



IV. CURRENT DEVELOPMENT PROPOSALS.



PUNALUU RESORT EXPANSION.

Project Description.—C. Brewer Properties is presently seeking a number of county approvals to construct in the Punaluu Special Management Area below Highway 11 two hotels containing a total of 500 to 635 rooms, and a variety of other resort facilities.

According to the revised Environmental Impact Statement (EIS) for Punaluu Resort issued in April of this year (the first EIS was withdrawn in early 1987), the proposed Punaluu Black Sand Inn to be located approximately 210 feet inland from the famous beach would consist of a number of four-story buildings erected on fill material with a final grade of 22 feet above sea level, due to possible *tsunami* inundation. The planned Village Hotel would be situated about 450 feet from the shore on the bluff overlooking Punaluu bay and would also be four stories in height. Integrated with this hotel would be Punaluu Village, comprised of 200 to 400 hotel/condominium units and approximately 65,000 square feet of commercial space in multi-story structures surrounding a man-made water feature.

Completing the proposed resort expansion would be a private club next to Ninole cove, 1,240 to 1,868 multi-family condominium units occupying about 123 acres of land above and below the Hawaii Belt Road (including 60 to 90 units in three-story buildings on the coastal plain near Ninole cove), and 70 to 80 single-family residential lots above Highway 11.

Unlike the first EIS, the revised document does not commit the developer to restore Ninole cove and springs, even though much of the rubble now filling this once-popular state recreational site can be traced to upland cane fields owned by a C. Brewer and Company subsidiary.

Project Impacts.—Major concerns that have been raised about this project to



PLANTATION RUNOFF COVERING NINOLE SPRINGS.

date include the potential for massive overcrowding of tiny, 800-foot-long Punaluu black sand beach, the only easily accessible swimming site in the entire district of Ka'u. C. Brewer Properties' consultant has acknowledged that "the coastal use survey included in the Draft EIS addresses the limited capacity of Punaluu Beach due to 'lava bedrock and lava boulders exposed at the water's edge along most of the beach creating poor swimming conditions,'" and "the likelihood that the great majority of the guests occupying the resort's planned hotel units would spend some time at Punaluu Black Sand Beach." The developer's aforementioned coastal use survey also noted that currently, "The entire beach and backshore appears crowded with people and vehicles."

Quite obviously, the placement of four-story hotel and condominium structures on the seaward portion of the bluff paralleling Punaluu's shoreline would severely degrade spectacular mountain views from the county park and coastal plain below. The planned inn adjacent to Punaluu beach, the equivalent of at least five stories in height due to its construction atop fill material, and the multi-story condominium clusters to be located near Ninole cove would devastate presently unspoiled coastal vistas as well.

Concerning historic Hokuloa Chapel and cemetery on the bluff which would be sur-

rounded on three sides by, and incorporated into, the proposed Punaluu Village, Henry K. Boshard of Mokuaikaua Church in Kona commented in the EIS:

Let me say that to all of us who were raised in that area and have been a part of the church's life and ministry for many years, that the church and cemetery are still being actively used. Whatever is being planned for the area should have due consideration for us, and not just dismiss us into oblivion, just because C. Brewer owns the bulk of the land in that area. In other words, we need some help from our county officials by reasonably protecting some of the beauty and distinctive environmental and cultural locations. Please remember that most of the people in Kau make use of Punaluu Beach and regard the area's history and culture with much aloha.

The coastal use survey commissioned by C. Brewer Properties recognized that, "Many of the [Ka'u] residents interviewed said that they visit Punaluu Beach Park after work to simply get away and relax for awhile," and that, "The beach park, in conjunction with the adjacent beach, the nearby boat ramp, and the adjoining rocky shoreline, is a primary site for a wide variety of local ocean recreational activities." Moreover, the developer's consultant has admitted that, "As noted, Punaluu Village to be located on the bluff in addition to the adjacent two proposed hotels will detract from the 'getting away from it all' experience now enjoyed by campers and coastline users."

The possible danger posed to Punaluu's fragile coastal ecosystem by a projected 2,500 to 4,000 percent increase in the use



WARNING SIGNS AT PUNALUU BEACH.



MOUNTAIN VIEW FROM PUNALUU COUNTY PARK.



UNIQUE MOUNTAIN VIEW FROM NINOLE AREA.

of treated sewage for golf course irrigation is listed as an unresolved issue in the revised EIS for Punaluu Resort. Brewer's consultant has agreed that, "Punaluu Harbor is a favored feeding and resting area for threatened green sea turtles and a feeding, resting, breeding and nesting area for endangered Hawaiian hawksbill turtles."

In regards to the economic feasibility of the proposed project, Roger A. Ulveling, Director of the state Department of Business and Economic Development, cautioned in the EIS:

Based on the market analysis, we question the immediate demand for additional hotel units on the island. The final Environmental Impact Statement (EIS) should address this issue in more detail. We point out that there are substantial acreages of land on the island which have the potential for resort development and, similar to Punaluu, these lands are already in the urban land use district. The development potential far exceeds the projected inventory of hotel rooms listed on Page II-38 of the draft EIS. On the assumption that the demand for such units is limited, the factors which make the subject Punaluu project more desirable and achievable should be identified.

A plethora of additional concerns relating to shoreline access, use of the Brewer-owned boat ramp at Punaluu bay, archeological sites, native Hawaiian rights, socio-economic impacts, natural hazards and neglected alternatives have also been raised during the permitting process.

Recommendations.—During a three-month period, over 3,000 signatures

of Big Island residents and visitors to Punaluu were gathered on a petition circulated by the Punaluu Preservation Committee calling on C. Brewer Properties to "consider alternative, less-sensitive sites in Ka'u for a quality development that will accurately reflect the history, culture and needs of this region." Foreign countries represented by signatories to this petition included Australia, Austria, Denmark, New Zealand, Sweden, Switzerland and West Germany.

In a December 28, 1986 letter to the *Hawaii Tribune-Herald* regarding the proposed resort expansion, Pahala resident June Domondon concluded:

The Developer owns 36,000 acres of land in the District of Ka'u—surely there must be an alternative hotel site among all that land that could be developed, instead of taking away from residents the only major ocean recreational site in the entire district.

The author of this volume summed up his comments to the revised Punaluu Resort EIS with the following remarks:

The Punaluu area's fragile assets, such as sweeping mountain and coastal vistas, significant historical and archeological sites including the state's largest surviving heiau complex, and the only easily-accessible swimming beach and finest thrownetting site in all of Ka'u, should make it unthinkable that this truly unique remnant of Old Hawaii be allowed to degenerate into a sprawling Waikiki-style mini-city.

Moreover, overdevelopment of Punaluu/Ninole, renowned throughout the world for its unspoiled beauty and serenity, could irreparably damage the long-term prospects for quality tourism in the district of Ka'u, while creation of a world-class historical, cultural and recreational complex on the site would serve to strengthen the visitor industry

islandwide.

Few would downplay the many contributions that C. Brewer & Co., Ltd. has made to the betterment of this district over the past century. It would be a true shame if this legacy of mutual benefit were to be tarnished so unnecessarily at this late date.

Therefore, C. Brewer Properties, Inc. should be strongly encouraged to relocate its proposed resort to a less-sensitive site in Ka'u, so that the splendor and majesty of Punaluu may be preserved undiminished for future generations of residents and visitors alike.



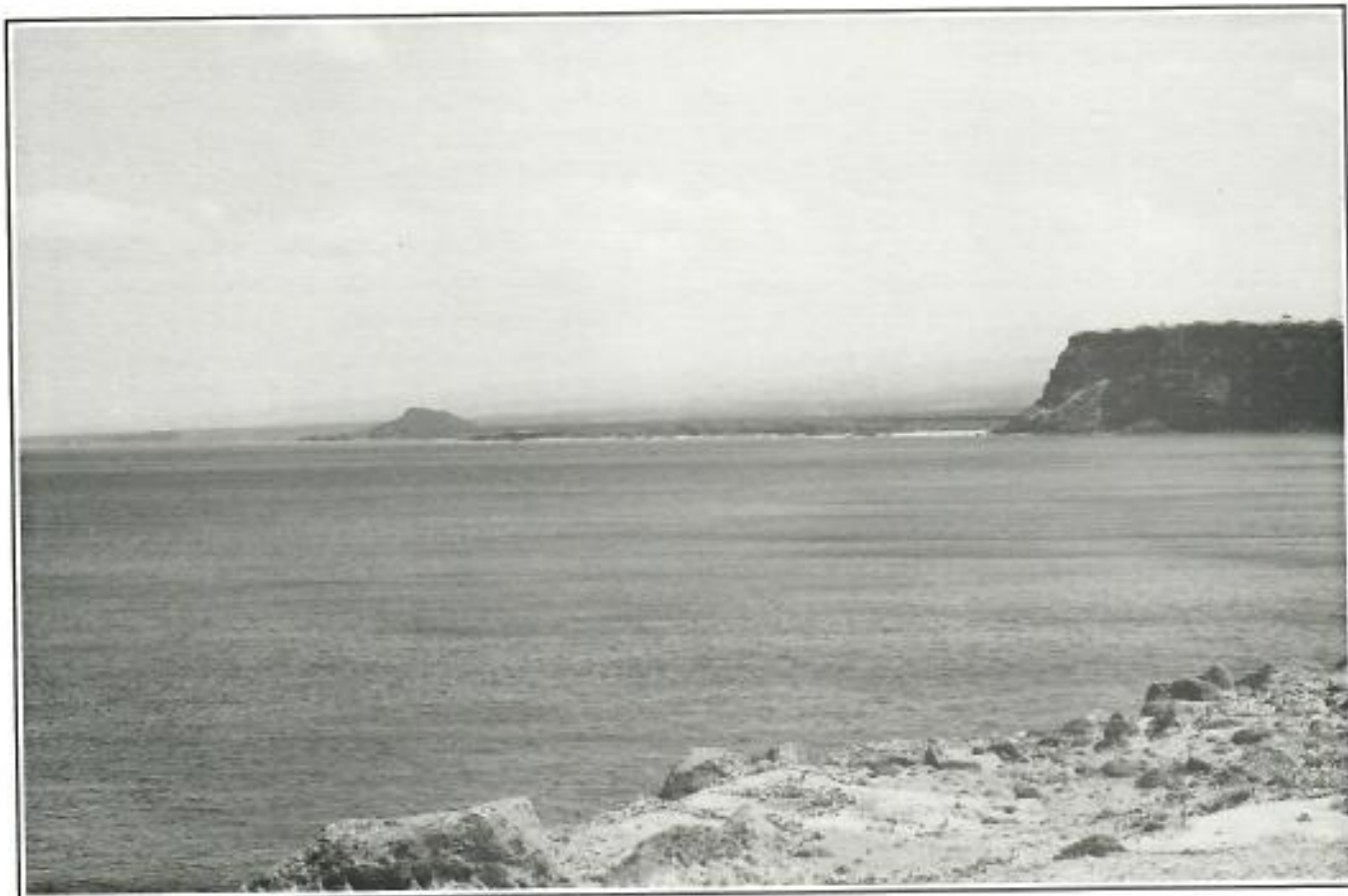
HAWAIIAN RIVIERA RESORT.

Project Description.—The proposed Hawaiian Riviera Resort would be located within a 20,616-acre parcel of land

situated between the Hawaii Belt Road and Kahuku coastline near the existing Hawaiian Ranchos subdivision in southwest Ka'u. It was stated in the EIS issued for this project in December of 1987 that:

The proposed project is being master planned through the joint efforts of the Palace Development Corporation and the Hawaii Ka'u Aina Partnership, and contains two separate but contiguous developments; the Hawaiian Palace Resort and the Hawaii Ka'u Aina Resort. Collectively, the two components, along with their common facilities, which include the 800 acre support community and 100 acre regional airport, will be known as the Hawaiian Riviera Resort.

Upon completion, the Hawaiian Palace Resort to be located on 784 acres at the western end of the 2,344-acre resort area would feature two luxury hotels with 1,275 rooms, a 400-slip marina "cut into the coastal lava cliffs," a "European-style marina village," an 18-hole golf course and 952 residential units. The eastern 1,560-acre Hawaii



VIEW OF THE MAGNIFICENT KA'U COASTLINE LOOKING WEST FROM KA LAE.

Ka'ū Aina Resort would consist of three hotels with 1,200 rooms, two 18-hole golf courses and 500 residential units.

The combined resort facilities would front on approximately three miles of presently undeveloped coastline with Pohue bay at its center, while the proposed support community would be located some four miles away in the northeastern corner of the property adjacent to Highway 11 and Kahuku Ranch headquarters. According to the developers' EIS, the regional airport would be situated between the resort area and support community, and eighteen miles of private roadway would interconnect the various Hawaiian Riviera Resort components.

Project Impacts.—Given that most of the "two hundred ninety-eight archaeological sites containing 1,144 component features" within the proposed project area are believed by the developers' consultant "to be prehistoric, possibly between fifth and fourteenth century ages," the cultural and visual ramifications of destroying some sites and incorporating the remainder into a major destination resort are an important concern. In an article datelined Pohue bay, which appeared in the *Honolulu Advertiser* on July 26, 1973, columnist and William Ellis II Expedition member Bob Krauss declared:

Yet, there is a magnificence about this back end of the island—a grandeur that makes us pause, sweat stained and weary, to admire what so few people have seen. We've decided to call this deserted, desolate end of Hawaii, between Milolii and South Point, Ellis in Wonderland. Here's why: every time we stop to rest on a piece of high ground with a spectacular view and a nice breeze, we find that some old Hawaiian was there before us. We'll be sitting on an old house site. Its like hiking in a living museum....

Of any place I have been in the world, this deserted coast has brought me closest to the basic forces of nature.

A disturbing number of references are made in the Hawaiian Riviera Resort EIS to a perceived ongoing decrease in Ka'ū's near-shore fishery resources in the vicinity of the proposed project as the result of increased fishing activity. An article in the June 1988 issue of *Honolulu* magazine discussed "the



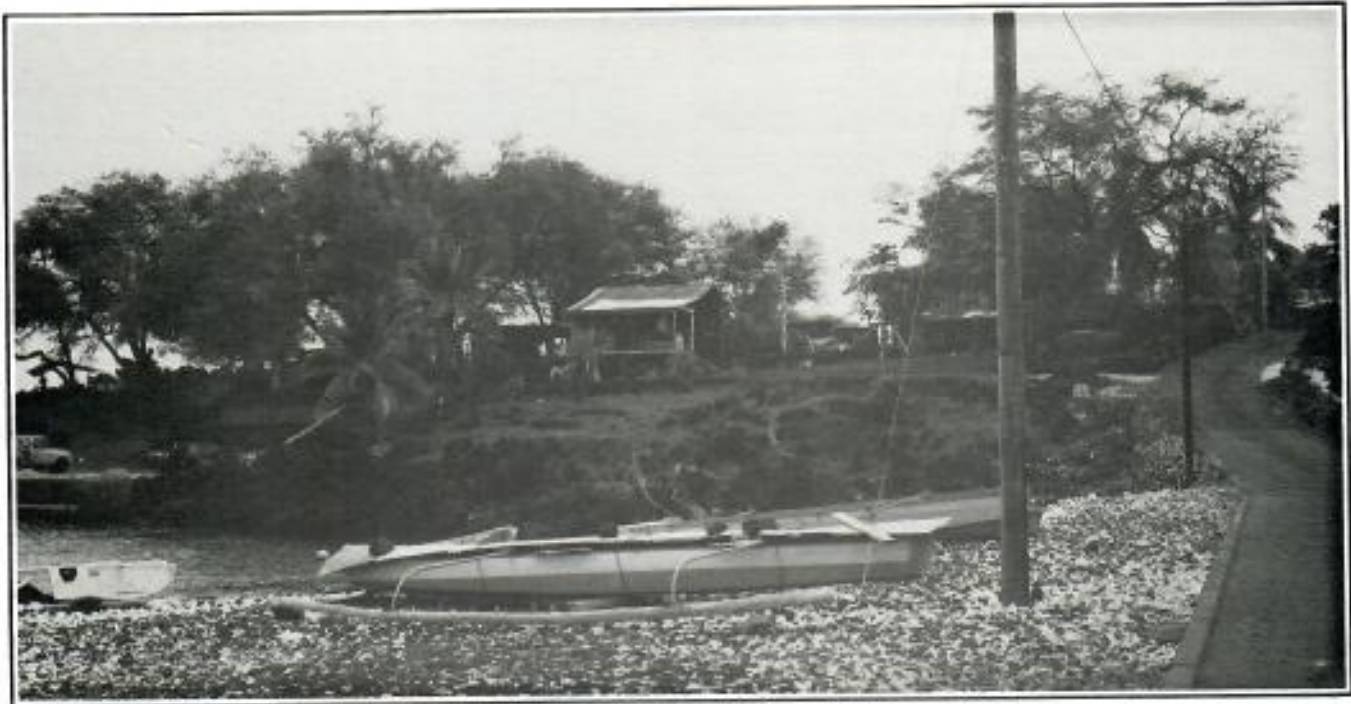
FISHING BOATS AT KA LAE.

severe decline (and in some cases the collapse) of Hawaii's nearshore fisheries," and mentioned "the steady decline in catch rates since 1900 of every Hawaii reef fish with commercial value."

Thus, the effect that construction of a 400-slip marina in Kahuku would have on fishing in nearby waters is not hard to predict—the possibly already diminished supply of fish would decline due to pressure from new boats attracted to the area, perhaps enough to threaten the livelihood of Ka'ū and South Kona fishermen. It should be noted that Milolii, located approximately fifteen miles up the leeward coast in South Kona district, is generally considered to be the state's last surviving Hawaiian fishing village.

The comments of persons interviewed as part of the developers' social impact assessment clearly indicate that the shoreline abutting the planned resort site is already utilized by Ka'ū residents and others for a wide variety of subsistence and recreational pursuits. Obviously, opening up this region to uncontrolled access by literally thousands of resort visitors, residents and employees would result in severe degradation of the attributes that current area users value highly. As acknowledged in the EIS:

To maintain a sense of privacy and isolation, many people are choosing out-of-the-way places where a four-wheel drive vehicle is needed to maneuver rugged terrain,



MILOLII, THE STATE'S LAST HAWAIIAN FISHING VILLAGE.

and where there are no support facilities. To some even these spots are becoming crowded.

A number of potentially adverse socio-economic impacts of the proposed resort—extensive employee in-migration, off-site population growth, the need for additional public services and facilities, and increased traffic volumes—are listed in the Hawaiian Riviera Resort EIS as unresolved issues. The



TINY MILOLII GROCERY STORE.

developers predict that of the 2,300 on-site employees required for the project's 1992 initial operations, "about three-quarters would be in-migrant..."

The EIS noted that, "Unless public-private cooperation produces substantially more affordable homes in West Hawaii, workers there will have to commute greater distances from locations (as in the study area) where affordably priced housing is available." Therefore, it is likely that a substantial resort-generated increase in the prices of substandard subdivision properties in the western portion of Ka'u district, as the result of speculation if for no other reason, would serve to deprive West Hawaii residents and others of their only remaining opportunity to obtain low-cost land and housing on this side of the island.

The April 1988 issue of *Hawaii Business* magazine featured an article entitled "Too much, too soon," which examined some of the dislocations caused by similar large-scale resort development in the districts of North Kona and South Kohala:

West Hawaii residents have already witnessed housing

rental hikes of as much as 100 percent over the past 12 months, as the Hyatt's 800 well-paid construction workers jockeyed for available rental units. County housing officials worry that employees will find little affordable housing on the market once the hotel comes on line. Some in the visitor industry fret that the demand for such large numbers of workers will inevitably mean an importation of employees from the Mainland, perhaps leading to a loss of the "aloha spirit" at island resorts. And employers throughout the state are wondering how much of their current staff will be wooed away to work on the burgeoning Kona-Kohala coastline.

The developers' Geological Investigation, conducted by the firm of Dames and Moore and appended to the Hawaiian Riviera Resort EIS, disclosed possible risks to the proposed development from lava flows, movement of existing ground cracks, seismic activity, *tsunami* inundation and storm waves. Regarding lava flow hazards, the geologists reported that:

There have been seven historic eruptions recorded along the Southwest Rift Zone of Mauna Loa. Two of these historic lava flows are located on or near the Ka'u Alna site.... Due to the steepness of the terrain, the great volume of lava which erupted from the vents, and the relatively short distance to the sea, the [1887] flow reached the sea within one day....

The Island of Hawaii is divided into nine hazard zones, with Zone 1 having the highest lava flow risk and Zone 9 having the lowest risk. The proposed site is located in Zone 2. By comparison, the primary population centers, Hilo and Kailua-Kona, are located in risk Zones 3 and 4 respectively....

Given that two historic (1887 and 1907) *a'a* lava flows had reached the site and that there have been seven (7) historic eruptions recorded along the Southwest Rift Zone of Mauna Loa, it is likely that there will be more eruptions along this rift in the future. The possibility of a lava flow entering this 5-mile-wide site exists.

According to the U.S. Geological Survey, "Avoidance through land use zoning and evacuation is virtually the only way to reduce losses from lava flows." An accompanying aerial photograph shows the awesome advance of a 50-foot-high, 1,500-foot-wide lava flow towards the coastal village of Hoopuloa (about fifteen miles from the planned resort) in 1926; Hoopuloa was subsequently obliterated by this flow.

The potential safety hazards of locating a marina at the proposed Hawaiian Riviera Resort were mentioned in a letter reproduced in the EIS from Doyle E. Gates, Administrator of the National Marine Fisheries Service:

In addition, we feel the practicality of a marina in this

area should be further assessed. The waters along the Kona Coast between Kauna Point and South Point are not typical "Kona" or lee waters such as found further north along this coast. During tradewind conditions the waters off the proposed resort become quite rough and potentially dangerous for small craft.

Other questions raised about the planned resort concern noise impacts of the airport, possible anchialine pond degradation, the marina's impact on humpback whale and sea turtle habitats, and the availability of adequate water to supply the development.

Recommendations.—Approving the construction of a project as massive as the proposed Hawaiian Riviera Resort along the isolated and hazard-prone Kahuku coastline would be foolhardy at this time, in view of a looming shortage of hotel workers, the inability of county and state agencies to keep pace with infrastructure needs in existing West Hawaii resort areas, and a host of other concerns.

Ideally, the property in question should be obtained by a government entity or private organization, such as the Nature Conservancy of Hawaii, for a wilderness park to accommodate the future recreational needs of the Big Island's expanding population.

The possibility of the inland grand hotel and related projects suggested in this book being developed as a joint venture between the principals of the proposed Hawaiian Riviera Resort and financially strapped C. Brewer and Company is certainly worthy of consideration.



ROCKET LAUNCHING FACILITY.

Project Description.—A commercial satellite launching facility was first



Hawaii State Archives

LAVA FLOW FROM MAUNA LOA ADVANCING ON HOOPULOA VILLAGE IN SOUTH KONA, APRIL 18, 1926.

proposed for the district of Ka'u in 1982 by Space Services, Inc., a Texas-based firm. The company's plans for a rocket pad on Hawaiian Homes land near Ka Lae were eventually abandoned, however, due to strong community opposition.

Establishment of a launching site in Ka'u was given renewed impetus by C. Brewer Chairman and President J.W.A. "Doc" Buyers's surprise 1986 offer to donate up to 500 acres of oceanfront land at Kahilipali point, four miles south of Naalehu, to the U.S. Government or any public or private group willing to build such a facility. In January of 1987, Governor-elect John Waihee endorsed the concept of a space launch operation on the Big Island, and two months later the Massachusetts-based international consulting firm of Arthur D. Little, Inc. (ADL) was engaged by the state Department of Business and Economic Development to evaluate statewide potential for space-related development.

Eight geographic areas in the State of Hawaii were considered as candidate locations for launch-related activities in the \$300,000 ADL report, issued in late August, as were Palmyra Island and the generic concept of an offshore platform. The study concluded that:

The southern portion of the Ka'u district of the Big Island, in an area north-northeast from the southern end to the boundary of Volcanoes National Park at Palima Point, is the preferred location for launch facilities among those considered....

The western region of Kauai [Barking Sands area] might be a suitable location for selected opportunities, principally limited to sounding rockets by commercial or civilian users. An important issue to be addressed here will be access to the Pacific Missile Range Facility or adjacent lands.

The consulting firm was again contracted by the state in early December, this time to select a specific primary and alternate site for a launch facility on the island of Hawaii. The three general locales selected by state planners for further survey were the Ka'u coast from Ka Lae to the national park's southern boundary, the Kumukahi cape region about 25 miles southeast of Hilo, and the northern portion of the island from Upolu

point to Laupahoehoe. Surprisingly, the latter two areas were not even listed as feasible locations in the original ADL report.

On February 22, 1988, ADL released draft findings recommending an 11,000-acre site at Palima point in Ka'u district, approximately three miles southeast of Pahala, as the best locality for a commercial satellite launching operation; the Kahilipali point area was identified as the most favorable alternative site.

The 1988 Hawaii Legislature subsequently appropriated \$1,539,230 for the preparation of an EIS and related studies on the possible establishment of launch facilities at the selected locations. Legislators specified that:

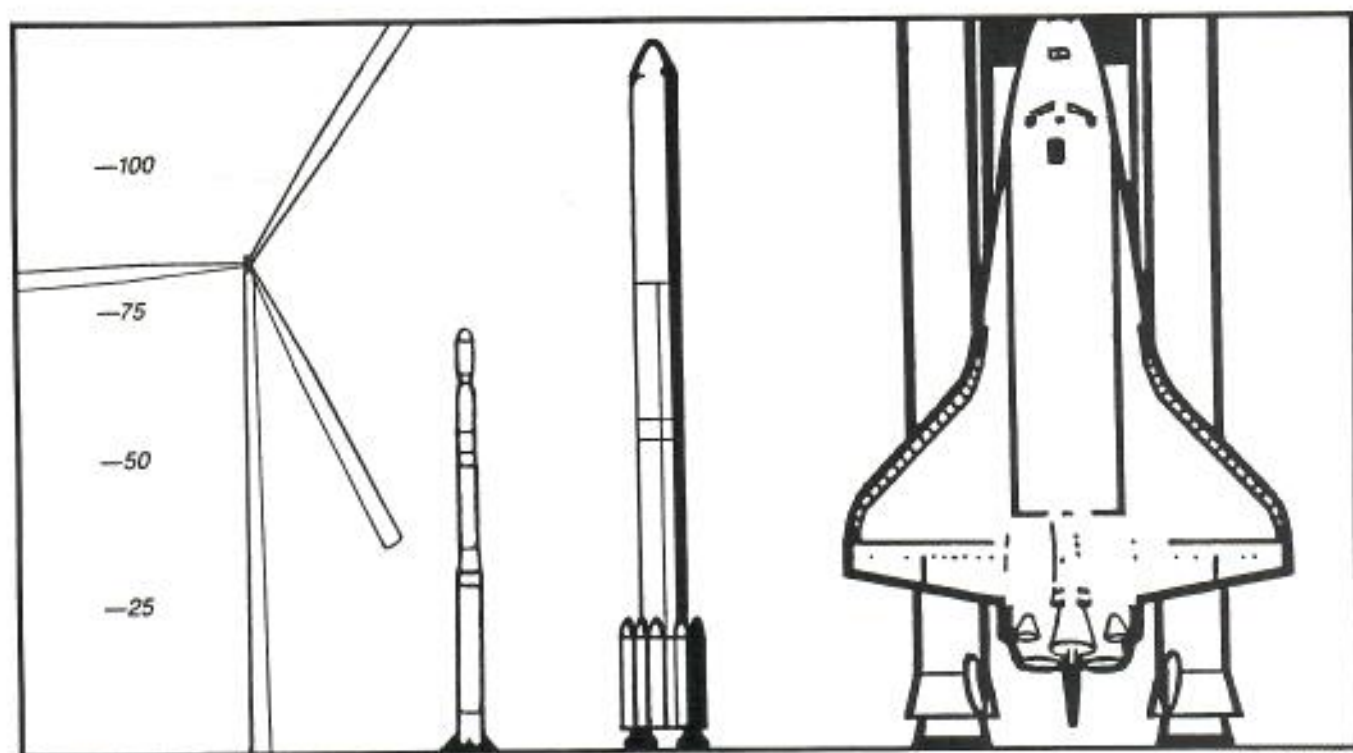
The impact statement shall separately analyze and distinguish among small (Scout-class), medium (Delta-class), and large (Titan-class) rockets and among types of propellants used. The EIS shall not consider activities involving any payload which uses radioactive material as a power source or activities related to military weapons payloads, military weapons research, or SDI, as it is the intent of the legislature that no such payloads or activities will be launched from, or take place at, the site.

As presently envisioned by state officials, a launch complex at Palima point would consist of four rocket pads constructed about 1,500 feet from the shoreline, control facilities and two tracking stations located further inland, and a system of roads connecting the various facility components with Highway 11 below Pahala. The initial ADL study also suggested that:

Beyond these basic infrastructure systems, a space transportation center might eventually include additional infrastructure systems depending on the requirements of the particular ELVs [expendable launch vehicles] operated there, the center's capacity, and the launch rate. These would include an air strip (runway, hangers, aviation fuel storage and handling facilities, and control tower) to receive ELV segments and payloads from off-island manufacturers as well as to handle general aviation traffic generated by activities at the center....

In addition to the individual launch sites and "industrial" clusters, it is possible that, either at the outset or at some point later, ELV manufacture could occur at the launch site.

It is expected that private industry would build and operate the actual complex, with the state providing such supportive infrastructure as power, water and site access. A safety zone with a 2.9-mile radius, from



State D.B.E.D.

HEIGHT COMPARISON BETWEEN KA'U WINDMILL AND SCOUT, DELTA AND SHUTTLE ROCKETS.
Titan rocket (not shown) is about 180 feet tall.

which the public would be excluded during launches, would surround the rocket pads.

Project Impacts.—A detailed quantification of the likely impacts of a space transportation center in the district of Ka'u is necessarily difficult at this time, due to the conceptual nature of the project and the large number of variables involved.

Probably the greatest area of public concern at present is the proximity of the proposed primary and alternate launch sites to established residential communities, Pahala and Naalehu respectively. Pahala currently has a population of some 1,619 persons, while Naalehu residents number about 1,168. Ironically, the existing structure closest to Palima point is the state-run Ka'u Hospital in lower Pahala.

Such concerns have been fueled by a series of well-publicized mishaps involving space launch vehicles. On January 28, 1986,

the NASA space shuttle *Challenger* exploded and crashed into the sea shortly after liftoff, killing its entire crew including Hawaii-born astronaut Ellison Onizuka. Close on the heels of the *Challenger* disaster came the April explosion of an Air Force Titan 34D rocket and the failure of a NASA Delta rocket in May. In March of 1987, NASA suffered yet another major setback when an Atlas-Centaur rocket and satellite combination went out of control 51 seconds after blastoff and was purposely destroyed at 14,000 feet. The following June, three small NASA sounding rockets were accidentally ignited by lightning on the launch pad at Wallops Island, Virginia and shot into the ocean.

The United States did not have a monopoly on launch failures during this period. In May of 1986, an Ariane rocket and satellite launched from French Guiana had to be destroyed when its third stage failed to ignite. Subsequently, the Soviet Union reported two

back-to-back rocket explosions under its new policy of openness.

A major space-related disaster occurred on May 4 of this year when a series of fires and explosions leveled a rocket fuel plant in Henderson, Nevada. The huge blasts at Pacific Engineering and Production Company, one registering with the same force as an earthquake of 3.5 magnitude, killed two persons, injured more than 250 others and shattered windows ten miles away in Las Vegas. The firm of Morton Thiokol, manufacturer of shuttle booster engines, also suffered an explosion at its Utah plant in late 1987 that killed four workers.

The ADL report discussed the possibility of rocket failures in the following terms:

The probability of in-flight failure or launch-pad abort for established U.S. ELVs appears to be less than 5 percent. The reliability of new vehicles can not be predicted but should be lower than those of established vehicles. In-flight destruction of a vehicle disperses its propellant load, which should ignite and burn. Some fraction of this load may reach the ocean surface. If the destruct system should fail to operate, the vehicle may impact intact and release the entire quantity of remaining propellant into the ocean.

Regarding the potential impacts of a

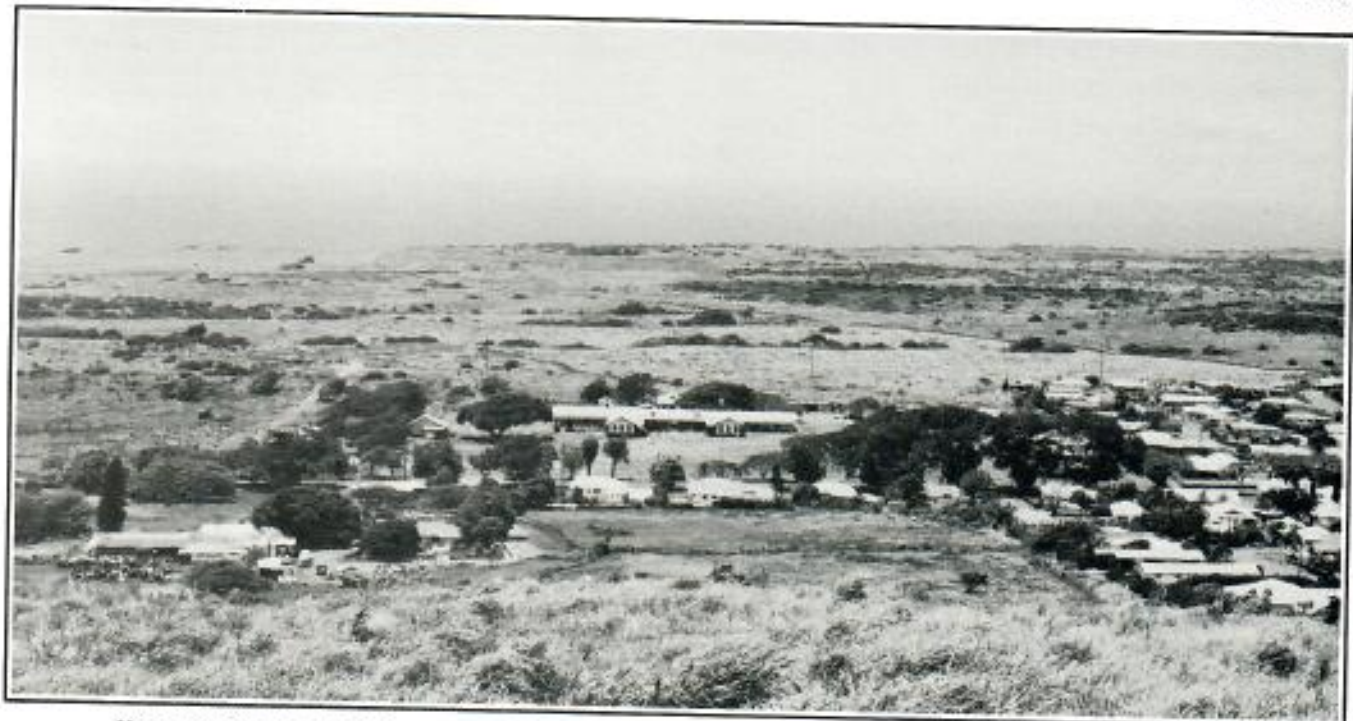
space transportation center on the district of Ka'u's environment, state Representative Andrew C. Levin, original sponsor of legislation appropriating public funds for an EIS, was reported to have voiced some concern that prevailing wind patterns could send fuel fumes from a launch site over populated areas. The ADL study noted that, "Impacts on very clean existing air quality will require analysis." It was further stated therein:

All ELVs are powered by chemical rocket engines. These engines operate by consuming a fuel (solid or liquid) and a self-contained oxidizer (usually liquid Oxygen, LOX). Major chemical species emitted by rocket engines are:

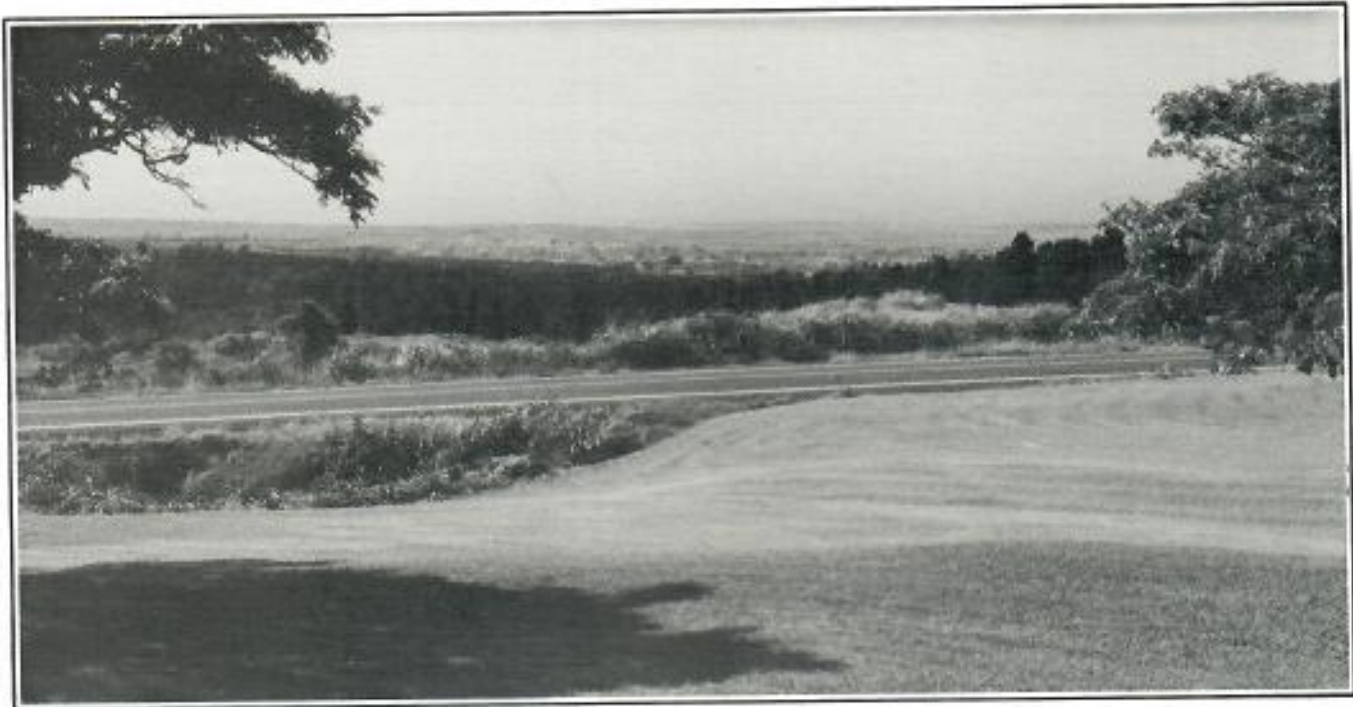
- o Water (H_2O);
- o Carbon Dioxide (CO_2);
- o Carbon Monoxide (CO);
- o Hydrogen Chloride (HCl);
- o Nitrogen (N);
- o Hydrogen (H); and
- o Aluminum Oxide (Al_2O_3).

Of these, CO [Carbon Monoxide] and HCl [Hydrogen Chloride] are generally recognized as air pollutants. Al_2O_3 [Aluminum Oxide] is emitted as a particulate and may also be of concern....

Due to acceleration of the vehicle and the staging process, the quantities emitted per unit length of trajectory are greatest at ground level (at the launch pad) and decrease continually (downrange). Ground level effects of the ground cloud created at lift-off are governed by the speed and direction of its movement, local meteorological conditions, and the concentration of the chemical constituents of the



VIEW OF PROPOSED KAHILIPALI POINT LAUNCH SITE WITH NAALEHU IN THE FOREGROUND.



VIEW OF PROPOSED PALIMA POINT LAUNCH SITE FROM THE GROUNDS OF KA'U HOSPITAL.

exhaust.

An April 9, 1987 article in *West Hawaii Today* entitled "Spaceport's effect on environment queried" contained the following remarks of a NASA official on the subject of launch vehicle emissions:

NASA Environmental Compliance Officer Lewis Andrews acknowledged the large aluminum oxide emissions of the solid fuel rocket motors, but he did not acknowledge any associated health concerns.

"Aluminum oxide has not presented environmental concerns that we know of," Andrews said from Washington. "Regarding potential health concerns, the only thing we have seen is that it wipes the paint off structures. We don't know what effect it has once deposited in the soil. Research is continuing, but it appears the aluminum oxide affects percolation (the diffusion or penetration of water through the soil)."

Andrews said shuttle rocket motors also produce large amounts of hydrochloric acid and result in acid deposition or acid rain. Other solid fuel rockets, including the Titan, share some of the same exhaust constituents as the shuttle, including aluminum oxide, hydrochloric acid and carbon monoxide, he said.

"With Delta, Titan and Scout expendable launch vehicles, for all in most instances, there is no problem with emissions, except hydrochloric acid. And with the Titan-Centaur type of vehicle, there is an expressed concern with hydrochloric acid," Andrews said.

The possible "noise/visual" effects of a rocket launching facility were described by

ADL as follows:

Noise impacts from any type of launch facility would be particularly significant, and would be felt over a wide area. Such noise would be intense, but of relatively short duration.

Visual impacts are a potentially important impact because the high profile nature of launch activities means a facility which is highly visible in the surrounding area. Such impacts would greatly alter the scenic character of the facility site location.

The issue of possible impacts on existing astronomical activities was also brought up in the ADL report:

As discussed in Chapter VII, the impacts of launch and other development on astronomical activities must be carefully assessed. As developments proceed, steps must be taken to comply with light ordinances (such as on the Big Island) or, in their absence, to ensure that any adverse impacts are mitigated.

A major bone of contention between proponents and opponents of a space transportation center in Ka'u district is the economic feasibility of such an undertaking. Regarding markets for launch services, the ADL report stated:

Past projections for payloads and launches have been extremely optimistic. Between 1980 and 1986, the highest number of launches occurred in 1984, when 32 launch

vehicles carried 45 payloads. Failures of the Shuttle, Delta, Titan and Ariane launches led to virtual grounding of non-Soviet Bloc launches. Looking to the year 2000, payloads are estimated to range from 21 to 49 per year between 1987 and 2000 under a high scenario estimate and between 12 and 34 annually under a low scenario estimate—estimates that are consistent with those of Arianespace, which projects a need to launch 20-25 satellites by ELVs through the mid-1990s, and of Martin Marietta, which anticipates a long-term commercial launch requirement of 16 satellites per year. To deliver this number of payloads per year will require 16 to 24 launches per year—a market to be divided among Arianespace, Martin Marietta, General Dynamics, [China's] Long March 3, Space Services, Amroc and others. To date, Arianespace has captured a 50 percent market share, and has publicly announced an objective to capture at least one-third of the market in the future....

Figure I-1 shows the total number of launches for orbital payloads forecast under a high scenario and a comparison with existing and planned capacity. As indicated, existing capacity can handle even the most optimistic forecast of demand for non-NASA, non-DoD payloads. It is likely that additional capacity will be added at existing facilities before a completely new (or "greenfield") launch facility is built.

According to ADL, the feasibility of a rocket launching complex in the State of Hawaii would be dependent on its ability to fill "a niche market: the launch of small to mid-size commercial and scientific payloads." The report elaborated:

However, the potential for niche opportunities, particularly for small rockets when combined with the bureaucracy and restrictions of operating at major launch facilities where NASA and/or DoD demands may take precedence, may create opportunities for smaller, specialized launch facilities.

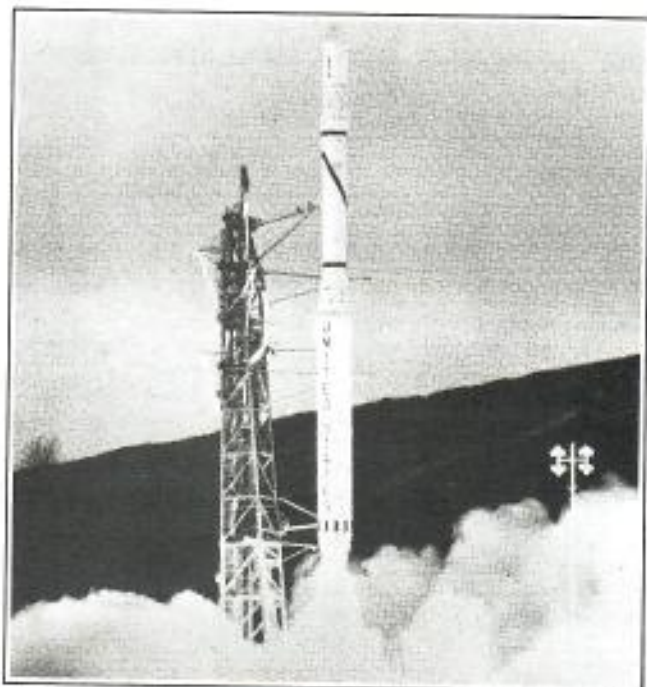
However, Hawaii would not be the only state pursuing such markets according to an article headlined "Florida starts spaceport drive," which appeared in the *Hawaii Tribune-Herald* on March 27, 1988:

Gov. Bob Martinez said Friday he will ask the Legislature next week for \$500,000 as seed money for developing in Florida America's first commercial spaceport....

Martinez said Cape Canaveral and the adjacent Kennedy Space Center gave Florida a clear advantage over Hawaii and other states that are thinking of competing for launches of commercial goods such as communications satellites.

"We have the tracking systems, the launch pads, the support services, and, most importantly, we have the people to make Spaceport Florida a reality," he said.

Moreover, the staying power of some of the small, newly-established firms in this highly competitive field was called into question by the financial failure of the American Rocket Company following issuance of the



State D.B.E.D.

LAUNCH OF A SCOUT ROCKET.

ADL study in which it was prominently profiled. This firm was also named in another March 27 *Hawaii Tribune-Herald* article entitled "Mayor sees interest in a spaceport":

Mayor Dante Carpenter says that unlike some in the state Senate, he is convinced that a market exists for a rocket launching facility in Ka'u.

Responding to comments made last week by Sen. Anthony Chang (D-Pauoa, Alewa, Nuanu) that no market for a launch site has been proven, Carpenter said yesterday that he's convinced the opposite is true.

"I have spoken personally to individuals from the American Rocket Co. and I know of two or three other firms that have visited locally or expressed interest," Carpenter said.

Additional concerns that have surfaced during debate over the proposed space transportation complex in Ka'u include closure of offshore waters to fishermen during launches, the possibility that off-island residents would obtain the lions's share of any technical positions created, geological instability and periodic flooding of the Palima point site, and the chance that the Big Island might become a nuclear target should the project proceed.

Recommendations.—The risks

and uncertainties, financial and otherwise, that would be involved in the construction of a rocket launching facility in the district of Ka'u clearly warrant the preparation of a particularly thorough and unbiased EIS. According to an article in the August 23, 1987 edition of the *Hawaii Tribune-Herald*:

The astronomer, author and television host who is perhaps America's best-known scientist has this message for Hawaii officials considering developing a satellite launching facility on the Ka'u coast of the Big Island: "Look before you leap."

Carl Sagan, in an interview with the *Tribune-Herald* yesterday after his speech to the Pacific ISY Conference, stressed he was not familiar with specific arguments and counter-arguments made over a proposed isle spaceport.

However, Sagan did offer a checklist of important matters that should be considered before a move to build a space facility began.

Sagan said the decision to proceed with a Hawaii spaceport should stem from sound motives.

"Is it in the national interest, or is it just boosterism?" he asked.

And Sagan said there should be an acknowledgement of the potential impact of a space facility on the environment and island lifestyle.

"If after evaluating these concerns, the answer is the downside (of building a spaceport) is small, then go ahead," he said.

Sagan said it was an "open question" as to whether the United States had a pressing need for another space launch facility given the doldrums of the current space program.

"I certainly hope we'll have a vigorous space program in the 1990s," he said.

The argument that space is a "clean" industry could also be seen as open to argument, he suggested.

"Compared to chemical facilities or a chemical factory like those of Union Carbide, yes. Compared to mom and pop grocery stores, no," he said.

Noting the "many important questions to be resolved," Sagan urged officials to do a thorough job before reaching

any decision.

Sagan described himself as a frequent visitor to the Big Island. "It doesn't take a lot of effort to really love it," he said.

Extremely worthy of note is the fact that the ADL report clearly stated, "Hawaii can add to its space-related activities with or without launch facilities." In fact, the study revealed that this state is already playing a significant role in the first five of the following seven space market segments assessed by the consultant:

- o Earth-based communications systems and advanced user-related industries;
- o Earth and planetary remote sensing research, development and support activities;
- o Earth-based navigational support and control systems;
- o Astronomical, astrophysics and other space science research;
- o Defense and other federal agency space activities;
- o Visitor industry developments related to space; and
- o Launch services at a small to mid-size launch facility serving commercial and scientific payloads.

In a contribution to the study *Hawaii 2000*, published in 1973, University of Hawaii at Hilo educators Charles M. Fullerton and Kaoru Noda wrote:

Could we afford to limit the development of heavy industry on the Big Island? Considered as a part of the total United States, the island of Hawaii contains about 0.11 percent of the nation's area. It is probable that no other 0.11 percent of the United States contains the variety of culture conditions and environmental factors found here. From the viewpoint of national self-interest can we afford not to set aside this unique cultural-scientific-environmental resource for future studies?



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DEDICATION.

To friends, neighbors and acquaintances in Ka'u who have helped me over the past decade, and to my Mother, this book is respectfully dedicated.



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