KAUAI/NIIHAU
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Repeated sightings

State of Hawaii

Department of Land and Natural Resources

DIVISION OF FISH AND GAME

MARINE SURVEY OF THE NA PALI COAST, ISLAND OF KAUAI

INTRODUCTION

This report summarizes the results of a marine fish survey conducted by the Division of Fish and Game between June 4 and 8, 1979 along the Na Pali Coast of Kauai (Figure 1). The survey was conducted to obtain and evaluate baseline nearshore marine resources information for the "Na Pali Coast Management Plan" being prepared by the Division of State Parks, Outdoor Recreation and Historic Sites of the Department of Land and Natural Resources.

Division of Fish and Game personnel participating in the survey included Paul Kawamoto, Henry Okamoto, Brian Kanenaka and Shugo Masuda.

METHODS AND MATERIALS

Fish counting transect stations were established at various locations subsequent to conducting cursory examinations of nearshore areas along the Na Pali Coast. The Division of Fish and Game's 13-foot inflatable boat was utilized for accomplishing the 12-mile coastline survey. Fish counts were conducted by snorkel diving along a pre-measured 250-yard long transect line or within a 100-foot diameter area. In conducting a 250-yard fish count, the two divers, one on each side of the line, recorded fish species, length and numbers on plastic slates within a 40-foot swath, with each diver responsible for a 20-foot swath parallel and adjacent to the line. In conducting a 100-foot diameter quadrat, one end of a pre-measured 50-foot cord was attached to a stationary object to allow delineation of a 100-foot diameter circle within which observations were made by two counters. The time of day and water depths were recorded during the start and end of each fish count. Upon completing a fish count, the information was transcribed onto data sheets for subsequent analysis. Further, notes concerning habitat type, water clarity, observations on currents and surge, and other pertinent information were included in the data sheets.

The approximate weight of each fish was estimated by multiplying the cube of the fish length by a previously determined species constant derived from known length-weight relationships. The estimated standing fish crop, expressed in term of pounds per acre, was then derived by multiplying the weight of each species recorded by the ratio: 43,560 square feet (or one acre)/area (in square feet) covered by the fish count.

RESULTS AND DISCUSSION

A total of 15 fish counts was conducted at 11 locations along the Na Pali coast that are described as follows:

HANAKAPIAI

Hanakapiai (Figure 2) is located about three miles west of Haena and characterized by a wide sand beach approximately 200 yards long. The sand extends into the offshore area to at least the 20-foot depth and there is no apparent evidence of coral or rocky substrate within 300 yards from the shoreline.

A 100-foot diameter quadrat was conducted to the west of the beach where lava cliffs and rocks began to replace the sandy shoreline substrate (Station #1). The fish count was conducted in waters ranging from 2 to 10 feet in depth around two small rocks that jutted above the water (Figure 3). Although only four species of fishes were recorded at this station, a large school of threadfin or moi (Polydactylus sexfilis) contributed significantly to the standing crop at this Station (Table 1).

The sand bottom and smooth lava rock substrate afforded little shelter to reef dwelling fish and thereby explains the low species diversity observed on this fish transect. It should be noted that the smooth lava bench exposed to breaking shoreline waves constituted a favored habitat for the moi.

Along the shoreline, typical splash zone fauna and flora were sparse. Small quantities of flat sea urchins or ha'uke'uke (Podophora atrata), a'ama crabs (Grapsus grapsus) and small limpets or 'opihi (Cellana sp.) were noticed especially among rocks that were exposed to splashing waves. Algae growth was sparse.

Shoreline waves averaged about two feet in height, which, combined with the shallow water depths fronting the beach, made boating access to shore difficult. Water clarity was good despite the occurrence of freshwater "lensing" which obscured underwater visibility to some extent. Two persons were observed beachcombing the shoreline area.

TWIN ROCKS

"Twin Rocks" is a descriptive name given to the shoreline area characterized by a pair of small rock outcroppings which is located approximately 3/4-mile southwest of Hanakapiai (Figure 2). Steep cliffs and four sea caves highlight a spectacular view of the shoreline. There is no land trail access to this area.

A 100-foot diameter quadrat (Station #2) was conducted around the larger of the rock outcroppings (Figure 4) which rose sharply from a depth of about 30 feet. A total of 20 fish species and an estimated standing crop of 1,526 pounds per acre were recorded at this Station (Table 1). Fishes contributing significantly to the standing crop included the piha (Spratelloides delicatulus), 'omilu (Caranx melampygus), maikoiko (Acanthurus leucopareius), palani (A. dussumieri), pualu (A. xanthopterus) and kala (Naso unicornis).

Splash zone fauna observed on the wave exposed portion of the rock outcropping included the opihi and ha'uke'uke. Water clarity was excellent with no noticeable current.

HANAKOA

Hanakoa (Figure 5) is located about mid-way between Hanakapiai and Kalalau and approximately one mile southwest from "Twin Rocks". A small cove-like area bordered by cliffs on both sides and a stream flowing through a boulder beach identifies this site (Figure 6). A 100-foot diameter quadrat (Station #3) was conducted in depths ranging from 5 to 7 feet and 13 fish species with a standing crop of 209 pounds of fishes per acre were enumerated (Table 1). The bottom substrate in the transect area consisted primarily of large boulders with no coral growth.

Along the shoreline, the exposed rocks especially at the stream were covered with a lush growth of brown algae (Chnoospora sp.). Generally, opihi were fairly abundant but small in size. The cliffs at Hanakoa offered some protection from the northeastern trades and the surface water was calmer in the cove than further out in the wind-exposed areas of Stations #1 and 2 (Figure 3). The large volume of fresh water flowing into the sea produced a pronounced temperature gradient with the colder surface fresh water lying over the sea water. Other than this "lensing" effect which blurred underwater visibility to some extent, the water was clear. Due to shoreline breaks, the boat could not be safely beached ashore; however, swimming ashore was relatively easy. Slippery rocks are a definite hazard along this shoreline.

WATERFALL ARCH

"Waterfall Arch" is another descriptive name used to identify a survey site about one mile southwest of Hanakoa (Figure 5). As the name implies, there are two small waterfalls on the west side of a lava arch (Figure 8).

A 100-foot diameter quadrat was conducted through the arch in depths ranging from 6 to 10 feet (Station #4). A total of 15 fish species with a standing crop of 500 pounds of fishes per acre was recorded at this Station (Table 1). Also observed in the transect area was a small, 20-inch carapace length green sea turtle (Chelonia mydas). The sand and boulder substrate at this site was devoid of coral growth (Figure 9). Splash zone fauna and flora were sparse. A slight easterly current was noticed while swimming through the arch.

KALALAU

Stretching almost two miles in length along the Na Pali coast and about one mile southwest of "Waterfall Arch" is Kalalau, one of the better known beaches in the area (Figure 10). The shoreline beach consists of a thin strip of sand backdropped by cliffs along the easterly portion (Figure 11) that transforms to a boulder covered beach centrally where the Kalalau Stream empties into the sea (Figure 12). From about 400 feet west of the stream, a long stretch of sand beach continues westerly toward Honopu. Examination of the offshore bottom topography indicates a corresponding sand and boulder substrate consistent with the shoreline composition.

A 250-yard fish counting ~~transect~~ (Station #5) was made in about 8 feet of water approximately 100 feet seaward of the boulder beach (Figure 13). A total of 20 species of fishes with a standing crop of 48 pounds per acre was recorded at this Station (Table 1). Although the bottom substrate consisted of numerous fish-shelter type crevices along the transect route, a low fish density resulted. This was apparently due to the higher concentrations of fishes observed in the shoreline breaker zone.

Small sized coral colonies, primarily Pocillopora meandrina, were noted on the boulder substrate. However, there were more dead than live colonies observed in the area (Figure 14). Although numerous 'opihi (Cellana talcosa) were observed attached to the boulders, macro-algae growth on the substrate was absent.

Shoreline waves caused by shallow nearshore depths limited ocean access into the sand beach. Landing was therefore possible only by swimming ashore. During the survey, one pole fisherman, two 'opihi pickers and six bathers were observed along the Kalalau shoreline.

LAVA TUBE

Approximately two miles southwest from Kalalau Stream and one-half mile west of Honopu is a small cave which tunnels into a steep cylindrical shaped lava chamber which has been descriptively named "Lava Tube" (Figure 15 and 16). A relatively smooth rock islet emerges from a 40-foot depth near the center of the open chamber where a 100-foot diameter quadrat (Station #6) was conducted. A total of 15 fish species with an estimated standing crop of 274 pounds per acre was observed at this Station (Table 1). Three small green sea turtles were also observed in the survey area.

The lava chamber offered an excellent respite from the choppy sea conditions that prevailed on the open ocean during the time of survey.

NUALOLO AINA

Nualolo Aina is located nearly one-mile west of the "Lava Tube," between Alapii Point and Puanaiea Point, east of Nualolo Kai State Park (Figure 18). Steep cliffs border a boulder beach that is approximately 150-yards in length. The beach is located within a small cove (Figure 17).

A 100-foot diameter quadrat (Station #7) was conducted about 200 feet offshore of the boulder beach in 6 to 7 feet of water. A total of 16 species with a standing crop of 116 pounds of fishes per acre was recorded at this Station (Table 1).

The bottom substrate at the transect site consisted primarily of moderate sized boulders. The soft coral (Palythoa tuberculosa) covered about five percent of the boulder surfaces.

Splash zone fauna was exceptionally dense. Three species of 'opihi (Cellana exarata, C. sandvicensis and C. talcosa), a good portion of which were of harvestable size (1-1/4 inch and larger shell length), occurred in large quantities. Other splash zone invertebrates such as a'ama crab, ha'uke'uke and the opihi predator Purpura aperta were also numerous. Lush growths of the red algae (Gelidium sp.) were noticed along the shore, especially at the mouth of Nualolo Stream.

Access to shore was accomplished by swimming through shoreline waves that were two to three feet high in the calmer sections of the cove and scrambling up slippery boulders along the shoreline.

MUALOLO KAI

Mualolo Kai State Park surrounds a cove situated between Makuaiki and Alapii Points (Figure 18). The east side of the cove is well defined by an expansive, shallow limestone reef that is exposed during low tide (Figure 19). In addition to this prominent reef, smaller reefs front the beach and provide considerable protection from wave action. At about the center of the cove, a narrow channel separating the reefs allowed easy access for landing a skiff on the sand and boulder beach (Figure 20).

Three 250-yard transects (Stations #8, 9 and 10) were conducted offshore of the Mualolo Kai State Park (Figure 18).

Station #8 was established along the westerly portion of the large, shallow limestone reef. The fish counting transect followed the edge of the large limestone reef. The substrate was composed of 50% limestone reef, 25% boulders, 20% sand, and 5% live corals. Large crevices were common along the face of the reef which dropped sharply to a depth of about 15 feet. A total of 44 fish species with an estimated standing crop of 306 pounds per acre was recorded at this Station (Table 1). The surgeonfish, maikoiko was the most dominant fish in term of weight and number. Most of the fish were observed foraging on the shallow reef but warily retreated into crevices as the divers approached along the reef's edge. The black sea cucumber or lole (Holothuria sp.) occupied the sand habitat, and a two-pound sized octopus or he'e (Polypus marmoratus) was observed on the smooth hard bottom substrate beyond the outer edge of the reef.

Station #9 was established north of the large limestone reef in depths ranging from 6 to 30 feet. A slight westerly current was noted during the fish count. Water clarity was excellent with underwater visibility exceeding 60 feet. The bottom topography in the transect area was primarily composed of a limestone bed with numerous fish-shelter type crevices. Predominant coral growths of Pocillopora meandrina and Porites lobata covered about 30 percent of the substrate. Other corals observed included colonies of Pocillopora damicornis, Porites evermanni, P. duerdeni, and Montipora flabellata. Algae growth was sparse. A total of 51 species with an estimated standing crop of 2,116 pounds of fishes per acre was recorded at this Station (Table 1). Fishes contributing significantly to the standing crop were primarily herbivorous species including the nenue (Kyphosus cinerascens), manini (Acanthurus triostegus), surf maiko (A. guttatus), maikoiko, and kala. A red spiny lobster (Panulirus marginatus) and two small green sea turtle were also observed during the fish count.

Station #10 was established seaward of a large reef that fronted the west side of the cove. The bottom substrate was moderately irregular but lacked fish shelter crevices, and consisted primarily of limestone with about 5 percent coral cover. There was an abundance of the calcified algae Porolithon sp., while other algae species occurred only sparsely. Underwater visibility was about 40 feet. A total of 39 fish species with a standing crop density of 141 pounds per acre was recorded at this site (Table 1). In terms of weight, the black triggerfish or humuhumu-'ele'ele (Melichthys niger) contributed most significantly to the standing crop, while the damselfish (Stegastes fasciolatus = Pomacentrus jenkinsi) was the most numerous in terms of number.

Inspection surveys conducted over the large shallow limestone reef in the eastern portion of the cove revealed a flat reef surface with numerous deep holes, many of which could be hazardous to waders. At certain areas, of the reef, the short-spined sea urchin or wana (Echinometra mathaei) was very abundant. In contrast, only a few long-spined wana (Diadema pancispinnis), and the red pencil sea urchin (Heterocentrotus mammillatus) were noted near the outer edge of the reef. Macro-algae was sparse on the reef flat. The brown algae or "button limu" (Turbinaria sp.) was found near the outer edge of the reef. During low tide, few fishes were noted over the reef as compared to the large quantities of nenue, manini, maikoiko, kala and uhus that were observed foraging over the reef at high tide.

Waves washing over the outer edge of the shallow reef flats ranged between 2 to 3 feet in height. The waters within the cove were calm, and provided excellent snorkeling and fishing opportunities. There were a few large moray eels (Gymnothorax flavimarginatus) observed in certain reef crevices. Also in evidence were fresh water seepages along the shoreline area of the cove.

MILOLII

Milolii State Park is located adjacent to and west of the Hualolo Kai State Park, between Makuaiki Point and Keawanui (Figure 21). A small perennial stream is located on the western end. The beach front is about one mile in length backdropped by massive lava rock cliffs (Figure 22). Both ends of the beach are composed of boulders, while the central portion is almost exclusively sand. A small boat channel and anchoring site (Figure 23) is located almost directly in front of the Milolii State Park cabin, and except for a second narrow opening through an otherwise contiguous reef flat in the vicinity of Makuaiki Point (Figure 24), no other boat passage exists. Extending west of the small boat channel toward Keawanui is a fairly large shallow limestone bench.

Three 250-yard fish counting transects (Stations #11, 12 and 13) were conducted seaward of the fringing reef.

Station #11 was established near the middle of Milolii approximately 100 feet offshore of the breaker zone. Despite the highly irregular topographic relief of the bottom profile, fish-shelter type crevices were generally absent. The bottom was composed of about 60 percent lava rock, 30 percent limestone and 10 percent coral coverage. Underwater visibility exceeded 50 feet. The fish count revealed 37 species with an estimated standing crop of 637 pounds per acre. The nenue accounted for almost one-third of the total estimated standing crop (Table 1).

Station No. 12 was established to the west of Station No. 11. Underwater visibility was limited to about 30 feet, and slight westerly current was noticed during the fish count. The bottom profile consisted primarily of smooth limestone onto which a sparse growth of coral was observed. A total of 30 species with a standing crop of 119 pounds of fishes per acre was recorded at this Station (Table 1). Moderate growths of the red algae, Amansia sp. were noted, and the brown and white sea cucumber (Actinopygen mauritiana) was fairly common at this location.

Station No. 13 was established west of the boat channel in depths ranging from 8 to 10 feet. The bottom terrain was fairly irregular with a primary substrate of boulders and limestone interspersed by patches of sand. Coral growth covered about 25 percent of the limestone-boulder substrate (Figure 7). A total of 33 fish species with a standing crop of 325 pounds per acre was recorded at this Station (Table 1). Generally, the fishes were abundant in numbers and small in size. Profuse growths of the calcified algae Porolithon sp. were noticed throughout the transect area. A large green sea turtle measuring 36-inches in carapace length was also recorded in the transect area.

A cursory night survey was also conducted at low tide on the exposed limestone bench located at the eastern section of Milolii State Park towards Makuaiki Point primarily to determine the nocturnal species common to the area. The reef was surprisingly barren of marine life and only few of the following organisms were observed: moray eel (Gymnothorax spp.); white eel (Conger cinereus = C. marginatus); night octopus or he'e (Polypus ornatus); 'ala'ihi (Holocentrus sp.); upapalu (Apogon sp.); goatfish (Family Mullidae); sea cucumber or namako (Stichopus tropicalis); and small sized green spiny lobster (Panulirus pen penicillatus). The a'ama crab, sand crab or 'o-hiki (Ocypode ceratophthalma), and ku-pe'e (Nerita polita) were also observed on the sand and boulder beach area.

As compared to Hualolo Kai, Milolii offered less opportunities for snorkeling and shoreline fishing. For example, the shallow reef flats at Milolii remained relatively barren of fish life irrespective of the tidal fluctuation, whereas at Hualolo Kai, large quantities of fishes migrated inshore at high tide to forage over the reef flats. Further, during the survey period the inshore waters at Milolii were noticeably turbid along certain sections of the shoreline, primarily attributable to the silt discharged by the Milolii Stream. Also, anchoring a boat at Milolii proved to be riskier than at Hualolo Kai due to Milolii's less protective narrow reef configuration.

REEF HOLE

"Reef Hole" is located between Milolii and Makaha Point (Figure 11) with a shoreline composition consisting of boulders. A narrow fringing limestone reef fronts the beach. An indentation in the outer face of the reef produced a small cove where a 100-foot diameter quadrat (Station #14) was conducted. Water depth ranged from 2 to 8 feet and a total of 28 fish species with a standing crop of 623 pounds per acre was recorded (Table 1). A green sea turtle and fairly lush growth of green algae (Caulerpa sp.) were noteworthy observations made in the transect area.

Although shoreline waves averaged about a foot in height, calm water conditions persisted throughout this area which was well protected from the normal northeast tradewinds. The area appears to provide for excellent nearnshore fishing opportunities.

During the survey, three opihi pickers, who also appeared to be carrying throwmets, were observed on shore.

MAKAHA POINT

Mahaka Point, a steep rocky promontory, is located about 1/2 mile southwest of "Reef Hole" (Figures 21 and 25). The shoreline is composed of boulders and limestone ledges. Patches of small reefs characterize the offshore area.

A 250-yard fish counting transect (Station #15) was conducted parallel to shore in about 8 feet of water. The substrate consisted of boulders and limestone. Coral was sparse and covered about one percent of the substrate. The bottom profile was moderately irregular with numerous fish-shelter type crevices. A total of 25 fish species with an estimated standing crop of 45 pounds per acre was enumerated at this Station (Table 1).

Although shoreline waves averaged two feet in height the offshore waters were extremely calm. In view of the low standing fish crop observed, fishing opportunities in the area are considered to be poor.

SUMMARY AND COMMENTS

The Na Pali coast marine survey covered approximately 12 miles of nearshore areas from Hanakapiai to Makaha Point. Overall, the total area surveyed is characterized by spectacular cliffs, sand and/or boulder beaches, lava caves, few live coral reefs and clear water.

During the week-long survey period, a total of 72 different species of fishes was recorded from 15 fish counting transects. Additionally, eight other species were recorded during inspections of areas beyond the transect limits (Table 2).

A summary of the 15 fish counting stations surveyed is presented in Table 1. The number of fish species recorded at the stations averaged 27 species (ranging between 4 and 59) while the estimated standing crop averaged 693 pounds of fishes per acre (ranging between 48 and 3,032). The number of individual fishes counted at each station averaged 3,834 individual fishes (ranging between 76 and 40,151 individuals).

Further analysis of the fish count data shows that the baitfish, piha, was the most numerous single species recorded while the moi had the highest standing crop. Collectively, the herbivores (rudderfish, surgeonfish and parrot fish) predominated over the carnivores (threadfin, goatfishes and wrasses) in both numbers and standing crop. Further, the common goatfishes, including the weke-'a'a (Mulloidichthys flavolineatus = M. samoensis) and weke-'ula (M. vanicolensis = M. auriflamma) were not observed in any of the fish counts as well as the large carnivores such as sharks and uluas (Caranx ignobilis). Green sea turtle sightings were fairly common with as many as seven turtles observed at Milolii in a single afternoon.

Much of the lava rock and boulder formations along the shoreline provided excellent habitat for splash zone organisms such as opihi and pipipi (Nerita picea). Although opihi was generally abundant, most were small in size. Pipipi was especially abundant on boulders which were protected from direct wave action.

The data collected suggest that fishes were relatively scarce between Hanakapiai and Nualolo Aina. The bottom topography within this area was mostly sand, lava rock and smooth boulders offering little shelter to reef dwelling organisms. Further, the nearshore area was completely devoid of coral reefs. The near absence of live corals in the nearshore areas between Hanakapiai and Nualolo Aina is suspected to be due to the lowered salinity of the shoreline waters caused by fresh water runoff and seepage. Further, the high surf action and shifting sand conditions that predominate in the near-shore areas during winter months is believed to be retarding the growth of young coral colonies.

The Nualolo Kai and Milolii areas, on the other hand, displayed a moderate quantity of reef fishes which may be attributable to the extensive coral reef flats occurring at both areas (Figures 26 and 27).

The extensive reef areas at Nualolo Kai and Milolii were easy to walk over. However, like most reefs, natural hazards such as pot-holes, sea urchins, moray eels, sharp corals, unstable footing, etc., were noted near the surf zones and reef edges. Lava rocks and boulders throughout the shoreline areas were also smooth and slippery.

While no strong ocean current or high surf was noticed during the survey period, these conditions are known to exist along the Na Pali Coast, especially during the winter months.

A limiting factor to the number of users of this spectacular coastline is accessibility to the area. During the survey, very few people were observed utilizing the coastal waters.

CONCLUSION AND RECOMMENDATION

The Na Pali coastline rises precipitously out of the sea forming mountainous cliffs, deep valleys and isolated beaches which make this area inaccessible except by foot-trails, boats and helicopters. In addition, high surf and strong current conditions generated primarily during the winter season limit boat access into this area. The natural features and seasonal high surf conditions of the Na Pali coastline area, therefore, appear to present a self-regulating limitation on the utilization of the area's resources.

During the survey period (June 4th through 8th, 1979) only minimal consumptive use of the marine resources was observed which may have been due to the limited accessibility to the area. Contrary to our expectation of encountering a great diversity and abundance of marine life along this 'remote' coastline area, the overall survey results indicated a rather unimpressive population of marine biota.

In view of the area's self-regulating use limitation and the unimpressive marine life surveyed, we recommend that the present utilization of the marine resources under existing fishery management rules and regulations be continued at this time.

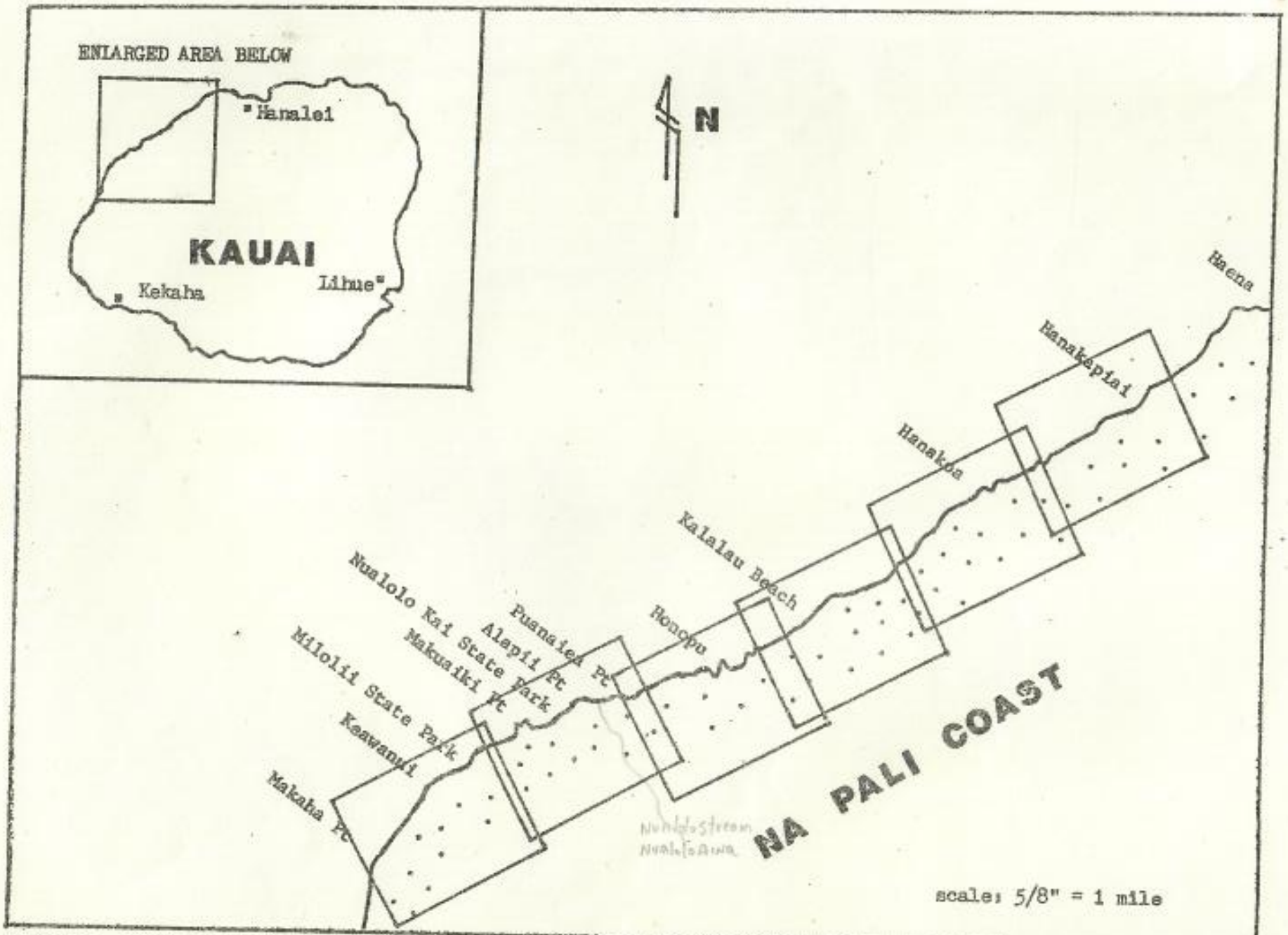

FIGURE 1. Area map of Kauai's Na Pali coastline areas surveyed June 4-8, 1979. Section areas (from Hanakapiai) to Makaha Point) as indicated are enlarged on Figures 2, 5, 10, 15, 18, and 21.

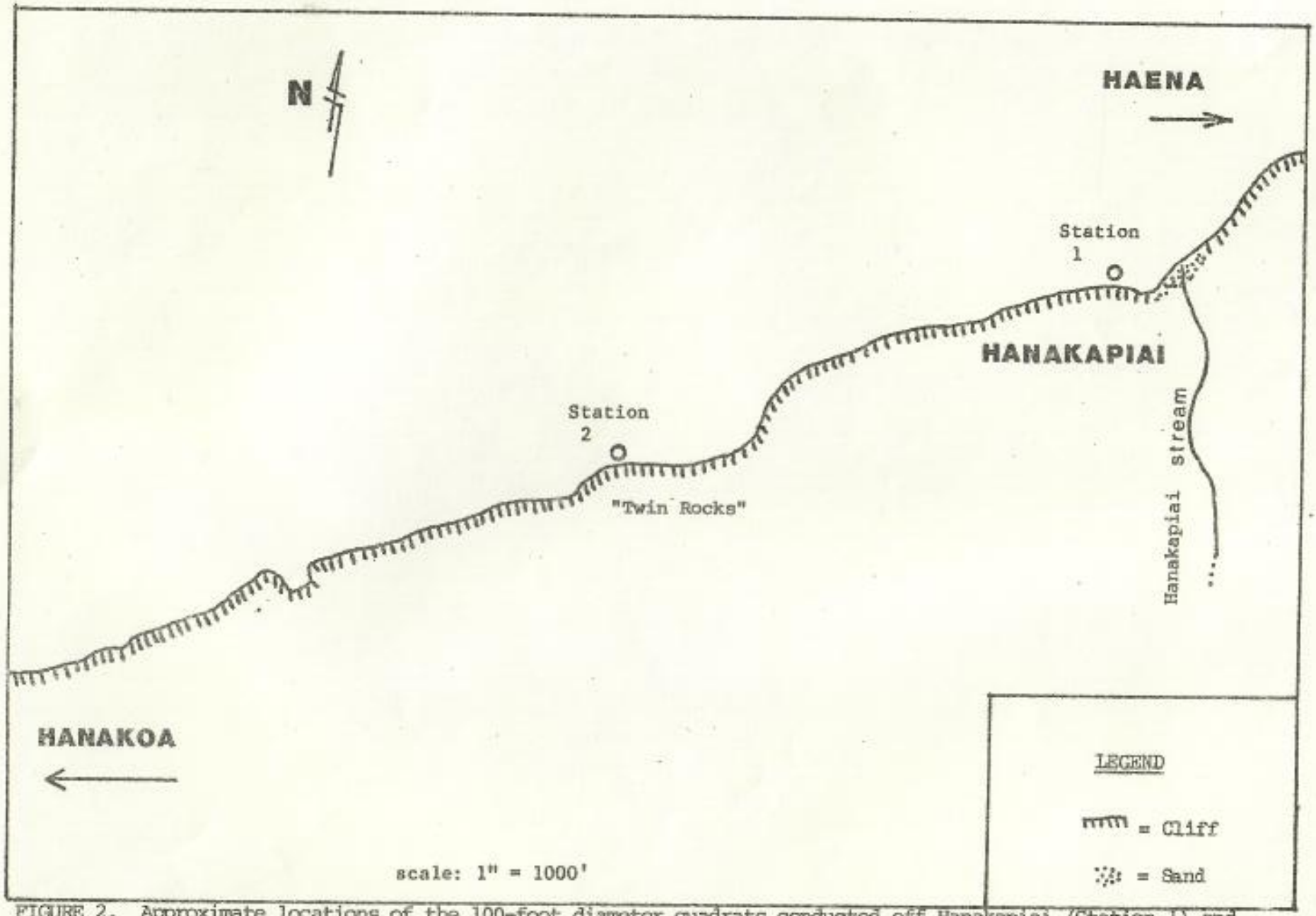

FIGURE 2. Approximate locations of the 100-foot diameter quadrats conducted off Hanakapiai (Station 1) and "Twin Rocks" (Station 2).

FIGURE 3. Station #1 is located at the western end of Hanakapiai Beach.

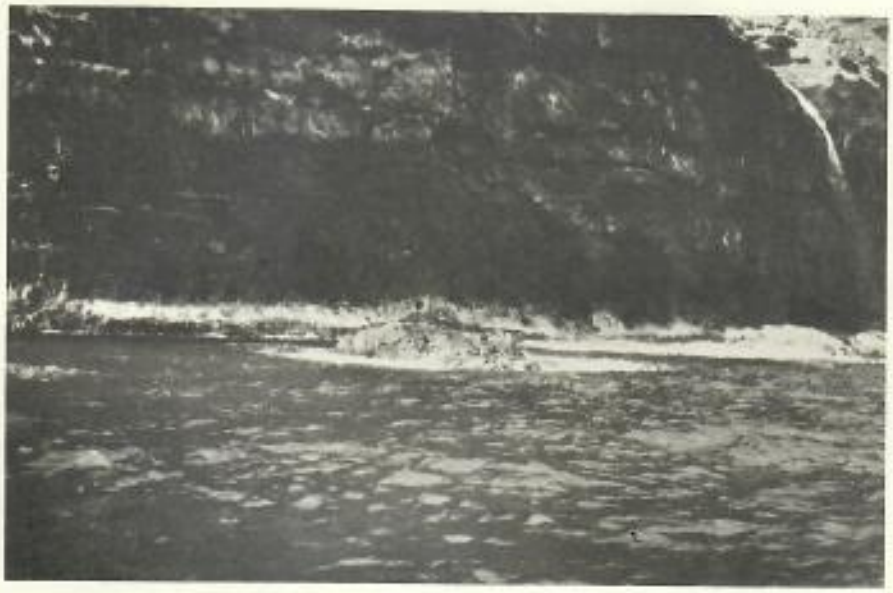

FIGURE 4. Station #2 is located at "Twin Rocks" where two rock outcroppings emerge from the water.

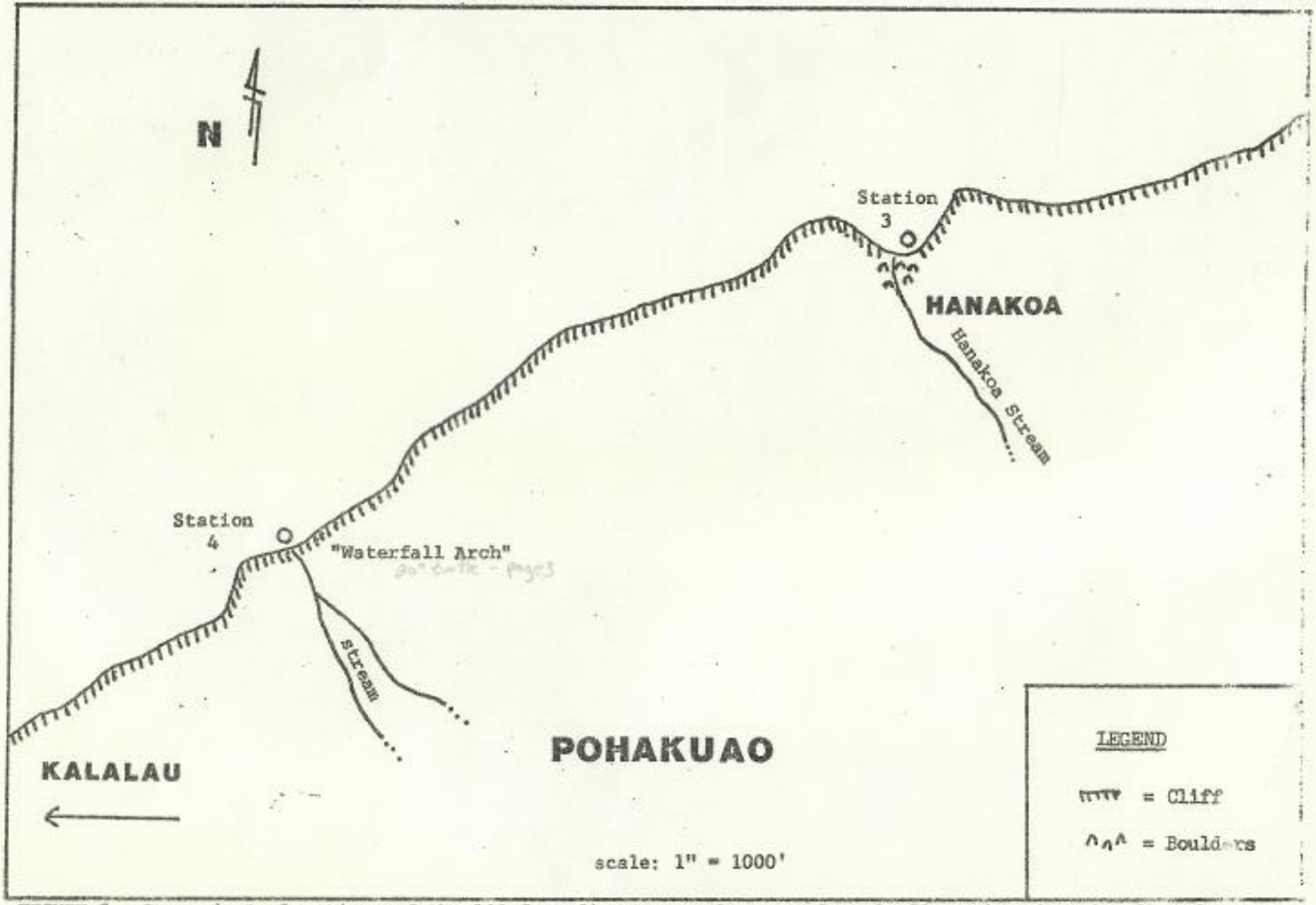

FIGURE 5. Approximate locations of the 100-foot diameter quadrats conducted off Hanakoa (Station 3) and "Waterfall Arch" (Station 4).

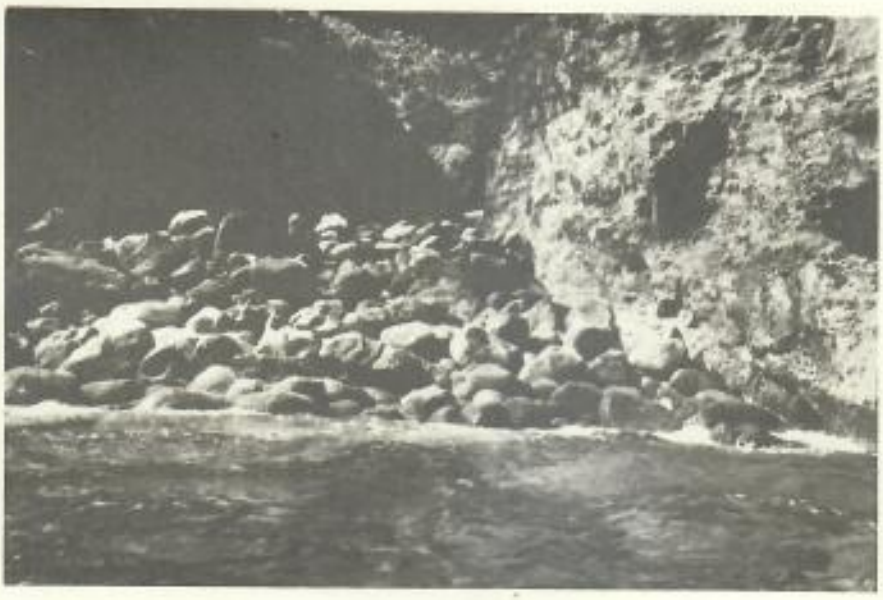

FIGURE 6. A boulder beach and the Hanakoa Stream is located along the shoreline of Station #3.

FIGURE 7. A rocky point shelters the cove-like area at Hanakoa.

FIGURE 8. Transect Station #4 was established around this arch which was descriptively named "Waterfall Arch."

FIGURE 9. Large smooth boulders devoid of coral growth typify the bottom substrate at "Waterfall Arch."

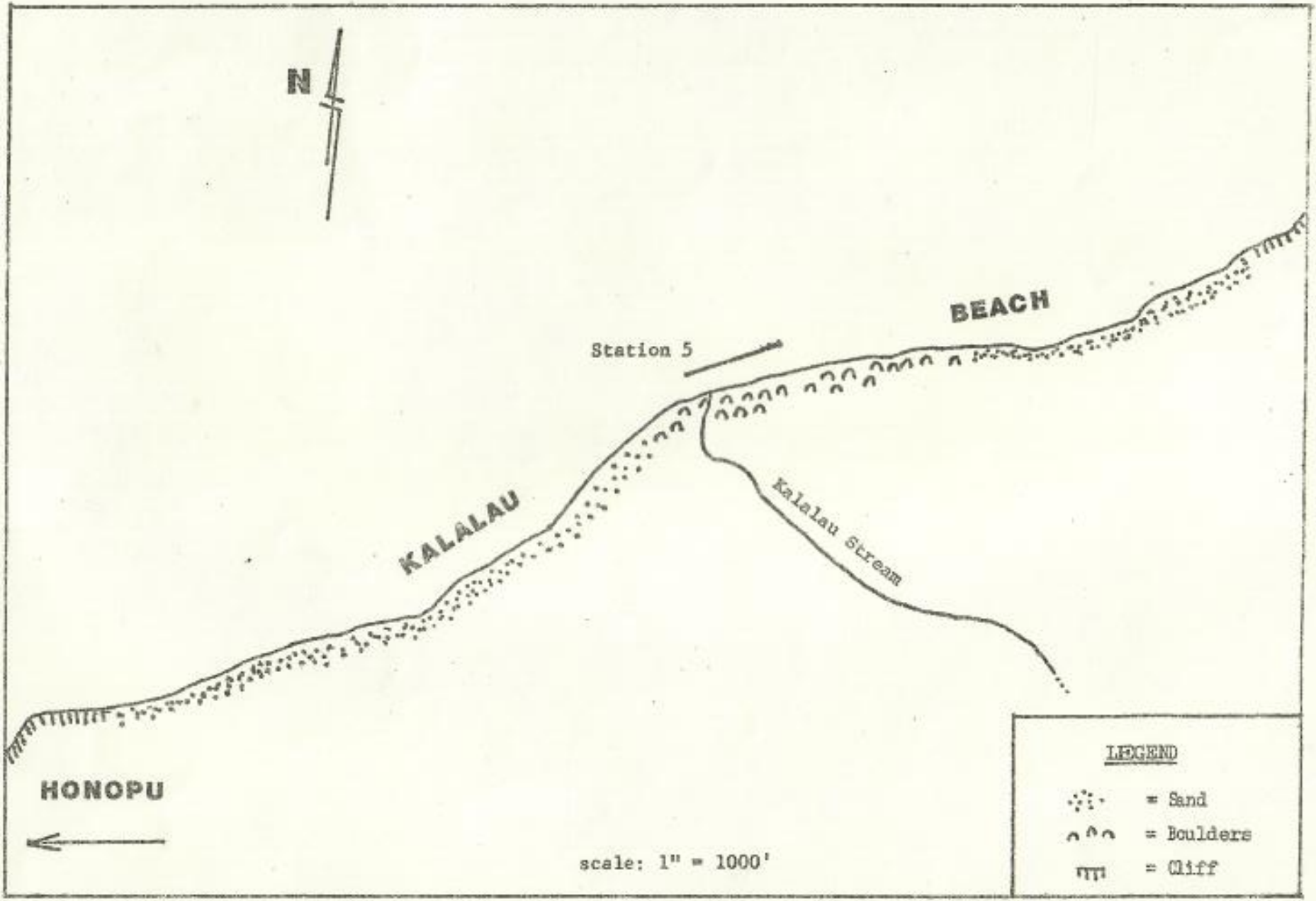

FIGURE 10. Approximate location of the 250-yard transect (Station #5) conducted along Kalalau's boulder beach.

FIGURE 11. A narrow sand beach backdropped by steep cliffs exemplifies the type of coastline at the eastern end of Kalalau.

FIGURE 12. Sloping coastal plain and boulder beach are typical of the central portion of the Kalalau Beach.

FIGURE 13. A fish count was conducted at Kalalau where the bottom and shoreline profile consisted primarily of boulders.

FIGURE 14. Coral (Pocillopora meandrina) growth was noted on boulders at Station #5, Kalalau.

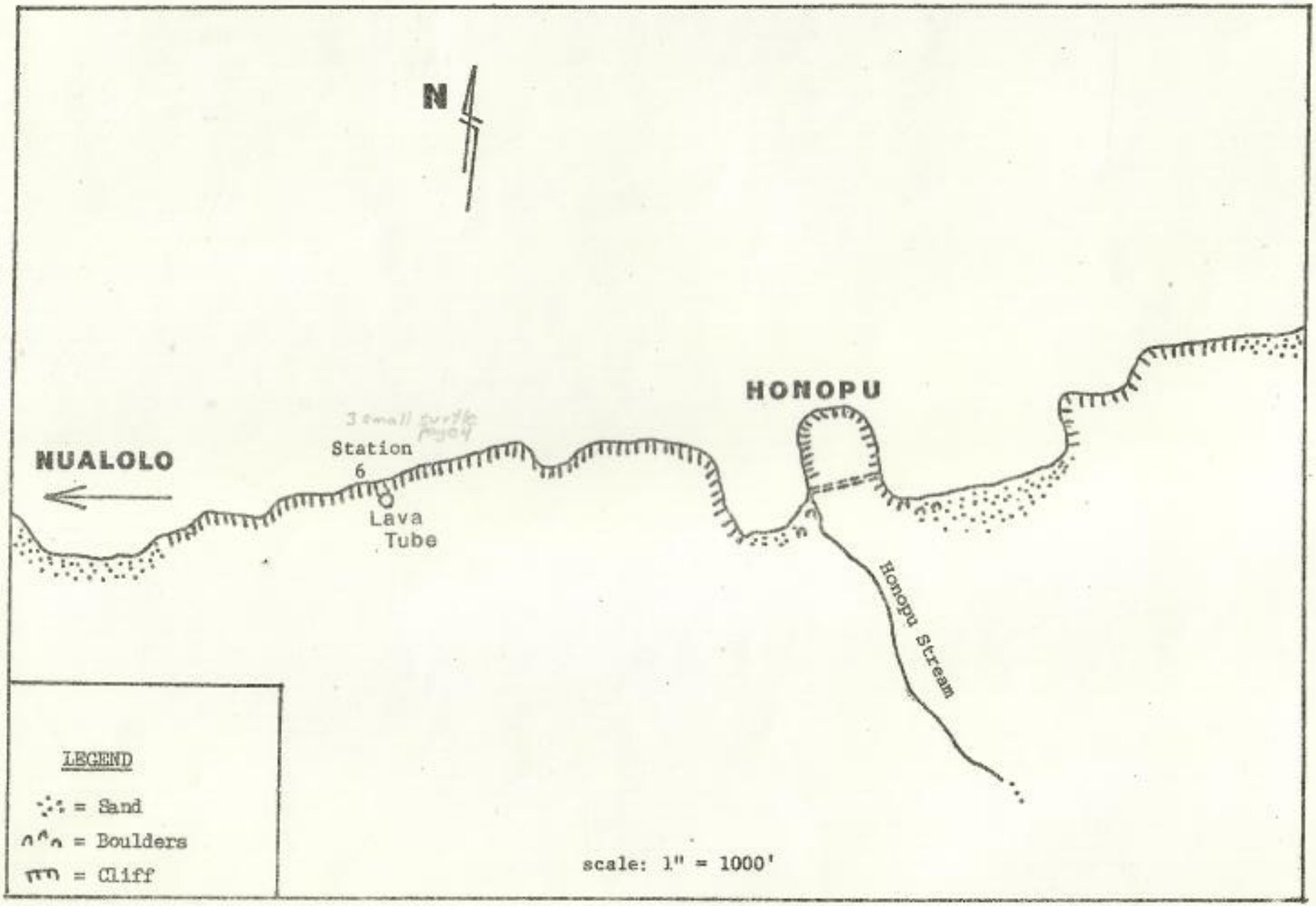

FIGURE 15. Approximate location of the 100-foot diameter quadrat conducted at the "Lava Tube" (Station #6).

FIGURE 16. This photo was taken from inside the "Lava Tube" looking seaward at the entrance of the tube.

FIGURE 17. Steep cliffs and the wave exposed boulder beach typify the shoreline at Nualolo Aina (Station #7).

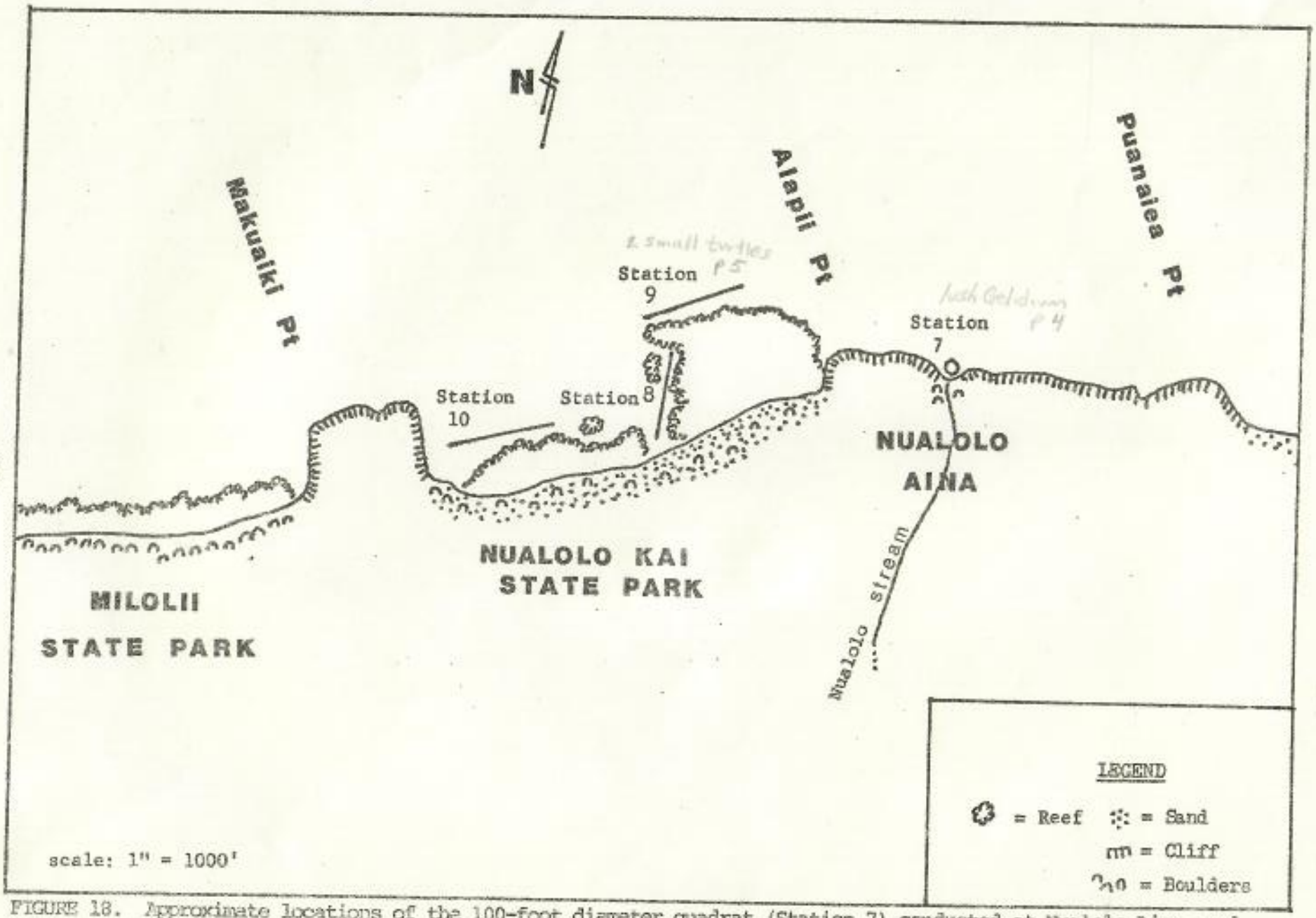

FIGURE 18. Approximate locations of the 100-foot diameter quadrat (Station 7) conducted at Nualolo Aina, and the three 250-yard long transect stations (Stations 8, 9 and 10) conducted at Nualolo Kai.

FIGURE 19. A shallow extensive limestone reef at Nualolo Kai was bordered by Alapii Point in the background.

FIGURE 20. Sand and boulder typify the beach composition at Nualolo Kai. Makuaiki Point is pictured in the background.

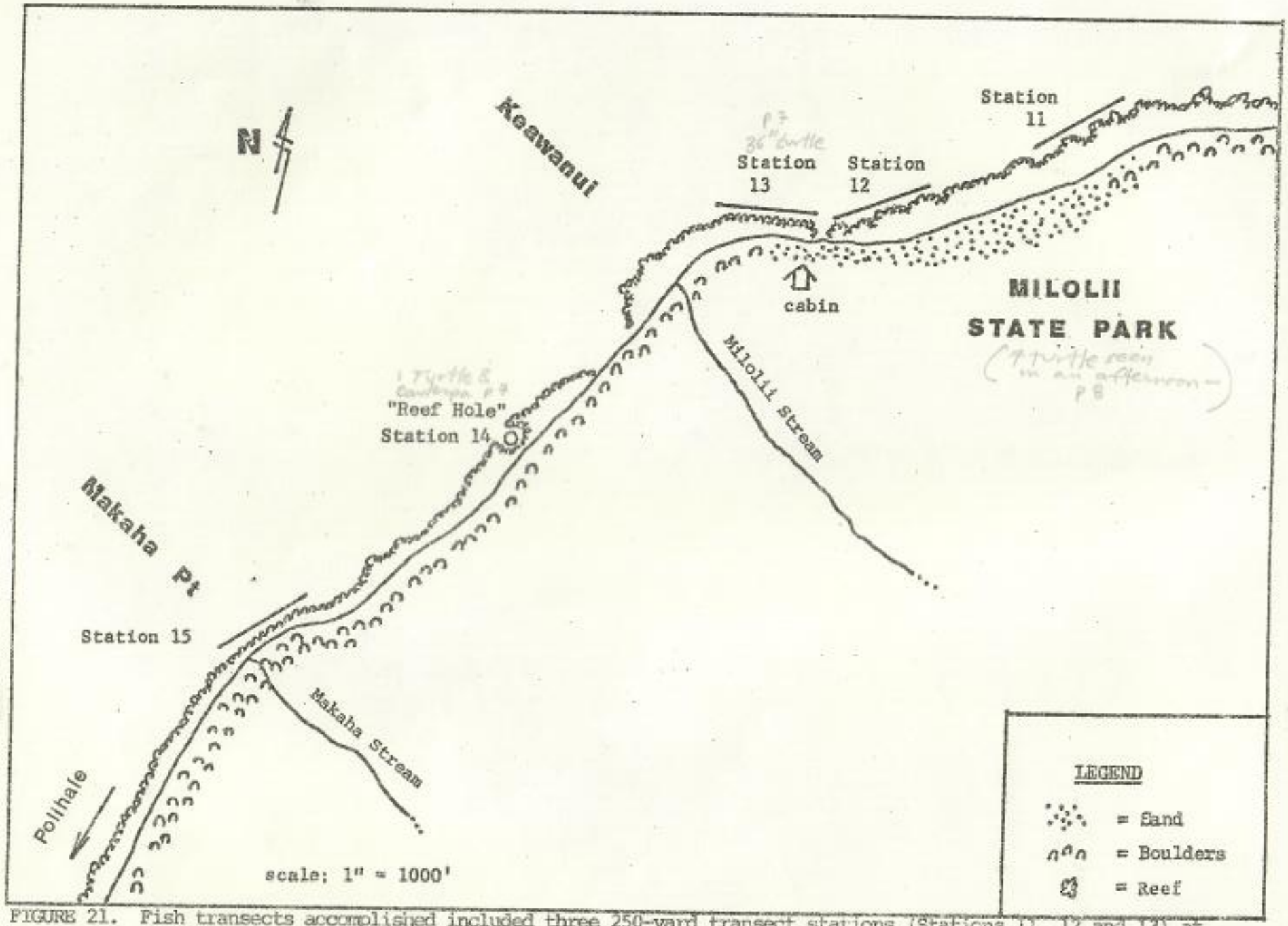

FIGURE 21. Fish transects accomplished included three 250-yard transect stations (Stations 11, 12 and 13) at Milolii, a 100-foot diameter quadrat (Station 14) at "Reef Hole," and a 250-yard transect station (Station 15) off Makaha Point.

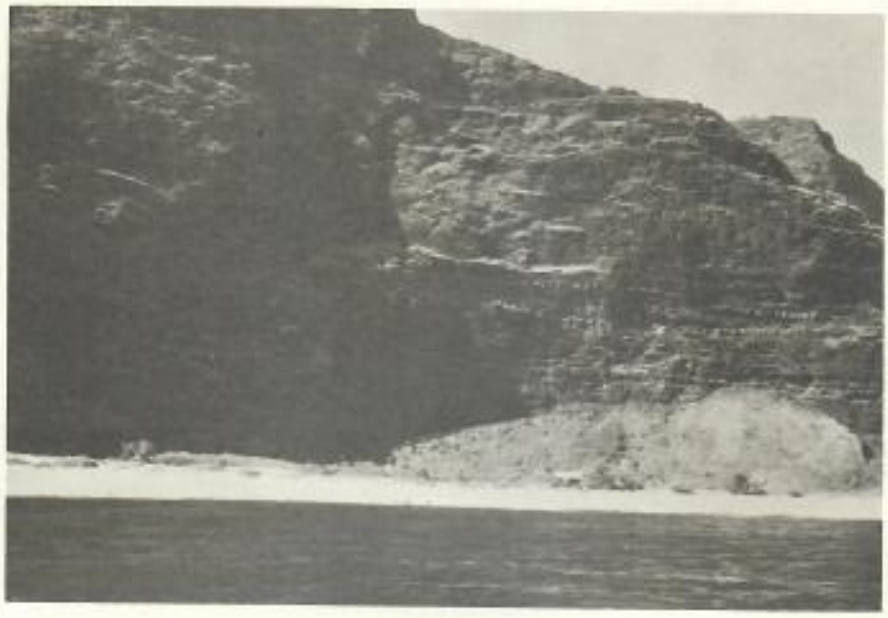

FIGURE 22. The Milolii State Park is characterized by an extensive sand beach backdropped by vertical cliff.

FIGURE 23. The anchorage site and a fringing reef were located on the west side of Milolii Beach.

FIGURE 24. A narrow reef at Milolii beach extends nearly to the base of Makuaiki Point in the background.

FIGURE 25. Steep vertical cliffs typify the backdrop at Makaha Point.

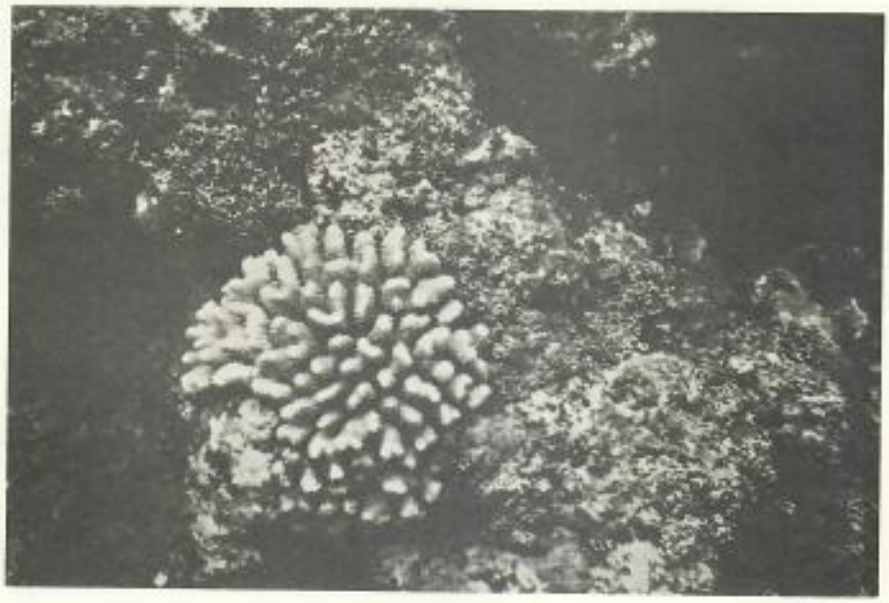

FIGURE 26. A coral head (Pocillopora meandrina is surrounded by calcified algae (Porolithon sp.) growth at Mililii.

FIGURE 27. A moderate reef fish concentration was observed over the coral-limestone substrate at Nualolo Kai.

TABLE 1. Summary of the fish counts conducted along the Na Pali Coast, Kauai between June 4 and 8, 1979

Station Number	Station Name	Number Species (Rank) Recorded	Number Fishes (Rank) Counted	Estimated Standing Crop (Rank) Calculated in Pounds/Acre
1	Hanakapiai	4 (15)	662 (9)	3,032 (1)
2	"Twin Rocks"	20 (9)	40,151 (1)	1,526 (3)
3	Hanakoa	12 (14)	5,093 (2)	209 (11)
4	"Waterfall Arch"	15 (12)	151 (14)	500 (6)
5	Kalalau	20 (9)	1,251 (6)	48 (15)
6	"Lava Tube"	15 (12)	591 (10)	274 (10)
7	Nualolo Aina	16 (11)	76 (15)	116 (14)
8	Nualolo Kai #1	44 (2)	839 (8)	306 (8)
9	Nualolo Kai #2	59 (1)	3,245 (3)	2,116 (2)
10	Nualolo Kai #3	39 (3)	579 (11)	141 (12)
11	Milolii #1	37 (4)	1,601 (4)	637 (4)
12	Milolii #2	30 (6)	422 (12)	119 (13)
13	Milolii #3	33 (5)	1,231 (7)	293 (9)
14	"Reef Hole"	28 (7)	1,286 (5)	623 (5)
15	Makaha Point	25 (8)	334 (13)	451 (7)
	TOTAL:	—	57,512	10,391
	AVERAGE:	27	3,834	693

TABLE 2. Species composition and estimated standing crop (in pounds per acre) by species for each of the fifteen fish counts conducted along the Na Pali Coast, Kauai between June 4 and 8, 1979.

SPECIES	Station No.:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Gymnothorax flavimarginatus									*			*				
G. meleagris									*							
Fistularia chinensis										.12						
Adioryx xantherythrus									4.76							
Myripristis murdjan									.86							
Priacanthus cruentatus									*							
Apogon snyderi																
Decapterus macarellus (= D. pinnulatus)			2.66													
Caranx melampygus			44.85	10.39			11.87			11.23					1.48	1.13
Lutjanus kasmira						.21			.42							
L. fulvus													.21			
Parupeneus pleurostigma			2.50	10.92					.42		.67		2.65			
P. porphyreus					.07				11.04	4.78	.01	.15		.49		
P. cyclostomus (= P. chryserydros)									.17	6.15	.39		.07	.65	4.88	.06
P. multifasciatus			2.30						.76	1.47	2.54	.59	2.73	13.22	1.94	.25
P. bifasciatus									.47	2.35	.94					
Monotaxis grandoculis									2.23	109.77						
Kyphosus cinerascens			7.09	4.22	106.38	6.58		12.31	26.86	371.34	5.50					
Chaetodon fremblii													.04			
C. auriga									*							
C. unimaculatus										.10			.29			
C. lunula									.45		.12	.46				
C. quadrimaculatus						.09			1.03	1.72		.34	.07	.53	.67	
C. multicinctus										.39						
C. miliaris			.09						.14							
Abudefduf sordidus		1.51	1.79	3.02	7.16	.59	5.28		2.34	4.94		6.78	4.68		26.83	7.03
A. abdominalis						.74		.72	.16	2.23	.09	1.12			.35	
Plectroglyphidodon imparipennis (= Abudefduf imparipennis)			.07		.07	.02	.17		.03	.73	.01	.03	.15	.05	.05	.15
P. sindonis					1.40	.40	.30			.99	.19	3.75		2.97	4.20	1.41
Stegastes fasciolatus (= Pomacentrus jenkinsi)								1.08	3.87	9.39	3.96	7.88	7.04	3.96	1.51	5.50
Chromis vanderbilti										.38					.14	
Parascirrhites fosteri										.13						

Table 2. (cont.)

SPECIES Station No.:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Cirrhitus pinnulatus				.28	1.19		.96	1.25	.50	.25	2.60	1.33	2.88	4.19	.50
Cirrhitops fasciatus				.26											
Bodianus bilunulatus		9.44							1.80		.78			7.70	
Labroides phthirophagus								.03	.13	.01	.03				
Thalassoma duperreyi		.53				.63		2.33	4.11	12.95	7.92	5.35	10.71	2.09	1.11
T. purpureum		10.78	1.25	8.52	4.56	.64	1.25	1.95	5.58	2.82	1.73	.66	1.67	11.41	1.12
T. ballieui					3.54	6.54	3.35	2.63	8.77	1.64	3.00	.97	4.39		2.96
T. fuscus		3.27			2.63	.71	.82	1.06	4.39	1.76	1.75	1.75	2.94	1.68	.21
Gomphosus varius							2.74	.75	20.91	.98	.15	3.76	13.47	3.65	
Stethojulis balteata							2.25	.13	.64	.21	.29	.75	.74	1.92	
Anampses cuvieri								2.74	1.98	1.98	3.28	4.57	3.95	1.75	5.76
Coris flavovittata										.02					
C. venusta										.14					
Calotomus spinidens					3.23								3.01	8.98	2.35
Scarus dubius									13.75						
S. perspicillatus									28.92	7.03	49.98		35.14		
Scarops rubroviolaceus								33.32	84.34	7.03			25.86		
Zanclus cornutus (= Z. canescens)							3.88								
Acanthurus triostegus		2.51	31.63	25.11			9.15	23.96	289.80	12.94	167.71	11.33	36.75	62.78	13.15
A. guttatus								31.36	249.02			3.14	3.11		10.89
A. achilles								2.70	63.93		.43				
A. leucopareius		164.16	84.05	21.12	11.60	61.56	22.16	61.89	257.98	6.96	89.74	13.75	73.71	140.77	16.25
A. nigrofuscus			2.28				1.69	8.83	17.24	5.30	4.41	14.90	6.18	11.38	4.47
A. nigroris								1.28	4.42	2.13	4.90	1.14	6.40		
A. olivaceus								11.85	2.02	3.03		1.52			
A. dussumieri		331.66	47.22	248.74	3.58	132.66	33.17	3.58	29.09		21.70	18.43	18.84	66.33	8.68
A. xanthopterus		133.10								4.36			2.23		
A. mata				16.28					21.32		.80		6.21	6.08	
Ctenochactus strigosus								9.58	88.44	14.15	2.05	2.36			
Zebrasoma veliferum															
Naso lituratus								13.85	69.28	4.79	1.34	2.31	4.58	10.20	7.33
N. unicornis		310.51		59.44		43.62	19.48	18.28	229.49	9.88		10.84	5.96	145.39	47.04
Rhinecanthus rectangulus		2.87	1.21	5.76		2.87	1.21	1.90	7.51	5.87	.73				.50
R. aculeatus												1.45			

Table 2. (cont.)

SPECIES	Station No.:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Melichthys niger										63.16	19.40	.96				
Parvagor spilosoma									.08							
Cantherhines dumerili (= Amanses dumerili)										12.34	.51					
Ostracion meleagris									.15							
Canthigaster amboinensis										.08	.08	.18	.90	.19		
Plagiotremus goslinei				.01	.01	.03	.09			.30	.06	.01		.06		
Cirripectes obscurus						.94				1.55	.04					
Exallias brevis									.10	.82		.33				
Kuhlia sandvicensis		11.29				7.39	.98		5.59	4.66		4.79				
Spratelloides delicatulus		.16	496.92	7.76		.41	6.21							.65	12.42	
Mugil cephalus												*				
Neomyxus leucuscus (=N. chaptalii)									8.92							
Polydactylus sexfilis		3,018.80														
Pranesus insularum					*											
Pamulirus marginatus										*						*
P. penicillatus												*				
Polypus marmoratus									*							
Chelonia mydas							*			*			*	*	*	*

*Species observed

Lawai-Kai beach home of Queen Emma, 1933

May 4-10, 1984

2-23-85 AA

Kauai officials find second poisoned fish

By Jan TenBruggencate
Advertiser Kauai Bureau

LIHUE — Health Department officials said yesterday they've found a second kahala fish with significant levels of ciguatera poison in its flesh, and have warned against eating any kahala caught off the west side of Kauai.

Fifteen members of two families were poisoned Monday when they ate parts of a 60-pound kahala or amberjack caught Sunday off Barking Sands. One of them remained at Kauai Veterans Memorial Hospital yesterday after being brought to the hospital Monday night in a coma. Officials said he was much improved and expected to be released soon.

Stephen Terrell-Perica, a Health Department epidemiological specialist, said a second kahala, caught Sunday in waters between west Kauai and Niihau, was tested at the University of Hawaii and also found to be contaminated.

The 16.5-pound fish had "a significant level of ciguatera toxin" in its flesh, and could be assumed to have even higher levels of the poison in its organs, according to a department release.

That finding contradicts two general beliefs about ciguatera poisoning: That smaller kahala (those under 20 pounds) normally aren't implicated in poisonings; and that the poison is mainly in the head and guts, so that people eating only the flesh aren't in much danger.

The release said that consuming any part of a kahala fish may be hazardous, even though toxin levels in the guts and head are higher than in the flesh.

In the poisoning case Monday, several of the 15 who suffered symptoms of ciguatera poisoning had eaten only flesh. However, all seven of those whose illness was severe enough for hospitalization had also eaten fish head, roe or guts.

The poisoning can come on quickly or as much as a day after eating toxic fish, and it exhibits a range of symptoms, including general weakness, numbness, diarrhea, muscle aches, vomiting, dizziness, chills, headache, and a reversal of the senses of hot and cold. In some people it also can dangerously slow the heart rate.

Kauai District Health Officer Dr. Jeffry Smith said there's no sure way to tell whether a fish is toxic, and no amount of cooking, freezing, drying or salting removes the poison.

Deepwater fishes like the tunas, marlin, mahimahi and ono are not involved in the ciguatera problem, since they aren't in the food chain that starts with the shallow-water seaweeds upon which poison-producing microorganisms grow.

Sighting Information • TURTLE and SEAL

Animal sighted (circle): TURTLE SEAL

Number of animals: 1 Type, if known: GREEN / HAWKSBILL

Date: 7/17/91 Observer: KEN BAIL / BUBBLES BELOW SCUBA CLASSES

Time: 10:30 AM Address & phone (optional) 822-3483

Location: SHERATON CAVERNS / POIPU, KAUAI

Observed from(circle): shore; boat(name: BUBBLES BELOW);

while skin or SCUBA diving(on surface or at 55' feet deep).

Estimated size(length): 3½ FT LONG SHELL

COMMENTS:(color pattern; injuries; scar patterns; tumors; flipper tags:present Y/N, tag color, and if readable tag number; bleach marks(number/letter); behavior; and weather.

TAGGED / LEFT FRONT FLIPPER NO

BBA 442 : (IS THIS THE ONE SEEN LAYING ON KAUAI'S BEACH?

Linda Bail Rolodex

Ken Bail

Nearshore resighting

Bubbles Below, Inc.

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GEORGE, HOPE ALL IS WELL. JUST A SHORT NOTE TO LET YOU KNOW THAT BBA442 IS BACK. I SPOTTED HER IN EXACTLY THE SAME HOLE (60') AT THE SHERATON CAVERNS OFF OF POIPU AS I DID ON 7/17/91. THIS SIGHTING WAS ON 4/26/93. WE HAD NO OTHER SIGHTINGS OF THIS TURTLE IN THE ALMOST TWO YEAR PERIOD IN BETWEEN. SHE APEARS HEALTHY, NO SIGNS OF TUMORS AND STILL HAS TWO OF THE SMALLER METAL TAGS ATTATCHED ALSO. WE WILL KEEP YOU IN TOUCH WITH ANY OTHER INFO WE CAN. PLEASE SEND MORE TURTLE/SEAL SIGHTING CARDS SO I CAN DISTRIBUTE THEM. WE HAVE BEEN DIVING KAULA ROCK QUITE A BIT LATELY AND ARE CONCERNED ABOUT THE BOMBING OF SUCH A RICH AREA. YOU SEE SEALS ON THE MAJORITY OF THE DIVES,

- OVER -

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THE AREA SHOULD BE SPARED SUCH
INTRUSIONS DON'T YOU THINK?

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WITH US WHEN YOU CAN.

KEN

Jack Harter Helicopters

INVITATION TO ADVENTURE

3-27-85

Aloha:

Please excuse the lack of communication. I've been waiting and hoping to have something to report. Also, this is a slow year for turtles basking. The most so far were 6 about a week ago. Even the numbers around the net are down.

Their basking seems to reflect heavy surf, which we haven't seen and a lack of people pressure which we have. Zodiacs have been landing routinely at the Nualolo Kai site [redacted]. There were about 30 people running around there today. Frankly, I don't think

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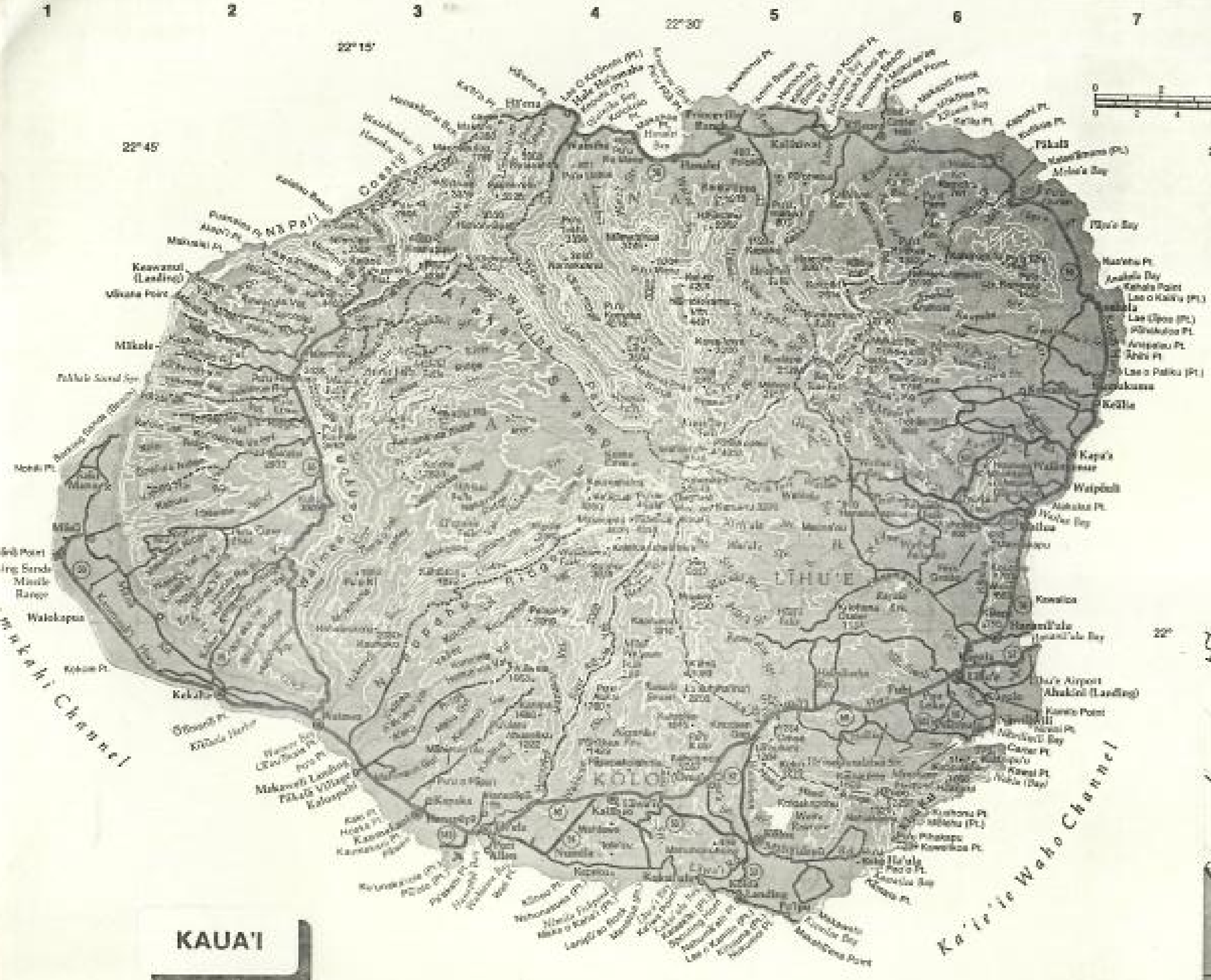
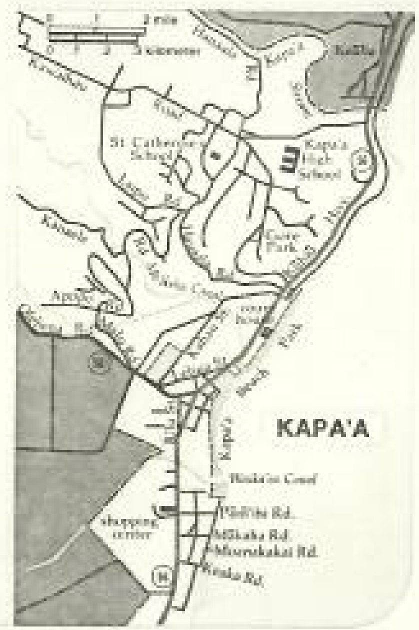
0
3
6
Puukole Pt.
Kikapa Pt.
Kaunuopu Pt.
Kii Landing
KAPAI CHANNEL
Keawanui Bay
Kaunumui Pt.
Paniau △
1281
PUUWAI VILLAGE
△ Kaea Cone
1018
Kuakamoku I.
Puea Pt.
Nanopapa Landing
Halalii Lake
Paoaneane Pt.
Leahi Pt.
548
△
Kawaihoa Pt.



PRONUNCIATION MARKS
The glottal stop, ', is similar to the stopping of sound between the oh's in English oh-oh! The macrons, ā, ē, ī, ō, ū, denote long, stressed vowels.



Report

Iwa offers peek

By Jan TenBruggencate
Advertiser Kauai Bureau

POIPU, Kauai — Hurricane Iwa threw most of the Kiha-houna heiau into the dining room and the pool of the Waiohai Hotel, but in the process revealed glimpses into the origins of the temple.

The storm uncovered foundation walls much larger than modern archaeologists were aware of, and showed indications of links to fishing shrines on the uninhabited islands of Nihoa and Necker, far to the west of Kauai, said archaeologist William Kikuchi.

Kikuchi has been digging at the site for several years, and had planned to continue this summer. But original excavation plans have been set aside for a program of following the newly uncovered perimeter walls to see where they go.

They may go right to the edge of the Waiohai, the four-story, 460-room Amfac hotel that was closed for the storm and reopened Saturday. Kikuchi has permission from the management to conduct the work, even if it means tearing up sections of the hotel's lawn. Eventually, he'd like the hotel to put up a kiosk with photographs, drawings and perhaps scale models of the heiau as it once might have looked.

In the meantime, though, a lot of basic dirt work needs to be done.

"The hurricane just about tore a good 85 percent of the heiau off," he said.

Records dating back to the turn of the century talk of a heiau, or Hawaiian temple, 130 feet long and 100 feet wide, on the point next to what is now the Poipu Beach Park. When modern archaeologists went there beginning 20 years ago, they found stonework of entirely different dimensions. Still, they felt it was important.

Archaeological Research Center Hawaii head Francis Ching in 1972 said it was the only remaining temple on the Koloa-Poipu shoreline with any research potential.

Kikuchi's research indicated the site may have had multiple uses in prehistoric times. It was dedicated to the gods Kamohoalii, Kuhaimoana, Kane and Hulukoki. The first two were gods who assumed shark forms and were worshipped as ancestral sharks.

And Kane, one of the major Hawaiian gods, was the god of procreation and life, suggesting the temple may have been dedicated to the proliferation of fish life, Kikuchi said in a 1975 report.

Then there's Hulukoki, "probably . . . the majestic supernatural bird of Kauai in the act of fluffing up its head feathers," Kikuchi said. Since there's no clear connection between the marine gods and this latter figure, there might have been separate uses at separate times for the same temple, Kikuchi said.

And there is clear indication the temple's original foundations were built upon and added to, he said.

The original foundation, revealed by the hurricane, shows the early Hawaiians cleared the lava bed to make a flat surface before starting their temple directly on the bedrock.

And among the surviving foundation stones, Kikuchi, his crew and hotel workers located three dike stones —, smooth, angular lava stones found where new lava has been forced up in cracks of old lava flows.

"There may be some religious connotations in the stones. Some of the old temples on Nihoa and Necker are very similar," Kikuchi said. At those fishing shrines, dike stones were placed upright within the structures, he said.

It all suggests the Kiha-houna heiau may have had simple origins, and that it later acquired the more important status of a temple to major gods, he said.

"This may originally have been a

The Honolulu Advertiser
Monday, January 17, 1983 A-3

at heiau's origins

Advertiser photo by Jan TenBruggencate

The stones along the left side of this trench are the remains of the heiau's old east wall, which appears to head straight for the Waiohai Hotel.

large fishing shrine, rather than a temple," he said.

With further excavations along the new-found walls, Kikuchi hopes to find pieces of carbon or volcanic glass, both of which can be used to date a site. Fishhooks and other small artifacts have been found within the walls already, he said.

Most of the site may be destroyed, "but we can still extract information from it," he said.

Kikuchi expects to do most of the work on a volunteer basis. His crew is formed from members of the Local Anthropology Club, largely made up of former students of Kikuchi, who teaches at Kauai Community college.

Eventually, Kikuchi would like to see some of the old heiau rocks put back in place. They are now piled on the hotel lawn within the perimeter of the heiau. But there's no point in trying to entirely rebuild it, because there's no way of knowing exactly what it looked like.

Instead, though, models might be made to show how it might have looked. Visitors to the site could view the rock wall perimeters and then see on a model what structures might have been found inside the heiau, he said.

*

Reported Catches of Green Sea Turtles

(Permitted under Fish & Game Reg. #36 until 9/6/78)

DATE	LOCATION	METHOD	LENGTH	WEIGHT	SEX
9/16/77	Keomuku, LA	Hand	38¼	270	-
7/15	Kohala, HA	Hook	36	150	m
"	"	"	42	175	m
8/?	Kona	"	41	250	m
9/?	"	"	48	200	f
"	"	"	33	180	m
11/?	"	"	36	200	m
"	"	"	45	260	f
11/29	Keeumoku, LA	Spear	44	300	m
"	"	"	38	250	f
"	"	"	36	250	f
"	Pt. Allen	Noose	36¼	170	m
12/5	Hilo	Hook	42	180	m
12/23	Upolu Pt. HA	Spear	38	260	f
12/4	"	"	36¼	190	m
12/17	Kaneohe	Hand	38	260	m
12/30	Hana	Hand	36¼	200	f
2/4/79	Kailua, OA	Scuba	37½	200	m
2/24	Honolulu	Kaka line	36	250	m
2/18	Kilauea, KA	Spear	37	220	m
2/15	Lanikai, OA	Hand	39	350	f
2/18	Moloaa, KA	Harpoon	36	260	f
2/22	Kekaha	Noose	38	180	f
"	"	"	40	200	f
3/3	Hickam	Net	38	90?	m
3/1	Moloaa	Harpoon	36	298	f
4/12	Kau	Hook	38½	275	f
4/14	Mokuleia	Hand	37	300	m
5/26	Moloaa	Harpoon	39	325	f

* Not in chronological order.

DATE	LOCATION	METHOD	LENGTH	WEIGHT	SEX
5/20	Naha, LA	Spear	38	226	f
7/6	Aliamanu, KA	Harpoon	36½	161	f
8/11	Nuu Landing, MA	Scuba	38	280	m
9/4	Haleiwa	Spear	37½	150	m

* All information and figures taken directly from reports as submitted by the Permittees.

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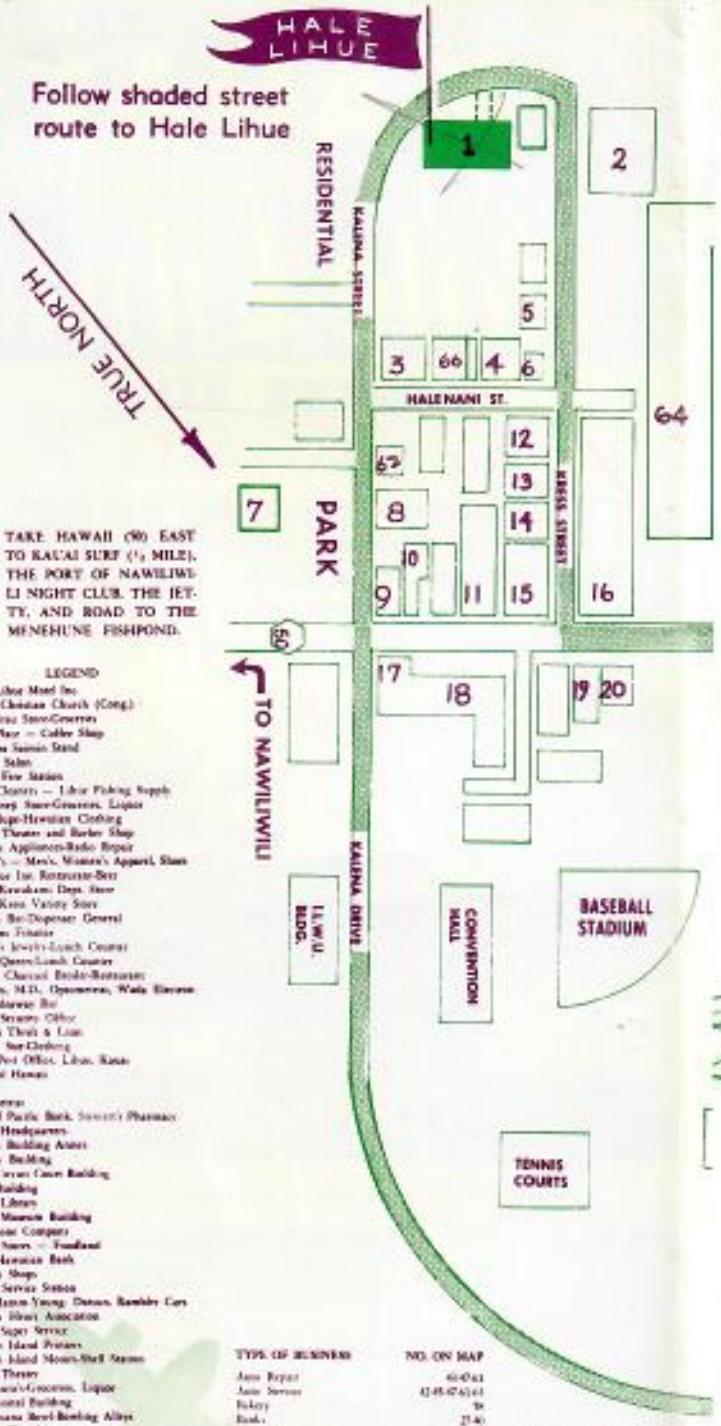

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Proprietor — M. Morishige
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One of the rooms at the Hale Lihue Motel.

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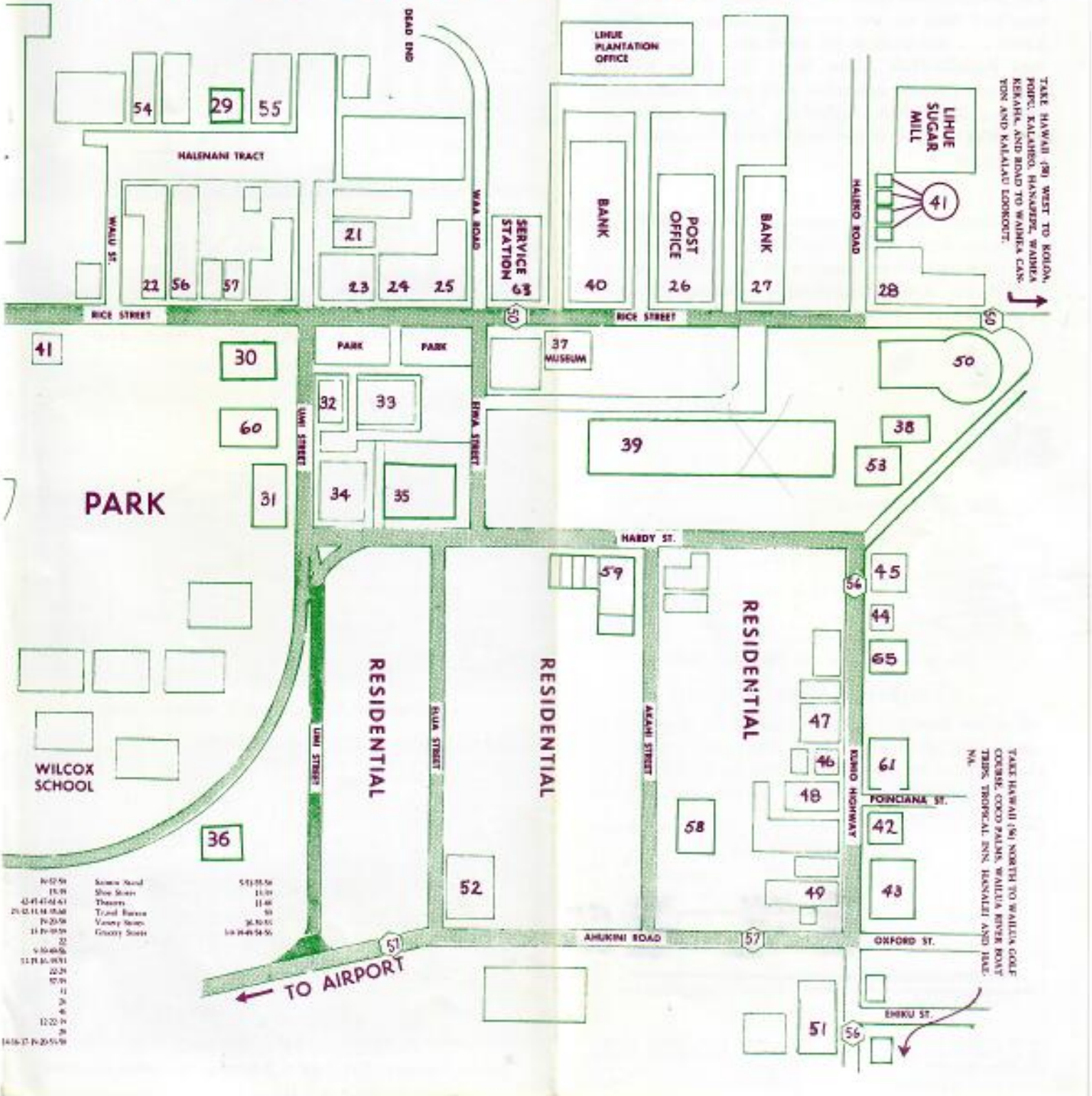
MAP OF LIHUE PROPER



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KUA KUKOʻO

June 1983

Turtle Discussion

Earlier in May, you got a special notice on the proposed changes for the taking of the green sea turtles. There was a public hearing May 19 where about 30 people (15 KUA members) attended. The majority of those who testified would like to see continued protection at lest until there is a noticable and stable increase in the population. Those in favor of taking turtles believe there enough turtles now to use for susistence purposes (home consumption). It is believed by some that this change will make it easier for additional poaching and abuse of turtles. If you would like to submitt a written testimony send it to :

Mr. Alan Ford, Regional Director
Southwest Regional Office
National Marine Fisheries Service
300 South Ferry St.
Terminal Island, CA. 90731
(by June 20,1983

P.S. (RE:Bill Sollner's news? article in Garden Island May 23) Neither Sandy Conrad or Patty Grant stated there are few if any turtles in Hawaii and Grant has seen turtles not none as Sollner reported.

Film Festival

The plans for the 2nd Annual KUA Film Festival are moving along smoothly. There will be a variety of films and slides, door prizes, and boothes. The date set is Aug 25 at 7:30. It will be held at the Kauai War Memorial. Special meetings are set for the planning. If you'd like to become more actively involved, call Julian Chapa or Barbara Brundage at 7429791.

Weekend Spree

If you didn't make reservations to go to Mililii June 24-26, you may still have a chance. All 30 spots are currently booked but in the event of a cancellation, those on an alternate list can fill in. Alternates may call Lani Soules at 2456791 (days) or 3328382 nights.

Dues

If you haven't paid your dues, this may very well be your LAST! newsletter. Send them to KUA, Box 188, Kapaa HI. 96746

dues

HELP !!!!!!!!! WANTED!!!!!!!!!NEEDED!!!!!!! Editor for this newsletter! Call Patty Grant at 2452049 Thanks in advance!

NEXT MEETING: JUNE 2, 7:00 pm, KOLOA NEIGHBORHOOD CENTER
Regular business + FILM: I'd Rather Be Diving + New T-shirts for sale !!!!!!!

5 July '83

Dear George:

The two turtle poachers were fined $150 ea with $75 suspended! When our enforcement officers come on the scene the turtle had already been butchered — the grn turtle was 30" across the back (). I asked the officer that caught these poachers to please inform me if they ever come across another dead turtle so that I can collect the stomach contents for analysis. Judge Nakea levied the fine.

George, I still haven't had time to write the memo regarding "turtle culture" in Hawaiian fishponds — I hope I can get it off to you in a couple of weeks.

While your in Costa Rica please check out the job opportunities with the Costa Rican "Dept. of Land + Natural Resources"! Costa Rica is a beautiful country, if there was an opening for an aquatic biol. it would be tempting!

Aloha,

Don Heacock

Hi George

Just a quick note to give you my new address. The move over to the Big Island was pretty smooth. We live about 5 min from Kailua wharf and are above town overlooking the water. We rented a large 3 bedroom house so if you ever need a place to stay in Kona look us up OK.

Again any help I can be on this end let me know, I have 4 days a week off and spend all of them diving.

Again it was good to meet you on Kauai and I am at your service in Kona

James A. Wark
P.O. Box 5783
Kailua, Hawaii 96740
808 389-5795

13 June 83

hand to the defense counsel.

He also said he wanted to "stifle any further notoriety in the case."

"It's difficult enough to prosecute without having the case tried in the papers," he said.

batch for tomorrow, as he strives to eliminate those who might come to court with their minds already made up.

The slow process of jury selection resulted yesterday in 90 persons' being excused after pleading that health

Honolulu

Kauai talking about

By JAN TenBRUGGENCATE
Advertiser Kauai Bureau

LIHUE—A series of events affecting the Kiahuna Beach Houses in the past three weeks has caused considerable comment on Kauai.

In 16 days, the development at Poipu Beach has suffered the following setbacks:

- A warehouse fire in Ahukini destroyed all appliances and considerable other material for 158 units under construction at Kiahuna.
- Another fire destroyed two nearly complete structures at the site that contained a total of 10 living units.
- Yesterday, James H. Coke, sales manager of Kiahuna, was killed in an early-morning traffic accident.

To many on Kauai, including some government officials, coincidence no longer is an acceptable explanation.

KAUAI FIRE CHIEF Frank Rita said he has not been able to find solid evidence of arson in the two fires, but he has refused to rule it out as a cause.

He said he has turned over the cases to the Police Department for investigation — partly because of the Kiahuna connection, and partly because of rampant rumors regarding the fires.

Abraham Waiamau, captain of the Police Department's Detectives division, agreed that coincidence as an explanation "does appear to be a little bit shaky."

"We are checking into these oddities," he said, but did not give details of the investigation's progress.

Lt. Ernest Moniz of the traffic section said there does not appear to have been foul play in the Coke death. The automobile was inspected and appeared to be in good shape aside from the damage caused by the crash.

Moniz said an autopsy will be performed to determine if alcohol or some other physical factor was involved. The department is going on the assumption now that Coke fell asleep at the wheel before the car ran off the road.

IN THE FIRES, a point speaking against the possibility of foul play is timing.

The Sept. 16 warehouse fire was noticed first by Harry Sasaki, who was leasing the warehouse, after 8 a.m. and when there were several workmen around — making it difficult for anyone to get in and set the fire.

However, skeptics have suggested that a smoldering fire may have been set, so it would erupt long after an arsonist left the premises. Or, a

Listing of Heiau
Thrum's on Hawaiian Annual
Hawaiian Historical Society -1921? 23?

Sirica opened the trial in the ... Courtroom, where he began the Watergate bugging trial 21 months ago. When preliminary jury screening is over, he will shift to his own, smaller courtroom four floors below.

. . . Haldeman, on opening day of Watergate cover-up trial.

Advertiser Oct 2, 1974 A-1

project's bad luck

fire could have been set and almost gone out, later bursting into flames.

THE FIRE at the Kiahuna began between 10 and 11 p.m. Friday, when a guard was on duty.

No one was seen in the vicinity. But from the time it was noticed as a small fire in a corner of one structure, it engulfed the whole building and the one next to it in a surprisingly short period.

Firemen were forced to spend most of their efforts keeping neighboring buildings from catching fire.

If the police, Fire Department or insurance officials have any evidence of foul play, they haven't released it — but, again, the rumors in the community are rampant.

HERE ARE a few theories, from different sources:

- Many workers have been laid off from the Kiahuna project, and some of them could have been angry enough to start a fire.
- A contractor may have realized he could not meet deadlines, so he may have used the fire as a convenient way out. Countering this is the story that the builders were ahead of schedule.
- Someone may have wanted to collect insurance.
- The whole set of problems may be a result of interference by the supernatural.

The last theory — dealing with the supernatural — has been receiving a fair amount of play.

And there is some historical background — both recent and ancient — that could tend to support this contention.

ARCHAEOLOGIST Francis Ching Jr., president of the Archaeological Research Center, said there are the remains of a large heiau — or Hawaiian temple — near the site. Its correct name is not known, but Ching cited sources giving the following possibilities: Kihahuna; Kiha-houna; Kihouna.

The heiau may have covered more than a quarter-acre, with walls as much as 8 feet thick in places. It has been called the "Temple of the Weeping Turtle," Ching said. One source indicated it was dedicated to the gods Hulukoki, Kane, Kamohoali'i and Kuhaimoana.

Fragments of the original heiau still can be found just down the beach from the Kiahuna, Ching said.

WHETHER THERE is any connection between the Kiahuna's problems and the heiau is not known. The heiau is in the same ahupua'a, or ancient land unit, as the Kiahuna site, Ching said.

The Kiahuna property itself probably was not a sacred place. Records indicate it contained agricultural land and some house sites, Ching said, but he was quick to make it clear the records are not always accurate.

"This Island hasn't been studied very closely, and many of the records are jumbled," he said. "This site (Kiahuna) was destroyed just before we had a chance to re-inventory it."

DOWN THE BEACH to the west of Kiahuna is the site of one of the Island's most consistently recurring ghost stories — the long-empty and reportedly haunted Hale Nani Hotel. The Hale Nani has had a history of financial failure, despite a very scenic location on what has been called Kauai's "Gold Coast."

It apparently all began when construction was under way and sand used for fill on the site was brought from the area near Makahuena Point, a few miles away.

The sand was so full of human bones that someone felt it would be too much trouble to separate them. Thus, Ching said, the grounds of the hotel — below the surface — are littered with human bones.

About the same time, reports of a shadowy, ghostlike figure began coming in from an area about halfway between the present-day Kiahu-

See COINCIDENCE on Page A-4

Coincidence at Kiahuna? Some link fires, death

From Page 1

na and Koloa Landing, which is adjacent to the Hale Nani.

THE STORIES of the sighting went on for years, but each year the alleged ghost moved closer to Koloa Landing and the Hale Nani. Finally there were reports of sightings on the Hale Nani property.

With the sightings came reports of doors opening and closing by themselves, toilets flushing when no one was around and the like. There were some reports of a headless ghost.

The stories may all have been figments of fertile imaginations, but many Kauai residents will point out that the Hale Nani has been closed more years than it has been open.

And while there appears to be no connection whatsoever between the Hale Nani appearances and the old heiau with the Kiahuna, there is a good number of Kauai residents who will make one.

The recent afflictions of the Kiahuna project are difficult to explain 'away as simple accidents, they say.

And if human interference can't provide an answer — then, for some, the proximity of the heiau and the Hale Nani will. The question that hasn't been answered is why it's happened.

Vitamin issue

WASHINGTON (UPI) — Rep. Craig Hosmer, R-Calif., charged the Food and Drug Administration yesterday with trying to "bamboozle" Congress out of passing a bill to prohibit the agency from restricting the sale of high-potency vitamins.

The FDA plans to restrict the sale of certain vitamins that exceed 150 per cent of the so-called "minimum daily requirement" even though it has not found high-potency vitamins to be hazardous to health.

The Senate, by a vote of 81 to 10, already has approved an amendment by Sen. William Proxmire, D-Wis., to prevent the FDA from putting its proposed new regulations into force.

UNIVERSITY OF HAWAII · KAUAI COMMUNITY COLLEGE

August 26 1976

George H. Balazs
University of Hawaii
Hawaii Institute of Marine Biology
Coconut Island, P.O. Box 1346
Kaneohe, Oahu, HI 96744

Dear Mr. Balazs:

Thank you very much for your letter of 18 Aug 1976 and the enclosed materials, especially your article "Green Turtle Migrations in the Hawaiian Archipelago."

I have not come across any other fishpond data to suggest that certain ponds were used specifically for turtles. The Waimanalo pond of Pāhonu is probably not a fishpond but a pen for the keeping of turtles in one area. I have seen penned turtles at the Kiholo ponds on the Island of Hawai'i. The explanation given to me by informants was that frequently, caught turtles are penned for later use as food. One informant mentioned that turtles would walk into the ponds and stay there fpr some length of time before returning to the sea.

The Advertiser article of 2 Oct 1974 is in error, the name of the temple is Kiha-hōuna; how the author obtained the definition "Temple of the Weeping Turtle" is beyond me. Kiha-hōuna refers to the chief-builder, Kiha, and the act of scooping, or hōuna. / Several miles inland at Maha'ulepu and located on a natural tonque of lava was a heiau called Ka-lae-o-ka-honu, which translates the "projecting land of the turtle." This is the only reference to turtles in this area. Perhaps the Advertiser got the temples mixed.

I will mail you a reprint of my Science article as soon as I receive them. Again, thank you for your interest.

Sincerely yours,
William K. Kikuchi
William K. Kikuchi

12/22/82 telephone conversation -
Animal very lethargic -
plastron sunken-in.

ENTER IN GERRY DATA Book-MISC. #5

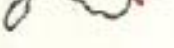
SEA TURTLE SIGHTING REPORT

(Please return to: George H. Balazs; Hawaii Institute of Marine Biology; P. O. Box 1346; Kaneohe, HI 96744; Tel. 247-6631)

Observation made by: Don Heacock

Address & Tel. No. (optional): P.O. Box 1671, Lihue, Kauai 96766 (245-4444)

Date: 21 Dec '82 Time: 3 PM Location (indicate on chart): Wailua Golf Course beach



Observation made from: X shore;

___boat; or while ___skin ___SCUBA diving.

~~Estimated~~ exact size (shell length): 37¼" (over-the-curve)

Turtle seen on: ___surface; or at depth of approx. ___ft. Distinguishing characteristics (species I.D. if known, long tail, shell color, tags, injuries, etc.): (♂, tail nearly 2X length of rear flippers)

(Information on turtle parts recovered from fish or sharks would also be greatly appreciated).

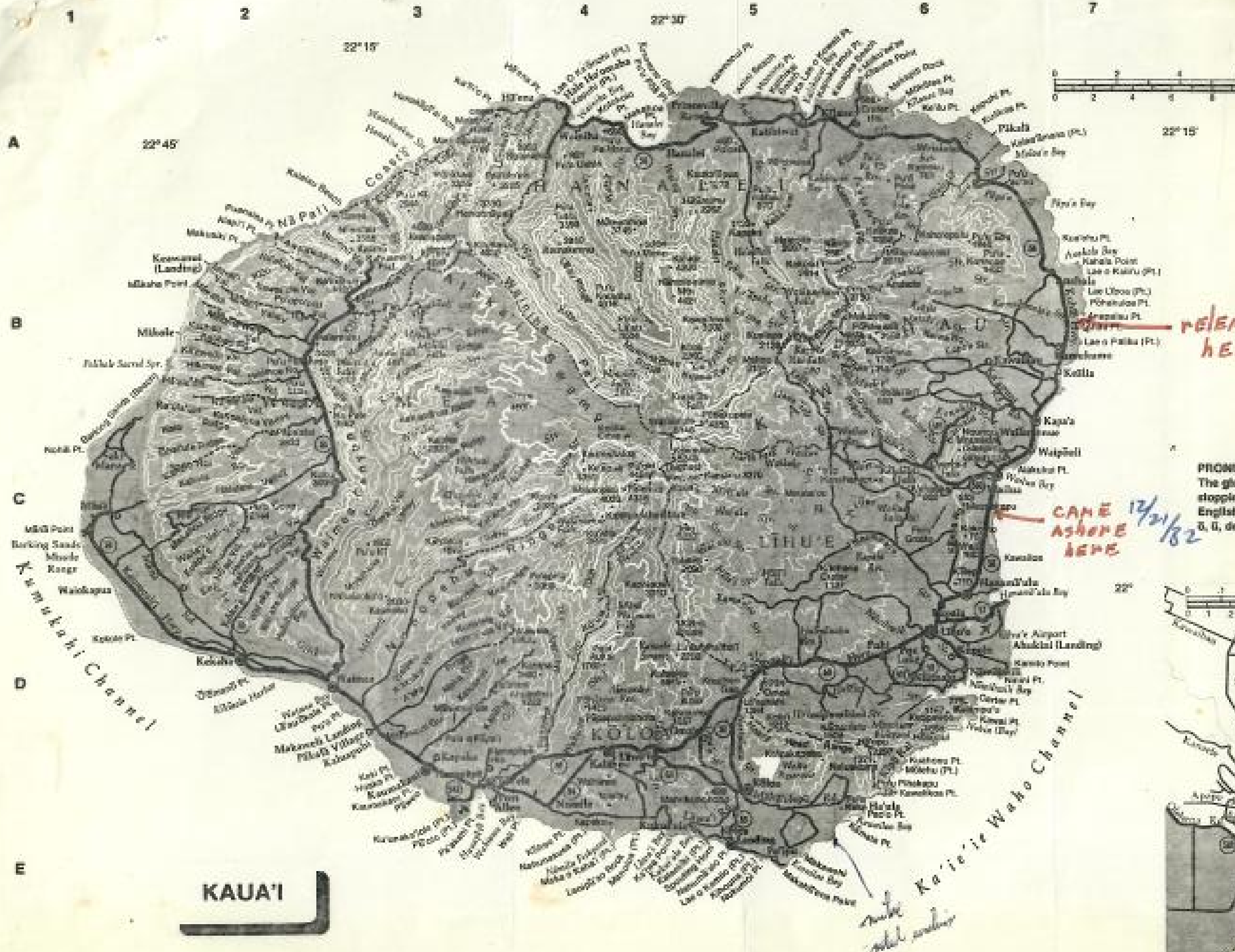
Chelonia mydas ♂; tumors on rt. eye (possibly blind in that eye);

Other comments: left eye appeared OK but some swelling seemed present in eye lids; left eye (pupil) clear - rt eye pupil opaque (cataract)

tagged twice on front left flipper with tags 6436 and 6437.

THANK YOU FOR YOUR COOPERATION

Found in the back of a pickup truck - Don knows one of the men. Taken for shell?



PRONUNCIATION MARKS
The glottal stop, ', is similar to the stopping of sound between the oh's in English oh-oh! The macrons, ā, ē, ī, ō, ū, denote long, stressed vowels.

SIGHTING INFORMATION: (TURTLE) AND SEAL

Animal sighted (circle): (TURTLE) SEAL

Number of animals: 2 Type, if known: Pacific Green Sea Turtle

Date: MARCH 11-84 Observer: D. MORIARTY

Time: 10:45 - 11:30 Address & phone (optional) PO BOX 53

Location: COVE TO EAST OF KILAUEA PT

Observed from(circle): (shore); boat(name: _____);

while skin or SCUBA diving(on surface or at _____feet deep).

Estimated size(length): 2-3 FT.

COMMENTS:(color pattern; injuries; scar patterns; tumors; flipper tags:present Y/N, tag color, and if readable tag number; bleach marks(number/letter); behavior; and weather.

Two turtles were observed copulating ??
We usually see turtle daily However I thought this behaviour would be of interest

April 19, 1983

Mr. Lindsay Faye, Jr.
Kekaha Sugar Company
Box AA
Kekaha, Kauai 96752

Dear Mr. Faye:

I am writing to ask if you can provide me with any historical information on the occurrence of sea turtles along the Na Pali coast or elsewhere on Kauai. A couple of years ago when I met Linda Collins at Aloha Magazine she gave me your name and address and suggested I contact you about this subject. She felt that you would have interesting information based on your own personal observations made over the years. I regret that it has taken me so long to write to you.

The general kinds of information that I am interested in are as follows: approximate numbers and locations of especially large groups of turtles; locations of nesting (egg laying); evidence of historical declines, increases or other population changes; and descriptions of catching methods known to have been used on Kauai. Virtually anything along these lines that you can relate to me would be most appreciated.

I have enclosed several items on sea turtles that I thought you might find interesting. I look forward to hearing from you when your time permits.

Best regards.

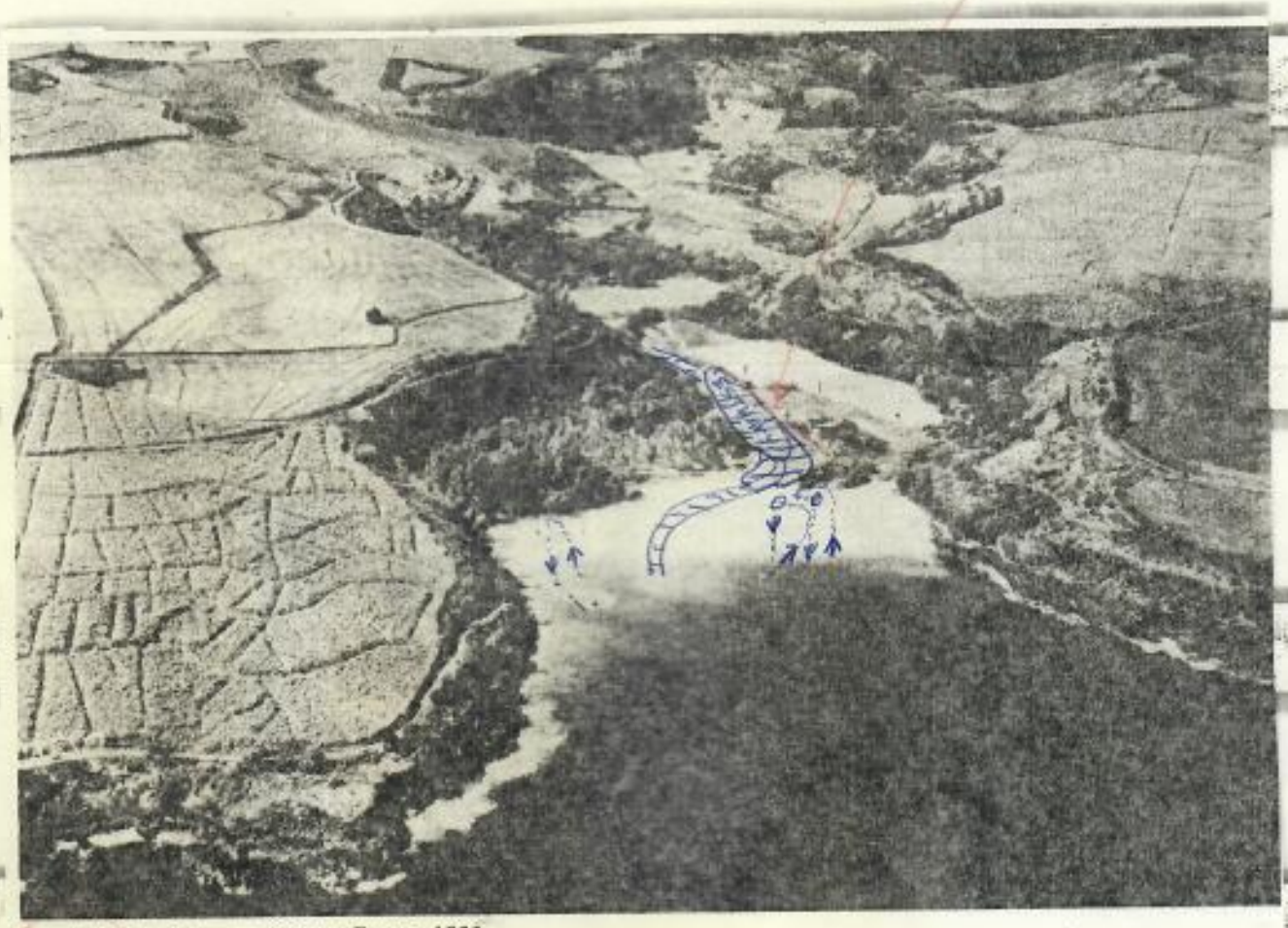
Sincerely,

George H. Balazs
Assistant Marine Biologist

mk
Enclosures

Don - Is this the beach ?

GB



Lawai-Kai beach home of Queen Emma, 1933

May 4-10, 1984

Waikiki Beach Press

George - yes, this is Lawai-Kai; the vegetation has, however, changed quite a bit since hurricane Iwa. This picture could not have been taken on May 4-10, 1984 — was it ??

o = turtle "nests" locations

---→ = approximate areas + directions turtle(s?) came ashore

Oil slick now stationary about 15 miles off Kauai

A Chevron oil spill that entered the ocean from Barbers Point last week is now floating about 15 miles from Kauai.

The slick, which seems to be holding its position, appears to be breaking up, a spokeswoman from the Coast Guard said yesterday.

The oil began as a leak from an offshore pipe on May 2 after a cover came loose on a pipe about 2 miles from shore.

Oil from spill on Oahu appears on Kauai shores

KAPAA, Kauai — An oil spill that entered the ocean off Barbers Point on Oahu nine days ago unexpectedly washed up on portions of Kauai's eastside beaches yesterday morning.

Oil globules twice the size of silver dollars were reported on the beach fronting Kapaa's Coral Reef Hotel and at other points as far north as Anahola. A Coast Guard spokeswoman described it as a "two-inch-thick ribbon of oil."

The Coast Guard last night said that as of noon yesterday there were actually two oil

slicks off Kauai. The first, "a heavy concentration" about 7 by 4 miles across, was 5 miles east of Hanamaulu Bay on Kauai's eastern shore and was apparently the source of yesterday's Kapaa wash-up.

The second slick was described as being about 2 miles square, of "moderate concentration," and about 3 miles off of Nawiliwili Bay.

Chevron Oil Company's Mike Hagler said a cleanup crew was dispatched several hours after reports were received in his office. Chevron is believed responsible for the spill, which resulted from a leaky pipe offshore of the refinery at Barbers Point.

Hagler said about 1,000 gallons in all leaked into the ocean, but he estimated only a small portion of it would reach Kauai. He said it could cost Chevron as much as $30,000 to clean up the oily mess.

"This is a complete surprise," Hagler said of the oil at Kauai. "We see no evidence of environmental damage or inconvenience to the public."

Kauai Civil Defense Director Sonny Gerardo said the oil does not seem to pose a threat to the public or to marine wildlife.

Oil Slick Is Just About Broken Up

LIHUE, Kauai — After reaching nearly 15 miles of Kauai's east shore, an oil slick has broken up but traces of it were drifting toward the northern tip of Niihau this morning.

The effect on Niihau will be slight because the slick has dissipated, a Coast Guard spokesman said.

Aerial surveys yesterday by the Coast Guard and Chevron Co., which has assumed responsibility for the oil slick, showed "it is non-existent," according to Chevron spokesman David Young.

He said up to 40 workers using shovels, leaf-rakes and plastic bags have removed up to 60 gallons of oil residue from beaches and reefs stretching from Kealia to Nawiliwli since the cleanup began last Friday.

About 120 gallons of oil made its way to Kauai following a May 2 oil spill of some 1,500 gallons of oil at the Chevron refinery on Oahu.

Young said yesterday the cleanup will "take as long as it takes to make sure the residents of Kauai and the people who use the beaches find them in good, clean and acceptable condition."

State wildlife officials said the only casualties from the slick so far were three red-footed boobie birds.

H38 5-16-84

HSB 5-15-84

Third Bird Found Dead on Kauai from Oil Spill

LIHUE, Kauai — Cleanup crews working to clear an oil slick from more than 15 miles of the Island's east shore have found a third red-footed booby bird dead.

Oil-covered remains of the seabirds have been discovered at Nukolii and Kapaa, where oil from a May 2 spill at the Chevon refinery on Oahu began washing ashore Friday.

State wildlife biologist Tom Telfer said the birds, which nest near the Kilauea lighthouse, probably got stuck in the slick while diving to catch fish.

MEANWHILE, OIL globules the size of baseballs were drifting into parts of Nawiliwili Harbor, located south of Lihue, and Kelia, located some 15 miles north of Lihue, according to the Coast Guard.

"The slick is moving in a southward direction. We have been told by people on the scene (on Kauai) that the currents will play a big part in what direction the oil will go," a Coast Guard spokesman said.

Chevron has assumed responsibility for the oil spill and has contracted Clean Islands Council to direct the cleanup. The council was established by Hawaii's oil companies to coordinate oil-spill cleanups.

Hotels along the affected beach yesterday began advising their guests not to swim in oil-covered waters.

Storm Uncovers Field of Kauai Petroglyphs

By Robert Pickard
Kauai Correspondent

POIPU, Kauai—The high surf generated by last week's storms has uncovered a series of Hawaiian petroglyphs carved into the beige sandstone at Maha'ulepu Beach in Poipu.

"It's a possible new find," said Dr. William Kikuchi, archaeology professor at Kauai Community College. "It's kind of momentous."

Kikuchi, who visited the site Sunday, said the petroglyphs include some traditional Hawaiian stick-figure designs and "some things I've never seen before"—something like chickens and figures wearing apron-like garments.

Some designs appear to date from prehistoric times, he said, while others—a star design and some letters and names—definitely came after Christianity was introduced in the Islands.

KIKUCHI SAID there is considerable historic evidence indicating there was a large Hawaiian community at the site. He said the evidence includes accounts by George Vancouver, the British explorer, and the existence of ancient fishpond sites and heiaus in the area.

The designs were buried under nearly six feet of sand before the storms uncovered them, he said. The sand has protected the petroglyphs from erosion over the years. Petroglyphs about 100 feet away were not covered by sand and have suffered some erosion.

Many of the words and letters discovered at the site are inverted, Kikuchi said, appearing as though someone were experimenting or just learning how to write. There was an old school in the area some years ago, he said.

Petroglyphs often are found in areas where the ancient Hawaiians rested or camped while making a journey—sort of like graffiti, he said. Ancient petroglyphs are often found with more modern designs and words carved around them, he said, indicating that people through the centuries chose the same spot to make their designs.

THE NEW FIND was sighted by persons walking the beach after the storm.

When first told of the discovery, Kikuchi said, he thought it was a site reportedly found in 1898, one he has searched for without success.

The new field is some three miles away from the 1898 site, he said, adding that for years there were rumors of petroglyphs there.

The archaeology club of the community college was planning a survey of the area when the storm hit, and will search for the 1898 site this weekend, he said.

POIPU FIND—The star design in Hawaiian petroglyphs uncovered at Poipu, Kauai, probably was done after the arrival of Christian missionaries but other sandstone drawings at the site appear to be prehistoric, William Kikuchi, archaeology professor says.

TRACES OF HISTORY—Kauai residents show petroglyphs carved in sandstone, uncovered by surf at Maha'ulepu Beach as a result of last week's storm. —Star-Bulletin Photos by Robert Pickard.

"Children of the Rainbow" work to keep the petroglyphs uncovered as the ocean begins to return the sand.

Advertiser photo by Jan Tenbruggencate

KAUA'I

Nickname: The Garden Isle
Land Area: 548.7 square miles
33 miles long; 25 miles wide
Fourth largest island in the Hawaiian chain
Mayor: Tony T. Kunimura
Population: 38, 856 (Source: Dept. of Planning/ Economic Development, Oct., 1982)

Storm uncovers petroglyphs. . .

By JAN TenBRUGGENCATE
Advertiser Kauai Bureau

MAHAULEPU, Kauai — Winter storm surf has uncovered a previously unknown petroglyph field in Kauai's Mahaulepu area, and one archaeologist said it represents a major find.

A small group of Hawaiian men has taken up residence at the shoreline site and claims the figures carved into a sandstone ledge have biblical significance.

Kauai Community College archaeologist Dr. William Kikuchi said that while some of the figures are clearly from after the time of European visits to Hawaii, many of them probably date to before Captain Cook.

"Some of the motifs look quite prehistoric," Kikuchi said.

He said the college's Anthropology Club, of which he is adviser, plans to make a study of the site as soon as possible.

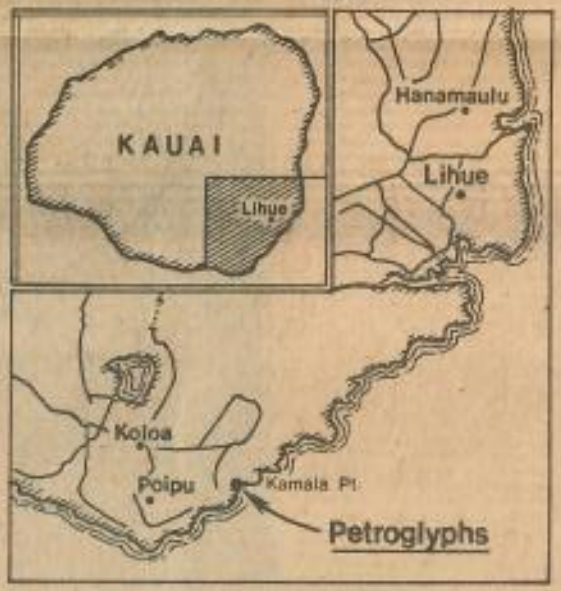
The petroglyphs are on two sandstone ledges in a bay southwest of Kamala Point in the Mahaulepu area. Although old-timers recall having seen one or two petroglyphs there on occasion, most of the field has been covered by sand for at least 30 years, sources said.

A pair of 30-year-old coconut palms growing on top of the field were undercut and knocked down by storm surf.

The field is not mentioned in the Bishop Museum publication, Bennett's "Archaeology of Kauai," which does mention a number of petroglyphs at Keoneloa Beach, a few bays to the southwest of the new site.

The field includes many human figures. Most have triangular torsos, with stick arms and legs and small round heads without facial features. One figure holds a smaller human figure in its hand.

Other figures include a turtle shape, a Polynesian crab's-claw sail design, several animals, at least two bird figures that appear to be chickens and a number of geometric figures.



There is a five-pointed star, which Kikuchi says is almost certainly post-contact, since the star was not a regular Hawaiian figure. There is another geometric figure that Kikuchi said looks something like a diagram of the Russian Fort Elisabeth at the mouth of the Waimea River. That fort was built about 1820.

Kikuchi said he was particularly interested in figures that appear to be Hawaiian cloaks.

The Mahaulepu area in historic Hawaiian times was a residential area. Today, aside from a single house directly behind the petroglyph site, the area is used for beach activities and sugar cane production.

Several local men have appointed themselves guardians of the site. Their spokesman, Ed Kaiwi of Anahola, said he found the petroglyphs with Hawaiian songwriter Liko Martin with the help of a guiding rainbow.

Kaiwi, who said he is descended from Hawaiian chiefs, called the group the "Children of the Rainbow."

Kaiwi said he sees "the story of the Bible" in the petroglyphs, and for much of the past few days, he has interpreted the figures for people who have come to the site after hearing of the find.

The petroglyphs show a number of biblical figures, prove the relation of Hawaiians with biblical tribes and warn of a coming famine, he said.

Kaiwi and his associates yesterday were faced with a problem, as the ocean began returning the sand it had taken from the beach. They began building a rock wall on the reef to try to keep them uncovered. Kaiwi said he hoped to have children's groups come to learn from the site, which he considers sacred.

State land department officials, who have control of activity along the shore in conservation zones, were to inspect the site yesterday afternoon.

Representatives of the owner of surrounding land, Grove Farm Co., and the firm that leases the sugar lands, McBryde Sugar Co., indicated they are concerned that people interested in the site are trespassing, but haven't decided how to react.

The Advertiser reviewed a number of maps to determine the name of the beach, but most showed no name nearer than Kamala Point. One 1916 chart indicates a place name near the mouth of the stream just down the beach from the petroglyphs as Puuleoleo.

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Back row: Don Heacock, Toni Sanchez, George Balazs. Front row: Patrick Graham and Monet Sanchez. Photo by Mariana Graham.

HAWAIIAN GREEN SEA TURTLES

by Toni Sanchez

Sunday, July 1st, on the beach in front of housing, Harry Hartwell and Chico and Toni Sanchez were enjoying a bonfire. Theresa Hartwell, Monet Sanchez and Bobby Thorne were out chasing sand crabs when they found eggs that had washed up on the beach. Being inquisitive, they investigated and found that instead of a sea serpent, they'd found it to be a turtle egg. Between late Sunday night and early Monday, we ended up with 64 good eggs and 5 hatchlings.

As crabs and birds are a natural predators to the eggs, it was a good thing that the eggs were brought home for safe keeping. Early Monday, more empty shells were found on the beach and lots of crabs around. This has been a very interesting as well as informative event and we've learned a lot about the Hawaiian Green Sea Turtles. I'd like to summarize some important points.

What to do when you find the eggs:

1. Place the eggs in a container (box, bucket, etc.) filled with about 2 inches of clean damp beach sand. Have the eggs touching each other, then cover them with more sand to about 3-4 inches. This basically simulates the natural nest.

2. Call 245-4444 here on Kauai, The Department of Land and Resources, Aquatic Division. Don Heacock was very helpful with the necessary information and also came out to take the eggs to care for them.

There are a few people I'd like to acknowledge at this time for their help and concern. Monet Sanchez (11) and Theresa (10) who helped collect the eggs. Chico Sanchez for caring and the only one in the group with any knowledge of turtles. CMDR Freas and his wife Ann for their help. Laura Hartwell for helping with the eggs and hatchlings-and to all the children and adults who have helped in searching for more eggs. You've all done a wonderful part toward protecting the Hawaiian Green Sea Turtles.

FYI NAVAL AND MARITIME

PHOTO CONTEST ANNOUNCED

Annapolis, MD-The 23rd Annual Naval and Maritime Photo Contest has been announced by its sponsor, the United States Naval Institute.

Awards of $100 each will be given to the top ten photographs selected by the Naval Institute as prize winners.

The winning photos will be published in a 1985 issue of the Naval Institute's monthly magazine, Proceedings, and will be displayed at the Naval Institute's 1985 annual meeting.

The contest deadline is 31 December 1984. Entries must pertain to naval or maritime subjects, but need not have been taken in 1984.

Entries must be either black and white prints, color prints, or color transparencies. Anyone is eligible to enter.

Additional information and contest rules may be obtained by contacting: Membership Department, U.S. Naval Institute, Annapolis, Maryland 21402, or calling (301) 268-6110.

The United States Naval Institute, located in Annapolis, MD, is an independent, self-supporting, non-profit organization. The Naval Institute is not a part of the U. S. Government.

USNI advances knowledge about the naval and maritime services through the publication of a monthly magazine, Proceedings; the annual Naval Review, and more than 250 books.

The Institute's membership includes more than 87,000 individuals from all walks of military and civilian life throughout the world.

AWARDS

ATCS Gandolfo receives award for "Outstanding Job Done" for NEX. AZ2 Capili and ET2 Cracraft flocked to 1st Class. AMS3 Prunk flocked to 2nd Class. Photo by PH2 McIntosh.

SH1 Alex Escasa Re-enlistment at NEX

PMRF members give their all for Navy Relief. L-R are: CDR Freas, AZ2 Nance, YN3 Liles, AT2 McCall, AOAN Nash and BMCS Howard. Photo by PH2 McIntosh.

IN FOCUS

Hawaiian Green Sea Turtles that were released on July 10th. Monet Sanchez in right photo. Photos by Mariana Graham.

Story on page 6

PACIFIC MISSILE RANGE FACILITY
HAWAIIAN AREA

MINI MISSILE

VOL. VI NO. 5 PMRF BARKING SANDS, HI. JULY 1984

RIMPAC'S OVER!

caption on page

Captain's Corner

By Captain Davivd Bennett

On Friday, 29 June, RIMPAC-84 was completed and from all accounts it was a very successful exercise. I couldn't be prouder of the way all of you pulled together to ensure PMRF did its part to guarantee that success. A hearty "Well Done" to all military, Civil Service, and Dyna personnel for a superb job in all respects.

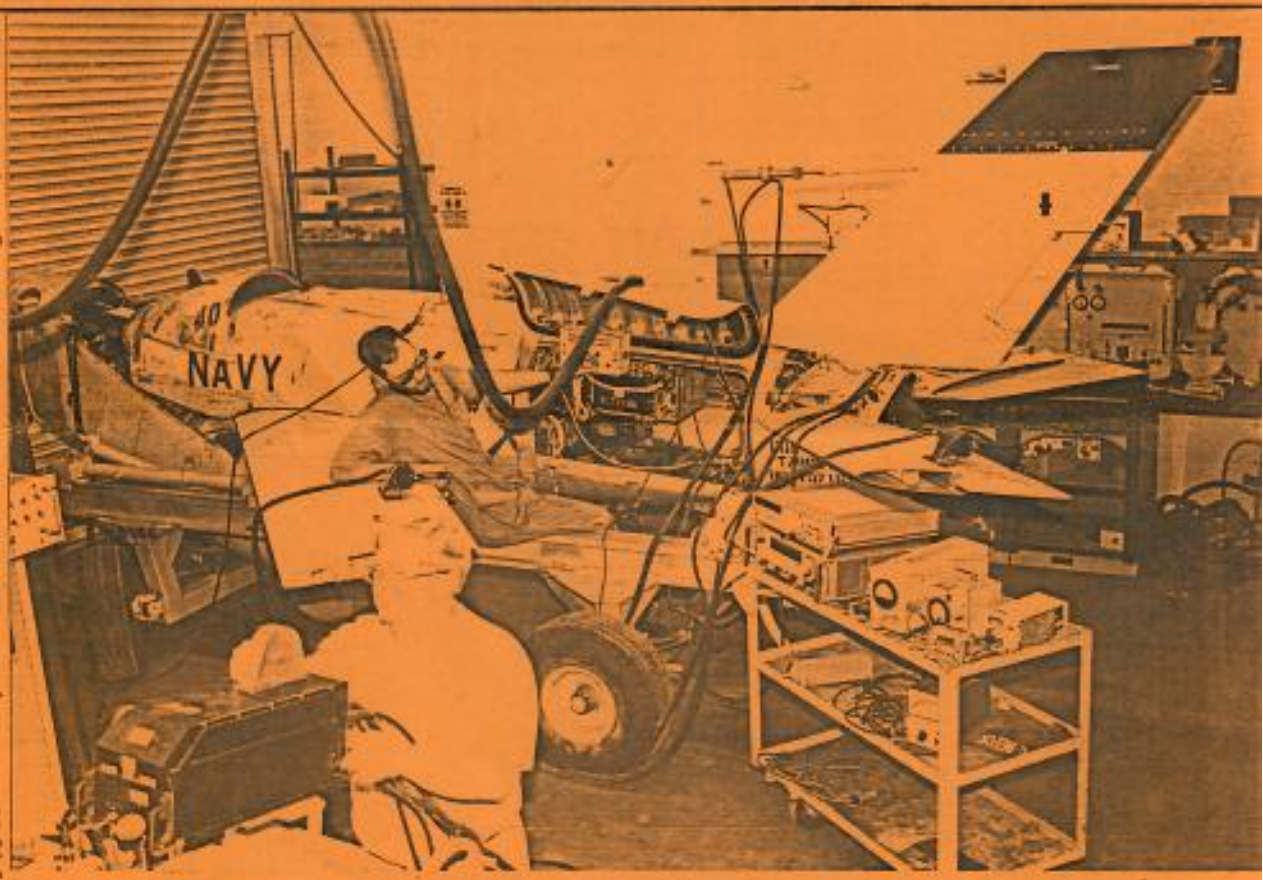
What's ahead in the next three months? Plenty of action with numerous Anti-submarine exercises, USMC missile shoots, mine laying exercises, etc. Pretty much a routine work-load for the rest of this fiscal year (ending 30 Sept.). After that we will be gearing up for a large BATTLE FORCE exercise to be held sometime during the Oct./Nov. time frame. That's going to be a real challenge for us, but fortunately will be of much shorter duration than RIMPAC.

Some random notes:

We signed a franchise with Kauai cable TV on Friday, 29 June. All of us in base housing and the UEPH owe a special thanks to Mr. Jim Taylor and Lt. Paul Sampson for their hard work and tough negotiating abilities. At one point Kauai Cable wanted to back out altogether, but Jim and Paul managed to convince them to accept the job. Best estimate to complete the installation is four months. Could take longer if the company experiences a delay in getting a FCC license to broadcast and/or unforseen problems in getting some electronic equipment from the mainland. We are taking every action to speed things up, but no promises for now.

In the "keep your fingers crossed" department: VADM BUSY, COMNAVAIRSYSCOM forwarded, with a strong endorsement, our request to CNO for authorization to lease a Beechcraft B200T Maritime Surveillance Aircraft. If CNO approves, we should see the aircraft around 10 Aug. 84. Should hear any day now. The B200T will significantly improve our mission readiness and range safety . It also will relieve some burden from maintenance as it will be contractor maintained, and we plan to go down to two ES2D's.

Until next time, keep up the outstanding work, stay safe, and take care of one another.



AT2 Compton and ATAN Henderson busy during RIMPAC. BQM-34 pictured. Photo by PH2 McIntosh.

Front Page captions

Top photo by PH2 McIntosh of JDS HATSUYUKI, DD122 a Japanese Destroyer firing an ASROC during RIMPAC 84.

Bottom photo by PH2 McIntosh of the T&C Bravo during RIMPAC ops.

By Lois Taylor
Star-Bulletin Writer

KILAUEA POINT, Kauai—Up in the airless tower of Kilauea Lighthouse, the temperature is more than 100 degrees. From the honeycomb glass turret is a spectacular view down the north coast to Princeville, southward into the still green valleys and everywhere else to the sea and the sky. A young redfooted booby who learned to fly two weeks ago lurches past the tower and settles uncertainly on a bush. Far away, two wedge-tailed shearwaters slide on an air current and look like a Sierra Club poster.

Kilauea Lighthouse on the northernmost point of the inhabited Hawaiian Islands was once the beacon that guided ships from the Far East past Kauai and into Honolulu. Today's sophisticated electronic equipment has made lighthouses obsolete as navigation aids and the 74-year-old lens that almost fills the top of the tower no longer flashes its two-second signal every 10 seconds.

"When it was installed," explained the park ranger, Dan Moriarty, "there was no ball-bearing technique to revolve it, so the lens and its frame were mounted on a cast-iron float chamber. That fit into a slightly larger chamber with a space of an eighth-inch around the bottom and the sides. In that space was 260 pounds of mercury that floated the lens. Pressurized kerosene lamps provided the light.

"The whole thing weighed four tons and was revolved by means of clockwork gears like a cuckoo clock. The lighthouse keeper had to pull the weights every three-and-a-half hours. Then when it was discovered that mercury was dangerous, various motorized systems were tried, but none of them worked for very long."

So in 1956, the Coast Guard installed on the seaward wall of the tower a quartz iodine lamp which is 10 times more brilliant than the beautiful old French-made lens, if not as picturesque.

In 1974, the light was automated, and it was no longer necessary for the lighthouse keepers and their families to live on the property. Four years later, the U.S. Fish and Wildlife Service took over, installed Moriarty and his family in one of the cottages and declared the property part of the National Wildlife Refuge System.

Moriarty, who had previously run the apprentice program for Pacific Tropical Botanical Garden at Lawai and had been on the faculty of the University of Hawaii, was concerned that this beautiful and historic spot was pretty much the private preserve of the small staff and their families.

About 20 people a day noticed the road marker on the round-the-island highway above Kilauea and drove down to see the lighthouse. They were awed by the beauty of the place, but had no idea of its history. "We are part of the Department of the Interior, just like the National Park Service, but the Fish and Wildlife Service is pretty much the poor relation," Moriarty said.

Guides, a visitors center, a gift shop, public bathrooms and all the other refinements of

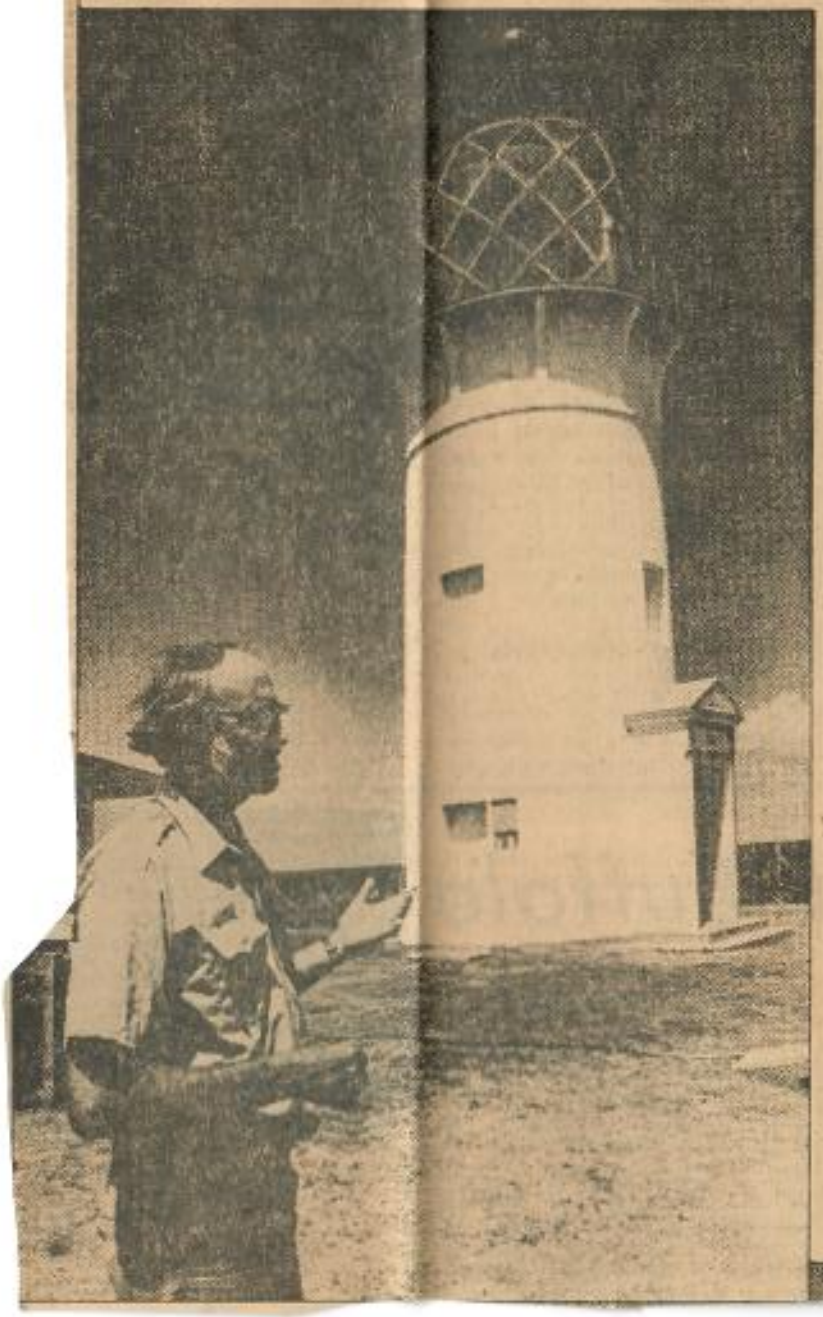
Kilauea Point park ranger Dan Moriarty gives a tour of the lighthouse area. That's the tower itself, Kilauea Point and a shearwater chick cupped in Moriarty's hands. —Star-Bulletin photos by Ken Sakamoto.

average national park were clearly beyond the budget of Kilauea Point. But, thought Moriarty, what if you could get some of this for nothing?

A year ago Barbara Steenhof of Hanalei found an injured Hawaiian gallinule—an endangered native bird—at the side of the road, called Moriarty's office and asked if someone could pick it up. Moriarty's wife Linda met Steenhof, took delivery of the bird and brought it back to Kilauea. The bird died, but an idea was born.

The two women became friends and Steenhof, who had been a docent at the Denver Zoo before moving with her husband to Kauai, suggested a support program for the lighthouse and bird sanctuary. That was the beginning of the Ki-

The Old Lighthouse



Star-Bulletin
Today
Honolulu
Friday, August 24, 1984

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Volunteer Phyllis Davis manages the Point's bookshop.

sociation. The first docent training program was given early this year to 55 volunteers, many of whom are Princeville residents "who don't want to play golf all day every day," Steenhof said.

Kilauea Point still doesn't have public bathrooms, but it does have guides, a visitors center and a gift shop—all provided by the association. Moriarty conducted the course and since only two of the three lighthouse keepers' houses are occupied, the third was converted into the shop and information center. Now an average of 1,000 visitors a day enjoy the area.

The principal attraction is the variety of seabirds that nest in the sanctuary. "Kauai has no mongooses, so we have a very healthy bird population, unlike Oahu," Moriarty said. "Kilauea is the best single spot in the state to see seabirds."

The current pride is the number of shearwater chicks—377 of them hatched this year—that live in little holes in the ground and look like feathered baseballs. "The shearwaters, because of their nesting habits, are menaced by mongooses, dogs and cats and are mostly extinct on Oahu except for the offshore islands," he said. "The adults take a couple of months to dig the holes with their beaks and flippered feet. They are pelagic birds, living on the open sea, with no reason to return to land except to nest—they can't lay an egg in the middle of the ocean."

Moriarty reached into a hole about the size of a tennis ball can and pulled out one of the shearwater chicks while 20 cameras clicked. "This is the most photographed bird we've got," he said. "He seems to like it." Now that the Olympics are over, Fuji Film could do worse than be the official film of Kilauea Point. Amateur photographers can aim a camera in any direction and the result will be memorable. Even upward, where the goofy young boobies were careening around the sky, having mastered the art of takeoff but flunking flying and landing.

Kilauea Point is open, free to the public, between noon and 4 p.m. Sunday through Friday. The interior of the lighthouse is closed to visitors because of the danger of falling on the stairway into the tower, but the area is still a three-star attraction.

"Nature is always changing," Moriarty said. "In the winter, you can watch the whales. In the spring, the shearwaters build their nests. Now we have the chicks, and in the fall we're hoping that the gooney birds will come in to nest. But a lot of people come just to see the lighthouse. There aren't many of them left either."

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A-3

Niihau's cliffs, left, will soon sprout a radar station to aid operations of the Pacific Missile Range Facility at Barking Sands, 20 miles across the channel on Kauai. The radar site will operate with another facility to be built on Makaha Ridge on Kauai.

Advertiser photo by Ron Jett

Navy plans unstaffed radar unit on Niihau

LIHUE — The Navy will install a remote-controlled surveillance radar facility on the island of Niihau under an agreement between Niihau Ranch and the Pacific Missile Range Facility.

The small, unmanned facility is to be built before the end of 1985 under a $6 million Navy contract that also includes construction of a surveillance radar station, along with associated electronic equipment, on Kauai's Makaha Ridge.

James Taylor, a civilian who is contract administrator for the Navy at the missile range, said the project involves a radar dome atop a small building that would house its electronic equipment. There would be two diesel generators, and Niihau Ranch will supply the facility with diesel fuel via a road to be built by the ranch, he said.

The radar will be used to sweep the waters and air around the Pacific Missile Range Facility to be sure civilian and unauthorized military boats and aircraft don't enter the range during maneuvers or equipment testing, he said.

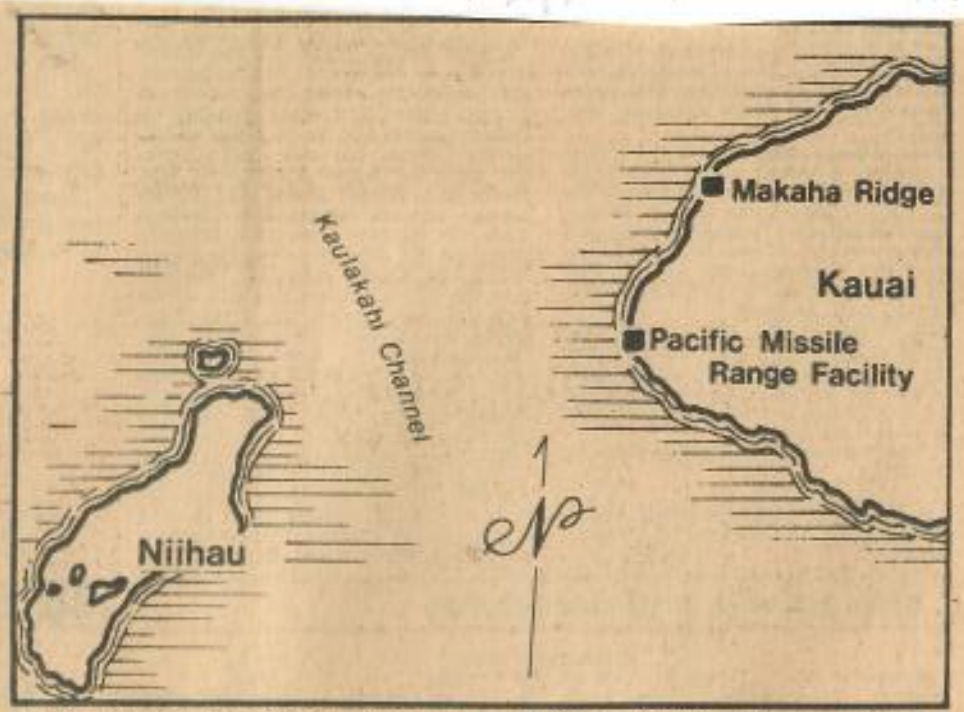
"This was the only location available for better coverage of the range. It will be used for clearing the range," he said.

Under the agreement, the Navy only has permission to reach the site by landing personnel by helicopter directly at the site, he said. Niihau Ranch is expected to help deliver some construction materials, but most sensitive equipment would be brought to the site by helicopter, he said.

Any non-Niihau residents working at the site would arrive by helicopter daily and would leave again by helicopter, he said.

Taylor said an environmental assessment of the site three years ago showed no signs of early Hawaiian habitation or use of the two-acre area, and no environmental danger posed by the project.

The radar unit will be on a cliff area overlooking the ocean. It is a windswept, rocky spot largely covered by dead kiawe brush, he said.



Niihau Ranch, in a separate agreement that was negotiated about the same time, acquired a lease to an elderly 79-foot Navy workboat to be used in ranch operations, but which will also be used to haul diesel fuel to Niihau for the radar site, Taylor said.

Navy Will Put Radar on Niihau

LIHUE, Kauai — The Navy plans to put a remote-control radar on Niihau to increase the surveillance capability of a tracking system at the Pacific Missile Range Facility at Barking Sands.

Along with the surveillance radar, the Navy will put a "small, unmanned building," other electronic equipment and a generator on two acres located on the southwestern side of Niihau, PMRF contract administrator Jim Taylor said yesterday.

The Navy will lease the property from Niihau Ranch, the caretakers of the Island, under an agreement signed in June, Taylor said.

Niihau, which is owned by the Robinson family, is located some 17 miles southwest of Kauai.

Taylor said the radar will help to reduce "blind spots" along the western coastline of Niihau and the Na Pali Coast and help the Navy track military and commercial ships that are found in waters and in the air off the missile range facility during military operations.

Currently, aircraft are used for "visual surveillances" during such military exercises.

THE NEW RADAR is part of a $5 million federal project that includes the placement of another surveillance radar on Makaha Ridge on the Na Pali Coast and improvement of tracking equipment at the missile range facility, Taylor said.

Taylor said the Navy has been interested in putting the radar at an offshore site for the past 10 years and began negotiating the lease with Niihau Ranch four years ago.

Under the $3-a-year lease, which runs for 15 years, the Navy will not be allowed to make beach landings but will be allowed to make helicopter landings.

In a separate 15-year lease also signed in June, Niihau Ranch acquired the use of a Navy LCM-8, a tow boat, to haul Niihau residents, of which there are about 170, livestock, equipment and supplies between Niihau and Kauai.

Denver-Isle Link

United Airlines today announced it will start a new nonstop daily service between Denver, Colo., and Honolulu on Dec. 13. The service will use United's widebody DC-10 aircraft.

Also on Dec. 13, United will launch a new one-stop service linking Denver with Maui through a stop in San Francisco. The aircraft on that run will be the narrowbody DC-8-71.

Oil spill's effect on marine life still under study

By Fred von Wiegen
Special to The Advertiser

LIHUE — The exposed windward points of Kauai's eastern shoreline appear to have borne the brunt of last month's oil spill but, a marine biologist said yesterday, it will take considerable research to determine the oil's impact on the near-shore marine environment.

Don Heacock, Kauai District marine biologist, said his surveys indicate that an area scientifically referred to as the upper intertidal zone was most affected by the oil spill, which originated from a leaky pipeline off Barbers Point on Oahu.

"Many different kinds of organisms live in our rocky intertidal areas because there's numerous niches and places for them to inhabit. It's a very stable environment for these organisms," Heacock said.

But the oil that began washing up here May 11 has contaminated sections of these coastal areas from Kapaa to Kipu Kai, he said. "It is clear that the habitat has been altered by the oil spill."

Evidence of the oil's encroachment on the delicate ecosystems that thrive on Kauai's shoreline can be seen in the dramatic die-off of two types of seaweed, Heacock said.

Several varieties of marine snails also were coated with oil, according to Heacock, but he said he has found no evidence that the oil is killing off the blackfoot opihi (the one favored by local appetites).

The question of the potential harm to humans who consume marine snails, such as opihi, is undetermined, Heacock said. "I have collected samples of edible opihi to see if there are petroleum hydrocarbon deposits and whether there is a threat to people who consume them," Heacock said.

Chevron estimated about 200 gallons of oil reached Kauai, or about 15 percent of the oil that leaked from the offshore pipeline.

Underwater surveys of sub-tidal areas have, so far, disclosed no evidence of coral being adversely affected by the oil spill, Heacock said.

He said the pollution will be washed out to sea by natural wave action.

Friday, June 1, 1984 The Honolulu Advertiser

Dive with the best.

Photo by Mark Reed

We are professional divers dedicated to bringing you the finest diving experience available in Kauai waters. First time out, or accomplished certified diver, we will guide you safely to our most beautiful underwater sights. We offer PADI certification courses, snorkeling tours, and fully-customized advanced expeditions as well. For the best, call 822-9422.

Sportdiving Kauai inc.

849

6-4-82

LINDA MATSUDA

Kauai 335-3552

Sees turtles
"kaumakani"
Directly down from Oteki
mill

NOV, 18 1984 KAUAI'S GARDEN ISLAND

IT WAS A BIG ONE, but Yasuo Moribe found out it was a turtle, which broke free yesterday at Wailua. (Photo by Bill Sollner)

★ Crowd ★

(Continued from Page 1)

sign of despair. Everyone figures he'll be back on the beach soon, trying to beat his own world

Fisherman catches crowd, turtle swims free

by Bill Sollner

A green sea turtle on the long end of a 30-pound-test fishing line was responsible for a massive traffic jam and packing of the beach opposite Coco Palms from about 10 a.m. until 11:35 a.m. Friday morning.

YASUO MORIBE hooked into another big one at Wailua Bay, Friday drawing a huge crowd. This time it was a green sea turtle.

On the other end of the line, clutching a bamboo pole for dear life and reeling in the monofilament whenever the "catch" gave him a chance, was Yasuo Moribe of Wailua Homesteads.

The diminutive angler is a regular at Wailua Beach, and about a year ago he caught a record-setting ulua at the same location.

Crowds of local residents and visitors were attracted as the battle of man vs. sea monster dragged on. At one time there appeared to be 300 or 400 people standing by expectantly, hopefully, as Moribe pulled and hauled at his cane pole.

The pole was frequently bent 90 degrees, and from time to time Moribe welcomed the aid of Tony Basuel and Albert Kano, also regular fishermen at Wailua Beach.

The 30-pound-test line was spliced at several points where other ones that got away had broken it, but the line held for over an hour-and-a-half. By that time, the "catch" was close enough in to shore that bystanders and kibitzers could identify it when it rose, from time to time, to the surface.

Finally, perhaps sensing the line was weak and using the ocean floor for traction, the creature broke loose.

There was a sigh of disappointment from the crowd, and people started hopping across the hot sand for their cars which had been left parked on both sides of the highway fronting Coco Palms.

The show was over.

Anxious police officers superintended the startup of traffic.

Yasuo Moribe reeled in the slack line remaining, but there was no

(Please turn to Page 3)

CONFUCIANISM
To be in one's own heart in kindly sympathy with all things; this is the nature of righteousness.

ISLAMIC
Wherever you go, wherever you rest, may the peace of Good Allah keep you blest.

JUDAISM
What doth the Lord require of thee but to do justly and love mercy, and walk humbly with thy God?

HINDUISM
As one may ascend to the housetop by ladder, rope, or bamboo, so there are many ways to reach God.

BUDDHISM
Hatred does not cease by hatred, but only by love. This is an old rule.

CHRISTIANITY
All things whatsoever ye would that men should do unto you, do ye even so unto them.

Dear George,
Everything is going very well over here and we're seeing lots of turtles on the Na Pali and in Hanalei Bay. Call if you're ever back on Kauai!

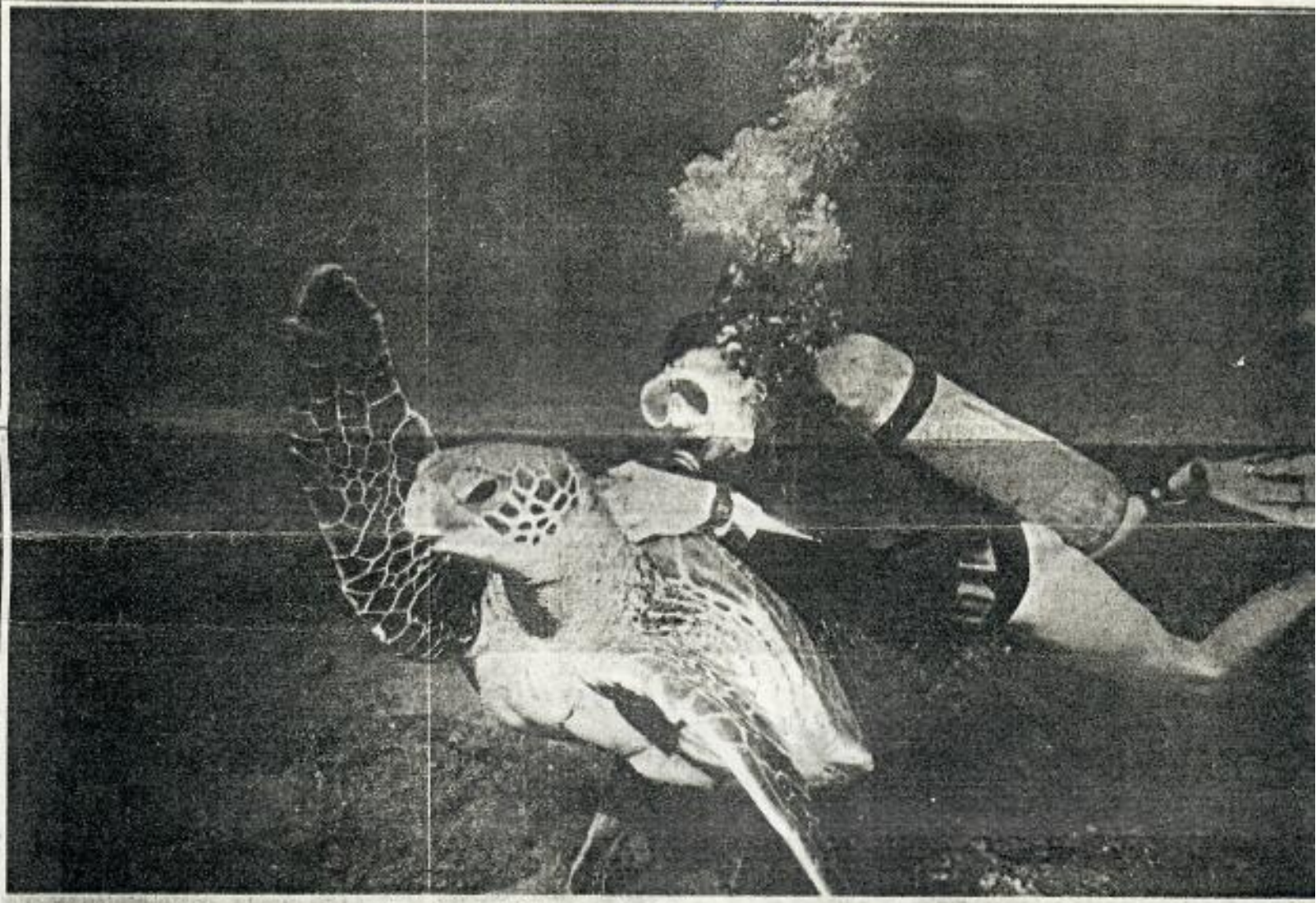
May all the seasons of your life be filled with Peace and Love

LADY ANN CHARTERS
DON and ANN MOSES
Don and Ann

Box 3422, Lihue, Kauai, Hawaii 96766

A wish for all mankind... PEACE

The Garden Island 8 Jan 1985



Turtle's treat

EIGHTY-FEET DOWN, Margy Parker, executive director of the Po'ipu Beach Resort Association, takes a ride on a turtle near Palama's buoy off Po'ipu Beach. The encounter happened on her first boat dive with Fathom Five Divers of Koloa while Parker was taking a certification class during the Christmas holidays. (Photo by Terry O'Halloran)

9 Jan '85

George -

I thought you would be interested in this photo of grn turtle taken by Terry O'! There was no story just the pic. on the front page! Please pass the pic and article on dolfins to those concerned. (Nitta Naughton, J.D. Consigliere)

(Happy New Year George!)

been reached between Hawaiian Dredging and the striking Hawai'i carpenters' union. The company has resigned from the state association that is handling negotiations between the strikers and the contractors.

The Hilton hotel at Nukoli'i, the Resort Association executive director Margy Parker said Friday morning.

Parker said the association received more good news recently when Mayor Tony Kunimura made a surprise appearance at their Wednesday meeting to announce

The Kaua'i Sheraton's ocean-front wings are being reconstructed by workers from Sakamoto S&M in Honolulu. Officials there said some subcontractors have been working all along, although some have been honoring picket lines. They had no

not returned to the project.

The return of the sub-contractors may indicate that there is hope for a quick settlement in the 16-week old strike. Some contractors have complained that Hawaiian Dredging's move puts the owners

(Please turn to page 9)

Holtwick resigns from Senior Centers

by Bill Sollner

Elsa Holtwick, Executive Director of Kaua'i Senior Centers, Inc. for 17 years, has resigned.

KSC Board of Directors accepted her resignation at a Wailua Marina meeting Wednesday. It was dated Dec. 28 and included a request that the resignation become effective Feb. 15 or sooner. Holtwick also offered to serve as an unpaid consultant until the Board chooses a new director.

Although the action has been brewing for some time, board members indicated unhappiness that it finally came through. Said KSC president Bud Carter: "I'm sorry that it has come to this."

Her letter of resignation indicates a certain degree of tension between KSC and the County Office of Elderly Affairs. It reads as follows: "OEA continues to make new demands on our staff without the courtesy of discussion. The latest sweeping change is in a method of determining the KSC, Inc. 'cost per unit of service.' As near as our staff can determine, this figure was reached by arbitrarily selecting specific classes at certain centers, determining the number of class sessions these represented in the past year, and dividing this figure into the total of $86,834 of government funds in the contract, to reach a KSC cost per

(Please turn to page 9)

Hazardous waste hearing postponed

by Bill Sollner

A public hearing on hazardous waste disposal from Barking Sands has been postponed indefinitely, according to Vicki Tsuhako of the Environmental Protection Agency office in Honolulu.

THE HEARING, set for January 30 at Lihu'e Library Conference Room, was to deal with the storage and transport of approximately 110,000 tons per year of cyanide-containing waste created by spent fuel used to operate torpedoes at the Pacific Missle Range Facility.

The waste is flushed out of torpedoes after they are recovered. The Navy has asked permission to continue storing it in fiberglass tanks in a bermed, concrete area on base. Three or four times a year flatbed trucks haul it to Nawiliwili where it is loaded on barges and shipped to Unitek Environmental Services, a hazardous waste disposal firm on O'ahu. They in turn ship it to a storage facility on the Mainland.

ON NOVEMBER 9, President Reagan signed a Resource Conservation and Recovery Act which changed the situation. According to Ms. Tsuhako, the permit under which Barking Sands operates its hazardous waste storage and transportation program is being revised and amended under the new law. Then it will have to be interpreted by the Environmental Protection Agency, and new regulations generated to comply

(Please turn to page 9)

'Guardian' upset with turtle encounter

by Julia Neal

Robert Macknowski, president of the Kaua'i Guardians Hawai'i, an organization he says he formed for environmental education and research, is upset about turtle-riding off Po'ipu, shown in a photo on the front page of Tuesday's Garden Island newspaper.

Macknowski, who incorporated the organization in March of 1984, told The Garden Island that he wants to see that charges are pressed against Margy Parker, who was shown holding onto the shell of the turtle, and Terry O'Halloran, who took the photo and owns Fathom Five Professional Divers.

Macknowski said the two could be charged and fined under the federal Endangered Species Act, which prohibits harassing, harming, pursuing, hunting, shooting, wounding, killing, trapping, capturing, or collecting endangered animals.

Federal officials, however, said they have so many reported incidents of people actually slaughtering turtles that their first priority is pressing charges against turtles being killed.

Gene Nitta of the U. S. Fish & Wildlife Service said turtle-riding is illegal and that he plans to contact O'Halloran to review the law with him.

O'Halloran said his dive shop encourages marine conservation and does not encourage divers to pursue turtles. He said riding

(Please turn to page 9)

The Garden Island 11 Jan. 1985

★ Turtle encounter ★

(Continued from Page 1)

turtles is not an activity on his boat dives.

O'Halloran said he has a permit to tag turtles, which involves touching them. He said he and Parker, on a dive by themselves, found the friendly turtle and that the turtle continued to swim with them after they touched it.

Macknowski claims riding turtles constitutes harassing turtles and said the pair could be fined up to $10,000 each if it can be proven they knew their actions were illegal or $500 each if they were ignorant of the law.

He said if the two are charged they will be allowed a hearing to defend themselves.

If the federal government fails to press charges, he said, he plans to file a suit in the local courts, with his organization representing the turtles, asking the judge to order O'Halloran and Parker to refrain from riding them.

Macknowski said his organization plans to monitor Kaua'i's coastline and wants to work with the Coast Guard, U.S. Fish & Wildlife Service and state Harbors Division to ensure that boaters and divers are refraining from harassing turtles, other endangered species, and marine mammals.

Under the federal Marine Mammal Protection Act, those who knowingly harass such animals as dolphins and whales can be fined up to $20,000 and ordered to jail for a year. The fine for ignorance of the law is up to $10,000.

Those with commercial boats who knowingly violate the Marine Mammals act can be charged up to $25,000 to retrieve their boats, which federal officials have the right to impound.

No body off Na Pali

by Georgia Mossman

A helicopter passenger on a scenic tour of Na Pali Coast Thursday was sure she saw a body floating face down in the ocean, but a search by fire rescue squad members in another chopper failed to turn up any sign of a body.

According to Fire Inspector Bill Enoka, visitor Heidi Galves, flying in an Island Helicopter about 100 feet above Na Pali, said she saw a body in the water off the Valley of Lost Tribes at 'Awa'awapuhi about 150 feet off shore. The pilot then turned around and searched the area. Nothing could be sighted but the woman insisted she was sure she had seen a body, so Hanalei fire station was called.

The rescue team went up in a Papillon chopper and spent about an hour of donated flying time searching the area from Kalalau almost to Polihale with no luck. They also landed on the beach at Kalalau to see if anyone was missing but all was fine there.

Koloa firemen were also called out at about 5 p.m. Thursday with a report of a wind surfer in distress off the Wai'ohai Hotel in Po'ipu. When they arrived they found the surfer had made it safely back to shore.

The Forum

Turtle flap 'picks nits, splits hairs

To the Forum:

I just read the article in Friday's Garden Island about the Turtle encounter. I wish to address Mr. Macknowski on the subject of prosecuting Margy Parker and Terry O'Halloron. I don't know any of the parties involved but it sounds to me as though you are making a mountain out of a molehill.

I think you are picking nits and splitting hairs. Though you may be technically correct, I don't think this "crime" is worth pursuing. I don't think this is the kind of publicity your organization needs. This isn't the case to use to make your example.

Catch someone in the act of killing a turtle or trying to shoot it from land and you will have my support, but to cause a lot of trouble to a couple of folks for having an interaction with another living thing with which we share the world seems petty, even if it is within the letter of the law.

To file a suit in the local courts because the federal government declines to prosecute makes it seem as if you think this is a major crime, and you won't rest until the "bad guys" are in jail. It doesn't seem to me that major; the folks didn't hurt the turtle or scare it into a panic.

I think you are more upset than the turtle. How can you claim to represent the turtle when you weren't even there? You don't KNOW the circumstances surrounding that picture. Don't be so quick to get on a high horse and accuse folks.

You'll get a lot more respect from me if you let this matter drop. I might even be able to forget that you brought it up in the first place.

Very sincerely,
Jurgen Sharp
Kapa'a

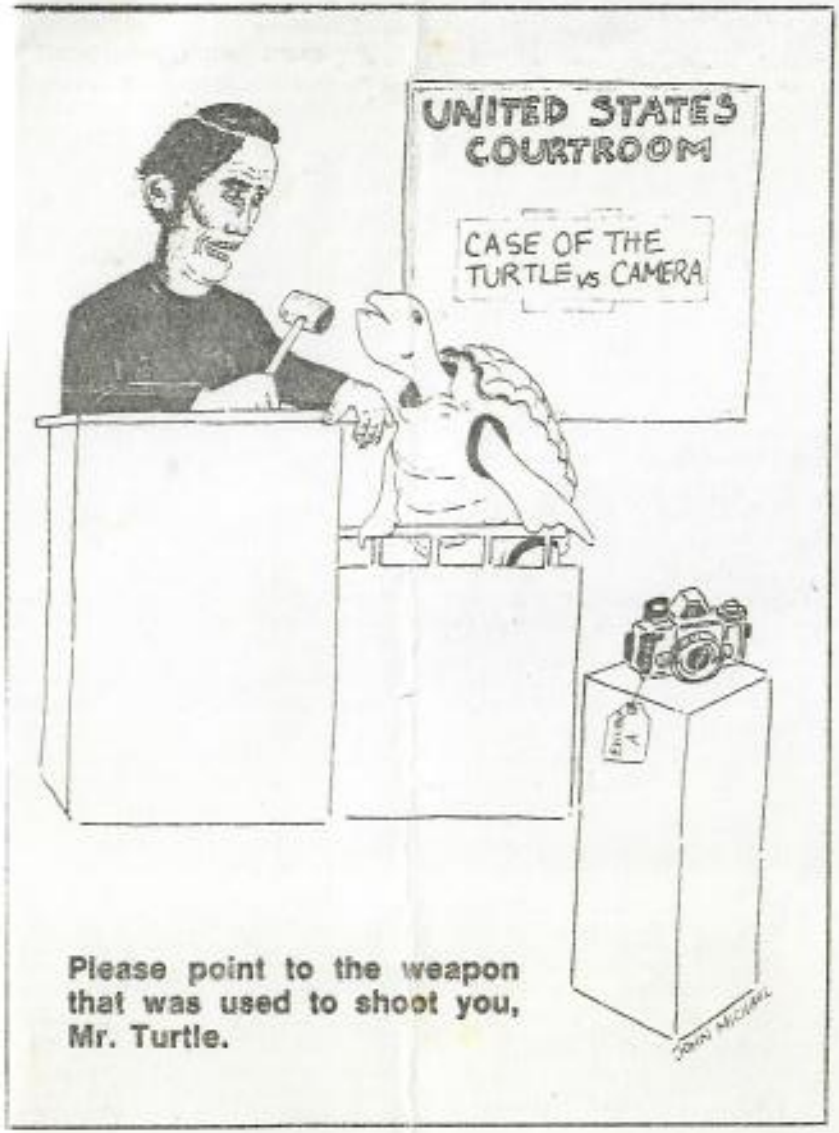
Learned about the endangered species

To the Forum:

With regard to the turtle riding incident published January 8 in The Garden Island, perhaps there can be some positive fallout. My wife Jean and I, as I'm sure Terry, Margy and Julia Neal, have learned something about the Endangered Species Act. When responsible members of a community unknowingly and unintentionally break a law, perhaps that law needs more vigorous publicity.

May we suggest a more positive approach for Mr. Robert Macknowski, President of the Kaua'i Guardians Hawai'i, to take in this matter. Take the time and effort you would spend in trying to prosecute Terry and Margy, and apply it instead to establishing a fund dedicated to publicizing the Endangered Species Act and why it exists. You have our pledge of $25 to get the fund rolling, should you do so. Certainly the negative approach of litigation you are now taking can only enrich the lawyers and not help the turtles.

Very truly yours,
Jack and Jean Barton,
Owners
South Shore Activities



Please point to the weapon that was used to shoot you, Mr. Turtle.

Turtles: Don't touch

To the Forum:

I had no idea the picture of Margy Parker playing with a sea turtle in last Tuesday's paper would have created the responses I have received. It appears that not only have I angered Robert Macknowski but perhaps the federal Endangered Species Act was being violated.

As owner of Fathom Five Divers I have been aware that this act protects turtles from being killed and I have always approved of this protection. Now the full intent of this law has developed a new meaning.

Not only should turtles not be killed, but it is potentially harmful even to touch them. After talking with local and federal officials regarding this I can see that if turtles are bothered in any way in their natural habitat they may be driven from areas they naturally select. This would be a shame as the turtles are relatively abundant on Kaua'i and I, for one, enjoy having them around.

I have always been concerned for marine animals and their conservation. As an individual diver, I believe it is best to enter the water as a visitor and disturb as little as possible. All my underwater hunting is done with a camera as I try to capture the beauty and grace of its creatures. I have never liked the first question usually asked of a diver exiting the water, "What did you get?"

At Fathom Five we have a policy that no live shells or other living animals are removed only to sit on someone's mantle.

I would like to make it clear that Margy Parker who is a new, enthusiastic diver had no idea she was in any way violating any laws or causing harm to this turtle. She also shares my concern and interest for these animals.

It was also reported that I have a scientific permit to tag turtles. This is true, but when the photo was taken it was Margy's first dive after certification and the objective was pure enjoyment. We were not engaged in any tagging procedures. This project has yet to be initiated on Kaua'i.

This whole issue brings to light the importance of understanding our marine conservation laws and the reasons behind them.

Sincerely,
Terry O'Halloron
Koloa

27 Jan '85 "The Garden Island"
KAUAI, HAWAII

Mahalo for concern for turtles

To the Forum:

Thank you all for your response and input concerning the 'Turtle Riding' promotional dive shop ad and violation of the extremely IMPORTANT AND VALID Endangered Species Act which was designed to halt and reverse the wanton, profit-motivated, destruction of our wildlife.

I am pleased that some of you can see this incident was not a protrayal of RESPECT for the Endangered Species Act, (the turtle being hunted in its own environment by a predator (human beings are predators) with a camera for a picture that suggests to thousands of others to break laws, and it's fun), but rather to endanger further an already endangered species and put them on the course to extinction.

The following is representative of my thoughts, and to some of you, will explain my actions and the purpose of Kaua'i Guardians Hawai'i regarding turtles, dolphins, whales, and humans.

Future generations have a right to an uncontaminated and undamaged Earth and to its enjoyment as the ground of human history, of culture, and of the social bonds that make each generation and individual a member of one human family. Each generation, sharing in the estate and heritage of the earth, has a duty as trustee for future generations to prevent irreversible and irreparable harm to life on earth and to human freedom and dignity.

It is, therefore, the paramount responsibility of each generation to maintain a constantly vigilant and prudential assessment of technological disturbances and modifications adversely affecting life on earth, the balance of nature, and the evolution of humanity in order to protect the rights of future generations.

All appropriate measures, including education, research, and legislation, shall be taken to guarantee these rights and to ensure that they not be sacrificed for present expediences and conveniences.

Governments, non-governmental organizations, and individuals are urged, therefore, to implement these principles imaginatively, as if in the very presence of those future generations whose rights we seek to establish and perpetuate.

So, I feel- if no action were taken in response to the turtle act, our children here on Kaua'i, would be able to look at the pictures of the sea turtles on the walls of the Kaua'i Museum. For they would not be in the ocean if we allow the intent and meaning of the Endangered Species Act to be discredited, like the attempts to discredit me and the positive action I made to reveal new meanings and light on the subject of love, life, and respect.

Robert Macknowski
Kaua'i Guardians Hawai'i

KAUAI GUARDIANS HAWAII
Environmental Education and Research

HUMPBACK WHALES
(Megaptera novaeangliae)

Notice of Interpretation of "Taking by Harassment"
in Regard to Humpback Whales in the Hawaiian Islands

ORGANIZATION: Kauai Guardians Hawaii
ACTION: Notice of Interpretation
AUTHORITY: Marine Mammal Protection Act of 1972, as amended, 16 U.S.C. 1361 et seq. and the Endangered Species Act of 1973, as amended, 16 U.S.C. 1531 et seq.

A. **Aircraft:** Approaching a humpback whale by flying lower than 1000 feet while within a horizontal distance of 300 yards from the humpback whale. "Flying" includes hovering, circling, or buzzing.

B. **Vessels, swimmers, and divers:**

1. In calving and breeding grounds - Approaching within 300 yards of a humpback whale, or herding or driving a humpback whale from any distance, in the following calving and breeding grounds:

   a. Lanai - all waters within two miles of the mean high water line from Kaena Point east by southeast, passing Halepalaoa Landing and Kikoa Point, to Kamaiki Point;

   b. Maui - all waters inshore from a line drawn from Hekili Point at Olowalu southeast to Puu Olai.

2. In all areas subject to this notice other than the calving and breeding grounds described above:

   a. Approaching within 100 yards of a humpback whale;

   b. Traveling faster than a humpback whale, or the slowest whale in a group of whales, while between 100 and 300 yards of the whale or whales;

   c. Multiple changes in vessel speed while between 100 and 300 yards of the whale;

   d. Separating a whale from a calf;

   e. Herding or driving whales.

C. Any other act or omission that substantially disrupts the normal behavioral pattern of a humpback whale is also presumed to constitute harassment. A substantial disruption of a normal behavioral pattern may be manifested by, among other actions on the part of the whale, a rapid change in direction or speed; escape tactics such as prolonged diving, underwater course changes, underwater exhalation, or evasive swimming patterns such as swimming away rapidly at the surface; stopping of breeding, nursing or feeding; attempts by a female or her escort to sheild a calf from a vessel or a human observer by tail swishing or by other movement to protect a calf; or the abandonment of a previously frequented area.

Robert Macknowski

P.O. Box 1421 • Hanalei, Kauai, HI 96714 • (808) 826-6735 /826-6995
NON-PROFIT

KAUAI GUARDIANS HAWAII
Environmental Education and Research

KAUAI GUARDIANS HAWAII POSITION PAPER

THE TUNA-DOLPHIN PROBLEM

Kauai Guardians Hawaii is opposed on ethical and humane grounds to all killing of cetaceans. In the last 20 years, six million dolphins have died in the tuna fisheries of the Eastern Tropical Pacific (ETP), which despite great progress and reduction of kill levels by more than ten-fold, remains one of the largest cetacean kills in the world. We are committed to obtaining a complete halt of this kill, and intend to undertake campaigns toward this goal.

The killing of dolphins by tuna fishermen is a relatively new problem. Until the early 1960's, tuna were caught by longliners and baitboats, methods which caused no dolphin mortality. In 1955, the invention of the Puretic power block gave fishermen a method of handling very long nets, and led to the development of the large capacity "purse seine" vessels. These vessels, with nets up to 3/4 of a mile long, were able to surround and capture entire schools of yellowfin tuna. In the ETP, these tuna would quite often travel under dolphins, and then the fishermen would set on a group of dolphins in order to capture the tuna under them. This became known as "fishing on porpoise". The dolphins would quite often become tangled in the net and drown.

The tuna/dolphin association which occurs in the ETP is not found anywhere else in the world. The large capacity purse seiners are more cost-effective than other methods, and have largely replaced them, although some longliners still fish in the ETP today.

From the mid-1960's to the present time, large seiners have dominated the ETP tuna fishery. This has led to several problems:

1. Dolphin mortality: This peaked in the early 1970's, but continues as a serious problem, with about 40,000 dolphin deaths annually. By contrast, the well-publicized slaughters of dolphins at Iki Island in Japan killed about 2,000 annually.

2. Depletion of tuna: Quotas and international regulation of the catch have collapsed, and there is presently no quota in effect on tuna in the ETP. The highly mechanized purse seiners are overfishing the ETP, and the catch of tuna has declined. In addition, the average length of yellowfin tuna caught and catch per unit effort have been dropping, signs of a fishery in trouble. Yellowfin stock in the ETP are being taken beyond their ability to replenish and support the existing fishing effort.

3. Overcapitalization: So profitable were the first of the purse seining vessels built that many more were immediately built, including many "super seiners" with a capacity in excess of 1,000 tons of tuna. There are now more vessels fishing in the ETP than are necessary to catch the amount of tuna now being taken. This causes great pressure on the resource, as these expensive vessels, many of which are presently operated at a loss, compete for what is left of the valuable tuna.

(continued on following page)

P.O. Box 1421 • Hanalei, Kauai, HI 96714 • (808) 826-6735 /826-6995
NON-PROFIT

4. Employment: The seiners are more highly mechanized than baitboats or longliners, using fewer crewpersons per ton of fish landed. Crew wages are much higher than those paid on baitboats or longliners, but only a fortunate few can become crewmen.

The ETP yellowfin fishery accounts for less than 10% of the world's supply of tuna, but is responsible for 100% of the tuna-related dolphin mortality.

The world picture of tuna fishing is quite different than that presented for the ETP. Less than 20% of the world's tuna is caught in the ETP; of this amount, approximately half of the tuna is yellowfin, which is the only species that is found to have an association with dolphins. Thus, over 90% of the tuna taken worldwide is captured without harm to dolphins.

The Kauai Guardians Hawaii position on the tuna-dolphin problem is that the practice of setting on dolphin should be phased out, beginning immediately. Fishing on yellowfin should be done by longliners, baitboats, or by seiners on "schools" of yellowfin that do not associate with dolphins. The phase-out of the practice of setting on dolphins will enable the stocks of yellowfin to recover from the present depleted status.

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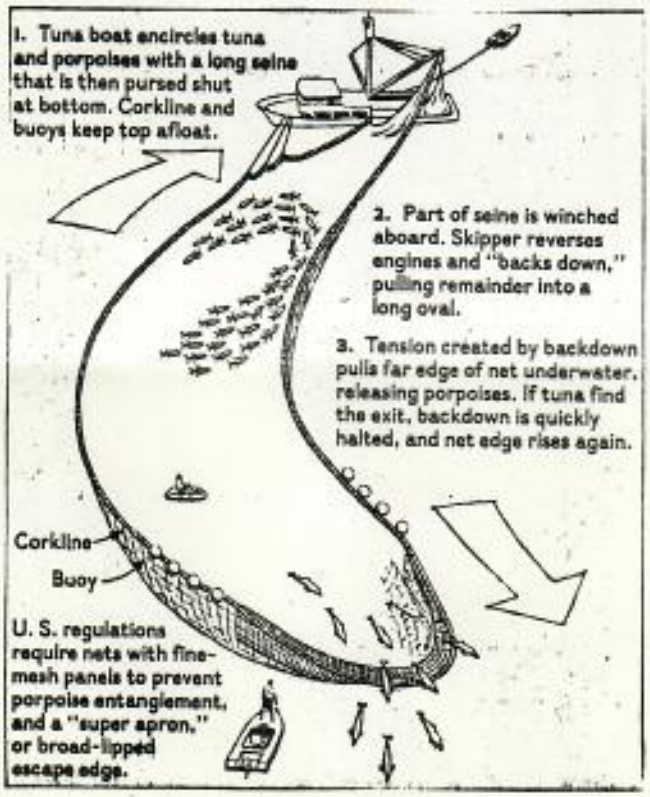

February 4, 1985 F/SWC2:GHB

Mr. Robert Macknowski
Kauai Guardians Hawaii
P. O. Box 1421
Hanalei, Kauai, HI 96714

Dear Mr. Macknowski:

Recently it was suggested to me by State aquatic biologist Donald Heacock on Kauai that you might appreciate receiving an array of scientific and educational literature on sea turtles. I am pleased to make the enclosed material available to you. If there is any way I can be of further assistance, please feel free to contact me.

Sincerely,

George H. Balazs
Wildlife Biologist

Enclosure

cc: Balazs
HL

3 photos in file

13 Feb. 1985

George - 7/30/84 Dead at Hanapepe

Finally got this roll of film developed with the pictures of the dead grn turtles. It measured 37 3/4 inches "overtheshell" and had been dead for a few days when these pics where taken (yuk it smelled awful!). I could have removed one of the front flippier if I knew that you needed them (for aging) at the time.

At first I noticed only the tumors on each eye and the tumor on the left side of the neck. When I pried open the mouth with a stick, however, I noticed a large (5-7cm diameter) tumor on the upper surface of the tongue near the back of the throat. Perhaps this tumor impaired the turtles ability to feed or/and breathe.

Feel free to keep these pictures if you can use them.

Aloha,

Don Heacock

TELETYPE ☐ TELEGRAM ☐ MAIL ☑

TO George Balazs AT NMFS

SUBJECT shark sighting DATE Jan 17, 1985 (of this note)

Dear George, Enclosed find the note which Dan Moriarty had pinned upon our Volunteers' board. I took it down, and have since made a trip to the mainland; so am sending you the info from here. My son's address is:

David F. Moore, M.D. P.O. Box 747 Kilauea, 96754. He was with Bill Stephenson P.O. Box, Kilauea, 96754, (Bill Will get it ok; I do not have his box # here.) Hope you get good sighting info.

Loved your talk; come back soon.

Mary Jane Moore

Volunteers, Fish & Wildlife - Kilauea.

cc Dan Moriarty

PLEASE REPLY TO → SIGNED

Rediform® 45 461

USE REVERSE SIDE FOR YOUR ANSWER

Inquiry Sent 1/21/85

Seven on Kauai Hospitalized After Eating Toxic Fish

By Lester Chang
Star-Bulletin Writer

LIHUE, Kauai — Seven members of two Kekaha families were treated for food poisoning after eating a fish Tuesday that contained a toxin, a state health official said yesterday.

Two brothers, identified as Rizalino Parbo, 68, and Julio Parbo, 43, were expected to be released today from Kauai Veterans Memorial Hospital.

Both men suffered symptoms that included low blood pressure, a slowed heart rate, nausea, headaches and vomiting, officials said.

Five others family members, who were not identified, also were treated at the hospital and released. Eight other family members also were affected by the food poisoning, but did not require hospitalization, according to Dr. Jeffry A. Smith, Kauai district health services administrator.

Smith said the two families bought a 60-pound kahala (Amberjack) caught in 200 feet of water off Barking Sands Sunday. They became sick after they cooked and ate the fish, including its internal organs which contained the highest concentration of the toxin, he said.

The fish is frequently associated with ciguatera poisoning in Hawaii, Smith said. Ciguatera is common among reef fish that eat algae containing microscopic organisms.

Smith said it is not possible to tell a contaminated fish by the way it looks or smells.

This was the first report of ciguatera poisoning on the Island this year, he said.

NEWS BRIEFS

1/16/85

GUARDING KAUAI'S UNDERSEA LIFE

Princeville's Robert Macknowski (right) is doing research on dolphins and other marine creatures in waters off Kauai, and wants charges pressed against a pair of Kauai people he claims violated the federal Endangered Species Act by riding a sea turtle. He also wants to see a marine sanctuary for dolphins off Kilauea.

GEORGE R. ARIYOSHI
GOVERNOR OF HAWAII

SUSUMU ONO, CHAIRMAN
BOARD OF LAND & NATURAL RESOURCES

EDGAR A. HAMASU
DEPUTY TO THE CHAIRMAN

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STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF AQUATIC RESOURCES
P.O. Box 1671
Lihue, Kauai 96766

Date: 7 March 1985

MEMEMORANDUM

TO: Mr. Gene Nitta, NMFS

FROM: Don Heacock, Aquatic Biologist - Kauai District

SUBJECT: Dead Green Sea Turtle Washed Ashore on Kauai

Dear Gene -

On Tuesday, 5 March 1985, I received a message (see attached note) that a sea turtle had washed ashore near Anahola (see attached map). When I arrived at the scene at 4:30 PM with Mr. David Onizuka (of our Ensenue Fish. Res. Center) the carapace of the turtle had been removed by someone.

I severed the front right flipper for Mr. George Balazs sea turtle aging project and will send it to him next week. I also severed the head in order to make, for educational purposes, a "skull mount" to demonstrate the morphological adaptation of sea turtles' jaws in removing coarse algae from rocks.

Sincere Aloha,
Don E. Heacock

Note: The ♀ turtle had a plastron that was 83.7cm (33.5 in.) T.L.

cc: George Balazs

7 March '85

George—
I spoke w/ Nobuko Takai this AM and she stated that the carapace was intact and in good condition when she saw the turtle at 10:30 AM. The ♀ turtle's plastral length was 83.7 cm (33.5 in.). No obvious signs of death were apparent.

3/5
10:25 am

Don:

A large turtle was reported found dead near the 2nd point on Aliamanu Road — (near Mr. Jenkins home) on Honolii side of cone

head smashed, but rest of body in good condition

reported by Mrs. Nobuko Takai
822-4579

Tom Telfer
Wildl. Biol.
DLNR — Kauai

= Boulder beach where dead sea turtle washed ashore on 5 March 1985.
(Taken from: "Kaua'i Coastal Resources Atlas", U.S. Army Corps Engineers, 1982).

Photograph 1–73: Section 4

0 100 200 300 400 500 600 700 meters
0 250 500 750 1000 1250 1500 1750 2000 2250 feet †

Turtle study approved for Na Pali

by Bill Sollner

George Balazs wants to find out what green sea turtles are doing at Nualolo Kai on Na Pali Coast. That's why he's put in a request to camp out there with the Division of State Parks. The Board of Land and Natural Resources approved the request at its meeting in Honolulu yesterday.

Balazs is with the National Marine Fisheries Service. His job is to know all there is to know about creatures like turtles. To do his job, he has to go where the critters are.

Green turtles are increasing in numbers on Na Pali coast.

JACK HARTER, as most everybody knows, runs Kaua'i Helicopters. He also keeps an eye on the wildlife of the island. In recent months he's reported turtle sightings along NaPali. They seem to be increasing in numbers . . . but what are they doing there?

Another question: Since Harter flies only during daylight hours, what goes on amongst the turtle population after dark? Balazs wants to spend three or four nights in Nualolo Kai to find out.

He told The Garden Island that over the past several years, Harter has reported turtles sleeping on the beach during this season, when the giant surf rolls in. The turtles 'haul out' on the beach during the day and bask. Do they also bask at night?

There's no data.

In the Leeward Islands, where the turtle population is considerably larger than it is on Kaua'i, turtles mostly do their basking at night, Balazs says. There's no evidence of nesting going on. Wrong season. But nobody has been around to see for sure. Maybe some of them are laying eggs on the beach at Nualolo Kai. Balazs will find out.

Specifically, he wants to know how many are coming out at night. He will check to see if any of them have been tagged. If not, he'll try to put tags on them so their migrations can be traced.

BALAZS THINKS the turtles may go back to French Frigate Shoals. If so, they can be identified by the tags he'll put on them here.

His theory is that maybe the wild surf makes the turtles' normal underwater sleeping areas unusable. If so, that might explain why they're coming out on the beach at Nualolo Kai to sleep during the night. . .as well as

(Please turn to page 7)

★ Turtles ★

(Continued from Page 1)

during the day.

A 250 pound turtle can stay under water for 2 hours and 20 minutes before coming up for air, Balazs says. But if they don't have to come up for air, they could get a real rest by sleeping on the beach.

And if there's any hanky-panky going on, Balazs says The Garden Island will get first reports on it from him. That would be one result of his short-term look at a unique situation.

THE GARDEN ISLAND
11 MARCH 1985

LADY ANN CHARTERS
P. O. BOX 3422
LIHUE, KAUAI, HAWAII 96766
(808) 245-8538 OR 822-1135

REPLY
DATE

George H. Balazs
Nat'l. Marine Fisheries, Honolulu Lab.
P.O. Box 3830, Honolulu, HI 96812

MESSAGE DATE 4-7-85

Hi George!

Remember us?! I heard you were going to spend some time at Nualolo Kai to observe the green turtles up there. There are definitely a lot more turtles on the Na Pali Coast. We have discontinued the fishing charters and take people out on sightseeing adventure trips instead. We've started our Na Pali trips for the summer, so if you need a ride to Nualolo, let us know. We stop at Nualolo anyway to snorkel and can take you in by ~~raft~~ life float.

Call us anyway to say hello! It'll be great to see you or to hear from you again!

Aloha, Ann Moser

ARCHAEOLOGY ON KAUA'I

VOL. 11 NO. 2 ISSUE 29 DECEMBER 1984

Produced by the

ANTHROPOLOGY CLUB OF KAUA'I COMMUNITY COLLEGE

Frontispiece
Ka Pae Ki'i Mahu O Wailua
Boulder #34, Looking Eastward B.P.B.M. Neg. #K97

KAUA'I COMMUNITY COLLEGE
3-1901 KAUMUALII HWY
LIHUE, HAWAII 96766

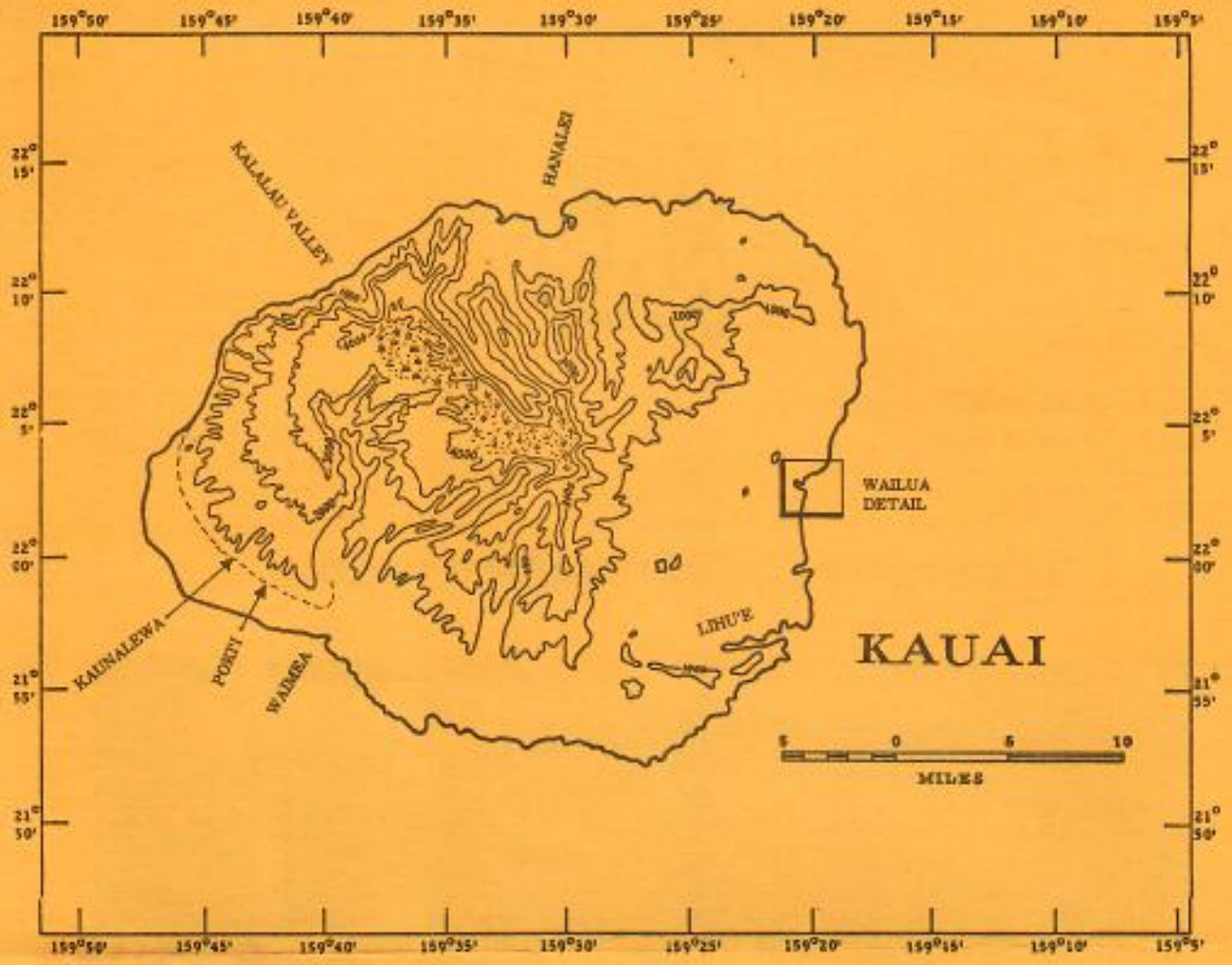


Fig. 1 Kaua'i Island

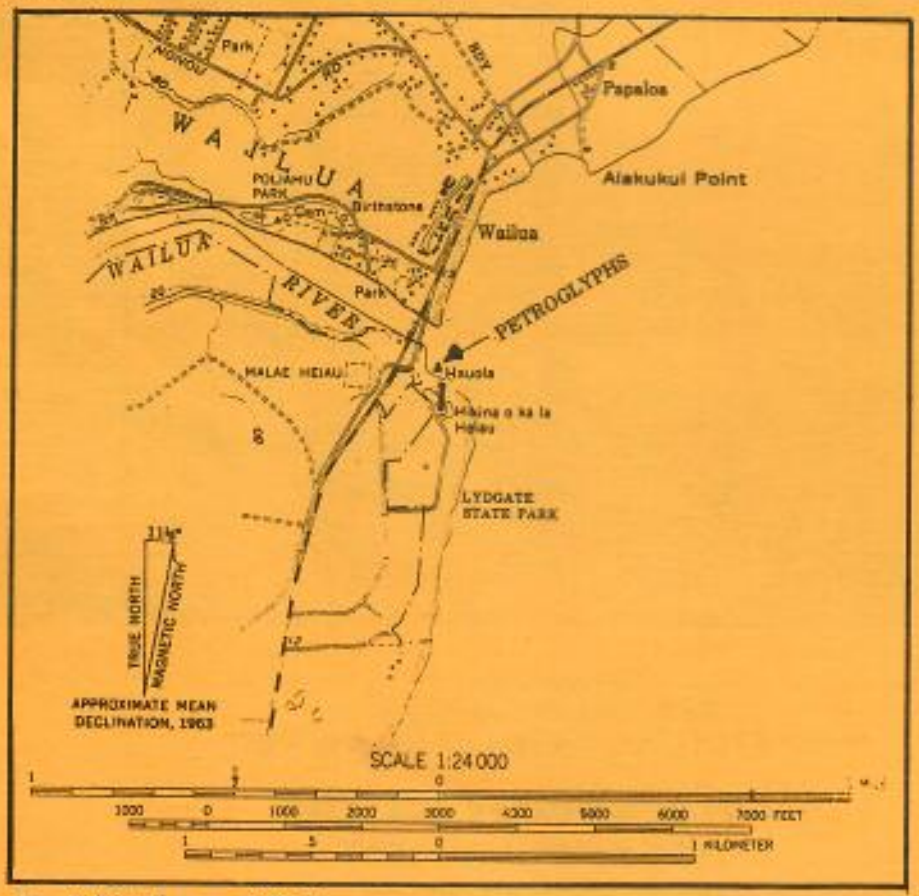


Fig. 2 Detail map of Wailua

NA PAE KI'I KAHU O WAILUA

The Petroglyphs of Wailua, District of Iinu'e Island of Kaua'i. Site 50-30-08-105A

by

William K. Kikuchi

Introduction

One of the most famous petroglyph sites in the Hawaiian Islands is found in the mouth of the Wailua River (Fig. 1.2). The area was once a well known site in the cultural-historical lore of the island of Kaua'i. A dance, two legends and several images formerly commemorated the site. Today, only the legend remains, hidden in two out-of-print sources. Recent interest in the site has begun to gow. This article will discuss and synthesize the data now available and present an interpretation of the data and describe the site as it once was.

History

The Wailua petroglyph boulders were well known in the late 1800s and into the early 1900s, as evidenced by two legends printed in 1899 by Manu and 1917 by Dickey. Neither J.F.G. Stokes (1909) nor E.C. Bennett (1931), both of the Bishop Museum, mentioned anything of the site when they surveyed the island. It was not until the 1940's that the petroglyph boulders were mentioned in tourist guides. It is possible that the site was covered with sand when the Bishop Museum scientists surveyed Kaua'i, as it often is. The appearance of the boulders is determined by the vagaries of the weather, e.g. the flow pattern at the mouth of the Wailua River, the sand deposited by storms and the tides of the sea.

In 1966 the Federal Government designated several sites in the Hawaiian Islands as National Historic Landmarks. One of these was the Wailua Complex of Heiau district, site coded 50-30-08-502. This desination automatically placed all sites within the district on the National Register of Historic Places. However, at that time there were no individual site codes for the non-temple sites. On October 8, 1971, the same landmark and temple sites were nominated by the Hawaii Historic Places Review Board to the Hawaii Register of Historic Sites, however the petroglyph boulders were not surveyed nor coded as an individually important site. Because the petroglyph boulders seem to be historically part of the temple of Hikina-a-ka-la and the City of Refuge, Hau'ola (both site coded 50-30-08-105), the site has been designated by the author as 50-30-08-105A (Fig. 3).

In the late 1960s two University of Hawaii professors in Art, Halley Cox and Edward Stasack, collected data for a book on Hawaiian petroglyphs. That book was published in 1970. Their short reference is the latest description of the site:

"HA-Al-6"
"Boulders on shore near the Southern boundary of Lihu'e district, south side of the mouth of Wailua River. Human figures, linear and curved outline. spiral (the only one known in the islands), ± 16 units. "

(Cox and Stasack 1970:88-89)

Two explanations should be made at this time concerning the Cox and Stasack reference. The first is that they used the Bishop Museum site code (HA-Al-6). and secondly. the site is not near the southern boundary of Lihu'e district but at its northernmost boundary between Lihu'e and Kapa'a.

In 1973, the Anthropology Club of Kaua'i Community College surveyed the temple of Hikina-a-ka-la and spent some time in drawing the boulders and respective petroglyphs of the site called Ka-pae-ki'i mahu (Fig. 3). The map and the detailed drawings of the boulder field and petroglyphs in this report are from the survey in 1973.

Legend

There are two major references to the legend of the petroglyphs of Wailua. The earliest comes from Moses Manu (1899 and Ms). while the second is from Judge Lyle A. Dickey (1917). Both authors claimed Kaua'i as their home. The legends are properly classed as aetiological legends, or legends which have as their function the explanation of origins.

Manu's version was reprinted and translated by Barrere, Puku'i and Kelly in 1980. Roughly, the legend reads: Kapo and her party left Ni'ihau for Kaua'i and came upon a surfing competition at Wailua. Here Kapo and her sisters were invited by some of the men to ride on the famous surf of Wailua called Maka'iwa. Accepting, they rode the first wave in pairs with the men. On the second wave, using their supernatural powers. they left the men behind while they rode to shore and awaited the third wave. The third wave, which was described as a mountain of water rather than normal surf, plummeted the men and forced them beneath the wave to their death. There they were changed into stone at the mouth of the Wailua River. Since then, these boulders are known as the row of images, or pae ki'i. and can still be seen when wave and river action removes the sand cover.

The second legend by Judge Dickey relates the boulders to the story of Maui (1917):

"Maui wished to bring the Hawaiian Islands together and for that purpose to catch the powerful fish Luehu. which, if he hooked, would cause all the islands to draw together. The fish could only be caught on the night of Lono and Maui would go out on that night each month with his eight brothers to fish for it.... His mother, Hina. told him not to disturb

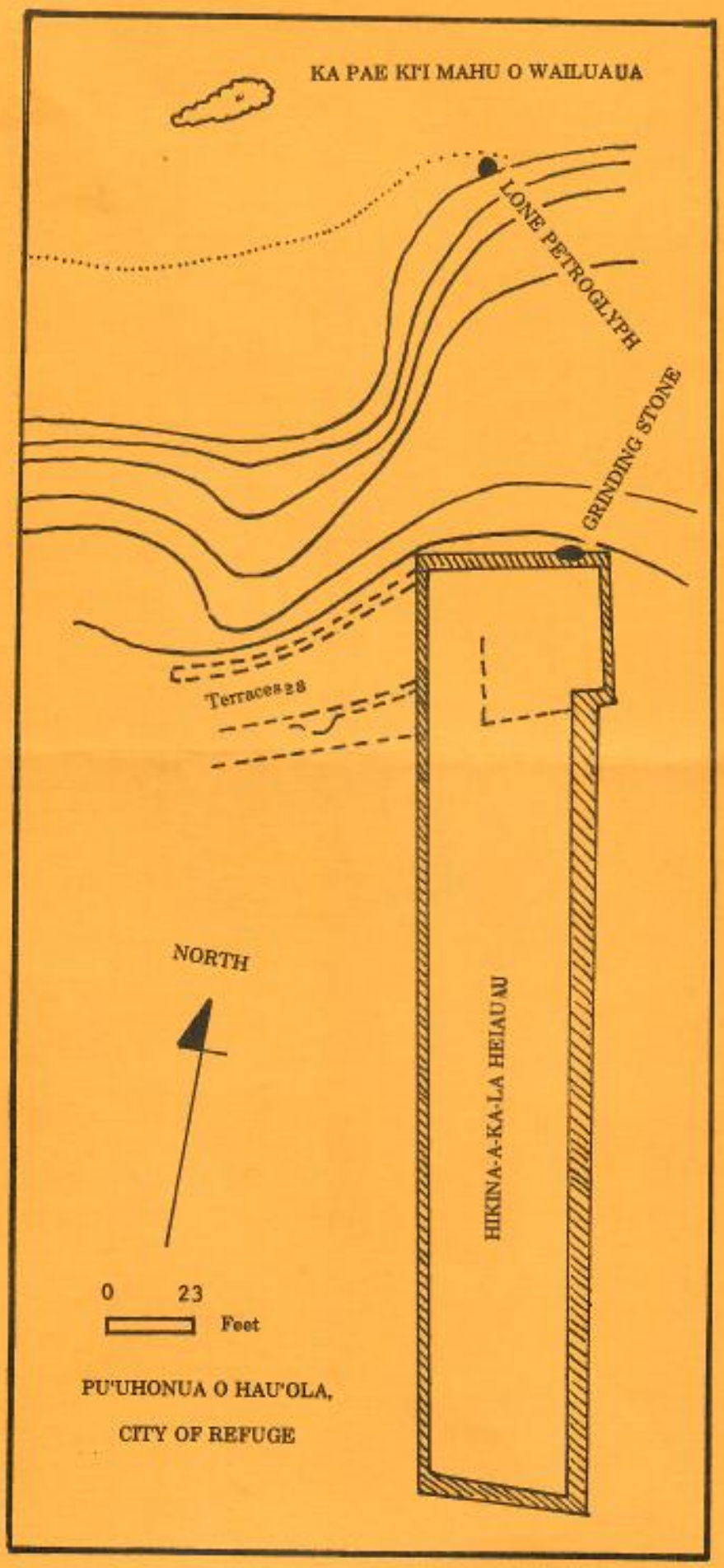


Fig. 3 Hikina-a-ka-la Heiau and Petroglyph Boulders

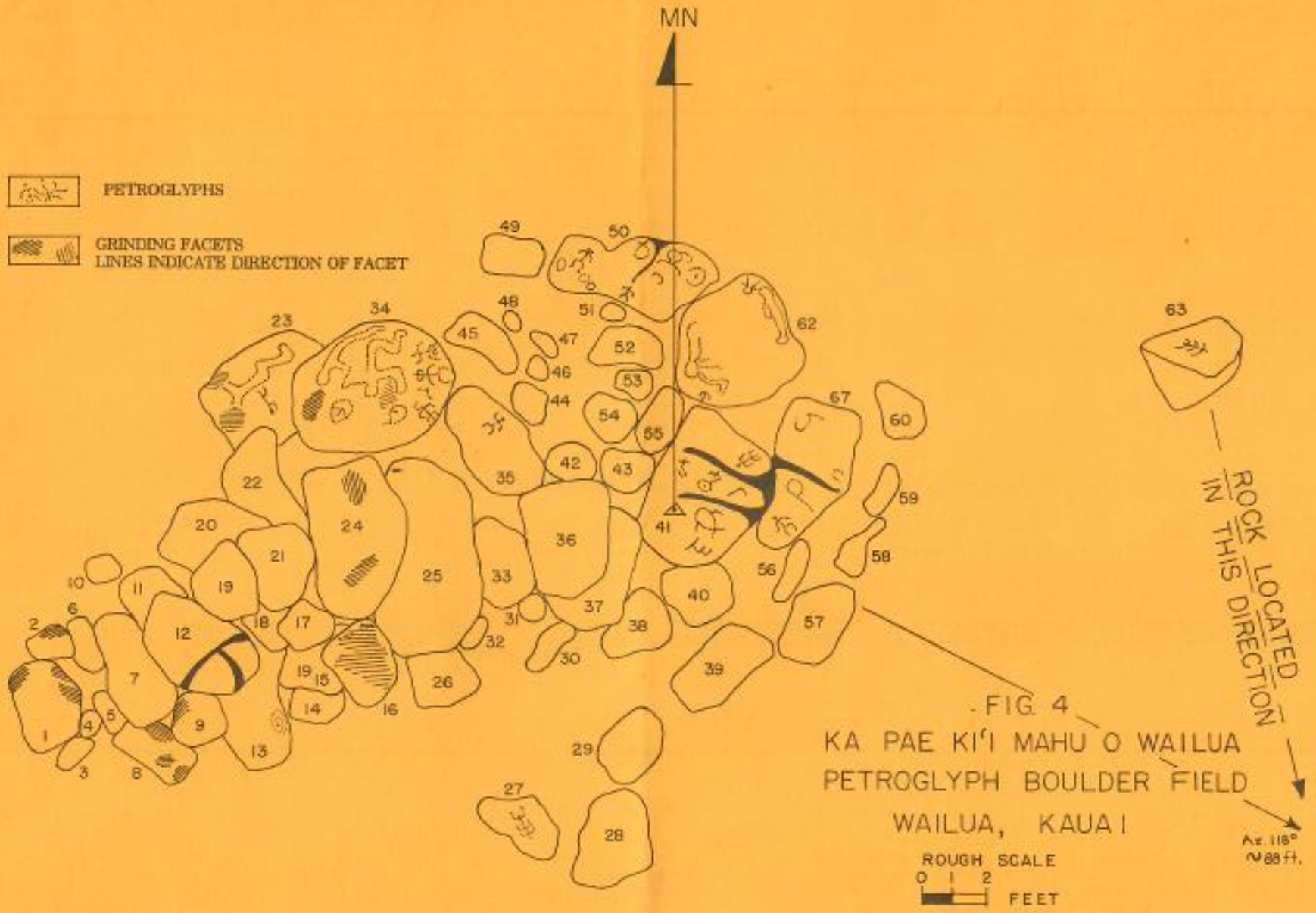


Fig. 4 Ka Pae Ki'i Mahu O Wailua, Petroglyph Boulder Field

any bailing dish he might find floating in the water at the mouth of Wailua River, as this would be his beautiful sister Hina-ke-ka'a. However, when Maui saw a dish for bailing out canoes floating near, he told his brothers not to look behind them on pain of death and picked up the bailing dish and he put it behind him in the canoe, where it turned into a beautiful woman. As soon as Luehu was caught the Hawaiian Islands began to draw together. As Kaua'i and O'ahu came near, great crowds gathered on the shore of O'ahu and cheered. This did not disturb the brothers of Maui at first, who paddled steadily, but when the cheerers exclaimed at the beauty of the woman behind Maui, all the brothers turned at once to look. Immediately the great fish became loose from the hook and the islands slid apart .... Because of their looking back, Maui's brothers were, on their return to Wailua, turned into stones and set across the mouth of the Wailua River.

They are said to have formed part of the wall of the City of Refuge when the course of the river was different. They are called 'Pae-mahu-o-Wailua', also paikii or picture rocks. It is said that a sculptor of ancient times, carving idols, could only make one to suit him and threw the others away. Those rocks are some of them, the marks being the hieroglyphics of the ancient sculptor."

(after Cox, Stasack 1970:75-76)

The two legends of Ka-pae-ki'i-mahu-o-Wailua are similar in three respects: 1) the death of men; 2) the men became boulders; 3) there was no mention of the petroglyphs or carvings. Both central characters, Kapo (or Kapo-'ula-kina'u) and Maui (or Maui-ki'i-ki'i-a-kalana), are Hawaiian demigods. Kapo was the half-sister of Pele, sired by a common mother, Haumea. Kapo's father was Ku-waha-ilo. Kapo-'ula-kina'u parentage insured her place in sorcery as well as being the double-personality patron demi-goddess of the dance. Kapo usually appeared as the vengeful part of her double-personality which was Laka, the passive demigoddess of fruitfulness and love. It is not unusual that her vengeful side caused the men to be pounded by the surf to their deaths and her sorcery changed their bodies into boulders to remind mortals of her awesome power.

The other demigod Maui, often called Maui-of-a-thousand-tricks was born as a miscarriage or as a blood clot, abandoned, rescued and restored as the youngest brother of seven children. His father was Kalana and his mother was Hina-a-ke-ahi. The legend of the Wailua petroglyphs as described by Dickey is a curious one because it combines several typical Maui stories with non-Maui themes into one. The first is his desire to bring all the islands together which is not a theme of Maui stories in Hawaii. The second is to catch the powerful fish Luehu (lua-ehu) an ulua

(a species of crevalle or jack) who was supposed to be the brother of Maui's mother (Luomala 1949: 98,112). Dickey's story mentions the hook but not its name. This is another Maui theme of his going to the underworld to get the special fishhook called Manai-a-ka-lani. The bailing cup, Hina-ke-ka'a, is not mentioned as Maui's sister but a woman he later rescues and marries. Dickey's legend was an ingenious combination of well known Maui themes to which the end result was the punishment of his brothers who turned into boulders at Wailua.

Commemorative Dance

The petroglyphs of Wailua must have been famous in Kaua'i legend and history to have had a dance composed of it. No other petroglyph site has been so honored. Remarkable here is the fact that the legends relate to the boulders whereas this dance relate to both the petroglyphs and the wooden images that sttod nearby. According to Keahi Luahine (Barrere, Puku'i. Kelly 1980: 81-82). the dance was called Hula ki'i o Poki'i or the dance of the images of Poki'i (or cherished children). Luahine states that the dance originated by the people of Halalau valley and was danced by children. Usually after a swim in the sea, the children would assume the stiff posturing and movements mimicking the wooden images and petroglyphs of Wailua. There was no musical accompaniement, only the chant by the dancer-chanters.

Hula Ki'i

* Poki'i ke ki'i	The image is at Poki'i
Ho'okiki'i ke ki'i	The images that leans back
Ho'ona'ana'a ke ki'i	Th images protrudes its belly
Ho'oualehe ke ki'i	The images with bent knees wide apart and with grimacing face
** Kaunalewa ke ki'i	The limber-jointed images that swing and sway
Ki'uwai i Wailua	Washed by the waves of Wailua
Ka pae ki'i mahu	...is the row of sexless images
Ua 'ike a	They are well known

(Barrere, Puku'i. Kelly 1980:81-82.

* Poki'i is a place name for a hill at the base of a ridge also called Poki'i. It is also defined. "cherished child."

** Kaunalewa was an ancient spring at the base of the ridge of kaunalewa. This was a spring reserved exclusively for chiefs to bathe. Kaunalewa is situated about a mile northwest along the base of the cliffs from Poki'i (Fig. 1).

Petroglyph Site

The Wailua petroglyph site was first surveyed and photographed in 1949 by Ms. Rebecca Banks, a former teacher at Kapa'a High School. She reported 36 figures and indicated that more could be found at the base of the bridge adjacent to the site.

The boulder-field site was again surveyed in 1973 by the Anthropology Club of Kaua'i Community College. The following compass bearings were taken (see Fig. 4 for compass station) to orient and locate the boulders:

336 degrees magnetic to the north side of the Wailua Bridge.
319 degrees magnetic to the south side of the Wailua Bridge.
118 degrees magnetic to the lone petroglyph on the boulder beach fronting the temple of Hikina-a-ka-la.
134 degrees magnetic to Kaua'i Resort Hotel.

The boulders on which the petroglyphs are found are located roughly 50-60 feet from the shoreline. The water level is approximately 2 feet below the highest boulder when these boulders are exposed by the meandering mouth of the river. They counted 61 boulders in the cluster (Fig. 4) of which only 8 have petroglyphs.

The boulders are of fine grained grey-blue basalt. Some of the surfaces are coated with a fine black veneer of manganese oxide. This veneer even coats the petroglyphs and the grinding facets indicating its uniform accumulation since the petroglyphs and grinding facets were made. The erosional forces of both river and ocean are abrading the surfaces of the boulders which will ultimately erase the petroglyphs.

A greater factor in the evntual destruction of the boulders seems to be the chipping and breaking off of major chunks of the boulders by bulldozer blade. Some are evidently accidental as bulldozers are used to open up the sand dams which occasionally block the river mouth. In clearing these dams the dozers will bump into the submerged boulders. Citizen concerns were published in the Garden Island Newspaper (July 8, 1968). Evidently the boulders were being damaged from 1965 (letters to Bishop Museum, July 8 and 12, 1965) resulting in the Bishop Museum staff writing to Lihu'e Plantation to be aware of the site and the destruction being wrought by them.

Some form of markers or fence was proposed (July 8, 1965) to isolate and protect these boulders even when they are covered with sand.

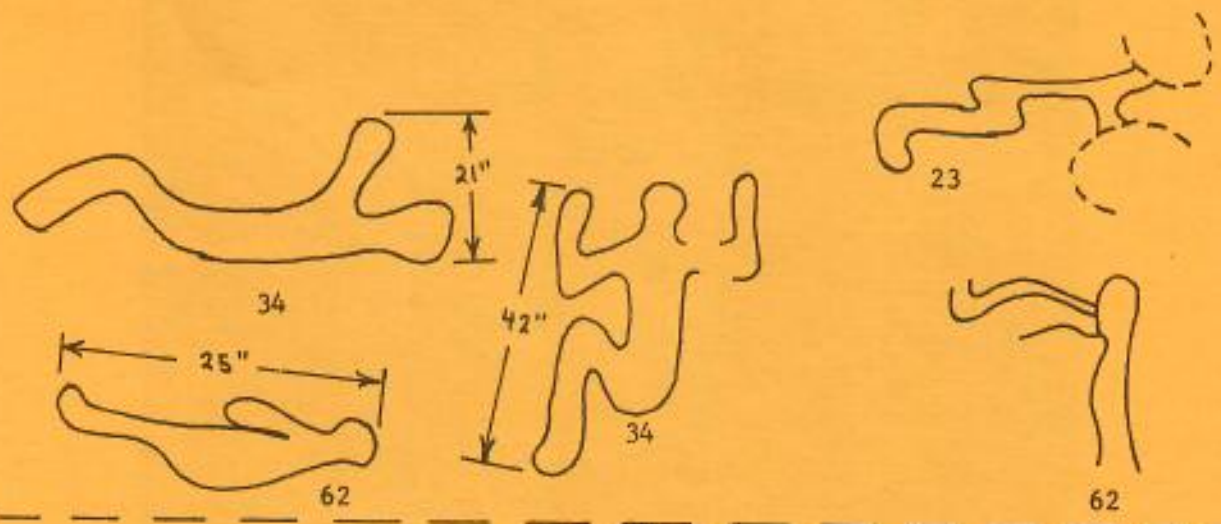
Associated with the petroglyphs were grinding or honing facets which are the result of the Hawaiian shaping and sharpening his stone adze, chisels or sinkers on these rocks. Some of the facets were made over a petroglyph thereby eradicating portions oft the figures. The following boulders were recorded as having grinding facets (Table 1).

TABLE I. PETROGLYPH FORMS AND GRINDING FACETS

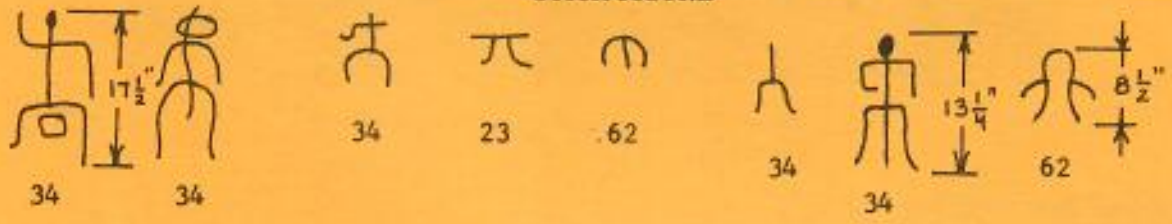
	HUMAN			MISCELLANEOUS				
BOULDER	OUTLINE	STICK	INCOMPLETE STICK	LINES	OVAL	FISH	SPIRAL	GRINDING FACETS
1								2
2								1
8								3
9								1
13							1	
23	1		1					2
24								2
34	2	4	1		1			3
35		1						
41		2		4		1		
50		2	1		2			
61		1		1	3			
62	2	1	1	1				
63		1						
TOTAL	5	12	4	6	6	1	1	14

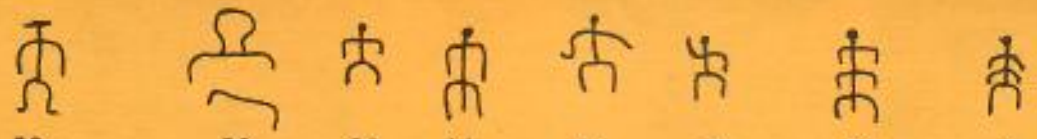
11
35

HUMAN OUTLINE

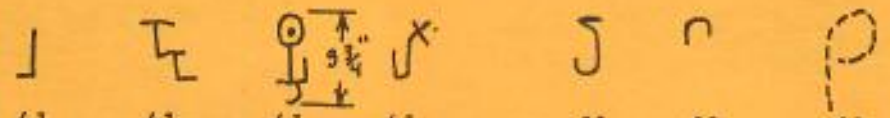


STICK FIGURE





LINES



OVALS

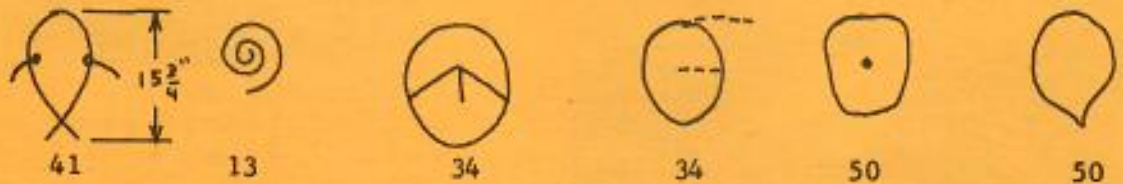


FIG Fig. 5 Petroglyph Types :S

Fig. 6 Boulder 41 on Left, 62 on Right, Looking Southwest. B.P.B.M. Neg. # K98

Fig. 7 Boulder 62, Looking Southwest
B.P.B.M. Neg. # A-468

Fig. 8 Boulder 41,
Looking Southwest
B.P.B.M. Neg. #
A-468

Fig. 9 Boulder 13, Looking West.
B.P.B.M. Neg. # A-468

Fig. 10 Boulder 50, Looking Southwest. B.P.B.M. Neg. # A-468

Fig. 12 Boulder 50, Looking Northwest. B.P.B.M. Neg. # K-160

Fig. 11 Boulder 63, Looking Southwest. B.P.B.M. Neg. # K-159

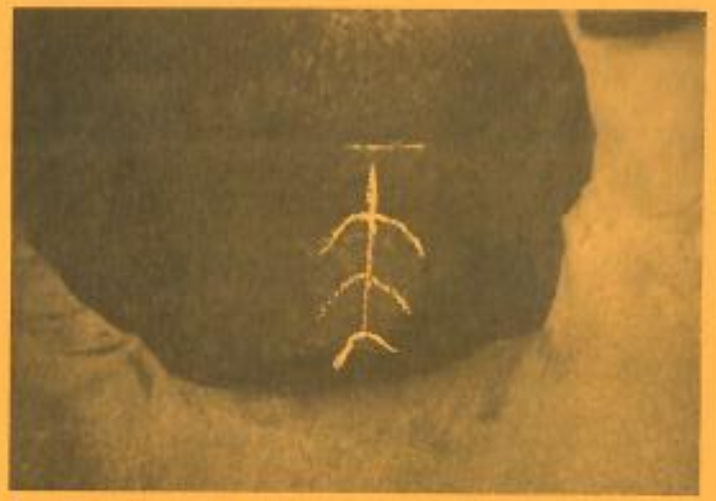


Fig. 13 Unknown Location B.P.B.M. Neg. # K-157

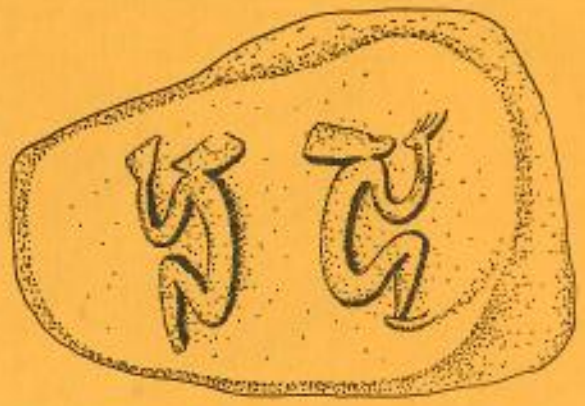


Fig. 14 Human form in relief on boulder.
Face of boulder prepared by pecking.
Height of figures is 11.8 inches.
Pu'u O Ma'o, Moanalua, O'ahu

Fig. 16 Easter Island bird man petroglyph no scale.

Fig. 15 Human form in relief on plaque
Plaque measures 5.2 by 3.8 inches by 1.3 inches thick. Figure is 3.3 inches high. Plaque plowed from field in Wailua, Kaua'i

It is also interesting to note that a large boulder placed upright near the north eastern corner of the temple was once a large grindstone with many interfacing facets. Its placement from the beach to the temple wall was no whim of the architect. Several fragments of grindstones were also found in the fields just below Malea heiau. This temple is located about 150 yards inland and uphill of Hikina-a-ka-la temple.

A total of 35 petroglyph figures were recorded occuring on the boulder field. Each boulder in the cluster was numbered from 1 to 61 and marked on the map (Fig. 4). The petroglyph forms are: human 1) linear, 2) outline.

I. Human
   a) linear or stick figures
   b) outline

II Miscellaneous
   a) lines
   b) ovals
   c) fish ?
   d) spiral

Table 1 and figure 5 lists the numbers of forms found and the boulders on which they are found.

All the petroglyphs were pecked to form their outlines and shapes. The function of these figures are not definitely known but the various possibilities are : 1) magical-symbolic. 2) figures associated with legends. 3) graffitti. 4) historic story markers. Table 2 presents the various petroglyph motifs some with scale, others without.

Petroglyph Forms

The Wailua petroglyphs number 36 figures and the possibility of finding more seems likely. Ms. Rebecca Banks in the late 1940's reported several more figures at the base of the Wailua bridge adjacent to the site. However, a search made by the author has been fruitless but not unexpected as changes in the water level, sand cover, river water erosion may have concealed or moved the stones.

There are two distinct forms of petroglyphs at Wailua. The first is the spiral form and the second is the outlined human forms. The spiral is found on boulder 13 (see Fig. 9) on the east face of a large boulder. The form is pecked on two adjacent faces of the boulder. It measured roughly 8.26 inches by 8.32 inches and consists of 2 and 3/4 turns of its arm. This is the only spiral form in the entire Hawaiian Island chain.

The second distinctive form is the human outline petroglyphs of which there are four full figures and one which is incomplete (frontispiece, Fig 6 and 7). Three of the five forms are distinctive figures of the side view of humans. These I refer to as the "kneeling prayer figures" showing an almost fetal side form except the arms and legs may not be drawn fully upwards and inwards toward the body. I have seen similar human forms at Puako on Hawaii Island and on the raised form from Moanalua on O'ahu (Fig. 14), the carved plaque of Kaua'i (Fig. 15) and Easter Island bird man figures (Fig. 16). The term "kneeling prayer figure" is given when I witnessed an old Hawaiian informant describing and demonstrating how her grandmother prayed on the floor of their home. The informant claimed that her grandmother was a strict follower of the ancient ways. These human outlined forms may be one of the more ancient motifs to be found in these Hawaiian Islands.

Images

According to Keahi Luahine (Barrere, Puku'i, Kelly 1980:81) there once were a row of wooden images, ka pae ki'i, located at the mouth of Wailua river on the grounds of Hau'ola, the place of refuge, on the eastern half of Kaua'i Island. This means the images were placed adjacent to and not within the temple of Hikina-a-ka-la. The row of images were called Ka pae ki'i o Wailua and were cared for by Luahine's relative Kai'akea. Since there is no direct evidence today of the images or its actual location, the report will assume that the location was probably fronting or facing the petroglyph boulders, set on the ground, possibly on the terraced areas, set perpendicular to the walls of Hikina-a-ka-la temple. The survey in 1973 (AOK Vol 3, no. 2, 1974) showed there exists today, three terraces and it is likely that one of these held the row of images. Each wooden image probably represented the men who were turned into stone. Perhaps one day, archaeological investigations can prove the images once existed by finding the foundations on which these images were placed.

Summary

The petroglyphs of Wailua may be a later addition to the legend of the men turning into boulders. Perhaps the boulders were famous and later men carved their figures on them. Today the petroglyphs themselves are the focus of the legend. It is also curious that no mention of the temple nor the area of refuge is mentioned in connection with the legend. Again, the passing years may have changed and readapted the legend so that all that remains are tiny fragments of what was once an elaborate story. The truth may never be known.

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AOK would like to thank the Bishop Museum for its assistance, cooperation and permission to use the photographs in this publication. The Museum's photo section and the anthropology department are especially acknowledged.

REFERENCES CITED

Barrere, Dorothy, M.K. Puku'i and M. Kelly
1980 Hula, Historical Perspectives. Pacific Anthropological Records No. 30. Dept. of Anthropology, Bishop Museum. Honolulu

Bennett, Wendell C.
1931 Archaeology of Kauai. Bernice P. Bishop Museum Bulletin 80. Honolulu.

Boyd, J.H.
n.d. Tradition of the Wizard Stones Ka-Pae-Mahu. Ms. Manuscript copy in author's collection.

Cox, Halley and Edward Stasack
1970 Hawaiian Petroglyphs. Bernice P. Bishop Museum Special Publication 60. Honolulu.

Dickey, Lyle
1915 Stories of Wailua. Kauai Historical Society. Lihu'e.

1908-17 In Hawaiian Historical Society Report, pp 14-36. Honolulu.

Ellis, Margaret and Jacob Fried
1949 A Report on Some Recently Discovered Petroglyphs on Kaua'i. Ms. typewritten 11-15 pages, maps and photos. Anthropology Department, Kaua'i Island Photo Box, Document Room, Archaeology Laboratory, Bishop Museum. Honolulu.

The Garden Island
1968 Famed River Petroglyphs Emerge From Sand; Historical Marker Needed. July 8, 1968, pg. 6. Lihu'e

Kikuchi, William K.
1974 Hikina-a-ka-la Heiau, Site 50-30-08-105. Archaeology on Kaua'i, Vol. 3, no. 2, March, pp 4-7, 9. Puhi.

1973-74 Field Note Book #1. Jan. 24, 1973 to Dec 14, 1974. Entry Feb. 14, 1974. In author's library.

Letters
1965 July 8: from Ruth Hanner to Dr. Kenneth P. Emory. Re. Help to preserve petroglyphs.

1965 July 12: from Ruth Hanner to Dr. Kenneth P. Emory. Re: Petroglyph boulders suffering damage.

1965 July 13: To Hans Hansen, Lihu'e Plantation from Dr. Kenneth P. Emory. Re: Careful driving by bulldozer operators at Wailua rivermouth.

Luomala, Katharine
1949 Maui-of-a-Thousand Tricks: His Oceanic and European Biographers. Bernice P. Bishop Museum Bulletin 198. Honolulu.

Manu Moses
1899 A Hawaiian Legend of a Terrible War between Pele... and Waka.... Ka Loea Kalaiaina. May 13-Dec 30, 1899. Mary K. Puku'i, translator. Ms in Bishop Museum Library.

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Staff April 1985

KAUAI FILE

supported the proposed permit system which they hoped would
n price stability in Maui's fresh fish market by restricting the
of vessels operating in the Northwestern Hawaiian Islands.

Habitat Protection - John Naughton participated with the Corps of gineers in a site inspection of the Natural Energy Laboratory of Hawaii (NELH) at Keahole Point, Hawaii. Much OTEC-related research is being conducted at the facility. A survey also was conducted at Hawaiian Abalone Farm (immediately adjacent to the NELH) where there are plans to deploy two 15-inch diameter pipes in the existing offshore research corridor to bring up the cold, deep seawater required for raising abalone.

On April 10 Naughton presented a paper on dynamite fishing in the Pacific Islands as part of a satellite seminar entitled "Illegal and Destructive Fishing Practices." Participants in the PEACESAT network for the evening seminar included Guam, Fiji, Kiribati, Ponape, Yap, Truk, Kosrae, American Samoa, the Cook Islands and Hawaii. Naughton's paper was well received and generated considerable discussion among the fishery officer participants.

Protected Species - Gene Nitta completed a review of a project to implement security measures at the Pacific Missile Range facility (PMRF) on Kauai. The Navy had requested comments on potential impacts to green turtles from the installation of infra-red video intrusion detection devices along the beachfront perimeter of the facility. Based on the description of the project provided by the PMRF, it was concluded that green turtles would not be affected.

Lew Consiglieri monitored two humpback whale research operations on Maui and conducted season-end consultations with the remaining research groups. Inclement weather drastically reduced sea-days for the researchers as well as many of the smaller tour-boat operators.

Fishery Development - A follow-up was sent to Hawaii fish processors and wholesalers who had not yet responded to the annual fishery products survey for 1984. There has been a 34 percent response to the original mailing thus far.

FISHERIES DEVELOPMENT DIVISION

Jack Dunnigan, industry development chief, Washington, D.C., visited the office on April 4 and briefed Fullerton and division staff on the organization and responsibilities of the headquarters development staff.

Howard Ness met on April 15 with Floyd Anders, Congressman Douglas Bosco and staff and members of industry regarding the industry's financial problems. While in northern California, Ness will meet with Bob Clark, harbormaster at Crescent City, to discuss a proposal to build a whiting plant there.

The FY 1985 Saltonstall-Kennedy solicitation will be published in the April 16 Federal Register. One hundred and twenty copies are ready to be mailed to SWR constituents.

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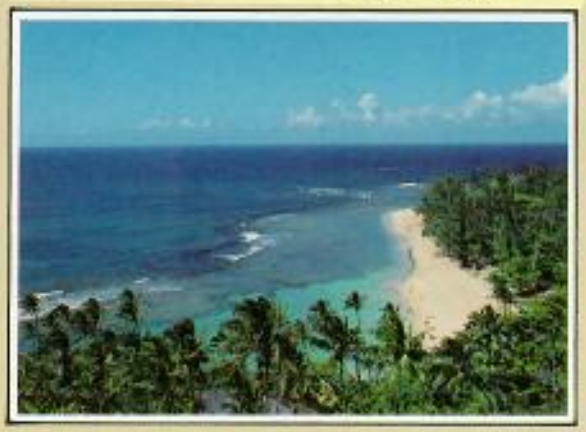
8 March '85

George -

The owner of "Aquatics Kauai", Mr. Pete Racherby (spell.?), phoned me about the picture of the sea turtle being ridden in this pamphlet. I stated that the picture should state that this activity is now prohibited by law....

Don H.



Aquatics Kauai

To enable you to completely express your aquatic artistry, Aquatics Kauai offers surfboard, Boogie Board and Waveski rentals. If you prefer a more leisurely pace, you can take advantage of our five and fifteen speed rental bicycles.

Although Aquatics Kauai offers fine diving equipment for sale and rental, as well as providing expert scuba repairs, we believe that the customer is only served properly by the attention of well-trained, knowledgeable employees who really enjoy helping people. These are the kinds of people who work at Aquatics Kauai.

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Ornate butterfly fish, named for their radiant splashes of yellow and orange, with black stripes are a common sight as are succulent spiny lobsters roaming among chunks of encrusted volcanic rock. You can view this underwater beauty with no more than a mask and snorkel as you freely float atop the waters in the safety of protected coves. For the more adventuresome, a trained instructor will accompany you on an introductory dive as you become a part of this breathtaking spectacle beneath the surface. For the certified diver, our twenty-six foot, twin-engine dive boat, the Nani Kai, will enable you to dive up to four times per day.

Photo taken prior to the law which prohibits harrassment of the Green Sea Turtle.

Island Diving

Kauai, the oldest and lushest of the Hawaiian Islands, harbors an abundance of snorkeling and diving areas along its rich shores. Waters teeming with bizarrely colored trumpet fish, butterflies and wrasses are a continuous seventy-five degrees and sixty-to-one-hundred-foot visibility is common.

Prevailing weather conditions permitting, Aquatics Kauai offers tours of the rugged Na Pali coast. Its jagged cliffs are resplendent with waterfalls and the surrounding waters are untouched and pure. This is Kauai as it was 100 years ago.

DIVE WITH THE BEST ...
DIVE WITH AQUATICS!

Restaurant Shiroma, in the Waipouli Complex (822-0111). This quaint Japanese-American-style diner features special dinners including teriyaki steak and shrimp, seafood combination, deluxe Chinese mix plate and deluxe Japanese mix plate. All dinners include soup or salad, vegetables, rice or french fries. The fresh, homemade lilikoi chiffon pie is very popular. Restaurant Shiro's casual atmosphere, reasonable prices and friendly waitresses make this an ideal stop. **(See tear-out coupon.)**

Rib & Tail Restaurant, Kapaa Shopping Center (822-9632). Enjoy Rib & Tail spectacular menu which features crab legs, lobster, fresh fish, steaks, chicken Valentino, shrimp, lasagne, barbecued ribs and spaghetti. All dinners include the scrumptious salad bar. Dancing nightly to Hawaiian, Oldies but Goodies, and Country Sounds. **(See tear-out coupon for special discounts.)**

Waipouli Restaurant, Waipouli Town Center (822-9311). Whether you're in the mood for Oriental or American food, you can find it at Waipouli Restaurant, specializing in Island delicacies. There are also sandwiches, fresh fish and short ribs. Breakfast, lunch and dinner are served daily from 7:30 a.m. to 9:30 p.m. **Show the ad in the Kauai Drive Guide for a special breakfast, lunch or dinner!**

Waipouli Town Center, right past the Coconut Plantation. For all your grocery and sundry needs, **Foodland** is the place to go. For souvenirs and Hawaiian gifts, **Hawaiian Etc.** will delight you with perfect finds. At **Deja Vu**, select from the attractive casual and beach wear for men and women. **Robert's** offers unique men's and women's fashions and accessories. Children have fun at **Fernandez Fun Factory**, playing the latest electronic games. Enjoy a delicious meal at **McDonald's**. You'll also enjoy breakfast, lunch or dinner at **Waipouli Restaurant. Waipouli Washerette** will fill your laundry needs, and **Gem Home & Garden** is stocked with general hardware, garden and houseware items.

KILAUEA LIGHTHOUSE & WILDLIFE REFUGE

Each day over 1,000 visitors tour Kilauea Lighthouse and the U.S. Fish and Wildlife Refuge surrounding it. This major Kauai attraction is staffed by volunteers of the U.S. Fish and Wildlife Service and offers a rare opportunity to observe many endangered species year round.

Today, Hawaiian wildlife is in trouble. Of the 97 (figure does not include fish, clams, mussels and insects) animals considered endangered, 33 are native to Hawaii. Birds dominate that group of 33, but seals, turtles and bats are included as well.

Hawaii's ecological destruction began with the arrival of European sailors in the late 18th century. They brought cattle, horses, sheep, goats and pigs. The new animals found no natural enemies and prospered in Hawaii's hospitable climate. They worked their way from the lowlands into the mountains, devouring and trampling native plants, turning forests into pastures and decimating thousands of miles of prime bird and wildlife habitats. The introduction of avian diseases such as malaria and smallpox killed many more native creatures, and introduced insects also took their toll. Island species were fragile due to their especially narrow requirements and ecological intolerance—the habitat of a native Hawaiian species was commonly a small valley or forest. And when the vegetation, geography or climate of that habitat was altered or damaged, a species would vanish forever.

Visitors to the Kilauea Lighthouse and surrounding refuge will see the largest seabird nesting colony in Hawaii. Here, red-footed boobies, brown boobies, red and white-tailed tropic birds and the great frigate bird inhabit the area year-round. From December to June, the endangered Laysan albatross nests on the refuge. From June to November wedgetail shearwater birds nest on the refuge and surrounding area. Spinner dolphins can be seen in the bay and endangered humpback whales are sighted in the coastal waters from December to May.

The Hawaiian green sea turtle can be sighted off Mokuaeae Island. Shy, gentle creatures, they live most of their lives in the ocean, but return to land to nest. Up until 1974, when a state regulation prohibited hunting of the turtles, the local restaurant industry steadily depleted the green sea turtle population by making steak and soup out of it.

On occasion, visitors have sighted the Hawaiian monk seal. In the 1880s, the seals were hunted for their blubber, used in making lamp oil. The adult seals have brownish coats, but the pups are famous for their jet black coats and sad, intelligent eyes. Extremely shy and vulnerable creatures, the monk seals will abandon their habitat at the mere presence of a boat or fisherman.

GEORGE R. ARIYOSHI
GOVERNOR OF HAWAII

SUSUMU ONO, CHAIRMAN
BOARD OF LAND & NATURAL RESOURCES

EDGAR A. HAMASU
DEPUTY TO THE CHAIRMAN

DIVISIONS:
AQUATIC RESOURCES
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RESOURCES ENFORCEMENT
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STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF AQUATIC RESOURCES
1151 PUNCHBOWL STREET
HONOLULU, HAWAII 96813

21 Oct. 85

George -

Thanx for sending me the information, I had not seen Ten Bruggencate's article!

Enclosed are:

1) field notes of the sea turtle "nests" at Hauapea Bch; note that there were only 4 "true" nets and that 3 of the 7 were only exploratory digs. George I'm disappointed that I was unable to confirm what species of turtle we have nesting here - maybe next year!

"SECRET BEACH" →

2) memo (bcc) to all Hatcheries (see last paragraph), and

3) copy of GI article on shark attack.

Aloha,

Don H.

Sea Turtle Nests – Kawapea Bch 1985

Nest #1

Kawapea Beach is ~1 mile long w/ several small basalt outcroppings.

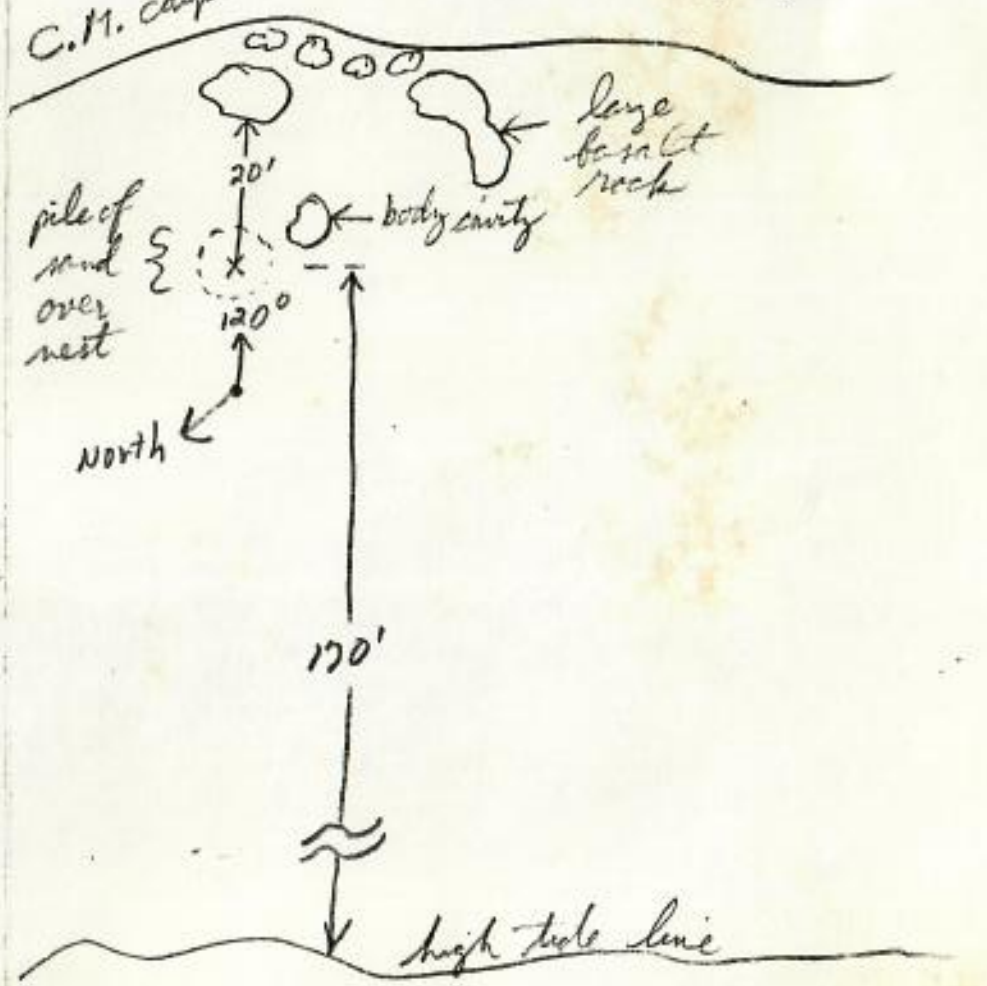
① first nest laid on night of 17 June 1985;

results: 22 August 85 evening – 14 hatched + went to the sea

23 – 0 hatched
24 – 0 "
25 – 1 hatched
26 – 0
27 – 0

28 → opened nest + found 15 empty shells at top of nest, + 85 unhatched eggs all of which had died in early embryonic stages of development and all of which were in the bottom of the nest. Note that Carl Marcus said that this nest site was flooded by the high tide about 5 days after nest was laid (~ 22 June)

TOTAL 100 =



Egg diameters (n=10)

49.0	49.5	48.5
48.5	49.5	49.0
49.0	49.5	
50.0	48.5	

GB: if egg diam > 45–48 mm then grn.

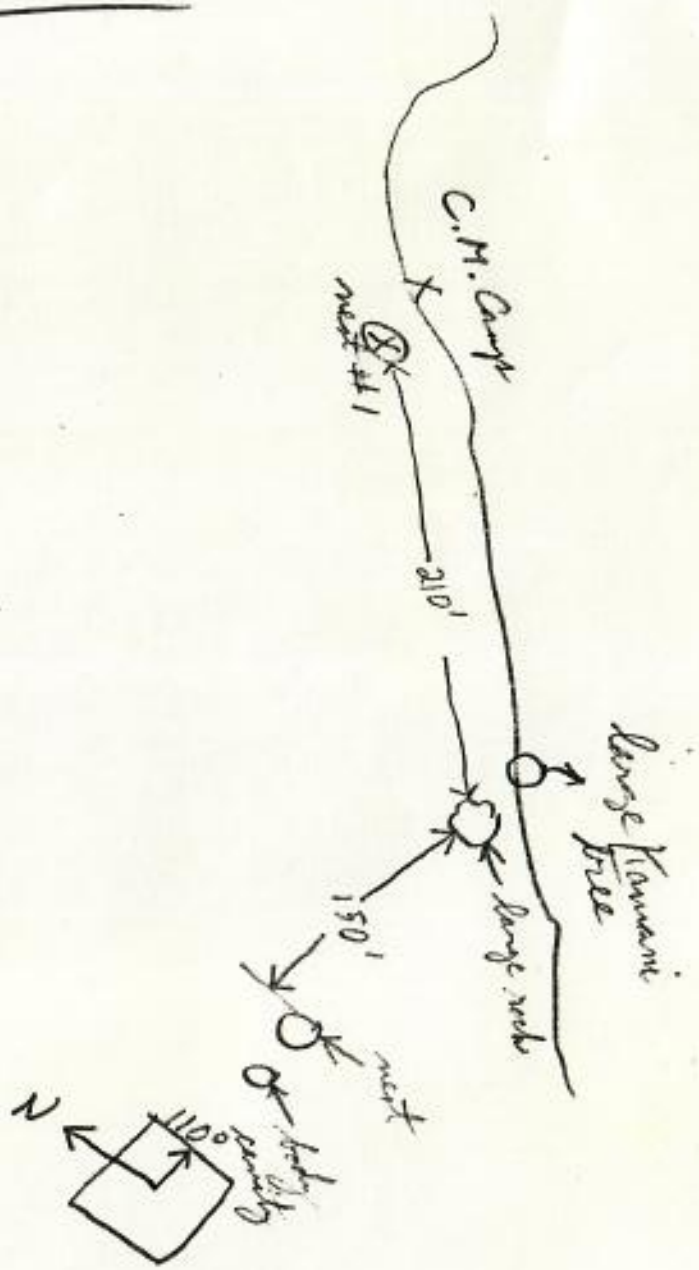
$\bar{x} = 49.1$ mm

② 2nd nest found on 2 July 1985

results: 7 September 1985 – 1 hatched (detected by tracks)

- no other hatchlings emerged from this nest during the following week
- will excavate this nest ASAP.
- on 4 Oct 85 attempted to excavate this nest (& nest #3) however, due to large surf & high H_2O nest was flooded and markers were washed away; dug at "approx" sites but found no eggs or shells.

Nest #2



(3) 3rd nest laid on night of 17 July 1985

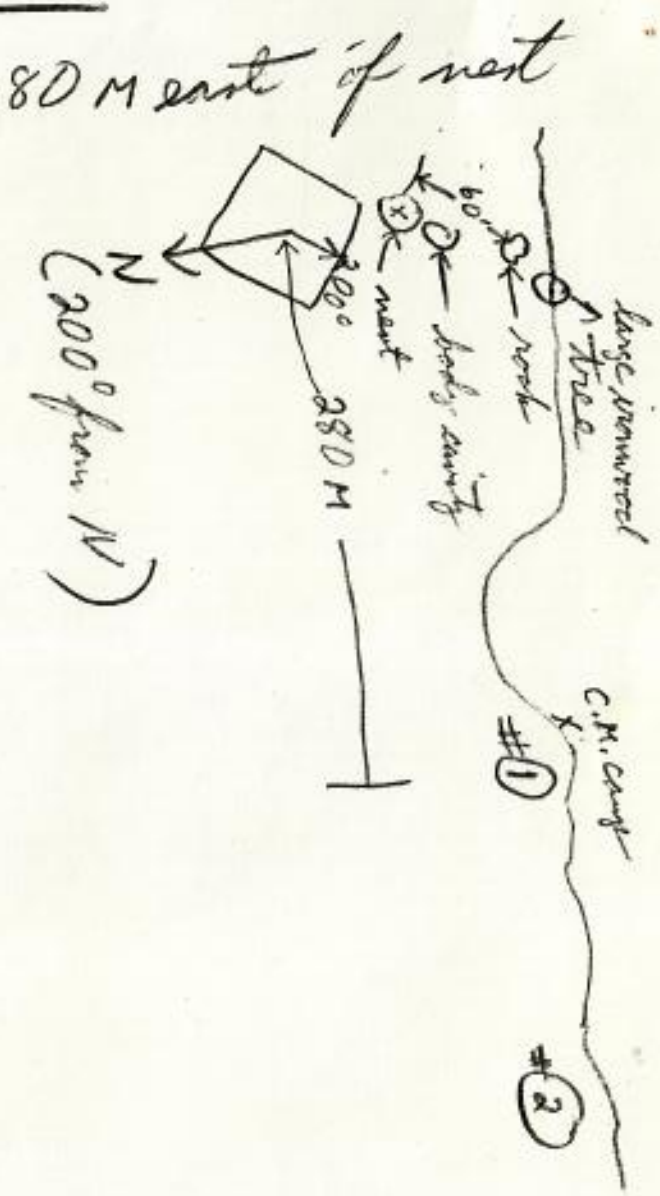
results: one hatchlings tracks were seen by Carl Marcus on 22 Sept 85.

—note: 4 Oct 85 attempted to excavate this nest however high water erased nest and markers and nest could not be found.

—note. Carl only saw tracks from one hatchlings and stated that this nest site was also flooded by a "high tide" during the first week after nest was laid.

Nest # 3

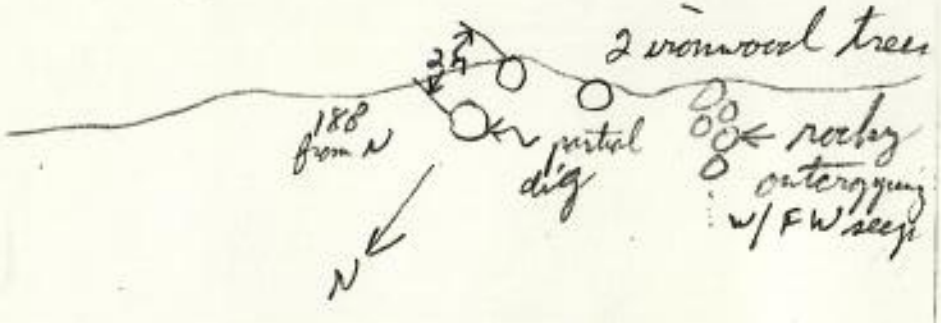
Nest #3 is 280 M east of nest #1.



(4) 4th nest dug on night of 28 July

— only partial dug; no body cavity or mound assoc. w/ real nest. Assumed this was only a "scouting" dig.

— note: on 19 Oct 85 this "dig" was excated & it was determined not to be a nest, only a partial dig.



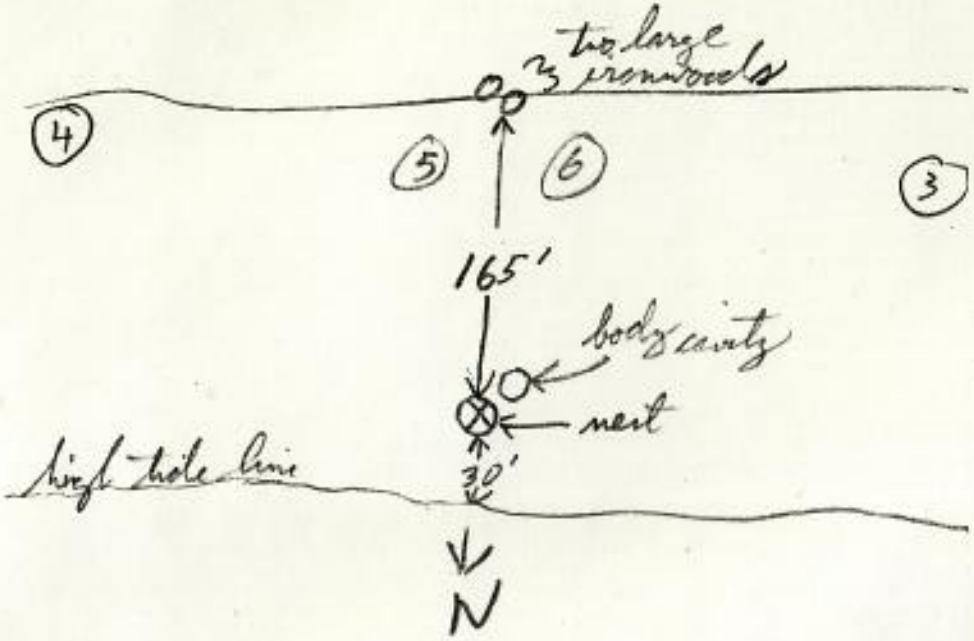
(5) & (6) nests 5 & 6 were only exploratory or partial digs, not nests, dug on 29 & 30 July, respectively.

(3)

Light hide line

(7) nest # 7

nest laid 1 Sept 85



note: during the last week of Sept, a large N, well washed entire nest away along w/ about 100' of beach. Camper stated he had seen "eggs" on the beach after the large surf.

Uses and Activities Along and Off the Coast

USES RELATED TO NEARSHORE BIOTA

- Pole-and-line fishing.
- Gill-netting.
- Throw-netting.
- Spearfishing.
- Torching.
- Trapping.
- Lobster.
- Sea urchin (wana).
- Octopus (he'e).
- Surround netting.
- Aquarium fish collecting.
- Seaweed (limu).
- Sport-diving.
- Shell collecting.

SHORELINE AND DEEP-WATER FISHING ACTIVITIES

- Crabbing (kona, 'a'ama, swimming crab).
- Limpet (opihi).
- Trolling, bottom-fishing.
- Specialized fisheries (type indicated).

USES NOT RELATED TO BIOTA

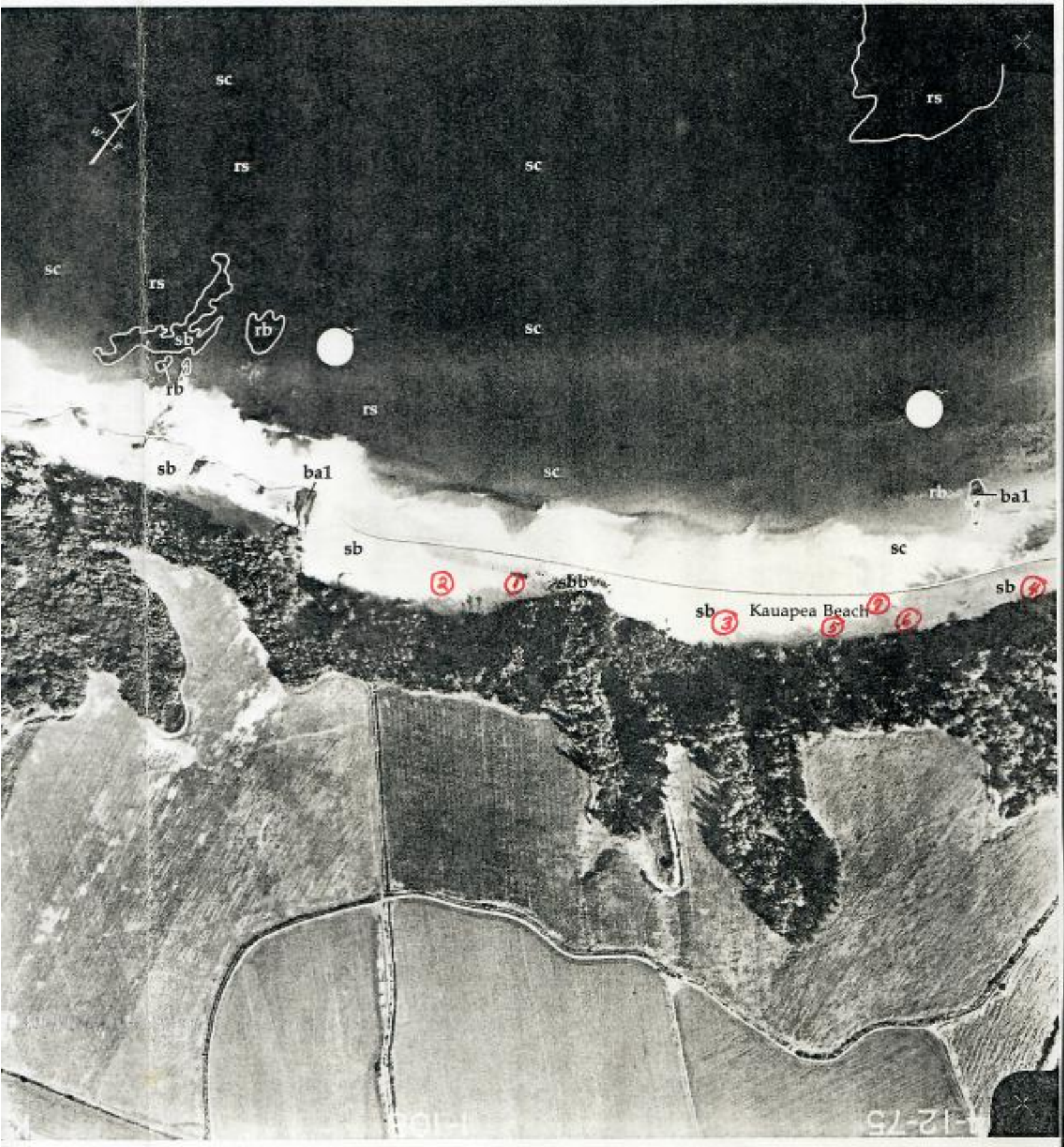
- Board surfing.
- Body surfing.
- Canoe paddling.
- Sailing.
- Aquatic recreation (smallcraft sailing, wind-surfing).
- Excursion boat.
- Anchorage.

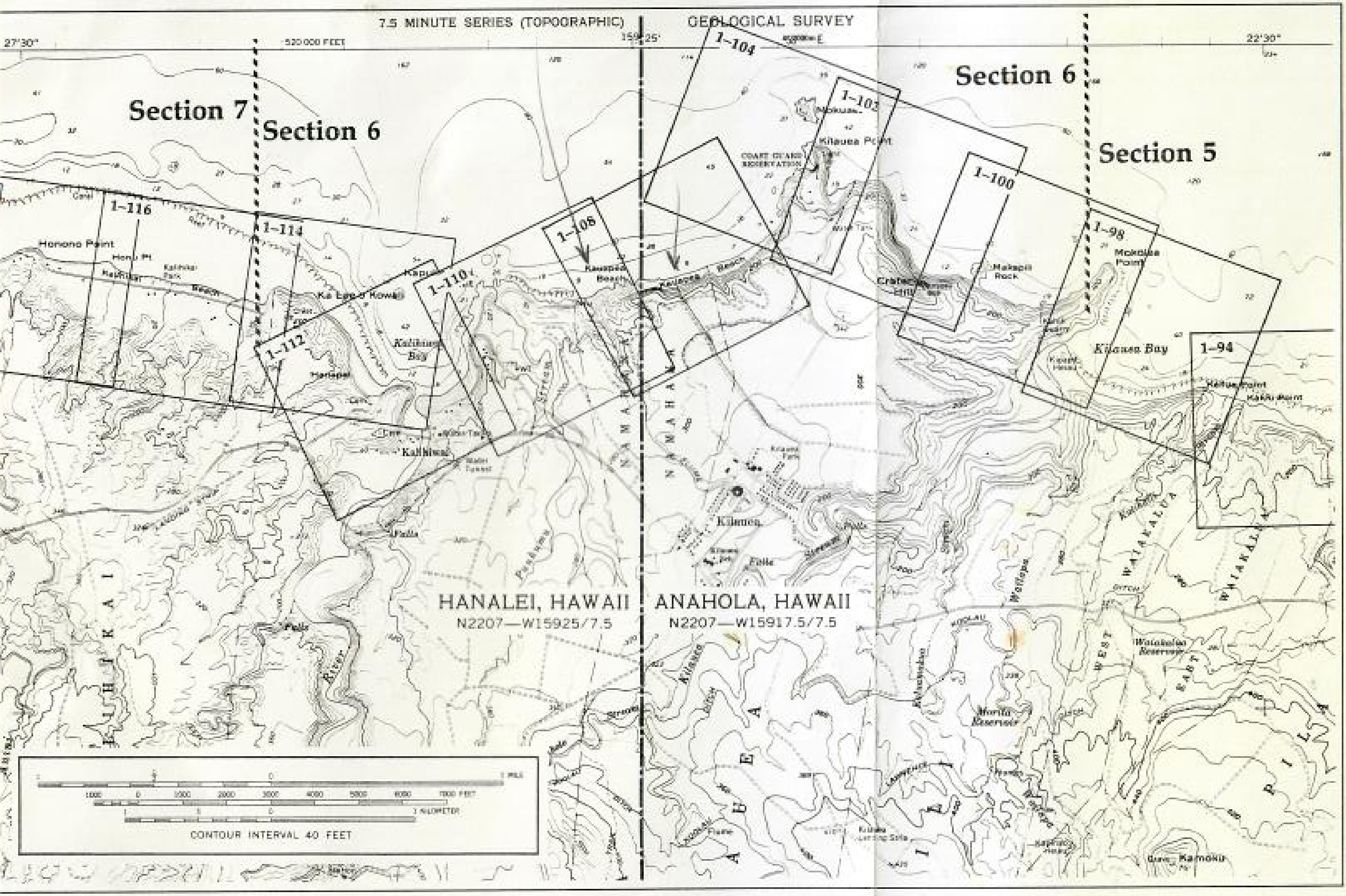
Study Sites

- Shoreline (above water observations).
- Inshore (inside reef edge).
- Offshore (beyond reef edge).

† Bar scale was calculated for an average photo scale of 1:5785. Variation in flying height may create differences of up to 4% in scale accuracy.

Photograph 1–108: Section 6




7.5 MINUTE SERIES (TOPOGRAPHIC)
GEOLOGICAL SURVEY
Section 7
Section 6
Section 6
Section 5
1–116
1–114
1–112
1–110
1–108
1–104
1–102
1–100
1–98
1–94
Honono Point
Ka Lae o Kowali
Kalihiwai Bay
Kalihiwai
Kauapea Beach
Kilauea Point
Mokuaeae
COAST GUARD RESERVATION
Crater Hill
Makapili Rock
Mokolea Point
Kilauea Bay
Kahili Point
Kilauea
Pauaiohu
Wailapa
Morita Reservoir
Waiakalua Reservoir
River
Falls
HANALEI, HAWAII
N2207—W15925/7.5
ANAHOLA, HAWAII
N2207—W15917.5/7.5
CONTOUR INTERVAL 40 FEET

rcg – Consolidated reef with well defined groove-and-spur system.

rsg – Sand predominates in the depressions of conspicious groove-and-spur system.

rcs – Mostly consolidated reef with some (25–50%) sediment bottom.

SHORELINE

ba – Volcanic rock shorelines.

ba1 – Low basalt outcrops/shoreline less than 1 meter high, including ramps.

ba2 – Talus rocks at the base of high sea cliffs (clearly not reworked by waves into a beach); sometimes this unit is seaward of ba4 or ba5 cliffs.

ba3 – Low outcrops to low cliffs (1–3 meters high), shoreline access possible.

ba4 – Sea cliffs more than 10 meters high; access difficult to dangerous.

ba5 – Sea cliffs more than 10 meters high; access dangerous to impossible.

bb – Man-made boulder shorelines (blue rock, revetments, rip-rap, etc.).

bc – Concrete/cement masonry seawalls and shorelines.

lm – Limestone rock shorelines.

lm1 – Low outcrops, boulders of limestone, including ramps.

lm2 – Limestone talus (probably rare, since limestone cliffs are not expected to be high).

lm3 – 1–3 meter high limestone cliffs.

lm4 – Limestone cliffs 3–10 meters high.

s – Sedimentary shoreline.

sa – Storm beach, deposited by large waves well inland and/or above shoreline.

sb – White sand beaches.

sb1 – Detrital sand beach.

sb2 – Black sand beach.

sbb – Boulder beach.

sbc – Cobble, pebble beach.

sbr – Poorly sorted deposits (common off stream mouths, sometimes shoreward extensions of rubble or sand beaches).

Special types.

br – Beachrock (a specialized category normally formed at the shoreline).

tp – Tidepools, where they are a prominent feature at the shoreline.

Offshore Bottom Type Summary

Categories	% Sand	% Rock
rbc, br, s, sb, sc, sd	100	—
rs	less than 50	more than 50
rbs, rcs, rsg	25 – 50	50 – 75
r, rc, co	less than 25	more than 75
rbb, rb, rcl, rcp, rcg	—	100

Aerial Photograph Based Classification System

OFFSHORE

s – Sediment.

sc – Sand bottom, including channels, in water depths less than 10 meters (especially common offshore from beaches).

sd – Sand bottom, deeper than 10 meters (some possibility of error, such as white reflecting rock in deep water, not checked by dives).

Special types.

co – Areas of greater than 50% live coral cover (spot checked for verification).

br – Beachrock (offshore).

r – Rock.

rs – Mostly sand bottom but with some rocky features; rock bottom covered by a veneer of sand.

rbs – Hard bottom, but with conspicious sediment up to 50% coverage.

rb – "Other" hard bottom types (a catch-all for dark areas, not reefal or sedimentary; normally basalt with a thin veneer of marine life).

rbb – Seaward extensions of talus boulder beaches, with definable rocks or boulders.

rbc – Seaward extensions of cobble beaches (rocks smaller than boulders).

rc – Reef complex.

rc – Shallow reef flats or structural reefs, normally (but not exclusively) in water depths less than 2 meters.

rcl – Consolidated limestone; lacking sediment (also a catch-all for moderate to high relief areas).

rcp – Consolidated smooth limestone pavement.

Houses in Puuwai village, Niihau.

Advertiser photos by Jan TenBruggencate

When life goes on, the

Accepted system may bother

PUUWAI, Niihau — It's easy to compare life on Niihau with that on the plantations before the days of labor unions.

The situation, clearly paternal, nevertheless seems to work for Niihau, and has protected a native Hawaiian community such that it survives unique in the state.

The situation, though, bothers some people. Board of Education member Chuck Norwood, at a recent meeting on Kauai, likened the conditions of native Hawaiians there to slavery.

Gov. George Ariyoshi, after a tour Wednesday, saw it differently.

"There is a place for people like yourselves to live your life, your lifestyle, in the way you have become accustomed to," he told residents.

The population of Niihau is small, and there aren't many Niihai-born people in positions of power in Hawaii, but one of them is Office of Hawaiian Affairs trustee Moses Kealoha. Kealoha in public statements and in private has said the island's operation by the Robinson family is preferred by the residents themselves.

Physically, Niihau isn't unlike parts of many of the islands. Most of it could easily be mistaken for undeveloped parts of West Kauai, or Waianae, or Lanai or the drier parts of the other islands.

Like Kahoolawe, it lies in the lee of a larger island and lacks the high mountains to grab rainfall. Like Kahoolawe, it is very dry most of the time.

Niihau is entirely owned by one branch of the Robinson family, and it's run as a ranch. It's like something plucked out of the past. There are no paved roads, no airport, no harbor. Boats anchor offshore or pull up on the sand at any of several landings.

There is no community electricity and no telephone — although there is radio contact with Niihau Ranch headquarters on Kauai, a link that serves for ranch functions and

Puuwai villagers gather at the Niihau church to greet the governor and his family.

The island had 226 residents in 41 households in 1980. The figures rise and fall as people move back and forth between Niihau and Kauai.

There is no doctor, no hospital, no dentist. Residents take the weekly boat to Kauai for such treatment, or go by helicopter in emergencies.

Nowadays, pregnant women near term move to Kauai to have their babies in the hospital.

Government has little to do with Niihau. Even the school buildings for its 35 students are owned by the ranch. The three teachers are lifetime Niihau residents, but paid and regularly trained by the state Department of Education, which provides educational materials as it does to other public schools.

Under a new Department of Education program, children in Grades 1 to 3 are taught in both Hawaiian and English. The theory is that if they learn the basics in their first

Niihau way

outsiders

language, Hawaiian, and then learn English as a second language, they will receive a better basic education than if they're taught entirely in English, a language they never speak outside school.

Each of the three teachers handles multiple classes, but the groups are broken up evenly into 12, 12 and 11 students.

The preachers at the Hawaiian-language church are selected from among the residents. Church services, like everything else on the island except the school, are conducted in Hawaiian.

Ranch business is done in Hawaiian, as both the Robinson brothers speak the language fluently. As children, they spent summers here. Their childless uncle, Aylmer, owned the island, and left it to the family of his brother, Lester, the father of Bruce and Keith Robinson.

It's been an expensive proposition, since the ranch has lost money steadily for many years.

Keith Robinson said the family commitment to the Hawaiian residents of the island is to maintain the undeveloped, rural nature as long as its residents want to continue living their isolated life, speaking their native tongue.

"If they want to change it, then we'll look at doing something else, but until then, this is the way it will be," he said.

There's not much to do on Niihau but to work for the ranch and to fashion Niihau shell leis, which are treated as fine jewelry and command high prices.

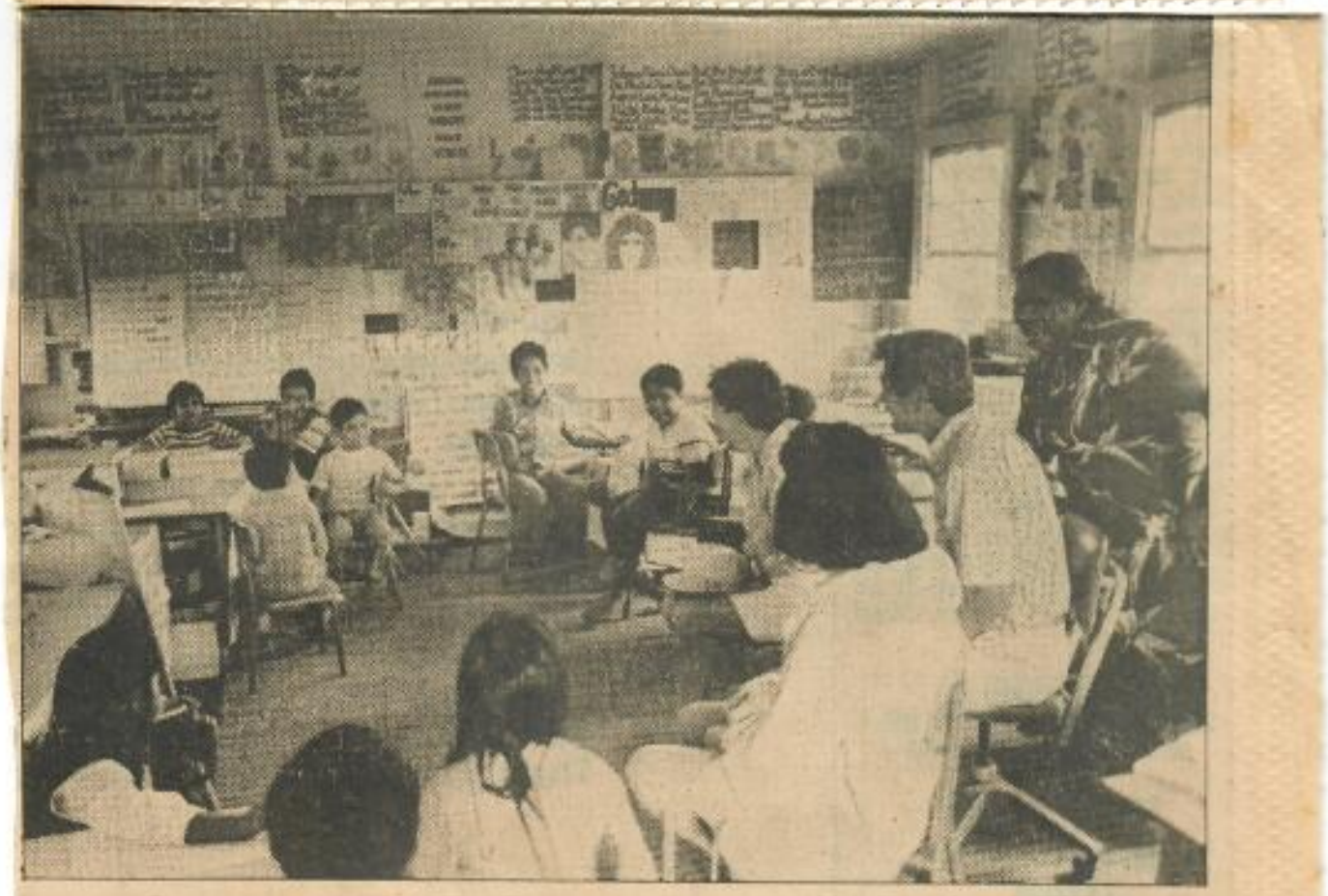
For some Niihau Hawaiians, that's not enough. Many have moved from the island and taken jobs on Kauai or elsewhere. Most are welcome to come back and visit, although the family tries to limit access by people seen as potential troublemakers.

By company rule, no alcohol is brought to Niihau. Those who want to go out for a few drinks are welcome to go to Kauai, drink their fill, and then catch the boat back to dry Niihau.

jan tenbruggencate
kauai bureau

It's like something plucked out of the past. There are no paved roads, no airport, no harbor. Boats anchor offshore or pull up on the sand at any of several landings.

Gov. Ariyoshi talks to kids at Kii Landing beach .



. . . and meets with first-, second- and third-graders in class

Hawaii's little-known super-

By Jan TenBruggencate
Advertiser Kauai Bureau

BARKING SANDS, Kauai — The Pacific Missile Range Facility is Kauai's third-biggest industry, and the most stable of the island's major economic forces.

Its annual budgets have been climbing steadily. It has a huge construction budget. And its growth is projected to continue through at least the next 10 years, said the range's commanding officer, Navy Capt. Robert T. Curtis.


Curtis

Curtis, a friendly, soft-spoken pilot with 200 combat missions to his credit, said the range not only is a big economic force on the island, but it's a good neighbor.

Anglers and surfers regularly cross the base to get to the beach. Navy helicopters regularly conduct search-and-rescue missions. The facility is active in community affairs as a base, and its individuals are people in the community.

Curtis recently gave reporters a tour of the base, displaying what he said is Hawaii's highest-tech high-tech operation.

Reporters saw a multi-color display that replayed an aerial dogfight, and watched on billboard-sized screens the maneuvers of a submarine and destroyer hunting each other in waters just over the horizon.

That's what the facility does most, and does better than any other operation in the world: assist in training and testing the military.

"This is the jewel of training ranges and testing ranges in the free world. We have more capabilities than any other range has," he said.

Yet few people on Kauai or in Hawaii know much about it.

The range has participated in space shuttle communications. it tracks cross-Pacific test firings from Vandenberg Air Force Base in California. It monitors satellites in space. It supports scientific experiments involving small rocket firings into the upper atmosphere. It tests new weapons systems.

But its main function is to be a gigantic, three-dimensional testing ground.

Listening devices on the ocean floor allow the range to pinpoint within 10 to 15 feet the location of a submarine anywhere within 1,000 square miles. Radar units at Barking Sands, on Makaha Ridge and at Kokee allow it to pinpoint surface ships and aircraft over 17,000 square miles of ocean.

All of that allows, for instance, a Hollywood-type training exercise. Three or four prospective submarine commanders are tested aboard a submarine for a 90-hour period. They are chased by other subs, tracked by ships and planes, attacked by all of these and by helicopters. In a single such exercise, as many as 150 torpedoes will be used.

When it's over, the computers at the Pacific Missile Range Facility will have the whole thing recorded. Each maneuver, each evasive turn, each firing, each simulated hit. So the participants can go into a screening room and see it all replayed. And the Navy will have an idea how the officers will perform under real-life conditions.

Dummy torpedoes and rockets without warheads are fired at ships to test their automatic defenses in other tests. For instance, the range is scheduled to conduct full combat environment testing of half the Navy's new Aegis-class cruisers, now being built. The others will be trained at a range in Puerto Rico.

The Pacific Missile Range is further able to conduct electronic warfare tests. Some tests can eyen be conducted for ships being maintained at Pearl Harbor, through the range's radar sta-

SSB&A 9-20-87 E4

tech military base

tion at Mauna Kapu, Oahu.

There are 130 military personnel working for the range, 80 government service workers, 460 employees of Dyncorp (formerly known as Dynaelectron Corp.), the civilian contractor that does most maintenance and technical work, along with 50 or more employees of such clients of the range as the organization that maintains torpedoes and Sandia National Laboratory, which conducts atmospheric and other tests through rocket firings.

Is it steady work?

"The turnover rate is less than 1 percent. The people really like working here," Curtis said. If another contractor than Dyncorp wins the bid, that company almost certainly will hire most of the same people. The same skills are needed and the residents have both the experience and housing.

Many of the jobs are engineering and computer positions. Curtis said he's always looking for them, and the range has even established a scholarship program for bright kids from needy families who are going into scientific fields.

"We don't know that they'll come back and work for us, but we hope so. We're always looking for people with those skills," he said.

The operating budget for the range this year is about $35 million. Construction projects under way include a $6.5 million helicopter maintenance hangar and a $2.5 million operations building that will hold $20 million worth of new computer equipment.

Curtis estimated that the 8,600 visitors using the range spend at least $8.6 million annually on hotels, cars and meals on Kauai.

The Navy hopes to expand the underwater range from its 1,000 square miles to 15,000 square miles and to use the new Global Positioning Satellite system to vastly increase its surface and air tracking range.

Curtis said he hopes to build a small harbor at the range to avoid the hour-long commute his boats must make from Port Allen, although that's some years off.

If there's one problem Curtis can't solve, it's housing, he said. There is a serious housing problem island-wide.

Many employees make long commuting trips because housing isn't available nearer their jobs, he said.

"We could use maybe 50 good rental homes in this area. I can't use Navy funds to build them. It's one area where the county could help us out," Curtis said.

KAUAI

POLICE FIRE RESCUE

Palolo Man Shot

A Palolo man was taken to Queen's Hospital early today after he was shot in the shoulder with a shotgun, police said.

A hospital spokesman said the victim, whose name was not released, was in fair condition.

Police said the shooting occurred at 2:56 a.m. at Palolo Housing.

Police said they are seeking witnesses to the shooting.

Airman Drowns

Gerald M. Engh, 20, an airman at Wheeler Air Force Base, drowned yesterday in Yokohama Bay near Waianae.

Police said Engh began experiencing trouble in high waves after he entered the water at about 5:15 p.m.

His companion, another Wheeler airman, Steven E. Gage, 22, jumped in and tried to help. But Gage also experienced trouble in the high waves that kept pushing him back into shoreline rocks.

3 GOP Candidates Ineligible

Three Republican candidates for the state Legislature are not eligible to run because they do not have enough valid signatures on their filing petitions, the lieutenant governor's office ruled.

Leonard Mednick, Elijah Jackson Jr. and William Winters were told yesterday that they were not eligible to run, spokesman Byron Baker said today.

Mednick was one of those who filed just before the filing deadline passed. With Mednick out of the running, Democrat Russell Blair is the only candidate in the race for the Senate's 16th District.

With Jackson ineligible, the only candidate for the House 29th District now is Democrat David Hagino.

Remaining candidates for the House 32nd District, with Winters out, are Democratic incumbent Mazie Hirono and Republican Fred Beeman.

WEATHER

Lucky You Live Hawaii →

Isle Military Projects OKd by Committee

A U.S. Senate panel has approved more than $100 million for military construction projects in Hawaii.

The measure, approved by the Senate Appropriations Committee, now goes to the full Senate for a vote, Sen. Daniel Inouye announced.

Inouye, an Appropriations Committee member, said major Hawaii projects include improvements at the Pearl Harbor Navy Public Works Center, an $18.2 million overhaul of the electrical distribution system and a $3.4 million update of the water distribution system.

Other Navy projects are an $11.8 million cold-storage facility at the Naval Supply Center, a $9.7 million occupational health clinic and a $3.2 million Naval Station SEAL Team training and support building.

A $5.9 MILLION aircraft maintenance hangar with support facilities is earmarked for the Barking Sands Pacific Missile Range installation on Kauai. A $2.8 million intermediate ballistic missile launch complex and a $2.3 million range operations center addition also are planned there.

military news

The **1st Marine Brigade** will conduct ground maneuvers at Dillingham Airfield from 7 this morning to midnight Tuesday, so residents of Mokuleia, Waialua and Haleiwa should not be surprised to see and hear helicopters. There also will be more military traffic than usual in the area. It's all a part of "Kernal Blitz," the largest amphibious exercise around Hawaii since 1982. The exercise included an amphibious landing at Barking Sands, Kauai, yesterday morning, and another landing is planned for Bellows Air Force Station today or tomorrow.

Plans for the **Pacific Missile Range Facility** may include a vast expansion of its underwater testing range, United Press International reported from Kauai. The range off Barking Sands already is the largest underwater military training area in the world. At change-of-command ceremonies at the base, Rear Adm. Joseph Wilkinson Jr. said use of Barking Sands for "war games" has increased by 45 percent in the last three years. The most expansive of several Navy proposals for the future calls for enlarging the 600-square-mile underwater training area to 200,000 square miles. Wilkinson is commander of the Pacific Missile Test Center at Point Mugu, Calif., of which the Kauai base is a part. He spoke at a ceremony in which Capt. Roger Evans relinquished command of the facility to Capt. David G. Bennett.

President Reagan has issued an executive order revising the rules under which military courts may impose the death penalty. As reported by UPI, the order closes loopholes under which a military appeals court overturned a death penalty last year. Under the order, a court-martial must state specifically which of 18 "aggravating circumstances" it takes into account as the reason for imposing the death penalty in rape and murder cases.

Among them are that the offense: caused "substantial damage" to national security; was committed with intent to avoid hazardous duty; occurred in wartime in an area occupied by U.S. troops or their allies; had as a victim the president, vice president, the person next in line of succession to the presidency, members of Congress or federal judges. The order also allows greater leeway for defendants to offer extenuating circumstances.

Since Jan. 11, the Navy's **Mobile Diving and Salvage Unit 1** has exploded 272 of the 370 World War II anti-tank obstacles outside the entrance to Pearl Harbor. The tripods, made of railroad rails, weigh about 1,500 pounds each and are embedded in the reef aout 150 yards off Iroquois Beach. The remaining obstacles will be destroyed soon.

Two Hickam AFB colonels have been nominated by President Reagan for promotion to brigadier general. They are Cols. Donald Snyder and Robert H. Ludwig, both assigned to PACAF Headquarters.

The **Lualualei Naval Magazine** will celebrate its 50th anniversary April 28. All former and current personnel and their families are invited. Call 668-3348 for more information.

— By Jim Borg
Advertiser Military Writer

See Neckel

Bombing of

THIS IS A SHORT HISTORY of the bombing of the Hawaiian Islands by military aircraft of the United States. The United States first dropped bombs on the Islands in 1935 and continues to do so.

Two of the U.S. bombing missions were short, one-time affairs to try and save Hilo from being covered with molten lava.

Volcanologists, after the two bombings of flowing lava, now think there are three ways to use bombs to slow — or stop — a moving lava flow. Aerial bombardment, in all three ways, aims to distrupt the steady flow of lava that supplies the moving front.

One way is to bomb open a break in the solid roof of a pahoehoe flow. Debris drops into the flow, dams it to make the lava come out of the break to spread out or turn in another direction — something like putting a hole in a hose to stop or reduce the stream coming out the nozzle. This was the way tried in 1935.

Another way deals upslope with an advancing 'a'a flow. This type of clinkery flow builds its own side channels and flows between them. This way bombs open a channel to let the liquid lava inside ooze out and spread — something like opening a hole in the side of a high river bank or flood wall. This was the way tried in 1942.

The third way — to bomb open the cone at the source of the flow to let the lava lake inside drain off in a new direction — has not yet been tried. But extensive testing in 1975 and 1976 of large aerial bombs on prehistoric lava flows on the Big Island indicates a good chance of diverting fluid lava flows by this method.

Here's a rundown on the two bombings of lava flows which threatened Hilo.

1935 — Mauna Loa Lava Flow

IN LATE 1935, A LAVA flow fed from a cone near top of Mauna Loa, 13,677 feet high, threatened Hilo. The flow was 20 miles long, advancing steadily, was within five miles of Hilo's water supply, and within 15 miles of the city itself. The people of Hilo were frightened.

Suggestions that explosions might rupture a tube filled with flowing lava were first considered in 1881, when an earlier flow threatened Hilo. Then in 1929, Lorrin Thurston, publisher of the *Honolulu Advertiser* and president of the Hawaii Volcano Research Association, advocated the use of explosives to disrupt or slow a threatening flow, but he suggested dropping a charge of TNT into an existing opening from a tripod over the hole.

It was Thomas A. Jaggar, director of the Hawaiian Volcano Observatory, when faced with the 1935 flow toward Hilo, who conceived of the use of aerial bombs.

At the request of the Hawaiian Volcano Observatory, backed by business and government officials of Hilo, the U.S. Army Air Corps agreed to drop 600-pound bombs to try to divert the flow.

An Army transport ship landed in Hilo with 20 600-pound bombs loaded with TNT, and 20 300-pound bombs to be charged in Hilo with black powder and sand to be used for aiming purposes.

By air from Luke Field on Ford Island in Pearl Harbor came 20 officers and 37 men. They came in 10 bombing planes, two observation planes and two amphibians.

Those 20 TNT bombs were dropped on the flow on Dec. 27, 1935, by 10 fabric-covered Keystone B-3 and B-4 bombers of the 1920s vintage. The Army stated "that the bombs were placed exactly where they should have been."

THE LAVA FLOW STOPPED its forward motion almost immediately, but then resumed its forward motion at a slower pace. The eruption ceased altogether within a week after the bombing without harming either Hilo or its water supply.

While at the time it was thought the bombing had stopped the flow, volcanologists now believe that the stopping of the flow soon after the bombing must be considered a coincidence.

One Hawaiian was quoted in the Hilo newspaper as predicting that the flyers who dropped their bombs on lava flows of the Hawaiian volcano goddess Pele would die by fire.

A few days later, six army airmen were killed in a Luke Field crash. Some Hawaiians said that the six men killed were the same men who had bombed the flow and that the bombers wrecked in the crash were the same one used.

Army authorities neither confirmed nor denied the rumors.

What meager information exists indicates that some of those killed had been in the Mauna Loa bombing runs; some had not; and some who were in the bomb runs had escaped unharmed from the Luke Field crash.

One elderly Hawaiian man in Hilo, who claimed descent from Pele, said that when it became obvious the bombing had not stopped the flow, that he personally went to the flow and petitioned Pele to save his friends, his home, and the people of Hilo.

Pele, he said, had answered his prayer.

1942 — Mauna Loa Lava Flow

IN THE MIDST OF WARTIME blackout, Mauna Loa erupted on April 26, 1942, a few months after the Japanese attack at Pearl Harbor.

Red glow from lava fountains and flows high on the mountain could mark the location of the Hawaiian Islands for the enemy fleet and its long-ranging aircraft. That glow could also silhouette American ships at night for any lurking enemy submarines.

If Japan knew about it.

With martial law in effect in Hawai'i, the eruption was classified as a military secret. Newspapers were not permitted to publish any account of it until eight days after the eruption ended. No mention of it could be made in letters — censors opened, read, clipped out all prohibited information and suspicious parts, resealed and stamped all outgoing mail as "Passed by Censor."

Of course, Island people knew about the Mauna Loa eruption. Its glow could be seen from Honolulu — brilliant in the blackout.

Island people wrote to their friends and relatives on the Mainland, especially to those who knew of Jaggar's long years of studies of Hawaiian volcanoes, that, "Dr. Jaggar's baby has been sick again — vomitting all over the front yard."

Military censors, army officers brought from the Mainland and unfamiliar with Island affairs, stamped and forwarded letters with such information to the Mainland.

One rumor said that Tokyo Rose broadcast the news the day after the eruption. A Japanese submarine was thought to have seen the glow and relayed the news by radio to the Japanese fleet.

BY MAY 1, THE FLOW was threatening to destroy the water flume which supplied the Big Island community of Mountain View, and irrigated its fields of sugar cane. It threatened to cut the only road which linked Hilo with the Kilauea Military Camp at Volcano, and even threatened to invade Hilo and destroy part of its harbor — the only port open on the Big Island, and vital to military freight and passengers. Raw sugar from all Big Island plantations was shipped from Hilo to California for refinining — and sugar was a high priority, critical and rationed war material.

Hawai'i's military government did not want to hurt the sugar industry nor lose the port of Hilo. It was receptive to a bombing mission to try to stop or divert the lava flow.

An Army plane after making its run over Mauna Loa in 1935.

1959-1969 — South Kona Range

U.S. GEOLOGICAL SURVEY maps show this bombing target about three-quarters of a mile inland from the ocean in the land of Kapua in the Big Island's South Kona district.

Coastal Kapua is remote and uninhabited — far from the few houses which are close to the highway several miles inland.

In 1939, the Navy leased the target area from the Bishop Estate. Carrier aircraft used it intermittantly for both bombing and strafing. When targets were destroyed, eventually a Navy team traveled overland to repair them.

Those houses inland were close enough that when some bombs landed, dishes on kitchen shelves rattled. Occupants watched parachute flares at night illuminate the target area as carrier planes dropped live bombs.

It was night that the dishes most often rattled.

Complaints brought a response from the Navy admiral. He was firm in stating that the South Point Bombing Range was only used during daylight hours — and it was never bombed, only strafed.

Local residents inland, and the fishermen along the coast were glad when the target was abandoned about 1969.

Floating off shore at Kapua in an outrigger canoe in the early 1960s, I watched a carrier plane work the target over with machine gun and light cannon fire. I was thankful the pilot did not switch his gunsights to a nearby outrigger canoe.

He did wiggle his wings at us as he flew back to sea.

article

the Isles

Tales of Old Hawai'i

By Russ Apple

Ruy Finch had succeeded Jaggar as director of the Hawaiian Volcano Observatory.

Finch flew over the 'a'a flow and selected the most favorable places to break the natural levees. He also selected alternate levees higher on the mountain.

By the time the bombers arrived, smoke and clouds hid the selected sites — and the alternate sites became the targets.

Army censorship cloaked the event at the time, and the extensive military records of the eruption and bombing have since been lost. It's believed that an unknown number of twin-engine Douglas B-18s dropped the bombs — number unknown — on the alternate sites.

ONE SIDE NOTE — a volcano buff of Hilo hiked up Mauna Loa with his 15mm movie camera to watch and film the lava flow. He was standing on a vantage point when U.S. Army Air Force bombers unexpectedly flew low over his head on their bomb runs. This civilian filmed what was a highly classified military secret at the time.

No great success was claimed for the bombing — and the flow apparently stopped from a natural cause — although bigger and better bombs were waiting in Hilo for a second try if necessary.

The apparent cause was the natural collapse of part of the rim of the spatter cone which fed the flow. A major new flow ran from the collapsed part to rob more than half the volume from the flow which threatened Hilo.

This led Finch to suggest that source-vent spatter cones might be a good target for future lava diversion attempts.

Years later, volcanologists inspected the sites of the 1942 bombing. Because of the lack of detailed records, the scientists were able to identify the area by viewing that clandestine movie made during the bombing. It showed in the background geologic features which could still be identified.

An unexploded bomb was found. It was identified and exploded by an Army Explosive Ordnance Disposal team from Fort Shafter. It was a pre-World War II vintage MK-1 — a 600-pound TNT demolition bomb, the same type used in 1935.

1975-1976 Bomb Testing

IN JULY 1975, ANOTHER eruption of Mauna Loa — confined to its summit, however — caused Hilo and state authorities to ask the Army and Air Force to prepare contingency plans for lava diversion.

Field tests were conducted in the Pohakuloa Training Area on the north slope of Mauna Loa, using prehistoric lava features as targets. The three types chosen were an 'a'a spatter cone, its downslope 'a'a lava channels with levees, and a lava-tube system on an adjoining pahoehoe lava field.

Effects on each area were tested with different bombs, explosive fillings, fuses, and delivery aircraft; 36 different bombs were dropped.

Aircraft that were in Hawai'i for training exercises and scheduled for bombing practice were used.

Volcanologists concluded that most lava flows of the type likely to endanger Hilo in the future probably could be diverted from harmful paths by aerial bombing — if vulnerable areas in the lava supply conduit develop; if they are identified; if they are bombed when most vulnerable; and if the weather is favorable.

Scientsts also note that bombing must be the last resort — if all other ways to divert lava flows fail — because many people in the Islands hold religious convictions that the use of explosives during an eruption is an insult to Pele, the Hawaiian volcano goddess.

* * *

The above bombing missions were connected with volcanic flows as targets and were humanitarian in nature. They sought to save endangered life and property.

Other bombing missions and targets were and are longer-term programs to train aviation personnel in the use of live ordnance.

Much of this live-ammunition training was during World War II. Some of that training continues today, but on a much reduced scale. Here's a rundown.

1940 and Continuing—Kaho'olawe

ANGUS MacPHEE, A MAUI RANCHER, first leased the Island of Kaho'olawe for cattle ranching in 1920. His last ranch lease from the Territo-

by U.S.

ry of Hawai'i started in 1933 and was due to expire in 1954.

In mid-1940, MacPhee sub-leased an unused part of the Island to the Navy for use as a bombing range.

That's when the United States started to drop bombs on Kaho'olawe — 1940.

Martial law was declared on Dec. 17, 1941, a few hours after the surprise attack in Pearl Harbor. Within a few days, the Navy took over the entire Island of Kaho'olawe. It put targets in selected places for practice in aerial bombing and ship-to-shore shelling.

MacPhee, his family and ranch hands were forced to abandon Kaho'olawe immediately. They left behind fences, walls, cisterns, dwellings, corrals, cattle, horses and personal possessions — all without compensation — although suit was eventually brought, and may still pend.

After World War II, a Presidential Executive Order while Hawai'i was still a territory put Kaho'olawe under naval jurisdiction. Statehood in 1959 did not change that status.

From 1941 through 1967, 26 years, the land and waters of Kaho'olawe were off-limits to civilians. Starting in 1967, on some weekends the waters off the Island were opened by the Navy to civilian fishermen. The Navy refrained from bombing and shelling on those weekends.

UNDER THE EXECUTIVE ORDER, when the Navy had no further use for Kaho'olawe, it was to rehabilitate the Island — do such things as plant trees to halt erosion and remove unexploded ordnance — and then turn the Island over to civilian control.

In 1969, a 500-pound unexploded bomb was discovered on a Maui pasture, a pasture leased to Elmer Cravalho, the mayor of Maui County. He was a leader in the move on Maui which pushes to return Kaho'olawe to civilian control.

That bomb in the pasture fell, the Navy finally explained, unfused from an aircraft in 1966.

One early move toward rehabilitation came in 1972, when the Navy permitted a civilian party ashore to plant about 1,500 trees and shrubs.

Feral goats which roam the Island promptly ate them.

Also in 1972, the Navy reduced the weight of individual bombs to be dropped on Kaho'olawe targets from a thousand pounds to 500.

In 1976, a number of Hawaiians and others protested the continued bombing of Kaho'olawe. Some occupied the Island for short periods — apparently the first activist-type protest by ethnic Hawaiians.

WITH HAWAIIAN PROTESTERS roaming Kaho'olawe, the Navy was not about to bomb or shell the Island and risk turning protesters into martyrs. To evict the unauthorized visitors, the Marines landed.

Hawaiian activists played hide and seek successfully, until they tired of the game and left unseen — sailing silently back to Maui.

Under the federal historic sites act, the Navy was obligated to survey Kaho'olawe for historic sites. One result — the Navy has restricted large areas of the Island from bombs and shells to protect the sites.

Now regularly, with Navy permission, Hawaiians and their guests spend a few days and nights on Kaho'olawe to learn about the Island, associate themselves with its land, and honor their past.

During such times, the Navy schedules no missions — but at other times, bombs still drop and shells still land.

Occasionally the explosions were dropped in attempts to interrupt the flow of lava, but mostly it has been for training purposes.

1940-1950 — Ka'u Bombing Range

WHEN THE NAVY got its bombing range on Kaho'olawe in 1940, the U.S. Army Air Corps wanted its own range. It found one in a national park.

A remote, uninhabited area of 6,000 acres on the Big Island was chosen. This aircraft bombing range was part of the Hawaii Volcanoes National Park. Like Kaho'olawe, this bombing range predated World War II in the Pacific.

A bill was introduced early in 1940 in Congress to withdraw this acreage from the national park and transfer it to the secretary of war for military purposes.

In Hawai'i, the *Honolulu Star-Bulletin* broke the news on March 30, 1940. Its editor, Riley H. Allen, spoke both editorially and privately against the bombing within a national park. Public reaction was immediate and adverse, and soon spread to the Mainland. Opposition came from organized conservation groups and a few individuals.

Objections did not center on bombing Hawaiian land, but on bombing within a national park.

The bill, which became law, was revised to permit the secretaries of the interior and war to select a suitable bombing range within the 6,000 acres specified.

They selected 3,000.

SELDOM, IF EVER, did the Army Air Corps use the range. Instead it was used frequently and

Military Planes

regularly by aircraft of the Naval Air Station, 35 miles away in Hilo.

Aircraft which used the Ka'u Desert Bombing Range, especially for strafing, did not always confine their firing to the range. On one occasion, civilians fishing some miles away were wounded.

In 1950, the army cleared the range of all the unexploded bombs and shells it could find, and returned the area to national park administration.

As a park ranger in the 1950s, I saw many unexploded bullets and empty shell casings on the range. Many of the large brass shell casings went into the machine shop of the Hawaiian Volcano Observatory to be made into parts for precision instruments.

One hangs on the Apple-Macdonald front porch at Volcano on the Big Island. An 'ohi'a clapper hangs beside it. The brass shell it strikes is our doorbell.

1942 and Continuing — Pohakuloa

WHEN ARMY AND MARINE CORPS engineers built the Big Island's Saddle Road in 1942, between Hilo on one side of the Island and Waimea on the other, a huge, uninhabited area between the volcanoes Mauna Loa and Mauna Kea became accessible.

Use of this Pohakuloa area for live firing through 1945 seems to have been for intermittant artillery exercises. As the wartime buildup of armament went on, the size of the artillery pieces in use at Pohakuloa grew from 75mm through 155mm.

Tanks trained there as well.

During the Korean War, the use of Pohakuloa expanded. Training for aircraft support of ground troops became Pohakuloa's specialty.

Witnesses report that napalm and high explosive shells are still frequently dropped from aircraft in the Saddle region. Aircraft which drop them are usually based on O'ahu. Army and Marine Corps units also come from O'ahu bases for training exercises because Pohakuloa is removed from civilian centers.

1942-1945 — Multiple Targets

DURING WORLD WAR II, when the Hawaiian Islands were major supply and training bases for the war in the Pacific, apparently many off-shore Islands and remote coastal areas were bombed from aircraft used in training pilots and aircrews.

Most places hit were apparently authorized targets; others apparently not.

Among the known targets:

Hawai'i Island: the cinder cones and sand dunes around Waiahukini, near South Point, Ka'u District.

Moloka'i: Mohuo'oniki islet near east end. As late as the 1950s, napalm and high explosives were seen by residents as they struck the islet.

O'ahu: Mana (Rabbit) islet and Kaohikaipi islet off Waimanalo. The Army claims it shot only artillery shells at these Islands, but scientists claim they have found bomb fragments and craters there.

Also, judging from the recent underwater demolition of live World War II bombs in their adjacent waters, Moku'auia and Kihewamoku islets off Malaekahana were also targets from aircraft.

1952 and Continuing — Ka'ula

OFTEN CALLED KA'ULA ROCK, Ka'ula Island is a small, steep-sided islet about 23 miles southwest of Ni'ihau. So little is known about Ka'ula that sources variously list its acreage as 108, 136 and 280.

Colonies of seabirds make Ka'ula their home. Fishermen from nearby Kaua'i depend on some of these birds to scout schools of fish for them.

Rare and endangered humpback whales cluster around Ka'ula from December through May.

Somehow left out of the Northwest Hawaiian Islands Wildlife Refuge in President Theodore Rossevelt's executive order in 1909, Hawai'i's Gov. Wallace Rider Farrington made Ka'ula a lighthouse reservation in 1924.

Uncle Sam built a lighthouse on it in 1932 and maintained it through its closure in 1947. By this time the U.S. Coast Guard had jurisdiction.

Perhaps it was a telephone call between admirals, perhaps a conservation in a social situation, but sometime in 1952 a naval admiral got a favorable reply from a Coast Guard admiral to his question, "Is it OK with you if the Navy bombs Ka'ula Rock?"

Whatever the method of communication, an informal agreement was reached.

That started the aerial bombing of Ka'ula in 1952.

Ka'ula's target area is a small area the southeast tip — perhaps 5 percent of the total Island area.

MISSED BOMBS APPARENTLY hit into the bird colonies on the rest of the Island, or fall into adjacent waters.

Bird watching civilians protested — to cause the National Marine Fisheries, the U.S. Fish and Wildlife Service and the State of Hawai'i Wildlife Division to get into the act. Raw data were needed to either nail the Navy or get the Navy off the hook under various federal laws.

Since 1976, a joint federal-state team makes annual surveys of the birds, and the Navy voluntarily stopped dropping live bombs on Ka'ula during the whale season — and at other times are now reportedly dropping only inert bombs.

In 1965, two Navy pilots mistook inhabited Ni'ihau for Ka'ula and dropped eight 250-pound bombs on Ni'ihau. No one on Ni'ihau was injured.

A shipwreck in Keoniloa Bay offers a site for sport divers. The former Coast Guard LORAN Station at Makahu'ena Point is presently in use as a home for wayward youths called Hale 'Opio. Tidepools east of the point offer good potential for nature study field trips. Public access beyond this area is limited.

Beyond Makawehi Point are large series of lithified dunes. Shoreline fishing for ulua (using the "slide bait" method) is common in the area. The remnants of an old sunken pier are located nearby. Divers, pole fishermen, and throw-net fishermen also frequent Kawailoa Bay and Ha'ula. Off Mahaulepu, high surf and dangerous currents occur in summer months. High surf causes somewhat turbid waters. Off Pao'o Point underwater visibility is better than 50 feet. Currents can be dangerous and shark sightings are common.

All of the shoreline lands of Maha'ulepu between Makahu'ena Point and Kawelikoa Point are among the most interesting areas in the State, both geologically and biologically. Native coastal strand vegetation on the dunes between Makahu'ena Point and Kamala Point is considered the best example on Kaua'i of this vanishing ecosystem. The lithified sand dunes near Keoniloa are probably older than 120,000 years. The sand dunes harbor not only the fossils of now extinct birds (bones of three species of goose, a long-legged owl, and a flightless rail have been found) and land snails, but colonies of sea birds, an indigenous strand vegetation and a small cave-dwelling insect and spider fauna. Because of their restricted distribution, the blind wolf spider and the blind terrestrial amphipod are considered extremely rare and endangered. Also within this area is the only solution limestone cave in the State. This feature is located in the large lithified sand dune near a quarry and a heiau [2].

Kawelikoa Point, or Black Mountain, as it is known to local fishermen, divides Maha'ulepu and Kipu Kai. Some 'opihi picking occurs around the base of the point.

Kipu Kai

Kipu Kai is the name applied to the three wide pocket beaches that extend from Kawelikoa to Mount Hokunui. The area is exceptionally beautiful and the beaches are of excellent quality, but access routes are over private property [37]. During periods of calm seas these beaches provide excellent opportunities for swimming, picnicking, shoreline fishing, limu harvesting, 'opihi picking, and beachcombing. Sportdiving nearshore is also rewarding.

Underwater visibility is over 50 feet at Kawai Point. During periods of high surf, hazardous ocean conditions prevail along the entire coast. Deep-sea fishing for uku and sea bass occurs in the offshore waters.

HISTORICAL AND ARCHAEOLOGICAL SITES

Waiakapua'a Spring

The spring at Kipu Kai called Waiakapua'a is where Kamapua'a, the demi-god who could assume the shape of a pig or man, slept on one of his trips to Kaua'i. It was here that Limaloa rolled a stone down to kill him while he slept, but Kamapua'a thwarted the attempt [38].

SECTION 18 MAHA'ULKPU

(MAHA'ULEPU, MAKAWEHI, KEONILOA BAY, KAMALA POINT, KAWAILOA BAY, PAO'O POINT, HA'ULA, NA'AKEA POINT, KAWELIKOA POINT, PIHAKAPU, MO'EHU POINT, KUAHONU POINT, NOHIU BAY, KAWAI POINT, KALANIPU'U, CARTER POINT)

- Aerial photos 1-327,329,331,333,335,337,341,344,347,351,1,9

PHYSIOGRAPHY

Coastline

The entire coastline is subject to tsunami flooding. The tsunami of 1957 generated wave heights of 7 feet at Makawehi and along the coast west of Kamala Point. The 1960 tsunami produced waves reaching 10 to 11 feet along the reach west of Kamala Point and also at Pao'o Point [30].

Keoniloa Bay

Keoniloa Bay has a flat and sandy bottom. Outside the bay, limestone rubble and sand occur between outcrops of smoothed reef rock.

Off Pa'a Dunes

East of the lithified sand dunes between Makahu'ena Point and Keoniloa Bay, an irregular volcanic rock and boulder bottom lies at depths of 20 to 25 feet. The pattern of rounded blocks separated by cracks resembles the "tile" bottom pattern off Makahu'ena Point. Although there is less depth variation and fewer caves than off Makahu'ena Point, bathymetric relief is considerable [JM #40].

Pao'o Point and Offshore

The coastline at Pao'o Point consists of a lithified sand dune formation indented by two small coves haded by sandy beaches. Offshore from the point, at a depth of 50 feet, is a heavily scoured terrace of volcanic rock having little vertical relief. This platform was presumably cut by wave action at a lower stage of the sea. Heavy surge shifts sand deposits among large rounded

83

KAUA'I ISLAND
COASTAL RESOURCE INVENTORY

(KICRI)

Prepared for:

U.S. Army Engineer Division
Pacific Ocean
Fort Shafter, Hawaii 96858
Contract No. DACW84-82-C-0016

Prepared by:

AECOS, Inc.
970 N. Kalaheo Ave., Suite A300
Kailua, Hawaii 96734

September, 1982

GEORGE R. ARIYOSHI
GOVERNOR OF HAWAII

SUSUMU ONO, CHAIRMAN
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STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF AQUATIC RESOURCES

P.O. Box 1671
Lihue, Kauai, HI 96766

Date: 10-21-1986

MEMORANDUM

TO: George Balazs

FROM: Don Heacock, Aquatic Biologist - Kauai

SUBJECT: Sea Turtle Nesting on Kauai

On Friday, 17 October 1986, Mr. Lindy Sutherland, Manager of Kipu Kai Ranch, phoned me to report that turtles (possible four) had nested along an isolated section of beach at Kipu Kai. He stated that a Mr. David Portius had originally seen "fresh" turtle tracks and nests on this beach on 9 August 1986 and reported the finding to him.

On Saturday, 18 Oct., I inspected the turtle nesting sites (4) but, due to time constraints, I was unable to excavate in order to determine (document) if eggs had been laid, the species involved, how many eggs had hatched, etc. George, I would greatly appreciate your assistance in excavating these four nests, which according to Portius and Sutherland were all laid (dug) on the same night, in order to document the turtle nesting activity in this area. According to my records this is the eighth (or the 11th if all four are counted) turtle nesting (digging?) to have occurred on Kauai in the past 2-3 years.

Finally, I feel there is a great need to initiate a turtle tagging program on Kaūai in order to gather pertinent biol-ecological data for their proper management, and to "get a handle " on the apparent high incidence of neoplasms (my previous notes to you) on Kauai turtles. Is the NMFS planning to conduct any applied research on sea turtles on Kauai?

Sincere Aloha,

Don Heacock

Donald E. Heacock
Aquatic Biologist - Kauai District

Small flock of nene seen re-establishing on Kauai

By Jan TenBruggencate
Advertiser Kauai Bureau

LIHUE — A small flock of Hawaiian geese — or nene — is re-establishing the state bird on Kauai after centuries of absence.

The birds have been spotted recently in the Lihue area and around Mahaulepu on the south side of the island. State wildlife biologist Tom C. Telfer said about five birds have been repeatedly seen in these areas.

He cautioned that the nene is an endangered species and is protected by federal law. That translates, for the curious, to look but don't touch.

The nene come from what was a captive flock at Kipu Kai, a small valley surrounded by mountains on three sides and the ocean on the fourth. It's not yet clear whether they are reproducing in the wild.

"This is the time of year when there should be goslings, but nobody's reported any," Telfer said.

Wildlife officials hope the bird's presence on an island without the mongoose will give it a chance to develop a healthy wild population.

That's been a problem on Maui and Hawaii, where the state has been releasing nene raised in captivity. While these nene have survived, their populations have not risen much. Wildlife experts fear there may be too many predators and too much change in their habitats for survival of a wild population without continuing supplements from the captive rearing project.

Kauai's first population in modern times of Hawaii's state bird originates on the Big Island. The birds were raised for a time at the Kipu Kai ranch of the late Jack Waterhouse at the southeastern base of the Haupu mountain range on Kauai. The first of these nene were acquired from Herbert Shipman on Hawaii. Shipman's birds also formed part of the breeding stock for the state's captive rearing project.

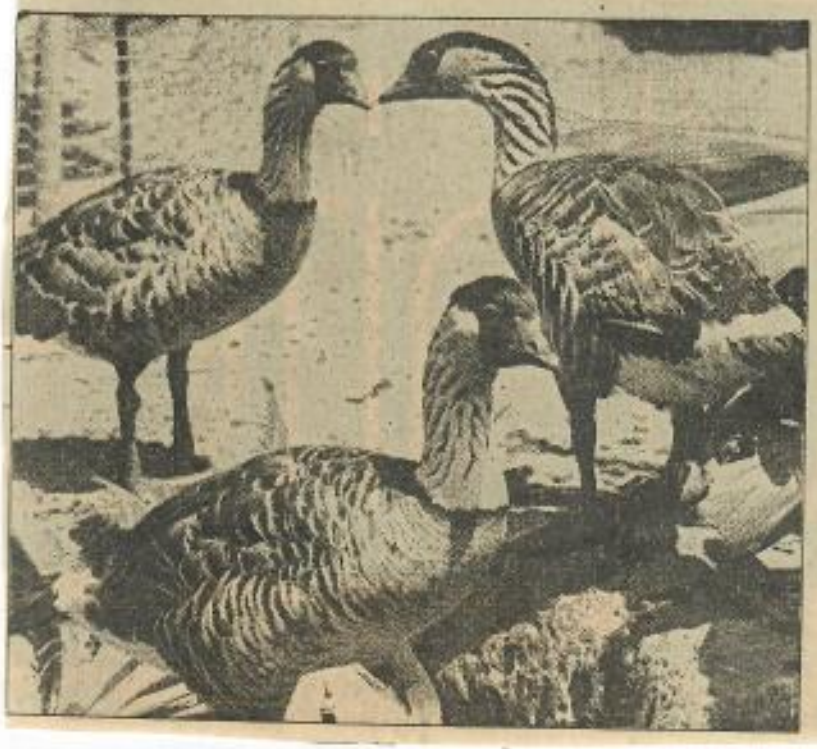
Telfer said the Kipu Kai birds were freed, and initially kept to the ranch lands. More recently, a few of the roughly 15 birds began ranging out of the valley.

"We've been seeing them during November around Ahukini. They've been loose in Kipu Kai for a couple of years, but this is the first case in which they have been seen regularly outside of there," Telfer said.

Kauai doesn't have mongooses, but it has dogs and cats that might bother the nesting nene, and it has a limited area of nene habitat compared to Maui and the Big Island.

The birds range on Hawaii along the slopes of the big volcanoes, and on Maui both inside and outside Haleakala Crater.

Nene seem to do best in low brush and pasture land. They are grazers, eating fruits like the berries of the pukiawe bush and greeners. While Canada geese and others are closely associated with water, the Hawaiian goose isn't. It has less webbing of the feet than many geese.



This flock of nene was photographed at Waimea Falls Park two years ago. The birds seen on Kauai recently were spotted around Mahaulepu along the island's south coast and come from a captive breeding stock at Kipu Kai.

Advertiser photo by Charles Okamura

HAWAII FISHING NEWS

Fisheries Resource Use and Management

by Sylvia Rodgers

■ In Part I of this series, we reviewed the traditional system used by Hawaiians prior to Western contact. In Part II we outlined the changes that took place during the past century with the destruction of konohiki rights and fishponds, with the introduction of modern fishing equipment and techniques, and with the ruin of nearshore marine habitats. In this concluding part, we will take a look at modern fishery management plans.

The overwhelming consensus is that marine life in the main Hawaiian Islands is declining, especially in nearshore waters. Major complaints have focused on overfishing, gill netting, introduced species, the lack of enforcement of marine laws and inadequate marine laws.

Seeking more information, I contacted Don Heacock, the District Aquatic Biologist for Kaua'i.

"There is still a lot of technical information on basic fishery management concepts and principles that needs to be put forth in layman's terms," Heacock said. "First, let's define fishery management. The definition is given in Magnusen's Fishery Conservation and Management Act of 1976. That congressional Act directs states within the United States to (1) conserve fishery resources and (2) manage them so that the fishery resources provide maximum socioeconomic benefits to the majority of the people that use the fishery resources. Managers therefore need to know what group their decisions will benefit—the commercial fishermen, the recreational fishermen or both.

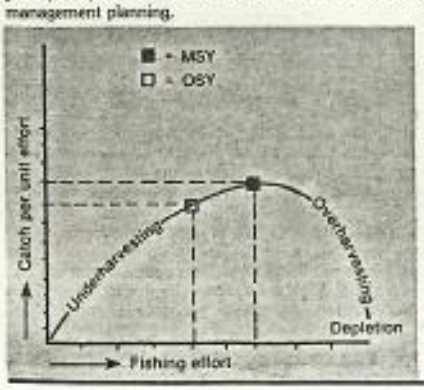
"In Hawai'i, we don't even know how many recreational fishermen we have or how many fish they catch," Heacock noted. "But certain marine resources may generate more benefit to the state if they were designated as recreational or home-consumption resources, rather than for commercial sale. For instance, the commercial fishery of Hawai'i in 1983 was estimated to be worth $17.8 million in gross sales. In contrast, the recreational fishery of Hawai'i in 1980 generated an economic worth of $38.2 million.

"Secondly," Heacock said, "the concept must be conveyed that fishery resources are finite. That is for any species of fish in a particular area there exists a maximum sustainable yield (MSY), or, in other words, a maximum catch in pounds that can be harvested year after year without causing the fish species to be overfished and headed toward severe depletion.

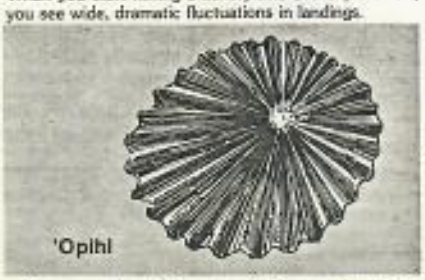
"A good example of MSY is Maui County's bottom fishery," Heacock explained. "Fishery scientists believe it's already at MSY. That is, if more fishing effort (number of fishing boats, number of fishermen, etc.) was placed on that fishery then the death rate of that species would be higher than its birth rate and the species would be headed toward depletion.

"Presently, the average size of the bottom fish caught in Maui water is significantly smaller than what it is on Kaua'i. The average 'opakapaka caught off Maui is almost at the minimum size limit that the fishermen are allowed to catch, which is 1 lb. Off Kaua'i, the average size of 'opakapaka being caught is about 7 lbs."

Two means of detecting overexploitation were explained by Heacock. The first is through catch per unit of effort (CPUE), which can be viewed as the total catch or profit made per fishing trip. When the CPUE decreases even when there is an increase in fishing effort, then MSY has been reached and the fishery is on the threshold of overexploitation. Because of this, fisheries scientists and managers now use optimal sustainable yield (OSY) rather than MSY as a criteria for fisheries management planning.



A second means of detecting overexploitation is through fluctuations in total landings. "Fish populations are dynamic—there may be more moi, for example, here one year than the next due to natural fluctuations," Heacock said. "But those fluctuations are very small. When you start fishing a fishery into overexploitation, you see wide, dramatic fluctuations in landings.


'Opihi

"For example, at the turn of the century, 'opihi landings were well over 150,000 lbs. Those are now down 88 percent today. And limu manauea landings were 10,000 lbs in 1977, but in 1983 they were less than 500 lbs."

After defining fishery management and conveying the idea of the finiteness of marine resources, Heacock discussed the purpose, types and effectiveness of fishing regulations.

"The primary objective of fishery's management as a science is to conserve fishery resources and to provide an equitable allocation of these resources among the commercial and recreational users," Heacock said. "Fishery resource allocation decisions are made each time a fishery regulation is established. However, regulations should be established only when there is a clear need to do so.

"Types of regulations designed to conserve fish stocks include size limits (usually for both commercial and recreational fisheries), gear restrictions (such as mesh eye sizes of gill nets), bag limits (usually set for recreational fisheries only), area closures (such as Hawai'i's kapulu system), seasonal closures (usually to protect spawning stocks) and as a last resort the outright prohibition of one type of fishing (either commercial or recreational fishing). An example of this latter type of regulation would be that set for nehu. Nehu in Hawai'i are basically reserved for commercial fishermen. Commercial fishermen who fish on aku boats can catch all the nehu they can; however, recreational fishermen are limited to only one gallon of nehu a day. There are other examples. An example where a fishery has been designated only as a recreational or home-consumption fishery would be the limu manauea and ogo fisheries on Maui."


Nehu

At a board meeting in late October, the Department of Land and Natural Resources (DLNR) agreed to the following new administrative rule:

New Administrative Rule, Chapter 13-93 (Limu Manauea and Ogo)

1. No taking with holdfast (root attachment).
2. No taking with reproductive nodes (bumps on stems).
3. No taking more than one pound per person per day for family consumption.
4. No taking more than 10 pounds per day for commercial marine licensee, except that limu can be taken only for family consumption on the Island of Maui.
5. Fish peddler or commercial marine dealer may possess more than 10 pounds with receipts in d for purchase pursuant to section 189-11, Hawaii Revised Statutes.

The decision to limit limu harvests on Maui to family consumption (note: it cannot be exported to other islands for sale) is a result of public testimony and a petition signed by Maui residents.

Heacock noted that some Hawai'i fishermen feel that the state should perhaps, as a last resort, also consider passing recreational or home-use regulations for 'opihi, 'o'opu and hihiwai (also known as wi).

"Of all the fishery conservation regulations used worldwide, minimum size limits have proved the most effective," Heacock said. "Minimum size limit should be based primarily on the size of a species at sexual maturity." Fish should not be caught before they spawn at least once, because the biological productivity of most fishery resources is primarily dependent on the number of baby fish produced. This method of fishery management has been recognized since as far back as 1893.


Moi

A 7-inch size limit for moi was also approved by the DLNR board at their October meeting. The board agreed to change the administrative rule pertaining to moi so that moi-li'i (moi of less than 7 inches) may not be taken at any time. Presently, regulations limit the taking of moi-li'i to 50 per day (i.e., a bag limit). The DLNR recommendation also adds a new rule that would prohibit the taking of moi during June, July and August (i.e., a seasonal closure).

. . . continued


Limu Manauea


Ogo

Fisheries Resource Use and Management, continued . . .

Heacock felt that, although these are steps in the right direction, they may still be inadequate to enable moi populations to increase and therefore improve fishing.

"First, moi do not lay eggs until they reach 12 inches long, so allowing them to be taken at 7 inches may not permit them to reproduce even once," he said. "Secondly, moi spawn from April to October, but only during the last four or five days of each last quarter of the moon."

By the way, there is a 15-per-day bag limit on moi. That law was established in 1978, and, though it is not stated, it essentially makes moi a recreational fishery since few commercial fishermen if any could live on such a limited catch.

Besides moi, two other fish that appear to be depleted in Hawai'i are 'ama'ama (Hawaiian gray mullet) and akule. The plight of the 'ama'ama (*Mugil cephalus*) has been complicated by the inadvertent introduction of a smaller, less desirable mullet (*Chelon engeli*) and the planned introduction of the common tilapia (*Tilapia mossambicus*). Both fish compete with the 'ama'ama for food. They also mature at an earlier age than 'ama'ama and they compete with it for habitat.

Furthermore, Heacock noted, there are no minimum size limits for 'ama'ama for home consumption, although a minimum 7-inch size limit has been established for sale of 'ama'ama. The size of 'ama'ama at sexual maturity has not been precisely determined for Hawai'i; however, the same species (*M. cephalus*) in Florida, Texas and Georgia first spawn at lengths of 10 to 12 inches total length.

Although minimum size limits have been shown to be the most effective conservation regulation, certain gear restrictions can affect the underlying size of fish caught. For example, there are no minimum size limits established for akule, but fishing regulations limit nets used for akule to stretched mesh-eye size of 1½ inches and forbid the use of nets from July to October to catch halalu (akule under 8½ inches ' length). "Nets of 1½-inch eye mesh will selectively take that species down to 8½ or 9 inches," Heacock said. "Akule don't even lay eggs until they reach 10 inches," he added.

Another example is seen with papio. The current minimum size limit for home consumption of papio caught with either hook-and-line or gill net is 7 inches. "However, nets with the legally minimum stretched mesh size of 2 inches will selectively catch papio between 5 and 8 inches long, often with most papio being under 7 inches," Heacock said. "Net fishermen are expected to 'throw back' papio under 7 inches. If the fish are found dead in the nets, this is a waste of a valuable resource. Papio smaller than 7 inches found entangled in the net but still alive are expected also to be thrown back. However, the mortality rate of net caught and released papio in Hawai'i is unknown.

"In a study done in Florida, the mortality rate of striped bass caught in gill nets and released was usually very high (80 to 90 percent died), and the study concluded that gill net mesh size regulations must be made in conjunction with minimum size limits if significant mortality of undersized fish is to be prevented. Similarly, the study concluded that seasonal closures for fish (such as 'ama'ama and moi spawning seasons in Hawai'i) must be made in conjunction with gear restrictions, such as prohibiting the use of gill nets during spawning season."

Another type of regulation, that of area closure, is utilized in Hawai'i through its marine life conservation districts (Hanauma Bay, Kealakekua Bay, Manele-Hulopoe bays, Molokini Shoal, Honolua-Mokuleia bays, and Lupakahi) and kapuku areas (shoreline fisheries management areas, such as Diamond-Head Waikiki). "Area closures are good for reef fish," Heacock said. "Because reef fish stay within an area, closure of that area will help populations to increase. However, the fish that are being depleted in Hawai'i are all fish that school and continuously move along the shoreline—such as akule, 'ama'ama and moi. Area closure is not an effective management technique for these species."

In conclusion, Heacock noted the following: "Fisheries management is a multidisciplinary science. The formation of management decision should be made on the basis of the most reliable data and research on the biological, environmental and socioeconomic aspects of fisheries. Management should be conceived and understood not as a constraint upon rational fisheries development but as an essential tool for the sound, sustained development of fisheries. Therefore management of fisheries must be an integral part of the development process. Initially such knowledge may only be approximate but, as exploitation intensifies, further studies should be pursued to render the evaluations more precise. Governments should therefore build up adequate research facilities including research vessels and formulate research programs.

"Because management of fisheries is an integral part of the fisheries development process there is a need to introduce effective management techniques at all stages and particularly at the beginning of fisheries development rather than wait 'til the effects of overfishing and/or habitat destruction have begun to be felt."

This then concludes this three-part series on fishery resource use and management. This final article is not a definite statement on modern fisheries planning. Some ideas such as quota systems and limited entry were not covered. However, it does define fishery management, points out the finiteness of marine resources, lists fishery management regulations that are available for implementation and illustrates some of the regulations that the state of Hawai'i has adopted. Hopefully, it has also provided you with some food for thought and, in the future, food for the table.

. . . Sylvia

High surf Nualolo Kai

~2 months earlier - 1 turtle on the beach at Milolii.

1-8-87

1/9/87 4pm Thes - 10 turtles Seen EASTERN END of beach.

George,

Steve Egger, a helicopter pilot for Kauai Helicopters on Kauai, reported sighting 7 hauled out (basking) turtles today on the Napali Coast. He'd seen 5 several days ago. (He's been flying on Kauai for 2 years.)

The location is between Milolii & Nualolo (Ref. NOS chart 19380). Mr. Egger said there's about 100' of sand beach there - it's a popular summer drop off point for cruise boats. The turtles seem to come & go. He's contacted Don Heacock, who thought you might want to tag the turtles. I told him you'd be in touch shortly, & thanked him for notifying Don.

P.S - Egger mentioned that one of his passengers took pictures - I didn't mention in return not to hover lower than the FAA limit (2000' ?).

Lew

Kauai Helicopters - 245-8591

Home → 5384 Kumole St.
Kapaa Kauai
96746

Tel - 822-7255

MANAGING KAUA'I'S fisheries so that generations to come can experience the simple pleasures of fishing — like these folks at Waimea Pier — is the goal of the Division of Aquatic Resources of the Department of Land and Natural Resources.

The DLNR invites fishermen to attend a public information meeting Tuesday, July 21, at Wilcox School cafeteria. A wide range of important fishing concerns will be discussed at the meeting. (Photo by Dave Boynton)

New fishing regulations proposed

by Rita De Silva

Raising the legal stretched-mesh size of gillnets and establishing federal marine licenses for commercial and recreational fishermen are two of the topics on the agenda of a public informational meeting this Tuesday at 7 p.m. in the Wilcox School cafeteria.

The state Department of Land and Natural Resources, Division of Aquatic Resources, has scheduled the meeting to gather comments from the state's fishing community on a number of issues relating to fishing and management of aquatic resources.

One of the most significant is a plan to require the stretched mesh of gillnets be larger than two inches.

The proposal is needed to conserve marine resources, according to aquatic biologist Don Heacock. He said there is concern about dwindling catches of important food fishes, such as akule, which have declined by 75 percent in recent years.

Raising the mesh size would allow the small and sexually immature fish to escape, Heacock said, hopefully increasing their chances of reproducing later.

The proposal would also require owners to affix an identifying tag on all fish nets and traps.

A federal proposal to establish a marine license system for commercial and recreational fishing is also on the agenda. The federal government has asked the state to solicit input on the Marine Fishing Conservation Assurance Program Act of 1987, which is now in Congress.

The bill would require anyo who fishes in marine waters obtain a federal permit. In a dition, anyone who sells or bu fish from a vessel would need federal stamp. A fee of o percent of ex-vessel value (t amount the fisherman obtains f his catch) would also be collecte from anyone landing fish f commercial purposes.

The program would be a ministered by the state, wit

(Please turn to Page 7)

★fishing★

(Continued from Page 1)

revenues to be shared by the federal and state government fisheries programs.

Fishermen are also asked to comment on a review of the state's Fish Aggregating Device system and offer suggestions for additional sites or improving the existing system.

The FAD system has drawn mixed reactions from the fishing community, with most fishermen favoring them, and those opposed expressing concern about the large number of small tuna they feel are being harvested around the buoys.

Prohibiting the sale of o'opu/hinana and hihiwai/ will also be discussed. Taking of the freshwater aquatic life would still be allowed for home consumption.

Opponents of the proposal say that prohibiting sale of these species would make it difficult for those unable to catch them to enjoy the delicacies.

A proposal to set a minimum tail width size of 2.2 inches or 5.6 centimeters for sale of slipper lobsters taken in the Northwestern Hawaiian Islands will also be discussed. Regulations imposed on the NWHI could be considered for the main Hawaiian Islands in the future.

Changing the effective period of state commercial marine licenses to one year from the date of issue is also being considered. Under existing regulations, all commercial marine licenses expire in June.

The change would eliminate the crush of renewal applications at the end of June and the inconvenience for first-time applicants who obtain their licenses in the middle of the effective period and must renew them within a few months.

Also on the agenda are:

- a proposal to prohibit the use of small-mesh nets for collecting marine aquarium fish. This regulation is expected to apply mainly to the island of Maui, where conservation of tropical aquarium fish is a concern;
- amending the Hilo Bay Administrative Rule to be consistent with Act 131, Session Laws of Hawai'i, 1987, prohibiting netting in Hilo Harbor;
- conservation of black coral off Maui;
- seasonal closure of nearshore fishes (akule, kumu, manini, etc.)
- regulating fishing in waters off Kalaupapa, Molokai by nonresidents of the settlement; and
- establishing a Marine Life Conservation District at Makaiwa Bay, Hawai'i and elsewhere.

Fishermen may also raise any of their concerns not listed on the agenda.

DLNR officials say they urge everyone interested to attend the meetings and contribute any information that might help Hawai'i's aquatic resource programs. Written comments will be accepted until Aug. 20, for anyone unable to attend or who prefers to write.

Written comments should be mailed to the Division of Aquatic Resources, 1151 Punchbowl St., Room 330, Honolulu, HI, 96813.

For further information, contact the Division of Aquatic Resources at 245-4444.

Dead sea turtle investig. 17 July '82

- 35.5" O.S.
- tag on rt. front flipper
- " # 3408
- no visable signs of injury; no tumors; however, plastral plates were concave ("sunken")
- appeared to be a healthy ♀
- turtle washed ashore in the area shown (X) below:

D. Heacock

Department of Land and Natural Resources

DIVISION OF AQUATIC RESOURCES

Date: 14 July 87

To: George Balazs
From: Don Heacock
Subject: Additional Sea Turtle Nesting on Kauai.

On the nights of 25 June + 11 July '87 (16 days apart) a turtle(s) came ashore at Lawai Kai (Allertons beach) and dug two nests that are located 30 feet apart. The nesting activities were reported to me by Mr. Toshi Kaneko, P.O. Box 519 Koloa, Kauai 96796 (742-1935). I've sent Mr. Kaneko Ehrenfeld's (1979) Sea Turtle Fact Sheet, and several other ~~pub~~ pamphlets. However, I'm sure that he would appreciate receiving a poster (Sea Turtles of the World, NOAA 1982) from you.

Aloha, Don Heacock

VIA DON

12 or 13 July 87 = / false
dig
Seen.

Karen
Kipukai

HELPFUL HINTS

1) NEVER SNORKEL OR DIVE ALONE. BESIDES, IT'S MORE FUN TO SHARE THE EXPERIENCE WITH A BUDDY.
2) OBSERVE THE OCEAN CONDITIONS BEFORE ENTERING THE WATER FOR DIRECTION AND SPEED OF ANY CURRENTS.
3) ALWAYS KEEP YOUR EYES ON THE OCEAN WHEN ENTERING OR EXITING. AVOID HIGH SURF AREAS.
4) DO NOT DIVE THE NORTH SHORE SITES DURING WINTER MONTHS DUE TO HIGH SURF CONDITIONS.
5) MAKE SURE YOUR EQUIPMENT IS ADJUSTED PROPERLY BEFORE ENTERING THE WATER.
6) WHY NOT BRING SOME FISH FOOD WITH YOU SUCH AS BREAD, PEAS OR SQUID?
7) WE SUGGEST USE OF GLOVES TO PROTECT YOUR HANDS FROM THE SHARP CORAL.
8) AVOID FATIGUE - GET BACK BEFORE YOU'RE TIRED.

CONSERVATION HINTS

PLEASE HELP US CONSERVE KAUAI'S PRECIOUS MARINE BEAUTY!:

1) PLEASE DO NOT BREAK OFF LIVING CORAL!

DID YOU KNOW THAT CORAL IS A COLONY OF MANY INDIVIDUAL ANIMALS? IT GROWS VERY SLOWLY IN HAWAII'S RELATIVELY COOL TROPICAL WATERS - LET OTHERS ENJOY ITS BEAUTY.

2) PLEASE DO NOT TAKE LIVING ANIMALS OR SHELLS!

MOST ANIMALS LOSE THEIR COLOR AFTER DYING AND USUALLY SMELL FOR A LONG TIME (IN YOUR SUITCASE). BESIDES, OUR OCEAN FRIENDS ARE MUCH HAPPIER IN THE SEA THAN ON YOUR SHELF! KEEP YOUR EYES OPEN AND YOU'LL FIND PLENTY OF EMPTY SHELLS!

3) PLEASE DO NOT SPEAR FISH!

THE FISH ARE SO TAME THEY WILL EVEN COME UP TO YOU - AND WITH OTHERS NEARBY IN THE WATER, SPEARFISHING CAN BE DANGEROUS.

SNORKELING SITES

① **SALT POND** - TURN LEFT ON HWY 543. LEAVING HANAPEPE GO ½ MI. TURN RIGHT ON LOKOKAI RD. BY CEMETERY. SNORKEL INSIDE REEF. DEPTH 6'.

② **BEACH HOUSE** - TAKE LAWAI RD. TOWARDS SPOUTING HORN. FOLLOW FOR 3/4 MI. TO BIG, CEMENT, BEACH HOUSE RESTAURANT ON LEFT, PARK ACROSS STREET, LARGE CORAL HEADS - 5'-15' DEPTH. GOOD UNDERWATER PHOTOGRAPHY SPOT.

③ **KOLOA LANDING** - TAKE LAWAI RD, TAKE FIRST LEFT OVER SMALL BRIDGE. TAKE FIRST DIRT ROAD TO RIGHT. FOR EXPERIENCED SNORKELERS OR SCUBA DIVERS. 15'-20' DEPTH. NO BEACH.

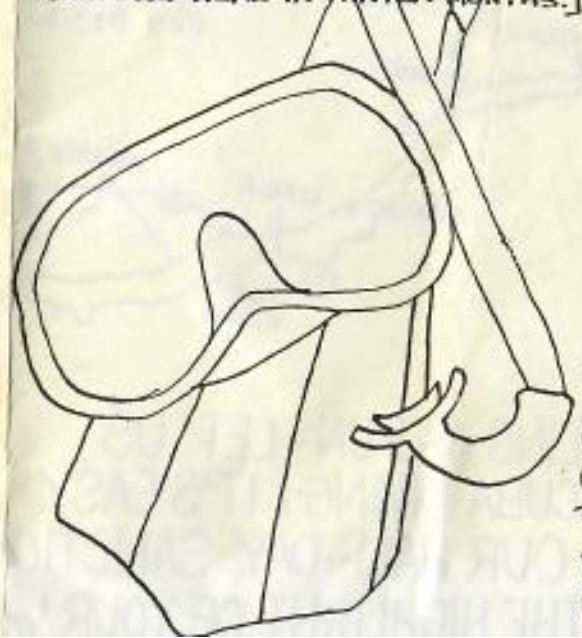
④ **POIPU BEACH PARK** - TAKE POIPU RD. SOUTH PAST HOTELS, TURN RIGHT ON HOOWILI RD. FOLLOW TO END. SNORKELING IS BEST IN COVE TO RIGHT. LOOK FOR SCHOOLS OF TAME SURGEONFISH (BLUE PALANI). 10'-15' DEPTH.

⑤ **LYDGATE PARK** - TAKE HWY. 56 NORTH TO WAILUA. TURN RIGHT AT KAUAI RESORT HOTEL. TAKE FIRST LEFT PAST HOTEL. GREAT FOR CHILDREN AND NOVICE SNORKELERS. LARGE ROCK-PROTECTED AREA. TAME FISH. DEPTH 6'.

⑥ **ANINI BEACH** - TAKE HWY. 56 NORTH PAST KILAUEA. TURN RIGHT ON KALIHIWAI ROAD PAST BIG BRIDGE. TAKE ANINI RD. LEFT. FOLLOW ABOUT 3 Mi. DOWN, POSSIBLE CURRENTS. 3'-15' DEPTH. [DO NOT SNORKEL HERE DURING WINTER MONTHS.]

⑦ **TUNNELS REEF** - TAKE HWY. 56 NORTH PAST WAINEHA. TURN RIGHT AT "RIGHT OF WAY TO BEACH" SIGN PAST YMCA CAMP. YOU'VE GONE TOO FAR IF YOU PASS DRY CAVE! LAVA TUBES! FOR EXPERIENCED SNORKELERS, BEGINNERS STAY ON TOP OF REEF. 3'-10' DEPTH. [DO NOT SNORKEL HERE DURING WINTER MONTHS.]

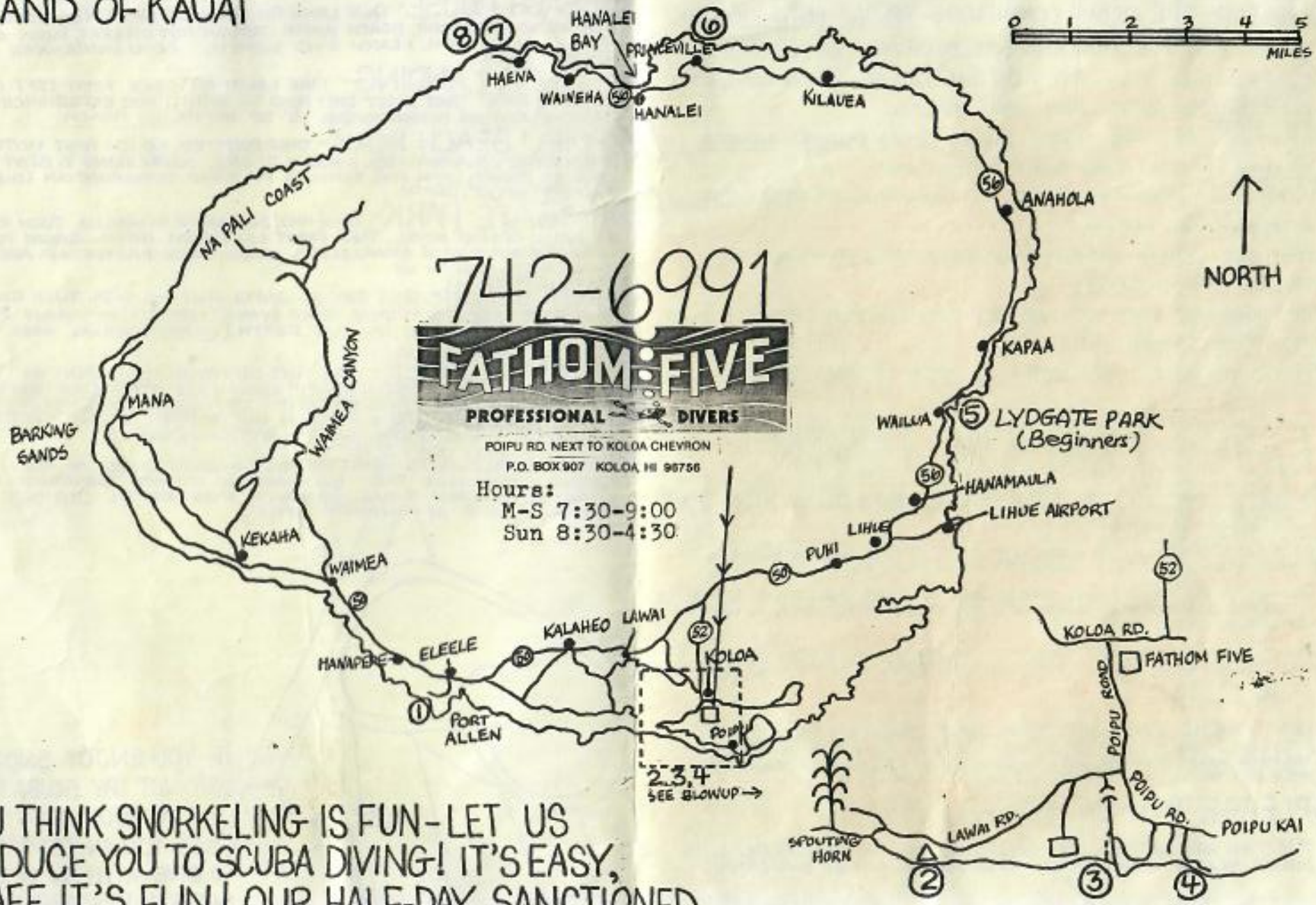
⑧ **KEE LAGOON** - FOLLOW HWY. 56 NORTH TO END OF ROAD AT HAENA. STAY INSIDE REEF. BE AWARE OF STRONG CURRENTS IN CHANNEL DURING TIDAL CHANGES. 3'-15' DEPTH. [DO NOT SNORKEL HERE IN WINTER MONTHS.]



IF YOU ENJOY SNORKELING WHY NOT TRY SCUBA DIVING! OUR INTRODUCTORY DIVE GIVES YOU AN OPPORTUNITY TO DIVE WITH AN INSTRUCTOR. SUPERVISION. ASK US FOR DETAILS!

FREE SNORKELING MAP

ISLAND OF KAUAI



742-6991

FATHOM FIVE

PROFESSIONAL DIVERS

POIPU RD. NEXT TO KOLOA CHEVRON

P.O. BOX 907 KOLOA, HI 96756

Hours:
M-S 7:30-9:00
Sun 8:30-4:30

IF YOU THINK SNORKELING IS FUN - LET US INTRODUCE YOU TO SCUBA DIVING! IT'S EASY, IT'S SAFE, IT'S FUN! OUR HALF-DAY, SANCTIONED PROGRAM COULD BE THE HIGHLIGHT OF YOUR VACATION - ASK US!

A Kauai old-timer's lament on Kaula tuna and bombing

5/3/87 SB&A A3

Advertiser photo by Jan TenBruggencate

Koichi Masaki: "If they destroy these birds, what will happen?"

By Jan TenBruggencate
Advertiser Kauai Bureau

LIHUE — Koichi Masaki remembers fishin around Kaula Island in the 1930s, seeing the sk come alive with the birds that nested there, an seeing the Hawaiian monk seals basking on th shelf along the island's steep sides.

In those days, an automatic lighthouse operat ed on the small island's summit, warning pass ing ships. It was closed after World War II.

Masaki, once the owner of the largest com mercial fishing boat on Kauai, caught tuna trol ling around the island and hauled bottom fis up until they loaded up the boat.

He remembers finding a reef the charts didn' recognize. Some folks still call it Masaki Ree It's a couple of miles from Kaula, with dee water all around it, and comes up to within 2 feet or so of the surface.

Masaki discovered it when he kept catchin shallow-water fish, ulua, while trolling in ope ocean. He went back and forth until he pinne down its location.

When the Coast Guard couldn't locate it, the took Masaki aboard their boat and had him pin-point it.

Masaki first went fishing in 1914. He had his first boat, a 32-footer, in 1916. But he didn't start fishing as far out as Kaula, as far beyond Niihau as Niihau is beyond Kauai, until 1928, when he had a boat he felt was big enough for going so far from home.

The action is past now. Masaki, 85, hasn't had a boat for years. The Kauai commercial fishing fleet, once 38 boats strong and led by Masaki's 52-footer, Seagull, is gone.

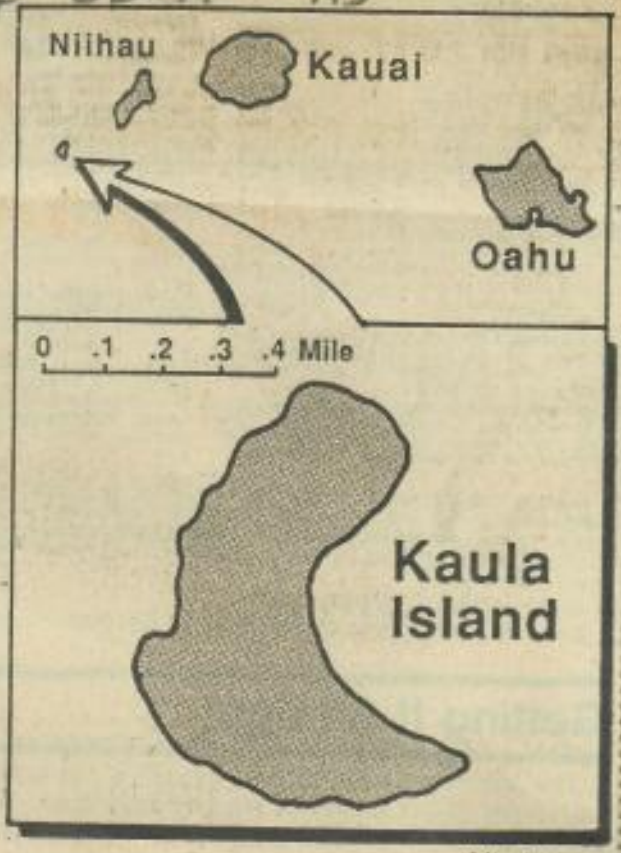
And besides, the fish aren't there like they used to be, he said.

He blames that in part on the Navy and its use of Kaula as a bombing target dating back to the early 1950s. When the bombs started dropping, the tuna abandoned Kauai waters, he said.

"If you go (fishing off) Niihau when they bomb that island, you can't catch one tuna. You can feel the blast 20 miles away," Masaki said.

Kaula is a volcanic tuff cone, a semicircle of land that lies 21 miles off Niihau. The island is 0.4 of a square mile in area, 2 miles in circum-

See Old-timer's on Page A-6



Advertiser map

Kaula Island lies 21 miles off Niihau.

Old-timer's lament about

From Page A-3

ference and 550 feet tall at its highest point.

When he heard Honolulu city officials had proposed bringing Kaula under their jurisdiction on the strength of an attorney general's opinion, Masaki got mad. He fears Honolulu would let the Navy have its way, while Kauai County, being closer, can exercise more control.

Navy sources here said they generally don't use live ammunition on the island any more, but could not speak for other branches of the military. Masaki said non-explosive bombs help, but still aren't right.

In addition to the damage to the fishery, the bombing damages the birds that nest on Kaula.

"If they destroy these birds — these birds only lay one egg each year — if you deplete them, what will happen? They know where the school of fish is. Without these birds, fishermen can't find the school, and our tuna fishery will go out of business," he said.

Masaki has already been lobbying with county authorities to fight to keep jurisdiction over Kaula. The island is of great importance to the fishing industry, and even though that industry is in a state of ruin on Kauai today, it could come back. The island needs it, the old-timer said.

Kaula, he said, is Hawaii property that was turned over in 1924 to the federal government as a Coast Guard reservation. The federal government in 1952 began letting the Navy bomb the island and, in 1965, turned it over to the Navy. But nobody ever got the state's approval.

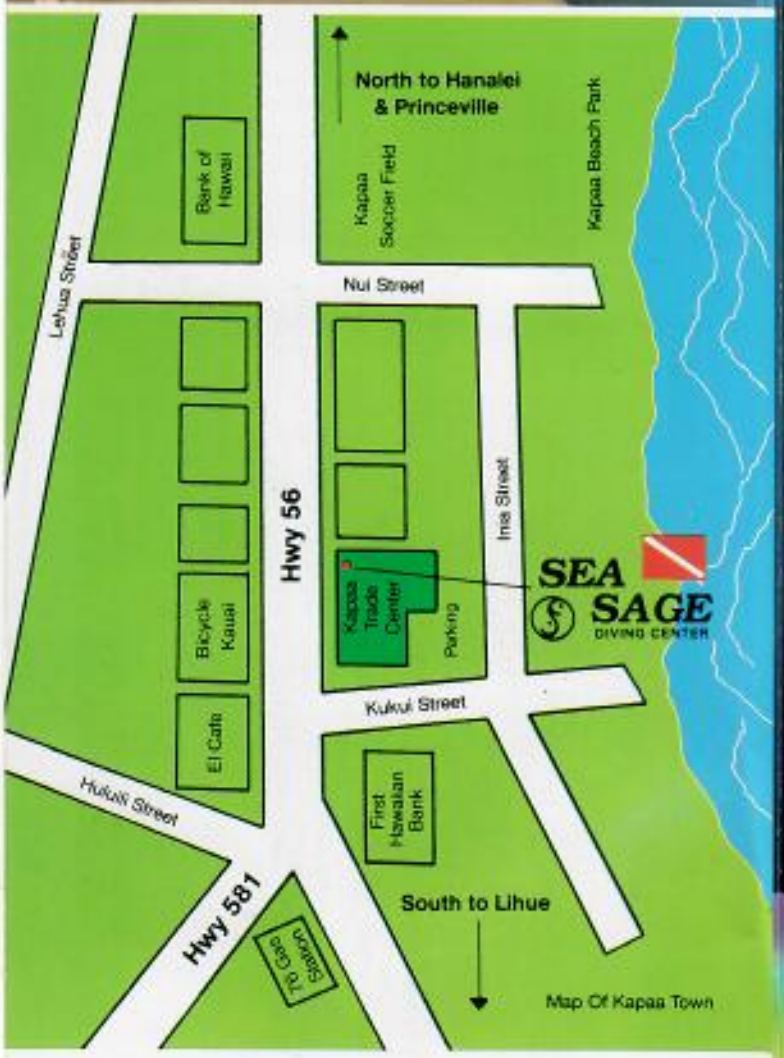
Masaki believes the state should take the island back, stop any bombing and make it a wildlife sanctuary, letting the birds flourish so they can guide the way to the fish once again.

Masaki has been a firebrand for years. He is a small man, with a deeply creased face and scarred fingers. His papery, tanned skin has seen plenty of salt and sun. Yet he is active, energetic, intense.

His favorite subject is fishing and the lack of government support for it. Conservation efforts are often misplaced and counterproductive, he said. And the state, if it cares at all about the fishing industry, should create a separate department of fisheries, Masaki said.

Between the outbursts about government and the way it has let the industry decline, Masaki is reflective.

Neighbor Island News



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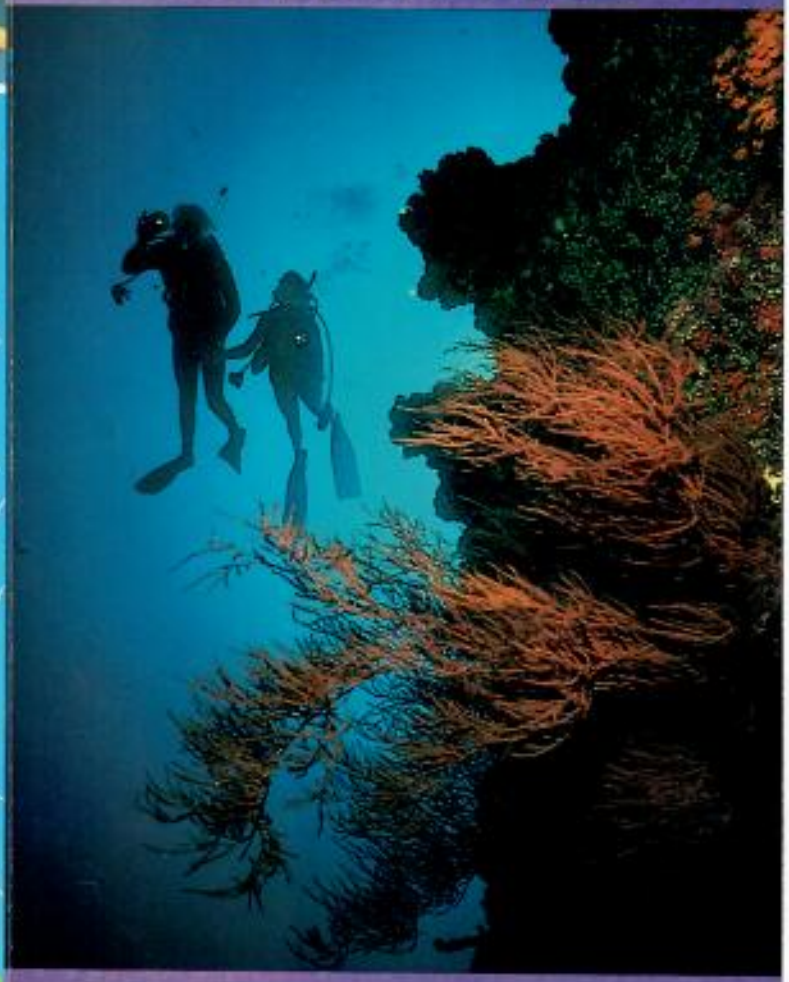

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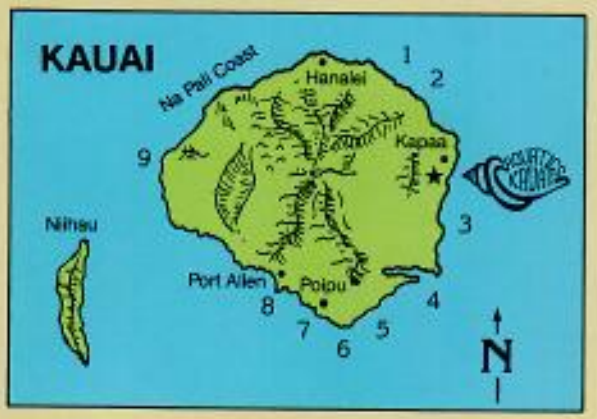

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twin-engine Radon, seven days a week. The Ginnie Mae is Coast Guard Certified for 24 passengers and boasts a full galley, bathroom facilities and enough room for 15 divers and snorkelers. She is the nicest diving vessel on Kauai.

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Kauai, the oldest and lushest of the Hawaiian Islands, harbors an abundance of snorkeling and diving areas along its rich shores. Waters teeming with bizarrely colored trumpet fish, butterflies and wrasses are a continuous seventy-five degrees and sixty-to-one-hundred-foot visibility is common.

Prevailing weather conditions permitting, Aquatics Kauai offers tours of the rugged Na Pali coast. Its jagged cliffs are resplendent with waterfalls and the surrounding waters are untouched and pure. This is Kauai as it was 100 years ago.

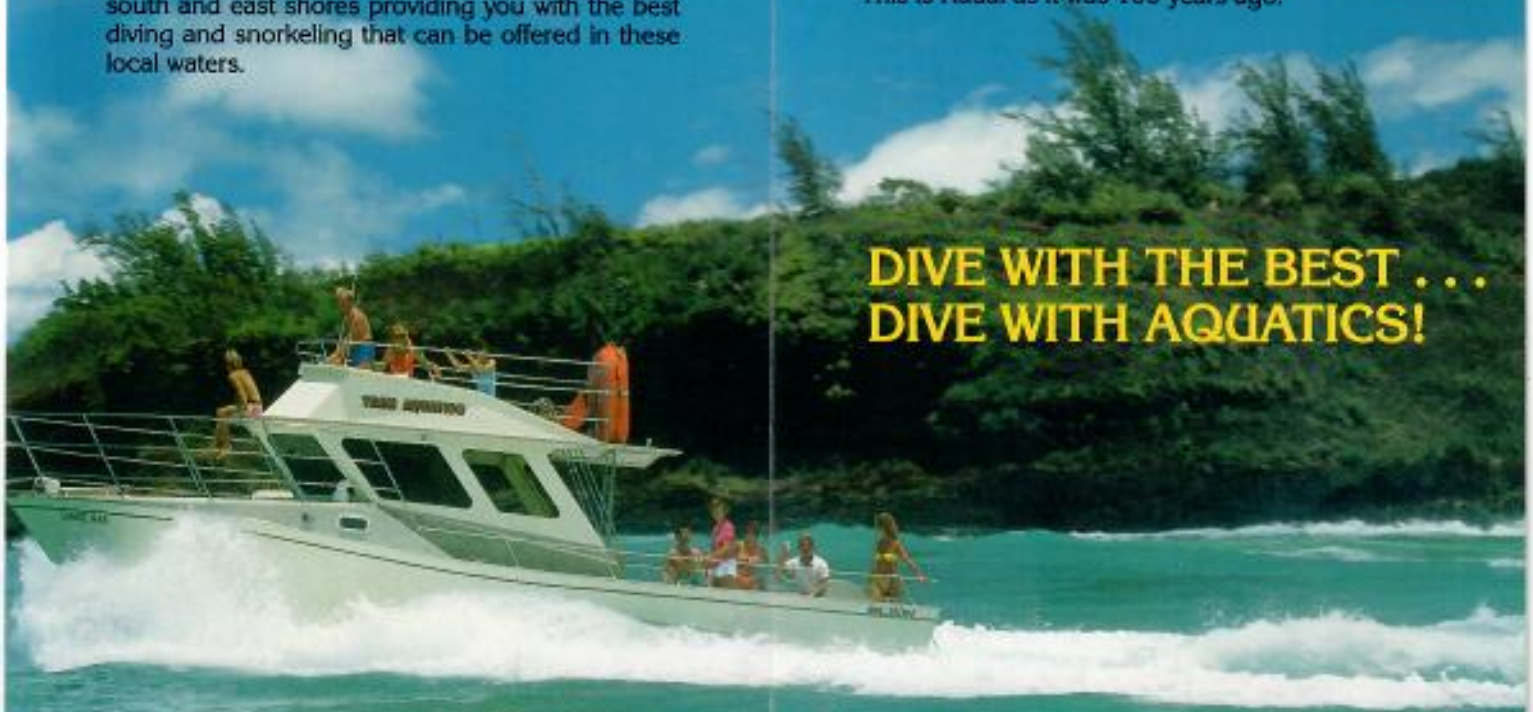

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Photo taken prior to the law which prohibits harassment of the Green Sea Turtle.

Akaka seeks Kauai land for refuge

By Lester Chang
Kauai Correspondent

LIHUE, Kauai — Rep. Daniel Akaka is proposing legislation to expand the Kilauea National Wildlife Refuge on Kauai, although the federal government has shown little interest in the proposal.

The U.S. Department of Interior says there is no need to acquire 138 acres near the 31-acre refuge because none of the birds in the area faces extinction.

Akaka contends federal management of the nearby acres is critical to the operation of the refuge.

Last week, he asked the House Appropriations' Subcommittee on Interior for $1.5 million in fiscal year 1988 to acquire the privately owned land at Crater Hill and Mokolea Point.

THE 101-ACRE parcel is owned by Crater Hill Properties of New Mexico, and an adjoining 37-acre parcel belongs to Oceanic Vistas Consortium of Virginia.

The subcommittee will send its recommendation to the full committee in the next few weeks, said Kehua Lani Lum, a press aide to Akaka in Washington, D.C.

Environmentalists and the Crater Hill Coalition, a citizens' group recently criticized the federal government for not pursuing the land purchase.

They say the acquisition will protect the nesting birds and public access to the area for many years to come.

The two parcels and the refuge make up the largest seabird colony in Hawaii. Some of the birds found there are the Laysan albatross, wedgetail shearwaters and the red-footed booby.

THE COALITION seeks federal management of Crater Hill because of concerns that the landowner will not erect a fence to protect the birds.

The landowner was required to put up the fence along with other conditions before county permits for a nearby subdivision were granted.

Congress can't consider appropriating acquisition funds until the owner signs a formal agreement to turn the property over to "private management," Sen. Daniel Inouye has told the group in a letter.

The Nature Conservancy, which acquires lands for conservation, recently withdrew its plans.

The Kauai County Council has passed a resolution supporting the acquisition of the land.

• Tuesday, May 5, 1987 Honolulu Star-Bulletin

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August 9, 1983

Mr. George Balazs
National Marine Fisheries Service
P. O. Box 3830
Honolulu, Hawaii 96812

Dear Mr. Balazs:

First, thank you for the postcard featuring the green turtle.

As to your request for a list of articles in The Garden Island on sea turtles, the Garden Island Index cites only one article--January 20, 1975, Section A, page 1, column 3. The title of the article reads: "Kauai court fines turtle poacher and restaurant." The case supposedly brought the first fine in Hawaii for illegal killing and selling of sea turtles.

At present we are concentrating on the 1971-1980 issues of the newspaper. If more citations on sea turtles are submitted by the indexers, I'll be glad to send the information to you.

Sincerely,

Catherine Lo

Catherine Lo
Editor/Project Director
Garden Island Index

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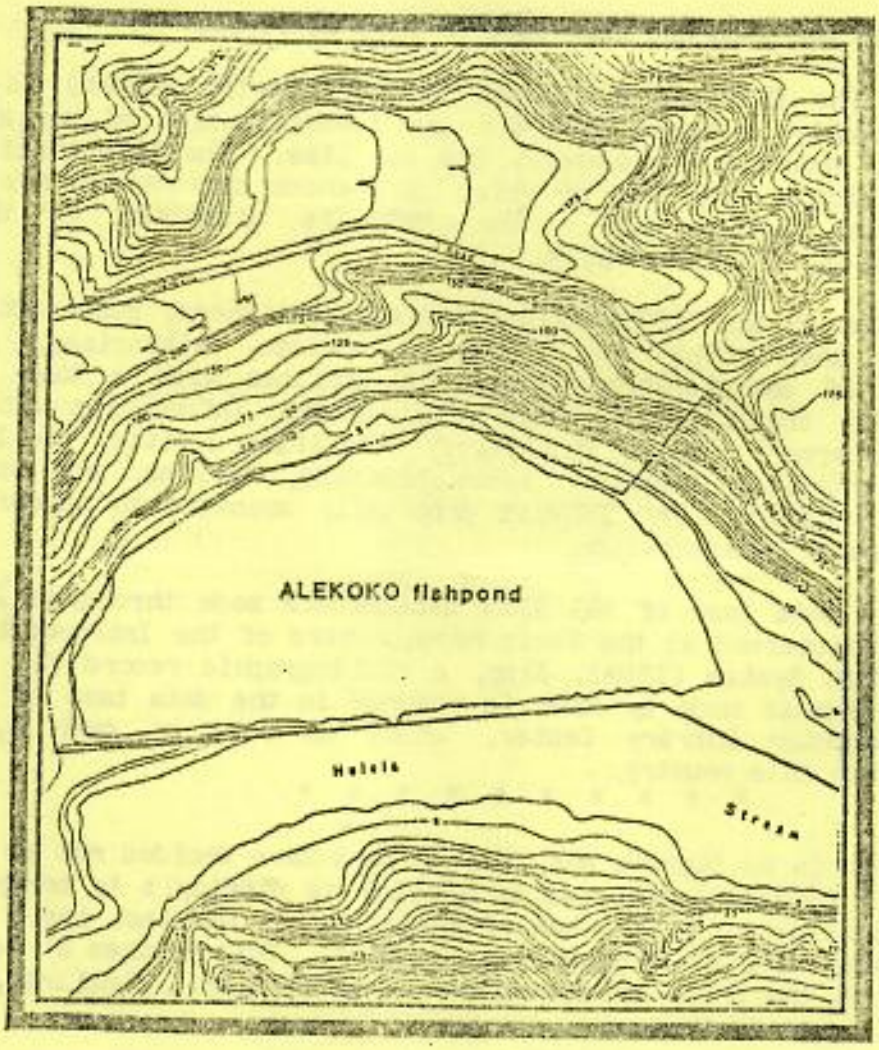

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ARCHAEOLOGY ON KAUA'I

Editors

William K. Kikuchi
Delores L. Kikuchi
Reginald K. Carter

NOTES

To our subscribers, 1985 has only one issue of AOK. To compensate, we will try to produce one issue in 1986 and two issues in 1987.

* * * * * * * * * * *

Please note our ISSN designation. Last year, AOK applied to the National Serials Data Program (NSDP) of the Library of Congress for an ISSN (International Standard Serial Numbering). The following is an excerpt from the ISSN Fact Sheet:

1. What is the ISSN and what purpose does it serve?

The ISSN (International Standard Serial Number) is an internationally accepted code for the identification of serials: magazines, journals, newspapers, and the like. The ISSN consists of eight digits, the last of which is a check digit which may be the capital letter "X". The ISSN is displayed in this configuration: ISSN 1234-5679.

Use of the ISSN provides serials publishers, subscription agencies, abstracting and indexing services, librarians, and purveyors of computer-based reference services with a tool for economically communicating basic bibliographic information with a minimum of error. Becuse it uniquely identifies a title, the ISSN aids in ordering, shipping, issue claiming, billing, and other control functions. The ISSN is especially amenable to accessing machine-readable information.

A data base of all ISSN assignments made throughout the world is maintained at the Paris headquarters of the International Serials Data System (ISDS). Also, a bibliographic record for all ISSN assignments made by NSDP is entered in the data base of the Online Computer Library Center, which is used by over 2,500 libraries in this country.

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In our efforts to improve AOK, the editors have decided not to use the mimeograph duplicating process as quality is difficult to control. We probably wasted more paper when we mailed out. The last issue and all future issues will be xeroxed from a master. This insures at least the legibility of the print and speediness of production. Similarly, we

will try to implement some electronic or computer uses to improve on the composition and art work. Please bear with us for any mistakes, smudges and inevitable gremlins in our production.

* * * * * * * * * * *

Improving the quality of AOK costs money. Time has come again to ask our readers for donations to allow us to continue publishing. Any contribution would be most appreciated. Again, your subscription is free and your donation is purely voluntary. You will still receive your AOK regardless of any giving or non-giving.

* * * * * * * * * * *

PŪNANA LEO:
NESTS FOR NURTURING THE HAWAIIAN LANGUAGE

by Byron Cleeland

If you were to tiptoe quietly into a Pūnana Leo center, you would observe a group of children from two to five years of age spending the entire day participating in all of the usual activities of small children around the world: playing, singing, eating snacks, taking naps, and learning about the world around them. You would immediately notice, however, that there was something unique about these activities at the Pūnana Leo: All of the activities are being conducted entirely in the Hawaiian language, a language teetering precariously on the brink of extinction.

How did such a center come about? Let's take a brief look at the history of the Pūnana Leo project and then see where the program stands today.

In January 1983, a small group of concerned individuals—mostly teachers of Hawaiian language—met on Kaua'i to discuss the possibility of establishing one or more centers where small children would be exposed to the Hawaiian language at a time in their lives when they are best able to learn a second language with native, or near-native, fluency.

The concept was not a new one; it had already experienced considerable success among subordinate linguistic groups in Europe, such as the Bretons of France and the Welsh of Great Britain. It was not until 1982, however, that the first manifestation of this concept appeared in the Pacific Basin when the first Maori centers were opened in New Zealand. Although it has since proved to be an extremely successful program with approximately three hundred centers opening throughout New Zealand within the first three years, it was still in the early stages of development when Maori educators visiting Hawai'i piqued the interest of some individuals concerned about the future of the Hawaiian language. Perhaps, they realized, this would be a practicable method of preventing the demise of the language native to only this small group of islands located in the middle of the vast Pacific Ocean.

The problems faced in Hawai'i, however, were--and continue to be--considerable. Foremost among these is the small group of fluent native speakers still remaining. This group numbers less than two thousand, and--except for the small Ni'ihau population--nearly all of these fluent speakers are of the kupuna generation.

The second major obstacle has concerned Department of Social Services and Health (DSSH) regulations concerning teacher qualifications. Because of the nature of the Pūnana Leo program, the DSSH determined that the centers were under its jurisdiction, and thus all of the numerous departmental regulations must apply. Unfortunately, however, fluent native speakers of Hawaiian who have the extensive educational background required of teachers by the DSSH are practically nonexistent, and the few individuals who do meet both of these criteria are either fully employed elsewhere and thus unable to participate in this project, or else they are long since retired and not in a position to commit themselves to spending long hours each week with a group of fifteen to twenty highly active small children.

Yet the group of concerned individuals persevered and took the first step by establishing 'Aha Pūnana Leo, a nonprofit corporation whose basic purpose was to initially open three centers--one each in Hilo, Honolulu, and here on Kaua'i--and then to assist other communities who might express an interest in having similar centers.

It was not until September 1984 that the first Pūnana Leo opened in Kekaha, Kaua'i. By sending a group of Ni'ihau women to Kaua'i Community College as full-time students during the 1983-84 academic year, one teacher finally attained the minimum qualifications which were still required under the temporary waiver which was requested and granted by DSSH concerning educational qualifications.

The three teachers who were initially employed at the Pūnana Leo O Kekaha here on Kaua'i for two years continued to go to school in the evening after working all day at the center in order to fulfill the educational qualifications as required by DSSH. Yet thanks to extensive lobbying by members of the 'Aha Pūnana Leo and other concerned individuals, legislation was finally passed which will make it more feasible to open more centers throughout Hawai'i, especially in areas where college-level programs are not available.

Section 1 (b) of Senate Bill Number 2126-86, approved by the Governor on April 22, 1986, and now referred to as Act 79-86, specifically states: "Staff members of programs taught solely in Hawaiian which promote fluency in the Hawaiian language shall be exempt from any regulations requiring academic training or certification."

This does not mean that the 'Aha is not concerned about having qualified teachers; it merely means that teachers can be trained in a manner more relevant to the purposes of the Pūnana Leo centers. In addition, it will enable native speakers of Hawaiian who are unable to enroll in college courses the opportunity to become teachers in the Pūnana Leo centers. All other DSSH requirements concerning the schools

and teachers are still applicable.

In the meantime, however, the other two Pūnana Leo centers were finally able to open in April 1985, but in order to be granted the required temporary licenses, both had to rely upon university graduates who had learned the Hawaiian language at the university. Although this arrangement did allow these two centers to open, it is unrealistic to expect large numbers of college graduates, who have made the effort to learn Hawaiian as a second language in the traditional classroom setting, to take further training in Early Childhood Education and then be willing to take employment in a position paying just above minimum wage in order to open a Pūnana Leo in any of the several different communities on all of the islands that are already expressing interest in having one.

Here on Kaua'i, for example such interest has already been expressed in Hanalei, Anahola, Kapa'a, and Līhu'e for opening new Pūnana Leo centers in those communities. And now that the centers will no longer be restricted by requiring the teachers to complete extensive college-level training, perhaps the dream of having a center in each of these communities will soon become a reality.

In the meantime, however, in order to better serve the Kaua'i community with the one existing Pūnana Leo center, the Pūnana Leo O Kekaha closed its doors on May 30, 1986, so that it could be reopened in the Līhu'e area. Grove Farm offered the use of an old plantation house located in Puhi Camp, but the Use Permit, Special Permit, and a Class IV Zoning Permit were all required in order to use this particular building as a Pūnana Leo center. After hearing testimony from thirteen different individuals who supported the project--including 'Aha board members, teachers, parents, and other interested persons--the Planning Commission voted unanimously at a public hearing held on July 23, 1986, to approve the application.

However, twelve conditions were attached to the approval in order to meet the concerns of the different county agencies involved, particularly that of the Fire Department. Grove Farm has been especially helpful in meeting the conditions that concern the roadway and the surrounding property, and the Kapa'a and Kaua'i Rotary Clubs have already helped to clean up the yard and help in preparing the building itself for occupancy. But extensive renovation of the 48-year-old plantation house has been necessary, including completely new plumbing as well as electrical wiring, all new windows and doors, and the addition of a new cesspool and a second bathroom which meets handicap specifications. Although work has been continuing since last August, there have been numerous delays; thus the projected reopening date has been postponed twice already, and even now the date is uncertain.

Is there any way that you, the reader of Archaeology On Kaua'i, can actively participate in this project? First, if you live on Kaua'i in the Līhu'e area and have a child who will be at least two years old by January 1, 1987, you may still be able to take advantage of the program by enrolling your child in the new Pūnana Leo Manokalanipō which is tentatively scheduled to open early in 1987. If you possess carpentry or other skills which may still be needed to complete the renovation of the

new site, you may even be able to give some assistance in this area.

If you live in another community that is interested in starting a new Pūnana Leo, you could contact an 'Aha Pūnana Leo board member to get more information about what is involved in opening a new center.

Finally, if you are not in a position to participate directly in the project but would like to support it, all Pūnana Leo centers continue to rely on grants, donations, and fund-raising projects in order to supplement the tuition paid by the parents, and--for the Kaua'i center--funds are still needed to cover the cost of renovation. These additional sources of funding are necessary in order to keep the tuition low enough so that the program will be available to all who are seriously interested in taking advantage of it for their children. All donations made to the Pūnana Leo program are tax deductible, and for donations made to Pūnana Leo Manokalanipō, all funds remain on Kaua'i to assist in the program here.

For anyone who would like to make a donation to the Kaua'i project, checks should be endorsed to Pūnana Leo Manokalanipō and mailed to:

Pūnana Leo Manokalanipō
P. O. Box 2093
Puhi, Hawai'i 96766

If you have a particular interest in either of the other schools, you could endorse your check directly to 'Aha Pūnana Leo and indicate on the check for which center you would like your donation to be used. If you endorse the check to 'Aha Pūnana Leo without indicating any particular center, your donation will go into a general fund to be used wherever the need is greatest.

Finally, if you have any other means of helping with this unique project through particular skills, talents, or even spheres of influence which you possess, you could also make this known to anyone currently involved in the Pūnana Leo project.

A curriculum development committee is currently working on developing a basic curriculum for the first year of a three-year cycle to be used in all Pūnana Leo centers, and this includes not only translating existing children's books into Hawaiian for use in the centers, but also writing original stories to be illustrated and, hopefully, published sometime in the future. Original songs to accompany these units are also being composed by the committee.

The Hawaiian language is truly perched precariously upon a fragile limb of the tree of continued existence, and if we are unable to provide sufficient pūnana (nests) where the language can be nurtured among the children of Hawai'i, yet another language may cease to live on the face

of the earth; and when a culture loses its language, the life of the culture itself retains only a tenuous hold on its branch of existence and may soon fall--along with the language--into the oblivion of historical curiosities.

E ola ka 'Ōlelo Hawai'i! Let the Hawaiian language live!

* * * * * * * * * * *

A Preliminary Survey of the Alekoko Fishpond and Hulē'ia Estuary

August 1986

by Michael H. Kido

Preface

The Hawaiian fishpond is perhaps one of the least used of Hawai'i's resources. In a time when we are consuming fifty million pounds of seafood annually (most of it imported), we should be exploring the potential for revitalizing these ancient aquacultural artifacts throughout the State. Instead, there seems to be very little viable interest in these projects, and, as a result, most remain unused and overgrown by weeds or give way to the bulldozer and urban development.

Kaua'i still has several fishponds remaining which have great potential for restoration. The largest is the 39-acre Alekoko Fishpond (also called the "Menehune" Fishpond) in Niumalu. Unlike other loko kuapā (walled fishponds) which are found along seacoasts, the Alekoko pond has been constructed a considerable distance up a river (Hulē'ia River) and the brackish nature of its water makes it ideal for the culture of fish like mullet, milkfish, awa and āhole (Kuhlia sandvicensis).

According to Ching (1973), the area of Niumalu in ancient times was "an important horticulture, aquaculture, and fishing area." Several fishponds were associated with large wet taro (Colocasia esculenta) pond fields and well developed irrigation systems. These taro lands still remain and would fit in well with an integrated agricultural/aquacultural masterplan for the area.

The following report, which has been submitted to the Kaua'i Planning Department, is a current assessment of existing conditions at the Alekoko Fishpond site. it is hoped that this preliminary survey will provide useful information and ideas as well as be an initial step in the restoration of Alekoko to a working Hawaiian fishpond.

Introduction

The Alekoko Fishpond is a Hawaiian treasure that is of irreplaceable value because of its historical and archaeological significance (Ching 1973, Kikuchi 1976), its tremendous potential for aquaculture, and its potential for the scientific and cultural education of our young people. The restoration of the fishpond will be an immense project that will take many years to complete. Along the way many crucial decisions about the pond's future and perpetuation will need to be made by Kaua'i's people. Before these decisions can be made intelligently, much more research is needed on various archaeological and biological parameters within the pond and Hulē'ia estuary.

Very little biological information is available on the Hulē'ia estuary. Information on the abundance and distribution of organisms, seasonal variations in this abundance and distribution, physical properties of the river's water, flow rates and characteristics of the pond and river, and data on the primary productivity of the estuary will all be essential when the pond is ready to be stocked. Gathering this data will be an important part of Alekoko's restoration and will also add considerably to our scientific data on Kaua'i's biota.

Towards this end, a preliminary investigation of the Hulē'ia estuary and Alekoko Fishpond was conducted to evaluate existing conditions. Our appreciation is extended to Mr. Louis Rego Sr. for his assistance in this endeavor.

Observations

Perhaps the most prominent feature of the estuary and pond is the mangrove. The dominant variety appears to be the stilt-rooted Rhizophora which is able to tolerate this brackish water environment. Typically, a mangrove ecosystem like this is dynamic and productive, extending its influence far out into adjacent inshore areas. The beneficial effects of the mangrove forest and the potential for its use is explored later.

A major facet of the restoration will be the rebuilding of the pond wall (kuapā). A visual inspection was conducted from Hulē'ia River. Despite age and the elements, the wall is remarkably intact. It is, however, overgrown by mangrove, extending into the river in some places 3-4 meters beyond the wall. The mangrove may currently be stabilizing the wall and river sediment, a condition which is capitalized on in aquaculture practices throughout the Indo-West Pacific (Macintosh 1982).

Several fairly small breaks in the wall were observed, the largest measuring less than 2 meters across. In a few other areas, the tops of the wall were below the river level at high tide with a resultant flow of water into the pond over the top of the wall. In these areas the top few layers of stone may have eroded away leaving the wall lower than intended by its builders. Cement bags, iron scrap, and other rubble was observed at a few places inside the wall, this material apparently being used earlier to repair damage to the wall.

Two cement water grates (mākāhā) exist in the fishpond, one near the center of the pond and the other on its seaward end. Both were in good condition but neither had its sluice gates in position. A very rapid flow of water of perhaps 1 meter/second was observed through the central mākāhā into the pond during the rise to maximum tide. This inflow of water was also observed (at a lesser rate) through the stone wall itself suggesting a permeable, non-solid core. The permeable nature of the wall may actually be essential to the pond's ability to exchange gases and nutrients with the river.

The vast interior of the pond was not sampled because it is inaccessible by boat from the river. Sedimentation was obviously excessive, perhaps one-third of the pond's surface being exposed during the spring low tide. It is likely that much of this sediment is now coming from the higher mauka lands which surround much of the north-west perimeter of the pond.

Because aquaculture ponds are so sensitive to sediment borne pollutants, it is essential that these adjoining lands remain undeveloped, thereby providing a buffer zone for the fishpond. Tributaries leading into Hulē'ia River may also be a source of pollutants as pressure is exerted to develop the highlands around Puhi and Kīpū. These pollutants are a serious biological threat to the fishpond as well as the Hulē'ia extuary and adjacent inshore areas around Kalapaki Bay.

Mangroves

A single dominant biological feature of the Hulē'ia estuary is the extensive growth of mangrove. An early photograph of the area taken around 1900 (Ching 1973) seems to indicate that the mangrove was probably not yet introduced. A later photograph of Alekoko Fishpond in the same report, taken in 1965, shows the pond wall still seemingly free of mangrove (although by then it very likely had been introduced into the estuary). A 1973 photograph however, reveals an extensive encroachment of mangrove into the estuary and on the pond wall. Once established then, the mangrove can show phenomenal rates of growth. Macnae (1968) documented prodigious rates of mangrove growth of up to 125 meters per year. Given this rapid growth then, control of the mangrove should be an important consideration in the restoration of the Alekoko Fishpond. We should however, adopt the view that the mangrove is a valuable resource that should be managed, rather than seeing it as a noxious weed that requires eradication.

An endless variety of products can be derived from the mangrove forest. Watson (1928) and De la Cruz (1979) give detailed product inventories which include timber, thatching, charcoal, tanning agents, resins, dyes, medications, animal fodder, and fish poisons. Mangrove wood is very dense and has a high resistance to decay in seawater. Because of this, it is one of the most extensively used building materials in some coastal areas (Macintosh 1982). Mangroves were the main cash crop in Puerto Rico in 1940, with an estimated ten million mangrove poles taken yearly (Cerame Vivas 1977). Ong et al (1979) estimated an annual loss of 5,000 hectares of mangrove forest to woodchip

production in East Malaysia. Because of its intrinsicly high value then, the loss of mangrove forest in some places is cause for alarm. We should therefore keep this high value of the mangrove in mind when formulating a plan for its removal from the fishpond.

Ecologically speaking, the mangrove forest is a valuable resource because of its beneficial effects on our offshore fisheries and its aquaculture potential. Studies have shown that mangroves export large quantities of energy into adjacent coastal zones. This energy then serves to support large fishery ecosystems in adjacent waters. Positive correlations are seen between the extent of mangrove development and the size of coastal fisheries. It is reasonable to assume then, that these offshore fisheries will decline in proportion to mangrove removal from the estuary. Such a decline was documented by Khoo (1976) in the Malacca Straits.

Mangroves are also found to support large quantities of benthic and pelagic organisms, many of which have significance to us as local sources of food. In our brief inspection of the wall area near the central mākāhā, numerous organisms including juvenile mullet, grass shrimp ('ōpae), amphipods, snapping shrimp, crabs and barnacles were seen. Judging by the numbers of crab net floaters in the river, a substantial population of Samoan crabs (Scylla) must also exist there. Many of these animals undoubtedly serve as links to various food chains supported by the mangrove forest. Crabs, for example, which feed off the mangrove substratum, are typically fed upon by a variety of predaceous animals. In Malaysia, these predators have been shown to include catfish, snakes, lizards, and birds (Ong 1978). Studies of these kinds of food web relationships for the Hulē'ia estuary would certainly be of great scientific value.

The mangrove estuary is also important as a feeding and nursery site for many aquatic animals. Macnae (1974), for example, concluded that many commercially valuable prawn species spend their juvenile stages within the mangrove swamps of the Indo-West Pacific. Further investigation is needed to identify potentially important commercial species which already exist in the Hulē'ia estuary and to determine their abundance and distribution.

The rivers connecting mangrove estuaries to the open ocean serve as waterways for migrations of many commercially important aquatic species. Mullet, for example, are catadromous, entering the estuary as juveniles, then returning to the ocean to spawn. So essential is the mangrove to these kinds of fish, that fishery declines are often blamed on mangrove destruction. In addition, many commercially important crustaceans, such as the giant freshwater prawn, make similar use of mangrove areas during their migration between marine and freshwater areas (Macintosh 1982).

Therefore, the mangrove is a tremendous resource with value well documented in the literature. In some places, mangroves are deliberately planted in front of pond dykes for protection and to prevent erosion. In addition to stabilizing the dykes, the mangroves also provide a useful source of timber (Schuster 1952). Some Hawaiian fishpond operators are reported to manage their mangroves to provide

protection from poachers. The intrinsic value of the mangrove forest should be an important consideration when planning the restoration of the Alekoko Fishpond. At the very least, we should adopt the attitude that it should be managed rather than eradicated.

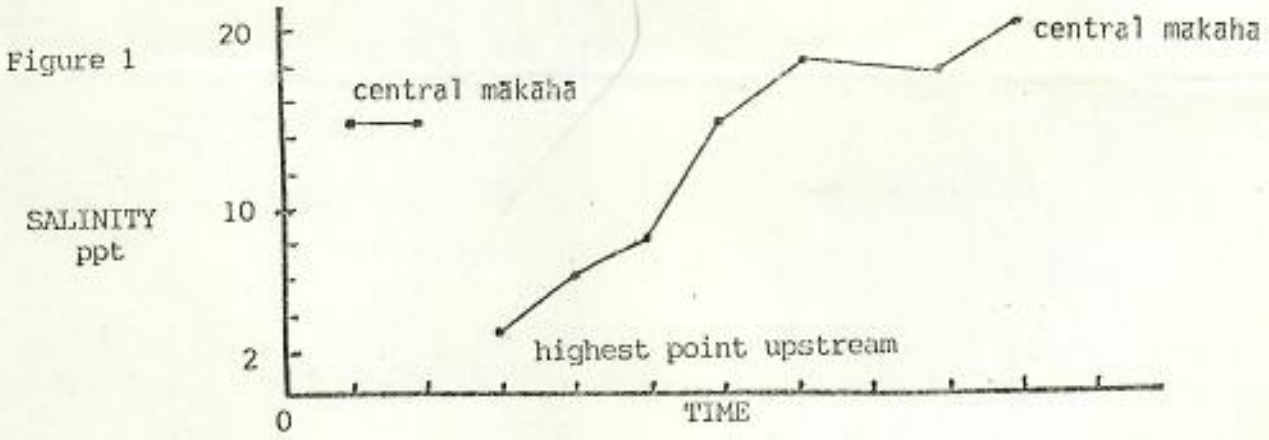
Salinity

Macintosh (1982) describes salinity as the "single most important ecological parameter in mangrove ponds." This physical parameter of seawater (influenced primarily by its salt content) affects several biologically important properties of the water; its ability to hold oxygen, specific gravity, viscosity, and, to some extent, pH. In the aquaculture setting, these characteristics are altered by variables like temperature, evaporation, rainfall, and flow rate within the pond.

The biological effects of salinity are critical in the culture of aquatic organisms because most have fairly specific ranges which they are able to tolerate. With some animals, salinity tolerance changes during the various phases of their development. Milkfish for example, while euryhaline as adults, they are hyper-sensitive to salinity changes as juveniles. Above salinities of 25 parts-per-thousand (ppt), their growth is severely retarded (Chen 1976). To complicate matters, environmental factors such as temperature and pH can adversely affect an animals tolerance to salinity changes which is the case even for the extremely euryhaline mullet.

Because of the importance of salinity in the culture of aquatic organisms, a preliminary study of this variable was conducted in Hulē'ia River using a hand-held refractometer. Readings were taken from the seaward mākāhā of the fishpond to as far upstream as could be traveled by boat; a distance of approximately 2-miles. The results are seen in figure 1.

Figure 1



From this scant salinity data, it can be seen that the ocean has a very strong influence on Hulē'ia River. Lowest salinities encountered about 2-miles upstream were from 3ppt to 5ppt. In comparison, a mountain stream would be expected to have a salinity ready of 0ppt. This influence of the ocean is most pronounced during spring tides when very large tidal exchanges are observed. Within approximately 2-hours, we observed a rise in salinity of from 15ppt to 18ppt as the tide rose from -.1 feet to +1.1 feet.

The only salinity reading taken within the fishpond itself was obtained at the central mākāhā where a salinity of 15ppt was recorded. Obviously much more salinity data is needed throughout the fishpond to determine potential culture species of Alekoko. At the observed salinity, possibilities could include mullet, awa, āhole, tilapia, Penaeid shrimp, mussles, and various kinds of crabs (Scylla in particular).

Conclusions

From this very brief survey of the Alekoko Fishpond and the Hulē'ia estuary, it is apparent that a more comprehensive survey is needed which will focus on:

1) various archaeological aspects of the fishpond such as a coring and dating of the sediment and a careful evaluation of the kuapā, and

2) physical and biological parameters of the estuary and fishpond as described earlier in this report.

Until these studies are completed, it is recommended that any further activity which will impact the Alekoko Fishpond or the Hulē'ia estuary, be suspended and the situation carefully monitor

References

Carame-Vivas, M.J. (1977). Management of the coastal zone with special reference to mangrove shores. In: Stewart, H.B.(ed.), Proc. Symp. on the Progress in Marine Research in the Carribbean and Adjacent Regions, Caracas, July 1976. FAO Fisheries Report No. 200, FIR/R200 (E/ES), pp.87-100.

Chen, T.P. (1976). Aquaculture Practices in Taiwan. Fishing News (Books) Ltd., Farnham, England, 162pp.

Ching, Francis K.W. et.al. (1973). The Archaeology of Puna, Kaua'i. Nuimalu ahupua'a. Loko Kuapā O Alekoko. Hawaiian Archaeological Journal 73-1.

De la Cruz, A.A. (1979). The functions of mangroves. In:Srivastava, P.B.L. (ed.), Proc. Symp. on Mangrove and Estaurine Vegetation in Southeast Asia, Serdang, Malaysia, April, 1978, Biotrop Special Publ. No. 10.

Khoo, K.H. (1976). Optimal utilisation and management of fisheries resources. In: L.J. Fredericks (ed.), Proc. Seminar on the Development of the Fisheries Sector in Malaysia. J. Malaysian Econ. Ass., 13:40-50.

Kikuchi, William K. (1976). Prehistoric Hawaiian Fishponds. Science, 193:295-299.

Macintosh, Donald J. (1982). Fisheries and Aquaculture Significance of the Mangrove Swamps, with Special Reference to the Indo-West Pacific Region. In: J.E. Muir and R.J. Roberts (eds.), Recent Advances in Aquaculture. Westfield Press, Colorado.

Macnae, W., (1968). A general account of the fauna and flora of mangrove swamps and forests in the Indo-West Pacific region. Adv. Mar. Biol., 6:73-270.

Ong, T.L. (1978). Some aspects of trophic relationships of shallow water fishes (Selangor Coast). BSc honours thesis, University of Malaya.

Schuster, W.H. (1952). Fish-culture in Brackish-water Ponds of Java. Indo-Pacific Fisheries Council, Special Publications No. 1, 140pp.

Watson, J.G. (1928). Mangrove Forests of the Malay Peninsula. Malayan Forest Records No. 6, 275pp.

ARCHAEOLOGY ON KAUAI
Kauai Community College
RR 1, Box 216
Lihue, Hawaii 96766

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George H. Balazs
Hawaii Institute of Marine
Biology
P. O. Box 1346
Kaneohe, HI 96744

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southwest Fisheries Center Honolulu Laboratory
2570 Dole St. • Honolulu, Hawaii 96822-2396

October 14, 1987 F/SWC2:GHB

MEMORANDUM FOR: William G. Gilmartin

FROM: George H. Balazs

SUBJECT: Summary report for my October 8, 1987 trip to Kauai to excavate turtle nests and necropsy a stranded turtle in collaboration with State Aquatic Biologist Don Heacock.

Between June and August of this year six turtle "nests" were recorded at Lawai Kai Beach on the south shore of Kauai. The adjacent land is a privately owned estate and botanical gardens open to the public under controlled conditions. The resident manager, Mr. Toshio Kaneko and his family, have carefully monitored these nesting occurrences and compiled detailed data. A photograph taken during the early morning hours of July 28th confirmed the species to be Chelonia mydas (green turtle). Possibly two turtles have been involved in these nestings. However, the approximate 15 day intervals between nestings show that a single turtle could have been responsible. For many weeks now, Mr. Kaneko and his family have made checks each morning for hatchling tracks (nest emergence), but none have been seen.

Four of the six nests were excavated and examined by Balazs, Heacock, and Kaneko on October 8th. The two others were left intact, since sufficient time may not have passed for full incubation and hatchling emergence. Of the four dug up, one was judged to be a "false" nest (no eggs laid). Eggs were found in the other three nests, but there were no signs of hatchling development or emergence. All of the eggs (268 total) were manually opened and determined to be completely infertile. The fine roots of beach morning glory plants had in many cases entwined the eggs, but this was unrelated to the absence of embryonic development. The number of eggs in each nest was as follows: June 25 - 99 eggs; July 11 - 73; and July 27 - 96 eggs. The two remaining nests will continue to be watched by Mr. Kaneko. During early November they will be excavated and examined under my guidance.

On Wednesday morning, October 7th, the day before my scheduled trip to Kauai, a large dead green turtle was found stranded near the river mouth at Anahola Bay on the northeast shore of Kauai. The turtle was quite fresh, so the decision was made to store it overnight under refrigeration so a necropsy could be conducted during my visit. We subsequently carried out this work at the Kauai sanitary landfill a short distance outside of Lihue. The turtle was found to be an adult male measuring 81 cm in curved

carapace length. It's entire tail, most of the right hind flipper, and a sizeable crescent segment (30 cm) of the posterior carapace were missing, all of which were clearly the result of shark attack. There were no internal or external signs of disease, or any other indication to account for the turtle's death. The stomach and intestines were moderately filled with algal food material consisting of Amansia glomerata and Pterocladia capillacea. The shark attack apparently proved fatal to the turtle, although it was noted that the abdominal cavity had not been punctured. Prior to leaving the dump the shell was further mutilated to prevent someone from taking it home as a "trophy". In addition, Don Heacock notified State conservation enforcement officers as to why the remains of a sea turtle were at the dump (should someone report it).

The follow-up done on these turtle nests illustrates the extreme importance of documenting hatchling production. It is very encouraging indeed to have sporadic nestings by green turtles happening again here in the main Hawaiian Islands. However, we need to continue to monitor these events to determine their productivity and actual contribution to population recovery. In the present case it was, unfortunately, not very great.

cc: Donald Heacock
Paul Kawamoto
Gene Witham
WPPO

Oct 1989

Explore Kauai's undersea world with Pacific Safari.

THE PACIFIC SAFARI. The newest tour boat on Kauai is the 36-foot Pacific Safari which features glass underwater viewing panels in the hull and provides a variety of cruises. Information is presented during the cruises concerning Hawaiian history and legends, sea life and points of interest along the Kauai coast. The Safari Cruise is a daytime cruise on which you'll see underwater marine life, Kauai's coastline and a unique underwater ballet. The Sunset Safari provides an opportunity for a two-hour cruise with a gorgeous sunset as a backdrop. The Safari Night Dive Adventure is a romantic cruise featuring an underwater show by a diver who interacts with nocturnal marine life illuminated by the boat's lighting system. 742-7033.

Hikers on Kalalau Beach. Mike Teruya photo.

11-18-87
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THA

Pacific Range tests a missile with muscle

By Jan TenBruggencate
Advertiser Kauai Bureau

MANA, Kauai — The Streaker target rocket flashed across the southern sky, leading a trail of white smoke.

A brisk wind blew across the west Kauai flats and whitecaps covered the sea between Kauai and Niihau, in the distance.

A soldier behind a wall of sandbags lifted a Stinger shoulder-mounted, surface-to-air missile.

His eye was on the viewer. He heard the weapon's signal: Its electronics had locked onto the Streaker's bright infrared signal.

The crew chief gave the OK.

The gunner fired.

The missile's takeoff blast filled the air with smoke. A shock wave rolled across the dry grass of the Pacific Missile Range Facility field.

Roughly 240 soldiers of the Army's 62nd Air Defense Artillery, 1st Battalion, 25th Infantry Division, based at Schofield Barracks, watched.

The red glow of the Stinger's tail headed straight out with a loud whooshing. Then it began skittering across the sky, its guidance system judging the speed and trajectory of the Streaker.

Suddenly it veered sharply left, aiming at a point far ahead of the Streaker. "It's missed," is a sudden thought. But no. The two missiles are on collision courses.

Their smoke trails converge. An explosion. Glowing and smoking debris falls into the ocean. A few seconds later, the blast of the impact is heard.

This part of the unit's week-long training exercise at the Navy's Pacific Missile Range Facility cost the Army nearly $400,000. Roughly $250,000 for the Streaker target and nearly $150,000 for a Stinger.

That's why they don't have live exercises often. Most of the gunners charged with handling Stingers never fire the real thing. They practice with re-usable, gas-charged training weapons.

By one estimate, the week's exercise will cost $3 million. That includes five Stingers, six Streakers (MQM-107A drone targets), a couple of BATS (Ballistic Aerial Target System) and a few thousand rounds of ammo for M167 Vulcan 20-millimeter anti-aircraft guns.

They do it here because the missile range can provide radar control and has the means to clear the offshore area of boats during an operation.

A soldier demonstrates the shoulder-mounted Stinger missile. . .

The 62nd Air Defense Artillery has 40 two-person Stinger teams, each consisting of a gunner and crew chief, six Stingers and a vehicle to move them.

The Stinger is what the United States is afraid Iran has or can get. It's a spooky weapon by any standards.

Its literature calls it the "most lethal man-portable, shoulder-fired air-defense weapon in the world today," capable of destroying helicopters and low-altitude fixed-wing aircraft like attacking jets.

The gunner fires with the 35-pound weapon on his shoulder, like a bazooka. The missile's range is over three miles.

It took a while for the exercise to get started yesterday. The first Streaker wouldn't

Bulletin

D6 4/19/90 HSB

Kauai panel approves marine refuge project off Kilauea Point area

By Lester Chang
Kauai correspondent

LIHUE — A proposal by marine environmentalists from Oahu to create Kauai's first state marine refuge off Kilauea Point has won the support of a County Council committee.

Members of the Economic Development and Human Resources Committee said yesterday the proposal by William Gilmartin of the National Marine Fisheries Service and Casey Jarman, an assistant law professor at the University of Hawaii, could help prevent overfishing in the area.

They also said the proposed marine life conservation district could help preserve marine habitats.

Some committee members initially balked at the proposal, saying they feared the marine zone, if it were created, could stop local fishermen from using the area.

Jarman said a survey showed many fishermen who use the area now support the proposal.

The Council will vote next week on whether to send letters of support for the project to Gov. John Waihee and William Paty, chairman of the Board of Land and Natural Resources.

Bob Macknowski, a Hanalei resident, had recently proposed a similar refuge for dolphins, but the Council didn't act on the proposal for lack of public interest.

The latest proposed refuge would encompass three miles of coastline from Kapukaamoi Point to Mokolea Point and coastal waters, Jarman, who specializes in coastal and ocean law, told the committee yesterday.

The proposed zone would be located near the Kilauea Point National Wildlife Refuge, the largest sea bird colony in Hawaii.

Jarman said the marine zone would provide additional protection for the humpback whale, the Hawaiian monk seal and the spinner dolphin, three sea mammals already protected by federal laws.

It also would provide additional protection for the endangered green turtle, she said.

The proposed zone is home for more than 60 species of reef fish and an assortment of coral, she said.

"Nowhere in the Hawaiian archipelago is it possible to see such a broad spectrum of marine wildlife," she said.

She said the zone would be ideal for research, education and conservation management.

Jarman recommended that the state Department of Land and Natural Resources develop a management plan and that the plan maintain current levels of fishing in the area.

She also suggested the state agency review the use of unattended gill-net fishing, noting the fishing method is indiscriminate in the type of fish and marine animals that are caught.

Among other things, she recommended:

- A ban of thrill craft in the zone.
- Cooperative efforts between federal and state enforcement agencies.
- A narrow travel corridor within the zone for boats.
- Commercial diving through a state permit and continued recreational diving.
- Restricted swimming within 100 yards of dolphins.

State of Hawaii
Division of Aquatic Resources
Department of Land & Natural Resources
P.O. Box 1671, 3060 Eiwa Street, Rm 301
Lihue, Kauai, HI 96766

MEMORANDUM 18 April 1990

To: Mac Andrade, Chief Enforcement Officer, DOCARE
From: Don Heacock, Kauai District Aquatic Biologist D.E.H.
Subject: Sea Turtle Mortality due to Tour Vessel Impact along the Na Pali Coast State Park, Kauai

Based on reports that you and I have received from tour boat operators, sea turtle mortality due to vessel impact may be a significant problem along the Na Pali Coast. If it is a serious problem, as the informants have suggested[1], it may a result of the following:

1. tour boat captains operating their boats too fast in nearshore areas where turtles feed and rest, and basically not watching where they are going because they are too busy giving the tour;
2. too many boats;
3. an abundance of turtles.

I suggest that we work with the NMFS to investigate and resolve this potential problem focusing on sea turtle conservation. Several steps that our Department or the NMFS may want to pursue are:

1. Send letters to all Na Pali Coast tour boat companies informing them that:
   a) several reports have been received about sea turtles being killed by impact with tour boats;
   b) any sea turtles mortally wounded or killed by vessel impact must be reported immediately to DOCARE;

2. Amend existing tour boat permits to make it mandatory that all sea turtle accidents/vessel impacts be reported immediately to DOCARE; also, the permits should include that it be mandatory that any sea turtles killed by vessel impact be recovered so that biological information can be obtained from the dead turtle;

3. Identify specific "microhabitats" along the Na Pali Coast that represent prime feeding and resting habitats and establish vessel "speed limits" within these areas. If this is desirable or necessary, these could also be incorporated

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[1]One boat captain said the company he works for hit three turtles in one week; two of these turtles were killed but were not brought back to shore because the company owner did not want "bad publicity".

into existing tour boat permits.

cc. Gene Nitta, NMFS, Protected Species Coordinator, Pacific
George Balazs, NMFS, Leader, Sea Turtle Recovery Team
Paul Kawamoto, Chief Environmental Protection, DAR
Sea Turtle Recovery Team member
George Niitani, Superintendent State Parks Kauai

Barking Sands rocket battle

By Jan TenBruggencate
Advertiser Kauai Bureau

LIHUE, Kauai — A battle over the environmental effects of solid fuel rockets at the Pacific Missile Range has turned into an attack on the military, on Star Wars missile defense research and on officialdom generally.

The controversy involves two rockets planned for launching from the range in tests associated with the nation's Strategic Defense Initiative, better known as Star Wars.

The Army's Strategic Defense Command is preparing an environmental assessment for the rocket systems. But at an informational meeting on the environmental effects last week, one speaker after another decried military testing generally.

Some speakers referred to radioactive pollution from military nuclear tests, although there is no proposed nuclear involvement in the Kauai launches, neither nuclear weapons nor experiments carrying any nuclear material.

Several cited examples of polluted groundwater and fish kills at other military launch sites, but asked few questions about the specifics of the proposed Kauai launches.

"It was so unfortunate. We brought all these experts all the way from Alabama, and hardly anyone asked them any questions. One speaker asked a question, and said he wasn't going to believe the answer, no matter what it was," said Vida Kilauano Mossman, public affairs office for the missile range.

Several members of the audience said they mistrusted the military and refused to accept guarantees the launches would not be hazardous.

Military officials told the speakers that if they want to stop military testing of defensive technologies, they are in the wrong forum. They need to talk to the politicians who fund the programs.

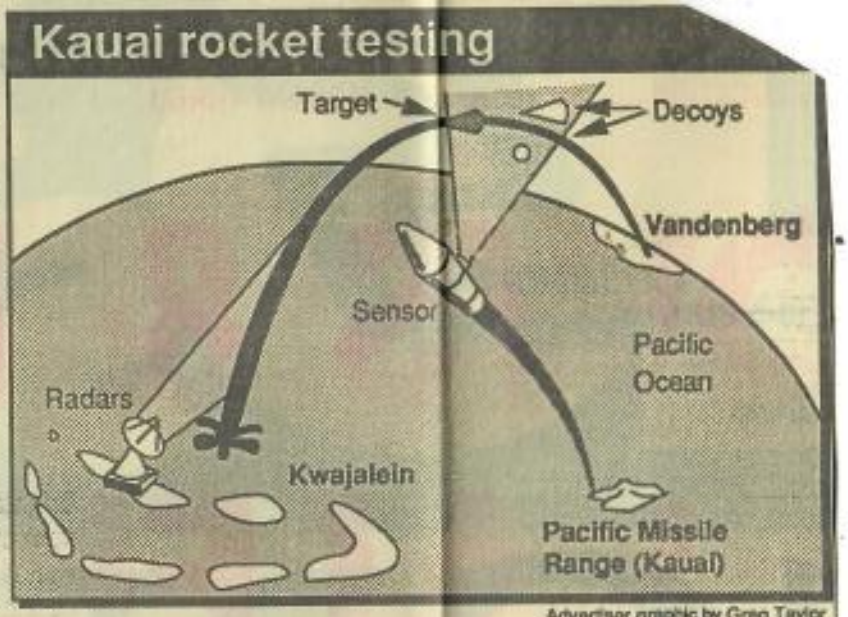
Most of the opponents of Strategic Defense Initiative testing expressed deep frustration with the government, the military and technology generally. Some said that with the end of the Cold War, such testing should also be stopped.

One speaker said the issue is not an environmental, but a moral one.

"I do not want Kauai to be the island where weapons are tested," she said.

While the anti-launching contingent was by far the most vocal part of the crowd, the missile range and its programs appeared to have strong, if quiet, support from many of the Kauai residents who appeared.

The Army expects to have the assessment done late this summer, and has given the island 30 days to make comments before it makes decisions on whether to proceed with the projects.



Advertiser graphic by Greg Taylor

touches many bases

Officials Thursday night said their preliminary tests show rocket fuel contaminants do not violate state or federal air quality standards and that noise should not be a serious problem. Endangered plant and bird species are found in the immediate area of the launch, and the study is to determine the impact of launches on them.

The first rocket to be put into use would the Strategic Target System, or STARS. It is made up of two surplus Polaris A-3 solid fuel rocket motors and a third solid fuel motor called an Orbus-1, which was designed for STARS.

The rockets, 34 feet high, would be launched from Barking Sands and aimed at Kwajalein atoll. The army would use new sensing equipment to track the rockets, as a means of testing the usefulness of various sensors.

The Army expects, starting in mid-1991, to launch four STARS missiles yearly and to continue for about 10 years.

The second type of rocket involves the Exoatmospheric Discrimination Experiment, or EDX, scheduled for nine firings, three annually starting in 1993. A 29-foot EDX rocket, with a single-stage Aries solid fuel booster, would carry a camera beyond the Earth's atmosphere.

The Strategic Defense Command proposes to launch from Vandenberg Air Force Base in California a rocket with experimental targets that mimic warheads and decoy warheads that are used to confuse anti-missile systems.

As the dummy warheads pass over Hawaii on their way to a splashdown site north of Kwajalein, the EDX camera system would photograph the experimental targets and then parachute back into the ocean about 40 miles north of Kauai for recovery.

The experiments are designed to show whether such cameras can tell the difference between warheads and decoys.

The Kauai Test Facility since 1962 has launched without a failure 315 rockets, said Barking Sands official Thomas Hoban.

Most of those missiles have been smaller than the STARS.

Barking Sands considered

for futuristic space gun site

By Jim Borg
Advertiser Science Writer

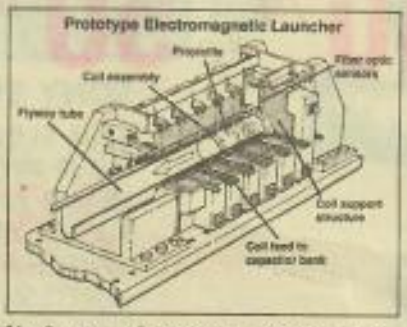
A futuristic space-launch concept that dates back to Jules Verne is fast becoming a reality at Sandia National Laboratories in New Mexico.

Barking Sands on Kauai is one of the sites where Sandia scientists say their electromagnetic coil gun could work.

This is all just in the idea stage now. There is no proposal to establish a new satellite-launching complex at Barking Sands, home of the Navy's Pacific Missile Range Facility.

However, Sandia researcher Bill Cowan says Barking Sands is among several attractive locations, which also include Vandenberg Air Force Base in California, Cape Canaveral in Florida and Puerto Rico. The sites have open ocean to the north or south, which allows over-water launches of polar-orbiting satellites.

The space age to date has relied on chemical propulsion. This works fine, but it isn't cheap.



A hybrid system using electromagnetic coils to provide initial boost, then a rocket to finish the job, would be 100 times cheaper, Sandia researchers estimate.

A coil gun, similar to rail guns under study as part of the Strategic Defense Initiative, accelerates projectiles by magnetism.

Payloads ride inside a heat-resistant armored "aeroshell" through a barrel made up of cylindrical electrical coils.

Just before firing, a pressure device sets the projectile spinning for stability in the air in the same way a spinning top stays stable on a table. Computers then energize the coils quickly in sequence, with the current acting on the metal shell.

"The projectile rides this electromagnetic wave, trying to keep out in front of it," says Cowan.

Tests so far have accelerated a 160-gram (5½-ounce) object to a record speed of 1 kilometer per second, or 2,250 miles per hour.

Experiments in a remote canyon near Albuquerque, along with a sophisticated computer program called Warp 10, show that the basic physical principals of pulsed-power launching technology are now well understood, Sandia officials say.

Launching to orbit will require a long flyway, angled up at about 30 degrees, consisting of many electrical stages each powered by its own capacitor bank.

The electromagnetic launcher would provide enough velocity — about 10,325 mph — to send the main part of the projectile above the atmosphere. The armor would drop away shortly after launch, the remaining shell would fall off above the atmosphere and a rocket would ignite to kick in the additional 10,000 mph of velocity necessary to achieve orbit.

The ultimate cost of the launcher would be about $1.3 billion, compared with $20 billion for development of successors to the space shuttle. But the coil gun would be limited to small payloads, up to about 1,000 pounds.

The research into low-cost capacitors was funded by the Strategic Defense Initiative Organization and Defense Nuclear Agency. Sandia Labs are operated for the U.S. Department of Energy by AT&T.

A report on the project in the April issue of Scientific American put too much emphasis on the Barking Sands site, said Cowan. The magazine said sonic booms from the half-mile-long coil gun, occurring as often as every 10 minutes, could be heard as far away as Princeville and Port Allen.

Challenges remain in designing satellites to withstand the high forces of rapid acceleration and the friction of the atmosphere, but Cowan says they are achievable with current technology. "We think we know how to do that," he said.

Welcome to Anini Beach

Aloha. We are the Chisholm's, Jo and Sterling. We have several vacation rental homes down at the end of Anini Beach. Having been here for many years, we are often asked by people visiting our little corner of the world where a good place would be to swim and or snorkel. The answer to that is practically anywhere along the beach at Anini. To better help you enjoy your visit here, we have put together the following information for you including a map of our end of the beach and reef. We hope that some day you would like to return to Anini and stay in one of our beach homes.

History. This reef is one of the oldest reefs in all of Hawaii. At one time, it was the private fishing grounds of the ancient Alii or Kings who once ruled this island. In those early days, special rites or konohikis were given by the Alii to certain commoners to catch a particular type of fish or octopus here. This meant that parts of the reef were kapu or restricted to everyone else. Also, there were major kapus when no one could fish on this reef. When Hawaii became a state in 1959, this old system of conservation and management was abandoned. The reef was opened up to everyone with little or no restrictions. The result of these changes has not been to the long term advantage of the reef's over all eco system.

Geology. While many of us think about tropical reefs as being huge coral formations, this reef, like most other reefs in Hawaii, is nothing more than an old lava flow that extends out under the ocean with a thin mantle of coral and seaweed on its rocky surface. At the fringe of the waves the lava flow steps down into deeper water in much the same manner as the mountains do directly in back of the beach. The Island of Kauai was formed by a successive series of these lava flows. The reef at Anini just happens to be one lava flow that did not get covered up by another lava flow. Look around while you are here and you will see what I mean.

Reef Ecology. Kauai is located at the fringe of the Tropic of Cancer, and as a result the open ocean waters here are relatively cool. Consequently, the marine life, while abundant, is not as profuse as it is along the warmer Equatorial zone. Also, the large expanse of reef at Anini is in fairly shallow water. During the calm and hot summer months, the water temperature inside the lagoon gets to be like a very comfortable bath tub. While these temperatures are nice

Caution! If you find a lot of heavy wave action occurring at the perimeter of the reef with secondary waves coming in over the lagoon and reaching the beach, STAY OUT OF THE WATER FOR YOUR OWN SAFETY! Just the turbid color of the water alone during these conditions should be a clue to its lack of good visibility for purposes of snorkeling. Also, and more importantly, there are several large and deep channels in the reef where rip currents are very strong when the ocean is rough as described above. The large waves build up and immense amount of water over the top of the reef in a very short period of time. All of that water exits the reef through the various channels with tremendous force.

Safety tips. There are no lifeguards at Anini Beach! We cannot accept responsibility for your safety, only you can do that by being alert to the conditions around you and also by being aware of your own physical limitations. There is one very good rule to follow while snorkeling or swimming, no matter how good the ocean conditions are when you enter the water. If you feel that you are moving along parallel to the beach or to the waves or even out to sea with little or no effort, immediately stand up on the reef (while you can) and assess the conditions to determine where you are AND why you are moving so easily in that direction. Swim or walk back to a calmer area. If you find yourself in a rip current in deeper water do not attempt to fight the current by swimming toward the beach! Swim parallel to the beach until you are over the reef again and can stand up and rest. Most of all, do not panic! This will only cause you to lose you strength and energy. If you are caught in a heavy rip current and cannot make it to the reef, save your energy by allowing the current to take you out beyond the reef. Swim parallel to the beach just behind the waves until you find a lull in the surf. That's the time to swim for the reef. You may have to do a little body surfing, but you will get through if you keep a cool head. For those who are on the beach and see a problem with someone in the water, there are public pay phones at the beach park a quarter of a mile back up the road. A phone is located on the street side of the bathroom facilities right at the entrance to the boat ramp.

All is well that ends well. Hopefully while you are visiting Anini Beach, the ocean and weather conditions will be favorable as they are most of the time. If, while you are enjoying the beauty of Anini Beach, the thought should occur to you that you would like to spend more time here, we can help you there as well. For further information regarding our Anini vacation rentals, please give us a call on Kauai at (808) 828-2156. In the mean time, ALOHA!

P.O. Box 89,
Kilaues, Kauai,
Hawaii, 96754
May 1,1995

Dear George,

What a nice surprise to receive all the "stuff" in the mail with respect to turtles. I was particularly interested in the tracking of their migratory paths up to FFS and back to Hawaii. My father was a doctor on Midway Island back in the 30ies and used to talk about the turtles that came up there. He used to talk about how incredibly large they were back then. He also talked about the tiger sharks too. While I have never been to Midway, FFS, Necker or Nihoa, they are places I grew up hearing about as a kid.

As I probably told you, I grew up on Kauai in the forties and fifties when catching turtles was legal. I grew up at Anini Beach on the North Shore where we have a huge reef. I learned the reef here and how to dive for turtles from the Hawaiians. While it is now illegal to catch turtles, we still talk about the old days. The best time for catching turtles was at night when they would come in and sleep in the sand pockets just inside the waves. We never took more than we could eat.

If what we see when we go out fishing and diving today is any indication of the population here, it appears to be on the increase. During evening time when the tide is low and we are out pole fishing at the outer edges of the various channels, sometimes it looks like a log jam of turtles coming in trying to find a place to bed down for the night. So, if you are interested in coming over and seeing some of this, I'd be glad to show you around.

On rare occasions we will have large turtles come ashore here at Anini. I have never seen any nesting behavior however. I do remember that up in the crater at Kilauea there is a protected beach where I remember seeing turtles haul out. I think there was nesting going on there, but that was a long time ago. The Kilauea crater area is now a bird sanctuary and the general public cannot get in there, so, you never know. Perhaps the wild life people stationed there could help you.

While I am the most familiar with the reef at Anini, I have seen numerous turtles off the reef at Kapaa though I have never dove there. Coming around the Island our way, there are a number of reefs beginning at Anahola and becoming more proper in formation beginning at Moloa'a From Moloa'a there is almost a continuous reef that terminates at Pila'a which is in sight of the Kilauea crater area. There is the red lemo (seaweed) all along this reef that the turtles just love. I know that they come in and sleep on these reefs as well.

The Moloa'a to Pila'a reef area is fairly well restricted to human access as a result of private property ownership, although people do get down there. I have heard of turtles coming ashore at Pila'a, but that was a long time ago.

There are scattered reefs from Hanalei Bay to the end of the road at Haena. I have seen some monster turtles off the reef in Hanalei just below the Princeville hotel. I mean some monsters. The remaining reefs I am not that familiar with although I have seen turtles out there.

I went down to Milolii along the Na Pali coast a couple of years ago where there is a little reef and saw a bunch of turtles down there. I did see several larger turtles while diving there. They were "clicked off" or resting on the bottom as you call it. I was taken back by the Fibropapilloma nodules on them. We never used to see that on the turtles around here when I was a kid.

I do not get around to dive the south side of the island very much, however, I have seen several fairly large turtles out by the old Poipu landing while diving. This was just recently and they appeared to be free of Fibropapalpma.

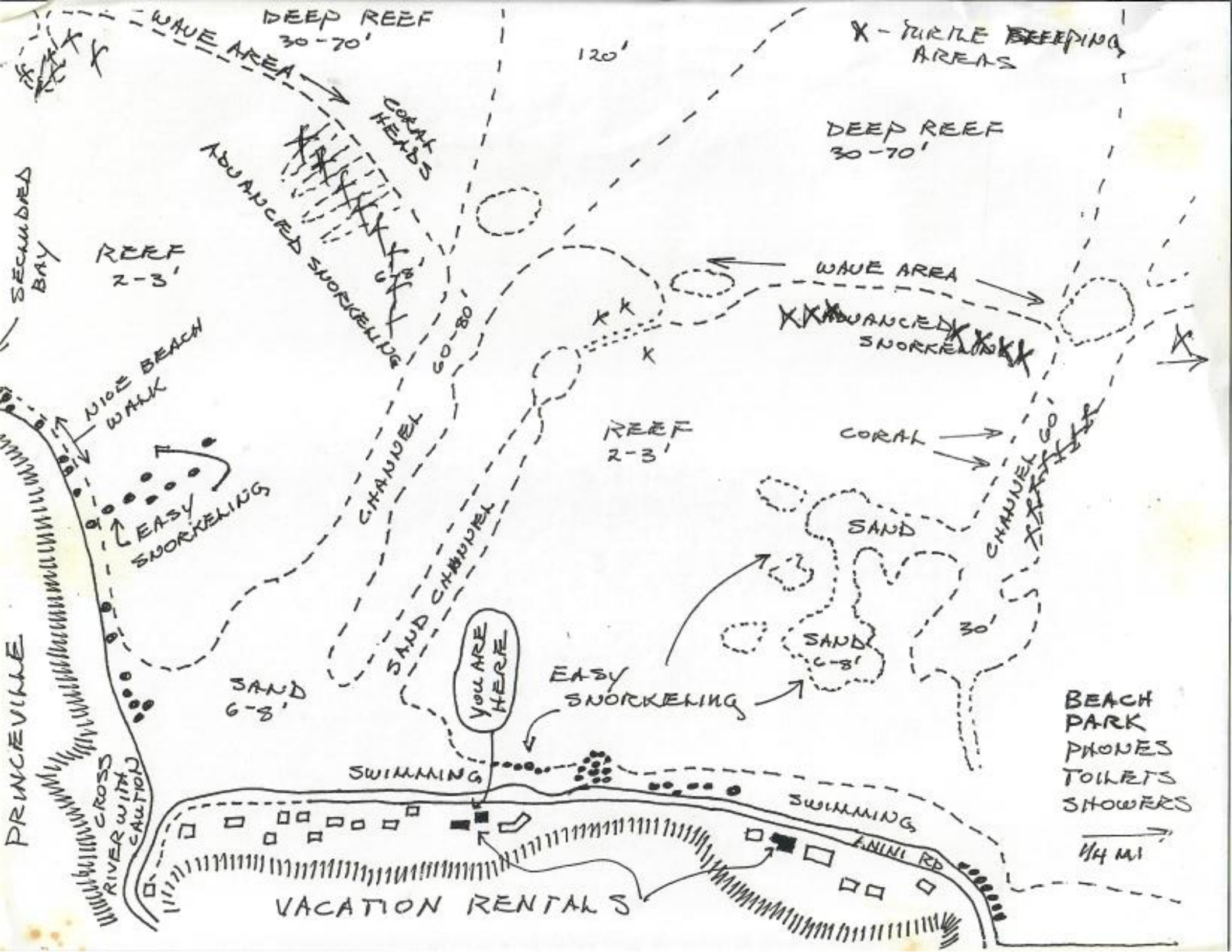
I have enclosed a little brochure with a partial reef map of the Anini area. I have indicated turtle sleeping areas for you, and if you would like I could provide you with a more complete reef map of this area. There are some big undercuts along the edges of some of the channels that penetrate the reef here, and I know that the turtles take advantage of these undercut areas to sleep at night. It is a little spooky diving down there at night as that's when the "man in the gray suit" comes patrolling around. That is why we primarily do most of our night diving inside the reef.

I have dove off of Niihau on several occasions and seen turtles over there. The shark population is pretty heavy over there. As a matter of fact, we have to fight them off sometimes when we go over lobster diving. Thank God we are not spearfishing over there or I wouldn't be here writing this to you. But, I'll bet with all those protected beaches, especially on the north end of the island there could be some nesting going on. One of the fellows who owns the island is named Keith Robenson and he is a home grown conservationist/environmentalist of sorts. While he has had some run-ins with the State Land people with respect to protected species of plants that he was trying to preserve on his land, he might be open to letting someone like you go there if he were approached properly. I know people who know him, and if you are interested, it could be worth a shot. If there could be some way I could go along, I'd sure give my eye teeth to go. Just a thought.

Again, thanks for the information. Give me a call some time. Evenings are best as I am usually out in the field during the day. I will be up on the Mainland for my daughters graduation from U.C. Davis for two weeks during the middle of June. Other than that, I'm here.

Aloha

Sterling Chisholm


DEEP REEF
30-70'
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CORAL HEADS
DEEP REEF
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ADVANCED SNORKELING
SECUNDERS BAY
REEF
2-3'
WAVE AREA
ADVANCED SNORKELING
60-80
NICE BEACH WALK
CHANNEL
REEF
2-3'
CORAL
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EASY SNORKELING
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YOU ARE HERE
EASY SNORKELING
PRINCEVILLE
CROSS RIVER WITH CAUTION
SWIMMING
SWIMMING
ANINI RD
BEACH PARK
PHONES
TOILETS
SHOWERS
1/4 MI
VACATION RENTALS