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INTRODUCTION

The Environmental Center was established by action of the Board of Regents in November 1970 in response to a mandate in Act 341 of the 1970 Legislature (Hawaii Revised Statutes Chapter 343. See Appendix A).

The purposes and plans for the Center's development were sketched out in a memorandum to the University President (Establishment of the University of Hawaii Environmental Center: SR:0001, 18 September 1970. See Appendix B). In that memorandum, the Director-to-be recognized the novelty of the plans and recommended review of the Center's activities after 2 years of operation. The development of the Center's programs has proceeded under the guidance of a Policy Committee appointed initially by the President, later by the Manoa Chancellor, and most recently by the Director of Research. The review for which this document is prepared will, however, be the first formal review of these programs.

OBJECTIVES

The underlying philosophy, general aims, and specific goals of the Center have been discussed in "Planning for the Early Eighties: Academic Plan--Environmental Center" (28 November 1977. See Appendix C). Only a brief summary seems necessary here.

The aims of the Center relate to the functions identified for the Center in its enabling legislation:

The functions of the Center shall be to stimulate, expand, and coordinate education, research, and service efforts of the University related to ecological relationships, natural resources, and environmental quality, with special relation to human needs and social institutions, particularly with regard to the State.

In its educational functions, the aim is to increase the general environmental understanding of students who will make decisions affecting the environment as: i) individuals, ii) officials or members of the staffs of governmental or private organizations, or iii) members of the general electorate.

In its research functions the aim is to increase the scope of and provide focus to environmental research and to improve the reliability of environmental research results.

In its service functions the aim is to make direct, objective contributions to environmental decision making.
ORGANIZATION

The Environmental Center is a Manoa-based system-wide unit of the University. Its Director was responsible originally to the Vice President for Academic Affairs and later to the Manoa Vice-Chancellor, and is now responsible to the Director of Research (See organization chart, Appendix D).

As provided in its legislative charter, the Center's membership is "comprised of those members of the University community actively concerned with environmental problems." No attempt is made to define this membership precisely other than to keep track of those who contribute to Center activities.

The staff of the Center is very small; consisting of the Director (full time), an Assistant Director (half time), an Associate Specialist (half time), a Secretary (full time), for a total position count of 3, and a few student employees.

The Policy Committee has a major role in determining Center policies. It is comprised of 20 members appointed for 3-year staggered terms by the Director of Research from among the departments, colleges, and campuses of the University and the undergraduate and graduate student organizations plus, ex officio the Director of the State Office of Environmental Quality Control. This Committee, which elects its own chairman, has a number of subcommittees concerned with various aspects of the Center's program.
PHYSICAL AND FINANCIAL RESOURCES

Space

The Environmental Center initially occupied part of a temporary building on Maile Way (Maile 10) and was later assigned the adjacent building (Maile 9) to accommodate the Hawaii Environmental Simulation Laboratory (HESL) a major associated enterprise supported primarily by extramural grants. Since those buildings were demolished in late 1976, the Center has occupied space on the third floor of Crawford Hall (Rooms 315 A-E and 317-327A). Within this space, the Center accommodates not only its own activities but geographic-information-system activities initiated by HESL and continuing with various extramural grants, and the headquarters of the Environmental Studies and associated programs.

Finances

Regular budget

During the first six years of its existence, the basic funding of the Center was provided through annual contracts with the State Office of Environmental Quality Control from legislative appropriations for this purpose. At the recommendation of the Center and OEQC, the Center's basic support since 1 July 1977 has been provided from the legislative appropriation to the University. Allocations to the Center from the appropriation have ranged from $73,000 in 1970-71 to $91,326 in 1977-78. Budget breakdowns are shown in Appendix E.

Extramural and special support

In cooperation with faculty in other units, the Center has been instrumental in obtaining extramural or other special funding for a number of projects, only a few of which have been administered by the Center itself. The largest was the Hawaii Environmental Simulation Laboratory which, in the period from 1971 to 1976 received over $1 million in grants and contracts, primarily grants from the Ford Foundation and the National Science Foundation. HESL was not administered by the Center, however, until the period of its external support was ending.

The Environmental Studies program, which is directed by the Assistant Director of the Center, has been supported in part by Center funds and in part
through contribution of services from other units and has received a special allocation of $7,000 from the College of Arts and Sciences in 1977-78.

Extramural funds provided by grant or contract for projects administered by the Center total $97,405. These are listed in Appendix J.

It will be noted that the ratio between extramural support for special projects and continuing support for the Environmental Center falls far short of the ratios in the case of most University research units (unless the HESL support is considered as extramural support to the Center). The Center was, however, established primarily to provide services pertinent to the State, and solicitation of extramural support is regarded as incidental to this purpose.
The implementation and evaluation of the Environmental Center's program are best discussed in terms of its three primary functions, those related to environmental education, environmental research, and environmental services. The general aims and specific goals of the Center in performing each of these functions are discussed in Appendix A, together with brief descriptions of achievements to date in each. The following discussions in part merely summarize and in part expand upon the presentation in that Appendix.

Since a major role of the Center is coordination, it must be recognized that in all of its functions the Center is dependent upon the cooperation of other units in the University. In the case of its service function, the dependence is spread so broadly that no particular attention to relationships with selected units is warranted. In the exercise of both its educational and research functions, however, the Center has been intimately associated with semi-independent endeavors, respectively those of the Environmental Studies program and of the Hawaii Environmental Simulation Laboratory. This review covers the development of those endeavors, but not as thoroughly as either may deserve.

An internal evaluation of the achievements of the Center in each of its functions is presented following the discussion of each. The balance among them is, however, addressed in a subsequent overall evaluation.
ENVIRONMENTAL EDUCATION

Initial efforts

One of the first actions taken by the Environmental Center was to publish a directory of Environmental Concerns at the University of Hawaii listing faculty with environmental courses, competence, and curricular with significant environmental content. This directory, with subsequent revisions and supplements, was used by the Center staff in advising students interested in emphasizing environmental matters in their education.

Environmental Studies Program

In the Fall of 1975, the Center took advantage of the interests in environmental education of a new assistant Director to expand greatly the efforts of the Center toward increasing the environmental education opportunities provided by the University, particularly at Manoa. As a result of these efforts new courses have been developed, an Environmental Studies option has been formalized, an environmental forum series has been established, plans have been developed for an Environmental Studies major and an Environmental Studies certificate program, two new graduate level environmental concentrations have been developed, a Pacific environmental education conference is being planned, and several supporting services have been initiated. These efforts are identified with an Environmental Studies Program which has been recognized officially in the College of Arts and Sciences, but which includes functions in other colleges and campuses of the University.

The new courses are offered by individual departments or in the Interdisciplinary Studies of the College of Arts and Sciences (IS), the Environmental Studies option has been provided in the Liberal Studies program of that College, the new graduate level concentrations will be provided in the Political Science Department of that College, and the Educational Foundations Department of the College of Education.

The Environmental Studies Program, was, however, initiated by and is headed by the Assistant Director of the Environmental Center, which has made available to the program not only his half-time position provided in the regular budget, but at times an extra quarter-time supported by special project funds. The Center has also until recently provided the Program with secretarial services.
and a half-time graduate assistant. These services are now provided through a $7,000 allocation from the College of Arts and Sciences. The Program is also supported by the Educational Foundations Department and the General Sciences Departments through allocations of third-time and quarter-time services of faculty members, respectively and by an extramural grant of $3,000.

The development of undergraduate environmental programs has been stimulated by the passage of two resolutions calling for formalization for each program passed by the 1977 Legislature, SR 264 and HR 360.

Undergraduate environmental courses and curricula at UHM

Liberal Studies Major in Environmental Studies

The Liberal Studies major in Environmental Studies (EVS/LS) was initiated in the Spring of 1976 and formalized in September 1977. It takes advantage of the opportunities in the Liberal Studies program in which a student can formulate individually a program leading to a B.A. degree. The direct clientele of the EVS/LS program is obvious—students who wish in their undergraduate education not to be bound to one of the traditional disciplines but to put together a program involving a combination of breadth and emphasis that will provide them with some competence in facing environmental problems.

The program is described in the UHM catalog as follows:

Environmental Studies
Interdisciplinary work on ecological questions, including public policy formulation, environmental design, and landuse planning can comprise a Liberal Studies major concentration in Environmental Studies. With a foundation of courses in general science, geography, Pacific urban studies and planning, and American studies, students may concentrate on either the social environment or the natural environment.

In addition to setting up the curriculum of the EVS/LS students, the Environmental Studies staff provides student counseling, student project direction, and graduate school and employment advising. The students use the environmental resource center facilities of the Environmental Center. The head of the EVS program and the director of the Liberal Studies program are co-signers of each student's proposal.
In its first year (1976-77) there were 15 "majors" in the EVS/LS program, and in the current year there are 22 with 8 more in the process of preparing their proposal. To date 24 students have graduated from the program, 5 to 8 per semester.

Most of the EVS/LS students have undertaken to work on one or more projects as part of their direct project or "environmental practicum" experience. These projects have dealt with current environmental issues, such as:

i) "Bottle-bill" legislation proposed in Hawaii
ii) Super-sonic transport service to Hawaii
iii) Steady-state economy (a movie and policy analysis)
iv) "Kaneohe Bay revisited" (a study of Kaneohe Bay pollution)
v) Projects on "intermediate technology" and "soft-energy" alternatives
vi) Growth alternatives for Hawaii

Course development

The development of needed environmental courses has been one of the major undertakings of the Environmental Studies Program. While in the past the program staff have been able to persuade faculty and departments to establish about 15 new courses without special program funding, with its present budget the program is to provide 2 or 3 courses a semester with its own funds (see Appendix F). Courses that will be partially or totally supported by the Program in the Spring Semester of 1978 are: an introductory course; I.S. 210, Introduction to Environmental Issues; PolSc 325F, International Environmental Politics; and PolSc 346, Health and Environment.

The new courses will serve not only the present EVS/LS program but additional undergraduate programs whose development is discussed below.

Further undergraduate program planning

Although the establishment of the present EVS/LS program meets the needs of many environmentally concerned undergraduate students, there are many students who wish to obtain a bachelors degree specifically identified as environmental rather than liberal studies or to obtain a bachelors degree in one of the traditional disciplines but to use select among elective courses those that will provide a broad environmental base around that discipline. To meet these additional needs and to further the response to the two legislative resolutions
referred to earlier, two programs have been planned by the EVS staff and proposed to the Program and Curriculum Committee of the College of Arts and Sciences.

The first, a new EVS major program leading to a B.A. in Environmental Studies, would have replaced the present EVS/LS program. The second is a program proposed to lead to a Certificate in Environmental Studies associated with any of the bachelor's degrees offered by the University. Both programs were considered in October and November 1977 by the Program and Curriculum Committee which disapproved the proposed EVS major program but encouraged further development of the Certificate program, suggesting some revisions. The proposal, without the revisions to be made is attached as Appendix G.

Supporting services

Students in the Environmental Studies Program use the environmental resources of the Environmental Center. In addition, the program maintains a placement library for environmentally related occupations and catalogs of graduate schools with environmentally related programs.

The Program publishes a semi-annual Environmental Studies newsletter covering its various activities which is distributed to some 300 students, faculty, and other friends of the program.

New graduate environmental programs

The Environmental Studies staff has developed, in cooperation with the concerned departments, two new environmental concentrations in Master's degree programs. One of these now has been established by the Political Science Department—a program leading to an M.A. in Political Science with a concentration in Political Ecology (see Appendix H). The other, being considered by the College of Education, would lead to an M.Ed. in Educational Foundations with a concentration in Environmental Education. From three to six students are currently intending to enroll in each of these programs, and considerable expansions in enrollment are anticipated when the programs mature in 1978-79.

Environmental Forum

The Environmental Forum is a series of weekly seminars initiated by the Environmental Studies program in the Spring of 1976. The seminars, scheduled
Wednesdays from 12:30 to 2:00 p.m., are open to the public as well as the University community and have been attended regularly by between 25 to 80 persons. The principal speakers have been selected from the University and external community. About half the seminars have dealt with environmental topics with particular relevance to Hawaii, the others have dealt with national and global issues concerning the natural and social environment.

Each seminar is now taped, with a Ka Leo reporter present, and a few have received Channel 9 TV coverage.

Community College environmental curriculum development

In cooperation with four UH Community colleges (HCC, KCC, WCC and LCC) the Environmental Studies staff is preparing a student-advising program and environmental course list that will assist students in the Community Colleges who wish to transfer to UHM Environmental Studies or would like an environmental program for their Associate of Arts degrees. The advising packet, now in preparation, will identify 100- and 200-level courses that are transferable to the UHM EVS/LS major.

Pacific Environmental Education Consortium

In the Summer of 1977, the Environmental Studies Program secured a grant of $3,000 to plan and sponsor a Pacific environmental education conference in January 1979. Dr. Maurice Strong has agreed to be the keynote speaker for the conference and to assist in identifying other environmental education experts who might participate. The United Nations Environmental Program and U.N. University have also indicated their willingness to cooperate with the Consortium.

Evaluation

The planning of the new environmental education programs and actual institution of the EVS/LS B.A. program, the Political Ecology M.A. program, and many of the new courses, all within the last 2½ years represent a substantial achievement, especially in the light of the limited resources available for the development.

The registration in the EVS/LS program and indications of intention to register in the Political Ecology and Environmental Education M.A. programs
substantiate initial premises that there was substantial interest in such programs at both undergraduate and graduate levels. Expressions of interest by undergraduates not served by the EVS/LS program indicate the need for establishing at least the proposed Certificate program in addition. The success of the Environmental Forum confirms that an environmental seminar series would attract extensive participation from the University and external community. From the quantitative aspect, then, the environmental education function of the Environmental Center seems to be successfully served by the Environmental Studies Program but there are needs still not met.

A particular need and opportunity for the establishment of new curricula or modification of existing curricula has arisen through the recent establishment by the East-West Center of an Environment and Policy Institute. This Institute will bring graduate students to the University and will wish to place them in programs that will at the same time increase their competence; recognize the increase by appropriate degrees, particularly doctoral degrees; and give the students opportunities to work on projects of concern to the Institute. Discussions involving the Director and staff of the Institute, the Director and Assistant Director of the Environmental Center, and faculty of a few departments have already begun toward identifying:

1. More specifically the needs of the new Institute;
2. Present capabilities of the University to meet these needs;
3. Possible developments to increase these capabilities.

Even though there are expressions of interest in programs and courses not yet offered, we do not consider that the full range of interest is yet apparent. The existence and potentialities of the programs are not yet recognized widely enough to assure this. The Environmental Forum is perhaps the major contributor to visibility, but we estimate that only about 30 percent of the UHM faculty and students are aware of the program. In part, increases in numbers of courses, curricula, and participants will in themselves generate increased visibility through their descriptions in the University catalog, and by word of mouth. However, we do not overlook the importance of means for advertisement such as booths at registration, posters, and brochures.

Qualitatively, the Program should be judged not only by the extent to which the program contributes to participant awareness of environmental problems but the extent to which the participants are led to recognize the framework
of natural laws and social needs within which these problems must be solved and the tradeoffs that are inescapably involved in the solutions. We know of no better means to maintain quality in this respect than to assure that the participants are exposed to the diversity of opinions that stem from different disciplines and value systems. The Program already involves a diversity of faculty and student participation, but we will welcome and intend to Stimulate still broader participation in the future.
ENIRONMENTAL RESEARCH

No very clear distinction can be made between the research projects and the service projects undertaken by the Center. On the one hand, the Center has undertaken environmental research only if it was intended to produce results whose dissemination would constitute service. On the other hand, even the most routine of the Center's environmental services have involved some research.

What distinguishes the endeavors discussed here as research from the endeavors discussed later as services is partly the generality of their findings, and partly their involvement of specific research funding from extramural sources.

The research activities of the Environmental Center have involved:
a) Assistance in the organization and operation of the Hawaii Environmental Simulation Laboratory.
b) Organization of extramurally supported research projects to meet specific needs identified through Center service activities, brought to the Center's attention by State agencies, etc., and direct administration of a few of these projects.
c) Other research by Center staff members.
d) Partial or pilot support of environmental research projects.

It is easiest to describe the Center's research functions separately for each of these forms of involvement, although more than one form of involvement has been represented in some projects.

Hawaii Environmental Simulation Laboratory

The Hawaii Environmental Simulation Laboratory (HESL) was a major ad hoc semi-autonomous endeavor to improve environmental management through the conduct of broad-based interdisciplinary research interactively with the community of potential users of the results. HESL's principal support was in the form of grants from the Ford Foundation and National Science Foundation totalling approximately $1 million over the 5 year period of its existence.

Although HESL did not become a direct responsibility of the Environmental Center until its waning phase, the Center was intimately involved with its initiation and development. The endeavor is described in Appendix I. To that
It is necessary to add only a few specific comments on the Center's involvement.

When the concept of HESL was brought to the University's attention by the Oceanic Institute, in 1970, it was the newly created Environmental Center that established a task force to represent the University in disclosing the concept and preparing proposals for external funding. When HESL's linkage with the Oceanic Institute was lost, the Center became but one of several University units whose faculty were involved. The Center Director served as chairman of HESL's governing Core Group and principal investigator under the foundation grants providing its major support. The University's financial support of HESL was in the form of a grant of $10,000 from the Center; the Center served as a medium through which the State (Office of Environmental Quality Control) channeled some of its contract support for HESL research; and the Center provided space for the HESL endeavor from about 1973 on.

When the success of some of HESL's functions appeared to justify continuation beyond the foundation-supported development period, the Center was selected as the most appropriate permanent University unit to continue them, and the Center assumed responsibility for HESL functions in 1976. A first attempt to secure state underwriting of these functions resulted in a 1976 appropriation that was not released. No appropriation resulted from a second attempt in 1977, and most HESL functions ended with the termination of its last grants and contracts for specific projects. The last remnant is a geographic-information-system project, now dormant pending decisions on proposals submitted for extramural support.

Other extramurally supported projects

The Center has been instrumental in organizing several extramurally supported environmental research projects in addition to those in the HESL endeavor, and has administered a few. To the extent that the scope of one of these projects has fallen primarily within the scope of a single department or research unit of the University, or that one could effectively be divided into sub-projects each of which would be within the scope of another unit, the Center's role has been to plan the projects, arrange for their support, and assure that they were conducted so as to meet their intended needs but not to administer them directly. In the case of a few, however, the scope of the projects was such that the Center itself undertook the administration.
Whether administered by the Center or not, the extramurally supported projects that have been organized by the Center are included in the tabulation in Part A of Appendix J. Products of the research cited in the last column of that table are listed in Appendix L.

Most of these projects grew out of service activities of the Center. These include the projects dealing with the air pollution effects of agricultural field burning, the Ala Wai Canal, the disposal of Pearl Harbor dredge spoil, and the EIS-system. Two of the projects, that on carrying capacity and that on soil creep, were carried out by HESL, and the Center simply served as a coordinating unit. The need for design and conduct of a Mirex monitoring project was brought to the Center's attention by the State Department of Agriculture.

The Mirex and agricultural burning projects involved funding from state agencies and private institutions, and the Department of Agricultural Biochemistry provided for analyses from its own resources in the former. The Office of Environmental Quality Control supplied the extramural support for the Ala Wai Canal, carrying capacity, soil creep, and EIS-system projects. The Pearl Harbor dredge spoil disposal project was funded by the Navy.

Other Staff Research

In addition to the projects with extramural funding, the Center staff have been engaged in environmental research to meet needs for which specific funding has not been available, in areas in which they have special competence, or both. For better management, the Center now recognizes such research as constituting specific projects, particularly when it is intended to produce specific reports or contributions. The more substantial of these projects are included in the tabulation in Part A of Appendix J.

Some of these projects have fallen within the scope of other University units, for example most of the tsunami projects undertaken by Cox. Others have resulted in reports issued by the Center such as the project on the special management area under the Shoreline Protection Act and that on the cost of tsunami false alarms, or in journal publications identified as Center contributions such as those undertaken by Burhans.
Projects supported by Center

Under its contracts with the Office of Environmental Quality Control, the Center had each year certain funds it could use to provide grants in support of special environmental projects undertaken in-house or externally. From these special project funds the Center has provided grants in support of:

a) HESL
b) Activities of the Center task force on heavy metal pollution
c) Hawaii Atlas
d) Two film projects, "Cloud over the Coral Reef" and "To Heal a Scar"
e) Environmental Studies development
f) Preparation and publication of Hawaii Environmental Laws and Regulations and annual revisions

Other special project funds were reserved to provide pilot or supplementary support to research projects proposed by faculty and students. Grants from these funds were made on the recommendation of the Research Subcommittee of the Center's Policy Committee. The projects supported by such grants are tabulated in Part B of Appendix J.

Evaluation

Many of the research units and departments of the University are engaged in environmental research, and the research projects organized, administered, or supported by the Center represent only a very small fraction of the total.

With regard to the extent of environmental research, the Center is concerned primarily that, when needs for such research arise, the competence of the University be considered by both the University and potential clients. The number and diversity of the research projects actually undertaken and the extent to which the Center is consulted by faculty and students of the University and by representatives of government agency and other institutions indicate that the Center is performing creditably in this respect, although we are sure there are unmet or inadequately met needs that do not come to our attention. The loss of the capabilities of the Hawaii Environmental Simulation Laboratory to meet the broadest needs is regrettable, but the Center, HESL, and the HESL Community Council did all that could reasonably be expected to prevent the loss.
With respect to the quality of the research organized or administered by the Center, our concerns are primarily that:

i) The results of research projects organized and administered by the Center be valid within the context in which they are intended to be used;

ii) The context be recognized clearly in project formulation and reporting.

Beyond these, the Center is concerned that the results of research be put to use in environmental management, but this is as much of a service aim as a research aim.
ENVIRONMENTAL SERVICES

The environmental services program was the prime focus of the Center's activities in its first several years and still represents its major program.

As indicated in the enabling legislation, the Office of Environmental Quality (OEQC) is an important client for these services. However, the external clientele has included a considerable number of other federal, state, and county agencies and legislative committees, and, indirectly at least, the general public. The University, and its faculty, staff, and students should be regarded as clients also.

External services

In providing its external services the Center follows policies developed by experience which are reflected in guidelines approved by its Policy Committee (Appendix K).

A large part of its services have been in the form of reviews of the environmental aspects of proposed legislation, regulations, plans, permits, and problems. The Center began many of its review activities on its own initiative, taking advantage of public-review and public-hearing opportunities. Increasingly, however, the Center has received requests from agencies and legislative bodies for reviews of specific proposals.

The principal review activities, clients served and numbers of formal reviews produced, have been as follows:

<table>
<thead>
<tr>
<th>Type of service</th>
<th>No. of products</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Reviews of environmental impact statements (EIS's):</td>
<td>234</td>
</tr>
<tr>
<td>Federal EIS's: For federal agencies direct or through the OEQC or the State Clearing House (DPED)</td>
<td></td>
</tr>
<tr>
<td>State EIS's, original system: For OEQC</td>
<td></td>
</tr>
<tr>
<td>State EIS's, present system. For OEQC or proposing agencies</td>
<td></td>
</tr>
<tr>
<td>Honolulu EIS's, for Department of Land Utilization</td>
<td></td>
</tr>
<tr>
<td>2. Reviews of negative declarations in EIS systems:</td>
<td>25</td>
</tr>
<tr>
<td>3. Reviews of agency regulations:</td>
<td>52</td>
</tr>
<tr>
<td>For federal and state agencies</td>
<td></td>
</tr>
</tbody>
</table>
4. Reviews of major variances: 48
   For state agencies

5. Reviews of legislation: 254
   For legislative committees, OEQC, etc.

6. Special reviews: 36
   For legislative committees, federal and state agencies

The reviews produced are tabulated by years in Appendix L.

In addition to those reflected in formal reviews issued by the Center, the Center has provided other services to the external community including:

1. Publication and subsequent revision of Environmental Concerns, a directory to environmental competence, programs, and courses of UH Manoa.

2. Publication and annual revision of the two-volume Hawaii Environmental Laws and Regulations, a compilation of pertinent State documents.

3. Services of staff members on task forces, commissions, and committees, including:
   a. OEQC Task Force on Keehi Lagoon.
   b. State Environmental Council (Vice-Chairmanship)
   c. OEQC-Department of Agriculture Committee on Agricultural Field Burning
   d. State Carrying Capacity Steering Committee
   e. Department of Planning and Economic Development Advisory Committee on Natural Resource Evaluation
   f. Department of Health 208 Water Quality Technical Committee
   g. State Water Commission

4. Recommendations of other University personnel as members of such groups.

5. Participation by staff members in conferences, symposia, and seminars including those resulting in formal addresses (Appendix K).

6. Informing agencies of research findings pertinent to missions. (The more formal of the reports through which the information was provided are included in Appendix K.)

7. Response to numerous requests, oral and written, for advice, referrals, etc.

Internal services

The clients of Center services are not restricted to those external to the University community. Perhaps the most valuable internal service provided by
the Center has been to provide the coordination through which individual members of the University faculty and staff may contribute effectively to the development and modification of federal, state and county environmental management policies in the State.

Other internal services have included:

1. Service by staff members on University advisory committees such as:
   a. Marine Affairs Council
   b. Sea Grant Advisory Committee
   c. Hawaii Natural Energy Institute Advisory Committee

2. Advice, referrals, or recommendations on numerous environmental matters, for example, on the application of the EIS system to University research (SR:0010, Appendix L).

3. Services of staff on departmental and University committees.

Evaluation

The importance assigned by the external community to the services provided by the Center is indicated by:

1. Requests by legislative committees, or by the Legislature through resolutions, for Center reviews of environmental issues or expansions on reviews provided on the Center's own initiative.

2. Referrals to the Center of all federal EIS's pertaining to Hawaii, all State EIS's, and all Honolulu EIS's.

3. Requests by agencies to expand upon specifics in EIS reviews or review comments of other reviewers, and even informal requests for advice as to the acceptability of EIS's and the appropriateness of negative declarations.

4. Requests for reviews of all proposed environmental regulations and variance requests of the Department of Health, and similar but less consistent requests from other agencies.

5. Requests for service on committees, etc., and importance of those committees.

6. Other requests, formal and informal for advice, referrals, service on committees, etc.

Some of the most important accomplishments have stemmed from providing concerned agencies with research results by other means than the Center's
routine reviews. Successes, limitations to success, and the often long periods necessary for success to mature may be illustrated by a few examples.

1) In the first year of the Center's existence, a faculty member approached the Center with a problem. In the course of a research project, he had discovered that a certain food product had a high toxic heavy-metal content. Although there were no specific standards for that metal in that product, the level was higher than standards set for water, for example. The Center recommended that the Department of Health be informed, advised to check the analyses, and given a chance to respond to the situation. The long-term effects were, as expected, that the source of the high heavy-metal content was identified and the manufacturer of the food product required to use other sources. The short-term effects were, however unexpected—a failure of the Department to respond promptly, a premature leak of the information, and a subsequent overreaction. Threats of lawsuits against the faculty member, the University, and the Department did not materialize—very likely in part because of documentation of the episode by the Center.

2) About the time that the Center was established, the federal Environmental Protection Agency (EPA) issued a blanket requirement that minimal wastewater be subject to at least secondary treatment. The environmental detriments of applying this requirement to discharges at depth in the open ocean were first brought to public attention by the Center, for example in an EPS enforcement conference in 1971 (EN:0002) at which no state agency indicated either reasons for requesting, or an intent to request, a waiver from the EPA ruling. The EPA subsequently agreed informally to exempt the wastewater discharge from the extended Sand Island outfall serving Honolulu, but by then the requirement had been incorporated in federal legislation. In August 1973, the Center summarized the rationale for amending the federal law (SR:0008), and amendment permitting exemption of open-ocean discharge from Pacific islands was passed in late 1977. In addition to maintaining better environmental conditions, the State will save several million dollars if the Sand Island discharge of wastewater from Honolulu is exempted from the secondary treatment provision, as allowed under the amended law.
3) As noted in the research discussion the Center undertook its Mirex research project at the request of the State Department of Agriculture. The request stemmed from a ban by EPA of the use of the insecticide Mirex. A recommendation by EOA technical personnel that pineapple industry usage of Mirex in Hawaii should be exempted from the ban was overlooked, but EPA agreed to staying the applicaiton of the ban, providing the environmental effects were monitored.

The results of the first year's monitoring indicated that there were no significant effects of Mirex use where EOA thought there would be detriments, and the results of the second year's monitoring indicated that exemption of the Hawaiian usage of the insecticide was appropriate. The use of Mirex seemed indeed to be far preferable to the use of alternative insecticides. Unfortunately, Mirex is no longer available for use, because the ban on use elsewhere so reduced the market that it is no longer manufactured.

The importance assigned by the University community to the services provided by the Center is indicated by:

1. The extent to which members of this community are willing to serve on the Policy Committee and to provide contributions to the Center's reviews, without financial recompense.

2. Requests for staff service on committees and importance of those committees.

3. Other requests, formal and informal.
PLANS AND PROBLEMS

The Environmental Center plans in the future to continue to:

1) Coordinate and develop environmental education opportunities in the University, and as necessary, provide these opportunities to students;

2) Stimulate, coordinate, contribute to, and as necessary, administer environmental research in the University;

3) Coordinate and provide environmental services within the University and from the University to the external community.

We are confident that the rationality of continuance will be apparent to reviewers of this document.

We must call attention, however, to the fact that continuance of the three functions at past levels will not be possible if the support of the Center is limited to the present level. Productivity at the present level is being maintained only as a result of some carryovers of support from the time when the Center had special project funds and "soft-money" support of continuing programs. As a matter of fact, the present level of productivity of services is significantly lower than the level in the past, although the decrease is not yet indicated in the statistics presented in this document. There are several reasons for this:

1) Although the Center's budget has been increased during the seven years of its existence, and the allocation for salaries have kept pace with inflation, the allocation for the combination of operating expenses and equipment have not.

2) The Center has on its own initiative undertaken to provide services that have been considered valuable and hence have subsequently been officially requested.

3) The demand for the kinds of functions the Center provides is far larger than the Center can meet. The workload of the Center in each function therefore expands to meet its capabilities in that function. If with short-term support it expands capabilities in one function it cannot continue to meet the workload in that function without slighting the needs in other functions.
4) To develop the Environmental Studies Program the Center allocated a significant part of its continuing staff capability previously involved with research and services, and inverted a considerable amount of its special projects funds. The special projects funds have now been replaced by other "soft-money" and allocation, but the staff allocation continues.

5) The Center is left with a legacy of expectations of the HESL endeavor which it has no means to meet.

The difficult problems resulting from the mismatch of workload and support are addressed in "Planning for the Eighties" (Appendix C).
[CHAPTER 341]

ENVIRONMENTAL QUALITY CONTROL

SEC. 341-1

Findings and purpose. The legislature finds that the quality of the environment is as important to the welfare of the people of Hawaii as it is the economy of the State. The legislature further finds that the determination of an optimum balance between economic development and environmental quality deserves the most thoughtful consideration, and that the maintenance of the optimum quality of the environment deserves the most intense care.

The purpose of this chapter is to stimulate, expand and coordinate efforts to determine and maintain optimum quality of the environment of the State.

[L 1970, c 132, pt of §1]

SEC. 341-2

Definitions. As used in this chapter, unless the context otherwise requires.

(1) "Director" means the director of environmental quality control.

(2) "Center" means the university of Hawaii ecology or environmental center established in section 341-3(b).

(3) "Council" means the environmental council established in section 341-6(c).

(4) "Office" means the office of environmental quality control established in section 341-3(a).

(5) "University" means the University of Hawaii. [L 1970, c 132, pt of §1]

SEC. 341-3

Office of environmental quality control; ecology or environmental center; environmental council. (a) There is created an office of environmental quality control which shall be headed by a single executive to be known as the director of environmental quality control who shall be appointed by the governor as provided in section 26-34. This office shall implement this chapter and shall be placed within the office of the governor. The office shall serve the governor in an advisory capacity on all matters relating to environmental quality control.

(b) There is created within the university an ecology or environmental center.

(c) There is created an environmental council not to exceed fifteen members. The director shall be the council chairman. The membership of the council shall include: representatives from mass media, and representatives from relevant disciplines, for example, environmental design, natural, physical and social sciences, technologies, social ethics and philosophy, representatives of the university, representatives from business and industry, public and private schools and colleges, and voluntary community group and associations. The members of the council shall serve without compensation but shall be reimbursed for expenses, including travel expenses, incurred in the discharge of their duties. [L 1970, c 132, pt of §1]

SEC. 341-4

Powers and duties of the director. (a) The director shall have such powers delegated by the governor as are necessary to coordinate and, when requested by the governor, to direct pursuant to chapter 91 all state governmental agencies in matters concerning environmental quality.

(b) To further the objective of subsection (a), the director shall:

1. Direct the attention of the university community and the residents of the State in general to ecological and environmental problems through the center and the council, respectively.

2. Develop a system for monitoring, and arrange for monitoring throughout the State, ecological, environmental and social conditions, changes, and effects such as those involving health, air, water, wastes, noise, soil, and pesticides.

3. Conduct research or arrange for the conduct of research through contractual relations with the center, state agencies, or other persons with competence in the field of ecology and environmental quality.

4. Encourage public acceptance of proposed legislative and administrative actions concerning ecology and environmental quality, and receive notice of any private or public complaints concerning ecology and environmental quality through the council.

5. Recommend programs for long-range implementation of environmental quality control.

6. Recommend such legislation as is necessary to preserve the environmental quality of the State.

7. Initiate public educational programs.

8. Offer advice and assistance to private industry, governmental agencies, or other persons upon request. [L 1970, c 132, pt of §1]

Appropriation for yearly contract, the terms and provisions of which shall be mutually agreed upon by the director of environmental quality control and the president of the university, see L 1970, c 132, §2.

SEC. 341-5

Structure and functions of the ecology or environmental center. (a) The center shall be so constituted as to make most effective the contribution of the university to the problems of determining and maintaining optimum environmental quality. Its membership shall be comprised of those members of the university community actively concerned with ecological and environmental problems.

(b) The functions of the center shall be to stimulate, expand, and coordinate education, research, and service efforts of the university related to ecological relationships, natural resources, and environmental quality, with special relation to human needs and social institutions, particularly with regard to the State. [L 1970, c 132, pt of §1]

SEC. 341-6

Functions of the environmental council. The council shall serve as a liaison between the director and the general public by soliciting information, opinions, complaints, recommendations and advice concerning ecology and environmental quality through public hearings or any other means and by publicizing such matters as requested by the director pursuant to section 341-4(b). (4) The council may make recommendations concerning ecology and environmental quality to the director and shall meet at the call of the director. The council shall monitor the progress of state, county, and federal agencies in achieving the State's environmental goals and policies and shall make an annual report with recommendations for improvement to the governor, the legislature, and the public not later than January 31 of each year. All state and county agencies shall cooperate with the council and assist in the preparation of such a report by responding to requests for information made by the council. [L 1970, c 132, pt of §1; am L 1974, c 248, §1]
UNIVERSITY OF HAWAII
Honolulu, Hawaii

July 13, 1970
with editorial revisions
September 18, 1970

Memo to: Harlan Cleveland, President
University of Hawaii

From: Doak C. Cox, Acting Chairman
Executive Committee, Ecology and Man Committee

ESTABLISHMENT OF A UNIVERSITY OF HAWAII
ENVIRONMENTAL CENTER

As is now generally recognized, the rates of raw material draft and waste disposal are related to both population and standard of living. It must be recognized also, however, that these rates may in addition be influenced by cultural orientation. The enormous but not inexhaustible storage capacities of nature and the resulting long lags between human actions and their ultimate environmental consequences have permitted the development of an assumption that selected material aspects of human welfare could be increased without environmental detriments either to other material aspects or to esthetic aspects. The appearance of success thus achieved by technological development under a philosophy of opposition between man and nature is just beginning to crack but it is already obvious that substantial deleterious environmental changes are underway. A more ecological philosophy, a tradeoff of material aspects of standard of living for esthetic aspects, an orientation toward conservation rather than exploitation, would considerably reduce detrimental environmental effects.

Although there has been some irrational emotionalism in the expression of environmental concerns, a lack of concern is equally irrational. It is not clear how large a world population may be accommodated with any particular standard of living and cultural orientation. It is quite certain, however, that the present trends in population and standard of living cannot continue. How the limitations will become manifest is to some extent within the range of human choice. With adequate knowledge and the will to use it -- with wisdom -- the future of mankind may be a pleasant one. Without such wisdom, the future will be at best rather unpleasant and quite conceivably severely curtailed.

Hawaiian concerns

Hawaiians are unavoidably involved with world-wide environmental problems but have special reasons for concern with their immediate environment. In its mid-oceanic location Hawaii is relatively isolated from the effects of waste disposal elsewhere in the world, and comparatively few drains are made on its non-renewable resources. The agricultural pursuits that were until recently the principal base for the Hawaiian economy were in general conservative of the environment. The Islands have, however, not been immune to the effects of increases in population and standard of living. Accelerations in the rates of increase have now resulted in readily recognized problems, while at the same time increasing economic reliance on tourism associates the potential of particularly serious economic losses with such problems. Because of ecological and socio-economic peculiarities associated with the geographic historical and setting of the Islands, special local solutions will have to be provided for these problems.

Recognizing the importance of environmental concerns in Hawaii, the 1970 legislature has passed and the governor has signed a bill (S3 1132-70) that adds to the statutes of the state a new chapter on "Environmental Quality Control" whose findings and purpose are stated as follows:

"The legislature finds that the quality of the environment is as important to the welfare of the people of Hawaii as the economy of the State. The legislature further finds that the delimitation of an optimum balance between economic development and environmental quality deserves the most thoughtful consideration, and that the maintenance of the optimum quality of the environment deserves the most intensive care."

The new act calls for the creation of an Office of Environmental Quality Control within the Office of the Governor to be headed by a Director of Environmental Quality Control, an Environmental Council to provide liaison between the Director and the public, and an ecology or environmental center within the University.
The role of the University

The University has or should have a substantial role with regard to any phases of the identification, diagnosis, and solution of environmental problems. Research is quite clearly involved, because in very large part the problems arise from lack of understanding of the environment, the natural ecological principles operative in it, technological effects and social responses to environmental change.

Instruction of several kinds must be involved:

a) Graduate instruction: for professional service in environmental disciplines.

b) Undergraduate instruction:
   i) for professional and subprofessional environmental services
   ii) for managerial services in enterprises affecting or affected by the environment
   iii) liberal education of the influential electorate to cope with the future environmental decision making.

c) Community colleges:
   i) possible technical training
   ii) liberal education of the electorate.

d) College of education: education of educators of generations capable of facing the more difficult environmental decisions of the future.

e) General education:
   i) professional and technical retraining
   ii) further education of the electorate.

Public service must be involved in assuring, so far as possible, that all pertinent knowledge is brought to bear on environmental problems. Any kinds of disciplines are involved, including:

a) Natural sciences: the natural environment and ecological principles.

b) Applied sciences such as those of engineering, architecture, and agriculture: technology pertinent to natural resources development and conservation.

c) Medical sciences: environmental effects on human health.

d) Social sciences: economic and sociological effects of environmental changes, perception of environmental problems, institutional means for achieving and controlling change.

e) Humanities: human goals in relation to the control of environmental change and the balance of material and non-material aspects of welfare.

f) Travel industry management: the importance of environmental concerns to a tourist industry.

The faculty must be involved because of their competence in technical and professional matters. The students must be involved because of their greater expectations of life in the consequences of environmental decisions.

With respect to specific environmental concerns, the University has had for some time a few strong programs, for example, those dealing with agriculture, land use, fisheries, water resources, tsunami. In the past year, a number of courses having to do with the environment, conservation, and pollution have appeared scattered through several departments. Suggestions have been made from both the College of Tropical Agriculture and the College of Engineering that they broaden their areas of responsibility to include environmental concerns more generally. A new "Survival College" has been proposed, and an ecology college has been suggested as a component of the planned new Oahu campus. The Architecture Department proposes to expand its competence into Environmental Design, and a Pacific Urban Studies and Planning Program has begun.

The proliferation of environmental courses, projects, and programs is an indication of the widespread and intense extent of interest in environmental concerns, but not of concerted planning. In spite of the proliferation and a good deal of apparent overlap there are some major areas in which only spotty, inadequate efforts have been made, of which air pollution is perhaps the major example.

The tendency of universities to restrict themselves to matters of principle rather than practice, simplified problems that can be handled within the framework of a single discipline, has been vigorously opposed in recent years by those proclaiming the need for "relevance". As a matter of fact, relevance to practical problems has always been an expressed goal of land-grant colleges. Since the founding of the College of Hawaii, training has been offered in the fields of agriculture and engineering that are now represented by professional colleges in the University of Hawaii. According to the Academic Development Plan (p. 49), "...in the tradition of land-grant universities, this institution concerns itself with research which promises to contribute significantly to the development of the State."

Public service is regarded as one of the regular functions of the University and according to AD Plan (p. 50) "...service begins at home. The primary responsibility of the University of Hawaii and of each of its constituent units is to serve the people of Hawaii."

A beginning toward coordination of environmental concerns in the University has been provided by the Ecology and Man Committee established under the Graduate Division by Dean Vyatte Gorter in June 1969, as a result of the preceding paragraph.
of recommendations stemming originally from an April 1969 ASUU Symposium of "Technology's Impact—the Pacific Environment". During the past year this Committee, through its executive committee or special ad hoc subcommittee has:

a) Prepared a catalog of the environmental interest and capabilities of Manoa campus faculty, departments, institutes, courses, and research programs.

b) Prepared testimony for State House and Senate Committees relating to a large number of bills with environmental aims.

c) Advised representatives of the State administration and the legislature on appropriate means of organizing for environmental quality control.

The way is now clear for the University to further significantly the stimulation and coordination of its efforts with respect to understanding the environment and coping with environmental problems by the establishment of an Environmental Center as recommended by the Ecology and Man Committee and as authorized by the Environmental Quality Control Act.

Establishment of the Center

Concerning the Environmental Center, the Environmental Quality Control Act specifies (Sec. 5):

"(a) The center shall be so constituted as to make most effective the contribution of the university to the problems of determining and maintaining optimum environmental quality. Its membership shall be comprised of those members of the university community actively concerned with ecological and environmental problems.

"(b) The functions of the center shall be to stimulate, expand, and coordinate education, research, and service efforts of the university related to ecological relationships, natural resources, and environmental quality, with special relation to human needs and social institutions, particularly with regard to the State."

The Act further specifies (Sec. 4) that the Director of Environmental Quality Control shall:

"(1) Direct the attention of the university community ... to ecological and environmental problems through the center. " and

"(3) Conduct research or arrange for the conduct of research through contractual relations with the center. " etc.

The Act makes an appropriation to further its objectives, from whose total amount $275,000 shall be expended by the University of Hawaii ecology or environmental center in accordance with a yearly contract, the terms and provisions of which shall be mutually agreed upon by the director of Environmental Quality Control and the president of the University of Hawaii."

As a token of its autonomous intent, the University should establish the Environmental Center as soon as possible, without waiting for the negotiation of a contract with the Office of Environmental Quality Control.

Considering the range of functions, disciplines, and people that should be involved in its program it would be a mistake either to subordinate the Environmental Center to any single college or to attempt to create it as a unit duplicative of competence in the colleges. The Center should be established in the central administration of the University, responsible to the Vice-President for Academic Affairs, where it can take advantage of pertinent competence wherever it exists in the University.

The Center should not have budgeted to it any academic faculty except as necessary to provide for its administration, and as may possibly be found necessary in the future to provide for the rare interdisciplinary whose professional advancement would not be adequate in any department. Rather the Center should include in its faculty membership all members of the academic faculty of the University who wish to be included and are considered by its faculty to be sufficiently concerned with and competent in some phase of environmental matters. Substantial involvement in any Center program should necessitate approval also of the chairman of the department or other unit in which the faculty member is budgeted.

Initially the faculty membership of the Center should be those listed in the environmental catalog compiled by the Ecology and Man Committee who are on duty during the Fall semester 1970. Although its program will thus be confined initially to the Manoa campus, it should expeditiously be expanded to all of the campuses of the University, including those of the community colleges, so that it may relate most effectively to problems arising in all parts of the islands.

The Center should be administered by a Coordinator to be named by the President, who shall be budgeted at least half time in the Center. The Coordinator should be advised and assisted by a Policy Committee of at least five faculty and two student members to be named by the President after consultation with the Coordinator. Means should be provided for soliciting nominations from the faculty of the Center for faculty appointments to the Policy Committee, and the selection shall be such as to be broadly representative of disciplines and colleges involved in the program. Appointments to the Policy Committee should be for a year, renewable for the sake of continuity. Initial members of the Policy Committee should be named from members of the Policy Committee of the Ecology and Man program.

Insofar as possible, the Center should arrange with instructional departments for the offering of courses dealing with the environment. It should, however, be empowered to establish under its own organization such courses as are so interdisciplinary in nature as not to be appropriately taught within any department. Very likely one or more seminars of the
The latter sort will be desirable. Formal courses, whether experimental or permanent, should be subject to the normal University review procedures. Pending the receipt of the contract to be negotiated with the Director of Environmental Quality Control, the program of the Environmental Center should be underwritten and initially supported from the regular appropriations or research units for the conduct of such research as it considers desirable. It should, however, be empowered to administer, itself, such research projects as do not fall principally within the mission of any department or research unit. For this purpose, the Center must be able to employ technical and professional personnel other than academic faculty, and academic faculty on overload. In its negotiation for research grants and contracts and its administration of research it should be responsible to the University in accordance with one of the following alternatives, listed in decreasing order of desirability:

a) support at the full level provided under the Environmental Quality Control office;
b) support for the basic administrative functions but not special projects as requested in the Environmental Quality Control Act, on the request of government officials or legislators, and on occasion on its own initiative as a result of research, or otherwise, it may be appropriate for the Center to prepare a statement on some environmental problem representing the consensus of those of its faculty having competence bearing on that problem; c) support for a secretary and minor administrative funds (approx. $15,000/annum); d) minimum operating funds (approx. $5,000/annum).

Some of the cost important functions of the Environmental Center will be certain kinds of public service. On the request of the Director of Environmental Quality Control, as prescribed in the Environmental Quality Control Act, the Center may perhaps be satisfactory for major projects, but the Center should not be dependent on the Office of Environmental Quality Control for the support of its continuing operation and seed money for pilot research.

Budgets for the Center should be prepared for the biennium 1971-73 as a part of the budgets of the University, at least with respect to basic salaries and operating expenses. Reliance on contract support from the Office of Environmental Quality Control may perhaps be satisfactory for major projects, but the Center should not be dependent on the Office of Environmental Quality Control for the support of its continuing operation and seed money for pilot research.

A statement prepared under the auspices of the Center in this way should generally merit greater consideration than a statement prepared on a purely personal basis. However, except as the University as an institution has some responsibility in the matter and as the statement is duly approved by the University administration, such a statement cannot be regarded as representing an institutional position of the University. The Center should assure that, so far as possible: a) competence pertinent to all significant aspects of a problem be involved in the preparation of such a statement on behalf of the Center; b) limitations of competence and limitations of data be identified; and c) any statement so prepared be adequately reviewed. Moreover, any project as novel as this must be regarded initially as an experiment. It is quite probable that some changes will appear desirable after a year's experience. Although there has been wide faculty participation in the general planning under the Ecology and Man Committee, the details of organization here presented have not been widely reviewed. The program has been discussed informally with the University Senate Executive Committee but not formally reviewed as one competitive for future University funding should the Center be established. Hence the Environmental Center should be established initially on a trial basis. Its organization and operation should be briefly reviewed prior to University approval of its budget request for 1970-71, and more thoroughly in the fall of 1971 after the experience of a year of operation and prior to University approval of its budget for 1972-73.

The Center must be provided with adequate secretarial, clerical, and editorial staff, which may include civil service, APT, and student help, because of the widespread nature of the program, good communication will be essential, probably involving a newsletter, and the secretarial help must be certain kinds of public service. On the request of the Director of Environmental Quality Control, as prescribed in the Environmental Quality Control Act, the Center may perhaps be satisfactory for major projects, but the Center should not be dependent on the Office of Environmental Quality Control for the support of its continuing operation and seed money for pilot research.

For the reasons discussed above, I recommend that the University of Hawaii act now to establish an Environmental Center with the organization, responsibilities and character described.
FROM: Doak C. Cox, Director

PLANNING FOR THE EARLY EIGHTIES: ACADEMIC PLAN—ENVIRONMENTAL CENTER

The staff of the Environmental Center have prepared the following contribution to Part 2 of AOP III in the form of statements on philosophy, objectives, achievements, aspirations, and answers to the questions raised in Vice-chancellor Ashton's memorandum of 7 August 1977.

A. Statements of philosophy, objectives, achievements, and aspirations

1. Philosophy

The philosophy underlying the Environmental Center program is best expressed in the form of premises.

a) Many human actions undertaken for the sake of certain benefits, especially short-term tangible benefits accruing to individuals and small groups, turn out to have environmental consequences that are detrimental in the long term, in intangible ways, or to people in common.

b) Even the intangible environmental detractors are significant, and the total detractors of many actions outweigh the benefits for which they are undertaken.

c) Premises a) and b) have been valid even in the case of actions that are subject to public regulation.

d) Improvement in the benefit/detriment ratios for action effects is possible.

e) To a significant extent, the improvement in d) depends upon increased understanding of the consequences of actions on the part of decision-makers, including those who are primarily responsible for the undertakings and those who have the powers to regulate them.

f) The functions of the University include: i) the education of those who will be planners, undertakers, or regulators of actions, including education with respect to the environmental consequences; ii) the conduct of research into the nature of the environment and the consequences of actions affecting it; and iii) the provision of services to the community, including appraising the environmental consequences of actions and the environmental implications of policies.

g) Any effort to improve environmental decision making must take into account benefits and detractors that are both tangible and intangible, short-term and long-term, and specific and general.

h) The information needed for this improvement is never single disciplinary. Hence, although disciplinary and therefore departmental strengths are needed in the University, its environmental education, research, and service efforts will be most effective only if means are provided for their transdisciplinary and transdepartmental coordination with respect to environmental problems.

i) The environmental competence of the University is not restricted to any one college or campus. Hence, coordinating functions of a University staff must be performed for actions affecting the environment.
environmental unit should be system-wide, although they may be placed administratively within a campus or college.

The competence of the University represents a considerable part of the overall competence that can be related to objective aspects of Hawaiian environmental problems. The University community has, however, no special competence with respect to such subjective aspects as those reflected in esthetic or ethical judgments. Hence, the services of a University environmental unit should reflect an activist but not an advocacy role.

2. Aims

Among the objectives of an enterprise it is useful to discriminate between aims, toward which the enterprise is directed but which can never be fully achieved, at least by the enterprise alone, and goals which the enterprise expects to achieve.

HRS 341-5(b) states that:

- The functions of the Center shall be to stimulate, expand, and coordinate education, research, and service efforts of the University related to ecological relationships, natural resources, and environmental quality, with special relation to human needs and social institutions, particularly with regard to the State.

The fundamental aim of the Environmental Center is to contribute to the improvement of environmental management through the effective performance of each of its recognized functions:

i) In its educational function, the aim is to increase the general environmental understanding of students who will make decisions affecting the environment as: (i) individuals, (ii) officials or members of governmental or private organizations, or (iii) members of the general electorate.

ii) In its research functions the aim is to increase the scope of and provide focus to environmental research and to improve the reliability of environmental research results.

iii) In its service functions the aim is to make direct, objective contributions to environmental decision making.

3. Goals

a) Initial goals:

1) To implement HRS 341-3(b): "There is created within the University an ecology or environmental center."

ii) To comply with HRS 341-5(a):

The Center shall be so constituted as to make most effective the contribution of the University to the problems of determining the optimum environmental quality. Its membership shall be comprised of those members of the University actively concerned with ecological and environmental problems.

b) Educational goals:

1) To identify and coordinate courses and curricula of the University bearing on environmental problems.

ii) To advise students on choices among such courses.

iii) To expand or stimulate the expansion of environmental course offerings and curricula.

Educational goals:

1) To develop and coordinate curricula and courses of the University.

2) To encourage critical reflection on environmental education.

3) To provide feedback on the experiences of environmental courses.

Achievements with respect to the above goals have been as follows:

4. Achievements

The selection of achievable goals has been directed to initiating and optimizing the performance of the Center with respect to the above aims:

The functions of the Center were established in 1970.

The membership of the Center is open ended, as implied in the second goal. The active membership, comprised of those who serve on its policy committee and those who have made substantive contributions, is determined each year by the University's selection procedures.

The function of the Center shall be to make effective use of the expertise of the Center's members to influence the policy-making processes of the University and to influence the decision-making processes of other institutions and organizations. This function is achieved through the effective performance of each of the Center's recognized functions.
contributions to its educational, research, and service functions
exceeds a hundred in any year and several hundred in period of the
Center's existence. Appointment of a small internal staff, headed by a Director.

Involvement of a Policy Committee representing broadly the depart-
ments, colleges and campuses of the University and including,
in addition, ex-officio, the Director of the State Office of
Environmental Quality Control.

Successive changes of administrative placement from the Office
of the Vice-President for Academic Affairs, to the Office of the
Manoa Chancellor, and now to the Office of Director of Research,
while retaining its system-wide function.

Primary continuing support through the University budget.

Issuance of a directory of environmental concerns of the University
for the use of students, faculty, and potential clients of services.

Establishment of an environmental resource center.

In addition to disseminating or assisting in the dissemination of
results of research projects, the Center has:

- Been represented on several continuing or ad hoc governmental
  advisory or coordinating groups, e.g. Environmental Council,
  Carrying Capacity Hearing Committee, Water Commission, Water
  Quality Standards Committee.
- Reviewed the most important environmental impact statements and
  related documents, environmental legislation, environmental
  regulations of governmental agencies, and agency-granted variances
  from environmental standards.
- Published and annual revision of the two-volume "Hawaii Environ-
  mental Laws and Regulations."
- Responded to a large number of requests for addresses, panel
  discussions, etc., and special reviews and reports.
- Responded to number of legislative and agency requests for
equipment and equipment-related coordinations of the University's
  "Environmental Laboratory."
Center Environment and Policy Institute, for example, the proposed Political Ecology Masters-level concentration in the Political Science Department, and the environmental education concentration in the Educational Foundations Department.

The establishment, expansion, and coordination of the University's

Hi) Coordination and sponsorship of the on-going Environmental Forum.

• 1v) Assistance in the development of environmental courses and curricula at UH Hilo and the Community Colleges.

v) Assistance in and sponsorship of local or regional community education efforts such as the proposed Environmental Education Conference for the Pacific Region.

C. Research

Reinstitution of the kind of broad, interactive research that was provided by the Hawaii Environmental Simulation Laboratory, through the provision of continuing base-level funding to be supplemented by grants and contracts.

d. Service programs

i) Continue the annual revisions of Hawaii Environmental Laws and Regulations which is jeopardized by the present level of funding.

B. Responses to specific questions

1. How would you order your priorities in the next six years given the present trends and future anticipated developments in your discipline/profession?

Comment on External Trends

As was expected, there was a "backlash" against the core extreme proposals for preservation of the natural environment that were advanced in the "environmental movement." The backlash may already have peaked—in any case the expressed needs for rational analysis of the environmental implications of decisions and general policies and individual actions continue high. Nationally and internationally, efforts to develop and improve methods for analyzing such implications are expanding. For example, though rates of increase in population pressures in some areas have slackened, there is every reason to believe that, with the continuing expansion of the world population, the continuing development of new technologies, and the decreasing availability of natural resources, particularly energy, the needs and efforts to evaluate and cope with them will increase in the years to come. The only increases in the world's population to be addressed in graduate study and in the graduate schools are those associated with the abstracts of the kind of broad, interactive research that was provided by the Hawaii Environmental Simulation Laboratory.

Changes in Center priorities

The establishment of the Environment and Policy Institute in the East West Center is a development that has special implications for the Environmental Center. This new Institute should be an especially effective mechanism for transferring Hawaiian experience in environmental management (and the Center's contribution to this experience) to the wider scene, and the reverse. The new Institute will also increase the demand for education linking development and environment.

The establishment of the Environment and Policy Institute in the East West Center is a development that has special implications for the Environmental Center. This new Institute should be an especially effective mechanism for transferring Hawaiian experience in environmental management (and the Center's contribution to this experience) to the wider scene, and the reverse. The new Institute will also increase the demand for education linking development and environment.

Changes in Center priorities

The stimulation, expansion, and coordination of all three major functions of the University's environment and policy institutes in the East West Center.

The establishment of the Environment and Policy Institute in the East West Center is a development that has special implications for the Environmental Center. This new Institute should be an especially effective mechanism for transferring Hawaiian experience in environmental management (and the Center's contribution to this experience) to the wider scene, and the reverse. The new Institute will also increase the demand for education linking development and environment.

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a) General: We are endeavoring to organize better the resources of the research of other units and Individuals not on the Center's Staff, the Center to facilitate and make more profitable their use by students, coordination of the support of this external research, the provision of some faculty, and staff.

These efforts have increased (except as the Center no longer has special funds that it can use for the support of research). Although the need for environmental research may be expected to increase substantially, the Center cannot afford to address its obligations increasingly by stimulating and coordinating the efforts of other units and persons not on its staff.

In the last three years the Center has increased substantially the priority to maintain quality in these respects.

b) Service: Maintaining the quality of our service efforts depends upon obtaining contributions to these efforts from diverse disciplines. It is placed administratively in the college of Arts & Sciences. There are needs for adding, to the component of that program within Liberal Studies, a component providing an environmental bachelor's degree, an option providing a certificate of competence in environmental studies, or both; and also graduate-level components. A high priority must be given by the Center to seeing that these needs are met, but the administrative structure under which they are to be met has not yet been clarified and the absolute support that the Center provides to the environmental educational efforts of the University cannot be increased unless the support of the Center is increased.

In summary, changes in priorities of the Center in the next six years depend somewhat on the extent to which the Center itself must be responsible for meeting increasing needs for environmental education and is given the support it needs to meet these needs. In the Environmental Studies Program that would most likely be reduced or eliminated would be:

1. Comprehensive resource-center operation and services. (Hours of resource-center availability to students and faculty. Assistance from our resource-center staff would have to be reduced.)
2. Newspaper clipping service which takes considerable student help time. This service would probably have to be eliminated.
3. Environmental research and consultation including that performed for government agencies. (We would certainly have to reduce these, though not eliminate them.)
4. Projects on projects within the Environmental Center that would most likely decrease. In the absolute sense, however, the support of environmental education should not decrease. If educational needs must be met within the program of the Center, the priority to environmental education must increase and the priorities to services and research will decrease. In the absolute sense, however, the support of environmental education should increase without decreasing the support of environmental research.

The current level of funding is $_____.

2) What means do you have for improvement in the quality of programs under discussion?

To improve the quality of programs under discussion, the Center would:

- Increase the budget for programs in the Environmental Studies Program, a reduction in the curriculum and course development services rendered to the UH community colleges (particularly HCC and Kapiolani CC.). (Student legislative and research projects are a strong part of the Program, but with reduced funding, the EVS faculty and counselors would have to decrease their assistance on these projects. Such projects include: Earth Day exhibits, Bottle-Bill legislation research, Steady-State Economy, Kaneohe Bay coral reef research, etc.)

While we have met and expect to continue to meet, some of the immediate needs, the Center is concerned that its programs serve the diverse needs of a variety of client groups and provide each group with appropriate means to make balances of environmental benefits and costs such as are represented in long-term vs short-term issues, individual vs common interests, and tangible vs intangible values. In general or in specific areas, the Center would:

- Provide a more flexible educational approach to encourage students to develop their own programs.
- Enhance the communication between students and staff through the establishment of a communication center.
- Increase the use of computers and other educational technologies to enhance learning.
- Increase the availability of resources for students to use in their research.
- Enhance the integration with other programs and courses.
- Increase the involvement of students in research and decision-making processes.
- Increase the support for research and development projects.
- Increase the opportunities for students to engage in community service projects.
- Increase the support for graduate and undergraduate research.
- Increase the support for environmental education programs.
v) Review of E.I.S.'s, Negative Declarations, agency regulations and variances, legislation etc. (Such reduction would be very unwise, but might be necessary,)
vii) Up-dating Environmental Rules and Regulations (unless this could be transferred to another office).

3 (B) What would you do given a modest increase in budget we would:

1) Maintain such services as the annual revision of Hawaii Environmental Laws and Regulations and up-dating the directory of environmental concerns at the University.

2) Improve our resource-center services to students, faculty and staff.

3) Expand our assistance and environmental course and curriculum development activities at the Hilo College and community colleges.

4) Assure adequate diversity of contributions to our review activities.

5) Extend the experience gained from our educational, research, and service functions more widely through more extensive formal publication, participation in regional conferences, etc.

4. Would greater cooperation and participation between your school or college and other schools and colleges cause changes in faculty allocation and therefore the utilization of resources?

The cooperation of college, schools, departments and other units with the Environmental Center has in general been excellent. Limitations to such cooperation stem either from the staff limitations of the Center or from the reward structure of the University as interpreted by other units. Departmental or administrative placements of low values on interdisciplinary team efforts (as distinct from disciplinary and individual efforts), and on service activities (as distinct from instructional activities or research activities leading to formal publication) clearly place faculty who contribute to the activities of the Center in jeopardy with respect to tenure and promotion, and hence may limit such participation.

5. What shifts in clientele being served do you anticipate in the next six years? (Include changes in size, level, target groups, etc.) Are there changes in your clientele which you believe will necessitate a re-assignment of faculty and an eventual redistribution?

I anticipate no significant changes in the clientele of the Center's service activities. The clients of its research projects change from time to time, but the service activities are not significant enough to warrant such changes in the personnel of the Center's service activities.

I anticipate, however, that the student clientele of the Environmental Studies program component in Liberal Studies will continue to increase to an enrollment of about 40. We also anticipate that the clientele of the Environmental Studies program should be enlarged to include undergraduate students who wish to receive degrees other than in Liberal Studies, and to include graduate students. We anticipate the potential enrollment of 50 to 70 undergraduates in an undergraduate environmental degree or certificate program and enrollments for environmental graduate degrees totaling of 20 to 30.

What innovations in teaching, research and community service do you anticipate that will contribute to more effective utilization of resources, more effective service, reaching a larger number with the same resources? Would you utilize innovative non-traditional modes of education?

Processes already set in motion in the areas of environmental education (EVS Program) and our EC library we think will ensure more effective utilization of these resources and services. Both have been in the early development stages for a year or more but are ready for full service at this time. They will increase in the number and quality of students involved in these programs and in the number of faculty and students using various resources.

In the evaluation of the Environmental Center's program we rely especially on the Center's Policy Committee whose members are appointed by the Director of Research from diverse components of the University system. The Committee meets infrequently, but its members are kept informed of Center activities generally and their advice is solicited on policy questions.

The Policy Committee cannot directly estimate the effectiveness of the program in the external community, but is kept informed of evidences of external effectiveness. The Center has no equivalent to the Community Council that served the Hawaii Environmental Simulation Laboratory, that was associated with the Center but supported mainly by extramural funds. The Chairman of the Community Council has been approached with respect to its possible service to the Center, but no decision has been made on this.

In the future, the Center has been approached with respect to the possible service to the Center of an external advisory board, which would serve to provide the Center with guidance and information by experts in environmental education and policy. The Center has not yet approached the University's Office of Community Relations to request this service, but would be pleased to do so if the Office could recommend an appropriate group of experts.

I therefore wish to commend your remarks to the following:

1) Improved use of educational resources in the University's service programs.

2) Increased use of educational resources in the University's service programs.

3) Increased use of educational resources in the University's service programs.

4) Improved use of educational resources in the University's service programs.

5) Increased use of educational resources in the University's service programs.

6) Increased use of educational resources in the University's service programs.

7) Increased use of educational resources in the University's service programs.

8) Increased use of educational resources in the University's service programs.

9) Increased use of educational resources in the University's service programs.

10) Increased use of educational resources in the University's service programs.

11) Increased use of educational resources in the University's service programs.

12) Increased use of educational resources in the University's service programs.

13) Increased use of educational resources in the University's service programs.

14) Increased use of educational resources in the University's service programs.

15) Increased use of educational resources in the University's service programs.

16) Increased use of educational resources in the University's service programs.

17) Increased use of educational resources in the University's service programs.

18) Increased use of educational resources in the University's service programs.

19) Increased use of educational resources in the University's service programs.

20) Increased use of educational resources in the University's service programs.
b) External effectiveness

1) Center service productivity.

11} Extent to which Center recommendations are considered in the revision of environmental impact statements, proposed legislation and regulations, grants of variances, etc.

11i) Extent to which the Center is requested to expand on previously volunteered recommendations or to provide recommendations on additional questions.

11v) Extent to which the Center is requested to plan, coordinate, or undertake research projects.

8. Are there plans for improved faculty development? What new ideas, innovations do you have?

The Center contributes to faculty development (including the development of faculty members of its staff) by providing opportunities to further their own competence and the use of their disciplines in interdisciplinary activities related to "real-world" problems and by providing forums for testing their disciplinary capabilities and contributions in the light of "real-world" interdisciplinary needs. We have no definite plans to use other means for faculty development, although we wish to expand the opportunities available within the university. We would encourage more appropriate recognition of interdisciplinary research.

9. What future innovations within the university would you indicate as necessary or helpful in developing increased program effectiveness in your college or school?

a) We would encourage the establishment of quasi-independent environmental coordination units in many of the schools and colleges of the University (such as recently existed in the college of Tropical Agriculture) and in other campuses of the University.

b) We would encourage more appropriate recognition of interdisciplinary research. The Center coordinates in the light of "real-world" problems and by providing forums for testing their disciplinary capabilities and use of their disciplines in interdisciplinary activities. Faculty members, in addition to their scholarly activities, frequently contribute to "real-world" efforts. We would encourage more recognition of interdisciplinary research and the use of interdisciplinary research in interdisciplinary activities. Faculty members of the Center contribute (including the development of research proposals) to further their own competence and the use of their disciplines in interdisciplinary activities related to "real-world" problems and by providing forums for testing their disciplinary capabilities and contributions in the light of "real-world" interdisciplinary needs.
STATE OF HAWAII
UNIVERSITY OF HAWAII
UNIVERSITY OF HAWAII AT-MANOA
MVJ CENTER

ORGANIZATIONAL CHART

ENVIRONMENTAL CENTER

OFFICE OF THE RESEARCH ADMINISTRATION

Director (G) 1.00
Assistant Director (G) .50
Research Positions (G) .50
Secretary III, SP-12, (G) 1.00

Committee Policy

Appendix D
### Environmental Center Annual Budgets 1970-78

<table>
<thead>
<tr>
<th>Year</th>
<th>Salaries and Wages</th>
<th>Student Help</th>
<th>Fringe Benefits</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1970-71</td>
<td>$33,786</td>
<td>$5,014</td>
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<td>$38,800</td>
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<tr>
<td>1972-73</td>
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<td>$55,344</td>
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<td>1973-74</td>
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<td>$9,602</td>
<td>$69,140</td>
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<tr>
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<td>$8,843</td>
<td>$9,000</td>
<td>$73,400</td>
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<tr>
<td>1977-78</td>
<td>$67,267</td>
<td>$9,000</td>
<td>$8,288</td>
<td>$83,553</td>
</tr>
</tbody>
</table>

### Notes
- 1970-77 funds were provided through annual contracts with OEQC except as indicated in (d).
- Actual expenditure patterns have departed somewhat from budgets, especially in 1970-71.
- Fringe benefits were not budgeted but were paid in 1970-71. In 1973 the decision was made that fringe benefits need not be budgeted from funds received by contract from OEQC.
- Salary increases in 1975-77 were paid from funds appropriated to the University.
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- Special project funds were not differentiated in budgets for 1971-73.
- 1977-78 funds are provided through appropriation to the University.
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SUGGESTED COURSES ~ SPRING '78 \ FALL '78

I. S. 210 INTRODUCTION TO ENVIRONMENTAL ISSUES
BIGELOW/BOYER/0'REILLY
A study of environmental issues and potential solutions, team-taught by a natural scientist, a social scientist, and a humanities professor. The course deals with issues of natural science, with social environmental issues which arise from and independently of the natural concerns, and with questions of values.

PHIL 100 INTRODUCTION TO PHILOSOPHY Sec. 2
BENDER
A discussion of the formation of modern Western thought, our perception of the relationships among men, nature and science. An examination of how these perceptions have led to exploitation of nature and of other people, and a study of the writings of some people who have argued that we need to change.

POLSC 325(alpha) INTERNATIONAL ENVIRONMENTAL POLITICS
BURHANS
The course will attempt to clarify and analyze the major socio-environmental crises facing mankind today and in the near future. Its central task will be to thoroughly examine the political manifestations and machinations surrounding these international ecological issues.

POLSC 300 POLITICAL PHILOSOPHY AND THE ENVIRONMENT
HENNINGSEN/KARIEL
What is the basis for the various lines that are drawn between aspects of ourselves, ourselves and work, ourselves and others around us, ourselves and our environment? How can we get in touch with these relationships? How do we change them?

ARCH 341 INTRODUCTION TO PLANNING AND URBAN DESIGN
PREUSS
Principles and practice of urban design within the comprehensive planning process. Emphasis on socio-cultural, economic, political and environmental determinants of form and pattern.

POLSC 375(alpha) POLITICS OF ENVIRONMENTAL HEALTH
PRATT/MANOHARAN
This course will examine relationships between environmental changes and the health status of the community. The strategy for this study will rely upon (1) creating conceptual tools for understanding health, politics, and environment; (2) integrating these concepts into an analysis of specific comparative situations; and (3) developing policy and action orientations.

FALL '78

REL 495V MDRTD HUNGER AND DEVELOPMENT ETHICS
BOSILIN/FRITSCHEL
This course focuses on the question of food availability and its relationship to many complex human issues.

Prerequisites required by department

For further information, contact:
ENVIRONMENTAL STUDIES PROGRAM

Appendix F
CERTIFICATE IN ENVIRONMENTAL STUDIES

PROPOSAL FOR A NEW INSTRUCTIONAL PROGRAM

College of Arts and Sciences
University of Hawaii-Manoa Campus

Proposal: A Certificate for the Environmental Studies Program

Submitted by: Dan Burhans, Assistant Director, Environmental Center
Associate Professor, Political Science

Date: October 24, 1977

APPROVED:

Dean, College of Arts and Sciences

Introductory Summary Statement

In November 1976, the Environmental Studies staff submitted a proposal for the establishment of an undergraduate major in Environmental Studies at the University of Hawaii. A related aspect of the proposed major was the development of a certificate program in Environmental Studies. In the proposal, we stated that the combination of a certificate program and undergraduate major would significantly broaden the scope of environmental education at the University of Hawaii-Manoa Campus, as well as meet student demands for broader options than those offered under the Liberal Studies major equivalent. The certificate is intended to serve as a "minor" for those students who are majoring in other fields but who would like to add an environmental dimension to their education. At the same time, it will serve those students who want to accumulate practical experience in environmentally-related areas.

During the academic year 1976-77, the Environmental Studies staff has been discussing the various dimensions of a certificate program with different faculty members and students who are involved with our program so that we can determine the nature, demand, and feasibility of such an option. We have discovered that there is a strong interest in the certificate program, particularly among students majoring in engineering, geography, psychology, and political science. We are confident that with minor administrative staff increase, beyond that necessary for offering a major, we can offer a strong certificate program.

The main emphasis of the certificate program will be on providing our students with a combination of basic environmental knowledge through course work and offering them some direct professional or pre-professional experience (internship) with government and private sector agencies. This emphasis will be incorporated in the program by offering a minimum number of introductory courses to familiarize the students with the fundamentals of natural and social ecology followed by an internship, practical training, or experience via a community and/or professional project. We have recently collected some data from environmental agencies and other employers across the country which indicate that the combination of environmental education and practical experience (e.g., voluntary activities, internship, or part-time job) of the kind that we are planning to offer through a certificate program is especially advantageous for future employment in environmental fields.

We have been involved since the beginning of this semester in coordinating a few projects for students who are enrolled with us through the Liberal Studies program. At the moment, we have students working on several different projects—one dealing with the environmental legislation on beverage containers, another producing an environmental movie on Steady-State economy, and several others studying various environmental bills and issues (e.g., noise, Hawaii General Plan). Currently, demands for greater options and services in the absence of our own major or a certificate program are met through use of instruction and services not directly associated with the Environmental Studies program. In response to these demands, we have initiated a few projects to provide a broader range of educational experiences for our students.

Certificate in Environmental Studies

Proposal for a New Instructional Program

Appendix G

Assistant Professor, Political Science
Department Chair, Environmental Studies Program

University of Hawaii-Manoa Campus
College of Arts and Sciences
Administrative resources which are currently on loan from various departments and offices to students and the UH community and it permits Environmental Studies to develop as a primary discipline or field of knowledge.

Additional Consents on the Relationship of the Environmental Studies Certificate and Major CFro~posed), and the Liberal Studies "major equivalent."

Other interdisciplinary fields, such as public health and engineering, were once in the same position as environmental studies. They could, even today, be treated as by-products of established disciplines, i.e., where biology courses took some account of public health and physics courses considered applied problems of engineering.

But obviously, the attention to public health and engineering would be minor under such an arrangement, and since we recognize the importance of the kind of knowledge generated in these applied areas, we organize them so that problems receive direct attention.

Environmental Studies has an identical relationship at a different period of time. The developing core of problems, concepts, research, and Major CFro presented), and the Liberal Studies "major equivalent.) In addition, graduate schools and employers in environmental fields give preference to students who wish to design their own major, particularly within an environmental studies framework (e.g., environmental planning, natural resource management, forestry and recreation management, etc.). We recognize the importance of Hawaii and are given considerable recognition through government and media. The DOE is establishing environmental education as a basic part of public education and they count on the UH to help them develop a cohesive program in environmental education. In addition, the State Legislature has given a mandate in Resolution HP, 350 and SR 264 to expand the current environmental studies program beyond the Liberal Studies current equivalent and over 100 have graduate programs.

(A Certificate in Environmental Studies would offer a very useful option to students from environmental studies majors. Some 300 U.S. colleges offer B.A. curriculum in environmental studies (or Liberal Studies students in environmental concentrations (90 percent) are in the Social Science and Humanities areas. This is unfortunate for the Program and the UH community, for environmental issues require objective and constituency:

1. Liberal Studies offers a very necessary option for students at UH who want to design their own major, particularly within an environmental studies framework. Important to Hawaii and are given considerable recognition through government and media. The DOE is establishing environmental education as a basic part of public education and they count on the UH to help them develop a cohesive program in environmental education. In addition, the State Legislature has given a mandate in Resolution HP, 350 and SR 264 to expand the current environmental studies program beyond the Liberal Studies current equivalent and over 100 have graduate programs.

2. The Environmental Studies Major and Certificate have a very different respect to education, even though environmental problems are highly important to Hawaii and are given considerable recognition through government and media. The DOE is establishing environmental education as a basic part of public education and they count on the UH to help them develop a cohesive program in environmental education. In addition, the State Legislature has given a mandate in Resolution HP, 350 and SR 264 to expand the current environmental studies program beyond the Liberal Studies current equivalent and over 100 have graduate programs.

3. The Liberal Studies major is based on the student "designing his own program." An Environmental Studies major would not be merely a collection of environmentally related courses drawn from other disciplines, but rather, its core will include foundations in environmental concepts, issues and solutions. This integration and cohesiveness is necessary to have a program which adequately serves the growing demand by students and the community and it promises educational fulfills its mission to provide a primary discipline or field of study.
FROPOSAL FOR A NtW IHTERUISCIPIUIARY ENVIRONMENTAL STUDIES PROGRAM

CERTIFICATE IN ENVIRONMENTAL STUDIES

The Environmental Studies Program offers a Certificate in Environmental Studies to undergraduates who complete certain requirements in addition to a regular major. The Certificate requires an academic core of 15-16 credit hours in environmentally related courses which includes an "environmental skill." The courses and description of the "environmental skill" are listed below. The student must take one course (3 credit hours) from Category I; three courses (9-10 credit hours) from Category II; and one course (3 credit hours) from Category III.

Category I (Required) 3 credits

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Prerequisites</th>
</tr>
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<tbody>
<tr>
<td>I.S. 210 (3)</td>
<td>Introduction to Environmental Problems</td>
<td>3 credits</td>
</tr>
<tr>
<td>Ocean 201</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ecol 211-212</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Am St 320</td>
<td>American Environment</td>
<td>Soph status or coi*</td>
</tr>
<tr>
<td>Am St 420</td>
<td>Man and Nature in America</td>
<td></td>
</tr>
<tr>
<td>Ed EF 497</td>
<td>Alternative Environmental Futures</td>
<td></td>
</tr>
<tr>
<td>Geog 309</td>
<td>Plants, Man and the Ecosystem</td>
<td></td>
</tr>
<tr>
<td>I.S. 261</td>
<td>Man, Ocean and the Environmental Crisis</td>
<td></td>
</tr>
<tr>
<td>Pol Sci 325 (Alpha)</td>
<td>Topics in International Relations: International Environmental Politics</td>
<td></td>
</tr>
<tr>
<td>Pol Sci 365 (Alpha)</td>
<td>Topics in Public Law and Policy: Environmental Law</td>
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</tr>
</tbody>
</table>

Category II Students are required to take 9 credits from the following courses, 6 credits in Part A and 3 credits in Part B. (No more than one course may be applied to both the student major and Certificate.)

Part A (6 credits total)

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit Hours</th>
<th>Prerequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>Am St 211-212</td>
<td>American Environment</td>
<td>3</td>
<td>Soph status or coi*</td>
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<tr>
<td>Am St 320</td>
<td>American Environmental Problems</td>
<td>3</td>
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<tr>
<td>Geog 201</td>
<td>Plants, Man and the Ecosystem</td>
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<tr>
<td>Ed EF 497</td>
<td>Alternative Environmental Futures</td>
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Category III (3 credits)

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
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</thead>
<tbody>
<tr>
<td>I.S. 210</td>
<td>Introduction to Environmental Problems</td>
<td>3</td>
</tr>
</tbody>
</table>

- Part A overlaps with the following courses from Category III:
  - Geog 101

* coi = consent of instructor

The Environmental Studies Program offers a Certificate in Interdisciplinary Environmental Studies for a new interdisciplinary program.
Members of this group now include: Fred Riggs, Dan Burhans, Kern Lowry, with Concentration In Political Ecology members of the department who have an interest in Political Ecology may be added to the group.

Gindance: Students in this program will be advised by a committee of three, at least two of whom must be members of the Department. The coordinator for the political ecology program will be the first person to advise each student, and will name a chairperson for the student's committee (in consultation with "interested in non-academic careers (i.e. not Ph.D. candidates) related to the student). The coordinator for the program will normally serve on each student's committee, for purposes of coordination, but will not be expected to chair any of the committees. The third member of the committee may be any faculty member of the University, whether or not a member of the Political Science Department.

Conceptually, political ecology is concerned with the relation between political and administrative processes and policies as they relate to such issues as the depletion and distribution of resources, pollution, the conservation and development of energy sources, population pressures and urbanization, ethnic conflict and turbulence, and appropriate technologies.

Constituency: The program is designed for anyone interested in environmental issues who wishes to prepare, through graduate study, for a career relevant to ecological issues. Hence, a broad diversity of background is anticipated, including students with an undergraduate degree in such fields as engineering, public health, planning, management, architecture, or agriculture, as well as liberal arts and social science majors and those who have already taken a major in environmental studies. Suitable arrangements can be made with the various professional schools of the University to take complementary programs leading to concurrent degrees, thereby enhancing their professional qualifications. In some cases it should be possible to reduce the total number of credit hours required by counting required courses in one program as electives in the other.

Certificate in Political Ecology: Students who do not wish to take the M.A. but do have an interest in political ecology may be awarded a Certificate in Political Ecology by completing up to 15 hours of course work in the core subjects, plus carrying out a policy-oriented field project. Such projects would lead to the preparation of a report based on field experience and observations in which policy recommendations and means of implementation would be offered and defended. The certificate is intended for persons wishing to involve themselves in environmental politics at the practical level without feeling a need for the additional courses in political science required of M.A. candidates.

*These courses are new and would have to be developed and approved.

### PROGRAM ELEMENTS

**Goals:** To provide graduate training in political science for students and will name a chairperson for the student's committee, for purposes of coordination, but will not be expected to chair any of the committees. The third member of the committee may be any faculty member of the University, whether or not a member of the Political Science Department.

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*These courses are new and would have to be developed and approved.
3. (3-6 credit hours) Elective courses in Political Science that are on a list of environmentally relevant offerings. The list should be revised and revised from time to time in the light of the changing interests and course offerings of members of the Department. Anyone wishing to have his course listed in this category should submit a proposal to the Ecology Group for consideration. Courses now offered which might be considered for inclusion in this list are:

- Pol Sci 375 (D) Ocean Politics (Kent)
- Pol Sci 398 Bio-Politics (Schubert)
- Pol Sci 325 (B) Coastal Zone Management (Kent/others)
- Pol Sci 371 Advanced Futuristics (Dator)
- Pol Sci 671 Public Policy and Law (Hilner)
- Pol Sci 740 Multinationals (Stauffer & Heaubauer)

4. (3 or more credit hours) Electives offered outside the department. Students may take any course offered in the University, with the approval of their committees. For illustrative purposes only, the following list has been taken from the catalog:

- Plan 614
- Plan 600
- Plan 601
- Pop 650
- Pop 695
- Pop 750
- Rel 495V
- Ed 685
- PH 681
- PH 612
- Am St 610
- Am St 710

Politics and Planning (Kent & Lowry)
Pre: Consent of instructor
Planning Theory (Dinell)
Pre: Consent of instructor
Planning Systems (Holmstrom)
Pre: Consent of instructor
Intro to Demography
Demography Survey
Pre: 691 or consent of instructor
Interdisciplinary Seminar
World Hunger and Development (BobUn)
Pre: 690 or consent of instructor
Environmental Education (Boyer)
Environmental Health
Ecological Concepts and Planning (Armstrong)
Technology and Environment (Uorster)
American Environment Readings
Pre: Consent of instructor

Note: If not cross-listed with GOO level courses, graduate course credit can be earned for 300 level courses by negotiating with the instructor.

B. Category B courses: 15 credit hours

The selection of courses suited to the needs and interests of each student will be made on the basis of consultation within the Department. However, the following suggestions may be considered.

1. Some students will have had little or no instruction in political science prior to their admission to this program. They should take Political Science GOO in order to get a minimum foundation in the field.

2. Some students will have had little or no instruction in political science in order to get a minimum foundation in the field. Elective courses in Political Science that are on a list of environmentally relevant offerings may be considered. These courses will be added to the curriculum only if they are approved by the Ecology Group in the Department.

3. (3-6 credit hours) Elective courses in Political Science that are on a list of environmentally relevant offerings may be considered. These courses will be added to the curriculum only if they are approved by the Ecology Group in the Department.
Roundtable Panel Paper
8 November 1976
HAWAII ENVIRONMENTAL SIMULATION LABORATORY

Introduction

Hawaii's special interest, of course, lies in the environment of the
islands, its concern with the improvement of the planning and management
of that environment has led naturally to a focus on those environmental aspects
that are most subject to human change and those changes that are of greatest human
concern. The social environment has been placed on those in which natural
geographic

Appendix I
To maximize the extent to which HESL's analytic efforts related to Issues considered Important in the Community, and the extent to which they would actually be used in the decisions pertaining to those issues, great emphasis in the HESL endeavor has been placed on Interactions with the community through various existing and ad hoc institutions.

A HESL Community Council, originally appointed by the President of the University to provide overall policy guidance to the endeavor, transformed itself into an autonomous body with a promotional as well as advisory role. Except with respect to the Community Council, however, HESL found by experience that it was much more effective to work with existing community associations and government agencies than to establish its own groups of persons influential in decision making. Through its contacts HESL attempted to serve as an intermediary between the associations and the agencies, bringing to the attention of the agencies the concerns of the community and to the community the appraisals and plans of the agencies.

Working especially with the technical staff of an agency, HESL had access to the data and models the agency was using in planning and management decisions, and in return could provide additional data supplied by the academic community, other agencies, and the staff of HESL.

HESL staff working with community associations served for a time almost as staff members of these associations. However, it appeared impractical to establish and maintain relationships with community associations throughout the state, as the efforts of HESL, the agencies, and other agencies continued.

Several environmental management games were adapted to Hawaiian conditions and used in the community interactive effort. Some of these have been further adapted and used in the Community Interactions Interactions, which have been received positively.

A request response system was developed to handle the flow of requests for information and to maintain the quality of the response. All requests for information received were logged in and reviewed by the staff managers. Each was classified according to its source, the nature and extent of the requested response, or any other factor. If a request was beyond the ability of HESL, it was referred to other institutions.

A field office at the Windward Community College in the Kaneohe Region, together with a staff of six full-time and three part-time employees, serves as the central office of HESL in the state. The office provides a forum for the discussion of environmental issues and serves as a clearinghouse for information on the state's natural resources.
effective capabilities, it was turned down. If response could be provided elsewhere, the requestor was advised where he could more effectively obtain the information he wanted. To respond to any other request, one that would require some diversion from or extension of on-going IIESL technical developments, a task force was appointed. If the diversion or extension required would be substantial, the request was accepted only if substantial feedback to the HESL effort was anticipated or the requestor was willing to pay for the work entailed.

In total almost 600 requests were logged in. Only 6 percent of these were rejected, 47 percent were satisfied by off-the-shelf information, 29 percent by limited new work and 16 percent by substantial new work, and only 2 percent remain for which responses have not yet been prepared.

Although the request-response system diverted a good deal of effort from HESL's major analytic activities, it was considered extremely useful in assuring that the analytic activities related to and produced answers pertinent to the questions of community concern. Because responses to requests requiring more than off-the-shelf information involved HESL's usual interactions, the system resulted in better community understanding of agency problems and more extensive involvement of agency personnel with community concerns.

For which responses have not yet been prepared.

Among HESL's successes, perhaps the most easily demonstrable relates to the application of HESL's sedimentation hazard model. This model is based on a Soil Conservation Service model relating soil loss to rainfall, soil type, slope, vegetative cover, and control practice. In the HESL model, sediment produced is conserved and serves as input to the construction sediment model, resulting in loss to further downstream. This model is based on a soil's characteristics and on its response to specific problems. The results of HESL's sedimentation modeling activities were considered to have contributed substantially to the development of the concepts of carrying capacity and overload as critical concepts in environmental planning. To the development of these concepts, HESL has contributed substantially, for example in response to a concurrent resolution of the 1974 Legislature (HESL, 1975) and a request from the OEQC (Ho et al., 1976).

Sedimentation modeling and its application

The request of the OEQC (HESL, 1974) for a request from the Office of the Governor was acting as a catalyst to the establishment of an Office of Environmental Quality Control (OEQC) in the Office of the Governor and the Environmental Center in the University. Both the OEQC and the Center have contributed to the development of some of HESL's more significant efforts. For example, the Kaneohe modeling activities were consolidated in a report prepared at the request of the OEQC (HESL, 1974).

Minority Commission on Environmental Planning (1973) identified certain key areas in environmental planning that were identified as critical concepts in environmental planning. To the development of these concepts, HESL has contributed substantially, for example in response to a concurrent resolution of the 1974 Legislature (HESL, 1975) and a request from the OEQC (Ho et al., 1976).

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Ratings, weightings and simplifications on the basis of best available information (where expert opinion in some cases) produced a simple formula by which what was termed sedimentation hazard could be estimated for a particular grading project, depending on terrain and climate, location, duration of disturbance, and practices to be used.

HESL pointed out that a standard in terms of maximum permissible sedimentation hazard would imply, through the use of the formula, an appropriate limitation of combinations of grading practice and duration of disturbance; and that such a standard, though single valued, would combine desirable aspects of site dependency and developer choice. The Department of Health has incorporated just this novel kind of performance standard and some more formal procedures, including those to which reference has been made as examples, in the model sedimentation regulations."
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<td>Jul 1974 - Jan 1975</td>
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<td>Jul 1974 - Jul 1977</td>
<td>Coordination</td>
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Grants to or contracts with Environmental Center, $:
- SR 0001: 2,867
- SR 0002: 1,632
- SR 0003: 400
- SR 0004: 800
- SR 0005: 600
- SR 0006: 400
- SR 0007: 200
- SR 0008: 100
- SR 0009: 50

Products*:
- SR 0011: Progress reports
- SR 0012: HESL report
- SR 0013: Ms report and dissertation
- CN 0009: Progress reports
- CN 0010: Progress reports
- CN 0011: HESL report
- CN 0012: HESL report
## Project Ala Wai Canal Improvement

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<td>J. N. Miller</td>
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<td>J. Walters</td>
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### Grants, Co-Principal Investigators, and Dates

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### Appendix

- Performing EIS system of State
- Costs of tsunami and local tsunami history
- False alarms and the ecology of the Pearl Harbor devastation
- Pearl Harbor damage and its effect on the Pearl Harbor area

### Doing Less Better

- July 1977 to Jan 1978
- Staff

### Summary

- Staff
- D. C. Cox
- July 1977 to Jan 1978
- Administration
- June 1976 to Jan 1977
- Staff

### History

- Staff
- D. C. Cox
- Dec 1976 to Jan 1977
- Administration
- June 1976 to Jan 1977
- Staff

### Products

- Staff
- D. C. Cox
- Dec 1976 to Jan 1977
- Administration
- June 1976 to Jan 1977
- Staff

### Products (continued)

- Staff
- D. C. Cox
- Dec 1976 to Jan 1977
- Administration
- June 1976 to Jan 1977
- Staff

### Products (continued)

- Staff
- D. C. Cox
- Dec 1976 to Jan 1977
- Administration
- June 1976 to Jan 1977
- Staff
B. Projects Supported by Environmental Center Special Project Funds

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<td>Apr 74</td>
<td>Heavy metal in stolonous pinnules</td>
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<td>Cheyney, D.P.</td>
<td>Jun 75</td>
<td>Issues of reintroducing environment</td>
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<td>Cornes, D.P.</td>
<td>Nov 75</td>
<td>Satellite image enhancement &amp; data analysis</td>
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<td>Chan, J.G.</td>
<td>Apr 76</td>
<td>Mercury deposition on metallic sites</td>
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<td>Muler, Pamela</td>
<td>Apr 75</td>
<td>Oceanography</td>
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<td>Young, Reginald</td>
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<td>W.T. Anderson, Donald</td>
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<td>Health effects of chlorinated effluent</td>
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<td>Preble, D. &amp; A. Sumiarstrom</td>
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<td>Physico-chemical study of Lake Waiau</td>
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<td>Tsukiji, R. &amp; G. Rutter</td>
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Product: HIMB report

Dates:
- Jan 73 to Jun 74
- Apr 75 to Nov 75
- Apr 76 to Nov 75
- Apr 77 to Dec 77

Projects Supported by Environmental Center Special Project Funds
Appendix K
UH Environmental Center

POLICY GUIDELINES ON SERVICES

To assure that, in the provision of its services to the community external to the University, the Environmental Center exercises due responsibility:

1. The Center will address itself to those issues, potential issues, or parts thereof, that are amenable to objective analysis and will avoid making recommendations which involve essentially subjective value judgments except when there is a clear public consensus as to such judgments.

2. In the preparation of any Center statement on an issue or potential issue, to the extent permitted by time limitations, the Center will invite wide participation from the University community and will actively solicit contributions from those members of the community that appear most knowledgeable about the issue addressed.

3. The Center will attempt to reconcile differences of opinion expressed by contributors to a Center position by expressing as alternatives any subjective value judgments that may underly the differences. If reconciliation is not possible, the Center will express the divergent points of view and identify them with their respective holders.

4. Any statement of information or advice provided by the Center will be identified with the Center and the contributors to the statement and will include a disclaimer that the statement represents an official position of the University or any other institution.

5. The Center will provide its information and advice on any issue to whatever governmental agency or legislative body or combination of agencies and whatever government agency or legislative body or combination of agencies and whatever other governmental authority or institutions have official responsibility for dealing with the issue involved. Information produced by the Center must be made available to the public.

6. To interpret these guidelines, to establish Center policies generally, and to assure that the Center administration adheres to these guidelines and policies, the Center will be guided by a Policy Committee. The members of the Policy Committee are to be appointed by the Dean of the College of Environmental Quality Control. The Director of Environmental Quality Control is to be, ex officio, a member of the Policy Committee.

Approved May 1976
*Effective 1976-77, the Director of Research makes appointment to the Policy Committee.
Formal Environmental Center Products

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Vol. 1 Laws
Vol. 2 Regulations

*See listing on following sheets.

Appendix L

Hawaii Environmental Laws and Regulations (with annual revisions)
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<td>Sep 1970</td>
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<td>Leu, L.S.</td>
<td>Jan 1971</td>
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<td>Craven, J.P.</td>
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<td>The Meaning of &quot;Best Practicable Treatment or Control&quot; in the</td>
<td>Webb, S.</td>
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<td>Johnson, J.M.</td>
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