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Governor of Hawaii



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Board of Land and Natural Resources

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STATE OF HAWAII  
DEPARTMENT OF LAND AND NATURAL RESOURCES

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Honolulu, Hawaii 96809

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- Conservation and Resources Enforcement
- Forestry and Wildlife
- Historic Preservation
- Land Management
- State Parks
- Water and Land Development

In reply, please refer  
to FILE NO.: MA-2772

MEMORANDUM

SEP 12 1995

TO: Mr. Gary Gill, Director  
Office of Environmental Quality Control

FROM: Michael D. Wilson, Chairperson *Gilbert A. Coloma-Agaran f*  
Board of Land and Natural Resources

SUBJECT: Document for Publication in the OEQC Bulletin, Final  
Environmental Assessment for Conservation District Use  
Application MA-2772 for Data Collection in the Honolua  
Bay Marine Life Conservation District in Honolua Bay,  
Maui; Seaward of TMK: 4-2-01

The above mentioned proposed use requires an environmental  
assessment in accordance with Title 11, Chapter 200 of the  
Environmental Impact Statement Administrative Rules. A negative  
declaration has been declared on the final environmental  
assessment.

Please feel free to call me or Roy Schaefer of our Office of  
Conservation and Environmental Affairs, at 587-0377, if you have  
any questions.

Enclosure

124

1995-09-23-MA-~~FEA~~ Honolua Bay Marine Life Conservation  
District Sedimentation and ~~Water~~ Water  
Motion Analysis  
FINAL

SEP 23 1995

FILE COPY

ENVIRONMENTAL ASSESSMENT

- (1) Applicant: Pacific Whale Foundation  
Attn: Eric K. Brown  
101 N. Kihei Rd., Suite #21  
Kihei, HI 96753
- (2) Approving Agency: Chairperson, Department of Land and Natural Resources  
Division of Aquatic Resources
- (3) Consulting Agencies: Department of Land and Natural Resources  
Division of Aquatic Resources  
Attn: Skippy Hau  
70 S. High St., #201  
Wailuku, HI 96793

Department of Land and Natural Resources  
Office of Conservation and Environmental Affairs  
Attn: Roy Schaefer  
1151 Punchbowl St., Rm. 131  
Honolulu, HI 96813

Hawaii Institute of Marine Biology  
Attn: Paul Jokiel  
P.O. Box 1345  
Kaneohe, HI 96744-1346

(4) Much of the technical characteristics of the project are detailed in section IX below. The economic characteristics would entail immediate employment for 4 marine biologists and the use of up to 6 volunteers assisting on the project. This program would also impact local dive stores in the purchase and rental of equipment. Research budget expenses would be covered by the Pacific Whale Foundation, Lahaina Divers, Earthwatch and the Maui Ocean Center.

The social characteristics of the project would be to enhance the local scientific knowledge of the area and allow educational institutions (e.g. Pacific Whale Foundation, University of Hawaii, Maui Community College and the Maui Ocean Center) an opportunity to gain insight into physical factors shaping reef ecosystems. Negative effects might be directed towards the aesthetic nature of the trays in a MLCD which is also a tourist destination. It has been our experience, however, that onlookers are more interested in our work and experiments than comment negatively about it.

Environmental characteristics: During the experiment green sample trays would remain on the bottom for 2 week intervals and be the major object of contention. Coupled with white sediment tubes and clod cards they would be visible on the bottom. Water quality would not be affected by the dissolution of the plaster of Paris clod cards due to the temporary nature of the traps and the large volume of water relative to the size of the cards. On land, two vehicles would be used to transport the gear down to the landing (1/4 mile) and then park up along the road. This would be done twice a day minimizing air pollution, traffic congestion and noise levels.

(5) Honolua Bay MLCD is a semi-enclosed bay with two coral reef areas bordering the northern and southern expanses of the bay (Figs. 1 & 2). The affected environment would consist of these reef areas with 100m transects bisecting the depth contour from 5' down to 40'. The nearshore south reef has coral coverage around 25-30% over a basalt substrate while the north reef has coral coverage near 50%. The coverage increases with depth to approximately 80-90% giving way to a sandy-silt bottom at 40' in the center of the bay.

The Makuleia Bay MLCD is adjacent to the proposed area but would not be impacted by the activities.

(6) Positive impacts would include but not be necessarily limited to:

- a. Acquiring baseline knowledge on physical factors shaping reef ecosystems.
- b. Educational enrichment of participating organizations and individuals present on site (e.g. tourists).

Primary negative impacts would be aesthetic and physical disturbance of the substrate. Since this area is a MLCD and a tourist destination the primary negative impacts would be directed towards the aesthetics associated with placement of structures on the bottom. Major physical impacts would be during placement and removal of the sediment traps and clod cards. These include temporary attachment of the trays to the bottom using tie-downs and inadvertent physical contact with the substrate by divers.

Alternatives considered include the following:

- a. Establish permanent stations (e.g. trays bolted to the bottom) to reduce the time and simplify the procedure for placement and removal of the sediment containers and clod cards.
- b. Measure parameters such as turbidity and suspended solids to project what sedimentation levels might be.
- c. Anchor current meters and/or pressure gauges on the bottom to analyze water motion.

(7) Mitigation measures would be directed in the following four areas:

- a. Use of divers with experience in buoyancy control for placement and removal of the trays.
- b. Temporary tie downs will be used instead of more permanent bolts and epoxy to limit bottom disturbances.
- c. Actual placement of the trays will be restricted to areas of barren substrate (i.e. low or nonexistent coral coverage).
- d. The trays and associated sediment traps would be darkened to reduce the visible profile.

(8) The short term determination would be the visible presence of the sample trays on the bottom and the physical contact with the reef. Due to the temporary nature of the traps, long term environmental impacts would be negligible. It is expected that within 6 months after completion of the experiment any traces of the sediment trays would be gone and coral inadvertently broken off would most likely regenerate within 1-2 years time.

(9) The fact that this experiment is temporary with no permanent structures, reef areas would regenerate and past research has shown negligible environmental impact using these methods (Gardner 1980; Jokiel and Morrissey 1993).

(10) Agencies to be consulted if EIS is required:

- a. Department of Land and Natural Resources
- b. Hawaii Institute of Marine Biology
- c. University of Hawaii Department of Zoology
- d. University of Hawaii - Hilo, Marine Options Program
- e. Maui Community College, Marine Options Program
- f. Scripps Institute of Oceanography, Div. of Ocean Engineering

**XVII. REFERENCES CITED**

Doty, M.S., 1971. Measurement of water movement in reference to benthic algal growth. *Bot. Mar.* 14: 32-35.

Gardner, W.D., 1980. Field assessment of sediment traps. *Journ. of Mar. Res.* 38: 40-52.

Jokiel, P.L. and J.I. Morrissey, 1993. Water motion on coral reefs: evaluation of the 'clod card' technique. *Mar. Eco. Prog. Ser.* 93: 175-181.

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# Honolua Bay Marine Life Conservation District

## Boundary

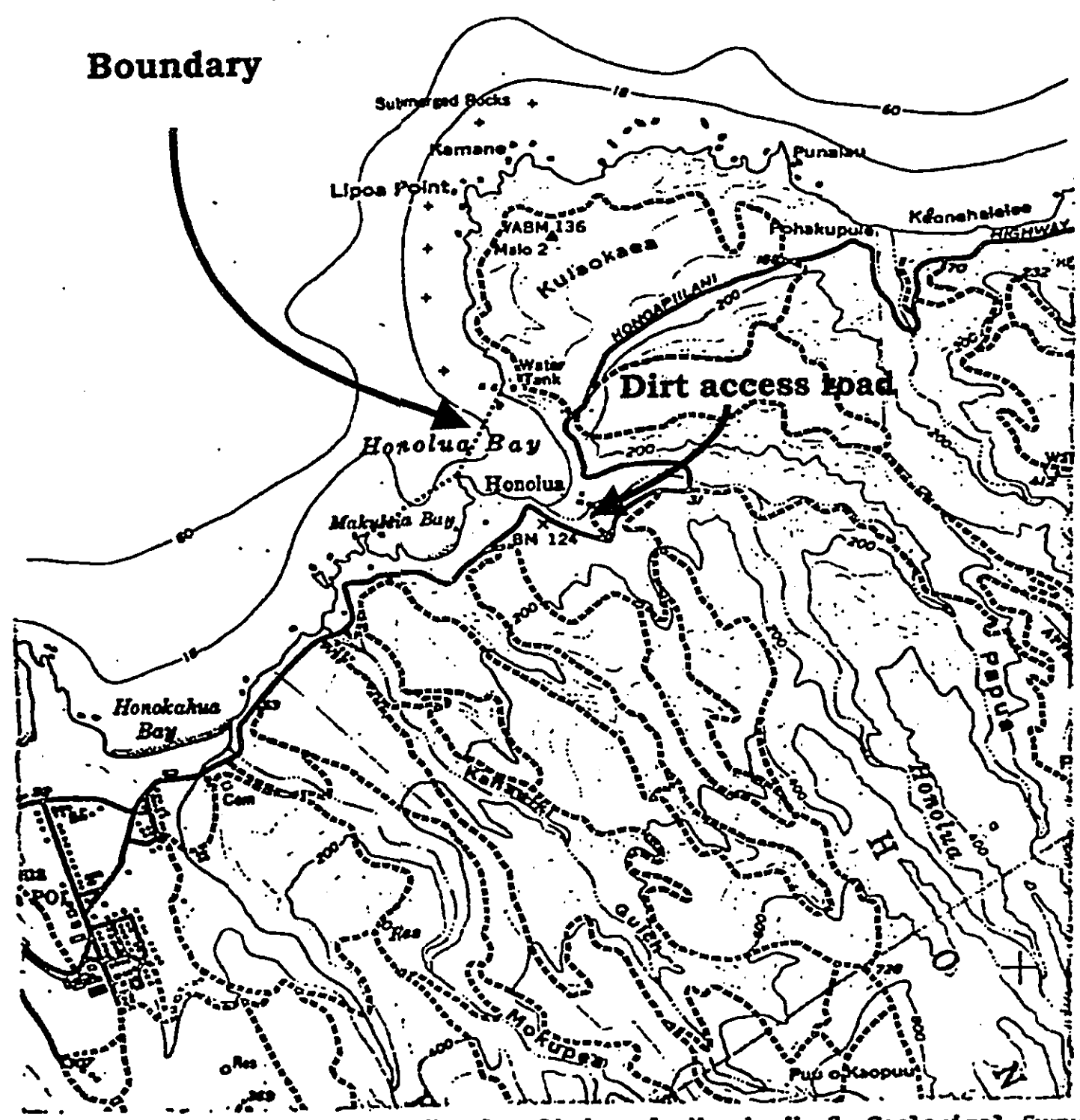


Figure 1: Location Map from Honolua Quadrangle Map by U. S. Geological Survey (Modified from: Environmental Consultants, 1974)

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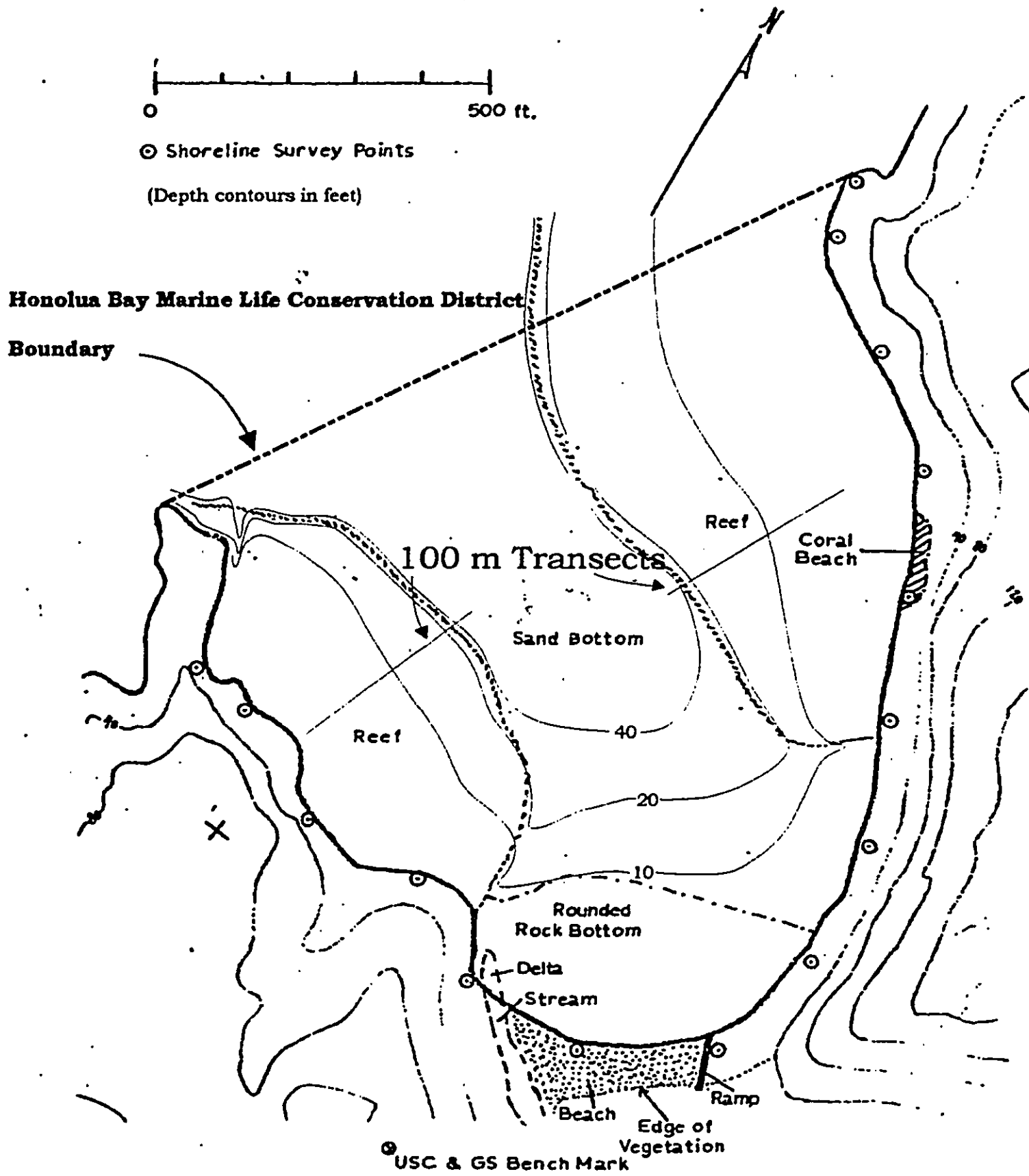


Figure 2: General Map of Honolua Bay  
(Modified from: Environmental Consultants, 1974)

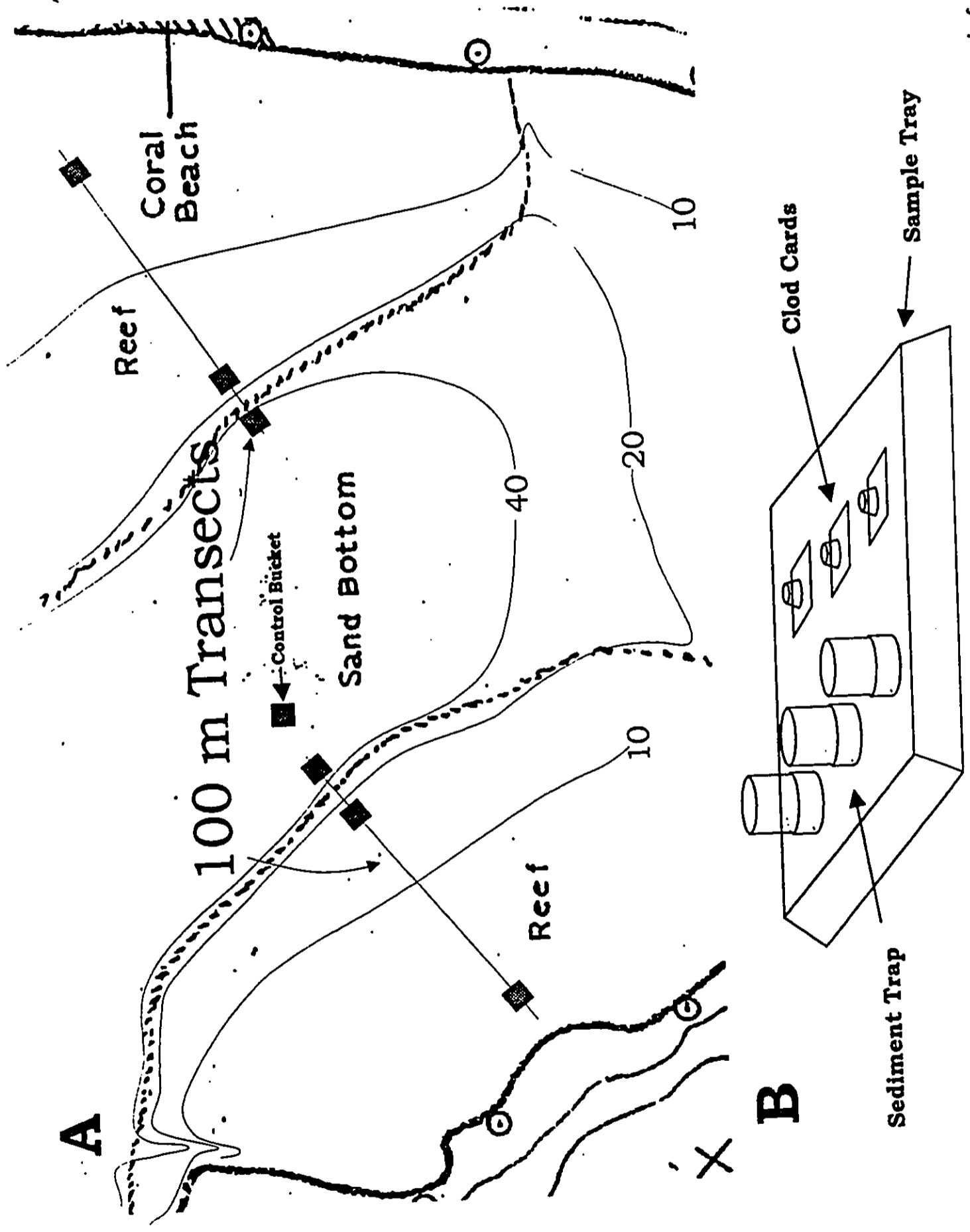


Figure 3: A. Transects showing the sampling stations (■ Stations not to scale). B. Enlargement of sampling tray. Depth contours in feet.



## PACIFIC WHALE FOUNDATION

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August 4, 1995

TO: Jo-Anne N. Kushima, Aquatic Biologist  
FROM: Eric K. Brown, Pacific Whale Foundation  
  
RE: Reply to comments on Conservation District Use Permit  
File No.: MA-2772

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Dear Ms. Kushima,

This letter addresses comments on the proposed Conservation District Use Application for Honolua Bay, Maui which is a Marine Life Conservation District (MLCD). In addition, after speaking with Dr. Paul Jokiel (Hawaii Institute of Marine Biology) and Roy Schaefer (Office of Conservation and Environmental Affairs) I have attached an addendum that proposes some modifications to the original research design. This includes elimination of the transect lines and control buckets for the sediment traps and clod card experiments plus a request to use sediment stakes to monitor horizontal movement of sediment. Also enclosed is a copy of our 1994 field report to Earthwatch that highlights our work and findings to date.

Listed below are the responses to your questions in the sequence that they were presented.

1. What compelling reason is there to have this study conducted in the Honolua Bay MLCD? Is there no where else on Maui or in the State of Hawaii that this study could be conducted?

Honolua Bay is one of the most unique reef areas in the state of Hawaii due to the high diversity of its coral and fish species. Protecting this vital resource is of great interest not only to the state of Hawaii but also to the local community and research organizations. Conducting investigations in such a prolific reef area allows for a wide range of questions to be addressed.

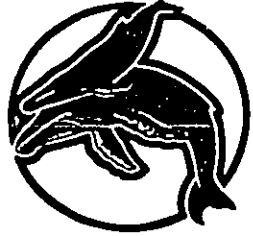
Honolua Bay is actually one of four sites currently being studied by the Pacific Whale Foundation along the West Maui coastline using the techniques described in the CDUA. We are interested in examining temporal and spatial changes at each of these sites and Honolua Bay is unique due to its protected status as a MLCD. One of our basic questions explores differences in coral and fish communities between sites as a function of legal protection and physical characteristics. In addition, we are also interested in the feasibility of MLCDs to preserve marine habitats around Hawaii even amidst increased tourist pressure.

2. Will the data collected as the result of this study be meaningful? How?

Understanding the origins of sediment (terrestrial or aquatic), how it moves around the reef (vertical sedimentation or horizontal movements) and its impacts on the reef ecosystem (smothering of coral or reduction in light penetration through increased turbidity) is imperative to clarifying the relationships between the physical and biological environment that exist in the nearshore area. This data along with the field reports will be provided to the appropriate state of Hawaii officials as part of our ongoing effort to inform management agencies responsible for protecting our nearshore resources. Using this information will hopefully assist planning decisions regarding not only MLCDs but also other nearshore areas that face development along the coastline.

This data will also be used in conjunction with my doctoral dissertation research which plans to investigate sedimentation dynamics at these sites and how they shape reef communities with regards to coral and fish assemblages.





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### 3. What connection does the Pacific Whale Foundation have with coral reefs?

Since its inception in 1980, the Pacific Whale Foundation has been interested in marine mammals and their marine habitat. Our mission is to gather and continually update credible scientific data-and to use that data to influence public policies in favor of the protection of whales and the marine environment. In keeping with this statement we have been broadening our horizons in the field of marine research to include coral reefs.

In 1987, the foundation funded and logistically supported the baseline survey of Molokini conducted by the University of Hawaii Marine Option Program. This eventually led to the placement of the first mooring pins at this MLCD. Then in 1989 the coral reef research project was started in an effort to characterize coral reef ecosystems on Maui. The goal of this project was to examine long term changes in the marine ecosystem and determine if these changes had any bearing on marine mammal distribution and recovery rates. This project has expanded over the years to include other organizations such as Earthwatch, which supplies our funding and volunteers, to the University of Hawaii at Manoa and Hilo that provide technical assistance in the area of research methodology and experimental design.

On a personal level, I also wanted to continue my education and pursue a Ph.D. in coral reef biology since I began working as the Senior Research Associate for the foundation and principal investigator for this project. After enrolling at the University of Hawaii this past year to work with Dr. Paul Jokiel several enhancements to the research protocol have become evident and these are described in the original CDUA and the addendum. I still plan on continuing this joint partnership between the Pacific Whale Foundation and the Hawaii Institute of Marine Biology while attending graduate school thus further establishing the connection with the foundation and coral reefs.

### 4. Are other factors such as the amount of usage the area is being subjected to by tourists and fishermen being considered?

Initially each of our sites was chosen based upon qualitative differences in legal protection, visitor usage and fishing pressure. Ultimately, we plan to conduct surveys that allow us to quantitatively measure differences between sites (e.g., monitoring number and types of visitors and residents at each of the sites during the day) (See Table 1 below).

Table 1: Identified types of human use patterns at each of our sites.

User Group	Access	Aquatic Interest	Number/Day	Percentage
Visitor	Boat	Snorkeler		
		Diver		
	Shoreline	Fishing		
		Snorkeler		
Resident	Boat	Diver		
		Fishing		
		Snorkeler		
	Shoreline	Diver		
		Fishing		
		Snorkeler		



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5. Are the visitors entering Honolua Bay from the shore only or are they also entering the bay from the ocean?

The answer to this question is that Honolua Bay is accessed from both the shore and ocean side by visitors and residents alike. Quantifying these patterns will clarify human use within the bay (See also Table 1 above).

6. Are the vessels anchoring? mooring?

It appears from our diving surveys that vessels only anchor in Honolua due to the lack of any permanent or temporary mooring facilities. Most charter operations anchor on a daily basis but occasionally vessels enter the bay and stay for several days by establishing a more elaborate anchoring/mooring system. This can consist of several anchors both bow and stern, hooked up to a surface float that has a trailing line attached to the boat. In any case these devices are removed once the vessel leaves the bay.

7. Is there fish feeding to attract fish for snorkelers and SCUBA divers to see?

Fish feeding is still an accepted practice aboard many charter boats in Hawaii and Honolua Bay is no exception. In addition, visitors and residents alike engage in fish feeding activities from the shore by carrying bags of various types of fish food (e.g., frozen peas, bread, etc.) out to the reef areas.

The Pacific Whale Foundation has begun to address the impacts of fish feeding by investigating fish populations at Kahekili Park before and after fish feeding is initiated. This site affords us a greater degree of control to conduct the experiments than Honolua Bay which is accessible from both the shore and by boat. This study began in 1993 to specifically analyze fish feeding activities on species diversity and fish densities in selected areas. The question has three components; 1. How does fish feeding alter the number of species present? 2. How does fish feeding affect species composition within an area? 3. Do fish densities change once fish feeding is initiated? We hope that the results from this portion of our study will elucidate fish feeding impacts to shallow water coral reef fish communities around Maui.

### Final notes:

We recognize that the Department of Land and Natural Resources is responsible for protecting Hawaii's aquatic resources and their habitats but we also realize that the state cannot do this alone. In order for the state to engage in environmental protection it needs assistance from the local community, private and public organizations committed to protecting environmental resources, and academic and commercial institutions that provide the technical expertise to study and recommend suggestions for continued improvement. This partnership can help answer questions regarding the status of Hawaiian reef ecosystems. In particular studying an area such as Honolua Bay represents an excellent opportunity to examine the effectiveness of a MLCD and answer one of the most basic questions facing environmental managers in Hawaii (i.e. Do MLCDs work in preserving the habitat or is more protected area needed to sustain the marine resource?). Examining temporal changes at comparative sites including MLCDs can address some of these questions. Past studies have indicated that MLCDs can display different trends in fish and coral data but these studies are only conducted over the short term (Grigg, 1994). What about the long term? Organizations such as the Pacific Whale Foundation, Earthwatch and the University of Hawaii can meet those needs at relatively little cost to the state.

In addition, I also recognize the need to keep Honolua Bay in relatively pristine condition so I plan on mitigating impacts by using only experienced divers and removing all gear upon completion of

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the project. Both the DLNR representatives on Maui and Oahu will be notified in writing when the experiments are finished and a copy of our field report will be submitted to your office as we have done with the Maui office in past years.

### ADDENDUM TO CDUA METHODS

#### Sediment Traps

The original design called for the transect lines to be deployed along a depth contour in order to place the sediment traps. This will no longer be necessary since a simple compass heading coupled with a depth reading will be sufficient for tray placement.

Pilot studies at other sites, however, indicate that the sediment trays should be in place year round instead of two week intervals as originally proposed. We are recording vertical sedimentation rates as high as 2.5 grams of sediment per day (Area = 20.3 cm<sup>2</sup>) in the nearshore areas. In order to more accurately measure such high sedimentation rates we need to obtain samples every two weeks but leave the trays in place year round.

#### Clod Card Experiment

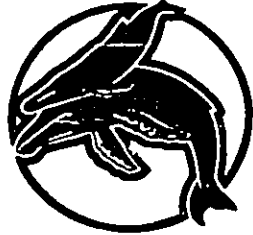
Initially we planned to deploy the clod cards over a 24 hour period once a month but our pilot studies indicate that 6 hours would actually provide better results since water motion patterns are higher than anticipated. Therefore time spent at Honolua would be reduced since collection of the samples could be accomplished within one day instead of two.

The clod card control buckets need not be deployed on the bottom of the bay but rather set up on shore during the same time period as the experiment. This will actually serve as a better control since water motion patterns can still affect the buckets at deeper depths.

#### Sediment Stake Placement

To examine horizontal movement of sediment as well as vertical sedimentation over a broader area within the study site we plan to deploy 12 stakes in a grid pattern throughout the center portion of the bay. These stakes will consist of a 1.5m piece of 1/2" rebar placed in the sand with a 60cm 1/2" PVC pipe as a sheath around the outside of the rebar at the level of the substrate. This PVC pipe will have centimeter markings on the outside to denote changes in sediment levels during the study period of one year. Depths for these stakes will range from 3 meters nearshore to 15 meters at the entrance of the bay. These stakes have already been deployed at two of our sites with great success (i.e. able to withstand strong southerly swells). The purpose of these stakes is to monitor shifts in sediment during large scale storms and periods of heavy stream runoff. It should be emphasized that these stakes will not be installed into the coral reef but rather placed in the sand bordering the main reef areas. The sediment trays will provide us information on sedimentation patterns over the actual reef.

One consideration that we have given a lot of thought on is the placement of the stakes within an area that experiences heavy anchor use. These stakes would not cause any problems with the anchors due to their small size but the experimental results could be compromised should any of the stakes get continually removed. After carefully surveying areas where anchors are used and trying to deploy the stakes that will still provide good coverage where anchors are used and trying to deploy the stakes that will still provide good coverage we came upon the placement scheme illustrated in Figure 1. It is hoped that we can initiate this experiment at the same time that we deploy the sediment trays and clod cards.



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### REFERENCES CITED

Grigg, Richard W., 1994. Effects of sewage discharge, fishing pressure and habitat complexity on coral ecosystems and reef fishes in Hawaii. *Mar. Eco. Prog. Ser.* Vol. 103: 25-34.

If you have any further questions please don't hesitate to call me at 808-665-0343 or FAX a message to 808-879-2615. I will be at this number until August 8th at which point I will move over to Oahu to begin my coursework for my Ph.D. studies.

Sincerely,

*Eric K. Brown*

Eric K. Brown  
Senior Research Associate  
Pacific Whale Foundation

cc. Roy Schaefer, Office of Conservation and Environmental Affairs  
Paul Jokiel, Hawaii Institute of Marine Biology