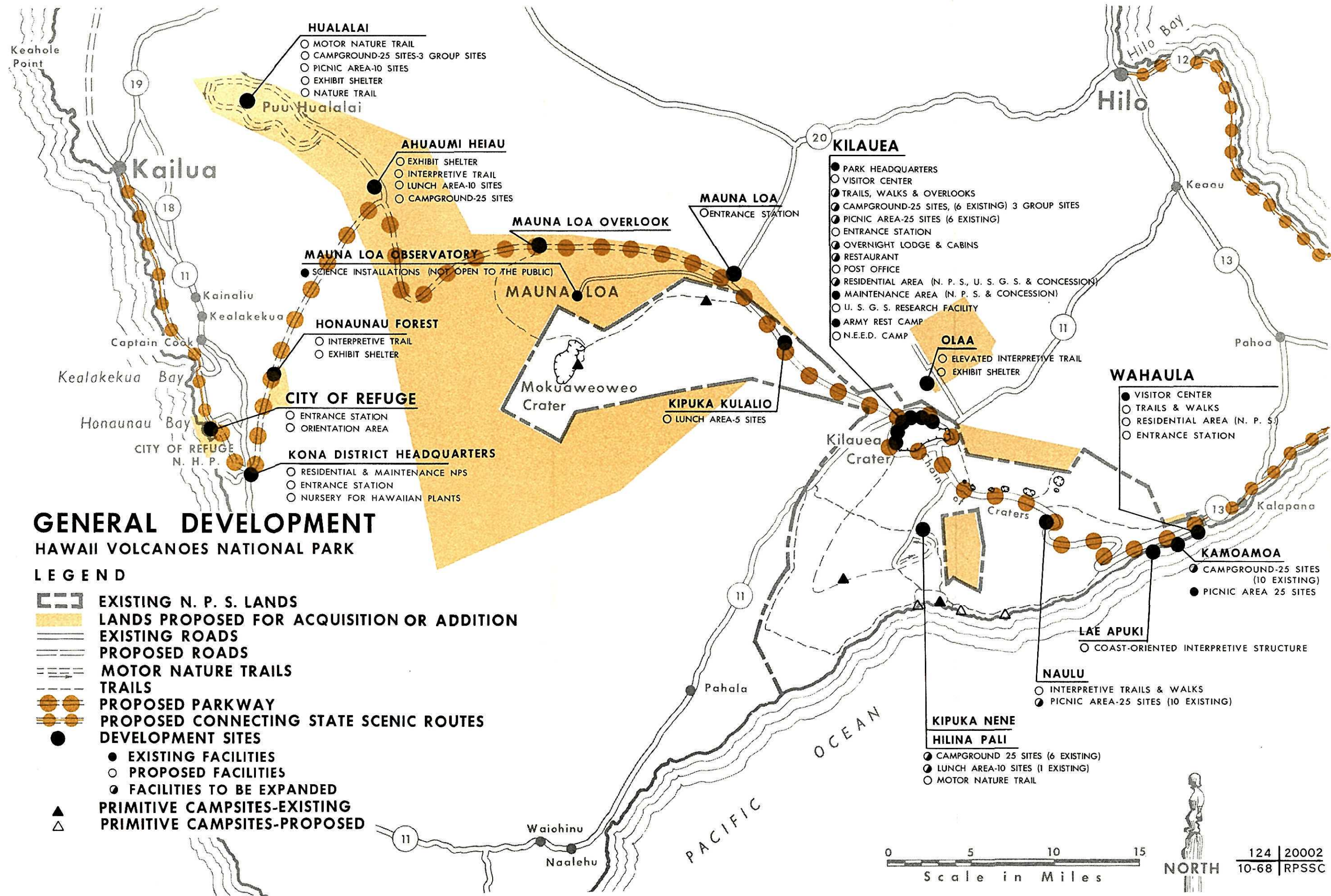
Olaa Forest Tract (9,654.67 acres): Although now under the administration of the National Park Service, this unique fern and ohia forest has never been an official part of the park. It is proposed that legislation authorize its inclusion.

Tract 20 (1,405.83 acres): These are the intervening lands between the Olaa Forest Tract and Kilauea. There is extensive subdivision, agriculture, and golf course development on these lands and no native forest of value remains. A small undeveloped parcel of 29 acres, between the Mamalahoa Highway (State Highway 11) and the Thurston Lava Tube, contains a portion of a park trail and emergency escape road inadvertently built on private land, but maintained as part of the park road system. Inclusion of this small parcel is proposed while the remaining lands in this tract should be deleted.

Tract 22 (5,794.88 acres): A fine portion of extensive virgin ohia and fern forest is within Tract 22. It is an excellent native bird habitat and would provide an additional buffer needed for the Thurston Lava Tube and Chain of Craters area.

Parcel F (6,197 acres)—Ainahou Ranch: This parcel is entirely within the boundaries of the park and is completely fenced. It is a medium-size ranch with residences, barns, corrals, and water storage facilities, and has never posed problems to the park. In fact, the ranch has assisted in the park feral-goat reduction program by allowing use of its land and fences. The ranch represents a nonconforming use within the park and a source of introduction of exotics. Purchase of this parcel is recommended to complete and restore the large ecological unit between Kilauea Crater and the sea.

Tract 19 (3,494.53 acres): This tract is on the eastern end of the Kalapana extension. A portion of it was acquired in 1961 to extend the Kalapana road right-of-way an additional 3 miles toward Kalapana. More recent subdivision within portions of this tract have made most of it unsuitable for national park status. However, existing National Park lands extend only a hundred feet from the Kalapana Road and several hundred feet from the Wahaula visitor center. Extension of nearby subdivision would intrude on the historic and natural scene. To protect the integrity of this important historic area, three parcels are proposed for acquisition—Parcel 12 (159.44 acres), Parcel 13 (113.17 acres), and Parcel 15 (portion) (146.16 acres). The remaining portion of this tract, 3494.53 acres, is proposed for deletion.



GENERAL DEVELOPMENT

HAWAII VOLCANOES NATIONAL PARK

LEGEND

- EXISTING N. P. S. LANDS
- LANDS PROPOSED FOR ACQUISITION OR ADDITION
- EXISTING ROADS
- PROPOSED ROADS
- MOTOR NATURE TRAILS
- TRAILS
- PROPOSED PARKWAY
- PROPOSED CONNECTING STATE SCENIC ROUTES
- DEVELOPMENT SITES
 - EXISTING FACILITIES
 - PROPOSED FACILITIES
 - FACILITIES TO BE EXPANDED
- PRIMITIVE CAMPSITES-EXISTING
- PRIMITIVE CAMPSITES-PROPOSED

HUALALAI

- MOTOR NATURE TRAIL
- CAMPGROUND-25 SITES-3 GROUP SITES
- PICNIC AREA-10 SITES
- EXHIBIT SHELTER
- NATURE TRAIL

AHUAUMI HEIAU

- EXHIBIT SHELTER
- INTERPRETIVE TRAIL
- LUNCH AREA-10 SITES
- CAMPGROUND-25 SITES

MAUNA LOA

- ENTRANCE STATION

MAUNA LOA OVERLOOK

MAUNA LOA OBSERVATORY

- SCIENCE INSTALLATIONS (NOT OPEN TO THE PUBLIC)

HONAUNAU FOREST

- INTERPRETIVE TRAIL
- EXHIBIT SHELTER

CITY OF REFUGE

- ENTRANCE STATION
- ORIENTATION AREA

KONA DISTRICT HEADQUARTERS

- RESIDENTIAL & MAINTENANCE NPS
- ENTRANCE STATION
- NURSERY FOR HAWAIIAN PLANTS

KILAUEA

- PARK HEADQUARTERS
- VISITOR CENTER
- TRAILS, WALKS & OVERLOOKS
- CAMPGROUND-25 SITES, (6 EXISTING) 3 GROUP SITES
- PICNIC AREA-25 SITES (6 EXISTING)
- ENTRANCE STATION
- OVERNIGHT LODGE & CABINS
- RESTAURANT
- POST OFFICE
- RESIDENTIAL AREA (N. P. S., U. S. G. S. & CONCESSION)
- MAINTENANCE AREA (N. P. S. & CONCESSION)
- U. S. G. S. RESEARCH FACILITY
- ARMY REST CAMP
- N.E.E.D. CAMP

OLAA

- ELEVATED INTERPRETIVE TRAIL
- EXHIBIT SHELTER

WAHAULA

- VISITOR CENTER
- TRAILS & WALKS
- RESIDENTIAL AREA (N. P. S.)
- ENTRANCE STATION

KAMOAMOA

- CAMPGROUND-25 SITES (10 EXISTING)
- PICNIC AREA 25 SITES

LA'E APUKI

- COAST-ORIENTED INTERPRETIVE STRUCTURE

NAULU

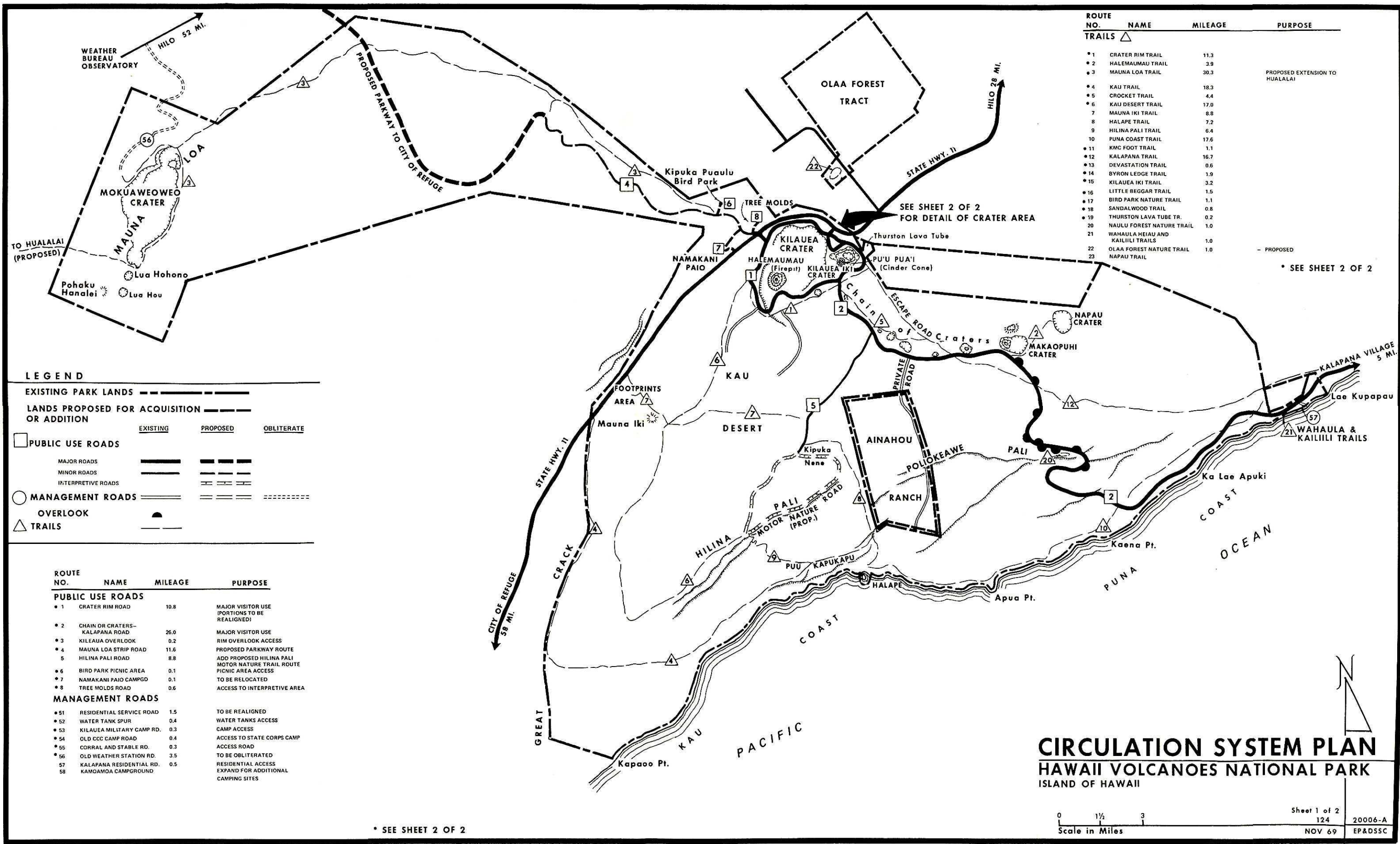
- INTERPRETIVE TRAILS & WALKS
- PICNIC AREA-25 SITES (10 EXISTING)

KIPUKA NENE

HILINA PALI

- CAMPGROUND 25 SITES (6 EXISTING)
- LUNCH AREA-10 SITES (1 EXISTING)
- MOTOR NATURE TRAIL





ROUTE NO.	NAME	MILEAGE	PURPOSE
TRAILS			
1	CRATER RIM TRAIL	11.3	PROPOSED EXTENSION TO HUALALAI
2	HALEMAUMAU TRAIL	3.9	
3	MAUNA LOA TRAIL	30.3	
4	KAU TRAIL	18.3	SEE SHEET 2 OF 2
5	CROCKET TRAIL	4.4	
6	KAU DESERT TRAIL	17.0	
7	MAUNA IKI TRAIL	8.8	
8	HALAPE TRAIL	7.2	
9	HILINA PALI TRAIL	6.4	
10	PUNA COAST TRAIL	17.6	
11	KMC FOOT TRAIL	1.1	
12	KALAPANA TRAIL	16.7	
13	DEVASTATION TRAIL	0.6	
14	BYRON LEDGE TRAIL	1.9	
15	KILAUEA IKI TRAIL	3.2	
16	LITTLE BEGGAR TRAIL	1.5	
17	BIRD PARK NATURE TRAIL	1.1	
18	SANDALWOOD TRAIL	0.8	
19	THURSTON LAVA TUBE TR.	0.2	
20	NAULU FOREST NATURE TRAIL	1.0	
21	WAHAULA HEIAU AND KAILILI TRAILS	1.0	
22	OLAA FOREST NATURE TRAIL	1.0	
23	NAPAU TRAIL		

LEGEND

EXISTING PARK LANDS ————

LANDS PROPOSED FOR ACQUISITION OR ADDITION ————

EXISTING PROPOSED OBLITERATE

PUBLIC USE ROADS

MAJOR ROADS ————

MINOR ROADS ————

INTERPRETIVE ROADS ————

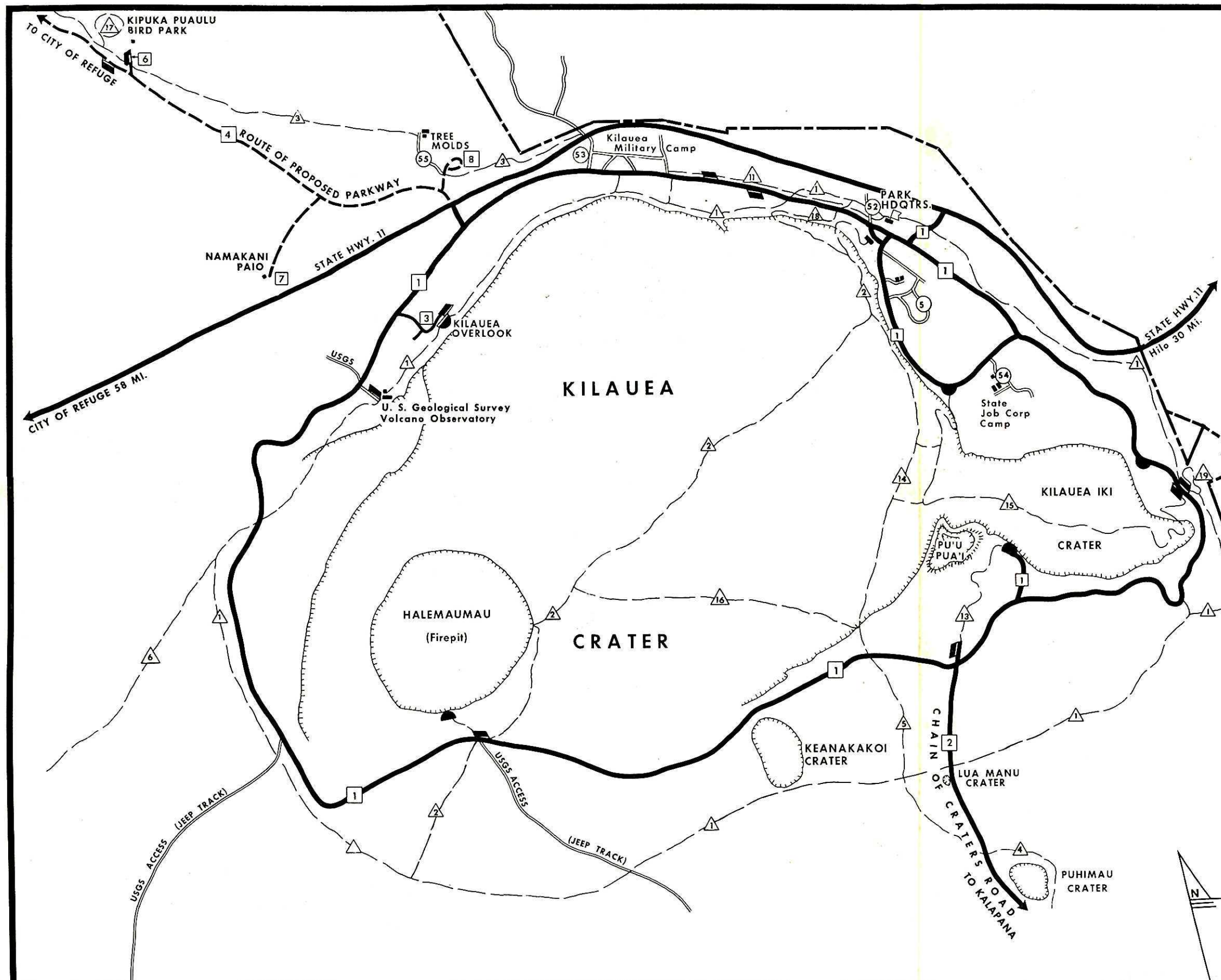
MANAGEMENT ROADS ————

OVERLOOK ————

TRAILS ————

ROUTE NO.	NAME	MILEAGE	PURPOSE
PUBLIC USE ROADS			
1	CRATER RIM ROAD	10.8	MAJOR VISITOR USE (PORTIONS TO BE REALIGNED)
2	CHAIN OF CRATERS-KALAPANA ROAD	26.0	MAJOR VISITOR USE
3	KILAUEA OVERLOOK	0.2	RIM OVERLOOK ACCESS
4	MAUNA LOA STRIP ROAD	11.6	PROPOSED PARKWAY ROUTE
5	HILINA PALI ROAD	8.8	ADD PROPOSED HILINA PALI MOTOR NATURE TRAIL ROUTE PICNIC AREA ACCESS
6	BIRD PARK PICNIC AREA	0.1	TO BE RELOCATED
7	NAMAKANI PAIO CAMPGD	0.1	TO BE RELOCATED
8	TREE MOLDS ROAD	0.6	ACCESS TO INTERPRETIVE AREA
MANAGEMENT ROADS			
51	RESIDENTIAL SERVICE ROAD	1.5	TO BE REALIGNED
52	WATER TANK SPUR	0.4	WATER TANKS ACCESS
53	KILAUEA MILITARY CAMP RD.	0.3	CAMP ACCESS
54	OLD CCC CAMP ROAD	0.4	ACCESS TO STATE CORPS CAMP
55	CORRAL AND STABLE RD.	0.3	ACCESS ROAD
56	OLD WEATHER STATION RD.	3.5	TO BE OBLITERATED
57	KALAPANA RESIDENTIAL RD.	0.5	RESIDENTIAL ACCESS
58	KAMOAMOA CAMPGROUND		EXPAND FOR ADDITIONAL CAMPING SITES

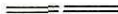
* SEE SHEET 2 OF 2



LEGEND			
ROUTE NO.	NAME	MILEAGE	PURPOSE
PUBLIC USE ROADS			
1	CRATER RIM ROAD	10.8	MAJOR VISITOR USE (PORTIONS TO BE REALIGNED)
2	CHAIN OF CRATERS		
3	KALAPANA ROAD	26.0	MAJOR VISITOR USE
4	KILAUEA OVERLOOK	0.2	RIM OVERLOOK ACCESS
5	MAUNA LOA STRIP ROAD	11.6	PROPOSED PARKWAY ROUTE
6	BIRD PARK PICNIC AREA	0.1	PICNIC AREA ACCESS
7	NAMAKANI PAIO CAMP	0.1	TO BE RELOCATED
8	TREE MOLDS ROAD	0.6	ACCESS TO INTERPRETIVE AREA
MANAGEMENT ROADS			
51	RESIDENTIAL SERVICE ROAD	1.5	TO BE REALIGNED
52	WATER TANK SPUR	0.4	WATER TANK ACCESS
53	KILAUEA MILITARY CAMP RD.	0.3	CAMP ACCESS
54	OLD CCC CAMP RD.	0.4	ACCESS TO STATE CORPS CAMP
55	CORRAL AND STABLE RD.	0.5	ACCESS ROAD
OTHER PARK ROADS			
	U.S. GEOLOGICAL SURVEY VOLCANO OBSERVATORY	8.0 (Appr.)	ACCESS TO USGS INSTRUMENTS

EXISTING PARK LANDS -----

LANDS PROPOSED FOR ACQUISITION
OR ADDITION -----

☐	PUBLIC USE ROADS	EXISTING	PROPOSED	OBLITERATE
	MAJOR			
	MINOR			
☐	MANAGEMENT ROADS			
	OVERLOOKS			
	PARKING			
<input type="triangle"/>	TRAILS			

Tracts 26 and 27 (2,052 acres): These tracts are southwest of Kapao point and are now used for grazing. They contain no known significant values which require protection or interpretation, nor is there a known threat to intrinsic values on adjacent parklands. Both are recommended for deletion from the authorized boundary.

Offshore Lands (approximately 5,400 acres)

A ¼-mile strip along the entire coast will insure protection of the intertidal zone, including the small island of Keaoi, to provide opportunities for interpretation of marine life as well as special protection of the marine life and coral reefs in the Halape area.

Hualalai and the Upper Slopes of Mauna Loa (187,000 acres)

Only the summit of Mauna Loa and a portion of the northeast rift are now within the park. The proposed boundary will include the southwest rift down to approximately the 8,400-foot elevation and to the same elevation on the north flank of Mauna Loa. The southwest rift boundary adjoins a nene refuge administered by the State Fish and Game Division. The north flank boundary will provide for construction of the parkway which will be a little above 9,000 feet in this vicinity, plus sufficient buffer between the proposed road and the non-Federal lands to the north.

Inclusion of Hualalai's summit and a corridor linking it with Mauna Loa will provide for public enjoyment of the interesting geologic and historic features on Hualalai, and allow ample space for the proposed parkway from which there are excellent views of Mauna Kea, the Kohalas, and the Island of Maui.

Parkway Right-of-Way—Ahuaumi to City of Refuge (approximately 1,015 acres).

Road location on the development plans is only approximate. Legislation authorizing park additions will include provision for a detailed road study of the entire parkway. The study will determine precise alignment within the context of the following requirements:

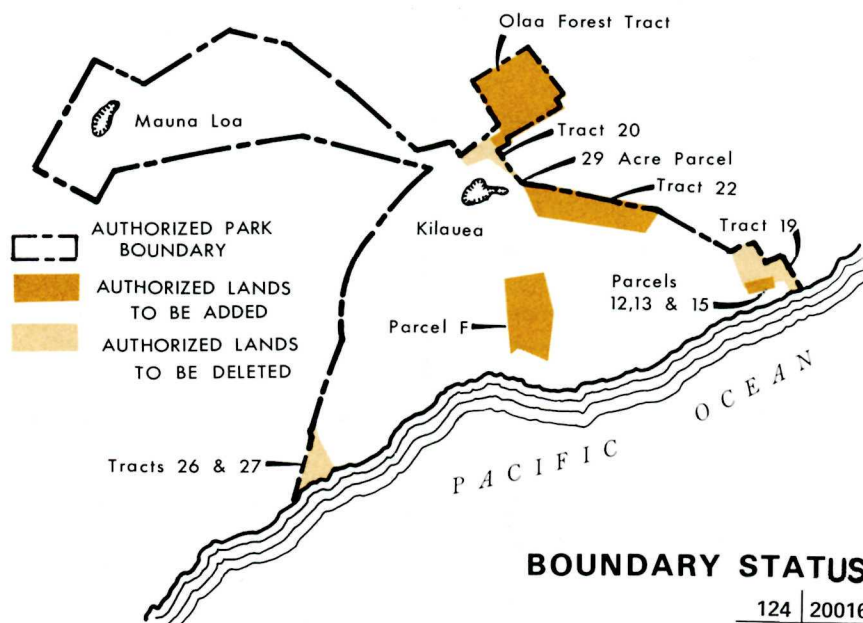
1. The parkway will remain within the proposed park boundary from Kilauea to Ahuaumi Heiau.
2. From Ahuaumi to Honaunau Forest the right-of-way will be approximately 11 miles long and 500 feet wide, and purchased in fee. About 665 acres will be required.
3. From Honaunau Forest to the parkway terminus at City of Refuge, approximately 14.5 miles, the right-of-way for parkway construction will be 200 feet wide and obtained in fee. About 350 acres will be required.

Honaunau Forest (5,000 acres)

To interpret this outstanding example of koa, ohia, and fern forest, it is proposed to purchase a portion as a representative sample.

Parkway Entrance and Administrative Site on Kona Belt Road (20 acres)

This area will be purchased in fee and will be the administrative and maintenance support base for the Mauna Loa-Hualalai section of Hawaii Volcanoes and for the City of Refuge. Residences for rotating personnel will be provided.

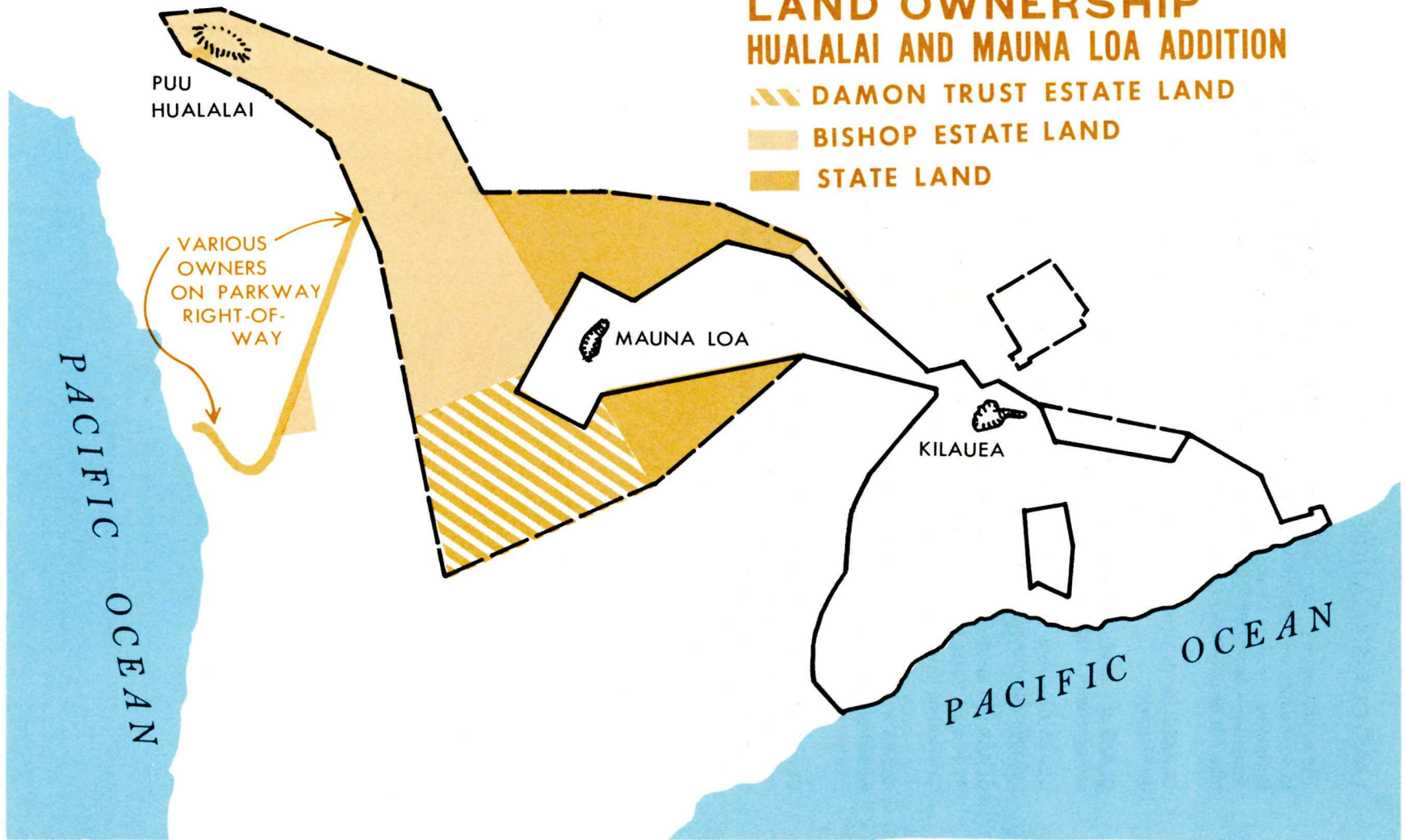


BOUNDARY STATUS

124	20016
10-68	RPSSC

LAND OWNERSHIP HUALALAI AND MAUNA LOA ADDITION

-  DAMON TRUST ESTATE LAND
-  BISHOP ESTATE LAND
-  STATE LAND



LAND CLASSIFICATION

The accompanying map classifies all national park lands, proposed and existing, in accordance with modified designations developed by the Outdoor Recreation Resources Review Commission. The land is classified as to its potential recreation use and thus includes private parcels, such as Ainahou Ranch, which may not be purchased for some time.

CLASS I - lands include only Kilauea military camp, a high-density, multiple-use development.

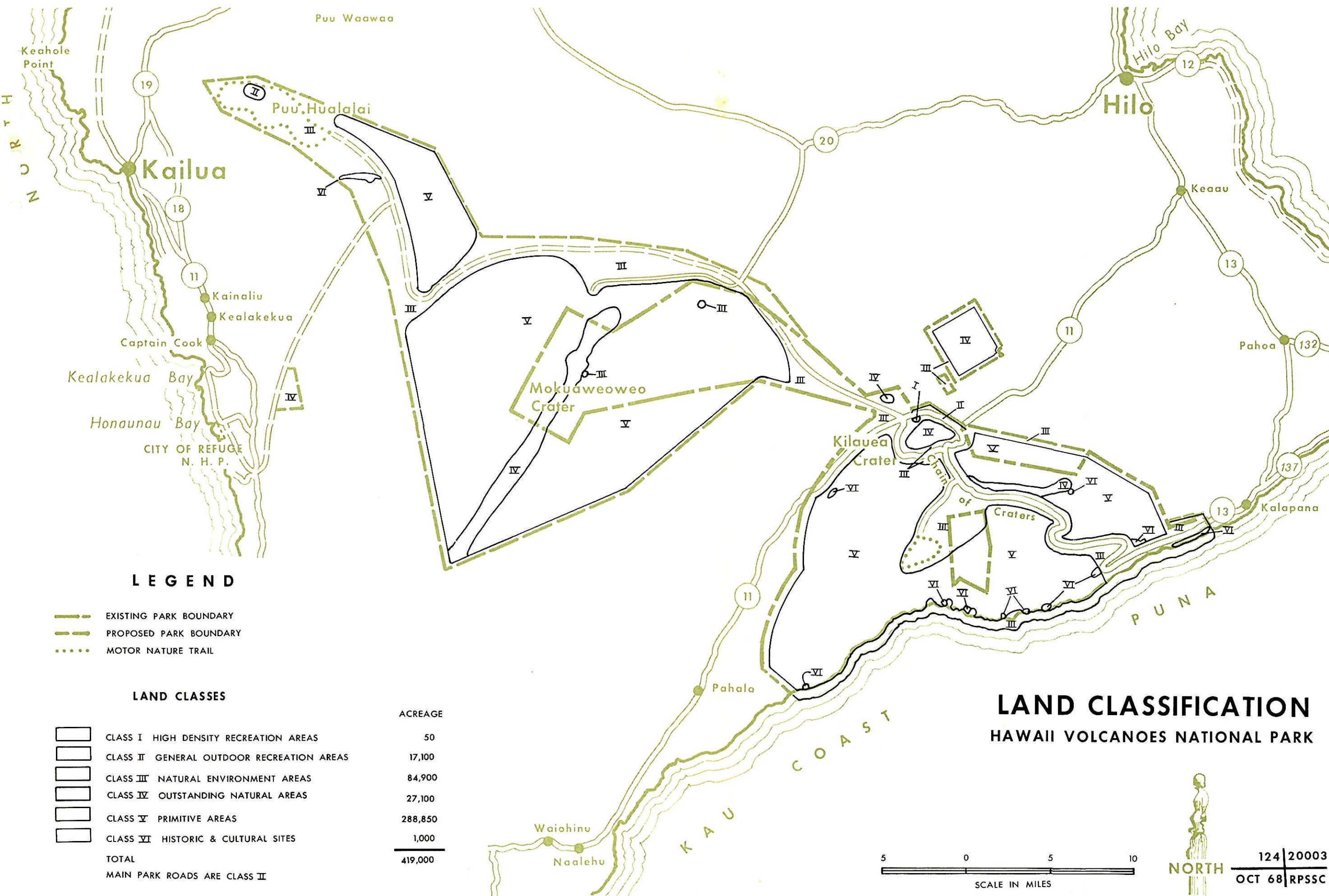
CLASS II - lands include all two-way roads and major developed areas such as campgrounds, lodges, and picnic areas.

CLASS III - lands take in the lands surrounding Class II areas and act as buffers between developments and primitive lands. One-way roads are also in this class.

CLASS IV - lands exhibit those natural features for which the park was set aside. At Hawaii Volcanoes this includes the active volcanic craters, major rift zones, outstanding kipukas, and unique sections of rain forest.

CLASS V - lands are large roadless areas which have the essential attributes of wilderness. Here they include extensive lava flows, dense rain forest, and remote coastal areas.

CLASS VI - lands include all of the major historic and archeological sites. Many other sites exist along the coast as well as inland. However they are minor and for the foreseeable future do not warrant Class VI designation, nor are there plans to restore or stabilize them.



PRIORITY OF NEEDS

PRIMARY

Fence park boundary.

Provide adequate Headquarters water system.

Replace sub-standard housing with multiple-dwelling units.

Expand research program, emphasizing management needs for feral animal and exotic plant control.

Seek legislation to designate Olaa Forest Tract as part of park, to authorize use of Federal funds for land acquisition, and to authorize a parkway connecting City of Refuge National Historical Park with Hawaii Volcanoes National Park to include a Honaunau Forest parcel.

Acquire non-Federal holdings within authorized boundaries in the vicinity of Thurston Lava Tube and Wahaula Heiau.

Place all overhead utility lines underground in the major public-use areas of Park Headquarters, the adjacent Steam Flats, and Kilauea Military Camp.

Complete stabilization of Wahaula Heiau and Kailiili Village.

Reconstruct Chain of Craters Road in accordance with National Park Service road standards and improve parking facilities.

Construct ranger shelter, hikers shelter, and water collection system at Halape.

Construct water collection system and hikers shelter at Kakiwai, Apua Point, and Keauhou Landing on the Kalapana coast.

Develop central trail terminus at Headquarters.

Acquire Ainahou Ranch.

SECONDARY

Reconstruct road circulation system in the Kilauea vicinity to facilitate fee collection and separate administrative traffic from visitor traffic in Headquarters area.

Construct parkway between Hawaii Volcanoes National Park and the City of Refuge National Historical Park.

Relocate U.S. Geological Survey research facility and construct new visitor center in Uwekahuna vicinity.

Construct entrance stations for fee collection.

LONG-RANGE

Construct marine interpretive structure in Kalapana coastal area.

Construct Olaa Forest facilities.

Stabilize secondary archeological sites.

Construct one-way motor nature trail, campground, and picnic facilities on Hualalai and Ahuaumi.

Expand existing park camping and picnicking facilities to carry capacity prescribed in the Master Plan.

**CITY OF REFUGE
NATIONAL HISTORICAL PARK**

THE RESOURCE

The City of Refuge—technically called the Place of Refuge at Honaunau or, in Hawaiian, Puuhonua o Honaunau—is on a 20-acre shelf of ancient lava that dips into the Pacific Ocean on the south edge of Honaunau Bay on the Kona Coast. The Place of Refuge was an integral part of Honaunau, the traditional seat of the Kingdom of Kona, where the kings and their courts occupied the best dwelling areas at the head of Honaunau Bay and along the shore to the south. Homes of the common people who served the court and priests were on the north shore of Honaunau Bay and inland from the chiefs' homes.

Honaunau was a religious, cultural, and political center of Hawaii until early into the historic period, shortly after Captain Cook's death (1779), when the seat of power shifted from Honaunau to Kailua, Kona, and later to Honolulu. The shift robbed Honaunau of the exalted position it had enjoyed from the time of Keawe (ca. 1650) to the rise of Kamehameha the Great (ca. 1790). Between those two periods, Honaunau was the most important place in Hawaii.

NATURAL HISTORY

The Honaunau coastal plain on which the City of Refuge sits was formed by prehistoric lava flows from Mauna Loa, followed by a coastal fault subsidence which continues today at a rate of one foot each hundred years. The park extends for about a mile along the coast, fronting portions of Honaunau and Kiilae Bays. In places, tidal areas formed by shallow lava flows extend 400 to 500 feet into the ocean. The surface of the lava is studded with small pits, crevices, and shallow basins. Several arms of the bays indent the flows.

In ancient times Honaunau was largely barren lava with shady groves of coconut, pandanus (lauhala), and kou along the coast. Pili grass, used for thatching houses, grew in the soil pockets on the lava. Several native medicinal plants grew in this region, as they do in the park today.

Thorny vegetation, such as kiawe (mesquite), was introduced in the last century and became dense enough over the entire coastal area to impede foot travel. Exotic vegetation was removed from the major portion of the park in 1962-63, restoring the landscape approximately to its original barren appearance, with occasional groves of coconut and pandanus. Some exotics have begun to re-establish themselves, and their control presents a difficult maintenance problem.

The tidal pools and offshore waters support numerous fish species, crabs, shellfish, seaweed, sea-urchins, eels, turtles, sea cucumbers, and some coral. The marine biota is distributed into four habitats—the tidepools, the protected shallow waters, the exposed rocky shoreline, and the bays. Sea-urchins, certain shellfishes, crabs, and seaweeds formed a good part of the ancient Hawaiian's diet.

Fresh and saltwater fishponds were constructed for the raising and storing of fishes, principally the mullet and milkfish, awa. A few of these once-numerous ponds remain along the Kona Coast, and a royal fishpond is within the City of Refuge.

Native shore birds inhabiting the Honaunau region are plover, wandering tattler, and ruddy turnstone. Common introduced birds are the myna, dove, cardinal, and white eye.

The only native mammal is the Hawaiian bat. The mongoose and rat, introduced into Kona many years ago, are prevalent in the park.

HISTORY AND ARCHEOLOGY

Theme

The City of Refuge encompasses a complex of ruins representing almost all phases of ancient Hawaiian culture. Although the principal values preserved by the park relate to the ancient culture, there are also a number of important historical associations. Honaunau is important today because of the events that occurred there and because of the extensive physical remains of structures associated with those events. The complex of ruins includes some of the best massive dry masonry structures of their kind and probably the best preserved in the Hawaiian Islands. Additionally, Honaunau is essentially as it always was, in contrast to the changes that have affected much of Hawaii.

Essentially, the City of Refuge story has two major themes; the first theme, XVI, *Indigenous Peoples and Cultures*, sub-theme, *Hawaii Aboriginal Culture, A.D. 750-1778*, presents the Place of Refuge concept and its importance to the common people. The theme also covers the dominant features of the Hawaiian culture: a social structure based on blood ties and the acceptance of seniority as the criterion of rights of leadership; and power attained by its ruling chiefs through belief in their direct descent in the senior lines from creator gods, as evidenced by their genealogies.

The second theme, XXI, *Political and Military Affairs, 1865-1910*, subtheme, *Hawaii History, 1778-1910*, tells of the Kamehameha dynasty and its relation to Honaunau, the ancestral home of that dynasty and the site of the sacred tomb-temple of Hawaiian royalty. Important ceremonies and events in and around Honaunau in 1782 started Kamehameha the Great on his conquest which resulted in his joining all the islands into one kingdom. Honaunau represents the growth of royal power in the Hawaiian island chain and the emergence of one family into dominance.

PRINCIPAL DETAILS

The Refuge at Honaunau

Concepts of refuge were part of the Polynesian culture and it is probable the chiefs of Kona established a refuge at Honaunau before the 16th century. The refuge was established as a sanctuary for noncombatants and defeated soldiers in time of war, for criminals, and for taboo-breakers. A man or woman who broke the kapu could escape the death penalty and all punishment at any time by entering the sacred ground of the place of refuge. There were at least five other refuges on the Island of Hawaii and one in every major district of the other inhabited islands of the Hawaiian chain.

The kapu system is the term used for the entire set of regulations and prohibitions governing human behavior in relation to the gods. It was established over the years as kahunas (priests) revealed the "will of the gods." The most ancient and fundamental kapu was the required separation of sexes for eating. Other kapus were designed to protect the land and conserve its resources; regulations pertaining to farming and fishing, water usage, and disposal of wastes came under this category.

Infractions of the kapus, even unwitting ones, would bring dire calamity to the individual and to the land if not atoned; therefore, swift and sure punishment was meted out to infractors by priests and chiefs in the name of the gods.

Places of refuge, believed to be under the protection of gods, included a heiau and were operated by priests. The gods were the spirits of dead chiefs—spirits who could lead the souls of men to safety or destruction. Upon death, certain chiefs underwent a process of deification.

All who applied to the place of refuge were admitted. There was no trial to establish guilt or innocence. War refugees stayed until the conflict was over; taboo-breakers until they were dismissed by priests—usually after a few hours or overnight. When they left, the protection went with them and they were free to return home in peace.

The Polynesian concept of puuhonua, much more fully developed in Hawaii than in any other Polynesian island group, is unique in human history; there was no judgment of the lawbreaking, the sin, or the action of the individual who sought refuge. This feature was lacking in refuge forms of all other cultures where judgment was made either within the refuge or after leaving it and punishment was common once the refuge was left. The Place of Refuge at Honaunau was the largest and most important puuhonua in the Hawaiian Islands and the only one which has remained almost intact.

Although religious sanctions were the prime force in keeping a puuhonua going and enforcing its protection of refugees, evidently some degree of physical protection was needed. The Great Wall which forms the inland boundaries of the Place of Refuge was built around A.D. 1550, perhaps for this reason. Tradition indicates that the wall was built by Keawekuiki-kaai, a ruling Kona chief. The wall is about 1,000 feet long, 12 feet high, and 14 feet wide, and is in a remarkably fine state of preservation. It was stabilized in 1963-64.

A low stone platform abuts the south leg of the Great Wall. It is reported to be Hale o Papa, the women's heiau, and was salvaged in 1963-64.

At the City of Refuge, the ruins of the first temple connected with the puuhonua stand close to the sea. Tradition says the ruling chief, Eho Kaimalino, built it in about A.D. 1200. Perhaps some of the stones from its platform were used in building the second temple, Alealea, about A.D. 1500. Alealea was not a single structure but grew by stages. From its lower levels, a carbon 14 sample was analyzed and revealed an age of 660 years, plus or minus 200 (A.D. 1100-1500). This large rectangular platform was excavated and stabilized in 1963-64.

The Hale o Keawe

A third temple was built around 1650 and was in use until 1829, ten years after the kapu system was abandoned and the practices of the old religion forbidden. The puuhonua which the temple protected ceased to function in 1819.

The third temple was known as the Hale o Keawe, or the house of Keawe. Upon Keawe's death, his bones were placed in the temple and he was declared a god, becoming the major deity of the puuhonua. From time to time, the bones of other important chiefs who were declared gods were added to the temple. Their combined supernatural power (mana) kept the place of refuge sanctified and inviolate.

The last deification of a chief took place in 1818 for a son of Kamehameha the Great. By that year, the bones of at least 23 deified kings and chiefs of old Hawaii were inside the thatched temple. Each was in an individual container. In addition to the bones of chiefs-made-gods, the bones of certain other selected male members of the ruling family were honored by burial there. It was from Honaunau, following the death of his uncle, the Kona Chief Kalaniopuu, that Kamehameha began his struggles to become king and unite the Hawaiian Islands into one kingdom by 1800. Because the bones of his ancestors and relatives were deposited there, the Hale o Keawe was not destroyed in 1819 along with the other temples. The bones of the deified chiefs and kings were removed in 1829, but the temple structure remained into the 1840's.

During the 11-year period when the Hale o Keawe was the only temple structure left in Hawaii, it was visited, described, and sketched by Europeans. The stone platform was restored in 1902, excavated in 1965, and stabilized and restored in 1966-68. The surface structure was restored in 1968.

Palace Grounds and Village

The main dwelling area of the resident king and chiefs was just outside the Great Wall adjacent to Keoneele Cove, an outrigger-canoe launching point, and to the south along the shore. Houses were one-room structures of wooden framework covered with thatch. A chief's establishment consisted of three or more houses, each used for a specific purpose. A king might have ten or more houses. In the palace grounds were royal fish-ponds, the royal housing area, and a meeting place for royalty. Many of the house platforms remain. About a quarter of a mile along the coast, south of the puuhonua, is a complex of house platforms reported to be the site of the high chief, Keawe.

Honaunau Village was inland from the chiefs' homes and also on the opposite (north) shore of the bay. The commoners lived in crudely built huts, usually one to a family. The palace grounds were kapu to commoners.

Numerous other archeological ruins, burial and shelter caves, and trails are scattered through the park, as are the walls of structures of more recent times. The most significant remains are:

Holua Slides (Sledding Tracts)—Of the four holua slides in the vicinity of Honaunau, three are in the park. These structures were used for sporting events by the royalty of ancient Hawaii. The tracts, a few feet wide and hundreds of feet long, were covered with dry grass and the participants rode down the grass chute on a sled.

Alahaka Cliff and Caves—In 1823, the Reverend William Ellis noted a number of cave shelters being used by the local people. A salvage project on two sites has yielded some interesting archeological material. Some of the caves, not yet examined in detail, were apparently used as burial chambers.

Alahaka Heiau—On the plain below the cliffs, in what was the village of Keokea, are the remains of a stone heiau platform which has some of the best prehistoric stonework in the park.

Alahaka House Site—The ancient house site at the base of the 1868 horse ramp up the cliff Alahaka (Way of the Ladder) allegedly locates the shelter of the "Gatekeeper," who collected a fee for the use of the ladder.

Oma'o Heiau—This temple ruin is located near the 1871 trail in the central portion of the park. It is the only temple that was constructed so as to make use of a natural feature; a lava squeeze-up was used as an oracle tower (anuu tower).

Ancient Trails and 1871 Horse Trail—A large number of ancient foot trails cross the park. They run mauka-makai—up and down the hill.

The "Kamehameha Highway" crosses the park and many of the mauka-makai trails. This was no highway, nor did it have anything to do with Kamehameha. It was a two-horse trail constructed in 1871. Later, the road between Honaunau and Napoopoo was constructed over the same route. The old "Government Road" connected Napoopoo, Honaunau, and Hookena.

The *Alahaka Ramp*, a portion of the 1871 trail up the Alahaka pali, connects Honaunau with Kiilae Village. This stone ramp was constructed when horseback travel was introduced to Hawaii. It is over the site of the original "Way of the Ladder." The two-horse trail was constructed in 1871, at which time the original ramp, built in 1868, was modified to its present form. It was stabilized in 1963.

Kiilae Village—The village consists of some dozen house lots enclosed by stone walls and containing house platforms, trails, shelter caves, and tapa-making shrines. The major portion of the village ruins are within the park. A part of the old village extends outside to the south along the ocean.

The village was inhabited from ancient times until about 1926. At Kiilae, recent village life was patterned after the old traditions using in many cases "modern" methods and techniques. Limited archeological testing has revealed, for example, metal fishhooks made as copies of the traditional bone hooks. Several house sites appear to be ancient but reveal only modern artifacts. Historical accounts of life there are available. In 1963-64, a few eye-witness stories were recorded.

The Kiilae Village ruins represent the latter part of Hawaiian cultural transition to modern times. Hawaiians in later years lived there in relative isolation as Honaunau was removed from the centers of trade and most of the population in Kona had moved up the slopes, settling near the Belt Road.

A *Cave of Refuge* (lava tube) was used for shelter during the many battles for possession of the island. Limited survey by the Bishop Museum in 1959 shows that the cave had been occupied. There are several entrances, a named spring at the lower end, and an abundance of midden material in the shelter.

A well-built house platform, the *Kekela's House Site*, was the residence of Queen Emma's mother, Kamehameha IV's mother-in-law.

The North Shore of Honaunau Bay

The site along the north shore of Honaunau Bay, while excluded from the park, comprises an integral part of the aboriginal Hawaiian settlement of the area. The north shore was surveyed by Lloyd J. Soehren of the Bishop Museum for the State of Hawaii in late 1967. Enlarging on previous studies, this survey identified a large number of house sites attributed to chiefs of Honaunau, small temple sites, trails, springs, dye vats, an undertermined but large number of burials, and a small holua slide. As is true within the City of Refuge, many of the aboriginal sites along the north shore have been obscured by later construction, especially stone fences and modern house sites.

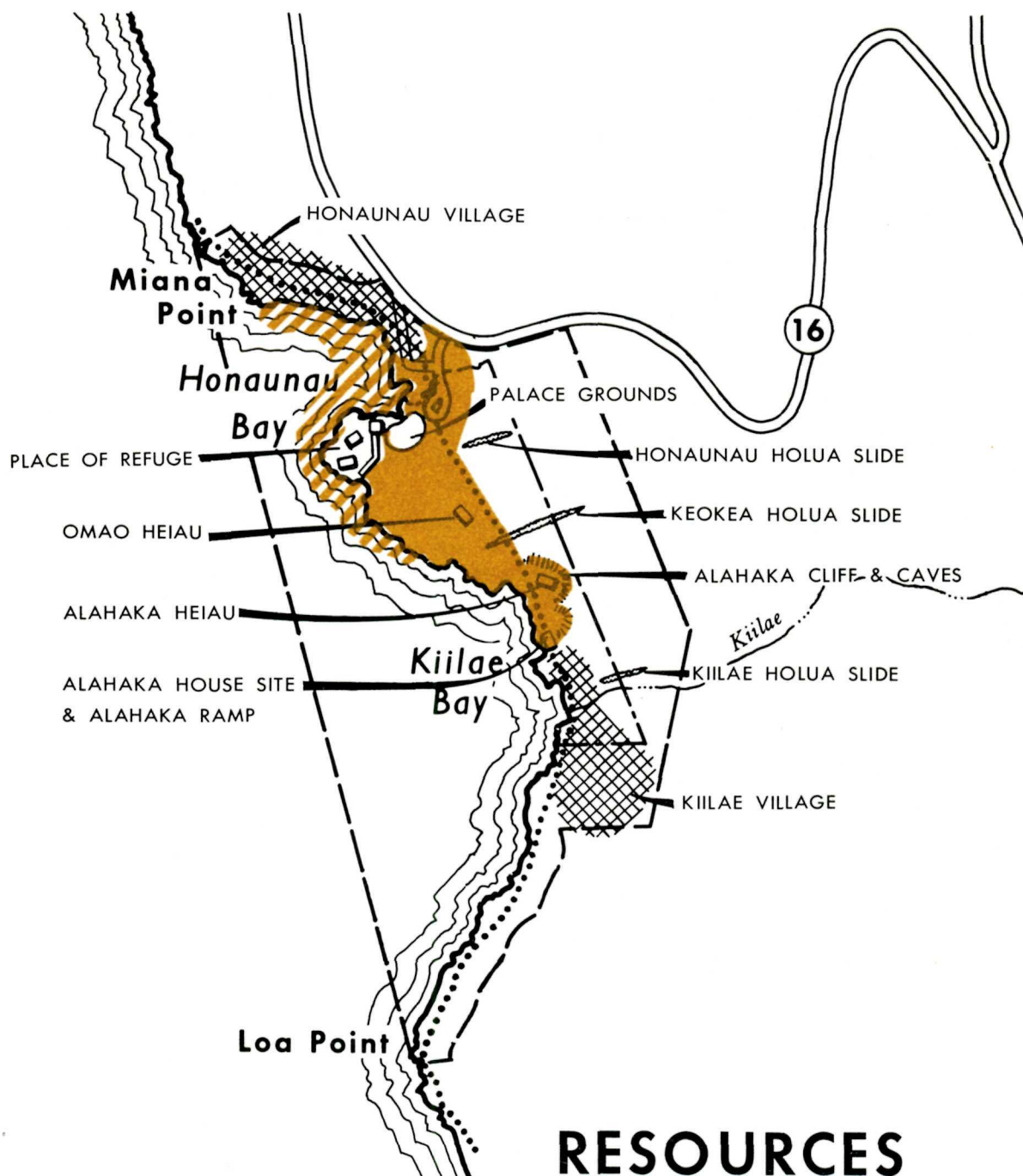
Along the north side to the shore, an irregular stone wall of undetermined antiquity extends from the northern end of the Alahaka cliffs past the head of Honaunau Bay. The wall is probably historic and built to exclude grazing animals from Honaunau Village.

The small holua slide is of considerable interest. It was probably a practice slide for beginners, who perhaps graduated to the two larger slides within the park. Only three or four practice slides are known.

Two heiau platforms near Miana Point are in fairly good condition. They were probably fishing shrines of some importance. Also noteworthy is a canoe mooring on an offshore rock near the canoe landing. It is a hole drilled through the rock to form a kind of ring through which a mooring line was passed.

The private inholdings at the head of the bay were not examined for features of antiquity. Construction of stone fences and modern houses on these lots has largely obscured any surviving remains of aboriginal occupation. In this area is the Hale Huki, which J.F.G. Stokes described as the "residence of a former chief of Honaunau." It was possibly the residence of the konohiki, the overseer of the ahupuaa, the land division of Honaunau.

In Dr. Soehren's opinion, "This area (the north shore) contains archeological features and historical associations comparable to those found on the south shore of the bay within the National Park."



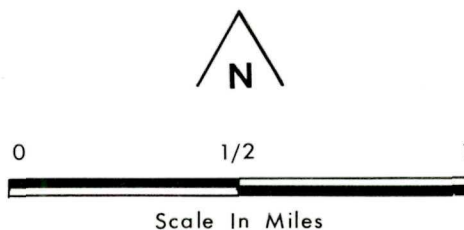
RESOURCES

CITY OF REFUGE

NATIONAL HISTORICAL PARK

LEGEND

-  CORAL & TIDE POOLS
-  AREA OF NUMEROUS SMALL
-  HISTORIC & ARCHEOLOGICAL SITES
-  1871 HORSE TRAIL
-  EXISTING PARK BOUNDARY
-  PROPOSED PARK BOUNDARY



ARCHEOLOGICAL INVESTIGATIONS AND EXCAVATIONS

The Honaunau Bay area, and particularly the Place of Refuge, has received extensive investigation. J.F.G. Stokes of the Bishop Museum undertook the first thorough research of the ruins at Honaunau in 1919. A major portion of his original research was incorporated into a study of the City of Refuge by the Bishop Museum in 1957 under contract to the National Park Service. A comprehensive report of this study, entitled *The Natural and Cultural History of Honaunau, Kona, Hawaii*, was prepared for the National Park Service. Following establishment of the park in 1961, the Service has undertaken extensive excavation, stabilization, and restoration projects and has conducted much archeological and historical research, often in conjunction with the Bishop Museum.

In the prehistoric zone of the park, archeological and historical research is less than half complete. One major project to be undertaken, the Old Heiau Site, is important to the interpretation of the puuhonua.

In the historical section of the park, archeological and historical studies have barely scratched the surface. Site survey and mapping and a study and manuscript report on history have been completed. Much excavation remains to be done. A compilation of the natural history of the Honaunau area was made for the 1957 Bishop Museum report.

THE HONAUNAU SETTING

The kings and chiefs of Kona selected Honaunau as their favorite residence because its environment was suited to their needs. It possessed a sunny, sheltered coast backed by gently rising, fertile, cloud-covered slopes ideal for raising taro, breadfruit, bananas, sweet potatoes, and sugarcane. The bay's clear, calm waters offered excellent reef and offshore fishing. Canoes could be launched in the small but deeply indented Honaunau Bay from a sandy cove. The 2 miles of shoreline, bays, and offshore waters between Miana Point on the north shore of Honaunau Bay and Loa Point south of Kiilae Bay are an important, valuable setting for the historic and archeological features of the Honaunau area.

RECREATION

The park extends along the shoreline at the mean high tide mark from the south shore of Honaunau Bay to Kiilae Bay. The lava shore is low with shallow tidal pools. Keoneele Cove, a long, shallow, partially sandy inlet of Honaunau Bay, extends into the palace grounds.

The central and northern shoreline of Honaunau Bay lies outside the park. The main beach-inlet area, Kapuwai Cove, has a larger sandier beach than Keoneele Cove and is protected by a bar about 300 feet offshore which facilitates boat launching and access. The bay has a low shoreline along its south and center sections and is higher and rockier along the north shore; it deepens rapidly. It extends about 2,000 feet across and is 1,500 feet in length. The other bay along the park coastline, Kiilae, is more open and has a rougher shoreline with no inlets or coves.

The marine biota and offshore waters are important to the historical and archeological features as well as a valuable natural resource. All along the Hawaiian coastline and in the offshore waters, the marine resources are being depleted by heavy fishing, shell-gathering, and the pressure of development. Virtually none of the Hawaiian shoreline or water has adequate protection.

The biota in the tidepools of Honaunau and Kiilae Bays is rich, varied, and colorful, and the tidepools are readily accessible by short walks along the shoreline. The clear bays afford excellent viewing of brightly colored fish which hover near submerged benches and boulders. There are large coral heads and numerous sea-urchins in the offshore waters.

Recent National Park Service efforts to restore the shoreline and inland scene to one that existed prior to Western man's appearance have used large quantities of herbicides and mechanical means. Simultaneously, there has been an increase of visitation to the Honaunau area. There is now concern that restoration, maintenance, and visitor use of the resources will cause the ocean and land ecosystems to become unstable. The major danger is the transportation of herbicides into the marine environment.

Since access to the ocean for swimming and boating is quite limited along the Kona Coast, Honaunau Bay is important to access and use. Honaunau Bay is small and consequently possesses only a limited capability for the boat access, shore fishing, netting, spearing, skindiving, and picnicking, which make the bay popular. There is essentially only one small launching point, Kapuwai Cove, for outrigger canoes and small boats. Only boats of 16 feet and under can be launched safely. The cove is also used for swimming.

The low shoreline, tidal pools, the favorable Kona climate, and the Honaunau setting are ideal for short hikes along the shoreline lava flows and tidal pools in very pleasurable surroundings. The shallow waters offshore contain marine biota of sufficient quality for underwater sightseeing.

FACTORS AFFECTING RESOURCES AND THEIR USE

LEGAL

Congress authorized the establishment of the City of Refuge National Historical Park in 1955 (69 Stat. 376, approved July 26, 1955). Three areas of land were described, and when title to the tracts was vested in the United States, the lands could be set apart upon designation of the Secretary of the Interior. This was accomplished by 1961 and the Secretary established the park by order effective July 1, 1961.

At the time of the hearings, the Service stated that all burials recovered from excavations would be reburied within the park in areas designated for that purpose.

The United States has proprietary jurisdiction over the lands within the park.

Most of the land within the park was sold to the United States by the Trustees of the Bernice P. Bishop Estate, Hawaii, for one dollar. At the time of negotiation for the establishment of the park in the 1950's, the National Park Service promised the Kona people to retain picnicking at Honaunau Bay.

LAND STATUS

All of the land within the park is federally owned, although title to a 2-acre school site has not yet been completely cleared. The park boundary extends to the high-water mark. Land below the high-water mark and the offshore waters are owned by the State. There is a detached 3.7-acre tract (Parcel 2) along the approach road about 2 miles from the park which is used as an Hawaiian garden where native plants are raised to supply interpretive and restoration material. Attached to this parcel is an easement 6 feet wide for a pipeline right-of-way from the parcel to the main part of the park.

FEDERAL (National Park Service)	180.83 acres
EASEMENT (Private Land)	1.02 acres
GROSS ACREAGE	181.85 acres

CLIMATE

The Kona side is almost entirely cut off from the trade winds which blow in against the island from the northeast. Its climate is delightfully moderate most of the year. The mornings are usually clear. Cool breezes blow onshore in the early morning; clouds form at 2,000 feet; and rain begins to fall, sometimes over the coastal area. The winds stop at night, the clouds disappear, and the cool night air flows down the mountain slopes across the coastal area toward the sea.

There is little variation in temperature from month to month. The average annual maximum is 88 degrees F. and the minimum 65 degrees F. The day-night difference is 20 degrees F. In summer there are occasional uncomfortable warm days when humidity is high and there is no air movement. Rainfall near the coast is low and remains rather uniform at 2 inches or so a month throughout the year. It is highest in June, lowest in December. The annual average is 20 inches. The maximum rate of fall is an inch an hour. Prolonged rainshowers are unusual. The construction season is year-round.

SPECIAL CONDITIONS

From December through February, high winds and hard rains occur with Kona storms. Occasionally, high seas require the closing of the shoreline sections of the park.

There is local quake activity. A serious earthquake occurred in 1951, razing many buildings in the vicinity of the park.

Tsunamis occur infrequently on the Kona Coast. There were three major tsunamis in the 1800's. Since much of the park is below the safety area (50 feet and above), a special warning system is employed by the park in cooperation with the County Civil Defense alert apparatus to warn park visitors and offshore fishermen of possible tsunamis when an alert is sounded.

FIRE HISTORY

There is no history of forest or uncontrolled grass fires in the park. The park land is mostly bare lava following removal of most of the exotic vegetation in 1962–63.

TERRAIN

Most of the park is below the 30-foot contour and is open. The land rises gradually to a fault escarpment, which is 120 feet high at its highest point within the park. The surface is exceedingly rough, with billows, pockets, cracks, and loose rocks. The escarpment is festooned by lava, like frosting on a cake. The cove and swimming beach are sandy; the balance of the park is mainly bare pahoehoe lava.

SOILS

There is little soil within the park, mostly accumulations of broken-down lava, material from the sea, and vegetal debris in pockets and depressions in the pahoehoe lava flows. On the beach are accumulations of "pepper-and-salt" sand composed of lava and coral fragments, shell fragments, and pieces of sea-urchins. The lava surfaces scar easily.

VISITOR USE

Visitor use at City of Refuge is developing into a relatively uniform pattern throughout the year. Park visitation is 75 percent nonlocal (off-island tourists) and 25 percent local (Big Island residents). During the summer, holiday periods, and weekends, the proportion is closer to 50-50. There are no provisions for overnight use.

Off-Island Visitors (75%)

Period of Heaviest Visitation	Summer Extended Holiday Periods
Average Length of Stay:	
Tour Visitor	30 minutes
Rental Car Visitor	45 minutes
Major Activities:	
Self-guiding Trails	
Conducted Walks	
Interpretive Talks	
Picnicking	
Shoreline and Tidepool hiking	
Transportation:	
Tour Car and Bus	65%
Rental Car	35%

Local Visitors (25%)

Period of Heaviest Visitation	Fall Holidays, Weekends
Average Length of Stay (varies as to activity)	1-3 hours
Major Activities:	
Picnicking	
Fishing	
Swimming	
Sea Harvesting	
Skin Diving	
Interpretive Activities	

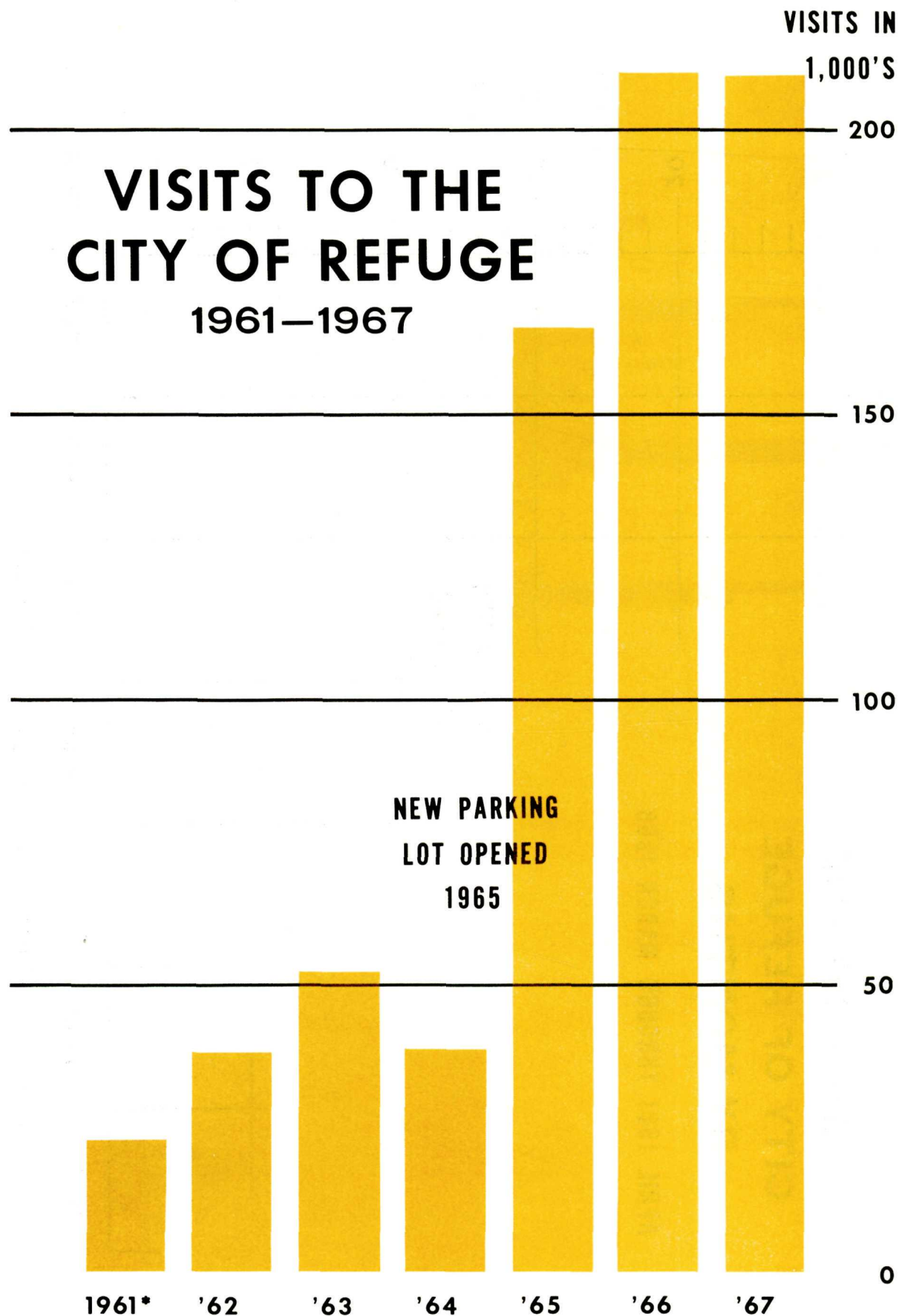
INTERPRETIVE USE

A visitor center completed in 1969 is the principal contact point. From this point, there are frequent guided tours to the Hale o Keawe, Palace Grounds and the Place of Refuge. Group size averages between 20 and 30.

A self-guiding trail also takes visitors through the most important historic and prehistoric features. About one-third of the park visitors or between 75,000 and 100,000 each year utilize the self-guiding trail.

Visitors are also given occasional demonstrations by a native Hawaiian in traditional activities such as woodcarving, food-gathering, house-thatching, net-dyeing, and toolmaking.

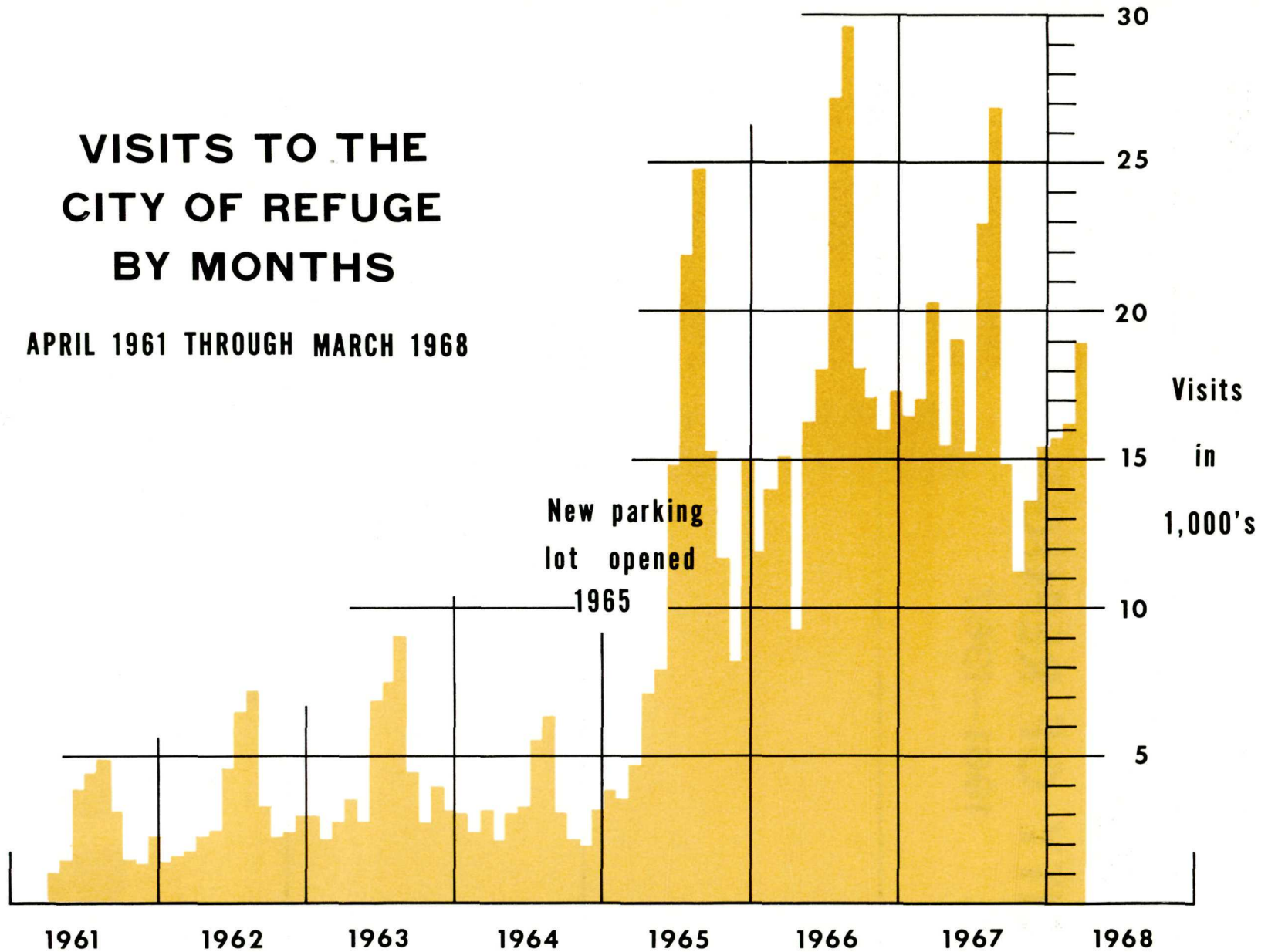
VISITS TO THE CITY OF REFUGE 1961—1967



*THE FIGURE IS FOR NINE MONTHS.

VISITS TO THE CITY OF REFUGE BY MONTHS

APRIL 1961 THROUGH MARCH 1968



Note— Peak visitation is in August in all years.

RECREATIONAL USE

Swimming

Keoneele Cove, the royal canoe landing area within the palace grounds, is used for swimming and shower facilities are provided for swimmers. The waters of the small cove are shallow and are best used by the many youngsters who wade there. Most swimmers use other portions of Honaunau Bay.

Skin Diving, Snorkeling, Scuba

A small number of enthusiasts use the park shores for access to water areas for snorkeling and scuba-diving.

Fishing and Sea Harvest

Fishermen use the park shores for pole and net-fishing of the ulua, papio, moana, and the humuhumunukunukuapuaa ("goes swimming by") and other native fishes. Night fishing is popular. Crab harvesting is done at night. Fishing is year-round with about 20–30 fishermen using the park each day. Use of the park shoreline by local fishermen is increasing.

Picnicking

There is a moderate amount of picnicking within the park. Most of the picnicking is by local people, though there is some lunching by out-of-state visitors in rental cars. Picnicking is increasing, is heavy on weekends, and is mostly in the palace grounds area where several tables are located. Picnicking within the prehistoric area is a noncompatible type of use. There is additional picnicking along the coastline and it is compatible in these areas which are outside the prehistoric area.

Camping

There are no campgrounds, but sleeping is allowed along the shore for night fishermen. There were slightly over 4,000 occurrences of this in 1967.

RESOURCE USE OF LANDS CONSIDERED FOR ADDITION TO THE PARK

Half of the Honaunau land between Miana Point and Loa Point is in the park and half is privately owned. The central and north shore of Honaunau Bay and the portion of land south of Kiilae Bay to Loa Point are outside the park and in private ownership. The waters and inter-tidelands of Honaunau and Kiilae Bays are State-owned.

Adjacent to the park is the small village of Honaunau which has a dozen older dwellings and structures, with half of them permanently occupied. The balance are infrequently used, mostly on weekends. Several are occupied by Hawaiian families that have lived there for years. Outrigger canoes and small powerboats are launched at the head of the bay at Kapuwai Cove, just outside the park. Deep sea and offshore fishing is extremely good from Honaunau 20 miles south of Milolii. Good boat-launching places are scarce along the Kona Coast and Honaunau is one of the better points for launching small outrigger and power crafts. Use of this launching point is local and light; about 15 skiffs on weekends when the weather is good.

The central Honaunau Bay area also has local picnickers, swimmers, skindivers, and spear and net fishermen. There is limited land for these activities.

The balance of the private shoreline, the north shore of Honaunau Bay to Miana Point, and the section between Kiilae Bay is uninhabited and rather rocky and rough with no good water access points for boats or swimmers. There is limited shore fishing by pole and line and some netting, spearfishing, and opihi picking. Fishing from outriggers offshore is done by locals.

PRESERVATION AND USE

PURPOSE

To preserve and interpret physical remains and the historic atmosphere of the cultural complexes associated with the native cultures that once flourished around Honaunau and Kiilae Bays. The practice of refuge before 1819, the establishment of the Hawaiian Kingdom, and the period of transition from aboriginal to modern times will be the dominant themes.

MANAGEMENT CATEGORY: *HISTORICAL*

OBJECTIVES

The National Park Service proposes the following objectives to achieve the park purpose:

RESOURCE MANAGEMENT

Research

Gain knowledge of archeological, historical, and natural resources in support of management and interpretive programs.

Maintain close liaison with the Bishop Museum and other institutions, freely exchanging data and information on research.

Preservation of Cultural Sites

In the prehistoric area, preserve prehistoric structures through stabilization and also restoration and reconstruction of the more important features. In the historic area, preserve selected prehistoric and historic structures through stabilization and restoration, but not reconstruction.

Preservation of the Setting

Restore the historical land and sea setting of the cultural sites in order to accentuate their significance, to maintain the traditional atmosphere of Honaunau, and to illustrate the ecological relationship of Hawaiians to their environment.

To protect marine resources by preventing pollution.

Museum Collections

Limit park collections of artifacts and natural history specimens to those intended for display and to those essential to study for the purposes of resource management and authentic presentation of the interpretive themes.

Boundaries and Land Ownership

Adjust boundaries and acquire land interests as required for the conservation of the environment associated with the cultural sites and their interpretation.

Development of Neighboring Lands

Seek the cooperation of State, county, and private interests in assuring the orderly and tasteful development of adjacent lands in order to preserve the Honaunau atmosphere.

Architecture

Develop an architectural theme which will relate to the prehistoric cultural significance of the park and will be in esthetic and functional harmony with the environment, considering such factors as the lava and ocean scene, high humidity, warm temperature, and prevailing winds.

VISITOR SERVICES AND FACILITIES**Interpretation**

The major interpretive theme is the Hawaiians' place-of-refuge concept, which is so well exemplified by impressive structural remains recalling a period when Honaunau was the religious, cultural, and political center of Hawaii. An integral part of the story of Honaunau concerns the growth of royal power in the Hawaiian Islands and the emergence of the Kamehameha dynasty. The theme will also explain the Hawaiians' relationship to their environment at Honaunau and how they depended on the products of the land and the harvest from the sea. The secondary interpretive theme for the park is the transitional life of the Hawaiians to circa 1925.

Recreation

Provide and manage traditional recreation—including swimming, fishing, outrigger canoeing, picnicking, and boat-launching—so there will be no conflict among the various recreational activities or any interference between recreation and the primary purpose of the park.

Access and Circulation

Cooperate with the State and county in their projects to provide scenic automobile access to the park and between the park and other nearby areas of scenic, cultural, and recreational interest.

Provide a visitor transportation system that will not encroach upon important park values.

Develop a system of unobtrusive trails for visitor access to significant features and facilities.

Facilities

Provide facilities for the day use of park resources.

Safety

Develop a strong safety program which will encourage visitors and employees to be prudent in their use of lava tubes, cliffs, and the ocean.

THE PLAN

Since its establishment as a national historical park in 1961, City of Refuge has become an island attraction second only to Kilauea Volcano. Unlike Kilauea, the values involve a fragile historic scene concentrated in a small coastal area surrounded by lands with potential for recreation and resort development.

The extensive overnight facilities planned for the Kona-Kohala Coast and a potential international airport for Keahole Point will have a profound effect on visitation and use at City of Refuge. Planning must consider a possible 500,000 visitors a year, or thousands of visitors each day, within 10 years.

The State and county park systems are proposing a large expansion of public recreation facilities at Kealakekua Bay, Palemano Point, and Hookena which directly affect planning for the City of Refuge. Continued liaison with these agencies will be an important element in all future planning, programming, and development.

City of Refuge National Historical Park will have a visitor carrying capacity of 5,300 persons per day when developed according to the plan. However, the use of the primary feature—the prehistoric area—would be limited to 2,800 persons per day.

VISITOR SERVICES

Facilities and Use

Preservation of the ancient setting and re-creation of the past is the major mission of the development program.

Access into the prehistoric area eventually will be converted to a trackless train and trail from a central site above the pali, where there will be parking and orientation. In the interim, the present parking area will be utilized.

Major interpretive facilities will remain in the vicinity of Honaunau Bay, with a guided tour of the prehistoric features and points from which visitors may enjoy trails to additional historic features, colorful tidal pools, and designated lunch areas.

Established use by local residents for fishing, swimming, boat-launching, outrigger canoeing, and picnicking will continue to be important to management and development programs for the near future. Parking space, picnic sites, and showers to accommodate these uses are proposed. The launching ramp will remain in its present location. As visitation increases to thousands of visitors each day, the demand placed on the limited park resources by a parallel increase in recreation will conflict with the primary purpose of the park as an exhibit of Hawaii's past culture. Recreation will not be discontinued at this point, but will be altered and controlled to assure that it is compatible with the park's purpose.

Later, as State and county recreation programs provide additional facilities at Kealakekua Bay, Palemano Point, Milolii, and Hookena, people will be attracted to these areas and there will be no need for competing facilities at Honaunau Bay. The ultimate phase in the plan will be to remove recreational facilities from the bay shoreline. Informal use by fishermen, skindivers, and swimmers will continue for those who wish to use park transportation or walk in from the central parking area. Lunching areas will continue to be provided. Outrigger canoes will continue to be stored and launched at Honaunau Bay to facilitate the continuation of this Hawaiian tradition.

Carrying Capacity

The carrying capacity of City of Refuge is governed primarily by the quality of experience the park visitor is to receive within the palace grounds, Hale o Keawe, and the place of refuge.

Visitors will be conducted through this area in groups of 50. The tour will take about an hour, with stops of about 10 to 12 minutes at each of five main points of interest.

The most limiting point is Hale o Keawe, where the area around the structure is quite small and continuously in the hot sun. Not more than 50 persons can satisfactorily be at this point at one time. It is estimated that 5 groups of 50 persons can tour the prehistoric area each hour, or a total of 2,500 per 10-hour day. The total park capacity is 1,000 visitors at one time and 5,300 per day.

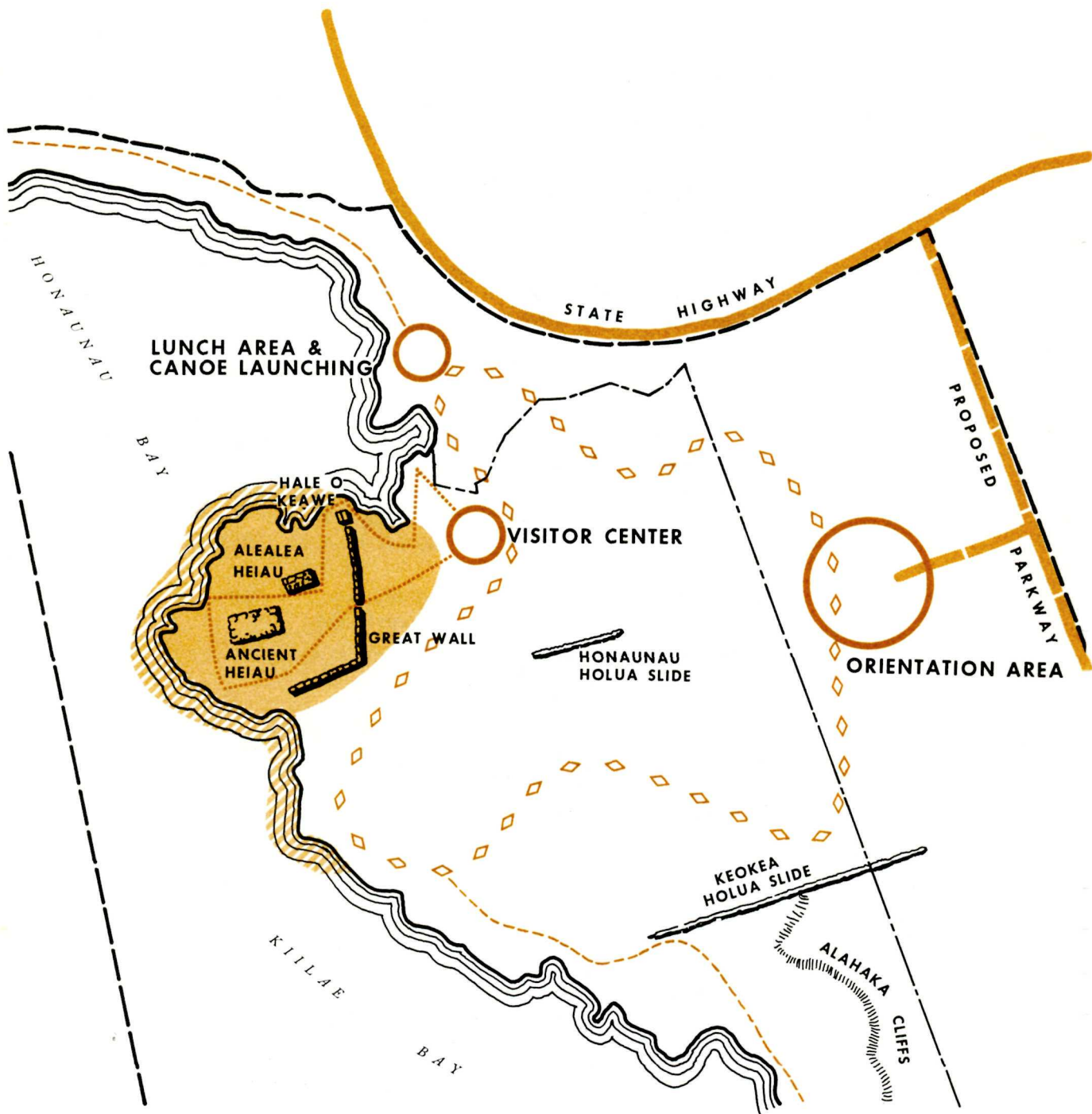
Section of Park	Type of Use	Pattern of Use	Persons Per Period of Use	Persons Per Day
Pre-Historic	Tour	Self- 7-8 a.m.	100/hour	300
		Guiding 6-8 p.m.		
		Guided 8 a.m. to 6 p.m.	250/hour	2,500
Historic (Kiilae Village)	Tour	Self-Guiding 2 hours in area	100	500
Honaunau Bay	Picnicking, Swimming, Snorkeling, Etc.	3-4 hours in area	350	1,000
South Shore	Hiking, Picnicking	2 hours in area	100	500
Tidal Pool Area	Hiking	2 hours in area	100	500
		In area at one time— Carrying capacity per day—	1,000	5,300

Interpretation

A sound interpretive program has evolved since the park was established in 1961. This program will be expanded as facilities are provided and the staff is increased to meet mounting demands. The program is based on guided tours through the fragile and heavily used prehistoric area, including the palace grounds and place of refuge. Tours led by a uniformed interpreter will start in the amphitheater after visitors have seen the exhibits in the interpretive facility. Following a brief introductory talk, groups will take a loop tour and receive on-site interpretation.

Those visitors with a commercial tour group will usually return to their bus after seeing the prehistoric area, and leave the park. Others may wish to take self-guiding trails through another part of the prehistoric area, to the tidal pools, or south along the rocky coast to Kiilae Village. Interpretation will use booklets, labels, and audio devices, as appropriate.

All interpretation will be related to the interpretive themes. For instance, the tidepool story will stress ethnobiology to illustrate how Hawaiians adapted to their environment.



LEGEND

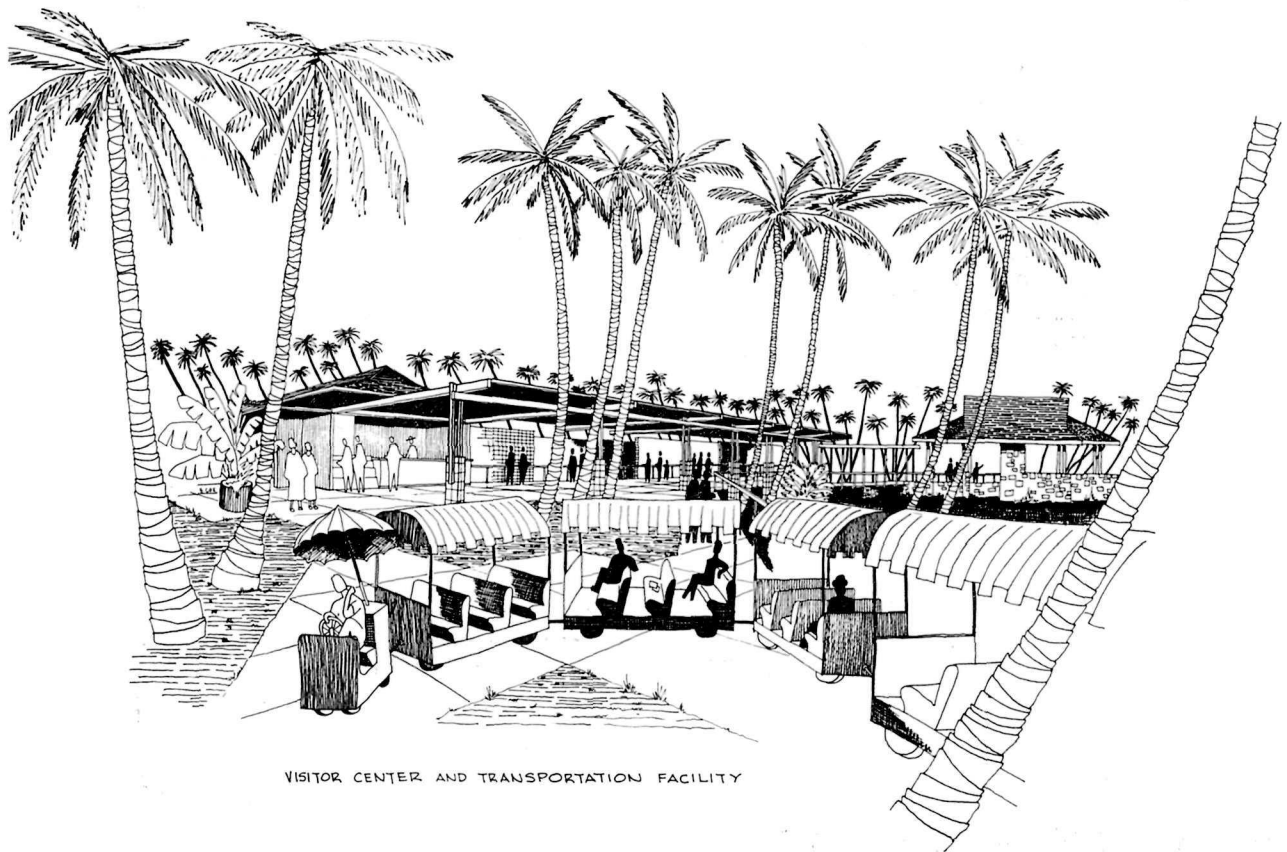
- EXISTING BOUNDARY
- PROPOSED BOUNDARY
- AREA OF PRIME EXHIBIT
- ▨ MAJOR TIDEPOOLS
- ◇◇ MINI BUS ROUTE
- CONDUCTED TOUR ROUTE
- - - FOOT TRAIL



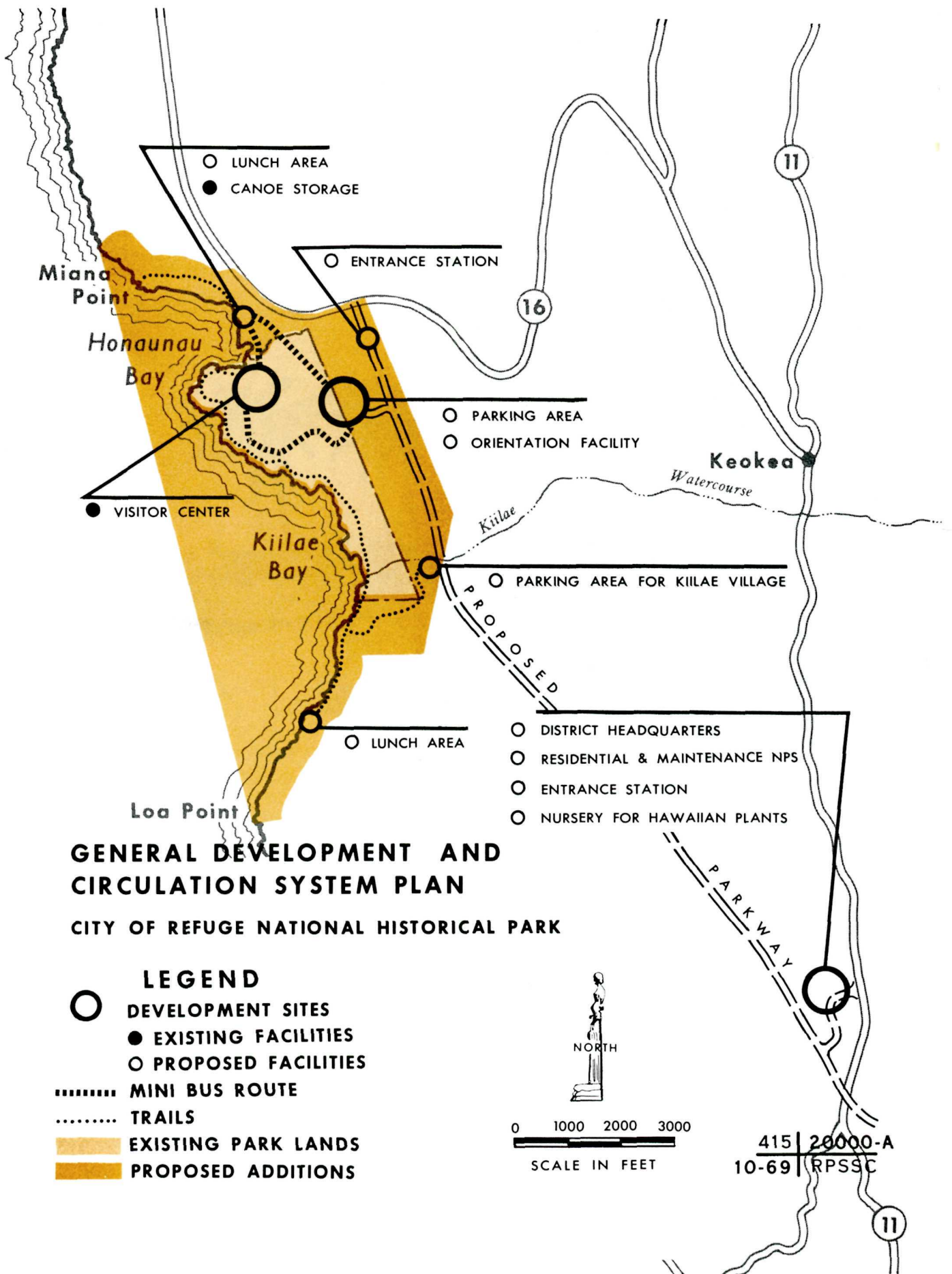
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SCALE IN FEET

VISITOR USE

CITY OF REFUGE NATIONAL HISTORICAL PARK



VISITOR CENTER AND TRANSPORTATION FACILITY



Environmental Awareness

The City of Refuge is an outstanding environmental study area and its use as such by school groups will be encouraged in order to promote a better understanding of Hawaii's cultural and natural values.

Transportation

Distances within the park are not great; however, the hot summer weather and the requirements of older visitors require the use of a transportation system to the points of major interest. The details on the type of vehicle used and scheduling will be outlined in the interpretive prospectus.

Fees

Entrance fees will be charged when the additional lands at Honaunau Bay are acquired and the circulation system makes their collection feasible.

RESOURCE MANAGEMENT

Boundaries

To preserve the values on Honaunau and Kiilae Bays and provide sufficient buffer and space for development of facilities, it is proposed to extend the boundaries to include 242 additional acres of land and 460 acres of intertidal and water area as shown on the accompanying map. The extension would include:

Honaunau Bay—Lands between the shore and the State highway on the central bay; on the north shore, the shoreline owned by the State, and 150 to 200 feet back.

South Shore, Kiilae Bay—The balance of Kiilae Village and the shoreline to Loa Point owned by the State, plus 150 to 200 feet back.

Upper Boundary—A strip of land above the pali to provide for the central parking facility and the sewage treatment plant, the upper portions of Holua slides, and a right-of-way strip for the incoming parkway.

Offshore Waters—Kiilae and Honaunau Bays between Miana and Loa Points.

Detached Parcel—The 3.7-acre detached parcel was included in the park to grow Hawaiian plants, such as ti, taro, and breadfruit, for use in the interpretive program, and as a source of native plants for restoration projects. It is proposed that this parcel be deleted.

Research

Considerable research has been done as part of the reconstruction of Hale o Keawe. Further research is needed on the rich historic resources along Kiilae Bay, in Kiilae Village, and the north shore of Honaunau Bay. Research is also needed to locate, clarify, and understand the basic ecology of the marine habitats and contiguous terrestrial communities. Programs will concentrate on the entire complex of values, as well as on the prime exhibit at the place of refuge, including:

Excavation of the old heiau in the place of refuge.

Synthesis of puuhonua research.

Coastal ecology and ethnobiology.

Holua slides and chief's housing complex.

A general understanding of the Hawaiian civilization as applicable to Honaunau Bay.

An underwater archeological survey.

The potential effect on the marine habitat resulting from the development of surrounding lands and the possible pollution of coastal waters.

Historic Preservation

The historic and prehistoric park resources are shown as Class VI on the land classification plan.

Major prehistoric structures such as the Hale o Keawe are to be reconstructed. Other structures will be stabilized and restored.

Selected significant historic structures in Kiilae Village will be restored and the balance stabilized.

Plant Control

All exotic plants will be removed and the historic landscape restored and maintained in the palace grounds, the place of refuge and immediate adjacent areas, around the holua slides, and in the coastal interpretive areas. Restoration includes selective planting of native and Polynesian vegetation.

The remaining park will have limited exotic plant control to prevent encroachment by major exotic plants, such as the kiawe and haole koa. The details of this program will be prescribed in the resource management plan.

Coconut palms, important to the historic scene, are a safety hazard to visitors. Continuing removal of dying palm fronds and nuts will be essential.

Pollution Control

All development and management programs will consider the potential pollution of resources through the historical park and its adjacent offshore areas. Of particular concern is the use of herbicides for exotic plant control as well as the careful attention to the designing of sewage disposal systems. Further research may identify other important measures.

Wildlife

Fishing and shellfish and sea-urchin collecting will be regulated according to the results of a research program.

Operating Facilities

All maintenance and management facilities will be removed from the prehistoric

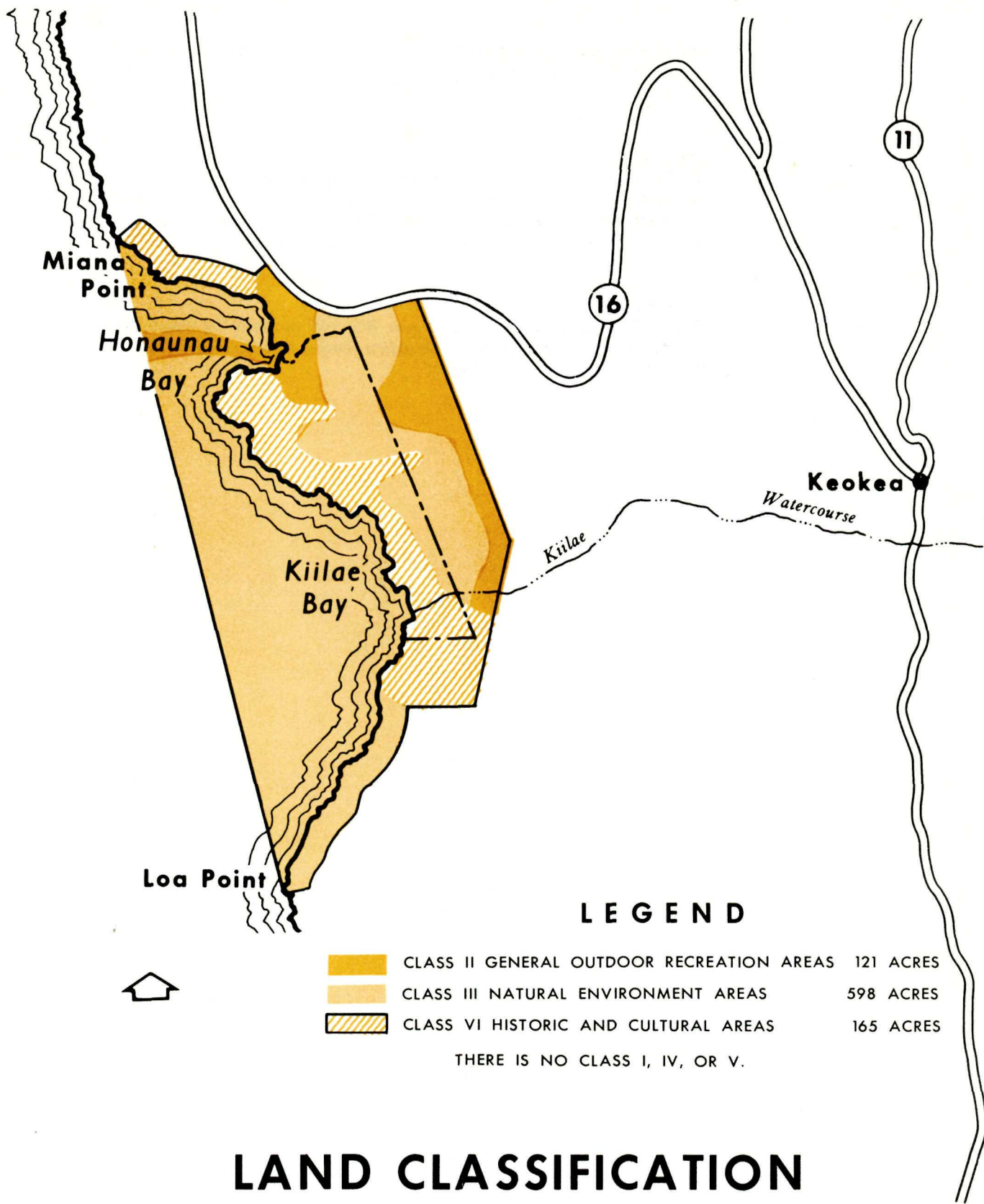
and historic areas and combined with parkway terminus facilities at a location on or near the Belt Road. Ultimately, only interpretive structures will remain in the coastal area.

Staffing

Staffing demands will increase with greater visitation, fee collection, completion of the visitor center, interim recreation use, and with the ultimate reorientation of access and transportation. The park will be under the general supervision of the Superintendent of Hawaii Volcanoes National Park.

Surrounding Use

The entire area surrounding Honaunau Bay will probably be developed for resorts and residences. Complete boundary fencing is recommended to protect the resources and assist management.



LAND CLASSIFICATION

CITY OF REFUGE

NATIONAL HISTORICAL PARK

PRIORITY OF NEEDS

PRIMARY

Adjust boundaries including the new administrative site.

Construct maintenance, housing, and administrative facilities at Kona administrative site.

Complete research, stabilization, and restoration in the prehistoric area.

Remove existing temporary visitor use structures in palace grounds.

Fence park boundary.

Complete research on historic area.

SECONDARY

Construct facilities for interim recreation use.

Remove existing maintenance facilities.

Construct entrance station and begin fee collection.

Complete trail system throughout park.

LONG-RANGE

Stabilize and restore historic area for on-site interpretation.

Construct orientation station and parking, inaugurate trackless train system, and remove existing visitor center parking.

Remove all but minimum recreation facilities on Honaunau Bay.

Interpret Hawaii farming exhibit (in new nursery site).

**PROPOSED PUUKOHOLA HEIAU
NATIONAL HISTORIC SITE**

THE RESOURCE

DESCRIPTION

Puukohola is a prominent hill, 135 feet high, about a mile southeast of Kawaihae. The summit commands a superb view of the west coast of Hawaii and overlooks Mailekini Heiau, a large high-walled, court-type temple down the slope a short distance to the northwest.

Puukohola Heiau is a massive, piled, lava rock structure measuring 224 by 100 feet. It is walled on the ends and on the landward side by 40- to 50-foot sloping walls. The seaward side is open and terraced by a series of three long, narrow terraces extending across the entire front of the heiau. The final terrace is enclosed by 10-foot extensions of the three outer walls. Within this summit terrace were the structures and objects connected with the heiau ceremonies. The principal features were the decorative wooden images scattered on the walls and terraces. Images representing gods were kept in special heiau houses in the custody of kahunas. A large god-tower or oracle tower appears to have been at the south end of the summit terrace platform. Altars of wood and stone were on the terrace as well as rock platforms for kahuna residences and structures.

The heiau, which has been partially restored and is in excellent condition, is open to the public, with walks and steps to provide easy access. It was dedicated as a registered National Historic Landmark in 1966.

HISTORY

Puukohola Heiau was built by Kamehameha during his rise to power in the critical period of initial contact with western civilization, one of the outstanding events of Hawaiian history. His skill in dealing with the foreigners who followed Captain Cook, and the firmness with which he organized his rule over all the islands undoubtedly was instrumental in preventing Hawaii from following so many other Pacific Islands into European empires. The momentum gained before and during his reign helped carry his kingdom through a century of independence.

That momentum began even in Cook's day when Kamehameha, the king's nephew, was demonstrating leadership in both peace and war. His responsibility for attending to the service of Kukailimoku, the war god of the kings and maintaining the heiaus dedicated to it, attracted chiefs to his side. The momentum was accelerated by the battle of Mokuohai in South Kona in 1782, when he and his supporters defeated Kiwalao; and it reached a high point with the fulfillment of the Puukohola prophecy.

Following the defeat of Kiwalao, Kamehameha had to be content with the districts of Kohala, Kona, and the northern part of Hamakua, which together formed one of the three kingdoms into which the Island of Hawaii was divided. There followed a decade of intermittent civil war during which Kamehameha fought undecisively with the rulers of the other two kingdoms, Keoua and Keawemauhili, and harassed Maui and Oahu.

In the spring of 1790 he launched a major campaign of conquest from Kawaihae to the island kingdoms of Maui, Lanai and Molokai.

Keoua took advantage of Kamehameha's absence to ravage Waipio Valley, where Kamehameha had been reared, and then entered Kohala to wreak havoc on

Kawaihae and Waimea, forcing Kamehameha to return to defend his lands on Hawaii.

While on Molokai, Kamehameha had sent an emissary to the famous soothsayer of Kauai, Kapoukahi, to determine how he could conquer all the Island of Hawaii. Kapoukahi told him he must erect a large new heiau to his war god at Puukohola.

Kamehameha sailed his war fleet home and made a beachhead at Kawaihae below Puukohola. This show of force made Keoua retreat to Hilo. Battles were then fought without gaining a decisive victory.

To insure the final defeat of Keoua, Kamehameha now paused to begin construction of the new temple for Kukailimoku. This task was undertaken at a vast expense of labor and a liberal sacrifice of human offerings. Kamehameha first gave thought to rededication of the time-honored Mailekini temple, halfway up the slope of the hill named Puukohola (Hill of the Whale).

Kamehameha's kahuna (or priest), who was versed in the location of heiaus and their construction, advised him against rededication of Mailekini and suggested building a new temple on the brow of the hill. It is possible an abandoned heiau was rebuilt, though more probable that a new one was constructed. Archeological investigation of the existing heiau platform may reveal what happened. The earliest heiau known on this site was in existence as early as the time of Lonoikamakahiki (about 1550) and was even then a place of human sacrifice. Priests selected the exact site, determined the orientation to the ocean and the mountains, the dimensions, and the arrangement of the structure. At every stage they performed the ritualistic ceremonies without which the work could not be acceptable to the gods. So great was the undertaking that workers by the thousands were called in; even chiefs and Kamehameha joined in the labor.

Their work was interrupted by an invasion from Maui and Oahu, but Kamehameha defeated the attacking forces in the famous naval battle of Kepuwahaulaula ("the red-mouthed gun") off Waipio in the spring of 1791. The battle was fought with cannon under the direction of John Young and Isaac David, two British sailors who had joined Kamehameha's staff in 1790 after being stranded on the island the previous year.

Following the Waipio battle, Kamehameha resumed construction of the heiau which was finished sometime during the summer.

Two of Kamehameha's chiefs were sent to Keoua to urge him to go with them to Kawaihae to attend the dedication of Puukohola and make peace with Kamehameha. Tradition says Keoua's acceptance had an element of fatalistic resignation to the doom which he clearly foresaw as a result of the journey to Puukohola. This was borne out when he was attacked and killed by one of Kamehameha's chiefs as he stepped ashore at Kawaihae beneath Puukohola. His body was offered as the principal sacrifice on the altar of the new heiau. Kamehameha authorized other sacrifices to gain favor with his gods and insure conquest of all the Hawaiian Islands. John Young later said he saw eleven humans sacrificed on the altar during the ceremonies.

Keoua's death ended all opposition to Kamehameha on the Island of Hawaii. A few years later, following a period of peace when he organized his government and developed the resources of the island, he proceeded with the conquest of all

the islands and the founding of the Hawaiian kingdom, fulfilling the Puukohola prophecy.

The Puukohola Heiau was built by Kamehameha specifically for the purpose of fulfilling the prophecy. It then became a luakini heiau, or Kamehameha's "State" heiau in the district of Kohala, though it appears to have been later supplanted by the Mookini Heiau on the northern tip of the island.

The Puukohola story is encompassed in Theme XXI, *Political and Military Affairs, 1865–1910*, sub-theme, *Hawaii History, 1778–1910*.

ASSOCIATED FEATURES

Mailekini Heiau, which lies immediately below the Puukohola Heiau, was a war temple of Kamehameha's ancestors. His ancestors, after Pili, ruled the many island kingdoms and frequently warred against one another to enlarge their territorial holdings. Kawaihae and Waimea were favorite battle grounds. Invasion fleets, some from Maui, made the beach at Kawaihae their target. The Mailekini Heiau was one of the prizes won by the alii who ruled the Kohala kingdom. The heiau was a large high-walled, court-type, luakini temple. Little is known about its history. Today, the ruins remain, partially restored. The main wall is 300 feet long, 12 to 15 feet wide and 25 feet high on one end. The main platform is about 300 feet long by 40 feet wide.

Haleokapuni Heiau, dedicated to the shark gods, lies underwater, just offshore from Puukohola; a victim of the general subsidence of the Kona coast during the last few hundred years.

Pictographs have recently been discovered on the lava outcrops along a wash north of Puukohola Heiau. Their relative value as historic or archeologic features is not known.

The John Young House Site lies to the north and across State Route 26 from Puukohola Heiau. Little of the structure remains except the foundation. The site is particularly important in that its original occupant, John Young, exerted great influence on Hawaii's adjustment to foreign contact and its emergence as a nation. Young took part in Kamehameha's many battles to obtain control of the Islands, directing the use of cannon and leading charges. Originally a seaman from England, he quickly found favor with Kamehameha and represented the alii in dealings with foreigners. His contemporaries credit him with a decision favoring the entry of American missionaries, an event which established the course leading Hawaii into the sphere of American influence.

EVALUATION

Puukohola Heiau is perhaps the most famous heiau in all the islands. It was built, or rebuilt, by Kamehameha the Great and is closely associated with one of the key incidents in his rise to power as supreme ruler of all the Hawaiian group—the sacrifice of a rival king, which gave Kamehameha control over the entire Island of Hawaii. It also superbly illustrates the fact that Kamehameha, despite more than a decade of contact with foreigners, remained true to the ancient Hawaiian social, political and religious systems. His treatment of his rival was typical of the ruthlessness by which Hawaiian chiefs sometimes gained power. The impressive appearance of the temple and the grisly events which occurred there

give this site a high degree of historical value and make it a suitable spot to interpret the formation of the Hawaiian Kingdom. The resulting political system was largely responsible for keeping the island independent until they were annexed to the United States.

FACTORS AFFECTING RESOURCES AND THEIR USE

LAND STATUS

Land Area		
Queen's Hospital (Private)	52.20	Acres
State of Hawaii	18.07	"
Total Land Area	70.27	Acres
Water area (State of Hawaii)		
	6.30	Acres
Gross Acreage	76.57	Acres

There are three principal interests in the lands in the vicinity of the ruins.

The State of Hawaii owns and administers Kawaihae Harbor through its Department of Transportation, Harbors Division. The fill of the harbor complex comes to the base of the Puukohola hill on the north and west. The State also owns the Spencer Beach Park to the south, which is administered by the County of Hawaii.

The lands between, approximately 1,500 feet wide, are owned by the Queen's Hospital and are part of Kawaihae 2, a large tract of 10,000 acres which the Queen's Hospital has in trust. These lands were owned by John Young and subsequently by his granddaughter, the late Queen Emma, founder of the Honolulu Hospital.

A development agreement between the Queen's Hospital and the Olohana Corporation was concluded in December 1964, giving the Olohana Corporation development rights to 2,000 acres of Kawaihae 2. Included within the 2,000 acres are the Puukohola Heiau Mailekini Heiau, and the John Young House Site.

A concrete products sand and gravel operation occupies about an acre of the Puukohola proposed park site. It is on State land (lease) and is in the process of being removed.

Phone, power, and water lines run between the two heiaus along the existing low-standard county road between Kawaihae and Spencer Park.

CLIMATE, TERRAIN, AND VEGETATION

Puukohola, in the driest section of the Big Island, has an arid and warm climate and desert-like terrain and vegetation. Mean annual temperature is about 78-degrees. Rarely does the thermometer reach 90-degrees, and low readings on winter nights seldom drop as low as 60-degrees.

Few of the frequent inland rains over the Kohala Mountains reach Puukohola. Annual precipitation at nearby Kawaihae had a range of 9.1 inches maximum to a low of 0.2 inches over a 25-year period. The wind pattern is a predominantly offshore—onshore pattern. Cool night and early morning air produces an offshore easterly breeze, and mid-morning heating draws in marine air producing a westerly breeze during the day until the land cools in the evening and the easterly land breeze resumes to perpetuate the cycle.

The Puukohola area seldom experiences storms. When one does occur, less than once every two years on the average, it may be intense although usually of short duration.

The shoreline is subject to tsunamis originating from earthquakes from Japan, the Aleutian Islands, or the South American coast. Informed opinion indicates that the shores of Puukohola and Kawaihae Bay should not suffer much tsunami inundation. As a normal precaution, coastal construction should be set back from the shore on sites well above sea level. Civil Defense alerts are issued several hours before the estimated arrival of a possible tsunami and evacuation procedures are routine in low-lying areas whenever they are predicted by Civil Defense.

The land around the heiau structures has irregular loose stones and sparse vegetation. Visitors on the heiau will find the area hot with intense sun and are unlikely to spend too much time in the area.

The soil is the typical reddish brown of arid desert regions. It supports a limited number of annual grasses, hardy shrubs such as haole koa, ilima, and kolu, and the kiawe tree. Trees along the shore are the monkeypod, beach heliotrope, milo, kou, and coconut which grow in dense thickets where ground water is available.

KOHALA COAST RESORT REGION DEVELOPMENT

The Kohala region around Puukohola is developing as a resort stimulated by the success of the Muna Kea Beach Hotel. The principal developer is the Olohana Corporation, managed by Laurance Rockefeller, developer of the Mauna Kea Beach Hotel complex, and a group of Hawaii associates.

A development plan for the Kohala Coast Resort Region was prepared in 1967 for the lands between the Port of Kawaihae and Puako "to achieve an attractive and balanced resort and residential community which can be a continuing stimulus to the economic growth of Hawaii, as well as a profitable venture for the developers and landowners involved."

The plan recognizes the richness of the ancient cultures and history of the Kawaihae-Puako region and the historical importance of Puukohola. It proposes an historical park between Spencer Park and Kawaihae harbor to preserve and interpret some of the region's culture and history. The Puukohola and Mailekini

Heiau ruins would be the nucleus of the historical park. Many groups have indicated an interest in the preservation and administration of Puukohola as a unit of the National Park System. The Queen's Hospital has volunteered to donate the structure and sufficient surrounding land if the area were to be administered by the National Park Service.

KAWAIHAE HARBOR

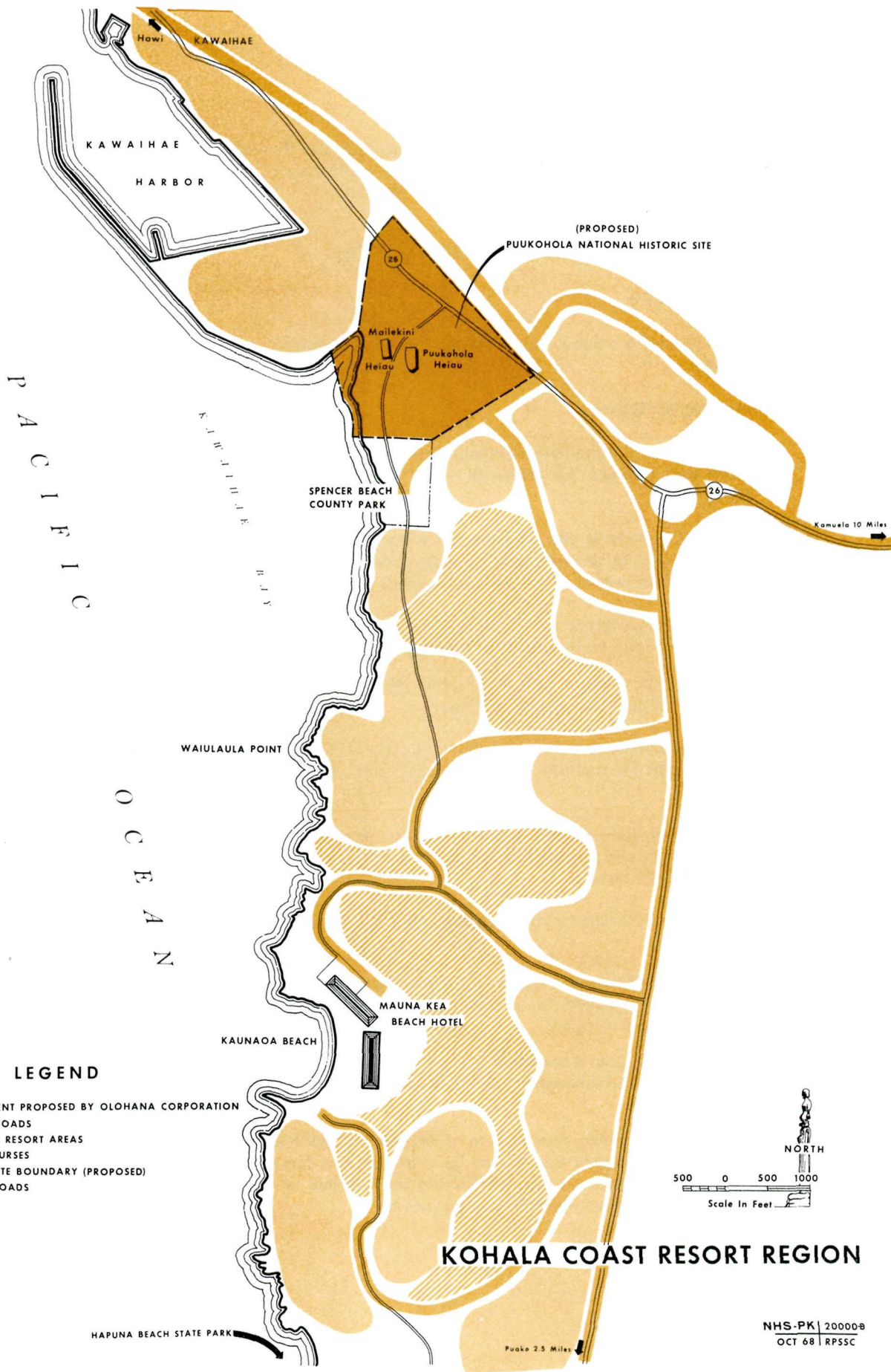
This modern, man-made harbor is adjacent to Puukohola. Industrial developments in the harbor include a major storage facility, grain elevator and storage silos, oil tanks, and a freight warehouse. A small marina is part of the harbor complex.

This facility intrudes substantially on the Puukohola scene, but landscaping controls proposed by the region development plan will assure the attractiveness of the industrial and commercial parks.

THE BISHOP MUSEUM PROJECT PROPOSAL

The Bishop Museum is interested in establishing an interpretive center at Puukohola to interpret and research the Hawaiian culture of the entire west coast of Hawaii, beginning with the culture of the Kawaihae region. The facility also would be a local arts and crafts center for the region's residents and visitors and present cultural programs and events.

The proposed facility would be a pioneer project in the interpretive field. It is expected that it will be financed by non-Federal funds.



PRESERVATION AND USE

PURPOSE

To preserve and restore the physical remains of the Puukohola Heiau and interpret its role in the military and political ascendancy of Kamehameha the Great and the formation of the Kingdom of Hawaii.

MANAGEMENT CATEGORY: *HISTORICAL*

OBJECTIVES

The National Park Service proposes the following objectives to achieve the park purpose:

Resource Management

Preservation of Cultural Sites—Preserve the Puukohola Heiau by stabilization and restoration; stabilize the Mailekini Heiau; stabilize the remains of the John Young House.

Preservation of the setting—Restore the historical setting of the heiau structures and the shoreline to accentuate their significance and to restore a part of the traditional atmosphere of the Kawaihae region.

Research—Research the archeological, historical, and natural resources associated with the cultural sites in support of management and interpretive programs.

Maintain close liaison with the Bishop Museum research program on the Hawaiian culture of the Kawaihae region.

Cooperation with the Bishop Museum—Cooperate with the Bishop Museum in their project to establish and interpretive and research center adjacent to Puukohola.

Museum Collections—Limit park collections of artifacts and natural history specimens to those intended for display or essential to study for presentation of the interpretive themes.

Development—Provide facilities needed for the day use of park resources.

Development of Adjacent Lands—Encourage State, county, and private cooperation in the orderly and tasteful development of the surrounding lands of the Kohala Resort Region.

Boundaries and Land Acquisition—Acquire lands needed for preservation, visitor use, and effective management of the heiau structures, the John Young House, and their setting.

Architecture—Develop an architectural theme which will relate to the prehistoric cultural significance of the site and be in esthetic and functional harmony with the indigenous environment, considering such factors as the lava and ocean scene, warm temperature, and prevailing winds.

Visitor Services and Facilities

Interpretation—The National Park Service interpretive theme relates to the building of the Puukohola Heiau by Kamehameha the Great and the role it played in the emergence of Kamehameha as king of all the Hawaiian Islands and in the formation of the Hawaiian kingdom.

The Bishop Museum will interpret the Hawaiian culture of west Hawaii.

Access and Circulation—Develop a system of unobtrusive trails for visitor access to the heiau structures, John Young House, and the shoreline.

Develop joint visitor parking for the National Park Service visitor center and the Bishop Museum interpretive facility.

Safety—Develop a strong safety program which will encourage visitors and employees to be cautious on the heiau structures and along the shoreline.

THE PLAN

This report recommends the Puukohola Heiau be established as a national historic site of 76.6 acres. Included within the proposed boundaries are the Puukohola Heiau, Mailekini Heiau, Haleokapuni Heiau, and the site of the John Young House, plus sufficient land to protect their historical integrity and to provide space for development of visitor facilities.

The one major attraction is the impressive heiau of Puukohola. Mailekini Heiau and the associated exhibits and museums will be secondary attractions.

The visitor will be introduced to the site through a modest visitor reception facility which will provide orientation, interpretation, and a view of the heiau in its historic setting. From here he may walk to the heiau and receive on-site interpretation. Another trail will lead to Mailekini Heiau, the shoreline, the John Young House Site, and then either to the adjacent Spencer County Park or back to the visitor center.

The proposed Bishop Museum and cultural center, although a separate structure, will be closely associated with the National Park Service development so that both can be visited from a single parking area.

All proposed facilities are shown on the accompanying plan.

CARRYING CAPACITY

The quality of the visitor's experience will be the controlling factor for carrying capacity at Puukohola; too many visitors on the heiau at one time would drastically reduce the experience.

Visitors probably will spend approximately one hour at Puukohola with about 20 minutes of that time on the heiau structure. The balance of their time would be at the visitor center and on the trails between the visitor center and the heiau. Some will spend a greater amount of time seeing the Mailekini Heiau the John Young House Site, or hiking along the coast. Time spent at the Bishop Research Center is not included in these figures. The controlling factor is the number that can be on the Puukohola Heiau at one time, which is estimated at 50. The carrying capacity is therefore estimated at 150 an hour, or about 1,500 to 2,000 persons a day.

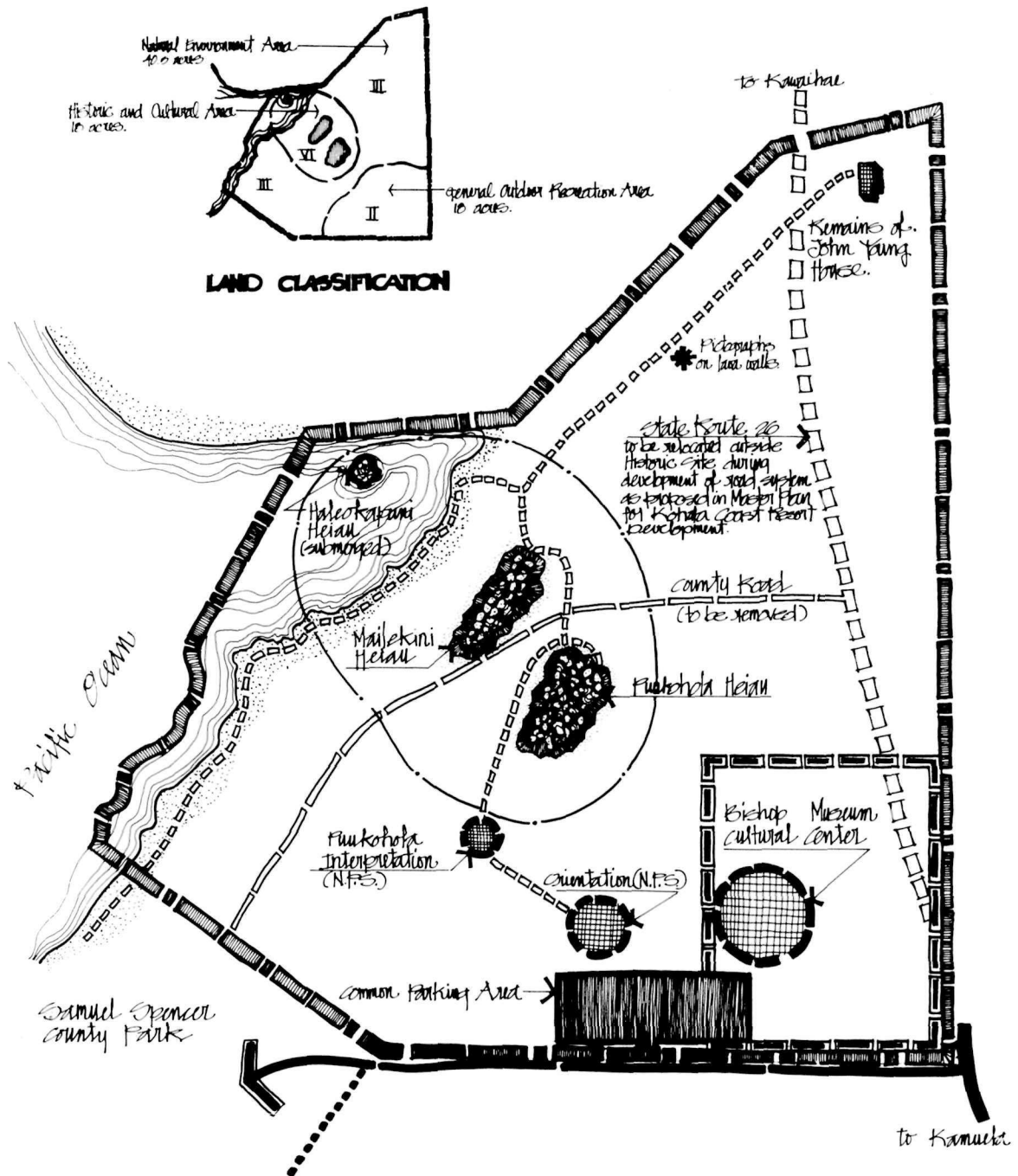
FACILITIES

The facilities at Puukohola will emphasize appreciation of the prime historic values and development will be limited to that directly associated with this purpose.

There are picnic and swimming facilities at Samuel Spencer County Park, adjacent to the historic site, and at Hapuna Beach State Park a short distance to the south.

RESEARCH

Although some research has been done, restoration and stabilization of Puukohola Heiau must await a detailed study of the structure and the



LEGEND

- Prime Historic Area
- Area to be managed by Bishop Museum
- Proposed boundary
- Trails

GENERAL DEVELOPMENT LAND CLASSIFICATION

Proposed Puukohola Heiau
National Historic Site

100 50 0 100 200 300
Scale in feet
NPS-115 22021-D
Feb. '90 EPD/MEC



surrounding area, including Mailekini Heiau, the John Young House, and the little-known Haleokapuni Heiau lying just offshore. These projects are in high priority and must precede development programs.

HISTORIC PRESERVATION

Following thorough research, Puukohola Heiau will be restored as nearly as possible to its original form, including selected structures on the platforms. Mailekini Heiau and the John Young House will be stabilized. A decision on what restoration of Haleokapuni Heiau—if any—is to be made must await the results of research.

REINTERMENT OF HAWAIIAN HUMAN REMAINS

During future archeological investigations and development of park facilities it is probable that a number of Hawaiian burial sites will be discovered. In accordance with established Hawaiian tradition these remains will be reinterred in an appropriate burial site. If a suitable site is not available in the surrounding area a special burial ground within the proposed historic site will be designated.

BISHOP MUSEUM DEVELOPMENT

Establishment of an appropriate working relationship between the Bishop Museum and the National Park Service is of paramount importance in development and management of the historic site.

The proposed Bishop Museum installation—only in the planning stages at this time—will include a museum structure and one or more additional facilities such as Hawaiian plant exhibits and their traditional uses and petroglyphs available for making rubbings. The land necessary for this project would be managed and developed by the Bishop Museum.

One of the following two alternatives for this operation is recommended:

1. Legislation authorizing the national historic site could include a provision to lease a portion of the area to the Bishop Museum on a long-term basis for their development and management. The parcel of land proposed for this status is shown on the accompanying plan.
2. Legislation could include a provision similar to the one mentioned above except that the area could be outside the park boundary. Common facilities such as parking, service area, and utilities would be provided by the National Park Service on Federal land.

EXOTIC PLANT CONTROL

The major existing plant cover over the entire area is kiawe, an exotic. There are also some exotic grasses. Complete eradication of exotics is proposed in the prime historic area around Puukohola Heiau and along a strip to the coast, as shown on the development plan. This will protect the integrity of the heiau and its setting. Reintroduction of native plants, particularly along the coast, will also be accomplished. The remaining area will receive less concentrated control.

MANAGEMENT

The historic site will be under the general supervision of the superintendent of Hawaii Volcanoes National Park. Only offices for the local staff will be provided at the orientation building and maintenance and storage facilities will be located near or as a part of that structure. Since housing is available in the nearby community of Kamuela, none will be provided within the historic site.

REGIONAL RECREATION

Preservation of the unique historic values at Puukohola will complement the total regional park and recreation plan for south Kohala and north Kona. As State and county facilities in the vicinity are further expanded it may be desirable to have a representative or an exhibit in the National Park Service orientation building or the Bishop Museum to dispense information on available recreation facilities.

FENCING

The entire historic site will be fenced in order to protect the major features and to control access.

FEES AND JOINT MANAGEMENT WITH BISHOP MUSEUM

The proximity of the Bishop Museum and Park Service facilities will require close cooperation between the two organizations. It is recommended that a joint fee be charged for the entire complex similar to the arrangement at Jamestown Island National Historic Site. This would require a special agreement with the Bishop Museum.

A single fee charged by the National Park Service for only its own facilities appears impractical and is not recommended.

ROAD RELOCATION

Development as now proposed will necessitate relocation of existing State Route 26 and the county road passing between Mailekini and Puukohola Heiaus. Relocation of the county road is important in that in its present location it constitutes a serious encroachment on historic integrity and would make planning and management difficult. This part of the plan should be accomplished as soon as possible. Relocation of State Route 26 is not urgent but is proposed as part of the ultimate plan to create a single cohesive unit rather than leave John Young House Site as a detached area.

Authorization to expend Federal funds to replace these sections of road outside the historic site should be included in the legislation authorizing the historic site.

A STUDY OF SIGNIFICANCE

KEALAKEKUA BAY

THE RESOURCE

The richest archeological and historical area in the Hawaiian Islands is the Kealahakua-Honaunau section of the Kona Coast on the Island of Hawaii. The ancient Hawaiian culture once flourished here and it was here the first clash between the Hawaiian and Western civilizations occurred.

The national value of Honaunau has been recognized by establishment of the City of Refuge National Historical Park to preserve the most important refuge in the islands and the traditional seat of the Kingdom of Kona.

Intensive research and planning have recently been focused on the archeology and history of the Kealahakua area in an effort to protect its historic, archeologic, and scenic values from premature development. These studies have shown the area possesses values of great importance.

In this report, these resources are examined to ascertain if they possess the necessary historical, natural, archeological, or recreational qualities, or combination of qualities, to make them nationally significant—the primary criteria in evaluating areas for possible addition to the National Park System.

THE ANCIENT HAWAIIAN CULTURE AT KEALAKEKUA

Kealahakua is an open, picturesque bay dominated by the steep cliff or pali, Pali Kapu o Keoua, on the northern rim. At each end of the bay is a flat point of land that was the site of coastal villages. On the northern point was Kaawaloa, and on the south, the old village of Kealahakua.

These villages were supported by extensive inland agricultural systems that extended in sloping terraces from about 500 feet at the edge of the cliff to about 1,000 feet several miles inland. Above the fields, the slopes were covered with a dense hardwood-fern forest. Above the forest lay the summit mass of Mauna Loa.

The coastal areas on both sides of the bay are relatively level, of bare lava, with lava ledges extending for miles along the coast. At each place with ocean access was a palm-fringed village. At the most desirable sites, such as Kealahakua and Honaunau, were the largest and more important settlements.

NATURAL CHARACTERISTICS

The sea, the climate, and the soil were the three natural elements responsible for the large Hawaiian population at Kealahakua. Tidal pools and offshore waters supported numerous fish species. Netting, trapping, and hook-and-line fishing were the principal methods used for taking fish. Much fishing was done by professionals, using canoes to reach the deep sea fishing grounds. Sea-urchins, certain shellfish, crabs, and seaweeds formed a good part of the marine diet, and these items were gathered by hand along the rocky coasts and on reefs. The offshore waters are generally calm-to-light seas with only occasional stormy periods making them unsuitable for fishing.

The Kealahakua climate is subhumid with an annual rainfall of 20 to 50 inches, falling in a seasonal pattern of wet summers and dry winters. The coastal area is

rather dry, delightfully moderate most of the year, with pleasant daily breezes. This climate attracted Hawaiians to the region.

The soils in the agricultural fields above the pali were moderately deep in deposit with a medium texture. They are dark brown in color and are of volcanic ash parent material. The fields were generally rocky, but well-drained; the upper fields had high productivity.

THE ECONOMIC STRUCTURE

The ancient economy at Kealakekua was based on agriculture and fishing. The producers of this economy, the farmers and fishermen, were the great mass of commoners who lived as tenants-at-will upon the lands under the jurisdiction of feudal chiefs. In addition to vegetables and fish, pigs, dogs, feathers, bark-cloth, tools, and implements were products of the economy.

Ancient Hawaii was rooted in agriculture to a greater extent than has been recognized. This was especially true at Kealakekua where agriculture supported a large population, far above what could be supported primarily by the sea.

THE AGRICULTURAL FIELD SYSTEM AT KEALAKEKUA BAY

The Kona agricultural system, of which Kealakekua is a part, was a nonvalley aboriginal agricultural system as contrasted with Waipio Valley where crops were grown on level, valley bottom lands where abundant fresh water was available. The Kona system used garden plots bordered with stone walls. They were virtually continuous along the coast from the vicinity of Kealakekua Bay to about Kailua and extended inland 3 to 4 miles. The major field walls lay perpendicular to the topographic contours and parallel to the slope of the terrain. Individual fields varied in size from about 50 feet long and 30 feet wide to over 1,000 feet long and up to 150 feet wide. Field dimensions appear to be related to topography. There was no evidence of irrigation. The fields appear to have been farmed, using dry-farming techniques, and the walls used merely as depositories for field rocks and/or boundary markers.

Based partly on ethnohistory information, it is probable the fields were primarily planted in sweetpotatoes and taro. Other crops were gingerroot, sugarcane, yams, bananas, and breadfruit.

This field system was inventoried and evaluated in a joint undertaking of the Bishop Museum and the University of Hawaii in February 1968, and their findings reported in the publication *Archeology of Kealakekua Bay*. It concludes that remains of the Kealakekua agricultural field system and a section of similar land in western Kohala above Kawaihae are the only nonvalley aboriginal agricultural systems left in the State. All others have been destroyed by modern agriculture or construction.

SETTLEMENTS AT KEALAKEKUA BAY

Kealakekua

At the time of discovery of the Hawaiian Islands by Captain James Cook in 1778, the largest settlement at Kealakekua Bay was the old village of Kealakekua, sometimes called Kakooa—a shortened form of Kireekakooa and

Karakakooa—by early English explorers. The village was well-described by John Ledyard, a member of Cook's crew:

The town of Kireekakooa is about a mile and a half in length but narrow and of an unequal breadth, and as I have observed contains about 1100 houses, some reckon 1300 including some detached buildings. It is situated along the shore within a few rods of the water, and is in general very compact, and as the houses in those places stand so as to create a breadth there are a number of little streets that intersect each other very happily though they do not seem to have been the effects of much design, and a very agreeable and common circumstance to be found among these rude sons of nature, was, that these little avenues were generally paved.

At the end of the beach at Kealakekua Village was Hikiau Heiau, a luakini heiau of the highest class—a place of human sacrifice. Situated around a small pond which lay between the heiau and the base of the pali were houses of the temple priests. Behind the pond along the lower talus slope were residences built on a number of terraces.

Kaawaloa

The village of Kowrowa (Kaawaloa) lay on the north point of the bay. It was described as having 300 houses and being about half as large as Kealakekua. Most of the chiefs seem to have resided at Kaawaloa. It was the residence of the high chief Kalaniopuu at the time of Cook's visit.

Only a mile apart, the two villages were cut off from each other by a steep pali. The villagers either went by canoe across the bay or by foot trail up and over the pali to get to each village.

Four hundred feet above Kaawaloa was a second important heiau, Puhina o Lono, where bodies were prepared for burial, possibly in the caves scattered in the pali above the bay.

A mile south of Kealakekua Bay was a sizeable settlement at Palemano Point and a few miles further was the important religious and political center of Honaunau.

HISTORIC EVENTS

The Visit and Death of Captain Cook at Kealakekua Bay

Captain James Cook, the brilliant English navigator and explorer, brought Hawaii into contact with the Western World with his discovery of the Hawaiian Islands in 1778. His first voyage to the islands was in January 1778 when he made his initial sighting of Oahu and his first landing at the village of Waimea on Kauai. He remained only 2 weeks and then sailed away for the coast of North America.

After Cook's departure, word of his visit spread throughout the inhabited islands of the Hawaiian chain. The circumstances of his coming corresponded roughly with ancient Hawaiian traditions about the god Lono, and the natives concluded that Cook was an incarnation of that deity. Thus, when he returned to the islands during November 1778, Cook was everywhere accorded honors of a god.

The vessels skirted Maui and finally, during January 1779, came to anchor at Kealakekua Bay.

The purpose of this second visit was to explore the islands and to refit the ships for another voyage to northern latitudes. With the friendly cooperation of the natives, the vessels were ready for sea again in less than 3 weeks.

While at Kealakekua, he and his officers were entertained by King Kalaniopuu. He met the nephew of the king, Kamehameha, who seemed to be the king's favorite. He also met the king's youngest son, Keoua. The king's eldest son and his heir presumptive to the throne, Kiwalao, was not at Kealakekua during Cook's visit. Captain Cook was taken to the Hikiau Heiau where ceremonies of veneration were performed. One of Cook's seamen, William Whatman, died on board ship, his body was brought ashore, and, it is said, interred in the heiau with the permission of the native priests. The observances at his grave are said to constitute "the first recorded Christian service in the Hawaiian Islands." Cook also used the heiau for making astronomical observations.

By the time the ships were ready to sail, the Hawaiians were somewhat appalled by the enormous amount of provisions required by the British, and they apparently were relieved when the ships sailed northward up the Kona Coast. But a sudden storm damaged the *Resolution*, and both vessels returned to Kealakekua Bay. The Hawaiians were still hospitable but there was increasing thievery of objects from the ship.

Finally, the *Discovery's* cutter was stolen and on February 14, 1779, Captain Cook went ashore to take the native king hostage for its return. A sharp, brief, and almost accidental skirmish resulted on a rocky landing by the village of Kaawaloa. Cook and four marines died under the clubs, stones, daggers, and spears of the Hawaiians.

The bodies were taken to Puhino o Lono Heiau, where Cook's body was treated like that of a mighty chief; it was cut up and distributed to the chiefs. Some of the bones were later given up, and a kapu placed on the bay while the English funeral service was held.

Friendly relations were reestablished. Late in the evening of February 22, the English ships weighed anchor and sailed northwesterly to Oahu and Kauai to eventually continue explorations in the north along the coasts of America and Asia.

The Battle of Mokuohai (Keei) I

In 1782, Kalaniopuu died. Before his death, he convened a council of chiefs and designated his son, Kiwalao, as his successor in kingship; and gave to Kamehameha the custody of Kukailimoku, war god of the kings of Hawaii, placing on him the responsibility of attending to the services of the god and maintaining the heiaus dedicated to it.

Kiwalao came under the domination of the chiefs of Hilo, and when the customary land distribution was made by the new king, the Hilo alii (royalty) received the lion's share. Five dissatisfied alii of the Kona district, with Kamehameha as their leader, banded together to protect their interests, and were soon at war with Kiwalao. A battle was fought on the coastal plain between Kealakekua Bay and Honaunau—the battle of Mokuohai, probably in the summer of 1782—from which Kamehameha and his supporters came out victorious, and in which Kiwalao was killed.

As a consequence, the island was split up into three kingdoms. Kamehameha held Kona, Kohala, and the northern part of Hamakua. From his new position he was able to launch a campaign against his rivals, which ultimately led to his conquest of all the islands.

Kaawaloa

After Captain Cook's death, Kealahou remained an important area in Hawaii's history, until the shift of royal residence and power in 1820 to Lahaina and later to Honolulu. Foreign ships continued to anchor in the bay. Some were exploring, such as Captain George Vancouver, who made three visits between 1792 and 1794 to make a survey of the islands. Many English captains came to pay their respects to the memory of Captain Cook. Others came on commercial business and to meet with King Kamehameha, and later Liholiho. During this period the royal residence was mainly at Kona; either at Honaunau, Kealahou, or Kailua.

Kaawaloa was the center of revolt against the abolition of the kapus in 1819. In the struggle between Liholiho, son of Kamehameha, who became king after his father's death, and Liholiho's cousin, Kekuaokalani, leader of the resistance, a battle was fought at Kuamoo between Kailua and Kaawaloa. The rebels were defeated and organized resistance to the abolition of the ancient religion ended.

The famous chieftess, Kapiolani, who defied Pele, lived at Kaawaloa for awhile. About 1829-30, Queen Regent Kaahumanu had the bones of the famous chiefs, which were kept at Waipio and Honaunau, removed to the burial caves in the pali near Kaawaloa.

For a period, Kaawaloa flourished as a commercial port in the sandalwood and cattle trade, but gradually its importance faded as the local population declined and the center of trade and political power shifted to Oahu. Kaawaloa eventually became a deserted coastal village. The old village of Kealahou disappeared into the small town of Napoopoo on the south shore of the bay.

THE HISTORICAL SIGNIFICANCE OF KEALAKEKUA

The archeological and historical significance of many of the sites around Kealahou Bay was determined by the National Survey of Historic Sites and Buildings made of the Hawaiian Islands in 1961. The Survey's purpose was to identify those sites which possessed exceptional value as commemorating or illustrating the history of the United States.

Such sites were recommended either for inclusion within the National Park System to complete the historical and archeological representation within the System, or for classification under the Registry of National Historic Landmarks. No sites of exceptional value were identified by the survey in the Kealahou Bay area. However, many sites were considered and specifically identified to be preserved on the State and local agency level.

Sites on the Hawaiian Aboriginal Culture theme recommended for State and local preservation were the Puhina o Lono Heiau, the Hikiau Heiau, and the Kealahou Burial Caves. In the Survey's report on *Hawaii History*, Cook's Monument and the Hikiau Heiau were identified for State and local preservation.

Noted in the reports were the Kaawaloa Village area and the Mokuohai Battlefield site as places of interest.

MAJOR ARCHEOLOGICAL AND HISTORICAL SITES

ARCHEOLOGICAL

Puhina o Lono Heiau

A small court-type temple where bodies were prepared for disposal according to the ancient Hawaiian custom; later known as "Cook's heiau" where his remains were prepared for burial. It is about ¼ mile above Cook's Monument, almost on the old Kaawaloa Road. The ruins are on private property and are in poor condition.

Kealakekua Burial Caves

In the sheer cliffs overlooking Kealakekua Bay. Most archeological materials have been removed from the caves. The caves can be easily seen by visitors taking the boat cruise in Kealakekua Bay. Privately owned.

Kealakekua Agricultural Fields

The remains of the field systems extend inland from the steep pali on the northern rim of the bay to about ½ mile inland. Old stone and earth walls and modern stone walls outline the field system. Dense vegetation covers portions of the fields. They are mainly privately owned, with some in State ownership.

The agricultural field system at Kealakekua Bay was inventoried and evaluated in a joint undertaking by the Bishop Museum and the University of Hawaii in February 1968, and the findings reported in the publication *Archeology of Kealakekua Bay* by Soehren and Newman.

Foot Trail

A portion of what is undoubtedly the ancient Hawaiian foot trail from Kaawaloa to Kealakekua remains where it crosses the barren lava flows above Kaawaloa flat. Above the pali, the trail is lost in the soil and dense vegetation. Its descent at Kealakekua is similarly lost.

HISTORICAL

Cook's Monument

A white concrete shaft and a nearby plaque close to the actual death site on the northwest shore of Kealakekua Bay at Kaawaloa. The monument is in excellent condition, but accessible only by trail or boat. It is owned by a private trust.

Hikiau Heiau

This piled rock temple platform on the eastern shore of the bay is a "truncated pyramid" which in 1908 measured 190 by 105 feet, with a seaward face 15 feet high. It has since been twice "restored." It makes an excellent and exceedingly impressive appearance.

In 1967, the heiau was designated as Hikiau Heiau State Monument. The State has acquired jurisdiction, but no definite boundaries have been established.

It is not certain that the present form of the heiau truly represents its appearance when it was an active place of Hawaiian worship.

The low beach area between the heiau and the base of the pali was the focal point for many events pertaining to Captain Cook's visit, as well as the residence of the temple priests and local chiefs.

Mokuohai Battlefield (Keei Battlefield)

The site of the battle of Mokuohai covers an extensive area south and east of Palemano Point. A few burial mounds may be found in the vicinity upon careful search, but whether they result from the battle itself or are more conventional interments would be difficult to ascertain. The site is owned by the Bishop Estate. It is accessible by the Honaunau-Napoopoo Road.

Kealakekua

The old village of Kealakekua, that portion not now occupied by the present village of Napoopoo, is largely deserted. Storms and tsunamis have demolished the stone walls along the crest of the beach, strewing rubble over the sand. The pond is nearly filled with debris and only a number of terrace facings remain behind the pond.

The site of Helelekalini Heiau is not exactly known, but it is certainly located in the old village area. The remnants of the great stone wall which formerly demarcated the sacred precincts of the Hikiau Heiau are behind the pond and heiau site.

The old village area is on State-owned land acquired for eventual use as a historical park. The beach frontage is presently used by fishermen, waders, swimmers, and picnickers.

The balance of the old village of Kealakekua lies under the modern structures of Napoopoo. On the southern end of the bay adjacent to the Hikiau Heiau is a large parking and viewing area. Tourists visit the heiau and can look across the bay to Cook's Monument. This point is a popular tour stop.

Kaawaloa

Kaawaloa is now a deserted coastal village which was occupied until about 1930, a period of 150 years since Cook's visit. Extensive alterations to the aboriginal village were made in the 19th century. Material for the numerous and extensive historical stone fences that remain today were taken from older structures, thereby destroying them. Few definitely aboriginal house sites can be identified today. The fence lots are clustered along the bay shore and the old road to Keauhou.

Several structures are definitely of ancient form. They are principally house sites, temple sites, graves, and wells. A number of stone foundations for grass houses can be found among the modern structures and kuleana wells. The best example of an ancient well is one called "Umi's Well." Steps lead down to the water from the west side. At the shore nearby is a natural pool, Haliilua, into which fresh water flows. It is said to have been reserved by the chiefs as a bathing place. Nearby was a canoe landing.

Notable among the historic ruins are the well-preserved remains of a mission building constructed of native stone and lime mortar.

The entire north shore is covered with exotic vegetation. Soehren, in his 1968 report on Kaawaloa, says the village represents the two broad but distinct periods, the aboriginal and the post-European, with the latter overlying the former. It possesses great historical significance and visitor appeal.

MARINE LIFE

Kealakekua Bay is rich in interesting marine life. Within the subtidal zone of the bay, the water is extremely clear and many fishes may be seen. The most common are the manini, the boxer, and the red striped Wrasse fish. These fish are associated with the abundant, large white coral heads and the yellow and purple heads of the porite coral which lie on the bottom of the bay.

In the intertidal zone, there are two major habitats; the rocky shoreline and the tidepools which come under the direct influence of continual wave action.

The rocky shoreline habitat consists of steep-faced, wave-cut, rocky cliffs. On the vertical faces is the biotic pattern of yellow bunchy algae, periwinkles, pink-hued coralline algae, sea-urchins, opihis, barnacles, and the scrambling black graspid crabs.

The biota in the high tide pools is not as diverse as in the pools at the lowest tide level. The most common inhabitants of the high tide pools are periwinkles, a yellow-white shell mollusk, and the large black graspid crab. At tide pools near the seaward edge are the most conspicuous and diversified flora and fauna. Algae are more noticeable than animal life. The substrate is covered with the small, fan-like, brown *Padina*, the pink and white *Janis*, and the brown *Turbinana*. Associated with these algae are the stringy tentacled terebellid worm and bright-colored mollusks.

Near the beginning of the subtidal zone are dense colonies of a crisp green alga inhabited by small mollusks, segmented worms, and crustaceans. Other biota associates are orange-brown algae, gray sea-urchins, the bandanna prawns, sea cucumbers, the spectacular red, flat-spined wana (poisonous and not to be handled), and the brittlestar.

There are other varicolored algae, starfishes, orange sponges, pink coral, tritons, and the whitish mitre. A complete inventory of the marine life of Kealakekua Bay awaits the completion of a study by marine biologists.

According to Dr. Maxwell Doty, Professor of Botany at the University of Hawaii, the plant and animal communities of Kealakekua Bay are now in balance and exist pretty much as they have since pre-European times. The surrounding land has not been disturbed so as to cause increased rates of percolation, runoff and amounts of pollution, either of which would drastically change the marine environment. Because of this excellently balanced condition, the bay is a wonderful place to view the rich marine life typical of the Kona coast, as well as to study it.

Kealakekua Bay is one of the finest undisturbed marine areas in the Hawaiian Islands. Pollution, the pressure for use, and the disturbance of marine life have not yet reached out-of-hand proportions as on Oahu.

RECREATION VALUES

The coastal shore is mostly barren lava with some kiawe thickets at points of habitation. The beaches are meager and of the cobblestone variety. There are occasional patches of sand and only limited access points for outrigger canoes. Public access to much of the area is prohibited.

Shore fishing and shell gathering are enjoyed by island residents. There is some swimming in Kealakekua Bay and off Palemano Point. Skin and scuba diving are excellent in the bay's usually calm water. There is some picnicking and camping along the shore.

Recreational opportunities can be increased through development for picnicking, camping, bathing, boating and outrigger-canoe launching. General access can be improved by acquisition of lands by the public and in the construction of roads and trails around Kealakekua Bay and to Palemano Point.

VISITOR USE

Kealakekua Bay is a popular tourist attraction. Many thousands of tourists come each year by tour bus to Napoopoo to see the beautiful view of the bay from the south shore. The Kealakekua Bay stop is part of the Kona tour of the coffee fields, the Kona rural scene, and the City of Refuge historical tour.

They also visit the bay by cruise ship to see the excellent underwater coral and marine life. Three ships bring hundreds of tourists to Kealakekua Bay each day on a 3½-hour trip from Kailua down the beautiful calm waters of the Kona Coast. Once in the bay, tourists transfer to glass-bottom boats to observe the coral gardens. They see Captain Cook's Monument and gaze up at the burial caves and view at close quarters the steep, spectacular Pali Kapu o Keoua.

Many tourists see Kealakekua Bay from the air, since most of the Hawaiian air tours include it on their daily inter-island tours.

PLANNING EFFORTS

Interest in the Kona coastal area between Kealakekua and Honaunau has accelerated recently as attention is directed to this rich historical, scenic, and recreational area. Surveys have been made on the archeological and historical values. Investigation into the marine life of Kealakekua Bay is underway. There have been joint planning discussions on a Federal-State scenic highway tie-in in the Honaunau area. Many agencies are moving into detailed planning and the development of specific recommendations on the proper use of lands in the Kealakekua-Honaunau area, in fact, the entire Kona Coast between Kawaihae and Hookena.

STATE PLANNING

The State of Hawaii has been most active in survey studies and planning in the Kealahou area. Specifically, it has:

- Evaluated the archeological features between Honaunau and Kaawaloa in December 1967.

- Completed an archeological survey of the lands above the cliffs of Kealahou Bay. The study identified the agricultural field system above the bay and related it to the ancient village of Kaawaloa.

- Outlined the historical significance of Kealahou Bay in a State of Hawaii report in January 1968.

- Engaged a team of marine scientists to study the waters of the bay and to recommend uses "which will not drastically change the balance of marine life within the bay."

- The study agreement provides for expansion of the research activity to Honaunau Bay under Federal Government participation and funding.

- Administered, through the State Foundation on Culture and the Arts, a statewide project in environmental and urban design. One of the five project areas is aimed at developing criteria and techniques for the selection of scenic and historic highway corridors.

- Under a contract to the State Foundation on Culture and the Arts, the firm of Belt, Collins Associates was hired to select a highway corridor for a shoreline belt road linking Kawaihae with Kailua, Keauhou, Napoopoo, Honaunau, and Hookena. In the Kealahou area, they suggest a corridor 1,000 feet in width on the top of the pali to provide maximum opportunity for the specific design of the scenic highway.

- Completed the State Comprehensive Outdoor Recreation Plan, prepared in mid-1968, which recommends Kealahou Bay as a "Potential Recreation Service Center: A regional, multi-purpose complex which is planned and developed as a unit in conjunction with the private sector to provide within one geographical location maximum cultural and recreational opportunities consistent with the expressed demand of the State's visitor and resident populations."

Kealahou Bay was recommended for these reasons:

- The site, which currently has many recreation resources, is mainly underdeveloped and could potentially incorporate additional recreational experiences.

- The City of Refuge National Historical Park adjoins the area on the south.

- The center is within reasonable traveling distance from the Kailua-Kona resort and residential sections.

- Consulted with the Federal Bureau of Public Roads in regard to scenic road construction under the Federal Aid System in the Honaunau-Kealahou area.

- Explored, through the State Division of Parks, the establishment of a

"Kealakekua State Park" along the eastern and northern shores of Kealakekua Bay. The State intends to utilize Land and Water Conservation Fund assistance in its establishment.

COUNTY PLANNING

The County of Hawaii is interested in developing a regional county park at Palemano Point and in developing a municipal golf course and recreation center above the present Keei Road.

There have been discussions with the principal landowner, the Bishop Estate, concerning the lease of land for the Palemano park and golf course.

Preliminary planning is underway between the County Department of Parks and Recreation and the State Department of Planning and Economic Development, the State liaison agency to the Federal Bureau of Outdoor Recreation, on possible Federal participation in the acquisition and development of the Palemano Point park.

JOINT STATE-COUNTY PLANNING

Governor Burns and County Chairman Kimura have agreed to jointly plan the detailed historic site/recreation development of the Kealakekua-Honaunau area. The State legislature has budgeted a planning item of \$55,000 for this project.

The salient features of the joint plan agreement are:

The coastal area from Kaawaloa to Honaunau is to be preserved and developed for the benefit of the people and visitors as soon as possible.

The area is to be developed under a common plan with the cooperation and participation of the Federal, State, and county governments, and the private owners concerned.

The State and county should jointly designate a planning agency or firm to develop the details of the plan and consult with the planners designated by private owners.

The major elements to be incorporated in the plan include:

State acquisition, preservation, and restoration of the major historic areas in the Kaawaloa Village area and the areas adjacent to the Hikiau Heiau and abutting on the cliffs of Kealakekua Bay.

Control of the scenic aspects of the pali through maintenance of open space by zoning or acquisition.

Restoration and opening for public use of the ancient land link between Kaawaloa and Kealakekua villages, including a foot trail along the cliff and the 19th-century horse road.

Preservation, restoration, and interpretation of part of the ancient Hawaiian agricultural fields above the pali.

Acquisition and restoration of the major historic sites on the land above the cliffs of Kealakekua Bay, including Puhina o Lono.

Maintenance of a scenic highway corridor above the Kealakekua Cliffs for placement of a low-speed scenic highway which would also serve as the lower boundary of hotel or residential development on the land.

Maintain the ecology of Kealakekua Bay through zoning, control of construction, and State regulation of uses of the bay.

County acquisition and development of a major regional park at Palemano Point.

Development of a historic marker and explanatory diorama at the location of the Battle of Mokuohai.

Development of a municipal golf course and recreation center mauka (inland) of the present Keei Road.

Preservation of the Kipu Village site and relating it historically to the Battle of Mokuohai.

Preservation of the north shore of Honaunau Bay and restoration of its ancient relationship to the City of Refuge.

Linking the foregoing developments by means of a scenic road system. The system should incorporate a sufficiently wide protective corridor, be supported by appropriate zoning, and have limited points of access so that its main use will be scenic and provide access to recreational and historic sites.

The Kealakekua-Honaunau development area should complement the proposed National Park Service parkway linking Hawaii Volcanoes National Park with Honaunau.

Private construction and development should be compatible with scenic and historic values so the region can become a major center for recreation and historic interest to the resident and visitor alike.

The State of Hawaii, County of Hawaii, and Bishop Estate joined in a formalized planning agreement for the Hookena to Kealakekua Bay area in the summer of 1968. Each agency designated a planner to work on the planning for this section of the Kona Coast.

PRIVATE PLANNING

The Kealakekua Ranch Company, a principal landowner, is planning a resort-golf course subdivision complex on lands above Kealakekua Bay between the edge of the pali and State Highway 11. Early in 1968, they petitioned the State Land-Use Commission to rezone about 300 acres from agricultural to urban to permit the development of 18 acres mauka (inland) of the highway for commercial and residential development. A larger area of about 281 acres makai (seaward) of the highway would be developed for low-cost housing, a golf course subdivision and hotel sites set back about 250 feet from the cliff area overlooking the bay. Certain pasture lands between the highway and the bay would be transferred to the county and State for recreational and historical purposes. All utilities would be placed underground.

Hearings were held on their petition. After much discussion on their proposal by State, county, organization and private parties, the Land-Use Commission approved the rezoning and development on the basis of a 1,000-foot setback from the pali.

FEDERAL PLANNING

Three Federal agencies are engaged in planning activities in the Kealahakua-Honaunau area. Two of these, the Bureau of Public Roads and the Bureau of Outdoor Recreation, are assisting the State and county in its scenic highway program and in planning and developing park and recreation areas through the Land and Water Conservation program.

The third agency, the National Park Service, is currently engaged in planning activities on the Big Island to determine the role of the Service in preserving the resources on the island deemed to be nationally significant and in the *formulation of detailed master plan documents covering Hawaii Volcanoes National Park and the City of Refuge National Historical Park and connecting the two parks by a scenic parkway.*

Part of their planning activity is this study, which was undertaken at the request of the Bureau of Outdoor Recreation, to look into the significance of the Kealahakua Bay area for possible inclusion into the National Park System.

NATIONAL PARK SERVICE CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

The archeological and historic sites of the Kealahou Bay area do not possess exceptional values sufficient to warrant their inclusion in the National Park System. There are resources, however, which should be preserved and developed by the State and county.

The scenic, recreational, and marine resources are important but are not of national significance. They are more a part of the local Kona scene.

State-county planning has progressed sufficiently so there are assurances the historical, archeological, scenic, recreational, and marine resources of the area will be preserved.

The National Park Service can assist in this preservation by working with the State and county on integrating the City of Refuge and scenic parkway development with the Kealahou Bay development.

This integration can best be achieved by the Service outlining as soon as possible its plans and objectives for Hawaii Volcanoes, the City of Refuge, and the Hualalai addition and parkway so they can be assimilated into a common conservation plan for the Kealahou-Honaunau area. (Plans and objectives are outlined in the preceding sections.)

RECOMMENDATIONS

General

Conserve the coastal scene from Kealahou Bay to Hookena for increased public use through a combination of Federal, State, and county parks and recreation areas.

Link all Federal, State and county historical, scenic, and recreational areas by a scenic road system. The system is to have a sufficiently wide protective corridor, supported by appropriate zoning, and have limited points of access so that its main use will be scenic and provide access to recreational and scenic sites and tied to the proposed National Park Service scenic highway linking Hawaii Volcanoes with Honaunau.

Increase State zoning of all lands between the scenic highway and the coast from Kealahou Bay to Hookena.

MAJOR CONSERVATION FEATURES

Federal

Enlarge the City of Refuge National Historical Park to include the north shore of Honaunau Bay and the south shore of Kiilae Bay to Loa Point. Included would be sufficient lands to incorporate important historical and archeological sites

currently outside the park boundary and adding the waters and shoreline of Honaunau and Kiilae Bays to preserve the Honaunau setting.

Develop a joint Federal-State scenic highway between Hilo and Kailua. The Federal Government would develop the midsection between Kalapana and Honaunau. The State would develop the Kailua-Honaunau and the Hilo-Kalapana sections. The Honaunau connection would be at the City of Refuge.

State

Establish a "Kealakekua State Historical Park" along the eastern and northern shores of Kealakekua Bay. The park would recognize the importance of the area in Hawaiian history and preserve the sites associated with Cook's visit. The park should be built around the ancient villages of Kealakekua and Kaawaloa, the agricultural field system above the bay and the Puhina o Lono.

Preserve the marine ecology of Kealakekua Bay through zoning, control of construction on surrounding lands, and State regulation of the uses of the bay. Management and protection could be assured by establishing a separate marine park or including the bay as an addition to the proposed Kealakekua State Historical Park.

Preserve the balance of the coastal scene between Keauhou Bay and Hookena through State zoning.

Preserve the Kipu Village site at Palemano Point and relate it historically to the Battle of Mokuohai.

Develop a historic marker and explanatory diorama at the battle site.

Develop a major beach park at Hookena.

Develop boat-access facilities at Kealakekua, Milolii, and if possible, at Hookena and Palemano.

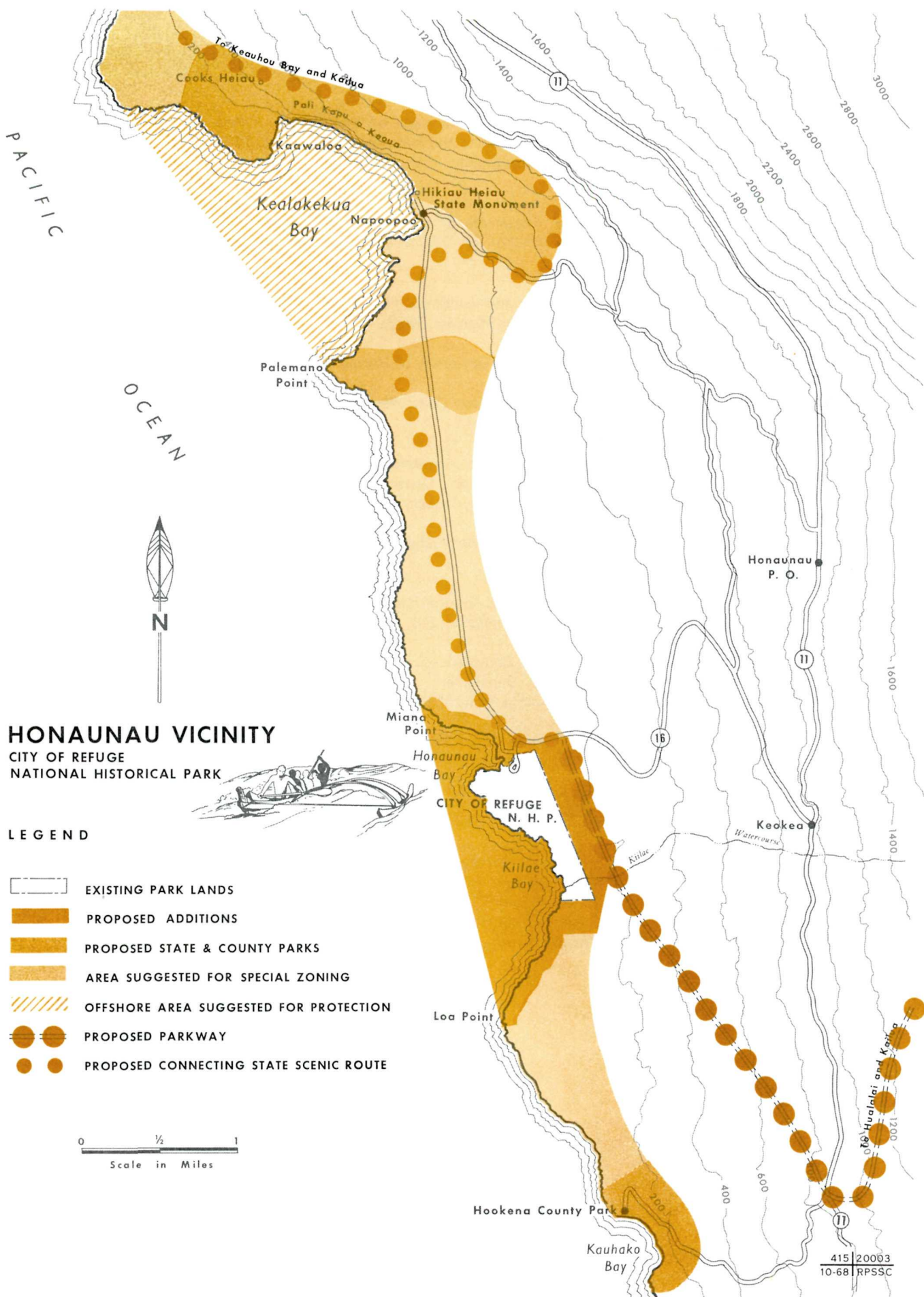
County

Acquire and develop a major regional park at Palemano Point.

Develop a municipal golf course and recreation center above the present Keei Road.

Private

Private development should be compatible with the scenic and historic values so the region can become a major center for recreation and be of historic benefit and interest to the island visitor and resident.



HONAUNAU VICINITY

CITY OF REFUGE
NATIONAL HISTORICAL PARK

LEGEND

- EXISTING PARK LANDS
- PROPOSED ADDITIONS
- PROPOSED STATE & COUNTY PARKS
- AREA SUGGESTED FOR SPECIAL ZONING
- OFFSHORE AREA SUGGESTED FOR PROTECTION
- PROPOSED PARKWAY
- PROPOSED CONNECTING STATE SCENIC ROUTE

0 1/2 1
Scale in Miles

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