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UNIVERSITY OF HAWAII

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VICE PRESIDENT FOR FINANCE AND OPERATIONS

January 13, 1992

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Mr. Brian K. J. Choy, Director
Environmental Quality Control Office
Environmental Quality Council
220 S. King Street, Fourth Floor
Honolulu, Hawaii 96813

OFFICE OF ENVIRONMENTAL
QUALITY CONTROL

Dear Mr. Choy:

Subject: Environmental Assessment/Negative Declaration
Chemical Fish Collection
Department of Zoology, University of Hawaii

The University of Hawaii has determined that an Environmental Impact Statement is not required under the provisions of Chapter 343, Hawaii Revised Statutes, for the project indicated above.

In accordance with EQC regulations, we submit herewith these copies of the determination. Attached to each is a copy of the assessment on which the determination is made.

Sincerely,

A handwritten signature in cursive script that reads "Ralph T. Horii, Jr.".

Ralph T. Horii, Jr.
Vice President for Finance
and Operations

cc: Moheb A. Ghali, Director,
Office of Research Administration
John Harrison, Director, Environmental Center
David W. Greenfield, Professor, Department of Zoology

1992-02-08-OA-~~FEA~~ UH Department of Zoology
Chemical Fish Collection

ENVIRONMENTAL ASSESSMENT FOR PLANNED CHEMICAL FISH
COLLECTIONS IN WATER DEEPER THAN 50 FEET ON OAHU, HAWAII

PROPOSED PROJECT

The purpose of this project is to investigate the small fish species living offshore in water deeper than 50 feet on Oahu, Hawaii. As part of a research project conducted during the past year to investigate the community structure of smaller, more sedentary, cryptic fish species in Kaneohe Bay, I was able to make a number of small rotenone collections in various habitats in deeper water at the end of transects extending out from Kaneohe Bay. These collections, made in the spur and groove habitats of different depths, and at sites at the dropoff (wall) habitat, yielded fish assemblages that were quite distinct from the assemblages found within Kaneohe Bay. These collections also were significant because they contained several undescribed species of gobies as well as other small fishes that are rare. These few collections in deeper water (50-100 feet) have demonstrated that the fish fauna of Hawaii is not as well known as many believe.

Two liters of liquid rotenone will be used at each of 40 collection sites. This is enough to cover an area of approximately 25 square meters (5m x 5m). No collections will be repeated at the same site and the collecting effort will be spread over the period of a year. Times and places will be chosen with great sensitivity to possible observation of the collecting by Hawaii residents, and every effort will be made to make collections at times and places where I would be most likely to encounter few people.

JUSTIFICATION OF PROPOSED ACTION

The use of chemical collections is justified because there is no other method that can be used to obtain data on the small, cryptic fish species that are present in Hawaiian waters. In order to complete a book on the fishes of Hawaii, it is necessary to collect, identify, and take color photographs of all species in Hawaii, including the small species that are not well known. The basis of any management plan for the natural resources of Hawaii depends upon a thorough knowledge of the species present, their relative abundances, and their association with specific habitats.

DESCRIPTION OF AFFECTED ENVIRONMENT

I plan to make a total of forty collections during the period of a year, offshore in water deeper than 50 feet at various locations around Oahu that can be reached by small boat. Most collections probably will be made in the vicinity of Kaneohe Bay because of the availability of boats at the Hawaii Institute of Marine Biology. The specific habitats collected mainly will be spur and groove and dropoff areas, but also will include some areas of coral rubble, etc.

TECHNICAL, ECONOMIC, SOCIAL AND ENVIRONMENTAL CHARACTERISTICS OF THE PROPOSED ACTION

Technical Characteristics

The active chemical ingredient in the ichthyocide to be used is rotenone (C H O), an extract of the roots of plants of the Leguminosae, that has been used for collecting fishes by the scientific community for over 40 years. Rotenone interferes with the respiratory process in fishes, resulting in suffocation and death. Most invertebrates are much less sensitive and negative effects on corals and other important habitat species are not expected. Parrish (1983) has summarized the potential effect of rotenone on birds, turtles, mammals or humans as follows "No harmful effects have been shown to birds, turtles, mammals or man as a result of repeated contacts with water in which rotenone was used (USDI 1949). Many fishery workers have swum repeatedly through thick clouds of rotenone in water. Prevost (1960) has pointed out that 'drinking the water...though it is toxic to fish, is not harmful to mammals or humans with the concentrations used,' and that 'there is no danger in eating fish killed by rotenone.'" Parrish (1983) also points out that only very low concentrations (around 1 ppm) are needed to kill fishes and that rotenone is not very stable when exposed to warm temperatures and sunlight. Because of the rapid dilution of these low concentrations in the open waters, and its instability, toxic concentrations only would be present in relatively small areas for a few minutes. These properties make rotenone a routine tool in fishery research and management.

Economic Characteristics

The majority of fishes that will be taken using this technique will be small, such as blennies and gobies, that do not have any direct market value. These fishes could serve as food for fishes that are fished for sport or commercially, but the small numbers that will be taken should not have an impact on the feeding of these larger species. A few incidental species that hide in holes during the day might be taken, but these numbers would be low. The

'U'u or menpachi (Myripristis) would be an example of such incidental species.

Social Characteristics

Because of irresponsible use of chemicals in the past for taking of fishes for food, aquarium specimens and other purposes, there is concern that Hawaii residents not be led to believe that the use of such chemicals is condoned for use by the general public. Because of this it is prudent to keep a very low profile when making scientific collections using an ichthyocide. I have had over 20 years of experience making fish collections using rotenone throughout Mexico, Central and South America, American Samoa and Saipan, and never have encountered any problems. During this past year, under DNLN permits SCP 91-26 & 92-08, I have made rotenone collections in Kaneohe Bay or just outside the Bay in deeper water. To my knowledge the public has not been aware of these collections and no complaints have been filed, and several of these collections have been along the shoreline in very shallow water. I use very small quantities of the ichthyocide and am very aware of potential problems relating to the concerns of people in the area. I always make an effort to make collections at times and places where I am likely to encounter few people. In this proposed project, because collections will be made well offshore, in deep water where the small amount of rotenone is rapidly dispersed, the potential for public concern will be even less. Because we scare away larger species before collecting and only take small species, larger individuals floating to the surface are unlikely. In addition, at the beginning of a station the divers stay above the small rotenone cloud and catch any specimens that might drift up towards the surface, and then go to the bottom to pick up the small species.

Environmental Characteristics

The impact of the small rotenone collections will be the removal of most of the small, cryptic fishes from the 5m x 5m area being sampled in depths of water greater than 50 feet. Information on previous sampling with rotenone in Hawaiian waters indicates that recolonization of the fish communities to a similar composition on a patch reef in Kaneohe Bay took one to two years (Brock et al. 1979, Wass 1967). Shaklee (1979) reported on a series of three collections with rotenone in three successive years at the same site on the Waianae coast. He found that there was no consistent trend in the total number of fishes, total biomass or number of species at the site, and there was no measurable impact a year after a collection was made. The above studies were efforts to completely remove all fishes from the sampling area. Thus, the impact of these studies should be considerably greater than the potential impact of

the small collections we propose to make because we will make an effort to chase larger species away from the area before samples are taken. In addition, because we will be sampling in deeper waters where habitats are more continuous, repopulation should be even more rapid.

Based on my many years of experience in making collections in the tropical Western Atlantic, when one observes a small area that was collected the day before, it is not possible to tell that a collection was made because only the small, cryptic species are missing and the larger fish species are present at the site.

GENERAL CONCLUSIONS AND RECOMMENDATIONS

1. Chemical collections will result in the removal of small, cryptic fishes from 40 5m x 5m offshore sites in water deeper than 50 feet at various locations around Oahu.

2. The natural communities at these sites should renew themselves in less than one year and should be similar to their original condition.

3. Water quality will be impaired for a half hour at the most (probably only about 15 minutes in these deeper sites) and will be very localized (5m x 5m) and at no time will there be a condition that is deleterious to the health of humans, seabirds, turtles or seals.

4. Through judicious selection of sites and collection times, the public should not be affected.

5. There is no substantial degradation of environmental quality nor any long-term effects.

6. No rare, threatened or endangered species of animals or plants will be substantially affected.

7. There is no conflict between the proposed action and the State's long-term environmental policies or goals. This action should contribute to assessment of the marine resources of the state and aid in informed resource planning and management.

8. The action has no direct substantial effect on the economic or social welfare of the community or State. Negative effects are negligible due to the small quantity and kinds of fishes taken, and the highly localized offshore area.

9. There appear to be no measurable environmental effects.

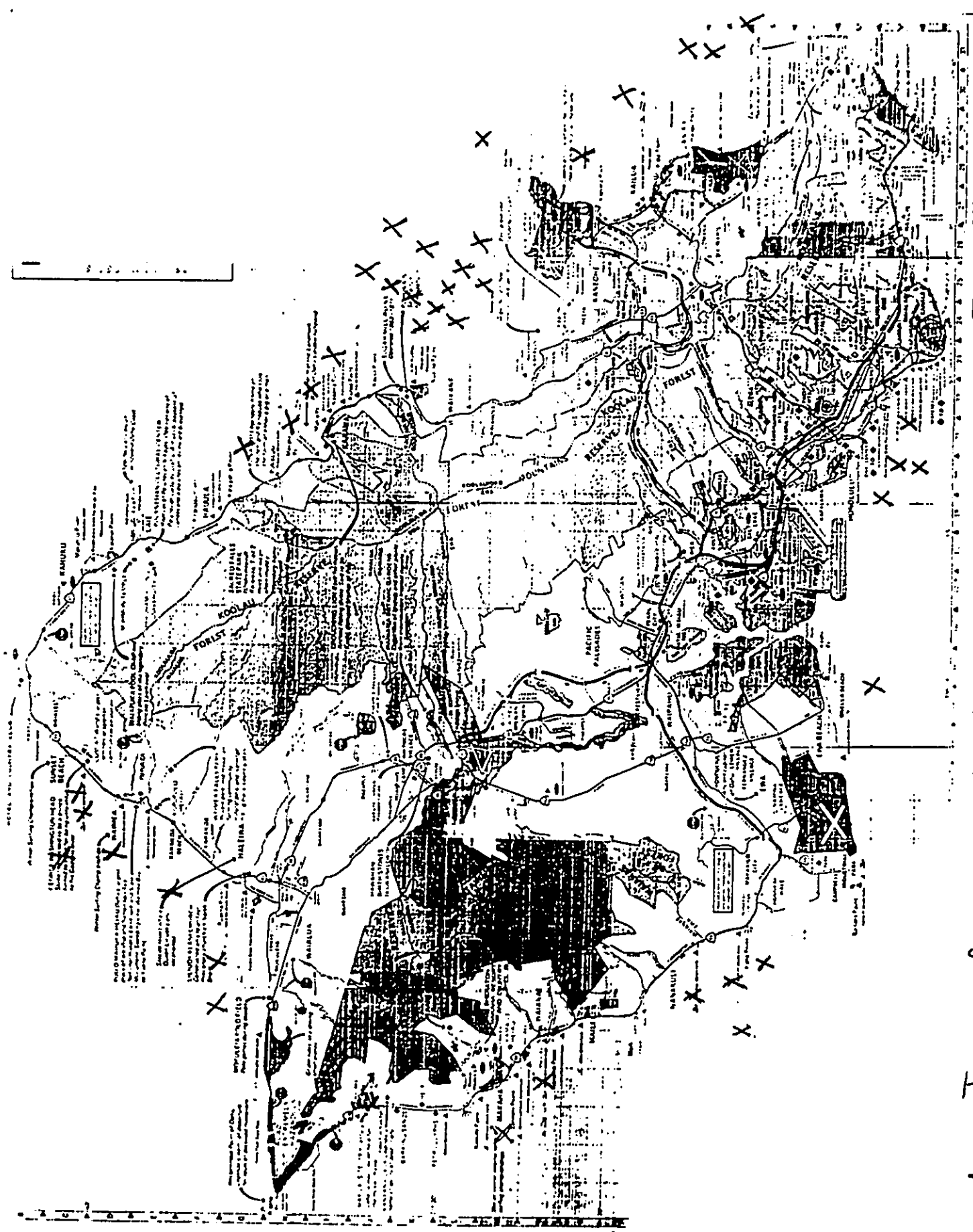
Because of the apparent lack of any significant persisting environmental impacts of this type of action in the past,

because the similarity of the present action to past actions of this type permits a confident prediction of no significant persisting environmental impacts, and because of the clear, positive value of this research in terms of resource management, scientific knowledge and education, this proposed action warrants a NEGATIVE DECLARATION. This is in accordance with the Hawaii Revised Statutes Chapter 343, which recommend the identification of classes of actions that probably will have minimal or no significant effect on the environment.

Literature Cited

- Brock, R.E., C. Lewis, and R.C. Wass. 1979. Stability and structure of a fish community on a coral patch reef in Hawaii. *Marine Biology* 54: 281-292.
- Parrish, J.D. 1983. Environmental assessment for planned chemical fish collections by the Hawaii Cooperative Fishery Research Unit. Submitted to Division of Aquatic Resources, Dept. of Land and Natural Resources, Hawaii.
- Prevost, G. 1960. Use of fish toxicants in the Province of Quebec. *Can. Fish. Cult.* 28: 13-35.
- Shaklee, J.B. 1979. Scientific collecting of fish using rotenone; an environmental assessment. Submitted to Hawaii OEQC.
- U.S.D.I. (United States Department of the Interior). 1949. *Fishery Leaflet #350*. p. 5.
- Wass, R.C. 1967. Removal and repopulation of the fishes on an isolated patch coral reef in Kaneohe Bay, Oahu, Hawaii. M.S. Thesis. Univ. Hawaii. 77pp.

Submitted by:
David W. Greenfield
Dean, Graduate Division
and Professor of Zoology
University of Hawaii



Locations of proposed 40 chemical fish collections
in waters deeper than 50 feet.

D.W. Greenfield