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International Marine Science Research Projects: Inventory and Analysis of Selected Projects at Sea Grant Institutions—1985

by

David A. Ross and Judith Fenwick

July 1985

Technical Report

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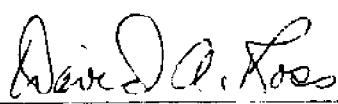
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Approved for Distribution:



David A. Ross, Chairman
Department of Geology and Geophysics

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ABSTRACT

The U.S. marine scientific community continues to show an interest in marine research within foreign Exclusive Economic Zones and with foreign scientists and institutions, in spite of the problems, regulations, and increased formalization involved in cooperative international projects. This inventory of international marine science research projects at Sea Grant institutions resulted from discussions on the possible establishment of a U.S. office or center for international marine science cooperation. Such an office has been proposed as one mechanism to assist in developing international marine research projects.

The report analyzes data from 98 inventory questionnaires, completed by Sea Grant institutions. It should serve as a reference piece for persons seeking information and assistance in initiating cooperative international marine science research projects. Projects are profiled by sources of funding, disciplines of principal investigators, geographic locations of projects, and general categories of research. Also included are summaries of the completed questionnaires, indexes for quicker access to pertinent areas of the summaries, and information for the reader with further questions or interest in contacting the principal investigator of a specific project.

INVENTORY AND ANALYSIS OF SELECTED
INTERNATIONAL MARINE SCIENCE RESEARCH PROJECTS
AT SEA GRANT INSTITUTIONS--1985

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INTRODUCTION

This inventory of international marine science research projects at Sea Grant institutions was prompted by discussions at various forums on the value of establishing a U.S. center or office for international marine science cooperation.¹ The authors feel that the need for such a center is increasingly evident as U.S. scientists face the problems, opportunities, and regulations involved in doing research within foreign Exclusive Economic Zones and with foreign scientists and institutions.

Our report is organized with two functions in mind:

1. To serve as an analysis of the data obtained from 98 inventory questionnaires completed by individuals at 17 of 29 Sea Grant institutions; and
2. To serve as a reference piece for persons seeking information and assistance for initiating cooperative international marine science research projects.

We present data on geographic locations of projects, sources of project funding, disciplines of the principal investigators, and general categories of the projects (through the assignment of keywords to each project). The projects included in this inventory go far beyond the traditional oceanographic sciences and the locations are often land-based rather than all marine-based. The thrust of these projects is, however, most definitely toward international cooperative marine science.

Our report also contains summaries of the completed questionnaires, indexes to give the reader quicker access to pertinent areas of the summaries, and enough information to allow the reader with further questions or similar

¹ For a full discussion of this proposed office, see, David A. Ross, Presented Statement to the Subcommittee on Oceanography, U.S. House of Representatives, 26 September 1984; and David A. Ross, "EEZ Offers Chance for Foreign Collaboration," Oceanus 27, no. 4 (Winter 1984/85): 57-61.

research interests to contact directly the principal investigator of each project.

We should note, however, that the report is flawed by the static quality of inventory information once it is published. The names of organizations and individual contacts change. Yet the need is evident for an established network through which to exchange information on international research projects. This report has caught an "instamatic" picture of that potential network. One function of a center for international marine science cooperation could be to keep the "family album", full of those "instamatic" pictures, constantly updated and available to the scientific community. As a first step toward starting that family album and hopefully easing the rigors of international research and collaboration, we have undertaken this inventory of international marine science research projects at Sea Grant institutions.

CHANGES IN MARINE SCIENCE RESEARCH

For many countries a new perspective of the ocean and its uses has recently developed. Shifting social values, changing economic conditions, the Law of the Sea Conference, and increased global political pressures have fostered this new perspective. For the United States, the perspective of the 1960s with an emphasis on science and technology was followed in the 1970s by environmental concerns. As we move through the 1980s into the final decade of the century, ocean policy may be dominated by economic development and resource management. With a decreasing supply of conventional land-based resources in a world of expanding population, the resources of the ocean will become more attractive for exploitation.

Ocean uses, traditional and new, have been pondered and reconsidered by most coastal nations as they focus increased attention on their extended marine and coastal jurisdictions and environments. Three factors have led many of the world's coastal states toward this reconsideration: 1) the implications of the Law of the Sea Treaty for global ocean interests; 2) potential for or establishment by many coastal states of a 200-nautical-mile Exclusive Economic Zone (EEZ); and 3) advances in marine science and technology.² These factors may also give rise to a change in the style and direction of U.S. marine scientific research in the international arena. Most developing countries have a paucity of marine science and technology capabilities with which to undertake the necessary studies for exploring or capitalizing on the potential of their new economic zones, whereas the U.S. has considerable knowledge, skills, equipment, and experience.

2 These points and much of the discussion that follows in this section are drawn from Ross, op. cit. (1).

The establishment and control of EEZs by coastal states, including jurisdiction over marine science, is a reality regardless of whether the Law of the Sea Treaty eventually goes into force. Enclosure of the coastal ocean comes at a time when the U.S. marine scientific community faces a decrease in the number of ocean-going ships and other budgetary constraints. However, this enclosure has also come when major areas of study, such as air-sea interactions (especially, climate and global ocean circulation), ocean drilling, the ocean's capacity to assimilate waste, and new technological applications such as sophisticated satellite observations could lead to innovative ocean uses. These and future studies will require access to all EEZs, which include essentially all upwelling zones, most subduction regions, most proven or potential marine resources (save manganese nodules) and, of course, all continental margins. It should also be stressed that EEZs encompass that part of the ocean which often has the most variability, receives most of the erosion and waste products from land, and is the most used and abused. To close off or reduce access to this region for research would dangerously narrow effectiveness of ocean science studies.

The proposal and conduct of efficient and effective studies by any U.S. scientist in a foreign EEZ will require increased cooperation with scientists and scientific institutions from the foreign nation(s), as well as within U.S. scientific institutions. U.S. marine science expertise is scattered among various organizations: governmental agencies, private industry, universities; and many of these organizations have limited experience in collaborative programs, especially with developing countries. Effective collaboration should be structured so as to help define the problems, develop and implement the methods of observation, refine the exchange of information and technology, and publish the results. In other words, the success of U.S. international

marine research will require continued access to foreign waters, and this will mean developing cooperative programs with scientists or institutions in these foreign countries. A single project with a given foreign country is probably not sufficient to ensure continuing access to its EEZ for all U.S. research vessels. Rather, by improving a foreign nation's scientific capability, an effective, continuing research program may well reduce that nation's reluctance in granting access for marine science research.

Controls and regulations for marine science research in some foreign EEZs are many, complex, and often changing. Marine science research in these regions may require detailed negotiations, permission, data exchange, possible training and assistance efforts, and especially close cooperation with the foreign country in all phases of the research activity. The challenge lies in developing and maintaining successful and viable foreign programs without sacrificing excessive amounts of time and resources. Meeting this challenge will require skills and infrastructure often unavailable to individual marine scientists.

Coordinating International Marine Science Research

The U.S. marine scientific community has shown a tenacious interest toward working in foreign countries, even with the increased formalization in obtaining permission and appropriate research clearances. Several recent studies³ have indicated that this interest continues and that a broader

3 Ocean Policy Committee, National Research Council, United States Interests and Needs in the Coordination of International Oceanographic Research (National Academy Press: Washington, D.C., 1982), pp. 103-120; Marine Technical Assistance Group, Ocean Policy Committee, National Research Council, Marine Technical Assistance to Developing Countries: The U.S. Role (National Academy Press: Washington, D.C., 1982), pp. 74-87; Ross, D.A., R.C. Ladner, and J.A. Early, 1983. The Impact of the Law of the Sea Conference on U.S. Marine Scientific Research: Report on a Questionnaire. W.H.O.I. Technical Report 83-15, p. 5.

range of mechanisms is needed to assist in coordinating international marine research projects.

One of the suggested mechanisms in building a more coherent base for cooperative marine programs has been through the proposed establishment of a Center or Office of International Marine Science Cooperation. Among the main objectives of this center would be:⁴

- To improve opportunities and efficiencies for those in the U.S. marine community wishing to work with foreign countries (and in foreign waters).
- To improve access for foreign countries and institutions to marine scientific research and training opportunities with U.S. organizations.
- To collect and circulate information to the U.S. marine scientific community concerning opportunities, mechanisms, and funding sources for foreign programs.
- To identify countries or areas for the U.S. marine community with particular problems or requirements, and advise on mechanisms for dealing with such problems (in particular, from scientists who have had experience in such countries).
- To identify American scientists interested in working in specific fields in specific foreign countries.
- To assist in the development of multidisciplinary (and perhaps multinational) teams.

The information gathered by this inventory illustrates the potential to achieve some of these objectives.

⁴ Ross, op. cit. (1).

REPORT AND ANALYSIS OF THE INVENTORY

Criteria for the Inventory

The questionnaire, upon which we have based this inventory, was distributed November, 1984 to the 29 Sea Grant institutions. These institutions represent a broad geographic network of colleges and universities; they do not include all U.S. institutions engaged in marine science research. They do, however, contain a variety of researchers with specific interests in international marine science.

We asked that a questionnaire be completed for each international marine science project which had been initiated at the participating institution, limiting the projects for inclusion to those, as of December 1984, that were proposed, current, or that had occurred within the past five years (starting or completion date). No limits were set as to dollar amounts or time involved in the projects since relatively low-cost activities often yield significant returns. Projects also were not limited to those sponsored by Sea Grant. In most instances, questionnaires were completed by the principal investigator of each project. Returns were received between late January and early May, 1985.

General Scope of the Inventory

We estimate that approximately 50% of the cooperative international marine projects at Sea Grant institutions were caught in the net of our inventory. Completed questionnaires were received from individuals at 17 of 29 Sea Grant institutions, or 59%, ranging from a high of 31 questionnaires returned from the University of Puerto Rico Sea Grant Program to a low of 1 questionnaire (received of three institutions).

The charts that follow represent an overview of the inventory in terms of project distribution: 1) by general geographic area, 2) by principal investigators' disciplines, and 3) by sources of funding (public and private) and how those funding sources were spread among the geographic areas.

Geographic Distribution: Project distribution was fairly even over the range of geographic areas, with Asia and the Caribbean leading, as shown in Figures 1A and 1B. The more popular countries for project location were Israel and Mexico, both with 8 projects; Japan followed with 6 and Argentina with 5 (see the Foreign Location Index). Somewhat surprising was the small number of projects with African countries, areas with great possibility for cooperative programs.

Principal Investigators' Disciplines: Figures 2A and 2B show project distribution among principal investigators' disciplines. The largest percentage of PIs, 42%, fall within the fisheries related disciplines, with oceanography second, at 15%. The dominance of PIs in fisheries may reflect the weight of Sea Grant oriented research that comprises this inventory.

The succeeding figures (2-C through 2-J) offer a breakdown of PIs' subdisciplines within the major disciplines. Although the data set is small for some of these subdisciplines, the figures are included to indicate the diversity of and within the disciplines.

Funding Sources: Funding sources have been categorized as public or private, then further allocated to a more particular type of public or private source (Figures 3A, 3B, 4A, and 4B). Public sources constituted 82% of the funding for the international projects with the balance of 18% from private sources. We were provided with only the sources on funding, not the dollar amounts involved. Thus, the descriptions of funding are based on the number of projects, not on dollar amounts.

In the realm of public funding, 27% of the projects were funded by foreign or international monies and 73% by U.S. sources (Figure 3B). The U.S. federal government was the direct source of 57% of the public funding. Projects with private funding had to look to foundations for the majority of their support, with 52% of the private monies coming from foreign and U.S. foundations (Figure 4B). Industry, both foreign and domestic, contributed an additional 17% of private backing (with foreign industry at 13% and U.S. industry at 4%).

Figure 5 illustrates that public funding provided the majority of support in all geographic areas. The largest segment of private funding was found in Caribbean projects, which (although not shown on the chart) is comprised of foreign and U.S. foundation support, and PI personal funds.

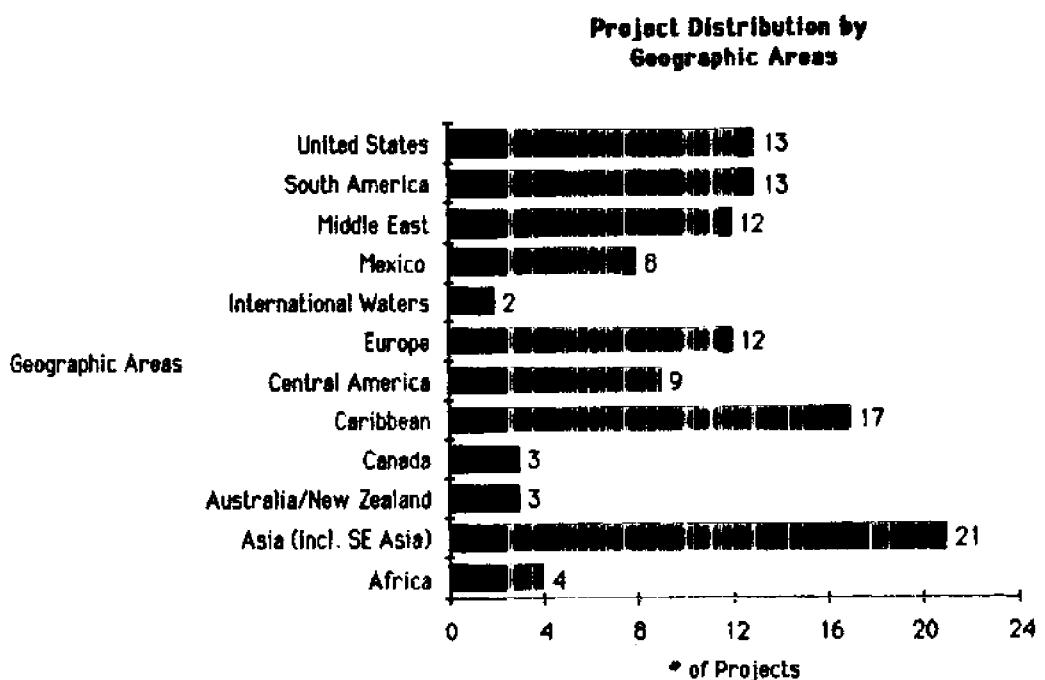


Figure 1A: Describes the number of projects taking place worldwide. Since some projects took place in more than one geographic location, the number of projects distributed among areas exceeds the base number of projects.

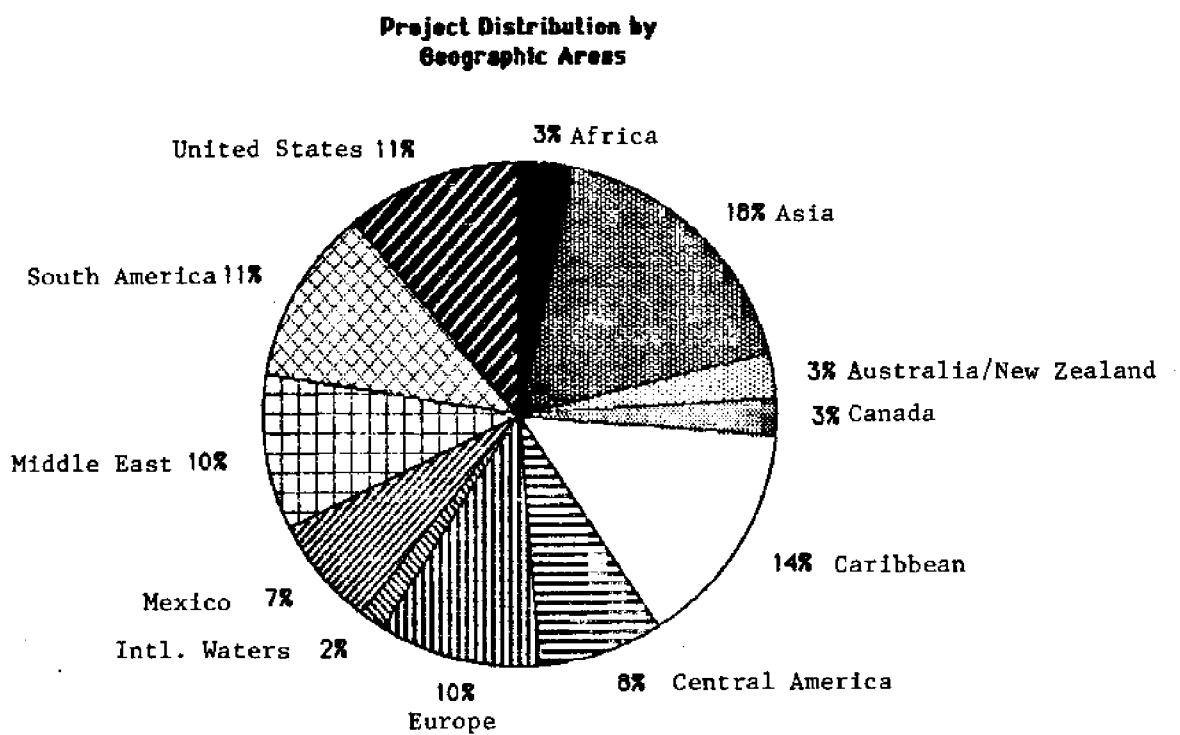


Figure 1B: Describes the percentage of projects taking place worldwide. Since some projects took place in more than one geographic location, the number of projects distributed among areas exceeds the base number of projects.

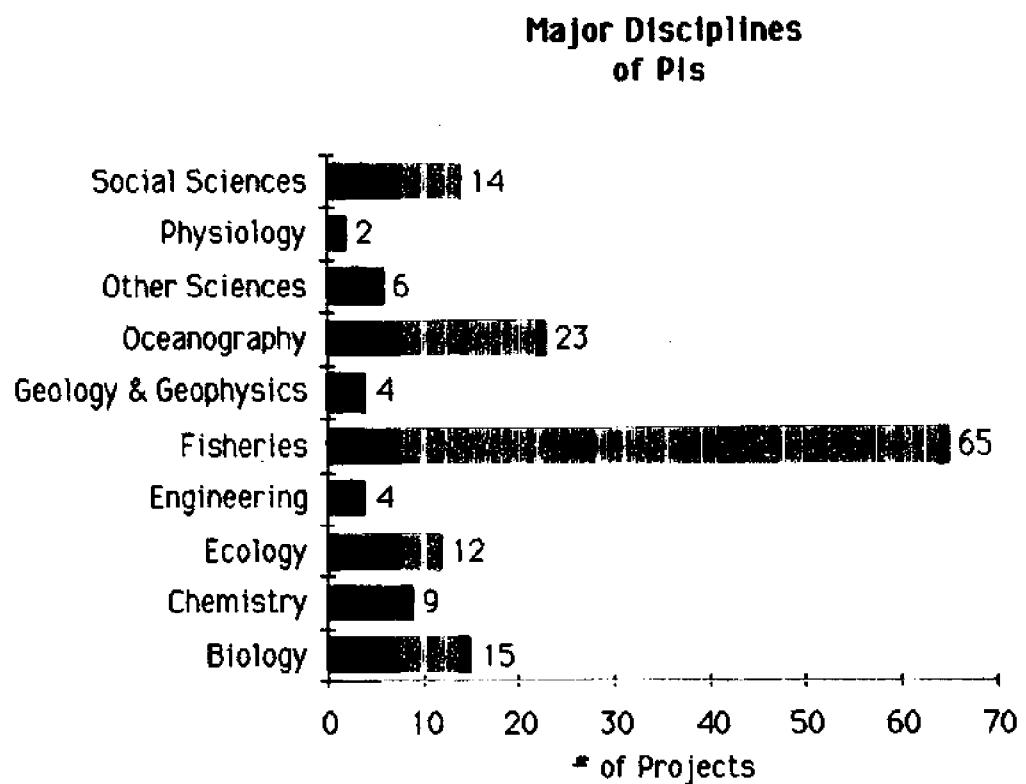


Figure 2A: This chart describes the distribution of principal investigators among major disciplines. Since many projects had multiple PIs, the number of projects shown by disciplines exceeds the base number of projects.

Percentage of PIs within Major Disciplines

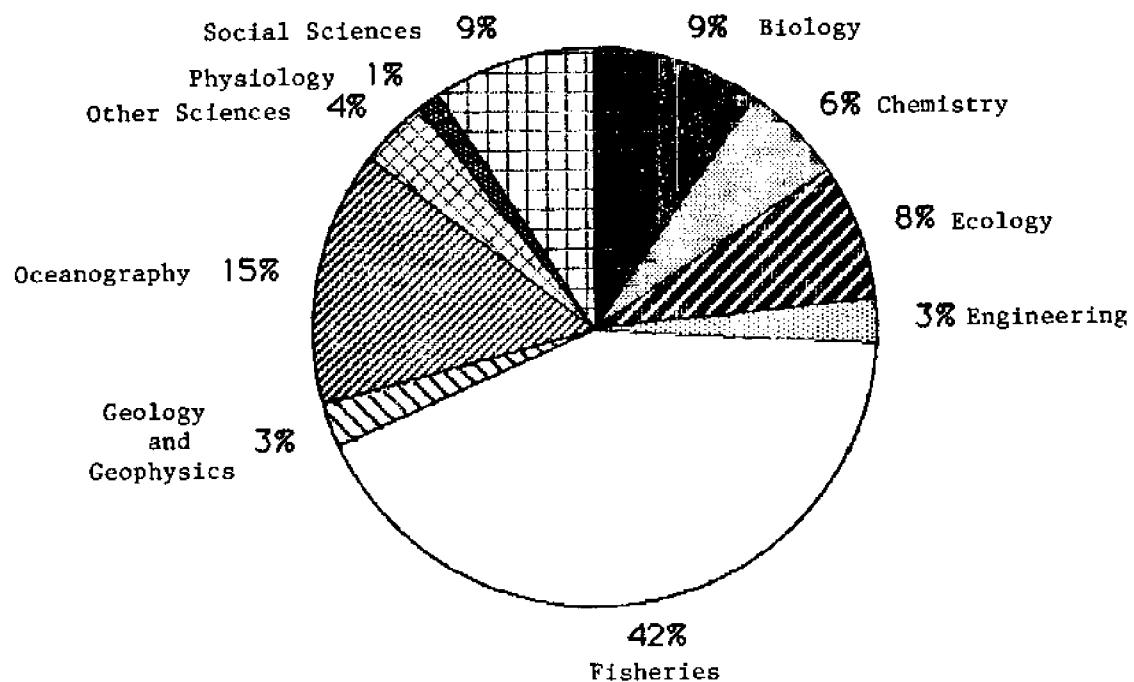


Figure 2B: This chart describes the percentage of principal investigators among major disciplines.

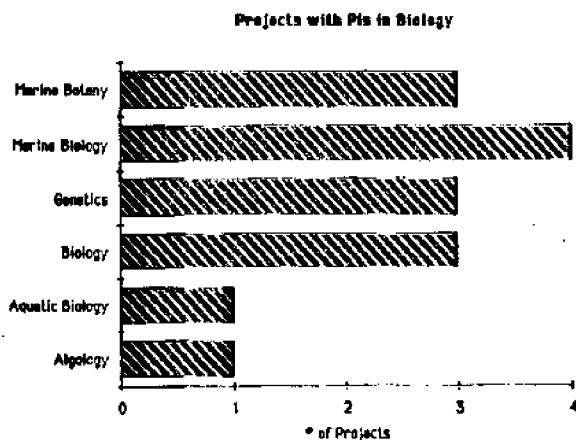


Figure 2-C: Subdisciplines within Biology represented by project PIs

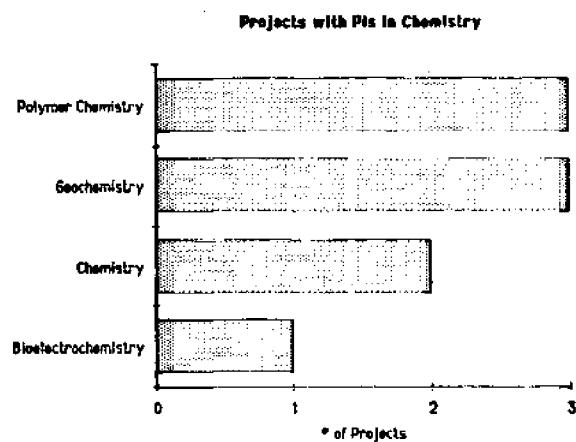


Figure 2-D: Subdisciplines within Chemistry represented by project PIs

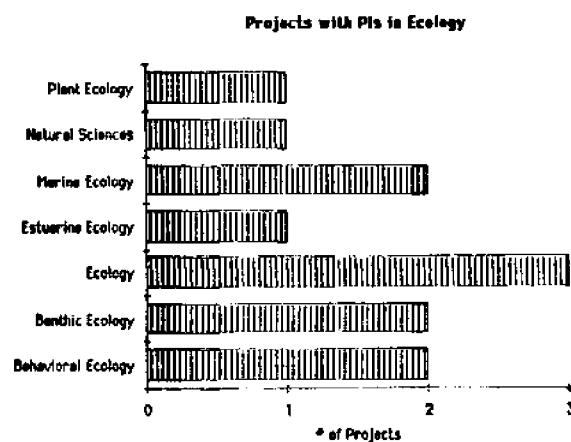


Figure 2-E: Subdisciplines within Ecology represented by project PIs

Figures 2-C through 2-J indicate subdisciplines of principal investigators.

Projects with PIs in Fisheries

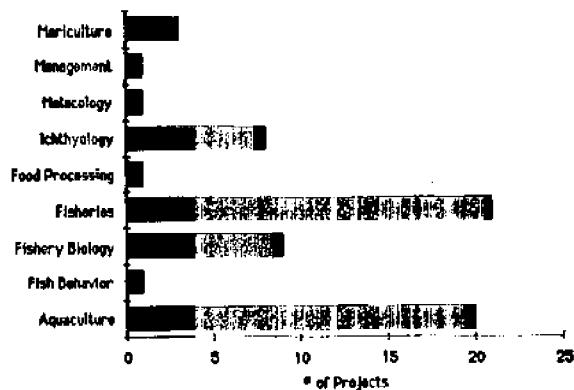


Figure 2-F: Subdisciplines within Fisheries represented by project PIs

Projects with PIs in Geology & Geophysics

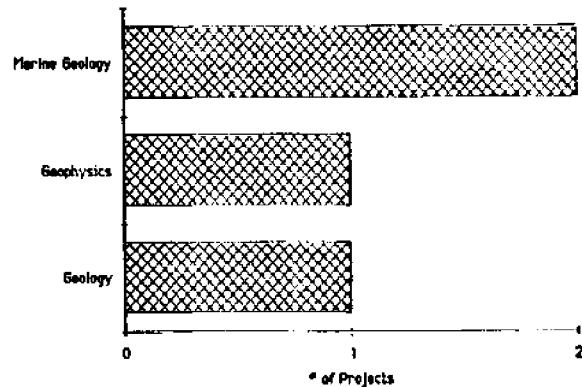


Figure 2-G: Subdisciplines within Geology and Geophysics represented by project PIs

Projects with PIs in Oceanography

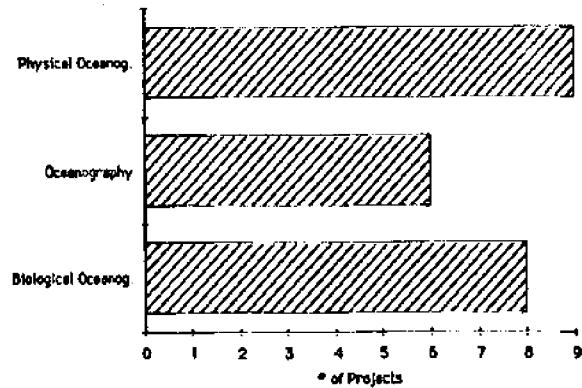


Figure 2-H: Subdisciplines within Oceanography represented by project PIs

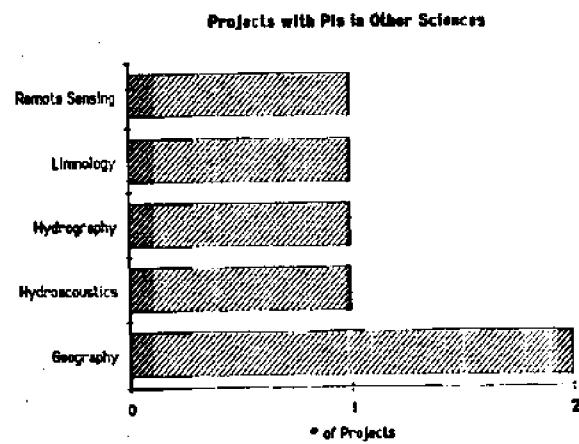


Figure 2-I: Subdisciplines within other sciences represented by project PIs

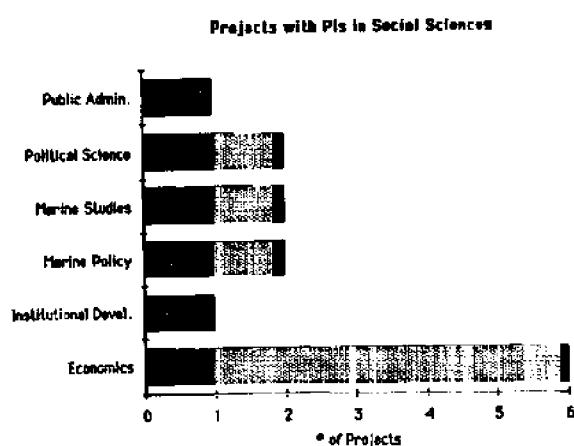
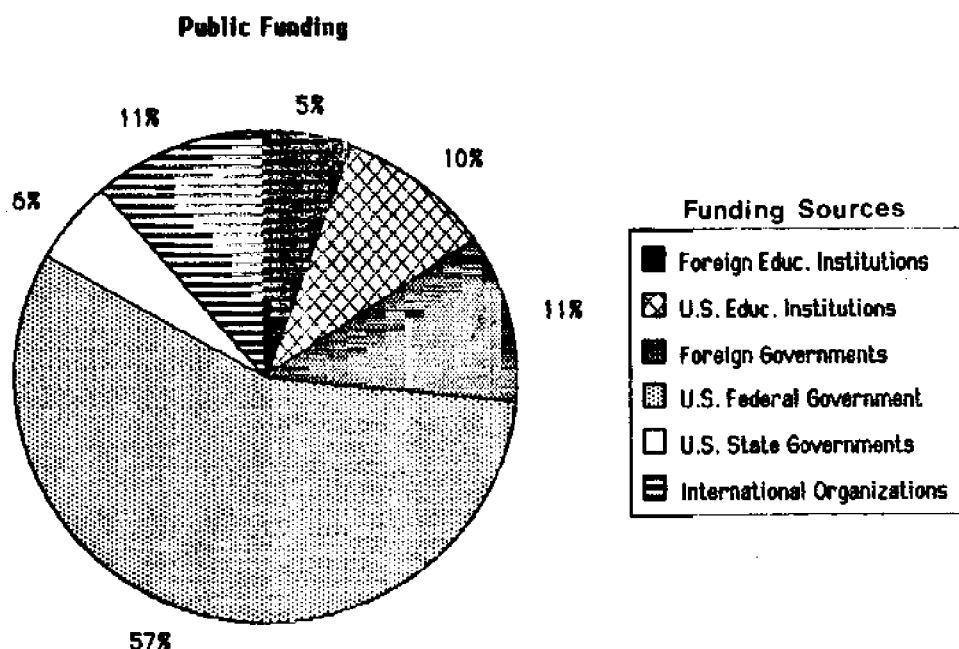
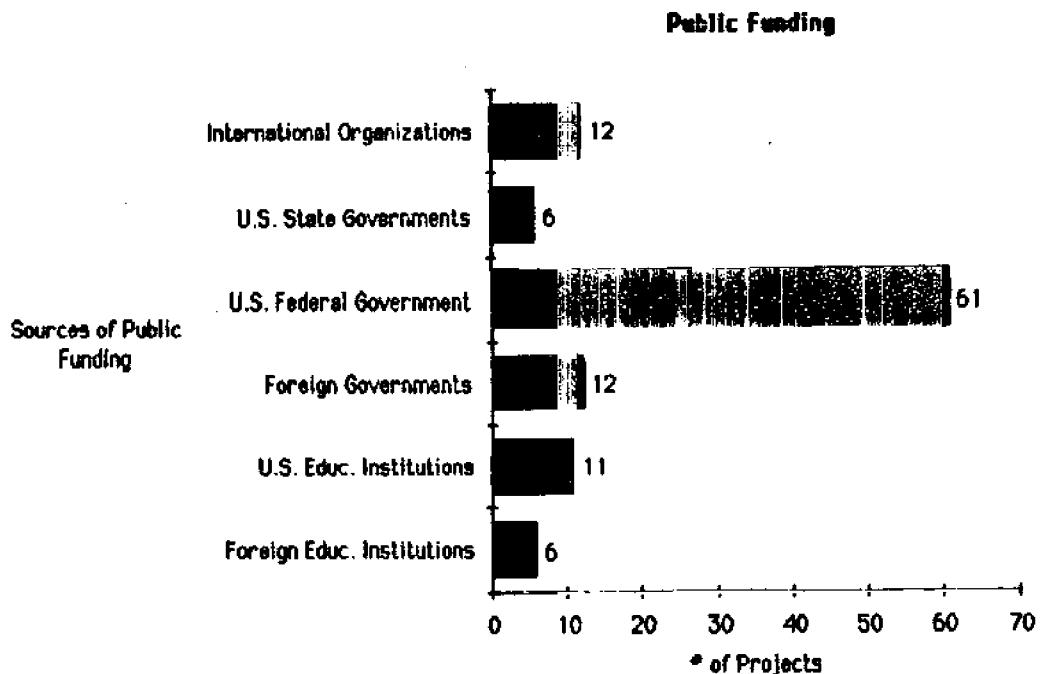
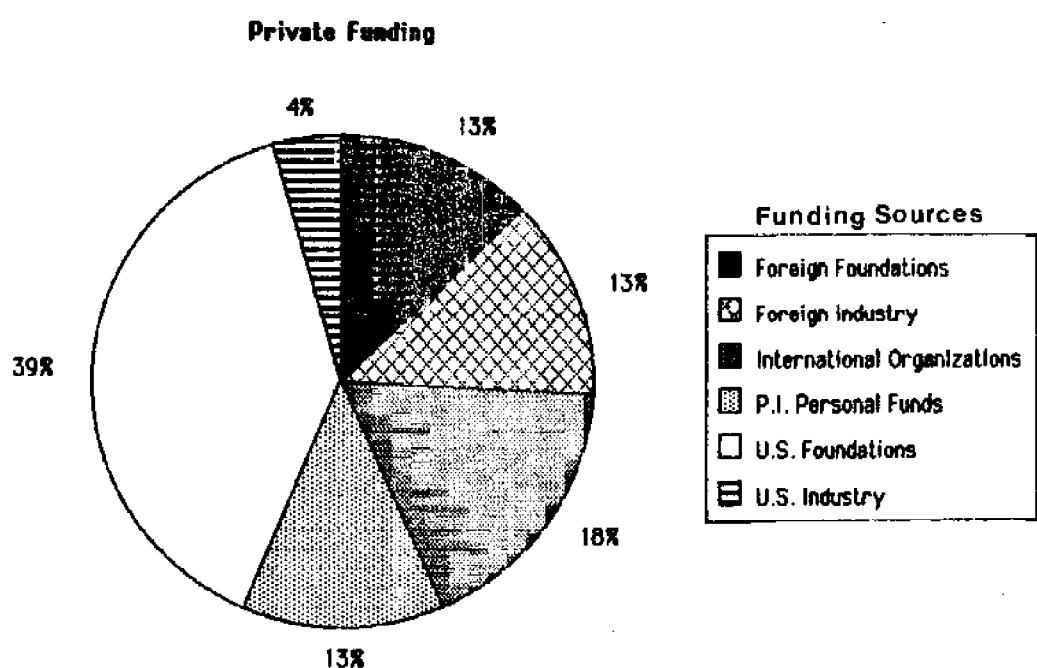
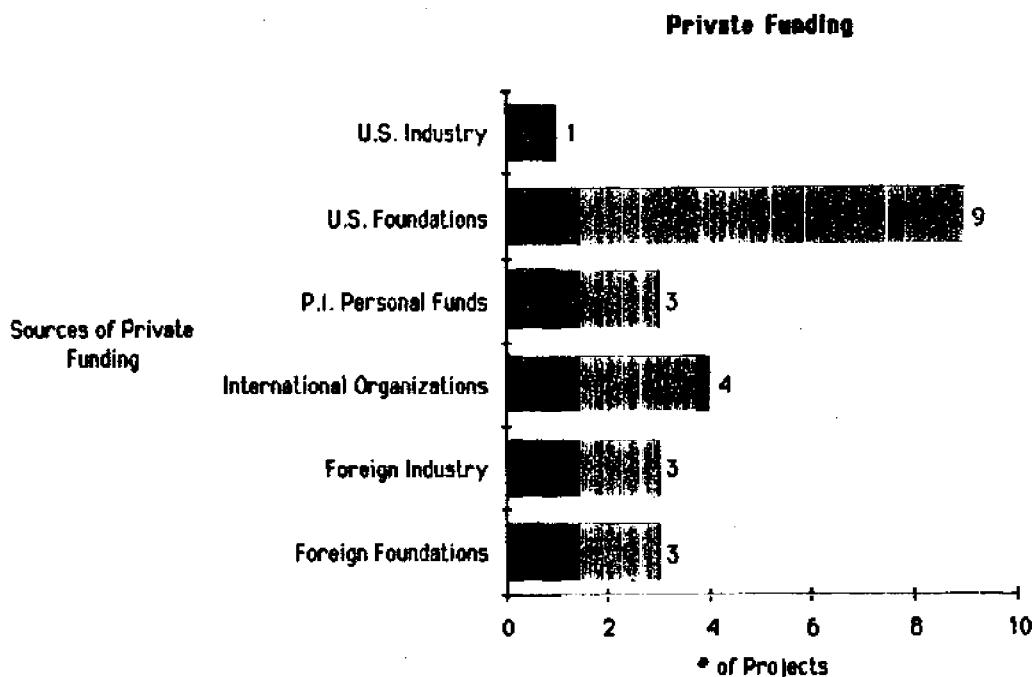


Figure 2-J: Subdisciplines within Social Sciences represented by project PIs



Figures 3A and 3B: Public funding sources by number of projects and by percentage of projects. Since some projects carried more than one source of funding, the number of projects to which private and/or public funding were allocated as shown by these graphs exceeds the base number of projects.



Figures 4A and 4B: Private funding sources by number of projects and by percentage of projects. Since some projects carried more than one source of funding, the number of projects to which private and/or public funding were allocated as shown by these graphs exceeds the base number of projects.

Funding by Geographic Area

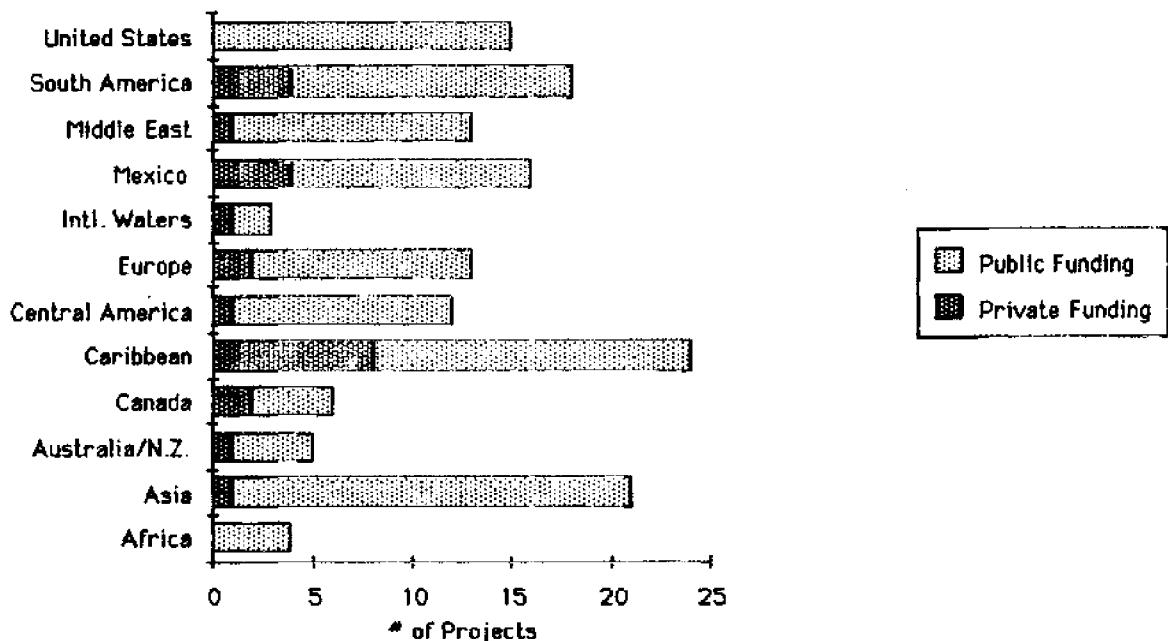


Figure 5: This chart indicates the correlation between geographic areas and funding sources (public and private). Since some projects took place in more than one geographic location and some projects carried more than one source of funding, the number of projects indicated on this graph exceeds the base number of projects.



INDEXES TO THE SUMMARIES

Explanation of Summary Indexes

These indexes should provide the reader with quick access to the summaries (starting on page 71) by keywords, foreign locations, funding sources, and disciplines of PIs. Four indexes are provided:

Keyword Index (pp. 33-40; in addition to keywords, indicates foreign locations of each project, following the project number; keywords were assigned to each project, based on project title and project description.)

Foreign Location Index (pp. 41-50; in addition to foreign location, indicates the keywords associated with each project, following the project number.)

Funding Sources Index (pp. 51-55; in addition to funding sources, shows foreign locations for each project, following the project number.)

Index by PIs' Disciplines (pp. 57-68; in addition to PIs' disciplines, shows project title for each project, following the project number.)

KEYWORD INDEX

Keywords	Proj#	For. Locat.
agriculture	027B	Indonesia
Antarctica	016B	So-Atlantic-Ocean Scotia-Sea
aquaculture	001A	Egypt Israel
	002A	Thailand
	002B	Thailand
	011A	Indonesia
	011M	U.S.-location
	012A	Israel
	012B	Haiti
	015AA	Panama
	015BB	Belgium Haiti
	015EE	Dominican-Republic
	015F	Mexico
	015K	Costa-Rica
	015L	Caribbean
	015M	U.S.-location
	015N	U.S.-location
	015O	Grenada
	015P	U.S.-location
	015Q	U.S.-location
	015R	Trinidad-Tobago
	015S	Dominican-Republic
	015Z	Jamaica
	024D	Belize
	024E	Philippines Panama Ecuador
	024F	Martinique
	024G	Bahamas
	024H	Mexico
	026B	Panama
artisanal-fishery	012B	Haiti
biodeterioration	026G	Argentina
bioproductivity	016D	Egypt Israel
	024A	Chile
	030B	Japan
boundary-dispute	008C	U.S.-location
chemistry	024C	Spain
coastal-biotopes	016F	United-Arab-Emir.

KEYWORD INDEX

Keywords	Proj#	For. Locat.
coastal-development/management	001A	Egypt Israel
	010A	Mauritius
	010B	Israel
	011I	Argentina
	011J	Peru
	011K	China
	011O	Canada
	027B	Indonesia
	029C	Ecuador
	029D	Ecuador
coastal-erosion	024C	Spain
cooperative-marine-programs	001A	Egypt Israel
	003B	Colombia
	015C	Dominican-Republic
	025A	Mexico
	025B	Mexico
	026F	Costa-Rica
	029B	Jordan
	029C	Ecuador
	029D	Ecuador
coral-reefs	015I	Philippines
crops	026E	Egypt
currents	008B	Spain Morrocan-waters Gibraltar-Str-of
	016C	Argentina
desalination	026A	Anguilla Caribbean
educational	003A	India
	003B	Colombia
	011B	Japan Taiwan South-Korea USSR
	011I	Argentina
	011N	U.S.-location
	015BB	Belgium Haiti
	015CC	U.S.-location
	015G	Dominican-Republic

KEYWORD INDEX

Keywords	Proj#	For. Locat.
-----	-----	-----
educational (continued)	015H 015M 015N 015P 015Q 016A 024F 025A 025B 026C 026F	Dominican-Republic U.S.-location U.S.-location U.S.-location U.S.-location Saudi-Arabia Martinique Mexico Mexico Colombia Costa-Rica
environmental-science facility-siting	003B 011D	Colombia Canada
fisheries	001A	Egypt Israel
	002A 002B 011A	Thailand Thailand Indonesia
	011B	Japan Taiwan South-Korea USSR
	011C 011D 011E 011F	Japan Japan U.S.-location Int'l-waters
	011G	Costa-Rica Philippines
	011H 011M 011O 011P	Italy U.S.-location Canada Sweden
	011Q	Poland Nigeria Zaire
	011R	India
	011S	Japan USSR South-Korea Taiwan
	011T 011U 012A 012B	U.S.-location U.S.-location Israel Haiti

KEYWORD INDEX

Keywords	Proj#	For. Locat.
fisheries (continued)		
	015A	Israel Red-Sea
	015B	Panama Philippines
		Belgium Haiti
	015C	U.S.-location
	015D	Mexico
	015E	Spain
	015F	Dominican-Republic
	015G	Mexico
	015H	Philippines
	015I	Israel Egypt Red-Sea
	015K	Costa-Rica
	015L	Caribbean
	015M	U.S.-location
	015N	U.S.-location
	015O	Grenada
	015P	U.S.-location
	015Q	U.S.-location
	015R	Trinidad-Tobago
	015S	Dominican-Republic
	015T	U.S.-location
	015U	Italy
	015V	U.S.-location
	015W	Bali
	015X	Australia
	015Y	England Sweden East-Germany Austria France
	015Z	Jamaica
	016B	So-Atlantic-Ocean Scotia-Sea
	016D	Egypt Israel
	024B	Canada
	024D	Belize
	024E	Philippines Panama Ecuador

KEYWORD INDEX

Keywords	Proj#	For. Locat.
fisheries (continued)		
	024F	Martinique
	024G	Bahamas
	024H	Mexico
	026B	Panama
	026C	Colombia
	026D	Argentina Costa-Rica Ecuador
	027A	Caribbean Mexico
	027B	Indonesia
	029C	Ecuador
	029D	Ecuador
fishery-biology	015A	Israel Red-Sea
	015B	Philippines
fishery-conservation-zone	011B	Japan Taiwan South-Korea USSR
	011E	U.S.-location
	011T	U.S.-location
	011U	U.S.-location
Georges-Bank habitat	008C	U.S.-location
	015I	Philippines
krill	016B	So-Atlantic-Ocean Scotia-Sea
lakes	001A	Egypt Israel
	014A	Arg Austrl Austria Can Chile Fin France W.Germ Guat Hung India Indon Isr Jap Jord Malawi Mex NZ Pan Pol Sweden Switz Tanz Thai Urug USSR Zaire Zambia
limnology	014A	Arg Austrl Austria Can Chile Fin France W.Germ Guat Hung India Indon Isr Jap Jord Malawi Mex NZ Pan Pol Sweden Switz Tanz Thai Urug USSR Zaire Zambia

KEYWORD INDEX

Keywords	Proj#	For. Locat.
living-resources	011L	Guinea-Bissau
mackerel	027A	Caribbean Mexico
mangroves	024E	Philippines Panama Ecuador
	026D	Argentina Costa-Rica Ecuador
mariculture	024E	Philippines Panama Ecuador
	024H	Mexico
	026B	Panama
marine-biology	016F	United-Arab-Emir.
marine-policy	029B	Jordan
marine-recreation	0110	Canada
marine-resources	003B	Colombia
	010C	Comoros-Islands Madagascar Maldives Mauritius Seychelles England Austria
	011L	Guinea-Bissau
	029A	Colombia
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	014A	limnology morphology lakes
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Colombia	0038	educational marine-resources environmental-science cooperative-marine-programs
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Ecuador	024E 026D 029C	fisheries aquaculture mariculture mangroves fisheries mangroves cooperative-marine-programs marine-resources resource-development/management coastal-development/management fisheries tourism
	029D	coastal-development/management marine-resources cooperative-marine-programs resource-development/management tourism fisheries
Egypt	001A 015J 016D 026E	cooperative-marine-programs fisheries aquaculture coastal-management lakes fisheries fisheries bioproductivity crops salinity
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Guatemala	014A	limnology morphology lakes
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Hungary	014A	limnology morphology lakes
India	003A	ports-and-harbors educational
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	014A	limnology morphology lakes
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	012A	fisheries aquaculture
	014A	limnology morphology lakes
	015A	fisheries fishery-biology
	015J	fisheries
	016D	fisheries bioproductivity
	011H	fisheries tourism
	015U	fisheries
Jamaica	015Z	fisheries aquaculture
	011B	fisheries educational fishery-conservation-zone
	011C	fisheries squid
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Maldives	010C	marine-resources resource-development/management
Martinique	024F	fisheries aquaculture educational
Mauritius	010A	coastal-development/management
	010C	marine-resources resource-development/management
Mexico	014A	limnology morphology lakes
	015D	fisheries
	015F	fisheries aquaculture technology-transfer
	016E	turtles-marine
	024H	fisheries aquaculture mariculture
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	015AA	fisheries aquaculture technology-transfer
	024E	fisheries aquaculture mariculture mangroves
	026B	fisheries aquaculture mariculture
Peru	011J	coastal-development/management upwelling
Philippines	011G	fisheries
	015B	fisheries fishery-biology
	015I	fisheries habitat coral-reefs
	024E	fisheries aquaculture mariculture mangroves
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Switzerland	014A	limnology morphology lakes
Taiwan	011B	fisheries educational fishery-conservation-zone
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	011T	fisheries salmon fishery-conservation-zone
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	014A	limnology morphology lakes
	015CC	fisheries educational
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	014A	limnology morphology lakes
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	015CC	Peace Corps Small-scale Marine Fisheries Extension Training Program
	015DD	Fish preservation in tropical countries lacking widespread refrigeration facilities
	015EE	Aquaculture program development for Dominican Republic
	015K	Site visit to Acuacultura, S.A., Costa Rica
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	015M	Informal aquaculture training and technical assistance for persons from Latin America and Africa
	015N	Short course in Macrobrachium culture
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	015E	Study of the red tide problem in northwestern Spanish estuaries
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	012A	Stable Isotope Ratios as Naturally Occurring Tracers in the Aquaculture Food Web
	024H	Mariculture and chemical extraction of commercially valuable red seaweeds from Baja Calif
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	024B	Locations and Temperatures of Pacific Salmon in Western Lake Ontario
	024D	Genetic and demographic assessment of <i>Strombus</i> <i>Gigas</i> and development of an in-shore hatchery and research facility in Belize
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	015F	Technology transfer: laboratory hatchery culture of queen conch, <i>Strombus gigas</i>
	015I	Fish stock assessment in coral reef habitats
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	027A	Racial Studies and Migrational Patterns for King Mackerel
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	026F	Joint Marine Studies Program between Univ of Costa Rica/Univ Delaware
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Marine-policy	029B	US-Jordan Cooperative Marine Science and Policy Program
	029D	Development of a marine resources management scheme for the Galapagos Islands
Marine-studies	011L	Management of Marine Living Resources of the Guinea-Bissau (Africa)
Materials-science	026G	US-Argentina Workshop on Biodegradation
Natural-sciences	026C	Workshop on Taxonomy and Ecology of Crustaceans and Finfish of the Caribbean Sea
Ocean-engineering	003A	Short Course on Small Harbor Engineering in India
	026A	DELBUOY Wave Powered Seawater Desalting Systems for Caribbean Countries
Oceanography	001A	Cooperative Marine Technology Program for the Middle East
	016A	Oceanographic Programs Development with Saudi Arabia
	016B	Antarctic and Sub-antarctic Phytoplankton: relating occurrence of resting spores to krill distribution
	024C	Study of the Nucleation of Calcium Carbonate in Natural Waters

INDEX BY PIs DISCIPLINES

PI Field	Proj#	Proj Title
Physical-oceanography	008B	Acoustics Doppler Current Measurements in the Strait of Gibraltar
	016C	Abyssal Boundary Current Studies
	020A	Joint Analysis of Monex Phase of Global Weather Experiment
	024A	Effects of topographic and wind-reduced upwelling on biological productivity off Chile
	025A	Informational and educational assistance to marine science institutions in Mexico
	025B	Scientific liaison, joint research planning and information exchange amongst Alta, Baja and Gulf of Calif. Marine Scientists
Plant-ecology	026E	Development of crops from Halophytes
Plant-physiology	026E	Development of crops from Halophytes
Political-science	0110	Comparative Coastal Governance for US and Canada in fisheries, ports, water quality, marine recreation, and major facility siting
	029A	Diagnosis of Marine Resources Development in Colombia
Polymer-chemistry	0110	New Chemistry of Chitin
Public-administration	0110	Comparative Coastal Governance for US and Canada in fisheries, ports, water quality, marine recreation, and major facility siting

INDEX BY PIs DISCIPLINES

PI Field	Proj#	Proj Title
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Remote-sensing	0260	Fisheries Related Studies of Mangrove Loss in Central America, and Study of La Plata River and Its Interaction with the Ocean

Guide to the Summaries

These summaries have been condensed from 98 completed questionnaires. In conjunction with the address listing of participating Sea Grant institutions, the summaries offer enough information to allow the reader with further questions or similar research interests to contact directly the principal investigator of each project.

This guide offers an explanation of each entry shown on the summaries:

<u>Project number</u>	At the onset of the inventory each Sea Grant institution was assigned a number and each questionnaire, as it was received, was given a letter to follow that number. Thus the sequence of project numbers shows some gaps where a Sea Grant institution did not have applicable projects or did not respond to the inventory.
<u>Institution</u>	This indicates the institution, and in some instances the specific department, of the principal investigator, and indicates the institution that submitted the completed questionnaire. An address listing for the participating institutions follows this guide.
<u>Proj. Title</u>	As indicated by preparer of the questionnaire.
<u>Foreign Location</u>	As indicated by preparer of the questionnaire.
<u>Funding</u>	As indicated by preparer of the questionnaire.
<u>Keywords</u>	Assigned to the project by WHOI Sea Grant, based on project title and description.
<u>Proj. Dates</u>	As indicated by preparer of the questionnaire.
<u>PI Name</u>	As indicated by preparer of the questionnaire; where multiple names appear, home institution appears in parentheses if different from institution that submitted completed questionnaire.
<u>PI Field</u>	As indicated by preparer of the questionnaire; where multiple PIs are listed above, disciplines are separated as are PIs by a slash.
<u>US Agencies</u>	As indicated by preparer of the questionnaire; this category specifically applies to <u>U.S. government</u> agencies, federal or state level.

<u>US Institutions</u>	As indicated by preparer of the questionnaire; this category applies to <u>U.S. academic</u> and <u>industrial</u> organizations.
<u>Foreign Agencies</u>	As indicated by preparer of the questionnaire; this category covers <u>foreign government</u> agencies and departments on national and regional levels; unless otherwise indicated, all agencies listed are in the country specified under "Foreign Location." Included on the full questionnaire were names of contacts within specific agencies and departments.
<u>Foreign Institutions</u>	As indicated by preparer of the questionnaire; this category lists <u>foreign academic</u> and <u>industrial</u> organizations; unless otherwise indicated, all institutions listed are in the country specified under "Foreign Location." Again, included on the full questionnaire were names of scientists and affiliations within specific organizations.
<u>Project Description</u>	As indicated by preparer of the questionnaire; some descriptions were shortened due to space constraints.
<u>Assessment</u>	Excerpted from full questionnaire; this section identifies problems the PI encountered working with or in particular countries, and sometimes offers advice on the mechanisms for dealing with those problems.

Proj#: 001A Inst: New Jersey Marine Sciences Consortium

Proj Title: Cooperative marine technology program
for the Middle East

For. Locat: Egypt
 Israel

Funding: US AID

Keywords: cooperative marine programs
fisheries lakes
aquaculture
coastal development/management

Proj Dates: 1981-ongoing

PI Name: Robert B Abel (NJ)/ Sayed Z El-Sayed (Texas A&M)

PI Field: Oceanography/ Oceanography

US Agencies: US AID

US Insts: Auburn Univ, Bigelow Laboratory for Ocean Sciences,
Louisiana State Univ, Scripps Institute for Oceanography,
Texas A&M Univ, Texas Christian, MIT, Univ of Michigan

For. Agencies: Egypt: Ministry of Education
 Ministry of Science
 Ministry of Agriculture
 Israel: Ministry of Energy & Infrastructure

For. Insts: Egypt: Coastal Research Inst., Alexandria Univ.,
Acad of Scientific Research & Technology, Inst. of Oceanography
& Fisheries, Nutrition Inst.

Israel: Kinneret Limnological Lab, Israel Oceanographic &
Limnological Research Ltd., Hebrew Univ., Bar Elain Univ.

Proj. Description: Egyptian, Israeli, and American scientists
collaborate on projects related to fisheries,
aquaculture, lakes management and shore processes

Assessment: Satisfactory project, only caution is to exercise care
in writing proposals.

Proj#: 002A Inst: Univ of Michigan

Proj Title: Collaborative research support for Thailand's aquaculture systems

For, Locat: Thailand

Funding: US AID

Keywords: fisheries
aquaculture

Proj Dates: 1982-87

PI Name: James A Diana/ Karl Lager

PI Field: Fisheries/ Fisheries

US Agencies: US AID

US Insts: Oregon State Univ
Auburn Univ
Univ of California/Davis

For, Agencies: Thailand: Fisheries Dept
Ministry of Agriculture and Cooperatives

For, Insts:

Proj. Description: This is one of six parallel collaborative research support projects in pond dynamics being carried out in developing countries to determine the mechanisms that regulate the productivity of tropical pond aquaculture systems.

Assessment: Would have requested a better understanding concerning the requirements of the AID subcontract.

Proj#: 002B Inst: Univ of Michigan

Proj Title: Strengthening Southeast Asian
aquaculture institutions

For. Locat: Thailand

Funding: US AID

Keywords: fisheries
 aquaculture

Proj Dates: 1982-83

PI Name: James S Diana/ Karl F Lagler

PI Field: Fisheries/ Fisheries

US Agencies: US AID

US Insts:

For. Agencies:

For. Insts: Kasetsart Univ

Proj. Description: To identify the principal technical deterrents to current aquaculture production and earnings in Thailand; to devise the means for reducing these deterrents; while so doing, to establish priorities and improve the research and teaching capabilities of the involved institutions; to expand the application of the experience and findings to other institutions and to practicing aquaculturists of the region through publication and inputs to extension services; and where practicable, to intensify the use of models as tools in teaching and in research planning.

Assessment: Satisfactory, but be certain that a clear understanding exists as to what exactly will be contributed by the Thais.

Proj#: 003A Inst: Univ of Florida/Sea Grant Program
Proj Title: Short course on small harbor engineering in India

For. Locat: India

Funding: Sea Grant and Univ of Florida
Indian Institute of Technology

Keywords: ports and harbors
educational

Proj Dates: 1979-80

PI Name: A.J. Mehta (Indian Institute of Technology)

PI Field: Oceanographic & Chemical Engineering and Material A

US Agencies: Sea Grant Program

US Insts: Univ of California/Berkeley

For Agencies: Central Water & Power Research Station, H. M. S. T.

For. Insts: Indian Institute of Technology
Dredging Corp. of India
Karnataka Regional Engineering College
National Institute of Oceanography

Proj. Description: 10-day course conducted at Indian Inst. of Technology (Bombay) Jan. 1980. Objectives were to provide summary of latest technology available in coastal/harbor engineering design practice, to provide a forum for exchange of scientific know-how among Indian and non-Indian experts; and initiate such a forum for the first time, thus giving impetus to future forums of similar nature. As a result of this program, a rapport has been established between Univ of Florida, the Indian Inst. of Technology, the Univ of California/Berkeley, Norwegian Inst. of Tech., and School of Engineering, Univ of Thessaloniki-Greece.

Assessment:

Proj#: 003B Inst: University of Miami/Rosenstiel School of
Marine and Atmospheric Science
Proj Title: Marine resources and environmental sciences training
and information exchange program for Colombia

For, Locat: Colombia

Funding: Univ. of Miami
Sea Grant (Florida)

Keywords: educational
marine resources
environmental science
cooperative marine programs

Proj Dates: 1978-82

PI Name: Francis Williams

PI Field: Biology

US Agencies: Sea Grant--International Programs

US Insts:

For Agencies: Colombian Oceanographic Commission; Colombian Navy (Oceanographic and Hydrographic Research Center); Ministry of Agriculture (Institute for Dev. of Renewable Resources); Director-General of Ports and Harbors; Canal del Dique Commission; Government of Bolívar State; COLCIENCIAS

For. Insts: Univ of Cartagena, Univ of Bogota,
Univ of Los Andes, National University
Technical Research Center (Bogota)

Proj. Description: Training program to enhance capability of Colombian scientists and technicians to deal with resources and environmental problems of the coastal zone. Specifically, provided two-week training course on principles of multidisciplinary marine resources and environmental studies of tropical coastal areas; provided on-the-job training in the design, planning, executing and coordinating of field and laboratory programs to provide data bases necessary for development of management plans for coastal environment resources, through an integrated study of Cartagena Bay.

Assessment: Pre-project planning grant would have been useful; need to appreciate paucity of equipment in Colombia, including boats, for research. Enthusiastic group of young staff and students in most universities and organizations.

Proj#: 008A Inst: Univ of New Hampshire

Proj Title: Trace metals in sediments of hypersaline
marine environments

For. Locat: Israel

Funding: National Science Foundation--Earth Sciences

Keywords: salinity
 sediments

Proj Dates: 1979-81

PI Name: H.E. Gaudette/ W.B. Lyons

PI Field: Geochemistry/ Geochemistry

US Agencies: NSF-Earth-Sciences

US Insts:

For. Agencies:

For. Insts: Hebrew University
 Tel Aviv University

Proj. Description: To test hypothesis that trace metals are
 accumulating in coastal marine sabkha sediments.

Assessment: Make earlier contact with foreign scientists.
 Customs was an expensive pain in the butt.

Proj#: 0088 Inst: Univ of New Hampshire
Proj Title: Acoustics Doppler current measurements
 in the Strait of Gibraltar

For. Locat: Spain
 Strait of Gibraltar

Funding: Office of Naval Research

Keywords: oceanography
 currents

Proj Dates: 1984-87

PI Name: Neal R Pettigrew/ James D Irish

PI Field: Physical Oceanography/ Physical Oceanography

US Agencies: Office of Naval Research
 US Navy
 US Air Force

US Insts: Woods Hole Oceanographic Institution

For. Agencies: Instituto Hidrografico de la Marina (Cadiz, Spain)

For. Insts:

Proj. Description: 13-month, fixed point measurements (5 locations)
 of velocity profiles, and bottom pressure and
 temperature in the Strait of Gibraltar. Principal
 goals include determination of mean transport and
 variability in both Atlantic and Mediterranean
 layers, and role of meteorological forcing.

Assessment: Speak Spanish and include Spanish collaboration

Proj#: 008C Inst: Univ of Maine

Proj Title: Economic aspects of US/Canadian boundary dispute in the Gulf of Maine and Georges Bank

For. Locat: U.S. location

Funding: U.S. State Department

Keywords: Georges Bank
boundary dispute

Proj Dates: 1982-84

PI Name: James Wilson

PI Field: Economics

US Agencies: U.S. State Department

US Insts: Boston University
MIT (Cambridge Systems)
Columbia University
Princeton University

For. Agencies:

For. Insts:

Proj. Description: Preparation and analysis of materials for U.S.
case before the World Court.

Assessment:

Proj#: 010A Inst: South Carolina Sea Grant Consortium

Proj Title: Workshop for coastal and marine management,
protection and development in East Africa
and the Indian Ocean

For. Locat: Mauritius

Funding: International Union for Conservation of Nature and
Natural Resources (IUCN)
National Science Foundation
UN-Environment Programme

Keywords: coastal development/management

Proj Dates: 1983-85

PI Name: Donald L Sparks

PI Field: Economics

US Agencies: National Science Foundation--Office of International
Programs

US Insts:

For. Agencies: IUCN
UN Environmental Programme

For. Insts: Univ of Mauritius

Proj. Description: To bring together scientists and administrators
from the East African and Indian Ocean region to
review recent research on protected systems and
species; to devise a regional strategy for
coastal and marine management; and to devise a
country-specific model for coastal and marine
management.

Assessment: Satisfactory project. A formal planning committee
should have been established.
Mauritius is an easy country to work in, and the
University is very helpful. Major problem is distance
and the time lag between communications is long.

Proj#: 010B Inst: South Carolina Sea Grant Consortium
Proj Title: Improvement and application of ocean wave data
 acquisition and modeling techniques for the facilitation
 of coastal zone decisions in Israel and the U.S.
For. Locat: Israel

Funding: Sea Grant-International Program

Keywords: oceanography
 coastal development/management

Proj Dates: 1978-81

PI Name: Dr. Victor Goldsmith

PI Field: Geology

US Agencies: US-AID

US Insts: Virginia Institute of Marine Science

For. Agencies: Israel Port Authority

For. Insts: Ben Gurion Univ
 Technion University Coastal/Marine
 Engineering Institute

Proj. Description: General objective of project was to strengthen
 the marine research and development capabilities
 of Israel as well as those capabilities within
 the South Carolina Sea Grant Consortium.

Assessment:

Proj#: 010C Inst: South Carolina Sea Grant Consortium

Proj Title: Western Indian Ocean island states: Problems and prospects for utilizing marine resources as a base for industrial development

For. Locat: Austria Comoros Islands England
Madagascar Maldives Mauritius Seychelles

Funding: UNIDO (U.N. Industrial Development Organization)

Keywords: marine resources
resource development and management

Proj Dates: 1984-85

PI Name: Dr. Donald L Sparks

PI Field: Economics

US Agencies:

US Insts:

For. Agencies: UNIDO

Maldives: various ministries

Mauritius: various ministries

Seychelles: various ministries

For. Insts:

Proj. Description: An examination of the use of marine resources in the Comoros, Madagascar, the Maldives, Mauritius, and the Seychelles.

Assessment: Thus far, successful; project not yet completed.

Proj#: 011A Inst: Univ of Washington/School of Fisheries

Proj Title: Aquatic resources development at Ambon, Indonesia

For. Locat: Indonesia

Funding: US AID

Keywords: fisheries
aquaculture
resource development/management

Proj Dates: 1979-84

PI Name: Lynwood S Smith

PI Field: Institutional Development and Fish Physiology

US Agencies: US AID

US Insts: Univ of Guam

For. Agencies: Indonesia: Ministry of Education
Ministry of Research & Technology
National Institute of Sciences
National Institute of Oceanology

For. Insts: Pattimura Univ

Proj. Description: Development of facilities and programs (including training of faculty and staff) of Pattimura Univ. and the National Oceanology Institute in fisheries and other aquatic sciences. Activities included establishment of an aquaculture lab, a marine science library, computerization of oceanographic data logging, analysis of water circulation in Ambon Bay, demonstration of culture of oysters and shrimp, expansion of the fisheries and food science curricula, train 3 Indonesian faculty to the MS level, several short-term training projects.

Assessment: High frustration level here. Encountered negative actions by the foreign university contact since national government forced the university to accept the project.

"Indonesians are status-oriented, Americans are achievement oriented"--that philosophy must be understood to work in Indonesia. Cross-cultural sensitivity absolutely required. US project members were excluded from broader scope planning by Indonesians. Contract should have included preliminary phase for collaborative planning.

For, Locat: Japan
South Korea
Taiwan
USSR

Funding: National Marine Fisheries Service (NMFS)-NOAA

Keywords: fisheries
educational
fishery conservation zone

Proj Dates: 1976-ongoing

PI Name: Roy E Nakatani

PI Field: Fisheries

US Agencies: NMFS
US Coast Guard

US Insts: Sea Grant Colleges

For Agencies: NMES-contacts

For, Insts:

Proj. Description: The Fisheries Research Institute provided each fiscal year since 1976 a number of qualified fishery biologists (75-233 observers per year) to serve aboard foreign fishing vessels to observe and record biological data required by NMFS for the management and protection of our valuable living resources (fisheries) within U.S. 200-mile fishery conservation zone in accordance with the Magnuson Fishery Conservation and Management Act.

Assessment: Successfully continuing since 1976.

For. Locat: Japan

Funding: State of Alaska
Alaskan fishing cooperatives, associations and unions

Keywords: fisheries
squid

Proj Dates: 1982-83

PI Name: Robert L. Burgner

PI Field: Fisheries

US Agencies: State of Alaska

**US Insts: North Pacific Fishery Management Council
Pacific Seafood Processors Association**

For Agencies:

For Insts: Hokusen-Gyogyo-Co (Japanese fishing company)
National Common Squid Drift Fishery Association

Proj. Description: A fisheries observer was placed aboard a Japanese driftnet vessel fishing for flying squid (*Onomastropes bartrami*) to record fishery operation, sea surface temperatures and incidental catches of fish species, including salmon.

Assessment:

For. Locat: Japan

Funding: National Marine Fisheries Service (NMFS)-NOAA

Keywords: fisheries
whaling

Proj Dates: 1983-85

PI Name: Roy E Nakatani

PI Field: Fisheries

US Agencies: National Marine Mammal Laboratory (NMFS)
U.S. State Department (Tokyo Embassy)

US Insts:

For Agencies:

For, Insts:

Proj. Description: The Fisheries Research Institute recruited, screened and provided two biologists who spoke Japanese to serve as US observers at some five landbased whaling stations in Japan. The observers monitored the take of sperm whales (Jan.-March) and the take of Bryde's whales (April-August) by the Japanese whaling industry for compliance with the International Whaling Commission's (IWC) regulations. At the end of each whaling season, the observer submitted a report to the Secretary of the IWC.

Assessment:

For Locat: U.S. location

Funding: North Pacific Fishery Management Council

Keywords: *fisheries*
fishery conservation zone
salmon

Proj Dates: 1981-83

PI Name: Ronald E Rogers

PI Field: Fisheries

US Agencies: NMFS US Fish & Wildlife Service
California Dept Fish & Game Alaska Dept of Fish & Game
Washington Dept of Fisheries
Oregon Dept Fish & Wildlife
North Pacific Fishery Management Council

US Insts:

For Agencies: Japanese Fishery Agency
USSR's Pacific Scientific Research Institute
of Fisheries
Canadian Dept of Fisheries and Oceans

For, Insts:

Proj. Description: Project has involved use of scale pattern analysis techniques to determine stock origins of chinook salmon caught by foreign fisheries in the Bering Sea and North Pacific Ocean.

Assessment: Room for improvement in quality and quantity of scale samples collected by US and foreign fisheries agencies.

Proj#: 011F Inst: Univ. of Washington
College of Ocean and Fisheries Science
Proj Title: Monitoring migrations and origins of
Salmonids in offshore waters in North Pacific

For. Locat: Sampling in international waters, seaward of U.S. EEZ
also attendance at meetings of International North
Pacific Fisheries Commission and US-USSR Bilateral Talks
on Fisheries Assessments

Funding: National Marine Fisheries Service (NMFS)-NOAA

Keywords: fisheries

Proj Dates: 1978-85

PI Name: Robert L Burgner

PI Field: Fisheries

US Agencies: NMFS-NOAA

US Insts: Alaska Dept of Fish & Game

For. Agencies: Japan Fisheries Agency
(in Ministry of Forestry and Fisheries)
Pacific Biological Station
(in Canadian Dept. of Fish & Oceans)
Pacific Scientific Research Institute of
Fisheries and Oceanography
(TINRO, in USSR Ministry of Fisheries)

For. Insts: International North Pacific Fisheries Commission

Proj. Description: To determine the distributions and migratory patterns of regional salmonid stocks in the central and western North Pacific Ocean and Bering Sea; pursuant to the research needs of the International North Pacific Fisheries Commission. This project also aims to provide information on ocean life history of salmonids useful in forecasting sizes of inshore runs, assessing the impact of high seas fisheries on various regional salmonid stocks, and elucidating aspects of salmonid marine growth and maturity.

Assessment: Diplomacy and patience of utmost importance

Proj# 0110 Inst: Univ of Washington/
Ctr for Quantitative Science
Proj Title: Management of multispecies fisheries
in tropical regions

For. Locat: Costa Rica
Philippines

Funding: US AID (proposal pending)

Keywords: fisheries

Proj Dates: 1985-90

PI Name: Vincent Gallucci/ R. Thorne/ D. Gunderson

PI Fields: Artisanal Fisheries/ Hydroacoustics/ Fisheries Science

US Agencies: US AID

US Insts: Univ of Rhode Island
Univ of Maryland
Univ of Washington

For. Agencies:

For. Insts:

Proj. Description: To devise management methods and rationale to deal with tropical fisheries that have as many as 100 species. Fisheries, with animals, many of whom cannot be effectively aged, unknown spawning seasons, and for whom spawning season stretches over extended parts of the year.

Assessment:

Proj#: 011H Inst: Univ of Washington/
Ctr for Quantitative Science
Proj Title: Management of multispecies fisheries on
Mediterranean Islands in early stages of
tourist industry development

For, Locati: Italy

Funding: UNESCO
Italian government

Keywords: fisheries
tourism

Proj Dates: 1986-88

PI Name: Vincent Gallucci (Washington)/ Orazio Rossi (Italy)

PI Field: Fisheries/ Artisanal Fisheries

US Agencies

US Insts:

For Agencies: UNESCO
National Research Division (CNR-Italy)
Ministry of Fisheries (Italy)

For, Insts:

Proj. Description: The volcanic islands to the north of Sicily and in the Mediterranean Sea are being used as a project representative of many of the small island groups in the Mediterranean, all of whom are subject to the development of the tourist industry. The concomitant reduction in quality of the aquatic environment is a concern, both from the viewpoint of maintaining the tourist industry and also from the viewpoint of quality of life for the traditional inhabitants of these islands. UNESCO, representing both North Africa and some of the European nations, is concerned about this short scale degrading of the environments.

Assessments:

Proj#: 0111 Inst: Univ of Washington/
Ctr for Quantitative Science
Proj Title: Training and development of coastal resource
managers in Argentina

For, Locat: Argentina

Funding: (project in proposal stage; no funding yet)

Keywords: coastal development/management
resource development/management
educational

Proj Dates: 1985-87

PI Name: Vincent Gallucci

PI Field: Fisheries

US Agencies:

US Insts:

For Agencies: Argentine National Research Council

For, Insts:

Proj. Description: The artisanal fisheries in coastal areas of Argentina are highly productive, play a central role in the generation of revenue for fishermen and fishing communities, and supply important food to the Argentine population (and in some cases are an important source of export revenue). This project is directed at enhancing the ability of managers to regulate and develop coastal marine resources.

Assessment:

Proj# : 011J Inst: Univ of Washington/
Ctr for Quantitative Science
Proj Title: Managing coastal resources of upwelling
areas in Peru

For, Locati: Peru

Funding: US AID

Keywords: coastal development/management
upwelling

Proj Dates: 1985-87

PI Name: J. Tarazona (Peru)/ Vincent Gallucci (Univ Washington)

PI Field: Biology/ Artisanal Fisheries

US Agencies: US AID

US Insts:

For Agencies:

For. Inst. University of San Marcos (Lima, Peru)

Proj. Description: The upwelling areas of Peru are known for their high biological productivity under normal circumstances. However, during periods of extreme El Niños when upwelling processes and strengths are greatly diminished, productivity for most of the resources drops tremendously with changes in oceanographic properties. This project will identify those resources which do not decline, try to determine why they do not, and examine the linkages in the food chain with those that do decline catastrophically.

Assessment:

Proj#: 011K Inst: Univ of Washington/
Ctr for Quantitative Science
Proj Title: Demonstration biomathematical project to model
dynamics of a small bay in Northern China

For, Locat: China

Funding: UNESCO

Keywords: coastal development/management

Proj Dates: 1985-86

PI Name: Vincent Gallucci/ Wu, Bay Line

PI Field: Aquatic Resource Management/ Biology

US Agencies: Sea Grant Program US AID

US Insts.

For Agencies: UNESCO

For. Insts: National Bureau of Oceanology (China)
Academia Sinica

Proj. Description: This project is based upon a Sea Grant project made in Garrison Bay in the San Juan Islands of Washington State. The Chinese are interested in the development of a similar project as a demonstration to show what the mathematical and biological approaches can provide when carefully integrated. The site for the project in China was Jiao Zhou Bay, a polluted bay near Qingdao.

Assessment: UNESCO brought Chinese scientist to US to study with US scientist on the agreement that same US scientist would go to China.

Proj#: 0111 Inst: Univ of Washington/
Institute for Marine Studies
Proj Title: Management of marine living resources of
the Guinea-Bissau, Africa

For. Locat: Guinea Bissau

Funding: World Bank--Technical Assistance Fund

Keywords: marine resources
living resources
resource development/management

Proj Dates: 1984-ongoing

PI Name: Vladimir Kaczynski

PI Field: Marine Resource Economics

US Agencies: US AID
U.S. State Dept (Bissau Embassy)

US Insts:

For. Agencies: World Bank--Technical Assistance Fund
Dept of Agriculture (Guinea-Bissau)
State Secretariat for Fisheries

For. Insts:

Proj. Description: Identify main problems, offer recommendations for improvement of the marine resource policy and management in Guinea-Bissau. Advise in formulation of international fishery policy of the government, particularly in relation to license fishing, joint ventures, exports and fishfood pricing policy.

Assessment: Satisfactory, but there is a strong need for training of enforcement officers, observers, fishery specialists, market specialists, fishery administrators, overall need for skilled managers-partners with whom to work.

Proj#: 011M Inst: Univ of Washington Sea Grant Program/
Washington Dept. of Natural Resources
Proj Title: Nori seaweed aquaculture: technology transfer
from Japan to Washington State

For Locat: U.S. location

Funding: Sea Grant Program (Washington)
Washington Dept. of Natural Resources
Northwest Regional Commission

Keywords: fisheries
aquaculture
technology transfer

Proj Dates: 1980-ongoing

PI Name: Thomas F Mumford, Jr

PI Field: Algolquist

US Agencies: US Dept of Labor
Sea Grant Program

US Insts: Northwest Regional Commission
Washington Dept of Natural Resources

For Agencies:

For. Insts: Zen-nori Gyoren
(National Federation of Shellfisheries Cooperative
Association)

Proj. Description: Technology transfer of Nori aquaculture technology from Japan to Washington State.

Assessment: Not satisfactory--no nori industry yet started in Washington; would change emphasis on project to marketing, economics and financing.

Proj#: 011N

Inst: Univ of Washington

Proj Title: Foreign scientists as visiting lecturers
and resulting publications

For. Locat: U.S. location

Funding: Sea Grant (Washington)

Keywords: educational
whaling
seals
salmon

Proj Dates: 1970-ongoing

PI Name: Patricia Peyton

PI Field: Sea Grant Communications

US Agencies: Sea Grant (Washington)

US Insts:

For. Agencies:

For. Insts: International Whaling Commission
British Antarctic Survey
Univ of British Columbia

Proj. Description: Organized to publish results of projects supported by Washington Sea Grant, including two lecture series (in living marine resources and in marine policy) which have involved foreign scientists as lecturers. Some publications are:
K. Radway Allian--of International Whaling Commission, "Conservation and Management of Whales"
W. Nigel Bonner--of British Antarctic Survey, "Seals and Man: A Study of Interactions"
Peter Larkin--of Univ of British Columbia, "Pacific Salmon: Scenarios for the Future"

Assessment:

Proj#: 0110 Inst: Univ of Washington/Dept. of Public Affairs

Proj Title: Comparative coastal governance for U.S.
and Canada

For. Locat: Canada

Funding: Sea Grant (Washington)
Social Science and Humanities Research Council of Canada

Keywords: coastal development/management
ports and harbors water quality
fisheries marine recreation
facility siting

Proj Dates: 1981-ongoing

PI Name: R.L. Bish/ M.H. Sprout-Jones (McMaster Univ.)

PI Field: Economics and Public Administration/ Political-Science

US Agencies: Sea Grant (Washington)
Various agencies in project areas

US Insts:

For. Agencies: Canadian Fisheries, Transportation (Coast Guard)
Ports, and Environmental agencies

For. Insts: Univ of Victoria (British Columbia)
Social Science and Humanities Research Council of Canada

Proj. Description: Comparison of legal structures and governing
processes for United States and Canada
(Washington State and British Columbia) for
fisheries, ports, water quality, marine
recreation and major facility siting.

Assessment: Mixed results; formal research design could not be
followed due to changes in institutions and environment.
Advise squeezing research into shorter time period so
that fewer changes will invalidate comparative research
designs. Canadian-U.S. work has been very easy with
full cooperation from government agencies.

Proj#: 011P Inst: Northwest and Alaska Fisheries Center

Proj Title: Publication of Sea Grant lecture series on
population genetics and its application
to fishery management

For. Locat: U.S. location

Funding: Sea Grant (Washington)
Northwest and Alaska Fisheries Center (NWAFC)
Univ of Stockholm

Keywords: fisheries

Proj Dates: 1982-85

PI Name: Fred Utter (NWAFC)/ Nils Ryman (Univ. Stockholm)

PI Field: Genetics/ Genetics

US Agencies: Sea Grant (Washington)
National Marine Fisheries Service
Northwest & Alaska Fisheries Center

US Insts: Univ of Washington Univ of Texas Univ of Montana
Washington State Univ Univ of California

For. Agencies:

For. Insts: USSR Academy of Science
Department of Genetics, Univ of Stockholm

Proj. Description: Co-editing of book resulting from Sea Grant
lectures given by Nils Ryman at Univ of
Washington in the fall of 1982.

Assessment: Opening of network, further interactions likely.

Proj#: 0110 Inst: Univ of Washington
(Contact: Prof. G.G. Allan)
Proj Title: New chemistry of chitin

For. Locat: Poland

Funding: Sea Grant (Washington)

Keywords: fisheries

Proj Dates: 1980-ongoing

PI Name: Bogumil Laskiewicz/ Jacek Dutkiewicz/ Henryk Struszczyk

PI Field: Polymer Chemistry

US Agencies: Sea Grant (Washington)

US Insts:

For. Agencies:

For. Insts: Univ of Jos (Nigeria)
 Univ of Lumumbashi (Zaire)
 Univ of Lodz (Poland)

Proj. Description: Three PIs each spent time at the Univ. of Washington, studying chemistry of chitin and chitosan. Laskiewicz now at Univ of Jos, Nigeria; Dutkiewicz just returned to Poland from Univ of Lumumbashi, Zaire; Struszczyk presently at Univ of Lodz, Poland.

Assessment: Try to set up more formal cooperation with foreign institutions; request visas well in advance of projected arrival.

Proj#: 011R Inst: Univ of Washington
(Contact: Prof. G.G. Allan)
Proj Title: Isolation of chitin from Bengali shellfish waste

For, Locat: India

**Funding: Sea Grant (Washington)
State of Washington**

Keywords: fisheries

Proj Dates: 1984-86

PI Name: Kalyan Sen of Indian Chemical Manufacturers Assoc.

PI Field: Chemistry

US Agencies: Sea Grant (Washington)
State of Washington

US Insts:

For Agencies:

For. Insts: Indian Chemical Manufacturers Assoc.
Indian Chamber of Commerce

Proj. Description: Investigated sources of shellfish waste in Bengal; processed to yield chitin and sent samples to Univ. of Washington for evaluation.

Assessment: Project in preliminary stages; try to bring in US industry at earlier stage; have face-to-face meetings when dealing with Indian colleagues.

Proj#: 0115

Inst: Univ of Washington/School of Fisheries

Proj Title: Various foreign scientific bilateral fishery meetings

For. Locat: Japan
South Korea
Taiwan
USSR

Funding: --

Keywords: fisheries

Proj Dates: ongoing

PI Name: Donald E Bevan/ Rogers/ Harris

PI Field: Fishery Biology/ Fishery Biology/ Fishery Biology

US Agencies: National Marine Fisheries Service

US Insts:

For. Agencies: Japan Fishery Agency
USSR-TINRO in Ministry of Fisheries
USSR-VINRO

For. Insts:

Proj. Description:

Assessment:

For, Locat: U.S. location

Funding: Alaska Dept. Fish and Game

Keywords: *fisheries*
fishery conservation zone
salmon

Proj Dates: 1981-84

PI Name: Donald E Rogers

PI Field: Fisheries

US Agencies: NMFS US Fish & Wildlife Service
California Dept Fish & Game Alaska Dept of Fish & Game
Wash. Dept of Fisheries Oregon Dept Fish & Wildlife
North Pacific Fishery Management Council

US Insts:

For Agencies: Japanese Fishery Agency
USSR's Pacific Scientific Research Institute
of Fisheries
Canadian Dept of Fisheries and Oceans

For, Insta:

Proj. Description: Project has involved use of scale pattern analysis techniques to determine stock origins of chinook salmon caught by foreign fisheries in the Bering Sea and North Pacific Ocean.

Assessment: Room for improvement in quality and quantity of scale samples collected by US and foreign fisheries agencies.

For. Locat: U.S. location

Funding: North Pacific Fishery Management Council

Keywords: *fisheries*
 fishery conservation zone
 salmon

Proj. Dates: 1984-85

PI Name: Donald E Rogers

PI Field: Fisheries

US Agencies: NMFS US Fish & Wildlife Service
California Dept Fish & Game Alaska Dept of Fish & Game
Wash. Dept of Fisheries Oregon Dept Fish & Wildlife
North Pacific Fishery Management Council

US Insts:

For Agencies: Japanese Fishery Agency
USSR's Pacific Scientific Research Institute
of Fisheries
Canadian Dept of Fisheries and Oceans

For. Insts:

Proj. Description: Project has involved use of scale pattern analysis techniques to determine stock origins of chinook salmon caught by foreign fisheries in the Bering Sea and North Pacific Ocean.

Assessment: Given the chance to repeat the project, would seek improvements in quality and quantity of scale samples collected by both U.S. and foreign fisheries agencies.

Proj#: 012A Inst: Illinois Natural History Survey

Proj Title: Stable isotope ratios as naturally occurring
tracers in the Aquaculture food web

For. Locat: Israel

Funding: US Dept. of Agriculture
Ministry of Agriculture (Israel)

Keywords: fisheries
aquaculture

Proj Dates: 1983-85

PI Name: David Homer Buck (Illinois)/ Gerald L Schroeder (Israel)

PI Field: Aquatic-Biology/ Nuclear Geophysics & Oceanography

US Agencies: US Dept. of Agriculture

US Insts:

For. Agencies: Ministry of Agriculture (Israel)

For. Insts: Agricultural Research Organization (Israel)

Proj. Description: Experimental environments are established to demonstrate the usefulness of the ratios of the natural isotopes of carbon (13C/12C) as a tool for studying the aquatic food web in aquaculture ponds, for measuring actual contributions of available foods to growth of the cultured organisms.

Assessment: Satisfactory in demonstrating the use of the technology in question, but have not met expectations with regard to effectiveness in exploiting the technology. Recommend closer coordination between projects in US and Israel.

Proj#: 012B

Inst: So Illinois Univ at Carbondale/Sea Grant

Proj Title: Assessment of artisanal fishery of La Gonave, Haiti
and small-scale aquaculture development

For. Locat: Haiti

Funding: International Aid Inc (US)
West Indies Self Help (Haiti)

Keywords: fisheries
aquaculture
artisanal-fishery

Proj Dates: 1982-85

PI Name: Christopher C Kohler

PI Field: Fisheries

US Agencies:

US Insts: International Aid Inc.

For. Agencies:

For. Insts: West Indies Self Help

Proj. Description: Developed an appropriate technology for culturing fish in Haiti, and facilitated adoption of this aquaculture system by the indigenous poor. The marine fisheries aspects of the project include surveying the methodology, catch composition and catch per unit of effort of the native fishery; developing habitat evaluation of coastal waters; assessing fish stocks not currently being exploited; and composing appropriate gear types for possible introduction to the fishery. Aquaculture component focuses on rearing of tilapia with local fish feed ingredients and fertilizer sources being identified.

Assessment: Impossible to work with local government (Haiti). Best to work with private voluntary organizations.

Proj#: 014A Inst: Ohio State University/Ohio Sea Grant

Proj Title: Inventory of morphometric and limnologic characteristics of the large lakes of the world

For. Locat: Argentina Australia Austria Canada Chile Finland France West Germany Guatemala Hungary India Indonesia Israel Japan Jordan Malawi Mexico New Zealand Panama Poland Sweden Switzerland Tanzania Thailand Uruguay USSR Zaire Zambia

Funding: Sea Grant Program

Keywords: Lakes
Limnology
morphology

Proj Dates: 1982-86

PI Name: Charles E Herdendorf/ Sirinimit Boonyuen

PI Field: Limnology/ Limnology

US Agencies: US Geological Survey Office of International Hydrology
Sea Grant

US Insts: numerous (see project publication with same title as project)

For. Agencies: numerous (see project publication with same title as project)

For. Insts: numerous (see project publication with same title as project)

Proj. Description: An inventory of the distribution, origin, morphometry, limnologic characteristics of the world's large lakes. The inventory includes all lakes (253), both fresh and salt, with surface areas greater than 500 Kilometers squared.

Assessments: Would attempt to gather a more complete data base, given the chance to repeat the project.

Proj#: 015A Inst: Univ of Puerto Rico

Proj Title: Initiation and control of sex reversal in coral reef fish

For. Locat: Israel
Red Sea

Funding: National Science Foundation
National Geographic Society

Keywords: fisheries
fishery biology

Proj Dates: 1978-85

PI Name: Douglas Y Shapiro

PI Field: Fish behavior, ecology and population structure

US Agencies: National Science Foundation

US Insts: National Geographic Society

For. Agencies: Nature Reserve Authority (Israel)
Ministry of the Interior (Israel)

For. Insts: Hebrew Univ
Tel Aviv Univ

Proj. Description: Part 1: field study examined three hypotheses concerning the behavioral induction of adult female-to-male sex reversal in a hermaphroditic coral reef fish.
Part 2: study the genetic relatedness of fish living in the same social group.

Assessment: Satisfactory; spend more time in the field.

Proj#: 01544 Inst: Univ of Puerto Rico

Proj Title: Fish stock exchange, aquaculture related
site visits and technical assistance in Panama

For. Locat: Panama

Funding: US AID Title XII
Univ of Puerto Rico

Keywords: fisheries
aquaculture
technology-transfer

Proj Dates: 1980

PI Name: Andrew S McGinty

PI Field: Aquaculture

US Agencies: US-AID

US Insts:

For. Agencies: Ministry of Aquatic Resources Development (Panama)

For. Insts:

Proj. Description: 1. Exchange fish stocks for future aquaculture research.
2. Make site visits to learn the state of the art of aquaculture in Panama and offer technical assistance.
3. Contact AID Mission and other assistance for aquaculture project.

Assessment:

Proj#: 015B

Inst: Univ of Puerto Rico

Proj Title: Social control of sex reversal in hermaphroditic fish

For. Locat: Philippines

Funding: National Institute of Mental Health

Keywords: fisheries
fishery biology

Proj Dates: 1978-79

PI Name: Douglas Y Shapiro

PI Field: Fish behavior, ecology

US Agencies: National Institute of Mental Health

US Insts:

For. Agencies:

For. Insts: Silliman University (Philippines)

Proj. Description: A 3-month field study investigated the way in which the organizational structure of fish social groups influence female-to-male sex reversal in a species of hermaphroditic fish.

Assessment: Satisfactory; spend more time in the field.

Proj#: 01588 Inst: Univ of Puerto Rico

Proj Title: Training program in practical aquaculture

For. Locat: Belgium
Haiti

Funding: Univ of Puerto Rico

Keywords: fisheries
aquaculture
educational

Proj Dates: 1984

PI Name: Andrew S McGinty

PI Field: Aquaculture

US Agencies:

US Insts:

For. Agencies:

For. Insts: PROTOS (Gent, Belgium)

Proj. Description: Provide training to Belgium volunteers for
fish culture project in Haiti.

Assessment:

Proj#: 015C

Inst: Univ of Puerto Rico

Proj Title: Counselling Universidad Autonoma de Santo Domingo
on marine science programs

For. Locat: Dominican Republic

Fundings: Univ of Puerto Rico

Keywords: cooperative marine programs

Proj Dates: 1979

PI Name: Luis R Almodovar

PI Field: Marine Biology

US Agencies:

US Insts:

For. Agencies:

For. Insts: Universidad Autonoma de Santo Domingo

Proj. Description: To plan work on the mangroves of the Dominican
Republic, with focus on algae.

Assessment: Satisfactory; learn Spanish fluently

Proj#: 015CC Inst: Univ of Puerto Rico

Proj Title: Peace Corps small-scale marine fisheries extension training program

For. Locat: U.S. location

Funding: Peace Corps

Keywords: fisheries
educational

Proj Dates: ongoing

PI Name: John M Kubaryk

PI Field: Aquaculture

US Agencies: Peace Corps

US Insts: Univ. of Rhode Island

For. Agencies:

For. Insts:

Proj. Description: Provide training to Peace Corps trainees in the area of marine fisheries so that they can work in a third world country as marine extension agents.

Assessment: Volunteers trained in this program now serving in Sierra Leone, Tunisia, Morocco, Turks & Caicos Island, Dominican Republic, Antigua, Barbados.

Proj#: 0150 Inst: Univ of Puerto Rico

Proj Title: Assessment of pollution problems attributed
to the Caroni Ltd Factory and Distillery
(Trinidad-Tobago)

For. Locat: Trinidad-Tobago

Funding: United Nations

Keywords: pollution

Proj Dates: 1982

PI Name: Juan G Gonzalez

PI Field: Biological oceanography

US Agencies:

US Insts:

For. Agencies: United Nations
Institute of Marine Affairs (Trinidad)

For. Insts:

Proj. Description: The U.N. requested PI's advice regarding the concern of local residents (Trinidad) about the effluents of a sugar factory and a rum distillery discharging their waste in rivers which eventually flow into the Gulf of Paria, a notably rich area between Trinidad and Venezuela. After a thorough evaluation of the situation, recommendations were issued to help mitigate the problem. Besides the high organic effluents, other sources of contamination were found as well as poor management practices at the beach front in the mangrove forests.

Assessment: Do not know if recommendations were implemented; spend more time conducting actual research

Proj#: 01500 Inst: Univ of Puerto Rico

Proj Title: Fish preservation in tropical countries
lacking widespread refrigeration facilities

For. Locat: Mexico

Funding: Sea Grant-Puerto Rico
Sea Grant-New York

Keywords: fisheries

Proj Dates: 1984

PI Name: John M Kubaryk/ Robert Zall

PI Field: Aquaculture/ Food Processing

US Agencies: Sea Grant-Puerto Rico
Sea Grant-New York

US Insts: Cornell University

For. Agencies:

For. Insts:

Proj. Description: Determine methods of fish preservation that can be applied to tropical countries that cannot or do not have wide scale use of refrigeration-freezing facilities.

Assessment:

Proj#: 015E

Inst: Univ of Puerto Rico

Proj Title: Study of the red tide problem in northwestern
Spanish estuaries

For. Locat: Spain

Funding: National Science Foundation (proposal pending)

Keywords: fisheries
red tide

Proj Dates: 1985-86

PI Name: Juan G Gonzalez

PI Fields: Biological oceanography

US Agencies: National Science Foundation

US Insts:

For. Agencies:

For. Insts: Spanish Institute of Oceanography

Proj. Description: Red tides cause extensive damage to mussel beds
in the Northwestern Spanish estuaries. The actual
damage is loss of revenue because of their
toxicity. The proposed study has to do with the
assessment of the causes of red tides and how to
control them.

Assessment:

Proj#: 015EE Inst: Univ of Puerto Rico

Proj Title: Aquaculture program development
for Dominican Republic

For. Locat: Dominican Republic

Funding: US-AID

Keywords: fisheries
aquaculture

Proj Dates: 1984-ongoing

PI Name: John M Kubaryk/ Francisco X Geraldes

PI Field: Aquaculture/ Aquaculture

US Agencies: US-AID

US Insts:

For. Agencies: Museo Nacional de Historia Natural

For. Insts: Universidad Autonoma de Santo Domingo (CIBIMA)

Proj. Description: Provide research facilities that are not available in the Dominican Republic to help in their development of an aquaculture industry based on local feedstuffs for tilapia, carp, and macrobrachium.

Assessment:

Proj#: 015F Inst: Univ of Puerto Rico

Proj Title: Technology transfer: laboratory hatchery culture of queen conch, *Strombus gigas*

For. Locat: Mexico

Funding: Mexican regional government

Keywords: fisheries
aquaculture
technology transfer

Proj Dates: 1982-83

PI Name: David L Ballantine/ Richard Appeldoorn

PI Field: Marine Botany/ Fisheries Biology

US Agencies:

US Insts:

For. Agencies: State government of Quintana Roo (Mexico)

For. Insts: PESCA

Proj. Description: Set up culture facilities for larval rearing in Mexico; train Mexican laboratory personnel both in Mexico and Puerto Rico to perform tasks utilized in culturing larvae and algae; design protocol for culturing; trouble-shooting.

Assessment: Lack of communication with Mexico; PI's have no direct knowledge of how project has advanced since their involvement.

Proj#: 0156 Inst: Univ of Puerto Rico

Proj Title: Celebration of the 20th Anniversary of the
Centro de Investigaciones en Biología Marina,
Universidad Autónoma de Santo Domingo

For. Locat: Dominican Republic

Funding: Univ of Puerto Rico
PI Personal funds

Keywords: educational

Proj Dates: 1983

PI Name: Luis R Almodovar

PI Field: Marine Botany

US Agencies:

US Insts:

For. Agencies:

For. Insts: Centro de Investigaciones en Biología Marina
Universidad Autónoma de Santo Domingo

Proj. Description: Represented the Director of the Dept. of Marine
Sciences (Univ of Puerto Rico) on the activities
pertinent to the celebration of the 20th anniversary
of Centro de Investigaciones, Universidad
Autónoma de Santo Domingo; advised concerning the
aquaculture program and possible MS degree.

Assessment: Learn Spanish fluently

Proj#: 01SH Inst: Univ of Puerto Rico

Proj Title: Special Lecturer for Academy of Sciences,
Dominican Republic

For. Locat: Dominican Republic

Funding: Univ of Puerto Rico
PI Personal funds

Keywords: educational

Proj Dates: 1983

PI Name: Luis R Almodovar

PI Field: Marine Botany

US Agencies:

US Insts:

For. Agencies:

For. Insts: Academia de Ciencias de la Republica Dominicana

Proj. Description: Delivered the main speech on the first meeting
of the Academy, titled "Uses of Marine Algae."

Assessment: Learn Spanish fluently

Proj#: 0151 Insts: Univ of Puerto Rico
Proj Title: Fish stock assessment in coral reef habitats

For. Locat: Philippines

Funding: US-AID Collaborative Research Support Program
(Proposal pending)

Keywords: fisheries
 habitat
 coral reefs

Proj Dates: 1976-79

PI Name: Richard S Appeldoorn

PI Field: Fisheries Biology

US Agencies: US-AID/BIFAD

US Insts: University of Rhode Island University of Maine
 Univ Southern Illinois Texas A & M Univ of Maryland

For. Agencies:

For. Insts: Marine Sciences Center, Univ of Philippines

Proj. Description: Development of assessment methodologies for fish stocks located in coral reef and other hard bottom habitats, with emphasis on visual census and trapping techniques.

Assessment:

Proj#: 015J Inst: Univ of Puerto Rico

Proj Title: Commercial potential and biological basis
of a shallow-water grouper fishery in the Red Sea

For. Locat: Israel
Egypt
Red Sea

Funding: US-AID Trilateral US-Egypt-Israel Program

Keywords: fisheries

Proj Dates: 1986-89 (proposed)

PI Name: Douglas Y Shapiro/ Richard S Appeldoorn/ Dannie A Hensley

PI Field: Fish behavior/ Fisheries biology/ Ichthyology

US Agencies: US-AID

US Insts: New Jersey Marine Science Consortium

For. Agencies: Institute of Oceanography and Fisheries (Egypt)

For. Insts: Hebrew Univ (Israel)
Univ of Ain Shams (Egypt)

Proj. Description: Analysis of the grouper populations of the Red
Sea, with emphasis on population structure,
commercial potential and stock assessment.

Assessment: Support for program within Egyptian agency not very
strong; project suspended for an interim following
Israeli occupation of Lebanon. Communication with
contacts in Egypt was difficult, either by phone, telex,
or mail.

Proj#; 015K Inst: Univ of Puerto Rico

Proj Title: Site visit to Acuacultura, S.A. (Costa Rica)

For. Locat: Costa Rica

Funding: Univ of Puerto Rico

Keywords: fisheries
aquaculture

Proj Dates: 1980

PI Name: Dallas E Alston

PI Field: Aquaculture

US Agencies:

US Insts:

For. Agencies:

For. Insts: Acuacultura SA (Liberia, Costa Rica)

Proj. Description: Visit to Macrobrachium farm in Liberia, Costa Rica.

Assessment: Mutual exchange of information resulted in research program developed at Univ of Puerto Rico to solve some technical problems in the industry.

Proj#: 015L Inst: Univ of Puerto Rico

Proj Title: Establishment of Caribbean Aquaculture Association

For. Locat: Caribbean

Funding: Dues from members

Keywords: fisheries
aquaculture

Proj Dates: 1982-ongoing

PI Name: Dallas E Alston/ Andrew S McGinty

PI Field: Aquaculture/ Aquaculture

US Agencies: US AID

US Insts:

For. Agencies: various, represented by members of CAA

For. Insts: Caribbean Food Crop Society
and others as represented by members of CAA

Proj. Description: The Caribbean Aquaculture Association was begun by Drs. Alston and McGinty. The Association was formed to foster common interests in aquaculture and mariculture in the Caribbean and to develop communication among aquaculturists.

Assessment: Lines of communication developed between members with the Univ. of Puerto Rico becoming center of aquaculture in the Caribbean; seeking to expand membership, and distribution of information through CAA newsletter.

Proj#: 015M Inst: Univ of Puerto Rico

Proj Title: Informal aquaculture training and technical assistance for persons from Latin America and Africa

For. Locat: U.S. location

Funding: Univ of Puerto Rico

Keywords: fisheries
aquaculture
educational
technology transfer

Proj Dates: 1981-85

PI Name: Dallas E Alston

PI Field: Aquaculture

US Agencies:

US Insts:

For. Agencies:

For. Insts:

Proj. Description: Many persons have requested informal training at the Dept of Marine Sciences (Univ of Puerto Rico-Mayaguez) to work with our aquaculture operations, to gain hands-on experience or simply to ask us for technical information.

Assessment: Participants from South Africa, Venezuela, Dominican Republic, Suriname, Grenada, Mexico and Haiti; meeting requests for information and technical assistance; ongoing.

Proj#: 015N Inst: Univ of Puerto Rico

Proj Title: Short course in Macrobrachium culture

For. Locat: U.S. location

Funding: Organization of American States--Washington, D.C.

Keywords: fisheries
aquaculture
educational

Proj Dates: 1984

PI Name: Dallas E Alston/ Andrew S McGinty

PI Field: Aquaculture/ Aquaculture

US Agencies:

US Insts:

For. Agencies: Organization of American States
Institut de Development Agricole et Industriel
(Grenada)

For. Insts: Grenada Teachers College

Proj. Description: Short course to offer participants a hands-on approach for the culture of Macrobrachium rosenbergii, with special emphasis on clear water techniques.

Assessment: Technical training in aquaculture--quite successful; resulted in PI visiting Grenada to make site selections for aquaculture.

Proj#: 0150 Inst: Univ of Puerto Rico

Proj Title: Site visits to evaluate areas for Macrobrachium culture in Grenada

For. Locat: Grenada

Funding: Organization of American States

Keywords: fisheries
aquaculture

Proj Dates: 1984

PI Name: Dallas E Alston

PI Field: Aquaculture

US Agencies:

US Insts:

For. Agencies: Ministry of Agriculture (Grenada)
DAS-General Secretariat, Dept. of Scientific Affairs
DAS-Aquaculture Coordinator (Grenada)

For. Insts: Caribbean Agro Industries (Grenada)

Proj. Description: Evaluate three areas as potential sites for Macrobrachium culture and to advise pond construction and selection of feed formulation materials, utilizing local raw materials.

Assessment: PI assisted in general overall plan for aquaculture development in Grenada.

Proj#: 015P Inst: Univ of Puerto Rico

Proj Title: Workshop on current trends in tropical aquaculture

For. Locat: U.S. location

Funding: US-AID Title XII

Keywords: fisheries
aquaculture
educational

Proj Dates: 1984

PI Name: Dallas E Alston/ John Kybaryk/ Andrew S. McGinty

PI Field: Aquaculture/ Aquaculture/ Aquaculture

US Agencies: US-AID
U.S. Embassy (Kingston, Jamaica)

US Insts: College of the Virgin Islands
Agricultural Enterprises Co. (Puerto Rico)

For. Agencies: Dept. of Fisheries Resources (Dominican Republic)

For. Insts: Maricultura (Netherlands Antilles)
Rhodes Univ. Dept. of Fisheries Science (South Africa)
Inland Fisheries (St. Catherine, Jamaica)

Proj. Description: Workshop with informal discussion format allowing participants to present their current views and research findings in tropical aquaculture.

Assessment: Participants from Puerto Rico, Virgin Islands, Netherlands Antilles, U.S., South Africa, Dominican Republic, Jamaica, Quebradillas. Valuable transfer of information among aquaculture scientists in the Caribbean.

Proj#: 0150 Inst: Univ of Puerto Rico

Proj Title: Aquaculture Workshop--1981

For. Locat: U.S. location

Funding: US-AID Title XII

Keywords: fisheries
 aquaculture
 educational

Proj Dates: 1981

PI Name: Dallas E Alston/ John Kubaryk

PI Field: Aquaculture/ Aquaculture

US Agencies: US AID

US Insts:

For. Agencies: participants from seven Caribbean areas

For. Insts:

Proj. Description: Aquaculture workshop, 1981, to cover basic
 techniques in aquaculture.

Assessment: Groundbreaking workshop for successive aquaculture
 meetings and projects. Aquaculture newsletter for
 Caribbean region evolved from this workshop (PESCA-
 Program of Caribbean Studies in Aquaculture).

Proj#: 015R Inst: Univ of Puerto Rico

Proj Title: Participant at seminar "The Potential for an Aquaculture Industry in Trinidad and Tobago"

For. Locat: Trinidad Tobago

Funding: Institute of Marine Affairs (Trinidad and Tobago)

Keywords: fisheries
aquaculture

Proj Dates: 1981

PI Name: Dallas E Alston

PI Field: Aquaculture

US Agencies:

US Insts:

For. Agencies: Ministry of Agriculture, Lands and Food Production
(Trinidad)

For. Insts: Zoology Dept. of Univ. of West Indies (St. Augustine)
Institute of Marine Affairs (Trinidad and Tobago)

Proj. Description: Contributor to seminar which examined the aquaculture potential of Trinidad and Tobago, with special reference to other projects in the Caribbean.

Assessment: Resources of Trinidad-Tobago evaluated for aquaculture, and foundation formed for future aquaculture work. Tours of the island by panelists before evaluation would have been more helpful.

Proj#: 0155 Inst: Univ of Puerto Rico

Proj Title: Strengthening aquaculture aid for less developed countries

For. Locat: Dominican Republic

Funding: US-AID Title XII
Univ of Puerto Rico

Keywords: fisheries
aquaculture
technology transfer

Proj Dates: 1982-84

PI Name: Ricardo C Cortes

PI Field: Aquaculture

US Agencies: US AID: Agriculture Development Office and
US AID Mission in Dominican Republic

US Insts:

For. Agencies: Department of Fisheries Resources
Agriculture Dept. of Dominican Republic

For. Insts:

Proj. Description: Technical assistance in aquaculture
to Fisheries Resource Division of
Agriculture Dept (Dominican Republic)

Assessment: Know Spanish and cultural background of Dominican people.

Proj#: 015T Inst: Univ of Puerto Rico

Proj Title: Revision of volume on "Sea Fishes of Southern Africa"

For. Locat: U.S. Location

Funding: J.L.B. Smith Institute of Ichthyology (South Africa)

Keywords: fisheries

Proj Dates: 1978-1985

PI Name: Phillip C Heemstra/ Margaret M. Smith

PI Field: Ichthyology/ Ichthyology

US Agencies:

US Insts:

For. Agencies:

For. Insts: Rhodes University (Grahamstown, South Africa)
J.L.B. Smith Institute of Ichthyology (Grahamstown, SA)

Proj. Description: Producing volumes on marine fishes of Southern Africa. This is a complete rewriting of J.L.B. Smith's "The Sea Fishes of Southern Africa."

Assessment:

Proj#: 0150 Inst: Univ of Puerto Rico

Proj Title: Catalog of sinistral flounders for FAO Project: Survey
and identification of world marine fish resources

For. Locat: Italy

Funding: UN Food and Agriculture Organization

Keywords: fisheries

Proj Dates: 1981-85

PI Name: D.A. Hensley

PI Field: Ichthyology

US Agencies:

US Insts:

For. Agencies: UN FAO

For. Insts:

Proj. Description: Preparing an FAO species catalog of the sinistral,
flounders of the world.

Assessment:

Proj#: 015U

Inst: Univ of Puerto Rico

Proj Title: Symposium on ontogeny and systematics of fishes

For. Locat: U.S. location

Funding: National Marine Fisheries Service (NMFS)-NOAA

Keywords: fisheries

Proj Dates: 1981-83

PI Name: H.G. Moser

PI Field: Ichthyologist

US Agencies: National Marine Fisheries Service of NOAA
National Science Foundation

US Insts: Univ of Miami
National Geographic Society
Los Angeles County Museum of Natural History

For. Agencies:

For. Insts: Hokkaido University (Japan)

- Proj. Description: Assemble ichthyologists from all over the world working on fish eggs and larvae. Produce a volume on ontogeny and systematics of fishes.

Assessment:

Proj#: 015W Inst: Univ of Puerto Rico
Proj Title: Jefindofish Project--trawling survey
 in Southern Indonesia for FAO

For. Locat: Bali

Funding: UN Food and Agriculture Organization (FAO)

Keywords: fisheries

Proj Dates: 1984-5

PI Name: Thomas Glocerfelt-Tarp

PI Field: Ichthyology

US Agencies:

US Insts:

For. Agencies: FAO

For. Insts:

Proj. Description: Trawling survey in southern Indonesia; production
 of a field guide to trawled fishes of the region.

Assessment:

Proj#: 015X Inst: Univ of Puerto Rico

Proj Title: Symposium on systematics and evolution
of Indo-West Pacific Reef fisheries

For. Locat: Australia

Funding: National Science Foundation
Australian Museum

Keywords: fisheries

Proj Dates: 1982

PI Name: D.A. Hensley

PI Field: Ichthyology

US Agencies: National Science Foundation

US Insts:

For. Agencies:

For. Insts: Australian Museum (Sydney)
Lizard Island Research Laboratory (Queensland)

Proj. Description: Papers presented and discussions with foreign
ichthyologists.

Assessment:

Proj#: 015Y Inst: Univ of Puerto Rico

Proj Title: Museum visits collecting data on fish systematics

For. Locat: Austria East Germany England
France Sweden

Funding: Sigma Xi

Keywords: fisheries

Proj Dates: 1980

PI Name: D.A. Hensley

PI Field: Ichthyology

US Agencies:

US Insts: Sigma-Xi

For. Agencies:

For. Insts: British Museum of Natural History, Uppsala Universitet,
Naturhistoriska Riksmuseet (Stockholm), Museum National d'Histoire
Naturelle (Paris), Museum fur Naturkunde (E. Berlin), Naturhistor-
isches Museum (Vienna)

Proj. Description:

Assessment:

Proj#: 0152 Inst: Univ of Puerto Rico

Proj Title: Jamaica inland fisheries

For. Locat: Jamaica

Funding: PI Personal funds

Keywords: fisheries
aquaculture

Proj Dates: 1981

PI Name: Andrew S McGinty

PI Field: Aquaculture

US Agencies: US-AID

US Insts: Auburn Univ

For. Agencies: Ministry of Agriculture (Jamaica)

For. Insts:

Proj. Description: Exchange of information concerning the development of aquaculture in rural areas of Jamaica.

Assessment:

Proj#: 016A Inst: Texas A&M

Proj Title: Oceanographic programs development with Saudi Arabia

For. Locat: Saudi Arabia

Funding: Saudi Arabian government

Keywords: oceanography
educational

Proj Dates: 1979 and 1983

PI Name: Charles Giannonna

PI Field: Oceanography and Environmental Engineering

US Agencies:

US Insts:

For. Agencies:

For. Insts: University of Petroleum and Minerals, Research Institute

Proj. Description: Initiated a marine science capability at the
Research Institute of the University of Petroleum
and Minerals, Dhahran, Saudi Arabia.

Assessment: Accomplishments will only be noticeable years after
completion; suggest working part-time on such project,
understanding that productivity will be low; plan to
feel little sense of accomplishment over the period
of performance.

Proj#: 016B Inst: Texas A&M

Proj Title: Antarctic & Subantarctic phytoplankton;
relating occurrence of resting spores to krill
distribution

For. Locat: South Atlantic Ocean
Scotia Sea

Funding: National Science Foundation

Keywords: fisheries
Krill
Antarctica

Proj Dates: 1981-84

PI Name: Greta Fryxell

PI Field: Oceanography

US Agencies: National Science Foundation

US Insts:

For. Agencies:

For. Insts: Houlder Bros (Uruguay)
British Antarctic Survey

Proj. Description: To compare quantitative and qualitative analyses
of preserved phytoplankton samples from spring
and autumn cruises, especially in regard to
resting spore ecology and distribution patterns.
Emphasis was placed on relating occurrence of
resting spores to krill distribution.

Assessment: Logistics awkward for Antarctic research due to strained
British relations with Argentina during Falklands war.
Note on scheduling problems with funding agencies--
"arrangements with our funding agencies require planning
ahead several years in advance and obtaining firm
commitments from the cooperative country."

Proj#: 016C Inst: Texas A&M

Proj Title: Abyssal Boundary current studies

For. Locat: Argentina

Funding: National Science Foundation

Keywords: oceanography
currents

Proj Dates: 1985-88

PI Name: T. Whitworth/ W.D. Nowlin, Jr./ R. Dale Pillsbury

PI Field: Physical Oceanography/Physical Oceanography/ Oceanography

US Agencies: National Science Foundation

US Insts: Oregon State Univ

For. Agencies:

For. Insts: Instituto Antartico Argentino

Proj. Description: Investigation of the source waters and variability of the deep boundary current which supplies cold Antarctic waters to the South Atlantic Ocean. Hydrographic measurements and current meter arrays will be used to investigate the spreading paths of dense Weddell Sea Deep Water into the Argentine Basin. Yearlong direct measurements will be used to estimate the spatial and temporal variability and the volume transport of the current north of Falkland Plateau, and to investigate possible relationships between the observed variability and the overlying flow of the Antarctic Circumpolar Current.

Assessment:

Proj#: 0160 Inst: Texas A&M

Proj Title: Biological productivity of SE Mediterranean
in Post-High Dam (Aswan Period)

For. Locat: Egypt
 Israel

Funding: US AID

Keywords: fisheries
 bio-productivity

Proj Dates: 1980, 1984-86

PI Name: Sayed El-Sayed

PI Field: Biological Oceanography

US Agencies: US AID
 Sea Grant Program

US Insts: Bigelow Laboratory of Marine Science

For. Agencies: Egypt Academy of Science and Technology

For. Insts: Dept of Oceanography, Univ of Alexandria (Egypt)
 Institute of Limnology and Oceanography (Israel)

Proj. Description: To assess the existing levels of biological productivity in the nutrient-impoverished Southeastern Mediterranean and to determine the principal factors controlling the primary, secondary, and tertiary (fishes) productivity of these waters.

Assessment: Personnel from the Division of International Programs of NSF can be of substantial assistance in contributing to success of projects, if they can be involved. Equally, ONR can be of inestimable help if they would agree to fund ship-time to carry out oceanographic investigations in Southeastern Mediterranean.

Proj#: 016E Inst: Texas A&M

Proj Title: Behavioral physiology of marine turtles

For. Locat: Mexico
Grand Cayman
Australia

Funding: Sea Grant Program
NSF-US-Australia joint program and Psychobiology program
Sea Turtles Inc

Keywords: turtles

Proj Dates: 1979-ongoing

PI Name: David W Owens/ Max Amoss

PI Field: Behavioral endocrine physiology/ Endocrine physiology

US Agencies: U.S. Fish & Wildlife Service
National Park Service
National Marine Fisheries Service
National Science Foundation

US Insts: Univ of California/Berkeley
Univ of Arizona
Sea Turtles Inc

For. Agencies: Instituto National de Pesca (Mexico)
Secretaria de Pesca
Queensland National Park Service (Australia)

For. Insts: Cayman Turtle Farm

Proj. Description: Study of sea turtles is commonly an international task because turtles do not recognize political borders. This project deals with research on basic biology of sea turtles. We study their behavior, reproductive physiology and endocrinology for two reasons: 1) these species have several unique adaptations, thus understanding them is of fundamental interest to all of zoology; 2) they are quite valuable from an economic standpoint, thus any assistance to removing them from the endangered species list will be a service to mankind as well as to the turtles. We commonly work with co-investigators in other countries where we collect samples and do field work that simply cannot now be done in the U.S.

Assessment: Mexico is tricky now and it is often difficult to get permits; system in Mexico changes regularly; more difficult to work with their government than to work with collaborator at a Mexican university. Find someone who has done similar work recently at a Mexican university.

Proj#: 016F Inst: Texas A&M

Proj Title: Survey of coastal biotopes of Dubai
United Arab Emirates

For. Locat: United Arab Emirates

Funding: Dubai Petroleum Co.

Keywords: marine biology
coastal biotopes
sediments

Proj Dates: 1981

PI Name: Thomas J Bright/ Eric N Powell

PI Field: Benthic Ecology/ Benthic Ecology

US Agencies:

US Insts: CONOCO Inc. and subsidiary,
Dubai Petroleum Co.

For. Agencies:

For. Insts:

Proj. Description: A descriptive assessment was made of the coastal marine biotopes of Dubai. Biotic zonation, community structure and species composition of the various biotopes were depicted. Community health and condition were determined. Sediments and hydrocarbon levels in sediments and organisms were analyzed.

Assessment: Preliminary on-site planning session would be helpful before going into the field for sampling.

Proj#: 020A Inst: Old Dominion Univ (Virginia Graduate
 Marine Science Consortium)
Proj Title: Joint analysis of Monex Phase of Global
 Weather Experiment

For. Locat: Kenya

Funding: National Science Foundation--International Program

Keywords: oceanography
 weather

Proj Dates: 1981-82

PI Name: Donald R Johnson

PI Field: Physical Oceanography

US Agencies: National Science Foundation

US Insts: Univ of Miami

For. Agencies: Marine and Fisheries Research Institute (Kenya)
 Dept-of-Fisheries (Kenya)

For. Insts:

Proj. Description: Analysis of data collected off Kenya during
 the Monex phase of the Global Weather Experiment.

Assessment: Recommend involvement of NSF Intl. Program at earlier
 date, during collection of data so that foreign
 scientists could have better input.

Proj#: 024A Inst: Marine Sciences Research Center--
State Univ of NY/ Stony Brook
Proj Title: Effects of topographic and wind-reduced
upwelling on biological productivity off Chile

For. Locati Chile

Funding: National Science Foundation--International Program

Keywords: bio-productivity
upwelling

Proj Dates: 1985-86

PI Name: William T Peterson/ Robert E Wilson

PI Field: Biological Oceanography/ Physical Oceanography

US Agencies: NSF (International Program--Science in Developing Countries)

US Insts:

For Agencies:

For. Insts: Catholic Univ (Talcahuano, Chile)

Proj. Description: Long term goal of this project is to understand the ways in which physical and biological processes interact to maintain the Talcahuano (Chile) region as a major spawning center for sardines, jack mackerel and anchovies. We propose to study the effects of upwelling events on hydrography, biological productivity and plankton distribution, on a daily basis, for a three-week period in January 1986.

Assessment:

Proj#: 024B Inst: Marine Sciences Research Center--
State Univ of NY/ Stony Brook
Proj Title: Locations and temperatures of Pacific Salmon
in Western Lake Ontario

For, Locat: Canada

Funding: Ontario Ministry of Natural Resources
Ontario Charter Boat Association
St. Catherine Game and Fish Association

Keywords: fisheries
salmon

Proj Dates: 1984

PI Name: James M Haynes

PI Field: Fisheries and Ecology

US Agencies:

US Posts:

For Agencies: Ministry of Natural Resources (Ontario)

Eng. Insts: Ontario Charter Boat Association

Proj. Description: To determine the distribution, movements, and temperatures of coho and chinook salmon in spring and summer in Lake Ontario.

Assessment:

Proj#: 024C Inst: Marine Sciences Research Center--
State Univ of NY/ Stony Brook
Proj Title: Study of the nucleation of calcium carbonate
in natural waters

For, Locat: Spain

Funding: US-Spain Joint Committee for Science and Technology

Keywords: oceanography
chemistry
coastal erosion

Proj Dates: 1985-88

PI Name: Jesu Pena/ Peter K Weyl

PI Field: Chemistry/ Oceanography

US Agencies: U.S. State Dept.
(US-Spain Joint Committee for Science & Technology)

US Insti

For Agencies:

For. Insts: Univ of Las Palmas de Gran Canaria (Spain)

Proj. Description: The solubility behavior of carbonate materials in seawater is not well understood. Over large range in water composition, the surfaces of materials come to equilibrium with seawater. Conventional wisdom assumes the solution would come to equilibrium with the solid phase. Equilibration between carbonate materials and seawater is important since it controls erosion and deposition on many oceanic shores and alters the exchange of carbon dioxide between ocean and atmosphere. We propose a new approach by investigating the nucleation of carbonate phases in detail, in order to improve our knowledge of the molecular mechanisms at the solid-solution interface.

Assessment:

Proj#: 024D Inst: Marine Sciences Research Center--
State Univ of NY/ Stony Brook

Proj Title: Genetic and demographic assessment of *Strombus Gigas* and development of an in-shore hatchery and research facility in Belize

For, Locat: Belize

Funding: US-AID (Program in Science Technology Cooperation)

Keywords: fisheries
aquaculture

Proj Dates: 1985-86

PI Name: William Steiner (USDA)/ Winston Miller-(Belize)
(S.E. Siddall, consultant to project, at SUNY/Stony Brook)
PI Field: Genetics/ Fisheries

US Agencies: US AID Program in Science Technology Cooperation

US Insts:

For Agencies: Ministry of Fisheries (Belize)

For, Insts:

Proj. Description: To survey queen conch stocks off the coast of Belize, to determine genetic differentiation, uniqueness of populations. To develop a hatchery for production of juvenile conchs to be used in experimental reseeding studies.

Assessment: Project just beginning; communications with Belize are poor. Site visits critical for developing projects.

Proj#: 024E Inst: Marine Sciences Research Center
State Univ of NY/ Stony Brook
Proj Title: Case study of mariculture development in mangroves

For Locat: Philippines
Panama
Ecuador

Funding: US AID

Keywords: fisheries
aquaculture
mariculture
mangroves

Proj Dates: 1983-84 (initiated at RSMAS/Miami, completed at SUNY)

PI Name: S.E. Siddall

FI Field: Mariculture and larval biology

US Agencies: US AID

National Park Service (International Affairs Branch)

US Targets

For Agencies: BFAR (Philippines)
Department of Aquaculture (Panama)

For. Insts: Univ of Philippines
SEAFDEC (Philippines)
Silliman Univ (Philippines)
Univ of Panama
ACEBRA (Ecuador)

Proj. Description: To document environmental impact of the development of shrimp and fish ponds in mangroves; to document the socio-economic pressures promoting such development; to document attitudes toward improvement/change in culture practices.

Assessment: Satisfactory; would have liked more funding for analysis and write-up; advise further work in Ecuador and Panama where coastal development has yet to claim most of the intact mangroves.

Proj#: 024F Inst: Marine Sciences Research Center--
State Univ of NY/ Stony Brook
Proj Title: Training program in Queen Conch hatchery methods

For. Locat: Martinique

Funding: Martinique-ISTPM
Martinique-CNEXO

Keywords: fisheries
aquaculture
educational

Proj Dates: 1983 (initiated at RSMAS/Miami, completed at SUNY)

PI Name: S.E. Siddall

PI Field: Mariculture and larval biology

US Agencies:

US Insts:

For Agencies: ISTPM (Martinique)

For. Insts: AQUAMAR (Martinique)

Proj. Description: To train two aquaculture specialists in the methods for culturing larval, juvenile and adult queen conch, *Strombus gigas*.

Assessment: Satisfactory but expectations were not met due to change of trainees during the program, caused by AQUAMAR (industry participant). Understanding of French most useful. Recommend continued on-site training of Martinique personnel now that they have developed their own queen conch hatchery-nursery.

Proj#: 024G Inst: Marine Sciences Research Center--
State Univ of NY/ Stony Brook
Proj Title: Artificial propagation of the Queen Conch

For. Locat: Bahamas

Funding: Wallace Groves Aquaculture Foundation (Freeport)

Keywords: fisheries
aquaculture

Proj Dates: 1980-83 (initiated at RSMAS/Miami, completed at SUNY)

PI Name: E.S. Iversen/ S.E. Siddall

PI Field: Fishery biology and parasitology/ mariculture and larval biology

US Agencies:

US Insts:

For Agencies:

For. Insts: Wallace Groves Aquaculture Foundation

Proj. Description: To develop hatchery methods for the queen conch, *Strombus gigas*; to investigate juvenile and adult growth and survival for purposes of producing fishery product.

Assessment: Project very successful. Given the chance to repeat the project, we would shift emphasis from field grow-out studies in captive populations to experimental reseeding of extensive habitats.

Proj#: 024H Inst: Marine Sciences Research Center--
State Univ of NY/ Stony Brook
Proj Title: Mariculture and chemical extraction of
commercially valuable red seaweeds from Baja Calif

For, Locat: Mexico

Funding: Univ Autonoma de Baja California
CONACYT (Mexico) (Funding pending)
NSF (Funding planned)
Sea Grant (Funding planned)

Keywords: fisheries
aquaculture
mariculture

Proj Dates: 1985-89

PI Name: B.H. Brinkhuis / J.A. Zwartveld

PI Field: Biological Oceanography/ Seaweed Biology

US Agencies: Sea Grant Program
National Science Foundation--International Programs

U.S. Insts.

For Agencies: Mexico: CONACYT
Ministry of Fisheries
Ministry of Education

Fer. Insts: Univ Autonoma de Baja California

Proj. Description: This is a 5-year plan to develop mariculture of commercially valuable red seaweeds in Baja California waters. The first 3 years will be devoted to basic research on biology and physiology of two species. A laboratory and field effort will be conducted. Starting in year 4, pilot projects will be initiated at selected locations. Year 5 will be devoted to designing a "how to" manual for use by fishermen turned marine agronomists.

Assessment: Memorandum of understanding was set up between Stony Brook and Univ Autonoma de Baja California.

Proj# 025A Inst: Univ of California/ San Diego
Scripps Institution of Oceanography
Proj Title: Informational and educational assistance
to marine science institutions in Mexico

For. Locat: Mexico

Funding: Sea Grant (Intl. Cooperative Assistance Program)
Tinker Foundation MacArthur Foundation
People to People Program

Keywords: educational
cooperative marine programs

Proj Dates: 1979-83

PI Name: George T Hemingway / Richard A Schwartzlose

PI Field: Marine Ecology and / Geography and
Biological Oceanography Physical Oceanography

US Agencies: Southwest Fisheries Center (NOAA)
Sea Grant Program
California Dept of Fish and Game

US Insts: San Diego State Univ Univ of California/ Santa-Barbara
Tinker Foundation MacArthur Foundation
People to People Program

For. Agencies: Mexican Dept of Fisheries; Inst. Nacional de Pesca;
Permisos y Concesiones; Aquicultura; Secretaria de Relaciones
Exteriores; State of Baja California Fish & Game Dept; Univ Autonoma
de Baja California; Univ Auton. de Baja California Sur; Centro de
Investigaciones Cientificas y Educacion Superior de Ensenada, Univ
de Sonora, Centro de Investigacion Cientifica y Tecnologica de la
Universidad de Sinaloa, Mexican Navy Oceanographic Office & others.
For. Insts: over 100 contacts (see completed questionnaire for
full list)

Proj. Description: To forge strong ties between US and Mexican
marine scientists by seeking parity of research and teaching. Tools
for this parity-seeking included bibliographic assistance, building
of strong library holdings, joint teaching and joint research
activities facilitation, conferences, short courses, small technol-
ogy transfer and methodology transfer, as well as extensive at-sea
joint work.

Assessment: Caution on common misunderstanding of US institutional
structures by Mexicans whose institutions are more hierarchical and
authoritarian. Learn the language; learn institutional structures;
establish personal contact with "client units"; do not set prior-
ities within Mexican units who have every right to set their own.

Proj#: 0258 Inst: Univ of California/ San Diego
Scripps Institution of Oceanography
Proj Title: Scientific liaison, joint research planning, and
information exchange amongst Alta California, Baja
California, and Gulf of California Marine Scientists

For, Locat: Mexico

Funding: Sea Grant (Intl. Cooperative Assistance Program)
Tinker Foundation MacArthur Foundation
People to People Program

Keywords: cooperative marine programs
educational

Proj Dates: 1983-85

PJ Name: George T Hemingway / Richard A Schwartzlose

PI Field: Marine Ecology and / Geography and
Biological Oceanography Physical Oceanography

US Agencies: Southwest Fisheries Center (NOAA)

Sea Grant Program
California Dept. of Fish and Game

US Insts: San Diego State Univ
Univ of California/ Santa-Barbara
Tinker Foundation
MacArthur Foundation
People to People Program

For. Agencies: Mexican Dept of Fisheries; Inst. Nacional de Pesca; Permisos y Concesiones; Aquicultura; Secretaria de Relaciones Exteriores; State of Baja California Fish & Game Dept; Univ Autonoma de Baja California; Univ Auton. de Baja California Sur; Centro de Investigaciones Cientificas y educacion Superior de Ensenada, Univ de Sonora, Centro de Investigacion Cientifica y Tecnologica de la Universidad de Sinaloa, Mexican Navy Oceanographic Office & others
For. Insts: over 100 contacts (see completed questionnaire for full list)

Proj. Description: To forge strong ties between US and Mexican marine scientists by seeking parity of research and teaching. Tools for this parity-seeking included bibliographic assistance, building strong library holdings, joint teaching and joint research activities facilitation, conferences, short courses, small technology transfer and methodology transfer, as well as extensive at-sea joint work.

Assessment: Caution on common misunderstanding of US institutional structures by Mexicans whose institutions are more hierarchical and authoritarian. Learn the language; learn institutional structures; establish personal contact with "client units"; accept delays and temporary defeats with equanimity; accept changes in policy and priority with equal calm; do not set priorities within Mexican units who have every right to set their own.

Proj#: 026A

Inst: Univ of Delaware

Proj Title: DELBOUY wave powered seawater desalting
systems for Caribbean countries

For. Locat: Anguilla
Caribbean

Funding: US AID

Keywords: desalination
salinity

Proj Dates: 1981-82

PI Name: C.M. Pleass

PI Field: Ocean Engineering

US Agencies: US AID (LDC-Energy Program)

US Insts:

For. Agencies:

For. Insts:

Proj. Description: To support the first sea trials of a desalination system that uses wave action as its source of energy. A proven reverse osmosis technology would purify the water, at an affordable cost.

Assessment:

Proj#: 026B Inst: Univ of Delaware/College of Marine Studies

Proj Title: Experimental mariculture of bivalves
to improve the fisheries of Panama

For, Locat: Panama

Funding: Partners of the Americas

Keywords: fisheries
aquaculture
mariculture

Proj Dates: 1984-ongoing

PI Name: Janzel Villalaz (Panama)/

Consultants: Melbourne Carricker (Delaware)/ Luis D'Croz (Panama)

PI Fields: Malacologist / Ecologist / Ecologist

US Agencies:

US Insts: Smithsonian Tropical Research Institute (STRI)

For Agencies:

For Insts: Univ of Panama

Proj. Description: Establish an experimental bivalve larval hatchery at STRI on Naos Island, Panama, to raise appropriate algae for feeding the larvae, collect experimental samples of scallops and clams (commercial species), determine their spawning periods, spawn adults, raise the larvae to setting; in cooperation with artisanal shellfishermen plant seed in protected areas of Panama Bay, control predators, and catch scallop seed in traps in the field to supplement that grown in laboratory. Scallops once a thriving commercial population, now seriously declined; clams likewise declining.

Assessment: Satisfactory; results several years away; "remember this is the tropics and there are 'costumbres' that must be observed, and that progress does not necessarily move as rapidly there as in the U.S."

Proj#: 026C Inst: Univ of Delaware/College of Marine Studies

Proj Title: Workshop on taxonomy and ecology of
crustaceans and finfish of the Caribbean Sea

For. Locat: Colombia

Funding: National Science Foundation (proposal pending)
COLCIENCIAS-Colombia

Keywords: educational
fisheries

Proj Dates: 1985

PI Name: Hernando Sanchez (Colombia)/ Melbourne Carricker (Delaware)

PI Field: Natural Sciences/ Malacology and Estuarine Ecology

US Agencies: National Science Foundation

US Insts:

For. Agencies: COLCIENCIAS (Colombia)

For. Insts:

Proj. Description: Workshop on systematics and ecology of crustaceans and finfish of southern Caribbean. Overviews of research programs on these taxa, discussions, suggestions for future research. Promote interdisciplinary interaction, future collaboration and research. Participants drawn from both U.S. and Caribbean. Papers and summaries from workshop to be published.

Assessment:

Proj#: 0260 Inst: Univ of Delaware/College of Marine Studies

Proj Title: Fisheries related studies of mangrove loss in
Central America and study of La Plata River
and its interaction with the Ocean

For. Locat: Argentina
Costa Rica
Ecuador

Funding: Tinker Foundation
Government of Ecuador
Government of Argentina

Keywords: fisheries
mangroves

Proj Dates: 1981-85

PI Name: V. Klemas/ M. Hardisky

PI Field: Remote Sensing/ Marine Biology

US Agencies:

US Insts: Tinker Foundation

For. Agencies: CLIRSEN (Ecuador)
National Research Council (Argentina)

For. Insts: Univ of Costa Rica

Proj. Description: Assessment of mangrove losses due to shrimp pond
construction; development of remote sensing
techniques for mapping biomass and coastal
productivity; studies of coastal pollution and
fisheries production; studies of coastal currents
and sediment transport.

Assessment: Exceeded expectations after a slow start; plan for more
realistic schedules and make better use of local talent
and facilities. Make sure you have a reliable
co-investigator in the host country and check to insure
whether host scientist's plans have full support of his
government.

Proj#: 026E Inst: Univ of Delaware

Proj Title: Development of crops from halophytes

For. Locat: Egypt

Funding: US AID Title XII

Keywords: crops
 salinity

Proj Dates: 1981-ongoing

PI Name: J.L. Gallagher/ G.F. Somers

PI Field: Plant ecology/ Plant physiology

US Agencies: US AID

US Insts: American Univ in Cairo

For. Agencies:

For. Insts:

Proj. Description: Testing of halophytic crops developed through
 Sea Grant project under vigorous saline
 conditions in the Egyptian desert.

Assessment: Satisfactory; work is continuing; methods being updated.

Proj#: 026F Inst: Univ of Delaware/College of Marine Studies

Proj Title: Joint marine studies program between University
of Costa Rica and Univ of Delaware

For. Locat: Costa Rica

Funding: Sea Grant -International Cooperative Assistance Program
Organization of American States

Keywords: cooperative marine programs
educational

Proj Dates: 1978-83

PI Name: Charles E Epifanio/ Don Maurer

PI Field: Marine Biology/ Biological Oceanography

US Agencies: Sea Grant--International Cooperative Assistance Program

US Insts: Woods Hole Oceanographic Institution

For. Agencies: Organization of American States

For. Insts: Univ of Costa Rica

Proj. Description: Several Univ of Costa Rica students were trained at the MS level at Delaware and others were trained as marine technicians and boat operators. Research involved physical, chemical, and biological studies in the Gulf of Nicoya, investigating circulation of the gulf, seasonal nutrient cycles, faunal composition of benthos and benthopelagic region, community structure of fish populations, reproductive biology of several decapod crustaceans, population dynamics of tropical blue crabs, and seasonality of abundance of larval crustaceans. Various remote sensing projects were superimposed on all of these areas.

Assessment: Satisfactory project; PI would require more administrative responsibility from Costa Rican scientists. Work through only one main individual at one institution. Allow that person to deal with other agencies in the host country.

Proj#: 0260 Inst: Univ of Delaware/College of Marine Studies

Proj Title: U.S.-Argentina Workshop on Biodegradation

For. Locat: Argentina

Funding: National Science Foundation
Government of Argentina

Keywords: biodegradation

Proj Dates: 1985

PI Name: S.C. Dexter (Delaware)/ Hector Videla (Argentina)

PI Field: Materials Science/ Bioelectrochemistry

US Agencies: National Science Foundation--International Programs

US Insts: Naval Oceanographic Research & Development Authority
NSTL-MS

For. Agencies: CONICET (Argentina)

For. Insts: INIFTA (Argentina)

Proj. Description: Conference to focus on the basic science of the mechanisms by which microorganisms interact with corroding metal surfaces. This includes a review of the biological corrosion problem worldwide through a review of past research efforts and current case histories. Sessions to deal with experimental methods and remedial measures.

Assessment:

Proj#: 027A Inst: Louisiana State Univ

Proj Title: Racial studies and migrational patterns
of King Mackerel

For. Locat: Caribbean
Mexico

Funding: National Marine Fisheries Service (NOAA)
La. Department of Wildlife & Fisheries
Sea Grant
LSU Fisheries Initiative

Keywords: fisheries
migration
mackerel

Proj Dates: 1983-87

PI Name: G.W. Bane

PI Field: Fisheries Biology

US Agencies: Southeast Fisheries Center of
National Marine Fisheries Service

US Insts: La. Dept. of Wildlife & Fisheries
Gulf States Marine Fisheries Commission
Gulf of Mexico Fisheries Mgmt. Council
SEAMAP

For. Agencies: PESCA (Mexico)
Fisheries Dept. [CIP] (Cuba)

For. Insts: Univ of Havana

Proj. Description: High-pressure liquid chromatography, electro-
phoresis and size structure analyses of
King Mackerel

Assessment:

Proj#: 027B Inst: Louisiana State Univ
(Center for Wetlands Resources)
Proj Title: Case histories of coastal zone management
in Indonesia

For. Locat: Indonesia

Funding: US-AID

Keywords: coastal development/management
fisheries

Proj Dates: 1983-84

PI Name: R. Eugene Turner

PI Field: Ecology

US Agencies: US-AID

HPC Testbed

For Agencies: various (see report, "Coastal Fisheries, Agriculture and Management in Indonesia: Case Studies for the Future")

For. Insts: various (see report, cited above)

Proj. Description: Document and analyze two contrasting coastal management projects involving Indonesian fisheries, agriculture and national planning goals.

Assessment: Study the culture; arrive early before actual work begins.
Reflect, then measure; not measure, then reflect.

Proj#: 029A Inst: Woods Hole Oceanographic Institution
Marine Policy & Ocean Management Center
Proj Title: Diagnosis of marine resources development in Colombia

For, Located: Colombia

Funding: Donner Foundation
Sea Grant Program (Woods Hole)

Keywords: marine resources
resource development/management

Proj Dates: 1982-84

PI Name: Robert W Knecht/ Biliana Cicin-Sain
(both now at Univ. of Calif./Santa Barbara)

P1 Field: Marine Affairs/ Political Science

US Agencies: Sea Grant Program

US Insts: Penner Foundation

For Agencies: Navy's Maritime and Ports General Directorate (DIMAR)
Ports of Colombia (COLPUERTOS)
Colombian Commission on Oceanography (CCO)
National Planning Office (DNP)
and others

For. Insts: Institute for Geologic and Mineral Studies (INGEOMINAS)
Inst. for Development of Renewable Natural Resources (INDERENA)
Fund for Scientific Research and Special Projects (COLCIENCIAS)
Center for Economic Development Studies (CDE)
Marine Research Institute of Punta de Betín (INVEMAR)
Center for Oceanographic and Hydrographic Research (CIOH)
National Tourism Company (CNT) and others

Proj. Description: Analyzed current situation and potential for development of several ocean resource elements: ports and harbors; minerals and energy; fisheries and aquaculture; tourism; and coastal zone management.

Assessment: Needed more time in-country. Good dedicated people in the scientific organizations, but infighting within the policy-oriented groups.

Proj#:**029B** Inst:**Woods Hole Oceanographic Institution/
Marine Policy & Ocean Management Center**
Proj Title:**US-Jordan cooperative marine science
and policy program**

For. Locat:**Jordan
Gulf of Aqaba**

Funding:**US AID**

Keywords:**cooperative marine programs
marine policy**

Proj Dates:**1984-85**

PI Name:**David A Ross/ George Grice**

PI Field:**Marine Geology & Marine Policy / Marine Biology**

US Agencies:**US AID
Sea Grant Program**

US Insts:

For. Agencies:**Ministry of Planning (Jordan)**

For. Insts:**Marine Science Center (Aqaba)
Yarmouk University
Univ of Jordan**

Proj. Description:**Scientists from the Woods Hole Oceanographic
Institution propose to assist and work with
scientists and administrators of Jordan in
developing a cooperative marine science and
policy program for the Gulf of Aqaba.**

Assessment:**Project not yet complete; if repeated, "get it started
quicker" and "remember it is the Middle East."**

Proj#: 029C Inst: Woods Hole Oceanographic Institution
Marine Policy & Ocean Management Center
Proj Title: Coastal and Marine Resources Management for
the Galapagos Islands

For. Locat: Ecuador
Funding: Donner Foundation
 Tinker Foundation
 Pew Memorial Trust
 Government of Ecuador

Keywords: coastal development/management
cooperative marine programs
fisheries
marine resources
resource development/management
tourism

Proj Dates: 1983-1984

PI Name: James M. Broadus

PI Field: Economics

US Agencies: National Park Service

US Insts: Smithsonian Institution

For Agencies: High Level Commission for Formulation of a Galapagos Master Plan

Navy of Ecuador Naval Oceanographic Institute (INOCAR)
Merchant Marine & Coastal Authority (DIMERC)
Galapagos National Park (PNG)
National Galapagos Institute (INGALA)
National Fisheries Institute (INP)

For. Insts: Charles Darwin Research Station

Proj. Description: To examine coastal and marine resource uses and problems in Ecuador's Galapagos Islands (current status and possible avenues for improvement). Problems in the islands which can be addressed by a coastal zone management/marine resources management process include conservation of the islands' unique biota and habitats, tourism, port development, waste disposal, resource extraction, and fisheries. A two-zone management scheme for coastal and marine resources is outlined. Mechanisms for improved coordination are identified.

Assessment: A successful project which established a strong rapport with many Ecuadorian agencies and institutions. The possible creation of a special management area in Galapagos waters was discussed in the report that resulted from this project. Work continues between Woods Hole and the present Government of Ecuador on creation of a marine special management area, tourism control, and use of scientific and technical information.

Proj#: 029D Inst: Woods Hole Oceanographic Institution
Marine Policy & Ocean Management Center
Proj Title: Development of a marine resources management
scheme for the Galapagos Islands

For. Locat: Ecuador

Funding: Tinker Foundation
Pew Memorial Trust
Johnson Endowment
Government of Ecuador

Keywords: coastal development/management
cooperative marine programs
fisheries
marine resources
resource development/management
tourism

Proj Dates: 1984-86

PI Name: David A Ross/ James M Broadus

PI Field: Marine Geology & Marine Policy/ Economics

US Agencies: National Park Service
U.S. Dept. of State
U.S. AID
NOAA-Marine Sanctuaries Program

US Insts: Smithsonian Institution
World-Wildlife Fund-US
National Resources Defense Council
Environmental Defense Fund

For Agencies: High Level Commission for Formulation of a Galapagos Master Plan

Navy of Ecuador Naval Oceanographic Institute (INOCAR)
Merchant Marine & Coastal Authority (DIMERC)
Galapagos National Park (PNG)
National Galapagos Institute (INGALA)
National Fisheries Institute (INP)

National Fisheries Institute Eco-Insts: IN Equipment Programme

UN Environment Programme
Charles Darwin Research Station
Darwin Foundation
Fundación Natura

Proj. Description: Ongoing cooperative study with Government of Ecuador on the Galapagos Islands, with focus on: implementation strategies for coastal zone management, background studies on special marine area management (including comparative global experience with marine parks and the economics of marine reserves), environmentally sensitive approaches to tourism management, and the use of scientific and technical information in coastal management.

Assessment:

Proj#: 030A Inst: Skidaway Institute of Oceanography
 Savannah, Georgia
Proj Title: Trace element budgets of the Upper Gulf of
Thailand: River inputs

For. Locat: Thailand

Funding: National Science Foundation--International Program

Keywords: trace metals
 river inputs

Proj Dates: 1984

PI Name: H.L. Windom

PI Field: Geochemistry

US Agencies: National Science Foundation--International Program

US Insts:

For. Agencies:

For. Insts: Chulalongkorn Univ

Proj. Description: Trace metal inputs and distribution in
 Gulf of Thailand

Assessment:

Proj#: 030B Inst: Skidaway Institute of Oceanography
Savannah, Georgia
Proj Title: Cooperative research on environmental characteristics
and lower trophic level production in regional
upwelling in the sea (Japan)

For, Locat: Japan

Funding: National Science Foundation--International Program

Keywords: upwelling
bio-productivity

Proj Dates: 1986

PI Name: L.P. Atkinson

PI Field: Hydrography

ANS Insects

For Agencies

For Insts: Univ of Tsukuba (Japan)

Proj. Description: Comparative studies of nutrient enrichment and its effect on biological production at Western Boundary Current fronts (Kuroshiro and Gulf Stream).

Assessment:

Address Listing of Sea Grant Institutions

- * Alaska Sea Grant College Program
University of Alaska
590 University Ave., Suite 102
Fairbanks, AK 99701

- California Sea Grant College Program
Univ. of California
A-032
La Jolla, CA 92093
(Scripps Institution of Oceanography
La Jolla, CA 92093)

- Florida Sea Grant College Program
University of Florida
Building 803
Gainesville FL 32611

- Illinois/Indiana Sea Grant Program
University of Illinois
1206 South Fourth Street
Rm. 104, Huff Gym
Champaign, Illinois 61820

- Louisiana State Univ. Sea Grant College Program
Center for Wetland Resources
Baton Rouge, Louisiana 70803

- * MIT Sea Grant College Program
Building E38, Rm. 330
77 Massachusetts Ave.
Cambridge, MA 02139

- * Maryland Sea Grant College Program
University of Maryland
H.J. Patterson Hall, Rm. 1222
College Park, MD 20742

- ** Minnesota Sea Grant Program
University of Minnesota
116 Classroom Office Bldg.
1994 Buford Avenue
St. Paul, MN 55108

- * Mississippi-Alabama Sea Grant Consortium
Gulf Coast Research Laboratory
Caylor Bldg.
Ocean Springs, Mississippi 39564

(continued)

- * No appropriate projects for the inventory or information received too late to include in inventory

- ** No response to inventory questionnaire

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New Jersey Marine Sciences Consortium
Sea Grant Program
Building No. 22
Ft. Hancock, NJ 07732

Ohio Sea Grant Program
Ohio State University
484 West Twelfth Ave.
Columbus OH 43210

* Oregon State Univ. Sea Grant College Program
Adm. Bldg. A-320
Corvallis, Oregon 97331

South Carolina Sea Grant Consortium
221 Fort Johnson Rd.
Charleston SC 29412

State Univ. of New York/Cornell Sea Grant College Program
New York Sea Grant Institute
37 Elk Street
Albany NY 12246

Texas A&M Univ. Sea Grant College Program
College Station, TX 77843

* University of Connecticut Sea Grant Program
Avery Point
Groton, CT 06340

Univ. of Delaware Sea Grant College Program
College of Marine Studies
Newark, Delaware 19711

Univ. of Georgia Sea Grant College Program
Ecology Building
Athens, Georgia 30602
(Skidaway Inst. of Oceanography
P.O. Box 13687
Savannah, Georgia 31416)

** Univ. of Hawaii Sea Grant College Program
1000 Pope Road, Rm. 220
Honolulu, Hawaii 96822

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** No response to inventory questionnaire

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Orono, Maine 04469

Univ. of Michigan Sea Grant College Program
2200 Bonisteel Blvd.
Ann Arbor, Michigan 48109-2099

Univ. of New Hampshire Sea Grant College Program
Marine Program Building
Durham, New Hampshire 03824

** Univ. of North Carolina Sea Grant Program
North Carolina State Univ.
Box 8605
Raleigh, NC 27695-8605

Univ. of Puerto Rico Sea Grant Program
Dept. of Marine Science
Mayaguez, P.R. 00708

* Univ. of Rhode Island Sea Grant College
210B Woodward Hall
Kingston RI 02881

* Univ. of Southern California Sea Grant Program
Institut for Marine & Coastal Studies
University Park
Los Angeles, CA 90089-0341

Univ. of Washington Sea Grant College Program
HG-30
3716 Brooklyn Ave., N.E.
Seattle, Washington 98105-6795

** Univ. of Wisconsin Sea Grant Institute
1800 University Avenue
Madison, Wisconsin 53706

Virginia Sea Grant College Program
Univ. of Virginia
102 Monroe Hill Range
Charlottesville, VA 22903
(Old Dominion Univ.
Applied Marine Research Lab
Norfolk, VA 23508)

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** No response to inventory questionnaire

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La Jolla, CA 92093

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University Park
Los Angeles, CA 90089-0371

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Nova University
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Dania, FL 33304

NOAA EDIS Miami Library Center
4301 Rickenbacker Causeway
Miami, FL 33149

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Skidaway Institute of Oceanography
P.O. Box 13687
Savannah, GA 31416

Institute of Geophysics
University of Hawaii
Library Room 252
2525 Correa Road
Honolulu, HI 96822

Library
Chesapeake Bay Institute
4800 Arwell Road
Shady Side, MD 20876

MIT Libraries
Serial Journal Room 14E-210
Cambridge, MA 02139

Director, Ralph M. Parsons Laboratory
Room 48-311
MIT
Cambridge, MA 02139

Marine Resources Information Center
Bldg. E38-320
MIT
Cambridge, MA 02139

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Lamont-Doherty Geological Observatory
Columbia University
Palisades, NY 10964

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Serials Department
Oregon State University
Corvallis, OR 97331

Pell Marine Science Library
University of Rhode Island
Narragansett Bay Campus
Narragansett, RI 02882

Working Collection
Texas A&M University
Dept. of Oceanography
College Station, TX 77843

Library
Virginia Institute of Marine Science
Gloucester Point, VA 23062

Fisheries-Oceanography Library
151 Oceanography Teaching Bldg.
University of Washington
Seattle, WA 98195

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R.S.M.A.S.
University of Miami
4600 Rickenbacker Causeway
Miami, FL 33149

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